

Dalberg



Hindustan Unilever Limited

REALIZING THE POTENTIAL OF CLIMATE-SMART SANITATION

FOR THE CITIES OF TOMORROW





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Executive Summary

INDIA'S SANITATION INNOVATIONS — BUILDING ON A STRONG FOUNDATION | India has made remarkable strides in improving the quality of and access to sanitation systems, and this strong foundation opens many more valuable opportunities to unlock as we shape the cities of tomorrow.

Over the past decade, flagship missions such as the Swachh Bharat Mission–Urban (SBM-U), Atal Mission for Rejuvenation and Urban Transformation (AMRUT and AMRUT 2.0), and the National Policy on Faecal Sludge and Septage Management (FSSM) have led to significant impact: over 6.3 million household toilets and ~630K public toilets built¹, ~19 million water connections² and ~15 million sewer connections provided. India has embedded climate thinking into urban governance through the Climate Smart Cities Assessment Framework (CSCAF) and city-level Net-Zero Climate Resilient Action Plans, creating a solid foundation of sanitation access to all.

THE UNREALISED POTENTIAL — becoming Climate-Smart to meet Rising Demand | With rapid urbanisation and worsening climate risks, global sanitation systems need to be upgraded and rebuilt. The United Nations has projected that by 2050, 68% of the global population will live in cities; in India, roughly half will be in urban areas by 2051³. Meanwhile, climate change is reshaping the way cities function. Asia is home to 99 of the world's 100 most climate-vulnerable cities, and 13 of the 20 most at risk are in India, facing recurrent floods, heatwaves, and water scarcity⁴. These pressures create a once-in-a-generation opportunity for India to build better — to design climate-smart, circular, and inclusive sanitation from the start.

WHY THIS MATTERS: The Impact | There is an unprecedented opportunity to positively impact the lives of those most vulnerable, the urban poor globally, especially women. In many cities, low-income households buy water from tankers; in India, tanker water can be 52x more expensive than piped water⁵. Women and girls face compounded risks: greater exposure to safety and health-related risks due to limited access, especially at night. During floods and heatwaves, these challenges worsen as women often travel farther to reach facilities, face health issues like urinary tract infections (UTIs) from reduced use, and bear added care burdens and income losses. By solving these challenges, we solve not just for cities but for the well-being and dignity of the people who live in them, helping create a resilient future for all.

THE CRITICAL CONNECTION: SANITATION AND CLIMATE ARE INSEPARABLE | Climate change and urban sanitation are fundamentally interdependent, creating a self-reinforcing cycle of vulnerability. On one hand, extreme weather directly impairs infrastructure: floods overwhelm sewers and toilets, while droughts and water shortages reduce the treatment capacity and accelerate system failures. These failures are further compounded by heatwaves, which accelerate bacterial growth and deteriorate sanitary conditions.

On the other hand, inadequate sanitation worsens climate vulnerability; when systems break down, untreated sewage contaminates water sources, spreading waterborne diseases and overwhelming health systems. People in urban poor communities are hit hardest since their socio-economic resources are too strained to address both climate risks and poor sanitation. Studies find that they are 32%⁶ more likely to live in high-risk floodplains with weak infrastructure and limited resources to cope with both climate shocks and poor sanitation.

To safeguard public health, cities must prioritize and invest in “climate-smart” sanitation systems that stay functional and safe during floods, droughts, and heatwaves.

¹[Swachh Bharat Mission successfully Transforms India's Sanitation Landscape, 2024](#)

²[Impact of AMRUT on Infrastructure and Services, 2024](#)

³[68% of the world population projected to live in urban areas by 2050, says UN, 2018;](#)
[Inside India's Ambitious Plan To Build New Cities As Growth Engines Of Future, 2023](#)

⁴[Asia is home to 99 of world's 100 most vulnerable cities, 2021](#)

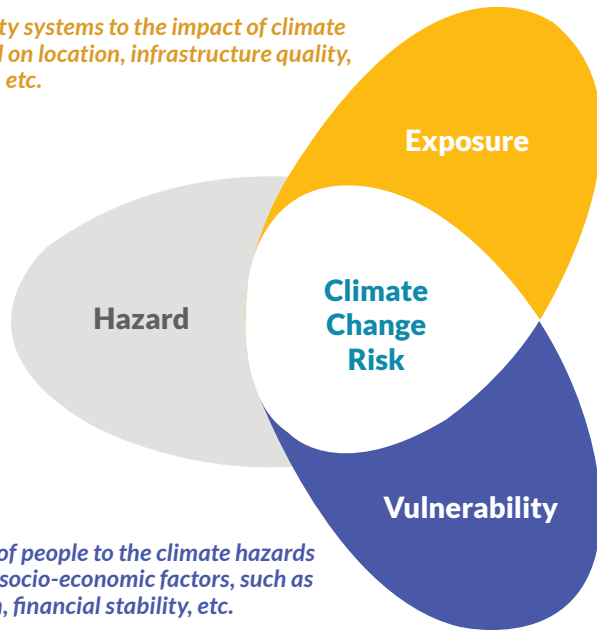
⁵[Left High & Dry: Mumbai's severe water tanker problem, 2023](#)

⁶[Disproportionate flood exposure for slum populations of the Global South, 2025](#)

Exposure of city systems to the impact of climate hazards based on location, infrastructure quality, sustainability, etc.

Eg., Drought, extreme heat, flood, etc

Vulnerability of people to the climate hazards influenced by socio-economic factors, such as gender, health, financial stability, etc.



A DUAL OPPORTUNITY |

The Intergovernmental Panel on Climate Change (IPCC) Climate Risk framework highlights a two-pronged approach to creating climate-resilient sanitation systems by reducing exposure to climate risk and strengthening communities to reduce vulnerability. The framework considers climate risk a function of three components: hazard, exposure, and vulnerability. In the context of urban sanitation systems, this analysis focused on (i) exposure, the extent to which sanitation infrastructure is directly affected by events such as floods and heatwaves and (ii) vulnerability, the underlying social, economic, and health conditions that determine the ability of people, especially the urban poor, to cope and recover.

