WASH Climate Action Plan

Ichalkaranji Municipal Corporation,

Maharashtra, India

April 2026

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

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Executive Summary

This Climate Action Plan for Ichalkaranji Municipal Corporation outlines a strategic approach to strengthening climate-resilient WASH services through integrated adaptation and mitigation measures. The plan is based on comprehensive assessments across the WASH service chain, including water supply, sanitation infrastructure, energy consumption, and greenhouse gas (GHG) emissions. Key challenges identified include aging infrastructure, intermittent water supply, distant water sources, groundwater depletion, pollution of water sources, limited sewerage coverage, and irregular desludging practices. These issues are further intensified by climate risks such as erratic rainfall, flooding, and rising temperatures, which impact service delivery and public health.

Energy audits and GHG emission inventories highlight opportunities to improve efficiency and reduce emissions across WASH systems. The plan emphasizes adoption of renewable energy such as solar power for WASH infrastructure, improved treatment processes, and optimized operations. Pilot interventions including solar panel installations for WASH facilities, scheduled desludging, reuse of treated wastewater, and enhanced monitoring systems have been implemented to demonstrate scalable solutions. These pilots inform a phased roadmap for citywide implementation. Cross-cutting actions on governance, gender empowerment through formal engagement of SHGs finance, and capacity building further support long-term sustainability. Overall, the plan provides a practical framework for transitioning Ichalkaranji towards climate-resilient, low-carbon WASH systems while improving service delivery and environmental outcomes.

Source: Central Water Commission 2019; Authors' analysis

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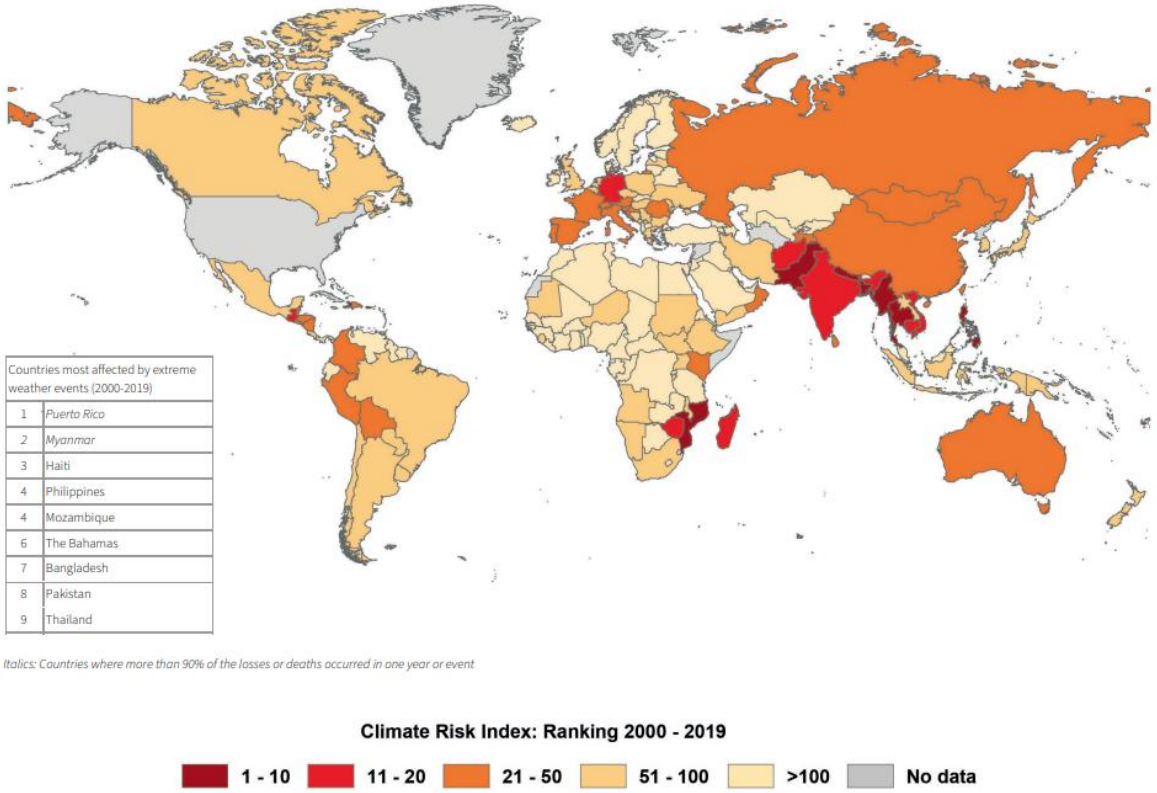
Context Setting

Need of a WASH Climate Action Plan and its approach

Increase in frequency of climate hazards increases risk to countries

- Over past 119 years the climate hazards frequency has been increased at rapid causing loss of human and economic activities.
- 90 % human losses are reported from the developing countries
- India is 7th most vulnerable country to the climate hazard (in 2019)
- 200 % climate hazards have increased in India since 2005 causing over $87 billions in year 2019.

Source: Germanwatch and Munich Re NatCatSERVICE



Source : Mohanty, Abinash and Shreya Wadhawan. 2021. Mapping India's Climate Vulnerability: A District-Level Assessment. New Delhi: Council on Energy, Environment and Water; https://economictimes.indiatimes.com/news/india/india-lost-over-1-3-lakh-lives-in-disasters-linked-to-extreme-weather-climate-change-in-50-years-un-agency/articleshow/100424018.cms?from=mdr

Vulnerability in India has increased due to climate change . . .

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

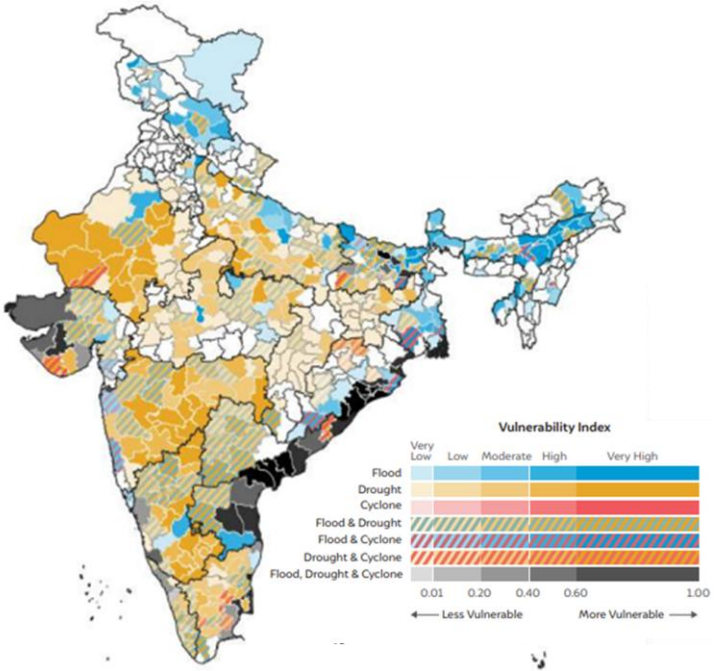
Uttarakhand, 2023 - Cloud burst destroys city infrastructure and services

Chennai floods, 2021 and drought, 2019

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.

India's steps towards Climate Change and WASH . . .

2003

CDM

National Clean Development Mechanism (CDM) Project Approval Authority that allow committed countries to implement emission reduction projects.

Setting up of Indian Renewable Energy Development Authority.

Coal Cess – carbon tax increased from Rs 50 per ton in 2010 to Rs 400 in 2017

2007, 2008

NAMA

National Action Plan on Climate Change (NAPCC)

The climate Program was launched, and its implementation would take place through eight National Missions.

Nation Sanitation Policy

2010

COP 15, Copenhagen

India voluntarily offered to reduce the emissions intensity of its GDP by 20–25% by 2020 compared to 2005 levels.

2015

Swachh Bharat Mission

- To prioritize sanitation and to accelerate sanitation coverage.
- To ensure that open defecation-free behaviors are sustained.
- **Solid and Liquid Waste Management.**
- **Circular Economy.**

2015

Paris Agreement

INDIA at GLOBAL FORUM

30-35% Emission Reduction

40% Electricity Power from non-fossil source

Net Zero by 2070

Upgradation in NDC, 2021

2020 to 2024

Flagship Missions

National Electric Mobility Mission Plan 2020.

AMRUT 2.0

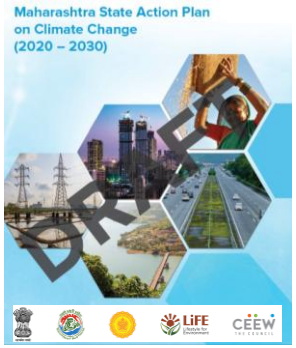
JJM

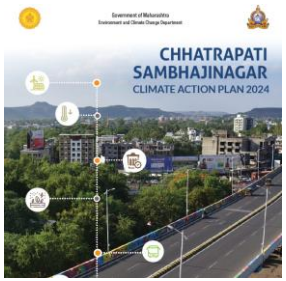
SBM 2.0

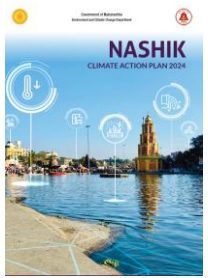
Source : Shifting discourses of climate change in India, 2014; India's Progress in Combating Climate change, 2014, http://harenvironment.gov.in/sites/default/files/Indian_Progress_Combating_Climate_Change.pdf; https://loksabhadocs.nic.in/Refinput/New_Reference_Notes/English/climate_I.pdf

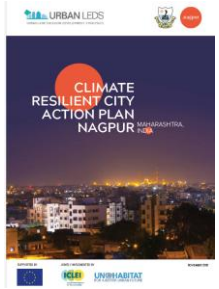
Maharashtra State's Initiatives for Climate Action and WASH

- Maharashtra, one of the most urbanized states in India, has been actively addressing the climate change challenges.
- The Government of Maharashtra (GoM) has formulated the **Maharashtra State Action Plan** on Climate Change (MHSAPCC) under the Climate Action cell
- Mission programs such as the **Majhi Vasundhara Abhiyan (MVA)**, which focuses on restoring the environment by emphasizing the five elements of nature.
- At the city level, local governments have also begun responding holistically to the climate crisis by developing **Climate Action Plans (CAPs),** which serve as frameworks for identifying and implementing both mitigation and adaptation measures to reduce GHG emissions and enhance climate resilience.
- Metro and large cities in Maharashtra, such as Mumbai, Chhatrapati Sambhajinagar, Nashik, and Solapur, have recently prepared CAPs. Cities under the Government of India's AMRUT program are also encouraged to create their own CAPs.









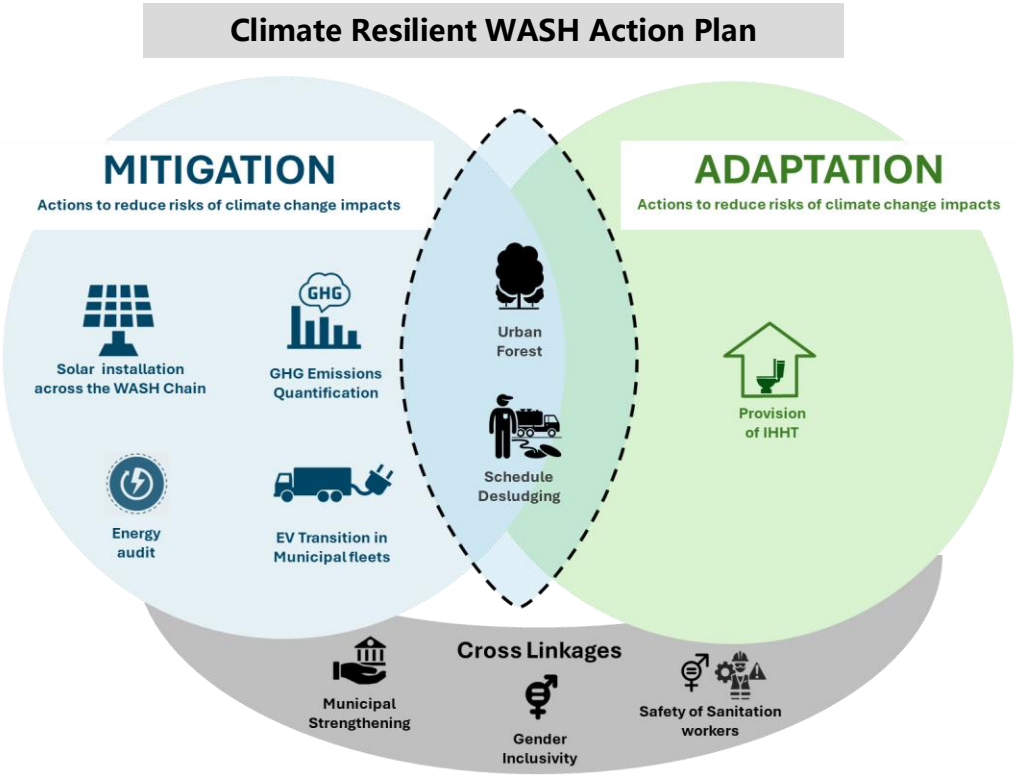
Source: Central Water Commission 2019; Authors' analysis

WASH Climate Action plans prepared for 3 cities under Mahji Vasundhara mission (MVA)

What is a Climate Resilient WASH Action plan

The term ‘climate resilient WASH’ for the project has been **defined as** the capacity of communities and WASH systems to anticipate, absorb, and recover from the effects of a potentially hazardous climate event such that essential basic structures and functions are preserved and restored through both adaptation and mitigation efforts.

A **Climate Resilient WASH Action Plan** is a plan designed to achieve climate and WASH-related goals. It includes detailed assessments of water, sanitation, hygiene, and greenhouse gas emissions, and provides citywide strategies and recommended actions. These actions are categorized into adaptation and mitigation measures, with an inclusive approach.



Exploring climate adaptation potential across the WASH service chain

Climate-related hazards like floods, droughts, storms, and rising sea levels directly impact WASH services at city levels, mainly affecting the availability and quality.

Effects of climate change

High concentration of Nitrate and Fluoride found in the ground water

Rising temperature hinders easy access to community and public toilets

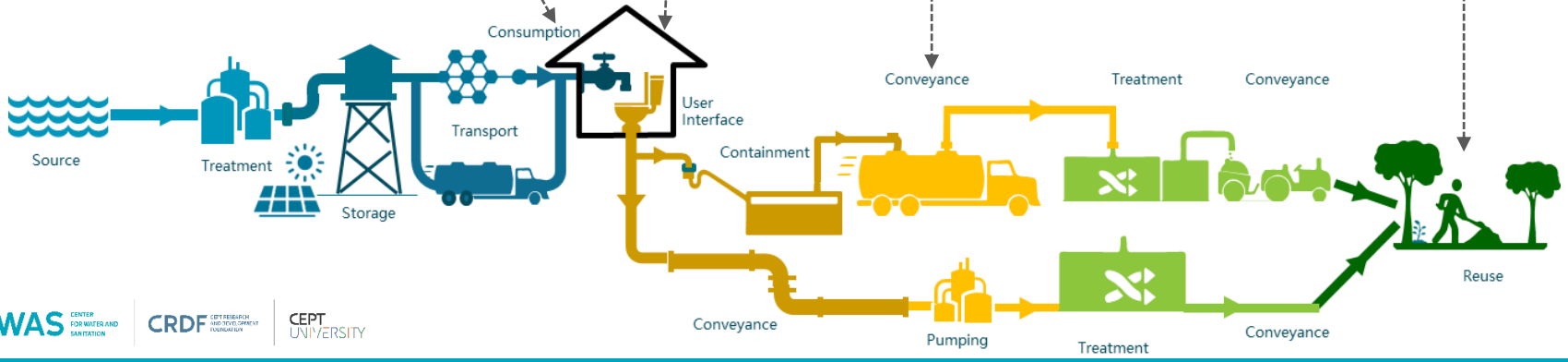
Adaptation measures

Conducting **water quality tests** for both surface and ground water across service chain

Improving access to **own water connection** and IHHT. Provision of MHM facilities at CT/PTs

Scheduled desludging of Prevent overflow of septic tanks and ensure household hygiene

Reuse of treated used water for urban forest leads to savings of fresh water



Calculating GHG emission and mitigation potential in WASH

WASH infrastructure and services leading to GHG emission

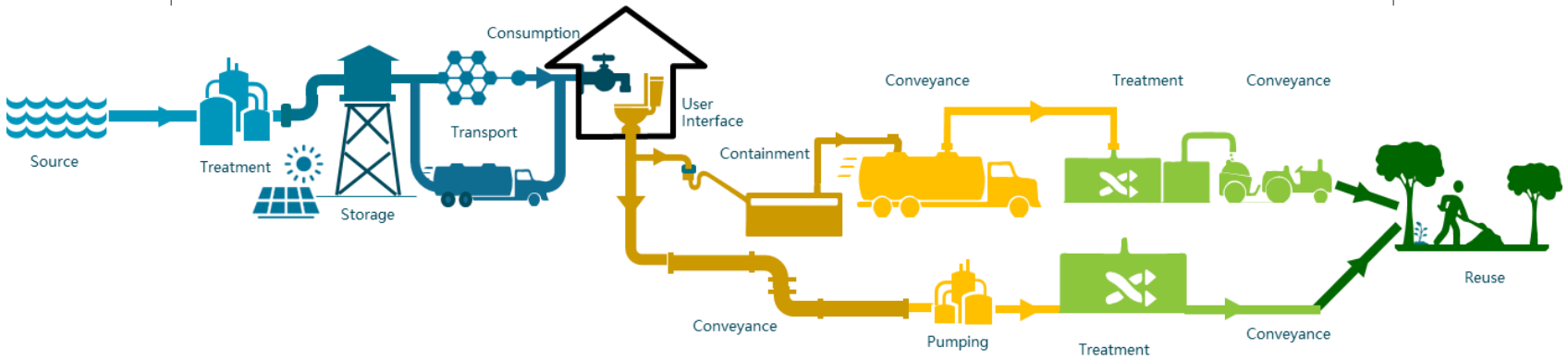
Energy consumption across the sanitation and water service chain resulting

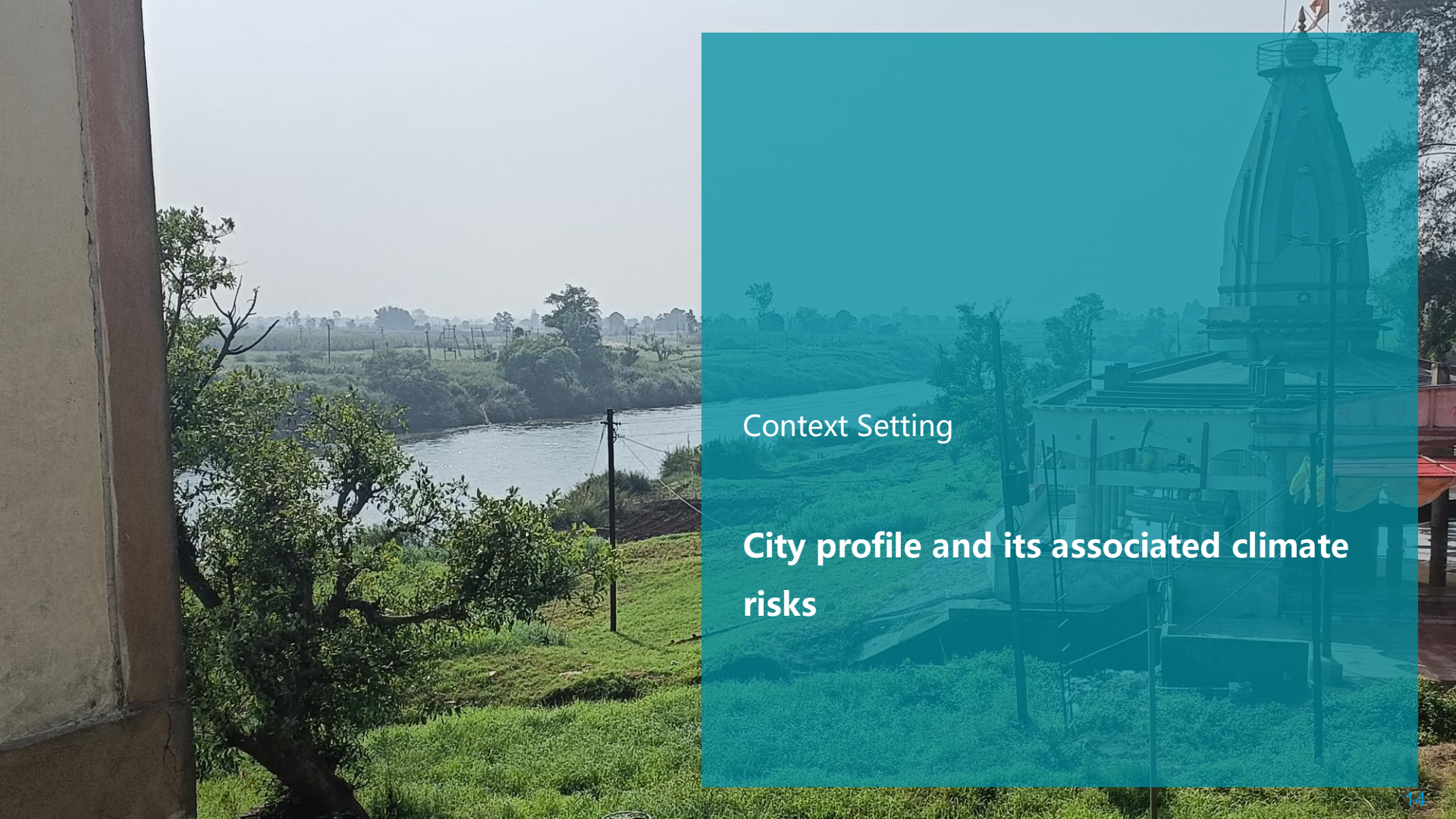
Rising temperature and depleting ground water

Mitigation measures

Conducting **energy audit** across the water and sanitation service chain
Use of energy efficient machinery.
Use of clean energy such as solar energy for various WASH services

Developing **urban forests** as **carbon sink** using the treated used water





Context Setting

City profile and its associated climate risks

City Profile: Ichalkaranji is located on the east of Kolhapur district

D Class Municipal Corporation

29.92 Sq.Km
Area

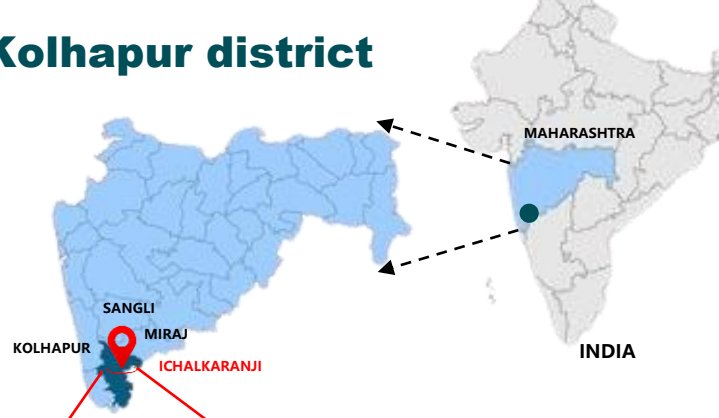
32
Wards

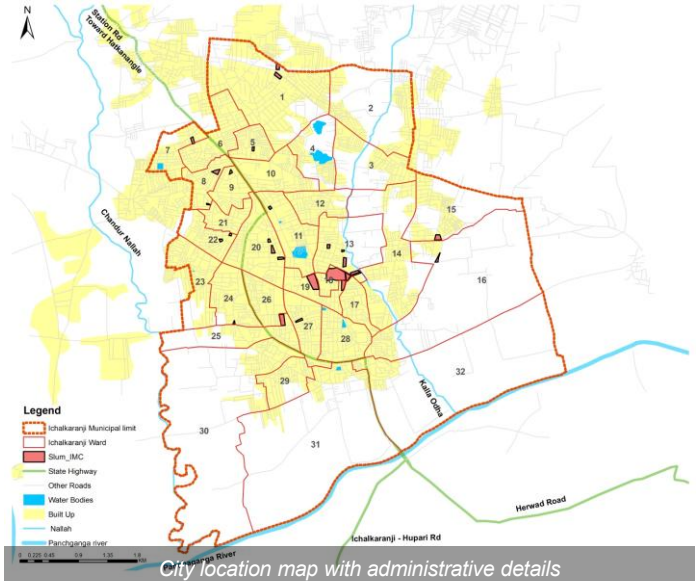
3,68,916
Population
Slum: **28,171**

49345
Households
Slum: **4,047**

8% of total population

- Kolhapur is a **district head quarters** in Maharashtra,India situated near Panchganga river.
- It is bordered by the **Sangli** district to the **north**, **Ratnagiri** district, **Sindhudurg** to the **west** and **Karnataka** state to the **east**.
- The **climate** is generally **dry** except during south west monsoon season.
- The city receives **annual rainfall 600 – 700 mm** from June to September due to its proximity to the Western Ghats.
- Kolhapur has a **higher per capita domestic product.** It has auto-ancillary, Foundry, and Casting industrial set ups which act as **supporting** industries for **Pune** and **Bangalore industries**.





