SCHOOL OF WATER AND WASTE

AAETI

THE POLICY & PRACTICE FORUM 2023

INCLUSIVE AND AFFORDABLE WATER AND SANITATION SOLUTIONS FOR A CLIMATE-RESILIENT WORLD: **WORKING TOWARDS A PARADIGM SHIFT IN THE GLOBAL SOUTH**

PARTNERS:

WATER RESEARCH COMMISSION

IWA the international water association

NFSSM Alliance

FSMA faecal sludge management alliance

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

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INTRODUCTION

The Policy and Practice Forum (earlier known as SFD Week) 2023 was organised by Centre for Science and Environment (CSE) in association with Water Research Commission (WRC), International Water Association (IWA), Faecal Sludge Management Alliance (FSMA), Deutsche Gesellschaft Fuer Internationale Zusammenarbeit GmbH (GIZ), National Faecal Sludge and Septage Management (NFSSM) Alliance and Columbia University (CU). The meet was hosted by the School of Water and Waste, CSE at the Centre's residential campus – the Anil Agarwal Environment Training Institute (AAETI) – on April 25–28, 2023. The theme of The Policy and Practice Forum 2023 was: "Inclusive and affordable water and sanitation solutions for a climate-resilient world: Working towards a paradigm shift in the global south".

We know today that water conservation is critical for a climate-risked age where rainfall will be even more variable and erratic. This requires investment in water conservation and flood mitigation measures so that habitations are more resilient; this in turn needs investment in waterbodies and green spaces so that rainwater is harvested and stored for dry periods, as well as in addressing storm-water drainage management. On the other hand, the sanitation challenge requires policies that advocate for the integration of household-level on-site systems with off-site systems and the collection and treatment of faecal sludge for reuse on land. Over the past few years, we have seen enormous innovations in policies and practices in our world that promote a paradigm shift in both water and wastewater management. There is an increased focus on non-sewered sanitation systems, local water supply systems through recharged groundwater aquifers, ponds, tanks and rainwater harvesting and the reuse of treated wastewater and biosolids. This paradigm shift is reducing the capital and resource intensity of the water supply and sanitation systems, which in turn works to increase access and sustainability. We are excited to see this change – not just in policy but also in practice. We believe it is an important time to learn from the experiences on the ground; to review the policies and technology choices and set the agenda going forward.

Attendees at the Policy and Practice Forum 2023 for a group photo at the Anil Agarwal Environmental Training Institute, Neemli. The meeting brought together some 120 policymakers, practitioners, researchers and academicians to deliberate on the current status of water and sanitation and to set the priorities for tomorrow.

TO THE FORUM

The Forum aimed to develop a paradigm change agenda that would be focussed on inclusive, sustainable and climate-resilient water and sanitation priorities in the Global South context. Attended by more than 120 participants, including 50 panellists and presenters consisting of 21 international participants majorly from Bangladesh, Nepal, South Africa and other countries of Global South. This event brought together international and national experts, policymakers, practitioners, academia, NGOs and researchers working on water, sanitation, used water issues and the challenges of climate change impacting the intensification of the water cycle. There were 10 sessions (including the inaugural and the concluding) spread over three days on themes related with current issues on sanitation and water, sectoral issues, challenges in terms of policies and practice.

This event drew experience of promotion of non-sewered sanitation systems from the last decade and also accounted the emerging challenges of rural–urban convergence, nutrient and used-water recycling, and the climate change resilience imperative for the framing of a Global South water-sensitive cities discourse. The Forum gave an opportunity to share the experience, policy and practice lessons from across the world and, more specifically, from Africa, Asia and India.

The Minister of Housing and Urban Development and several bureaucrats at the Centre and states unequivocally stated that sanitation services are a public good and it is the responsibility of the government to ensure that these are provided either free or at a low cost to the citizens and committing substantial funds for state-level sustainable sanitation. Policy environment for ensuring safe sanitation was also assured. The event was very successful in terms of building consensus on some of the key priority areas came out from various brainstorming discussions. The energy and enthusiasm of the participants was all level high during a well as after the sessions and the AAETI environment worked as a catalyst for all this.

THE POLICY & PRA

INTERNATIONA

Roshan Raj Shrestha
(Water, Sanitation & Hygiene), BMGF,
Seattle, US

Kartik Chandran
Columbia University,
New York, US

Eva Mary
Faecal Sludge Management Alliance (FSMA),
Rotterdam, Netherlands

Arne Panesar
GIZ, SuSanA
Germany

Alexandra Dubois
GIZ, SuSanA
Germany

Jennifer Molwantwa
Water Research Commission,
South Africa

Jay Bhagwan
Water Research Commission,
South Africa

ACTICE FORUM 2023

IAL SPEAKERS

Andy Peal
SuSanA,
United Kingdom

Abdullah Al-Muyeed
CWIS-FSM Support Cell,
Bangladesh

Hasin Jahan
WaterAid, Bangladesh

Peter Harvey
UNICEF,
Kathmandu, Nepal

Bhawana Sharma
ENPHO,
Nepal

Rajeev Munankami
SNV, Bangladesh

THE POLICY & PRA

NATIONAL S

Aveek De
eGov Foundation, Bengaluru

Krishna K.
Consortium for DEWATS Dissemination, Bengaluru

Vishwanath Srikantaiah
Biome Environmental Solutions, Bengaluru

Somnath Bandopadhyay
Ex. Prof. Nalanda University, Bihar

Arun Krishnamurthy
Environmentalist Foundation of India, Chennai

Ravi Joseph
The World Bank Delhi

Sanjay Singh
Population Services International, Delhi

Suraj Kumar
Innpact Solutions, Delhi

V.K. Madhavan
WaterAid, Delhi

Jagan Shah
Artha Global, Delhi

Avinash Yadhav
National Institute of Urban Management, Hyderabad

Pulkit Garg
Municipal Corporation, Jhansi

L.K. Atheeq
Department of Rural Development and Panchayati Raj, Government of Karnataka

Venkatesh Dutta
School of Earth and Environmental Sciences (SEES), BBAU, Lucknow, Uttar Pradesh

B.Parameswaran
Drinking Water and Sanitation, Panchayati Raj & Drinking Water Department, Government of Odisha

CENTRE FOR SCIENCE AND ENVIRONMENT

Sunita Narain
CSE, Delhi

Depinder Kapur
CSE, Delhi

Vinod Vijayan
CSE Environment Monitoring Laboratory, Rajasthan

Subrata Chakraborty
CSE, Lucknow

ACTICE FORUM 2023

SPEAKERS

Manushi Ashok Jain
Sponge Collaborative, Chennai

Roopa Mishra
SBM, MoHUA, Delhi

Hardeep Singh Puri
Ministry of Housing and Urban Affairs, Delhi

G. Asok Kumar
National Mission for Clean Ganga, Delhi

V.K. Chaurasia
CPHEEO, Ministry of Housing and Urban Affairs
Delhi

Manu Bhatnagar
INTACH, Delhi

Navindu Gupta
ICAR- The Indian Agricultural Research Institute, Delhi

Srikanth Mutnuri
BITS , Pilani, Goa

G. Mathi Vathanan
Housing and Urban Development, Govt. of Odisha

P.K. Mohapatra
Odisha Water Supply and Sewerage Board, Odisha

Himanshu Kulkarni
ACWADAM, Pune

Dhawal Patil
Ecosan Services Foundation, Pune

K.V. Santhosh Ragavan
IIHS, Tamil Nadu

Sushmita Sengupta
CSE, Delhi

Sumita Singhal
CSE, Delhi

Pavan Kumar
CSE, Delhi

Ravi Kumar
CSE, Delhi

THE SESSIONS	
DAY 1: APRIL 25, 2023	
SESSION 1: The Inaugural Session	
Presentation topic	**Presenter**
Transforming urban Odisha: Towards inclusive and affordable solutions for water and sanitation	**G. Mathi Vathanan** Principal Secretary, Housing and Urban Development Department, Government of Odisha
Our evolving sanitation journey: Why this paradigm shift to affordable and inclusive sanitation is needed? Where are we today? What are the new and old challenges for tomorrow? Our agenda together	**Sunita Narain** Director General, Centre for Science and Environment
SESSION 2: Keynote presentations: Scaling Up of Affordable and Sustainable Water and Waste Management	
Policies and practices for non-sewered sanitation	**Roshan Raj Shrestha** Deputy Director, Water, Sanitation & Hygiene, Bill & Melinda Gates Foundation
Changing cities from fishes to squirrels – What policies do we need?	**Arne Panesar** Head, SuSanA Secretariat, GIZ
FSMA: Informing policy into practice in FSM	**Eva Mary** Program Coordinator, Faecal Sludge Management Alliance (FSMA)
Scaling of affordable water and sanitation	**Jennifer Molwantwa** CEO, Water Research Commission, South Africa
Inclusive sanitation initiative for resilient and water-wise cities https://youtu.be/VdqF1N868dg	**Suresh Kumar Rohilla** Programme Lead, International Water Association
WASH in Asia: Status, challenges and solutions	**Peter Harvey** Regional Advisor WASH, UNICEF, Kathmandu, Nepal
SESSION 3: Global and National Experience in Water and Sanitation: Challenges and Lessons. What Works, Where and Why?	
A global journey on urban sanitation – looking back, looking ahead	**Arne Panesar** Head, SuSanA Secretariat, GIZ
Inclusive and climate-sensitive sanitation system planning	**Suraj Kumar** CEO, Innpact Solutions Private Limited
Using the Shit Flow Diagram to advocate and monitor inclusive sanitation in different parts of the world	**Andy Peal** Independent WASH Consultant, Member SuSanA
Achievements and future challenges of the CWIS approach in Bangladesh in terms of sustainability and inclusiveness	**Abdullah Al-Muyeed** Chief Operating Officer, Citywide Inclusive Sanitation-Faecal Sludge Management Support Cell, Bangladesh

Presentation topic	Presenter
Institutional set-up of WSAs and municipalities to promote FSM and other inclusive sanitation interventions	**Jay Bhagwan** Executive Manager, Water Research Commission presented on behalf of **Risimati Mathye** Department of Water and Sanitation – South Africa
SESSION 4: Enabling Policy and Regulatory Framework: Innovations in Governance	
Context setting	**Subrata Chakraborty** Senior Programme Manager, Water Programme, CSE
Policy to practice – Learnings from implementation of innovation	**K.V. Santhosh Ragavan** Senior Specialist, Indian Institute of Human Settlement
Enabling policy and regulatory framework: Innovations in governance	**Aveek De** Sanitation Mission Leader – E Gov Foundation
Policy drafting – National faecal sludge and septage management	**Ravi Joseph** Independent Consultant
WASH policy and regulation initiatives in Nepal	**Bhawana Sharma** Executive Director, Environment and Public Health Organisation, Nepal
DAY 2: APRIL 26, 2023	
SESSION 5: Faecal Sludge Treatment Systems: Planning, Technology, Performance, Economics and Operations	
Context setting	**Pavan Kumar** Programme Manager, Water Programme,CSE
Journey towards safely managed sanitation in non-sewered sanitation areas of Bangladesh	**Hasin Jahan** Country Director, WaterAid Bangladesh
Informed choice processes to support infrastructure investment decision-making	**Rajeev Munankami** Multi Country Programme Manager, Urban Sanitation, SNV
Faecal sludge treatment systems: Planning, technology, performance, economics and operations	**Krishna K.** Senior Project Manager, Consortium for DEWATS Dissemination, India
Case study of Odisha	**P.K. Mohapatra** Engineer in Chief, Odisha Water Supply and Sewerage Board
Informal sector engagement for sustainable FSSM	**Sanjay Singh** Director Programmes, Population Services International

SESSION 6: Resource Recovery for Circularity: Designing Treatment Systems and Standards for Nutrient Reuse and Recycling	
Presentation topic	**Presenter**
Context setting	**Sumita Singhal** Programme Manager, Water Programme, CSE
GIZ portfolio review on wastewater and faecal sludge reuse	**Arne Panesar** Head, SuSanA Secretariat, GIZ Presented on behalf of **Alexandra Dubois** SuSanA Secretariat
Going beyond technologies and standards	**Dhawal Patil** General Manager, Ecosan Services Foundation
Designing for circularity: The water , food , energy nexus in an era of climate change	**S. Vishwanath** Founder and Director, Biome Environmental Solutions
Rural and urban biodegradable waste – Challenges, opportunities and strategies for resource recovery	**Navindu Gupta** Principal Scientist, ICAR-The Indian Agricultural Research Institute
Quality evaluation of faecal sludge-based biosolids in India to ascertain their reuse and resource recovery potential	**Vinod Vijayan** Deputy Lab Head, EML& FSM Laboratory, AAETI, CSE
Resource recovery from septage	**Srikanth Mutnuri** Associate Professor, BITS Pilani (Goa Campus)
Circularity on used water management in smaller towns	**V.K. Chaurasia** Joint Advisor, CPHEEO, Ministry of Housing and Urban Affairs
SESSION 7: Rural–Urban Convergence on Used Water, Sludge and ODF++	
Context setting	**Sushmita Sengupta** Senior Programme Manager, Water Programme, CSE India
Clustering approach for FSM	**V.K. Madhavan** Chief Executive, WaterAid, India
ODF ++, Rural urban convergence on used water and sludge	**L.K. Atheeq** Additional Chief Secretary, Rural Development and Panchayat Raj Department, Government of Karnataka
Decision-making pointers for FSM clustering across the rural and urban continuum	**Avinash Y. Kumar** Practice Lead – Water, Sanitation and Environment, National Institute of Urban Management
Exploring urban–rural, rural–rural convergence in FSSM in Maharashtra	**Utkarsha Kavadi** Director, RCUES, AIILSG Mumbai and Maharashtra Urban WASH and ES Coalition

SESSION 8: Water and Treated Used Water Connection: The Opportunity for Augmented Water Conservation and Management	
Presentation topic	**Presenter**
Context setting	**Ravi Kumar** Deputy Programme Manager – Water Programme, CSE
Groundwater in the co-management of water and wastewater	**Himanshu Kulkarni** Founder, Advanced Center for Water Resource Development and Management, Pune
Faecal sludge and septage management (FSSM) in Jhansi (U.P.)	**Pulkit Garg** Municipal Commissioner, Jhansi
Water reuse challenges and how to overcome them?	**Venkatesh Dutta** Professor, School of Earth and Environmental Sciences, Babasaheb Bhimrao Ambedkar University, Lucknow
Lake restoration for groundwater recharge	**Arun Krishnamurthy** Founder, Environmentalist Foundation of India
DAY 3: APRIL 27, 2023	
SESSION 9: Climate Change and Resilience: Framing of Water-Sensitive and Water-Wise Cities in the Climate Change Context	
Climate change and resilience the framing of water-sensitive and water-wise cities in the climate change context	**Manu Bhatnagar** Principal Director, Natural Heritage Division, INTACH
Climate change and resilience: Framing of water-sensitive and water-wise cities in the climate change context	**Depinder Kapur** Director, Water Programme, CSE
Sanitation must be seen as a catalyst for climate action and sustainable development!	**Arne Panesar** Head, SuSanA secretariat, GIZ
Mainstreaming nature-based solutions in India's cities	**Manushi Ashok Jain** Co-founder, Sponge Collaborative, Chennai
National Drinking Water Grid – An enabler for climate-resilient water and sanitation?	**Somnath Bandyopadhyay** Independent consultant, Ex. Prof. Nalanda University
SESSION 10: Developing an Agenda for Change, Identifying Priorities and Collaborations	
Working Group 1: Non-sewered sanitation treatment systems and solutions	**Jay Bhagwan** Executive Manager, Water Research Commission
Working Group 2: How to scale up non-sewered sanitation systems	**Rohini Pradeep** CDD Society, Bangalore
Working Group 3: Way forward for an inclusive urban sanitation change agenda	**Vandana Menon** Independent consultant
Working Group 4: Treated bio-solids – standards and reuse	**Sahana Goswami** WRI, Delhi
Working Group 5: Rural–urban convergence for treated used water and sludge management	**B. Parmeswaran** Joint Secretary, DDWS, Government of Odisha

THE INAUGURAL SESSION

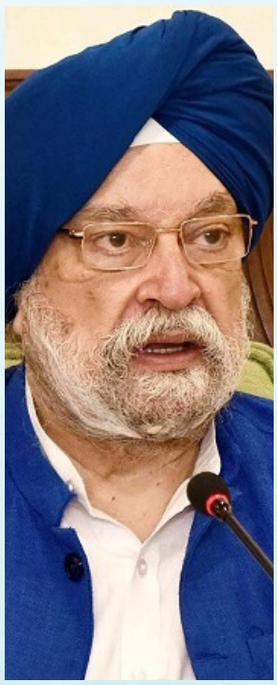
DAY 1: APRIL 25, 2023

CONTEXT SETTING AND MODERATOR

Sunita Narain,
Director General, CSE

SPEAKERS

Hardeep Singh Puri, Union Minister, Ministry of Housing and Urban Affairs and Ministry of Petroleum and Natural Gas



G. Mathi Vathanan,
Principal Secretary, Housing and Urban Development Department, Government of Odisha

G. Asok Kumar,
Director General, National Mission for Clean Ganga

Sunita Narain setting the context for the Forum

“These were not just conferences but community-building exercises to understand each other in terms of where we were in our journey for inclusive and affordable sanitation which is sustainable and use it back to do a lot more in practice and policy changes”

SUNITA NARAIN,
Director General, CSE

Sunita Narain, Director General, CSE, inaugurated the event with a brief background of what CSE has been successful in achieving so far. CSE’s work on *Excreta Matters* , a two-volume report on the status of water and wastewater in urban India. Published in 2012, at a timewhen cities had no idea about sewage and excreta, it is based on a detailed survey of 71 cities was noteworthy and stirred the dialogue about water and wastewater across India. Introduction of the Shit Flow Diagram (SFD) tool, with the help of GIZ, helped cities readily understand and communicate how excreta “flows” through a city or town through a graphical representation. SFDs opened up a complete new understanding about where cities are lacking in terms of wastewater and faecal sludge management practices and services.

