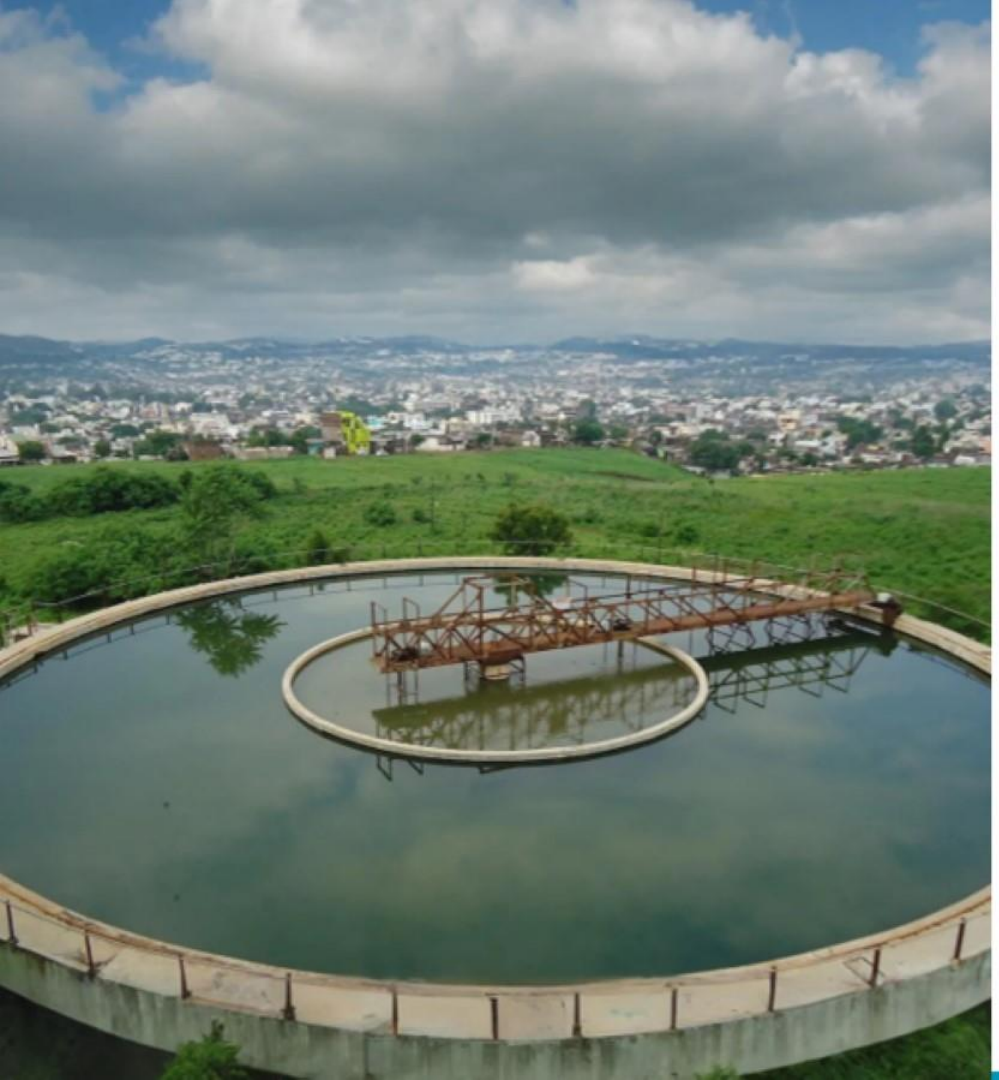


India's municipal water challenges and promising developments

September 2024

IWMI-Tata Partners' Meet 2024

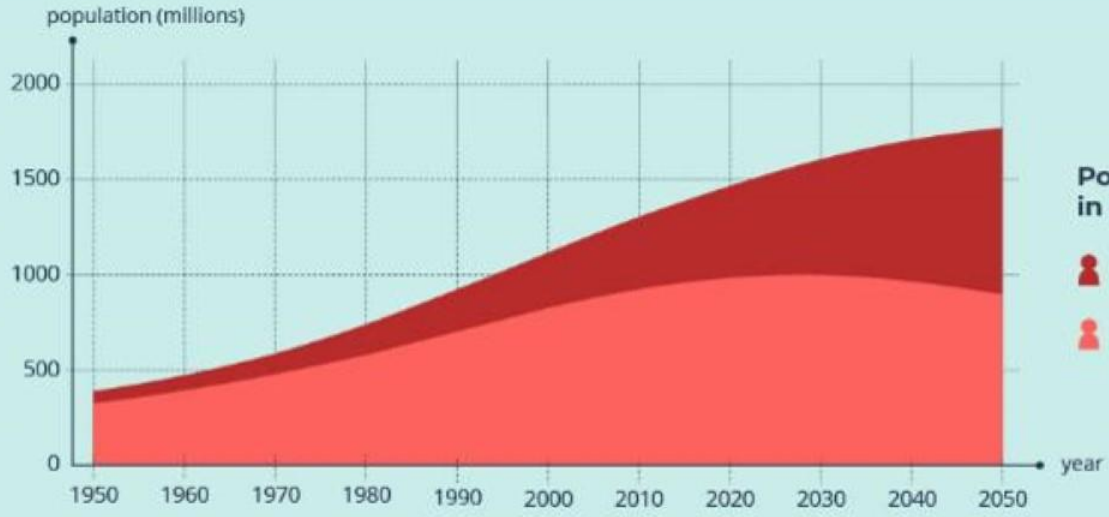
Meera Mehta, Dinesh Mehta, Dhruv Bhavsar, Aasim Mansuri, Aditi Dwivedi, Jigisha Jaiswal and Saubiya Sareshwala

Center for Water and Sanitation, CRDF, CEPT University

CWAS CENTER FOR WATER AND SANITATION | CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION | CEPT UNIVERSITY

India is becoming more and more urban

Around 2030, the rural population is expected to decline while the urban population rises rapidly



Source: UN DESA, Urban and Rural Population India (2018)
World Urbanization Prospects: The 2018 Revision, custom data acquired via website

URBANET

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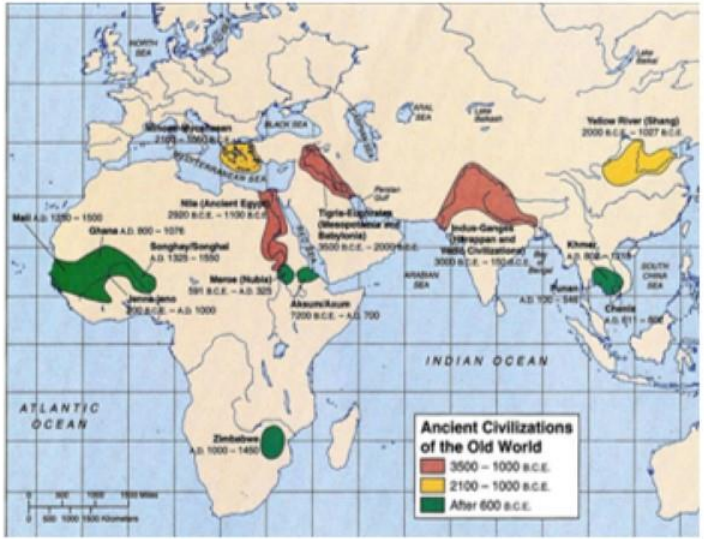
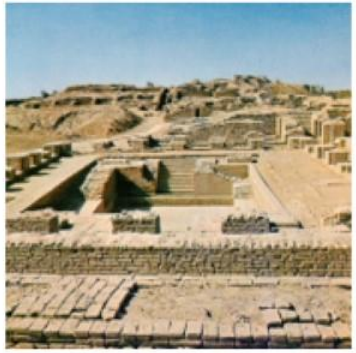
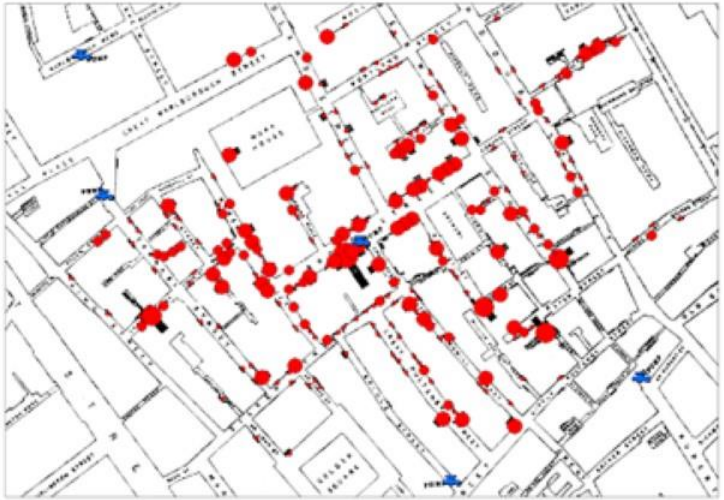
Water and Sanitation – essential concepts in urban planning for ages

