



# UN Water Conference



## Resilient and Inclusive Sanitation in combatting Climate Change Events and Extremities

21 MARCH 2023  
Virtual Side Event



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# MODERATORS



**Dr. Sudipti Arora**

IWA – Grundfos YWP  
Fellow



**Dr. Virginia Newton-Lewis**

Director of Water Sustainability  
Grundfos



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# Introduction and setting the context



**Prof. Kalanithy Vairavamoorthy**  
Executive Director, IWA



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# PANELLISTS



**Dr. Arne Panesar**



**Prof. Juliet Willetts**



**Suraja Raj**



**Hitesh Vaidya**



**Pericles S. Weber**



**Jay Bhagwan**



**Jennifer Vergara-Chan**



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# Sanitation - a catalyst for climate action & sustainable development!



**Dr. Arne Panesar**  
Sustainable Sanitation  
Alliance, Germany



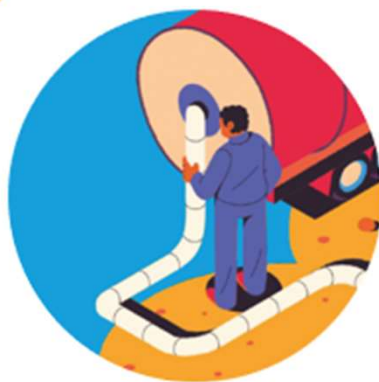
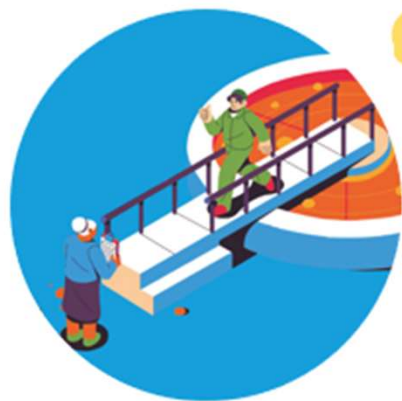
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## Contribution to global GHG emissions:

**2-6 % CH<sub>4</sub> +  
1-3 % of N<sub>2</sub>O**



## Potential of sustainable and climate-resilient sanitation:

- Reduced methane and nitrous oxide emissions through adequate wastewater / faecal sludge management
- Production of clean energy (e.g. biogas)
- Low-emission alternatives to chemical fertilisers and irrigation water
- Nature-based solutions (e.g. constructed wetland)
- **Carbon sinks** (e.g. faecal sludge based biochar)
- Less system failures → more sanitation coverage



**Sanitation must be seen as a catalyst for climate action & sustainable development rather than an obstacle**



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# The concept of Sanitation Sensitive Design to deal with climate change effects and extremities



**Jay Bhagwan**

Water Research Commission, South Africa  
Chair of the IWA NSS SG



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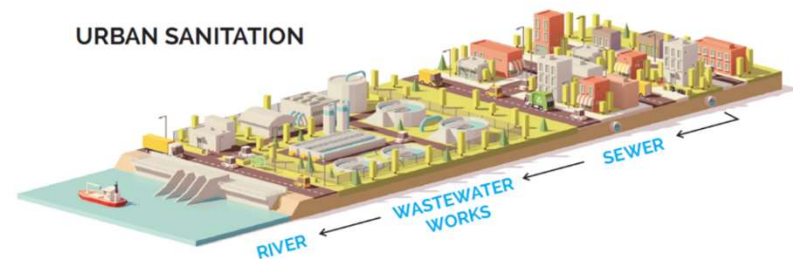
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# Binary engineering approach



- Water supply and sanitation is no more an integrated approach in the modern world
- Water supply designed to feed the hunger an unsustainable drainage system, we have to go further and further away from the catchment to find water
- The drainage systems requires large amounts of water for transporting human wastes over long distances for treatment.
- LOCK-IN TO THIS TECHNOLOGY
- A water crisis is actually a **"Sanitation Crisis"**



