# Climate responsive WASH initiatives in small and medium towns of Maharashtra and Gujarat

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# Vulnerability of WASH services in India has increased due to climate change…


Delhi Floods, 2023 – Water Treatment Plants are dysfunctional; sewage mixing with flood water

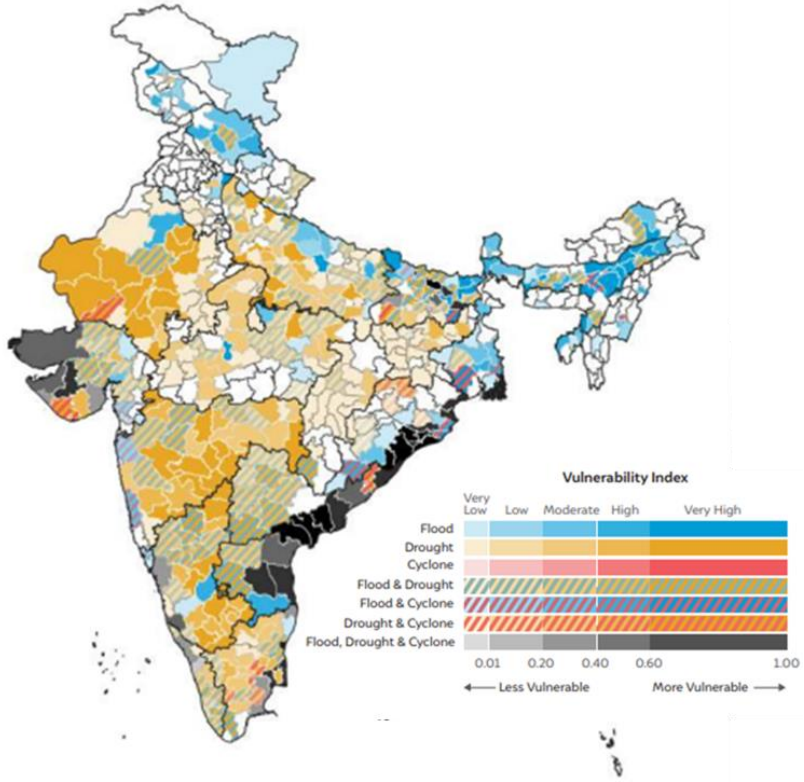
Chennai floods, 2021 and drought, 2019

Uttarakhand, 2023 - Cloud burst destroys city infrastructure and services

Kerala floods, 2018 – Access to sanitation facilities

Latur, 2016 - Water delivered through trains during drought

- Climate change impacts seen more on developing countries - **90 %** human losses reported from developing countries
- India is **7th** most vulnerable country to the climate hazard
- **27** out of **36** states are highly vulnerable to climate change impact




Source: IPCC, 2023: Summary for Policymakers. In: Climate Change 2023: Synthesis Report. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 36 pages. (in press) https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf ; ;Mohanty, Abinash, and Shreya Wadhawan. 2021. Mapping India's Climate Vulnerability – A District Level Assessment. New Delhi: Council on Energy, Environment and Water.

# Emissions, mitigation and India's National Determined Contributions (NDCs)...


India is 3rd largest GHG emitter among all the countries.

1. Reduce the emissions intensity of its GDP to 45% below 2005 levels by 2030.
2. Achieve about 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030.
3. Create an additional carbon sink of 2.5-3.0 billion tonne of carbon dioxide equivalent through additional forest and tree cover by 2030.
4. Propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LiFE'– 'Lifestyle for Environment' as a key to combating climate change.

**Focusing on Carbon capture usage and storage technologies**

**Sector specific targets for all action and strategies**

**Focus on research and innovation towards clean fuel technologies**

**Focus on international cooperations and financial credit flows**

Source: https://pib.gov.in/PressReleasePage.aspx?PRID=1876119

# National flagship missions steering the WASH objectives...


## SBM 2.0 : Focusing on entire sanitation value chain

- Includes collection, containment, treatment, disposal and recycling of faecal waste and waste water
- Grey and black water management in NonAMRUT cities.
- Make all urban local bodies as ODF+ and those with a population of less than 1 lakh as ODF++.
- Outcome based Funding
- Aligning with National Missions and National Priorities