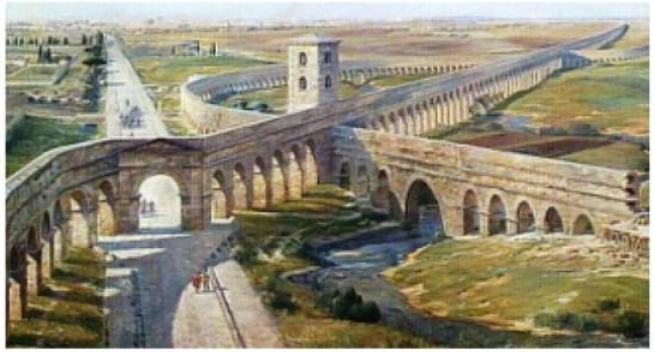
Major civilizations and cities developing around rivers





The Great Bath in Harappa and Roman Aqueducts





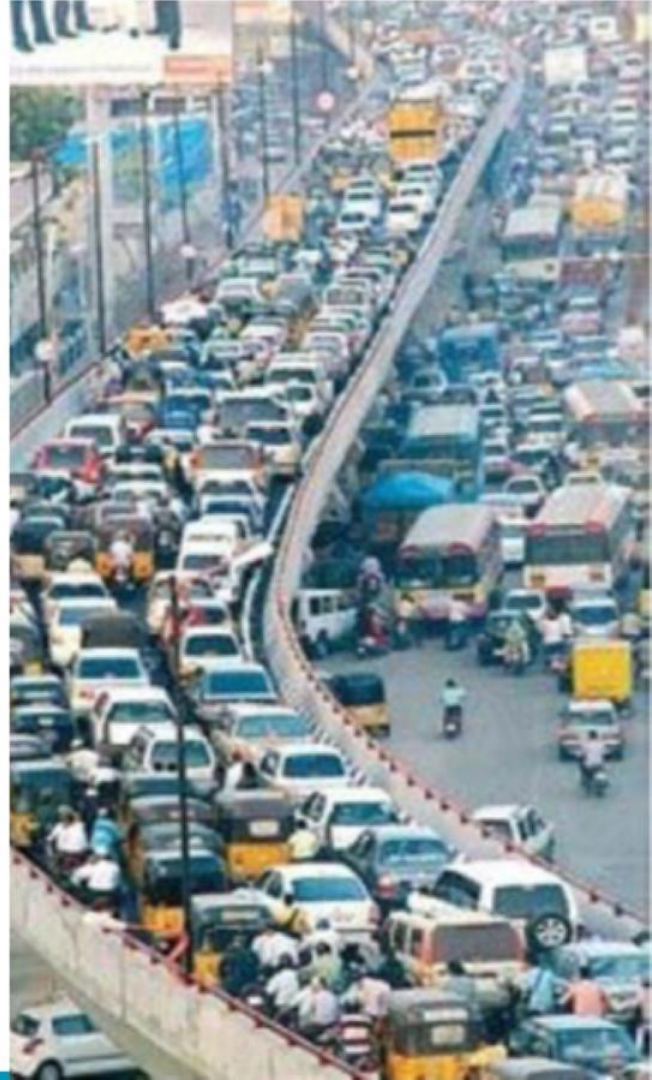
Massive Aqueducts:
Water brought from far, instead of using local resources

Physician John Snow links spread of **cholera to a polluted water pump during the 1854 Broad Street cholera outbreak in the United Kingdom.**

Source: BORDA (2010), "Decentralized waste water treatment: experience sharing", presentation at CEPT University

More recently - Conventional Urban Planning has focused more on land use management and road networks

- Land use and transportation planning (roads and parking) have become core focus of city planning
- The usual key assumption is that all infrastructure will follow the road network, which is not always the best suited for water, storm water and sanitation systems. This can often lead to consequences such as:
  - Water demand to be met from distant sources
  - Tendency to build more and more water infrastructure – regional imbalance
  - Ignoring hydrogeology and groundwater in mainstream planning
  - Lakes dry up and then are taken over for development

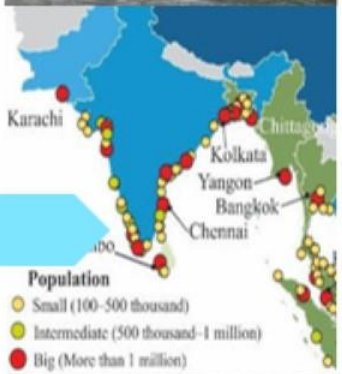


A paradigm shift is needed in urban planning – especially in the context of universal access, climate change and financing needs

Access for the low-income groups

Droughts and heatwaves affect **low-income groups disproportionately**

Those without access to services are more vulnerable to climate change



Need for climate resilience

Need **"climate-proof" WASH infrastructure** and services - self reliant infrastructure in terms of resilience to extreme weather events, sustainability of sources and energy dependency

Need for more and sustainable funding

Achieving the goals for development **requires significant investments**

While central missions have budgeted significant funds, there is a need for **sustainable funding** at local level

“Har Ghar Nal” and “Har Nal me Jal”

AMRUT 2.0 focuses on "Har Ghar Nal" and "Har Nal me Jal"

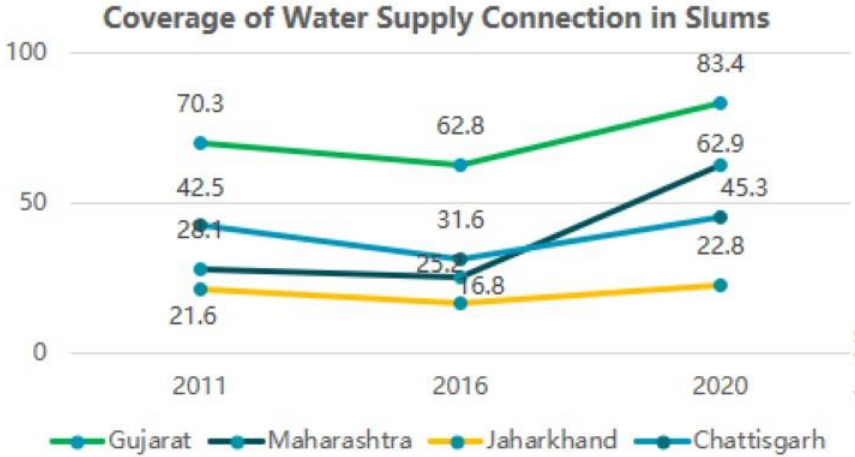
- AMRUT 1.0 focused on 500 cities for providing services of water supply, sewerage infrastructure, storm water drainage, urban transport and development of green spaces and parks.
- **Over 1 crore HH water tap connections were** provided under AMRUT 1.0 in 500 cities
- A major objective of AMRUT 2.0 is to move towards universal access to household level water tap in all 4700 statutory towns of India. **Nearly 3 crore new tap water connections to be provided** to all in all 4,700 statutory towns of India

Source: A Mission for Fulfilling Aspirations, Transforming villages, Har Ghar Jal, Jal Jeevan Mission, 31st Dec 2021

Last Mile Connectivity - are water services reaching the vulnerable?

