CWAS CENTER FOR WATER AND SANITATION
CRDF CEPT UNIVERSITY

Moving towards Climate Resilient WASH services

Case of 3 cities in Maharashtra

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Moving towards Carbon Resilient WASH Services

Implementing

"Energy Transition Initiatives in WASH Service Delivery"

with technical support from

Center for Water and Sanitation (CWAS), CRDF, CEPT University in partnership with HSBC,

to support the cities of Maharashtra.

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Acknowledgement

Considering the recent events and climate change impacts faced globally around the world has highlighted the urge to identify various sectors which can be assessed based on energy consumptions and modified to mitigate the climate changes. Climate change impacts have been seen more on developing countries, leading to 90 % human losses as reported. India is 7th most vulnerable country to the climate hazard. Further 27 out of 36 states are highly vulnerable to climate change impact.

Sanitation services play a crucial role in Maharashtra which are indispensable for promoting public health, environmental sustainability, social equity, economic development, and disaster resilience. Investing in and ensuring access to effective sanitation services are critical. Assessing the emissions and mitigation potential across the WASH service chain with adoption of renewable energy sources, identifying opportunities for reducing carbon emissions and enhancing energy efficiency can support in reducing the climate change impacts.

In this context Center for Water and Sanitation (CWAS) in partnership with HSBC will support cities Vita, Ichalkaranji and Karad from Maharashtra to move towards carbon neutrality. The key support will include detailed assessment of the WASH service chains, energy audit and GHG calculations, citywide schedule desludging, SHG involvement for O&M, demonstration of renewable energy pilot projects and provide capacity building to key stakeholders, documentations and implementations.

CWAS team acknowledges excellent support by Vita, Ichalkaranji and Karad council officials. Discussions with other stakeholders such as private contractors in sanitation and water department, community groups and slum households have also helped assess existing WASH in the cities paving the way to climate mitigation and adaptation initiatives.

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Centre for water and Sanitation (CWAS)
CRDF, CEPT University, Ahmedabad

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03 Overview of the Selected Cities

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Location – Karad, Maharashtra

01

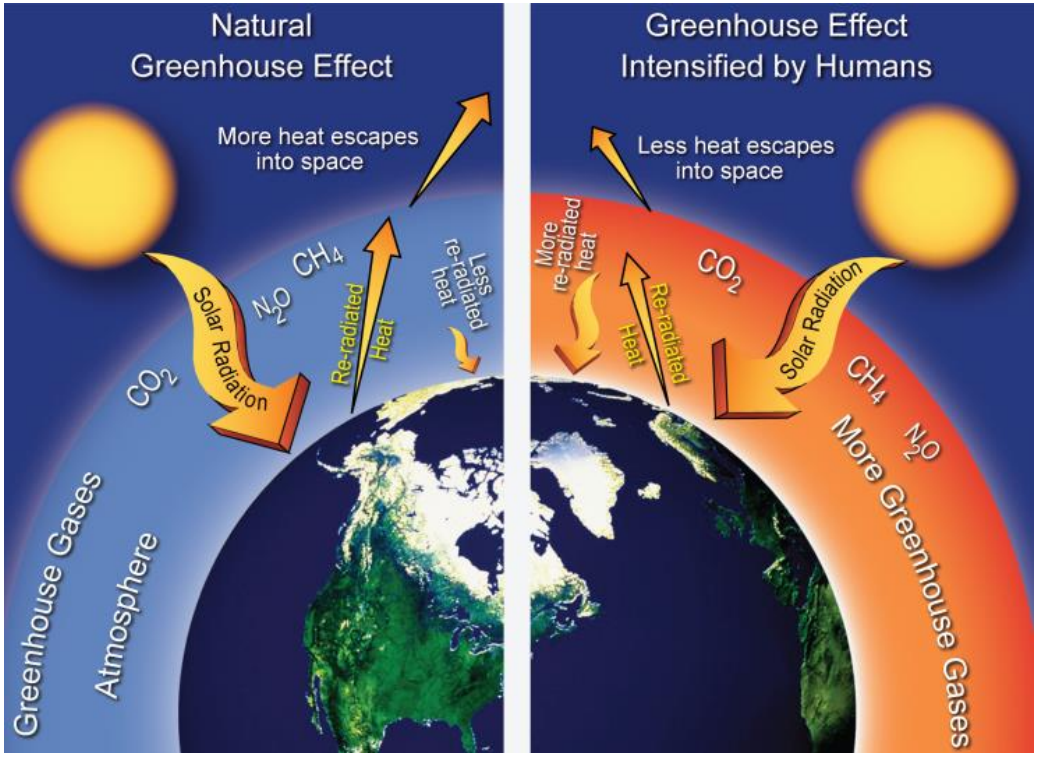
Introduction to Impact of Climate Change on WASH

What is Climate Change ?

Climate Change refers to the long-term shifts in the temperature and weather patterns.

These shifts may be natural, but since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil, and gas) which produces heat-trapping gases. The main greenhouse gases (GHGs) causing climate change include carbon dioxide and methane. These gases trap excessive heat in the Earth's atmosphere, disrupting the planet's natural balance and leading to a warming effect. As a result, the impacts of this warming are being felt across the globe in various ways.

India is no exception to this global crisis. Nearly half of India's cities and their residents are already grappling with the perils of the Climate Crisis. The escalating impacts of climate change in India significantly affecting essential services which includes intense droughts, water scarcity, severe fires, rising sea levels, flooding, infrastructure damage, heightened air pollution and declining biodiversity.



Source: IPCC Special Report on 1.5°C global warming (2018)

Impact of Climate Change on WASH

The escalating impacts of climate change including floods, water scarcity, and extreme weather events are placing significant strain on crucial services related to Water, Sanitation, and Hygiene (WASH).

Water resources are being stretched, sanitation infrastructure is deteriorating, and access to clean water is increasingly limited, which in turn leads to contamination. These disruptions hinder basic hygiene practices like handwashing and proper toilet usage, further increasing the risk of waterborne diseases. WASH service providers are also facing challenges related to water shortages, system overloads, and the breakdown of infrastructure during extreme weather events.

"To address these issues, Climate-resilient WASH Infrastructures are essential to ensure continued access to safe water and sanitation!"

Improper/ reduced functioning of treatment plants

Backflow/ overflow in toilets and poor access to facilities

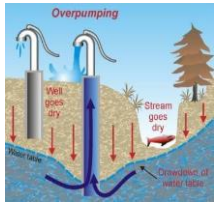
Challenges in maintaining hygiene (toilet usage, handwashing)

Temporary shortage and drying up of water resources

Faecal waste discharged in living environment

Difficult to pump sludge from onsite systems due to low moisture

Service providers experiencing heat stress



Breakdown of facilities and dry pumping

Building a Climate-Resilient India

In response to the global climate crisis, India has made significant commitments as part of its Nationally Determined Contribution (NDC) under the Paris Agreement and its recent pledge at COP26. "*The country has set ambitious targets to enhance renewable energy and reduce emissions, aiming to achieve Net-Zero emissions by 2070.*" A critical step toward this goal includes a reduction of one billion tonnes of carbon emissions from the total projected emissions by 2030.

This commitment is essential for mitigating the impacts of climate change, particularly on essential services like WASH. To align with these goals, India has launched several initiatives that integrate "**climate resilience**" into the country's development and environmental protection strategies.

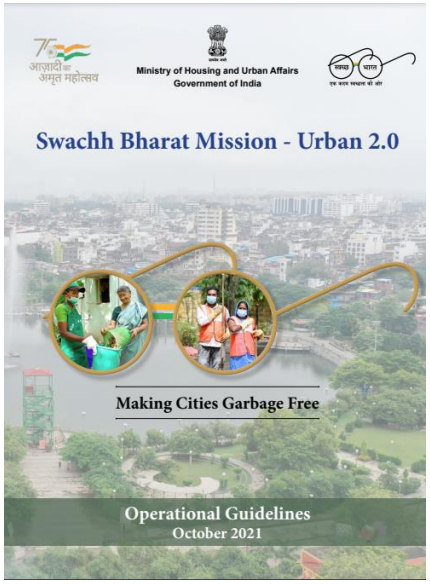
The National Programs such as the **Swachh Bharat Mission (SBM) or Clean India Mission** and other state programs are playing a pivotal role in strengthening the foundation for a sustainable future.

Swachh Maharashtra Mission

aligned with the Swachh Bharat Mission

The Government of India launched the ‘Swachh Bharat Mission’ (SBM) in 2014, aiming to achieve an Open Defecation Free (ODF) India by 2019. A key focus of SBM has been the construction of toilets, connected either to sewer networks or onsite sanitation systems. However, while toilet construction is a crucial step in addressing the sanitation challenge, it is not the ultimate goal. The desired outcomes can only be achieved when these efforts are paired with effective management of untreated waste.

Building on the principles of SBM, the Government of Maharashtra launched the ‘Swachh Maharashtra Mission’ for Urban Areas (SMMUA) in 2016. This initiative aimed to eliminate open defecation by increasing the construction of Individual Household Toilets (IHHT) and advancing Fecal Sludge and Septage Management (FSSM) through sustainable, nature-based treatment systems. Maharashtra also introduced the innovative concepts of ODF, ODF+, and ODF++, focusing on improved sanitation through safe faecal waste management. These concepts, later adopted nationally, emphasize not just infrastructure creation but also sustainable sanitation practices.



Initiatives by Government

The Majhi Vasundhara (My Earth) Mission, launched in 2022, is a flagship program of the Environment and Climate Change Department, Government of Maharashtra. This initiative seeks to raise awareness among citizens about the increasing climate emergencies and encourages the adoption of localized, specific climate adaptation and mitigation measures.

