

Beyond toilets: the Wai-Sinnar model for safe and sustainable citywide inclusive sanitation

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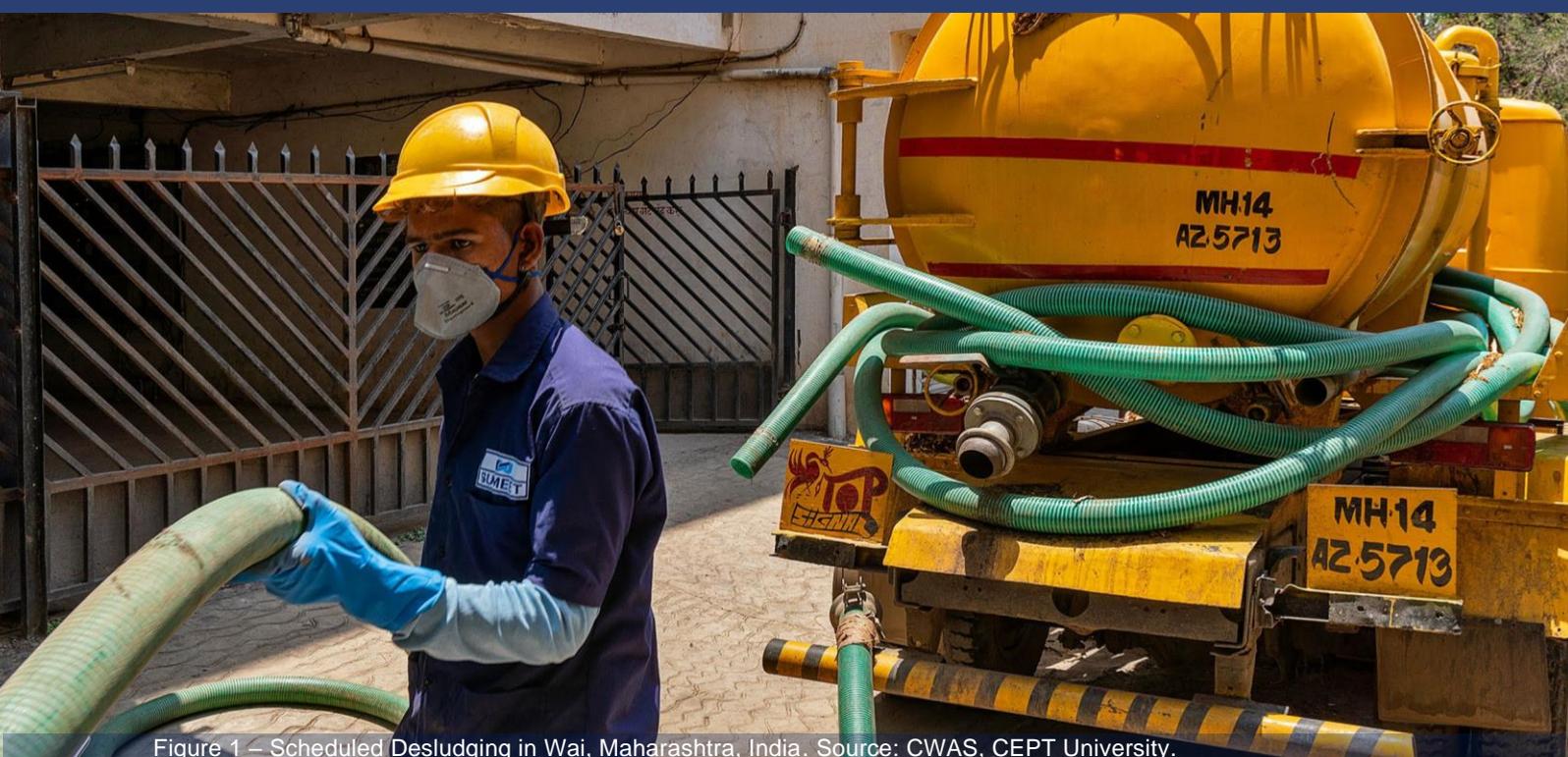


Figure 1 – Scheduled Desludging in Wai, Maharashtra, India. Source: CWAS, CEPT University.

Summary

Wai and Sinnar are located in Maharashtra. Wai is a pilgrim city with a population of 43,000, whereas Sinnar is a rapidly emerging industrial city with a population of 74,000. Together these two are representatives of more than 7,400 small and medium cities in India where over 40% of India's urban population resides.