City location map with administrative details

Source: Data as on 2022 . Information from IMC, https://cgwb.gov.in/sites/default/files/2022-10/kolhapur.pdf

Economy: Ichalkaranji is a rapidly growing industrial centre driven by textile industry

- This city has historical importance. This city is known as the **Little Manchester of Maharashtra**. One **Naro Mahadev** was the **founder** of the Ghorpade family. He made Ichalkaranji the seat of his **capital in 1708 AD**
- In **1719 AD** Ichalkaranji became the **centre of political activities.** The ruler built the palace and other public buildings.
- Originally established as a **municipal council in 1904,** Ichalkaranji transitioned to a **Municipal Corporation** in **May 2022** to oversee city administrations comprising of **32 wards.**
- The city enjoys robust **transportation links** boasting a diverse community, lending it a **cosmopolitan character**.
- Situated within the Pachganga and Krishna River Basin, Ichalkaranji lies on the Deccan Plateau, **surrounded by agricultural fields, scrublands, and proximity to the ecologically sensitive Western Ghats.**
- To enhance and **improve** the **infrastructure facilities** of the city, Municipal Council along with Ichalkaranji Co-operative Industrial Estate and DKTE Textile and Engineering Institute have jointly come together and formed a "**Ichalkaranji Textile Development Cluster Limited (ITDC).**


Palace of Ichalkaranji


Textile Mill

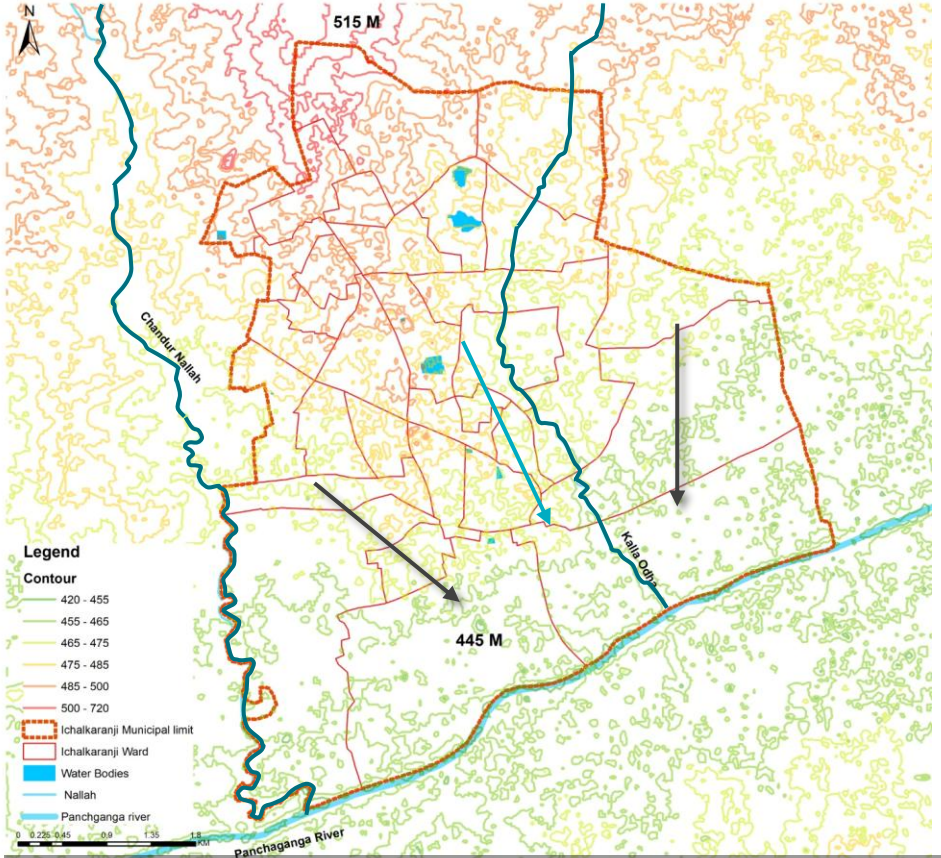

Anicent Ramling temple

DKTE Textile & Engineering Institute

Source: Primary survey and information from IMC, http://oldrol.lbp.world/UploadArticle/127.pdf

City Topography: The city gradually slopes from north to south i.e. towards the Panchganga river

- Ichalkaranji lies in the **Panchganga valley** with its slope towards **South East direction**, with **16.7°N 74.47°E** coordinates.
- It is about 29 km east of Kolhapur and 10 km south-east of Hatkanangale railway station.
- The city's **avg elevation is 538 mts** above sea level.
- Wet season is **warm**, oppressive, windy, and overcast and the dry season is **hot** and **partly cloudy**.
- The average ambient **temperature** remains 24.8°C, and varies from **12.8°C to 38°C.**
- The annual average **rainfall** is **600 – 700 mm**
- Pre Monsoon water table **5-10m BGL** and post monsoon 2-5m BGL
- **Black soil** is present in most parts therefore fertility of that area is quite good with major crops like **jowar, ground nut, sugarcane and vegetables.**



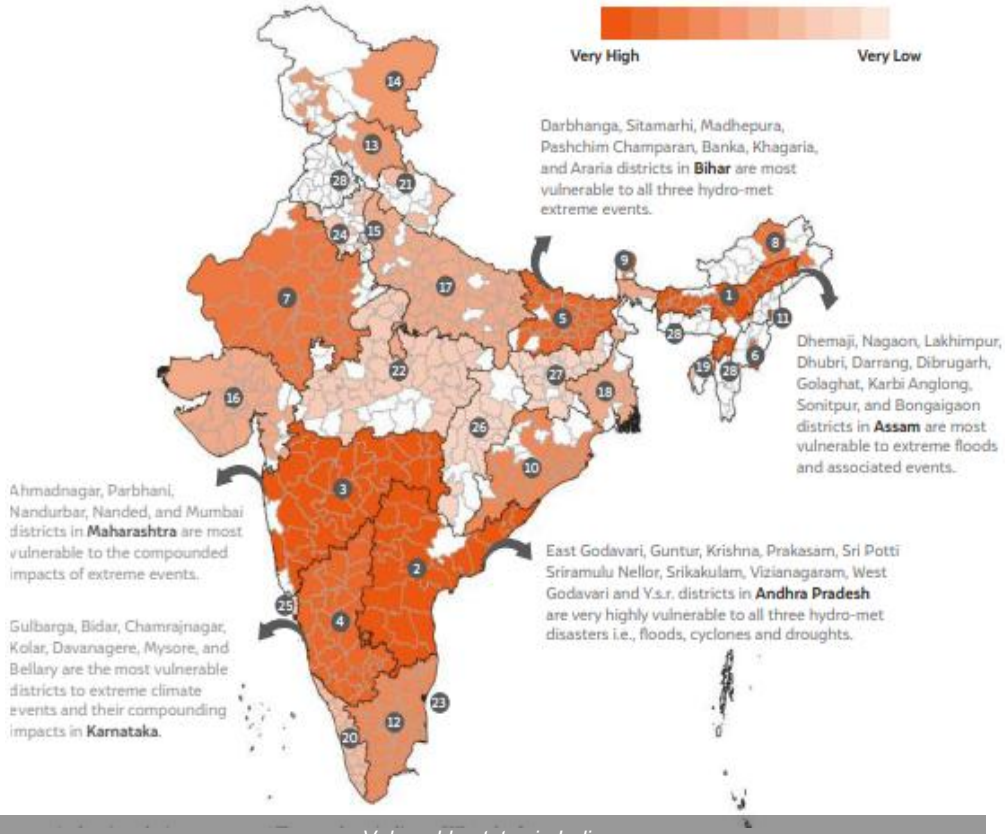
Topography map showing highest and lowest point in the city

Source: Primary survey and information from IMC, http://oldrol.lbp.world/UploadArticle/127.pdf

Context Setting: Maharashtra ranks 3rd in the climate vulnerability index, indicating significant impacts on the population due to various natural disasters

- Maharashtra ranks in first top three states in India with high vulnerability Index. The vulnerability of these areas poses significant risks to basic services in cities, affecting water supply, sanitation, infrastructure, and public health systems.
- In **Maharashtra**, districts such as **Ahmadnagar, Parbhani, and Mumbai** are most susceptible to compounded extreme events, impacting urban and rural populations by disrupting essential services and economic activities. climate vulnerability significantly impacts basic services across various regions in India.
- **Maharashtra,** Bihar, **Assam, Karnataka, and Andhra Pradesh** face high risks from extreme **hydro-meteorological events, leading to disruptions** in **water supply, sanitation, infrastructure, and public health**.

State	Overall vulnerability index	Rank
Assam	0.616	1
Andhra Pradesh	0.483	2
Maharashtra	0.478	3

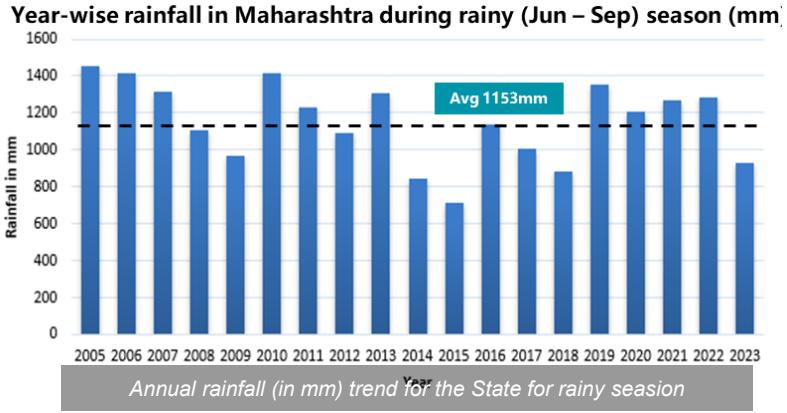


Vulnerable states in India

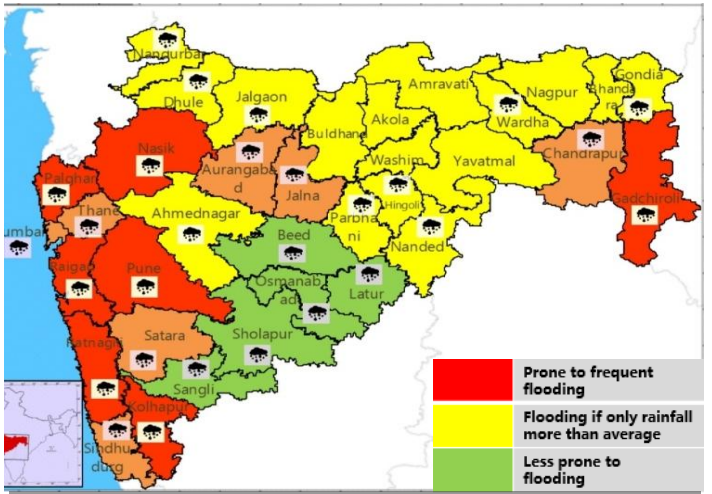
Source: Report by CEEW Mapping India' s Climate Vulnerability

Context Setting : Fluctuations in rainfalls and occurrence of floods in Maharashtra poses a risk for WASH infrastructure

- The growing impacts of climate change are evident through rising air temperatures and more frequent extreme weather events. In recent years, Maharashtra has experienced severe floods resulting from a mix of natural factors and human activities.
- The fluctuations in rainfall significantly increase the region's vulnerability to climate change, as erratic weather patterns can intensify both droughts and floods.
- Maharashtra, located in the western part of India, experiences a significant monsoon season that greatly influences its climate and agriculture.
- The state's average annual rainfall is approximately 1153 mm, there is considerable variability leading to both surplus and deficit rainfall
- Since 1983, Maharashtra has faced massive floods in the years 1986, 1989, 1990, 1991, 2000, 2005, 2006, 2007, 2013, 2015, and 2021, causing significant disruptions to infrastructure and daily life.



Annual rainfall (in mm) trend for the State for rainy season



Flood prone districts categorized from high to low

Ichalkaranji 2005

Mumbai 2006

Kolhapur 2021

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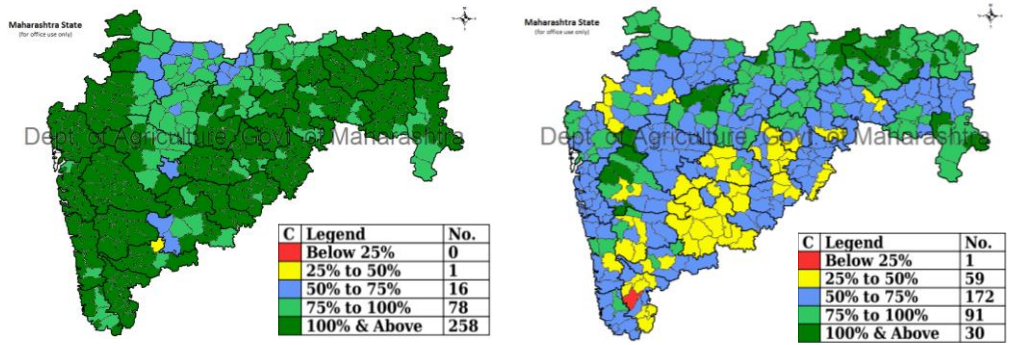
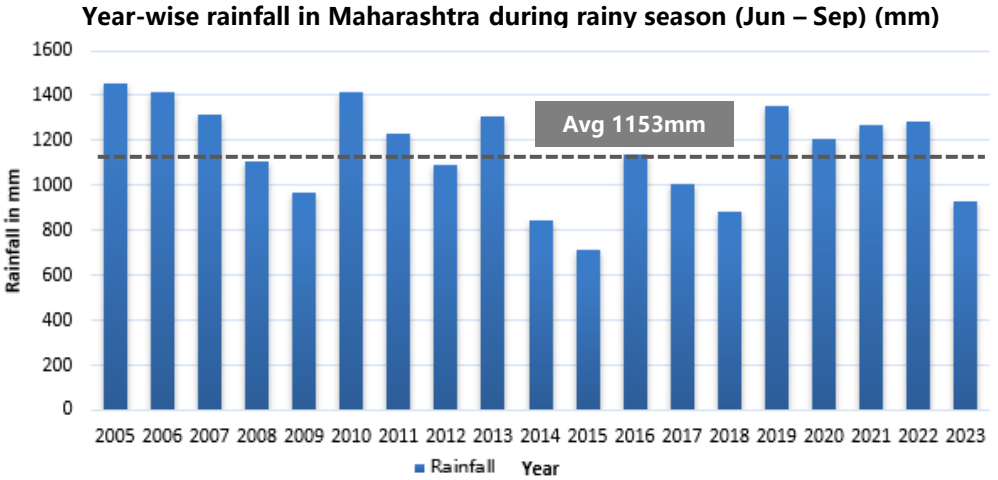
Source:: Report on Impact of Extreme Weather Events in relation to Floods over Maharashtra in Recent Years

State level: Rainfall fluctuations has been observed over the years

- The impacts of climate change are becoming increasingly evident, with rising air temperatures, extreme weather phenomena.
- **Understanding these rainfall patterns from state to city** is crucial **for effective WASH services management**.
- **Maharashtra**, located in the **western part of India**, experiences a significant monsoon season that **greatly influences its climate and agriculture.**
- The state's **average annual rainfall is** approximately **1153 mm**, there is considerable variability leading to both surplus and deficit rainfall.
- Rainfall generally ranges between **800 mm** and **1400 mm**.
- Overall, while there is **no consistent trend** of increasing or decreasing rainfall, the variation highlights the unpredictable nature of the monsoon in Maharashtra.



Tehsil wise rainfall of rainy season of 2005 & 2015 for Maharashtra

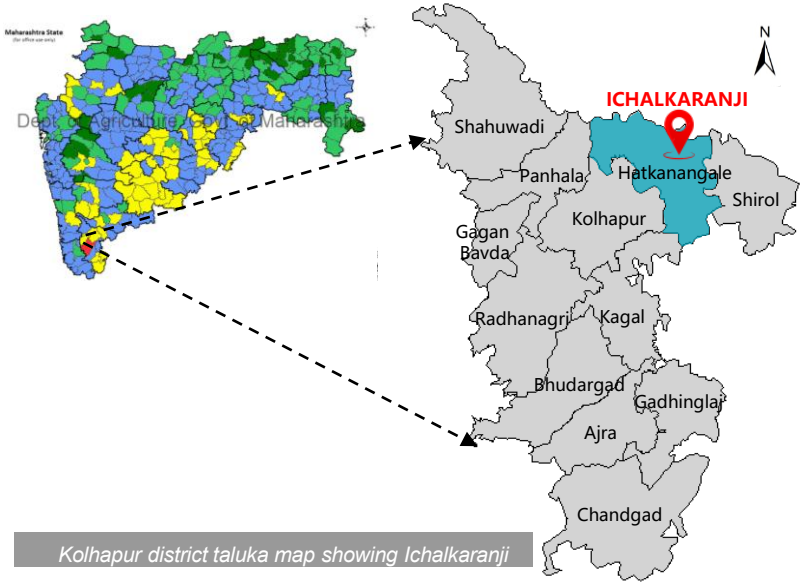


Source:: https://maharain.maharashtra.gov.in/

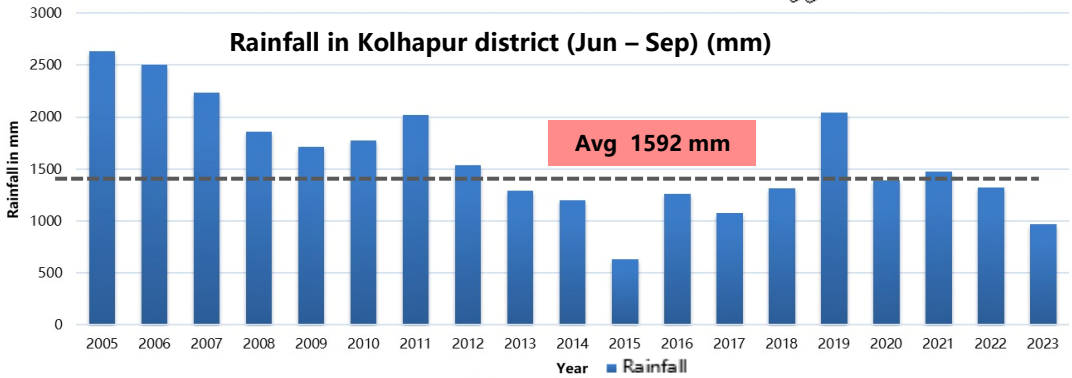
District level: The Kolhapur district has variable rainfall in the eastern part where Ichalkaranji is located

- **Ichalkaranji** falls in the **Kolhapur district** of Maharashtra
- The district is subdivided into **4 divisions** and **further** into **12 talukas.**
- It has three major characteristic **land forms** (1) the **hill**, **ghats** and plateau (2) the **foot hill** zones (3) the **plains**.
- The **climate** of the district is characterized by **general dryness** except during south west monsoon season i.e. June to September.
- The rainfall graph indicates variation **in annual rainfall** with a few years experiencing **slightly higher rainfall**, such as **2011** and **2019**.

- Furthermore, this trend could have **significant implications** for the region's **agriculture**, **water supply**, and ecosystem.
- Consistent **variations** in rainfall over the years may lead to **water scarcity**, affecting crop yields and potentially **causing economic stress** for the local population.



Kolhapur district taluka map showing Ichalkaranji



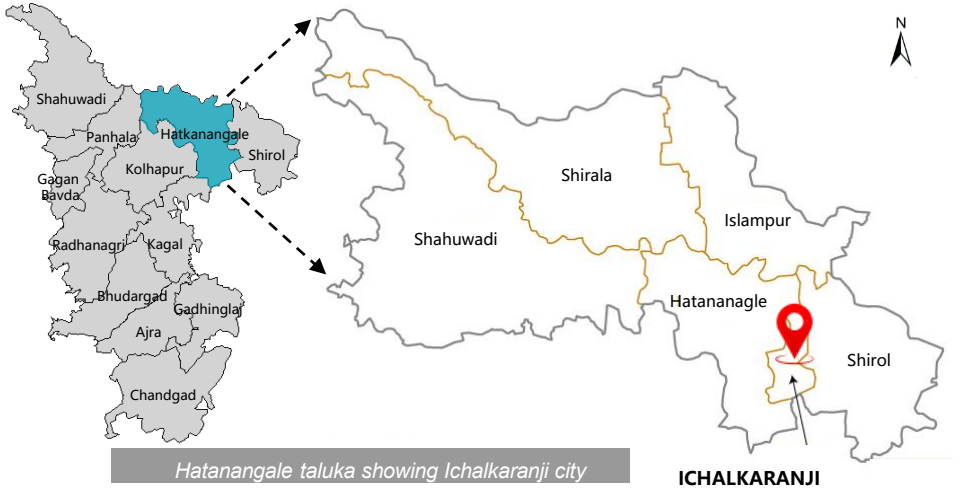
Source: https://cgwb.gov.in/sites/default/files/2022-10/kolhapur.pdf

Source: https://maharain.maharashtra.gov.in/

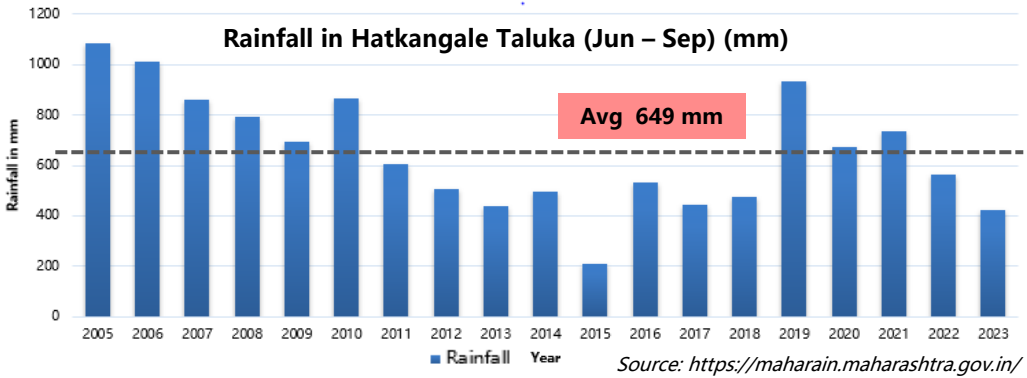
Taluka level: Across 10 years except 2005 and 2019 the taluka experiences around average rainfall

- **Ichalkaranji** comes under **Hatkanangle Taluka of Kolhapur district.**
- 2005, 2010 and 2019 have heavy rainfall above average which indicates a noticeable variation in the rainfall.

- This trend indicates increasing **challenges** in **water management** for the taluka, **emphasizing** the **need for strategies** to **address** both **drought** conditions and occasional **intense rainfall** events to **prevent flooding**.
- Ichalkaranji city received an **average rainfall** ranging from **600 to 700 mm**.
- The **primary source** of this **precipitation** is the **southwest monsoon**, which arrives in June and continues till September.
- Located within the basin of the Panchganga River, the city is **susceptible to rising water levels** during periods of heavy rainfall.
- While the average annual rainfall might not seem excessive, intense precipitation events on upstream of the river can overwhelm the river's capacity, leading to flooding.



Hatanangale taluka showing Ichalkaranji city



Source: https://maharain.maharashtra.gov.in/

Source: https://cgwb.gov.in/sites/default/files/2022-10/kolhapur.pdf,

Climatic Risks for Ichalkaranji city

Ichalkaranji belongs to the Western Maharashtra region, mainly includes Sangli, Kolhapur and Satara district. The region experiences varying risks depending on their geography, socioeconomic factors, and governance.

Natural Climatic Risks

Erratic Rainfall patterns

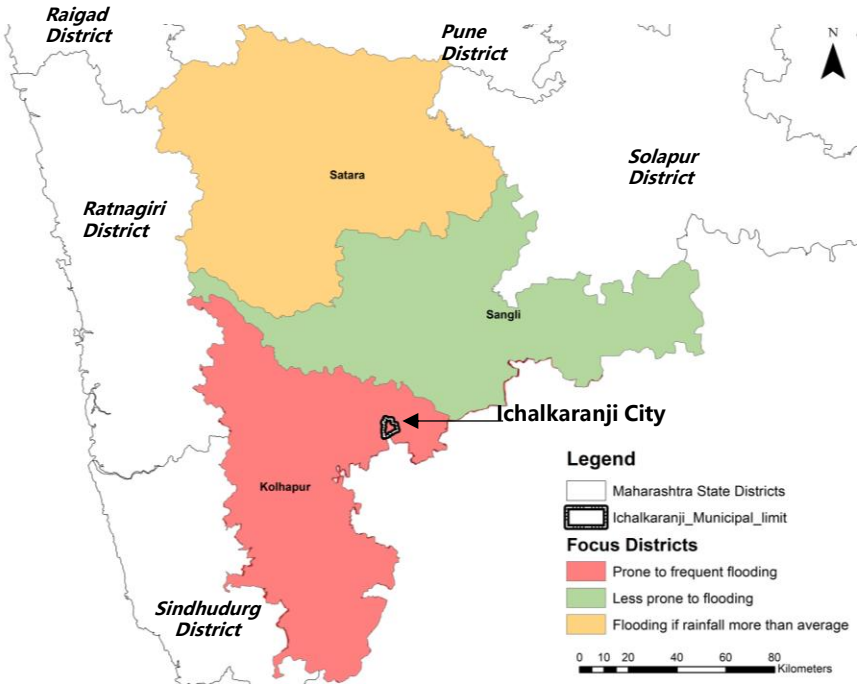
The region has an **erratic rainfall pattern** throughout the monsoon season.

Higher urban flooding

Kolhapur district is prone to floods due to the presence of Panchganga and Krishna rivers

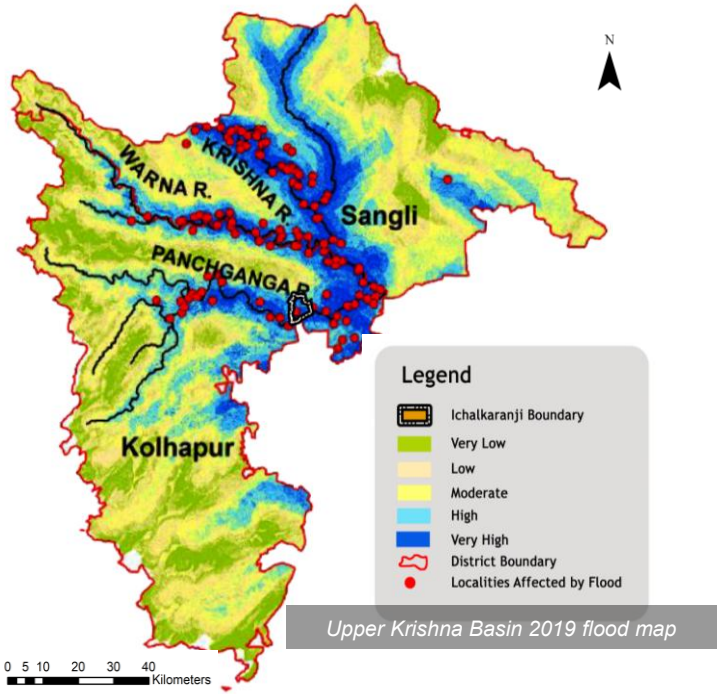
Human-Driven Changes and impact

Activities		Impacts
Uncontrolled water extraction from borewells	*Leading to*	Fluctuations and depletion in ground water
Unregulated desludging of septic tanks	*Leading to*	Ground water contamination
Excessive impervious surfaces and encroachment of water bodies	*Leading to*	Urban flooding

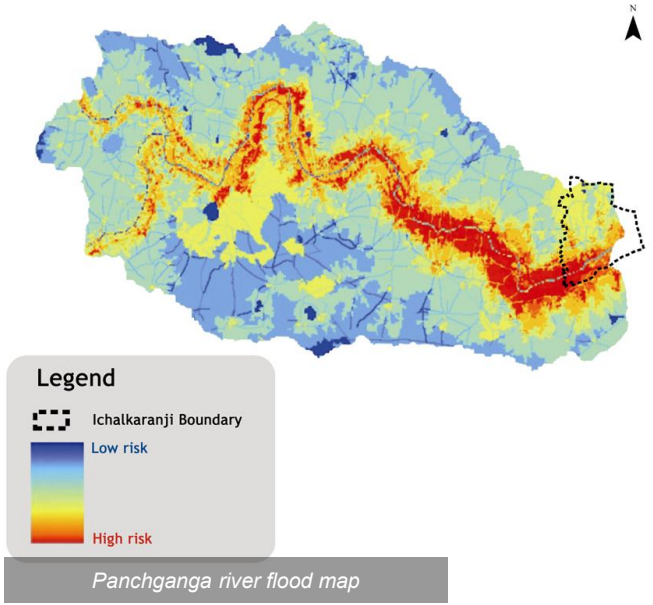


Natural Climatic Risks : Ichalkaranji is part of the Western region of Maharashtra which experiences flooding due to proximity of Panchaganga river

- The growing impacts of climate change are evident through rising air temperatures and more frequent extreme weather events.
- In recent years, Maharashtra has experienced severe floods resulting from a mix of natural factors and human activities.



Upper Krishna Basin 2019 flood map



Panchganga river flood map

- The growing impacts of climate change are evident through rising air temperatures and more frequent extreme weather events. In recent years, Maharashtra has experienced severe floods resulting from a mix of natural factors and human activities.
- The fluctuations in rainfall significantly increase the region's vulnerability to climate change, as erratic weather patterns can intensify both droughts and floods.

Natural Climatic Risks : Due to heavy rainfall in western region of Maharashtra Ichalkaranji and Kolhapur faces frequent flooding

- **Kolhapur** and **Ichalkaranji**, located in western Maharashtra, have **frequently faced severe flooding**, especially during the monsoon season. The 2019 floods were particularly devastating, with Kolhapur receiving record rainfall of 1058 mm, causing widespread disruption to daily life and infrastructure.
- The **impact of these floods** on both Kolhapur and Ichalkaranji has been significant. **Residential areas, agricultural lands**, **and commercial zones suffer extensive water damage**, leading to the displacement of thousands of **residents and substantial economic losses**. Critical infrastructure, including roads, bridges, and the WASH systems, is often severely affected, resulting in prolonged service disruptions and increased health risks due to contaminated water and inadequate sanitation.
- Moreover, the **local economy, which relies heavily on agriculture** and **small-scale industries**, faces long-term setbacks due to crop destruction and damage to industrial facilities.

