A Journey of Urban Sanitation in India

CONTRIBUTIONS OF THE INDO-GERMAN DEVELOPMENT COOPERATION

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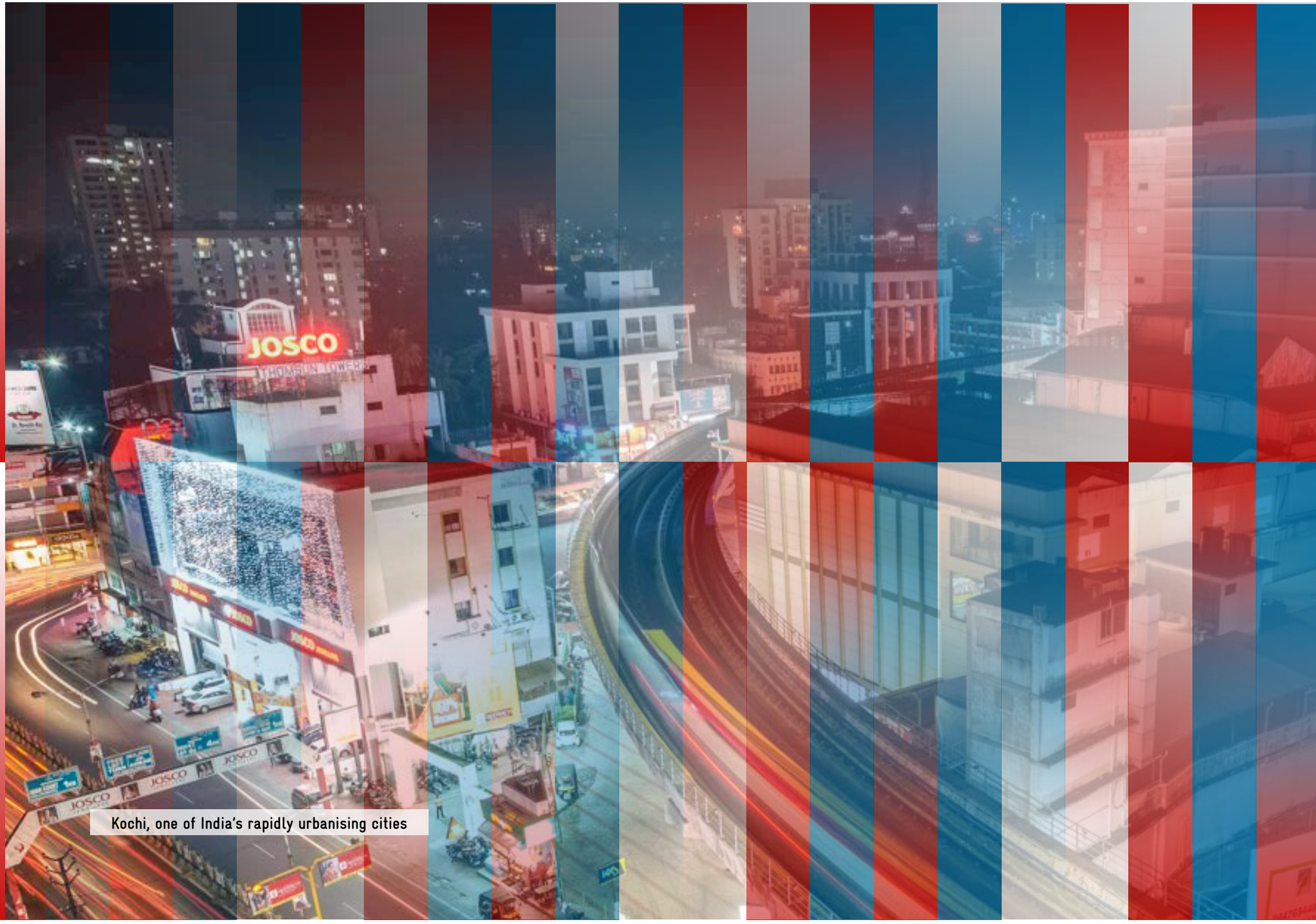
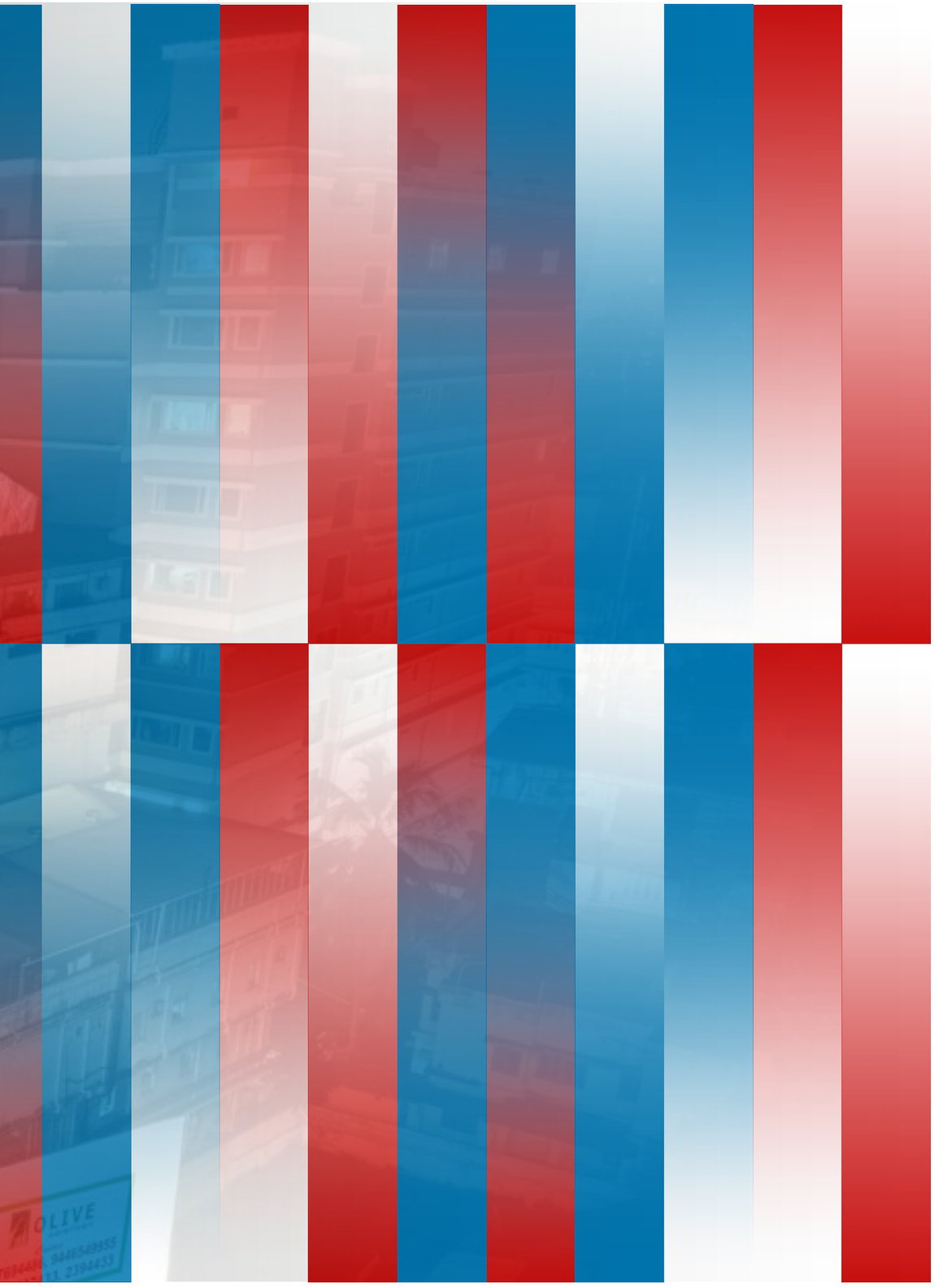
Chaotic colourful houses on the banks of river Ganges, Varanasi



Kochi, one of India's rapidly urbanising cities



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MESSAGE

India is aiming to deliver a high quality of life for its citizens and a clean and sustainable environment. To achieve this, it is working on integrated, inclusive, and comprehensive approaches, which also includes people-centric, demand-driven, scientific and 'smart' sanitation initiatives. Syncing the implications of rapid urbanisation with desired outcomes is challenging, however sustained and harmonised efforts for capacity development of service providers and citizens across sectors, missions and programmes, long-term planning, an amalgamation of approaches, technologies and preparedness for emergencies, will go a long way in developing 'liveable and resilient' cities across India.

Sanitation has been a top priority of Telangana since its emergence as the 29th state of the Republic of India in 2014. The Government under the Swachh Bharat-Swachh Telangana mission has been successful in transforming its urban centres into Open Defecation Free (ODF) cities and is continuously improving its position in the national sanitation ratings of cities. It has adopted a multi-pronged approach to improve service delivery through technology, behaviour change, capacity enhancement and occupational safety. Faecal sludge management has been a key focus area in cities for effective collection, treatment and disposal with improved infrastructure with end-to-end service delivery mechanisms. The Telangana Government is deeply committed to achieving the Sustainable Development Goals (SDG) targets well ahead of the globally agreed timelines. The State is promoting innovation by establishing a Water, Sanitation, Hygiene (WASH) innovation hub as an incubator for startups in the water and sanitation sector through the INK@ WASH platform.

I understand that this publication provides insights into selected works carried out by the German Development Cooperation (GIZ and KfW) in the urban sanitation sector across different cities and states in India including Telangana. The technical know-how, planning approaches and capacity building initiatives highlighted in this publication over the last decade of GDC support to India in urban sanitation may be referred to for further strengthening the approaches to urban sanitation in Indian cities.

I understand and appreciate GIZ's cooperation received by the Telangana state for the advancement of urban sanitation through the development of the State Sanitation Strategy and City Sanitation Plans in selected cities. I look forward to continuing this successful cooperation for jointly taking the sanitation agenda ahead. I am sure the readers will find this publication useful in strengthening a holistic approach to sustainable urban sanitation.

