NFSSM Alliance

CWIS Explainer & Checklist

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ACKNOWLEDGEMENTS

This knowledge report on Citywide Inclusive Sanitation (CWIS) has been led by Dasra's Urban Sanitation team, developed as part of the NFSSM Alliance.

We extend our gratitude to the many Alliance members and sector partners whose insights and experiences continue to shape the discourse on inclusive sanitation in India. Their ongoing work and collective vision provide the foundation for resources such as this one.

This product was written by Shreya Sharma, with editorial contributions from Shreya Narain, Anushka Benny, Dhruv Mitter, Reshwin Washington, Shreya Samant, and Rishma Saha.

We hope this piece serves as a valuable resource for practitioners, policymakers, and stakeholders working to advance equitable and sustainable sanitation for all.

Chapter 1

INTRODUCTION

With a rapid rate of urbanisation, India needs sustainable and robust systems to manage its growing cities.

India's population living in urban cities

in 1950	by 2023	by 2050[1]
17%	36.4%	52.8%

Further, the numbers and sizes of cities and towns are on the rise in India, with the number of cities and towns doubling between 1951 and 2011.

To keep up with this rapid growth, the systems and facilities that run these cities need to be inclusive and sustainable. Sanitation is a cornerstone in building a sustainable city; however, cities at large are challenged with poor sanitation. While cities are the centres for economic growth (75% of India's national income will come from cities by 2031) and social stability, unplanned and mismanaged growth can affect public health, the economy, and the environment.

Safe and affordable access to sanitation is necessary for the improved quality of life of each citizen. With growing cities, the proportion of urban poor also grows, such that in 2021, one-in-three people in urban areas were poor, while in 1950, one-in-eight persons in urban areas were poor[2]. Current sanitation systems lack inclusivity and equity, with the effects of poor sanitation disproportionately impacting marginalised communities and the urban poor having to take up jobs in hazardous conditions. They are also the most at risk from climate-related risks that are exacerbated by poor sanitation.

The sanitation value chain spans components such as constructing toilets, collecting and transporting faecal sludge, cleaning septic tanks and sewers, and operating and maintaining treatment plants and toilets. Sanitation is a key aspect to make urban spaces liveable, sustainable, and resilient, and ensuring inclusion in access, safety, and sustainability across this value chain is crucial for public and environmental health.

FIG 1 **SANITATION VALUE CHAIN**

Inclusive and sustainable sanitation outcomes can be achieved by adopting the City-Wide Inclusive Sanitation (CWIS) service framework, developed by the Gates Foundation. This CWIS service framework details the specific service outcomes - safety, equity, and sustainability, and systems functions - responsibility, accountability, and resource planning and management, which can help achieve these outcomes.

1 *https://population.un.org/wup/country-profiles/*

2 *https://www.niti.gov.in/sites/default/files/2021-09/UrbanPlanningCapacity-in-India-16092021.pdf*

The CWIS service framework is based on the seven principles around inclusive and sustainable sanitation from the **Manila Conclave of 2018**

Everyone in an urban area, including the urban poor, benefits from **equitable safe sanitation services.**

Gender and social equity are designed into planning, management, and monitoring.

Human waste is safely managed along the **sanitation service chain**, starting with containment

Authorities operate with a **clear, inclusive mandate**, performance targets, resources, and **accountability**

Authorities deploy a range of **funding, business, and hardware approaches** sewered/non-sewered- to meet goals.

Comprehensive long-term planning fosters demand for innovation and is informed by analysis of needs and resources

Political will and accountability systems incentivise service improvements in planning, capacity, and leadership