Kolhapur district map


Ichalkaranji


Ichalkaranji

New articles on floods

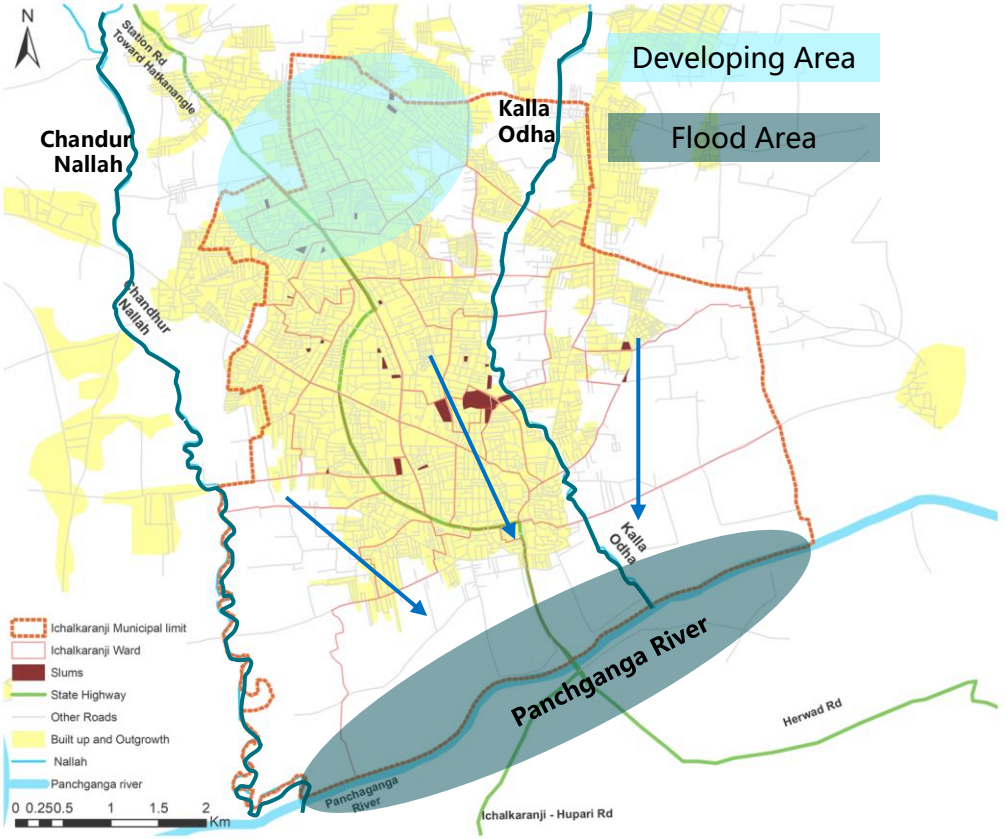
Human-Driven Changes and impact: Increased construction and paving in urban areas has led to more impact on flooding

- Ichalakranji city has experienced **floods** in the years **2005, 2019 and 2021**, where rainfall was ranging from 2000 to 3000 mm during the rainy season.
- **Increased construction and paving** in **urban areas create impervious surfaces,** such as roads and buildings, that prevent water infiltration into the ground. This leads to higher surface runoff and contributes to flooding.
- The Ichalkaranji floods, which have periodically affected the town have **significant and multifaceted impacts on the WASH service chain infrastructures and affects the efficiencies.**


पुढारी

इचलकरंजीतील जुना पूल वाहतुकीस बंद ; पंचगंगा पात्राबाहेर

News article on floods at IMC in 2019; floods at Datta Mandir area



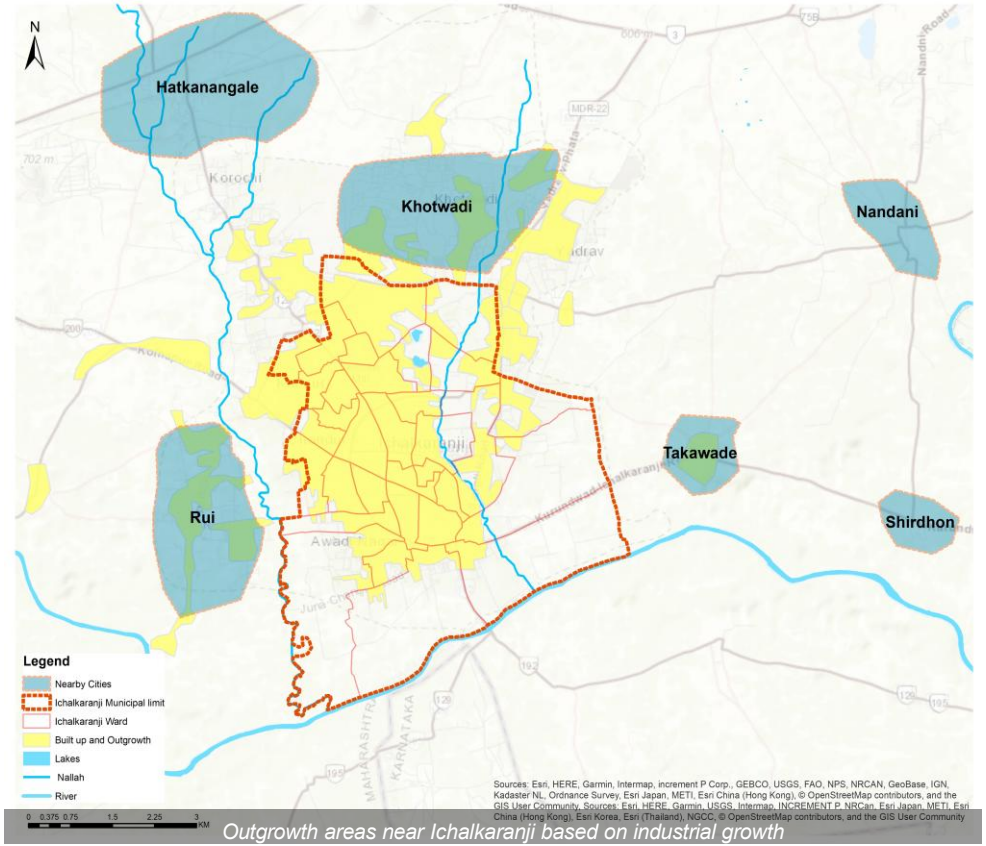
Developing area causing surface runoffs, leading flooding near Panchganga

Source: Information from DRP report by Rachana Kansagra, Maharashtra State Adaptation Action Plan on Climate Change-MSAAP

Human-Driven Changes and impact: The growing development activities considering the industrial growth might impact the nallas carrying capacity

- The **development** of **handloom and power loom industries** at have resulted into urbanization of the town.
- The other handloom services industries are concentrated on the **northern side of town,** boost in industrial sector has led to **strong road network connectivity** within the town.
- It is also the **main place** in the boundary of **South Maharashtra** and **Karnataka** State.
- The trend of **development** of commercial activities which is scattered is observed along **SH 192 & SH 200** at present.
- Due to two town planning schemes implemented in the town, a **planned development** is observed.

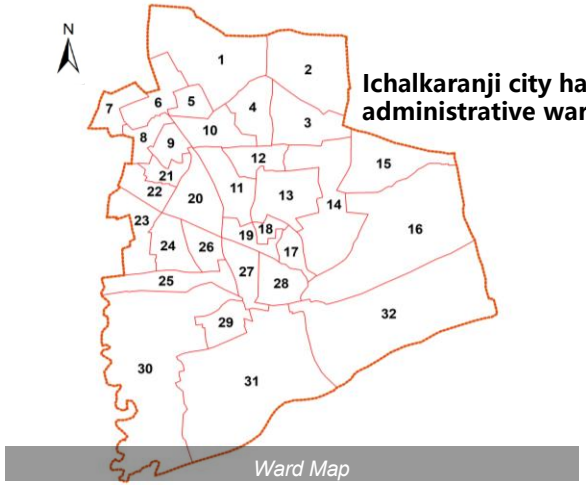
Some glimpses of the city with commercial as well as outskirt areas, good road network



Outgrowth areas near Ichalkaranji based on industrial growth

Source: Information from DRP report by Rachana Kansagra, Maharashtra State Adaptation Action Plan on Climate Change-MSAAP

Human-Driven Changes and impact: Increased impervious surfaces and alteration of natural water flow due to rapid industrialization

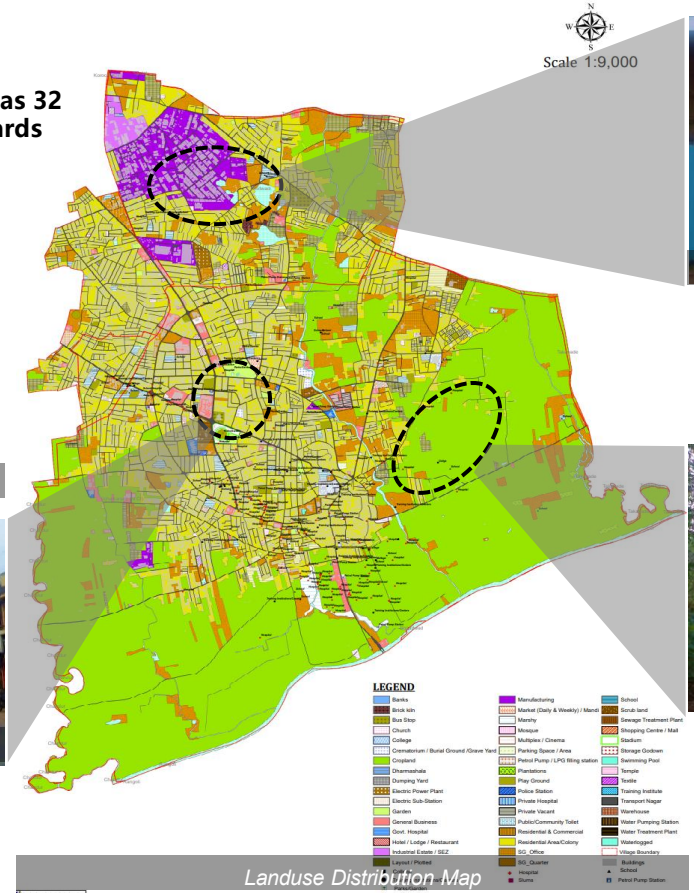


Ichalkaranji city has 32 administrative wards

Ward Map

CBD area for Ichalkaranji

Core city is **densely populated** with **mix** of residential commercial **areas**. There are trees for green cover



Landuse Distribution Map

Source: IMC and primary survey

Indsutrial areas (textile, power loom, etc)

The **textile**, handloom and power loom **industry**, has led to **strong road network** connectivity leading to urbanization.

Agricultural development on the southern side

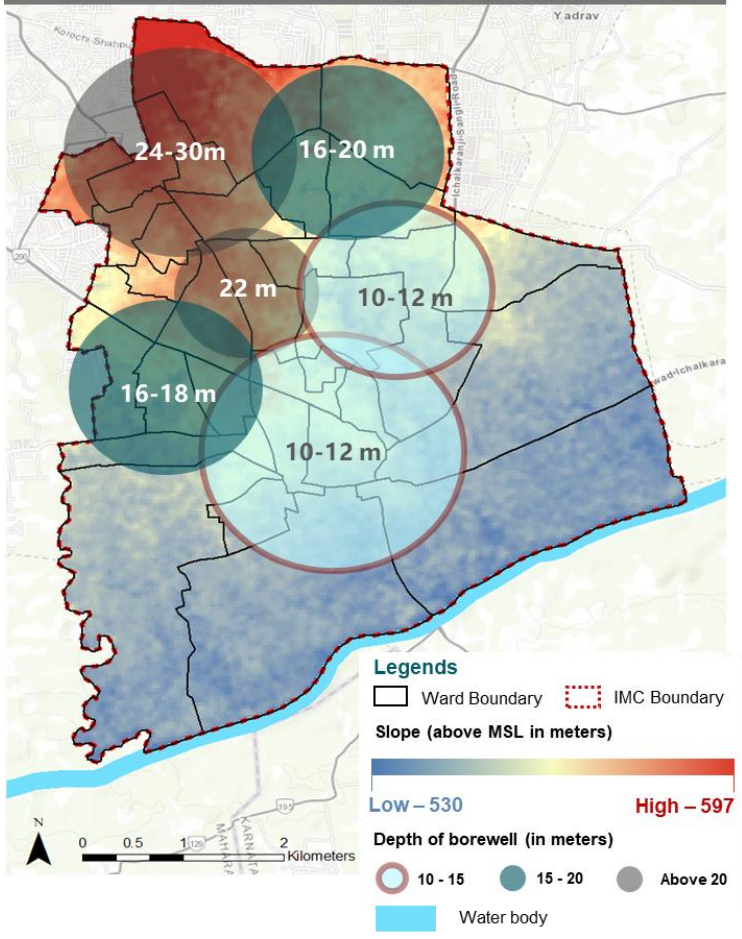
Important place in urban development of **western Maharashtra**. The fertile soil makes **rice** and **sugarcane** as major crops. The agricultural area is developed is towards Panchganga river in the south.

Human-Driven Changes and impact: Ground water depletion due to increasing number of borewell in the city

- There are more than **700 borewells** within the city, out of which **381** are equipped with **online operating systems** and meters for remote monitoring **by IMC** staff.
- **Ground water table levels** vary from **1 m to 24 m.**
- Presence of **high concentrations** of **iron, fluoride**, chloride, and nitrates due to use of fertilizers, **effluents from septic tanks**, sewage in open drains and probable effluents from industries.
- In last decade, 4-6 m **increase in depth of borewell** is observed in the northern part of the city.
- **Currently there are no permission or restrictions** on **setting** up of private **borewells**.

Borewells digging process and online borewell meters in the city

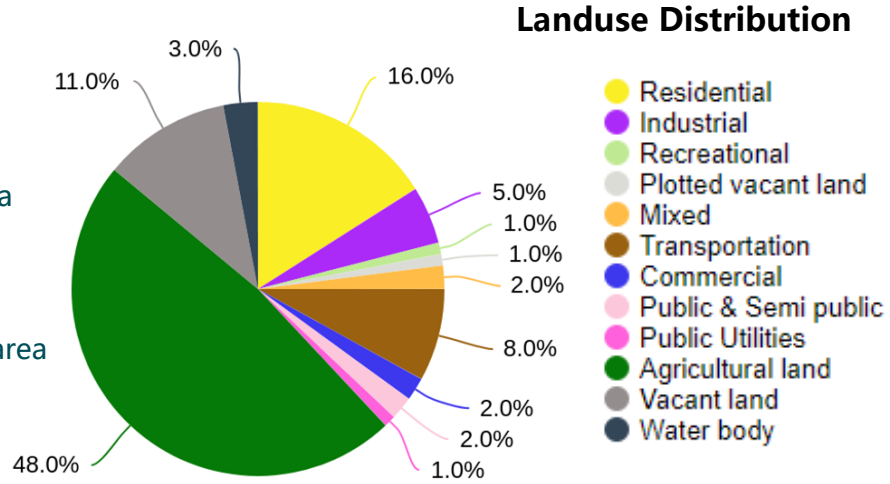
Map showing slope and depth of borewell within the IMC limit



Landuse: Core areas in the city have low rise-built with high density. 20-25% tree coverage helps lower city temperatures

60%
developed area

40%
undeveloped area



- As per ELU analysis the **agriculture land 1204.01 Ha** which contributes about **48 %** of total land of Municipal area. Black soil is present in town, therefore fertility of that area is quite good with major crops like Jowar, ground nut , sugarcane and vegetables.
- Most of the city maintains a **low-rise built** form, with **higher densities** in the older **inner city** areas. It has mostly **plotted development** (individual houses). The construction of **apartment** buildings is not that common but observed in **newly developed areas.**

City's 20-25% area is covered by trees which indirectly lowers city temperatures

- Coverage of Open spaces: **12 %**
- Green Cover in the city: **23 %**
- Green cover is observed in areas beyond core city which are more planned. **All streets** are covered with **trees to at least on one side** to ensure shade.

Total trees

~ 1.73 lakhs

Open space and its area

29 spaces
0.4 sq.km.

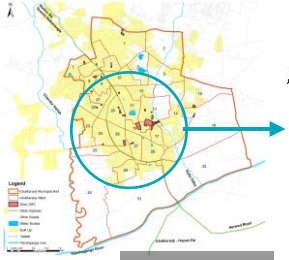
Carbon sink

4.34 Millions MTCO2/year

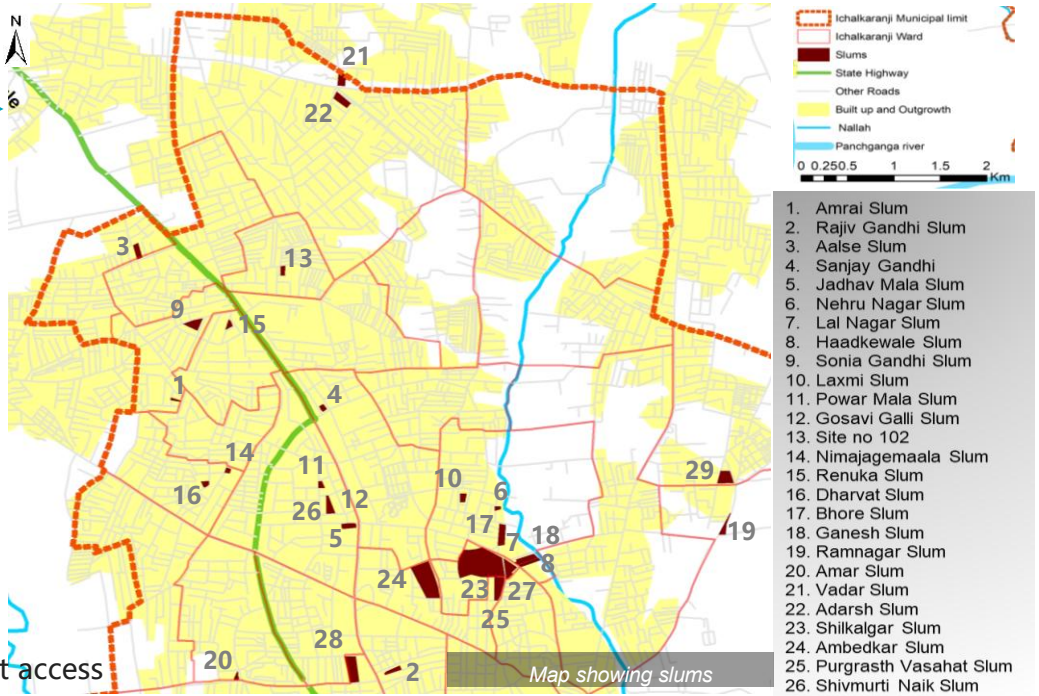
Source: Primary survey and information from Town Planning dept. MC

Slums: 8% of total population resides in 26 slums in the city

- Ichalkaranji has 26 slums with a population of 28,171.
- Avg HH size is 7 with 4047 HHs.
- Most of the slums are concentrated in the core area.



Key map



Map showing slums

- As per discussion with the ULB officials, both declared and undeclared slums are **eligible to get access to toilet and water connections**.

Land Ownership	Declared	Undeclared	Status not known	Grand Total
GOM	2	-	-	**2**
IMC	13	1	-	**14**
Private	8	1	1	**10**
Grand Total	**23**	**2**	**1**	**26**

- The **service coverage is slums is acceptable** in terms to get access to basic services.
- Some of the slum **community toilets need** to be **refurbished**.
- With **ongoing schemes** such as Nagarothan, Rajiv Awas Yojana, JNNRUM, etc IMC is carrying out **necessary improvement activities**.

64% Individual toilet

73% Water supply

37% CT dependent

58% Drainage coverage

Source: IMC and primary survey

Slums: Irregular water supply timings lead to storage practices; pakka roads with both sides drains observed

Water Supply

Water storage prevalent due to irregular supplu timings

- Water supply **on anytime** and on any day for **1-2hr.**
- **Bore wells** in city and few of them which are present **in slum** but **non functional.**

Drainage

Higher percentage of clogged drains and partially covered

- **Partial network** of drains. Good in core city as compared to other parts.
- Drains are **mostly along the road**, in few slums there is no proper drainage network due to kaccha roads. **More clogged drains** observed during primary survey.

Roads

The roads are mostly pakka in core area with uncovered drains

- Slums in the **core** area have **concrete roads**. Lack of proper roads leading to slums, **internal roads** are mainly **mud trails.** Very **few street lights** are observed.

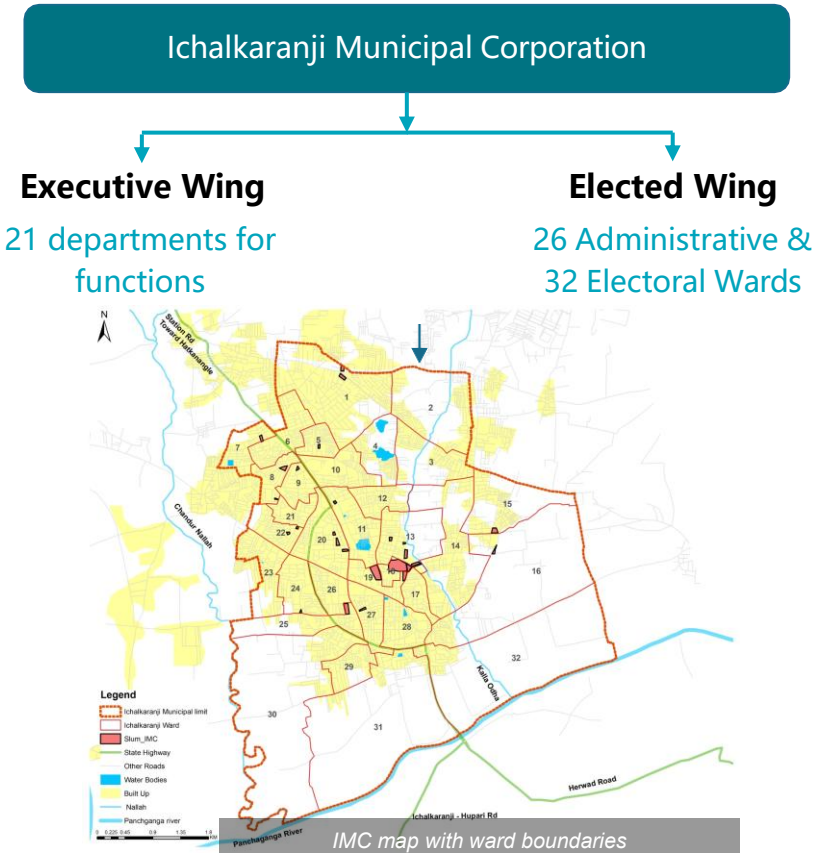
Source: IMC and primary survey

Governance Structure: Ichalkaranji is governed by an elected wing which is aided in its day-to-day operations by the executive wing

Structure and Governance

- **Council:** Governed by elected representatives from different wards.
- **Mayor and Deputy Mayor:** Elected by council members, responsible for executive functions.
- **Standing Committees:** Manage functions like finance, health, education, and public works.

- The governance and functioning of D class municipal corporation is generally guided by The Maharashtra Municipal Corporations Act 1949.
- **The executive wing** is the bureaucratic team, led by Municipal Commissioner and performs duties as defined in the Municipal act of 1965.
- For 'D' Class Corporation there shall be a Standing Committee and the following [six] Subjects Committees :- (i) Public works Committee. (ii) Education, Sports and Cultural Affairs Committee, (iii) Sanitation, Medical and Public Health Committee, (iv) Water Supply and Drainage Committee, (v) Planning and Development Committee, (vi) Women and Child Welfare Committee.



Source: The Maharashtra Municipal Corporations Act 1949.