CSE, in association with its partners, convened the first SFD Week in 2019. “A lot of progress has been made since then,” said Narain. This paradigm shift is reducing the capital and resource intensity of the water supply and sanitation systems, which in turn works to increase access and sustainability. Narain went on to say: “We are excited to see this change – not just in policy but also in practice.

Narain said: “We know that water conservation is critical for a climate-risked age where rainfall will be even more variable and erratic. This requires investment in water conservation and flood mitigation measures so that habitations are more resilient, as well as in waterbodies and green spaces so that rainwater can be harvested and stored for dry periods, and in addressing storm-water drainage management. On the other hand, the sanitation challenge requires policies that advocate for the integration of household-level on-site systems with off-site systems and the collection and treatment of faecal sludge for reuse on land.”

She added: “Over the past few years, we have seen enormous

Shri Hardeep Singh Puri addressing participants of the Policy and Practice Forum

innovations in policies and practices in our world that promote a paradigm shift in both water and wastewater management. There is an increased focus on non-sewered sanitation systems, local water supply systems through recharged groundwater aquifers, ponds, tanks and rainwater harvesting and the reuse of treated wastewater and biosolids."

This paradigm shift is reducing the capital and resource intensity of the water supply and sanitation systems, which in turn works to increase access and sustainability. Narain went on to say: "We are excited to see this change – not just in policy but also in practice. We believe it is an important time to learn from the experiences on the ground; to review the policies and technology choices and set the agenda going forward."

The keynote address was delivered virtually by Hardeep Singh Puri, Union Minister for Housing and Urban Affairs and Petroleum and Natural Gas, who appreciated CSE's initiative in putting together the Policy and Practice Forum. He emphasised on the need for such forums to discuss and disseminate best practices about inclusive and affordable water and sanitation management.

Puri pointed out that the water crisis in India was not due to the lack of water, but because of mismanagement of water resources. He commended the efforts of people and organisations like CSE which are not only mobilising intellectual opinion on this subject, but also taking the discourse to public policy actions. The government's flagship programmes like the Swachh Bharat Mission and AMRUT have played a transformational role in upgrading basic water and sanitation infrastructure in the country.

He said that these are exciting times in India for both policy and practice, but a lot still needs to be done. "Our cities are facing a new problem of inclusion and affordability every day with regard to water and sanitation infrastructure, which need deliberate consultation and practical solutions. The need to have combined approaches such as STPs, ETPs and decentralised wastewater treatment systems,

"As far as energy is concerned, we have a very well laid-out plan for green transition. But in the case of water, we don't have a choice. It is getting more precious and scarcer at an alarming level, and climate change is going to aggravate matters. While treaties might resolve political conflicts around water, they will not tackle the need to fundamentally alter the way we extract, consume and dispose of water, as well as the way we plan and manage sanitation systems"

Hardeep Singh Puri,
Union Minister, Ministry of Housing and Urban Affairs and Ministry of Petroleum and Natural Gas

Sunita Narain speaking about the need for knowledge exchange, learning from the ground and setting priorities

circular economy by increased reuse and recycle, decentralized management of water by participative approach of community ownership to manage water, digitally advanced tools and technologies," he said.

Speaking in the inaugural session, G. Mathi Vathanan, Principal Secretary, Housing and Urban Development Department and Chairman, Odisha Water Academy (OWA), Bhubaneswar, presented the unique successes of the Odisha model and the state's journey in water security and integrated sanitation management. Odisha has focused on a decentralised community-led approach which is affordable and inclusive.

G. Asok Kumar, Director General, National Mission for Clean Ganga (NMCG), gave a detailed overview of the initiatives taken by the Mission towards abatement of pollution in the river (see box). The NMCG, he stressed, has committed to the Sustainable Development Goals targets of equity in water distribution, access to safe drinking water and democratisation of water. Kumar also informed that Namami Gange had been recognised as among the

> **The good news is that water literacy has grown. Over the past decades, the country has learnt critical lessons on water management and has evolved a new paradigm. There is an interest in decentralised water management. But in spite of that it is clear that we are not doing enough to secure our future. The problem lies in the fact that our land and water bureaucracies are fractured. Water security requires this to change. Giving the local community much greater control over the water structures – deepening democracy and devolution of powers – is the answer"**
>
> **Sunita Narain,** Director General, CSE

"Top 10 World Restoration Flagship Initiatives to Revive the Natural World".

Reflecting on his journey as a water and sanitation administrator, Kumar spoke about his daysin the year 2000 in Nizamabad, at a time when water was low on priority for authorities. Over one lakh toilets were built during his tenure; a drinking water habitation committee was constituted, and in 2008, he had started a daily water supply scheme in Hyderabad.

In 2020 came the campaign of "Catch the rain where it falls, when it falls'" under which 47 lakh structures were built all over the country with people's participation – as a result, groundwater level went up significantly in many places. The campaign enabled creation of appropriate rainwater harvesting structures suitable to local climatic and soil conditions. Under it, waterbodies in cities were mapped so that decentralised storage of water could be done: a census revealed 16 lakh waterbodies.

"In 2019, with the formation of the Ministry of Jal Shakti as a single decision-making authority on water-related matters, coordination improved. Later, with the construction of 115 million toilets under Swachh Bharat Mission, the issue of sanitation has been addressed to a large extent to achieve the sustainable development goals of 2030... in another two years, most of the Ganga river and its tributaries would be clean"

G. Asok Kumar, Director General, National Mission for Clean Ganga

"Odisha has prioritised non-sewerage sanitation systems: the state has built 111 non-sewerage faecal sludge treatment plants. Citizens are being provided with 24x7 supply of good quality water and 100 per cent metered connectivity. Percentage of non-revenue water has been brought down from 50 to 15 per cent. Odisha has also recognised manual scavengers as 'highly skilled' and provided them with the due benefits"

G. Mathi Vathanan,
Principal Secretary, Housing and Urban Development Department, Government of Odisha

G. Asok Kumar on NMCG's gains

The numbers of dolphins in the Ganga have gone up from **300–350 to 3,000**

• Arth Ganga is an initiative under the National Mission for Clean Ganga (NMCG's) flagship programme Namami Gange. It espouses a sustainable and viable economic model to integrate people living in the Ganga basin with the river's rejuvenation. Under the Arth Ganga concept, six key verticals of intervention have been introduced – promotion of Zero Budget Natural Farming (ZBNF) in the Ganga basin; monetisation and reuse of treated wastewater and sludge; development of livelihood generation opportunities through activities like Ghat Mein Haat for sale of local products from cities and towns along the riverbank; encouragement to public participation through regular events such as Ganga Aartis, cleanliness drives, Ganga Guide Trainings, Yoga on Ghat, etc in coordination with District Ganga Committees (DGCs); promotion of cultural heritage and tourism by developing local tourism and cultural circuits; institution building through setting up decentralised monitoring and governance units such as District Ganga Committees; enhancement of capacities of DGCs and other local administration institutions for better water governance; and sustenance of the projects after handover of assets.

• Between 2014 and 2023, the NMCG has added 2,000 million litre per day (MLD) of treatment capacity. Sewage from drains is being intercepted and treated in sewage treatment plants (STPs). About 183 STPs have been sanctioned at a cost of almost Rs 30,000 crore. To attend to the 22-km most polluted stretch of the Yamuna in Delhi, 1,400 MLD treatment capacity would be added.

• NMCG has come out with a framework for safe use of treated wastewater.

• For locations where sewerage has not reached yet, Namami Gange is focussing on decentralised STPs with a less-than 1 MLD capacity. NMCG is also concentrating on reuse of treated water and sludge in a joint venture with the Railways, NMCG will be using treated wastewater for cleaning railway coaches. Also, 23 NTPC (National Therma Power Corporation) plants have signed an agreement with NMCG for reuse of treated wastewater.

• NMCG is also looking at multiple uses of treated wastewater for agricultural purposes.

• For reuse of treated sludge, NMCG has joined hands with organisations like Patanjali, IFFCO etc to utilise sludge as a soil conditioner.

• NMCG monitors the performance of STPs on a real-time basis – this monitoring will cover 175 STPs.

•The Mission has launched a 140-city River City Alliance (RCA), jointly with the Department of Water Resources, River Development and Ganga Rejuvenation under the Ministry of Jal Shakti and the Ministry of Housing and Urban Affairs. The vision is to connect river cities and focus on sustainable river-centric development. Beginning with 30 member cities in November 2021, the Alliance has expanded across India to cities beyond the Ganga basin.

Fish catch percentage has **increased** from **4 per cent to 10 per cent**


THE FULL MONTY
FISTFUL OF DOLLARS
LIVE AND LET DIE
MEN IN BLACK

SESSION 2
KEYNOTE PRESENTATIONS: SCALING UP OF AFFORDABLE AND SUSTAINABLE WATER AND WASTE MANAGEMENT

Day 1: April 25, 2023

CONTEXT SETTING AND MODERATOR

Subrata Chakraborty,
Senior Programme Manager, CSE

SPEAKERS

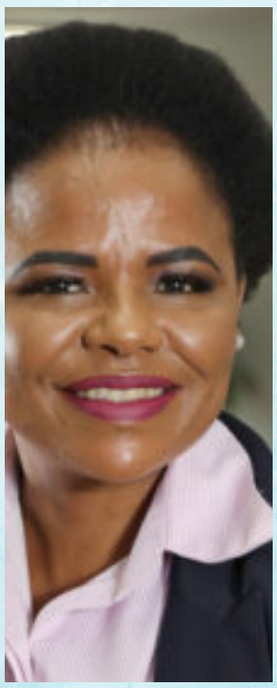
Roshan Raj Shrestha,
Deputy Director, Water, Sanitation and Hygiene, Bill & Melinda Gates Foundation

Arne Panesar,
Head, SuSanA Secretariat, GIZ

SPEAKERS

Eva Mary,
Programme Coordinator, Faecal Sludge Management Alliance (FSMA)

Suresh Kumar Rohilla,
Programme Lead, International Water Association



Jennifer Molwantwa,
CEO, Water Research Commission, South Africa

Peter Harvey,
Regional Advisor WASH, UNICEF

Roshan Raj Shreshtha spoke about the need for collaborative and sustainable innovations for sanitation solutions

> **There is an urgent need to develop the mechanisms for cross learning and best practices for the South Asia region to scale inclusive sanitation objectives"**
>
> **Roshan Raj Shrestha,** Deputy Director, Water, Sanitation & Hygiene

Roshan Raj Shrestha, Deputy Director, Water, Sanitation & Hygiene, Bill & Melinda Gates Foundation, said that as per current speed, by 2030 only 20 per cent coverage of sewers would be possible in South Asia. Mixed approaches – such as a mix of centralized and decentralised treatment systems – is needed. He gave the example of Lebanon, where most of the sewage networks were not connected to sewage treatment plants and all the treatment plants had been shut down due to economic collapse, resulting in a 200 per cent inflation rate in early 2023.

Last-mile connectivity of households to sewer lines is a near-consistent problem in developing countries such as India and Bangladesh. Planning of sewerage infrastructure projects is an important aspect that needs carefully examination. Sewered projects are mainly planned by big agencies such as the World Bank and Japan International Cooperation Agency (JICA), and no consideration is given to places that cannot be connected by sewers.

For sustainability of sanitation infrastructure, all the components of the sanitation value chain – including containment, emptying and transportation, and safe treatment – have to be examined. Innovative technologies for various components of the sanitation value chain, such as reinvented toilets and omni-processors, are also needed.

Regulatory associations on a regional scale, such as the Eastern and Southern Africa Water and Sanitation (ESAWAS) Regulators Association, are a good way to provide policy guidance to a group of countries with similar issues and challenges. India can also lead and formulate such as association for South Asian countries. The Global Sanitation Centre of Excellence (GSCOE) is a forum for collaborative and sustainable innovation, incubation, scaling manufacturing, skill development, training showcase and deployment of sanitation solutions.

> **Innovative technologies and policies can accelerate the process of circularity – rather than linearity – in urban regions and open new opportunities for circularity"**
>
> **Arne Panesar,** Head, SuSanA Secretariat

Arne Panesar, Head, SuSanA Secretariat, GIZ, emphasised on the need for circularity – rather than linearity – in urban regions. Innovative technologies and policies – such as Biochar, which can be a game changer, making the system carbon negative – can accelerate the process to open new opportunities for circularity, and need to be adopted. The transition from a linear to circular model may take long – it took Lusaka, Zambia, 30 years of institution building and sanitation policy reform.

In that context, the African Sanitation Policy Guidelines for all the countries in Africa is a good initiative, accelerating policy development for the entire continent. In India, the National Urban Sanitation Policy should have a long-term perspective and integration in the master plan to maximise benefits.

Apart from technological solutions, an enabling environment plays a key role in project cycles. Cities should use shit flow diagrams and city-service delivery assessment tools extensively for planning and execution of the projects.

Arne Panesar spoke about the need for circularity in his keynore address.

Eva Mary from the Faecal Sludge Management Alliance (FSMA) spoke about FSMA's vision and initiatives.

> **Faecal sludge management (FSM) standards need to focus on FSM quality and risk management"**
>
> **EVA MARY,**
> Programme Coordinator, Faecal Sludge Management Alliance (FSMA)

Eva Mary, Programme Coordinator, Faecal Sludge Management Alliance (FSMA), spoke about the theory of change based on the flywheel effect – small wins accumulating over time to create momentum towards a breakthrough. The newly developed "Genie" method, recently added as a continuous improvement mechanism, applies the principles of continuous improvement in ISO 9001 Quality Management System on the knowledge repository within the Toolbox by FSMA. It also enables the application of lessons from existing projects to new projects.

Jennifer Molwantwa,
CEO, Water Research Commission, South Africa

Jennifer Molwantwa, CEO, Water Research Commission, South Africa, emphasised the need to reduce the costs of new sanitation. She shared the South African sanitation landscape and challenges such as lack of enabling environment around complexities of politics and governance due to which – in spite of South Africa adopting many technical – no desired outcomes were achieved.

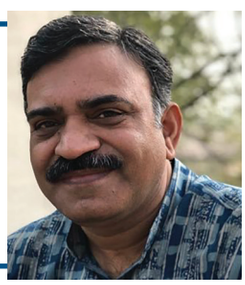
“Affordability drives acceptance. There is a need for the costs of new sanitation to be reduced”

Dr Rohilla provided a brief introduction to the International Water Association (IWA) and its work. He highlighted the importance of IWA as a global network of water professionals, researchers and practitioners dedicated to addressing water challenges and promoting sustainable water management practices worldwide. With over 70 years of heritage, IWA connects people in the water sector to help solve global, regional and local water challenges. It has developed strategic programmes and initiatives to address water security and lack of access to safe sanitation. These initiatives include digital water, water and sanitation services, cities of the future, and basins. IWA’s inclusive urban sanitation initiative aims to reshape the global agenda on urban sanitation by promoting inclusive, resilient, water-wise and sanitation-secure cities.

IWA emphasises the importance of integrating sanitation into the long-term goal of implementing integrated urban water management in cities. Its initiatives and campaigns aim to develop a shared vision and take collaborative action towards sustainable water management for resilient and livable cities.

“Far too many people in towns and cities around the world still lack access to safely managed sanitation. There is a need for an accelerated and inclusive approach to expanding safe service coverage”

Suresh Kumar Rohilla, Programme Lead, International Water Association



> **To achieve inclusivity, focus should be on regulated market-based approaches rather than standardised approaches. WASH services should be climate-resilient for potential impacts of extreme weather events and access to reliable water sources during extreme weather events. Robust management and service delivery models should cope with crisis and the impact of the system in terms of greenhouse emissions"**
>
> **Peter Harvey,** Regional Advisor WASH, UNICEF, Kathmandu

Peter Harvey Regional Advisor WASH, UNICEF, Kathmandu, Nepal, spoke about the status, challenges and key strategies to scale up water and sanitation in Asia. Access to piped water is still a major challenge in Asia, especially in rural areas, and ensuring water quality is the biggest hurdle in ensuring safely managed water services. A high proportion of the population relies on self-supply for both potable and non-potable needs. Increased attention is needed to reach the last mile with regard to basic water services, water safety as well as financing, regulation, innovation etc. and transition from point sources to piped-water supply.

He said that open defecation remains a challenge in Asian countries, and most of the population relies on on-site/non-sewered sanitation (latrines or septic tanks). Proper utilisation of sanitation infrastructure is needed to eliminate open defecation. He said that an inclusive approach to safely managed sanitation is needed, and that negative impacts on WASH infrastructure and services resulting from water stress and scarcity, climate-related disasters, pollution and long-term environmental degradation should be investigated. He ended the presentation by asking how the WASH sector can utilise climate finance more effectively to accelerate access to safely managed sanitation in urban areas.

Peter Harvey talking about WASH in Asia, its status, challenges and solutions

SESSION 3

GLOBAL AND NATIONAL EXPERIENCE IN WATER AND SANITATION: CHALLENGES AND LESSONS. WHAT WORKS, WHERE AND WHY?