**200 to 400 L per capita per day to pollution**

# Sanitation Sensitive Design the disruptor

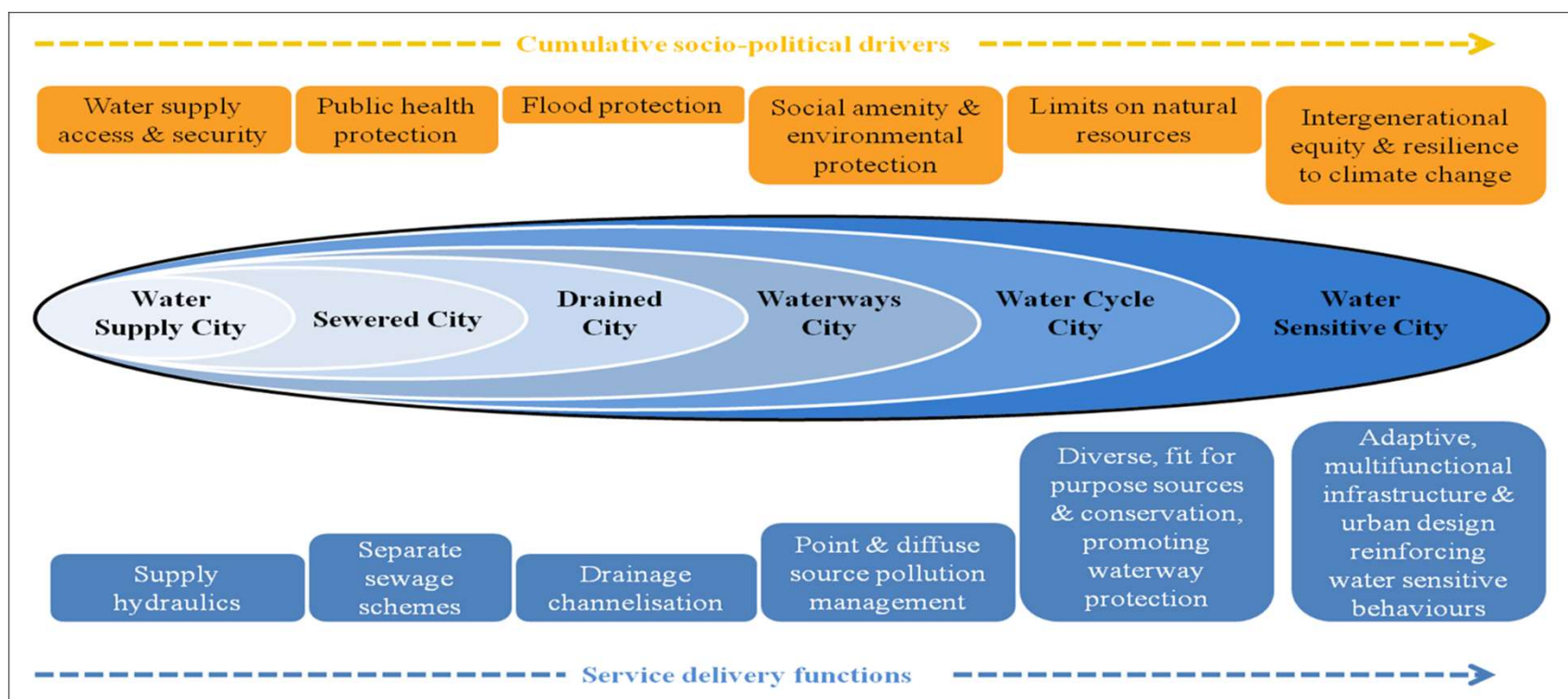


MRW 1347893\_circular-economy.png

## KEY ELEMENTS OF SSD

- ALIGNS TO WATER SENSITIVE DESIGN PRINCIPLES
- INTEGRATES WATER AND SANITATION PLANNING
- OFFERS EQUITABLE SERVICE
- HUMAN WASTE AS A RESOURCE
- MANAGES ENVIRONMENTAL POLLUTION
- OFFERS RIGHT TO ACCESS
- CREATES A NEW SANITATION MARKET AND ECONOMY
- ALIGNED TO TECHNOLOGY DISRUPTION – NON-SEWERED AND OFFGRID SOLUTIONS (GREEN)
- NEW BEHAVIOURS

# The NEW NSS EFFECT – SANITATION SECURITY



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# Inclusive and Resilient Water and Sanitation in Hill Cities



**Hitesh Vaidya**

National Institute of Urban  
Affairs. India



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# Forum for Inclusive and Resilient Water and Sanitation in Hill Cities



## Background

The rapid and unplanned urbanization in the Himalayan region has perturbed the hydrological regimes of watersheds and reduced groundwater recharge in the area. This has led to the climate crisis which further has impacted the provision of essential services such as water and sanitation, in an already stressed municipal system.

For the past 4 years, NIUA has been working in one the Himalayan state of Uttarakhand enabling citywide inclusive sanitation



### Focus Points:

- State Scale up plan for FSSM
  - Co Treatment and new FSTPs
- State investment plan
  - Phasing of towns
- Budget allocation for FSSM
  - SBM 2.0, AMRUT 2.0, 15<sup>th</sup> FC
- Support to pilot towns
- Advocacy : UD Department, Uttarakhand Peyjal Nigam, Jal Sansthan, SPMG, ADB



Minister of Housing and Urban Affairs releasing Knowledge Products



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# Forum for Inclusive and Resilient Water and Sanitation in Hill Cities

## Aim to Constitute the Forum:

- To have a collaborative and responsive forum that provide a platform for Hill Cities to engage actively with each other, states and the central government
- To help in developing and implementing contextual policy, technological, governance and financial solutions

### PILLARS OF THE FORUM

#### Knowledge Sharing

- National and international networking
- Thematic workshops
- Network of technical experts
- Publication of local practises

#### Capacity Building

- Thematic trainings
- Twinning cum exposure programs of practitioners with national and international cities
- Collaboration with academia

#### Advisory Support

- Access to wide range of experts
- Facilitate conversations with central ministries and think tanks
- Support in formulation of policies, bye-laws etc.