The Solution

WHAT WORKS: PROTECTING COMMUNITIES FROM CLIMATE RISKS AND LOWERING VULNERABILITY |

Emerging sanitation models in India demonstrate how climate-resilient design and community empowerment can reduce the exposure to climate hazards and the vulnerability of communities. To reduce climate exposure to infrastructure, sanitation models incorporate resource circularity, renewable energy use, weather-resilient design, etc. For instance, to strengthen communities and reduce vulnerability, the Community Circular Sanitation Model in Hyderabad built community-managed, decentralised wastewater systems that treat and reuse water for flushing and urban gardens, reducing pollution while creating local jobs and technical capacity.⁷ Together, these experiences show that climate-resilient sanitation relies on both robust infrastructure and empowered communities.

INDIA'S EXEMPLAR: THE SUVIDHA MODEL | As climate extremes intensify, India already has a working blueprint for climate-resilient sanitation, one that can simultaneously reduce exposure to climate risks and the vulnerability of people: the Suvidha Centres. Suvidha is Hindustan Unilever's flagship social innovation model, launched in Mumbai in 2016 with the Brihanmumbai Municipal Corporation and built since as a public-private partnership with HSBC India and JSW Foundation. It brings four essentials under one roof — clean toilets, purified drinking water, showers and laundry, open 24x7 and designed for the safety and dignity of women, children, senior citizens and persons with disabilities.

The model is built to remain functional during floods, water cuts, and heatwaves—exactly when urban poor communities are most likely to lose access to basic services. Engineered for climate stress, each centre meets nearly 80% of a household's daily water needs, and provides uninterrupted access to its users, acting as a critical lifeline during extreme weather. By integrating responsibly managed sewerage, Suvidha ensures that waste is treated safely, protecting water bodies, preventing disease outbreaks, and avoiding sewage contamination even under climate shocks.

Serving over 600,000 people annually, Suvidha provides safe hygiene and sanitation access, with 95% women believing it to be safe to use at night. Suvidha reuses 90% of greywater and helps stabilise household routines even in prolonged periods of water

⁷ [Enhancing Circular Economy Perspectives – Plastic Waster Management Strategy and Action Plan for Greater Hyderabad Municipal Corporation, 2020](#)

scarcity. Households gain up to Rs. 33,500 annual disposable income through time and health savings, and 90% of users report a renewed sense of pride in their community. Suvidha demonstrates that climate adaptation is not theoretical—India is already delivering it, protecting vulnerable communities while keeping essential sanitation and sewerage services running through the harshest climate events.

THE ROAD AHEAD IS CLEAR | By building on a solid, existing foundation, India can serve as a global reference point for future sanitation models as urbanisation accelerates and climate hazards intensify. Models such as Suvidha in Mumbai demonstrate that the two-pronged approach—reducing exposure to climate hazards and strengthening communities to mitigate vulnerability—offers a practical and feasible compass to safe, sustainable, and empowering sanitation facilities. Scaling this approach with the support of government, philanthropies, civil societies, CSR, and private partners will deepen the capacity of cities to withstand climate change and urbanisation, and become more liveable, positioning India as a leader in urban sanitation internationally. Amid accelerating urbanization and climate pressures, we have a rare chance to leverage sanitation innovation for the resilient cities of tomorrow.

A Dual Opportunity: Two-pronged approach for city sanitation systems - adapted from IPCC framework on climate risk