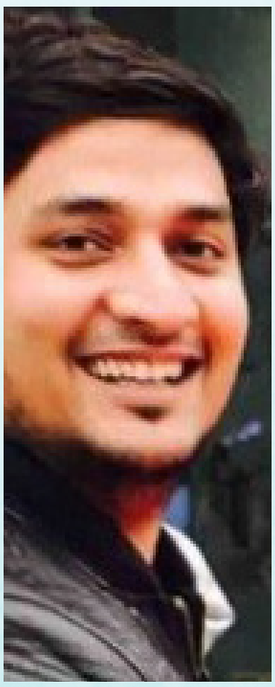
Day 1: April 25, 2023

CONTEXT SETTING AND MODERATOR

Arne Panesar,
Head, SuSanA
Secretariat, GIZ

SPEAKERS

Suraj Kumar,
CEO, Innpact
Solutions Private
Limited



SPEAKERS

Andy Peal,
Independent WASH Consultant, Member SuSanA

Abdullah Al-Muyeed,
Chief Operating Officer, Citywide Inclusive Sanitation – Faecal Sludge Management Support Cell, Bangladesh

Jay Bhagwan,
Executive Manager, Water Use and Waste Management, Water Research Commission

Arne Panesar talked about the SuSanA publication *A Sanitation Journey – Principles, Approaches, and Tools for Urban Sanitation,* and covered the evolution of urban sanitation in the Global South, perspectives from South Asia and Africa, sanitation approaches and tools, and potential of the publication and outlook. He said that reflection on the urban sanitation journey in South Asia shows a lack of focus on sanitation post-independence in various countries owing to institutional conflicts, Central and provincial/state funding, and prevalence of nature-based treatments and market-driven small-scale systems. In contrast, Sub-Saharan Africa had centralised institutional arrangements and institutional reforms undertaken to improve governance, monitoring and accountability. The publication helps in an understanding of the current position and future decisions on sanitation, with a clear and accessible format providing an introduction to sanitation for the people entering the sanitation sector.

Selection of what is suitable where is based on practical use, contribution to paradigm shifts in urban sanitation, and relevance to today's work in the sector. There is a need to test the tools and approaches in scaling-up processes and strengthen the appropriate institutions to steer these processes"

Arne Panesar,
Head, SuSanA Secretariat, GIZ

Suraj Kumar presented the work of Innpact Solutions across Bangladesh, India and Nepal

> **Solutions are not restricted to conventional systems and rural areas cannot duplicate urban systems"**
>
> **Suraj Kumar,** CEO, Innpact Solutions Private Limited

Suraj Kumar highlighted three key Citywide Inclusive Sanitation (CWIS) planning approaches from their experience in working across India, Bangladesh and Nepal: identifying true beneficiaries for containment improvement through geospatial approach; optimising system utilisation across the value chain, including transfer stations, public and community toilets; and introducing a new sanitation paradigm with reinvented toilets as an alternative to traditional systems. The key takeaways were that solutions are not restricted to conventional systems and rural areas cannot duplicate urban systems.

Andy Peal presented shit flow diagrams (SFDs) from a global perspective. SFDs – which started as an "idea" and is now an "approach"– have been used in over 240 cities. They are generated by 44 organisations and involve municipality officials, a research institute, NGO or local sanitation stakeholders. The database of SFDs of the cities is useful to monitor progress against baselines, benchmarking what works where and why. Mr Peal said – giving city-level examples from Lusaka, Zambia and Baguio City and the Philippines – how SFDs brought clear, credible, concise city diagnoses and established long-term, citywide, inclusive vision and helped prioritise investments where they are needed most. More widely, SFDs are supporting the sanitation sector; helping achieve SDGs through a defined methodology and systems approach, facilitating further research in related fields and disciplines, greenhouse gas emissions, climate change resilience, public health and safety of sanitation workers etc.; and guiding the development of national (sector) policy and global initiatives (e.g. WHO Guidelines).

Andy Peal showcasing SFD work done worldwide and future strategy

"Shit flow diagrams (SFDs) are helping to support the sanitation sector and achieve SDGs through defined methodology and systems approach, facilitating further research in related fields and disciplines, greenhouse gas emissions, climate change resilience, public health and safety of sanitation workers etc., guiding the development of national (sector) policy and global initiatives"

Andy Peal, Independent WASH Consultant, Member SuSanA

Abdullah Al-Muyeed narrated the sanitation journey of Bangladesh from MDG-2015 to SDG-2030 through his presentation titled as "Pursuits of Happiness, Journey towards 2030". He compared data from 2015 to 2020 for urban and rural sanitation and challenges faced in terms of policy perspective-integration and advocacy. The National Action Plan (NAP) was constituted in 2017–20 to implement the Institutional and Regulatory Framework (IRF) FSM to facilitate FSM service delivery by local government institutions (LGIs). Subsequently, the CWIS–FSM (Citywide Inclusive Sanitation–FSM) was formed as the nodal coordinating agency for achieving SDG6. The CWIS–FSM cell is responsibe for strengthening and scaling up CWIS-FSM in Bangladesh through various means such as policy, advocacy, capacity building, effective sanitation and service delivery systems as well as influencing urban sanitation financing, developing a market for transformative sanitation products and services, establishing a national sanitation dashboard, development of emergency/ disaster and climate change management systems and development of CWIS guidance documents on efforts towards gender mainstreaming.

Jay Bhagwan discussed the challenges in transporting human waste, the transition to managing sludge at the source, and the sanitation policy in South Africa. The country was 10 years behind the rest of the world in sanitation infrastructure, but implemented strict programmes to increase coverage from 40 per cent to 96–98 per cent. On-site sanitation, however, became an issue. With the launch of the Household Sanitation White Paper in 2001 and the National Sanitation Policy in 2016, the shift of focus changed from containment to safe management of the entire sanitation service chain. The policy aims to be inclusive, enabling financing for all levels of people and breaking the barrier of cost through technology. The focus is on avoiding the consequences of poor planning and designing a unicentral policy approach.

In terms of institutionally defined the roles and responsibilities, Water Services Authorities (WSAs) were meant to regulate water services and Water Service Providers (WSPs) meant to provide service. Responsibilities were allocated in line with the various pillars such as planning, financing, capacity building, policy enforcement, etc. Models were designed so that they can percolate to more local levels.

SESSION 4
ENABLING POLICY AND REGULATIONS FRAMEWORK: INNOVATIONS IN GOVERNANCE

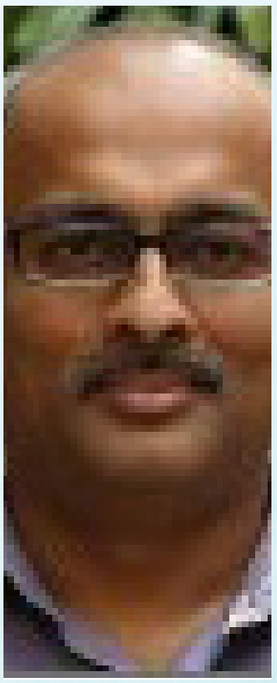
Day 1: April 25, 2023

CONTEXT SETTING AND MODERATOR

Hasin Jahan,
Country Director,
WaterAid Bangladesh

SPEAKERS

Subrata Chakraborty,
Senior Programme Manager, Water Programme, CSE



K.V. Santhosh Ragavan,
Senior Specialist, Indian Institute of Human Settlement

SPEAKERS

Ravi Joseph
Independent Consultant

Aveek De,
Sanitation Mission
Leader, eGov Foundation

Bhawana Sharma,
Executive Director,
Environment and Public
Health Organisation,
Nepal

> **By bringing together a range of stakeholders and providing technical expertise and support, these committees and units can help to ensure that sanitation programs are implemented effectively and efficiently, and that they have a meaningful impact on public health and the environment"**
>
> **K.V. Santhosh,** Regional Advisor WASH, UNICEF, Kathmandu

K.V. Santhosh Ragavan reiterated the principles of affordability, technicality and equity. He spoke about the regular need of Legal and Institutional Review (LIR) by using various innovations with his experience of working in the state of Tamil Nadu and the use of innovative approaches such as advisory committees and technical support units to accelerate decision-making and bringing about systematic changes in the sanitation sector.

By bringing together a range of stakeholders and providing technical expertise and support, these committees and units can help to ensure that sanitation programmes are implemented effectively and efficiently, and that they have a meaningful impact on public health and the environment.

Tamil Nadu's success story is a result of developing credibility across years, concerted efforts and multiple approaches. Government buy-in is very important for a successful sanitation agenda which can be leveraged through financial commitments (SIP) and ownership, and building on existing institutional strengths. Operational continuity of plants requires institutionalised systems and processes and innovative multi-modal capacity-building mechanisms to overcome resource constraints.

Santhosh Ragavan described policy-level initiatives adopted in Tamil Nadu for faecal sludge management.

Good data can lead us to have good governance and help us to understand the policies and complexities"

Aveek De, Sanitation Mission Leader, eGov Foundation

Aveek De spoke about enabling policy shifts through digital public infrastructure. He spoke about about how good data bring good governance and help us understand the policies and complexities. He said that eGov has created Digital Infrastructure for Sustainable and Healthy Habitats, an open digital platform for multiple waste streams in sanitation. The initiatives taken by the state of Odisha to develop a digital public infrastructure are aimed at improving delivery of public services and enhancing efficiency and transparency of governance. One of the key initiatives in this regard is the adoption of the open-source platform DIGIT, developed by eGov Foundation for e-governance of urban local bodies (ULBs) and other departments in the state. DIGIT is an open-source platform that provides a single-window service for citizens to access a range of government services online, including payment of taxes and fees, issuance of certificates, and registration of grievances. By adopting this platform, the state of Odisha is able to provide citizens with a more efficient and transparent way of accessing government services, and improving the overall quality of governance.

> **Non-sewered systems must be cost-effective, and equity in the benefits of sewer systems should be considered"**
>
> **Ravi Joseph,**
> Independent consultant

Ravi Joseph spoke about the drafting of policies for the National Faecal Sludge and Septage Management (NFSSM) without discrimination between sewered and non-sewered sanitation. The first NFSSM policy was introduced in 2013, and it included the requirement that 20 per cent of wastewater should be reused and recycled, but the country is still struggling to achieve this. The session also discussed regulations, and it was noted that the country heavily depends on on-site sanitation systems (OSS). It was suggested that fixing the institution could be more effective than fixing the pipe. Non-sewered systems must be cost-effective, and equity in the benefits of sewer systems should be considered.

PHOTOGRAPH: VIKAS CHOUDHARY/CSE

Policy and governance mechanisms of an FSTP

A CSE study indicates cost of O&M of an FSTP is Rs 18–24 lakh/year.

- Should the O&M cost of plant operations be paid by the city municipal authority? Should there be state and Central Finance Commission support for small towns that are running deficits in municipal finances? Should there be any other means, i.e. hybrid annuity models, sanitation tax etc.?

Enabling framework for integrating women's and marginalised groups in policy formulation and governance of sanitation service chain

- How to get their voice heard in decision making and involve them in the service-delivery mechanism?

Health and safety of sanitation workers: How fast can we equip them with the machines – tools and gears – to ensure zero death of sanitation workers?

- How can we dignify their work? Can the cities at least account for and register all sanitation workers and cover them under existing welfare schemes?

Use of IT in governance

- How can we use IT to inform policy decisions? How to ensure IT helps service delivery, making governance more responsive and accountable? What is the scope of grievance redressal?

Subrata Chakraborty emphasised that good governance and infrastructure are critical for improved inclusive sanitation services. Sharing the experiences from the sanitation journey of Uttar Pradesh, he detailed policy and governance mechanisms that can tackle the issues and challenges in faecal sludge management.

Bhawana Sharma speaking about Nepal's sanitation landscape

Bhawana Sharma gave an overview of the status of water and sanitation and the policy and regulation landscape in Nepal. She said that Nepal had basic sanitation facilities coverage of 82 per cent in 2015 and aspires to achieve 100 per cent coverage by 2023 and under SDG 6.2.4. Coverage of toilet construction was 30 per cent in 2015; coverage of 90 per cent is aspired for by 2030.

The SFD of Kathmandu Valley comprising 18 cities shows that still 88 per cent of the waste flows into the open. Nepal has enough constitutional provisions for environment but enforcement and practice is an issue. There are a lack of specifications at the user interface, insufficient monitoring, inadequate standard operating procedures, no set tariffs, irregular emptying frequency, lack of disposal sites and/or treatment plants, insufficient licensing and registration protocols for desludging operators, and lack of tariffs/costs for reuse of byproducts. Several initiatives are in the pipeline to strengthen the data as well as the WASH system in the country.

The Ministry of Water Supply (MoWS) has also developed a mobile app NWASH to collect data regarding existing water-supply systems, potential new water-supply systems for unserved population, sanitation and hygiene in schools, community and healthcare facilities, water-user committees, household surveys and drainage and waste management aspects. The formulation of the new WASH Act of Nepal is also a welcome effort in this direction. The WSSTFC Act (Water Supply and Sanitation Tariff Fixation Commission Act) – which replaces the earlier Water Supply Tariff Fixation Commission (WSTFC) Act – aims to provide a regulatory framework for water supply and sanitation services in Nepal, with a focus on improving the quality and sustainability of these services, promoting public health and protecting the environment.

K.V. Santhosh Ragavan reiterated the principles of affordability, technicality and equity. With his experience of working in the state of Tamil Nadu, he spoke about the regular need for Legal and Institutional Review (LIR) with innovative approaches such as advisory committees and technical support units to accelerate decision-making and bring about systematic changes in the sanitation sector.

By bringing together a range of stakeholders and providing technical expertise and support, these committees and units can help ensure that sanitation programmes are implemented effectively and efficiently, and they have a meaningful impact on public health and the environment. New governance systems were introduced for cluster operations such as issuance of State Investment Plan, Memorandum of Understanding (MoU) between cluster ULBs, Standard Licensing Agreement (SLA) for regulation of operators, bylaws for management, regulating on-site sanitation system and revising and/or strengthening existing governance. Tamil Nadu's success story is a result of developing credibility across the years, concerted efforts and multiple approaches.

Government buy-in is vital for successful implementation of the sanitation agenda which can be leveraged through financial commitments (SIP) and ownership and building on existing institutional strengths. Operational continuity of the plants requires institutionalised systems and processes and innovative multi-modal capacity-building mechanisms to overcome resource constraints.

Santhosh Ragavan describing policy-level initiatives adopted in Tamil Nadu for faecal sludge management

SESSION 5
FAECAL SLUDGE TREATMENT SYSTEMS: PLANNING, TECHNOLOGY, PERFORMANCE, ECONOMICS AND OPERATIONS

Day 2: April 26, 2023

CONTEXT SETTING AND MODERATOR

Jay Bhagwan,
Executive Manager, Water Use and Waste Management, Water Research Commission

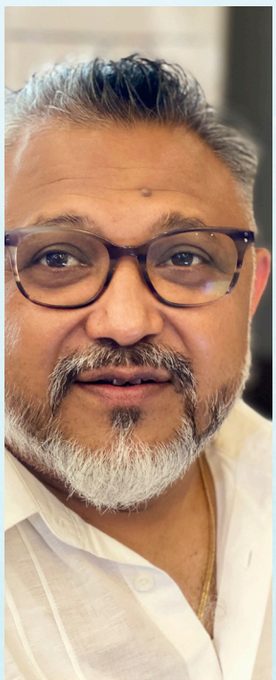
SPEAKERS

Pavan Kumar,
Programme Manager, Water Programme, CSE

Hasin Jahan,
Country Director, WaterAid Bangladesh

SPEAKERS

Rajeev Munankami,
Multi-country Programme Manager, Urban Sanitation, SNV



P. K. Mohapatra,
Engineer-in-Chief, Odisha Water Supply and Sewerage Board

Krishna K.,
Senior Project Manager, Consortium for DEWATS Dissemination, India

Sanjay Singh,
Director Programmes, Population Services International

Hasin Jahan reflected on Bangladesh's sanitation journey and discussed the way forward.

> **Technology cannot be thought of in isolation, and a successful sanitation journey must take into account a range of factors beyond just technology"**
>
> **Hasin Jahan,** Country Director, WaterAid Bangladesh

Hasin Jahan presented Bangladesh's journey towards safely managed sanitation in non-sewered sanitation areas of the country.

The evolution of sanitation approaches in Bangladesh – from becoming ODF to technology-driven FSM/FSTP to a comprehensive CWIS approach and now to inclusive urban sanitation (IUS) – highlights the importance of a holistic and integrated approach to sanitation. Jahan pointed out that technology cannot be thought of in isolation, and a successful sanitation journey must take into account a range of factors beyond just technology. By focusing on factors beyond technology, such as planning, mapping, business approaches, and awareness and capacity-building, we can help ensure that our efforts towards sanitation are effective, sustainable and equitable.

Bangladesh adopted a middle path that considers the interaction between technology and management, as well as multi-stakeholder engagement. Bangladesh faced challenges such as the lack of ownership in municipalities, capacity issues, and selection of appropriate and affordable technologies with simpler operation and maintenance.

To ensure the sustainability of sanitation programmes, it is important to reflect on what went well and what needs to be improved. This includes conducting comprehensive performance evaluations and assessments such as the SFDs (shit flow diagrams) and waste flow diagram analyses to understand the local context and identify areas that require improvement.

Rajiv Munankami presented the FSM analysis study conducted by SNV in 32 cities across five countries. SNV, a development organisation, works in over 30 countries worldwide to promote sustainable development and poverty reduction. Munankami highlighted the issues with technology design and the capacity of designers and emphasised on the importance of an informed approach to decide on the technology and investment in new cities. The presentation also discussed the issues with large urban sanitation and incomplete O&M plans as well as the need to involve relevant stakeholders in the decision-making process. Lessons learnt included the need for collective decision-making, identifying best-suited interventions, and strengthening systems involving multiple stakeholders.

> **There is a need for informed choice processes to support infrastructure investment decision-making"**
>
> **Rajeev Munankami,** Multi-Country Programme Manager, Urban Sanitation, SNV

Rajeev Munankami presenting the findings of the SNV study conducted in 32 cities across five countries

Vijay Chaurasia giving a presentation about sewage infrastructure in the country

> **Grey and black water discharging in waterbodies is a big issue in urban areas and should be dealt with seriously"**
>
> **V.K. Chaurasia,** Joint Advisor, CPHEEO, Ministry of Housing and Urban Affairs

V.K. Chaurasia in his presentation, "Non-sewered sanitation system as a faster alternative to the sewered sanitation system", highlighted that a "non-sewered" solution cannot work as an alternative to a "sewered" solution. FSTPs act as an interim measure, and currently many FSTPs suffer from underutilisation. The cost of treatment for FSTPs differs in different states, and needs to be investigated from an engineering perspective. Where STPs exist, septage can be co-treated with sewage while when an STP site is 30–40 km away, the FSTP can be built at the site of the proposed STP.

