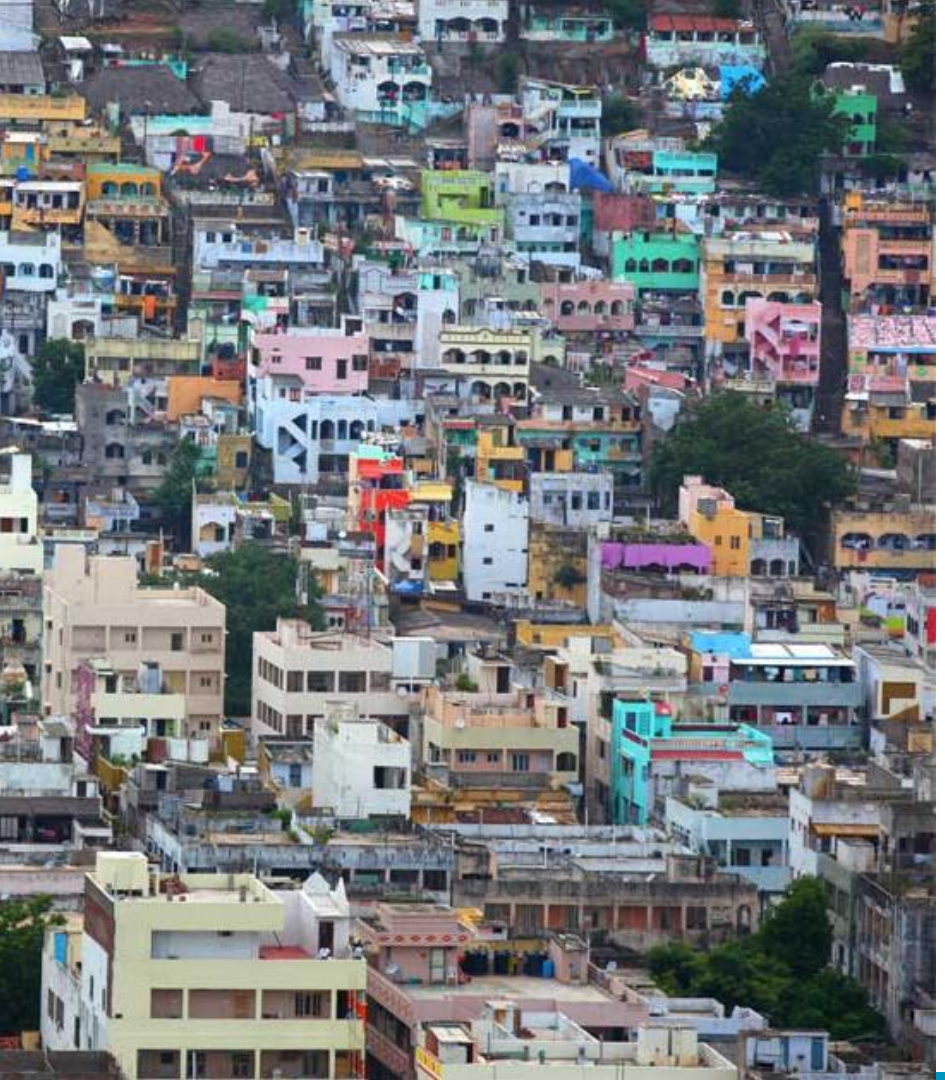

Making cities inclusive, climate resilient and sustainable

Meera Mehta

Keynote address,

Indian Institute of Technology, Madras

October 2023

With support from team at the Center for Water and Sanitation, CRDF, CEPT University

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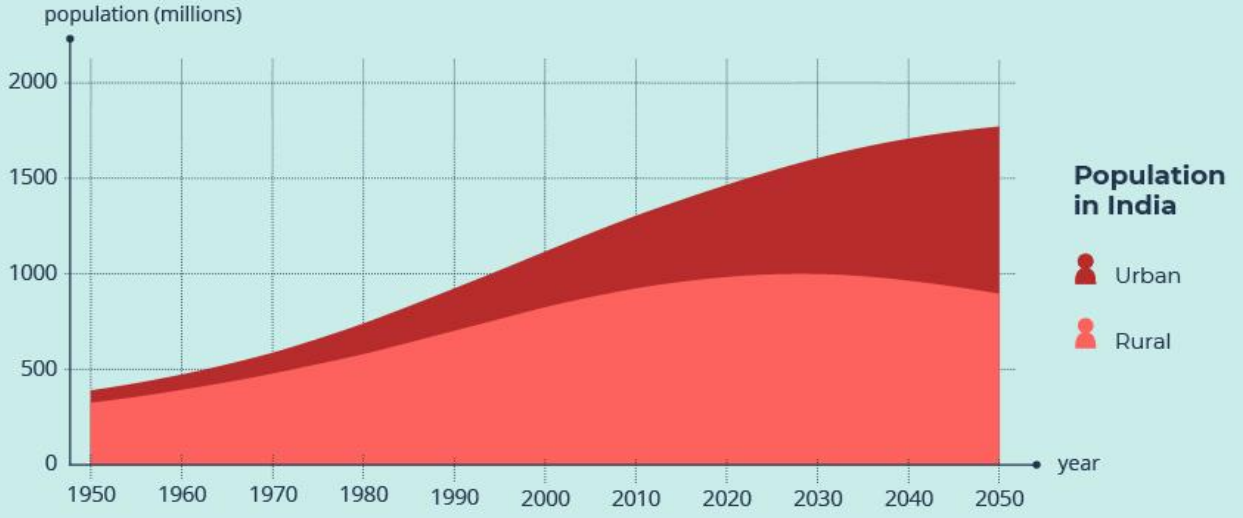
India is becoming more and more urban

Around 2030, the rural population will decline while the urban population will rise rapidly



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

URBANET

Climate and Water Security is being discussed at this conference

Drawing on our work, I will focus on five areas…

Achieving SDGs

Climate resilience

Inclusion and Gender

New forms of financing

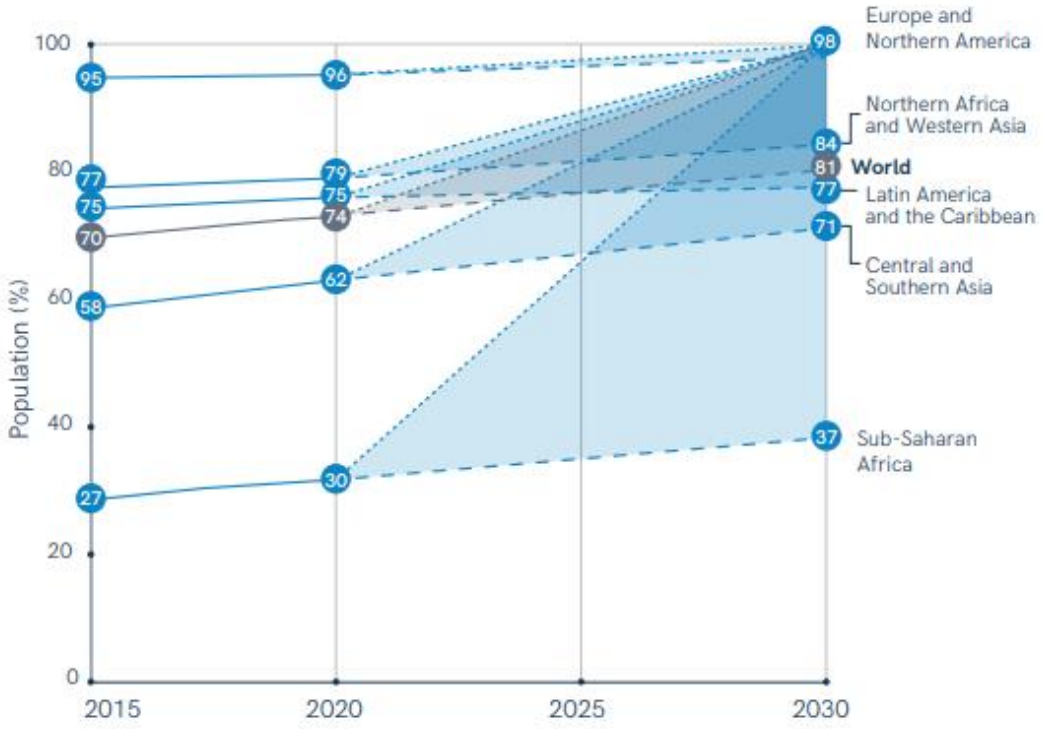
Monitoring with digital technologies

1

SDGs Sustainable Development Goals in India

Only 7 years are now left to achieve SDGs!

