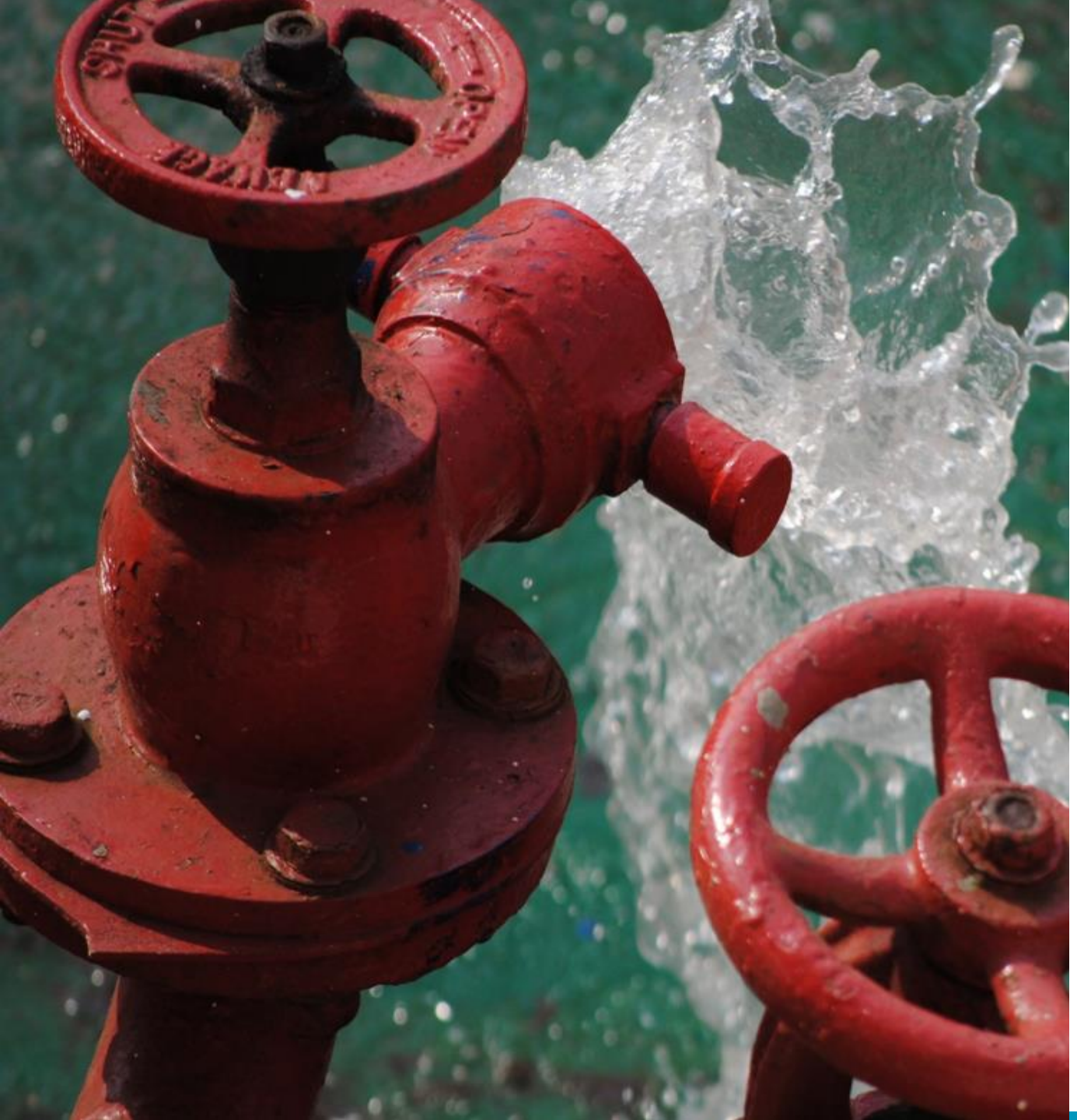


Valuing water in developing countries

Dinesh Mehta

Value of Water Conference, Frankfurt

March, 2025

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

Valuing water: Economic Value – is the Price Right?

Sr.No.	Country	City	Water Stress Category	Water Quality	Water Price/Cu.m.
1	Norway	Oslo	Low (<10%)	97.8	€ 5.51
2	Sweden	Stockholm	Low (<10%)	96.7	€ 3.60
3	USA	Los Angeles	Extremely High (>80%)	81.0	€ 3.12
4	USA	New Orleans	Medium - High (20-40%)	79.4	€ 2.87
5	USA	Washington	Low (<10%)	85.0	€ 2.81
6	Israel	Tel Aviv	Extremely High (>80%)	89.7	€ 2.72
7	Finland	Helsinki	Low (<10%)	99.5	€ 2.52
8	USA	Atlanta	Medium - High (20-40%)	84.6	€ 2.14
9	USA	Virginia Beach	Low - Medium (10-20%)	88.8	€ 1.92
10	USA	San Jose	Low (<10%)	88.7	€ 1.87
11	Ireland	Dublin	Low - Medium (10-20%)	89.9	€ 1.85
12	Canada	Vancouver	Low (<10%)	91.7	€ 1.71
13	USA	New York	High (40-80%)	85.9	€ 1.65
14	Brazil	Rio De Janeiro	Medium - High (20-40%)	56.5	€ 1.32
15	Chile	Santiago	Extremely High (>80%)	75.7	€ 0.97
16	Lebanon	Beirut	Extremely High (>80%)	27.4	€ 0.22

How does one explain high water prices in low-water stress cities?

No links between water stress, water quality and water price!