The program focuses on five elements of nature:

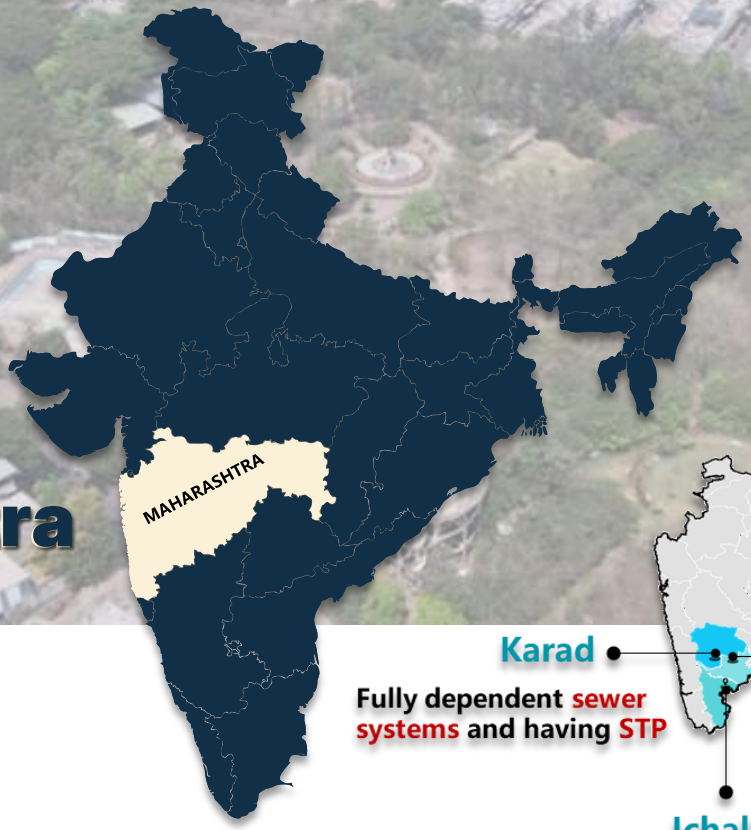
- Bhumi: Earth
- Jala: Water
- Vayu: Air
- Agni: Energy
- Akash: Enhancement

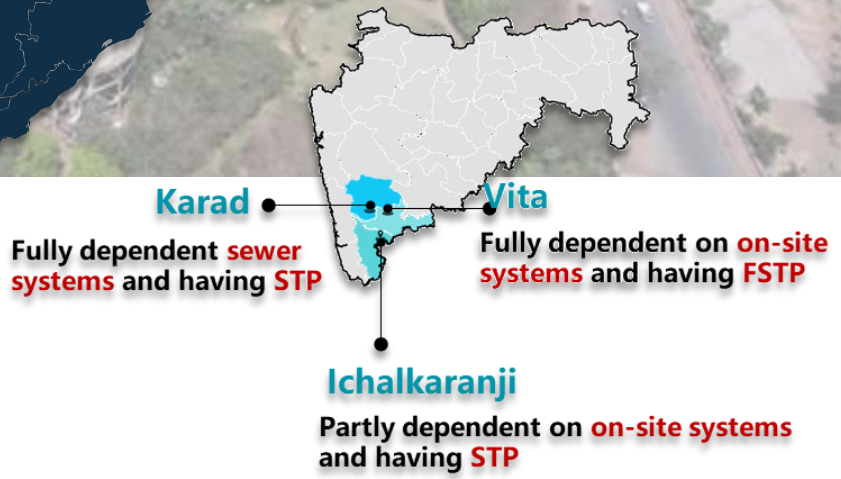
This mission aligns closely with the ongoing efforts of the Center for Water and Sanitation (CWAS), CEPT University, Ahmedabad, which has been collaborating with the Government of Maharashtra since 2010.

CWAS has been instrumental in implementing key programs like Service Level Benchmarks (SLB) for water supply and sanitation, the Swachh Maharashtra Mission for Urban Areas (SMMUA), and now, the Majhi Vasundhara Mission.

Through these initiatives, CWAS actively supports the adoption of a climate-resilient, citywide inclusive approach to water and sanitation services.

Case of Maharashtra





In 2022, CWAS received a CSR Grant by HSBC India to promote climate-resilient WASH System. Under this initiative, CWAS is collaborating with the municipal governments of Karad, Vita, and Ichalkaranji to implement adaptive and mitigative measures aimed at enhancing the resilience of the sanitation value chain to climate impacts.

The project emphasizes practical, community-focused interventions to strengthen WASH services in these small and medium-sized cities, aligning with the goals of the Majhi Vasundhara Mission. By integrating climate adaptation and mitigation strategies, this initiative not only addresses immediate challenges but also reinforces Maharashtra's broader climate and sanitation agenda.

***Cities**: Ichalkaranji Municipal Corporation | Vita Municipal Council | Karad Municipal Council*

This collaboration marks a significant step towards fostering climate resilience in urban sanitation and water management systems.

02

Integrated Approach for Climate Resilient WASH

Integrated Approach for Climate-Resilient WASH

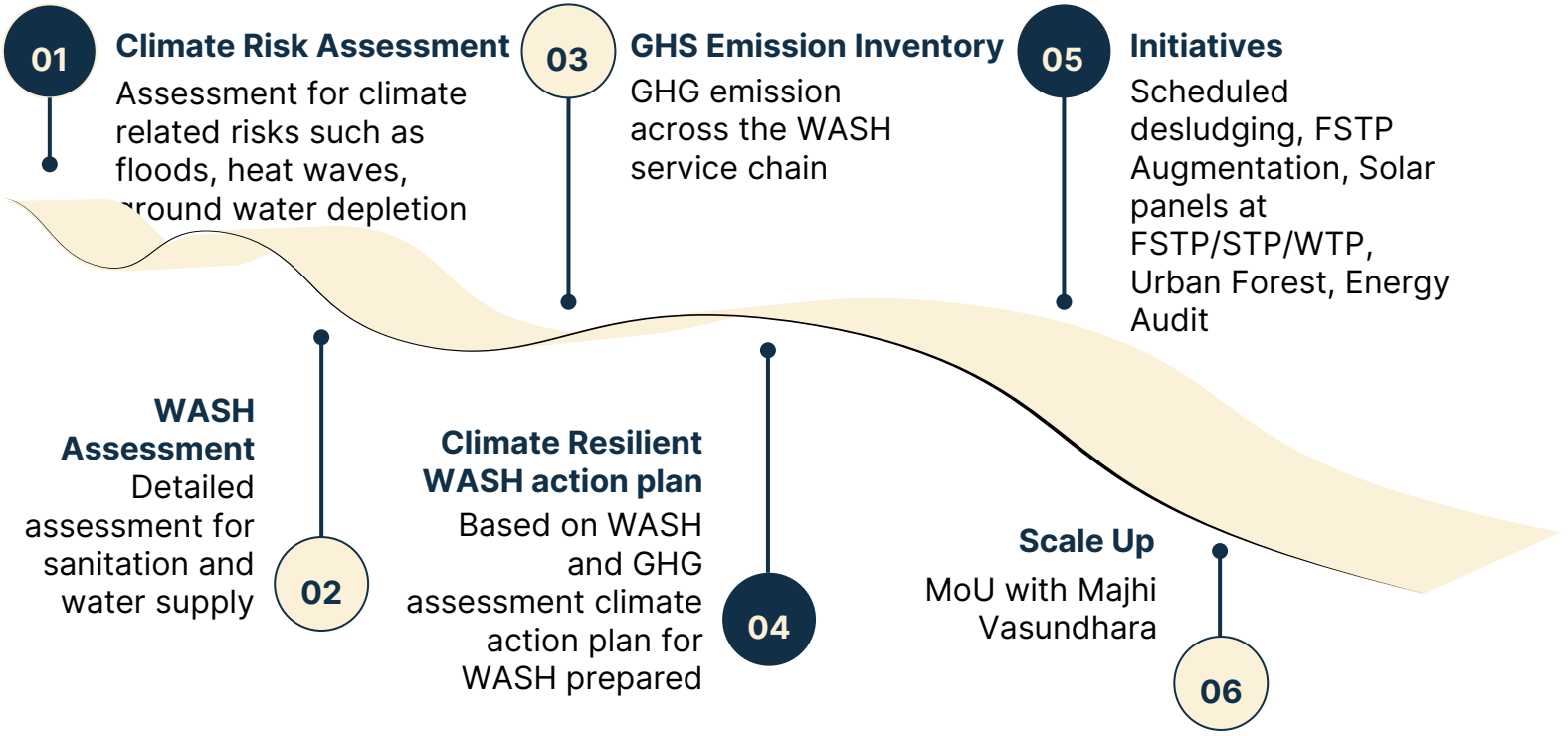
The HSBC project aims to empower Urban Local Bodies (ULBs) to plan and provide inclusive, climate-resilient WASH services and infrastructure. A detailed assessment was conducted in the three cities of Maharashtra to evaluate existing services, infrastructure, and associated greenhouse gas (GHG) emissions. This process involved consultations with ULB staff, private contractors, SHG women, citizens *"to identify gaps, challenges, and actionable solutions."*

The approach integrates Adaptation, Mitigation, and Cross-linkages to address climate challenges holistically.

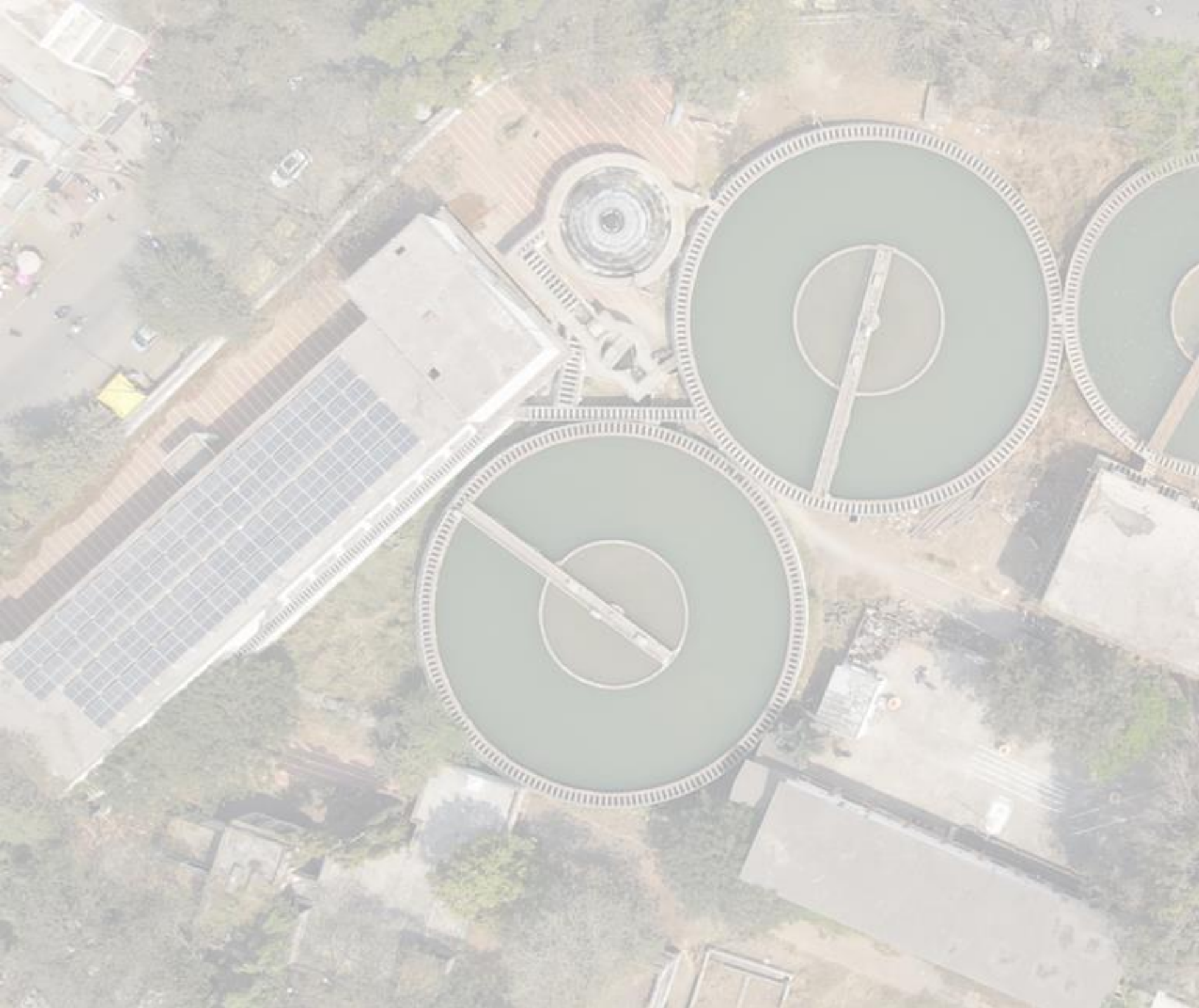
The HSBC project emphasizes a holistic framework that combines climate adaptation, mitigation, and cross-linkages to create sustainable and inclusive WASH systems. Adaptation efforts aim to safeguard essential services and infrastructure against climate vulnerabilities, ensuring long-term functionality and resilience. Mitigation focuses on transitioning to low-carbon solutions, such as renewable energy and efficient resource management, to reduce environmental impacts. Cross-linkages play a vital role in bridging these efforts by integrating social, institutional, and environmental dimensions, fostering inclusivity and gender-sensitive approaches. Together, these interconnected strategies empower cities to address climate risks comprehensively, promoting equitable and sustainable urban growth.