**A financial outlay of 1,41,600 crores has been finalized for SBM-U 2.0 for the period 2022-26.**

## AMRUT 2.0: To make the cities 'water secure' and to provide functional water tap connections to all.

- Water resource conservation, rejuvenation
- Recycle/ reuse of treated used water,
- Rainwater harvesting by involving community at large.
- 100% sewage/ septage management in 500 AMRUT cities
- Outcome based Funding
- Promote PPP

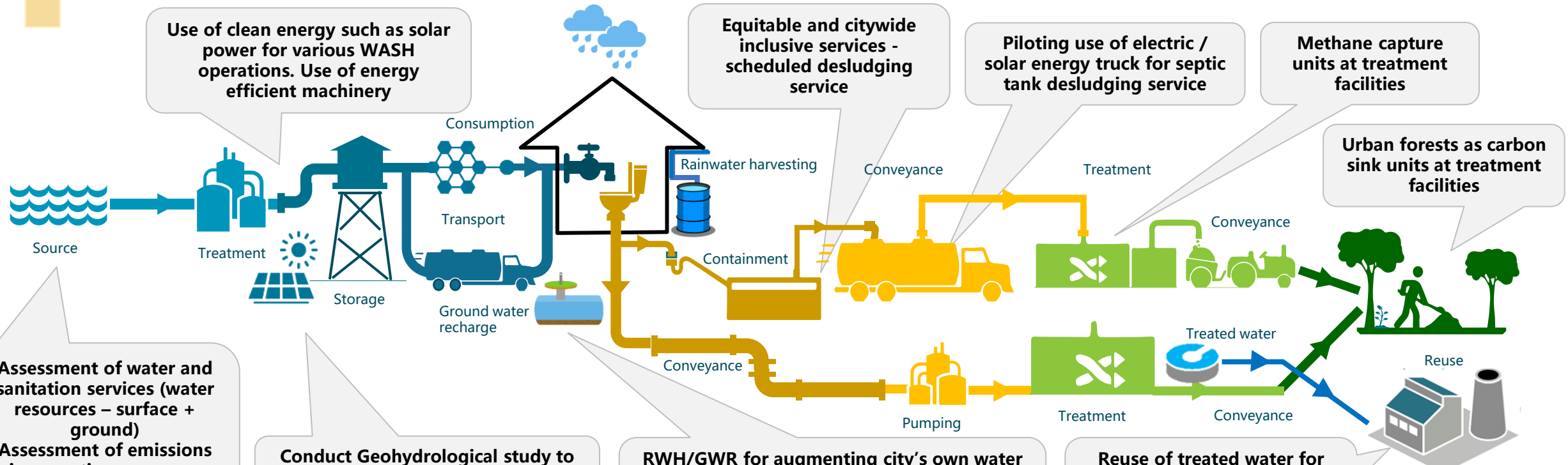
**A financial outlay of 2,77,000 crore has been finalized for SBM-U 2.0 for the period 2022-26.**

# Small and Medium towns of Maharashtra and Gujarat acting as “Urban laboratories” for building climate responsive WASH actions…

- 7 Small and Medium Towns from Maharashtra and 2 Medium towns of Gujarat **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.**