Source: https://www.holidu.com/magazine/water-price-index-intl

Valuing water: social, cultural and religious value

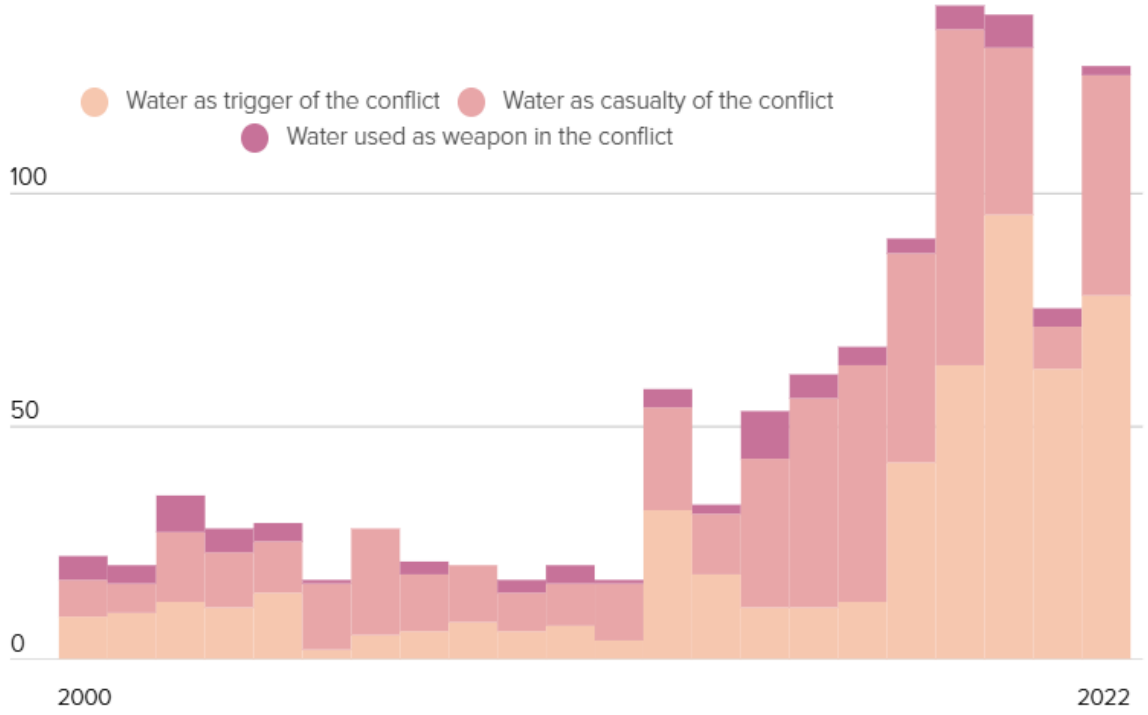
A staggering 600 million people attended the Maha Kumbh Mela, or the festival of the Sacred Pitcher, which began January 13 and went on till February 26, 2025 in the city of Prayagraj (Allahabad), Uttar Pradesh, India

The gathering is focused around taking a dip in the holy Ganges river

Geo-Political Value of Water - Water Wars?

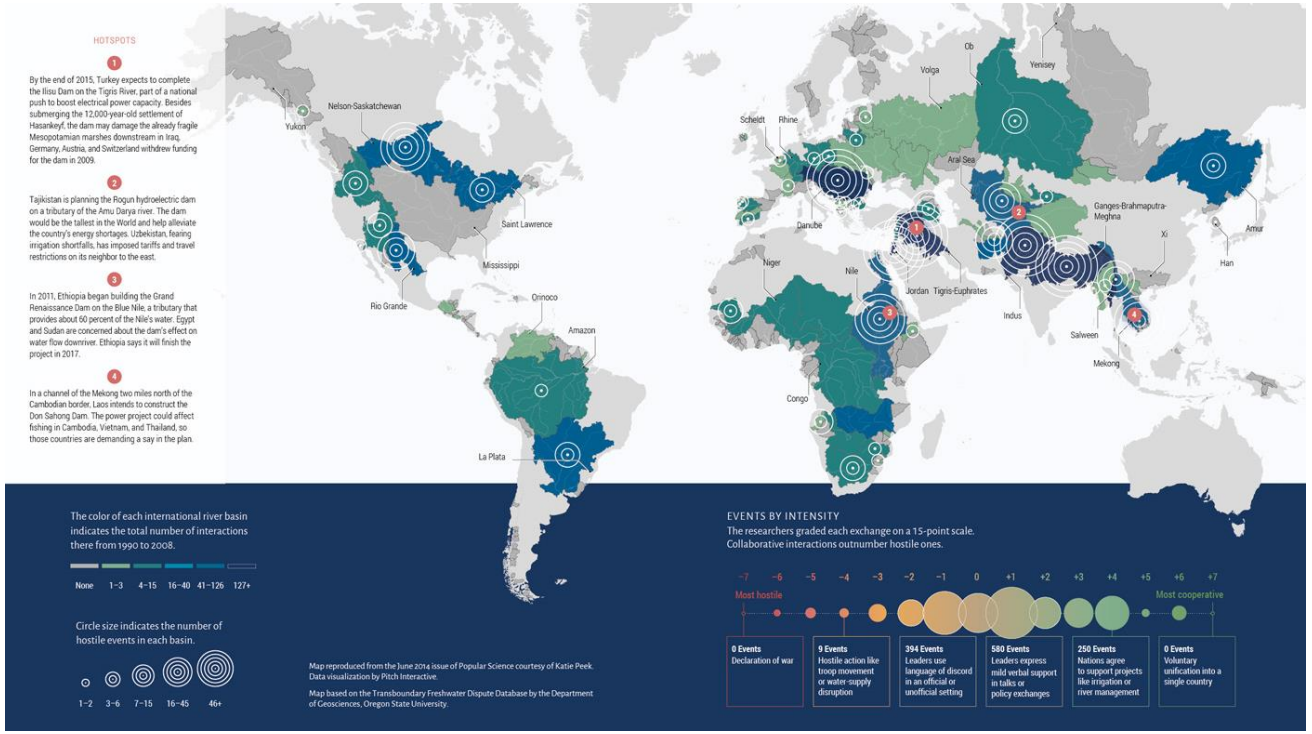
WATER CONFLICTS ON THE RISE

Conflicts involving water from 2000 to 2022 worldwide, categorized based on the role water played in the conflict.



Retrieved from: https://www.politico.eu/article/russias-war-on-water-in-ukraine/

TRANSBOUNDARY BASINS: WHERE IS THE HIGHEST RISK OF WATER CONFLICT?



Retrieved from: https://www.newsecuritybeat.org/2015/06/worlds-hostile-international-water-basins-infographic/

Valuing water: how do we take into account climate change?

Water Scarcity and Droughts

Variable Seasonal Rainfall, floods

Temperature rise and Heatwaves

Rise in Sea Level and threat to coastal cities

COP27 SHARM EL-SHEIKH EGYPT 2022

COP28 UAE UNITE. ACT. DELIVER.

COP29 Baku Azerbaijan

WATER is at a central place in the climate talks at COP talks

Increased access to water as climate adaptation and resilience

Countries to integrate water and climate agendas at national level



25% population of the world is already living in

DAY ZERO scenario.