Departments: Sanitation and water supply departments have been crucial in implementing initiatives for WASH- Climate

ACTIVITIES

- Identify the **details** along the **sanitation value chain** with context of ongoing **operations** and **monitoring** systems.
- Details of the **overall supply chain** with treatment **procedures**, **distribution** and coverage.
- Water supply **tax system**
- Coverage of different types of **landuses** in the city, **green cover**, availability of open spaces, **reservations**, etc
- **Availability of SHGs** in the city, involvement in different activities, willingness to work in WASH

OUTPUT

- ✓ Passing of **resolution** for citywide **schedule desludging**
- ✓ Treated waste water **reuse plan**
- ✓ **Permission** for **solar installation** to operate smaller capacity pumps and motors.
- ✓ Municipal **outgrowth areas**
- ✓ **Location** of **WASH facilities** and coverage
- ✓ Proposal for **urban forest** near STP
- ✓ **Involvement** of women groups **in WASH service** chain like IHHT improvement, **maintenance** of urban forest, **monitoring** activities, **O&M of MHM facilities,** etc

- ✓ **Energy consumptions** along the sanitation value chain
- ✓ **Energy audit** study, Private **contracts assessment**
- ✓ **Complaint redressal** process, ongoing schemes

Departments: Secondary departments for assessing financial status, human resources, energy consumptions with climate changes in past

DEPARTMENT	Tax	Accounts	Establishment	Electricity	Disaster
ACTIVITIES	• Assessment of past **budgets**, **DCB** tables, water, sewerage **taxes**, etc in order to understand **gaps** and **status** in any ongoing services.	• Overall council structure of **administrative depts**. and **executive wing** for daily operations and service delivery	• **Consumption of energy** in **current** treatment and distribution processes, **losses** or **fines** if any	• **History of climate** change **events**, actions taken, impact on city	
OUTPUT	✓ **Municipal finance assessment** ✓ Capital, revenue expenditure in wash, **property tax assessment** ✓ Water and sewerage **tax collection efficiency**	✓ **Gaps** in **sanctioned** and **recruited posts** ✓ **Department** to approach for approval for **respective proposal** ✓ **Responsibilities**/ powers **of** different **depts**.	✓ Energy audit, **GHG emission calculation** along the WASH service ✓ Improvements to **reduce power factor** penalty ✓ Possible location of **solar** with monitoring ✓ Need for **replacement** of **old pumps** to improve efficiency	✓ **Assessment** of **past events** to understand, climate change impacts. ✓ This can help **suggest efficiency measures** to mitigate impacts	

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Executive Summary

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- Approach and Methodology
- City Profile
- Overall Climate risks

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- Water Supply Infrastructure and services
- Sanitation Infrastructure and services

Assessment for Mitigation

3

- Electricity Consumption
- Energy Audit for WASH
- GHG emission estimation for WASH service chain

Municipal Finance Assessment

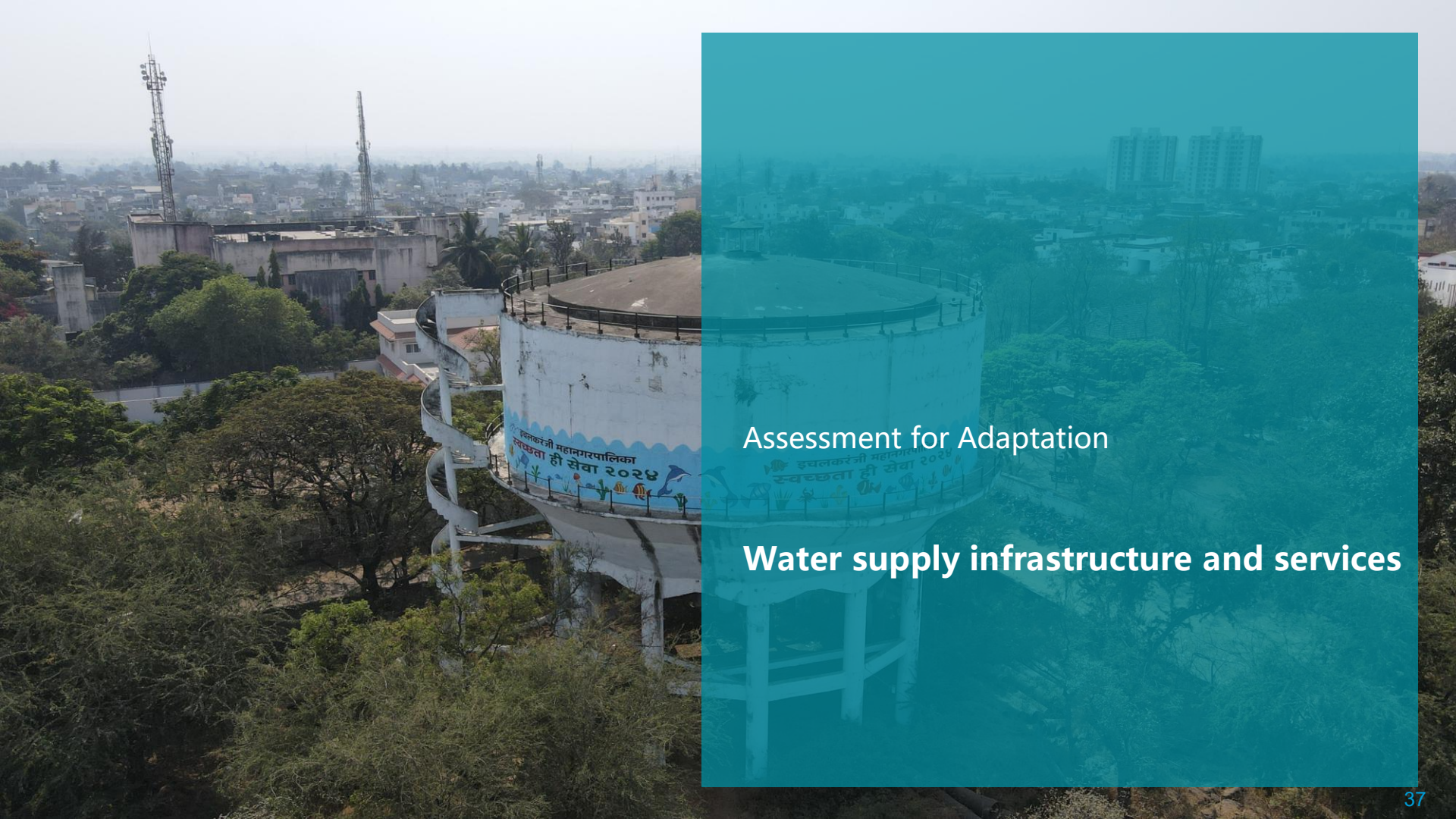
4

- Municipal Budget Analysis

Implementation and Scaleup

5

- Adaptation related measures
- Mitigation related measures
- Cross cutting initiatives

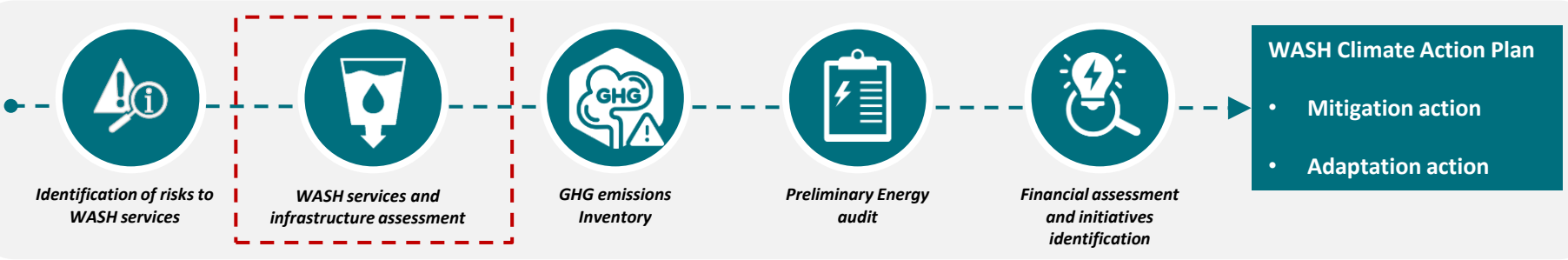


Assessment for Adaptation

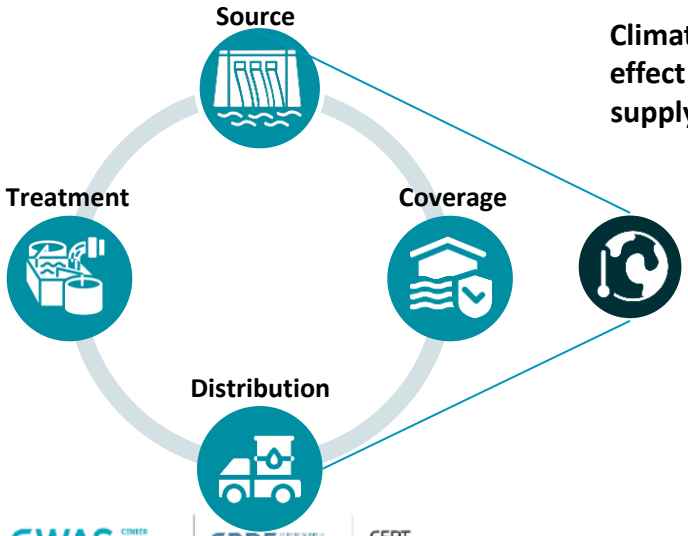
Water supply infrastructure and services

Assessment for Adaption

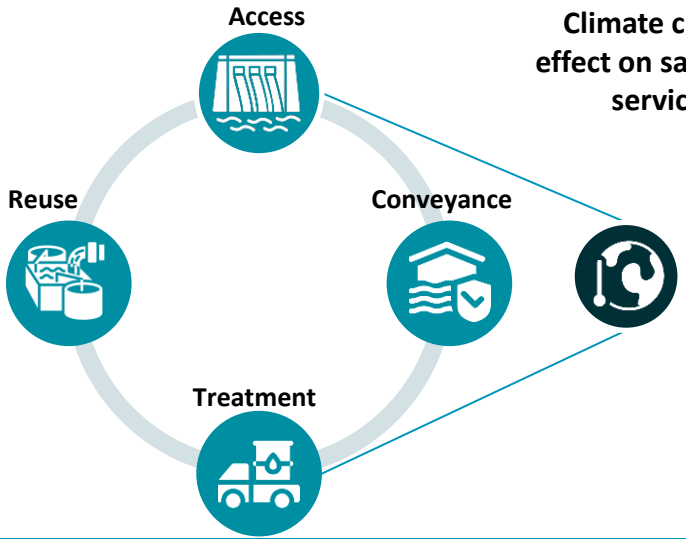
What WASH Climate Action Plan Consist of?



Existing Water Supply services and infrastructure assessment

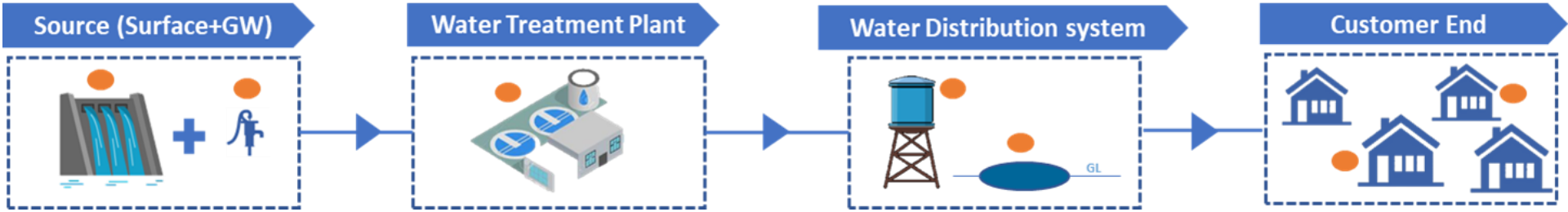


Existing Sanitation services and infrastructure assessment



CWAS CRDF CEPT UNIVERSITY

Water service chain: Panchganga and Krishna river are main sources of water supply



2 water sources

45 MLD extraction

Krishna river (18 km)

Panchganga river (4.5 km)

8 Pvt. Water Tankers

108 MLD

Treatment capacity

45 MLD Utilized

16 hours daily working

11 zones with

11 ESRs

Pipeline Network: **488 Km**
Area Covered **: 29 Sq.km.**

101 **LPCD**

50 K **connections**

2-3 **hour alternate day**

HH level borewell dependency


Intake well at Panchganga


Water treatment plant


ESR


Distribution system

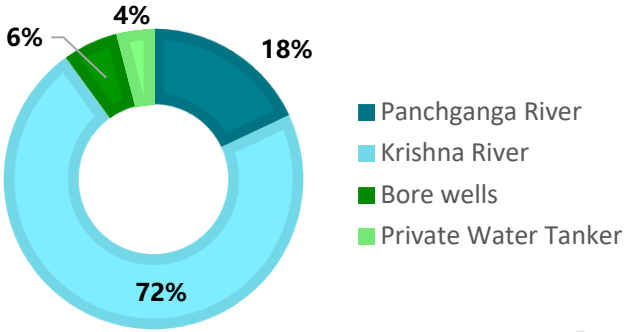
Source: IMC and primary survey

Source: Ichalkaranji dependent on surface water as well as borewells for water supply in the city

Quantity of Water drawn from each Source

SOURCE

- Surface Water
  - Panchganga River
  - Krishna River
- Ground Water
  - Borewell
  - (well) Private Water Tanker



Total water Supplied **45 MLD**

Surface Water

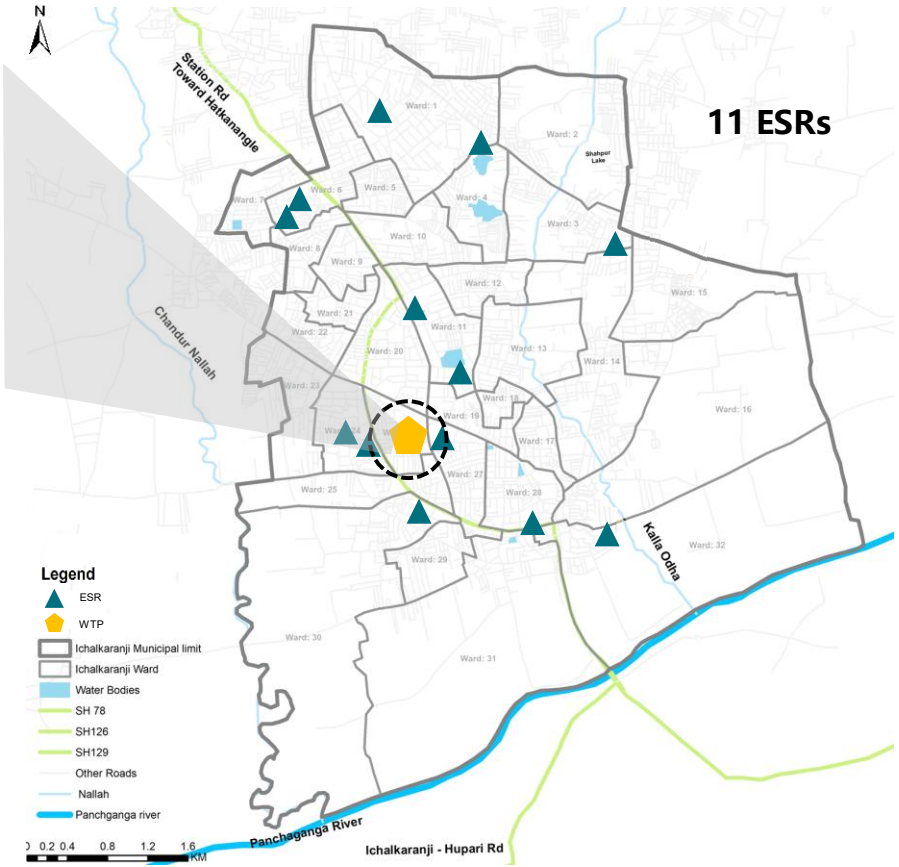
Panchganga River - 9 MLD

Krishna River - 36 MLD

- **Panchganga River** flows through the city and **meets Krishna River downstream** of the city
- The city has **two nallahs**: **Chandur, Kala**; fresh water streams contributing to Panchganga rivers and at present except monsoon season water gets treated and use for multiple purpose.
- **Panchganga River**, used to be the **primary source** of drinking water for the city.
- Subsequent to the Hepatitis outbreak in the city, Ichalkaranji shifted its water intake from Panchganga River to Krishna River **(18 km).**

Treatment: Installed Water Treatment Plant (WTP) of 108 MLD capacity with 45 MLD utilized capacity

- Ichalkaranji has **108 MLD** Water Treatment Plant (conventional technology) which treats Krishna river and Panchganga river water and supply to **11 ESRs**
- There are 3 WTPs units : 2 old units with capacities of 18 MLD and 36 MLD, and a newly constructed one with a capacity of 54 MLD. Total being 108MLD
- At present, daily **45 MLD** water is **being treated** in the **WTP** and Ichalkaranji Municipal Corporation is **planning to upgrade** the existing pumping station at Majarewadi as well as additional pumping station to cater the future demand



Location of water treatment plant and ESR

Source: Primary survey, water supply dept.

Treatment: IMC is exploring potential for solar power at WTP. Regular water testing is done at IMC from 7 locations weekly

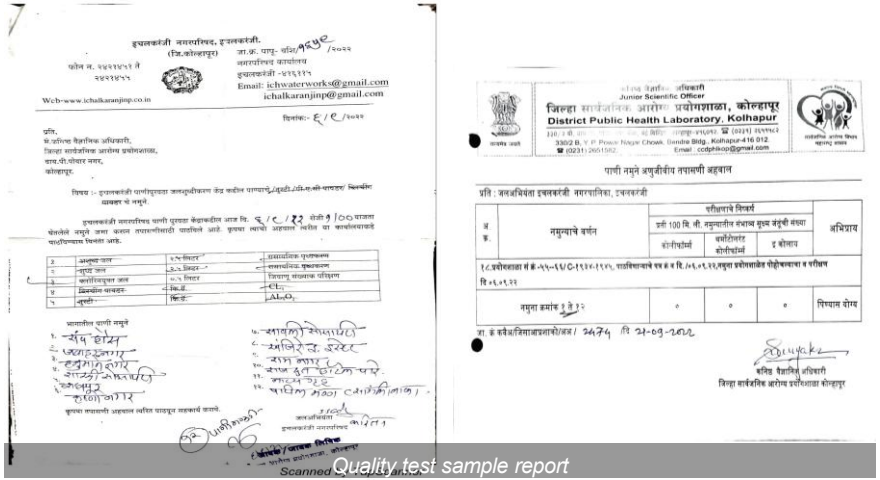
Water treatment plant flow diagram

- **Ground water** is **supplied directly** through water distribution stations.
- The **WTP** occupies an area of approximately **6.7 acres**, with additional space available for potential **solar panel** installation on the Rapid Sand Building to power **smaller capacity pumps** and motors.

Quality testing

- Water quality is rigorously monitored at the WTP, with **weekly** tests conducted for **residual chlorine, physical, chemical, and bacteriological parameters.**
- **Samples** are periodically sent to **accredited government** water **quality testing labs** for further analysis.

Rapid Sand Filtration Unit



Quality test sample report

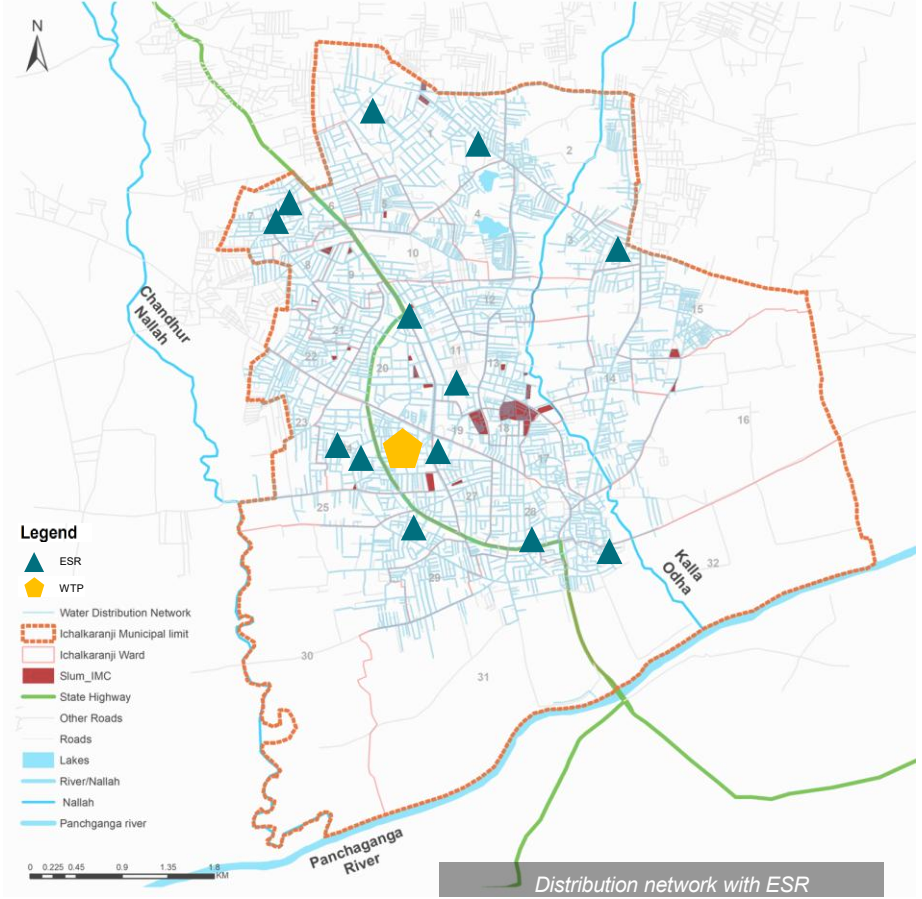
Source: Primary survey, water supply dept.

Distribution: Water is supplied 2-3 hrs every alternate day not meeting the demand

- City has only **one WTP (3 units)** which supplies water to entire city
- City has **11 ESRs** which distributes water in **11 zones** of the city
- Water is supplied 2-3 hrs per day on alternate day basis
- Some **HHs** also **dependent** on **bore wells** for water supply. City has approximately 700 borewells connections
- The water supply **network** of the city is **old and leakage losses** are high. **Coverage** of **sewerage network** is **low** which leads to high wastewater discharge into the nallahs.
- **Distribution Network** is around **488 Km** and **Area** Covered by distribution Network **is 29 Sq.km**

ESR Location	Supply
Jawahar nagar	4.8 MLD
Shahapur	3.6 MLD
C zone	4.05 MLD
A zone	10.1 MLD
B zone	5.4 MLD
D zone	2.7 MLD
Thorat chowk	2.81 MLD
Yashwant	2.81 MLD
Khanjire	3.48MLD
Thambemala	4.68 MLD
B/A	3.7 MLD

ESRs at Ichalkaranji



Distribution network with ESR

Source: Primary survey, water supply dept.

Coverage: 77% households with water supply connections receive 101 LPCD water supply with absence of metering

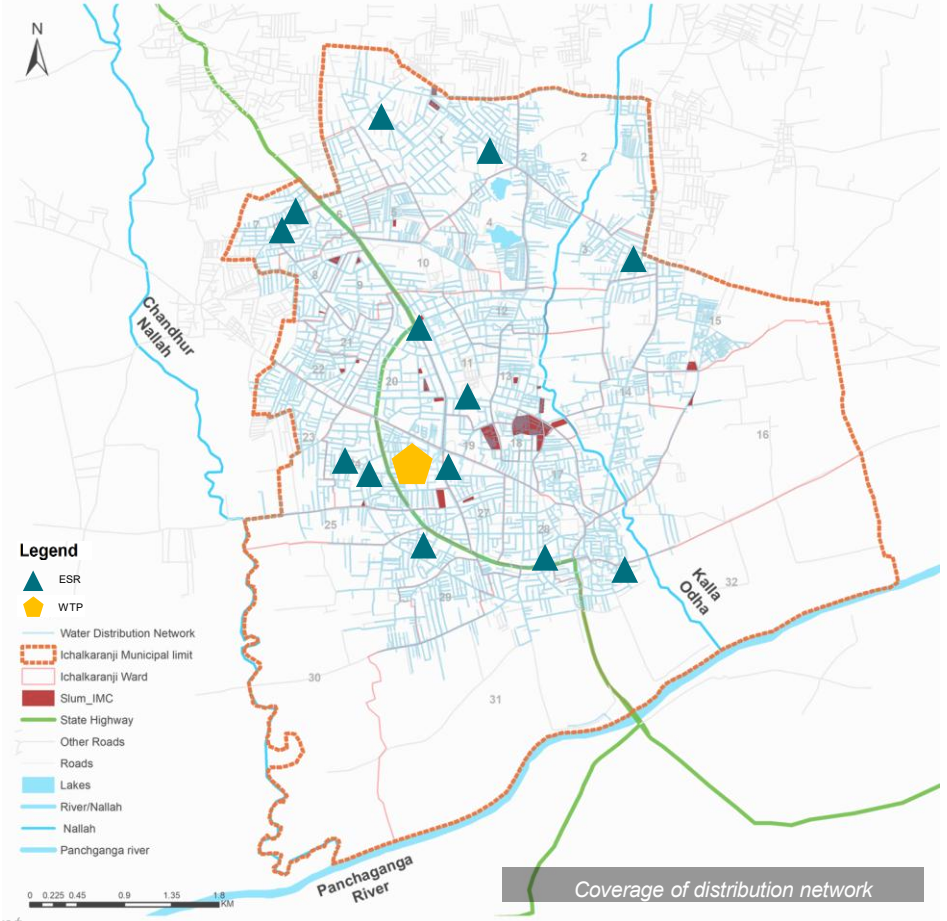
77% Total 53,448 no. of HHs connections

70% Total 2,832 no. of slum HHs connections

101 lpcd	1.5 – 3 hrs
Per Capita water Supply	Duration of water supply

Once in 2-3 Days; Once in 4 Days – *In Summer*
Frequency of water Supply

- The **existing** water **supply** system is **insufficient** for the city, due to increasing population and **industrialization**.
- City gets **water supply every 2 days** & to overcome water issues in the city, there are total **700** corporation **bore wells** which is operated by IMC.
- The corporation has good efficiency in **redressal** of **80% customer complaints**. Also cost of recovery in water supply is 59% with a collection efficiency of 76.53%.
- **Metering** is completely **absent** at HH level with water supply for average duration of 1 hour 30 min. Only **67%** of **commercial connections** are **metered**.



Coverage of distribution network

Source: Primary survey, water supply dept.

Summary of the detailed climate resilient WASH assessment

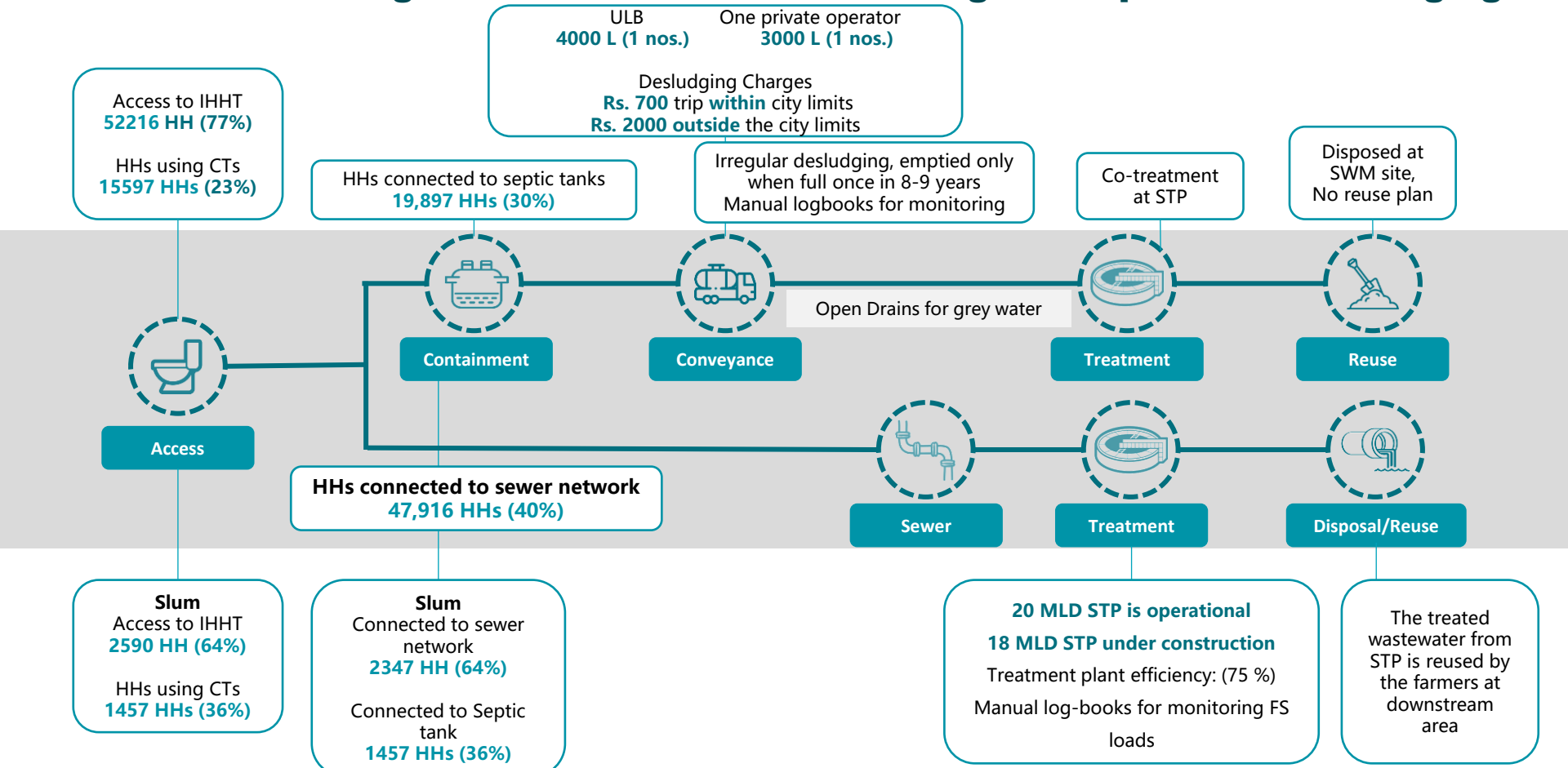
Water Supply

- The city has an organized **water distribution** system **with 11 ESRs** ensuring coverage across all zones.
- **Commercial connections** have a decent **metering rate at 67%**, which helps in monitoring and managing water usage in commercial sectors.
- The corporation **efficiently addresses 80% of customer complaints** and achieves a **cost recovery** rate of **59%** with a **collection efficiency** of **76.53%.**
- **Aging** and **insufficiently** covered **water network**, **declining groundwater levels**, and high industrial water demand.
- **Low water supply coverage** and high per capita water consumption levels.
- **Pollution of primary** water **sources**, notably the Panchganga river, has rendered it unfit for drinking or industrial purposes.
- **Low utilization rate** of **treatment** facility (42%) leading to a supply-demand gap.
- **Inadequate access** to clean water in certain areas, **particularly slums**, and a lack of monitoring and metering in industries, making it difficult to manage water usage effectively.
- Some HHs **rely on private borewells** for their water needs, **with no permissions or restrictions on their setup**.
- Over the **last decade**, an **increase of 4-6 meters in the depth of borewells** has been observed in the northern part of the city.