Last Mile Connectivity is ensuring access to safe water to all households of the city including slums and vulnerable communities through individual tap connections

Even through, over the years, coverage of Water Supply and Sewerage Infrastructure has increased, statistics suggest the need to realize the AMRUT 2.0 achievements will require ensuring 'Last Mile Connectivity' even in states such as Gujarat and Maharashtra.



A study was conducted to assess 'last mile connectivity' of water supply to slums and low-income households, across 10 cities

CWAS at CEPT University carried out the study at the request of the Ministry of Housing and Urban Affairs (MoHUA).

1. To assess coverage of water supply connections
2. To review of household water connection procedur and costs
3. To assess water connections given in slums and other vulnerable areas.
4. To recommend Key Policy Interventions at both state and city levels

Source:
- Performance Assessment Systems (PAS) (2011-2020) "Service Level Benchmark Data for Gujarat , Maharashtra, Jharkhand and Chhattisgarh . PAS.; Image Source: The Print-ANI Feed
- CWAS (2023), Last Mile Connectivity for Urban Water Supply Services : A study done for Ministry of Housing and Urban Affairs (MoHUA). Available at: https://cwas.org.in/resources/file_manager/Last%20mile%20connectivity%20for%20urban%20water%20supply%20services.pdf

Three challenges that inhibit universal coverage of water connections

Administrative Barriers

- Involvement of multiple department in providing connection
- Lack of Required Documents
  - Land Tenure & Ownership Documents
- Absence of Application Tracking System
- Lack of adequate and reliable Information
- Lack of Citizen Awareness
- Complex and lengthy approval procedures

Cost Barriers

- Affordability to Obtain new Water Connection
- High water tariffs

Infrastructure Barrier

- Lack of Distribution Network Coverage

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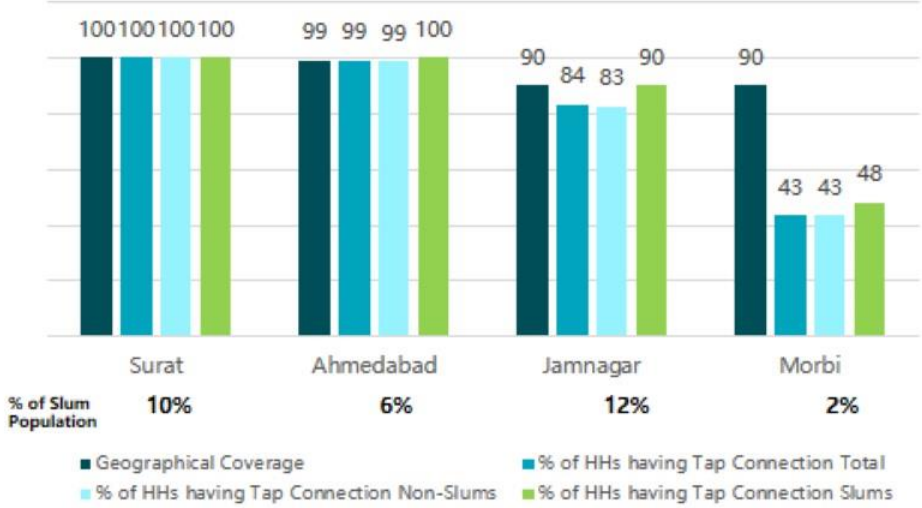
Source: CWAS (2023), Last Mile Connectivity for Urban Water Supply Services : A study done for Ministry of Housing and Urban Affairs (MoHUA). Available at: https://cwas.org.in/resources/file_manager/Last%20mile%20connectivity%20for%20urban%20water%20supply%20services.pdf

Gujarat: 90-100% coverage of water supply network and good coverage of tap connections in 3 out of 4 cities

Network Coverage

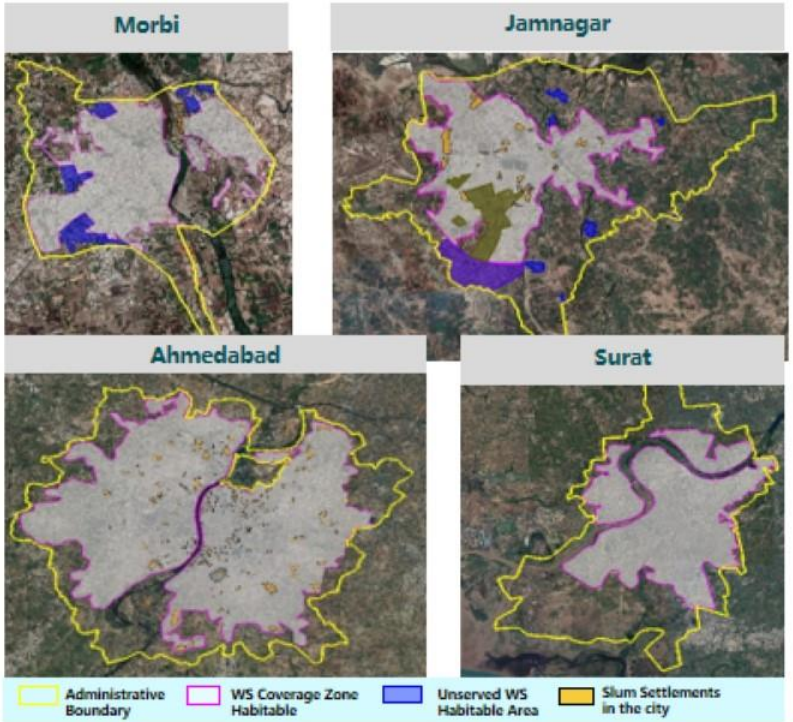
- Network laid in 90-100% in cities of Gujarat.
- Morbi has than 45% overall tap connections coverage as network is laid in 2021 under AMRUT



*For Jamnagar- A large part of the area is military area which counts as one connection
*100 percent network coverage is to be achieved under AMRUT 1.0, due to Covid period there is delay in laying of piped network

Database Challenges

- Data for water connection is **not properly maintained and not digitized.**

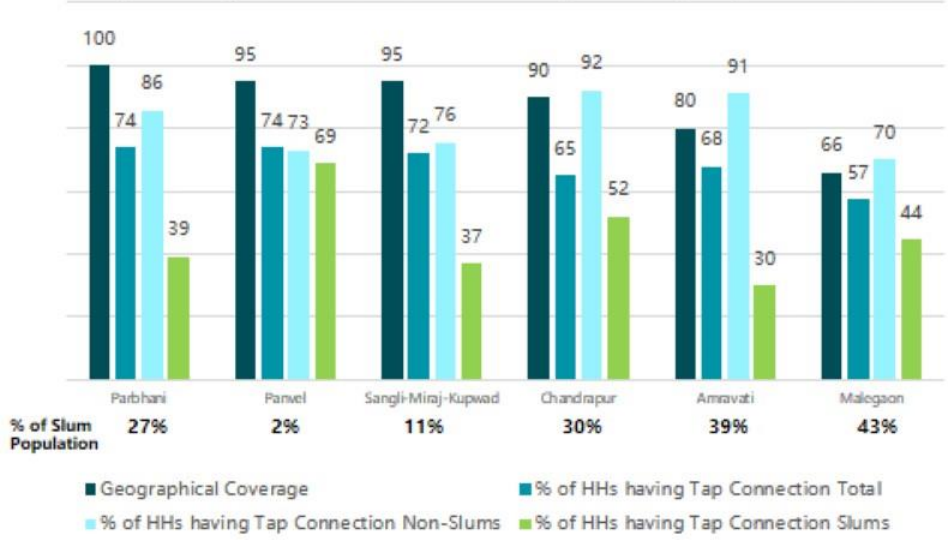


Source: SLB PAS Data for Ahmedabad, Surat and Morbi FY 2020-21; Jamnagar data verified and updated by city officials of Jamnagar, 2022

Maharashtra: Good network coverage, though coverage in slum areas needs to improve