(K. TARAKA RAMA RAO)

Preface

In 2014, India embarked on 'Clean India Mission' (*Swachh Bharat* Mission - SBM) as a flagship programme under the leadership of the Honourable Prime Minister. The vision was to ensure hygienic and sanitised cities across India. The urban sanitation journey is well on its way with enhanced coverage and improved service levels. The national time-bound flagship missions, Smart Cities Mission, *Atal* Mission for Rejuvenation and Urban Transformation (AMRUT) and National Mission for Clean *Ganga* (*Namami Gange*) as well as SBM have complimented the objectives of each mission and provided new momentum to improved sanitation infrastructure in Class-1 (population over 100,000) cities including the metropolitan cities. The enabling policy instruments set the context, importance, and direction to prioritise investments for sanitation improvements including solid waste and faecal sludge management.

India is now addressing water and sanitation challenges from the perspective of improved service delivery and beyond infrastructure creation alone. Citizen engagement and capacity building are also the focus areas of the mission programmes resulting in successful cases for potential replication. The new version 2.0 of SBM and AMRUT, is envisioned to make all Indian cities 'Garbage Free' and 'Water Secure'. These flagship missions signify a step forward in India's march towards effectively addressing the challenges of rapid urbanisation and will contribute to the achievement of the Sustainable Development Goals by 2030.

For decades, the German Federal Ministry for Economic Cooperation and Development (BMZ), German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), German Federal Ministry for Economic Affairs and Climate Action (BMWK) and other ministries through Germany's International Cooperation Agency (GIZ) and the German Development Bank (KfW) have been supporting the Government of India in working towards development goals through collaborative projects. This support is undertaken under the 'German Development Cooperation (GDC)' banner.

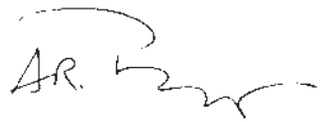
Collaborative projects through Indo-German Cooperation have provided a boost to India's efforts toward sustainable development for many decades now and GIZ's support for the urban sector is much valued. The most recent support for the 'Climate Smart Cities Assessment Framework', is very timely for incentivising cities to adopt measures to become climate-smart. The State Sanitation Strategies (SSS) and City Sanitation Plans (CSPs) supported under the 'Support to National Urban Sanitation Policy' project, are now adapted and mainstreamed by the Government. Technical guidance and support for the revision of Central Public Health and Environmental Engineering Organisation's (CPHEEO) Manuals and other advisories have helped strengthen the planning and implementation framework in the areas of solid waste management and wastewater management. Frameworks including the integrated wastewater management and Shit Flow Diagrams (SFDs) are valued as important capacity development tools by several nodal training institutes.

This publication aims at describing India's urban sanitation journey over the last ten years spanning policy, investments, innovations, and capacity building. It also elaborates on how the German Development Cooperation has contributed to this journey, recapitulating successful examples of the bilateral cooperation between selected states and cities of India and Germany.

The key learnings of GIZ in urban sanitation in India are elucidated as emerging challenges and priorities, in this publication. It offers valuable learnings for practitioners and policymakers in the urban sanitation space in India and elsewhere while also helping define the scope of continued German Development Cooperation's

bi-lateral agencies' engagement in the urban sanitation sector of India.

We hope that this publication is useful to all passionate water and sanitation professionals, urban planners, policymakers, and anyone who intends to engage in the ambitious task of improving urban sanitation, public health, and the well-being of the country. We understand that readers would benefit from the insights featured in this publication and work towards improving and sustaining the urban sanitation situation in India.



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This publication profiles contributions from the German Development Cooperation (GDC) and the Government of India to provide sustainable sanitation for all. It is largely drawn from the work done by GIZ and KfW and its many Indian partners – from the Government of India to Urban Local Bodies at the local level.

The authors would like to extend their appreciation to all the individuals and organisations that contributed to the development of this publication. In particular, the collaboration between the GIZ 'Sector Programme Sustainable Sanitation' and the Indo-German bilateral programme 'Sustainable Urban Development – Smart Cities', has made the conceptualising of this publication possible.

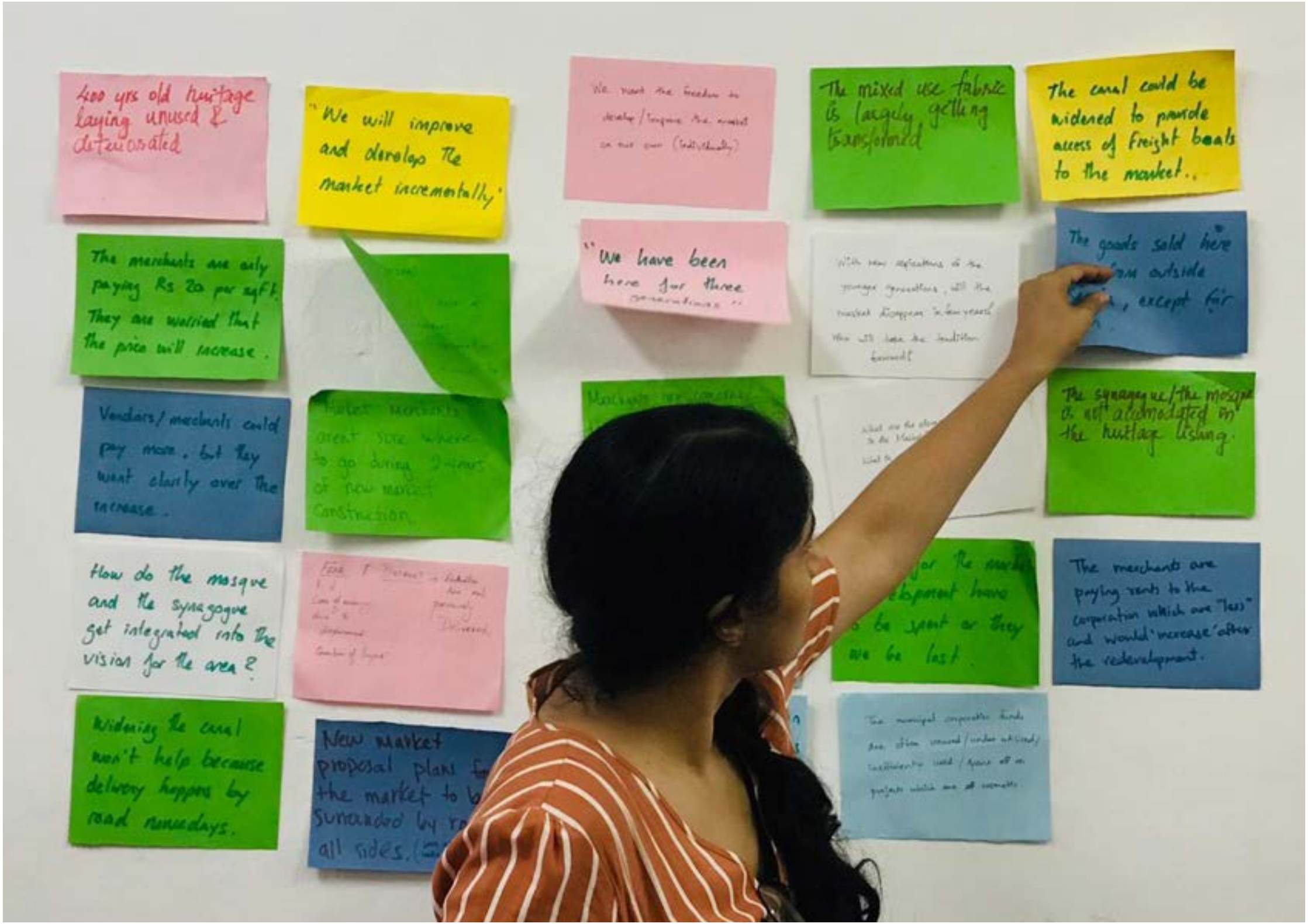
The authors wish to acknowledge the valuable contributions from German Development Cooperation's project implementing partners – the Ministry of Housing and Urban Affairs, Government of India, and respective urban development departments responsible for municipal administration of the partner states namely, Andhra Pradesh, Himachal Pradesh, Kerala, Maharashtra, Odisha, Tamil Nadu, Telangana and Uttarakhand.

The contribution from the GIZ projects, namely, Climate Smart Cities (Ms. Vaishali Nandan and team), Support to Ganga Rejuvenation (Ms. Martina Burkard and team), Prosoil Project (Mr. Jitendra Yadav and team) and Gagillapur develoPPP Project (Mr. Hrishikesh Rayadurgam and team) is highly appreciated. Some of their achievements have been highlighted in this publication. The contributions from the KfW Development Bank, India office (Ms. Annika Fuhrmann, Ms. Carla Berke, Mr. Christoph Kessler, Mr. Kiran Avadhanula, Mr. Philipp Wyrsch, Mr. Rahul Mankotia, Mr. Rainer Sünnen) for enriching the contents of the Publication is sincerely appreciated.

Sincere gratitude to the Sustainable Urban Development-Smart Cities Programme team of Dr. Teresa Kerber, Mr. Georg Jahnsen, Dr. Esakkiraj, Ms. Shweta Dua, Mr. Adwitiya Patro and Mr. Sudakhar Krishnan; and to the GIZ Sustainable Sanitation Programme team including Ms. Daphne Manolakos, whose hard work and dedication have added a great deal to the development of the sector and this publication. Sincere appreciation also to Mr. Dirk Walther from GIZ, for his thorough review.

Mr. Depinder Kapur's contribution to this publication is gratefully acknowledged as also are Ms. Susmita Sinha's efforts in coordinating and compiling this publication. HatchPack Studio, India's contribution for layout, design and printing is also appreciated.

There is a long journey ahead for sustainable sanitation improvements in India, fraught with numerous hurdles. We hope that this publication helps to overcome the many obstacles that lie on the onward journey, helping India achieve its ambitious national targets and aspirations contributing to the Sustainable Development Goals.


400 yrs old heritage laying unused & deteriorated
"We will improve and develop the market incrementally"
We want the freedom to develop/improve the market on our own (individually)
The mixed use fabric is largely getting transformed
The canal could be widened to provide access of freight boats to the market..
The merchants are only paying Rs 20 per sqft. They are worried that the price will increase.
"We have been here for three generations"
The goods sold here from outside , except for
Vendors/merchants could pay more. but they want clarity over the increase.
The synagogue/the mosque is not accomodated in the heritage listing.
How do the mosque and the synagogue get integrated into the vision for the area?
The merchants are paying rents to the corporation which are "less" and would 'increase' after the redevelopment.
Widening the canal won't help because delivery happens by road nowadays.
New market proposal plans
the market to b
surrounded by ro
all sides.