A household survey to assess the type of containment, capacity of existing septic tank, and evaluation of sanitation value chain should be carried out before constructing an FSTP.

Odisha's sanitation journey has marked several technological, monitoring and institutional initiatives throughout the sanitation value chain"

P. K. Mohapatra
Engineer-in-Chief, Odisha Water Supply and Sewerage Board

P.K. Mohapatra shared the sanitation story of the state of Odisha. He highlighted the importance of mixed solutions, i.e. a mix of STPs and FSTPs to meet the infrastructural demand of a city's growth.

Odisha's sanitation journey has marked several technological, monitoring and institutional initiatives throughout the sanitation value chain. Dhenkanal and Bhubaneswar are constructing a second FSTP as the existing one is running at 80 per cent capacity. The settling thickening tank achieves 96 per cent removal of COD, and longer drying times reduce pathogen issues.

Digitisation has helped in monitoring the state of affairs in ULBs every fortnight. A web application has been developed for the allotment of vehicles after registration, and the vehicle is tracked and monitored to ensure timely action. The core component cost is less and ancillary cost is more, while O&M cost is less than Rs 1 lakh per month. Self-help groups have been drawn in for operation of the FSTPs.

P.K. Mohapatra presented a case study of Odisha and its sanitation initiatives.

Sanitation enterprises are invisible and ULBs have failed to engage with them as a "partners". Scattered demand, congested places and inadequate monitoring are challenges for informal service providers, and need to be discussed and solved through appropriate mechanisms"

Sanjay Singh, Director Programmes, Population Services International

Sanjay Singh bought up the important issue of informal sector engagement for sustainable FSSM. He said that FSM depends on the informal sector but its betterment is rarely given thought. As a way to provide rapid sanitation coverage to all, FSSM focuses on human waste management at Rs 200–250 per capita while more comprehensive sewerage system costs Rs 7,000–11,000 per capita.

FSSM also provides employment to informal workers. Hence policies and guidelines should include the increased perspective of the FSSM market and key stakeholders.

Sanitation enterprises are invisible and ULBs have failed to engage with them as "partners". Therefore there is a need to find ways to organise informal sector service providers to license as micro-enterprises, find mechanisms for improved engagement with service providers and form a consortium of sanitation enterprises.

In co-treatment plants, there are inadequate numbers of discharge locations and accessibility challenges, which can be planned for by conducting location mapping and survey and allocating budgets to make the locations suitable for disposal of faecal sludge. Scattered demand, congested places and inadequate monitoring are challenges for informal service providers, which need to be discussed and solved through appropriate mechanisms.

Options for improving functionality of FSTPs in India, based on the experience of operations and maintenance challenges faced by the FSTPs and co-treatment units in Uttar Pradesh, were also discussed. The need for evaluation of performance efficacy of different treatment systems and the challenge of securing sufficient and regular quantities of sludge reaching the FSTPs for the sustainability of the infrastructure created for FSM was also discussed.

Pavan Kumar setting the context for the session

Questions for panellists

The following questions were discussed with practitioners and experts who have a stake in and knowledge of the issues, challenges, potential and limitations of faecal sludge management based on non-sewered sanitation systems:

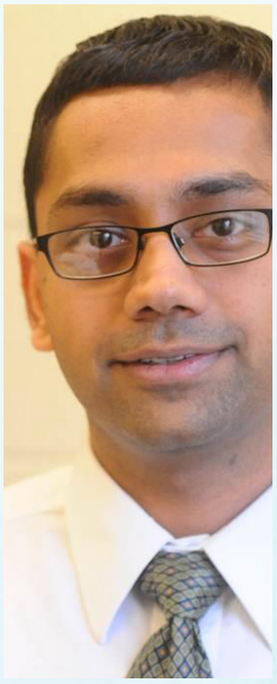
- Can one FSTP operator also control all desludging operators or open competition for desludging work?
- Treatment system (FSTP) selection:
  - Does our experience inform us of one or more preferred FSTP treatment systems for each state of India?
  - How to scale up as a state-level strategy?
- The real challenge of faecal sludge not reaching FSTPs
  - Should we incentivise faecal sludge reaching the FSTP by paying a tipping fee?
  - How much do penalties and high registration fee for desludgers help in improving sludge collection?
- Sustainability of FSTP operations
  - Should the O&M cost of plant operations be paid by the city municipal authority, as is the case of sewage treatment plant operations?
  - Should there be state and Central Finance Commission support for small towns that are running deficits in municipal finances. Or should there be any other means: hybrid annuity models, sanitation tax(as part of property tax), etc.?
  - Volumetric and treatment standards based payment for plant operations, not just for O&M.
  - How much of the O&M cost recovery is possible from revenue of selling treated biosolids and treated wastewater?

Pavan Kumar set the context by discussing challenges and options for improving functionality of FSTPs in India based on our experience of operations and maintenance challenges faced by faecal sludge treatment plants and co-treatment units in Uttar Pradesh. He highlighted the need for evaluation of performance efficacy of different treatment systems and the challenge of securing sufficient and regular quantities of sludge reaching the FSTPs for the sustainability of the infrastructure created for FSM.

SESSION 6
RESOURCE RECOVERY FOR CIRCULARITY

Day 2: April 26, 2023

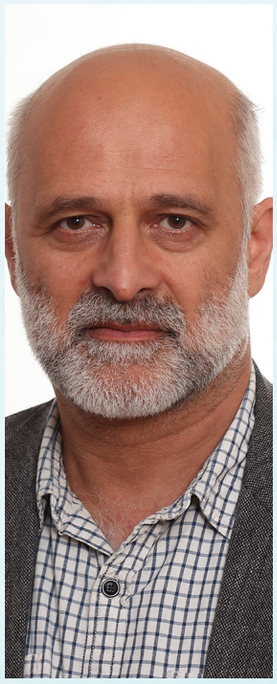
CONTEXT SETTING AND MODERATOR



Kartik Chandran,
Professor, Earth and Environmental Engineering, Columbia University

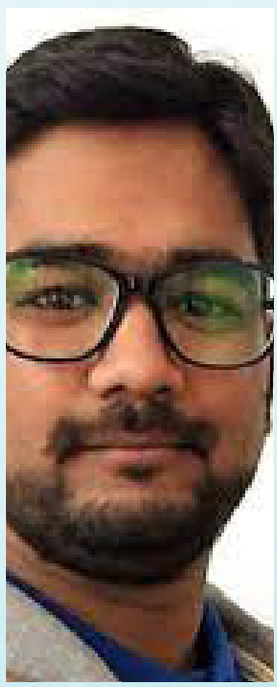
SPEAKERS

Sumita Singhal,
Programme Manager, Water Programme, CSE



Arne Panesar,
Head, SuSanA Secretariat, GIZ

Dhawal Patil,
General Manager, Ecosan Services Foundation



SPEAKERS

S. Vishwanath,
Founder and Director,
Biome Environmental
Solutions

Vinod Vijayan,
Deputy Lab Head, EML &
FSM Laboratory, AAETI,
CSE

V.K. Chaurasia,
Joint Advisor, CPHEEO,
Ministry of Housing and
Urban Affairs

Navindu Gupta,
Principal Scientist, ICAR-
The Indian Agricultural
Research Institute

Srikanth Mutnuri,
Associate Professor, BITS
Pilani (Goa Campus)

Starting the session, the moderator Kartik Chandran showcased an interesting tool developed for the evaluation of wastewater and sanitation systems including on-site sanitation systems. The data and numbers would be required to make the simulation of the plant. The platform/tool can, however, evaluate many parameters without having visited the field, though some data would be required. Following this, the session proceeded for the context setting by Sumita Singhal.

Arne Panesar gave a brief about GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and its projects and activities landscape. GIZ is a German development agency that works in more than 120 countries worldwide to promote sustainable development and reduce poverty. In the context of sanitation, GIZ works to improve knowledge management and experience sharing in the sector, with the aim of informing the design of new activities, reducing the need for pilot projects, and encouraging the scaling-up of concepts. GIZ also works to build the capacity of its partners and experts in the sanitation sector, in order to promote more effective and sustainable approaches to sanitation. This includes promoting resource recovery and circularity as a response to climate change impacts and risks, including water and food-security crises.

By promoting innovative and sustainable approaches to sanitation, building the capacity of its partners and experts, and sharing knowledge and experiences across the sector, GIZ is helping to promote a more equitable and sustainable future for all.

> **Overall, GIZ's approach to sanitation is grounded in the principles of sustainable development, which emphasise the importance of environmental sustainability, social equity, and economic viability"**
>
> **ARNE PANESAR,**
> Head, SuSanA Secretariat, GIZ

GIZ has played a key role in promoting resource recovery and reuse projects in various countries around the world. Here are some examples:

Dibicoo Project in Cape Coast, Ghana: This project was implemented by GIZ to improve access to sanitation services in the city of Cape Coast. In addition to promoting decentralised wastewater treatment, the project also promoted reuse of treated wastewater for non-potable purposes such as irrigation and flushing toilets.

Wastewater Treatment, Reuse and Water Supply (WTR) in Jordan: GIZ has been working with the government of Jordan to promote sustainable and efficient use of water resources, particularly in the context of wastewater treatment and reuse. The WTR project aims to increase the capacity of wastewater treatment plants, promote the reuse of treated wastewater for irrigation, and improve access to safe drinking water in urban and rural areas.

Programme for the Modernisation and Strengthening of Drinking Water and Wastewater Management (PROAGUA II) in Peru: GIZ has been working with the government of Peru to improve access to safe drinking water and sanitation services, as well as promote sustainable management of water resources. The PROAGUA II project includes interventions such as the construction of water treatment plants, the promotion of water conservation practices, and the development of sustainable financing mechanisms for water and sanitation services.

Dhawal Patil highlighted that the reuse of treated wastewater has the potential to provide a range of benefits, including use in less explored areas such as floriculture, pisciculture and sericulture, as well as in industrial applications such as power plants, mills, factories and refineries. In addition, the recovery of energy and nutrients from wastewater can also be achieved through thermal treatment processes such as pyrolysis, incineration and gasification. In order to ensure the safe and sustainable reuse of treated wastewater, however, it is important to establish regulations and standards for its use in agriculture and industry. This includes monitoring the quality of treated wastewater to ensure that it meets the required standards for its intended use, as well as establishing mechanisms for monitoring and regulating groundwater abstraction for agricultural and industrial purposes to prevent overexploitation.

In India, there is a need to develop a comprehensive framework for the reuse of treated wastewater that takes into account the local context and the needs of communities and industries. This includes promoting the use of nature-based solutions such as wetlands and decentralised wastewater treatment systems, as well as establishing sustainable financing mechanisms for wastewater management.

Overall, the reuse of treated wastewater has the potential to provide significant benefits in terms of water conservation, energy and nutrient recovery, and sustainable development.

> **In order to ensure the safe and sustainable reuse of treated wastewater, it is important to establish regulations and standards for its use in agriculture and industry"**
>
> **Dhawal Patil,** General Manager, Ecosan Services Foundation

Dhawal Patil speaks about the need of resource recovery beyond technology and standards

> **Bengaluru is highly dependent on water supply from far-off places. Therefore, it becomes more important for Bengaluru to practise reuse of treated water. . . FSTPs are used as a ladder to development, and this perception has to be increased at a faster pace. We are lagging behind in this aspect of development. We have new ideas and new legacies, which need to be carried forward"**
>
> **S. VISHWANATH,**
> Founder and Director, Biome Environmental Solutions

S. Vishwanath spoke about the water, food and energy nexus in an era of climate change in his presentation "Experiences from Bengaluru". He said that Bengaluru is highly dependent on water supply from far-off places. It therefore was more important for Bengaluru to practise reuse of treated water.

Bengaluru presents a good example of reuse of treated water for lake recharge, agricultural purposes and groundwater recharge. Reuse of untreated water in agriculture – after considerable primary treatment by farmers – is also prevalent. Septage is also used in agricultural fields after converting it to manure by using the trenching method. 770 MLD of treated wastewater from sewage treatment plants is transferred to drought-prone districts (Kolar, Chikkabaliapur and Anekal) for different uses, including agriculture. Groundwater recharge is done through used water to supplement agricultural demand. Lakes are auctioned for fisheries by the local village government, which generates revenue to the local government. Many recharged lakes have become bird sanctuaries and have become home to many new species of birds. In Kolar City, the lake is filled with treated wastewater. Treated wastewater is also used in vineyards.

S. Vishwanath highlighted that while China treats 90 per cent of its wastewater, India treats only 40–60 per cent. Reuse within the application is difficult – hence treated wastewater is transported to other sites. FSTPs are used as a ladder to development, and this perception has to be increased at a faster pace. We have new ideas and new legacies, which need to be carried forward.

S. Vishwanath presenting about the water, food and energy nexus in terms of circularity

Navindu Gupta highlighted the need for abiding with the required standards before application of biosolids as manure

> **In applying treated sludge as compost in soil, if there are any harmful micro-organisms present, they will enter the food chain and cause problems"**
>
> **Navindu Gupta,** Principal Scientist, ICAR-The Indian Agricultural Research Institute

Navindu Gupta emphasised the importance of maintaining soil health and the need for standards for agricultural reuse of biosolids and treated wastewater.

Gupta said that there is a strong requirement for a license to sell biosolids as manure, with all parameters in limit. He added that treated sludge cannot be treated as fertilizer until it has the requisite amount of NPK. IARI is managing rice straw in compressed biogas to generate biogas. How the carbon credit is affected while treating faecal sludge needs to be carefully looked at. There are many other parameters that need to be studied for slurry composting like energy, temperature etc.

Vinod Vijayan presenting a CSE study conducted across faecal sludge treatment plants (FSTPs) in India to assess resource recovery potential

"The most common resource recovery from faecal sludge is soil conditioner and organic fertiliser. This is due to the presence of essential plant nutrients and organic matter in faecal sludge that increases the fertility and water-retaining capacity of soils"

VINOD VIJAYAN,
Deputy Lab Head, EML and FSM Laboratory, AAETI, CSE

Vinod Vijayan highlighted that faecal sludge (FS) treatment technology results in end products that need to be further treated, disposed of, or utilised for some type of resource recovery. The most common resource recovery from FS is soil conditioner and organic fertiliser. This is due to the presence of essential plant nutrients and organic matter in FS that increases the fertility and water retaining capacity of soils.

Raw faecal sludge , however, cannot be applied to soil directly as it contains pathogenic microorganisms that creates a health risk to farmers and others who depend on crops grown in soil supplemented with faecal sludge. A study conducted by the laboratory team, CSE, to evaluate the quality of the biosolids generated from various faecal sludge treatment plants showed that pH of the biosolids was in the range of 5.0–8.4; electrical conductivity in the range of 0.36–5.1 dS/m; carbon content of the FS-derived biosolid was in the range of 9.9–40.1 per cent; and the C/N ratio was in the range of 5:1–12:1. Heavy metal (Hg, Cr, Zn) concentration in biosolids is a little higher than the permissible limit set by the Fertilizer (Control) Order (FCO, 2009), which may be due to the accumulation of metals in the sludge. Out of 46 biosolids samples, 17 showed high faecal coliform and *E. coli* count, above the standard limit recommended by USEPA/WHO for biosolids (<1000 MPN/g).

Microbial load and moisture content of the biosolids are observed to be directly correlated. Most of the biosolids showed the presence of helminth eggs above the regulatory limit recommended by USEPA/WHO for biosolids (<3 eggs/4g of dry weight). Helminth eggs are resistant to most of the post-treatment methods to remove pathogens like UV, IR radiation, or even sunlight. Based on the physicochemical properties, the dry sludge (biosolids) collected from various FSTPs in India can be used as organic manure either directly or after post-treatment. Another option is to convert biosolids into co-compost or biochar. Bioenergy can be harnessed from biosolids (17 MJ/kg) as it has a calorific value compared to that of cow dung (16–18 MJ/Kg) and other agricultural biomass (14–23MJ/Kg).

Sumita Singhal set the context by emphasising the need of resource recovery and circularity. She spoke about the scale of the problem in terms of volume of sludge and treated water produced from the plants and the role of resource recovery in making up for water scarcity and nutrient scarcity.

Questions for the panellists

The following questions were put forward to discuss by the panellists.

1. What are the economic and environmental implications/ benefits of reuse of recycling of byproducts (tangible and intangible)?
2. What are the learnings if any from what is happening on the ground at scale in Bengaluru and other towns in India and in Global South countries for reuse of treated used water and biosolids, its beneficial or negative impact assessments and studies?
3. What are the preferred treatment systems for sewage and septage that maximises nutrient recovery? Should this be a criteria for selection of treatment systems in the tenders and bid documents?
4. Norms and standards: What we should be advocating for? With whom? What data and analytics gaps do we need to bridge?

Srikant Mutnuri spoke about nutrient value of wastewater and human excreta. He presented a case study of terra preta and its experimental set up as a fertiliser to identify crop yield. Field experiments are currently being conducted at an agricultural field in Goa; 2.6 tonne of terra preta has been transported to the site and another 2 tonne will be transported. Treated water shall be used for gardening at highways – policies shall be used to stop groundwater usage for such purpose.

V.K. Chaurasia provided a snapshot of the generation of wastewater, its treatment and gap in India, with a vision of creating 10,000 MLD capacity for reuse by 2030 and annual revenue/ savings of Rs 7,000 crore by 2027.

In Israel, 100 per cent of the wastewater is recycled and reused. In India, 20 per cent of wastewater is reused. China reuses 20 per cent of the generated wastewater in the country.