UN estimates that global demand for fresh water will outstrip supply by 40% in 2030

WRI - https://www.wri.org/insights/highest-water-stressed-countries

According to JMP **ON-PREMISE ACCESS IMPROVED** significantly for water since 2000

33% → 73% however,

DISPARITY IN ACCESS

In the least developed countries, this coverage is still at 37%. In sub-Saharan Africa, 31%

JMP - Progress on household drinking water, sanitation and hygiene 2000-2022: special focus on gender

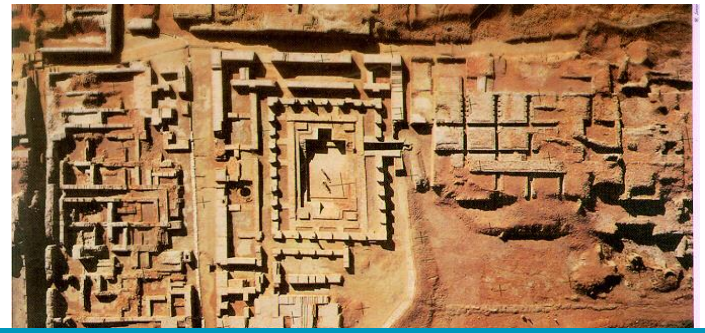
By some estimates, this **water scarcity** is affecting nearly 400 million people and **costing $4.8 trillion** in economic activity.

Learning from Crises to Build Urban Water Security https://www.rand.org/pubs/visualizations/DVA3540-1.html

What does History tell us? Civilization/Cities have collapsed due to lack of water

Mayan civilization: Drought led famine?

Indus Valley Civilization: From sewers and trade ports to abandoned cities



Fatehpur Sikri: Grand capital but dying water source

Modern disasters?

Mexico City Day Zero scare

Cape Town Day Zero

CAPE TIMES

PANIC: Residents have started stockpiling their water supplies in the event of Day Zero. Picture: Henk Kruger/ African News Agency (ANA)

How city will pay for Day Zero

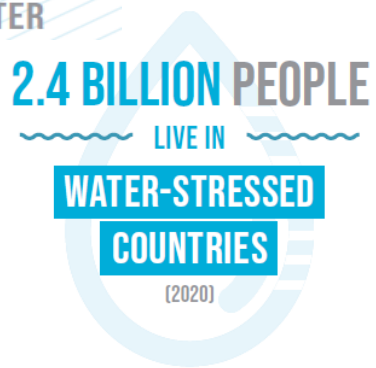
DAY ZERO GUIDELINES

Chennai – Floods followed by drought

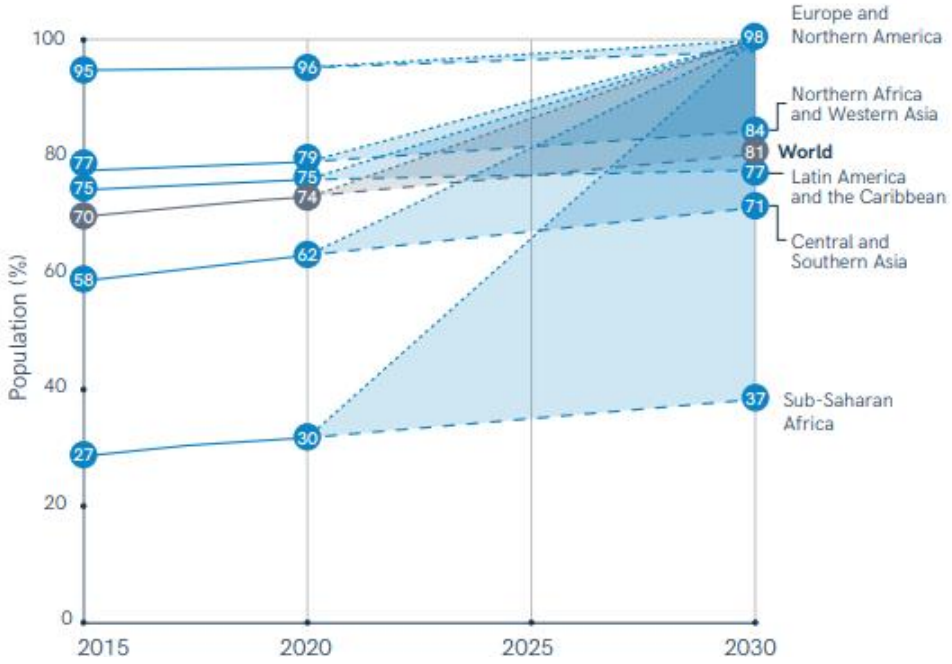
Status of Drinking Water At Global Level

6 CLEAN WATER AND SANITATION

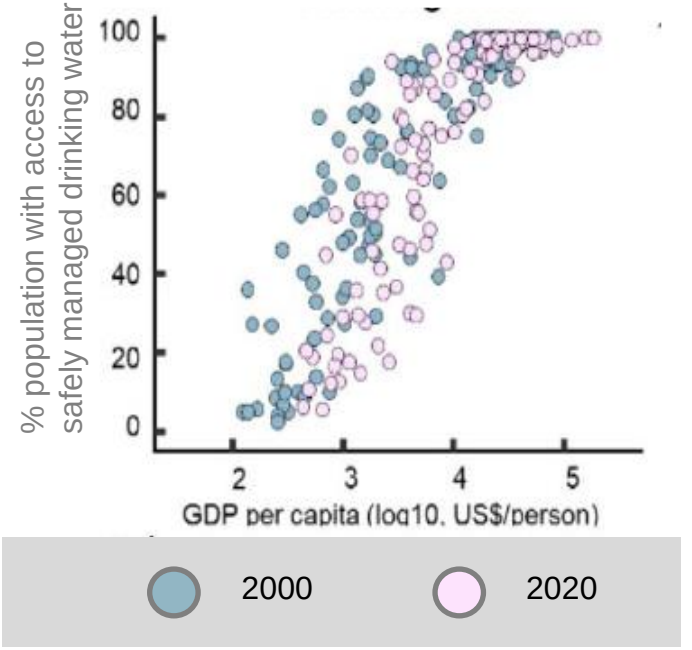
- **One in four** people still lack access to safely managed drinking water across the globe *(JMP report on SDG, 2023)*



- The world is not on track to achieve SDG 6.1 - 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



- Poor countries have a worse situation related to access to water and sanitation.



