

21 November 2023: 14:00 to 15:15 IST

Unpacking the linkages between WASH and climate mitigation

How Water, Sanitation and Hygiene (WASH) Sector can reduce GHG emissions

In this webinar, we will present a research study on '**Mitigation measures in drinking water and sanitation services**', that describes the mitigation measures for various potential adverse impacts resulting from the management of water and wastewater systems.

The session will also cover **experience from three Indian cities** where efforts have been taken to move towards non-fossil based / renewable energy sources for WASH operations and reduce carbon emission. **An expert panel** will share insights and experiences, both from global perspective and Indian context.



Session Presentations

Presentation on Mitigation measures in drinking-water and sanitation services



Dr. Ricard Giné-Garriga

Stockholm International
Water Institute



Mitigation measures in drinking-water and sanitation services

Ricard Giné-Garriga, Stockholm International Water Institute,
Water and Sanitation Dept, Sweden

Stockholm, November 2023

CHAPTER 4

Mitigation measures in drinking water and sanitation services

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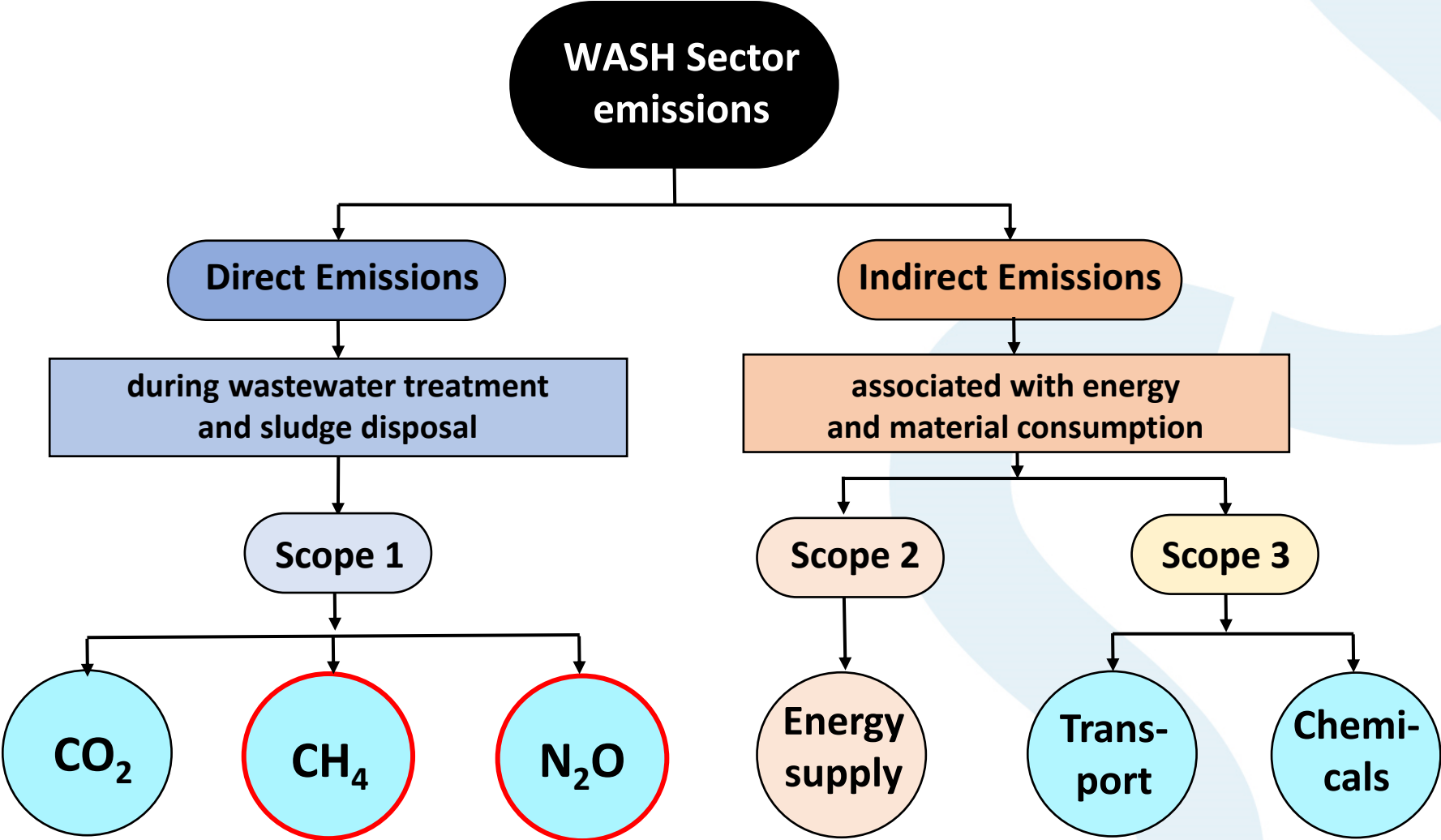
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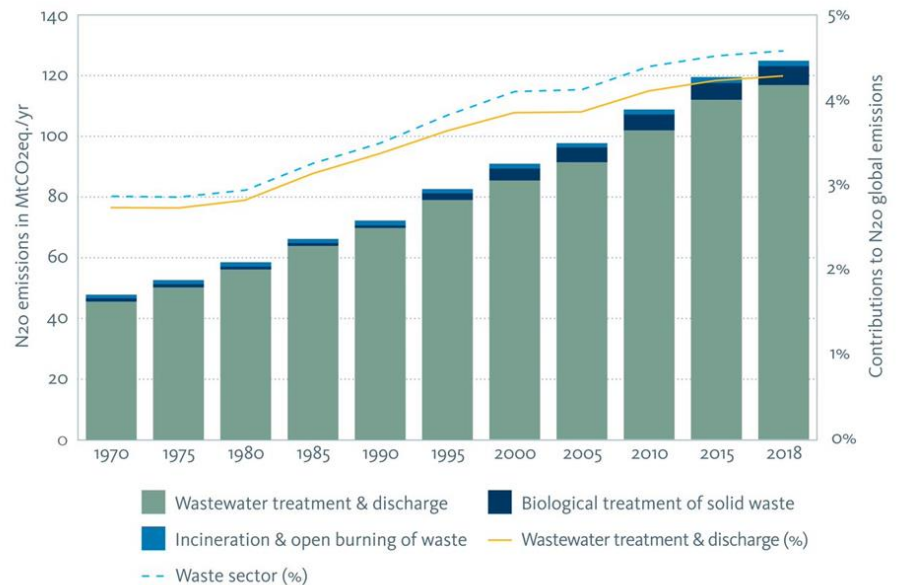
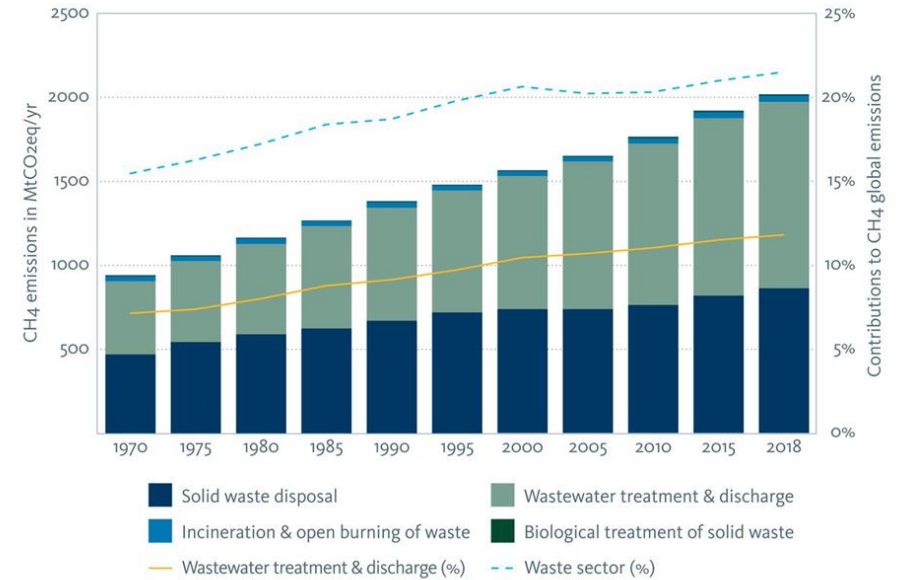
David Hebart-Coleman (Stockholm International Water Institute)