The Centre has its own goal but there are many states that are ahead of the national goals. Several states treat and reuse 100 per cent of their wastewater. Different states have different policies for wastewater treatment. Haryana has a wastewater treatment policy of 2019. Gujarat–Karad Municipal Corporation has been treating wastewater since 1970. There are used water discharge standards set up by NGT; heavy penalty will be levied if the standards are not met. National policies and framework about reuse of treated water are in place but standards on disposal and reuse of used water and standards on disposal and reuse of biosolids need to be developed.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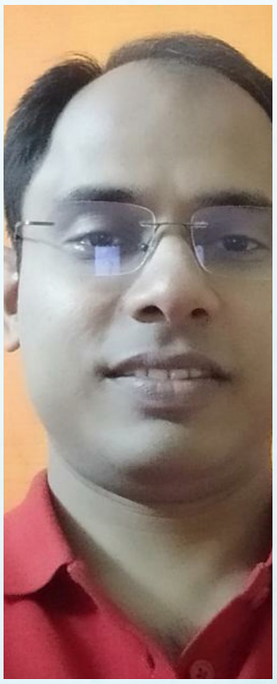
SESSION 7
RURAL–URBAN CONVERGENCE ON USED WATER, SLUDGE AND ODF++

Day 2: April 26, 2023

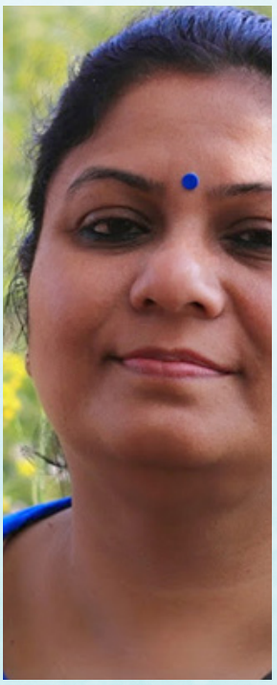
CONTEXT SETTING AND MODERATOR

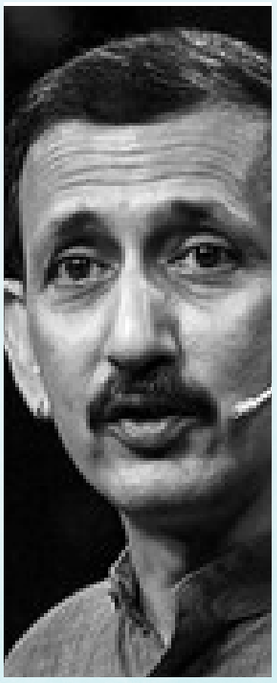


B. Parameswaran,
Director-cum-Joint Secretary, DDWS, Government of Odisha

SPEAKERS

Sushmita Sengupta,
Senior Programme Manager, Water Programme, CSE

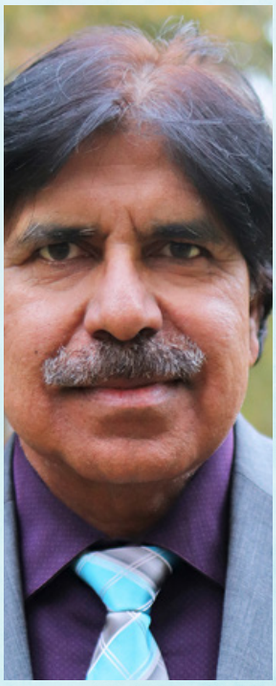




V.K. Madhavan,
Chief Executive, WaterAid, India

SPEAKERS

Avinash Y. Kumar,
Practice Lead, Water, Sanitation and Environment, National Institute of Urban Management



L.K. Atheeq,
Additional Chief Secretary, Rural Development and Panchayat Raj Department, Government of Karnataka

Utkarsha Kavadi,
Director, RCUES, AIILSG Mumbai and Maharashtra Urban WASH and ES Coalition

B. Parameswaran presenting the example of Odisha for rural–urban integration for faecal sludge management

Due to last-mile connectivity, challenges of sewered networks and non-functionality of STPs, Odisha took the path towards non-sewered sanitation"

B. Parameswaran, Director-cum-Joint Secretary, DDWS, Government of Odisha

The different models for desludging services, clustering approach and reuse need to be understood"

V.K. Madhavan,
Chief Executive, WaterAid, India

V.K. Madhavan highlighted the major challenge of containment structures such as oversized and unscientific septic tanks, leach pits, single pits etc. and the linked challenges of financing, absence of demand for converting in scientific containment structures and lack of skilled labour. He also highlighted the limitation of twin pits structures in flood-prone, low-lying or high-water-table areas. Madhavan raised the need for understanding the different models for desludging services, clustering approach and reuse. He mentioned that many households will get water supply of 55 LPCD under Jal Jeevan Mission and this will lead to untreated water flowing into in waterbodies. This will create a huge challenge and the state needs to head towards a decentralised approach. He also emphasiaed on climate change, resilient planning and infrastructure.

V.K. Madhavan highlighed the need for resilient planning and infrastructure to tackle the challenge of climate change.

> **For long-term sustainability, incoming septage at the plant is very important, and to ensure this the responsible authorities should engage with various stakeholders such as citizens, desludging operators, farmers (for reuse) etc."**
>
> **Avinash Y. Kumar,**
> Practice Lead, Water, Sanitation and Environment, National Institute of Urban Management

Avinash Y. Kumar highlighted clustering as an emerging model for the treatment of faecal sludge but said that it needs to be well planned. He presented an example from the state of Madhya Pradesh. He said that capacity, location and modalities play a critical role while planning clusters.

For long-term sustainability, incoming septage at a plant is very important, and to ensure this the responsible authorities should engage with various stakeholders such as citizens, desludging operators, farmers (for reuse) etc.

L.K. Atheeq presented Karnataka's approach for managing rural sanitation, where around 70 per cent of the population resides in rural areas. For a focused effort, in 2020–21 the state prepared "Karnataka State Rural Sanitation Policy, Strategy and Model Byelaws", with stakeholder consultation.

The state has been facing a major challenge in converting single pits to twin pits or septic tanks. So far the focus has been on construction of toilets and now it is expanding to grey and black water management. The state partnered with the CDD Society and developed a decision matrix for LWM planning and implementation. It adopted the clustering approach, where each cluster has four to five gram panchayats. In each cluster, FSTP with capacity of 2–3 KLD has been established largely based on planted drying beds. However, the gram panchayats face the challenge of irregular desludging, indiscriminate disposal of faecal sludge etc. For grey water management, the state has adopted an in-line treatment approach in which the flow of water is as follows: screening, sedimentation, filtration and then planted gravel filter. Under rural–urban convergence, treated water from STPs is supplied to fill up lakes in neighbouring rural areas.

Utkarsha Kavadi presented Maharashtra's approach of urban–rural convergence for faecal sludge management.

Maharashtra has more than 200 FSTPs. Most are not working on full capacity. In 2021, the Ministry of Jal Shakti and Ministry of Housing and Urban Affairs, Government of India, issued a letter to states directing them to utilise the available unutilised treatment capacity at the plants and to have better coordinated approach between urban and rural authorities at the cluster level to deal with transportable waste. Under this direction, Maharashtra state assessed potential unutilized capacities of existing FSTPs, identified potential urban–rural clusters and implemented a pilot cluster in Indrapur, Pune district.

Indrapur has 10 KLD FSTP with unutilized treatment capacity. For clustering, 16 villages were identified for urban–rural linkages with 10 km of radius from Indrapur FSTP. The planning process includes stakeholders mapping and meeting, detailed feasibility assessment, and developing institutional and financial mechanisms. The successful implementation of the Indrapur cluster led to demand generation of clustering from other parts of the state.

The session concluded with a question and answer session, where participants asked about the Hybrid Annuity Model (HAM), efforts for climate change resilient planning, and efficiency of Karnataka's in-line treatment of grey water during rainy seasons.

Sushmita Sengupta presented the scenario of rural sanitation, type of containment structures and various clustering models, and set the context for the session. She highlighted the emerging need for long-term state-level strategy and planning, standardisation of treatment systems for used water management in rural areas, and the micro watershed development approach for groundwater recharge and source sustainability of drinking water.

QUESTIONS FOR SPEAKERS

The following questions and suggestions were put to the speakers:

- What is happening on the ground in rural–urban convergence of used water and septage management?
- Can successful pilot projects be scaled up at the state level?
- Is there a need for a long-term state-level strategy and planning?
- Have we exhausted the potential of the intensive five-year mission approach of ODF and ODF++?
- Can we have standardized treatment systems for used water management in rural areas?
- Volume of used water/grey water and faecal sludge varies from state to state and the climate.Treatment systems will vary accordingly.
- How are the waste stabilization ponds in rural areas working out?
- Does groundwater recharge and source sustainability of drinking water require a micro watershed development approach and financing support?

SESSION 8
WATER AND TREATED USED WATER CONNECTION: THE OPPORTUNITY FOR AUGMENTED CONSERVATION AND MANAGEMENT

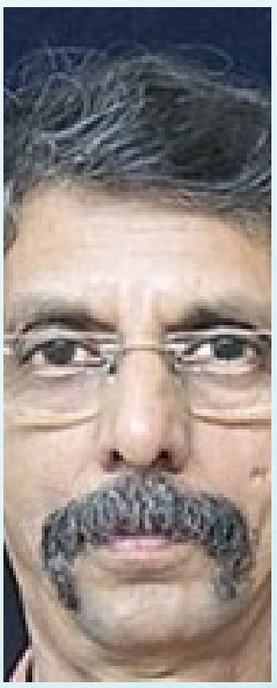
Day 2: April 26, 2023

MODERATOR

Jagan Shah,
Senior Fellow, Artha Global Context Setting

SPEAKERS

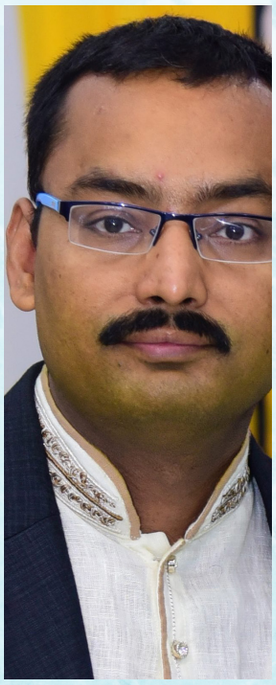
Ravi Kumar,
Deputy Programme Manager, Water Programme, CSE



Himanshu Kulkarni,
Founder, Advanced Center for Water Resource Development and Management, Pune

SPEAKERS

Venkatesh Dutta,
Professor, School of Earth and Environmental Sciences, Babasaheb Bhimrao Ambedkar University, Lucknow



Pulkit Garg,
Municipal Commissioner, Jhansi

Arun Krishnamurthy,
Founder, Environmentalist Foundation of India (EFI)

Ravi Kumar Kalal set the context by discussing the legal aspect and current situation of wastewater treatment in urban India. He stated that while total wastewater generated in urban India is around 72,368 MLD, installed treatment capacity is only around 31,841 MLD and actual treatment capacity around 20,236 MLD. Additionally, according to the Central Pollution Control Board (CPCB)'s 2020–21 Annual Report, only 72 per cent of wastewater is untreated and disposed of into the open. Maharashtra and Telangana have the most polluted river stretches in India.

Mr Kalal also discussed the enabling environment required for the reuse of used water, which includes policy and regulatory frameworks, sociocultural acceptance, financial viability, technologies and institutional arrangements. He highlighted several policies and guidelines, including the Environmental Protection Act, 1986; National Environment Policy (NEP, 2006); National Urban Sanitation Policy (NUSP, 2008); and the Guidelines of National Building Code 2016 that emphasise recycling sewage and used water from municipal and industrial sources before discharge to waterbodies.

He also mentioned the mandate by the Ministry of Power under its 2016 Tariff Policy, requiring thermal power plants located within a 50-km radius of a sewage treatment plant (STP) of a ULB to mandatorily use treated used water (TUW). Several cities in India, such as Hyderabad, Chennai, Bengaluru, Ahmedabad and Gandhinagar, have mandated STPs for buildings with more than 50–100 apartment units.

He discussed the incremental technology interventions required to achieve different end uses of TUW, which should be cost-competitive when compared to alternative options available to industries. The reuse case studies discussed during the training programme included Bangalore–Cubbon Park, Nanded City Township Pune and KC Valley Bangalore. Finally, he mentioned that the conventional sources of water for industries include municipal water supply, private tankers and direct extraction from freshwater sources.

Groundwater dependencies are often overlooked in formal planning processes, with discussions remaining stranded on sources and access rather than aquifers, their recharge and discharge features, and quality.

To make connections between wastewater and conservation, reuse and recharge, we need to understand the quantitative and qualitative aspects of groundwater, including its potential storage, recharge, extraction, natural discharges and contamination"

Himanshu Kulkarni,
Founder, Advanced Centre for Water Resource Development and Management (ACWADAM), Pune

Himanshu Kulkarni highlighted that groundwater is a crucial component of urban water supply and needs to be mainstreamed into planning and policymaking. The Advanced Centre for Water Resources Development and Management (ACWADAM) works on groundwater through partnerships and projects that generate local knowledge on aquifers and lead to community action.

Groundwater dependencies, however, are often overlooked in formal planning processes, with discussions remaining stranded on sources and access rather than on aquifers, their recharge and discharge features, and quality.

To make connections between wastewater and conservation, reuse and recharge, we need to understand the quantitative and qualitative aspects of groundwater, including its potential storage, recharge, extraction, natural discharges and contamination. It is crucial to focus on recharge at different scales and develop management plans that consider aquifer and watershed relationships.

Himanshu Kulkarni emphasising the need for groundwater recharge at various scales

For a city, faecal sludge management (FSM) solution should be both nature-based and affordable. Ensuring affordability is crucial to ensure long-term viability and scalability of the FSM system, making it accessible and feasible for the city and its residents"

Pulkit Garg,
Municipal Commissioner, Jhansi

Pulkit Garg spoke about the FSM initiatives adopted by the Jhansi ULB. The Jhansi FSTP, with a capacity of 18 KLD, was constructed by Jhansi Nagar Nigam.

There was resistance, in the form of protests – from planning to inception – from local residents, who were concerned that installation of the plant could destroy the living conditions in their area with a foul odour. A massive door-to-door Information, Education and Communication (IEC) campaign was organised by Jhansi Nagar Nigam (JNN) officials and contractors to manage this issue.

This plant is India's third and Uttar Pradesh's first FSTP. It works by the biological method (priority given to nature-based systems) in which electricity, freshwater and chemicals are not used for treatment, and it can operate continuously for 24 hours. Purified water and manure from the plant is used in the Corporation's garden and plants are grown on the divider. Testing of treated water and manure is monitored by CSE, New Delhi.

In March 2019, the plant was given the "Best Innovation Award in Swachh Survekshan 2019". The achievement of getting Jhansi city the ODF++ (Open-Defecation Free Plus Plus) and securing the third position in Swachh Survekshan 2018 in Uttar Pradesh are important milestones in the field of sanitation and cleanliness.

So far more than 5,000 civil body officials have visited the plant, including Shri Durga Shankar Mishra, Chief Secretary, Uttar Pradesh.

The implementation of a 32 kilolitre per day (KLD) project in Meri village near Sanfran City on Kanpur Road is a significant step towards promoting sustainable and efficient faecal sludge and septage management (FSSM) in the area. The project, which is based on secondary treatment ABR (anaerobic baffled reactor), aims to treat and dispose of faecal sludge and septage generated by households and businesses in the area in a safe and sustainable manner. In addition to the treatment of faecal sludge and septage, the project also includes a range of other interventions aimed at promoting sustainable and inclusive FSSM. These include the publishing of bylaws along with IEC (Information, Education and Communication) activities to ensure emptying of septic tanks of households every three years, as well as the provision of heavy penalties on acts of improper septage disposal or draining of septage into open areas or drains.

The project also aims to find ways to make FSSM self-sustainable and profitable, such as through the procurement of vehicles that can collect septage from narrow streets – and optimisation of the fleet for the collection of septage from narrow streets – with a capacity of 600–800 litre. Enforcing bylaws and efficient operations is also essential to making FSSM functional, sustainable and inclusive.

Arun Krishnamurthy discussed the changes in waterbodies over the past 15 years and emphasised the need to address newer challenges. He identified urban flooding, lack of fresh drinking water, and unequal distribution of groundwater as major issues. He also shared his experience working with the Environmentalist Foundation of India and Indore Municipal Corporation in restoring Kanadia Lake in 2020, which led to the adoption of other nature projects in the city. The restoration involved optimising the lake's water-holding area through desilting, deepening and bund strengthening. He also highlighted that changes in land-use patterns and poor planning also contribute to current waterbody problems.

Prof. Venkatesh Dutta highlighted the economic inefficiency of water due to the ever-increasing demand for freshwater. The depletion of groundwater has resulted in a drop of almost 15–20 metre in recent decades, leading to the collapse of aquifers and looming threat of "day zero" in Lucknow city. Most urban utilities treat water as a homogenous good despite clear preference for quality-differentiated supply.

Prof. Dutta also mentioned the encroachment or drying up of more than 65,000 waterbodies in Uttar Pradesh as per the recent Census of Waterbodies by the Ministry of Jal Shakti. To mitigate this problem, non-potable water can be used for various purposes such as power plants, industrial applications, irrigation and natural augmentation.

The speaker discussed various policies and frameworks, such as the National Environment Policy (NEP, 2006); National Water Policy (NWP 2012); Model Water Reuse Regulation (2018) by MoUD; Service Level Benchmarks (SLBs) of MoHUA; and National Framework on Safe Reuse of Treated Water by NMCG, which promote the safe and sustainable reuse of treated wastewater for non-potable uses.