Executive Summary

The outlook regarding sanitation – how it is being perceived, advocated and implemented – is going through a change in India. It has moved from a 'some sort of priority' to a 'significant priority and focus-on issue', attracting much attention and investment, especially from the Government.

In this publication, the first chapter captures India's urban sanitation journey particularly over the last decade spanning policy, investments, innovations and capacity building. In an attempt to provide improved sanitation to all, the Government of India – has moved from conventional sanitation concepts beyond networked sewerage towards environmentally responsible, inclusive, holistic and sustainable solutions.

The second chapter elaborates on how the German Development Cooperation (GIZ and KfW) has contributed to this journey. GIZ has committedly supported the Indian Government and other stakeholders, over the years, to strengthen India's urban sanitation agenda. This has been made possible through programmes and projects that have worked towards developing capacities, supporting policies, fostering knowledge exchange, promoting innovative approaches, providing technical solutions as well as adapting and demonstrating light house projects to learn from. Successful global practices have also been appropriately adopted to help accelerate positive change on the ground. This publication reflects on the key aspects of the German Development Cooperation's approach to attaining a sustainable circular economy in urban India.

In Chapter 3, the publication recapitulates successful examples of the cooperation between India and Germany. Selected key interventions of the urban sanitation sector have been highlighted under five focus areas namely, enabling frameworks, innovative projects, capacity building, community engagement and climate change. The selected interventions include initiatives at all three levels - national, state and city.

The resolve and the actions of the last decade have led to some incredible improvements in sanitation in India. The access to toilets in India is almost universal today, and the focus has moved towards effective solid and liquid waste management including recycling and reuse.

Chapter 4 reflects on the current priorities and challenges in the urban sanitation sector. Priority areas for improvement include sustained and harmonised efforts for capacity development of service providers and citizens across sectors, missions and programmes, long-term planning, integrated approaches, appropriate technologies and preparedness for emergencies. These will contribute positively to developing 'liveable and resilient' cities across India.

However, keeping in mind the scale and diversity of the country, there is a long way to go. A one-size-fits-all policy and programme approach will not deliver results. This publication attempts to capture GIZ's learnings while supporting India's urban sanitation efforts so that India may reach its goal of providing improved sanitation to all and can achieve international development commitments.

Abbreviations and Conversions

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
ASCI	Administrative Staff College of India
ASEM	Advisory Services in Environmental Management
BCC	Behaviour Change Communication
BMUV	German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
BMWK	German Federal Ministry for Economic Affairs and Climate Action
BMZ	German Federal Ministry for Economic Cooperation and Development
BSCL	Bhubaneswar Smart City Limited
CCMC	Coimbatore City Municipal Corporation
CITIIS	Cities Investments to Innovate Integrate and Sustain
CPCB	Central Pollution Control Board
CPHEEO	Central Public Health and Environmental Engineering Organisation
CSCAF	Climate Smart Cities Assessment Framework
CSE	Centre for Science and Environment
CSP	City Sanitation Plan
DEWATS	Decentralised Wastewater Treatment Systems
DFBOOT	Design, Finance, Build, Own, Operate and Transfer
DPR	Detailed Project Report
DRDO	Defence Research and Development Organisation
EU	European Union
ERSU	Emergency Response Sanitation Units
FSM	Faecal Sludge Management
FSSM	Faecal Sludge and Septage Management
FSTP	Faecal Sludge Treatment Plant
GDC	German Development Cooperation
GIZ	Germany's International Cooperation Agency (Deutsche Gesellschaft für Internationale Zusammenarbeit)
GoI	Government of India
HR	Human Resources
HRIDAY	Heritage City Development and Augmentation Yojana
ICT	Information and Communications Technology
IDSMT	Integrated Development of Small and Medium Towns
IEC	Information, Education and Communication
IGEP	Indo-German Environment Partnership
iGOT	Integrated Government Online Training
ILCS	Integrated Low Cost Sanitation
IT	Information Technology
IUDP	Integrated Urban Development Programme
IWRM	Integrated Water Resource Management
JJM	Jal Jeevan Mission
JnNURM	Jawaharlal Nehru Urban Renewal Mission
kWh	Kilowatt-hour

KfW	German Development Bank
KILA	Kerala Institute of Local Administration
KMC	Kochi Municipal Corporation
LCS	Low Cost Sanitation
MDG	Millennium Development Goals
MLD	Million Litres per Day
MoHUA	Ministry of Housing and Urban Affairs
MoUD (now MoHUA	Ministry of Urban Development
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
NIUA	National Institute for Urban Affairs
NGT	National Green Tribunal
NMC	Nashik Municipal Corporation
NMCG	National Mission for Clean Ganga
NFSSM	National Policy on Faecal Sludge and Septage Management
NSSI	National School Sanitation Initiative
NUSP	National Urban Sanitation Policy
ODF	Open Defaecation Free
O&M	Operation and Maintenance
PPP	Public Private Participation
RAY	Rajiv Awas Yojna

SAAP	State Annual Action Plan
SBM	Swachh Bharat Mission (Clean India Mission)
SCM	Smart Cities Mission
SDG	Sustainable Development Goals
SFD	Shit Flow Diagram
SGR	Support to Ganga Rejuvenation
SLB	Service Level Benchmark
SLIP	Service Level Improvement Plans
SNUSP	Support to National Urban Sanitation Policy
SPMG	State Programme Management Group
SSS	State Sanitation Strategy(ies)
SUD-SC	Sustainable Urban Development-Smart Cities
SuSanA	Sustainable Sanitation Alliance
SWM	Solid Waste Management
ULB	Urban Local Body(ies)
USD	United States Dollar
VAMBAY	Valmiki Ambedkar Awas Yojana
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation
1 Lakh	0.1 Million
1 Crore	10 Million

Contents

Featured Interventions in Chapter 3

01

India's Urban Sanitation Efforts

Over the years, the Government of India has worked to develop, plan and implement various measures for sanitation improvements. The adopted measures have formed the basis for moving towards holistic approaches resulting in cleaner, more inclusive and greener cities.

The most significant change in the last decade is that sanitation has become a core issue on India's national political and development agenda. Consequently, addressing related problems has high priority. The Government, policymakers and professionals working in the sector made the effort to learn from various sanitation planning exercises, and assessments of work on international development goals[1]. These learnings led to the *Swacch Bharat* Mission (SBM) in 2014, a key milestone in India's sanitation journey, that has paved the way for many supporting programmes, like *Atal* Mission for Rejuvenation and Urban Transformation (AMRUT) and the Smart Cities Mission (SCM). These programmes link urban development to access to basic services, service delivery leading to improved quality of life, resilience to climate change, and liveability of cities – all of which collectively look at sanitation as part of a development matrix.

This chapter provides an overview of the Indian Government's efforts for addressing urban sanitation issues and challenges.

Genesis of Urban Sanitation Programmes in India

Developmental activities in the initial decades since independence (1947), focused on agricultural and industrial development. Urban development started getting attention only later with the third Five Year Plan (1961-66). At the time of independence, India inherited an urban town legacy of an "old town" that was congested and densely populated, followed by a "new planned town" that housed the administrative establishment and residential areas, and a military cantonment in some towns. Only the planned part of the new town and military cantonment had limited underground sewerage systems or septic tanks. The rest of the town's sanitation depended exclusively on dry toilets (and open defaecation) that had to be cleaned manually. The management of existing sewerage systems of planned areas in cities continued as well as the practice of manual cleaning of dry toilets / septic tanks and removal of night soil in the non-sewered urban areas. To improve the sanitation situation in the non-sewered areas, the **Low Cost Sanitation Scheme** (LCS, 1961) was launched to eradicate the practice of manual scavenging. This was the first urban sanitation scheme from the third Five Year Plan which was carried forward till 2010 and finally incorporated into the *Swachh Bharat* Mission in 2014.

Since major industries were concentrated in the big towns and cities of India, these towns were the focus of the first urban development initiatives. The **Integrated Urban Development Programme** (IUDP) was launched in the fourth Five Year Plan (1969-74), primarily for the large metros focused on improving urban infrastructure including water supply and sewerage systems.

Small and medium towns got attention only by the late seventies when the **Integrated Development of Small and Medium Towns** (IDSMT) was launched in 1979-80. Larger cities and metros got additional support for infrastructure

A sewage treatment plant in Telangana, a typical sanitation solution in bigger cities or urban India

development (including sewerage and solid waste management) through the **Megacity scheme** (1993-94). In the early eighties, under the **Integrated Low Cost Sanitation Scheme** (ILCS) (successor of the LCS), subsidies were provided for low-cost toilets and containment alternatives. This boost catered to the majority of the urban population. It aimed at converting individual dry latrines into pour flush latrines. The improved pour-flush facilities also aimed at encouraging people to build toilets to reduce open defaecation. These efforts were instrumental in laying the foundation for India's urban sanitation sector.

The increasing complexity of India's urban sanitation situation on the ground as well as its alignment with global initiatives like the **International Drinking Water Supply and Sanitation Decade programme** (1980-1989) of the United Nations (to improve services for sanitation as well as water supply) and the **Millennium Development Goals**[2] (MDGs) prompted the Indian Government to ramp up its sanitation efforts. This also meant an evolving understanding of what sanitation represented (see Box 1 Defining Sanitation). The key steps taken since the 2000s are depicted in Figure 1.

Solid-waste laden sewage in drains has been a common sight across India

Box 1: Defining sanitation

In India, the traditional understanding of sanitation is the management of liquid waste (wastewater). Over the years the interpretation of the term has evolved as it has been influenced by global discussions and deliberations. At present, based on explanations provided in Government policies and programmes, it may be interpreted as **procedures and measures designed and applied to protect and improve public health conditions related to clean drinking water, adequate treatment and disposal of all types of human waste – solid and liquid.**

This interpretation is based on the description in the National Urban Sanitation Policy (NUSP), 2008, and the SBM, 2014. In the NUSP, the meaning of sanitation has taken a broad perspective defining it as "Safe management of human excreta, including its safe confinement, treatment, disposal and associated hygiene-related practices. While this policy pertains to the management of human excreta and associated public health and environmental impacts, it is recognised that integral solutions need to take account of other elements of environmental sanitation, i.e. solid waste management; generation of industrial and other specialised/hazardous wastes; drainage; and the management of drinking water supply".