Like many other settlements in India, Wai and Sinnar faced sanitation-related issues such as open defecation, disposal of untreated faecal waste (includes both faecal sludge and septage) in the open, financial constraints in providing safe sanitation services and growing environmental

pollution. However, both the cities have now overcome these issues and are providing improved sanitation services across the value chain.

Wai and Sinnar carried out a unique “Own Toilet scheme” offering subsidies to households for construction of an individual toilet, even before the launch of the Swachh Bharat Mission (SBM). They are also the first localities in India to implement the city-wide scheduled emptying of septic tank services and among the few to have a dedicated Faecal Sludge Treatment Plant (FSTP). All the initiatives undertaken to improve the sanitation services have been inclusive and sustainable in terms of finance and operations through partnerships with the private sector and using the city’s own funds. Both local governments took ownership of the initiatives and institutionalized them through partnerships with the private sector and ordinances of the city council.

Wai and Sinnar have now emerged as models for other small and medium settlements of India in the sanitation sector. In addition, many small cities in South Asia and Africa facing similar issues can learn from their experience (C-WAS, CEPT University). Wai and Sinnar have demonstrated that, for small and medium settlements, it is feasible to offer high quality, affordable, equitable and inclusive sanitation services to all the citizens.

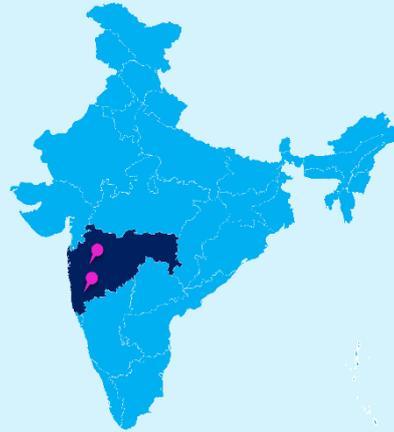
Overview

Geographical information

Country: India

City: Wai and Sinnar, Maharashtra

City population: 43,000 in Wai and 74,000 in Sinnar



Problem

- Access to toilets: In both cities, about a third of the households did not have access to individual household toilets. There was high dependence on community toilets and open defecation (OD) was also observed in specific “OD spots” in the cities.
- Containment systems and conveyance: Both cities were completely dependent on onsite systems with most household toilets connected to septic tanks. Tanks were not emptied regularly as prescribed by the Central Public Health & Environmental Engineering Organisation (CPHEEO) guidelines. Most septic tanks were cleaned only once in 8–10 years when they overflowed. The resultant low-quality effluent containing unsettled faecal matter was being released into open drains. The emptying service was provided by the local governments on a demand / complaint-based system which was chargeable.
- Conveyance and disposal of septage: Both cities were disposing of this collected untreated septage on open land at their solid waste dump sites due to lack of any treatment facilities.

Solution

- Ensuring safe sanitation across the sanitation value chain in both the cities.
- Tracking environmental benefits.
- Fostering inclusive sanitation from the perspective of vulnerable populations, gender equity and social inclusivity.
- Municipal strengthening and sustainable finance mechanism.