He also pointed out five major challenges to the implementation of these policies, including social and cultural acceptability, public health concerns, infra-technology challenges, financial sustainability, and legal and regulatory challenges.

The following were some suggestion to address the issues:

1. Establishing water-quality standards fit for the purpose of end-use;

2. Developing state policies and municipal regulation with clear-cut standards;

3. Developing markets for reclaimed water and incentivize compliance;

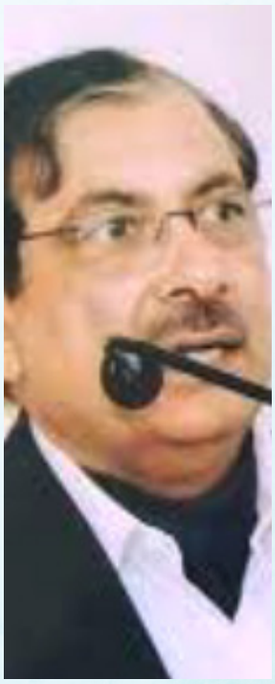
4. Providing opportunities to reuse treated wastewater and maintain the quality freshwater supply; and

5. Well-managed institutional arrangements with clear policies are key to effective water recycling projects.

SESSION 9
CLIMATE CHANGE AND RESILIENCE: FRAMING OF WATER-SENSITIVE AND WATER-WISE CITIES IN THE CLIMATE CHANGE CONTEXT

Day 3: April 27, 2023

SPEAKERS

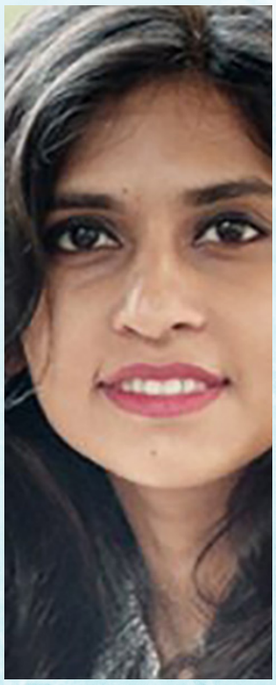


Manu Bhatnagar,
Principal Director, Natural Heritage Division, INTACH

Depinder Kapur,
Director, Water Programme, CSE

SPEAKERS

Manushi Ashok Jain,
Co-founder, Sponge Collaborative, Chennai



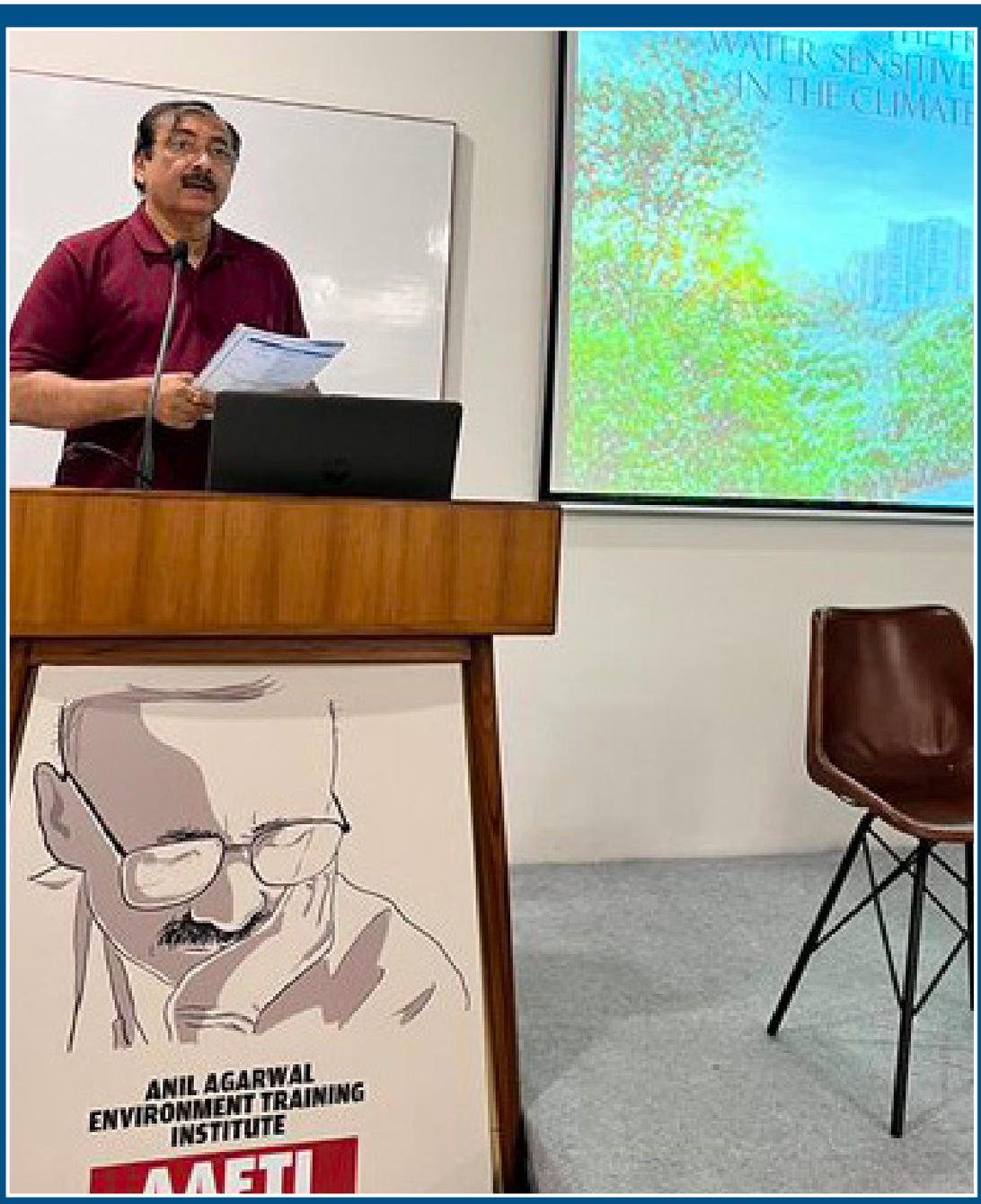
Somnath Bandyopadhyay,
Independent Consultant, ex. Prof. Nalanda University

Arne Panesar,
Head, SuSanA Secretariat, GIZ

Manu Bhatnagar discussed India's rapid urbanisation, with over 53 cities with a population of a million-plus. Punjab and Gujarat already have more than 50 per cent urban population. Although cities cover only 3 per cent of land area, they contain 50 per cent of the population and consume 70 per cent of all resources.

The high population density puts heavy pressure on open spaces and natural assets, especially in urban areas. Bhatnagar noted that India has about 8,000 urban areas, with a handful planned and the rest pure organic growth. The issues include a growing demand–supply gap, exhausted and anaemic rivers, depleted aquifers, global warming, rainfall patterns and urban water insecurity.

Human agency causes include a supply-side focus in the zone of diminishing returns, urban planning that ignores watersheds and topography, heat islands and a real estate focus that leads to loss of wetlands and urban forests. To move forward, Bhatnagar recommended policy mainstreaming of water issues, a collaborative approach, reduced energy inputs and preparation for extreme events to ensure water security.



Manu Bhatnagar sharing his views about water-sensitive cities in context of climate change

Depinder Kapur discussed the importance of incorporating ethical principles and values in designing policies to address challenges related to urban water and wastewater. He emphasised the need to contextualise interventions to cities of the Global South to avoid inflicting more damage than good. He suggested fixing existing non-functional infrastructure, developing functional and inclusive infrastructure for unserved areas, and mitigating in situ urban flooding as key interventions. He also emphasised the importance of water-sensitive urban planning and design and reducing the cost of electricity pumping to transport water and wastewater over long distances to treatment plants.

> **Interventions to cities of the Global South need to be contextualised to avoid inflicting more damage than good"**
>
> **Depinder Kapur,** Director, Water Programme, CSE

Depinder Kapur emphasising the need for context-specific interventions to cities of the Global South

The four parameters to promote sustainable and integrated approaches to water management for water-sensitive cities of the Global South that address the unique challenges faced by cities in developing countries are:

1. Grey infrastructure for informal settlements: It is important to recognize that informal settlements often lack basic water and sanitation infrastructure, and therefore need to be prioritised in any effort to promote water-sensitive cities. Rather than expecting these areas to practise water conservation, they should be offered subsidised water and wastewater services to ensure access to safe and reliable water and sanitation.
2. Functionality of existing infrastructure: Without improving the functionality of existing infrastructure, any gains from water-sensitive cities interventions may not be realised. Therefore, it is crucial to prioritise the improvement of existing grey infrastructure to ensure that it is functioning efficiently and effectively.
3. Reuse of treated or untreated wastewater: The reuse of treated or untreated wastewater is an important aspect of water-sensitive cities as it allows for recovery of nutrients and promotes sustainable and efficient use of water resources. Incineration and disposal should be avoided in favour of reuse wherever possible.
4. Stormwater management: High run-off from high built-up urban areas and climate change-induced rainfall intensity pose significant challenges to stormwater management in water-sensitive cities. Therefore, it is important to prioritise the augmentation of stormwater management systems to both conserve water and meet discharge standards.

By addressing these four parameters, cities in the Global South can promote sustainable and integrated approaches to water management, improve public health and well-being, and protect the environment for future generations.

> **Sanitation should be seen as a catalyst for climate action and sustainable development rather than an obstacle"**
>
> **Arne Panesar,**
> Head, SuSanA Secretariat, GIZ

Arne Panesar discussed the potential of sustainable and climate-resilient sanitation in the context of the climate agenda.

The session highlighted the link between climate change and sanitation and emphasised the importance of adequate wastewater and faecal sludge management in reducing methane and nitrous oxide emissions. The session also discussed low-emissions alternatives to chemical fertilisers and irrigation water, nature-based solutions, carbon sinks, and the role of SuSanA in promoting sustainable sanitation practices. The key focus areas highlighted for climate-resilient sanitation include institutional policy and planning, infrastructure and finance.

Manushi Ashok Jain spoke about the role of nature-based solutions in addressing climate change, and the integration of nature-based solutions through planning, design and advocacy projects across multiple scales. She presented the landscape of a variety of projects implemented by Sponge Collaborative, a a multi-disciplinary strategic planning and design firm.

She emphasised that climate change can be addressed through nature-based solutions based on the principles of protect (green ecosystem and waterbodies from encroachment and pollution), restore (ecological functions of degraded or polluted landscape), enhance (coastal, riparian, wetland ecosystem with hybrid infrastructure) and construct (blue–green infrastructure in open spaces, streets and buildings) and by adopting approaches such as the promotion of strategic basin planning and water-sensitive urban design and mainstreaming blue–green infrastructure planning and implementation in Indian cities.

At the institutional level, *Sponge Handbook: Chennai* served as a tool for policymakers to integrate blue-green infrastructure into urban infrastructure delivery. With the help of strong regional analysis, short-term projects such as sponge street upgrades, interceptor streets and filtration gardens were proposed.

At the metropolitan scale, Sponge Collaborative is working on a third vision Master Plan with Chennai Metropolitan Development Authority (CMDA). This is a spatial framework to prioritise where blue–green systems need to be protected from land-use conversion, restored from negative urban impacts, enhanced to face climate risks, and constructed to mitigate hazards. At the neighbourhood scale, the sponge city framework is developed by using land cover mapping and street surveys, siting sponge-street and open-space interventions, quantifying impact of sponge network on flood mitigation, and aquifer recharge.

> **Is it time to think of a grid for drinking-water security?"**
>
> **Somnath Bandyopadhyay,**
> Independent consultant, ex. Prof. Nalanda University

Somnath Bandyopadhyay talked about various water systems and resources in different parts of Gujarat, including irrigation canals, wetlands, rivers and groundwater. He discussed various waterscapes in Gujarat state.

He also discussed how the Narmada River has provided water security to Gujarat and enabled growth in various sectors. He believes that a national water grid is emerging, possible and desirable for building resilience and providing possible water trade. This water grid will incentivise local sources, storage and reuse, including rainwater harvesting, desalination, and dew and wastewater treatment. It will also be linked with other networks such as highways and railways.


THE POLICY & PRACTICE FORUM


FORUM 2023
WORKING TOWARDS A PARADIGM
SHIFT IN THE GLOBAL SOUTH
Date
APRIL 25-27
2023
Venue
ANIL AGARWAL ENVIRONMENT TRAINING
INSTITUTE, NIMLI, ALWAR, RAJASTHAN
SSM
giz
FSMA
IWA

SESSION 10: DEVELOPING AN AGENDA FOR CHANGE, IDENTIFYING PRIORITIES AND COLLABORATIONS

Day 3: April 27, 2023

CONTEXT SETTING AND MODERATOR

Sunita Narain
Director General,
Centre for Science and Environment

SPEAKERS

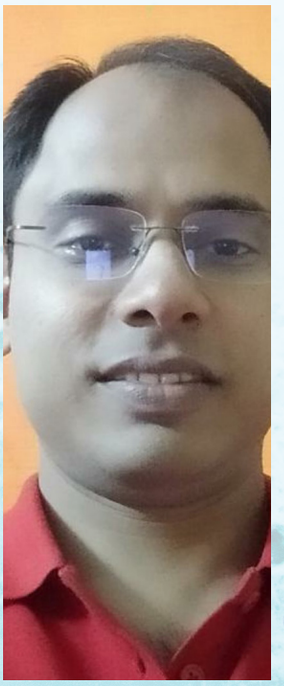
Roopa Mishra,
Joint Secretary,
Ministry of Housing and Urban Affairs,
Mission Director – Swachh Bharat Mission-Urban

Jay Bhagwan,
Executive Manager,
Water Use and Waste Management, Water Research Commission;
Arne Panesar Head,
SuSanA Secretariat, GIZ

SPEAKERS

Kartik Chandran,
Professor, Earth and Environmental Engineering, Columbia University

Jagan Shah,
Senior Fellow, Artha Global



B. Parameswaran,
Director-cum-Joint Secretary, DDWS, Government of Odisha

Sunita Narain setting the context and welcoming Roopa Mishra, Joint Secretary, MoHUA

The session focused on the way forward for different thematic areas, which was based on the brainstorming done by the working groups. The groups were carefully selected and distributed among the participants and panelists attending the P&P forum based on their expertise in selected thematic areas.

The working group presentations were moderated by Sunita Narain, Director General of CSE (Centre for Science and Environment), and chaired by Roopa Mishra, Joint Secretary of MoHUA (Ministry of Housing and Urban Affairs) and Mission Director of SBM (Swachh Bharat Mission) Urban.

Sunita Narain initiated the session by briefing Roopa Mishra on the importance of the session, its background, and how it culminated all the ideas and deliberations from the previous two and a half days. The session aimed to identify the way forward and action plans for different thematic areas, such as sustainable sanitation, faecal sludge and septage management and water-sensitive cities.

Overall, the session provided a platform for experts and stakeholders to come together and share their insights and experiences, and to develop concrete and actionable plans for promoting sustainable and inclusive urban development in India and Global South.

WORKING GROUP 1: NON-SEWERED SANITATION TREATMENT SYSTEMS AND SOLUTIONS

Working Group 1`s presentation on "Non-sewered sanitation treatment systems and solutions" was given by Jay Bhagwan, Executive Manager of the Water Research Commission. During the brainstorming session, the group members spoke about the importance of political will for the success of an initiative, and how national policies can stimulate the implementation of state policies. The group also highlighted that faecal sludge and septage management (FSM) should be seen as an alternative to sanitation problems.

Jay Bhagwan emphasised the institutionalisation of FSSM practices, clustering of smaller urban and rural ULBs, and creating an enabling environment through subsidising FSM setups and related services, scheduled desludging, and context-adapted bylaws. For solutions, he advocated for technology that is agnostic, locally specific, affordable and efficient, such as nature-based solutions that include sludge drying beds and settling thickening tanks. He also highlighted that service delivery is more important than technology selection and that capacity building of different stakeholders, developing baseline data through SFDs (shit flow diagrams), ensuring the safety of sanitation workers, and inclusion in planning are necessary for successful implementation of non-sewered sanitation treatment systems.

The pointers for the way forward included promoting co-treatment, mobile FSTPs (faecal sludge treatment plants), beneficial reuse of by-products influencing technology selection, reuse of biosolids in agriculture, and routing sludge to pumping stations. These actions can help in promoting sustainable and inclusive urban development, improving public health and well-being, and protecting the environment.

Overall, the presentation highlighted the importance of an enabling environment, capacity building and technology that is locally specific, affordable and efficient for the successful implementation of non-sewered sanitation treatment systems. The way forward should prioritise actions that promote co-treatment, beneficial reuse of byproducts and routing sludge to pumping stations.

Jay Bhagwan presented the recommendations for Working Group 1 focussing on non-sewered sanitation systems and solutions.

WORKING GROUP 2: HOW TO SCALE UP NON-SEWERED SANITATION SYSTEMS

The presentation by Rohini from CDD Society focused on Working Group 2's theme of "How to scale up non-sewered sanitation systems". The presentation highlighted the importance of enabling policy-level interventions for scaling up non-sewered sanitation systems (NSS).

The presentation emphasised on the need to bring equity between NSS and sewered solutions (SS) and legislation and regulation-freezing criteria and standards for NSS with consideration of socioeconomic conditions. The presentation also highlighted the need for enabling financial arrangements for infrastructure, software and administration. Within institutional arrangements, mandates, responsibility and accountability should be clearly defined. Differential policies for different tiers of cities and convergence of NSS and SS could also be explored.

Policy-level interventions require an enforcement mechanism and capacity development of stakeholders, strengthening data-based governance, robust planning processes, and private-sector ecosystem development. Administrative changes are also required, such as a decentralised agenda, priority for tier 2 and 3 towns, ease in acquisition of land, and a bottom-up approach. The presentation also highlighted the need for political change agenda and buy-ins, tapping MP/MLA funds and consensus building.