The forum will be driven by key stakeholders of these Hill Cities and Towns – commissioners, mayors, NGOs, etc

The Forum is timely, as UN-SDG recognizes this decade as the ‘Decade for Action’, and an explicit reference to “Human rights to a clean, healthy, and sustainable environment” in



Consultation meetings with various Stakeholders



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# Climate hazards, impacts and adaptation - developing resilient sanitation systems



**Prof. Juliet Willetts**  
University of Technology Sydney



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## Findings from research in 4 cities in Indonesia:

- Water shortages: >50% people lost access to toilets multiple times per month, >30% returned to open defecation
- Floods: Inundate unsealed systems, cause pathogen exposure
- Poor quality sanitation showed highest impacts
- High rates of discomfort and distress, particularly for women and disadvantaged groups

<https://www.unicef.org/indonesia/reports/climate-resilient-urban-sanitation-indonesia-hazards-impacts-and-responses-four-cities>



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## Adaptation actions - Framework for climate resilient sanitation system



### 1 INSTITUTIONS, POLICY AND PLANNING

- Policy integration of climate and sanitation
- Risk- and vulnerability- informed planning and wider urban development links
- Leadership and political will
- Institutional responsibilities

### 2 FINANCE

- Financing along the sanitation chain (households, service providers, city governments) for:
- Preventive/adaptation measures
- Disaster response

### 3 INFRASTRUCTURE AND SERVICE PROVISION

- Robust or repairable sanitation infrastructure
- Responsiveness and flexibility in service delivery and treatment operations
- Integration across urban water cycle, including drainage
- Monitoring for continual adaptation

### 4 USERS

- User engagement, awareness and capacity to cope and adapt
- Disaster response and support



UTS-ISF (2022) Landscape report on climate change and urban sanitation: Views of >60 organisations