Problem

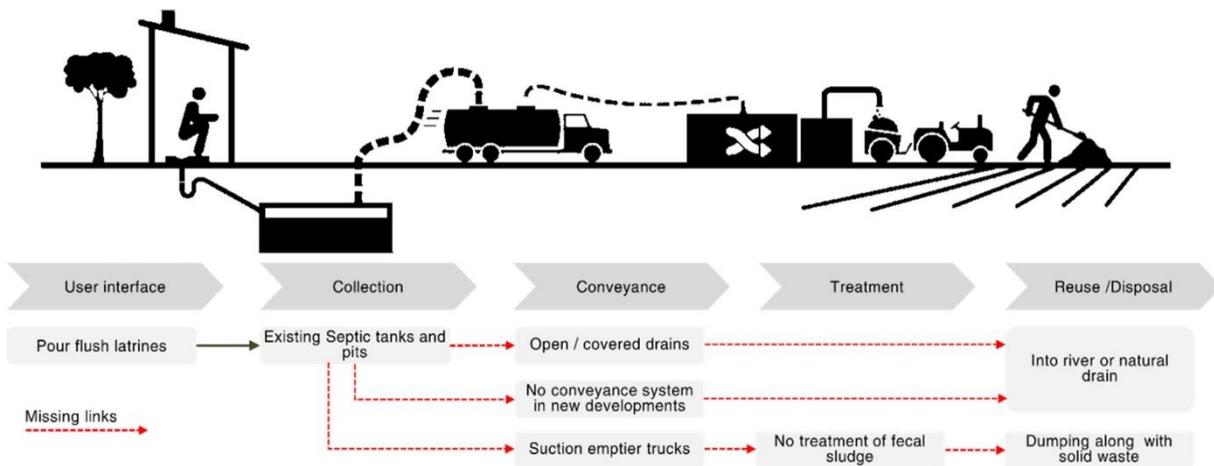


Figure 2 – Sanitation Service Chain. Source: CWAS, CEPT University.

Access to Toilets: As per census 2011, 32% of households in Wai and 37% in Sinnar did not have access to individual toilets. As a result, they either used community toilets or defecated in the open. In the community toilet blocks, 6% (Wai) to 13% (Sinnar) of the toilet seats were non-functional (CWAS, CEPT University, 2015). In both the cities, “OD spots” were present where open defecation was observed. Also, during some of the household level assessments, it was found that lack of space and finance, and issues related to land titles were the major problems faced by households while constructing their own toilets.

Collection/containment system for toilets: Both cities were completely dependent on onsite systems with most household toilets connected to septic tanks. Detailed studies showed that tanks were not emptied regularly as prescribed by the CPHEEO guidelines. Most septic tanks were cleaned only once in 8–10 years when they overflowed. The resultant low-quality effluent containing unsettled faecal matter was being released into open drains. Figure 2 shows the missing links across the sanitation service chain. Tanks were also not designed according to standards. Some were oversized so they would last for years without need for emptying (CWAS, CEPT University, 2015).

Conveyance and disposal of septage: Both the municipal councils owned one suction emptier truck each which was used to provide demand-based emptying services in a complaint redressal model to the households against a charge of INR 400–1000 (USD 5–12)/trip. The collected faecal sludge was then disposed on open land at their solid waste dump sites without any treatment (CWAS, CEPT University, 2015).

Solution

1. Partnership with respective city governments for citywide sanitation improvement planning.

In 2013, the CEPT University Center for Water and Sanitation initiated their support for some city sanitation efforts in Wai and Sinnar after consulting with Maharashtra Jeevan Pradhikaran and Water Supply and Sanitation Department of government of Maharashtra (WSSD). The aim was to prepare city sanitation plans for both cities, emphasizing universal access to toilets based on outcome-centric options rather than technology and ensuring financial sustainability.

The first step was to conduct citywide sanitation assessment in both cities using performance indicators. With the help of a survey and monitoring-based mobile application called SaniTab, a detailed database of the sanitation has been generated in both the cities.

The city governments decided to focus on two priorities - making the cities open defecation free and initiating faecal sludge and septage management. CWAS was involved in providing implementation and monitoring-related support in this stage.

Both cities signed council resolutions for implementing the proposals. This ensured that the city government took ownership of the initiatives and that the plan was not disturbed by change in office positions.

2. Achieving an open-defecation-free city:

- a) **Own Toilet Scheme, Swachh Bharat Mission and Sanitation Loans:** With the aim of making these two cities open defecation free, both the Municipal Councils of both cities came up with the “Own Toilet Scheme”, where subsidies were provided to the households from the municipal funds. The main objective here was to focus on household toilets for sustained use and universal coverage by unlocking the latent demand for “own toilets” through demand-driven schemes at the local level. The scheme was launched before Swachh Maharashtra Mission and later it was merged with the national mission. Households without toilets were offered subsidies to construct their own facilities. Under situations such as lack of space, funds or other tenure related problems, the Urban Local Bodies (ULBs) also came up with concept of “Group Toilet” where 2–4 neighboring households can share one toilet. The CWAS team also engaged people at grassroots level and provided architectural solutions to address space constraints. An awareness campaign was conducted for those having major financial constraints to encourage them to take sanitation loans to bridge the gap between subsidies and construction cost. A “Toilet and Lender” fair had also been organized where multilevel stakeholders were

brought together. Due to these efforts, ownership of toilets increased and usage has been very high (CEPT University and All India Institute of Local Self Government, 2015).