GHG emissions from drinking-water and sanitation



- Wastewater treatment produce ~ 1-3% of total GHGs, and directly accounts for 11,84% and 4,28% of global CH₄ and N₂O emissions, respectively
- The mitigation impact of decentralized sanitation is also high (roughly 1 to 2% of current CH₄ emissions)
- Drinking-water and wastewater management is responsible for approximately 4% of global electricity consumption. By 2030, the amount of energy consumed is expected to increase by 50%





Mitigation actions to reduce *direct* GHGs

Modify and control the operational conditions of WWTPs units (minimization)

- Most efficient way to reduce GHG emissions
- Not always possible due to the operational limitations of the installed units.

Apply new treatment configurations and processes (prevention)

- Maximise the anaerobic pathway for organic matter removal and the use of microalgae.
- Land requirements might hamper these solutions in specific contexts

Biogas capture and valorisation (including household digesters)

- Direct capture and reduction of CH₄ emissions to produce energy through a cogeneration system.
- Biogas produced at HH level provides a renewable and clean-burning energy source. High risk of significant leakage from poorly maintained systems.

Improve design of decentralised sanitation solutions, with specific focus on composting toilets

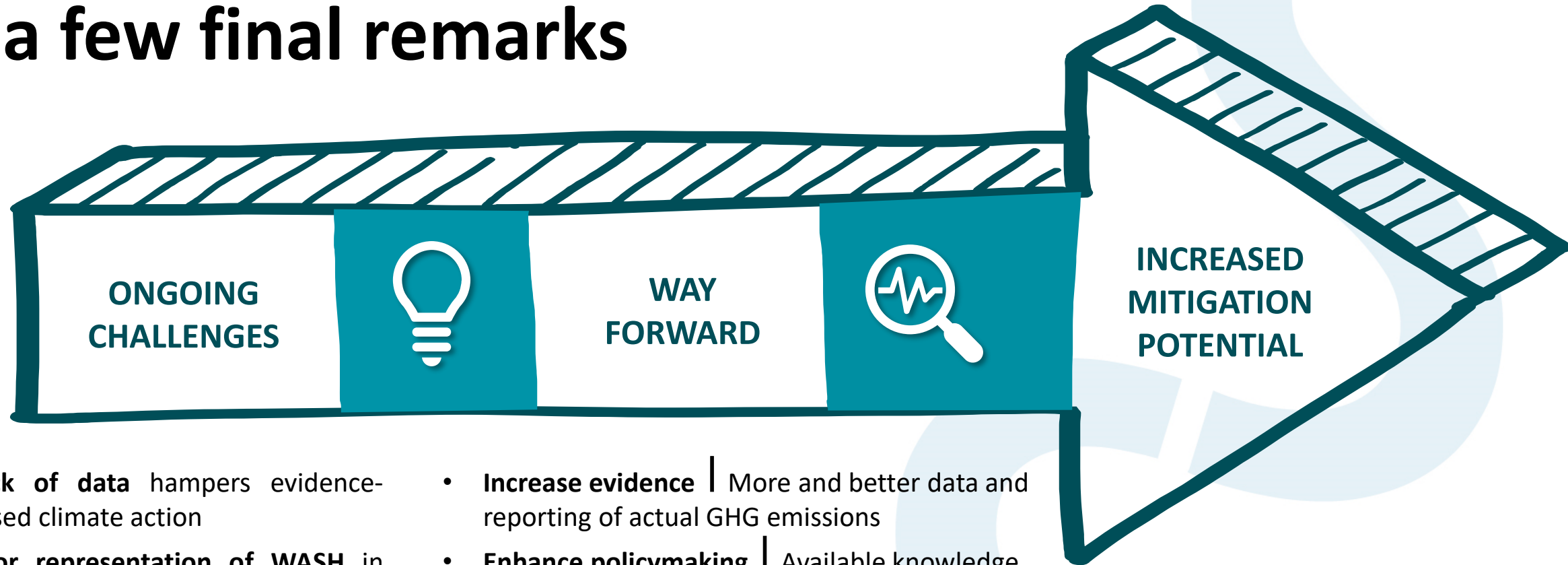
- The mitigation potential of composting toilets adds to other existing advantages (avoided groundwater pollution, nutrient recycling, etc.).
- Better characterization of both CH₄ and N₂O emissions is needed. Limited adoption of composting toilets due to e.g. socio-cultural barriers.