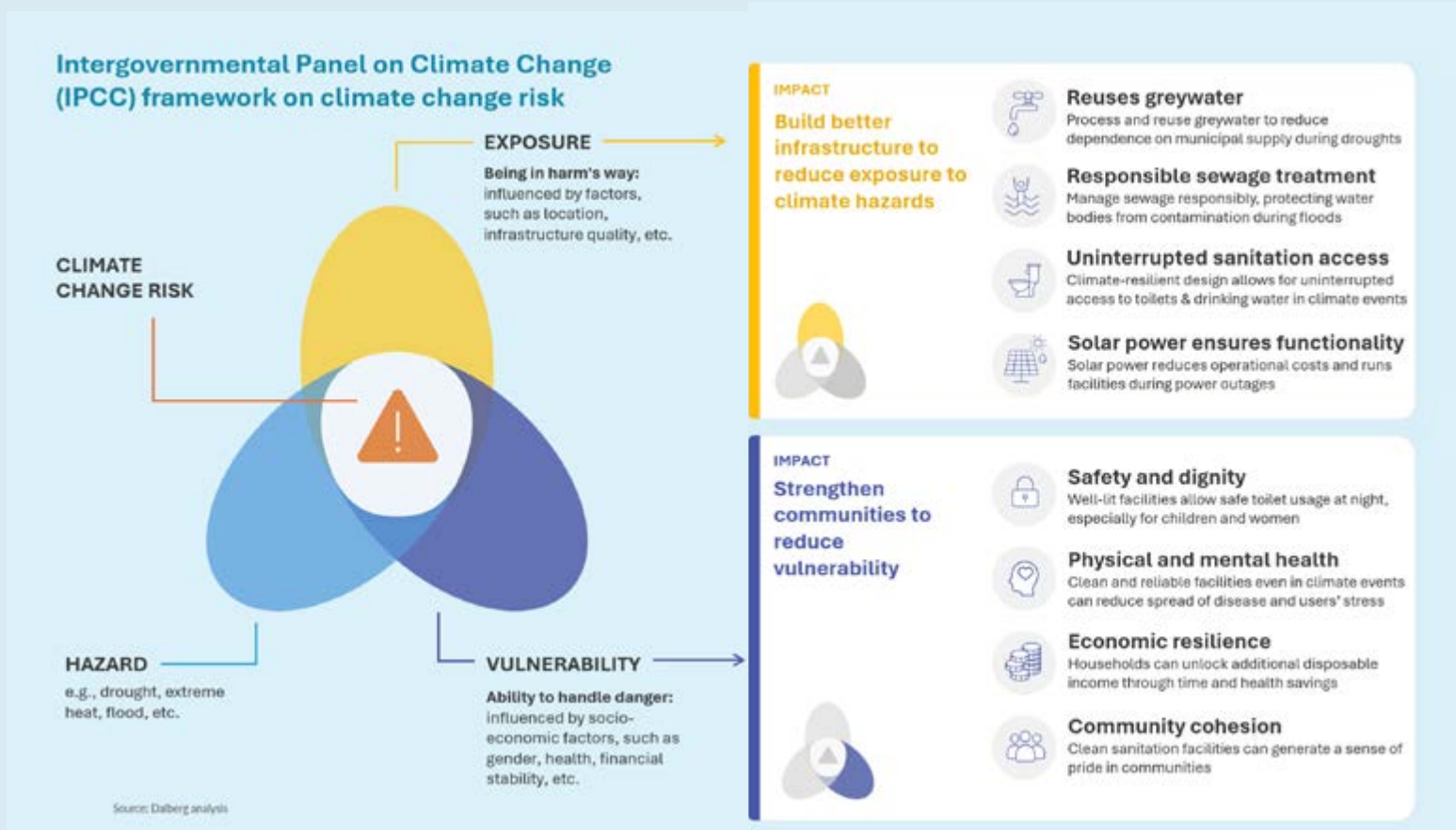


Figure 1: IPCC Framework and the Two-Pronged Approach

How Sanitation Can Solve Both Urbanisation and Climate Pressures

Urban sanitation has historically been viewed as a public health and service delivery challenge. However, as cities grapple with the intersecting challenges of climate change, water scarcity, rapid urbanisation, and growing socio-economic inequalities, sanitation is increasingly emerging as a critical pillar of urban resilience. Climate-related shocks such as floods, heatwaves, droughts, and water contamination events can disrupt sanitation systems, disproportionately affect vulnerable populations and undermine public health outcomes.

Reliable, accessible, and climate-resilient sanitation systems do far more than provide a basic service. They help safeguard water resources, prevent disease outbreaks, protect local ecosystems, support economic productivity, and enhance community well-being during both everyday conditions and times of crisis. As cities seek to adapt to a changing climate while accommodating growing populations, sanitation must be recognised not merely as a social necessity, but as essential resilience infrastructure capable of strengthening the long-term sustainability, health, and inclusiveness of urban environments.

India's urban transformation presents a unique opportunity to embed climate resilience into sanitation systems from the outset. The progress achieved by the national sanitation missions and urban development programmes shows how India has already built significant momentum across sanitation access, water and sewerage infrastructure, and climate-smart urban governance. For instance:

- **THE SWACHH BHARAT MISSION – Urban (SBM-U)** has substantially increased sanitation coverage, with the construction of more than 6.3 million individual and 600K community and public toilets across statutory towns. SBM-U also transformed sanitation coverage, declaring all statutory towns open-defecation-free and introducing ODF+ / ODF++ / Water+ certifications to sustain service quality, treatment, and reuse. The implementation of these protocols since 2016 has helped ensure standardised outcomes in sanitation and solid waste management in urban areas.⁸
- **THE ATAL MISSION FOR REJUVENATION AND URBAN TRANSFORMATION (AMRUT AND AMRUT 2.0)** has focused on achieving universal access to water supply and sewage systems. As of 2025, AMRUT mobilised \$28.6 billion to projects, resulting in over 20 million tap connections and 15 million sewer connections. AMRUT also set clear targets for 100% universal access, safe septage management, and treated-water reuse, guiding future sanitation infrastructure projects.⁹
- **THE NATIONAL POLICY ON FAECAL SLUDGE AND SEPTAGE MANAGEMENT (FSSM POLICY, 2017)** provides a roadmap for cities without sewer systems to manage waste safely through decentralised solutions. Since its adoption, states have expanded their treatment capacity. For instance, Uttar Pradesh set up 59 faecal sludge treatment plants by the end of 2024—up from just one in 2018.¹⁰ These efforts help address the needs of the 60% of urban dwellers who rely on on-site sanitation systems.
- **THE CLIMATE SMART CITIES ASSESSMENT FRAMEWORK (CSCAF)** embedded climate resilience indicators into urban governance across water and waste sectors, encouraging local climate action. As of 2023, 226 cities were assessed using the CSCAF 3.0 to measure progress on water security, water circularity, etc., and guide local climate action planning.¹¹

Together, these government initiatives have strengthened institutions, improved service delivery, and built the foundation for universal sanitation access.

⁸SBM-U, 2025

⁹10 Years of AMRUT, 2025

¹⁰Uttar Pradesh's leap in faecal sludge management—but can the system sustain it?, 2025

¹¹Climate Smart Cities Assessment Framework (CSCAF), 2025



While government programmes have established the policy, financing, and infrastructure foundation for urban sanitation, a broader ecosystem of civil society organisations, social enterprises, technology innovators, philanthropic institutions, and CSR initiatives has played a critical role in accelerating progress on the ground. These actors have helped bridge service delivery gaps, expand access for underserved populations, pilot innovative technologies and operating models, strengthen community engagement, and generate evidence for scalable solutions. For instance:

- **PRIVATE SECTOR – LOOTEL:** Lootel operates a network of smart ‘toilet-café’ that combine premium clean restrooms with café and EV-charging services under a Pay–Use–Redeem model. Its business model uses IoT-enabled monitoring and centrally managed operations. The venture now has 7 locations and has served over 1 million users thus far. ¹²
- **NON-PROFIT ORGANISATIONS – SULABH INTERNATIONAL:** Sulabh is a long-standing social service organisation promoting environmental sanitation via its pay-and-use public toilets. Sulabh has expanded to over 10k public toilets, 20k school toilets, and over 1.6 million household toilets, serving over 20 million people every day. ¹³
- **TECHNOLOGY-LED INNOVATION – WOLOO:** Woloos is a mobile app that enables users to locate certified clean and hygienic washrooms across more than 700 cities in India. It has a database of over 100,000 washrooms. The app’s listings cover both company-operated facilities and partnerships with retail outlets, and the washrooms incorporate hygiene assurance protocols developed in collaboration with the Toilet Board Coalition. Today, the Woloos app has been downloaded over 500k times. ¹⁴
- **PHILANTHROPY – ARGHYAM:** Arghyam, a foundation established through an endowment from Rohini Nilekani, supports sustainable water and sanitation solutions that emphasise community ownership, scalability, and data-driven management. Its programs focus on improving source sustainability, water quality, and operations and maintenance (O&M) of local infrastructure. In FY 2023–24, Arghyam invested over INR 14 million to strengthen local water systems, illustrating how philanthropic capital can play a catalytic role in advancing long-term WASH resilience.
- **CSR – SUVIDHA (BMC, HUL, HSBC, JSW FOUNDATION):** The Suvidha model in Mumbai shows how municipalities, private partners, and communities can jointly deliver reliable, climate-resilient sanitation. As Hindustan Unilever’s flagship social innovation model, it was launched in Mumbai in 2016 with the Brihanmumbai Municipal Corporation (BMC), later joined by HSBC India and JSW Foundation. It brings four essentials under one roof –clean toilets, purified drinking water, showers and laundry –reusing up to 90% of greywater and remaining functional during floods, water cuts, and heatwaves. Serving 600,000 people annually and offering safe access for 95% of women, Suvidha strengthens dignity and resilience while helping households save up to Rs.33,500 annually through improved health and reduced waiting time. Suvidha is designed for the safety and dignity of women,

¹² [Lootel About, 2025](#)

¹³ [SULABH International, 2025](#)

¹⁴ [Woloos About, 2025](#)

children, senior citizens and persons with disabilities, and delivers strong health and hygiene outcomes¹⁵. Suvidha has partnered with the Ministry of Housing and Urban Affairs to establish the Centre for Hygiene and Sanitation Excellence to codify Suvidha's decade of learnings and scale them across India's cities. The model has also been recognised by Harvard Kennedy School and the World Economic Forum and featured at COP28 as a climate-resilient WASH solution.

Despite notable progress, India's urban sanitation and water systems continue to face growing pressures from rapid urbanisation and intensifying climate risks. By 2051, half of India's population is expected to live in urban areas, with 25 to 30 people migrating to cities every minute, often settling in hazard-prone areas due to limited affordable housing options.¹⁶ Rapid urbanisation is outpacing long-term planning – NITI Aayog estimated that 65% of cities continue to expand in an ad hoc manner without approved master plans.¹⁷ Meanwhile, climate risks are intensifying pressures on urban infrastructure systems. India is home to 13 of the world's 20 most climate-vulnerable cities, exposed to extreme heat, water stress, and air-pollution risks.¹⁸ Mumbai, Chennai, Kochi, Visakhapatnam and other coastal cities, in particular, are forecasted to face severe inundation risks by the end of the century. There is an urgent need to integrate climate resilience, inclusivity, and long-term planning into urban development frameworks.

Urban expansion and climate adaptation efforts are building momentum for creating sustainable and resilient sanitation systems. Climate-related hazards such as heatwaves, floods, and droughts frequently disrupt water supply, sewerage, and drainage systems, while declining groundwater levels and pollution further reduce usable water resources. In many cities, climate shocks overwhelm infrastructure – pipelines burst during floods, treatment plants fail during power outages, and urban poor communities remain disconnected from formal networks. Floods overwhelm toilets and drainage systems, while heatwaves disrupt water supply and power outages, which in turn, interrupt water access and wastewater treatment. Urban expansion has also accelerated deforestation and loss of natural drainage, compounding flood risks and contributing to the contamination of surface and groundwater. Many cities struggle to keep their sanitation facilities functional due to the lack of operation and maintenance (O&M) budgets. Fragmented responsibility, and unclear accountability between utilities, contractors and local bodies further delays repairs and prolong sanitation service outages over time. **These breakdowns highlight a valuable opportunity to strengthen systems, so they deliver lasting resilience.**

Urban poor communities stand to benefit the most. Improved systems will help them anticipate, withstand, and recover from shocks caused by extreme climate events and rapid urbanisation. Weak housing conditions, limited income and livelihoods, and limited access to sanitation and water services heighten their vulnerability. As of 2022, 35.2% of the world's urban population did not have access to safely managed sanitation services.¹⁹ The situation in dense, low-income community is pressing as they rely on crowded community facilities often marked by poor hygiene, long waiting times, and frequent sewage overflows during monsoon flooding. Frequent water cuts further compound hardship, forcing many households to depend on private tankers that can charge up to 50 times the cost of piped water.²⁰

At the community level, these systemic gaps are amplified by persistent socioeconomic and gender inequities. Women and marginalised communities often experience disproportionate exposure to unsafe or unhygienic sanitation facilities due to entrenched socio-cultural barriers. The health consequences are significant: contaminated water and inadequate hygiene increase the incidence of diarrhoeal and vector-borne diseases, particularly in dense urban-poor communities. For daily-wage workers and low-income households, the economic burden is also severe—time spent queuing for toilets or collecting water reduces income and limits their capacity to recover from climate-related losses. The consequences are often intergenerational: children may miss or arrive late to school due to illness or time spent accompanying caregivers to sanitation facilities. Beyond physical health, the lack of clean, accessible toilets also affects one's sense of dignity and social participation, as the discomfort and stigma associated with unclean facilities discourage community interaction and mobility. Together, these intersecting vulnerabilities undermine both public health and the resilience of urban economies.