# Climate adaptation and mitigation potential across WASH chain demonstrated in these cities . . .

## GHG emission estimates across the WASH service chain

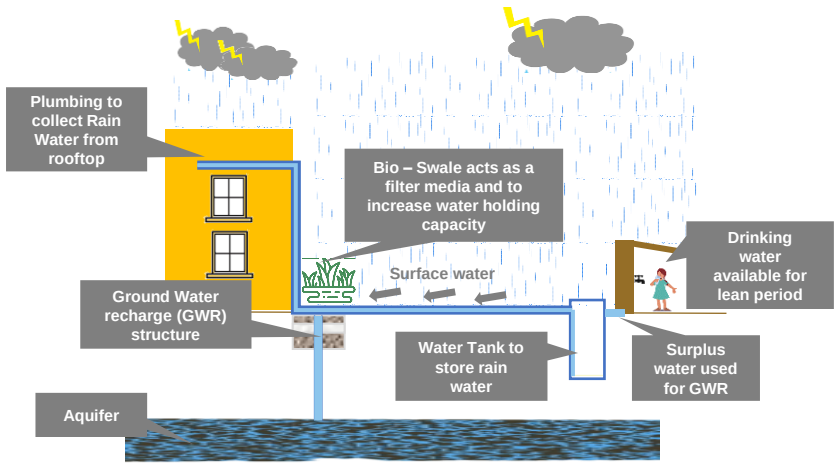



## Augmenting Water resource across the WASH service chain

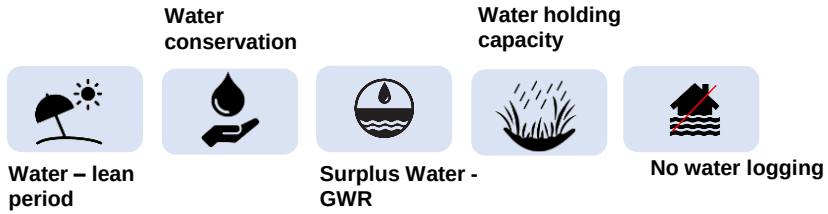
# Augmenting water resources and mitigating urban flood through Rain Water Harvesting (RWH) /Ground Water Recharge (GWR)…

- Kickstarting implementation from **educational buildings, public buildings, parks and gardens, urban flood spots** and further **scaleup at individual HH Level**

- **88 thousand liters** of Rainwater available for **3000+ students** during lean period; **550 thousand liters** of **ground water recharged** during monsoon




**Salient features of the project**



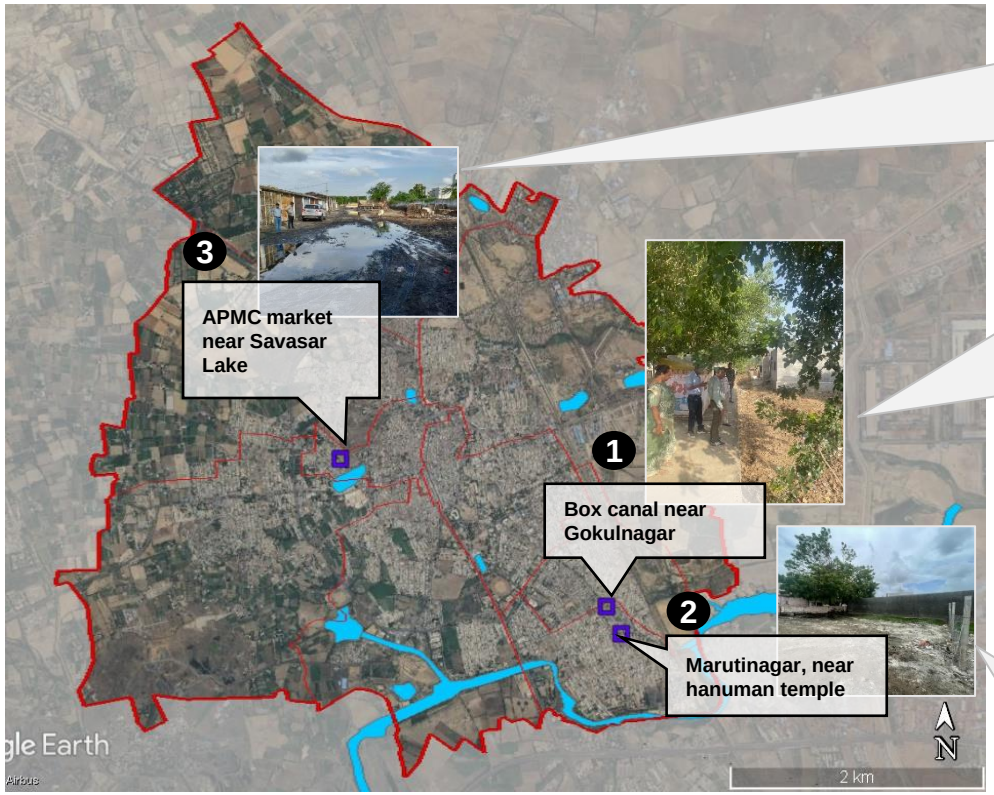

**Plumbing Work**

**Bio-swale/ borewell**

**VJT – Mineralized tanks**

# Urban Flooding mitigation through Ground Water Recharge (GWR)…

- **Mitigating urban flood** scenario, while exploring the **concept of Sponge cities** through **ground water recharge** structures
- **35 Million liters** of **ground water recharged** during monsoon
- Identify **urban flood locations** in consultation with city authorities, FGDs with citizens and field visits
- Develop **Ground water recharge** structures