SDG 6.1 – Progress on access to safe and affordable drinking water

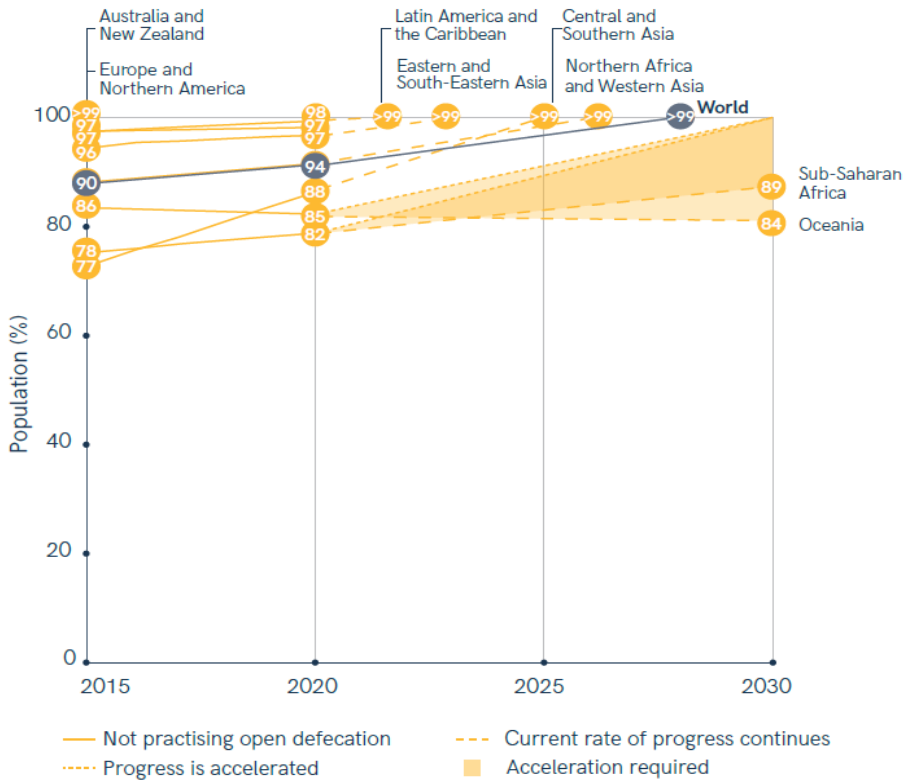


The world is not on track to achieve universal access to safely managed drinking water services by 2030, and requires 4 times increase.

At current rates of progress, the world will only reach 81% coverage by 2030

Source: Progress on household drinking water, sanitation and hygiene 2000-2020: five years into the SDGs,p.31, WHO-UNICEF JMP, 2021

SDG 6.2 - Progress on eliminating open defecation



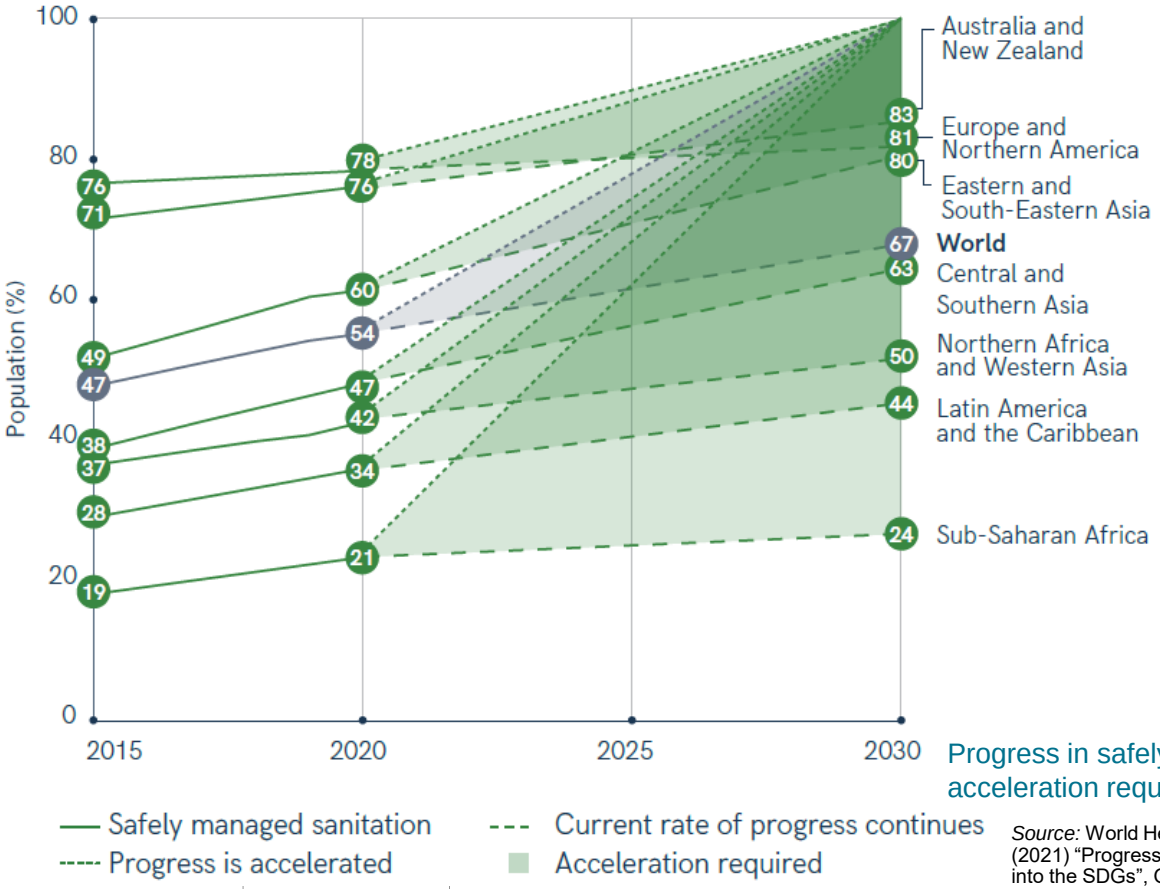
Significant progress in eliminating open defecation suggests that overall, the world is now on track to eliminate open defecation by 2030

India through its Swachh Bharat Mission has contributed greatly to this agenda

The Indian experience represents the largest drop in open defecation since 2015, in terms of absolute numbers.

Source:: World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), (2021) "Progress on household drinking water, sanitation and hygiene 2000-2020: Five years into the SDGs", Geneva, p. 9 and 64