Mitigation actions to reduce *indirect* GHGs

Conduct energy audits or life cycle assessments	<ul style="list-style-type: none">• Energy audits allow for systematic identification of areas of inefficiency, also providing direction for energy saving opportunities.
Advanced aeration control systems	<ul style="list-style-type: none">• Aeration control systems can save considerable amounts of energy by quickly adjusting the operation conditions within the reactor.• Low oxygen levels through decreased aeration may increase N₂O production
Enhance pumping operations	<ul style="list-style-type: none">• Pump stations upgrades, together with variable speed systems, can represent significant energy savings, also lowering O&M requirements.
Reduction of non-revenue water	<ul style="list-style-type: none">• Reducing current level of NRW improves the energy efficiency and overall performance of water utilities. Lack of skills might hamper utilities to effectively manage water losses.
Use of renewable energies	<ul style="list-style-type: none">• Besides the positive mitigation potential, increased use of renewable energy helps reduce the cost of maintenance operations and the dependence on a steady supply of energy from utility companies.
Achieve energy neutrality through energy recovery	<ul style="list-style-type: none">• Many possible solutions can be implemented for both reducing the energy consumption and increasing the renewable energy production in the plants.

... a few final remarks



- **Lack of data** hampers evidence-based climate action
- **Poor representation of WASH** in the climate policy debate
- WASH projects rarely estimate their potential for emissions reduction, hampering **climate finance**
- **Increase evidence** | More and better data and reporting of actual GHG emissions
- **Enhance policymaking** | Available knowledge and evidence informing climate policies and strategies, and the formulation of response plans
- **Incentivize investment** | Expand and enhance drinking-water and sanitation management at scale, through climate-resilient WASH solutions
- **Gather momentum** | Establishment of climate platforms to strengthen cooperation among climate and WASH stakeholders

Thank You!

For further questions, please contact:

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Session Presentations

Moving towards Carbon Neutral cities through WASH activities

–
Case of cities from Maharashtra, India



Mr. Aasim Mansuri

Center for Water and Sanitation, CEPT University





Moving towards Carbon Neutral cities through WASH activities – Case of cities from Maharashtra, India

Webinar : Unpacking the linkages between WASH and Climate Mitigation
21st November, 2023

Aasim Mansuri, Senior Program Lead
on behalf of Center for Water and Sanitation (CWAS), CRDF, CEPT University India TEAM