***Locations of Pilot on use of storm water for GWR and urban flood control in Anjar***

- *APMC is the Vegetable market*
- *The premises is located at lower elevation than the adjoining areas*
- *Due to this water gets accumulated during the monsoon season*
- *Causing sanitation issues*

- *The area is low laying, also the sewage pumping station is located in this area*
- *During monsoon water gets flooded up to 4-5 feet height*
- *Also unhygienic condition is created due to mixing with sewer line*

- *The area is low laying, also new developments in and around the area has blocked its natural drainage pattern*
- *Water flood the area up to 4-5 feet, which takes almost 5-6 to recede*
- *Causing breeding grounds for mosquitoes*

# Visioning a sustainable and impactful system through community engagement and awareness…

- community engagement is essential for building **sustainable and impactful systems** to ensure that initiatives are rooted in **local context** and contribute to long-term **resilience and well-being with deep sense of authority/responsibility**

- More than **50 School Principals/teachers/staffs trained** in 10+ schools of Gandhidham

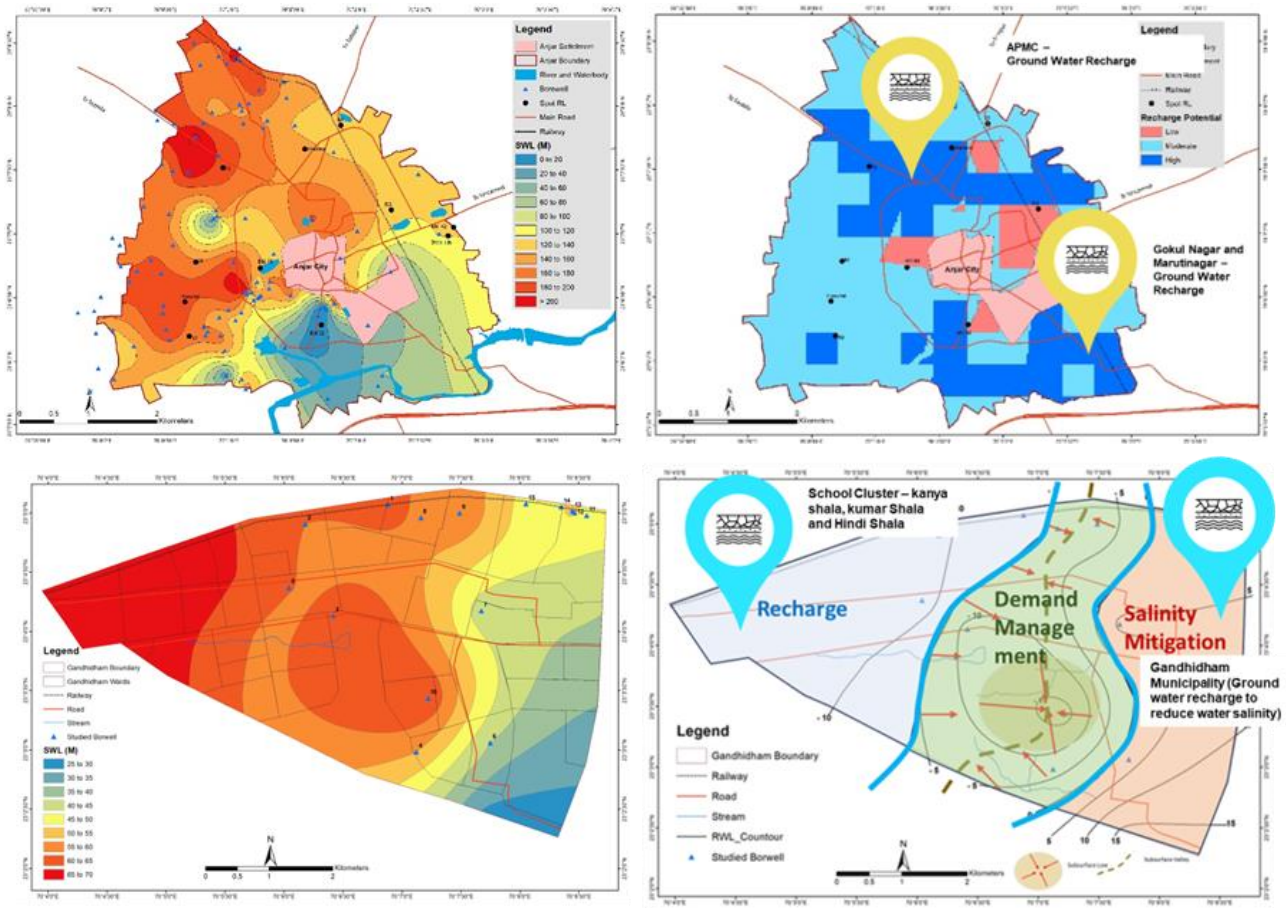
- Spreading awareness through **participating city level events** such as – “Seva Setu”, “Viksit Bharat Yatra” etc.