SDG 6.2 Progress on safely managed sanitation – world

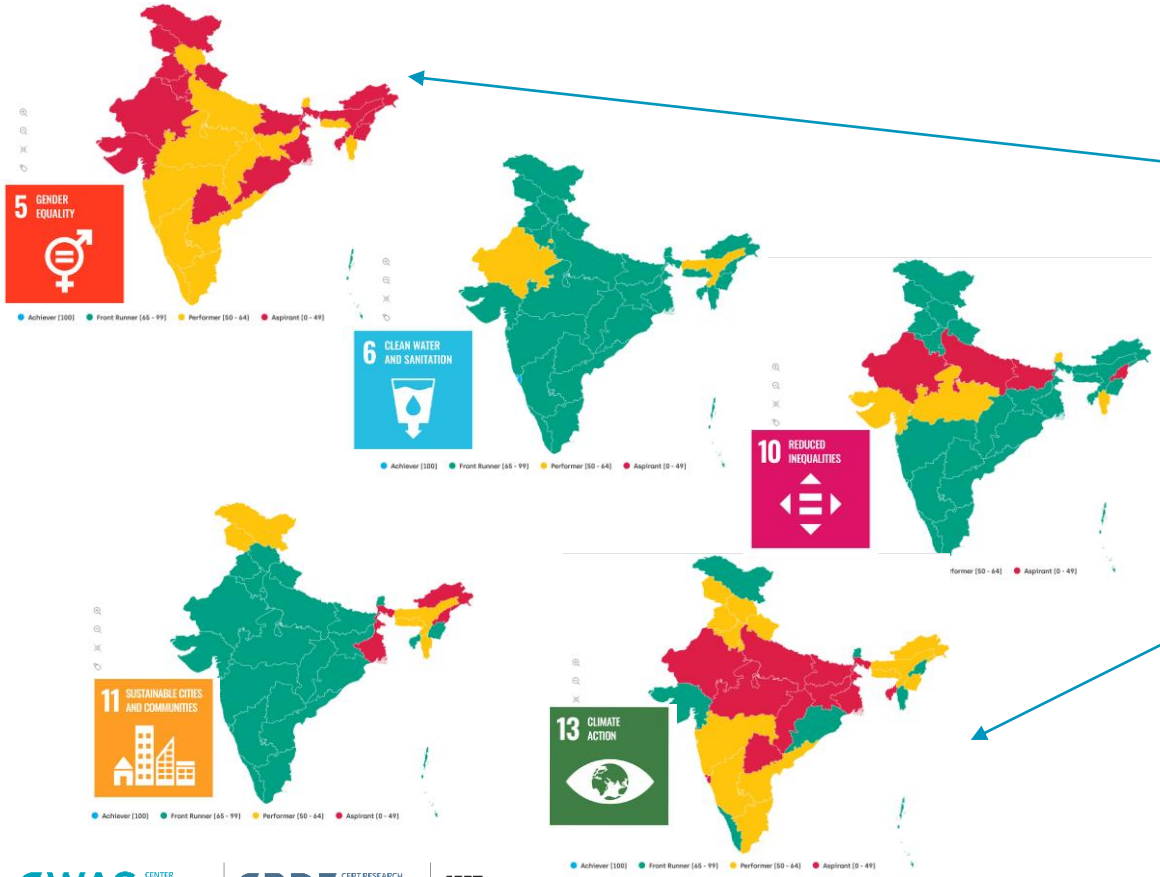


No region in the world is on track to achieve universal access to safely managed sanitation services by 2030

Progress in safely managed sanitation services, 2015 – 2020 and acceleration required to reach universal coverage by 2030

Source: World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), (2021) "Progress on household drinking water, sanitation and hygiene 2000-2020: Five years into the SDGs", Geneva, p. 52 - 54

SDG India Index 2020-21

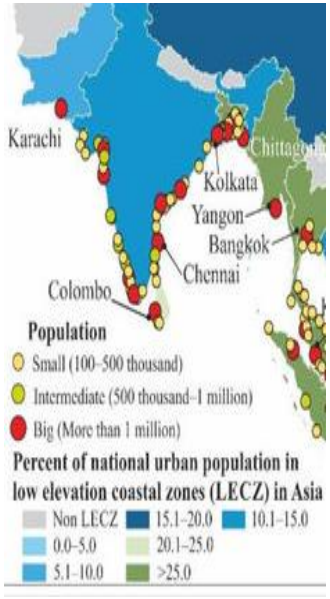


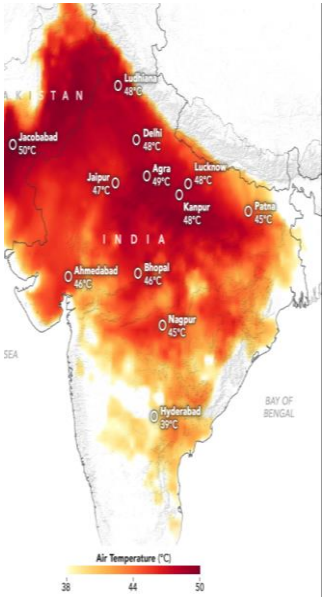
While India has done well on several SDGs – more efforts are needed on '**Gender equality**' and on '**Climate Action**'

NITI Aayog (2021). SDG India Index and Dashboard 2020-21 Partnerships in the Decade of Action. Retrieved from :https://sdgindiaindex.niti.gov.in/assets/Files/SDG3.0_Final_04.03.2021_Web_Spreads.pdf

2 Climate resilient WASH

Drought and stress on water supply	Floods and threat to life, infrastructure and economy	Sea level rise and threat to coastal cities	Heatwaves and carbon emissions	Inequality and resultant vulnerability





Making our cities water secure – emerging experiences

Water security is ….

Reliable and Affordable Access

of adequate

Quantity | **Quality**

of water for

Basic Human Needs | **Livelihoods** | **Local Ecosystem Services**

with a

Well managed risk of water-related disasters

Source sustainability

- Groundwater management
- Rainwater harvesting
- Reducing distant source dependence

Municipal service efficiency

- Access to all
- Non-revenue water
- Equity in services

Climate resilience

- Avoid “Day Zero”
- Erratic rainfall
  - Urban flooding
  - Coastal and mountain risks

Urban water security toolkit

Measures to move towards water security and reducing urban flooding through water recharge / water harvesting projects

Ironical situation- floods vs. water scarcity

On the one hand there is **acute water scarcity** and on the other, the **streets are often flooded** during the monsoons

Frequent **Urban flooding** scenario in arid regions

Pilot Demonstrations
Adaptive measures for: Water security and Mitigating urban floods

Rainwater Harvesting

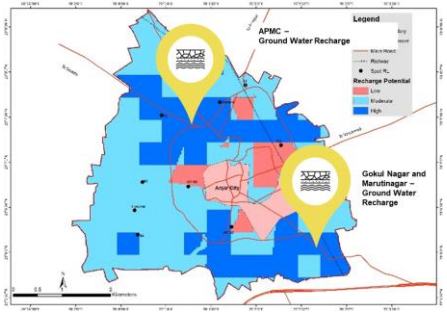
Rainwater harvesting in schools for drinking water supply

Groundwater recharge

Flood control through GW recharge for housing colonies

Scaling up plan

Urban Watershed Delineation
Groundwater Recharge Potential Map at city level



Revival of traditional lake catchment system; Well rejuvenation

35 Million liters **of ground water recharged during monsoon**

Making WASH services Carbon Neutral - across the service chain

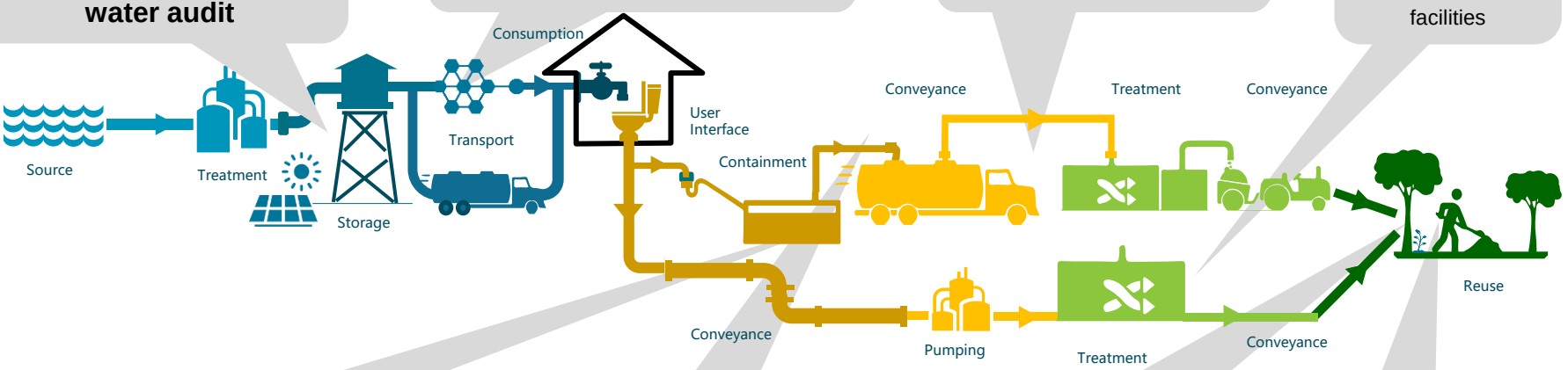
Supporting Cities in Maharashtra: Karad, Vita, Ichalkaranji, Wai, Sinnar, Satara

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

Piloting use of **electric / solar energy truck** for septic tank desludging service

Methane capture units at treatment facilities



Equitable and citywide inclusive services - Plan for **citywide scheduled desludging service** in consultation with city governments

Safaimitr suraksha - **Sanitation worker safety training and sensitization**

Gender Empowerment - Plan for involving SHGs in consultation with city governments – **NULM convergence**