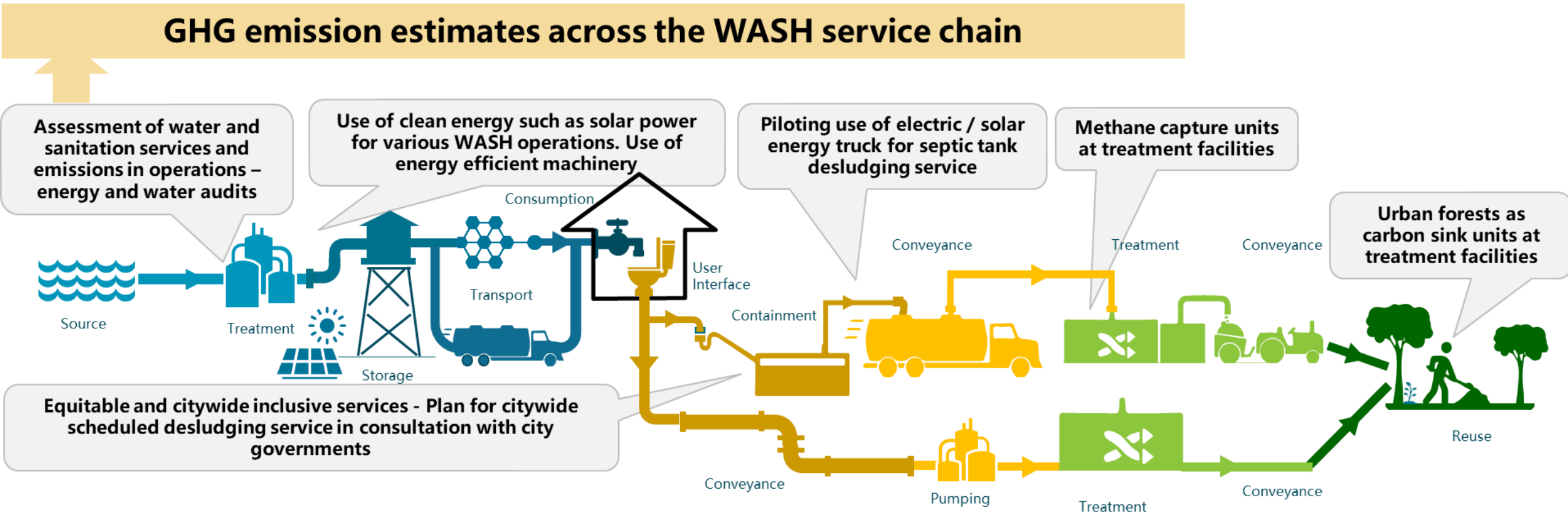
Small and Medium towns of Maharashtra acting as “Urban laboratories” for building climate responsive WASH services...

- 7 Small and Medium towns ranging from 40,000 to 4 lakh population setting up examples of building climate responsive WASH services.
- Towns are located in different climate conditions facing drought as well as flood situations
- All towns have different WASH services context in terms of services provision both onsite and offsite water and sanitation services.
- Initiatives taken up in towns provide cross sectoral impacts.



Various mitigation and adaptation actions taken across the WASH services . . .

GHG emission estimates across the WASH service chain



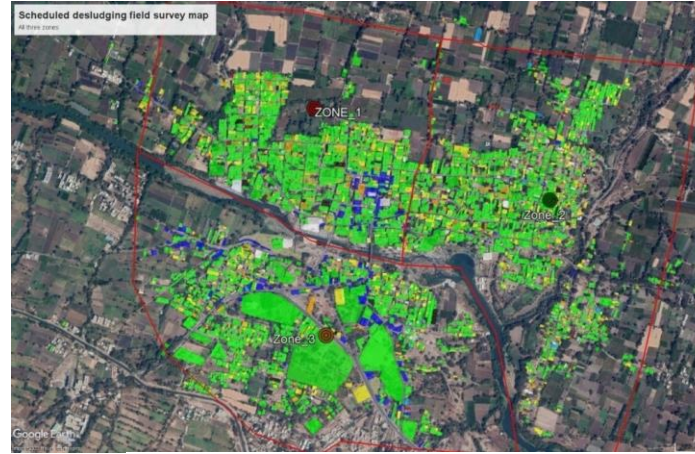
Video of a city demonstrating these activities . . .



Financed from the city's own funds

Scheduled desludging leading to multidimension positive impact...

- A total of **10272 septic tanks** are desludged in **these cities**. With Wai completing 1st cycle of scheduled desludging.
- Leading to reducing 60 % organic load in drains and **improving river water quality**.
- Safely **collecting 65 + million liters of faecal sludge** and transporting it to treatment facility.