By reimagining urban sanitation systems, India's cities can be transformed into more inclusive, accessible, and climate-resilient places. The scale and frequency of climate pressures are projected to grow exponentially, necessitating a more systemic and forward-looking approach to urban sanitation resilience. Over the past decade, national missions and local innovations have achieved substantial gains in expanding service coverage, improving delivery, and embedding sustainability principles. Yet sustaining these advances under mounting climate stress will require not only infrastructure investments but also community engagement that link sanitation systems with broader resilience objectives. The next chapter examines these areas of progress and explores what more is needed to translate current achievements into lasting, system-wide resilience.

¹⁵ [About Suvidha, 2026](#)

¹⁶ [India preparing for the biggest human migration on the planet, 2018](#)

¹⁷ [675 towns under 1-lakh population to get GIS-based master plans](#)

¹⁸ [India is home to 13 of 20 cities most vulnerable to environmental hazards worldwide: Report](#)

¹⁹ [Urban population without access to safely managed sanitation, 2025](#)

²⁰ [Unaffordable and Undrinkable: Rethinking Urban Water Access in the Global South, 2019](#)

A Dual Opportunity for Climate Resilience: More Protection, Lower Vulnerability

The Intergovernmental Panel on Climate Change (IPCC) highlights a two-pronged approach to creating climate sanitation systems: the reduction of climate exposure and strengthening of communities to reduce vulnerability. The IPCC framework defines climate risk as the interaction of three key elements—hazard, exposure, and vulnerability, underpinning how climate change affects infrastructure and the communities they serve. In the context of urban sanitation systems, exposure denotes the degree to which sanitation infrastructure is directly affected by these events, and vulnerability captures the social and economic factors that determine people's ability to cope with and recover from such shocks. Using this lens helps assess how urban sanitation models can reduce both system exposure and human vulnerability to enhance overall resilience of sanitation to climate change.

Globally, cities are building more climate-resilient sanitation infrastructure by embedding resource circularity, renewable energy, and robust design. Climate change exacerbates the frequency and intensity of climate events, putting stress on the tolerance and operation threshold of sanitation facilities. For instance, severe flooding can overwhelm water pipes and sewers, leading to cross contamination and the spread of water-borne disease. Drought and heatwaves can disrupt system operation by water and power shortages. Globally, sanitation facilities have attempted to tackle climate risks with innovation. For instance:

1. WATERLESS DRY TOILETS FOR ARID REGIONS (SOUTH AFRICA) - While access to sanitation in South Africa has expanded significantly in recent years, growing water scarcity and a rapidly increasing population continue to strain existing systems. Since 2015, the country has faced record-low rainfall. Climate change has intensified droughts, and water shortages are further compounded by water losses from ageing infrastructure.²¹ To reduce dependence on scarce freshwater, the local enterprise Enviro Loo has developed and installed waterless dry toilets that use natural ventilation and solar heat to evaporate and dehydrate waste. These systems provide safe, odour-free sanitation in schools and informal settlements without the need for piped water or electricity, offering a practical solution for arid and water-stressed regions.²²

2. FLOOD-RESILIENT LATRINES IN THE AMAZON BASIN (PERU) - In the flood-prone regions of the Peruvian Amazon, sanitation coverage remains among the lowest in South America, with widespread open defecation contributing to high rates of waterborne disease. Seasonal flooding from December to May frequently contaminates the soil and water sources, worsening health risks for rural families. To address these challenges, UNICEF and local communities have built flood-resilient latrines elevated above typical flood levels, preventing overflow and maintaining functionality throughout the rainy season. Each unit securely contains waste in a lined and sealed pit, with sawdust or dried leaves added to absorb moisture, reduce odour, and support composting. This simple yet effective design ensures year-round access to safe sanitation in one of the world's most climate-vulnerable ecosystems.²³

3. DISASTER-RESILIENT TOILETS (ASSAM AND GUJARAT, INDIA) - In Assam and Gujarat, where floods and cyclones frequently damage sanitation infrastructure, REDR India and UNICEF supported the development of disaster-resilient toilet (DRT) designs that can better withstand climate events. The DRT model strengthens the traditional twin-pit design by deepening the foundation for greater structural stability and elevating the plinth to maintain functionality during low-intensity floods. These adaptations enhance durability, reduce maintenance needs, and enable quicker restoration of services after extreme weather events—helping safeguard access to sanitation in hazard-prone regions.²⁴

4. DRY COMPOST TOILETS FOR WATER-SCARCE, FREEZING CLIMATES (LADAKH, INDIA) - In Ladakh's cold-desert area, including Leh, conventional flush systems fail in winter as pipes freeze and water is scarce. Communities have long used dry compost

²¹[Water Crisis in South Africa: Causes, Effects, And Solutions, 2024](#)

²²[Flush with success: How a new type of toilet is changing students' lives at South African schools, 2024](#)

²³[WASH Climate Resilience – Compendium of cases, 2025](#)

²⁴[Development of a Disaster-Resilient Toilet: lessons from the States of Assam and Gujarat, India, 2020](#)



toilets—elevated, water-free chambers that add a cover material (for e.g., soil, ash, or sawdust) so waste safely decomposes into manure. This people-led design avoids burst pipes and sewage leaks, conserves scarce freshwater, and returns nutrients to fields. Local NGO, Ladakh Ecological Development Group (LEDeG), continues to promote the use of dry compost toilets, saving water, reducing pollution by sewage, and supporting agriculture.²⁵