- b) **Community and Public Toilets:** The team had carried out surveys to evaluate the condition and functionality of existing community and public toilets in both Wai and Sinnar. Based on the assessment, Community Toilet/ Public Toilets (CT/PTs) were refurbished for those who still cannot afford Individual Household Toilets (IHHT). These CTs and PTs have undergone further upgrades to adhere to the SBM Open Defecation Free (ODF)+ protocol and to make them inclusive, especially for women and vulnerable households. To do this, assessments were done for the infrastructure, usage patterns and O&M contracts of all the CTs and PTs through a gender lens. Recently, facilities for menstrual hygiene management have been added along with other upgrades.
- c) **Discouraging Open Defecation:** It was crucial to make sure that after toilets were built, people used them and did not return to open defecation. A group of volunteers had been assigned who coordinated "Good Morning Pathak" tours around the OD locations on a regular basis in the early morning and late evening. If a citizen is discovered urinating in public, appropriate action is taken. The CWAS team is also supporting plans for development of existing OD spots into public spaces and improvements in the surrounding environment.
- d) **School Sanitation:** To further ensure persistent use of toilets, assessments were done for toilet facilities in all schools where the children spend a considerable portion of their day. One of Sinnar's larger schools successfully ran a crowd funding campaign as a pilot project to raise funds to refurbish the sanitation infrastructure of the school. Zapwadi School in Sinnar has now installed brand new toilets for the students.

3. Ensuring safe conveyance of septage.

The next stage of the sanitation value chain was to manage the faecal sludge generated from the household toilets.

Ensuring regular emptying of septic tanks: A plan for scheduled emptying of septic tanks was envisioned where service would be provided to all properties according to a pre-determined schedule spanning a cycle period of 3 years. The cities were divided into three parts and each part was taken up in turn every year. Thus, each property receives the septic tank emptying service once every 3 years. The plan ensures that the onsite sanitation systems function well, and the emptying service is provided to all regularly. This is a first-of-its-kind plan in India and to ensure its success, an awareness campaign was also taken up. Wai's first three-year cycle of scheduled desludging was successfully completed in 2022. Over 6800 households in Wai have been covered with 95% of acceptance rate of the service.

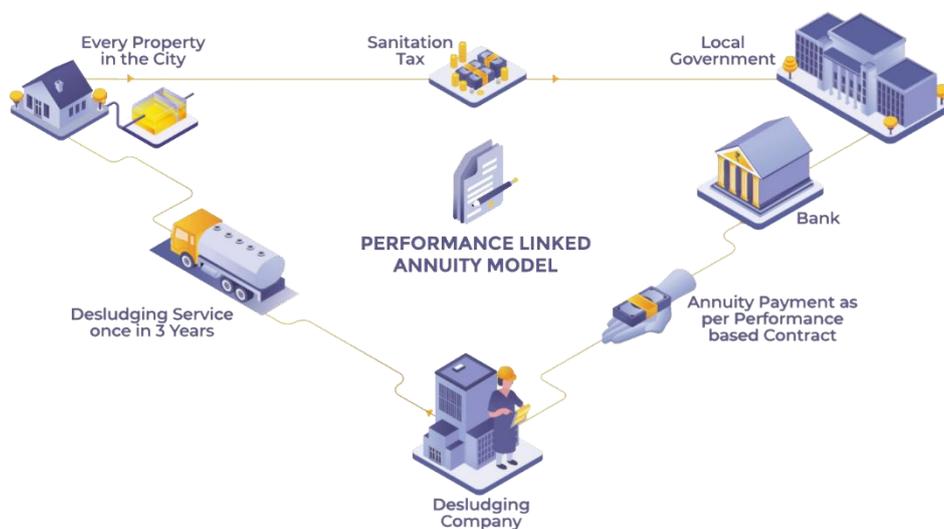


Figure 3 – Performance Linked Annuity Model. Source: CWAS, CEPT University.

Engaging the private sector through performance-based contracts: For carrying out emptying and treatment, the cities decided to partner up with private companies through a PLAM (Performance Linked Annuity Model) type agreement as shown in Figure 3. CEPT team provided transaction advisory support to the cities for developing performance-based contracts. Both cities had floated tenders on the State Government’s online portal and contractors were carefully selected through a transparent process to take up scheduled emptying and also construct and run the FSTPs. Agreements with these contractors contain conditions to protect interest of all parties. Payments linked to performance standards help maintain quality of service and safety compliance, such as the prohibition of manual scavenging, requirement of safety gear for workers, quality of suction trucks, cleaning up of spillage, assigning responsibility for damage to septic tanks, quality of construction, quality of treated sludge and timeliness of service. On the other hand, the contractor is also protected against payment delay through an escrow account mechanism where the city government maintains an amount equal to three months of payment.