# Climate Change, Sanitation, and Public Health Risks



**Suraja Raj**  
Emory University, USA

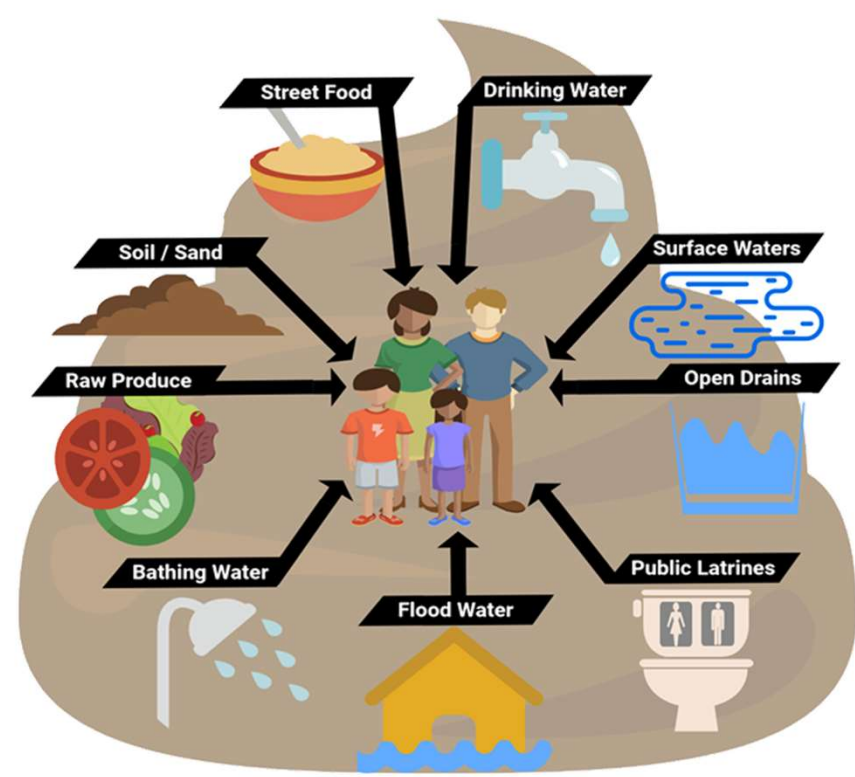


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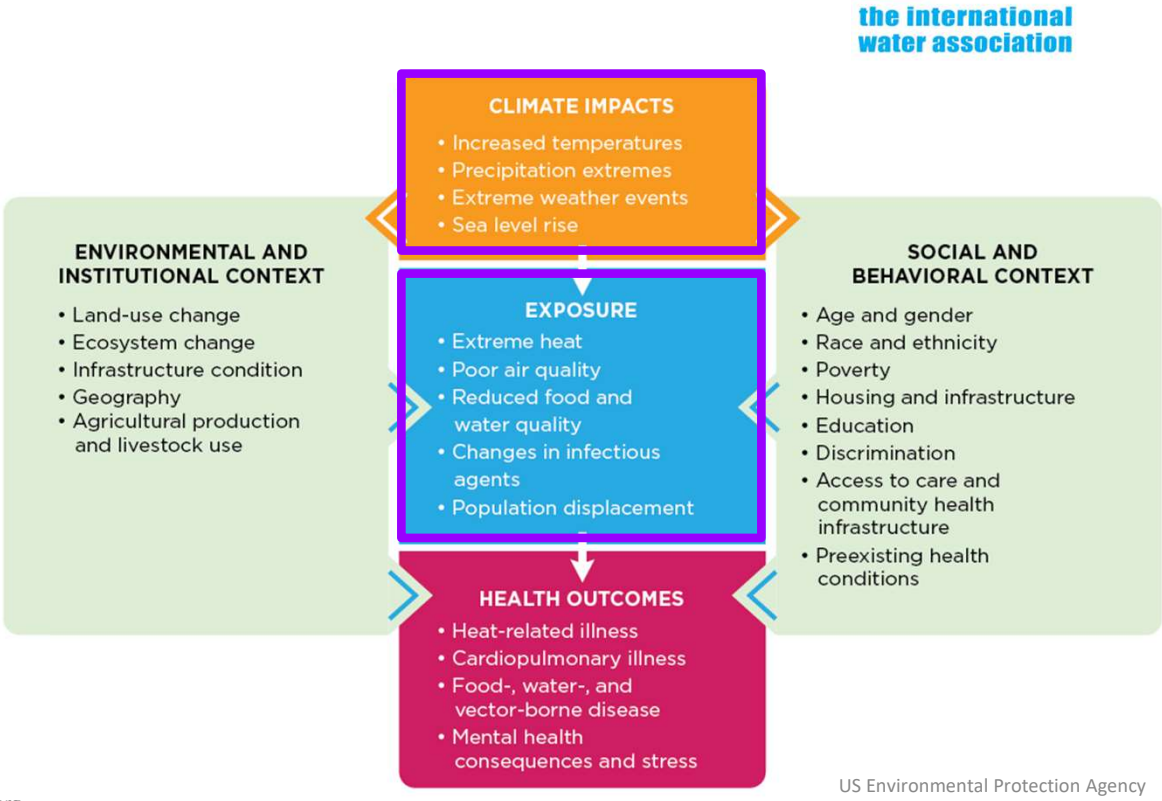