Network Coverage

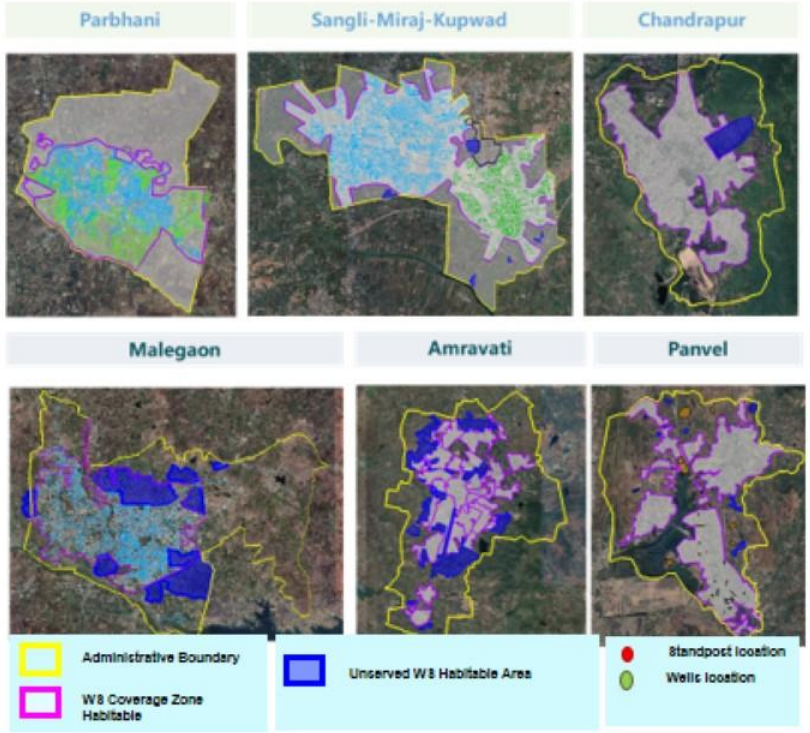
- Clear bifurcation between notified and un-notified slums, the slums which are un-notified do not get services.
- Dependency on water tankers. Arises possibility of private water market.



Source: CWBP 2020-2021 data for Amravati, Panvel and Parbhani; Slum data for Panvel from Shelter Associates 2019 slum HH survey SLB PAS 2020-21 data for Malegaon ; Sangli-Miraj Kupwad data verified and updated by city officials 2022; Chandrapur data retrieved from Notesheet which Chandrapur submits to MoHUA for AMRUT monitoring

Database Challenges

- Lack of digitized records in cities that do not have metered connection



AMRUT has enabled "infrastructure networks" to reach to vulnerable areas, though household connections have not been provided to all

- Under AMRUT, cities have achieved their geographical network coverage to more than 90 percent in most cities.
- However, individual water connections have not reached all households, particularly those staying in slum settlements

Many vulnerable areas have to rely on access to water through different measures and practices

Group Connections approach	Illegal Connections	Standposts/ Handpumps	Tanker water supply

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Source: CWAS (2023), Last Mile Connectivity for Urban Water Supply Services : A study done for Ministry of Housing and Urban Affairs (MoHUA). Available at: https://cwas.org.in/resources/file_manager/Last%20mile%20connectivity%20for%20urban%20water%20supply%20services.pdf

Reasons for poor water connection coverage in cities

Recent laying of water supply network under AMRUT 1.0

Morbi Non-Slums: 43% Slums: 48%

Chandrapur Non-Slums: 92% Slums: 52%

- **Network laying** was completed in 2021 under AMRUT 1.0
- New network areas are still under the process of providing HH water connections.
- Data for water connection is not properly maintained and not digitized.

Clear bifurcation between notified and un-notified slums

Panvel

Non-Slums: 73%
Slums: 69%

- **Unnotified slums** do not get any water supply services.
- They are dependent on water tankers and probable access to the private water market.

High connection cost

Malegeon

Non-Slums: 70%
Slums: 40%

Panvel

- High connection cost in Malegaon at **Rs. 7947 per connection is the major reason for low coverage in Malegaon**

Complex Administrative Process

Panvel

Morbi

- **Complex administrative process** with too many documents and involvement of multiple departments for approvals to obtain water connections.
- **Non-digitized application forms** are also one of the reasons in Morbi for delay in obtaining connections.

Source: Based on discussions with city officials of Gujarat and Maharashtra, 2022

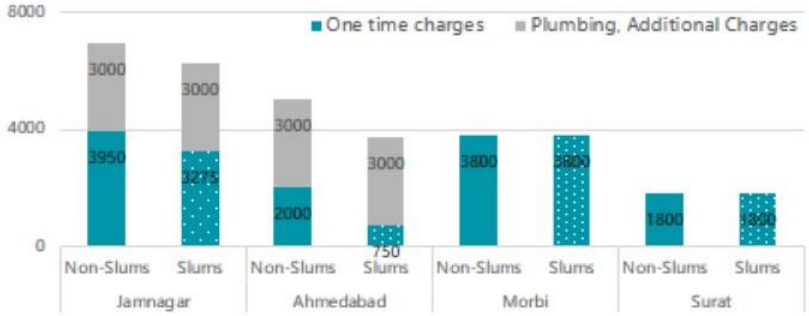
Administrative process and water connection charges - challenge in getting connections for vulnerable groups

A four-step process takes 20-45 days to get a new water connection in Gujarat and Maharashtra along with long list of documents requirement for few cities (mainly large corporations)

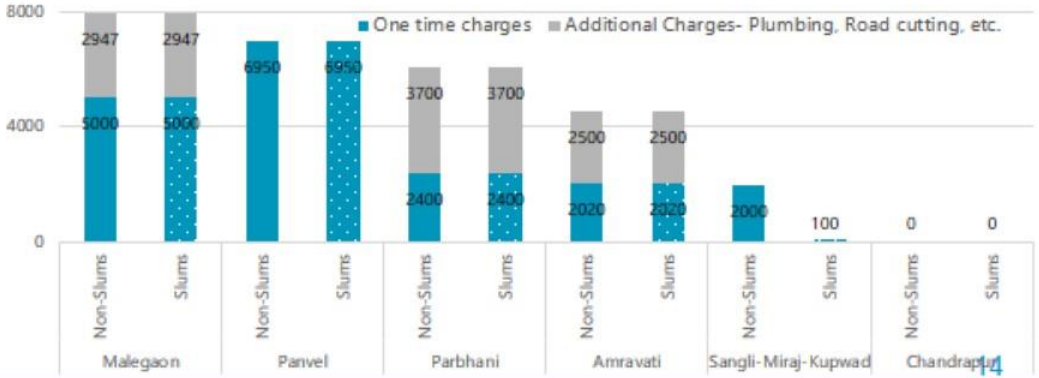
1. **1 day** — Application and Documents Submission
2. **3 to 7 days** — Internal Verification & Approvals
3. **2 to 10 days** (Depends on the applicant) — Fees to be paid for new connection
4. **7 to 15 days** — Work Orders are given

Water connection charges vary significantly across cities even in the same state

Water connection charges in cities of Gujarat



Water connection charges in cities of Maharashtra



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Tedious documentation processes

Although very few supporting documents required, there is no standard application format

Submitting handwritten application for getting connection is an impediment

Supporting documents in Gujarat cities	Morbi	Jamnagar	Ahmedabad	Surat
Property tax receipt	√	√	√	√
Address Proof and Identity Proof		√	√	√
Copy of House Tax Assessment sheet registered as tenant in case of tenancy		√		
Drainage Connection Receipt			√	√
Building permission/ Certified letter of construction permission and user licence			√	√
NOC Form (Society Chairman)			√	√
Copy of layout plan (Incl. TP scheme final plot and subplot.)			√	
Rs. 300 Stamp Paper Guarantee				√
Income Certificate				√
Copy of Plumber's License (From registered Plumbers provided by Corporation)				√