Urban forests as **carbon sink units** at treatment facilities

Demonstration of renewable energy at Infrastructure level

Installations at
Water Treatment Plant

Installation at
Faecal Sludge treatment plant

Installations at
Centralized and Decentralized
Wastewater Treatment plants

Scaling this to the State through Majhi Vasundhara and SBM

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

** City population ranges between 50k – 400 K*


Satara : 30 Kw


Karad : 72 Kw


Ichalkaranji : 81 Kw


Wai : 30 Kw


Sinnar : 15 Kw

Projected Overall cost saving in 25 years: INR **60** million

State level Climate Mission in Maharashtra – Majhi Vasundhara

MoU with Environment and Climate Change Department of Government of Maharashtra

Focus areas under Majhi Vasundhara

- **Bhumi {Earth}**
  - Conservation & Enhancement Of Green Cover & Biodiversity
  - Solid Waste Management
- **Vayu {Air}**
  - Air Quality Monitoring And Air Pollution Mitigation
- **Jala {Water}**
  - Water Conservation
  - Rainwater Harvesting And Percolation
  - Cleaning & Rejuvenation Of Water Bodies/River
  - Treatment Of Waste Water
- **Agni {Energy}**
  - Promotion Of Renewable Energy
- **Akash {Enhancement}**
  - Awareness On Environment Improvement & Protection
  - Pledge Taken Up By The Citizens For The Observance Of One Green Act

3 Inclusion and Gender

Ensuring ‘Last Mile Connectivity’

Ensuring and enhancing role of women SHGs and councillors

Supporting uplift and safety of marginalized groups such as sanitation workers

Last Mile Connectivity - universal access to water connections

Three key challenges:
To achieve universal coverage of individual water connections

Administrative and Legal Barriers

- Multiple departments involved
- Too many documents required
- No Application Tracking System
- Tenure requirements for basic services
- Lack of citizen awareness
- Complex, lengthy approval procedures

Cost Barriers

- High connection costs for new connections
- High water tariffs

Infrastructure Barriers

- Lack of internal distribution networks

Source: CWAS (2023) Last Mile Connectivity for Water Supply. Available at: https://cwas.org.in/cwas-resources/last-mile-connectivity-for-urban-water-supply-services

Ahmedabad: an Inclusive City

CEPT UNIVERSITY

Scheduled desludging service – Inclusive and Equitable service . . .

- **Includes** those **not connected to sewer networks – both slum and non-slum properties**
- **Mandatory desludging** service but **not linked to "user charges"** – service to ALL
- Special care to **service vulnerable areas** – long pipes for narrow lanes or smaller trucks to enter narrow lanes
- **Equitable - no charges** at time of desludging - benefiting low income areas - **sustainably financed through equitable "sanitation tax"**
- **Mechanized safe** desludging service for all – Safety of Sanitation workers

SBM-NULM convergence in Maharashtra: City led approach facilitated by the State Government

Sanitation-based-livelihoods for SHGs

- **270+** ODF++ cities
- **220** operational FSTPs
- **500+** MRF and waste compost facilities etc.
- **~1 lakh SHGs** in the state of which 90% are active

Capacity support for by SHGs

- **SHGs willing** to participate in sanitation related activities
- Need support **tendering process, financing** etc.

State policy and guidelines formulated

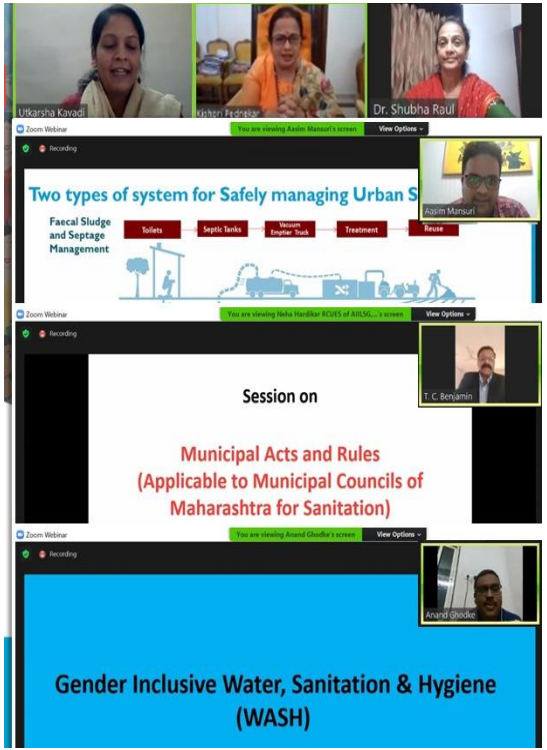
- State level **working group** formed by the **DMA, GoM**.
- **State level strategy** and **business model** developed

City led approach facilitated by State

- Proactive cities **engaged** SHGs in **SWM and FSSM** related activities.
- **"SHG only tenders, support and trust** from ULB needed to sustain engagement

Strengthening the role of women councillors and presidents

Webinar for Women Elected Representatives (Presidents) for ULBs



Division level orientation workshop for newly elected women representatives in Nagpur

City level orientation workshop for elected women representatives in Wai

Inclusion – Sanitation Workers' Rights: Dignity and Safety at workplace

Focus on Safai Mitra Surakshit Shahar Under SBM 2.0

SafaiMitra Suraksha: Zero fatality in sanitation work

- ✓ SOP for cleaning septic tanks and sewers
- ✓ Technology challenge
- ✓ Norms and protocols for equipment and workforce

Access to Infrastructure, PPEs and regular health camps

Skill building and training of San-Workers

IEC campaigns

500 Cities have declared themselves **SafaiMitra Surakshit Shehar**


Sinnar city

4 New forms of financing and ensuring sustainability

Urban infrastructure has been generally financed through public funds but innovative options are emerging

Own sources, Transfers and programs

- Taxes, fees, user charges
- Public sector programs
- State and Central Transfers
- Grants from Finance Commissions and SFCs

+

- Philanthropic Funding, CSR
- Private sector investment
- Social Impact Investors
- Capital Market Borrowing

- Output Based Aid
- Blended Finance
- Impact Bonds
- Municipal Bonds
- Repayable Finance
- Crowdfunding

- ✓ Additional funding
- ✓ Efficiency of private sector
- ✓ Performance linked approaches
- ✓ Social & environmental impacts with emerging global interest in impact investing

Options to leverage private resources and impact investments

Outcome based funding

Funder makes payments only if pre-agreed outcomes are achieved

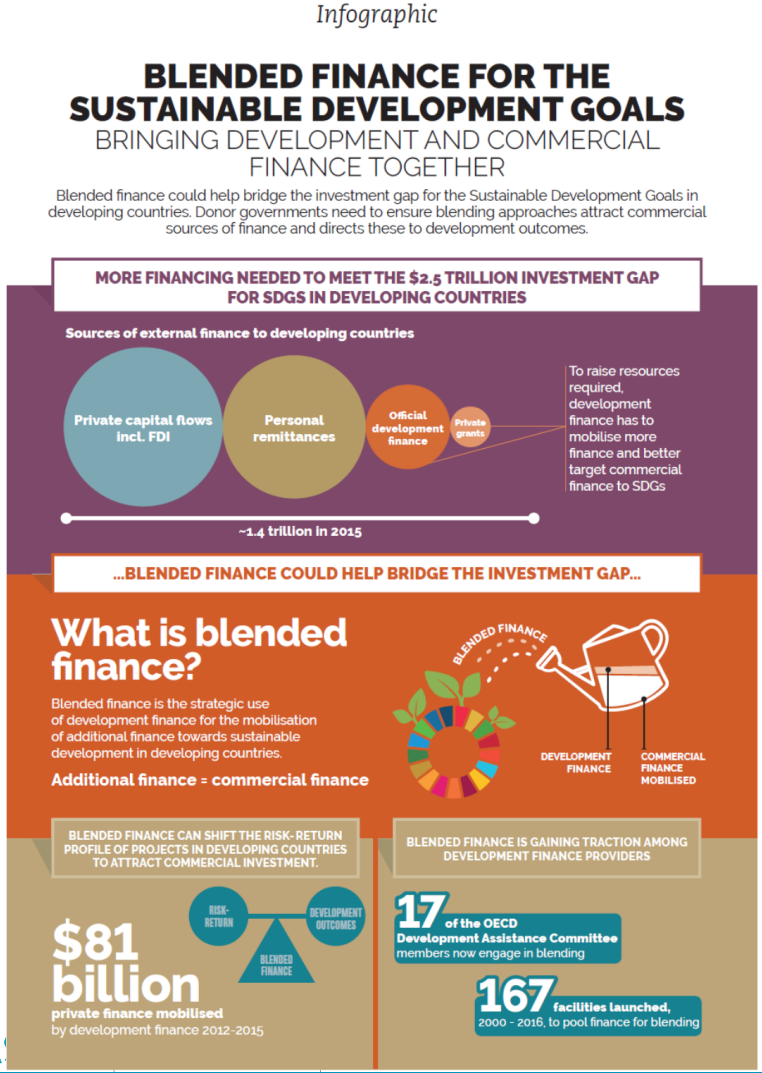
Blended finance

The combination of private (with returns) and public capital to achieve development outcomes

Municipal / Green Bonds

Accessing debt market resources for ‘green investments’ in cities

Source: Social India Finance presentation, 2020; **Convergence and the Brookings Institution (2017) “Impact Bonds in Developing Countries: Early Learnings from the Field”**



What is blended finance?

"Strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets" (OECD)

Blended finance can help risk-return profile of projects to attract private and commercial finance to project and activities that help achieve SDGs in different sectors

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

Blended Finance: examples of commercial finance mobilized across the sanitation service chain in India

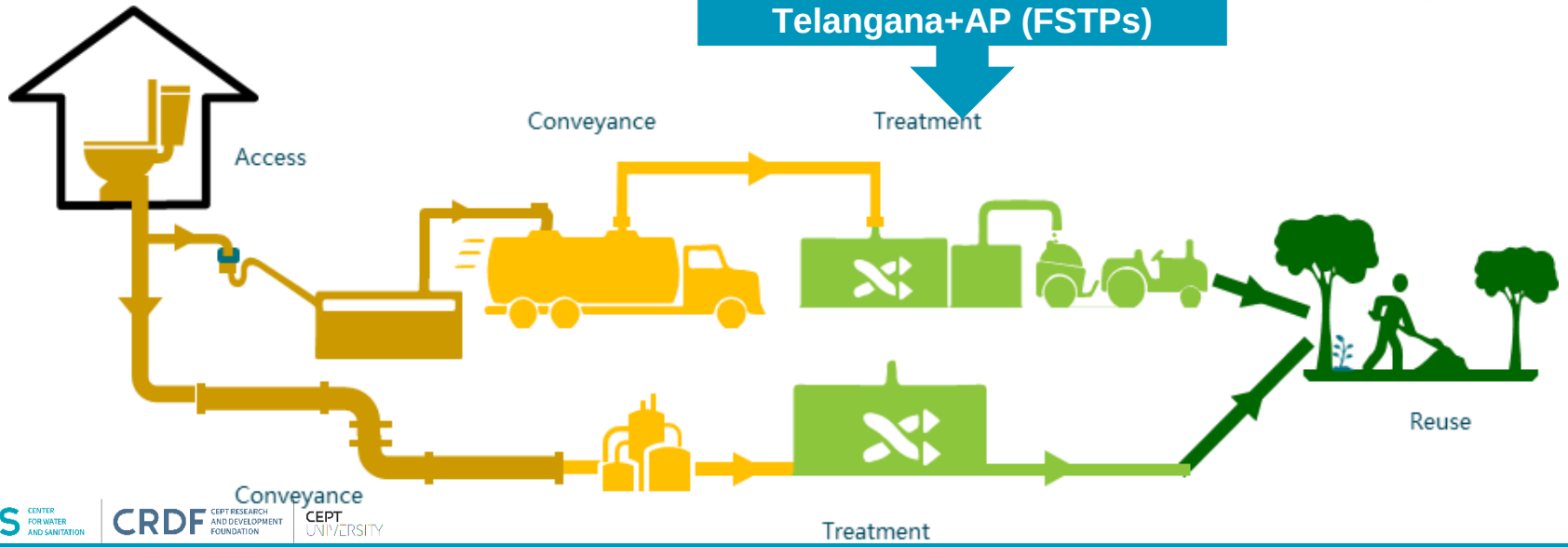
Sanitation credit, Jalna

Performance Linked Annuity Model (PLAM), Wai /Sinnar

Municipal Bonds for wastewater treatment: Metro cities in India

Hybrid Annuity Model (HAM): Namami Gange (STPs) and Telangana+AP (FSTPs)

Reuse with PPP, private sector: Nagpur, Anjar and Gandhidham, Surat



Greening of public infrastructure investments

SBM 2.0

स्वच्छ भारत
एक कदम स्वच्छता की ओर

- More emphasis on **reuse**
- Ensure **universal coverage** of **toilets**

AMRUT 2.0

अमृत
Atal Mission for Rejuvenation and Urban Transformation

- Should have more focus on **water security**
  - **Rain-water harvesting** structures
  - **Aquifer** management
  - **Flood control** and management
- Development of **green spaces**

Green Initiatives by GoI

भारत सरकार
GOVERNMENT OF INDIA
सत्यमेव जयते

Green Credit Scheme is environmental and climate friendly but needs **strong regulations** to work to avoid greenwashing.

Carbon Credit Trading Scheme to reduce GHG emissions with strong regulatory market to buy and sell carbon credits.

Urban Infrastructure Development Fund: Under the UIDF, climate adaptive plans and projects should be prioritized under this fund for **Tier 2& 3 cities** *(NABARD has a dedicated National Adaptation Fund for rural projects)*

Source: SBM 2.0 guidelines, 2021, AMRUT 2.0 guidelines, 2021, UIDF Model Guidelines, Union Budget 2023-24

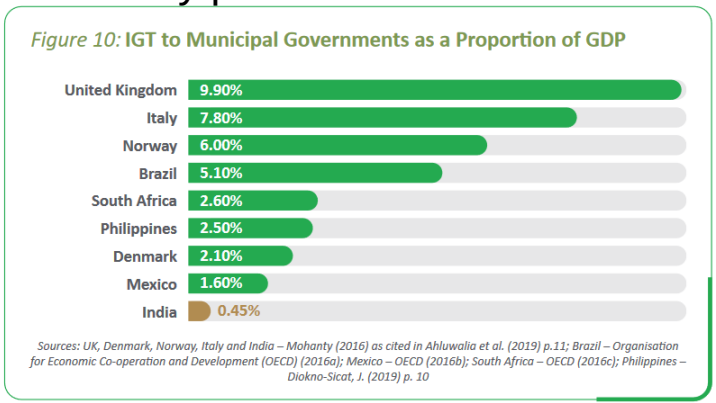
Improving municipal finance for urban local bodies…(1/2)

"Indian cities will require an investment of **$840 billion** in the areas of infrastructure and municipal services till 2036 to meet the needs of its fast-growing urban population"

-Recent estimates by World Bank in the report Financing India's Infrastructure Needs: Constraints to Commercial Financing and Prospects for Policy Action

Need to focus on greater transfers (IGTs)to ULBs…

- Indian cities contribute **2/3rd of GDP** but are fiscally poor



- Making IGTs predictable and untied.

Share of ULBs in GST?

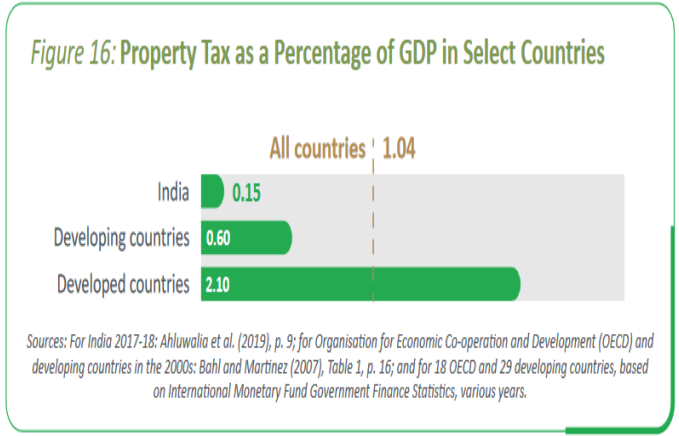
- Cities do not get any benefit from their economic vibrancy as all the buoyant local taxes – such as the octroi, entry tax and local body tax – have been abolished.
- "…sharing of the revenues from GST among all three levels of government."
- Need for a Separate list of revenue sources for local governments in the Constitution?