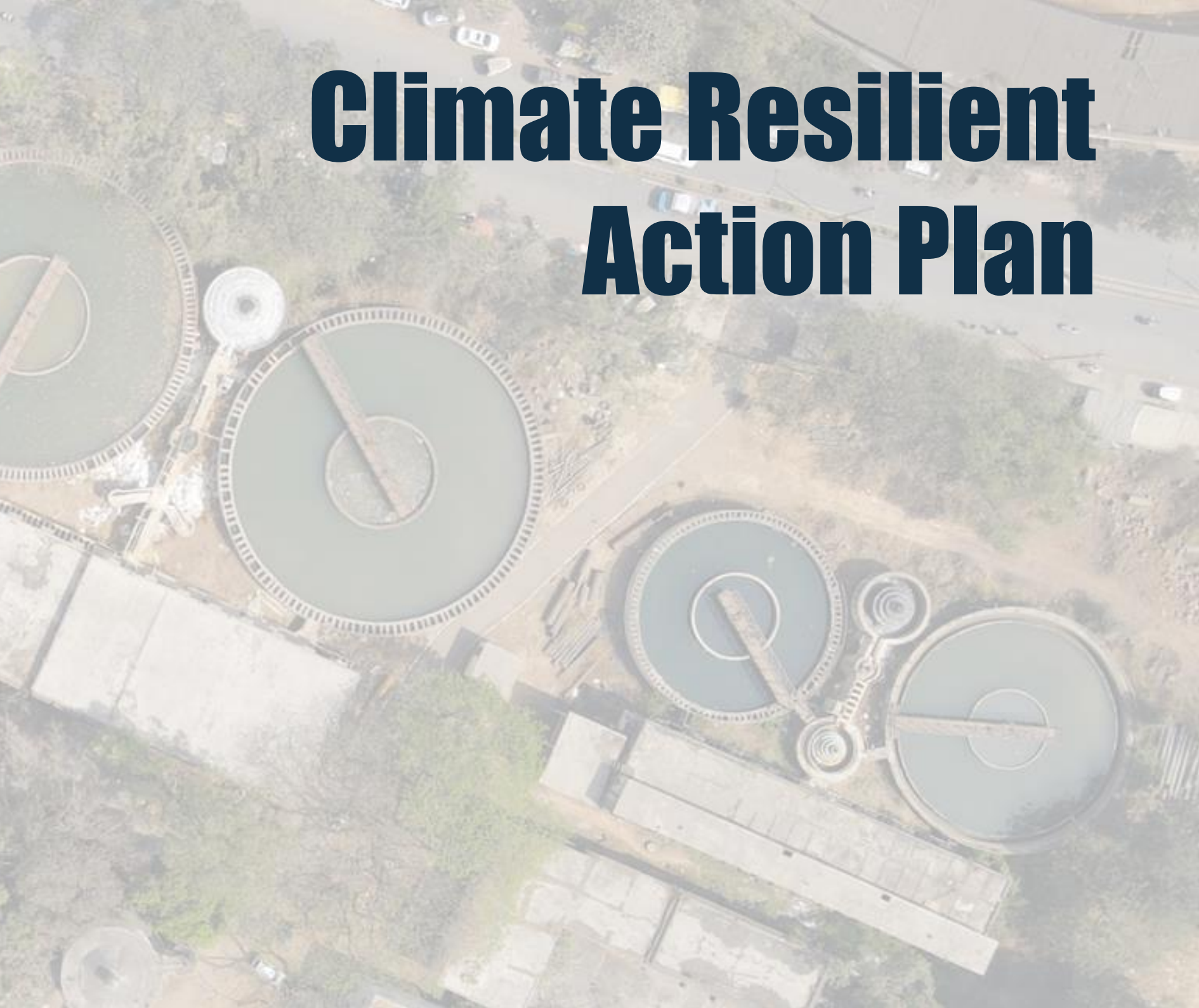
Action Plan for Climate-Resilient WASH

Moving towards a climate-resilient future, CWAS has developed a comprehensive Climate-Resilient WASH Framework and Action Plan based on extensive experience from collaboration with governments, stakeholders, and local communities, along with an in-depth review of state and city-level climate action plans.



Based on the action plan, an assessment of climate data with ULB officials & the community identified climate risks and patterns. This was followed by a detailed WASH assessment of infrastructure and services, through qualitative and quantitative measures. The analysis led to the creation of a GHG emission inventory to highlight the largest sources of emissions, which identified targeted mitigation strategies including the adoption of energy-efficient and renewable technologies. Based on these findings, CWAS, in partnership with ULBs developed and implemented adaptation and mitigation strategies to strengthen climate resilience in urban WASH systems.





Climate Resilient Action Plan

Climate-Resilient Action Plan

A Climate-Resilient Action Plan is designed to enable cities to anticipate, prepare for, and respond to the impacts of climate change while safeguarding public health, ecosystems, and infrastructure. It focuses on building the capacity of urban areas to withstand and recover from climate-related challenges such as flooding, extreme temperatures, and water scarcity. By implementing adaptive strategies like improving water storage systems, enhancing green infrastructure, and transitioning to renewable energy sources, the plan strengthens the city's ability to maintain essential services under changing climate conditions. This approach ensures the long-term sustainability of urban environments, enabling them to thrive despite future climate uncertainties.

*Content - Subject to change**

03

Overview of the Selected Cities

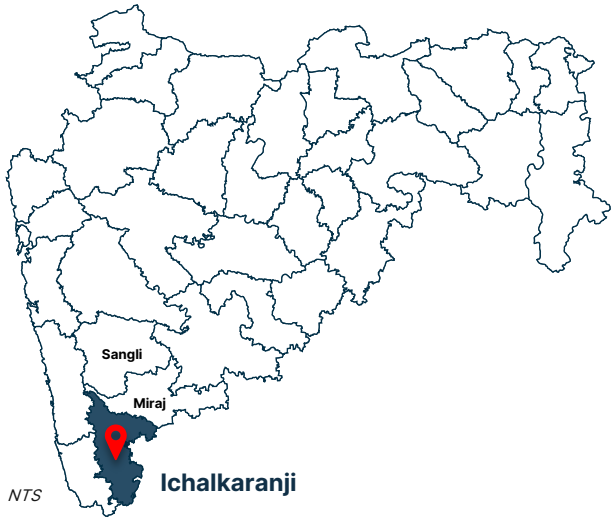

इचलकरंजी महानगरपालिका

Ichalkaranji Municipal Corporation

Ichalkaranji, a Class D Municipal Corporation, is situated in the Panchganga valley with a southeastward slope. It is located approximately 29 km east of Kolhapur and 10 km southeast of the Hatkanangale railway station. The city experiences a warm, humid, and overcast wet season, while the dry season is characterized by hot and partly cloudy conditions.

As a newly established Municipal Corporation, Ichalkaranji relies partly on on-site sanitation systems in its core areas, while the newer developments are served by a sewerage network.

Kolhapur District



29.84 Sq.km Area

3.4Lakhs Population ('19)

67K Households

32 Wards

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

Palace of Ichalkaranji

Textile Mill

Ancient Ramling temple

DKTE Textile & Engineering Institute


BIRLA

Key Highlights of Ichalkaranji

Ichalkaranji, a city known for its industrial vibrancy, is steadily addressing the growing water supply needs driven by rapid population growth and industrial expansion. Currently, residents receive water every two days, with an average duration of 1 hour and 30 minutes per cycle.

In terms of sanitation, Ichalkaranji has made considerable 1140 bore wells spread across the cities with its underground sewer network, which is divided into two subzones. While the core areas benefit from this network, the city is also working towards improving coverage in other areas. These achievements underscore Ichalkaranji's efficient water management system, with some of the key highlights outlined below.

Source of Water	STD (MLD)	LPCD (User end)	Sanitation System
Surface + Ground Water	20 MLD + 18 MLD Under construction	80 LPCD	57% Sewer, 43% On-site

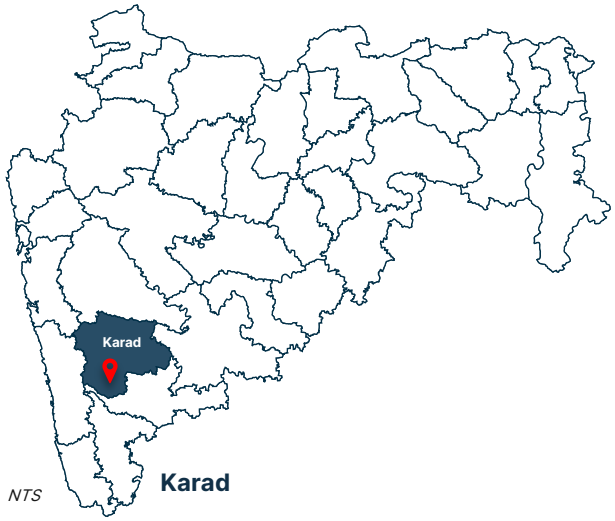

कराड नगरपरिषद, कराड

Karad
Municipal Council

Karad, a B-Class Municipal Council and a prominent urban center in Maharashtra's Satara district, is located along the banks of the Krishna and Koyna rivers. This strategic location enhances its scenic charm and supports its agricultural productivity. Known as the "Sugar Bowl of Maharashtra," Karad is a hub for sugar production.