# Scaling up the initiatives to achieve water security across the city...

RWH GWR

- Municipal Schools
- Institutional Buildings
- Urban Flooding Spots
- Storm water drains

Conducting **Geo-hydrological study** to understand the city aquifers for **identifying potential water conservation projects/ initiatives**

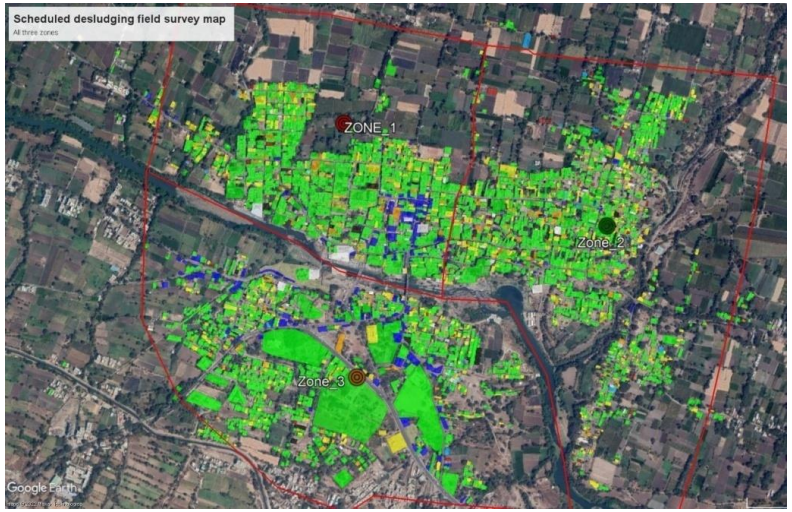


# Scheduled desludging leading to multidimension positive impact…

- A total of **10272 septic tanks** are desludged in **these cities of Maharshtra**. 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

# Eco-sensitive Treatment plants setup in these cities...

## Wai, India

Capacity: 70 KLD Commissioned - 2018

24 Million litres of FS treated*

*FS treated from 2018 to 2023

## Sinnar, India

Capacity: 70 KLD Commissioned : 2019

30 Million litres of FS treated**

Capacity: 60 KLD Commissioned: 2021

~ 12.5 Million litres of grey water treated**

**FS treated from 2019 to 2023

# Closing the loop through Resource Recovery in these cities…

- **22,000 square** meters of urban forest and landscaped area in midst of barren land
- **8356 trees of 25+ species** planted
- Treated **water** is used for **watering the plants** through a **drip irrigation system**
- **Sludge used as fertilizers at the urban forest or taken away by farmers.**
- The **quality** of the treated products are **regularly monitored** through testing the samples.
- **SHGs engaged** for maintenance of garden and urban forest through a contract and paid on a monthly basis.
- **Attracting bird species and butterfliers** – previously not seen