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"

Improving municipal finance for urban local bodies…(2/2)

Significant untapped revenue from property taxes and other own revenue sources of ULBs

Municipal strengthening for improved property tax collections…



- Linking Property Tax Base to **Market Prices**
- Continued Focus on Reforms to **Increase Coverage and Collection Efficiency** of Property Tax

Incentivising local governments to improve own revenues

Performance grants to ULBs

- **Improved data collection** and making it available through audited accounts
- Improvement in **own revenues**
  >90% property tax and water tax collections
- **State level incentives** as by Government of Maharashtra

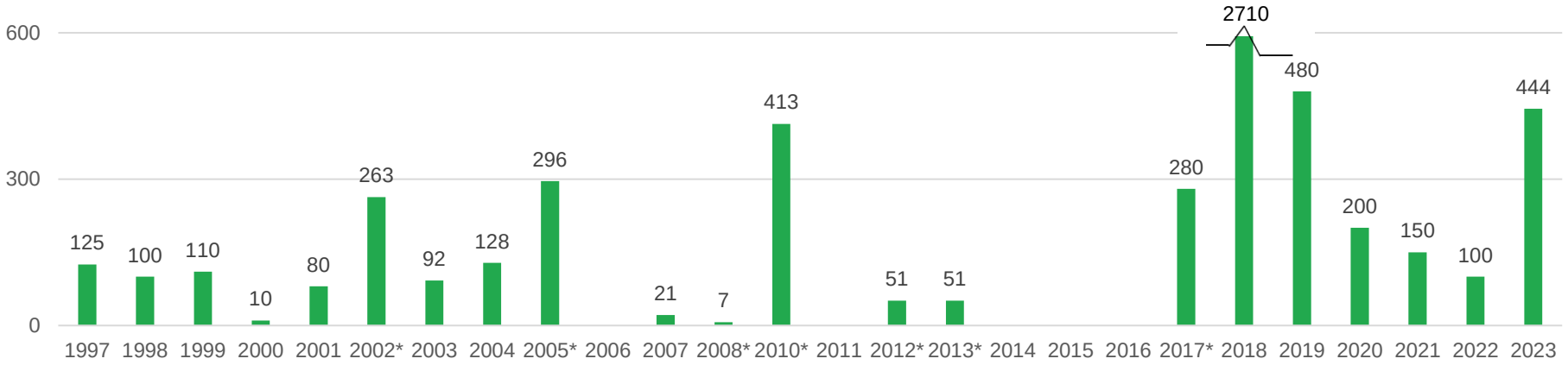
Exploring the Potential of other Non-Tax Sources and Land Value Capture to Enhance Local Resources

- Rental income, parking fees
- **Land value capture tools-** impact fees, Tradeable Development Rights

Source: Strengthening finances of Municipal governments, CWAS, 2020

Raising the importance of municipal bonds in wider public finance

Issuance of 33 Municipal bonds worth INR 6,031 crore in India (1997-2023)



Note: *Pooled bonds issues years marked

Most Municipal Bonds in India have been raised to finance **water supply and sewerage projects.** GoI can offer additional incentives to promote green projects. The new UIDF window at NHB can focus on Green Bonds

Incentives by GoI on raising municipal bonds

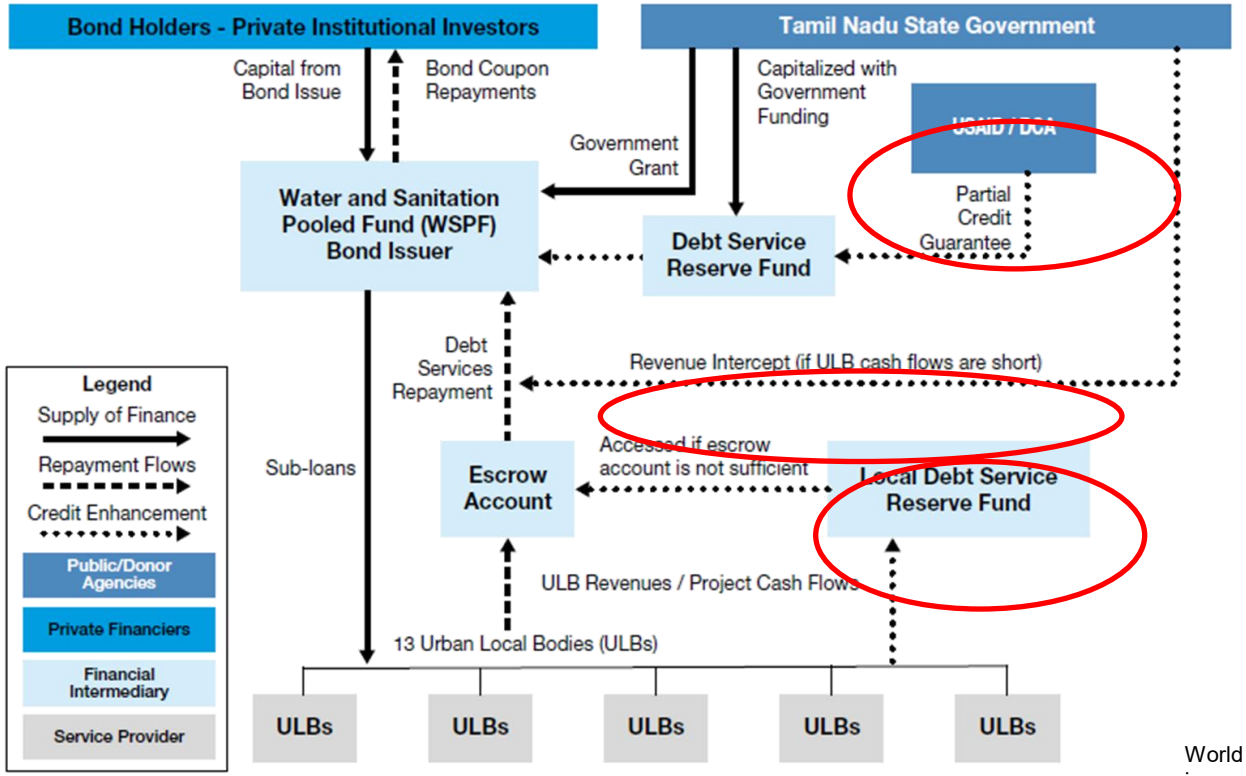
13% of bond amount

Bond amount	Incentive
100 cr	13 cr
200 cr	26 cr (Max)

Source: www.sebi.gov.in, www.mohua.gov.in, 2018, AMRUT 2.0 operational guidelines, MoHUA, 2021

Pooled bond funds from capital market in TN, India

FIGURE 1 Pooled Municipal Bond Issuance in Tamil Nadu, India: Financial Structure



WSPF has been successful in mobilizing funds from the capital markets through over 5 successive issues .

This approach can be used for pooling fund requirements for small towns

World Bank Group (2016), "Pooled Municipal bond issuance in Tamil Nadu, India in "Case studies in blended finance for water and sanitation", p. 2

Green Bonds for climate finance

What are Green bonds?

- Raised capital for environmental and climate focused green projects
- Fixed income debt instrument
- SEBI guidelines for issuing Green Bonds

Sectors eligible for Green bonds

Renewable energy

Sustainable water and waste management

Pollution prevention

Clean transportation

Climate change projects

India's green bond market

The Government of India raised USD 1 billion the Sovereign Green Bonds January 2023

India's first green bond was raised in 2015 by Yes bank ltd.

Ghaziabad raised first municipal green bond for water and sanitation treatment infrastructure

Indore raised a green bond to build largest solar plant - for pumping and supplying water from Narmada

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Sources: Author's literature review on green bonds ; India sets sights on record green bond issuance entering 2022 access at https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/india-sets-sights-on-record-green-bond-issuance-entering-2022-67940627

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.