The city boasts complete sewerage network coverage and a Sewage Treatment Plant (STP). Notably, Karad achieved a significant milestone in infrastructure development by becoming the first small and medium-sized town in Maharashtra to establish a sewer network as early as 1972.

Satara District



10.55 Sq.km Area

89K Population

13K Households

15 Wards

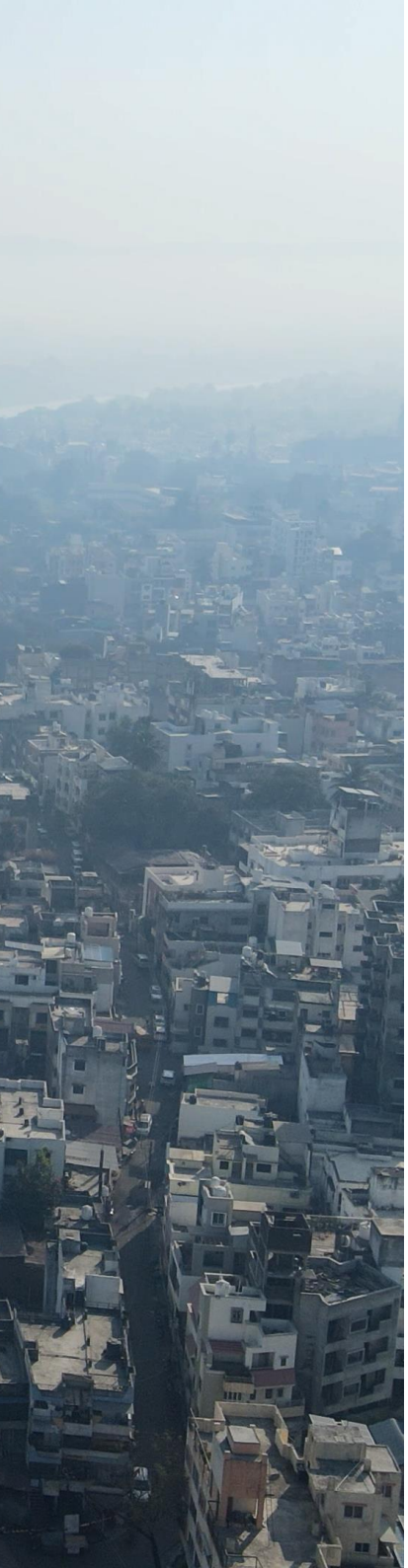
Source: KMC and Primary Survey

Krishna Ghat

Krishna Institute of Medical Science

Govt. Engineering College, Karad

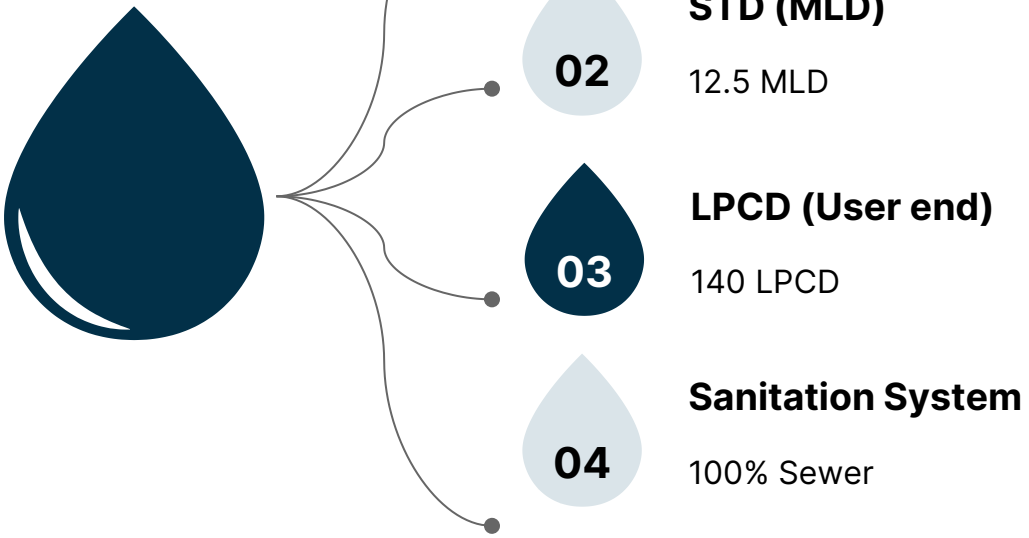
Naktya Ravlyachi Vihir



Key Highlights of Karad

Karad, situated at the confluence of the Krishna and Koyana rivers, is strategically positioned with a reliable surface water source for its water supply.

The city primarily relies on the Koyana River, with a 33 MLD Water Treatment Plant (WTP) ensuring efficient treatment, though only 13.5 MLD is currently utilized. The water distribution network spans 65.80 km, covering an area of 10.55 sq. km, supplying water daily for 2-3 hours across nine zones through nine elevated storage reservoirs (ESRs). With 100% metered household connections, the city meets the standard of 135 LPCD, supported by an underground sewer network, ensuring efficient and equitable service delivery. These achievements underscore Karad's efficient water management system, with some of the key highlights outlined below.



Vita
Municipal Council

Vita, a B-Class Municipal Council and the headquarters of Khanapur Taluka in Sangli district, is situated in the Krishna River basin with a southwestward slope. The town experiences warm, dry, and clear summers, while winters are long, cold, windy, and partly cloudy.

Known as the "City of Gold," Vita is a rapidly growing hub for gold trade and jewelry. Despite its growth, the town remains fully reliant on on-site sanitation systems, with a Faecal Sludge Treatment Plant (FSTP) for waste treatment.

Sangli District

55.54 Sq.km Area

57K Population ('19)

13K Households

12 Wards

Source: Information from sanitation department, VMC and https://www.cgwb.gov.in/old_website/District_Profile/Maharashtra/Sangli.pdf

Growing Handloom Business

Gold Jewellery Crafted

Palakhi Festival

Temple of Revasiddha

Key Highlights of Vita

Reflecting on its water supply journey, Vita has long depended on a combination of surface water sources and borewells to meet the city's needs. The city operates a 10.85 MLD Water Treatment Plant (WTP), which processes water from the Krishna River and Alsund Lake (Panchganga River) and supplies it to 15 Elevated Service Reservoirs (ESRs), 3 Ground Service Reservoirs (GSRs), and 4 sumps.

This WTP is the backbone of Vita’s water supply system, serving as the sole treatment facility for the entire city. In addition to surface water, households extract approximately 3 MLD of water from borewells to meet their demands. The city boasts a 125 km distribution network covering 55 sq. km and supplying water to around 2,000 connections. Despite these efforts, water is currently supplied for only 30 minutes on an alternate-day basis, with many households continuing to rely on borewells for their needs. These achievements underscore Vita's efficient water management system, with some of the key highlights outlined below.

Source of Water

Surface + Ground Water

LPCD (User end)

105 LPCD

FSTP (MLD)

35 KLD

Sanitation System

100% On-site


ORGANIC
PIT
COMPOSTING
विटा नगरपरिषद विटा
VITA MUNICIPAL COUNCIL VITA
विटा नगरपरिषद सेवा अंतर्गत
MH 12 TV 2715
MH12T
V2715

04

Adaptation Initiatives

4.1 Increase in coverage of Individual Household Toilets
4.2 Implementation of Scheduled desludging
4.3 Installation of Solar Plants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VACUUM GAUGE

Priority sectors for Adaptation Initiatives

The world is witnessing rising temperatures, shifting seasons, and an increasing frequency of extreme weather events, making climate adaptation more urgent than ever. Adaptation involves making ecological, social, and economic adjustments to minimize damages or seize opportunities arising from climate change. It is a proactive approach to building resilience against current and future climate impacts.

Adaptation measures vary widely and are tailored to the specific needs of communities or regions. These measures can include nature-based solutions, infrastructure improvements, and efficient service delivery mechanisms. Each of these actions addresses climate risks by enhancing resource sustainability, protecting public health, and improving urban ecosystems. Successful adaptation requires collaborative efforts across governments, local communities, and private and public sectors.

Provision of IHHT

Scheduled Desludging

Solar Plants

> Ensuring **universal 'access'** to individual toilets strengthens not just infrastructure but the resilience of entire communities.

Access:
Increase in coverage of Individual Household Toilets

In the face of rising climate challenges, access to individual household toilets has become more than just a basic necessity-it's a key pillar of health and resilience for vulnerable communities. Beyond the immediate benefits of safety, privacy, and dignity, these facilities play a critical role in mitigating the impacts of climate change. Properly constructed and managed toilets prevent the contamination of water sources—an essential safeguard in areas increasingly prone to flooding or drought.

HH Toilet Coverage in three cities:

01 **Ichalkaranji Municipal Corporation**

Access to IHHT - 52216 HHs (77%)

02 **Karad Municipal Council**

Access to IHHT - 18293 HHs (94%)

03 **Vita Municipal Council**

Access to IHHT - 13,200 HHs (94%)

Recognizing these far-reaching benefits, CWAS has been actively supporting Urban Local Bodies (ULBs) in achieving universal access to individual household toilets (IHHT). This effort ensures that households are equipped with essential sanitation facilities to cope with climate impacts such as heatwaves and floods. To drive this initiative, CWAS has designed survey tools and app-based solutions to identify demand for IHHTs and streamline applications under the SBM 2.0 framework.

By prioritizing individual sanitation, CWAS is fostering a healthier, more resilient urban fabric—one that equips communities to thrive in the face of climate uncertainty.


कराड नगरपरिषद, कराड.
सार्वजनिक शौचालय
कराड नगरपरिषद, कराड.
सार्वजनिक स्वच्छतागृह.
(पुरुषांसाठी)

Access:
Improving Sanitation in Slums

In cities like Karad, only about 5% of slum households have access to individual household toilets, while a significant 95% depend on community or public toilets (CT/PT). This heavy reliance highlights the urgent need to improve the coverage, safety, and functionality of shared sanitation facilities.

While continuing the push for individual household toilets, CWAS is also supporting the enhancement of shared sanitation systems in areas where IHHTs are not yet feasible. In slum settlements—particularly across the central and northern zones where CT/PT coverage is scattered—CWAS is working with local governments to expand toilet access and improve existing infrastructure. This also includes the introduction of lock-and-key mechanisms to enhance safety and privacy, especially for women, children, and the elderly. Currently, public toilets in these areas are cleaned once daily and remain open 24/7, with monitoring supported by ULB staff and sanitation supervisors. However, strengthening infrastructure, ensuring regular maintenance, and prioritizing inclusive design are critical steps toward equitable sanitation access for all.