Under SBM, its interpretation includes ending open defaecation, eradicating manual scavenging of faeces, generating awareness and bringing about behaviour change regarding sanitation practices and augmenting capacities at the local level. Furthermore, it aims to improve the management of solid and liquid waste.

Globally, the World Health Organisation (WHO) describes sanitation as access to and use of facilities and services for the safe disposal of human urine and faeces. "A safe sanitation system is a system designed and used to separate human excreta from human contact at all steps of the sanitation service chain from toilet capture and containment through emptying, transport, treatment (in-situ or off-site) and final disposal or end-use. Safe sanitation systems must meet these requirements in a manner consistent with human rights, while also addressing co-disposal of greywater, associated hygiene practices and essential services required for the functioning of technologies"[A]. In 2008, the Sustainable Sanitation Alliance (SuSanA)[B], released the following statement regarding the definition of sustainable sanitation[C]: "To be sustainable a sanitation system[D] has to be not only economically viable, socially acceptable, and technically and institutionally appropriate, it should also protect the environment and the natural resources. When improving an existing and/or designing a new sanitation system, sustainability criteria related to the following aspects should be considered:

- Health and hygiene
- Environmental and natural resources
- Technology and operations
- Financial and economic issues
- Socio-cultural and institutional aspects
- Awareness and community involvement

A. *WHO Guidelines on Sanitation and Health p. XII , 2018*

B. *An alliance based on a network of people and organisations who share a common vision of sustainable sanitation and whose secretariat is carried out by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)*

C. *Roland Schertenleib, Christoph Lüthi, Arne Panesar, Mintje Büürma, Depinder Kapur, Abishek Sankara Narayan, Alexandra Pres, Prit Salian, Dorothee Spuhler and Annkathrin Tempel (2021) "A Sanitation Journey – Principles, Approaches & Tools for Urban Sanitation" . GIZ & EAWAG – Bonn, Germany & Dübendorf, Switzerland; 2021*

D. *According to the Compendium of Sanitation Systems and Technologies (Tilley et al., 2014b): "A Sanitation System is a context-specific series of technologies and services for the management of these wastes (or resources), i.e., for their collection, containment, transport, transformation, utilisation or disposal.*

One of the first efforts post link up with international agendas was the launch of the **National Water Policy** (1987). In addition to governing the planning and development of water resources and their optimum utilisation, the Water Policy also addressed the problem of urban sanitation by emphasising on the provision of sanitation services in urban areas.

At this early stage of addressing sanitation issues, infrastructure improvements and service improvements were attempted. However, the responsibility of service provision was still not clear. The 74th Constitutional amendment (1993), recognised the role of Urban Local Bodies (ULBs) in sanitation management by including sanitation, solid-waste management, and other services in the portfolio of ULBs. This helped pave the way for establishing sanitation service provision. It also renewed the focus on urban development in the new millennium with policy changes and new missions, moving forward from the fifty years of India's independence that saw uneven urbanisation with a massive expansion of low-income housing and informal settlements and inadequate sanitation services provision.

To boost the efforts of the ILCS, the **Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act** (1993) was enacted. This banned the manual night soil removal. However, this Act was not adopted by many states. Therefore, in 2013, the **Prohibition of Employment as Manual Scavengers and their Rehabilitation Act** was enacted countrywide. This sought to improve the lives of manual scavengers by rehabilitation while also promoting the replacement of dry toilets with flush toilets.

A sanitation worker using mechanical equipment for cleaning sewers

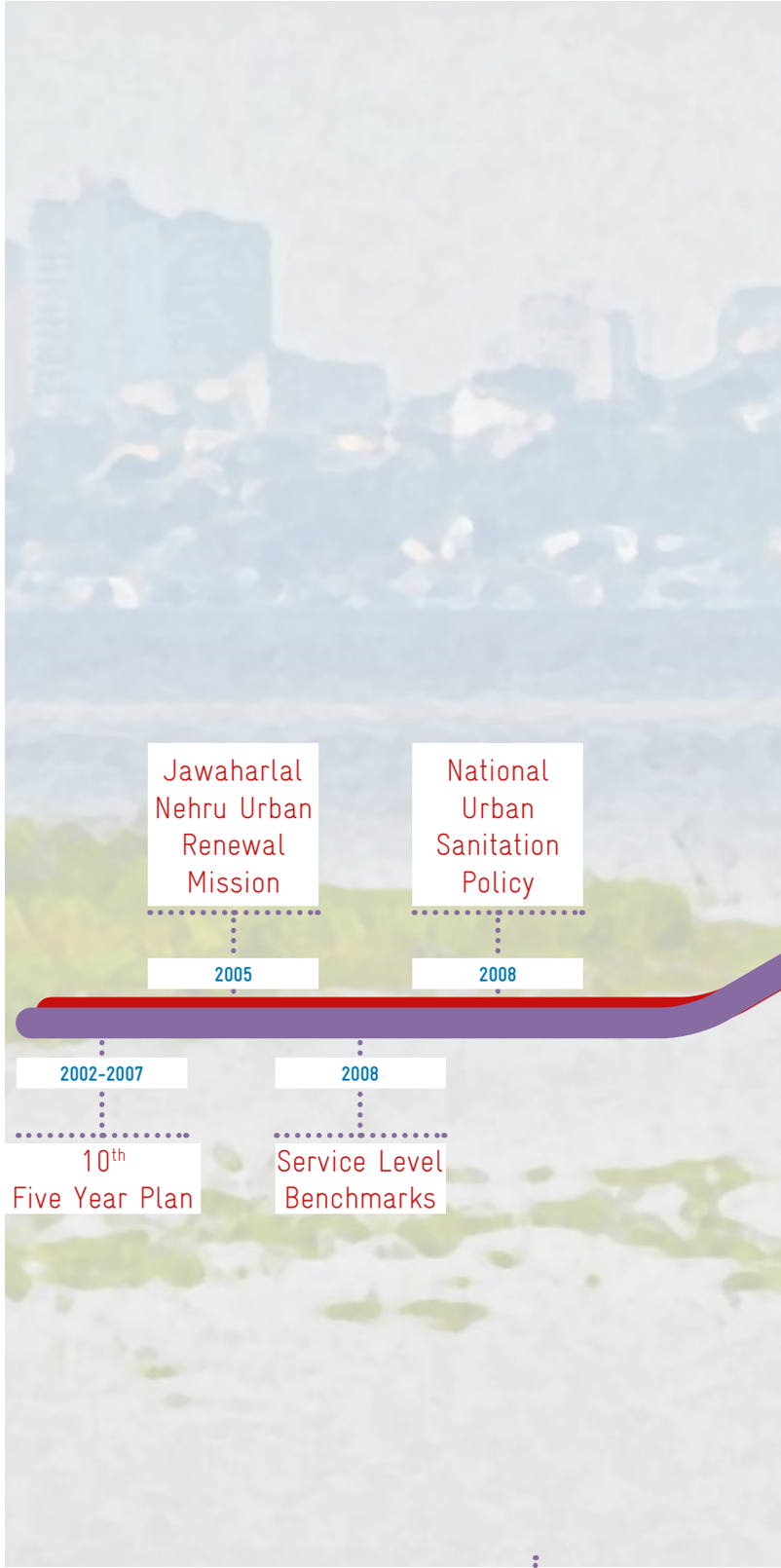
Holistic Approaches

Investment for urban development has been massively scaled up this millennium - not only from the central Government but also from separate allocations made for cities by the Finance Commission[3], private lending instruments and bank finance.

A renewed focus on urban sanitation was observed since the start of the new millennium. There was a shift from improved infrastructure to improved service levels. Long term schemes were replaced with ambitious time-bound missions. Technology upgradation (water supply and sanitation) took place by leaps and bounds. The judiciary took up the matter of wastewater and environmental pollution through the setting up of the National Green Tribunal. Stringent wastewater treatment standards were introduced. And for the first time, along with faecal sludge management, decentralised sanitation systems became acceptable as an important component for achieving inclusive citywide sanitation. India declared itself Open Defaecation free in 2019.

Increased Investment for Sanitation

The Tenth Five-Year Plan (2002-2007), earmarked significant financial resources for water supply and sanitation, given the emphasis on reaching the goals etched out by the MDGs. With additional financial allocation, the emphasis on improving infrastructure and services for the urban poor saw the launch of the *Jawaharlal Nehru* National Urban Renewal Mission (JnNURM) in 2005. JnNURM was the first big urban mission that provided a massive urban infrastructure investment push for 63 cities in India. Funding under JnNURM was contributed jointly by the central government, the respective state governments, and ULBs in proportions based on the population of the city or town. The pro-poor[4] thrust under the mission was emphasised through making reforms that earmarked 25% of the municipal budget for provision of basic services including affordable housing and sanitation facilities for the urban poor. JnNURM aimed at providing improved basic services, such as housing, water supply, and sanitation.



EVOLVING LANDSCAPE

Fig 1: Evolving sanitation landscape in India since 2000

A specific programme to address housing for the urban poor was the ***Rajiv Awas Yojana*** (RAY, 2011), in which every citizen had access to sanitation among other basic amenities.

With the emphasis on sanitation service delivery post-JnNURM and reiterated under the **National Urban Sanitation Policy**, it was imperative that a monitoring system was developed. The **Service Level Benchmarking**[5] (SLB) initiative, which aimed at defining a minimum set of standard performance parameters for the water and sanitation sector for monitoring and reporting by the cities, was therefore introduced. The discourse of urban sanitation was marked by SLBs, a shift from a pro-poor programme approach, to improved services instead of infrastructure creation as a measure of performance and investments.

For the first time, a rating of Indian cities was undertaken under the National Sanitation Ranking known as ***Nirmal Shahar Puraskar***[6] (Clean and Green City Award) 2010. It's success paved the way for ***Swachh Survekshan*** (2015) which was initiated as a ranking initiative of Indian cities on cleanliness (solid waste management and sanitation parameters). Institutional strengthening of monitoring at the city level and citizen feedback was incorporated into the scoring.