Sources of funds for social impact investment

Figure 2: Source of Funds for Impact Investment Fund Managers, 2012

Source: GIIN, J.P. Morgan

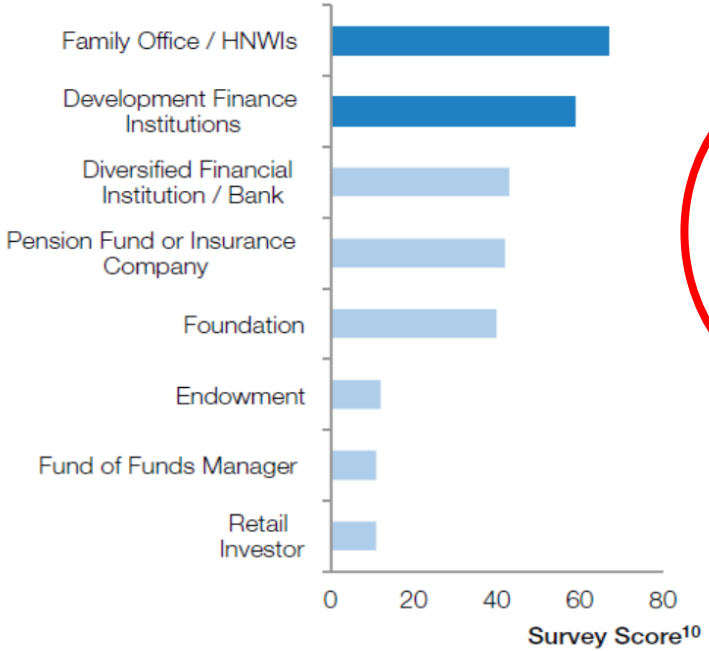
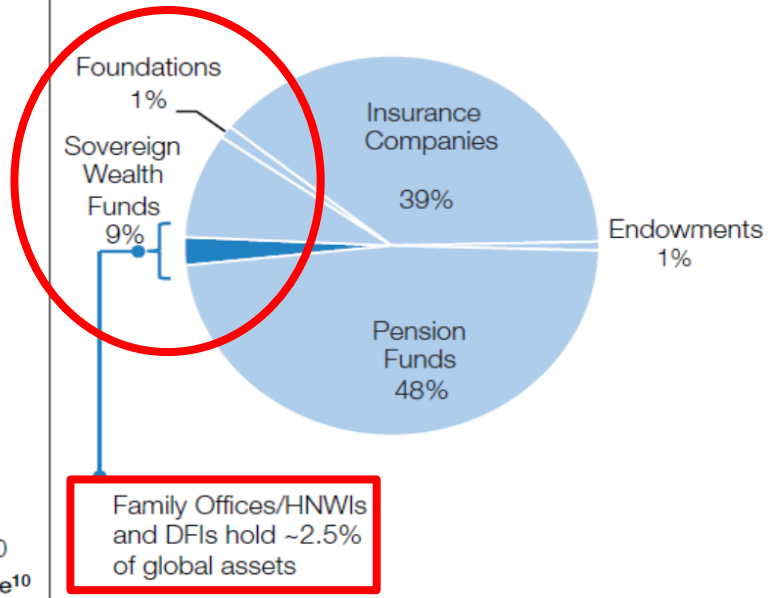


Figure 3: Distribution of Global Asset Ownership, by Investor Type, 2011

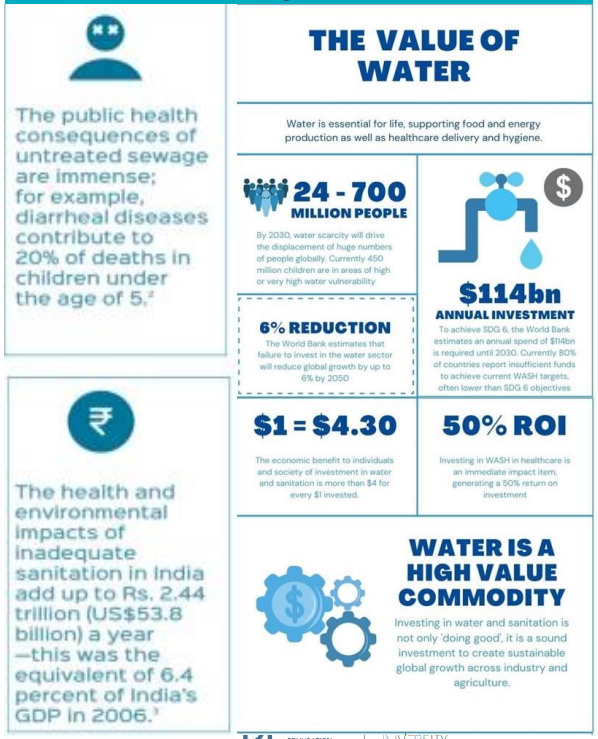
Note: Omitted from the analysis include Mutual Funds, Asset Management Divisions of Bank and Fund Managers (Private Equity, Hedge Funds, etc.)
Source: OECD, Foundation Center, NACUBO, Overseas Development Institute, Deloitte Analysis



Source: Monitor Institute (2009), “Investing for social and environmental impact: A design for catalyzing an emerging industry”, Snapshot

What is needed to get impact investors to cities and to WASH?

Advocacy and research around the benefits and impacts of investing in WASH



Relevant instruments for promoting impact investments

Programs to align investor interests and national goals/programs

Creditworthiness assessment of urban local bodies in India

Benefits of Creditworthiness Assessment

Improved access to capital

Lower borrowing costs

Investor confidence & economic development

Parameters of Creditworthiness Assessment

Enhanced financial management

Enhanced service delivery

Long-term planning & sustainability

Source: Based on forthcoming report by CWAS – Assessing Creditworthiness of Cities for market borrowing

Accessing impact finance - Exploring ESG ratings for Indian Cities

ESG Assessments, disclosures and investing

Measuring sustainability and societal impact to better determine future performance

Popular in corporate but city governments are also adopting

Access new markets for development funds
Build credibility for investors

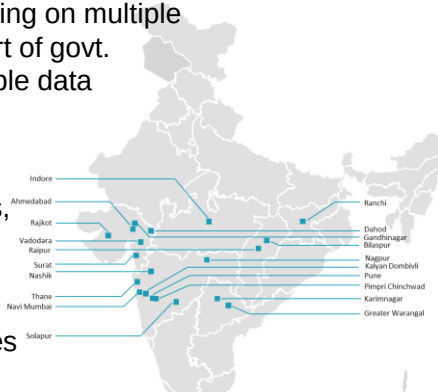
ESG for Indian cities

Indian cities already reporting on multiple ESG relevant topics as part of govt. initiatives – publicly available data

Framework by CWAS and PwC India

19 themes, 62 indicators - City mandates, service performance, Laws and policy, National commitments/ programs

Tested on 20 cities - ESG ratings, profiles



US Municipal Bond marketplace - ISS ESG Muni QualityScore (formely ACRe Data) maintains ratings and data for all cities

Toronto's Debt Issuance Program linked to strategic ESG outcomes and reporting

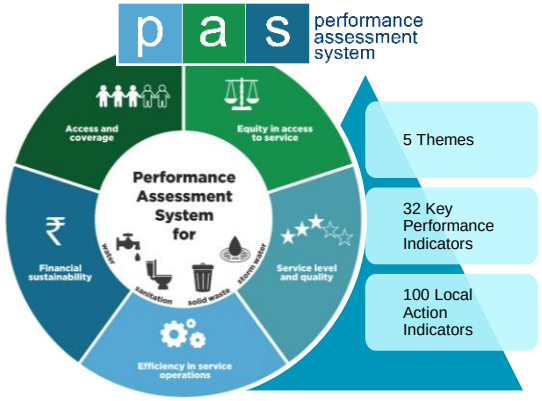
Vancouver, Montreal adopting TCFD recommendations in financial reporting

5 Regular and effective digital monitoring is critical

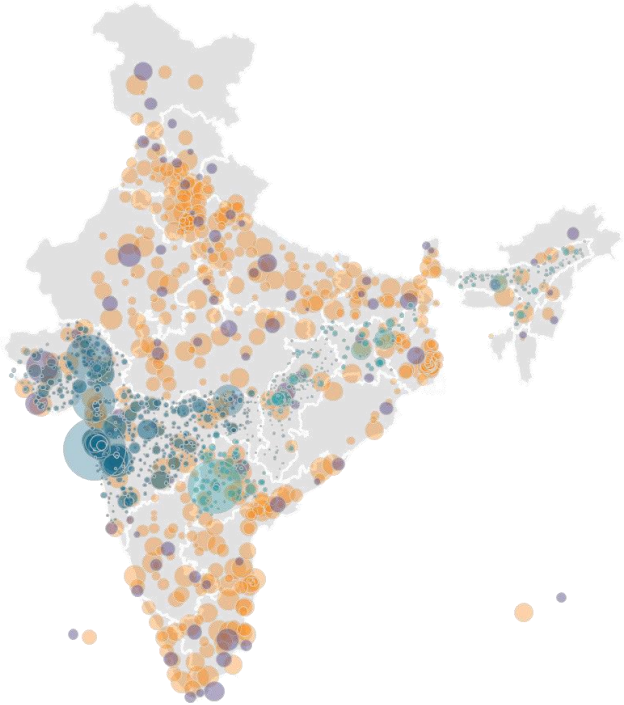
Sustained monitoring of universal access to safe water and sanitation in essential through country owned systems at city, state and national levels

Strong and regular monitoring systems are needed to ensure that any issues related to sustainability are identified early and addressed.