Assessment for Adaptation

Sanitation infrastructure and services

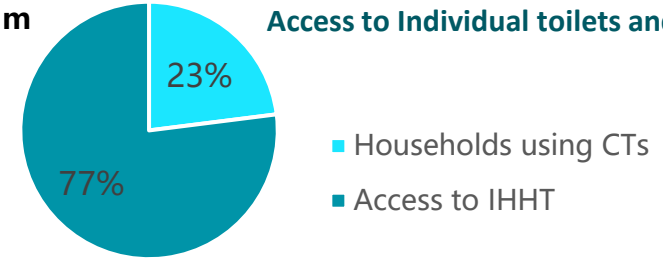
Sanitation: Existing sanitation situation with irregular septic tank desludging



Source: Primary survey, sanitation dept.

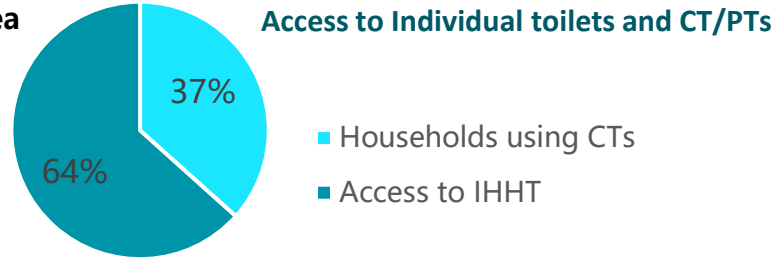
Access to IHHT: 100% IHHT Coverage in non slum areas while 64% coverage in slums (1/2)

Non-Slum Area



Parameter	Number	Percentage
Population	3,68,916	-
Households	67,813	-
Access to IHHT	52,216	**77 %**
HHs using CTs	15,597	**23 %**

Slum Area



Parameter	Number	Percentage
Population	18,325	-
Households	4,047	-
Access to IHHT	1,457	**37 %**
HHs using CTs	2,590	**64 %**

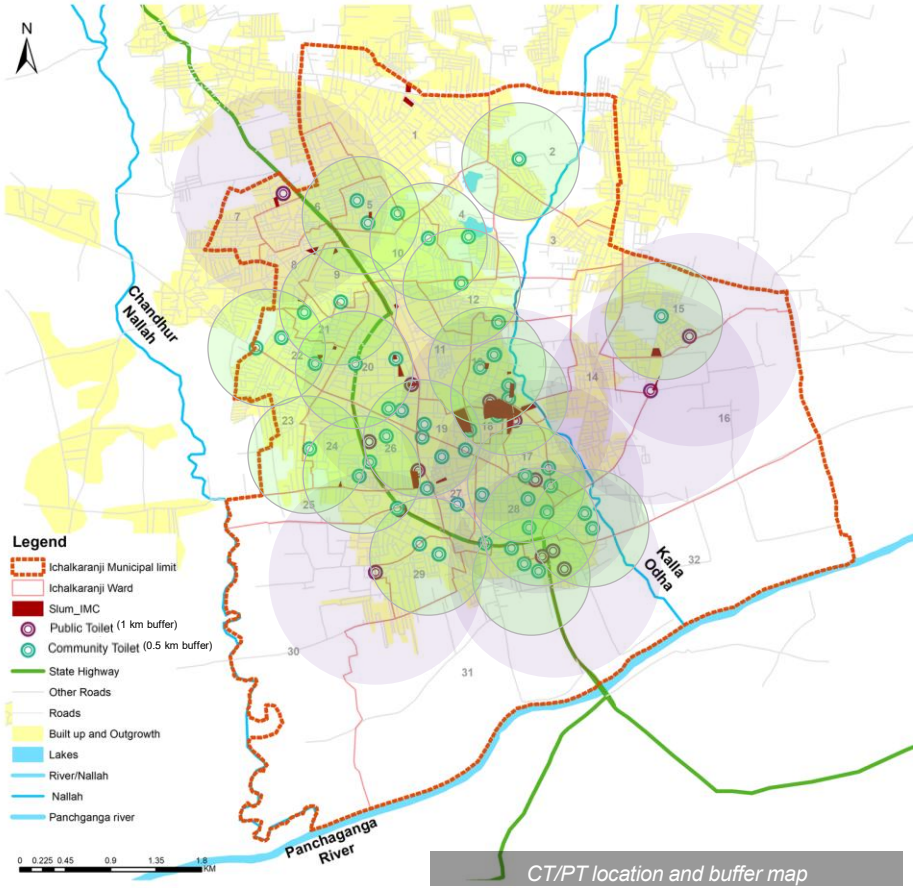
Source: Primary survey, sanitation dept.

Access: Households with dependency on CTs is 36% (2/2)

- Coverage of public toilets is scattered in the central and northern side. Slum CTs need refurbishment.
- **Frequency cleaning**: once in a week; open 24 hours
- **Cleaning agency**: ULB staff; maintain record book which is checked by sanitation supervisor
- **ST emptying**: depends upon the usage frequency; tanks of CTs with high usage are emptied accordingly in a month. Those with low usage are emptied once in 2-4 months.

Toilet	Number	Number of Seats	Connected to onsite sanitation	Connected to sewer
Community Toilet	50	1050	19	31
Public Toilet	14	80	6	8

CT PT photos in non slum areas



CT/PT location and buffer map

Source: Primary survey, sanitation dept.

Containment: The on-site sanitation system prevails mostly on the northern side (1/3)

The city is partially dependent of septic tanks and partially on sewer

30% Onsite
Through Septic tank

70% Offsite
Through sewer network

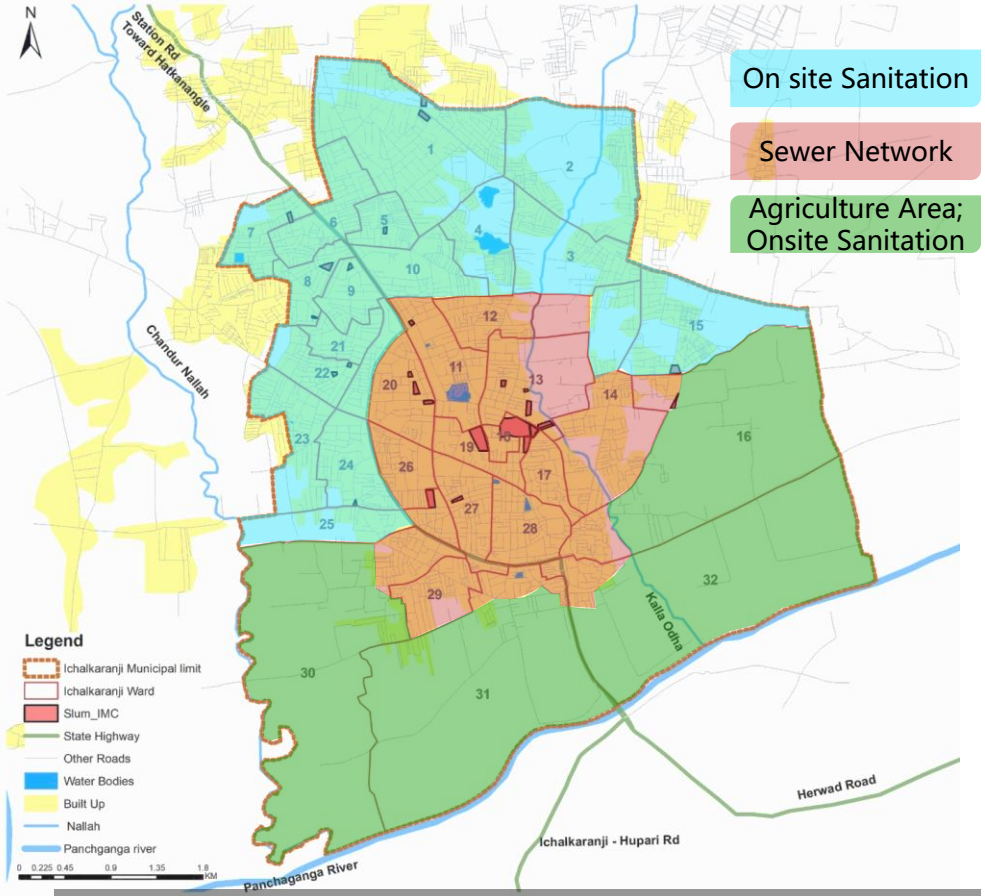
Household level septic tanks

19,897HHs
No. of Septic tank

3000 litre
Avg. size of Septic tank

- Mostly **rectangular septic tanks** are observed
- Currently **demand based practice** is being done, this has resulted in solid sludge and in some cases **dysfunctionality of tanks.**
- **Low desludging in slums** due to high costs.

Septic tank and sewer system in Ichalkaranji



Coverage of containment type in city

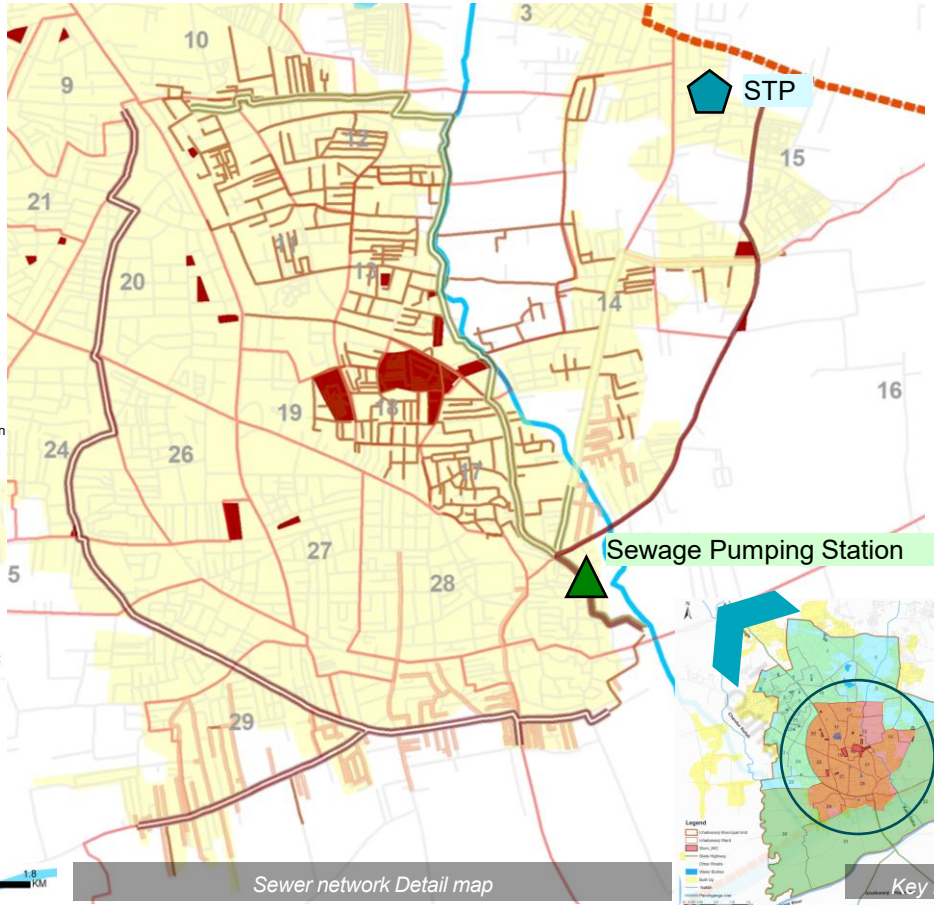
Source: Primary survey, sanitation dept.

Containment: Sewer network covers 70% of city and is present in core area (2/3)

- Mostly the **core area** or city center of Ichalakaranji has **sewer network coverage** as shown in map.
- There underground sewer network is divided into **two subzone viz. Zone A and Zone B.**

Onsite Sanitation System	28 %	8.5 sqkm
Underground sewerage network	33 %	9.8 sqkm
Non residential area	39 %	11.7 sqkm

- The total length of road network is **127 km.**
- It covers **75 km (2.4 sq km area**) storm water drains in **core** city, while **125 km (4.5 sq km)** in the **outer** areas.
- Most of the areas with **pakka** roads have drains on **both sides** of the roads.
- **Slum** areas with **kaccha** roads **donot** have **proper drains**, the ones present are **mostly clogged** due to waste disposal.
- The sewerage network is **quite old** and has leakages **need** to be **repaired**.

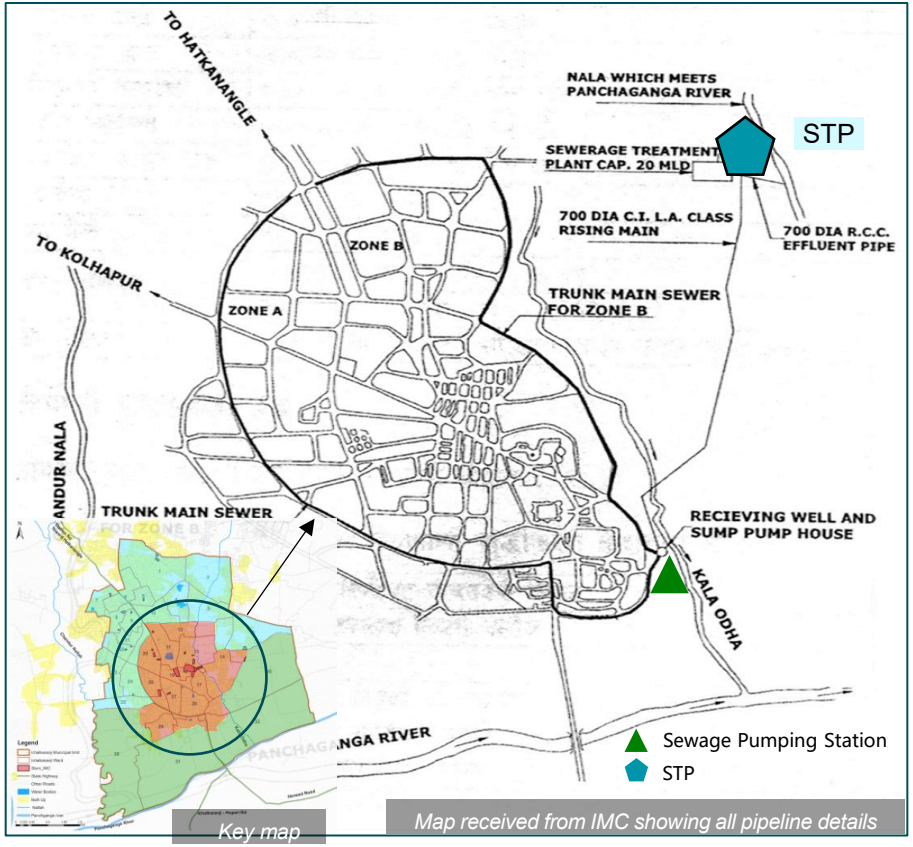


Source: Primary survey, sanitation dept.

Containment: The limited coverage of network results in discharge of waste water in water bodies and nallahs (3/3)

- The **increasing industrial demand** is **developing strain** on the existing system.
- The **limited coverage** of the sewerage **network** results in high volumes of untreated **wastewater discharged** into **water bodies** and **nallahs**, aggravating **environmental degradation** and climate related impacts.
- **Delay** in **sewerage complaint redressal** by users.
- **IMC is working** towards **enhancing** the **waste water facilities** and exploring opportunities for reuse.

Sewer and drains in slum and non slum areas along roads



Source: Primary survey, sanitation dept.

Conveyance: All septic tanks are currently desludged on demand basis, with ULB and private trucks

- Due to **low awareness** for regular **desludging** (every 3 years) septic tank **effluent** directly **enters** the **drain/nallas** and eventually **pollutes water sources.**
- **No strict regulations** or **monitoring** to ensure **proper PPE usage** while desludging operations.
- **Old emptying trucks** hence low efficiency and more maintenance which affects operations.

- IMC's sanitation **improvement initiatives** include the provision of **individual toilet seats** under various government schemes such as SBM, Maharashtra Sujal Nirmal Abhiyan, Mahila Bal Kalyan, and Samaj Kalyan Nidhi.
- IMC has **one authorized private desludger** with **charges** fixed **same** price **as council**.
- IMC now has **planned** to move **towards citywide schedule desludging**. They have **floated tender** for the same.
- This is more **beneficial** for the **private player** and also will improve treatment efficiency at STP.

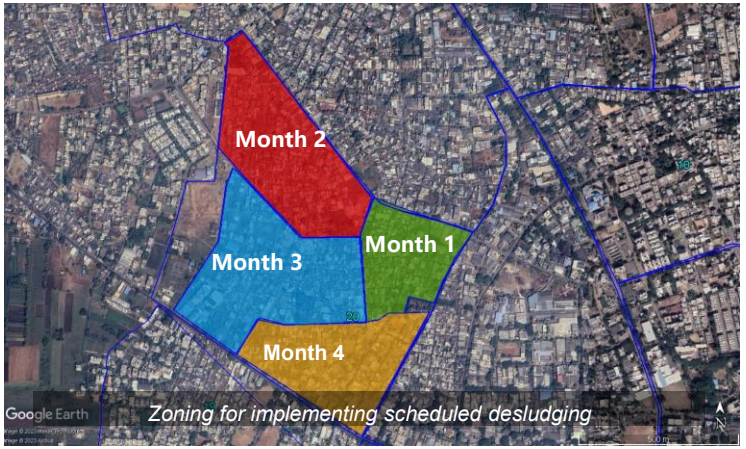
Conveyance details for demand desludging

Details	ULB	Authorized private desludger
Truck numbers	1	1
Truck capacity	4000 lit	3000 lit
Number of trips per day	2-3	4-5
Number of septic tanks emptied daily	3-4	7-8
Number of ST desludged per year	840	1960
Operation hours	7am to 2pm	7am to 5pm
Desludging Charges per trip within city limits	Rs. 700	Rs. 700
Desludging Charges per trip outside city limits	Rs. 2000	Rs. 2000
Opening of chamber cover	Done by HHs	Done by HHs

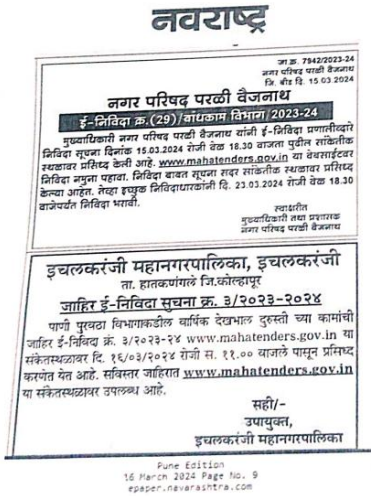
Source: Primary survey, sanitation dept.

Conveyance: IMC implementing citywide schedule desludging with a 3 year cycle

- Resolution has been passed by the Corporation to provide scheduled desludging services as a public service. The operations would be financed from the sewerage tax that all HHs with IHHT have been paying
- Private operator has been awarded contract for providing scheduled desludging services.
- Performance based contract has been signed along with a tripartite agreement between IMC, private operator and bank.
- The septage collected as part of the scheduled desludging operations would be discharged into the maintenance chambers near the STP.
- The operations would be fully monitored through Sanitrack which is an app developed for real-time tracking and monitoring.
- As per the contract the private contractor would do the IEC activities and ensure only mechanized operations ensuring safety of the sanitation workers.



Zoning for implementing scheduled desludging


नवराष्ट्र

नगर परिषद परळी वैजनाथ

ई-निविदा क्र.(29)/बांधकाम विभाग/2023-24

मुख्याधिकारी नगर परिषद परळी वैजनाथ यांनी ई-निविदा प्रणालीद्वारे निविदा सूचना दिनांक 15.03.2024 रोजी वेळ 18.30 वाजता पुढील सांकेतिक स्थळावर प्रसिध्द केली आहे. www.mahatenders.gov.in या वेबसाईटवर निविदा नमुना पहावा. निविदा बाबत सूचना सदर सांकेतीक स्थळावर प्रसिध्द केल्या आहेत. तेव्हा इच्छुक निविदाधारकांनी दि. 23.03.2024 रोजी वेळ 18.30 वाजेपर्यंत निविदा भराव्या.

स्वाक्षरीत
मुख्याधिकारी तथा प्रशासक
नगर परिषद परळी वैजनाथ

इचलकरंजी महानगरपालिका, इचलकरंजी
ता. हातकणंगले जि.कोल्हापूर

जाहिर ई-निविदा सूचना क्र. ३/२०२३-२०२४

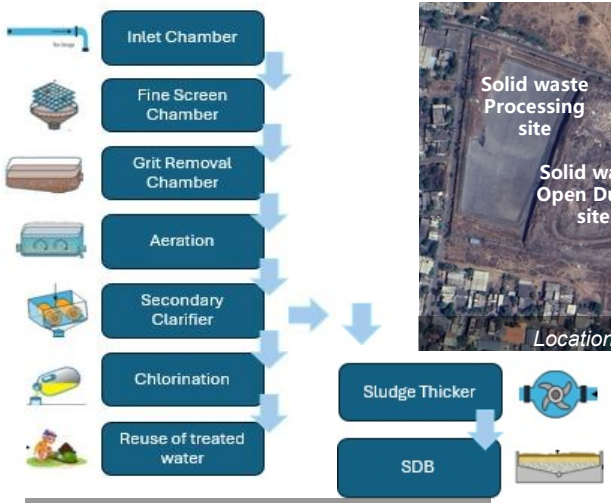
पाणी पुरवठा विभागाकडील वार्षिक देखभाल दुरुस्ती च्या कामांची जाहिर ई-निविदा क्र. ३/२०२३-२४ www.mahatenders.gov.in या संकेतस्थळावर दि. १६/०३/२०२४ रोजी स. ११.०० वाजले पासून प्रसिध्द करणेत येत आहे. सविस्तर जाहिरात www.mahatenders.gov.in या संकेतस्थळावर उपलब्ध आहे.

सही/-
उपायुक्त,
इचलकरंजी महानगरपालिका

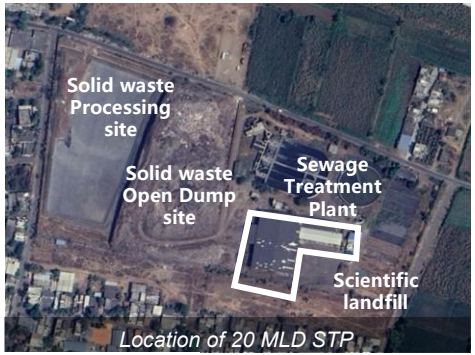
Pune Edition
16 March 2024 Page No. 9
epaper.navarashtra.com

Treatment: IMC treats 55% of it's waste water compared to its generation (1/2)

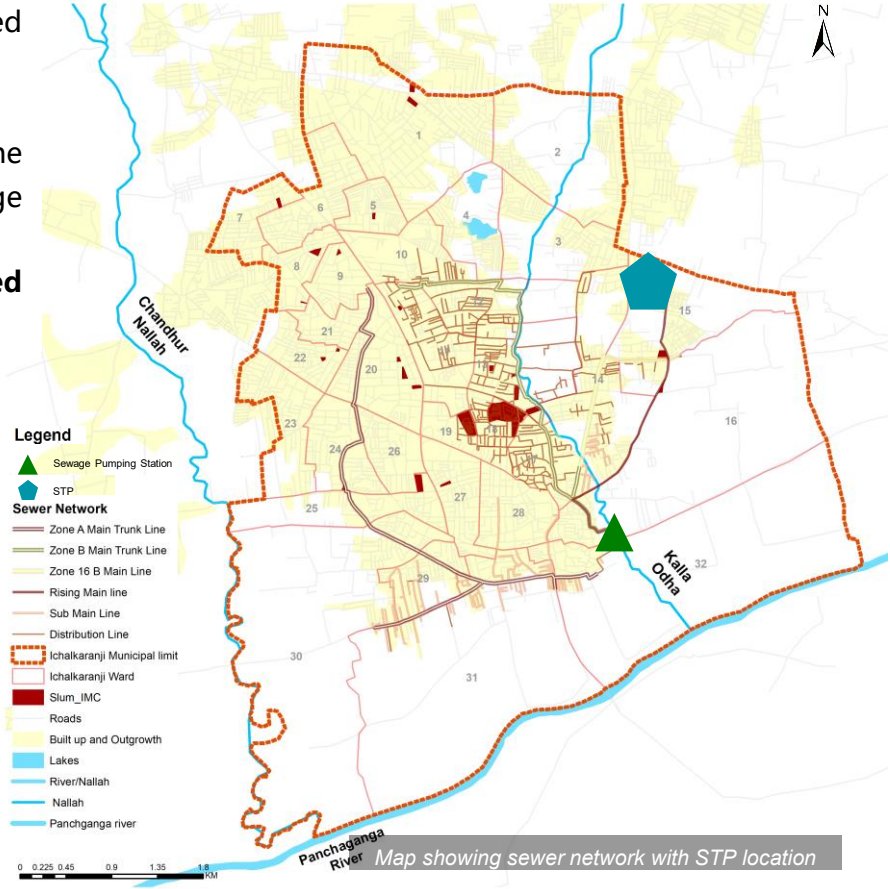
- The total sewage generation: **36 MLD**; septage generation: **20 KLD;** based on the **extended aeration technology** at **20 MLD STP.**
- The **18 MLD STP** is **under construction** to fulfil the gap of 16 MLD.
- The **septage** collected from septic tanks in the city is **discharged** into the **chamber** which is **then** collected into the **well wet** of existing sewage pumping station and then **pumped** to the **STP** for Co treatment.
- Out of total waste water generated in the city IMC STP has been **treated 58 to 59%** of **waste-water** generated from last four years



Process flow diagram of STP operations



Location of 20 MLD STP



Map showing sewer network with STP location

Source: Primary survey, sanitation dept., PAS-SLB data

Treatment: 18 MLD new STP is under construction. Quality tests conducted twice in a month(2/2)

Mechanical Screen arrangement at STP with belt conveyor


Grit chamber & parshall flume


Aeration Tank with Surface Aerators

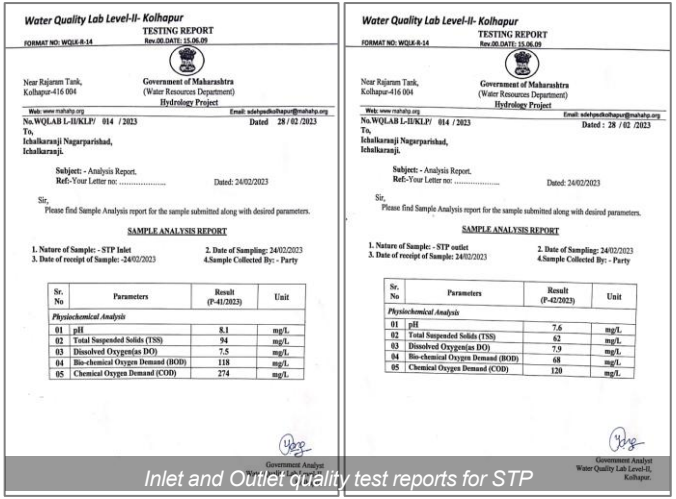
Proposed 18 MLD STP

- The construction **18 MLD** capacity **STP** & Pumping Station under the **UIDSSMT grant** is ongoing beside the existing pumping station.
- The new STP is located around **6 km from old STP.**
- The **old STP** has **frequent repair issues** which is **affecting** its **functionality**.