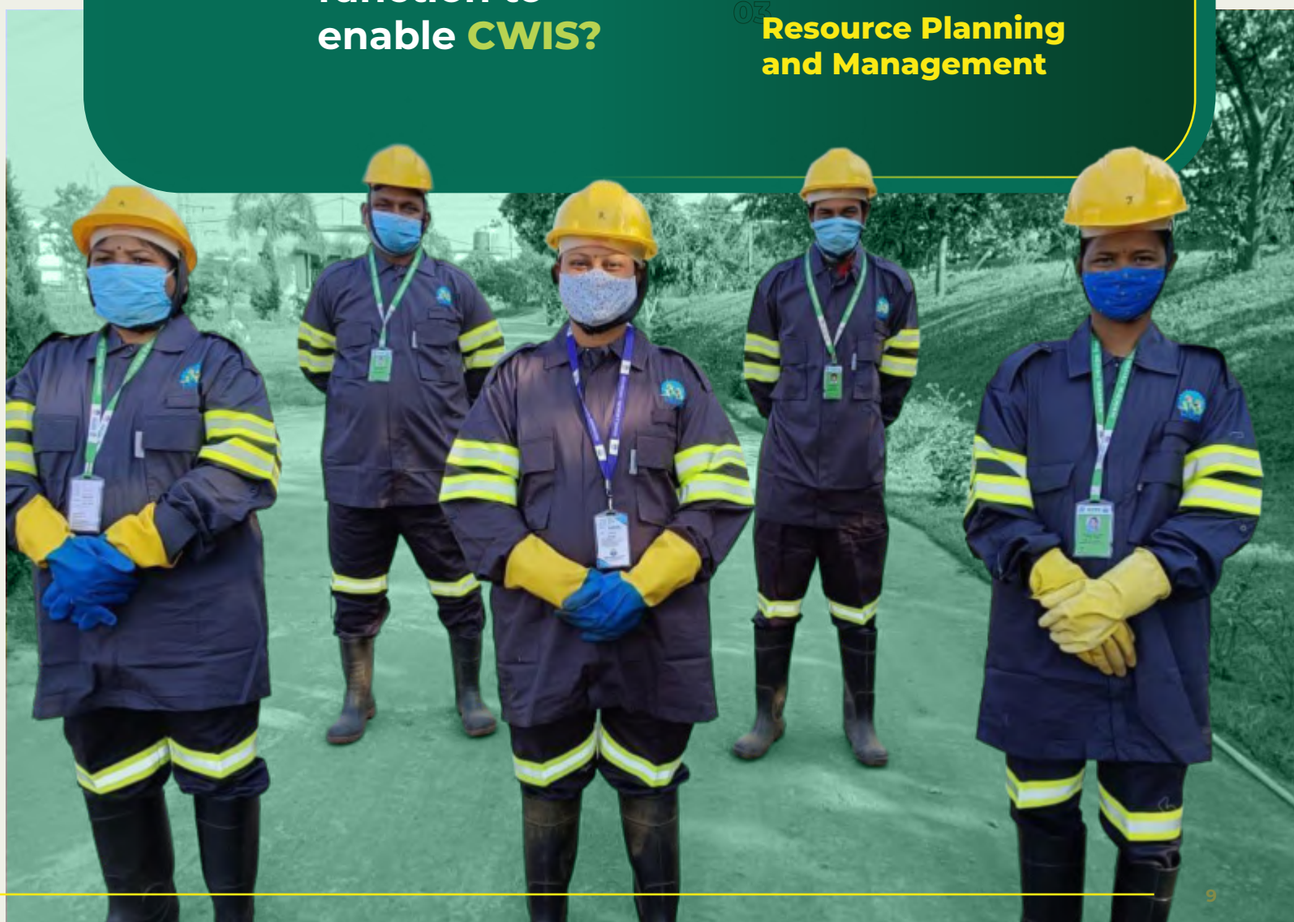
CWIS Matrix

What outcomes can a city focus on to enable **CWIS?**

01 Equity
02 Safety
03 Sustainability

How do public system need to function to enable **CWIS?**

01 Responsibility
02 Accountability
03 Resource Planning and Management



Chapter 2

OUTCOMES

CWIS outcomes refer to the measurable and desirable results aimed at ensuring equitable and sustainable urban sanitation services.

02-01 Equity

To create a sustainable city, equity must be a key outcome in all sanitation planning.

Equity means ensuring affordable access to quality safe and sustainable sanitation services for all residents of cities, regardless of their gender, disability, and socio-economic status. The dangers of poor sanitation practices affect the population unequally, and this negative impact affects the socio-economic well-being of these groups, further exacerbating inequalities.

Some effects of poor sanitation include:

Women & Girls

Lack of safe, private sanitation facilities pushes women towards open defecation, exposing them to harassment and assault. Further, girls often face health hazards, drop out of school due to menstrual challenges, and skip meals to avoid defecation, affecting their nutrition.

Transgender Persons

Transgender individuals frequently face harassment and denial of access to public toilets, leading to exclusion and unsafe sanitation practices.

Caste-Based Inequity

Dalits are often forced to take up unsafe sanitation work due to a lack of other livelihood opportunities. Caste inequity also plagues access to sanitation, with a Dalit woman in India living, on average, 14.6 years less than a higher-caste woman due to inadequate access to sanitation, water, and healthcare.[3]

Low-Income Urban Communities

Residents of informal settlements often lack access to sanitation infrastructure, leading to disease, loss of income due to illness, increased healthcare costs, and diminished educational and economic opportunities.

3 *https://idsn.org/un-report-average-dalit-woman-dies-14-6-years-younger-women-dominant-castes/*

An increase in accessibility and decrease in disparity can be achieved through 3 key levers:

Inclusive Policy and Governance

Formulation of regulations and decision-making structures that prioritize underserved groups' access to fair and equitable and quality services.

Equitable Public Financing

Allocation of budgets in a manner befitting prioritisation of fairness in distribution of resources and access to services, especially in low-income, underserved areas and communities.

Inclusive Policy and Governance

Active involvement and participation of community members, especially marginalized groups, in service delivery and decision making to mainstream diverse concerns and ensure inclusivity.

01 Inclusive Policy and Governance

State

- Develop inclusive urban sanitation policies, frameworks, and regulations that prioritise marginalised communities and ensure equitable access to sanitation services.
- Create mandates for inclusion in tender distributions, contracts, and construction regulations; and standardised design guidelines for infrastructure to increase equitable access to toilets.
- Involve marginalised communities in decision-making processes by focusing on participatory governance models.

City

- Contextualize and implement state level policies which foster inclusive service delivery.
- Mandate gender and caste-intentional representation in community participatory bodies.
- Provide gender-sensitive training and capacity building for all involved in service delivery.
- Construct inclusive toilets and strengthen operation and maintenance (O&M) of public infrastructure through robust monitoring.

> *In Action* — ODISHA

Inclusive Urban Sanitation Policy

The Odisha Inclusive Urban Sanitation Policy (OIUSP) 2024 promotes equitable access to sanitation services along with safe and inclusive service delivery. With a gender-intentional approach, the policy aims to uplift marginalised communities, ensure the safety and dignity of sanitation workers, and reduce disparities

2017 Odisha notified the Odisha Urban Sanitation Policy which aimed at achieving safe sanitation in all cities through FSSM, recognising sanitation as a basic right of citizens. This was followed by infrastructure development, such as the establishment of FSTPs, and enhanced efficiency and effectiveness of services to reach the last mile across all ULBs.

2022 Since 2022, the State has embarked on a journey of CWIS and gender transformative outcomes. This has prompted a revision of the Odisha Urban Sanitation Policy to reflect the inclusive approaches already adopted in sanitation interventions and to explicitly incorporate an inclusive lens in its policy framework.