Source: *JMP report on SDG, 2023*

Having a water connection is not enough – adequacy, equity, affordability, and quality are crucial

Intermittent and poor water supply leads to high dependence on groundwater
Study in two cities of India -

Figure 2: Water Sources Used by Households in Kolkata and Chennai

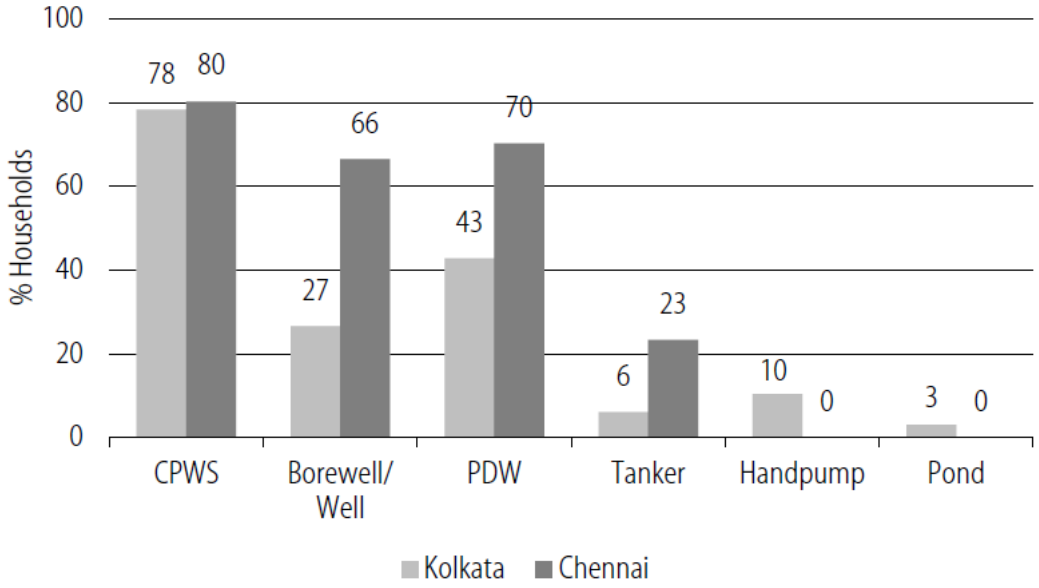
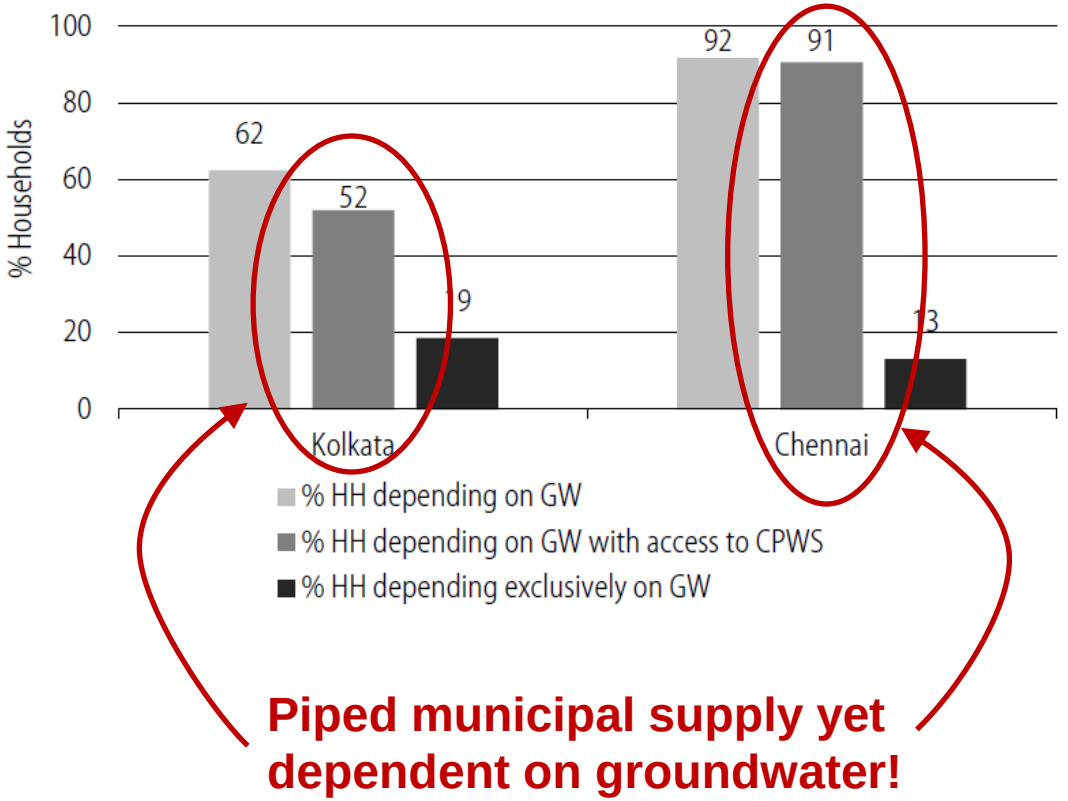