Along similar lines, the **National School Sanitation Initiative** (NSSI, 2011) aimed at open defaecation elimination in schools, paved the way for the *Swachh Vidyalaya* (clean school) *Puraskar* (award) an initiative of the Ministry of Human Resources Development (MoHRD) in 2015. This was aimed as an incentive to reward schools for undertaking a measurable set of interventions for improving school sanitation including hygiene and handwashing behaviours.

The monitoring and rating systems brought performance into focus which then led to investments.

The national urban ***Swachh Bharat* Mission** was introduced in 2014 as a flagship development programme of the Government to achieve 100% Open Defaecation Free India by 2019. The salient feature of the SBM was its financial incentives for supporting toilet construction and solid waste management along with an enhanced behaviour change communication funding. For the first time, a household toilet subsidy was also provided for urban toilets construction (both individual toilets as well as community and public toilets), resulting in significant progress on the ground. From a holistic perspective, SBM also supported the eradication of manual scavenging, awareness generation about sanitation and its link to public health, capacity augmentation for ULBs and creating an enabling environment for private sector participation for capital as well as operation and maintenance expenditures.

Table 1: Key National Missions on Urban Sanitation and their Core Components						
National Programmes	Swachh Bharat Mission (Urban)	Swachh Bharat Mission 2.0	Atal Mission for Rejuvenation and Urban Transformation	Atal Mission for Rejuvenation and Urban Transformation 2.0	Smart City Mission	Namami Gange Programme
Coverage	All statutory towns (4041)	All statutory towns (4041)	500 cities	All Statutory towns (for water supply) and 500 cities (for sewerage and septage management)	100 cities	8 States and 12 rivers
Total Budget outlay	Rs 62,009 crores	Rs 1,41,600 crores	Rs. 50,000 crores	Rs. 2,77,000 crores	Rs. 1,00,000 crores	Rs.20,000 Crore
Period	Five years (2014-2019)	Five years (2021-2026)	Five years (2015-2020)	Five years (2021-22 to 2025-26)	Five years (2015-16 to 2019- 20) but has since been extended	Entry-Level Activities (2014, for immediate visible impact), Medium-Term Activities (within 5 years) Long-Term Activities (within 10 years)
Core Components	Household toilets, including conversion of insanitary latrines into pour-flush latrines, Community toilets, Public toilets and urinals, Solid waste management, IEC & Public Awareness, Capacity building.	Sustainable Solid Waste Management, Sustainable Sanitation, Used water management, IEC/ BCC, Capacity Building.	Water supply, sewerage facilities and septage management, storm water drains to reduce flooding, pedestrian, non-motorized and public transport facilities, parking spaces, and enhancing amenity value of cities by creating and upgrading green spaces, parks and recreation centres, especially for children.	Universal coverage of water supply; Sewerage, septage management and recycle/ reuse of treated used water; and Rejuvenation of water bodies (including urban wetland) and creation of green spaces.	Adequate water supply, assured electricity supply, sanitation including solid waste management, efficient urban mobility and public transport, affordable housing especially for the poor, robust IT connectivity and digitalization, good governance, especially e-Governance and citizen participation, sustainable environment, safety and security of citizens, particularly women, children and the elderly, and health and education.	Sewerage Treatment Infrastructure, River-Front Development, River-Surface Cleaning, Bio-Diversity, Afforestation, Public Awareness, Industrial Effluent Monitoring and Ganga Gram.

Booming real estate makes the provision of sanitation more challenging

In 2014, the ***Namami Gange*** (Clean Ganga) programme, aimed at rejuvenating India's largest river, was launched. It carried forward the mandate of previous initiatives of cleaning the river. It had two objectives – one of effective abatement of pollution along the entire length of its flow, including urban wastewater, and the other of conservation and rejuvenation of the river.

To address the niche requirements[7] of heritage cities, and cultural landmarks of India, the National **Heritage City Development and Augmentation *Yojana*** (HRIDAY, 2015), was introduced. It focused on the development of core heritage infrastructure by the Ministry of Housing and Urban Affairs (MoHUA) for areas near heritage sites approved after identification by the Ministry of Culture. Development of infrastructure like approach roads, drainage, footpaths, electrical wiring, landscaping, sanitation, streetlights, water supply, waste management and allied citizen services such as tourist conveniences, security were some of the major focus areas of the scheme.

The **Atal Mission for Rejuvenation and Urban Transformation** (AMRUT) and the **Smart City Mission** (SCM) were both launched in 2015. While the focus of AMRUT was on providing basic services (including water supply, sewerage, and urban transport) for improving quality of life, following a project-based approach, the SCM promoted innovative practices for sustainable urban development following an area-based strategy. The improved quality of life in cities was addressed under AMRUT by developing green and well-maintained open spaces like parks, reducing pollution by switching to public transport or constructing facilities for non-motorised transport (e.g. walking and cycling).

Capacity development and information, education and communication, were incorporated as critical components with budget outlays, in all the three national flagship Missions.

The ***Jal Shakti Abhiyan*** was launched for water-stressed areas in 2019. It aimed to provide support for asset creation. From this emerged the ***Jal Jeevan* Mission** (JJM), which aimed to provide piped water to all households in India, along with a focus on source sustainability and rejuvenation of water bodies.

The **SBM 2.0** launched in 2021, aims to sustain the sanitation and solid waste management improvements achieved till the year 2021. It will also provide sanitation access to the increasing urban population, liquid waste management, well-being of sanitation workers, improved source segregation of solid waste and working towards remediation of legacy waste dumping sites. The aim is to institutionalise '*swachh*' behaviour. It is committed to making all cities 'Garbage Free'.

The **AMRUT 2.0** launched in 2021, carries the transformations achieved forward by aiming to make all cities in India (universal coverage in water supply to about 4,800 statutory towns and universal coverage of sewerage and septage management to 500 cities) self-reliant and water-secure through a reform-based approach and encourages public private partnerships. A circular economy approach addressing water source conservation, rejuvenation of water bodies and wells, recycle/ reuse of treated/used water, and rainwater harvesting by involving the community at large is being targeted under it.

Increasing amounts of litter especially plastic waste ends up in the world's oceans

Sanitation an Integral Component of Key Missions

Addressing sanitation as a core element of urban development was a vital step taken in all key missions launched by the National Government in the new millennium. JnNURM was followed by a major leap in visioning the urban sanitation priorities for India, in the form of the National Urban Sanitation Policy (NUSP) (2008) which was supported through the German Development Cooperation (GDC). NUSP[8] consolidated various efforts for improved sanitation and was instrumental in demystifying urban sanitation as sewerage focussed infrastructure development. For the first time, moving away from an engineering-driven approach, NUSP aimed to transform urban India through a community-driven approach. Policy imperatives of NUSP reaffirmed a long-term vision of sustainable, inclusive sanitation for India:

> "All Indian cities and towns become totally sanitised, healthy and liveable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women".
>
> -The vision for Urban Sanitation in India, NUSP 2008

NUSP mandated each state to prepare a State Level Sanitation Strategy (SSS) and cities to formulate a CSP for city-wide sanitation planning. The NUSP serves as the country's first comprehensive sanitation policy, helping urban sanitation gain prominence and importance.

The three missions initiated since 2014, have targeted sanitation through investments, comprehensive plans and an inclusive perspective. The important gains of the State Sanitation Strategies and Sanitation Plans were incorporated in all the three missions since 2014:

- The SBM's (Urban) vision is to ensure hygiene, waste management and sanitation across the nation. This entails each city to prepare a city-level action plan which should include the toilet coverage and waste management practices and identify the infrastructural gaps for securing funding. The programme also has IEC and capacity building components as part of the funding. The AMRUT's mission is to provide basic services (e.g. water supply, sewerage, urban transport) to households and build amenities in cities which will improve the quality of life for all, especially the poor and the disadvantaged as a national priority. Each state has to prepare State Annual Action Plans (SAAPs) that are linked to Service Level Improvement Plans (SLIPs). City and State level planning is therefore integral to AMRUT.
- The Smart Cities Mission's objective is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes. The elements of citizen consultation and developing proposals based on long term planning were integral to the SCM. The Cities Investments to Innovate Integrate and Sustain (CITIIS) challenge incorporated a result-based monitoring framework called the "Maturation Framework" as a critical planning element.

Urban sanitation initiatives by the Government of India

Addressing Non-Networked Sanitation

A national rating exercise initiated in 2009 based on parameters like the absence of visible open defaecation, the proportion of total human excreta generation that is safely collected and treated, and the proportion of treated wastewater that is recycled, highlighted poor sanitation coverage, specifically collection and treatment of faecal sludge from on-site containment systems (pits and septic tanks). This rating exercise and other assessments highlighted the need for non-networked sanitation.

The **Advisory Note on Septage Management in Urban India**, 2013, underlined the imperative of addressing septage management as a priority in the partly sewered and non-sewered cities.

Centralised sanitation systems are capital intensive. The Report on Indian Urban Infrastructure and Services (2011) made the first estimates of infrastructure requirements and advocated for innovative private sector financing for urban infrastructure. The capital investment projected over the 20-year period from 2012 to 2031 was put at a staggering Rs 39.2 lakh crore, for water, sewerage, stormwater drainage, solid waste management, urban roads and transport, traffic support, street lighting and renewal and redevelopment (including slums) infrastructure, at 2009-2010 prices. AMRUT 2.0 has a total indicative outlay of 2.77 lakh crores for water, sewage and septage management as well as for rejuvenation of water bodies and green spaces in cities.

The CPHEEO[9], which had published a Manual on Sewerage and Sewage Treatment updated it in 2013 with the aim of reflecting the existing conditions of sewerage systems in India.

The limitations of the conventional centralised approach for sanitation were highlighted in the Preamble of the Revised Manual. It highlights the centralised systems as 'highly resource-inefficient technologies[10] as well as the applicability of decentralised wastewater collection and treatment. The Manual also highlights the significance of operation, maintenance and management of sewerage and sewage treatment systems.