Location of new 18 MLD STP

Quality testing

- IMC conducts **inlet** and **outlet** quality test every **15 days in month**. All the tests get conducted by Water Quality **Lab Government** of Maharashtra (Water Resources Department) Hydrology Project from **Kolhapur**
- Following are the **parameters** which are consider for testing: -
  i. PH
  ii. Total Suspended solids (TSS)
  iii. Dissolved Oxygen (DO)
  iv. Biochemical oxygen demand (BOD)
  v. Chemical Oxygen demand (COD)


Water Quality Lab Level-II- Kolhapur
TESTING REPORT
FORMAT NO: WQLK-R-14 Rev.00.DATE: 15.06.09
Near Rajaram Tank, Kolhapur-416 004
Government of Maharashtra (Water Resources Department)
Hydrology Project
Web: www.mahahp.org Email: sdehpwdkolhapur@mahahp.org
No.WQLAB L-II/KLP/ 014 /2023 Dated 28 / 02 /2023
To, Ichalkaranji Nagarparishad, Ichalkaranji.
Subject: - Analysis Report. Ref:-Your Letter no: ..... Dated: 24/02/2023
Sir, Please find Sample Analysis report for the sample submitted along with desired parameters.
SAMPLE ANALYSIS REPORT
1. Nature of Sample: - STP Inlet 2. Date of Sampling: 24/02/2023
3. Date of receipt of Sample: -24/02/2023 4.Sample Collected By: - Party

Sr. No	Parameters	Result (P-41/2023)	Unit
Physiochemical Analysis			
01	pH	8.1	mg/L
02	Total Suspended Solids (TSS)	94	mg/L
03	Dissolved Oxygen(as DO)	7.5	mg/L
04	Bio-chemical Oxygen Demand (BOD)	118	mg/L
05	Chemical Oxygen Demand (COD)	274	mg/L

Water Quality Lab Level-II- Kolhapur
TESTING REPORT
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3. Date of receipt of Sample: 24/02/2023 4.Sample Collected By: - Party

Sr. No	Parameters	Result (P-42/2023)	Unit
Physiochemical Analysis			
01	pH	7.6	mg/L
02	Total Suspended Solids (TSS)	62	mg/L
03	Dissolved Oxygen(as DO)	7.9	mg/L
04	Bio-chemical Oxygen Demand (BOD)	68	mg/L
05	Chemical Oxygen Demand (COD)	120	mg/L

Inlet and Outlet quality test reports for STP

Source: Primary survey, sanitation dept.

Reuse: IMC is reusing treated waste-water for agriculture, road barriers, fire extinguishing etc.

- IMC follows **co treatment at STP**, all the septage from the septic tanks is also emptied at STP.
- Two **by products** are generated post treatment at STP: **treated waste water** and **dried sludge**.
- The treated waste water is given **tertiary level** treatment for safe reuse/disposal.
- Sludge drying beds are used for treating the solids from septage.
- Avg. treated waste water generated: **19 MLD**
- IMC had an **agreement** with **farmers' society** for use of treated wastewater for **agricultural purposes**. There are almost 100 acres of land where treated water can be reused.
- By **means of tanker** water is also distributed at other locations such as **road barriers, fire extinguishers**, gardening etc.
- Avg. dried sludge generated: **1000-1200 kg**
- Currently about the **dried sludge** there is **no such involvement** of activities. Previously **IMC** used to **sieve** and **pack for** its **sale** to local farmers or vendors **as a manure**.

Urban forest and planation development at SWM site


Reuse of treated waste water for watering plants


Tanker filling point for treated waste water

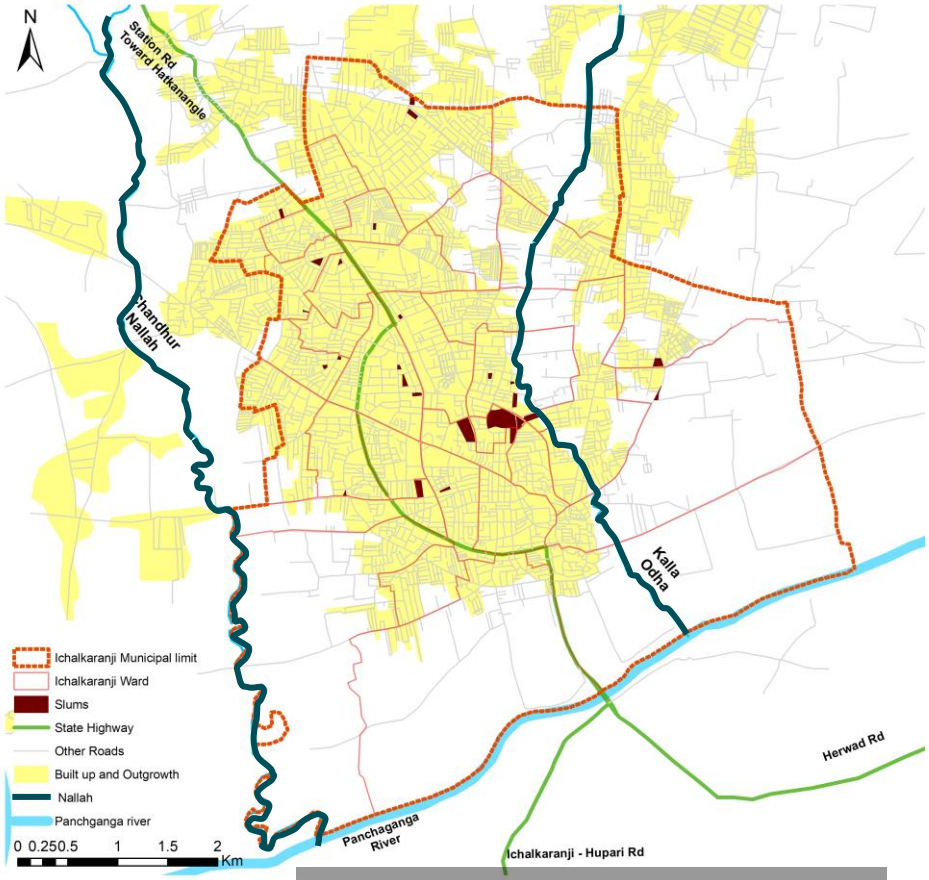
CWAS CENTER FOR WATER AND SANITATION | CRDF CEPT RESEARCH AND DEVELOPMENT FOUNDATION | CEPT UNIVERSITY

Source: Primary survey, sanitation dept.

Two major nallahs: Chandur nalla supplies water for irrigation; Kala nalla polluted due to industrial waste

- There are **2 major nallahs** Kala Odha Nalla, Chandur Nalla
- The **Kala nallah** was once a freshwater stream with dense plantation along either side. But at present, the nallah is **black** due to **industrial effluent** and untreated domestic wastewater.
- **Chandur nalla** supplies water to the surrounding villages for **irrigation**.
- Since the topography of the town is down type, the city face **problem of water logging** or flooding.
- The **effluent from septic tanks** and grey water from households is **let out into open drains** & underground sewer network along roads.

Kala odha and Chandur nalla at Ichalkaranji



Map showing major nallas

Source: Primary survey, sanitation dept.

Contract Assessment: The engagements durations are different as per contract requirement

Cleaning and Waste collection and processing

Features	Cleaning of roads, gutters, etc.	Biomedical waste collection to processing	Development / Installation / Operation & maintenance	Desludging septic tank within and outside IMC limits
Contract Length	1 Year	15 Years	5 Years	1 Year
Payment Duration	Monthly	Monthly	Monthly	NA Private contractor pays to IMC every 3 months
Contract Cost	Rs. 30 to 60 lakhs (varies as per wards)	Rs.	Rs. 2.9 Cr for machine installation Rs. 699/ton for O&M of processing plant	Rs.
*Tender Type	Online	Online	Online	Offline
Fixed rate/lump sum fee	Fixed rate	Fixed rate	Lump Sum and Fixed Rate	Fixed rate
Penalty Clause	1 Year	15 Years	5 Years	1 Year
Gender Inclusive (inclusion of women, language, etc)	✗	✗	✗	✗
Personal Safety Clause	✓	✗	✓	✗
User complaint redress	✓	✗	Not Applicable	✓
Dispute resolution mechanism	✓	✓	✓	✓
Mitigating payment risk	✗	✗	✗	✗
Mitigating Termination risk	✓	✓	✓	✓

Contract Assessment: The engagements durations are different as per contract requirement

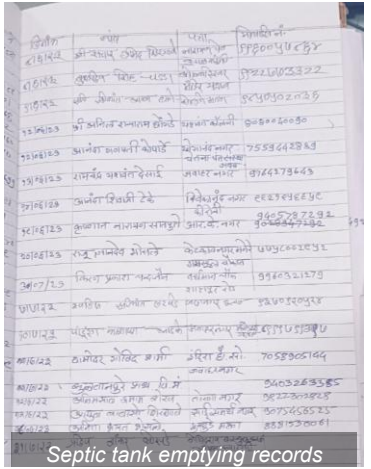
Sewer System maintenance and treatment

Features	Appointment of architect/structural engineer for prep of water supply DPR	Providing suction cum jetting machine for desilting of manhole and sewer pipe line	Operation and maintenance of 20 MLD STP	EV vehicle/ Urban forest/ solar power plant
Contract Length	1 Year	1 Year	1 Year	1 Year
Payment Duration	Monthly	Monthly	Monthly	Monthly
Contract Cost	Rs.	Rs. 80,64,000	Rs. 17,77,443	As per Contract
*Tender Type	Online	Online	Online	Online
Fixed rate/lump sum fee	Lump Sum	Fixed rate	Lump Sum	Fixed rate
Penalty Clause	✓	✓	✓	✓
Gender Inclusive (inclusion of women, language, etc)	Not Applicable	✓	✗	Not Applicable
Personal Safety Clause	Not Applicable	Not Applicable	✗	Not Applicable
User complaint redress	Not Applicable	✓	Not Applicable	Not Applicable
Dispute resolution mechanism	✓	✓	✓	✓
Mitigating payment risk	✓	✓	✓	✓
Mitigating Termination risk	✓	✓	✓	✓

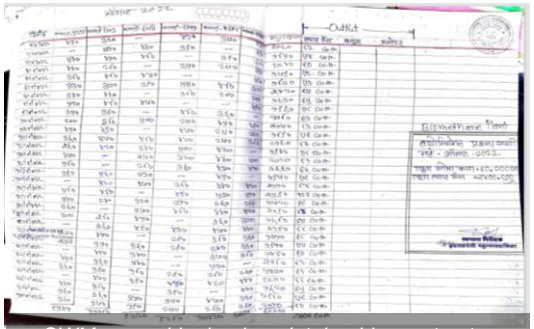
Reporting and monitoring: mechanism for FSSM and climate change related activities

Summary

- There is dual monitoring and reporting pattern at department level.
- Use of app based monitoring practiced in the form of whats app and geo tagged photos.
- Manual records of different activities are maintained.
- Department wise there is a system of monthly or weekly record checking to ensure ongoing activities smoothly.
- Respective department supervisor conduct random site visits to monitor field activities.
- The manual records do not capture appropriate information or end to end monitoring.

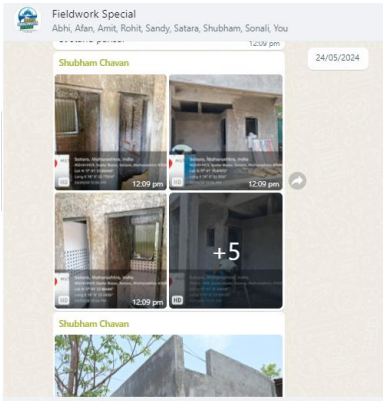


Septic tank emptying records



SWM manual logbook maintained by contractor

Geotagged photos of cleaning activities



Whats app group for completed tasks by sharing geo tagged photo

Contract process: No performance based contracts, Service quality is given low priority over other aspects

Technical and financial assessment | Contract development | Procurement process | Monitoring

Key Gaps

- Mostly senior staff, hence, only assess on ground situation for relevant proposal.
- Budget constraints to appoint temporary technical consultant.
- Overall less women staff, for improved and gender friendly assessment.
- Past assessments have not met the required standards.

- Lack of knowledge to make contract gender sensitive
- Lack of focus on climate mitigation related aspect
- Less focus on performance based contracts and SLB

- Contract awarding prioritizes legal and financial aspects over service quality or level.
- Occasionally, challenges arise in aligning bidder expectations with project deliverables.
- Lack of monitoring by ULB staff in the process.

- Formats do not measure key output metrics
- Still using manual monitoring systems which are not accurate.
- There's a reluctance to transition from traditional monitoring systems to online ones, exacerbated by insufficient training and capacity building initiatives from both the ULB and contractors for workers.

Summary of climate resilient WASH assessment

Sanitation

- The city has a structured cleaning **schedule for CT/PTs and systematic record-keeping**, which is regularly monitored by a sanitation supervisor.
- The city has a **defined sewer network** in the **core area**, structured into **two subzones** for better management.
- A substantial portion of the storm water drain network is established, covering both the **core city (75km)** and **outer areas (125km).**
- The **integration of septage co-treatment at** the **STP** ensures comprehensive management of **both sewage and septage**.
- **Irregular desludging** of septic tanks, causing effluent discharge poses significant risks of **groundwater contamination** and associated **health hazards.**
- Wastewater **treatment facilities struggle** to **meet discharge standards** set by the Central Pollution Control Board (**CPCB**), indicating **deficiencies in** treatment **processes** that are exacerbated by climate-related pressures.
- The **management** of faecal sludge and septage **lacks comprehensive planning** and implementation.
- **Aging wastewater** treatment **capacity, facilities** and **no plan for reuse** opportunities, particularly given high industrial demand and increasing **strain on the system** due to climate variability.
- **Public awareness and participation** in wastewater management initiatives are **lacking**, as are resources and funding for necessary infrastructure upgrades and capacity-building efforts.

Table of Contents

Executive Summary

Context Setting

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- Purpose of the document
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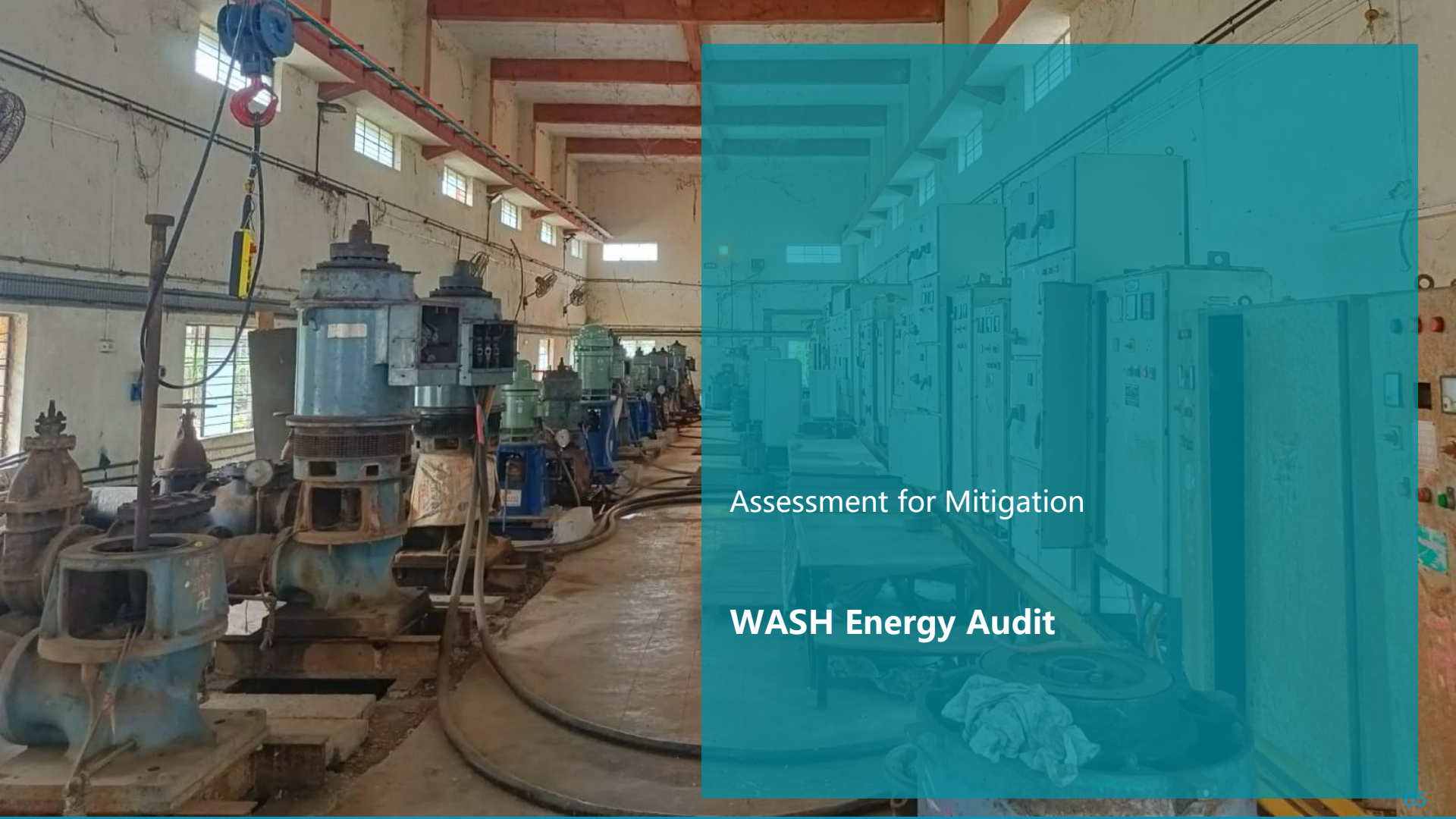


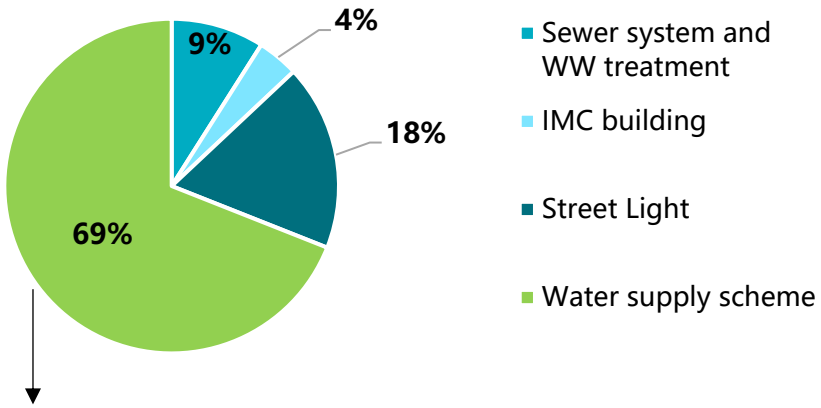
Assessment for Mitigation

WASH Energy Audit

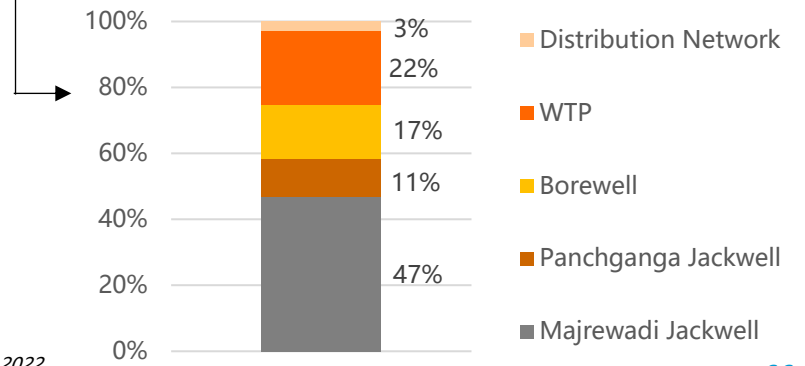
Water supply services consumes 69% of total energy used by IMC for municipal services

- CWAS team with support from IMC conducted an assessment of annual consumption of energy consumption/ electrical consumption.
- Based on the assessment, Water supply services consumes 69% of total energy consumption (Year 2022).
- This 69% energy usage cost council about 82 lakhs per month. The sources of water are at a greater distance leading to more energy consumption and effort to supply water. Also, heavy dependence on over 700 municipal borewells for groundwater extraction significantly increases the energy demand of the overall water supply system.
- This high energy usage not only incurs significant financial costs but also **contributes to** indirect **greenhouse gas (GHG) emissions**.
- By **implementing energy-saving measures** and efficient technologies, IMC can lower its carbon footprint and support sustainability goals.

% Energy Consumption for different municipal services



Breakup of 69%



Source: Electricity department, Ichalkaranji Municipal Corporation, 2022

Based on energy consumption assessment an Energy Audit for WASH services was conducted

Energy audit as a tool used by cities to assess the energy efficiency and performance of the energy equipment's. A walk-through type of energy audit methodology was used.

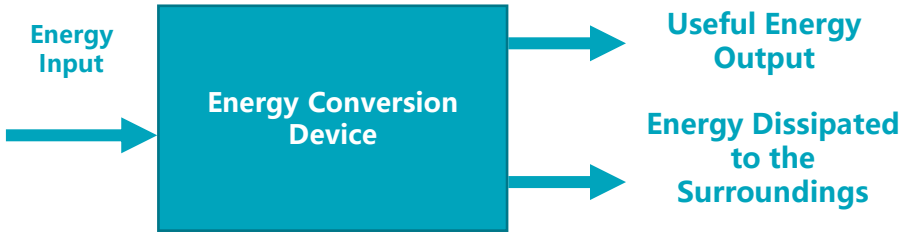
WALK-THROUGH ENERGY AUDITS

The Walk-Through Survey audit examines energy bills, inspects the facility, and consults with key decision-makers. It delivers a report detailing energy consumption, a benchmark comparison, and suggestions for cost-effective energy efficiency enhancements.

Benefits of Energy Audit

- Primary objective of **energy audit is to determine** ways **to reduce energy consumption** per unit of product output or to lower operating costs
- The **three top operating expenses** are **energy** (both electrical and thermal), labour and materials
- **Energy would emerge** as a top ranker for **cost reduction**
- Energy audit provides a "bench-mark" for managing energy in the organization.
- **Environmental Impact -** Reduced carbon footprint and support for sustainability.
- **Improved Efficiency -** Identification and rectification of energy inefficiencies.

Calculation of Energy efficiency



$$\text{Energy Efficiency} = \frac{\text{Useful Energy Output}}{\text{Total Energy Input}}$$

Source: ENERGY AUDIT FOR A WASTEWATER TREATMENT PROCESS by Ms. Gayatri R. Deshmukh1, Mr. Yeshu G. Deshmukh2, Prof. Ashvini B. Nagdwate3 (International Research Journal of Engineering and Technology (IRJET), Vol:4 issue 01 I 2017

Overall process methodology adapted for estimating the energy efficiency

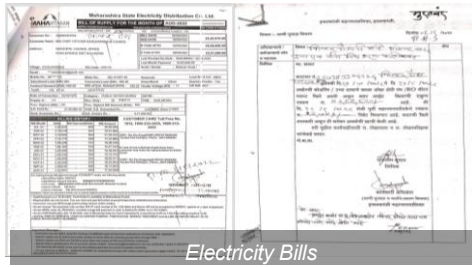
1 Understanding overall water and sanitation service chain

- Map the **entire water and sanitation system**, **including sources, treatment, and distribution**.
- **Collected data and conduct stakeholder interviews** to identify energy-intensive stages and operational challenges.

Site Visit to WTP and STPs

2 Analyzing the energy bills and analyzing the pump details

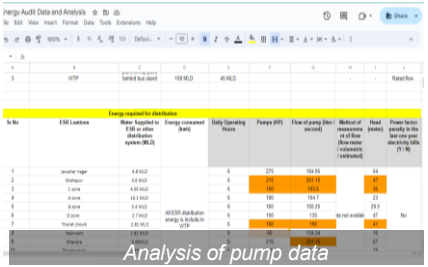
- Reviewed **previous energy bills and use sub-metering** to pinpoint **high energy users**.
- Inventory all pumps and assess their performance against specifications to identify inefficiencies..



Electricity Bills

3 Identification of the low efficiency equipment

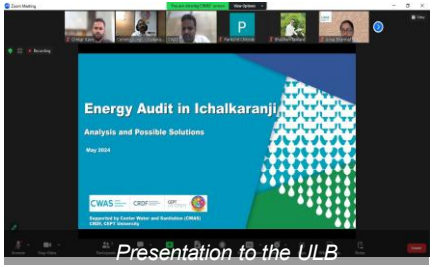
- **Compared equipment performance** with industry standards and **conduct physical inspections to identify inefficiencies**.
- Highlighted **underperforming equipments /pumps**



Analysis of pump data

4 Recommendation and suggestions

- Proposal containing **equipment/pumps upgrades, operational changes**, and **enhanced maintenance practices** to improve efficiency.
- **Suggested integrating renewable energy sources** and **establish monitoring systems** for continuous



Presentation to the ULB

Energy audit assessment will pave way for making WASH infrastructure energy efficient

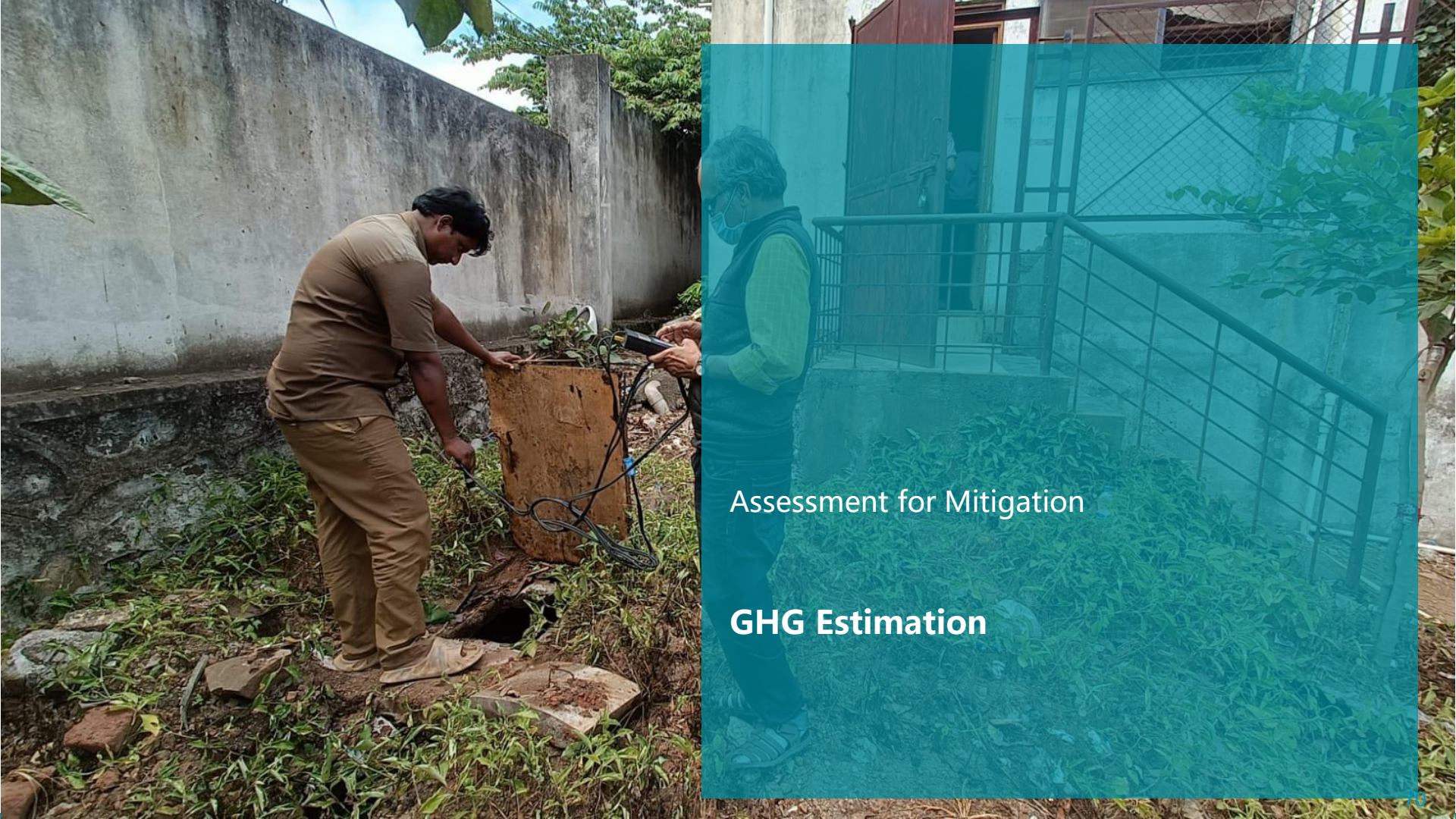
Some of the brief finding from the systematic process followed for Energy assessment to mitigate climate impacts:

- Pumps at both **primary water sources** for **bulk purchase** are **operating inefficiently** and **require immediate replacement**.
- Among the **11 water distribution stations, 4** of them have pumps that **are inefficient**. However, since there is **no metering** at these stations, energy efficiency is assessed using estimated flow data.
- The **efficiency of the sewerage pumping** station **could not be calculated** due to a **lack of flow data**.
- Low knowledge of staff on **Standard Operating Procedures for the daily operation and maintenance of pumps**.