Figure 7: Dependency on Groundwater (GW) among the Sampled Households

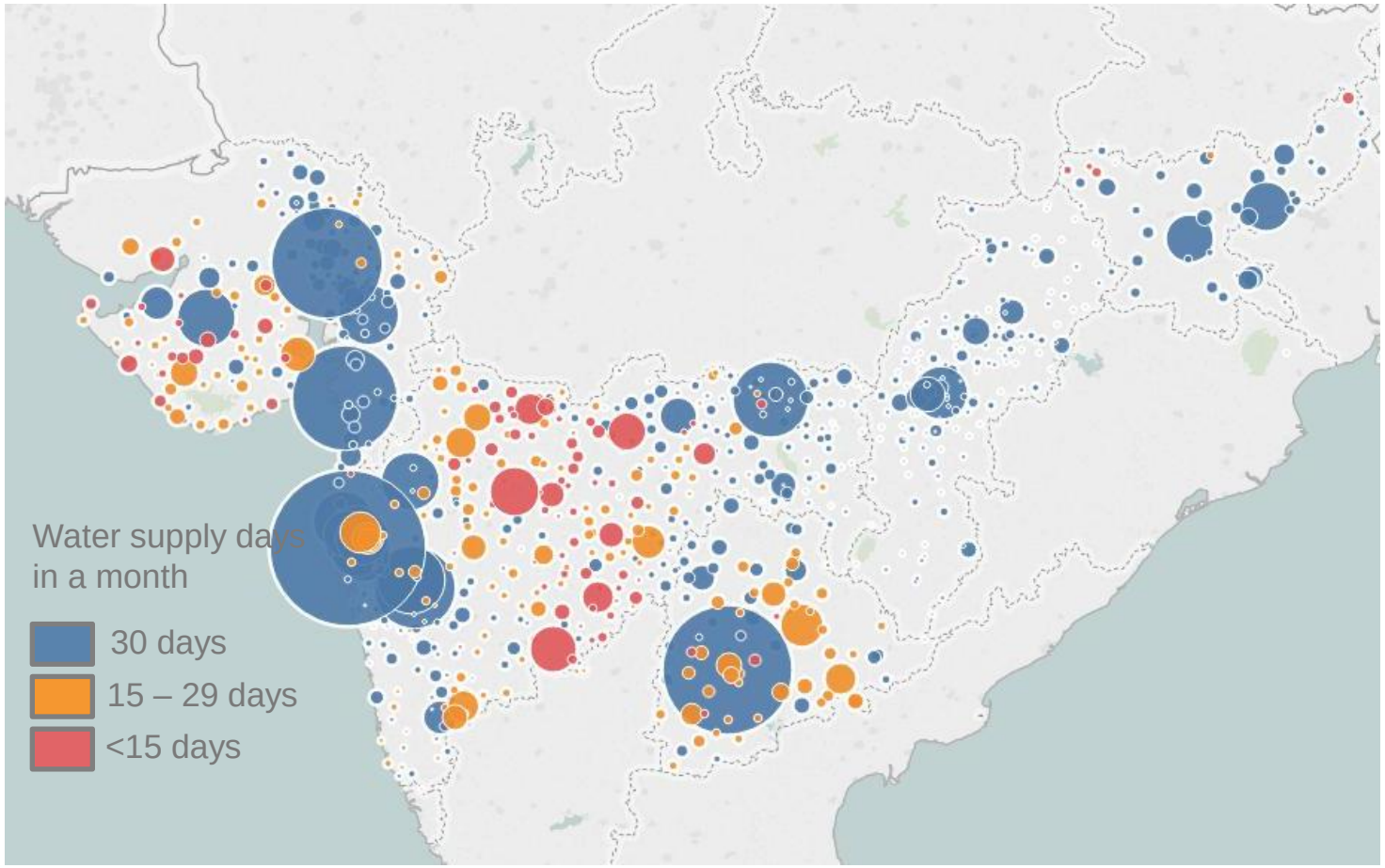


Piped municipal supply yet dependent on groundwater!

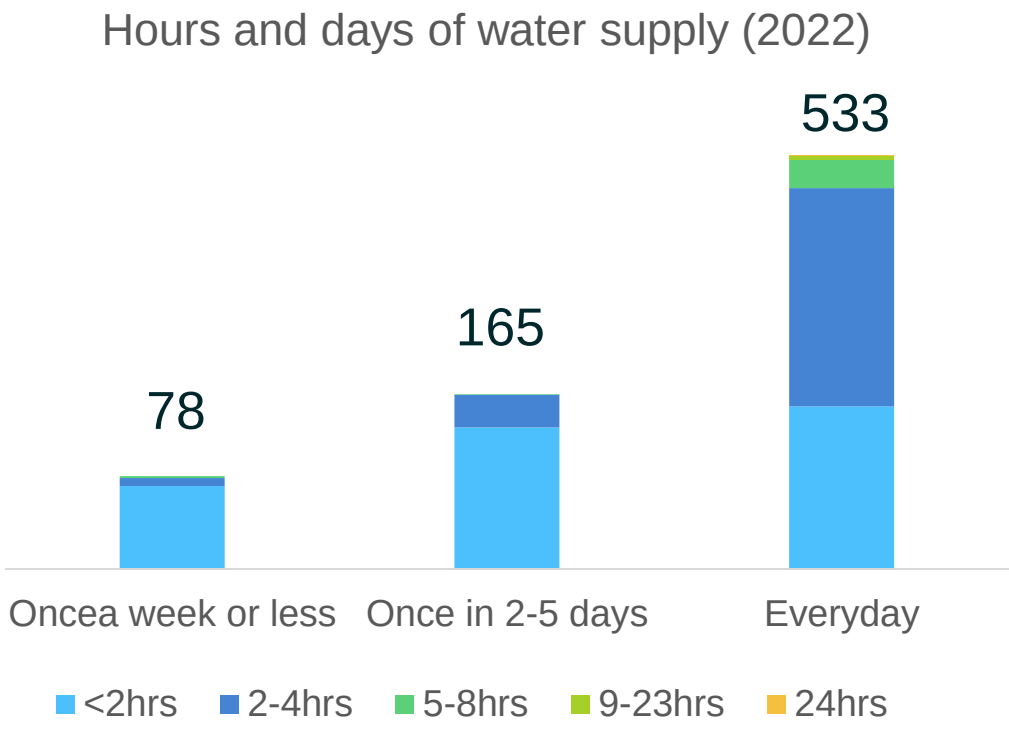
Source: Sachin Tiwale, Karthikeyan R, Kriti Batra (2025), Serving a Pipe Dream: Alternatives to Centralised Piped Water Supply in Two Metro Cities in India, Economic and Political Weekly, Vol. 60, Issue No. 9, 01 Mar, 2025