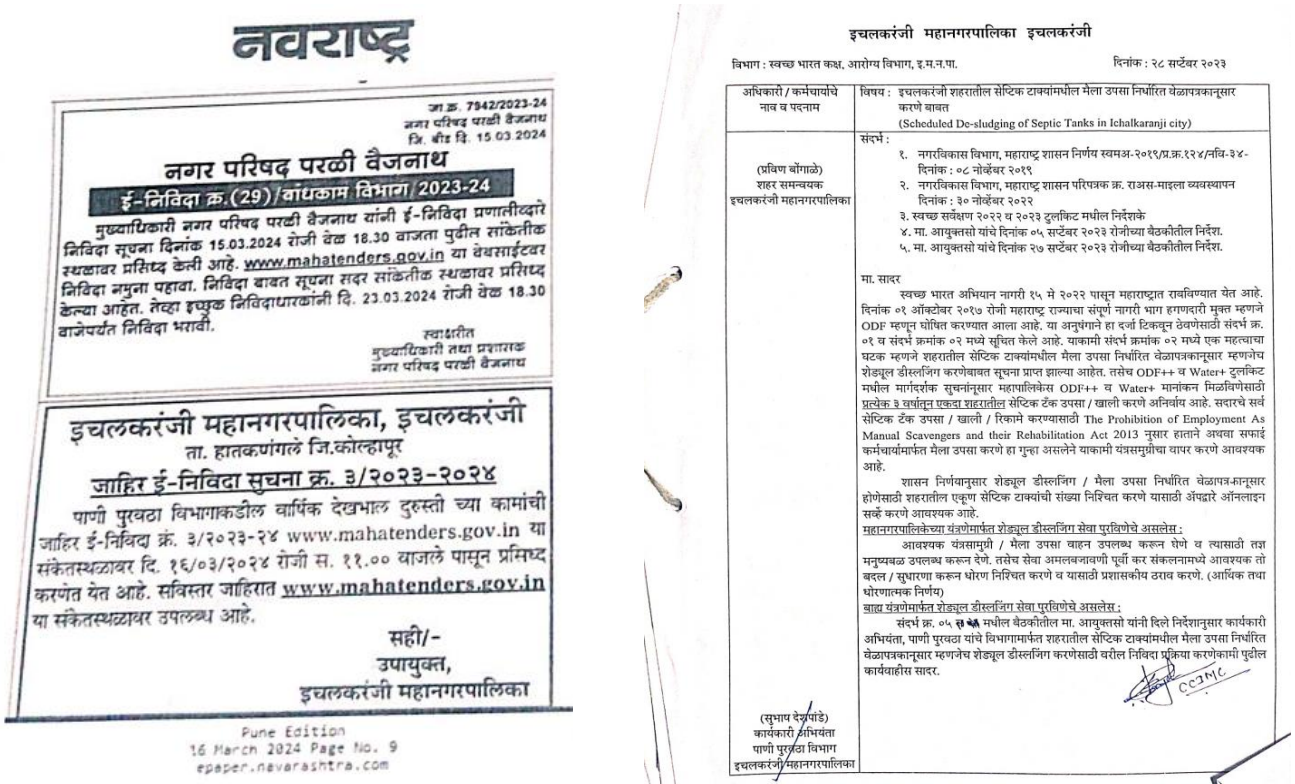

आज़ादी का अमृत महोत्सव
स्वच्छ सर्वेक्षण
MAKE IN INDIA
आत्मनिर्भर भारत अभियान
सप्तपदी स्वच्छतेची
ULB CODE : 802884
इचलकरंजी महानगरपालिका,इचलकरंजी.
पुरुष स्वच्छतागृह
INDIAN
MEN
WOMEN
आज़ादी का अमृत महोत्सव
स्वच्छ सर्वेक्षण
MAKE IN INDIA
आत्मनिर्भर भारत अभियान
सप्तपदी स्वच्छतेची
ULB CODE : 802884
इचलकरंजी महानगरपालिका,इचलकरंजी.
महिला स्वच्छतागृह

“Beyond access, the next crucial step is the ‘**safe conveyance of faecal sludge**’ to treatment plants for effective waste management.”

Conveyance:
Implementation of Scheduled desludging

Managing faecal sludge effectively is a cornerstone of climate-resilient sanitation systems. While access to toilets addresses one part of the challenge, ensuring the proper conveyance and treatment of sludge is equally critical. Regular desludging of septic tanks is essential to prevent overflows and minimize the release of harmful greenhouse gases like methane and nitrous oxide, which are significantly higher when tanks remain uncleaned. Studies reveal that frequent desludging can reduce methane emissions by nearly half, contributing to a healthier environment and lowering the pollutant load on treatment facilities.

Recognizing the importance of this process, scheduled desludging operations have been introduced, ensuring that septic tanks are cleaned *at least* ***"once every three years"***, as recommended by national guidelines. This initiative is supported by robust systems such as performance-based private sector engagement for desludging operations and real-time monitoring using digital tools like '**Mahasanitrack**'.



नवराष्ट्र

जा.क्र. 7942/2023-24
नगर परिषद परळी वैजनाथ
दि. बीड दि. 15.03.2024

नगर परिषद परळी वैजनाथ

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

मुख्याधिकारी नगर परिषद परळी वैजनाथ यांनी ई-निविदा प्रणालीव्दारे निविदा सूचना दिनांक 15.03.2024 रोजी वेळ 18.30 वाजता पुढील सांकेतीक 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 भरावी.

स्वाक्षरीत
मुख्याधिकारी तथा प्रशासक
नगर परिषद परळी वैजनाथ

इचलकरंजी महानगरपालिका, इचलकरंजी
ता. हातकणंगले जि.कोल्हापूर

जाहिर ई-निविदा सुचना क्र. ३/२०२३-२०२४

पाणी पुरवठा विभागाकडील वार्षिक देखभाल दुरुस्ती च्या कामांची जाहिर ई-निविदा क्रं. 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

इचलकरंजी महानगरपालिका इचलकरंजी

विभाग : स्वच्छ भारत कक्ष, आरोग्य विभाग, इ.म.न.पा. दिनांक : २८ सप्टेंबर २०२३

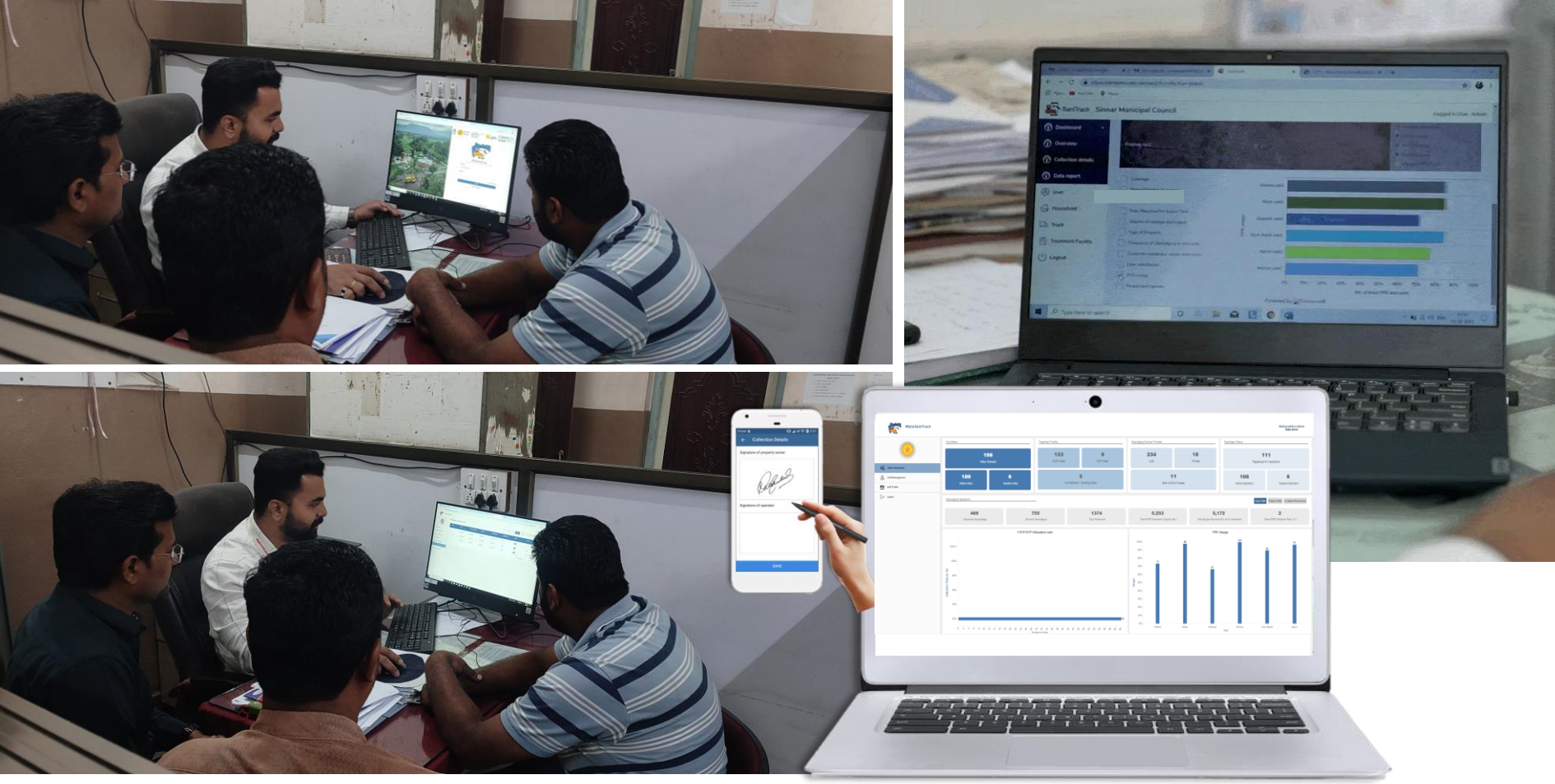
अधिकारी / कर्मचाऱ्यांचे नाव व पदनाम	विषय : इचलकरंजी शहरातील सेप्टिक टाक्यांमधील मैला उपसा निर्धारित वेळापत्रकानुसार करणे बाबत (Scheduled De-sludging of Septic Tanks in Ichalkaranji city)
(प्रविण बोंगाळे) शहर समन्वयक इचलकरंजी महानगरपालिका	संदर्भ : १. नगरविकास विभाग, महाराष्ट्र शासन निर्णय स्वमअ-२०१९/प्र.क्र.१२४/नवि-३४- दिनांक : ०८ नोव्हेंबर २०१९ २. नगरविकास विभाग, महाराष्ट्र शासन परिपत्रक क्र. राअस-माइला व्यवस्थापन दिनांक : ३० नोव्हेंबर २०२२ ३. स्वच्छ सर्वेक्षण २०२२ व २०२३ टुलकिट मधील निर्देशके ४. मा. आयुक्तसो यांचे दिनांक ०५ सप्टेंबर २०२३ रोजीच्या बैठकीतील निर्देश. ५. मा. आयुक्तसो यांचे दिनांक २७ सप्टेंबर २०२३ रोजीच्या बैठकीतील निर्देश. मा. सादर स्वच्छ भारत अभियान नागरी १५ मे २०२२ पासून महाराष्ट्रात राबविण्यात येत आहे. दिनांक ०१ ऑक्टोबर २०१७ रोजी महाराष्ट्र राज्याचा संपूर्ण नागरी भाग हगणदारी मुक्त म्हणजे ODF म्हणून घोषित करण्यात आला आहे. या अनुषंगाने हा दर्जा टिकवून ठेवणेसाठी संदर्भ क्र. ०१ व संदर्भ क्रमांक ०२ मध्ये सूचित केले आहे. याकामी संदर्भ क्रमांक ०२ मध्ये एक महत्त्वाचा घटक म्हणजे शहरातील सेप्टिक टाक्यांमधील मैला उपसा निर्धारित वेळापत्रकानुसार म्हणजेच शेड्यूल डीस्लजिंग करणेबाबत सूचना प्राप्त झाल्या आहेत. तसेच ODF++ व Water+ टुलकिट मधील मार्गदर्शक सुचनांनुसार महापालिकेस ODF++ व Water+ मानांकन मिळविणेसाठी प्रत्येक ३ वर्षांतून एकदा शहरातील सेप्टिक टँक उपसा / खाली करणे अनिवार्य आहे. सदरचे सर्व सेप्टिक टँक उपसा / खाली / रिकामे करण्यासाठी The Prohibition of Employment As Manual Scavengers and their Rehabilitation Act 2013 नुसार हाताने अथवा सफाई कर्मचाऱ्यामार्फत मैला उपसा करणे हा गुन्हा असलेने याकामी यंत्रसमुग्रीचा वापर करणे आवश्यक आहे. शासन निर्णयानुसार शेड्यूल डीस्लजिंग / मैला उपसा निर्धारित वेळापत्रकानुसार होणेसाठी शहरातील एकूण सेप्टिक टाक्यांची संख्या निश्चित करणे यासाठी ॲपद्वारे ऑनलाइन सर्व्हे करणे आवश्यक आहे. महानगरपालिकेच्या यंत्रणेमार्फत शेड्यूल डीस्लजिंग सेवा पुरविणेचे असलेस : आवश्यक यंत्रसामुग्री / मैला उपसा वाहन उपलब्ध करून घेणे व त्यासाठी तज्ञ मनुष्यबळ उपलब्ध करून देणे. तसेच सेवा अमलबजावणी पूर्वी कर संकलनामध्ये आवश्यक तो बदल / सुधारणा करून धोरण निश्चित करणे व यासाठी प्रशासकीय ठराव करणे. (आर्थिक तथा धोरणात्मक निर्णय) बाह्य यंत्रणेमार्फत शेड्यूल डीस्लजिंग सेवा पुरविणेचे असलेस : संदर्भ क्र. ०५ व ०६ मधील बैठकीतील मा. आयुक्तसो यांनी दिले निर्देशानुसार कार्यकारी अभियंता, पाणी पुरवठा यांचे विभागामार्फत शहरातील सेप्टिक टाक्यांमधील मैला उपसा निर्धारित वेळापत्रकानुसार म्हणजेच शेड्यूल डीस्लजिंग करणेसाठी वरील निविदा प्रक्रिया करणेकामी पुढील कार्यवाहीस सादर.
(सुभाष देशपांडे) कार्यकारी अभियंता पाणी पुरवठा विभाग इचलकरंजी महानगरपालिका	