Monitoring city level water and sanitation services at scale - PAS

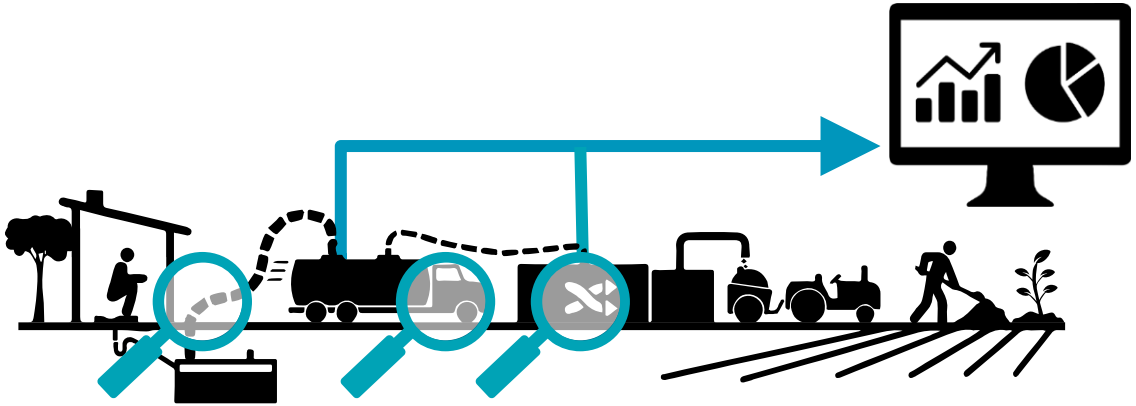


- ✓ Nationally owned digital platform for self reporting by ULBs
- ✓ Sustained implementation since 2009 - at scale being used in 1000+ cities across India
- ✓ Plans to add Climate resilience



Digital monitoring for effective service delivery

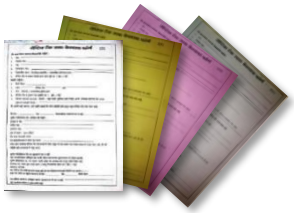
Use of monitoring systems across sanitation service chain – digital systems with dashboards



Possible uses of AI and ML

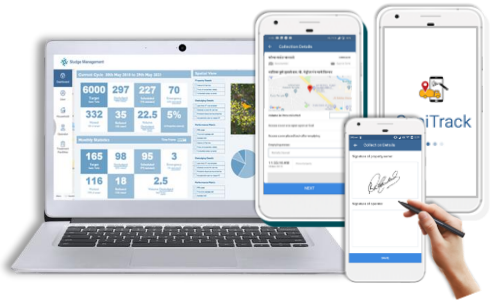
- Network and time efficiency - Optimise energy/water use
- Wide applications for image, video and voice processing - complaint redressal and breakdown assessment, monitoring use of PPE
- Large data processing – detecting accounting issues

FROM Paper based – TO digital systems

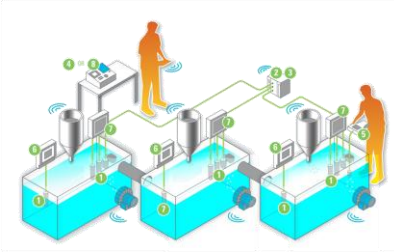


SaniTab

SaniTrack

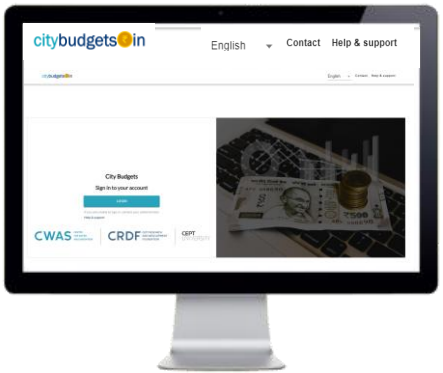


SanQ

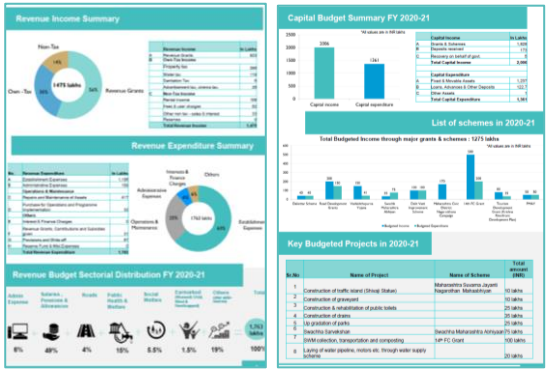


Strengthening municipal systems for procurement and budgeting

Budget Software



Budget Brief



Payment Dashboard

Enabling **uniformity and digitization of municipal budgeting** in Maharashtra

Easier to understand complex budget documents

Tracking and monitoring billing and payment of private contractors through **single window entry system**

Enhanced Transparency

Improved Accountability

Easily scalable across other cities

Source:

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Capturing community feedback using digital tools

Civil society

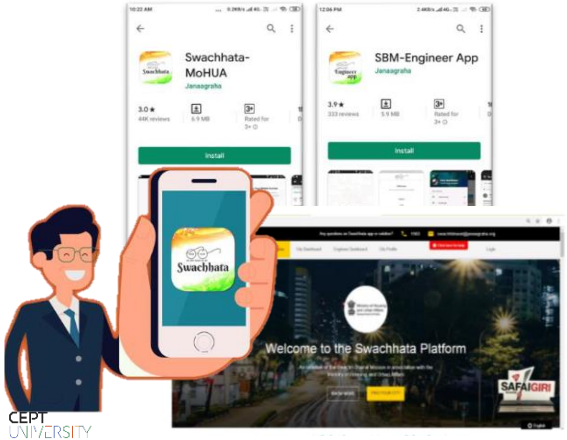
Youth Groups

Women Self Help Groups

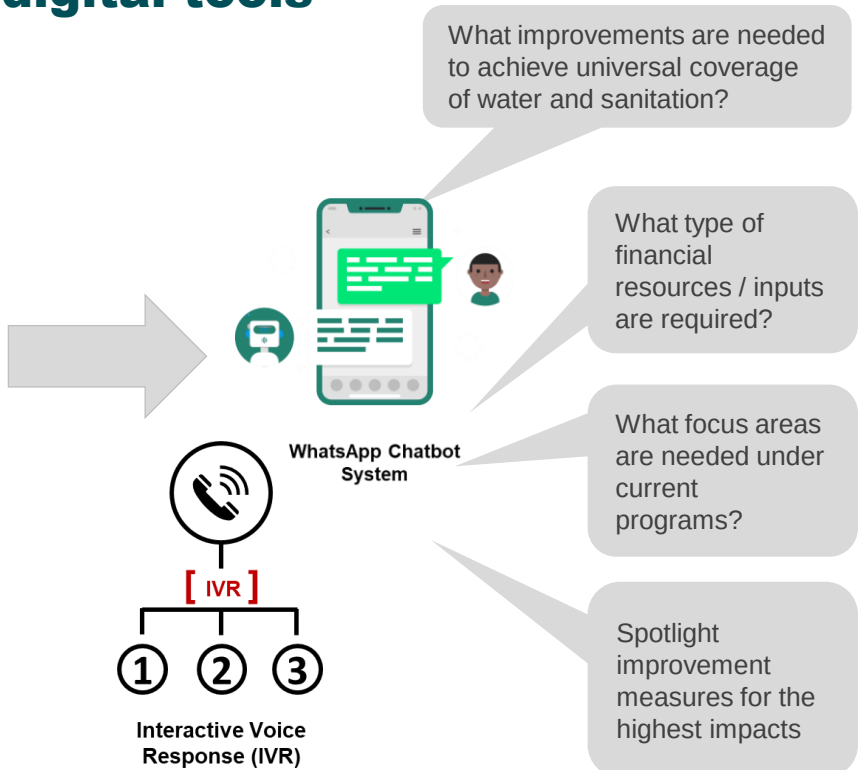
Bring in citizen voices especially for the vulnerable population in slums.

Platform to enable citizen reporting on service indicators like coverage and quality – a ***feedback platform***?

Feedback mechanism for local government: Performance improvement plan at local level to reduce disparities in service levels



MoHUA's Swachhata app for streamlining complaint redressal system



Crowdsourcing information on citizen perspective on service levels

In summary

Achieve **SDGs** for Goals 3, 5, 6, 11

Assess and address WASH linked **climate resilience**

Inclusion and **gender transformation** – Last mile connectivity and leveraging SHGs

Adapt new and **innovative forms of financing**

Use **digital tech for monitoring** and citizen responses

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About us

The Center for Water and Sanitation (CWAS) at CEPT University carries out various activities – action research, training, advocacy to enable state and local governments to improve delivery of services.

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cwas.org.in
pas.org.in

cwas@cept.ac.in
tiny.cc/pasenews

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