Fig 1. SaniPath Tool Pathways



SaniPath.org

Fig 2. Climate Change and Health Exposures

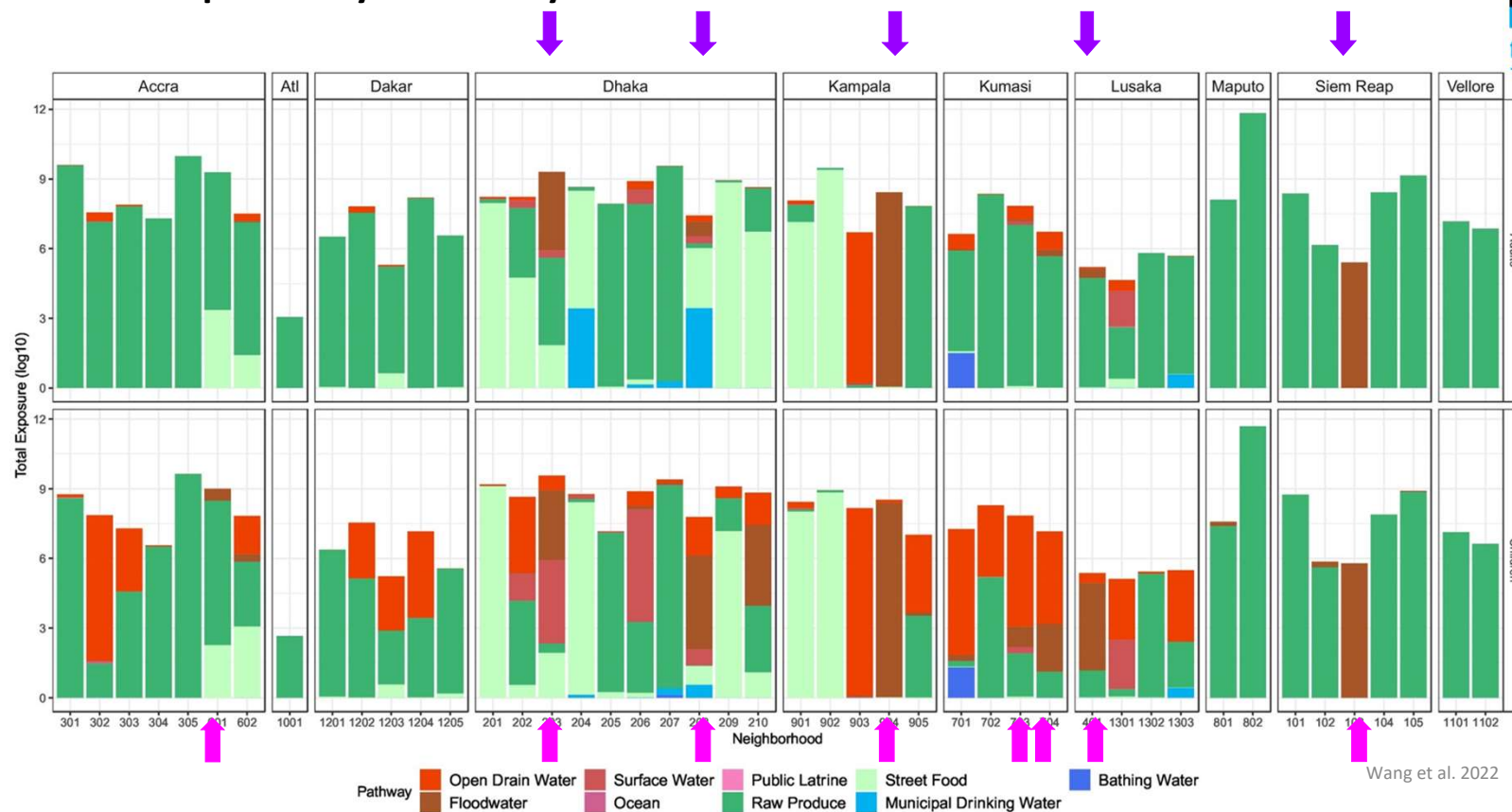


US Environmental Protection Agency



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Fig 3. Total Fecal Exposure by 9 Pathways Across 9 Cities



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# Manila Water's Climate Change Mitigation and Adaptation Strategies



**Jennifer Vergara-Chan**  
Manila Water, Philippines



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# ESG COMMITMENTS TO 2025



## ENVIRONMENT

### Carbon Emission Reduction

60% reduction and avoidance through renewable energy and other initiatives

## ECONOMIC

### CAPEX

Building infrastructures sufficient to satisfy service improvements

## SOCIAL

### Water Security

At least 15% Raw Water buffer

### ESG Programs and Projects

Decarbonization Strategy  
Renewable Energy Initiatives  
Watershed Management  
Forest Carbon Capture

Capex Program  
Vendor Management

New Water Sources  
NRW Reduction  
Watershed Protection and Reforestation  
Tubig Para Sa Barangay  
Environmental Advocacy  
WASH, Lingap and CSR Programs  
COVID Analysis in Wastewater



**Philippine Nationally Determined Contribution to the Paris Agreement:** Reduction and avoidance of greenhouse gas emissions of the country by 75% based on business as usual by 2030