- Reduction in Nitrogen, Total Suspended solids and Organic loads in septic tanks effluent after desludging them



- Reduced concentration from septic tank effluent helped in reducing the discharge of nitrogen and TSS into the open drains
- 50-60% decrease in the value of TSS in desludged areas
- 50-60% decrease in BOD load in drains in desludged areas



- Regular desludging services will eventually improve the quality of river water and ground water as the quality of drain water and supernatants will improve

Positive environmental impact of FSSM and Emissions reduction using renewable energy...

- A **total 75 + million liters** of treated water from FSTP irrigating **22,000 sq.m. urban forest with 8356 trees of 25 different species** .
- Urban forest to help **Sequester about 13,537 tons over 25 years.**
- A total of **228 Kw solar power** is installed across **7 cities** to power STP, WTP, FSTP and GWTP. Generating **clean energy of 8550 MWh over 25 years** and **saving of 1 Million USD.**
- Solar power assisting in reducing **7011 tons of CO2 emissions** over 25 years

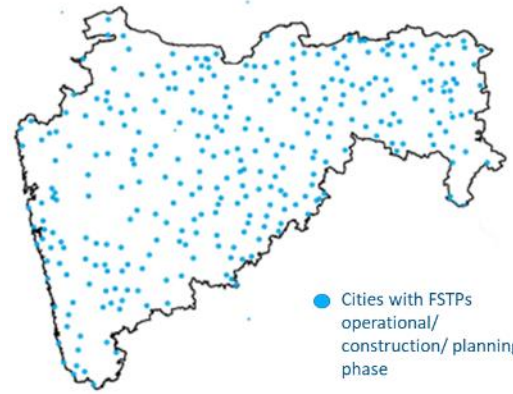


Source: National Solar rooftop calculator, 2023; Sharma R, Pradhan L, Kumari M, Bhattacharya P. Assessment of Carbon Sequestration Potential of Tree Species in Amity University Campus Noida. Environmental Sciences Proceedings. 2021; 3(1):52. <https://doi.org/10.3390/IECF2020-08075>; Dr. H. S. Singh, Social Forestry Wing, Status of Tree Cover in Urban Areas of Gujarat, Gujarat Forest Department, Gandhinagar, 2011, <https://forests.gujarat.gov.in/writereaddata%5Cimages%5Cpdf%5Cstatus-of-Tree-Cover-in-Urban-Areas-of-Gujarat.pdf>; Crisil Foundation (2021) Crisil Foundation: Carbon Sequestration study report 2021

Learnings from laboratory cities are scaled up in India and across the globe

State

CWAS - Partner to the state government for implementing the SWACHH MAHARASHTRA MISSION URBAN and MAJHI VASUNDAHRA MISSION – **400 cities**
60 Million Urban population



- 'Swachha Bharat Mission 2.0' mandates provision of **scheduled desludging service** as a part of ODF++ protocol in India
- **1000+** FSTPs in planning or implementation phase in **India**, **300+** FSTPs alone coming up in **Maharashtra**.
- **Resource recovery and use of clean energy** - adopted in these cities
- Cities contributing towards **achieving SDG 5, 6, 13, 11, 17**.
- **SBM-NULM-Majhi Vasundhara convergence** initiative at statelevel is also being implemented in Maharashtra.

National

Influenced **National Policies and guidelines**



Global

Support to **Kabwe, Zambia for Scheduled Desludging**



Partnerships and Collaboration to attain Scale . . .

BILL & MELINDA
GATES foundation



एकच लक्ष्य
शहरे स्वच्छ
स्वच्छ महाराष्ट्र अभियान (नागरी) २.०



Panse Consulting
Engineers Pvt. Ltd.
(Environmental Consultants)



Panel Discussion

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Unpacking the linkages between WASH and climate mitigation

Moderated by



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Executive Director,
CWAS, CEPT
University, India



Prof. Jacek Mąkinia
Gdańsk University of
Technology, Poland



Prof. Meera Mehta
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THANK YOU

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About us

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

CWAS CENTER FOR WATER AND SANITATION



CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION



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