OZONE SUCTION CUM JETTING MACHINE (CAPACITY 8000 LTR)


विटा नगरपरिषद सेवा अंतर्गत
MH 12 TV 2715
MH12T V2715


विटा नगरपरिषद सेवा अंतर्गत
MH12T V2715


KAM-AVIDA



MahaSaniTrack is a mobile application for tracking septic tank desludging operations. It assists ULBs to monitor safe disposal of faecal sludge from septic tanks to treatment plants, which is key to achieve the ICT goal under SBM 2.0, Swachh Sarvekshan and Safai Mitra Surakshit Sheher. Chief officers / sanitation engineers / supervisors are provided with web dashboards which show real-time information on city coverage, household readiness, safe disposal and use of personal protective equipment etc.

To enable effective implementation, training programs for sanitation workers and municipal staff have been conducted to familiarize them with app-based tracking and data management. These measures ensure not only the seamless operation of desludging services but also that all collected waste is treated at dedicated facilities, aligning with climate-resilient municipal service delivery goals.

By integrating proactive desludging into sanitation systems, communities are better equipped to manage the impacts of climate change while safeguarding public health and the environment.

Treatment:
Nature based FSTP and Co-treatment STP

Addressing climate-resilient sanitation extends beyond desludging to include the efficient treatment of faecal sludge. In areas implementing scheduled desludging, treatment facilities must adapt to manage the increased inflow while remaining resilient to climatic challenges such as heavy rainfall. To meet these needs, nature-based treatment solutions and innovative upgrades are being incorporated into the sanitation infrastructure.

At the treatment facility, enhancements ensure the sustainability and effectiveness of the sludge management process. Solar panels have been installed to make the facility energy-neutral, aligning with climate-resilient goals.

The treatment process begins with the dewatering of sludge in Sludge Drying Beds (SDB), followed by an Aerobic Baffled Reactor (ABR) for advanced organic matter digestion. Planted gravel filters further remove odors and discoloration, and a final chlorination step ensures disinfection and safe reuse of the treated wastewater.

To tackle frequent rainfall and ensure uninterrupted operations, the SDBs are now sheltered under protective sheds. This adaptation prevents rainwater interference, maintaining the efficiency of sludge drying and ensuring the facility remains fully functional during adverse weather conditions. Such upgrades not only enhance operational resilience but also demonstrate a holistic approach to integrating climate considerations into sanitation systems.


Photos for urban forest
1. Area mapped in map
2. Before and after photos
3. Date/Month wise growth of Miyawaki forest photos to show the growth

Reuse:
Development of Carbon Sinks (Urban Forest)

Urban forests have emerged as a powerful tool for enhancing climate resilience while aligning with the principles of the Swachh Bharat Mission 2.0 and Maharashtra's Reuse Policy. These policies advocate for the reuse of treated wastewater for non-potable purposes, such as watering gardens and supporting urban green initiatives. Through integrating this approach, cities have turned unused land near treatment facilities into thriving ecosystems.

These forests, designed using the Miyawaki method, which emphasizes dense, multi-layered plantations of native species have been established on clean land near FSTPs or STPs. Covering a total area of **19,764 square meters** and planting **10,306 trees** to date, these forests not only act as vital carbon sinks, sequestering CO2 emissions, but also conserve natural resources by reusing treated wastewater from FSTPs or STPs for irrigation. These initiatives has saved an estimated **80 million liters** of fresh water, highlighting the practical benefits of sustainable water reuse.

In a move to ensure inclusivity and community participation, **women-led Self-Help Groups (SHGs) have been engaged through formal tender processes to maintain these urban forests**. This approach not only empowers women economically but also instills a sense of shared responsibility in preserving these green spaces. To ensure inclusivity and community participation, women-led Self-Help Groups (SHGs) have been engaged for the maintenance of these forests. This engagement, formalized through a tender process, not only ensures the upkeep of the forests but also fosters economic opportunities and empowerment for local women.

Creation of Miyawaki-style urban forest

1471	10	2000	2385 tons
Trees	species	Sqm. Area	Sequester over 25 year

Urban Forest

Reuse of treated wastewater for Street & Divider Cleaning

> Women’s hands shaping a greener future for all.

Photos needs to be changed.

05

Mitigation Initiatives

5.1 GHG Emission Estimation
5.2 Energy Audit for WASH
5.3 Energy Transition
5.4 Reuse of Treated Water

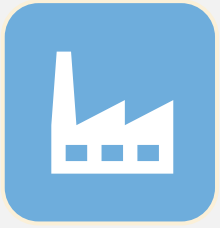
Priority sectors for Mitigation Initiatives

A shift towards mitigation actions highlights the commitment to reducing the overall carbon footprint of WASH services. Mitigation efforts focus on minimizing energy consumption and emissions through strategic interventions such as energy audits, energy transitions, and the quantification of greenhouse gas (GHG) emissions.

The energy transition emphasizes adopting renewable energy solutions and optimizing energy efficiency across the WASH chain. Conducting energy audits identifies inefficiencies in water and sanitation systems, paving the way for solutions that not only lower emissions but also reduce operational costs. Complementing these efforts, the GHG inventory provides a comprehensive measure of emissions from WASH services. This inventory allows service providers to understand the carbon footprint of their activities, pinpoint high-impact areas, and implement targeted emission-reduction strategies.

These initiatives not only mitigate climate impacts but also align with global sustainability goals by enhancing the operational resilience and environmental sustainability of municipal systems.

Solar installation across WASH



GHG Emissions Quantification

Energy Audit

Scheduled Desludging

EV Transition in Municipal fleets

Provision of IHHT

GHG Emissions Estimation

In the bustling streets of India's small and medium cities, the daily rhythms of life often mask an invisible challenge—the carbon footprint of essential services like water and sanitation. Imagine a community where every drop of water delivered, and every ounce of waste managed contributes to a growing global crisis: climate change. Yet, hidden within this challenge lies an opportunity. By addressing greenhouse gas (GHG) emissions, these cities can transform their basic services into powerful tools for climate action.

Greenhouse gas (GHG) emission estimation forms the cornerstone of effective climate action in the WASH sector. Recognizing the critical role of water and sanitation services in both contributing to and mitigating climate change, it is imperative to establish a robust baseline of GHG emissions across the WASH value chain. Using the IPCC's empirical methodology, direct and indirect emissions were systematically estimated for all the cities. This comprehensive assessment provided a clear understanding of the carbon footprint associated with diverse sanitation systems—on-site sanitation in Vita, sewer-based systems in Karad, and mixed systems in Ichalkaranji.

The estimation process not only quantifies the emissions but also identifies inefficiencies and hotspots, allowing targeted interventions to mitigate emissions. CWAS, in collaboration with municipal governments, has taken proactive steps under its CSR-funded program to support these cities in transitioning towards climate-resilient WASH systems. The program seeks to reduce emissions while enhancing adaptation capacities, ultimately contributing to global goals, such as limiting temperature rise to 1.5°C.