Below is a summary of pumps operating at less than 50% energy efficiency.

Sr No	Locations	Pumps (HP)	Efficiency (%)
1	Krishna River	1080	**39**
2	Panchganga River	400	**46**
3	Jawahar nagar	275	**47**
4	A zone	180	**28**
5	B zone	160	**37**
6	Yashwant	60	**47**

Recommendations have been provided to the council to **check and replace low-efficiency** pumps to improve the **efficiency of the WASH service chain.**

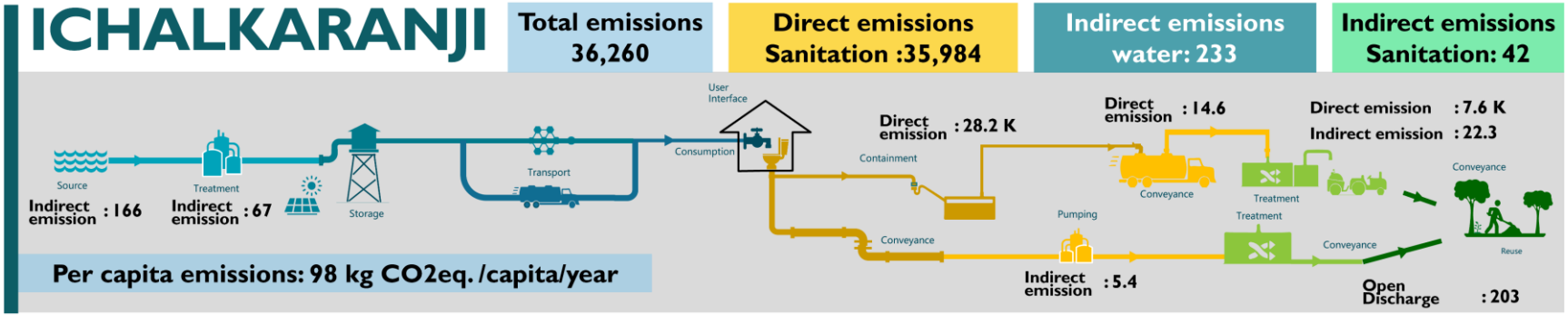


Assessment for Mitigation

GHG Estimation

To derive local emission factors, activity is initiated to measure emissions from septic tanks

Initial GHG estimates using IPCC empirical quantification . . .



On-field GHG estimates using gas analysers...

- Septic tank samples selected across various locations and different typologies
- Methane measurements from morning 7 am to 7 pm at an interval of one hour
- Methane emissions from septic tanks ranging from 100 ppm to 10,000 ppm
- Septic tanks desludged within 1 to 5 years showcase less emissions as compared to other septic tanks which are never desludged

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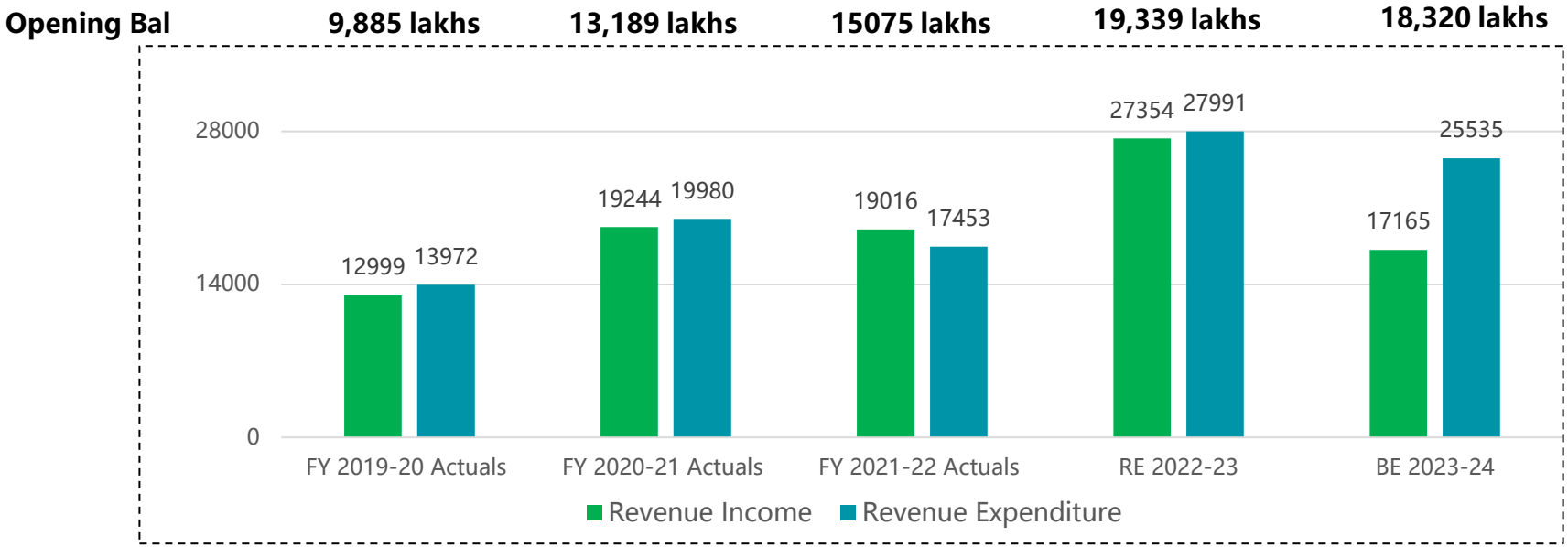
Municipal Finance Assessment

Budget Analysis

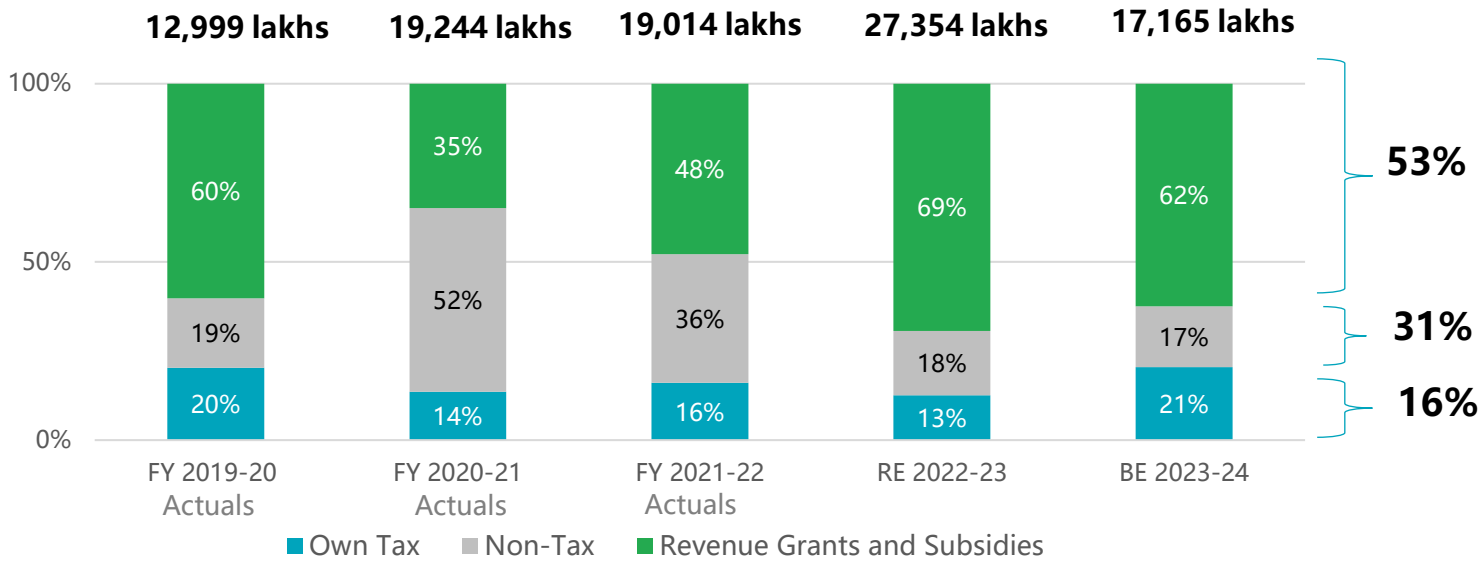
The total revenue budget of Ichalkaranji is estimated to be INR 25,535 lakhs, increased by two folds in last five years



- The total revenue budget size estimated in FY 2023-24 is **INR 25,535 lakhs.** The budget size has increased by two times since FY 2019-20
- The total revenue income for Ichalkaranji is **INR 17,165 lakhs** which has increased by **1.5 times** in the last five years.
- Revenue expense is made through surplus from **opening balance** which city has.

Source: Ichalkaranji Municipal Budget FY 2019-24

Revenue grants contribute highest in Ichalkaranji's revenue income

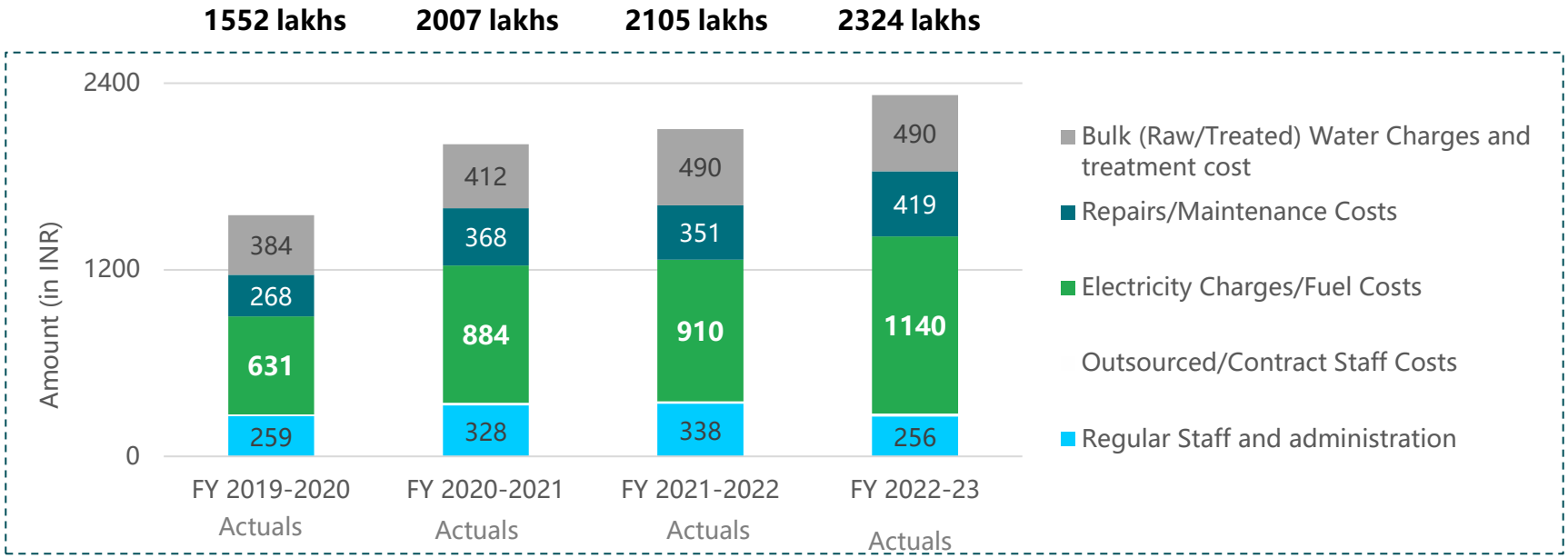


- IMC has shown **16%** dependency on **own tax sources** like property tax, water tax, SWM tax, tree tax etc.; **31%** dependency on non-tax sources like rental income, fees and user charges, interest etc. and **53%** on revenue grants, subsidies, assigned revenues and compensations like stamp duty grant, motor vehicle grant, GST compensations etc.
- **Property tax and water tax** are the two most important sources of revenue which contribute **86% of own tax revenue income**. Property tax contributes **64%** to own tax income and water tax contributes **22%** of own tax income. Sewerage and special cleaning tax only contribute 5% of the total own tax revenue income.

Source: Ichalkaranji Municipal Budget FY 2019-24

Note: Refer Annexure for more details

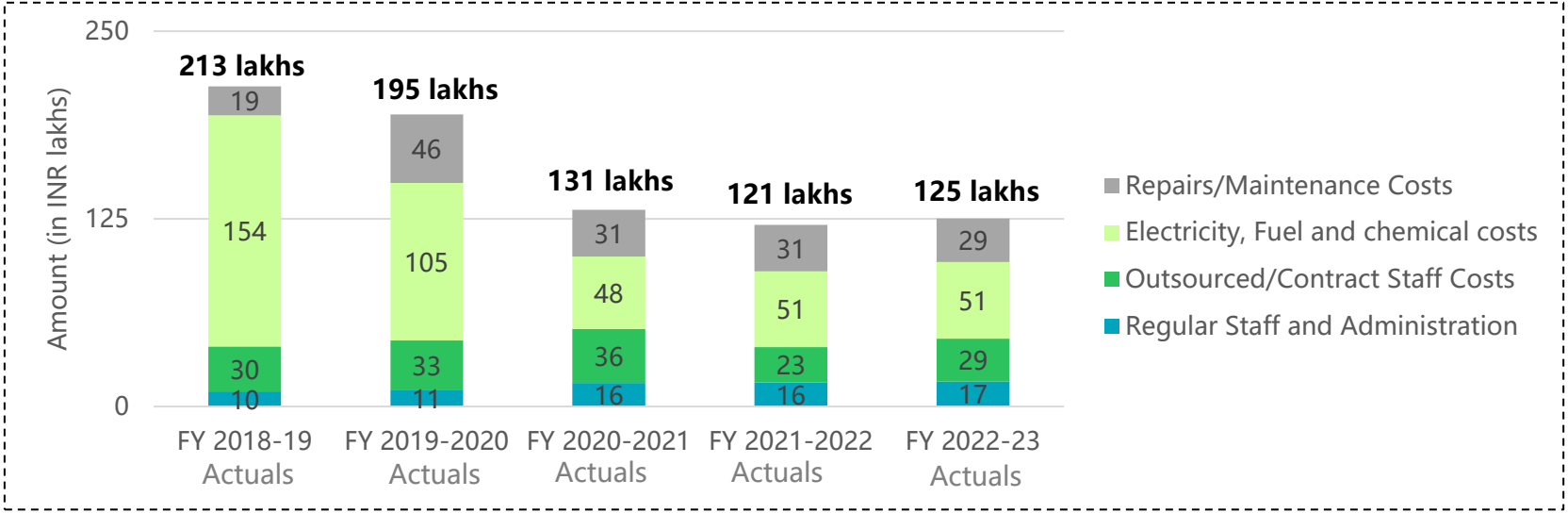
Water supply revenue expense has increased by 1.5 times than previous years with highest spending on electricity



- In Ichalkaranji, **highest** water supply expense is on **electricity charges and fuel costs which has almost doubled in last four years.**
- The second highest expense is on **bulk water purchase and treatment and repairs and maintenance** with INR 490 lakhs and INR 419 lakhs in FY 2022-23.
- The expense on **regular staff, administration and outsourced staff** has remained constant at INR 256 lakhs.

Source: Ichalkaranji Municipal Budget FY 2019-24, PAS SLB Checklist for Ichalkaranji, 2019-23

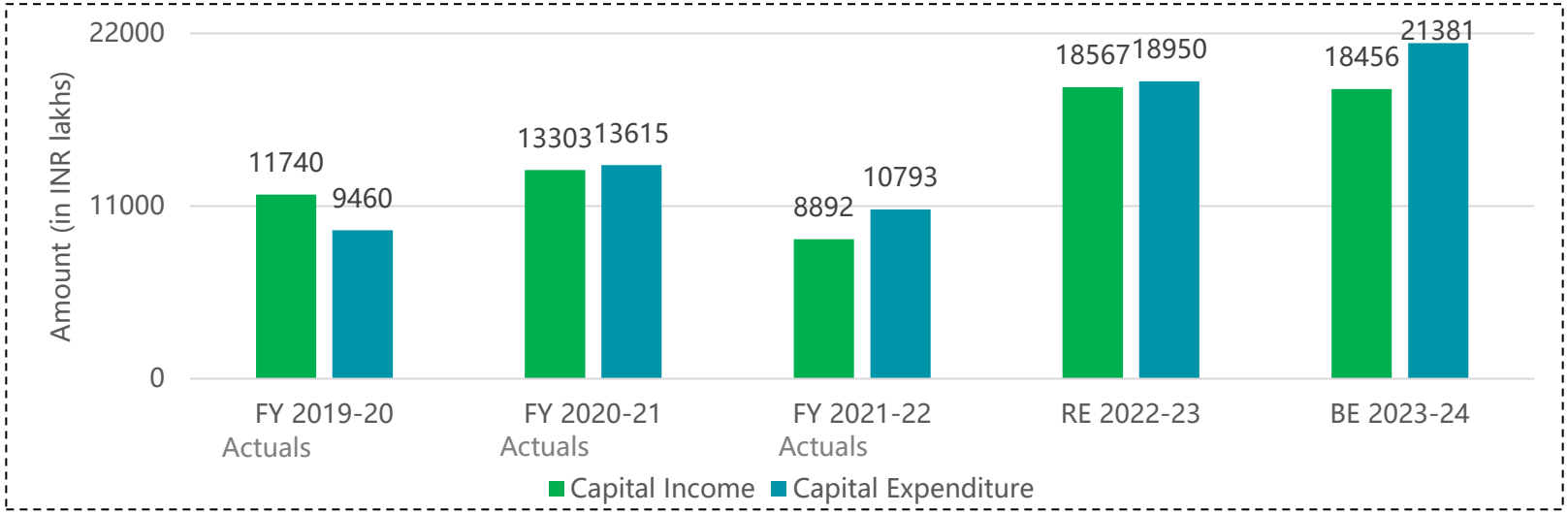
Sanitation revenue expense has decreased in last five years due to decrease in electricity cost caused by partially functional STPs



- The total sanitation expense on wastewater and sewerage management in Ichalkaranji has decreased from INR 213 lakhs in FY 2018-19 to INR 125 lakhs in FY 2022-23 as the city was spending high on its electricity cost.
- The highest expense is made on electricity, fuel and chemical costs followed by outsourced contracts and O&M.
- The electricity cost of STP was high and needed frequent maintenance, so gradually they started operating it partially due to which electricity cost reduced.

Source: Ichalkaranji Municipal Budget FY 2019-23, PAS SLB Checklist for Ichalkaranji, 2019-23

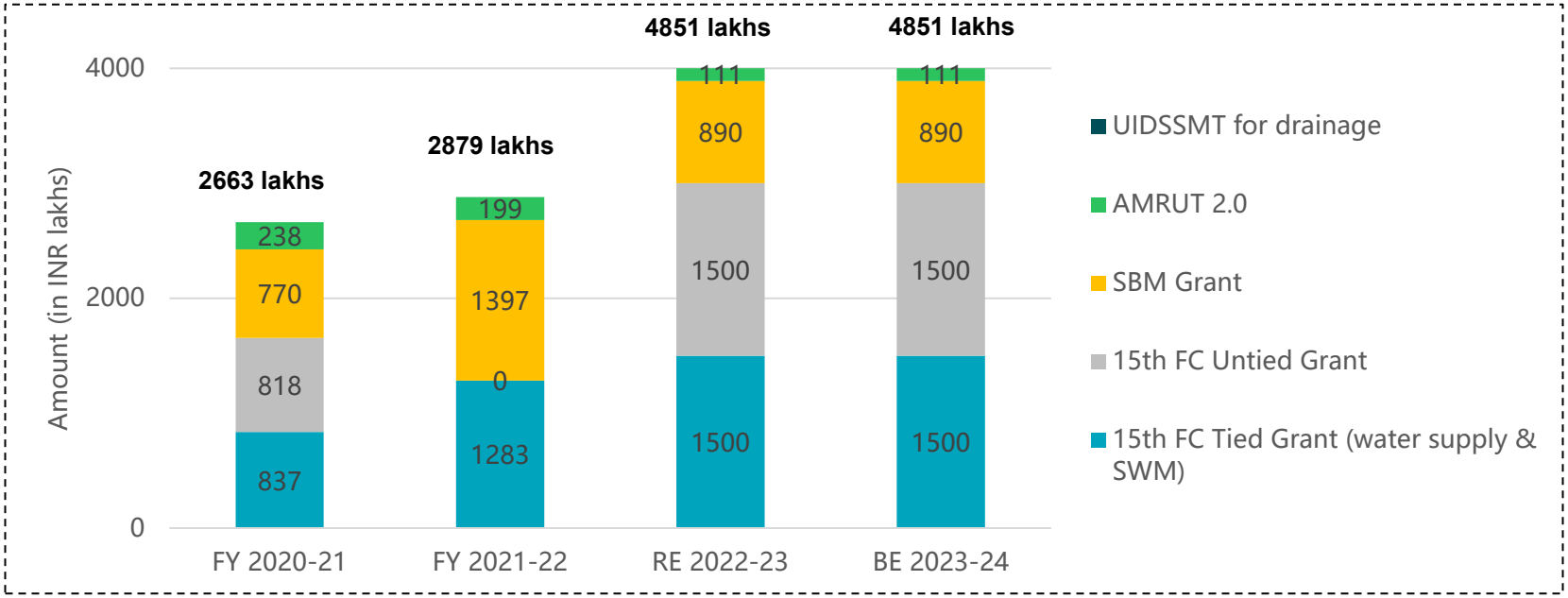
The total capital budget of Ichalkaranji is budgeted as INR 21,381 lakhs for FY 2023-24, a two-fold increase in last five years



- The total capital budget size estimated in FY 2023-24 is **INR 21,381 lakhs.** The budget size has increased by two folds since FY 2019-20
- The total capital income of IMC is estimated to be **INR 18,458 lakhs** which has increased by **1.5 times than last year.**
- The expenses on capital projects is made through the sufficient opening balance which city has.

Source: :Ichalkaranji Municipal Budget FY 2019-24

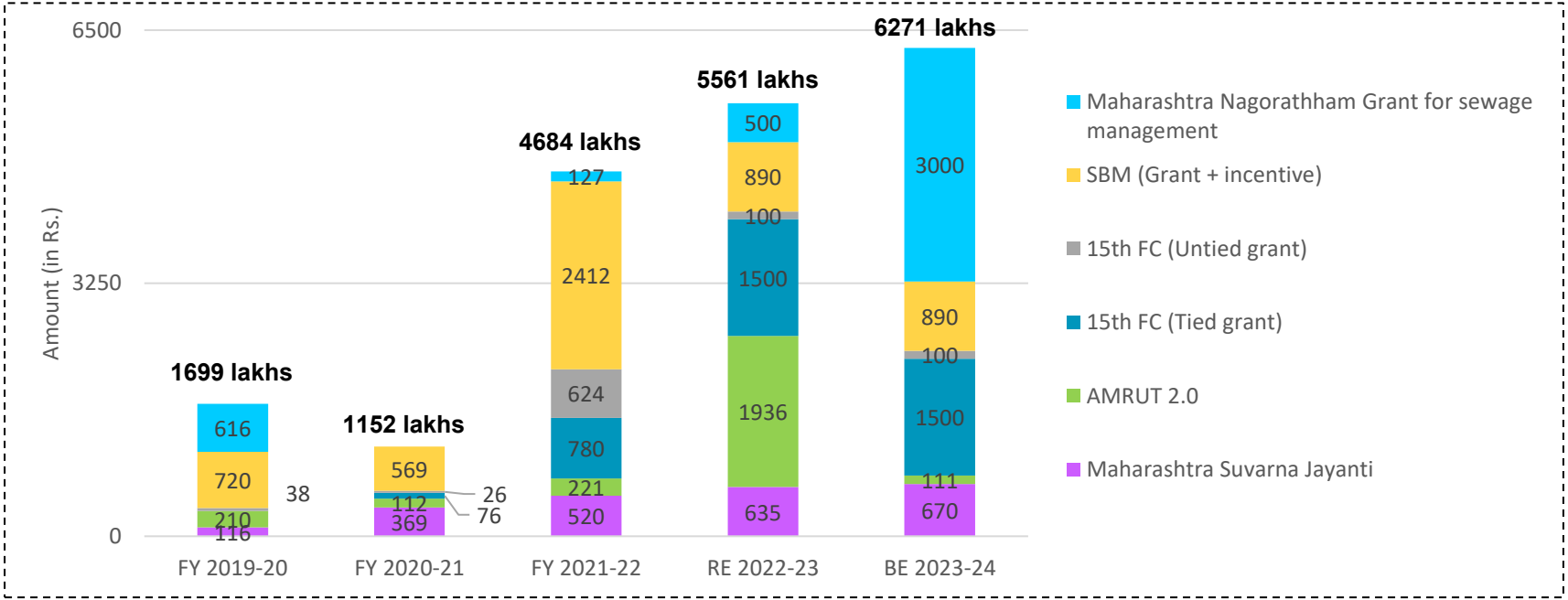
Maximum capital grants are obtained through 15th FC tied funds for WASH sector followed by SBM 2.0



- In Ichalkaranji, the highest amount in WASH sector comes from 15th FC tied funds of INR 5119 lakhs, 15th FC untied of INR 3818 lakhs, **SBM 2.0 of INR lakhs**, AMRUT 2.0 of INR **659 lakhs and UIDSSMT of 100 lakhs** from FY 2019-20 to 2023-24

Source: :Ichalkaranji Municipal Budget FY 2019-24

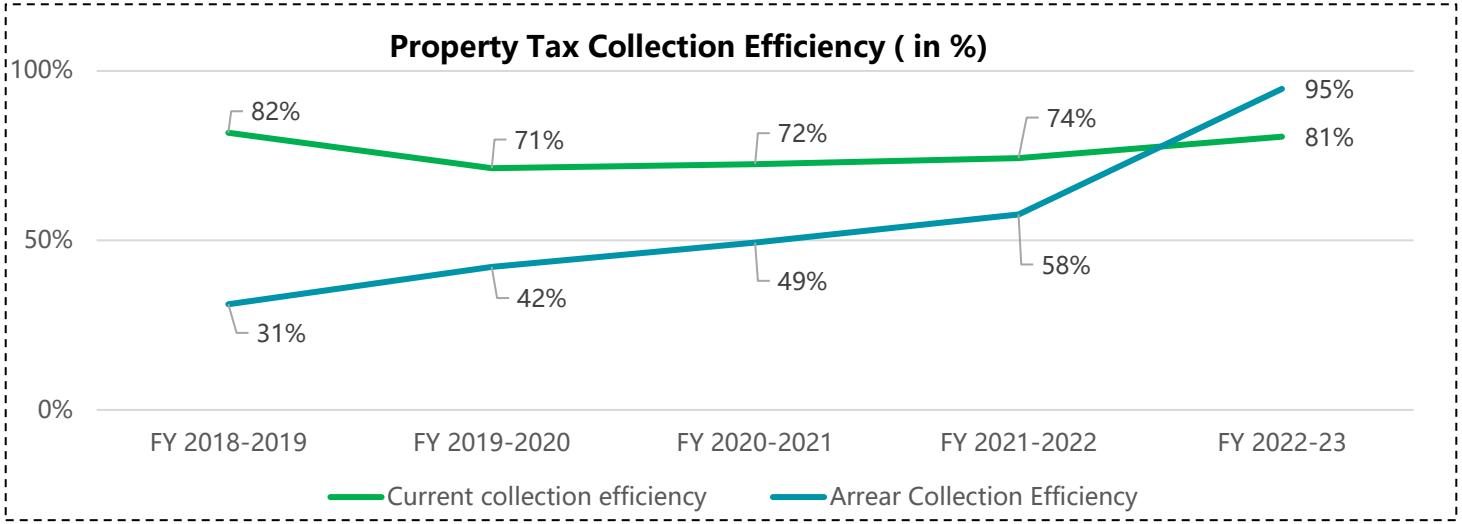
Year-wise WASH allocation and utilization through capital grants..