For scaling up, research needs to be done on differential standards, innovation in data collection, reporting, analysis, enhancement of tools, and technology matrix for FSTP, STP, and decentralised wastewater treatment systems in different cities. To take the next step, South–South collaboration, inter- and intra-sectoral integration, coordination among actors, public–private partnership or engagement, and academic/lab collaboration could be explored. The presentation ended with Rohini stating that "Sanitation services are public services."

Overall, the presentation highlighted the importance of enabling policy-level interventions, administrative changes and research for scaling up non-sewered sanitation systems. By promoting inter-sectoral integration, public–private partnerships and academic collaboration, we can promote sustainable and inclusive urban development, improve public health and well-being, and protect the environment.

Rohini Pradeep presenting on behalf of Working Group 2 on how to scale up non-sewered sanitation systems

WORKING GROUP 3: THE WAY FORWARD FOR AN INCLUSIVE URBAN SANITATION CHANGE AGENDA

Vandana Menon presenting the way forward for an inclusive urban sanitation change agenda on behalf of Working Group 3

The presentation by Vandana Menon, an independent consultant from Working Group 3, focused on the way forward for an inclusive urban sanitation change agenda. Vandana discussed the policy from two lenses: regulation and financial. From a regulatory perspective, Vandana highlighted the need to formalise desludgers, restrict monopolies, ensure payment through digital solutions, and form bylaws while advocating for compliance leniency. On the financial side, she talked about providing insurance, promoting public–private partnerships, market maturity and incentives, credits, and social impact bonds. Regarding research, Vandana advocated for studying desludging zones, technical innovations in trucks and equipment, and transfer stations within a city. For collaborations, she talked about promoting local leadership, expanding existing networks, and creating forums for giving voice to the users of the end product and desludgers. She said, "Manual scavenging needs to be stopped" and the need of the hour is a "consolidated sanitation policy".

Overall, the presentation highlighted the importance of regulatory and financial interventions, research, collaboration and the need to stop manual scavenging and consolidate sanitation policy. By promoting public–private partnerships, market maturity and incentives, the financial sustainability of sanitation solutions can be improved. By studying desludging zones and technical innovations and promoting local leadership and collaboration, we can promote sustainable and inclusive urban development, improve public health and well-being and protect the environment.

WORKING GROUP 4: TREATED BIOSOLIDS – STANDARDS AND REUSE

Sahana Goswami presented the recommendations and way forward on behalf of Group 4 on biosolids and its reuse and standards

The presentation by Sahana Goswami from WRI focused on Working Group 4's theme of "Treated Biosolids – Standards and Reuse". Sahana discussed the recommendations as part of the National Action Plan on Circular Economy and proposed extending it into a national-level policy on the reuse of biosolids. The idea of establishing a body at the ULB level responsible for the reuse aspects and governance reforms in the ULB structures was also put forward. Sahana strongly raised a voice for Extended Producer Responsibility on the quality of biosolids generated and integrating the economics of bio-solid standard testing and reuse within the CAPEX and OPEX estimates of FSTP/STPs.

She proposed several research topics for the thematic area, including characterisation, virtual biosolid pathway modelling, determining reuse potential, charting out the quality and quantity of biosolids generated from different treatment systems by building a decision matrix, and linking influent and effluent biosolids streams using appropriate technologies. Sahana also proposed prioritising standardising protocols and SOPs for biosolid testing in labs.

On the collaboration side, Sahana suggested exploring partnerships with agriculture universities, IARI/MNRE, Pollution Control Boards (PCBs) as the monitoring and regulatory body at the state level, rural departments/Panchayati Raj for urban–rural convergence, FFCO/industries to absorb the higher value products from treatment, agricultural cooperative societies/Krishi Vigyan Kendra, community groups/ farmers associations/SHGs, start-ups and innovators/ entrepreneurs in finding options to advance the circular economy, and international research institutes such as Columbia University. She ended by saying that we should replace addressing "biosolids with feedstock". Overall, the Working Group 4 presentation highlighted the importance of establishing a national-level policy on the reuse of biosolids, extending producer responsibility, research topics, collaboration with various sectors, and promoting a circular economy.

WORKING GROUP 5: RURAL–URBAN CONVERGENCE FOR TREATED USED WATER AND SLUDGE MANAGEMENT

The presentation by B. Parmeswaran, Joint Secretary, DDWS, Government of Odisha, focused on the theme of Working Group 5, "Rural–urban convergence for treated used water and sludge management". The presentation highlighted the importance of in situ storage, reuse and repurposing treated water where possible, and neighbourhood-based utilisation in line with ecological zones where land/topographical restrictions exist. Water reuse should be based on local water demand for lake rejuvenation, industrial and farm use. Parmeswaran emphasised the need for data-driven decisions for assessment of quantity, quality, current uses, water availability (ground and surface), and water requirements as part of informed planning and policy for reuse. Stakeholder mobilisation should be done through formation and/or mobilisation of bodies similar to Jal Jeevan Mission in peri-urban areas and capacity building to reduce the rural–urban disconnect in terms of invested representatives of communities and other stakeholders on different topics such as used water management and reuse. Regarding finances, Parmeswaran advocated for subsidising the cost of water reuse, if any, such as pumping and testing, with the onus on the user. To achieve true convergence, treating rural wastewater and treated urban used water under Amrit Sarovar where possible should be practised. Reuse of treated sludge should be based on local demand. For example, if an STP/FSTP is near farms, treated sludge should be promoted as a soil conditioner or compost. For convergence in treatment, Parmeswaran suggested extending FSTPs to take on rural FS to utilise unused capacity within a 10-km boundary. For equity, justice and inclusion, defining priorities on water/sludge assignments under high demand, rural needs over industries, and communities with no water access over those that have some available access should be done.

Overall, the presentation highlighted the importance of in situ storage, reuse and repurposing of treated water, data-driven decisions, stakeholder mobilisation, capacity building and subsidising costs for water reuse.

B. Parmeswaran presenting about the way forward for rural–urban convergence

CONCLUDING AND CLOSING OF THE FORUM

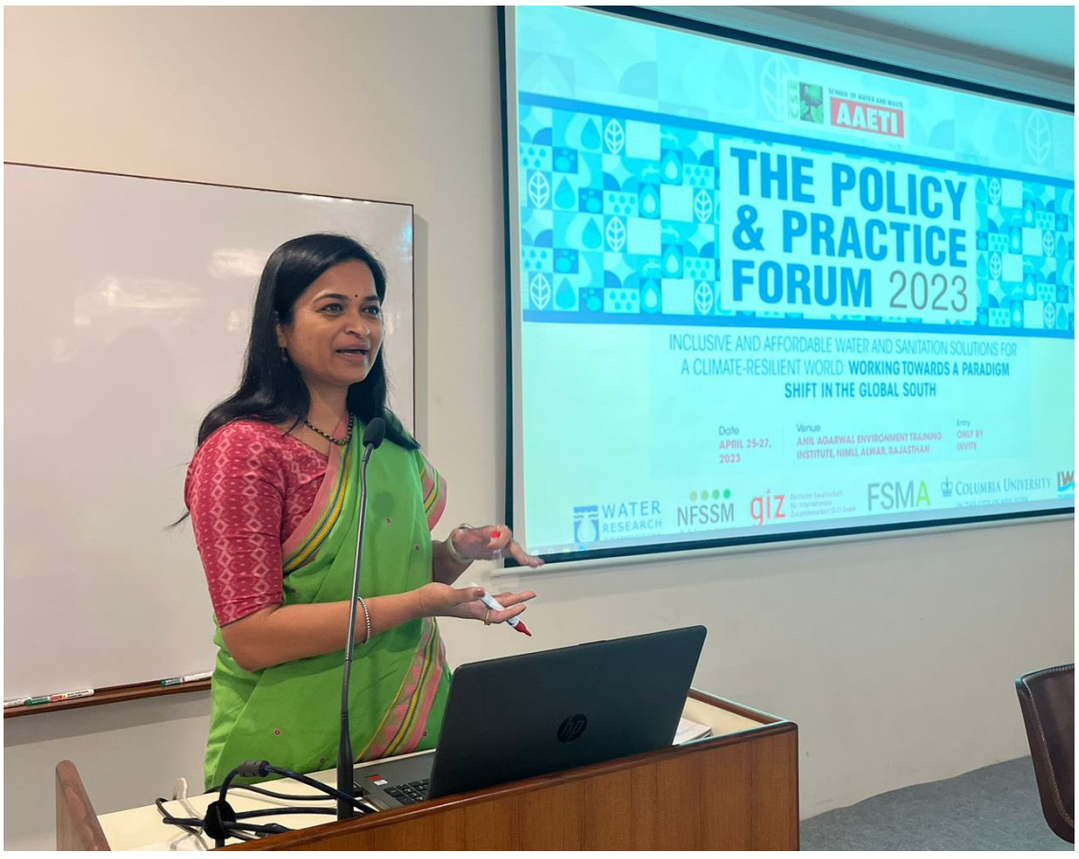
During the session reflection, Roopa Mishra commended all the working groups for their brainstorming and deliberation in putting forward a plethora of ideas for the different thematic areas assigned to each group. She highlighted that the thematic areas truly took care of all the perspectives related to sanitation.

Mishra also commended CSE and Water team for arranging such a forum where national experts, policymakers, practitioners, academia, NGOs, and researchers working on water, sanitation, used-water issues, and the challenges of climate change impacting the intensification of the water cycle could come together to discuss, deliberate and carve a path forward for achieving SDGs.

Mishra highlighted that none of us can exist or progress in isolation, and the way forward requires political leadership, partnerships, public finance, and people. She concluded by highlighting the importance of taking forward this agenda and learning curve ahead to ensure sustainable and inclusive urban development.

Sunita Narain thanked Roopa Mishra for attending the Policy and Practice Forum 2023 and for her valuable insights. She also announced the launch of two studies conducted by the CSE laboratory for performance evaluation of FSTPs and analysis of biosolids.

Ms Narain concluded the forum by thanking all the participants for their active engagement and contributions towards promoting sustainable and inclusive urban development, improving public health and well-being, and protecting the environment. She also thanked the Water team for organising the forum and providing a platform for national experts, policymakers, practitioners, academia, NGOs and researchers to come together and discuss crucial issues related to water and sanitation.



Roopa Mishra addressing the participants in the Policy and Practice Forum

Roopa Mishra highlighted the need of 4 Ps in the sanitation sector reform agenda

The sanitation sector is a work in progress . . . the government's vision for the sector is based on the principle of "three Ss": Seriousness, Speed and Scale"

Roopa Mishra,
Joint Secretary, Ministry of Housing and Urban Affairs,
Mission Director – Swachh Bharat Mission-Urban

A FEW MORE GLIMPSES FROM THE EVENT

Yusuf Kabir, UNICEF, sharing a light moment with fellow participants

Abdulla Al-Muyeed and others sharing thoughts with Sunita Narain

Arne Panesar during a conversation with Sunita Narain and Abdulla Al-Muyeed

Santosh taking charge of CSE publications display and selling counter

CSE's Swati, Poonam and Jatin ready to register the participants for Policy and Practice Forum

Working group participants at a brainstorming session during dinner

Engaging late-evening discussions of the working groups underway

Participants sharing their knowledge and experiences during working group discussions

Participants ready for a photograph after a rigorous working group discussion

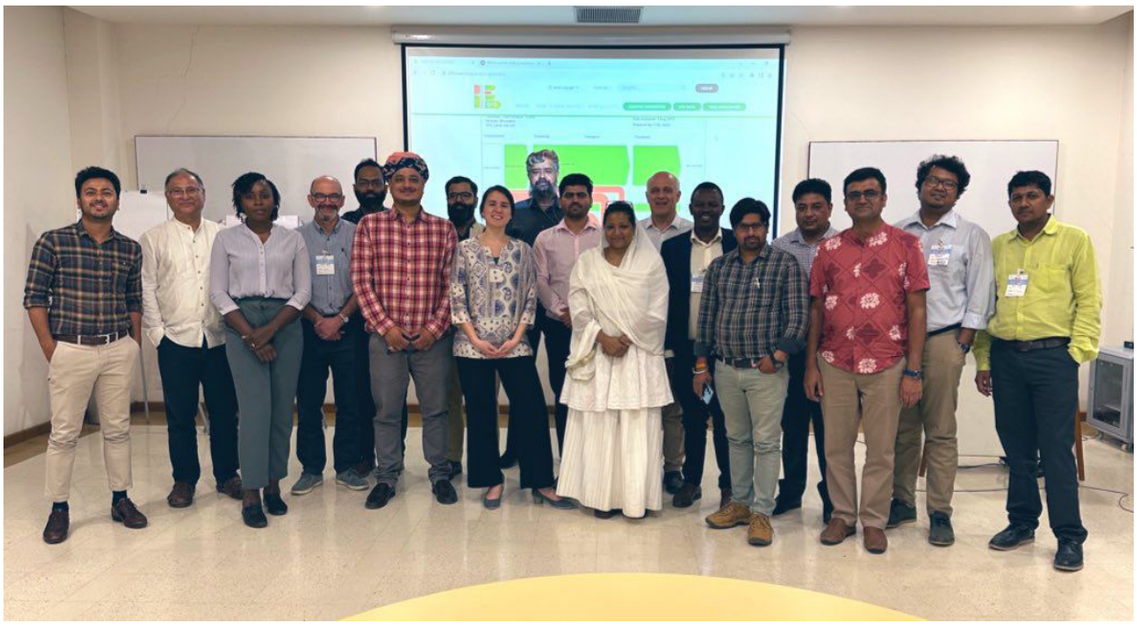
Avinash Y. Kumar from NIUM clearing his doubt during a question-and-answer session

Chaiwe Mushauko-Sanderse, SuSanA, emphasised the need for more deliberate interaction between countries of the Global South to learn from each other's successes and failures.

Yusuf Kabir from UNICEF imparting his knowledge during discussions

Sugeet Grover, CSE, explaining the green features of the AAETI campus during the campus tour

Jyoti Parsad Dadhich, CSE, introducing participants to various decentralised wastewater treatment systems in AAETI during a campus tour



A group photograph of the participants of a SuSanA meeting to discuss the challenges and way forward

OTHER ENGAGEMENTS AND FUN ACTIVITIES DURING THE POLICY AND PRACTICE FORUM

Participants taking part in early morning trekking activity

Participants trekking – such activities stimulated positive interactions and open communication

Happy participants after completing an early morning trekking activity on Day 3 of the Forum

BEAUTY AT OUR STATE-OF-THE-ART TRAINING CENTRE ANIL AGARWAL ENVIRONMENTAL TRAINING INSTITUTE (AAETI)

The group of participants had a few creative and extra talented photographers who captured the beauty of your training center at AAETI. It's always wonderful to have visual records of memorable moments and beautiful places. Here are a few snippets captured through their lenses.

A view of AAETI on a cloudy day

Rajeev Munankami captured the beauty of AAETI with his lens

Jairam Pathak from the Agha Khan Foundation brilliantly captured 25 different varieties of birds

Prof. Venkatesh Dutta, BBAU Lucknow, captured the beauty at AAETI

A fascinating waste-wise initiative on the campus at AAETI. All the waste – including kitchen and food waste – is segregated after every meal and measured on the spot.

An evening of traditional food and culture for the participants to immerse themselves in

A view of the gala dinner for the guests at AAETI during the Policy and Practice Forum

BEHIND THE SCENES

The success of the Policy and Practice Forum 2023 was due to meticulous planning and execution by the CSE and the Water team. Starting from the conception of the event, the team identified the key thematic areas and worked towards selecting experienced resource persons who could provide valuable insights and perspectives. The team then structured the sessions to ensure that each thematic area was covered comprehensively, and the discussions were informative and engaging.

The logistical arrangements for the participants' travel were also carefully planned, including transportation to and from the venue and accommodation arrangements. The team also coordinated with the participants and panellists to ensure that they had all the necessary information and support for their participation in the event.

Engaging with the panellists to structure the sessions was another critical aspect of the planning process. The team worked closely with the panellists to ensure that the discussions were relevant, informative, and engaging for the audience.

Finally, all the necessary arrangements at AAETI, where the event was held, were made to ensure that the event was conducted successfully. The team worked tirelessly to ensure that every detail was taken care of to provide a seamless and enjoyable experience for all the participants.

Overall, the success of the Policy and Practice Forum 2023 was a result of CSE's and the Water team's dedication and hard work in planning and executing the event. The following are a few glimpses from behind the scenes.

The seating arrangements in preparation of the event

Depinder Singh Kapur along with Subrata Chakraborty making fine adjustments in the seating arrangements a day before the event

Lakhinder from CSE checking the audio–video a day before commencement of the Forum

FEEDBACK

I am delighted to join the three-day Policy and Practice Forums organised by the Centre of Science and Environment (CSE). The forum was unique in participants, represented by hardcore water and sanitation professionals from the Global South (India, Bangladesh, Nepal, South Africa, Zambia and Uganda). The group was small that came up with concrete recommendations for the action, especially to speed up inclusive sanitation goals through decentralized and non-sewered approaches.

"We have no time left to transition from water insecurity and wastewater management impacted by climate change," the Honorable Minister, Mr Hardeep Singh Puri, Ministry of Housing and Urban Affairs, Government of India, said during his opening remarks.

Notes from the champion senior public officials like Secretary Mr Mathi Vathanan, Principal Secretary, HUDD, Government of Odisha, Mr Asok Kumar, Director General, National Mission for Clean Ganga and finally Ms Roopa Mishra, Joint Secretary, Ministry of Housing and Urban Affairs, Mission Director – Swacch Bharat Mission – Urban were outstanding. Ms Roopa Mishra highlighted the need for Seriousness, Speed and Scale that 4P approaches can do: P: Political Commitments; P: Public Financing; P: Partnership; and P: People. Ms Roopa said that India has already achieved two "Ps"– "Political Commitment and Public Financing" – and now needs to focus on two "Ps" – "Partnership and People".