Globally, sanitation models that put people first are making communities more resilient to climate risks. By placing people at the centre of design, governance, operation, and maintenance, these models have reduced social and economic vulnerabilities that often determine how individuals and households experience and recover from climate shocks. These models have improved safety and dignity, especially for women and children; created livelihood opportunities through local management and operations; and strengthened the reliability of services when public systems are overstretched. For instance:

1. COMMUNITY-LED TOTAL SANITATION (KENYA) - In Kenya's urban and peri-urban settlements, Plan International and the Institute of Development Studies partnered with local governments to implement Community-Led Total Sanitation (CLTS). The initiative mobilised communities to eliminate open defecation through participatory mapping, sanitation monitoring, and peer accountability—without relying on hardware subsidies. Women's groups played a central role in managing shared toilets, organising clean-up campaigns, and enforcing community by-laws that improved hygiene and drainage.²⁶

2. RURAL WATER SUPPLY AND SANITATION PROJECT (BANGLADESH) - The Bangladesh Rural Water Supply and Sanitation Project demonstrate how community ownership and local entrepreneurship can secure climate-resilient water access in rural areas. Led by the Department of Public Health Engineering with World Bank support, the project mobilised communities, local governments, and private contractors to extend safe water access to over 1.6 million rural residents across 68 upazilas. Communities identified sites, selected technologies, managed funds, and oversaw maintenance, while trained local entrepreneurs constructed and serviced wells and piped systems. This model built local capacity for monitoring water quality and managing arsenic risks, a key climate-linked health hazard in Bangladesh.²⁷

3. COMMUNITY CIRCULAR SANITATION MODEL (HYDERABAD, INDIA) - In Hyderabad's urban poor communities, local collectives supported by NGOs such as Joint Action for Water have pioneered decentralised wastewater treatment and reuse through community-based circular economy sanitation systems. These systems treat domestic wastewater locally using DEWATS (Decentralised Wastewater Treatment Systems) and reuse treated water for flushing toilets and watering community gardens. Community groups participate in design, fee-setting, and maintenance, creating a governance loop rooted in shared accountability.²⁸

4. COMMUNITY-MANAGED TOILET BLOCKS (MUMBAI & PUNE, INDIA) - Due to the lack of availability of toilets in many communities, SPARC, NSDF, and Mahila Milan co-designed, built, and operated community toilet blocks with residents. Facilities are connected to legal water and power, include separate areas for women, men, and children, and have on-site caretakers drawn from the community. A low-cost subscription per family, supplemented by small pay-per-use fees, funds daily cleaning, minor repairs, and basic O&M, embedding accountability in local governance. The model functions as both infrastructure and institution: it improves safety, health, and user experience while mobilising residents and strengthening local governance.²⁹

²⁵ [Ladakhi Dry Compost Toilets: A Model Of Sustainable Living In A Fragile Environment, 2024](#)

²⁶ [Piloting Urban Community-Led Total Sanitation approaches in an underserved informal settlement in Kenya, 2012](#)

²⁷ [Fact Sheet, Safe Water for Rural Populations of Bangladesh: Bangladesh Rural Water Supply and Sanitation Project \(BRWSSP\), 2016](#)

²⁸ [Enhancing Circular Economy Perspectives – Plastic Waster Management Strategy and Action Plan for Greater Hyderabad Municipal Corporation, 2020](#)

²⁹ [SPARC's Strategy for Community Toilet Block Construction and Maintenance in India, 2012](#)

SELF-HELP GROUPS-MANAGED TOILETS (TAMIL NADU, INDIA) - Tiruchirappalli long faced unreliable, poorly maintained community toilets in low-income communities, undermining safety and access—especially for women and children. The city partnered with NGOs to hand over operation and management of selected community toilets to women’s self-help groups (SHGs). SHGs are in charge of the design, governance, and operations of these toilets where women handle daily staffing, collect fees, clean toilets, etc. to maintain the facilities. By 2023, Tiruchirappalli had around 400 community toilets, with about 150 managed by SHGs, sustaining service quality and user trust while generating livelihoods for women and improving safety and reliability in dense settlements.³⁰

Together, these examples demonstrate that climate-resilient sanitation depends on the reduction of climate exposure and vulnerability of people — each reinforcing the other to safeguard health, dignity, and livelihoods against future shocks. They also highlight that resilience is not a single intervention but an ecosystem of interlinked solutions: infrastructure that can endure floods and droughts, and communities equipped to adapt, manage, and sustain them over time.



³⁰ [Women-Led Sanitation Stories of Change, 2023](#)

Chapter 3

Suvidha: A Future-Ready Social Innovation for Cities of Tomorrow

Started in 2016, Suvidha Centres offer ...



Hygienic, affordable toilet, bath, drinking water, and laundry for all, incl trans-genders & PWDs



Well-lit facilities ensuring safety of women & children even at night



Well- ventilated toilet corridors with fans that prevent suffocation



Awareness building & behaviour change initiatives in the community



Financially self-sustaining model with respect to operational expenses



Women-led centers with dignified employment for the community



Access to gardens for the community to bond and for the children to play



Sustainable water, energy and sewage management

25

Centres established

600 k+

People have access to safe sanitation

100 million

times used

~300 million

litres of water recycled

The Suvidha model stands as India's proof that climate-resilient sanitation can simultaneously reduce exposure to climate shocks and strengthen communities to reduce vulnerability. Developed by Hindustan Unilever Limited (HUL) in partnership with the Brihanmumbai Municipal Corporation (BMC), HSBC India, and JSW Foundation, Suvidha Centres provide integrated toilets, bathing areas, laundry facilities, and safe drinking water under one roof in Mumbai's urban poor communities. Suvidha's success has relied on BMC's enabling role, including land provision and approvals for new centres. In 2024, the Ministry of Housing and Urban Affairs (MoHUA) signed a memorandum of understanding with HUL to build on the Suvidha model through a Centre for Hygiene and Sanitation Excellence (CHASE) aimed at improving public hygiene and sanitation across India.