> "It is also necessary to recognise that the practice of piped sewer collection is an inheritance from advanced countries with high water usages, which permit adequate slushing velocities. Due to their high per capita water supply rates, the night-soil does not settle in pipes and hence no choking and no sulphide gas generation. Whereas, in the Indian scenario, the per capita water supply is low and inequitable in many cities and that too intermittent and this results in settling down of night-soil in the sewers, choking, gasification, etc., which necessitates very often extreme remedies of cutting open roads to access and break open the pipes for rectification and so on."
>
> *- CPHEEO Manual on Sewerage and Wastewater Treatment Systems, 2013*

Indiscriminate dumping of faecal sludge into the open environment is a big challenge in India

As more toilets got built under the *Swachh Bharat* Mission from 2014, with mostly septic tank linked onsite sanitation systems, the demand for addressing septage management increased. As per the National Sample Survey, 2018, nearly 60% of urban India depends on on-site sanitation systems. Faecal Sludge Management (FSM) is therefore a significant and critical approach to reduce the discharge of untreated faecal matter into the environment. To address this issue, in 2017, the Government published the National Policy on Faecal Sludge and Septage Management (FSSM). This provided an impetus to septage management, offering a national recognition to septage management and septage treatment through septage treatment plants. The Policy set the context, priorities, and direction for as well as facilitating nationwide implementation of FSSM services in all ULBs. Several states implemented their own state-level septage policies and faecal sludge treatment plants started coming up all over India. Some states including Odisha, Andhra Pradesh, Telangana and Tamil Nadu became forerunners in establishing septage treatment plants, resulting in more than 400 FSTPs planned for implementation across the country to date. The FSSM Policy aims to ensure safe and sustainable sanitation for every household, street, town, and city.

NITI Aayog, the highest policy formulation body of the Government of India, in its recent report, has highlighted the importance of FSSM as an urban sanitation priority for India. FSSM is now integrated as a sanitation priority, as a citywide inclusive sanitation approach, by the World Bank and Asian Development Bank in their loan agreements and work. Co-treatment of septage with sewage at existing sewage treatment plants and the construction of faecal sludge treatment plants is now mainstreamed into formal urban sanitation systems, for their ability to service peri-urban, congested or any other areas in a city that may be left out from sewerage coverage under centralised sanitation systems.

Addressing sanitation issues is challenging in the context of a rapidly changing urban environment, climate change and also its interlinkages with human behaviour, education and abilities, economic growth and development as well as cultural and social aspects. A comprehensive plan to pave the way forward will emerge from the lessons learnt from the continuous efforts by the Government and stakeholders.

Solid waste choking waterbodies is a typical problem in Indian cities

Box 2: Stress on sanitation due to rapid urbanisation

Nature has an innate ability to clean itself if the pollution load does not go over its self-cleaning or absorbing capacity. Sanitation, therefore, was not a problem when population sizes were small and cities were not bursting at their seams, as nature could take care of the pollutant load in wastewater. However, urbanisation, which largely occurred in the 1990s after India liberalised its economy, changed that. While official Census 2011 data showed only 31% of the population as urban, this could be an understatement. This figure could be as high as 47% if rural habitations above 5000 population were also counted as urban. With urbanisation came its own demand for improved urban infrastructure including sanitation and therefore the need for improved access to toilets and latrines, which led to the challenges of safely managing the increased wastewater and faecal sludge generated. India's limited capacity to do so has resulted in decreasing water quality and increasing water stress.

India's urban population[E] (as a percentage of its total population) has increased from 26% in the 1990s to 35% in 2019[F]. Trends show that people have moved from rural to urban areas to find work and make a living. Big cities have become more densely populated and big villages in the vicinity of large cities or in the corridors connecting big cities have transitioned to urban set-ups. As the pace of urbanisation became faster, the burden of urban sanitation grew as well.

Continuous and rapid urbanisation, over the years, has also contributed to climate change – further exacerbating the challenges of water and sanitation as climate change manifests itself most prominently through the water cycle.

The changing climate increases pressures on water resources (see Figure below) that are already under stress due to poor wastewater management and hence polluted water sources. Changes in temperature and precipitation lead to changes in water recharge patterns, and changes in rainfall patterns lead to floods and droughts.

In short, urbanisation along with increasing climate change effects is making the sanitation challenge more complex. Urban sanitation issues have thus become more intense, and especially challenging for new emerging small towns in the country which do not have adequate sanitation systems in place yet.

E. *www. macrotrends.net. Retrieved 2020-11-24.*

F. *Working Paper 'Urbanization, Demographic Transition and the Growth of Cities in India, 1870-2020', C-35205-INC-1, 2016*

Water stress due to depleting aquifer and its pollution

Open drains in congested by-lanes though a public health hazard are a common occurrence in India

A young boy diving into a polluted waterbody in a city in central India

02

The Indo-German Collaboration

The Federal Republic of Germany has been supporting India's efforts toward sustainable urban development for many decades through various German organisations including Germany's International Cooperation Agency GIZ. For over 60 years, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH has been working jointly with partners in India for sustainable economic, ecological, and social development. GIZ's thematic areas in India are energy, environment, climate change, biodiversity, sustainable urban and industrial development and sustainable economic development.

The German Federal Ministry for Economic Cooperation and Development (BMZ), the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), as well as the Federal Ministry for Economic Affairs and Climate Action (BMWK), are the main commissioning (funding) parties of GIZ in India. Indian public sector, the European Union and similar organisations are some of the other commissioning parties.

The Indian Government has launched numerous important initiatives to address the country's economic, environmental and social challenges, and GIZ is contributing to some of the most significant ones. For example, GIZ supports key initiatives such as Smart Cities Mission and *Swachh Bharat* Mission. GIZ, in close cooperation with Indian partners, devises tailor-made, jointly developed solutions to meet local needs and achieve sustainable and inclusive development.

The Federal Republic of Germany has been a key partner to India in the urban sanitation sector, providing support with regards to framing policies, fostering knowledge exchange, promoting innovation and technical solutions, as well as adapting and demonstrating light house projects to learn from. Some of the programmes implemented under the umbrella of Indo-German Cooperation are highlighted here.

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**Mr. Hardeep Singh Puri, Minister, MoHUA,
at an event celebrating 60 years of Indo-German Development Cooperation**

Mr. Hardeep Singh Puri, Minister, MoHUA, at signing of implementation agreement for a GIZ bilateral project

Indo-German Cooperation in the Urban Sanitation Sector

The Indo-German bilateral cooperation in the environment and sanitation sector has a longstanding and successful association. The first agreement concerning Technical Cooperation between the two Governments dates back to 1971. In the initial period, individual projects were carried out tackling topics such as air and water pollution and environmental quality monitoring. Those standalone projects were summarised and merged in the year 2002 under an umbrella programme called the **'Advisory Services in Environmental Management (ASEM)'**.

With environment continuing to be a focal area of Indo-German cooperation, the **'Indo-German Environment Partnership (IGEP)'** programme was launched in 2011. This built on the experience of ASEM but at the same time strengthened its thematic profile in the urban and industrial sector, enhancing the effectiveness to up-scale successful case studies and supporting the environmental reform agenda and priority needs of India. The IGEP programme had three broad components, namely, Sustainable Urban Habitat, Sustainable Industrial Development, and Policy for Environment and Climate.

An international delegation's visit to a common effluent treatment plant in Uttarakhand

The IGEP Programme had an overall time horizon of up to six years (2012–2018).

In 2011, a new Urban Sanitation Programme **'Support to National Urban Sanitation Policy'** was added to take the urban sanitation agenda forward. Under Phase I of this programme, support was provided from 2011 to 2014 to support implementation of India's National Urban Sanitation Policy. Its main objective was to support the Government to roll out the policy including its key elements of State Sanitation Strategies and City Sanitation Plans (CSPs). The CSPs enabled the creation of a baseline of the city sanitation status, hotspots and the identification of a priority set of interventions. It helped move the sanitation agenda beyond projects supported by GIZ. States were supported to prepare Sanitation Strategies as roadmaps and frameworks for improving systems and processes to improve the quality of sanitation project planning and implementation.

The Indo-German Cooperation continued its commitment to the urban sanitation agenda through Phase II of the **'Support to National Urban Sanitation Policy' programme (2014-2018)**. Phase II of the programme built on the lessons learnt from its predecessor programme. It mainly focused on applying the lessons and approaches at the state level for large up-scaling of CSPs, implementation of State Sanitation Strategies and supporting projects through Detailed Project Reports (DPRs) under SBM and AMRUT.

Since 2014, the Indian Government has increasingly responded to the urban challenges by establishing various national urban missions and programmes like SBM and AMRUT. While the initial funding missions were mostly sectoral, the Smart Cities Programme for the first time offered integrated approaches and strengthened the implementation role of states and cities. The **'Sustainable Urban Development – Smart Cities' (SUD-SC)** programme was initiated in 2018 with a focus on aligning with India's urban development agenda. The programme aimed at advocating a holistic approach to sustainable urban development for basic services (water supply, sanitation, solid waste management), housing and spatial planning. The programme supported innovative and integrated approaches to sanitation interventions, which are an integral component of urban development, helping create evidence so that scaling-up becomes possible.

A follow-on Phase II of the **'Sustainable Urban Development Smart Cities'** programme has been commenced in 2022 with a duration of three years. In this phase, the programme shall continue operating within the existing thematic and methodological framework of SUD-SC Phase I, while extending the scope to additional cities and region. The programme shall integrate and apply concepts for risk-informed, integrated, resilient and sustainable urban development with the aim to make urban systems more resilient and robust to ensure public services of general interest.

To anchor climate-friendly urban solutions, the **'Climate Smart Cities'** programme was initiated in 2018, aiming at ensuring that projects being planned and implemented under India's Smart Cities Mission were climate-friendly. The programme supports the Government in the achievement of the National Climate commitments and the Sustainable Development Goals (SDGs). The programme supports the Indo-German Working Group on urbanisation and the international exchange of experiences on urban climate strategies. A National 'Climate Smart Cities Assessment Framework' has been supported and implemented in 2019 under the programme. Support is extended to cities for improvements in climate-related areas using innovative methods to co-create solutions. Under the programme, the 'Climate Centre for Cities' has been set-up within the National Institute of Urban Affairs (NIUA) to conduct regular

performance monitoring of cities concerning their climate action and provide contextual handholding if required. A **Climate Smart Cities Alliance** has also been formed under the programme with more than 70 global and national member organisations to facilitate the implementation of pilots and projects in cities.