4. Ensuring treatment and reuse of:

- a) **FSTP set up:** To ensure that all the sludge that is collected was disposed of safely, faecal sludge treatment facilities were proposed. The cities, according to the council resolutions, allocated land and funds for the treatment facility. While Wai city went through a donor-led funding route, Sinnar rolled out tenders and engaged a private company through a Design-Build-Operate contract with its own funds. Citywide tests were done to understand the quality of septage being generated and the technology and capacity required from the FSTPs. In both cities, treatment facilities have been installed

and have treated almost 44 million litres of faecal sludge and septage by 2022. The FSTPs in Wai and Sinnar are among the first few FSTPs in India.

- b) **Reuse of treated sludge and water:** One of the core components of the treatment of faecal matter in both cities is reuse. In Sinnar, the treated water is used for spreading out an urban forest over an area of 8000 sqm. which is sprouting next to the FSTP land as seen in Figure 4 a and b. The treated solid is used as fertilizer for the urban forest. The forest is attracting a variety of living creatures including birds and butterflies and has a wide variety of plants, which enriches the city's biodiversity. In Wai, treated water is used for plantation within the site and several use cases have demonstrated including pilots for firefighting, vehicle washing, road plantation etc.



Figure 4a – Faecal Sludge Treatment Plant in Wai City. Source: CWAS, CEPT University.



Figure 4b – Faecal Sludge Treatment Plant and Adjacent Urban Forest in Sinnar City. Source: CWAS, CEPT University.

5. Tracking environmental benefits.

As a result of scheduled desludging, the performance of septic tanks has improved which has in turn improved the quality of effluent flowing through drains into the rivers. A water quality monitoring exercise was carried out to keep track of this environmental impact in accordance with the recommendations made by the Maharashtra State Pollution Control Board (MPCB) and the Central Pollution Control Board (CPCB). A study by Jaiswal et al. (2022) in Wai city has shown that with the desludging, the quality of supernatants has improved, and this has led to improvement in the quality of drain water. While inspecting the open drain samples in desludged areas, 50–60% decreases in the value of Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD) load was observed as the concentration of septic tank effluents have reduced.

6. Fostering inclusive sanitation from the perspective of vulnerable populations, gender equity and social inclusivity.

Both cities have thrived on making their sanitation service delivery inclusive. To ensure universal access to toilets, women's Self Help Groups have been approached to encourage applications for toilet subsidies and promote sanitation loans through internal or formal lending. Community and public toilets in both the cities have also been assessed with a gender-sensitive-design approach. All properties within the city are provided with desludging services on a mandatory basis with no fee imposed at the time of desludging. Instead, a small sanitation tax is levied on all properties in both cities. Also, to ensure desludging service are applied equally across the cities, including in low income and slum areas, the desludgers carry long pipes which are able to reach septic tanks located at the end of narrow lanes in high density localities.

In Wai, workshops have been organized for women decision makers to brief them about the sanitation programme. On the service side in Wai, the treatment operations as well as desludging operations are being led by women. When it comes to sanitation workers' health and safety, ample attention is provided on proper usage of Personal Protective Equipment (PPE), such as gloves, face masks, helmets, safety goggles etc. It is mandatory for all desludgers as well as treatment plant operators to use appropriate gear on their jobs. In Wai, a sensitization workshop cum health camp was held for all sanitation workers, including those from the solid waste management department, where workers were sensitized about the proper use of safety gear and were also provided appropriate PPE. Their managers have also been trained to monitor the use of PPE.

7. Municipal strengthening and sustainable finance mechanism.

- a) **Institutionalizing Faecal Sludge and Septage Management (FSSM) and improving the monitoring process:** In order to institutionalize FSSM services, initiatives have been

suggested for various stakeholders to strengthen the institutional foundation of the city administration. The CWAS team has assessed the existing complaint redressal system in Wai and based on the analysis, measures were recommended to further improve the sanitation value chain. "Payment dashboard" and "Adava report"¹ have been created to enhance the monitoring process of payments by various private and governmental parties.