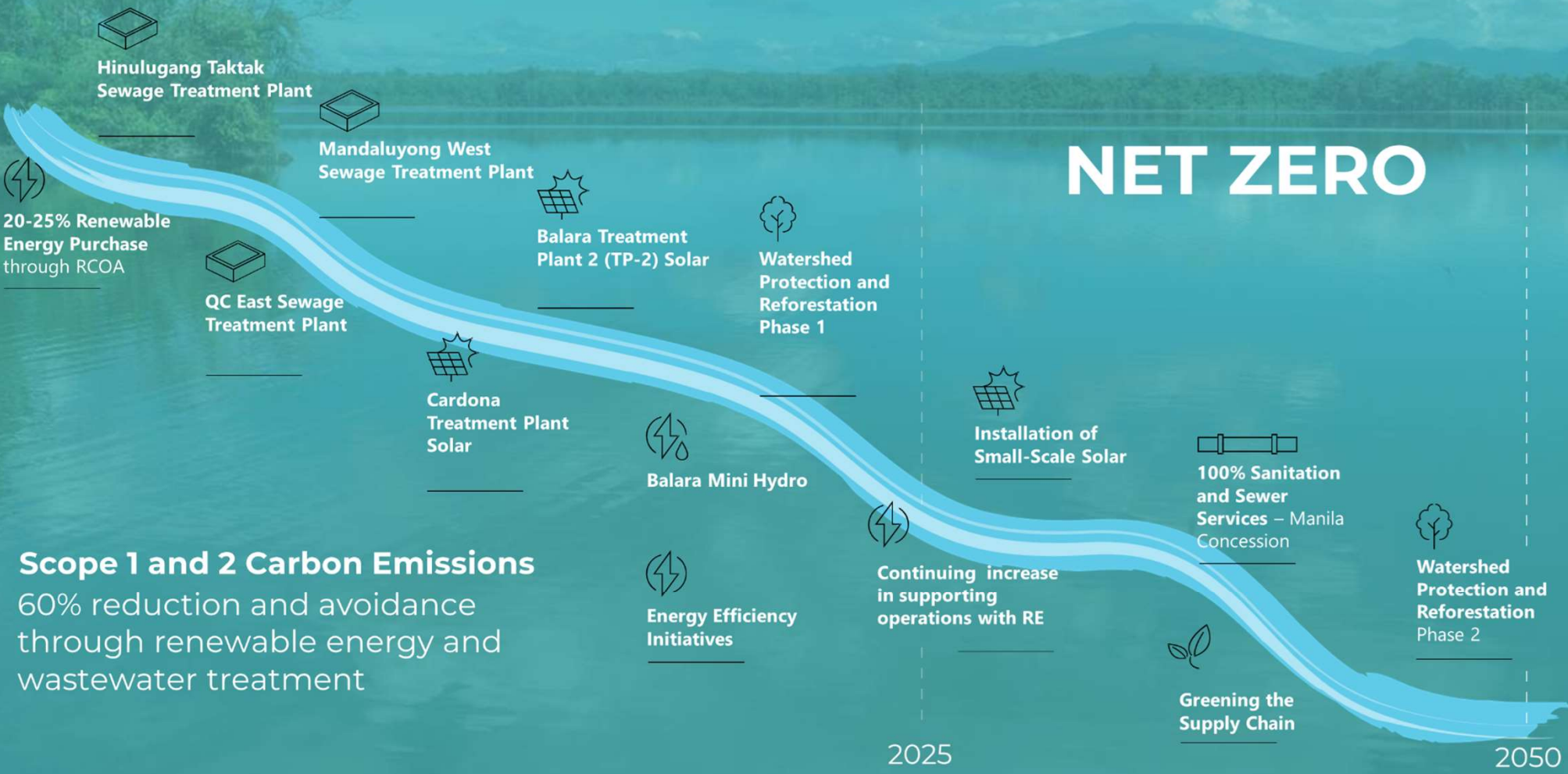
**NDC Wastewater Sector Strategy:** Expansion of sewage and septage treatment to avoid methane emission (25x GWP) from septic tanks