**75 million+ litres** water reused

# Gujarat Cities – Anjar and Gandhidham are showcasing 100% reuse Circular economy of wastewater management…

- **Anjar and Gandhidham Municipalities** have entered in a **concession agreement** with **WIL** (Welspun India Limited) for a period of **35 years**
- Welspun has used a **Design, Build, Finance and Operate** (DBFO) model for this Sewage Treatment Plant
- Welspun is paying **40 Paisa/KLD** to the municipalities through which Cities receive a **revenue of Rs. 62 lakhs per year**
- Sewage from both the cities is **treated in the STP**, further the treated water is **used by the textile industry** (Welspun)
- Benefits of the project:
  - ✓ Elimination of dumping of untreated sewage into the Nakti Creek
  - ✓ Revenue to municipalities through royalty from Welspun
  - ✓ Entire waste water is being recycled for production activities at Welspun
  - ✓ Zero water pollution and sludge generation
  - ✓ Excess bio-sludge is used as manure for plantation

**Good Practice by the cities for reuse of wastewater in partnership with private entity…**

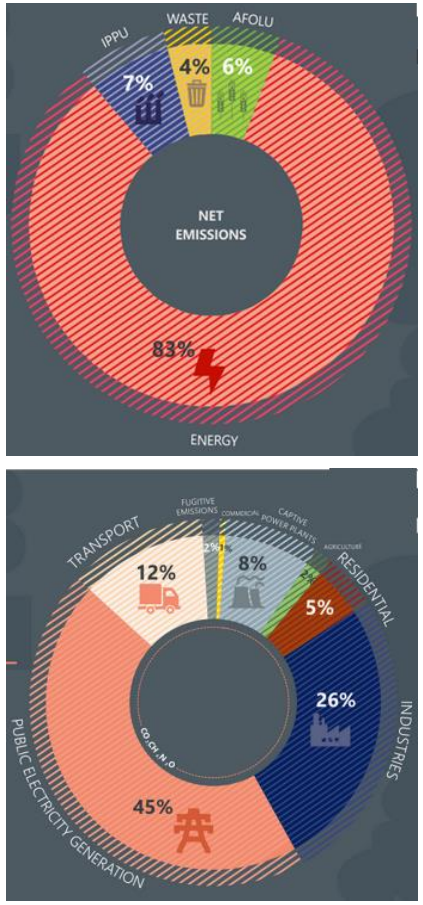
| | |
|---|---|
| **Anjar and Gandhidham Municipal Council** | Transmission of raw sewage and desludging septage from cities to treatment plant |
| Sewage Treatment Plant (STP) (Capacity 40MLD) | Design, Built, Finance, Operate and Maintain, by Welspun |
| **Reuse in Power plants, textile industries and for gardening purpose** | Environmental, financial and social impact |

- 100% Reuse of treated water and bi-products
- Zero procurement of blue water (Narmada water)
- Revenue for the cities (Rs. 62 lakhs per year at the rate of Rs. 0.4/KL for the raw sewage)