During the visit of the German Chancellor to India in 2015, the German Government offered support and the benefit of its experience in restoring rivers in Europe, such as the Rhine, Danube and Elbe. This signalled the beginning of the project **'Support to *Ganga* Rejuvenation'** (SGR). This programme aimed at strengthening the capacities of National institutes (NMCG) and the state department of Uttarakhand State (State Programme Management Group - SPMG) involved in the *Ganga* rejuvenation by sharing German and European experiences in river basin management. These efforts were bolstered by the India-European Union (EU) Water Partnership in 2015. Due to the numerous synergies resulting from the respective cooperation, the BMZ and the EU in 2017 commissioned GIZ with the implementation of rejuvenation interventions in the form of co-financing. In Phase II (since 2018) of the SGR programme, support was also extended to the State of Uttar Pradesh, addressing institutional development, river basin planning and management, maintenance of environmental flows, inclusive public outreach and communication, pollution accidents and crisis management, and safe reuse of treated wastewater.

At the national level, most programmes are working together with the MoHUA, apex training institutes and think tanks. At the state level, programmes are cooperating with selected state governments and regional training institutes; and, at the local level, cooperate with medium-sized cities, their administrations and elected representatives. This three-tier approach makes local solutions replicable, enables them to have a broad impact and promotes the vertical exchange of knowledge.

GIZ primarily provides support through public policy/advisories, capacity development, trainings, knowledge management and innovative projects on-the-ground thus contributing towards inclusive, integrated sanitation solutions to be planned, implemented and operated with developed capacities, fortifying the sector as a whole. The activities related to capacity building, climate change and gender mainstreaming cut across all programmes. Through various initiatives, efforts are aimed at supporting the Government and development sector by building capacities, developing measures for scaling-up and involving stakeholders throughout the project planning and implementation phase.

A typical command and control centre in 'smart cities' of India

The GIZ Sustainable Sanitation Programme in India

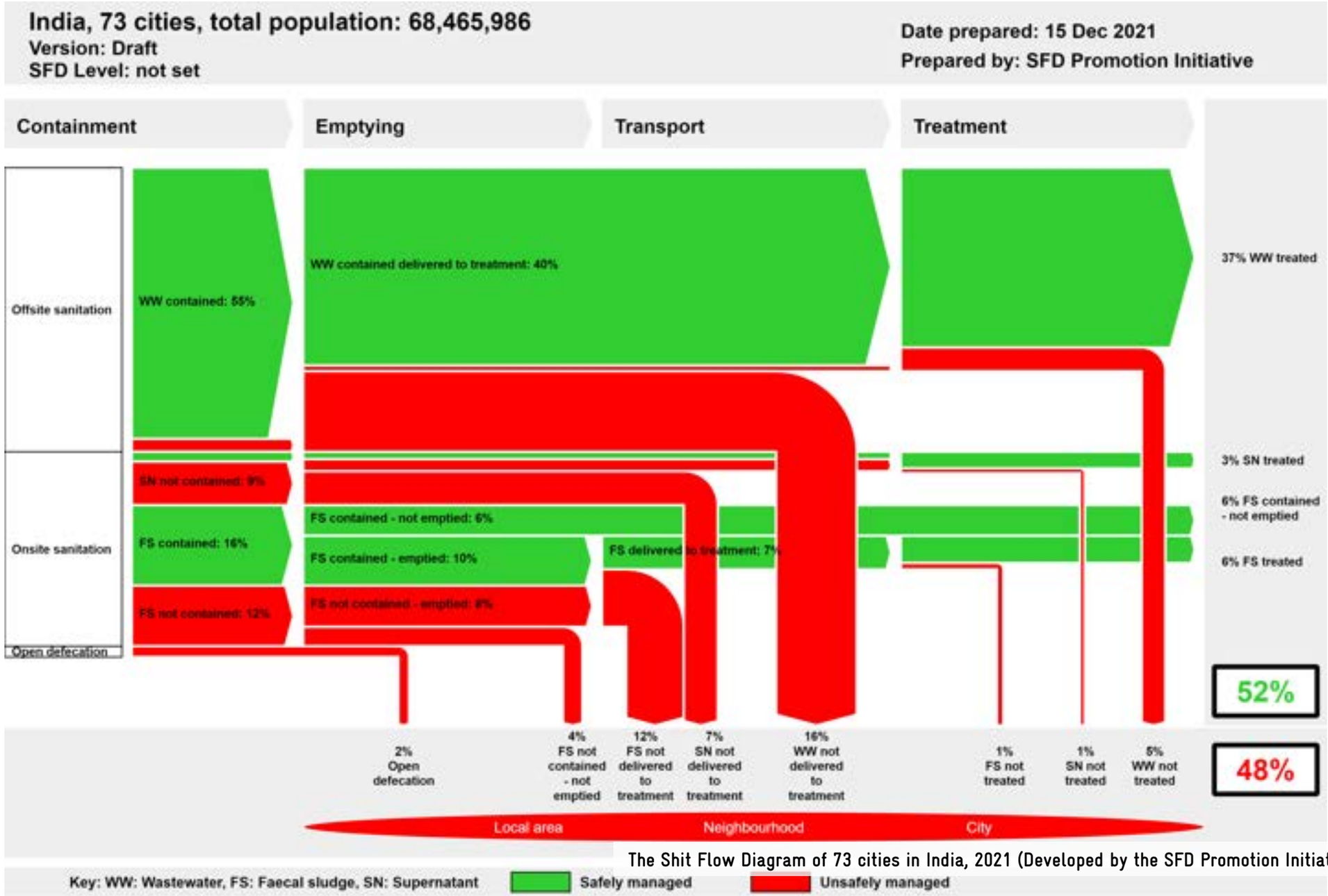
Since 2001, the BMZ has commissioned the Global **Sustainable Sanitation Programme**, Germany with the aim of breaking the taboo around sanitation and disseminating innovative solutions for scaling-up sanitation for all. In the recent phase, the programme supported the BMZ in implementing the **BMZ Water Strategy (2017)**. The programme disseminates sustainable solutions along the whole sanitation service chain. Since its inception, various interventions have been implemented jointly with GIZ programmes in India that contributed to changing viewpoints as well as in learning important lessons from demonstrations on the ground.

In 2008, the Sustainable Sanitation Programme was initiated with about 15 other organisations, the **Sustainable Sanitation Alliance** (SuSanA) – an international network for sustainable sanitation practitioners, whose secretariat is hosted by the Sustainable Sanitation programme. SuSanA has grown to over 14,200 members and over 380 partner organisations globally. In addition to its function as a knowledge sharing and learning platform, the network acts as a think tank that accelerates innovations and campaigns for better sanitation at the political level.

In 2016, SuSanA's India Chapter was initiated to bring together practitioners and contribute meaningfully to Government sanitation programmes and initiatives. The SuSanA India Chapter has been organising wide-ranging rich discussions on topics covering rural sanitation; Operation and Maintenance of community sanitary complexes; monitoring of COVID-19 in wastewater; markets and private sector engagement; faecal sludge and septage management, and similar topics. SuSanA's work has been central to sector development and has improved coordination among stakeholders.

Since 2014, the GIZ Sustainable Sanitation programme, also spearheaded the development and dissemination of **Shit Flow Diagrams** (SFDs), an easy-to-use advocacy tool, that shows how excreta and wastewater is managed along the sanitation chain within a city. The tool aims to prevent untreated sewage and faeces from contaminating the environment and thus contribute to the protection of water sources. Since 2014, more than 150 cities in Africa, Asia and South America produced an SFD, helping improve the planning framework for urban sanitation services for 150 million people.

An SFD of a city from India, developed by the programme, was used by Bill Gates and the Indian Prime Minister Narendra Modi to discuss solutions for better sanitation in India. GIZ and Centre for Science and Environment (CSE), New Delhi took up the initiative in India through training programmes and dissemination activities, to help cities visualise the sanitation situation in their cities which would then trigger action on the ground. SFDs have been used extensively in India as an advocacy tool. CSE presented SFDs for 60 cities of Uttar Pradesh in 2019, to initiate a state-wide initiative to manage faecal sludge. Hundreds of Indian cities/ towns have produced SFDs. These have gone through the SFD quality-check review process and have been uploaded on the global SFD web portal.



The Shit Flow Diagram of 73 cities in India, 2021 (Developed by the SFD Promotion Initiative)

Financial cooperation through KfW Development Bank

German Financial Cooperation with developing and emerging countries is carried out by the KfW Development Bank on behalf of the German Government, primarily the BMZ. In this frame, investments and reform programmes are financed in a range of sectors including water supply, sanitation, energy, natural resources management, health, education, and financial system development. KfW's activities in the water sector aim for holistic water management including environmentally sustainable sanitation.

In India, KfW Development Bank is financing a number of projects in the water and sanitation sector covering over 50 cities. As of 2021, the Financial Cooperation has committed nearly EUR 1 billion to ongoing projects and programmes in this sector and has an additional commitment of EUR 1 billion to be financed in the coming years.

To date, KfW Development Bank financing has covered citywide comprehensive wastewater infrastructure in five small and medium-sized towns of Madhya Pradesh[11] contributing to the cleanup efforts of River *Narmada*. As a complementary financing for the NMCG's effort to clean the *Ganges*, it is financing the laying of

A sewage treatment plant under construction at Pollachi, Tamil Nadu
© KfW India

sewer networks and provision of citywide sanitation infrastructure in the cities of Haridwar and Rishikesh in Uttarakhand. In Chennai's Kovalam Basin watershed, KfW is financing the construction of a 150 million litres per day capacity desalination plant as well as a climate change adapted and integrated stormwater management system. Expanding on its climate-resilient efforts, it is financing the reconstruction of around 400 kilometres of roads in Kerala which were impacted during the devastating 2018 floods in the state. In addition, KfW Development Bank has financed several urban infrastructure projects in Tamil Nadu and Odisha through financial intermediaries.

India is fast emerging as an economic and industrial power. It is a member of the 'Group of Twenty' (G20) as well as one of the five major emerging national economies, namely Brazil, Russia, India, China and South Africa. Despite the country's rapidly growing economy, poverty and other socio-economic issues remain a challenge. The burgeoning population and accelerated urbanisation in the country have resulted in an environment at risk and greenhouse gas emissions that continue to spiral upwards. The Indian Government, the private sector, as well as a development cooperation agencies such as GIZ shall strive towards being resilient to meet these challenges of urban development.