**Manila Water's contribution:** methane avoidance from aerobic wastewater treatment (sewage and septage)



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# On the Road to Net Zero



## Scope 1 and 2 Carbon Emissions

60% reduction and avoidance through renewable energy and wastewater treatment

Future projects for MWSS and other regulatory bodies' approval





# Sanitation and climate resilience in Rio de Janeiro



**Pericles S. Weber**  
Igua Saneamento, Brazil

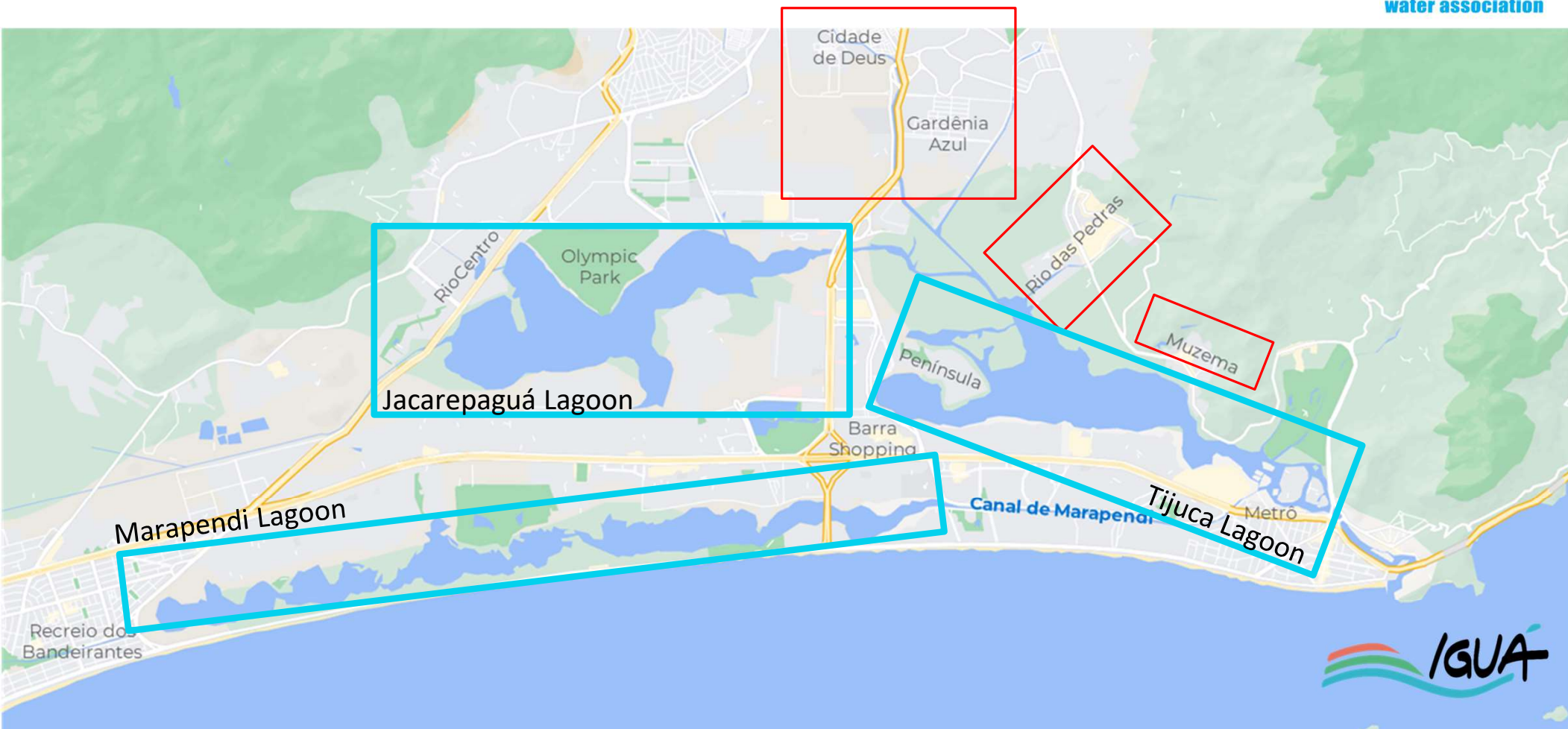


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# Sanitation and climate resilience in Rio de Janeiro



# Sanitation and climate resilience in Rio de Janeiro



Sewage released directly into the lagoons and sea, on a tourist beach



Siltation and eutrophication of Lagoons



Miscellaneous waste disposal

## The challenge diagnosis



Direct impact on the life of more than 1 million inhabitants



GHG emissions and loss of coastal area resilience



Loss of marine biodiversity due to degradation of mangrove areas





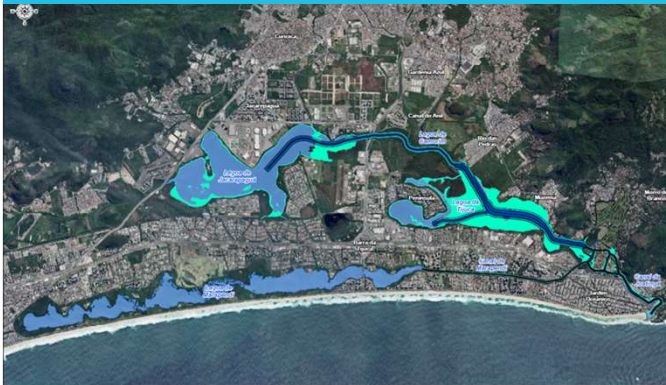
# Sanitation and climate resilience in Rio de Janeiro

## Our transformation actions

Combination of engineering projects and nature-based solutions promoting sanitation, public and environmental health: mitigation and adaptation options for strengthening climate resilience.



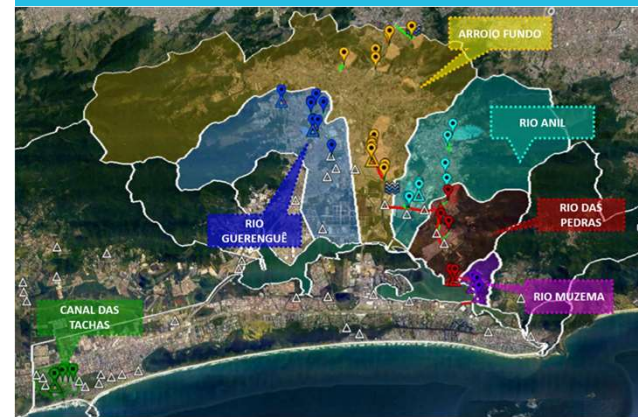
Sediment removal from the bottom of the lagoons, recreating the natural exchange between the ocean and the lagoon system