Supporting documents in Maharashtra cities	Parbhani	Chandrapur	Sangli	Malegaon	Amravati	Panvel
Property tax receipt	√	√	√	√	√	√
Address Proof and Identity Proof	√	√	√	√	√	√
7/12, Property Card/Purchase Deed			√		√	
Building permission/ Certified letter of construction permission and user licence						√
Rs. 20 or Rs. 100 Stamp Paper/ Rs. 100 bond of applicant				√	√	
NOC Forms (Owner/Society/Council)				√	√	√
Applicant Passport Photo (3 copies)					√	
Road dismantle permission					√	
Income map						√
Owners NOC if applicant is not covered under Mumbai rent control act.						√
Additional documents for slums						
Matters considered by election commission regarding proof of residency will be considered						√
Slum declaration circular				√		

Tedious process of collecting documents from multiple departments

Some documents requires 2-3 trips to concerned departments

Source: Assessed based on discussions with city officials, 2022

High user charges - barrier for urban poor households

Ahmedabad	Surat	Jamnagar	Morbi	Parbhani	Chandrapur	Malegaon	Panvel	Amravati	Sangli Miraj Kupwad
Water tax based on property tax/ property size		Flat Charges Per Year per connection					Metered and Non-Metered Charges Bifurcation Per Year		
30% of the property tax Rs. 100-200** per year for 40-50 m² carpet area)	Rs. 174-3750** **per year upon the size of the property** (0-15m² to 501m² and above).	**Non-slums: Rs.1,150** **Slums: Rs.575**	**Rs.600**	**Rs. 2,400**	**Rs.1,430**	**Rs. 2,611**	**Metered Rs 9/1000 L Rs. 2187*** Per year **Non-Metered Rs. 1500**	**Metered:** Rs. 19 per 1000 L till 15,000 L Rs. 29 per 1000 L till 15k-25k L **Rs. 5278*** per year **Non-Meter: Rs. 6,720**	**Metered: Rs 8/1000 L Rs. 1,944*** per year **Non-Meter: Rs. 1,920**

*Charges derived for metered connections considering 135 lpcd consumption of water and family size of 5. ** Charges derived considering a sample property size

- Cities have adopted various mechanisms for levying user charges i.e. flat charges, metered slab charges and charges linked to property tax
- The user charges slab is higher in the case of Amravati. These rates are issued by MJP as it is providing water in Amravati.

Source: Based on discussions and water charges documents provided by city officials of Maharashtra and Gujarat, 2022

Reducing or removing connection charges for vulnerable communities will encourage them to take individual connections

- Few cities have lowered the connection costs for slums, to increase the individual connections in slums
- Gujarat state level scheme SJMMSVY leveraged everyone to get the connections in Rs. 500 which also reflects in good coverage (i.e. slums and non-slums equal coverage percentage) of individual connections in the cities
- The user charges do not have bifurcation for slum and non-slum households for 9 out of 10 cities. Only Jamnagar has the bifurcation of non-slums and slums with slum user charges rate half in comparison to non-slum user charges.
- Providing equitable rates for water user charges will encourage the slum households to procure individual connections

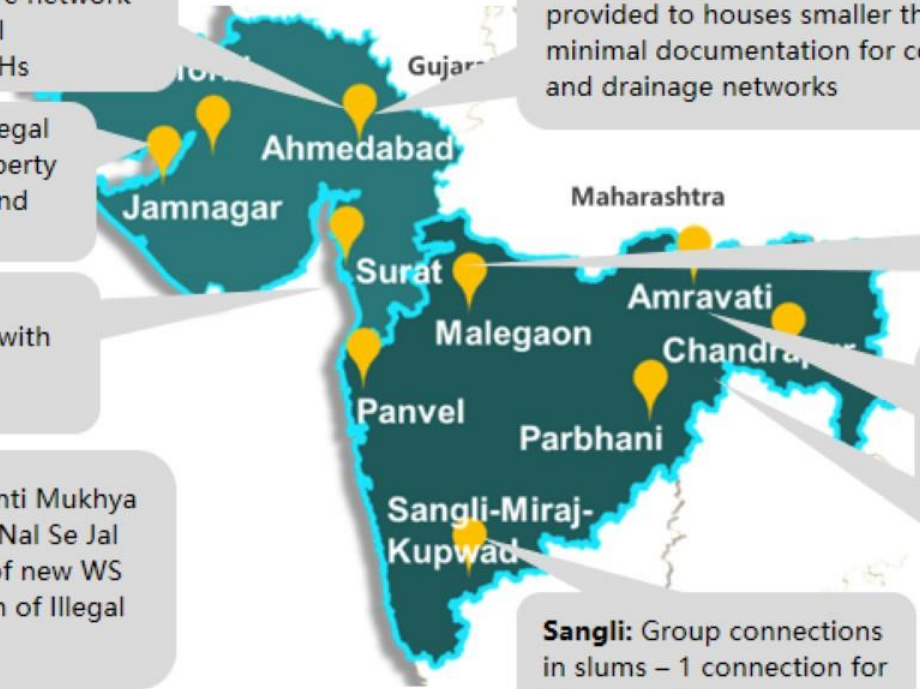
Initiatives to improve water connection coverage

Ahmedabad: Slum Networking Program (1995) – Network infrastructure network extended to slums with partial investment by participating HHs

Jamnagar: Identification of illegal connections by matching property tax and water tax databases and through site survey

Surat: Free Drinking Water connections (2012) to homes with area and construction critera

Gujarat: Under Swarnim Jayanti Mukhya Mantri Shaheri Vikas Yojana- Nal Se Jal for urban scheme, provision of new WS Connection and regularization of Illegal connections for Rs 500 per



Ahmedabad: Rs 500 NOC scheme (2002) – NOC provided to houses smaller than 40 sq mts with minimal documentation for connecting to water and drainage networks

Malegaon: Illegal connections surveyed and legalization process done for 7200/10,000 connections

Amravati: Supportive State scheme - Maharashtra Suvarna Mahotsavi Nagari Dalitvasti Water Supply And Sanitation Scheme – utilized for subsidy on connections

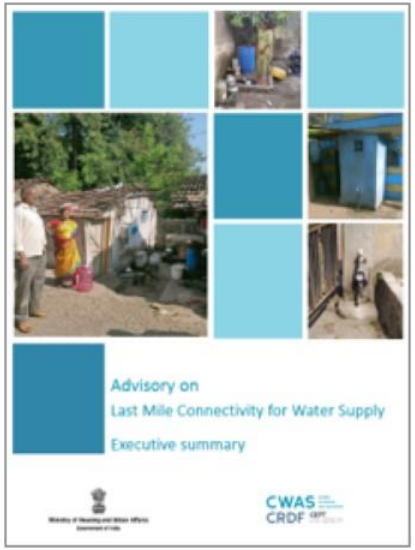
Sangli: Group connections in slums – 1 connection for 5 households

Chandarpur: Free water connections through AMRUT programme in

Source: Based on discussions with city officials, 2022

Based on the findings of the Last Mile Connectivity study, an advisory was prepared for Ministry of Housing and Urban Affairs

- Improving spatial coverage and providing access to all
- Alleviating legal and administrative barriers
- Affordable connection charges and water tariffs



Climate Resilience

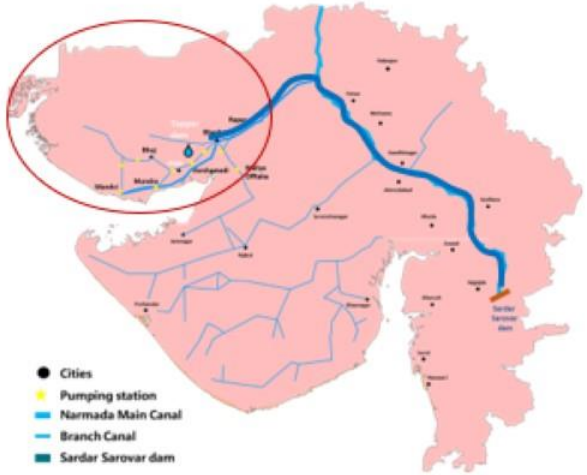
From creating infrastructure to climate resilience

Infrastructure provision → **Ensuring Services** → **Climate resilience**

- ✓ Identify natural water bodies –current and defunct and plan to rejuvenate them!
- ✓ Strengthening regulatory systems for private wells and borewells
- ✓ Planning bye-laws to promote rainwater harvesting
- ✓ Financial incentives to promote new approach/ Blue-Green Infrastructure at scale

Need to strengthen own water sources!