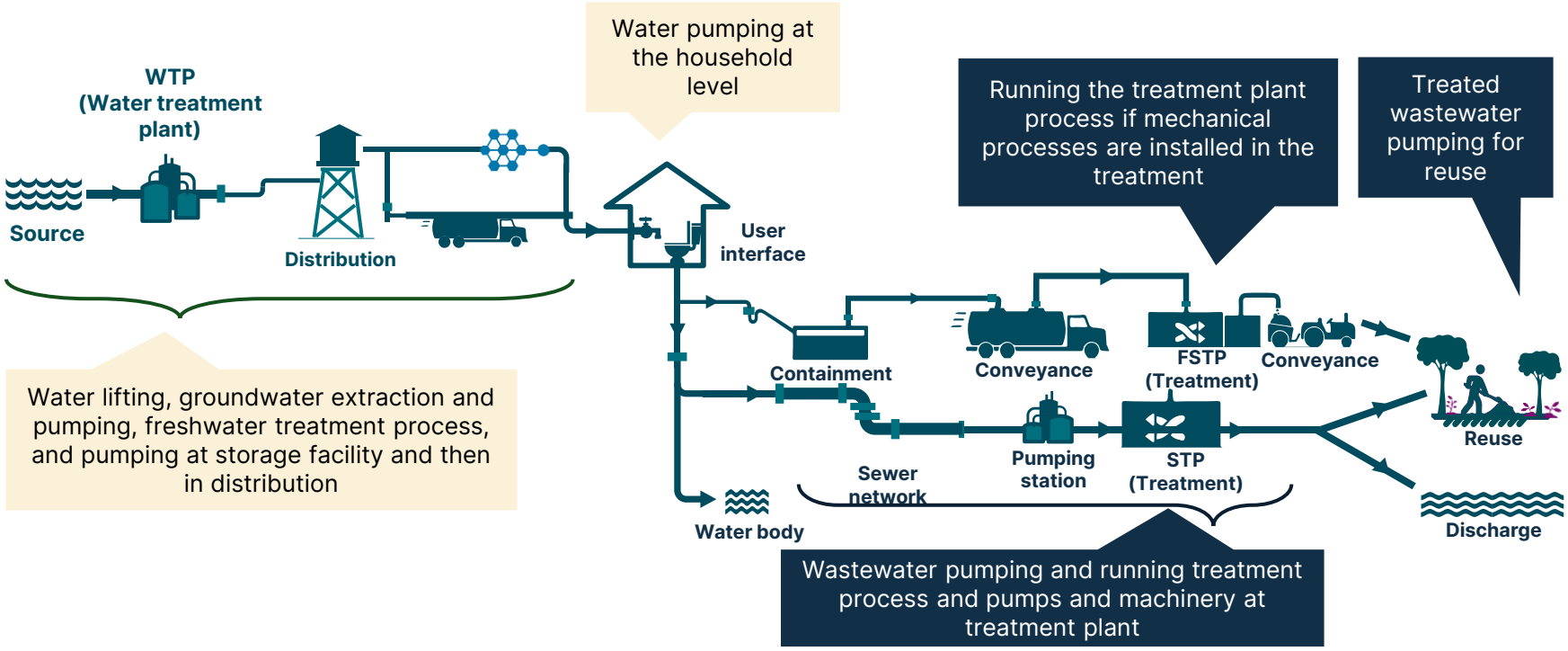
ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

IPCC (Intergovernmental Panel on Climate Change) is prime organization under united nations that decode the climate science and provides different finding associated with climate science. IPCC provides the standard emission factors for different sectors by validating different worldwide research and provide the theoretical estimation methodology with detailed explanation on the factors and formulas used to calculate the emission.

Energy Audit for WASH

In the context of growing energy demands and the need for sustainable development, energy efficiency within municipal services has emerged as a critical area of focus. Water, Sanitation, and Hygiene (WASH) services, which form the backbone of urban infrastructure, are significant contributors to municipal energy consumption—ranging from 40% to 90% of total energy use in various cities. Recognizing the energy-intensive nature of these services, energy audits were conducted in the cities of Vita, Ichalkaranji, and Karad to identify inefficiencies and recommend strategies for optimization.

To uncover hidden inefficiencies and opportunities, energy audits were conducted across the WASH infrastructure in these cities. These audits delved deep into energy consumption patterns, assessing areas of high use and operational bottlenecks. The findings painted a clear picture: outdated pumps and inefficient practices were driving up energy costs and emissions.



Addressing inefficiencies in energy use within WASH systems emerged as a critical step toward enhancing sustainability and reducing operational costs. Key interventions focused on replacing outdated pumps with energy-efficient models and establishing a robust maintenance schedule to optimize system performance. These measures were projected to significantly improve the energy efficiency of water supply and sanitation systems in Vita, Ichalkaranji, and Karad, resulting in substantial electricity cost savings.

Approx Savings of

INR 15 crore

annually in electricity costs for WASH systems in Vita, Ichalkaranji, and Karad.

Energy Transition

The Swachh Bharat Mission 2.0 and the Majhi Vasundhara Abhiyan have introduced transformative measures to integrate sustainability into urban development practices. Among these, promoting renewable energy sources such as solar power has emerged as a foundation of environmental and economic progress. These initiatives have set the stage for actionable strategies that transition cities towards cleaner energy solutions, directly addressing the dual challenges of carbon emissions and energy inefficiency. To support this, CWAS, in partnership with Urban Local Bodies (ULBs), has taken significant steps to implement solar energy systems and based on detailed city-specific assessments, both on-grid (PV) and off-grid solar systems have been installed at water and wastewater treatment facilities in Vita, Karad, and Ichalkaranji. This initiative has translated into real-world interventions that not only support climate goals but also deliver measurable benefits for urban communities.

Solar power projects have been installed at water and wastewater treatment facilities at;

Ichalkaranji

- 81 KW Capacity
- On the rooftop of the filter house at the water supply treatment facility.
- CSR Grant

Karad

- 72 KW Capacity
- On top of the Solid Waste Management shed.
- CSR Grant

Vita

- 40 KW Capacity
- On water pump house & on the shed of the sludge drying beds at the FSTP
- CSR Grant & ULB own funds

ULBs are working to expand solar capacity, aiming to scale up to 2200+ kW in the near future.

Solar panels are installed on the filter house rooftop at Ichalkaranji's water treatment facility.

SDB shed and solar panels installed at Vita FSTP.

Solar panels are installed on the Solid Waste Management shed rooftop in Karad Municipal Council.

Addressing inefficiencies in energy use within WASH systems emerged as a critical step toward enhancing sustainability and reducing operational costs. Key interventions focused on replacing outdated pumps with energy-efficient models and establishing a robust maintenance schedule to optimize system performance. These measures were projected to significantly improve the energy efficiency of water supply and sanitation systems in Vita, Ichalkaranji, and Karad, in order to substantial electricity cost savings.

Impact and Benefits

- Low energy cost
- Increased renewable energy usage
- Reduction in GHG emissions
- Asset creation at no upfront investment

Reuse of Treated Water

In alignment with mitigation efforts, CWAS has supported the reuse of treated wastewater and solids at the Faecal Sludge Treatment Plant (FSTP) and the Sewage Treatment Plant (STP). These interventions shows resource efficiency by repurposing treated water and byproducts for sustainable urban applications. At both facilities, treated wastewater has been utilized to irrigate urban forests developed adjacent to the treatment plants. These forests consist primarily of indigenous tree species, contributing to improved urban greenery and biodiversity. Additionally, treated water has been allocated for watering road medians, fire extinguishers, and other municipal uses, supported by a dedicated tanker service in each city. These practices are demonstrating how innovative reuse strategies can effectively reduce the environmental impact of WASH services, enhance urban resilience, and support broader climate goals.

Saplings of different species were placed in the plantation area.

19,764
Sqm. Area

10,306
Trees Planted

80 ml. Liters
Freshwater saved through
Treated wastewater reuse

Tanker filling point for treated wastewater

Reuse for Vehicle Washing

Reuse of treated wastewater for Irrigation and Urban Forest

Require similar photo for this type of initiatives

06

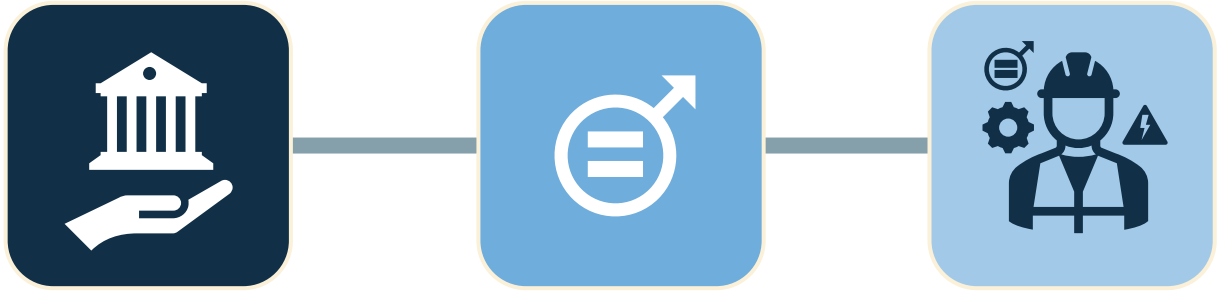
Cross Cutting Initiatives

6.1 Gender Inclusivity in WASH Service Delivery
6.2 Ensuring the Safety of Sanitation Workers
6.3 Strengthening Municipal Finance

Photos needs to be changed.

Cross cutting Initiatives

Recognizing the multifaceted challenges faced by urban areas under various national missions like SBM 2.0, it became evident that sustainable and inclusive solutions require addressing broader systemic issues. These cross-cutting initiatives were designed as an integral part of the strategy to ensure a citywide inclusive approach. Drawing from the principles of equity, sustainability, and resilience, these initiatives emerged from a comprehensive analysis of urban needs and feedback from key stakeholders. They focus on creating a strong foundation for inclusive urban sanitation systems while aligning with broader climate and development goals. The following key focus areas were identified to align with broader objectives of inclusivity and resilience:



Municipal Strengthening

Gender Inclusivity

Safety of Sanitation Workers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Gender Inclusivity in WASH Service Delivery

Gender inclusivity has been a priority across the WASH service chain, particularly in enhancing access to sanitation. As part of this, increasing coverage of individual household toilets was emphasized, with CWAS actively supporting Urban Local Bodies (ULBs) in generating demand and mobilizing toilet applications under the Swachh Bharat Mission (SBM). This effort aligned with national goals to ensure equitable access to sanitation facilities for all households.

Additionally, another focus area has been the formal engagement of Self-Help Groups (SHGs) in climate and WASH-related activities. SHGs have been involved in various initiatives through dedicated tenders and contracts tailored to their capacities. Some notable examples include:

Urban Forest Maintenance:

Women SHGs have been entrusted with the O&M of urban forests at FSTP and SWM sites, where treated wastewater is reused to irrigate indigenous plant varieties. These groups, registered under NULM, receive training and handholding support to ensure efficient operations. The contract has been renewed for a second cycle due to their successful management.

8000+ Sq.mt of urban forest maintained by women of SHGs

Menstrual Hygiene and Management (MHM):

SHGs are engaged in the operations and maintenance of menstrual hygiene facilities in community and public toilets. Their responsibilities include ensuring the functionality of sanitary pad vending machines and incinerators, refilling pads, and disposing of incinerator ash. Additionally, these SHGs play a vital role in raising awareness about safe MHM practices among users of public toilets.