Suvidha centres offer safe and dignified sanitation services 24*7 to more than 600,000 residents annually. Each centre operates on a circular and affordable design that reuses up to 90% of greywater for flushing and cleaning, runs on solar energy, and remains functional during floods or water shortages. Thus, Suvidha is an example of a system that endures when climate stress overwhelms much of the surrounding infrastructure.

REDUCING EXPOSURE TO CLIMATE HAZARDS: Suvidha's design shields sanitation infrastructure from climate-related disruptions through circular resource use and renewable energy:³¹

CIRCULAR WATER REUSE: All Suvidha Centres manage and treat sewage responsibly, recycling 90% of greywater. This reduces dependence on municipal supply during droughts, saving roughly 300million litres of water annually - equivalent to the amount of drinking water Mumbai consumes daily.

RENEWABLE POWER: Solar panels keep systems functioning during power outages while lowering operational costs. Reliable operations during climate events: 94% of users report that centres remain accessible during heavy rains and flooding, compared to only 57% for other nearby facilities. 7 out of 10 users reported continued access to water during peak summers and water cuts.

RELIEF TO SANITATION SYSTEMS: By decentralising services, Suvidha reduces the strain on city sewers and treatment plants, acting as a micro-resilient node within Mumbai's broader network. This design also ensures continued community access to safe facilities during system overloads, particularly in extreme climate events.



Build better infrastructure to reduce exposure to climate hazards



Continued access for 94% of users

94% of users reported continued access to services during heavy rains and waterlogging v/s 57% of non-Suvidha users



7 out of 10 users reported continued access to water during peak summers and water cuts



~300 MN litres of water recycled

cumulatively by 25 Suvidha centres, sufficient to meet a day's worth of drinking water requirements of entire Mumbai's population



Reduced queueing for >90% of users

>90% of users reported that they no longer have to queue for toilets in peak heat v/s 53% of non-Suvidha users

Source: Dalberg analysis



Earlier, during monsoons, toilets would overflow and become a breeding ground for rats, worms, and mosquitoes. Water would drip from holes in the roof. We had no choice but to use the toilet in that terrible condition. With Suvidha, we do not face these issues anymore.

Group of working women

During a recent BMC water-cut, I collected drinking water from Suvidha. My sister, facing the same water shortage at home, utilised Suvidha's laundry services.

Working woman



Figure 3: Suvidha's impact to climate exposure

³¹ Primary research-based findings

Strengthening community resilience to reduce vulnerability: Beyond infrastructure, Suvidha strengthens social resilience by improving safety, health, and livelihoods—particularly for women and children:³²

SAFETY AND DIGNITY: Disruption in sanitation facilities could lead to open defecation and people avoiding the use of toilets, endangering users' health, safety, and dignity. With Suvidha, 95% of women feel safe using toilets at night; 80% report reduced shame from not carrying a “dabba” of water; 100% of men report restored dignity from not having to defecate in the open.

PHYSICAL AND MENTAL HEALTH: Users experience 50% fewer diarrhoea episodes; 80% of women report improved menstrual hygiene; 94% report lower stress during climate events; less than 1% report urinary tract infections (UTIs).

ECONOMIC RESILIENCE: By saving time and improving health, individual women earn Rs. 17,000 and households gain up to Rs. 33,500 in additional disposable income each year through time saved from queueing, reduced absenteeism, and better productivity.

COMMUNITY COHESION: 90% of users express pride in having a Suvidha Centre in their neighbourhood, and all surveyed children said they play around the centres—showing how these hubs foster shared ownership and social connection.



Strengthen communities to reduce vulnerability



Reduced stress for 94% of users

94% of female users agreed that their stress levels around toilet usage and/or washing clothes reduced due to Suvidha



Disease reduction for 90% of users

90% of users credit reduced disease from improved health practices, enhancing hygiene after defecation and while handling food



INR 17,000 per year

Total dispensable income unlocked per woman from time freed up and reduced absenteeism at work; total household income gain of ₹33,500 per year



10 out of 10 children shared that they play in the vicinity of the Suvidha centres

Source: Dalberg analysis

Figure 4: Suvidha's impact to vulnerabilities of people



Before Suvidha, I didn't let my grandchildren eat dinner properly, worried that they would want to go to the bathroom at night. Now, I can sleep peacefully knowing they will be safe.

Female Suvidha user

The toilet before Suvidha used to be so unclean and the waiting time was so high that men and children to openly defecate in the nearby dumping ground. This does not happen anymore after Suvidha.

Group of male Suvidha users



SUVIDHA'S SUSTAINED IMPACT RESTS ON TWO FOUNDATIONS: The operating discipline HUL brings to every centre and the participation of the communities they serve, translating private-sector rigor into reliable local services. HUL's engagement introduces and applies disciplined processes from design to the operation of Suvidha centres. This ensures facilities are regularly cleaned and maintained, ensuring uptime, hygiene, and customer satisfaction rarely seen in typical public toilets. Community partnership also plays a major role in Suvidha's success. Each centre is locally staffed and maintained, building the technical capacity of residents while reinforcing accountability and pride. Centres act as community-led sanitation hubs that combine inclusivity, circularity, and sustainability, functioning as micro-resilient infrastructure that strengthens both sanitation systems and people's socio-economic and health wellbeing.

³² Primary research-based findings

SUVIDHA MODEL HIGHLIGHTS AN IMPORTANT LESSON FOR SCALE: Sustaining private sector quality standards within public or community facilities requires strong institutional mechanisms. As the model expands, ensuring consistent cleanliness, uptime, and user experience will depend on structured tools such as clear service-level agreements, third-party audits, and performance-linked operation and maintenance (O&M) incentives. At the same time, community ownership remains essential to long-term success—empowering residents to act not only as users but also as planners, decision-makers, and operators of urban sanitation facilities. Together, these safeguards help prevent the maintenance–satisfaction trap that undermines many public sanitation efforts.