2024 **The OIUSP was drafted, and was a milestone in prioritising the expansion and sustainability of sanitation efforts, with an inclusive approach.**

The policy aims to achieve adequate and equitable sanitation for all, with an emphasis on women, children, and vulnerable individuals, while enabling accessible, acceptable, and safe sanitation that upholds privacy and dignity for all.

The policy highlights the need for addressing climate change issues and advocates for climate-resilient infrastructure and communities, with a special focus on urban residents of the Economically Weaker Section (EWS) and other marginalised sections of society.

The policy includes the following frameworks: legal, statutory and policy, financial, planning, monitoring, capacity building and human resources, communication.

02 Equitable Public Financing

State

- Devolution of budgets earmarked for sanitation to local governments, ensuring mandatory resource allocation directed towards underserved communities such as towards people with disabilities, women, urban-poor, and for worker safety
- Allocate funds for financing technology-agnostic solutions and inclusive personal protection equipment (PPE), allowing the scope for states to select and implement suitable localised solutions with optimal community impact.

City

- Develop transparent financial frameworks outlining investment plans for fair and efficient resource utilisation at the city level.
- Implement subsidies for urban-poor communities to ensure services are affordable and accessible.
- Investment to be guided by cost-benefit analysis and community impact assessments for adoption of technology agnostic solutions and PPE.

> *In Action* — MAHARASHTRA

Innovative Financing Models

Under Maharashtra's Government Resolution of 2015, 50% of the Financial Commission's funds are to be used for sanitation. The state has also successfully leveraged the 14th Financial Commission's funds and implemented subsidies, sanitation loans and credit, which are easily accessible to citizens, for the construction of toilets. The state enabled funding from ULB grants, having a robust process for subsidy transfer through on-grounds verification, followed by direct bank transfer. Additionally, cities undertake targeted behavioural change communication for the subsidies through radio, movies, and posters. Maharashtra's important and innovative interventions include:

In Action — MAHARASHTRA'S INNOVATIVE FINANCING MODELS

Credits & Loans

Sanitation credit refers to a financial product or mechanism that provides accessible, low-interest/interest-free loans or credit to households to help them cover the costs of constructing individual household toilets. In urban Maharashtra, a significant portion of the population faces a financial gap in building toilets despite government subsidies. Sanitation credit, often taken and distributed through Self-Help Groups (SHGs), allows households to secure the necessary funds to complete the construction of durable toilets and bathrooms. This credit can help address the latent market demand and enable more households to achieve universal access to sanitation facilities.

Performance Linked Annuity Model (PLAM)

A performance-based payment contract for desludging was developed to ensure high-quality, reliable services. Under this contract, payments to private service providers are tied to the number of septic tanks desludged and the safe disposal of waste at designated treatment sites. The contract includes strict clauses that emphasise safety compliance, such as the use of proper safety gear for workers, the quality of suction trucks, and proper cleaning of any spillage. This agreement, acting as a service level contract, safeguards the interests of all parties involved, ensuring that citizens receive consistent, high-quality desludging services from local governments while the private providers are assured of regular payments.

Sanitation Tax

The sanitation tax is a charge imposed by urban local governments to support sanitation services. It is usually collected alongside property or water bills. The funds generated from this tax are allocated to various services, including septic tank desludging, sludge treatment, and drain cleaning. The sanitation tax ensures that local governments have adequate funding to manage and maintain sanitation services in these cities, while leading to a perception among citizens of desludging as a free essential service. The city of Wai, for example, collects Rs. 120 annually as a sanitation tax. The implementation of the sanitation tax has increased household affordability and acceptance of desludging services, with an increase from 7-8 septic tanks being emptied per month to the same number being emptied per day.

03 Community Engagement

State

- Establish and integrate community participation frameworks in planning, service delivery and monitoring, to empower marginalised communities and ensure their active involvement in decision-making

City

- Ensure periodic planned Information, Education and Communication (IEC) and Behaviour Change Communication (BCC) campaigns to shift attitudes within communities to ensure sustained use of services.
- Leverage or create community groups (such as SHGs, SDAs) for sanitation service delivery and decision-making, fostering a sense of local ownership and responsibility.
- Build occupational capacity and skills of vulnerable communities to contribute to service delivery in decision-making and encourage local ownership.
- Integrate community feedback and grievance redressal mechanisms into service delivery planning, decision-making and implementation processes.

> *In Action* — TELANGANA

Self Help Groups and Safai Karamcharis

Women and transgender SHGs have been employed across several states for the operation and maintenance of toilets, FSTPs, and desludging services. Such inclusive management of public sanitation facilities not only enables marginalised community members to take ownership of the services they are crucial stakeholders in, but provides them with a sustainable source of livelihood and entrepreneurship opportunities.

In Action — SELF HELP GROUPS AND SAFAI KARAMCHARIS | TELANGANA

With the belief that women can play a key role in promoting and sustaining sanitation movements, the State Government of Telangana has taken systematic steps to encourage their formal participation in sanitation decision-making and service delivery.

> Following the state's directive to the ULBs, Slum Level Federations (SLF) and within that, women SHGs, were **issued formal contracts** with standardised pay. To streamline the process, a Town Mission Coordinator (TMC) was employed to act as a facilitator between the ULB and the SHG.

> **A guidance document** was formulated, outlining not only the pay structures, but also delineating the roles and responsibilities of all stakeholders and the step-by-step process for ULBs to engage with the SHGs.

> **A certificate-based training** was conducted for all the SLFs who were awarded the contracts and through that, 1,500 women were trained on the importance of safe sanitation, gender integration, contract terms, service standards, O&M procedures and other technical aspects.