- The total capital expenditure budgeted for WASH in FY 2023-24 is **INR 6271 lakhs (29~%) of total capital grants.**
- Highest expenditure is made through SBM grants, 15th FC un-tied and Maharashtra Nagorattham grant for sewage management in the period of five years.
- Additionally, expenditure is made through grants like Maharashtra Suvarna Jayanti Yojana and AMRUT 2.0

Source: :Ichalkaranji Municipal Budget FY 2019-24

The average current collection efficiency is 76% whereas the average arrear efficiency is 55% in five years



1. Method of Assessment: Method of property tax assessment is **Annual ratable value**. Rate table differs for each zone and has not been revised since many years.

- Assessment is done **once every five years**. No contract for assessment has been allocated, council's own staff carryout the assessment. There is **no GIS Mapping of properties in IMC. Assessment is done manually through surveyors.**

2. Collection efficiency: The **current collection efficiency** is **76%** whereas the **arrear** collection efficiency is **55%**

3. Property Tax Expenditure: Property tax expenditure is **6% of total property tax collections** and **5% of property tax demand**.

Source: : Ichalkaranji MC PAS SLB Checklist: FY 2018-23; IMC DCB tables FY 2018-23

Summary of key findings

Overestimated Budgets:

Budgeted estimates of revenue income are **overestimated which leads to unplanned spending** of revenue expenditure..

Increase in Budget Size:

The **capital and revenue budget** are estimated **to increase by two folds**. The **total budget size** of Ichalkaranji for FY 2023-24 is estimated to be **INR 46,916 lakhs.**

Dependency on revenue grants:

In Ichalkaranji, the major source of revenue income is **revenue grants and subsidies (53%); own-tax income is 16% and non-tax is 31%.**

Collection Efficiency and Cost Recovery:

Property tax and water tax are major sources of own-tax income **(86%).** The **current collection efficiency** of water tax is only **31%** and the **arrear collection efficiency** is only **52%** not meeting the benchmark. Cost recovery is very low at 52% average for water supply.

WASH expenses:

Water supply expenses have increased by 1.5 times from FY 2019-20 at INR 2025 lakhs to INR 2324 lakhs in FY 2022-23 due to increase in electricity cost. Sanitation (wastewater management) expense has decreased by half from INR 213 lakhs to INR 125 lakhs due to partially functional STP. SWM expense has increased by 1.5 times in the last four years from INR 2451 lakhs in FY 2018-19 to INR 3340 lakhs in FY 2022-23.

Capital Utilization:

The city has utilized its SBM 2.0 and AMRUT 2.0 funds, however, 15th FC tied and untied funds remain unspent.

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Implementation and Scaleup

Adaptation related measures

Adaptation efforts for climate resilient WASH

- Climate adaptation mitigates floods and heatwaves, protecting vulnerable women, children, and elderly. WASH strategies, increasing coverage of individual toilets, gender-sensitive community toilets, regular septic tank desludging to prevent flood overflows, and clean water access, ensure safety and hygiene.

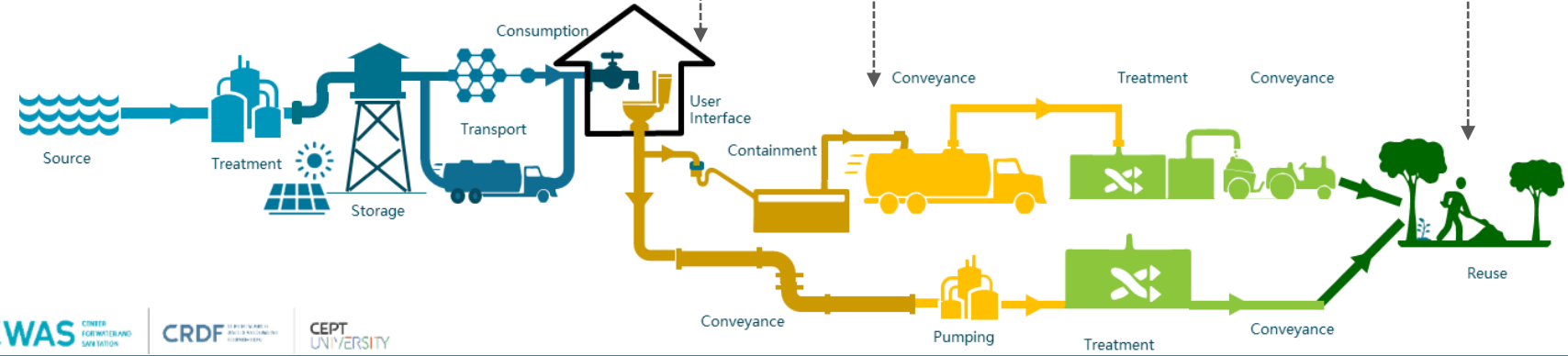
- Urban forests and carbon sinks, while primarily climate mitigation tools, support adaptation by mitigating heatwaves, reducing flood risks, and improving water quality. They complement WASH efforts by preventing water contamination and septic tank overflows, enhancing resilience for vulnerable women, children, and elderly against escalating climate challenges.

Adaptation measures

Improving access to **own water connection** and IHHT. Provision of MHM facilities at CT/PTs

Scheduled desludging of Prevent overflow of septic tanks and ensure household hygiene

Reuse of treated used water for urban forest leads to savings of fresh water.

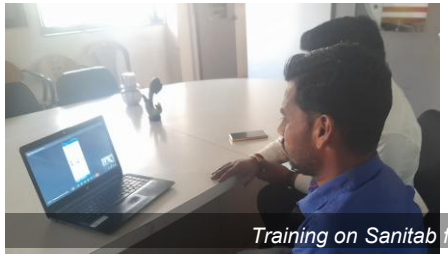


Adaptation : Increasing coverage of individual toilets under SBM

- Under the SBM 2.0 mission, the focus remains for increasing coverage of individual toilets. After almost a decade of the SBM mission a lot of work on improving access to individual toilets. Now the HHs that remain are the ones that mainly have issue of either finance or space. CWAS supported the cities in mobilizing toilet applications. And conducted follow up at the State mission office for funds disbursement.

- For which a digital survey form was designed and customized on the Sanitab app. Sanitab app is a real-time digital monitoring tool mainly used for monitoring scheduled desludging operations. Sanitation supervisors were trained on using the app to conduct HH survey in vulnerable areas were. It as designed in Marathi language for ease of use.

- IMC has been able to mobilize applications from slum areas and other vulnerable areas. Support was also provided to conduct IEC activities and give information about the IHHT subsidy as part of SBM.



Training on Sanitab for IHHT survey and on field survey for mobilizing applications for IHHT

Adaptation : Making community toilets gender inclusive

- It is important to make sure that vulnerable populations who depend on community toilets have continued access to and can safely use them during climate-related disasters. CWAS conducted an assessment of community toilets from a gender lens and shared the recommendations.

- On pilot basis menstrual health and hygiene (MHM) machines were installed at selected locations. The procurement and O&M was institutionalized through budget allocations under relevant budget heads to ensure sustainability.

- Women SHGs would be formally engaged to maintain the repaired and MHM installed community toilets through an ‘NULM SHG only’ tender.

MHM machines installed in CT/PT and cross learning visit to Wai by the Vita SHG members

Adaptation: Citywide scheduled desludging of septic tanks

- Regular desludging of septic tanks is crucial during climate events like urban floods. Overflowing tanks can contaminate water sources, spread disease, and damage infrastructure.

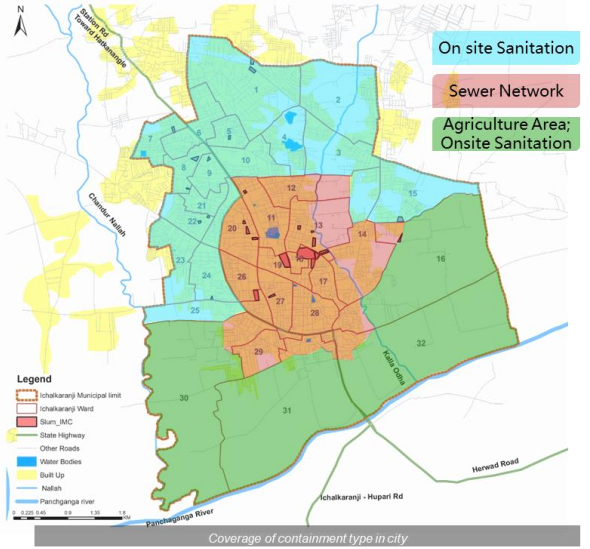
- Maintaining them ensures proper sanitation, protects public health, and prevents environmental hazards. Timely desludging helps systems function effectively during emergencies and reduces the risk of failure.

- Ichalkaranji is a growing city which has a mix of sanitation systems ie. The city is partly sewered and partly has on-site sanitation ie. septic tanks. Scheduled desludging has been implemented in all the areas with septic tanks.

- The process started with assessment of the areas and number of septic tank and zoning of wards for initiating the operations.

- Local government resolution was passed to finance scheduled desludging operations through sanitation tax.

- Cost estimates and tender documentation was done. Post which it was sent to technical and administrative approvals. Tender was published and work order was given to private service provider.



Coverage of containment type in city

इचलकरंजी महानगरपालिका

प्रशासकीय ठराव क्र. ८४ दि. ०६/०३/२०२४

प्रस्ताव : इचलकरंजी शहरातील सेप्टिक टाक्यांमधील मैला उपसा निर्धारीत वेळापत्रकानुसार करणेबाबत व त्यासाठीचे शुल्क निश्चित करणेबाबत.

(Scheduled De – sluding of Spetic tanks in Ichalkranji city)

संदर्भ :

१) नगरविकास विभाग, महाराष्ट्र शासन निर्णय स्वमअ-२०१९/ प्र.क्र. १२४/ नवि -३४ दि. ०८ नोव्हेंबर २०१९

२) नगरविकास विभाग, महाराष्ट्र शासन परिपत्रक क्र. राअस – माझला व्यवस्थापन दि. ३० नोव्हेंबर २०२२

३) स्वच्छ सर्वेक्षण २०२२ व २०२३ टुलकिट मधील निर्देश

४) मा. आयुक्तसो यांचे दि. ०५ सप्टेंबर २०२३ रोजीच्या बैठकीत निर्देश

५) मा. आयुक्तसो यांचे दि. २७ सप्टेंबर २०२३ रोजीच्या बैठकीतील निर्देश

प्रस्ताव :

स्वच्छ भारत अभियान नागरी दि. १५ मे २०२२ पासून महाराष्ट्रात राबविण्यात येत आहे. दि. ०१ ऑक्टोंबर २०१७ रोजी महाराष्ट्र राज्याचा संपूर्ण नागरी भाग हगणदारी मुक्त म्हणजे ODF म्हणून घोषित करण्यात आला आहे. या अनुषंगाने हा दर्जा टिकवुन ठेवणेसाठी संदर्भ क्र. ०१ व संदर्भ क्र. ०२ मध्ये सुचित केले आहे. याकामी संदर्भ क्र. ०२ मध्ये एक महत्वाचा घटक म्हणजे शहरातील सेप्टिक टाक्यांमधील मैला उपसा निर्धारित वेळापत्रकानुसार म्हणजेच शेड्युल डिस्क्लि[illegible] व Water + टुलकिट मधील मार्गदर्शक सूचनानुसार महानगरपालिकेस ODF++ व Water + मानांकन मिळविणेसाठी प्रत्येक ३ वर्षांनी [illegible] उपसा/ खाली करणे अनिवार्य आहे. सदरचे सर्व सेप्टिक [illegible] रिकामे करण्यासाठी The Prohibition of

Government resolution for implementing scheduled desludging

Adaptation: Citywide scheduled desludging of septic tanks

- Operations began in February 2025 through the private sector in the first ward of scheduled desludging. The on-field staff was provided training on using online monitoring tools.
- Awareness generation efforts were also undertaken by private service provider to orient citizens to be willing to get the service done.
- The faecal sludge collected could be disposed for treatment at a discharge point
- IMC would levy a sanitation tax and monitor scheduled desludging activities through the Sanitary Supervisors.
- The payment is based on performance of the private service provider.


Schedule desludging inauguration

Schedule desludging in Ichalkaranji

Adaptation: Urban forest aiming towards eliminating need of fresh water

- The treated wastewater is envisaged to irrigate urban forests developed adjacent to the STP. The urban forest has been developed as a green wall near the SWM site.

- Urban forests involve planting saplings, primarily of local indigenous varieties, on clean land generally situated close to the FSTP/STP/ SWM Plant.

- Miyawaki technique of plantations has been done which covers an total area of 2,000 sq.m, with the plantation of 1,140 saplings. A water pipeline has been laid from the STP location to use the treated wastewater. The water would flow through gravity

Urban forest at Ichalkaranji

Implementation and Scaleup

Mitigation related measures

Mitigation efforts for climate resilient WASH

- Mitigation efforts as part of the project focused essentially on measuring and reducing greenhouse gas (GHG) emissions from WASH systems. The aim was to identify areas within WASH service delivery where energy consumption could be optimized reducing both costs and carbon emissions.

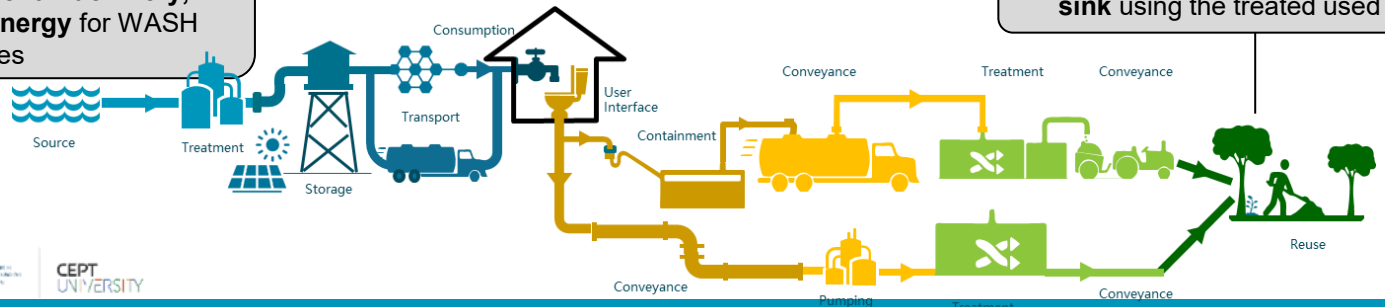
- This meant that firstly energy consumption for municipal service delivery was conducted post which WASH energy audit was conducted to assesses inefficiencies within the service chain. As per the recommendations, inefficient pumps were to be replaced and shift towards solar power was suggested.

- Efforts towards energy transition were implemented mainly through installation of solar panels on WTP and other infrastructure. The approach was to leverage the pilot demonstration towards citywide scaleup through public funds.

- By introducing carbon sequestration techniques, WASH treatment facilities are being developed as carbon sinks—helping reduce greenhouse gas emissions and mitigate the impacts of climate-related disasters

Conducting WASH **energy audit,** Use of **energy efficient machinery, transition to solar energy** for WASH services

Developing **urban forests** as **carbon sink** using the treated used water



Mitigation measures

CWAS CRDF CEPT UNIVERSITY

Mitigation: Enhancing pump efficiency and training on schedule of practice for pump operations

- The water supply system in IMC consumes 1000+ MWh/month ie approx. ₹82,00,000 while sanitation services consume 140+ MWh/month approx. ₹16,00,000
- Post the assessment of Pump efficiency as part of the WASH energy audit is was found that the most the pumps were had an efficiency below 50%. Apart from replacement it was recommended that operations as per schedule of practice (SOP) could help in reducing operational cost.

Standard Operating Procedure Training Workshop on Pump Operations

- Workshop Objective: The SOP training aimed to equip ULB engineers and pump operators with practical knowledge to improve pump efficiency and optimize daily operations.
- Organizing Partners: The workshop was conducted by CWAS, CRDF, CEPT University, Majhi Vasundhara, and Ichalkaranji Municipal Corporation, in collaboration with Kirloskar Brothers Ltd.
- Key Takeaways: Participants learned how pump efficiency directly impacts energy conservation, sustainability, and cost-effectiveness of water and sanitation services.




Standard Operating Procedure Training Workshop on Pump Operations

Mitigation: Energy transition through pilot solar installations at water treatment plant

- Mitigation through energy transition was initiated in Ichalkaranji by piloting solar installations at the water treatment plant. This shift to renewable energy would lead to a significant reduction in greenhouse gas emissions and would also demonstrate the feasibility of integrating clean energy into essential urban services.

- With solar installations at the WTP, energy costs would also be saved to a certain extent, contributing to long-term financial sustainability.

- As part of pilot demonstration, **103kW** capacity solar have been installed at the rooftop of water treatment plant. Post-installation, net metering systems were set up at each facility to measure the electricity generated by the solar panels. Additionally, an **online monitoring** app was provided to track the performance and efficiency of the solar systems in real-time.

Solar panels at WTP, Ichalkaranji

Mitigation: Scale up through citywide leveraged projects by IMC

- Based on the saving and the reduction in electricity bills the IMC have initiated to scale up the installation of the solar panels at other municipal services like WTP plant, Auditorium, swimming pool and at other municipal buildings.

- Post assessment of the space availability and the energy requirements, IMC have floated a tender for installation of solar panels of capacity **800kW.**

- A key impact of this pilot, beyond the energy transition, was the increased engagement of ULB officials. They were encouraged and oriented to scale up efforts, took ownership of the project, and initiated discussions with the Maharashtra Energy Development Agency (MEDA) for technical and financial support.

- Officials also received hands-on training in area assessment, evaluating solar technology options, procurement processes, installation procedures, and engaging with private technology providers


Solar scale would be done at WTP


Solar scaleup would be done Auditorium and swimming pool


Hands on training of IMC staff

Mitigation: Model tender for Public-Private Partnership (PPP) engagement for solar at WASH infrastructure facility.

- The **model performance-based solar PPP tender** aims to establish a solar power plant at public infrastructure within a city. The city incurs no upfront capital costs and pays only for the electricity generated. Under this model, a private operator finances both CAPEX and OPEX while handling the design, installation, and operations & maintenance (O&M) for a period of 10 years or above or as decided by the city.

Financial Features	Operations and system Monitoring	Other clauses
No capital investment and formation of escrow account	Online monitoring systems to track performance of solar systems	Dispute Resolution
Payment based on performance of solar system	Minimum performance guarantee	Cost escalation
Payment security mechanisms	Operation and Maintenance and transfer with appropriate training	
Environment or sustainability objectives		

- The model PPP solar tender has been submitted to the mission office of Majhi Vasundhara Abhiyan for statewide scaleup.
- The model solar tender has also been shared with other cities who are planning for solar scale up through the private sector.

Cross cutting initiatives : Formal engagement of women SHGs for CT/PT and MHM maintenance

- The project encompasses inclusivity mainly for women across all its initiatives—not only by improving access to basic WASH facilities, but also by strengthening agency of women through formal livelihood generation.

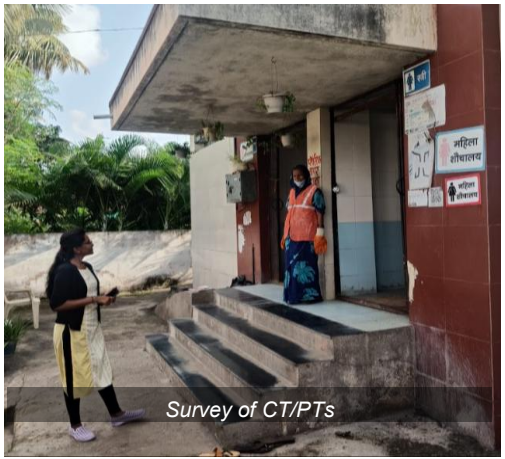
- Ichalkaranji has an active network of more than 800 women self help groups. IMC has previously engaged awareness generation activities.

- Efforts were undertaken to explore how women SHGs could be engaged in WASH-related activities. It was observed that IMC manages over 70 community toilets, primarily used by vulnerable groups residing in slum areas.

- Many of these toilets faced challenges in maintenance due to high footfall, particularly from women users, and lacked essential Menstrual Hygiene Management (MHM) facilities. To address these issues, meetings were held with SHG members, officials from IMC–NULM, and the sanitation department to identify suitable activities that SHGs could undertake.

- It was mutually decided that SHGs will operate and maintain 10 CT/PT which would be repaired and equipped with MHM machines. Resolution for the same has been passed.


Meeting with SHG and NULM Department


Survey of CT/PTs

Cross cutting initiatives : Gender sensitization training for IMC staff

- In order to strengthen the inclusion of gender, sexuality, and rights in urban sanitation, CWAS supported IMC to conduct a training of head of departments. The training was conducted by sector experts CREA, Delhi.
- Topics like gender and intersectionality, gender inclusion in WASH and compliance with the Prevention of Sexual Harassment at Workplace (POSH), were covered through interactive presentations and exercises
- Participants responded positively to the training, expressing that it was highly informative and eye-opening.
- It was recommended to conduct a training of trainers who could conduct such trainings at frequent interval of time.

Gender sensitization training for IMC staff

Cross cutting initiatives : Gender sensitization training for sanitation workers

- The second phase of the training was conducted for sanitation workers. The workshop focused on fostering awareness about gender, identity, intersectionality, sexual harassment at workplace and patriarchy among sanitation workers.
- A session was also conducted on gender inclusion in WASH and climate change.
- Participants shared personal experiences, including gender disparities, child marriage, and restrictions faced by women. The workshop emphasized the need for societal change, encouraging participants to challenge entrenched norms and advocate for gender equality.
- Participant found the training easy to understand and highly informative, especially considering their limited educational backgrounds.

Gender sensitization training for sanitation workers

Cross cutting initiatives : Safety of sanitation workers

- Significant emphasis has been placed on ensuring the well-being of sanitation workers through improved working conditions recognizing this IMC with support from CWAS conducted training workshop for sanitation workers
- The objective of these workshops was to raise awareness among sanitation workers about occupational hazards and underscore the significance of wearing PPE gear. The workshops aimed to educate workers on the importance of using PPEs, fostering healthy habits, and highlighting the adverse effects of addiction. Practical demonstrations were conducted to illustrate the proper usage of PPE gear, and a set of PPEs was distributed to each sanitation worker. Following the training, a health camp was conducted, offering comprehensive medical check-ups for all participants.

Training workshop on safety at workplaces

Implementation and Scaleup

Scale through Majhi Vasundhara Abhiyan

Scaleup initiatives: Scale up through Majhi Vasundhara Mission (1/2)

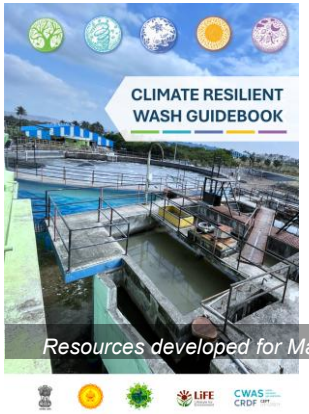
- CWAS signed an MoU with Environment and Climate Change Department of Government of Maharashtra on 5th June 2023for supporting activities related to climate change and WASH under Majhi Vasundhara Mission.

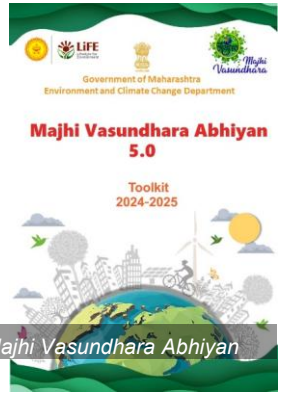
- Majhi Vasundhara Abhiyan (MVA), is a competition-based campaign promoting citizen participation in climate change mitigation. CWAS supported scale up activities for:

- **MVA**: Designing WASH indicators, integrating women' s engagement, and supporting toolkit development and translation. The focus areas include aquifer recharge, greywater management, and secondary waste segregation.

- Training local officials, developing an MIS portal, and organizing a divisional workshop to guide winning local bodies on utilizing award funds for carbon-neutral activities. Additionally, a DIY guidebook was created to help cities adopt Climate WASH strategies independently.

MOU signing ceremony





Resources developed for Majhi Vasundhara Abhiyan

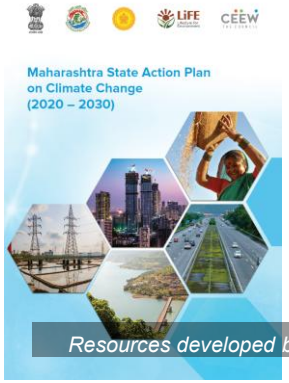

Trainings and field visits as part of scale up efforts under MVA

Scaleup initiatives: Scale up through Maji Vasundhara Mission (2/2)

- **Scale up of energy transition for WASH Utilities**: A consultation meeting was organized with sector experts and local body officials to promote public-private partnerships for solar-powered operations in WASH utilities. During the meeting, a model contract developed by CWAS was presented, and suggestions were invited on potential risks and contractual clauses.

- **State Climate Action Cell :** CWAS assessed Climate Action Plans of nine states to evaluate WASH strategies, leading to recommendations on non-revenue water management and floodplain encroachment removal, now incorporated into Maharashtra' s State Climate Action Plan. Additionally, city climate action plans of four Maharashtra cities were reviewed to design climate action strategies for Ichalkaranji.
- **Harit Maharashtra Toolkit:** The CWAS team also assisted the department in drafting the initial Harit Maharashtra toolkit, ensuring its alignment with MGNREGA guidelines and targets.

Consultation meeting of sector experts and ULB officials




Resources developed by the State climate action cell

Thank you

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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