Water brought from distant Narmada ...

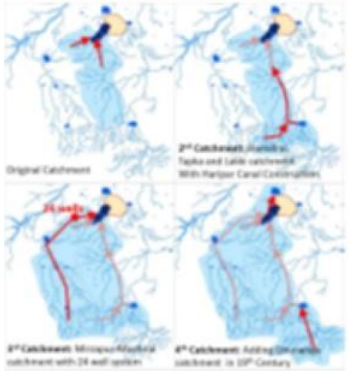


And yet, Kutchh cities are not able to supply water daily ...

Climate vulnerability, "non-water days" and private water markets

Rejuvenation of local water bodies to ensure alternative supply as well as health of groundwater

Revival of local, traditional sources



Repairing traditional lake catchment system developed by old rulers

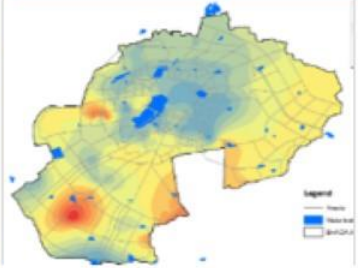
De-silting lakes with public participation

Revival of old unused well for decentralized piped supply for a slum

Rainwater Harvesting

Student managed rain water harvesting in school for drinking water supply

Groundwater recharge



Ensuring viability of groundwater borewells through water level monitoring and recharge activities

Flood control through GW recharge for a housing colony

Wastewater Reuse

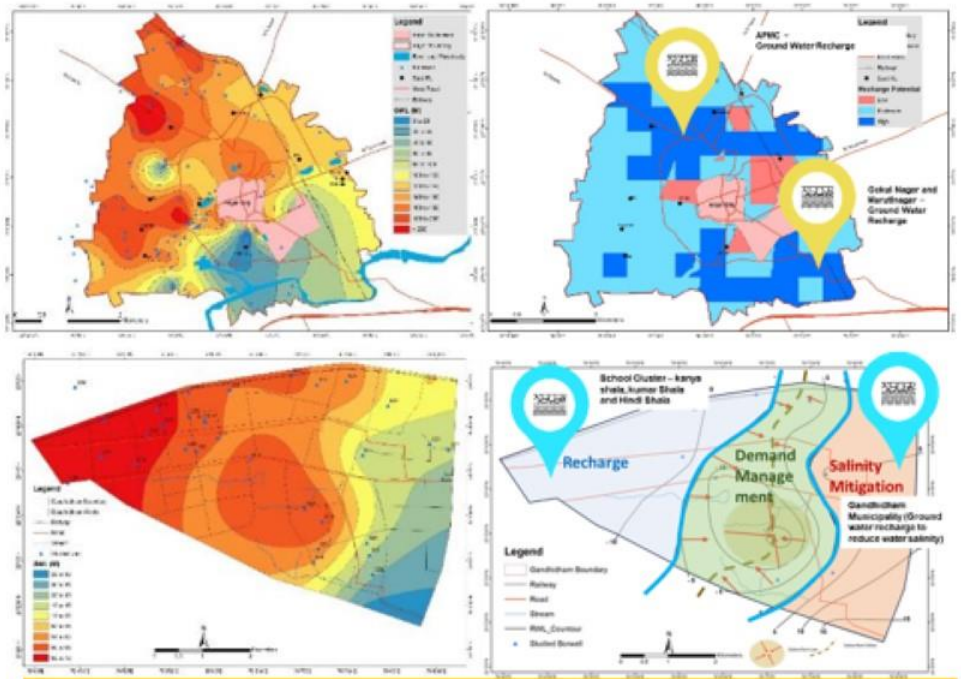
Greening by DEWATS

Through...

- Citizen Involvement
- Pilot project demonstrations

More information: CWAS - Moving Bhuj Towards Water Security , Rethinking Urban Water Management - Lessons from Bhuj

Geohydrological study for understanding aquifer and watershed of cities leading to groundwater recharge strategies



Identification of potential water recharge sites....

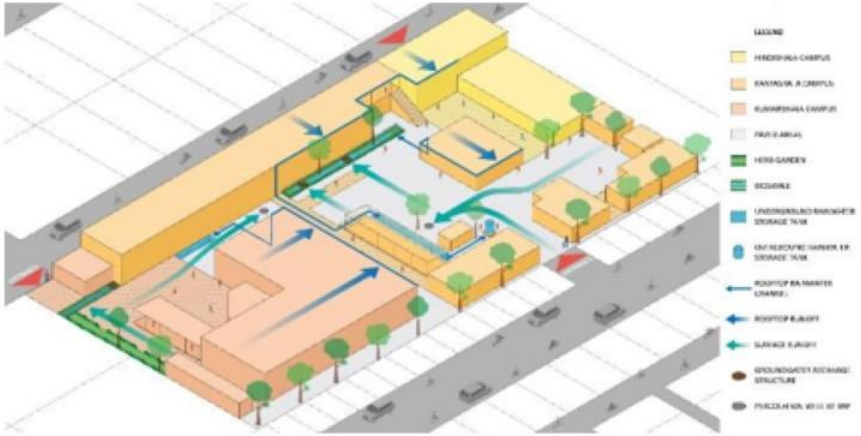
Zone-wise Groundwater recharge structure strategy

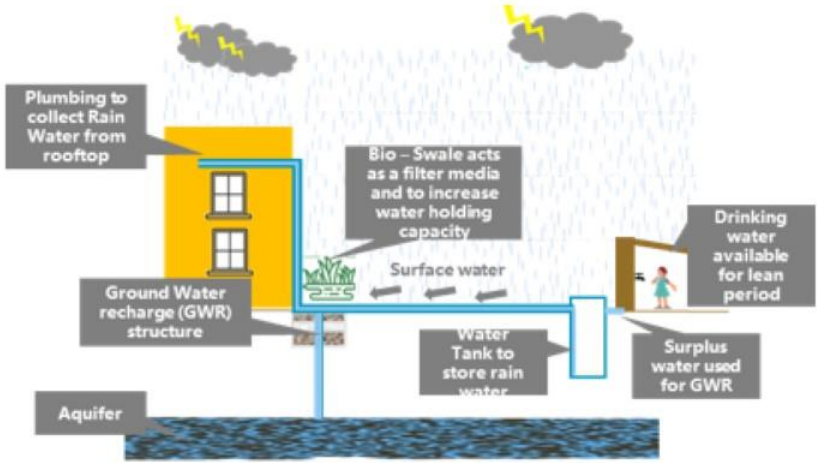
Addressed multiple issues:

Water scarcity, urban flooding, and groundwater depletion

Rainwater harvesting for drinking water needs during lean period

Household / Institutional level





3 school cluster

Municipal Council

Jal Sanrakshan Mela organized in Gandhidham in context of – Launch of National initiative "Jal Sanchay Jan Bhagidari "

Jal Sanrakshan Mela organized in support with Gandhidham Chamber of commerce : 20th -21st July, 2024

1200+ visitors from various walks of life visited the Mela

Visitors included – MP, MLA, Government Officials, Development Authority, Armed forces, citizens

12+ vendors Participated

500+ school students

35+ villagers from nearby villagers visited the Mela

"Nukkad Natak" on water conservation

Engaging women's Self-Help Group for O&M of Climate resilient solar GWTP and reuse of treated used water

- SMC installed a pilot **60 KLD Solar powered GWTP** based on the Moving Bed Bio-Reactor at one of its public garden.
- **SHG engaged through a SHG friendly contract** for O&M of and reuse of usedwater at 2000sqm of garden area **through proper trainings**
- Installation of **7.5 kVA off grid solar** energy system has been done for fulfilling **treatment plant's energy requirements**.
- Greywater from various typologies like **vulnerable areas, apartments, bungalows, hotels etc. is treated at the GWTP.**
- **Around 17 Million liters of grey water** has been treated till the date **since January 2022**