> Additionally, in Telangana, Safai Karamcharis earn **performance-based contracts** based on a partnership between the state government and the Dalit Indian Chamber of Commerce and Industry (DICCI). By linking compensation to service quality and offering skills training, the model empowers Safai Karamcharis through professionalism and entrepreneurship, fostering dignity and sustainability in sanitation work.

02-02 Safety

Safety in sanitation is essential for protecting public and environmental health, and worker well-being. When services are delivered without adequate safety measures, they pose serious risks. The acute dangers of handling toxic faecal waste exist across multiple levels, from being exposed to disease-causing pathogens to physical injuries caused by entering manholes. The risks are further compounded by the caste-based exclusion and marginalised social identity of many sanitation workers, which often results in their safety, dignity, and well-being being overlooked in mainstream policy and service delivery. Safety therefore entails safeguarding the dignity and physical and mental well-being of sanitation workers, while addressing health concerns.

Beyond workers, unsafe sanitation practices threaten public health through the spread of diseases such as Cholera, Dysentery, and Hepatitis A, and can severely impact reproductive health. Contamination of water sources and food due to poor waste management can lead to widespread illness. Environmental safety is also at stake, as untreated waste pollutes water bodies, air and soil, contributing to ecosystem degradation and long-term health risks for communities.

An increase in dignity and decrease in hazardous risks can be achieved through 3 key levers:

Enhancing Safety through Infrastructure & Technology

Mechanising solutions and strengthening measures to safeguard against health risks, ensuring quality and reliable sanitation services.

Promoting Worker Safety and Dignity

Integration of worker rights and occupational safety in service delivery. Professionalising the occupation to ensure safety concerns are not side-lined.

Safe & Accessible Services

Ensuring that sanitation services are safe and accessible to all residents, minimising health and environmental risks.

01 Enhancing Safety Through Infrastructure & Technology

State

- Identifying opportunities for increased mechanisation of operations and for increasing the safety of machinery.
- Creating standardised and adaptable design guidelines for safe and efficient sanitation services.
- Promotion and allocation of resources for development of mechanised solutions and for innovation for increased safety (including safe disposal) of sanitation infrastructure.
- Using standards such as those set by BIS and ISO (ex, ISO 30500), which define technical parameters for treatment efficiency, pathogen removal, structural integrity, and occupational safety, ensuring that waste is properly contained, transported, and treated before reuse or disposal.

City

- Dedicated inspection and monitoring of all services provided by public-private players
- Training of masons, builders and engineers to construct infrastructure based on mandatory guidelines issued by central authorities.
- Create robust testing mechanisms.
- Create mechanisms for safe disposal or reuse of waste.

> *In Action* — HYDERABAD

Sewer Jetting Vehicles

The Hyderabad Metro Water Supply and Sewerage Board (HMWSSB) introduced 70 Mini Sewer Jetting Vehicles (MSJV) for cleaning sewers to eliminate contact with faecal matter in the cleaning process

These machines were hired through micro-entrepreneur model of rehabilitating manual scavengers with funding support integrated with government loan and sanitation scheme

In Action — SEWER JETTING VEHICLES | HYDERABAD

Through this, 70 manual scavengers were rehabilitated by issuing work contracts. Within these, the members belonging to the SC/ ST community could avail a loan for 75% of the investment under the Stand-Up India Scheme and also could claim subsidy under the T-Pride Scheme of the Telangana Government

By implementing this model, HMWSSB created 70 entrepreneurs. A management service was provided to coordinate the activities and present a single PoC between the HMWSSB and the entrepreneurs.

Before the introduction of the Mini Sewer Jetting Vehicles, only reactive measures were taken-up through the process of manual cleaning and usage of bigger sewer cleaning vehicles. With the jetting vehicles' mobility and flexibility, there has been enhanced sewer line cleaning especially in congested localities. There has been an increase in customer satisfaction with quicker grievance redressal. Most importantly, there is a considerable decrease in dependency on conventional sewer cleaning techniques and manual labour.

02 Promoting Worker Safety

State

- Policies enabling sanitation worker safety & dignity by providing formal social safety nets such as welfare schemes, insurance, and minimum wage norms
- Budget allocation and development of gender-inclusive, ergonomic, and adequate PPE.
- Opportunities for rehabilitation of workers and up-skilling of their families.
- Creation of rest-houses for sanitation workers to change out of PPE, store their clothes and belongings, and rest.

City

- Ensuring sanitation worker rights through contextualised policies and monitoring.
- Ensure the implementation/disbursement of welfare schemes at a granular level.
- Creating grievance redressal platforms with the close involvement of Ward Councillors.
- Distribution and training for PPE usage, awareness building, and monitoring of usage of PPE.
- Create and maintain rest houses for sanitation workers to change out of PPE, store their clothes and belongings, and rest.
- Periodic training and protocol checks for upskilling of workers

In Action — ODISHA

Garima Scheme

The Garima scheme, launched by the Odisha government in 2020, set a national precedent in ensuring the safety and dignity of sanitation workers. Garima focuses on a thorough set of systems and facilities which ensures that safety measures implicate all sanitation workers by providing them with technical and professional support, service and occupational benefits, and social security benefits which compensate for the occupational risks and incentivise the uptake of safety measures. Core sanitation workers, who are classified as "skilled" or "highly skilled", in a move towards reinforcing dignity, receive access to personal protective equipment, mechanised cleaning tools, and comprehensive training programs. By extensive application of technology, one safeguards the health risks sanitation workers are exposed to.

Garima has shown to result in workers learning to refuse the unsafe cleaning of sewer lines.

The schemes also introduced Garima Grihas, which are dedicated rest houses that provide a safe and hygienic space for sanitation workers to rest and change out of their PPE kits and attire, which ensures hygiene and reduces the health risks to family and community members that may come in contact. Additionally, these facilities help combat the stigma that sanitation workers face when returning to the community, aiding societal acceptance and mental well-being.