Duration of water supplied at consumer end

One-third of the cities do not supply water every day

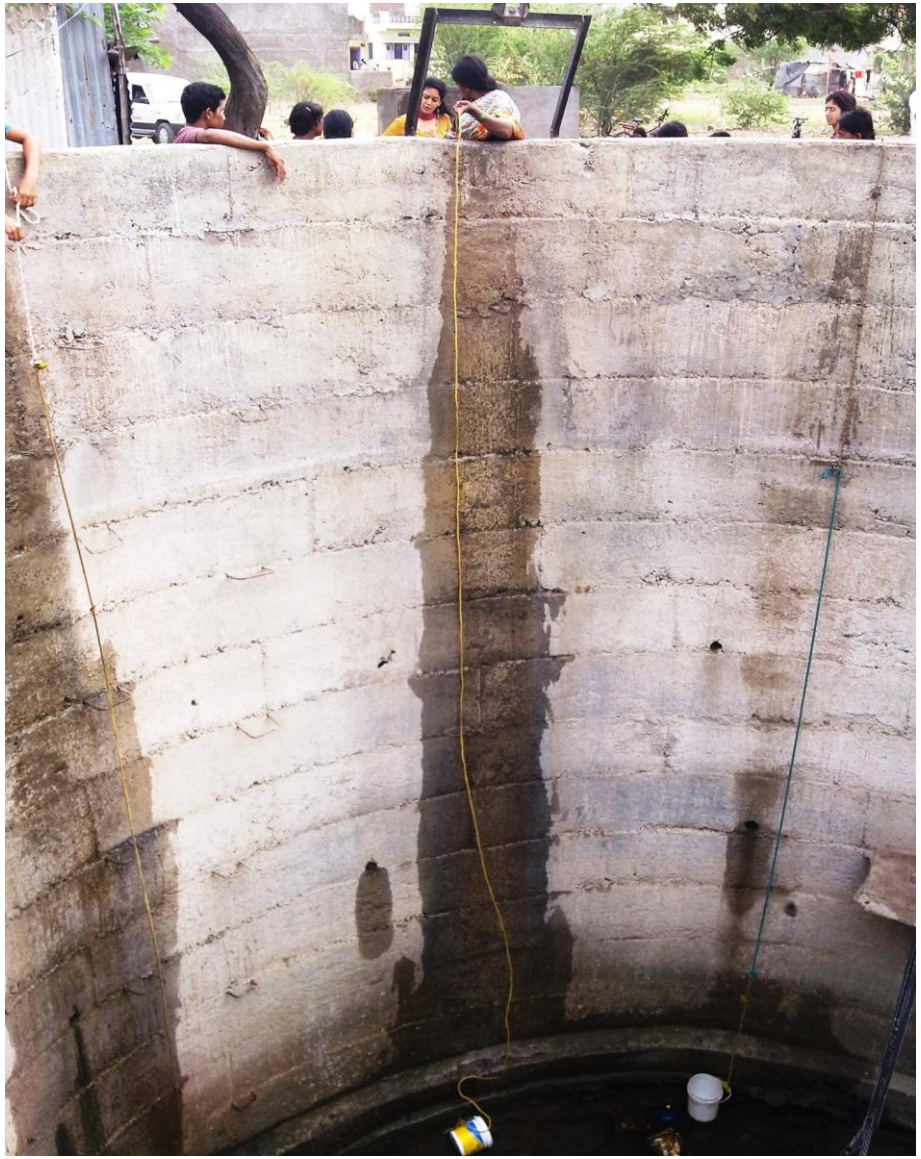


Average water supply duration is around 2 hours



Source: SLB-PAS, 2022 data provided by city officials of Government of Gujarat, Maharashtra, Chhattisgarh and Jharkhand states

NON WATER DAYS...



THE ‘WATER DAY’ – sometimes once in 7 days!

Packaged bottled water – is it an alternative for the poor?

Cities with the most expensive typical affordable bottle of water

Oslo, Norway	Virginia Beach, USA	Los Angeles, USA	New Orleans, USA	Stockholm, Sweden
€1.52	€1.31	€1.27	€1.22	€1.21

Cities with the cheapest typical affordable bottle of water

Beirut, Lebanon	Bangalore, India	Accra, Ghana	Lagos, Nigeria	Istanbul, Turkey
€0.03	€0.11	€0.13	€0.14	€0.15

https://www.holidu.com/magazine/water-price-index-intl

In the rapidly changing geo-political situation what can be done in developing countries?

There is a Shift from ‘AID’ to ‘TRADE’

Despite recognition of WASH contributions to GHGs, very little financing is available

Increasing reliance on philanthropy and ‘repayable capital’

Countries will have to depend on their efforts, innovate solutions and use emerging technologies

Here are some ways in which we have attempted to make a difference

Making cities and towns water secure – our experiences

Water security is

Reliable and Affordable Access

of adequate

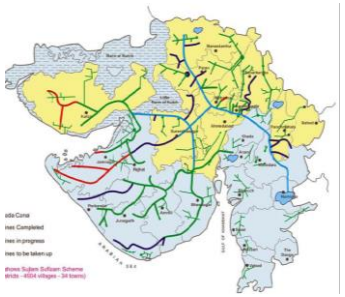
Quantity | **Quality**

of water for

Basic Human Needs | **Livelihood** | **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

1 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

Printed from
THE TIMES OF INDIA

Rains pound Gandhidham, Anjar towns in Kutch

TNN | Jul 12, 2020, 04.32 AM IST

Rajkot: Heavy rain lashed Kutch's commercial city Gandhidham and Anjar on Saturday evening causing severe water-logging in many areas. However, the people welcomed the rain that gave them some respite from the humid heat.

Pilot Demonstrations

Rainwater Harvesting

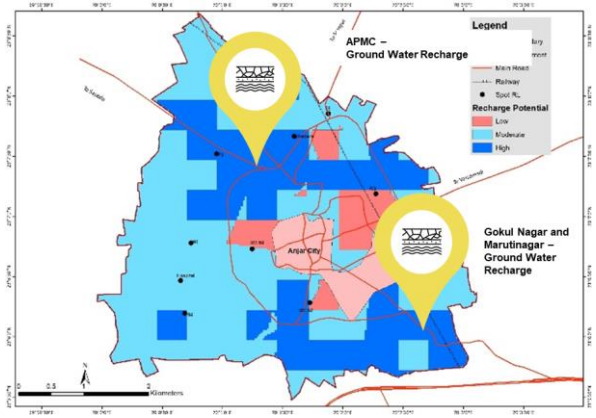
Rainwater harvesting in schools for drinking water supply

Groundwater recharge

Flood control through GW recharge for housing colonies

Scaling up plan

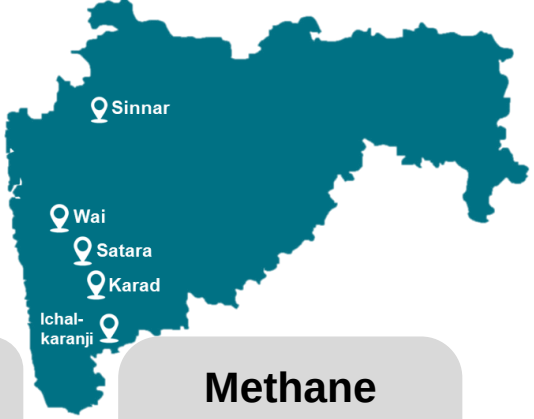
Urban Watershed Delineation
Groundwater Recharge Potential Map at city level