SHG members operating the SGWTP

Training session for SHG members

“Greening” water and sanitation infrastructure for cities

Assessment of water and sanitation services and emissions in operations – **energy and water audit**

Use of clean energy such as **solar power** for various WASH operations. Use of energy efficient machinery

Use of **electric municipal vehicles** powered by **solar energy**

Methane capture units at treatment facilities

Urban forests as **carbon sinks** at treatment facilities

Reduction in water loss in municipal supply as well as wastewater reuse will reduce overall water demand which will in turn lead to lower electricity use for extraction/pumping and heance lower emissions

Reduction in emission (methane) with treatment as well as well-functioning septic tanks with **regular delsudging**

Scaling this to Maharashtra State through Majhi Vasundhara and SBM

Demonstration of renewable energy for WASH – Maharashtra

Installations at
Water Treatment Plant

Installation at
Faecal Sludge treatment plant

Installations at
Centralized and Decentralized
Wastewater Treatment plants

Reducing by **16 %** dependency on conventional energy source of municipal services

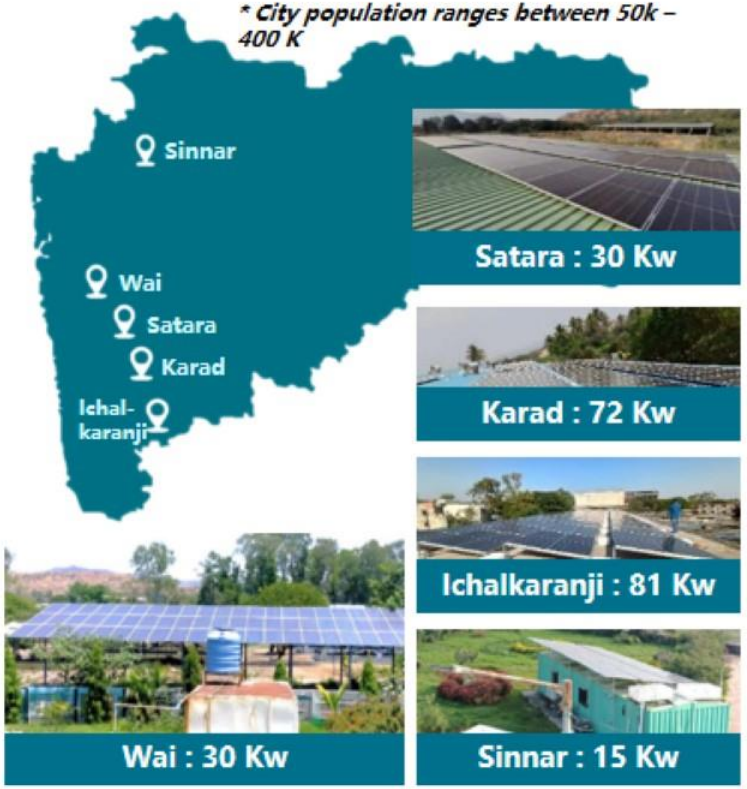
Over 25 years:

Clean energy generation potential

8550 MWH

Emission reduction Potential

7,011 tons CO2



Scaling this to the State through Majhi Vasundhara and SBM

Projected Overall cost saving in 25 years: INR 60 million

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Financial resources needed for urban services

Achieving SDGs and urban growth targets will require additional financing

As per a recent World Bank study, India will need to invest **$840 billion in urban infrastructure by 2036**- an average of **$55 billion** or **1.2 percent of GDP per annum.**

Indian cities contribute **2/3rd of national GDP**. Despite the high economic contributions from cities, they receive **inadequate Public Funding for urban infrastructure,** especially through Intergovernmental trasfers

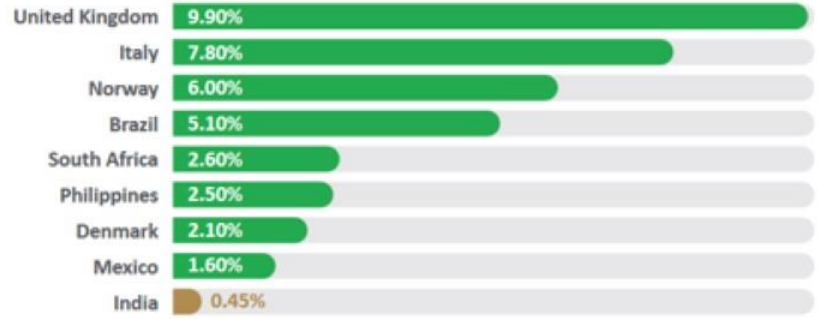
Therefore, cities will need to also focus an increase in public funds and mobilise extra budgetary resources

- **Municipal borrowing**
- **Blended Finance**
- **Impact investments**

Improving access to public funds

Focus on enhancing predictable and untied intergovernmental transfers (IGTs) to ULBs…

Figure 10: IGT to Municipal Governments as a Proportion of GDP



Sources: UK, Denmark, Norway, Italy and India – Mohanty (2016) as cited in Ahluwalia et al. (2019) p.11; Brazil – Organisation for Economic Co-operation and Development (OECD) (2016a); Mexico – OECD (2016b); South Africa – OECD (2016c); Philippines – Diokno-Sicat, J. (2019) p. 10

- Cities do not get any benefit from their economic vibrancy as all the buoyant local taxes – such as the octroi, entry tax and local body tax – have been abolished…

Untapped revenue potential from property taxes and other own revenue sources…

Figure 16: Property Tax as a Percentage of GDP in Select Countries

Sources: For India 2017-18: Ahluwalia et al. (2019), p. 9; for Organisation for Economic Co-operation and Development (OECD) and developing countries in the 2000s: Bahl and Martinez (2007), Table 1, p. 16; and for 18 OECD and 29 developing countries, based on International Monetary Fund Government Finance Statistics, various years.

- Incentivising local governments to improve own revenues both tax and non-tax revenues
- Reforms to brings efficiency of Property Tax coverage and collection with market rate indexation

Sources: CWAS (2020), " Strengthening finances of Municipal governments" ; and World Bank (201), "Financing India's Infrastructure Needs: Constraints to Commercial Financing and Prospects for Policy Action"

There is an increasing recognition of the need to mobilise infrastructure investments through market borrowings

The municipal bond market size increased by 5X

due to the incentives worth INR 13 crore on INR 100 crore bond amount under AMRUT reforms

Issuance of Municipal and Pooled Bonds worth INR 4,231 crore in India (1997-2024)

Stronger "creditworthiness" improves a city's ability to access different financing resources

Creditworthiness Assessment Framework for cities

- **Creditworthiness Assessment** for cities as **Pre-cursor to actual credit rating and decision to borrow.**
- **Round table meet at MoHUA** to promote enhancing the creditworthiness of cities.

ESG Assessment Readiness Framework for cities

- **Encourage cities to become ESG-ready** and create an enabling environment for investors to make decisions about their investments in cities.