Source : Field visit to Welspun, discussion with authorities and city officials

# Mitigation – Move towards clean energy plays a big role…

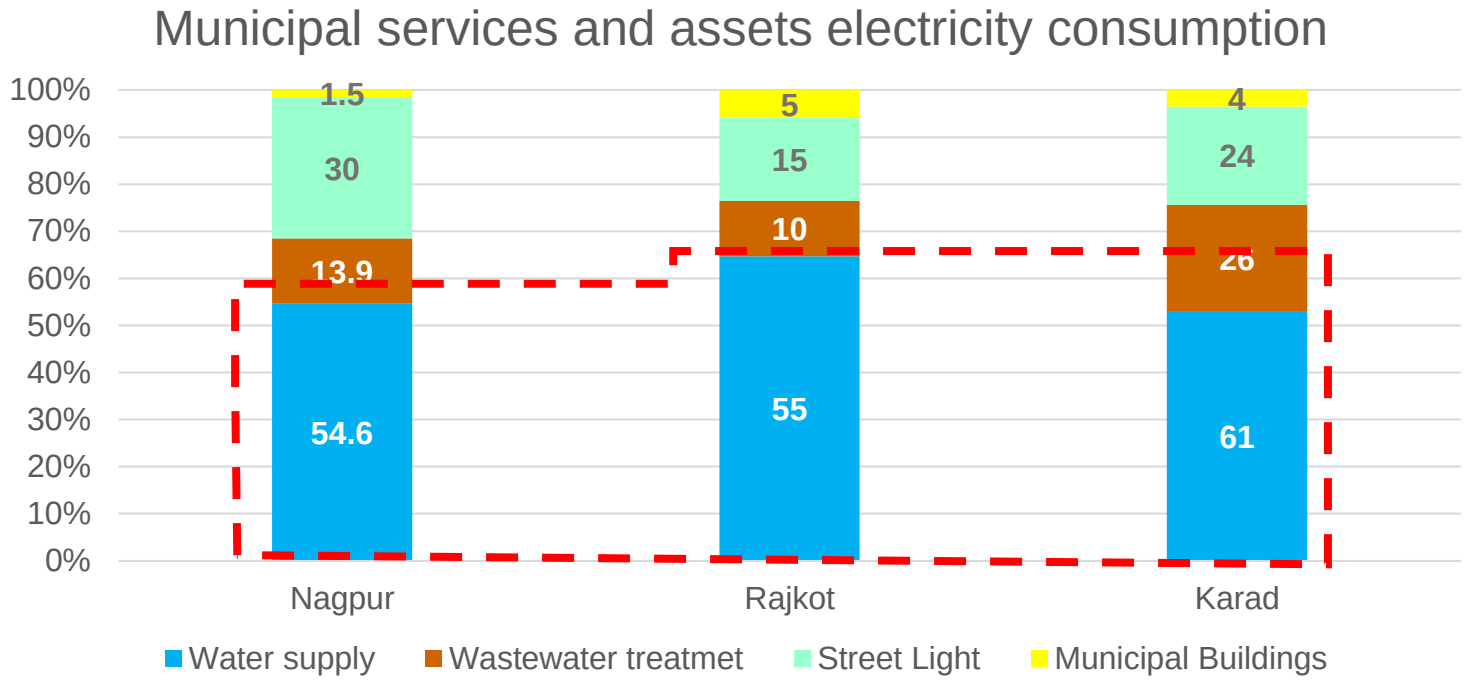
**Sectoral contribution**




Source : GHG Platform India

**2,455** Mt $CO_2$e emission from the energy sector

**40% to 60% of the electricity bill of** municipal corporations goes towards water / sewage pumping




Source : 1. https://southasia.iclei.org/wp-content/uploads/2022/04/6.-Thane-City_GHG-Emission-Inventory-2017-18-Report_v-2.0.pdf; 2. https://southasia.iclei.org/wp-content/uploads/2022/04/2.-Climate-Resilient-City-Action-Plan-Nagpur-Report-Low-Res_compressed.pdf; 3. Karad municipal council, 2023

# Renewable energy - important for achieving mitigation targets…

**Exploring options in a cities of Maharashtra / Interlocking renewable energy with WASH sector yields benefits in terms of emissions and cost saving over long terms**

- **5** cities
- **Solar Installation across WASH service value chain**
- **228 Kw** of Solar plant installed
- Installation at water, wastewater, greywater and faecal sludge treatment facility

** The selected pilot cities population ranges between 50k – 400 K*


**Clean energy generation potential over 25 years**

**8550** MWH

**Emission reduction Potential (over 25 years)**

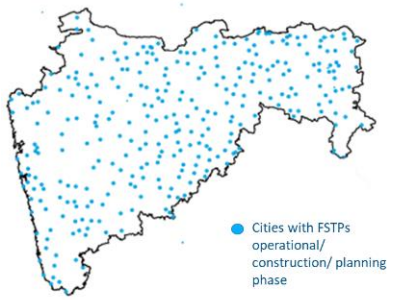
**7,011** tons CO2

**Projected Overall cost saving (25 yrs)**

**1 Million USD.**

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

| City | State | National | Global |
|---|---|---|---|
| CWAS – in partnership with the city ULB and development authority is developing **Water security action plan** for **Anjar and Gandhidham** | CWAS - Partner to the state government for implementing the SWACHH MAHARASHTRA MISSON URBAN and MAJHI VASUNDHARA MISSION – **400 cities** **60 Million Urban population** | Influenced **National Policies and guidelines** | Support to **Kabwe, Zambia for Scheduled Desludging** |



- **Scaleup** of rainwater harvesting (RWH) and ground water recharge (GWR) based on the **Pilot initiatives** in **educational institutes, public buildings, parks and gardens**
- **GWR** as **urban flood mitigation** strategy

- '**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 state level is also being implemented in Maharashtra.

# Thank You

**Global South Academic Conclave on WASH and Climate Linkages**