Revival of traditional lake catchment system; Well rejuvenation

35 Million liters of ground water recharged during monsoon

2 Making WASH services Carbon Neutral - across the service chain in small towns

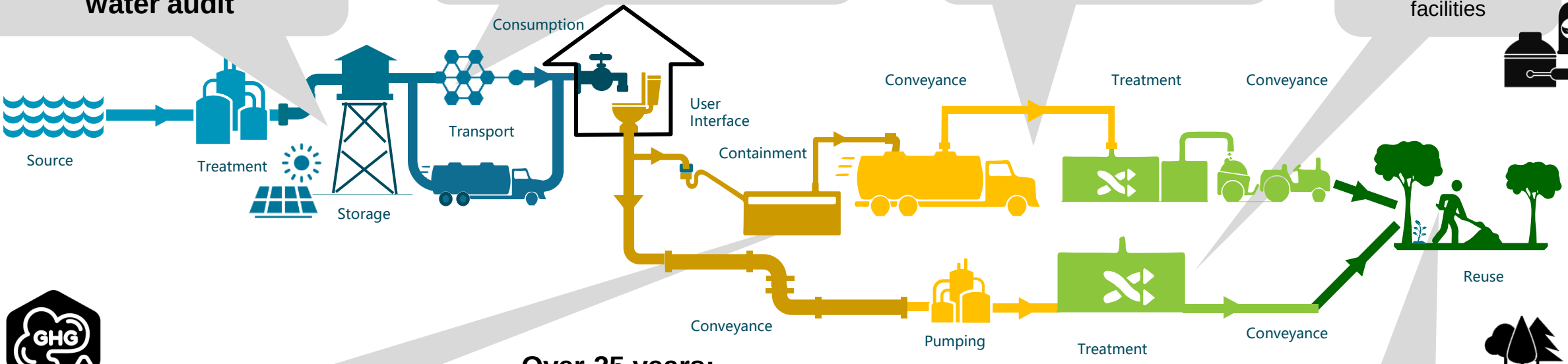


Assessment of water and sanitation services and emissions in operations – **energy and water audit**

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

Over 25 years:

Clean energy generation potential **8550** **MWH**

Emission reduction Potential **7,011** **tons CO2**

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

3 Reuse of used water – urban “greening” through circularity

Sinnar city: reuse of water for treatment plant for development of garden and urban forest

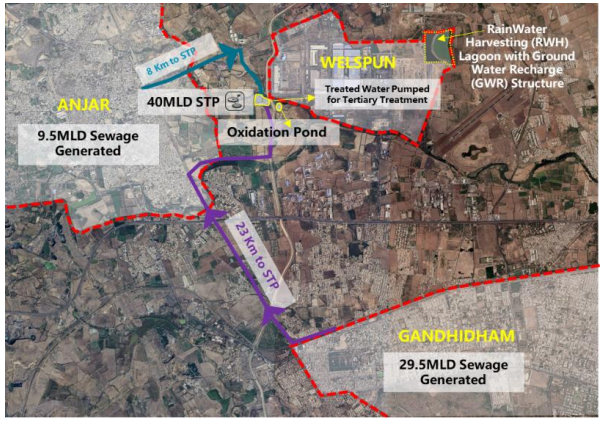
Scaling up with faecal sludge treatment plants across the state of Maharashtra

Other examples and potentials with public-private partnerships

Energy sector and municipal STPs - Example of Nagpur – 90% treated water reused. Tie ups with - NTPC and Mahagenco

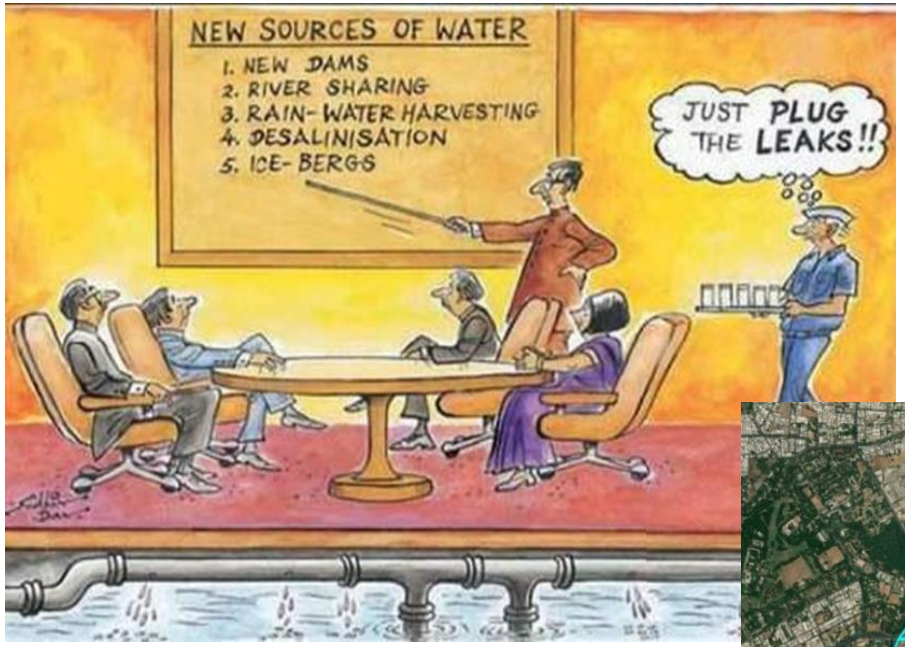
Maharashtra reuse policy - municipalities responsible for recycling wastewater and reusing treated wastewater in thermal power plants, industrial estates, and for other non-potable purposes

Textile industry and municipal wastewater Example from Gujarat – Welspun (Textile secotor) set up STP to treat water from Anjar and Gandhidham for own industrial reuse. Cities generating revenue from selling sewage.