Source: www.sebi.gov.in, www.mohua.gov.in, 2018, AMRUT 2.0 operational guidelines, MoHUA, 2021, Discussions with CFAs of Gujarat and Maharashtra, 2023

Innovative approach of raising finance through green bonds and carbon credits - Case of Indore

Green Bonds

Green bonds over municipal bonds as it was easier to obtain carbon credits for a **"green" project**

Prerequisite checklist helped with ready made data availability

Carbon Credit Mechanism

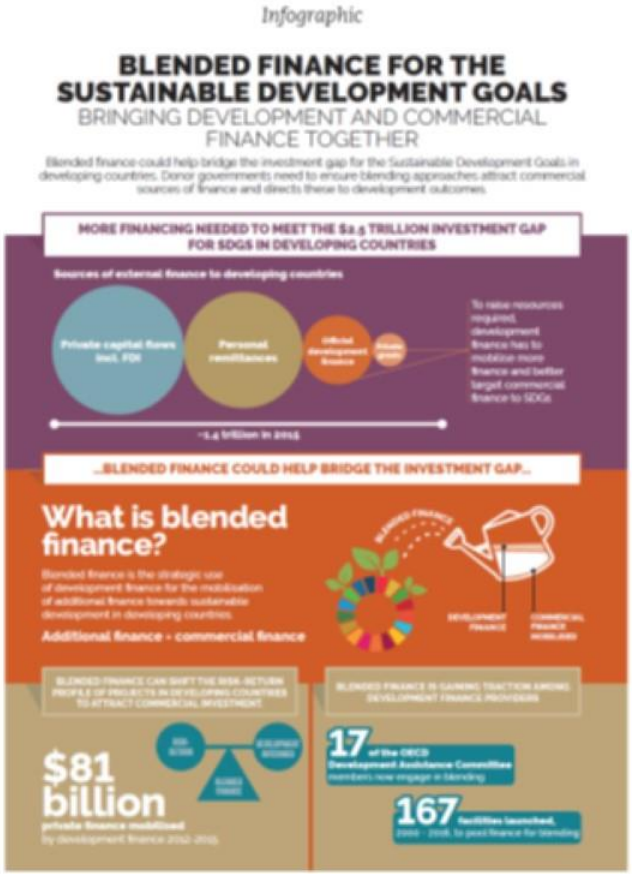
Bundling of solar projects to obtain carbon credits

Verification and authorization through EKI

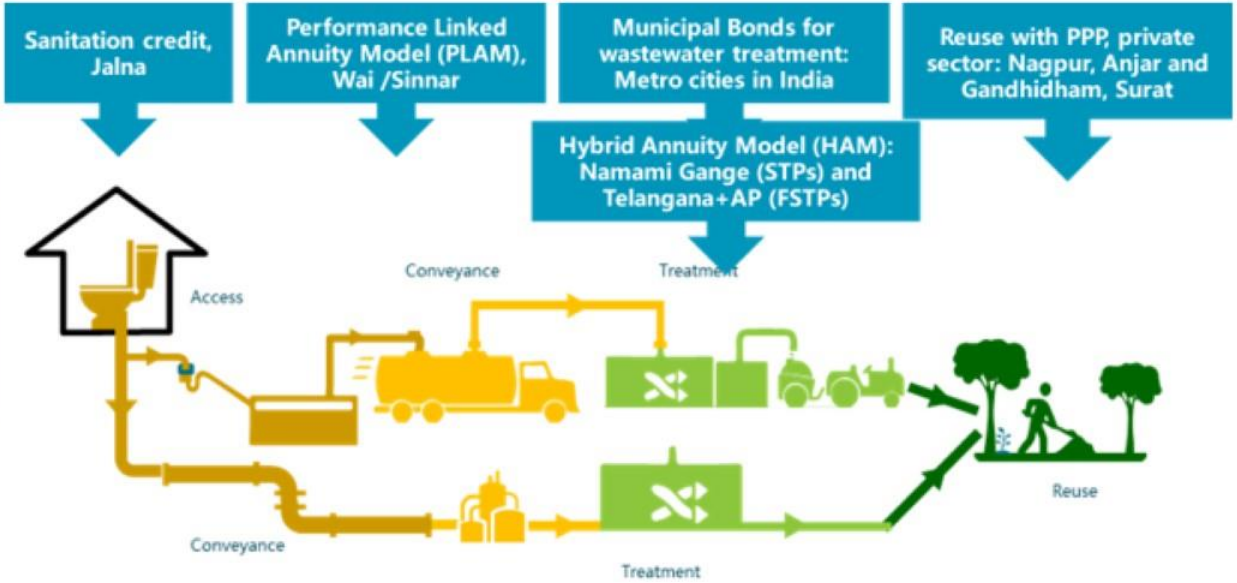
Selling of carbon credits worth INR 52 lakhs which is encashed for O&M of WASH solar project

- Currently, there is a **voluntary carbon credit market in India**..GoI plans to develop the Indian Carbon Market (ICM) where a national framework will be established to decarbonize Indian economy by pricing GHG.
- Bureau of Energy Efficiency, Ministry of Power, along with Ministry of Environment, Forest & Climate Change are developing the **Carbon Credit Trading Scheme** for this purpose.

Innovative Financing Approaches: Blended Finance



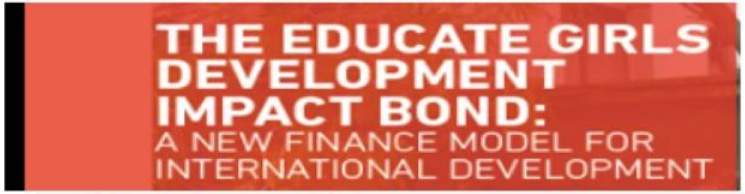
Blended Finance is an instrument to demonstrate the "Strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets" (OECD)



Source: OECD (2018), *Making Blended Finance Work for the Sustainable Development Goals*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264288768-en.

Impact Investment in India – Experiences in Education and Health

Impact bonds (IBs) are outcomes-based contracts or pay-for-success financing. They use private funding from investors to cover the upfront capital required for a provider to set up and deliver a service. The service is designed to achieve measurable pre-specified outcomes. The investor is repaid only if these outcomes are achieved.

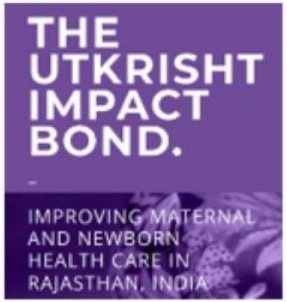


- DIB of USD 267,000 - Three-year intervention focusing on improved learning outcomes and enrolment numbers for out-of-school girls.
- It targeted 18,260 school-going children in the Bhilwara district of Rajasthan.

Quality Education India Development Impact Bond

A case study produced as part of the independent evaluation of the Department for International Development's Development Impact Bond Pilot Programme

Impact Bond Details	Educate Girls DIB	Utkrisht DIB	Quality Education India DIB
Target Sector	Primary Education	Maternal and Newborn Healthcare	Primary Education
Objective	• Improve enrollment of girls in Grade 2-8 • Improve Learning for ~18K boys and girls in Grade 3-5	• Support up to 444 private healthcare facilities to achieve and sustain a standard of quality that will result in decreased maternal and newborn mortality	• Improvement in numeracy and literacy learning of ~3,30,000 students
Partners	• Service Provider(s): Educate Girls • Impact Investor: UBS Optimus Foundation • Outcome Funder: Children's Investment Fund Foundation • Outcomes Evaluator: Ideas42	• Service Provider(s): HLFPPT, PSI • Impact Investor: UBS Optimus Foundation • Outcome Funder: Merck for Mothers, USAID • Outcomes Evaluator: Mathematica	• Service Provider(s): Gyanshala, KEF, PiT & EI, SARD • Impact Investor: UBS Optimus Foundation • Outcome Funder: British Asian Trust, MSDF, Comic Relief, IFC, The Mittal Foundation, The Elton Foundation • Outcomes Evaluator: Gray Matters
Period of Performance	H2 2015 – H2 2018	H1 2018 – H1 2021	H1 2018 – H2 2022
Bond Size	~0.4M USD	~9M USD	~11M USD
Results / Expected Results	• Achieved 160% of total learning target • Achieved 116% of total enrollment target	• Up to 600,000 pregnant women positively impacted, up to 10,000 lives saved over a five-year period	• ~0.2-0.4 SD per annum depending on intervention type



Source: http://instiglio.org/educategirlsdib/wp-content/uploads/2018/07/Educate-Girls-DIB_results_brochure_final-2.pdf; accessed on 12th October 2018
Source: https://www.usaid.gov/sites/default/files/documents/1864/Utkrish-Impact-Bond-Brochure-November-2017.pdf; accessed on 12th November 2018

In summary

Ensure last mile connectivity for water supply services

Promote climate resilience for own water sources and exploring alternative sources

Focus on enhancing public funds and leveraging innovative financing mechanisms

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.

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