As of 2025

700+ Cr SANITATION WORKERS

have been trained under Garima and certified as **Sewer Entry Professionals**

03 Safe and Accessible Services

State

- Mapping of households to ensure services are accessible and reaching all citizens, regardless of their social identity, disability, and economic status.
- Mandating monitoring and grievance redressal responsibilities to be integrated within SOPs.
- Creating policies to institutionalise community-led ownership and maintenance of services with adequate remuneration.

City

- Increasing accessibility for all users with equipped facilities in public and private spaces with a special emphasis for services in schools and for urban-poor communities.
- Promoting access to private sanitation facilities through individual household or group toilets.
- Management and disposal of waste, leveraging timely and appropriate techniques to avoid consequences on public and environmental health.

> *In Action* — **MAHARASHTRA**

Individual Household Toilets

Maharashtra government's efforts to construct Individual Household Toilets (IHHT) for all is a demonstration of efforts towards safe access for all. Maharashtra rolled out several schemes and initiatives to ensure that every household – including those in slums and low-income areas - either has a toilet or has access to a toilet.

The following were the initiatives involved:

01 **Finance:** The government partnered with financial institutions to provide subsidies and enable accessible sanitation loans and credit which allowed urban poor communities to access improved sanitation facilities.

02 **Innovation:** To combat the issue of space constraints in slums and slum-like settlements, Maharashtra employed innovative design solutions such as having vertical septic tanks instead of horizontal ones, having community septic tanks wherein faecal sludge from multiple household toilets is collected in one tank, and group toilets which are toilets located in a shared community space wherein each toilet stall is used by one household through a lock-and-key system.

Through targeted efforts, Maharashtra is advancing towards its goal of universal access to sanitation facilities.

02-03 Sustainability

Sustainability means ensuring services are reliably and continually delivered based on effective management of human, financial, and natural resources. Efforts must be made to ensure the sustainability of all interventions, which implicates sustainability in both safety and equity.

The management of revenues and resources – including financial, human, energy, and water – sustains the performance of interventions. Planning for solutions requires a realistic and thorough assessment of expected costs, technical requirements, and resource requirements against the available resources. Investments, technologies, pricing and other system features must be designed to be viable in unique financial, geographic, and community contexts.

With climate change, there is an additional concern of resilience and adaptability. Newly developing infrastructure must not only cause the least possible disturbance to the environment but must also be resilient enough to withstand catastrophes.

Additionally, safe disposal and reuse of human waste, particularly through robust biosolids management and used-water treatment is essential not only for breaking cycles of contamination but also for ensuring long-term water and resource security. Proper treatment ensures pathogens are destroyed, nutrients are stabilised, and harmful pollutants are removed, making biosolids safe for reuse in agriculture, land restoration, or energy recovery. This transforms a public health risk into a valuable resource, reducing freshwater demand, lowering dependence on chemical fertilisers, and cutting methane emissions from uncontrolled waste. By closing the loop on human waste, cities can simultaneously safeguard health, advance resource security, and strengthen resilience to the water and climate crisis

Sustainable design and implementation of interventions can be achieved through 3 key levers:

Capacity Building and Community Strengthening

Empowering communities to take ownership of service delivery, take decisions, undertake and sustain implementation without external support.

Strengthening Infrastructural Efficiency and Effectiveness

Adopting standardised infrastructure that is suited to local contexts and financially sustainable.

Climate Resilient Infrastructure

Investing in technologies and methods that are most resilient and cause the least amount of harm to the environment to prevent vulnerability.

01 Capacity Building and Community Strengthening

State

- Create employment opportunities for local communities in service delivery and decision making. This ensures localised, targeted solutions for complex problems and community ownership of services.
- Include inclusive sanitation in university and civil service training curriculums.
- Mandate ULG officials to monitor sanitation activities with open channels of communication and grievance redressal mechanisms for community members and sanitation workers.
- Institutionalise capacity building programs to ensure that changing officials across the years understand and integrate inclusive sanitation in their operations.

City

- Conduct training programs to introduce community members to inclusive sanitation technologies, safety standards, creating SOPs, undertaking and monitoring sanitation services.
- Ensure inclusivity in service delivery and decision making by engaging self-help groups to create a self-sustaining system of identification of problems and proposal and implementation of equitable services.
- Instate a grievance redressal mechanism to understand the FSSM-related needs and priorities of the city.

> *In Action* — ODISHA

Slum Dwellers' Association

In Odisha, slum dwellers participate in local governance through the Slum Dwellers' Association (SDA), created under the Jaga Mission. The SDA is a revolutionary platform ensuring that slum dwellers' voices are heard and that they are the owners of change. It helps build a bridge between the decision makers and the citizens by allowing the governing bodies to comprehensively understand the development issues that need to be addressed and potential solutions for them.

In Action — SLUM DWELLERS' ASSOCIATION | ODISHA

Framework
SDAs work in partnership with ULGs. An agreement is signed between the two bodies mandating SDAs to undertake certain operating procedures such as hold meetings, keep records, etc.

Policy
SDAs are legally recognised under the Odisha Municipal Corporation Act as operating under ward committees, making them official stakeholders in city development.

Capacity Building
SDAs receive capacity building training to execute their mandates.

Gender Inclusivity
It is mandated that 50% of an SDA's Executive Committee members are women, and in practice the proportion is even larger.