4,862 cities in India have made their plans for water security under AMRUT 2.0. This is an exciting time in India for both Policy and Practice.

Well done, CSE, Sunita Narain and Depinder Kapur. I hope this kind of forum will be initiated by professionals from each country from the global south to gear the speed for scale!

ROSHAN RAJ SHRESTHA, DEPUTY DIRECTOR, WATER, SANITATION AND HYGIENE, BILL & MELINDA GATES FOUNDATION

The programme on "Policy and Practice Forum 2023", anchored by the Centre for Science and Environment, New Delhi, is being attended by more than 130 panellists and participants from all over the world and especially from Africa, South Asia and India.

There were 10 sessions in the three-day meet, which touched upon the most neglected aspects of the sanitation service value chain: treatment and reuse.

In the inaugural session, while delivering the keynote address, G. Mathivathanan, Principal Secretary, Housing and Urban Development Department-cum-Chairman, Odisha Water Academy (OWA), Bhubaneswar, presented the uniqueness of the Odisha Model, and highlighted Odisha's remarkable journey in water security and integrated sanitation systems approach, including both sewered and non-sewered, decentralised community-led sanitation – with an affordable and inclusive approach.

The P&P Forum Sessions were structured to include international and specifically Global South countries experiences.

SANTANU RATH, DIRECTOR, ODISHA WATER ACADEMY (OWA)

Day 1 of the Policy and Practice Forum in India was a great start to the discussions. We discussed among other things case studies on water and sanitation interventions within the region, water and sanitation tools (SFD, sanitation safety plans), knowledge tools and interventions (Sustainable Sanitation Alliance [SuSanA]) and regulatory frameworks.

I also added my bit about affirming the need for more South-to-South engagement considering the similarities in contexts, challenges and solutions. We need to see more deliberate action from Global South countries in speaking to each other and in actively pursuing solutions that have worked and learning from those that haven't.

CHAIWE MUSHAUKO-SANDERSE, SUSANA

The Policy and Practice Forum 2023 was a truly enriching and insightful event, bringing together water and sanitation professionals from around the world to exchange ideas and learn about innovative practices.

Innpact Solutions highlighted three key CWIS planning approaches from their experience in working across India, Bangladesh, and Nepal: identifying true beneficiaries for containment improvement, optimising system utilisation across the value chain, including transfer stations and public and community toilets, and introducing a new sanitation paradigm with reinvented toilets as an alternative to traditional systems.

The forum also featured powerful sessions on sustainable FSTP operations through local SHG involvement from Odisha's experience, the potential of nature-based solutions in grey water management, and the safe use of biosolids from FSTPs to enhance sustainability, especially in rural areas. A big thank

you to the Centre for Science and Environment, New Delhi team for organizing this outstanding event, and for those who haven't visited the CSE Neemli campus, don't miss the opportunity to experience it firsthand.

INNPACT SOLUTIONS

Thank you so much for the invitation for the great meet. It was indeed a great learning experience, as well as getting to know the views of the government directly. Of course, the different points of view keep you thinking at the same time . . . be open to ideas and perspectives. All together, it was a great intellectual experience, not to forget the warm hospitality of the CSE team (and the premises). Look forward to such forums – so important for the discourse.

SUJAYA RATHI, INDEPENDENT CONSULTANT

Thank you CSE team for inviting me to the three-day Forum. I congratulate the team for hosting this convention where we all could benefit from very detailed, technical deliberations. Thank you for bringing in so many perspectives together. Definitely, each one of us is benefitted from the rich, thought provoking information we have gathered through the deliberations and the potential of future collaborations that we see through the networking. I must appreciate your hospitality, all arrangements including travel, food and stay were flawless. Listening to the torchbearers has given reassurance that there is a paradigm shift happening all across and would lead us to a better world for sure!

DR SAYALI SANDBHOR, HEAD CIVIL ENGINEERING, SYMBIOSIS INSTITUTE OF TECHNOLOGY, PUNE, INDIA

Thank you AAETI and the CSE team for the great effort and it was great catching up with good networks and great learnings.

SIKSHYA, GWSC (THAILAND)

Just reached Freiburg and look back to a wonderful week full of exchange and insights with you all. Thanks to the whole CSE Team for making this happen!!!

And thanks to everyone involved and especially to CSE – it was an excellent week. Really great to have the opportunity to share experiences and learn from each other – I certainly learnt a lot – in such a beautiful location. Thanks for inviting me.

ANDY PEAL, INDEPENDENT CONSULTANT

I send you all greetings and best regards. I have arrived safely back home in Kampala. I learnt a lot from you all, in ways more than you can imagine. In future, we can combine with a field visit some nice FSMs. Also, if possible, we can alternate between south to south so we learn from you and you learn from us.

CHARLES B. NIWAGABA, MAKERERE UNIVERSITY; KAMPALA, UGANDA, EAST AFRICA

I would like to also take the opportunity to share a big thank you and congratulatory note to the CSE team for this event. The technical depth in the discussions presented potential to connect with exciting minds, and the level of engagement at the event has allowed it to set a very high standard to our policy conversations. The event also seemed to have a healthy representation of seniors, mid-career and young practitioners from the sector. A lot of gratitude to the CSE team for facilitating a safe and hospitable environment at the AAETI campus, which truly allowed us to engage long into the day. Though intellectually intense, it also was therapeutic as well. Going back with great food for thought . . . All in all, this has been an amazing event!

AVINASH Y. KUMAR, NATIONAL INSTITUTE OF URBAN MANAGEMENT, GOVT OF TELANGANA

Sustainable and equitable development will be possible in this country only if the Government does something in this regard. NGOs can at the most implement pilots on the margins. That is why the role of the Centre for Science and Environment (CSE) and its Director, Sunita Narain, is so commendable. CSE has done evidence-based advocacy for four decades under Sunita's leadership to get the Governments at the Centre and the states to undertake legal and policy measures to reduce air and water pollution. I attended a convention over the past three days organised by CSE on sustainable sanitation so as to prevent pollution of our waterbodies and groundwater due to the untreated release of polluted used water and sludge, mainly from toilets.

It was heartening to note that the Minister of Housing and Urban Development and several bureaucrats at the Centre and several states unequivocally stating that sanitation services are a public good and it is the responsibility of the government to ensure that these are provided either free or at a low cost to the citizens and committing substantial funds for state-level sustainable sanitation. Even though there is a long way to go, the status of waterbodies are indeed improving.

RAHUL BANERJEE, INDEPENDENT CONSULTANT

Thank you Sunita ji, Depindarji and the entire CSE team for hosting and facilitating the international conference on such contemporary themes and wide-ranging issues, with an impressive line-up of amazing speakers and panellists. The agenda and sessions were well thought of, designed in sequences. The deliberations were extremely thought-provoking and insightful. Overall it was a great learning experience.

Appreciate your warm hospitality as well . . . the surrounding hills, chirping birds and serene eco/environment-friendly atmosphere left an indelible impression on everyone's mind. Far away from the madding crowd . . . profound gratitude.

SANTANU RATH, DIRECTOR, ODISHA WATER ACADEMY

Going by how enriching the last day of the forum was, I can only imagine how stimulating the first two days would have been! The synthesis was rich and a good learning for us.

As I mentioned, learning coming out of these sessions should inform the work that organisations like ours are doing and I am wondering if we could continue these conversations during our annual reflections and planning meeting. This usually entails involvement of around 30–35 colleagues from the four states we work in, engaging intensely over three days to understand the changes in the environment we work in and then trying to weave it into our planning.

It would be great if we can have a conversation with some of your colleagues that work on water and sanitation to talk to us about the changes in the sector and help us sharpen our priorities. Having it at your campus can help us to visit the field as well. Do let us know if we could have this sensitisation/training/conversation sessions between June 6 and 9 at the AAETI campus.

BISHWADEEP GHOSE, CEO, WATER FOR PEOPLE

Great brainstorming on regulatory, policy, planning, implementation, capacity, technical and financial aspects for scaling up used water management, with specific focus on small cities.

ROOPA MISHRA, JOINT SECRETARY, MINISTRY OF HOUSING AND URBAN AFFAIRS, MISSION DIRECTOR – SWACHH BHARAT MISSION-URBAN

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84.	Raiman Krishna	Assitant Manager	KPMG	India

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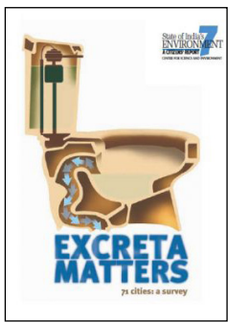
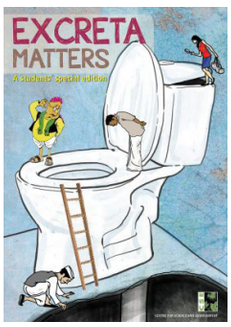
SUNITA NARAIN
ROOPA MISHRA

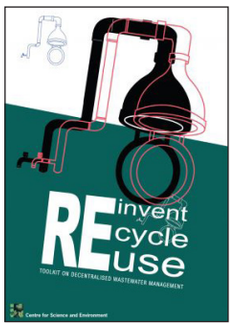

PANELISTS

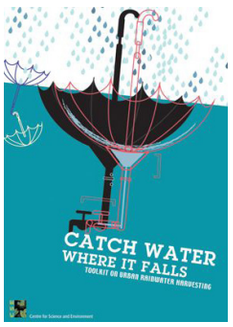
CSE URBAN WATER AND WASTEWATER PROGRAMME

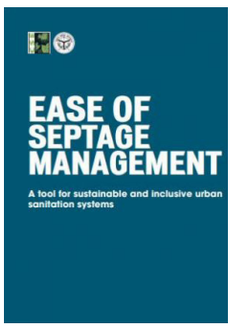
PUBLICATIONS

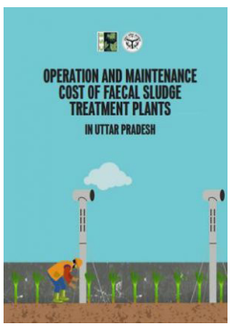


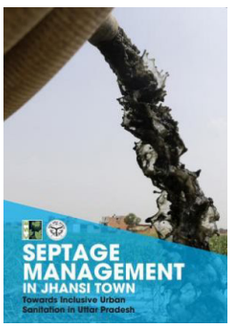


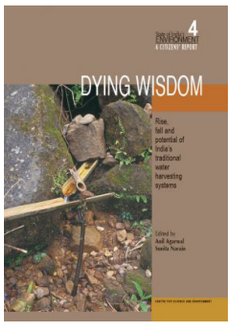


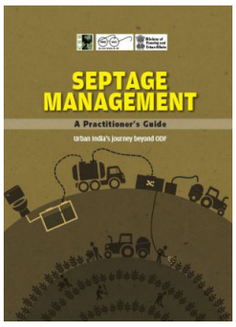


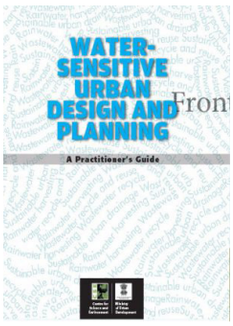


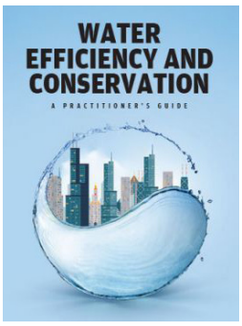


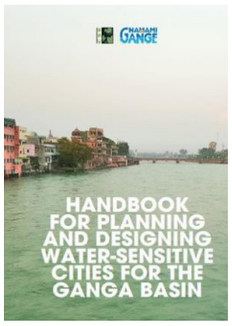


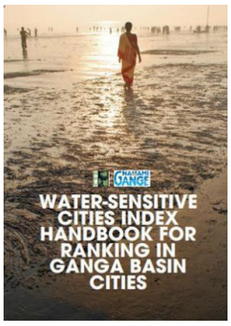


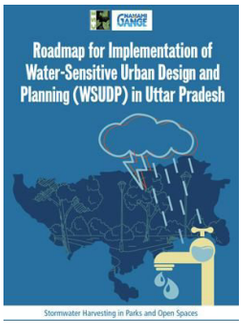


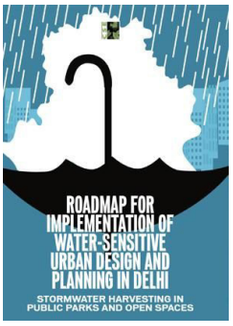


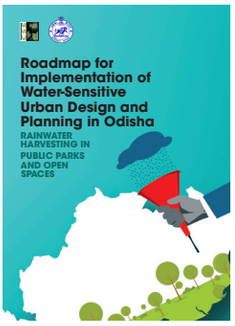


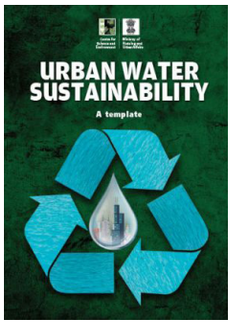


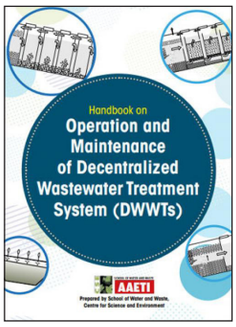


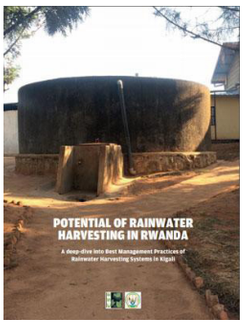


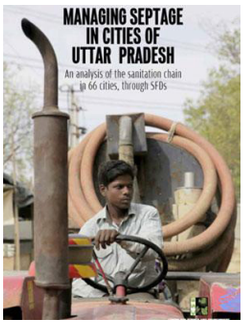


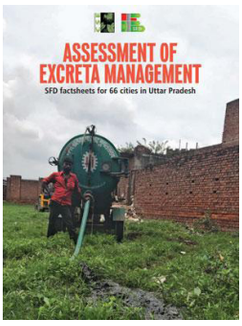


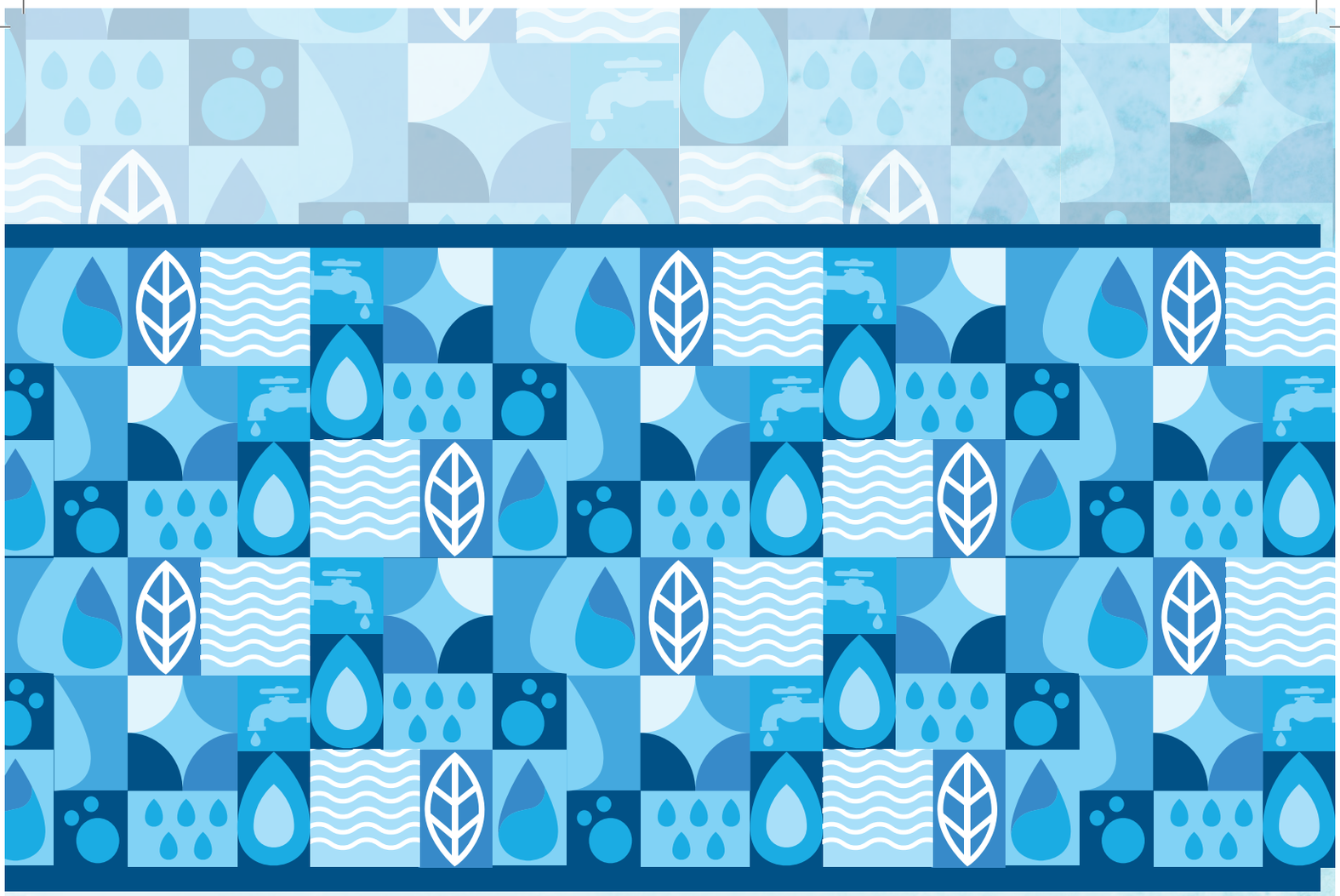












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