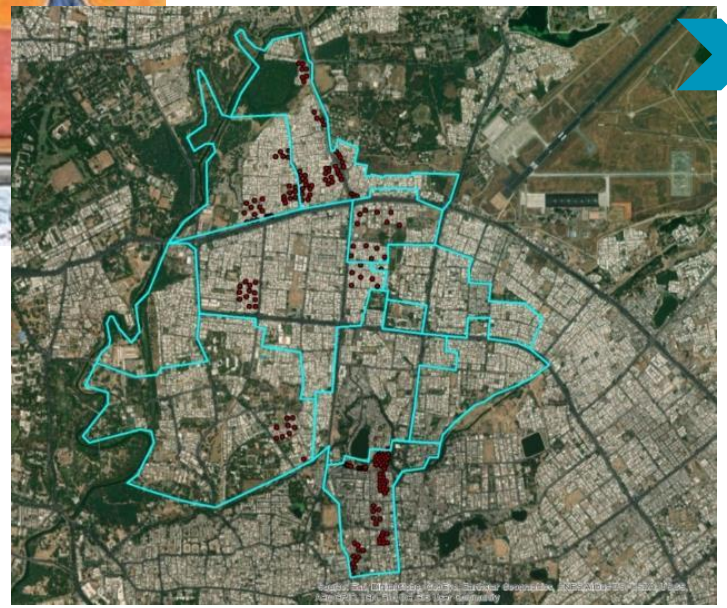
4 Plugging the leaks - Reducing Non-Revenue Water in cities

In India, household level metering non-existent – losses in distribution largely unregulated



Preliminary Water Audit Methodology

- Preliminary water audit studies in 10 cities
- NRW varies from 35% to 77%
- Rajkot city installed monitoring system and regularized illegal connections

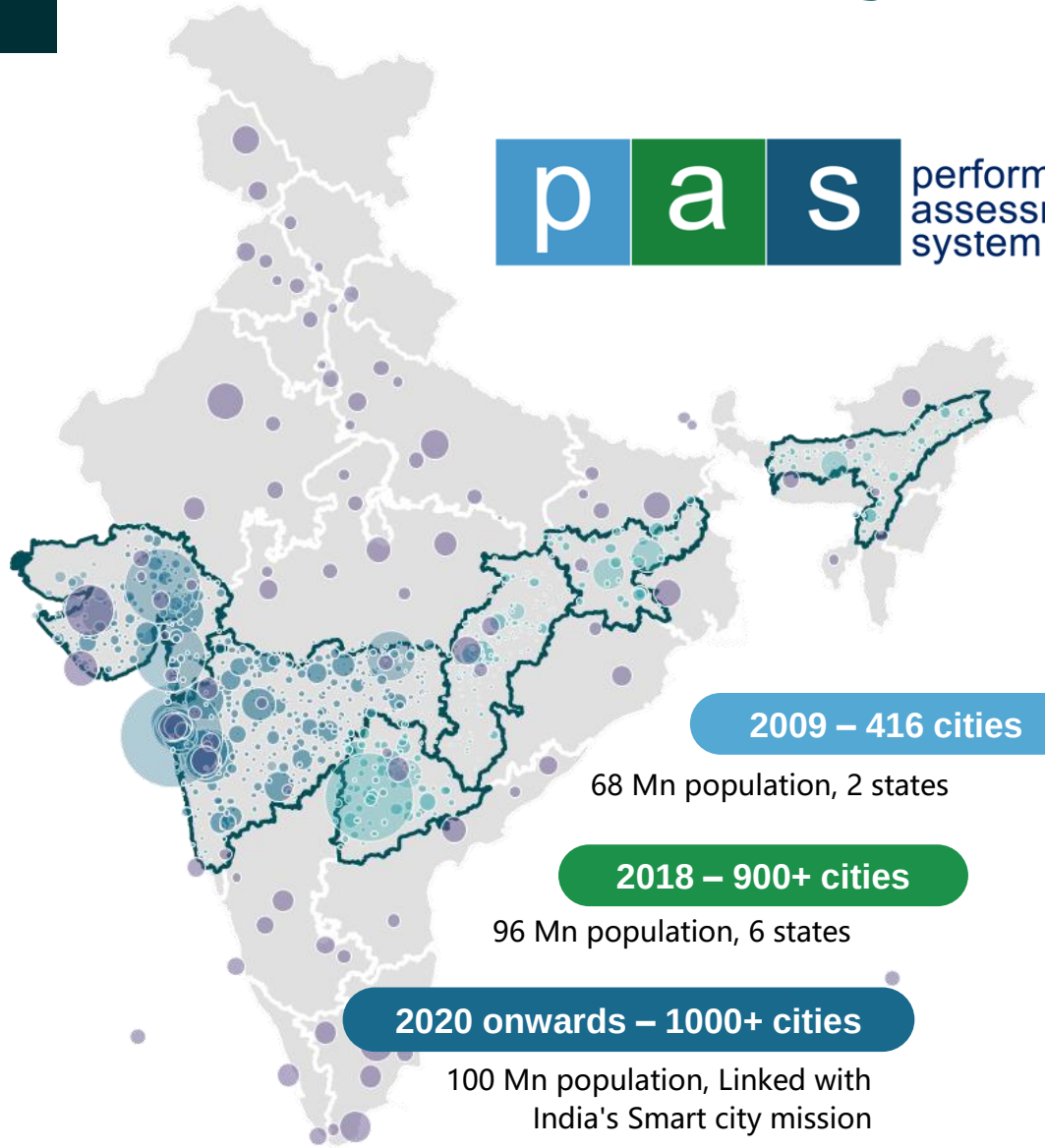


Pilot water audit in Vadodara city

- SCADA reporting only transportation loss – distribution network unregulated
- Bucket surveys and sampling
- Results, extrapolated to the city, reflect an annual loss of ~ $ 8 million to the city government
- Results also highlighted inequity in supply across localities

5

PAS Program – Information on 1000+ cities across India for the past 15 years



pas performance assessment system

2009 – 416 cities

68 Mn population, 2 states

2018 – 900+ cities

96 Mn population, 6 states

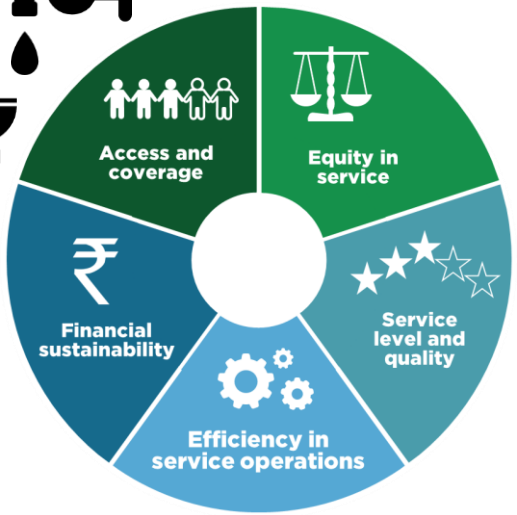
2020 onwards – 1000+ cities

100 Mn population, Linked with India's Smart city mission

WATER

SANITATION

SOLID WASTE



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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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