Integrating
Gender,
Sexuality,
and Rights
in Urban
Sanitation

To ensure the sustainability and scalability of gender inclusivity efforts, it was essential for decision-makers and implementers to understand and recognize its importance. To achieve this, a training workshop was organized for Heads of Departments, their subordinate staff, and sanitation workers. The workshop focused on raising awareness of gender dynamics, intersectionality, and the provisions of the PoSH Act, 2013.

The training included interactive sessions that encouraged participants to engage with real-life examples, group activities, and thought-provoking presentations. These sessions aimed to highlight gender roles, societal norms, and the need for an inclusive approach to service delivery.

45
Head of Departments (HoDs)

130
Staff Trained

Require clear photo for this page

Ensuring the Safety of Sanitation Workers

Building on the principles of inclusivity and equity, the focus on sanitation worker safety has been a priority of CWAS's efforts to foster dignified working conditions. Recognizing the risks faced by these workers, CWAS partnered with ULBs to institutionalize safety practices, emphasizing the provision and proper use of personal protective equipment (PPE). By integrating safety provisions into labor contracts, developing model procurement tenders, and ensuring budget allocations for activity and gender-specific PPE, CWAS helped establish a structured framework for worker safety.

Additionally, training workshops and health camps were organized to encourage consistent PPE use and promote awareness of workplace health. These measures reflect a comprehensive approach to safeguarding sanitation workers while supporting their rights and dignity.

500

Sanitation Workers trained

Model Contracts Clauses

for safety of sanitation workers shared with cities


MOISTURE
ION CUM JETTING MACHINE (CAPACITY 8000 LTR)

Require more photo for this point


कराड नगरपरिषद, कराड.
सार्वजनिक शौचालय
कराड नगरपरिषद, कराड.
सार्वजनिक स्वच्छतागृह
(पुरुषांसाठी)


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Strengthening Municipal Finance

Achieving long-term sustainability for WASH-climate initiatives requires robust financial mechanisms to ensure adequate funding and efficient allocation. Recognizing this, CWAS collaborated with ULBs to strengthen municipal finance systems, enabling them to scale and sustain these critical interventions. As part of the effort, CWAS conducted evaluations of municipal budgets, offering tailored recommendations to optimize revenue generation and improve fund allocation. Tools such as budget briefs were utilized to present financial data in an accessible and actionable format, fostering informed decision-making by local governments.

To ensure funds were effectively utilized, allocations were made under key budget categories supporting essential activities, including:

- Scheduled desludging operations.
- Operation and maintenance of Faecal Sludge Treatment Plants (FSTPs), Sewage Treatment Plants (STPs), and urban forests.
- Installation and expansion of solar panels at STPs, FSTPs, and Water Treatment Plants (WTPs).
- Menstrual Hygiene Management (MHM) facilities.
- Procurement of Personal Protective Equipment (PPE) for sanitation workers.

This financial approach not only ensured the effective implementation of WASH-climate programs but also laid the groundwork for their long-term viability, aligning municipal efforts with broader sustainability and climate resilience goals.


MAHARASHTRA

07

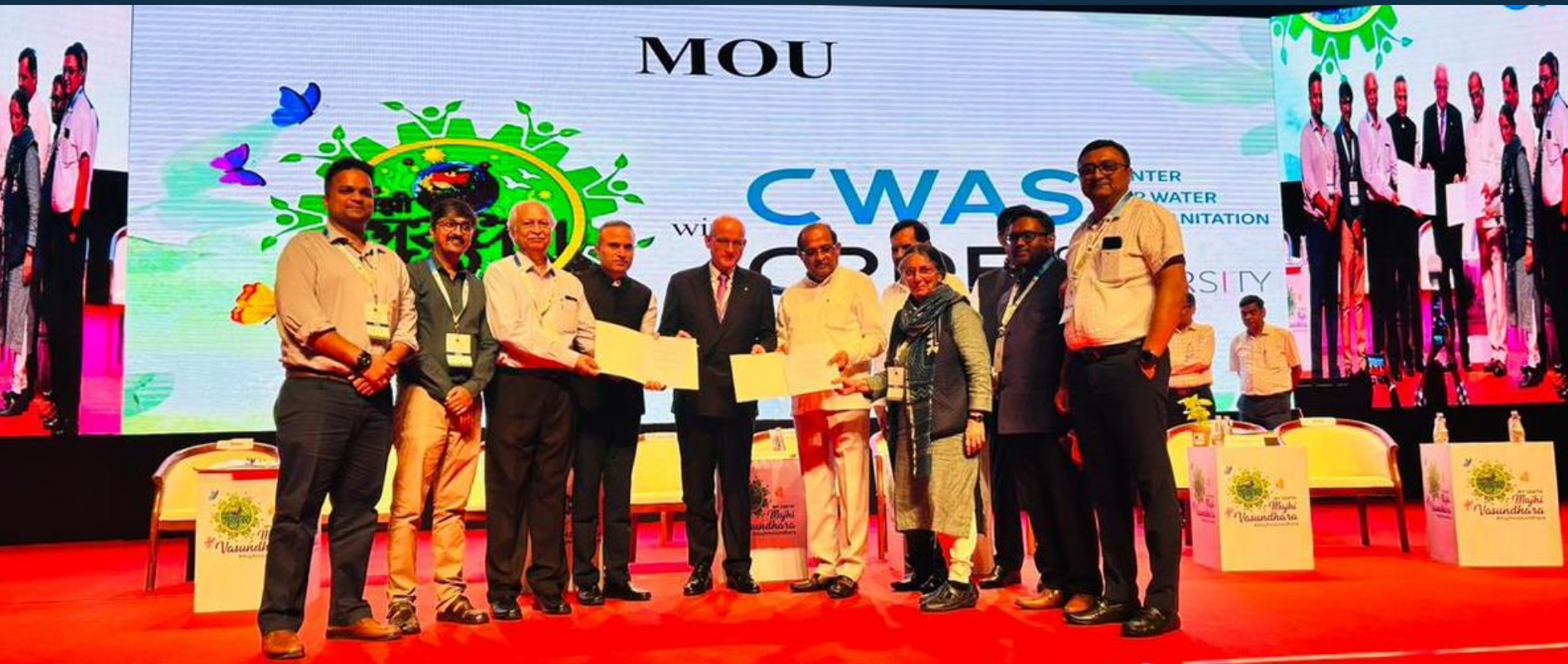
Scale Up

7.1 State-level Partnership for Climate-Resilient WASH
7.2 City-level Partnership for Climate-Resilient WASH
7.3 Scale up Activities

State-level Partnership for Climate-Resilient WASH

CWAS signed an MoU with “Maharashtra’s Environment and Climate Change Department” ***to support and advance WASH and climate efforts under the state’s Majhi Vasundhara program***, including resource material development, capacity-building workshops, practice schedules, and fostering cross-learning among cities.

In 2023, on #WorldEnvironmentDay, CWAS signed an MoU with the Department of Environment and Climate Change, Government of Maharashtra.



Scale Up Activities

To drive the transformation towards climate-resilient WASH systems, the partnership between CWAS and Maharashtra's Environment and Climate Change Department is focused on several key initiatives designed to scale up climate-responsive WASH practices across the state. These initiatives are aligned with the goals of the Swachh Bharat Mission (SBM) and the Majhi Vasundhara program, which aims to enhance environmental sustainability through five key components:

- Development of model contracts for PPP-based solar installations
- Formulation of guidelines for engaging women and promoting climate-responsive WASH development
- Provision of capacity-building support to cities
- Integration of WASH-climate linkages into the Majhi Vasundhara toolkit
- Preparation of advocacy materials highlighting WASH-climate linkages

City-level Partnership for Climate-Resilient WASH

As urban areas across India face increasing pressures from climate change, water scarcity, and sanitation challenges, ensuring the sustainability and resilience of Water, Sanitation, and Hygiene (WASH) services has become a critical priority. In the initial stages, pilot projects implemented by CWAS and local urban bodies provided valuable insights into addressing the intersection of climate resilience and WASH. However, these early-stage projects faced several challenges, including limited funding, insufficient technical capacity at the local level, and the need for more robust systems to integrate climate considerations into urban infrastructure.

To overcome these barriers and ensure long-term sustainability, scaling up these efforts to citywide initiatives became essential. This scale-up allowed for the broader implementation of climate-resilient WASH practices, supported by financial contributions from Urban Local Bodies (ULBs) and prize money from the Majhi Vasundhara Mission, which focuses on environmental sustainability.

The scaling-up process has had a significant impact by enabling ULBs to secure long-term funding and integrate climate-resilient WASH systems across cities. By providing technical support, conducting municipal finance assessments, and fostering cross-learning among cities, these initiatives ensure the continued success and inclusivity of WASH services, contributing to sustainable urban development and climate resilience in the long run.

Supported photos required.

Scale Up Activities

CWAS collaborated with Urban Local Bodies (ULBs) to expand pilot projects into citywide initiatives, leveraging local resources and expertise. These efforts have significantly enhanced the scale and impact of climate-resilient WASH interventions:

Pilot initiative supported by CWAS		Leveraged scale up project by ULB
• 81 kW solar panel at STP • 1000+ trees plantation on 1045 Sq.mt. Land	Ichalkaranji Municipal Corporation	• 550 kW at WTP and 1.2 MW at IMC buildings ***– 5,00,000 USD*** • Greenbelt plantation on 1125 Sq.mt land with 1000 trees
• 72 kW solar panel at STP • 1400+ trees plantation on 4000 sq.mt	Karad Municipal Council	• 280 kW at STP, 80 kW at town hall and 400 kW at WTP ***– 2,30,000 USD*** • 1400+ tree plantation
• 22 kW at Panchshil Nagar pump house and 8 kW solar panel at FSTP	Vita Municipal Council	• 10 kW at Vivekanand Nagar pump house ***– 12,000 USD***

16% reduction in dependency on conventional energy source of municipal services as per current usage

- 225 MWH Clean energy Generated till Feb 2024
- 5630 MWH, Clean energy generation potential over 25 years
- 4617 tons of Co2, emission reduction potential over 25 years

₹ 200K USD saving over 25 years

- 1090 KW Clean energy to be installed
- 35,000+ MWH, Clean energy generation potential over 25 years
- 28,000 tons of Co2, emission reduction potential over 25 years

₹ 3M USD savings over 25 years

Partners

स्वच्छ भारत
एक कदम स्वच्छता की ओर

एकच लक्ष्य शहरे स्वच्छ
स्वच्छ महाराष्ट्र अभियान (नागरी) २.०

माझी वसुंधरा

इचलकरंजी महानगरपालिका
ICHALKARANJI MUNICIPAL CORPORATION
•प्रेतं मे जनहितपालनम्•
स्थापना 2022

विटा नगरपरिषद, विटा.
स्थापना : १८५४

कराड नगरपरिषद, कराड.
स्थापना : १५-९-१८५५

HSBC

CWAS CENTER FOR WATER AND SANITATION

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About us

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