02 Strengthening Infrastructural Efficiency and Effectiveness

State
- Adopt standardised design guidelines for the construction of septic tanks, ensuring they are accessible and safe, and treatment plants to ensure smooth operations.
- Adopt a mix of approaches and technologies (sewered and non-sewered solutions) in the same city, depending on appropriate contexts and resource recovery potential.
- Enable a system of monitoring and reporting which allows the contextualisation of state-level guidelines to suit local needs by establishing a decentralised monitoring body.
- Ensure sustainable financing through effective allocation of budgets, and allocate funds for expansion and recovery.

City
- Adapt infrastructure to local needs in consultation with engineers, sector experts, and community members. Leverage standardised guidelines to suit contextual needs.
- Create systems to ensure cost-recovery of operating expenses such as resource recovery and ensuring public uptake of recovered products, public-private partnerships, etc.

> *In Action* — KERALA

Mobile Treatment Units

Mobile Septage Treatment Units (MTUs), developed by the WASH Institute, are truck-mounted, self-contained faecal sludge treatment systems engineered for rapid deployment in emergency situations.

During Kerala's devastating 2018 floods

4 MTUs were mobilised, successfully treating over ***9.18 lakh litres*** of septage across ***156 locations in 60 relief camps.***

in severely affected districts, including Alappuzha, Pathanamthitta, Thrissur, and Ernakulam

These units perform solid–liquid separation, centrifuge-based sludge thickening, and on-site effluent treatment using membrane filtration, enabling immediate restoration of sanitary conditions without dependency on permanent infrastructure. Their capacity—ranging from 3,000 to 6,000 litres per hour, allows multiple septic tanks to be serviced per day, dramatically reducing the risk of groundwater contamination, disease spread, and environmental degradation during crises.

Beyond emergency deployment, MTUs exemplify resilient infrastructure with scalable advantages, low operational cost, ease of maintenance, and high adaptability. Designed to navigate narrow lanes and serve urban, peri-urban, and rural zones, these units significantly reduce logistical burdens by treating septage on-site and minimising unnecessary transport.

In Action — MOBILE TREATMENT UNITS | KERELA

A cost analysis reveals that the total investment per unit, around ₹10–11 lakhs (~US $15,700), around ₹10–11 lakhs (~US $15,700), is notably lower than traditional vacuum-truck-based systems, while offering advanced filtration and treatment capacity. Institutions such as Duke University, RTI International, and BITS Pilani have validated the technology, which meets both national and international effluent quality standards. As a replicable and affordable sanitation solution, MTUs not only offer robust disaster response capabilities but also support long-term public health and environmental resilience across geographies.

03 Climate Resilient Infrastructure

State

- Create policies to integrate a climate adaptability lens to future-proof infrastructure and service delivery.
- Allocate finances to support the development of innovative technologies that minimise water use, environmental contamination, and carbon emissions.
- Engage with environmental experts to analyse the environmental offsets of all projects and invest in innovation to cause the least environmental impact and highest climate resilience.
- Create systems for safe disposal and reuse of waste.

City

- Implement context-specific and localised solutions to create the minimum possible impact on the environment.
- Invest in nature-based sanitation solutions and strengthen green infrastructure in collaboration with technical and sectoral experts.
- Include technical experts, scientists, and climate experts as permanent members of city-level decision-making bodies.
- Engage with communities to understand traditional sanitation practices and infrastructure. Analyse the sustainable elements of this infrastructure (such as the use of local materials) and identify opportunities to integrate such elements into the design and implementation of technology.

In Action — NARSAPUR

Pyrolysis Omni-Processor

An Omniprocessor (OP) is an advanced thermal treatment system that uses controlled combustion (pyrolysis) to convert human waste into valuable resources. Unlike conventional treatment methods, OPs achieve complete pathogen kill while generating multiple useful outputs. The Pyrolysis OP (P-OP) converts fecal sludge into biochar and treated water.

The P-OP was established in 2017-18 in Narsapur, a town near the Godavari River. Installed on an area of 12,500 square feet, it serves a population of 50,000 and treats approximately 15 KLD of septage daily.

The initial capital investment (CAPEX) was ₹1.5 Crores, with operating expenses (OPEX) currently at ₹2.5 lakhs per month.

The P-OP employs a comprehensive six-stage treatment process that effectively handles both solid and liquid components of septage.

The waste is first separated into solid and liquid, followed by heating and filtration of the liquid to eliminate harmful germs while ensuring CPCB guidelines are met. On the other hand, the moisture content of solid waste is reduced using pyrolysis and turned into useful biochar or ash. The plant's modular, scalable design allows it to efficiently treat varying volumes of waste, with outputs including treated water, thermal energy, and biochar—each meeting environmentally safe standards.

The P-OP helps us meet our shared goals as we move the needle towards a 'Viksit Bharat 2047'.

Improved Public Health

The complete pathogen elimination by P-OP helps reduce incidences of waterborne diseases and environmental contamination.