- b) **IT-enabled smart monitoring system for desludging:** CWAS helped the local authorities of both Wai and Sinnar to put in place a robust monitoring mechanism and enabled different stakeholders to use these systems and tools for monitoring and tracking the interventions. Two apps were created: SaniTrack tracks scheduled septic tank emptying operations and SaniTab captures on-site sanitation information and monitors performance of desludging services, using dashboards to show real time progress.

Lessons learned

As already mentioned, Wai and Sinnar cities are representatives of around 7400+ towns of India, including 3600 Urban Local Governments and 3800 Census Towns. This depicts that the experience in these cities can potentially impact 150 million people who live in these towns, i.e., approximately 50 percent of total urban population of India. In addition, many small cities in South Asia and Africa are of similar size as these cities and can learn from experience of Wai and Sinnar. Also, for all the initiatives undertaken in these cities, the processes and systems were established within the local government and by following all the required and routine government led processes. This ensured that the intervention do not become a one-time exercise but develops as a demonstrated model showcasing best practices to be replicated by other cities. Also, the initiatives from both the cities have been extensively documented in the form of movies, reports, e-flip book, papers etc and are widely disseminated at various national and international platforms. The learnings from these cities have also guided the policy development at the state and national level.

Useful links

<https://cwas.org.in/cwas-resources/movie-on-wai-citywide-inclusive-sanitation>

<https://cwas.org.in/cwas-resources/movie-on-sinnar-the-sanitation-journey-of-a-city>

Further reading and references

- Role of Center for Water and Sanitation in Supporting the Journey of Sinnar for Safe Sanitation, CWAS, CEPT University, January 2021 <https://cwas.org.in/cwas-resources/role-of-center-for-water-and-sanitation-in-supporting-the-journey-of-sinnar-for-safe-sanitation>
- Wai Citywide Inclusive Sanitation: CWAS, CEPT University, Oct 2019 <https://cwas.org.in/cwas-resources/wai-citywide-inclusive-sanitation>
- Jaiswal J, Mehta M and Mehta D (2022) Impacts of scheduled desludging on quality of water and wastewater in Wai city, India. Environment and Planning B: Urban Analytics and City Science, 49(8), 2216–2229. DOI: 10.1177/23998083221078596.

About the author

Dr Meera Mehta is Professor Emeritus at CEPT University and Center Head, CWAS. She has 45 years of experience in housing, urban development and infrastructure finance. Her experience spans Asia and Sub-Saharan Africa. She has been a consultant for many agencies including UNICEF, the World Bank, the Asian Development Bank, WaterAid, the Government of Netherlands and has been a member of various national and international technical committees. She studied Architecture and Urban Planning and has a PhD in Economics.

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Kasturi Joshi is a Senior Research Associate at CWAS. She has been primarily supporting the planning and implementation of sanitation programs in the small and medium cities of Maharashtra with a focus on Citywide Inclusive Sanitation (CWIS) and Faecal Sludge and Septage Management (FSSM). Access to own toilets for all, sanitation finance at household level, gender inclusivity, municipal capacity strengthening, resource recovery and reuse at the FSTPs have been some of her areas of work and interest. She has a master's degree in Urban Planning from CEPT University, Ahmedabad, and bachelor's degree in Architecture from Visvesvaraya National Institute of Technology (VNIT), Nagpur.

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About the institution / organisation

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. <https://cwas.org.in/>



About the IWA Inclusive Urban Sanitation Initiative

IWA's Inclusive Urban Sanitation initiative responds to a huge and growing public need - safe sanitation in combination with access to safe drinking water and hygiene underpins good health. The aim of this initiative is reshaping the global urban sanitation agenda by focusing on inclusive sanitation service goals--and the service systems required to achieve them - rather than the traditional singular focus on expanding sewer networks and treatment works. This forms part of IWA's larger agenda to promote inclusive, resilient, water-wise, and sanitation-secure cities.

About the Inclusive Urban Sanitation Stories

The Inclusive Urban Sanitation stories are documenting some of the policies, practices, and approaches that demonstrate how stakeholders especially those in urban areas (e.g., public sector, operators, academics, regulators, and other key actors) are taking part or contributing to Sustainable Development Goal 6 which require water and sanitation concepts and norms to look beyond technology and the usual focus on building infrastructure. Increased focus is on safety, inclusion, environment, public health, and multiple technology solutions tailored to different geographies and socio-economic contexts for building climate-resilient cities. The stories aim to inspire urban stakeholders to discuss ways for advancing inclusive urban sanitation, especially in low- and middle-income countries.