A SYSTEMS APPROACH TO SANITATION: LESSONS FROM THE SUVIDHA MODEL

Suvidha offers clear, transferable lessons for cities seeking to build sanitation systems that can withstand climate shocks while improving everyday reliability for urban communities. As India prepares its cities for a future of rapid urbanization and intensifying climate pressures, these lessons offer a strong pathway for building systems that protect both infrastructure and the people who rely on it.

1. Essential services under one roof improve reliability by meeting multiple daily needs in one place, making sanitation more convenient and safer for users.

2. Circular resource use enhances climate resilience by cleaning and reusing most water and using solar power, reducing dependence on stressed city water and electricity systems.

3. Climate-proofed infrastructure ensures high uptime by using elevated structures, durable materials, and decentralised treatment so services remain functional during floods, heat, and other shocks.

4. Community ownership strengthens long-term sustainability by involving local residents in staffing, maintenance, and decision-making, building pride and protecting the facilities over time.

Ultimately, Suvidha demonstrates how the private sector and communities can work in tandem—offering practical lessons for cities seeking to build sanitation systems that minimise climate exposure of infrastructure and vulnerability of communities.

The Way Forward: Scaling Smart Sanitation Systems, Transforming Lives at Scale

India stands at a pivotal moment in its sanitation journey. As we shape the cities of tomorrow, the convergence of rapid urban growth and intensifying climate pressures means we have a unique moment to **realize the potential of expansive, future-proof sanitation systems.**

A strong foundation has been built in the past decade through national missions such as SBM-U 2.0, AMRUT 2.0, and the Climate Smart Cities Assessment Framework (CSCAF), which together have transformed access and embedded sustainability into urban planning. Now, the next step is clear: to scale models that make this progress enduring — systems that can absorb shocks, recover quickly, and protect the most vulnerable.

India now has a unique opportunity to shape sanitation systems that can withstand the pressures of rapid urban growth and a changing climate. Models like Suvidha show that inclusivity, circularity, and local stewardship can turn basic infrastructure into engines of dignity, health, improved livelihood, and climate security. Indian cities are still being built, and examples like Suvidha offer templates that can lock in resilience and equity as the world navigates an inflection point of rapid urbanisation and worsening climate risks.

The models highlighted in the report collectively show that resilience is built through a combination of inclusive design, circular resource use, strong municipal stewardship, and empowered communities. To translate these insights into action, cities can begin with a few practical steps:

- 1. Embed climate resilience parameters into all new sanitation planning** (e.g., flood proofing designs, decentralised treatment, circular water systems).
- 2. Strengthen community roles in Operations & Maintenance**, especially through women's involvement, Self-Help-Groups and local organisations that improve accountability and service continuity.
- 3. Adopt modular, scalable models**—from decentralised wastewater systems to integrated service centres that can be expanded as population and risks grow.
- 4. Use data and simple monitoring tools** to track uptime, cleanliness, and user satisfaction, ensuring performance standards are consistently met across facilities.
- 5. Mobilise blended financing** (government schemes, CSR, philanthropy, and private partners) to de-risk innovation and sustain long term operations.

Achieving this vision will require coordinated action across government, philanthropy, CSR, and private partners, each playing a complementary role. Catalytic finance, policy alignment, and community partnership can together advance India's next generation of urban sanitation systems. Government programmes such as SBM-U 2.0 and the Urban Infrastructure Development Fund (UIDF) can enable cities to invest in resilient infrastructure; CSR and philanthropic capital can de-risk innovation and demonstrate viable community-led models; and private partners can bring operational excellence and financial discipline to sustain them over time.

By taking these steps, cities can move beyond incremental improvements and build sanitation systems that are equitable, climate ready, and futureproof. The path ahead is not about replicating one model but about adopting principles that strengthen both infrastructure and the communities they serve—laying the foundation for more resilient, dignified, and livable cities across India.

ANNEXURE

Note on methodology

This study employed a mixed-method approach that combined document review, secondary research, expert consultations, qualitative interviews, and a primary survey to generate a comprehensive understanding of the Suvidha model.

- **DOCUMENT REVIEW:** Undertook an in-depth analysis of Suvidha's existing documentation, including past impact evaluations, operational records, and accounting data, to assess performance trends and identify key data gaps.
- **SECONDARY RESEARCH:** Conducted rapid desk research to analyse climate and city-related frameworks from international and national organisations, set the context for the study, and benchmark findings against comparable city and national-level urban poor community data.
- **EXPERT CONSULTATIONS:** Engaged with Dalberg's internal practice leads for WASH, Climate, and Gender, and external experts from HSBC India, UNICEF, Janaagraha, and C40, to validate insights and refine hypotheses on integrating climate resilience and community-centric sanitation approaches.
- **QUALITATIVE INTERVIEWS:** Conducted in-depth interviews with 29 community members and 3 women staff across two Suvidha Centres (Gaikwad Nagar, Chembur and Dharavi); including 12 small-group and one-to-one discussions with 16 female and 13 male participants.
- **PRIMARY SURVEY:** Partnered with Convergent to conduct a quantitative household survey of 400+ respondents across four Suvidha Centres (Andheri, Dharavi, Gaikwad Nagar in Chembur, Jagdusha Nagar in Ghatkopar), comprising a treatment group of 264 users and a control group of 143 non-users.

Together, these methods enabled triangulation across multiple data sources, ensuring a robust, evidence-based understanding of how Suvidha contributes to reducing climate exposure and strengthening communities to reduce vulnerability through inclusive and resilient sanitation systems.