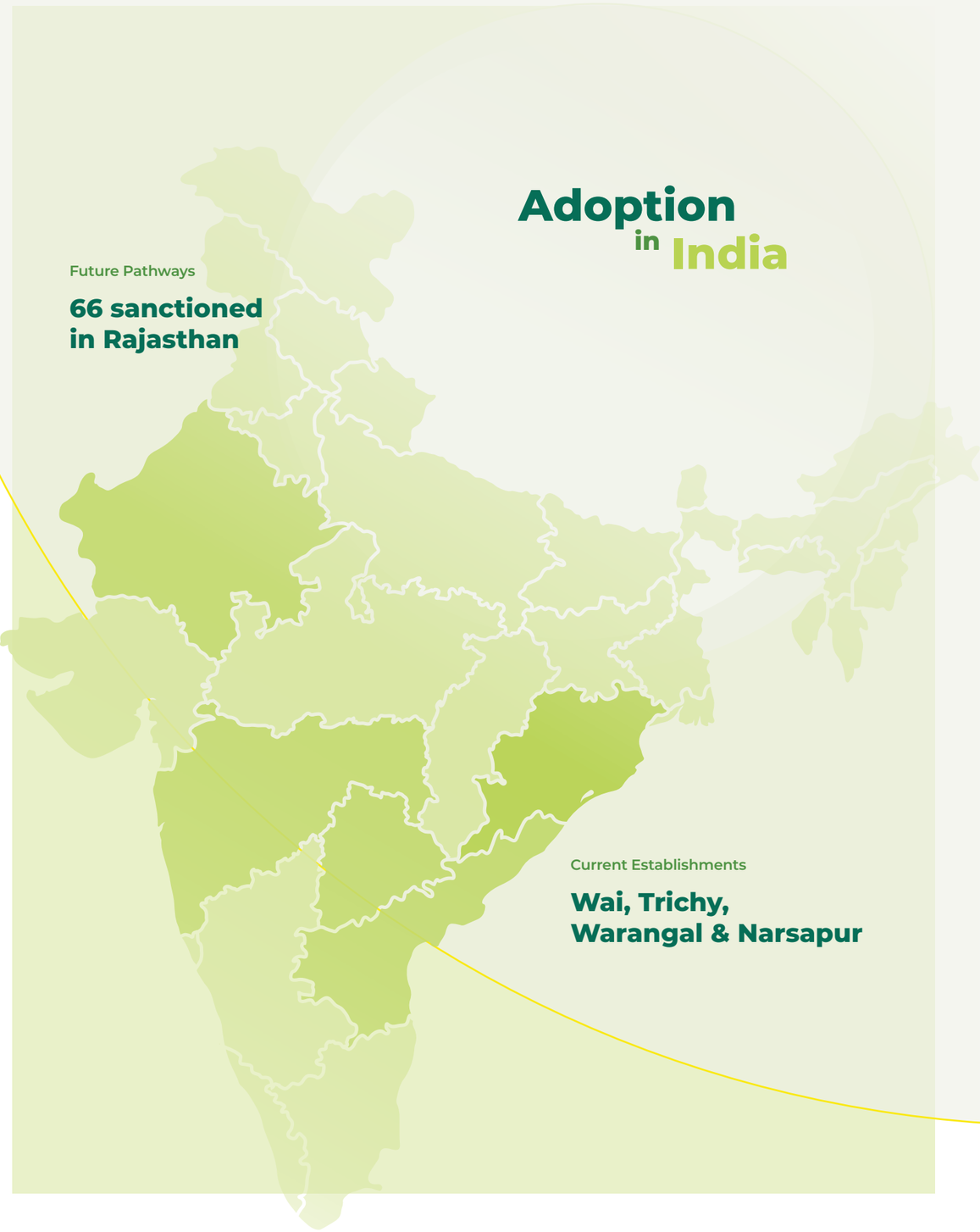
Employment generation

Beyond the technical advantages, the P-OP fosters socioeconomic development by creating employment opportunities for local residents, thereby supporting livelihoods and encouraging community involvement in sustainable sanitation management.

Alignment with National Regulatory Ecosystem

Supports India's goals under Swachh Bharat Mission 2.0, National Urban Sanitation Policy, and achieve United Nation's Sustainable Development Goal 6.3 by reducing pollution, eliminating dumping, minimizing the release of hazardous materials, and significantly increasing the safe reuse of wastewater

Adoption in India



Future Pathways

66 sanctioned in Rajasthan

Current Establishments

Wai, Trichy, Warangal & Narsapur

Chapter 3

FUNCTIONS

How do public systems need to function to enable CWIS?

Public systems, including governing bodies and individuals, must uphold key functions to enable sustainable and inclusive cities. These serve as guiding values in shaping policies, service delivery mandates, monitoring systems, financing, capacity building, and all other components of the city-wide sanitation value chain.

03-01 Responsibility

Authorities must take up the responsibility of treating sanitation as a public good. Governments must ensure clarity and execute a defined public mandate to ensure safe, equitable, and sustainable sanitation for all.

Policy and Governance

Recognising inclusive sanitation as a public good and institutionalising clearly defined and strong accountability mechanisms.

Role Clarity

Clearly define roles and responsibilities for all stakeholders across levels of government for management of the value chain.

Defined Goals and Standards

Implement regulations and standards that govern sanitation practices, outlining responsibilities for compliance and service delivery.

> *In Action*

Dehradun

Dehradun, the capital of Uttarakhand, is situated at the foothills of the Himalayas and has emerged as a model city for urban sanitation and waste management in the state. **As the administrative center, Dehradun plays a significant role in formulating sanitation policies and implementing them effectively at the local level.**

Dehradun has demonstrated remarkable progress in recent years by securing the first position in Uttarakhand under the Swachh Survekshan for two consecutive years, 2022 and 2023, in the category of cities with a population exceeding one lakh. The city also earned Water+ certification, indicating its success in achieving full wastewater treatment coverage and ensuring the safe reuse of treated water.

The Uttarakhand Septage Management Protocol (G.O. No. 597/IV(2) UD2017-50 (Sa)/16, dated May 22, 2017) provides a comprehensive, state-wide framework for managing faecal sludge and septage. Developed by the Urban Development Department, Government of Uttarakhand, in collaboration with Pey Jal Nigam, Pey Jal Sansthan, Urban Local Bodies (ULBs), the State Mission for Clean Ganga (SMCG), and partners such as GIZ, the protocol aims to standardize and institutionalize faecal sludge and septage management (FSSM) practices across all urban areas. The protocol also mandates the establishment of a Septage Management Cell (SMC) in every ULB. These cells are responsible for planning, implementing, and monitoring FSSM activities to ensure safe and efficient sanitation services.