Expansion of treatment capacity and efficiency at WWTP Barra da Tijuca



Construction of combined sewerage systems for collecting sewage and directing it to the WWTP



Removal of solid waste and prevention of new deposits

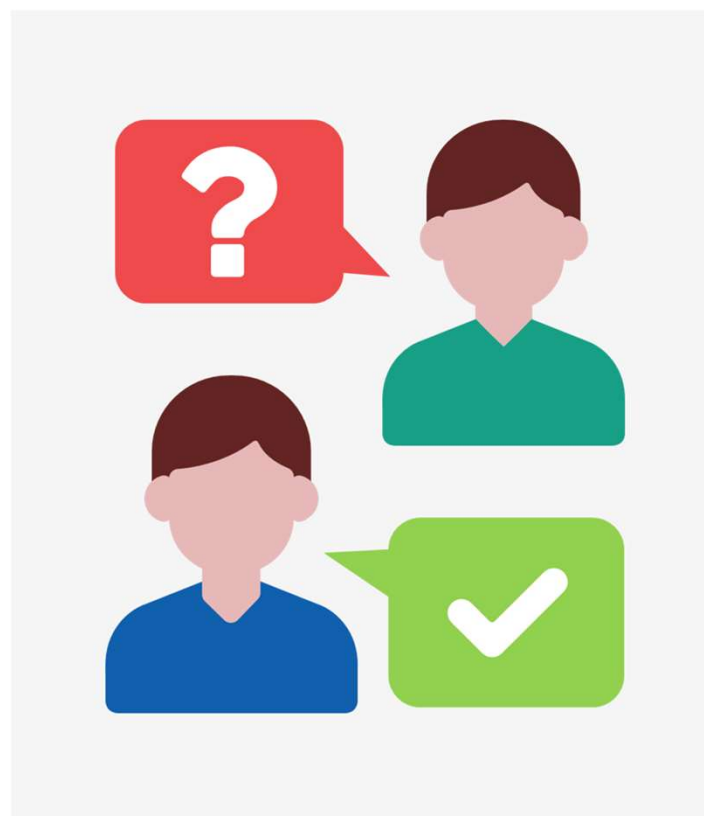


Creation and maintenance of a mangrove seedling nursery. More than 40,000 seedlings are already being planted in an area of 5,000m<sup>2</sup>.





# QUESTIONS TO PANELLISTS

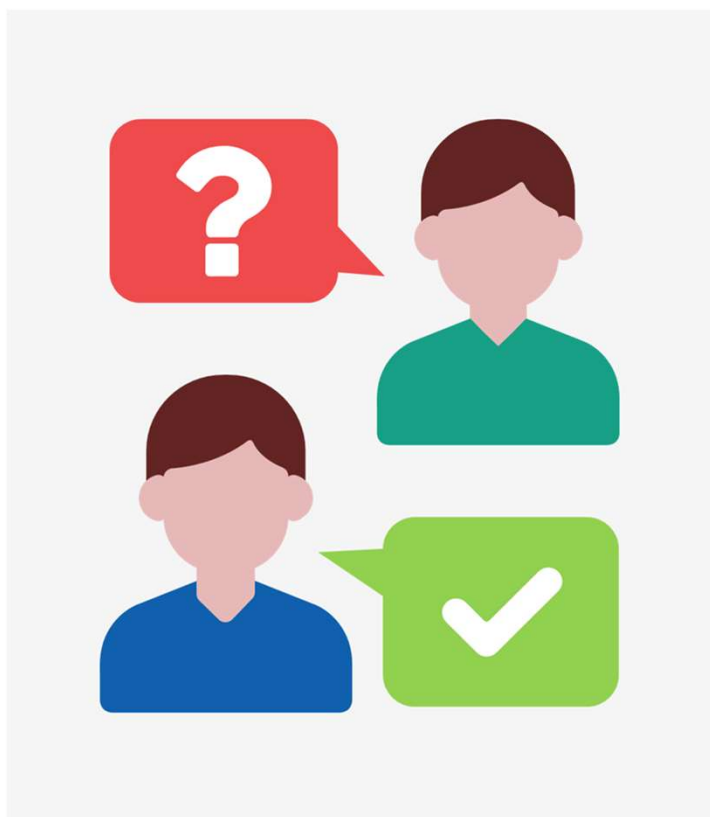


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# Q and A



**Yang Villa**  
IWA – Grundfos  
YWP Fellow



**Chelsea Hayward**  
IWA – Grundfos  
YWP Fellow



# Partners



sustainable  
sanitation  
alliance



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# Agenda



- ❖ Introduction of session and setting the context
- ❖ Panel Pitch
- ❖ Questions to Panelists
- ❖ Q & A with Participants
- ❖ Wrap up & Thanks



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