These byelaws provide a tailored regulatory framework encompassing the registration and GPS tracking of desludging vehicles, adherence to Occupational Health and Safety (OHS) standards, and enforcement mechanisms through penalties for non-compliance.

Viewed through the lens of CWIS, Uttarakhand's Septage Management Protocol and corresponding byelaws embody the functions and outcome principles of the CWIS approach, particularly those of accountability, responsibility, and safety. They demonstrate a systemic shift from ad hoc, service provider-centric sanitation practices to a structured, policy-driven model where government institutions assume clear roles in ensuring safe, inclusive, and sustainable sanitation for all.

03-02 Accountability

Measures to ensure accountability must be embedded across the sanitation value chain to ensure that authorities perform against their mandates through transparency, monitoring, data, and incentives.

Performance Indicators and Monitoring

Create mandates and performance objectives that can be monitored for effectiveness and responsiveness

Incentives and Penalties

Create incentive programs for governing bodies that achieve or exceed sanitation targets, fostering a culture of responsibility.

Transparent Reporting and Independent Regulation

Establishment of an independent regulator to ensure transparent monitoring of stakeholders and their performance against their mandates. compliance and service delivery.

> *In Action*

Warangal

Warangal has strengthened accountability in sanitation service delivery by adopting the Integrated Municipal Information System (IMIS), a unified digital platform that consolidates data across the sanitation value chain. Through IMIS, the city monitors real-time performance indicators, including CWIS metrics such as desludging frequency, treatment plant operations, safe disposal, coverage across different settlement types, and sanitation worker safety parameters. The dashboard enables municipal leadership to review service delivery against targets, identify performance gaps, and take timely corrective action with clearly defined follow-up responsibilities.

In addition, the IMIS integrates grievance redress tracking and service request management, allowing citizens to report issues and monitor resolution timelines. This transparency strengthens accountability between service providers, municipal departments, and residents, ensuring that commitments translate into effective service delivery.

These accountability mechanisms support evidence-based governance and provide a foundation for equitable, reliable, and safe sanitation services citywide, reflecting the CWIS principle of transparent oversight and monitoring across institutions.

03-03 Resource Planning & Management

Resources - human, financial, natural - must be effectively managed to support sanitation interventions in a sustainable and scalable way.

Integrating Various Priorities for Sustainability

Develop a comprehensive sanitation plan that simultaneously integrates various priorities – environmental, health, urban planning – to optimise resource use and align goals across departments.

Data-Driven Decision Making

Utilise data collection and analysis to inform resource allocation and planning. This can include mapping sanitation needs, assessing existing infrastructure, and identifying priority areas for investment.

Fund Allocation and Infrastructure Creation

Identify infrastructural needs and diverse funding sources, including public budgets and private investment, to sustain finances for interventions over long periods.

> *In Action*

Mussoorie

Mussoorie, popularly known as the Queen of the Hills, is one of India's most visited hill stations. As a ridge town, its unique topography features steep slopes radiating from the hilltop in several directions, posing significant challenges to the establishment of centralised used water treatment infrastructure. Despite these constraints, the city has adopted innovative, decentralized solutions that align with the Citywide Inclusive Sanitation (CWIS) approach.

> *In Action* — **Mussoorie**

Decentralized Planning

+ Mussoorie currently operates five Sewage Treatment Plants (STPs) with a total capacity of 7.32 MLD, while four additional STPs with a combined 3.30 MLD capacity are under construction. This expansion reflects a systematic, terrain-sensitive sanitation strategy focused on equitable coverage, efficiency, and resilience. **Through careful planning and coordination, the city strives to achieve universal and safe used water management for all residents.**

Legacy Waste and Solid Waste Management

+ The city faced **long-standing waste accumulation challenges at Gaddikkhana and IDH Tehri Bypass Road.** The Mussoorie Nagar Palika undertook cleanup and reclamation initiatives at these sites to improve environmental health and urban livability.

Key Interventions

+ Conversion of around 5,000 MT of non-recyclable waste into Refuse Derived Fuel (RDF), sent to the Shishambada Processing Plant in Dehradun.
+ Establishment of a 20 TPD Material Recovery Facility (MRF) and an 8 TPD bio-methanation plant at costs of ₹1.3 crore and ₹1.4795 crore respectively.
+ Transformation of both sites into landscaped public spaces, combining waste remediation with urban beautification.

Monitoring and Sustainability

+ All incoming waste is weighed and recorded daily to ensure transparency.
+ The bio-methanation plant uses anaerobic processes to produce methane for electricity, promoting circular resource recovery.
+ Facilities are regularly monitored to maintain safety and performance standards.

CWIS Alignment and Impact

+ Mussoorie's initiatives reflect CWIS principles through:
+ Efficient resource planning and waste-to-energy conversion.
+ Environmental sustainability via reduced landfill dependence.
+ Accountability and transparency through systematic monitoring.

CONCLUSION

The adoption of the CWIS framework and principles has and will continue to evolve as experience and practice grows. Since 2017, a growing number of public service authorities, policy makers, and development banks are aligning with the underlying imperatives of CWIS. Several global institutions are working to reframe their urban sanitation strategies and investments around public service system functions and outcomes, to strengthen the focus on equity and inclusivity in sanitation service delivery. [4]

The CWIS principles have been operationalised in diverse contexts, and are informing the scale and replication of sanitation efforts at state and national levels.

4 Schrecongost A, Pedi D, Rosenboom JW, Shrestha R and Ban R (2020) Citywide Inclusive Sanitation: A Public Service Approach for Reaching the Urban Sanitation SDGs. Front. Environ. Sci. 8:19. doi: 10.3389/fenvs.2020.00019

CWIS Explainer
& Checklist

NFSSM
ALLIANCE