Objectives of selected sanitation focused programmes of GIZ in India

Support to the National Urban Sanitation Policy (Phase I)

Commissioned by:
BMZ

Duration:
2011-2014

Implementing Partner Ministry:
Ministry of Urban Development, GoI

Partner State / Cities:
Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra and Uttar Pradesh

Programme Objective:
The implementation and operation of sanitation infrastructure at national, state and city level; as well as management of the sanitation sector as a whole, focusing on improving sanitation in poorer parts of cities

Support to the National Urban Sanitation Policy (Phase II)

Commissioned by:
BMZ

Duration:
2014-2018

Implementing Partner Ministry:
Ministry of Urban Development, GoI

Partner State / Cities:
Andhra Pradesh,
Kerala, Maharashtra, Telangana
and Uttarakhand

Programme Objective:
To support Indian states and cities to carry out effective measures for avoiding pollution caused by wastewater and municipal solid waste

Sustainable Urban Development - Smart Cities (Phase I)

Commissioned by:
BMZ

Duration:
2018-2021

Implementing Partner Ministry:
Ministry of Housing and Urban Affairs, GoI

Partner State / Cities:
Kerala (Kochi), Odisha (Bhubaneswar) and Tamil Nadu (Coimbatore)

Programme Objective:
Responsible national, state and municipal institutions have applied concepts for sustainable urban development for the provision of urban basic services and housing in selected smart cities

Sustainable Urban Development - Smart Cities (Phase II)

Commissioned by:
BMZ

Duration:
2022-2024

Implementing Partner Ministry:
Ministry of Housing and Urban Affairs, GoI

Partner State / Cities:
Kerala, Odisha, Tamil Nadu, Karnataka, Telangana

Programme Objective:
National, state and municipal institutions apply concepts for risk-informed, integrated, resilient and sustainable urban development in selected city authorities in order to guarantee public services.

Climate Smart Cities

Commissioned by:
BMUV

Duration:
2018-2022

Implementing Partner Ministry:
Ministry of Housing and Urban Affairs, GoI

Partner State / Cities:
Kerala (Kochi), Odisha (Bhubaneswar) and Tamil Nadu (Coimbatore)

Programme Objective:
To anchor climate-friendly solutions for urban infrastructure projects and area-based development in the planning and implementation of projects under the Smart Cities-Programme

Support to Ganga Rejuvenation (Phase I & II)

Commissioned by:
BMZ

Duration:
2018-2023

Implementing Partner Ministry:
National Mission for Clean Ganga (NMCG), Ministry of Jal Shakti, GoI

Partner State:
Uttarakhand and Uttar Pradesh

Programme Objective:
To ensure that responsible stakeholders at the national and state level increasingly apply integrated approaches for Ganga rejuvenation

03

Sustainable Sanitation Interventions

The Government of India has launched important development programmes to address the country's sanitation challenges, and GIZ is contributing to some of the most significant ones. For example, it supports key initiatives such as the *Swachh Bharat* Mission, the *Atal* Mission for Rejuvenation and Urban Transformation, the Smart Cities Mission and *Namami Gange*.

Since the beginning, a sustainable circular economy approach is the foundation of GIZ's conceptual work in the urban sanitation sector, with a focus on minimising the use of resource inputs by closing the loop and redefining waste as a resource. The importance of safe management of excreta and wastewater, which includes proper containment, emptying, transport, treatment and disposal/re-use has been another important cornerstone of GIZ's work. Today, both the circular economy model and the sanitation service chain model are internationally recognised and mainstreamed in the sustainable sanitation discourse.

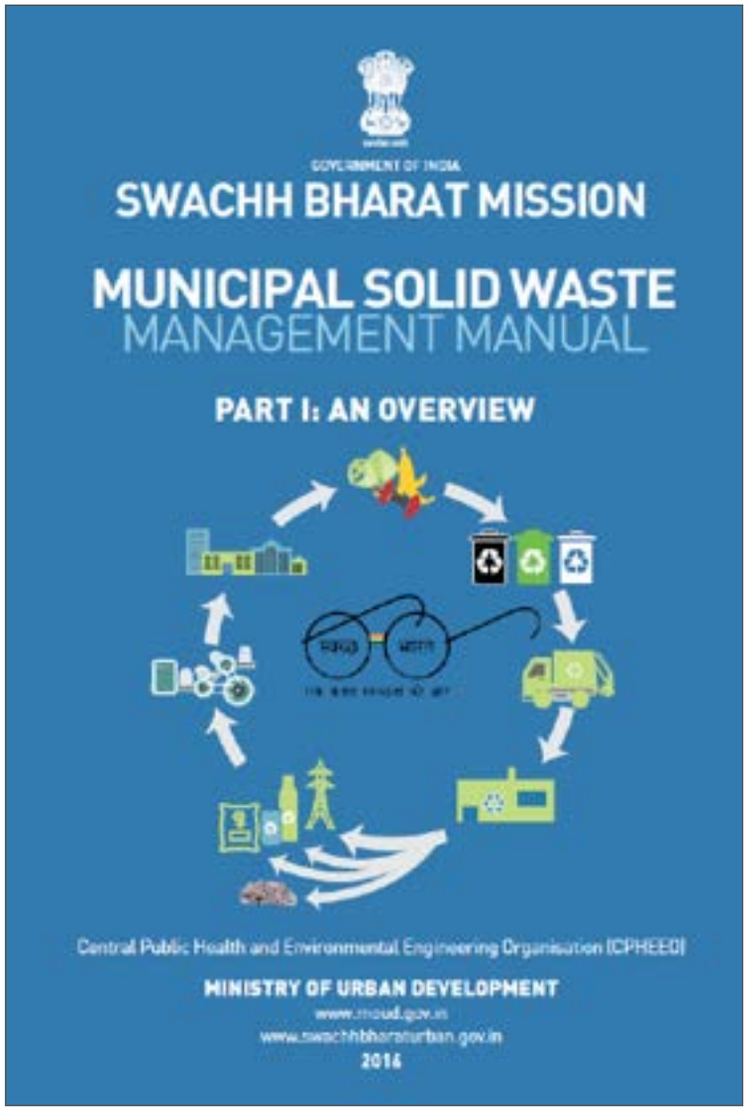
Over the last years, the urban sanitation sector in India has developed rapidly and the German Development Cooperation has made important contributions to this sanitation journey. Selected key interventions (light house projects) of GIZ and KfW in the urban sanitation sector in India have been clubbed (in this chapter) under five focus areas namely,

i. Enabling framework for urban sanitation (Public Policy and Advisory)
ii. Innovative pathways for upscaling and financing (Projects on the ground)
iii. Building Capacities and Competencies (Training and Capacity Building)
iv. Community engagement for sustainability (Participatory planning)
v. Sanitation and Climate (Climate resilience)

Gender and Climate Change are treated as cross-cutting themes in all interventions. The promotion of gender equality and the elimination of gender-based disadvantages and discrimination are two strategic pillars of GIZ's corporate-policy orientation. Additionally, digitalisation is already having a substantial impact on social and economic prospects worldwide. GIZ offers innovative approaches for leveraging the opportunities offered by digitalisation to promote sustainable development.

GIZ, in close cooperation with Indian partners, devises tailor-made, jointly-developed solutions to meet local needs and achieve sustainable and inclusive development. The following section elaborates on selected activities for each focus area.

A sewage treatment plant on the banks of the River Ganga



A. Enabling Frameworks for Urban Sanitation

To supplement the efforts of the Indian Government in framing and implementing sanitation-related policies, the German Development Cooperation has extended its support over the last decade under various bilateral programmes. GIZ, one of the main implementing partner of German Development Cooperation, has worked alongside Governments at the national and state level to create enabling frameworks (through specific interventions) for the successful implementation of urban development policies. A few policy and advisory related interventions are exemplified below:

Revision of the Municipal Solid Waste Management Manual, Government of India

Municipal Solid Waste Management (MSWM) in urban areas has emerged as one of the biggest challenges that the country faces today - not only from an environmental and aesthetic impact angle but also due to the potential threat to public health resulting from improper and non-scientific handling of municipal waste. The SBM brought into focus the need for the provision of toilets and proper management of Municipal Solid Waste (MSW) in all 4,041 statutory towns and cities of the country.

To assist the states and cities to understand and effectively implement MSWM systems, the MoUD (now MoHUA) undertook the task of revising the Manual on Municipal Solid Waste Management, 2000, jointly with GIZ. The Ministry constituted a committee in 2013, consisting of experts, Government officials and GIZ for reviewing and updating the manual. The revised **'Municipal Solid Waste Management Manual'** was published in 2016 after three years of collaborative effort. The manual is aimed at serving as a national guide and ready reckoner for policymakers, planners and all practising professionals in achieving the desired goals of SBM.

GIZ's rich experience in the solid waste management sector (e.g. supporting the revision of the SWM Rules 2016, support to the state of Andhra Pradesh, Telangana, Maharashtra, Uttarakhand and Kerala in preparing the State Strategies and Action Plans for MSWM, technical review of MSWM DPRs) was very beneficial in the entire manual revision process.

To ensure that the revisions are understood and followed by all stakeholders, a series of capacity building modules and programmes were rolled out.

Developing and Implementing State Sanitation Strategies

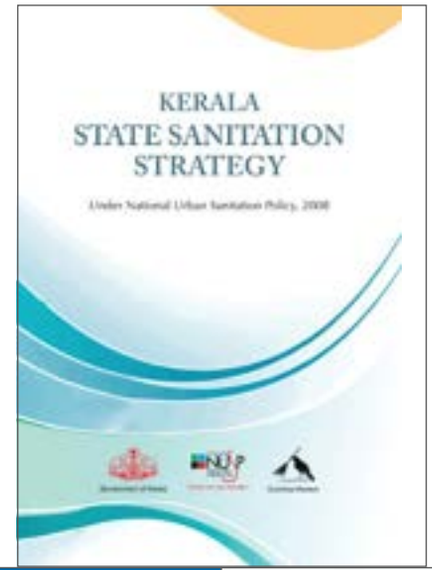
As part of its programme 'Support to National Urban Sanitation Policy', GIZ supported the state of Kerala, Telangana, Andhra Pradesh and Himachal Pradesh in preparing their respective State Sanitation Strategies (SSS) in line with the objectives of NUSP.

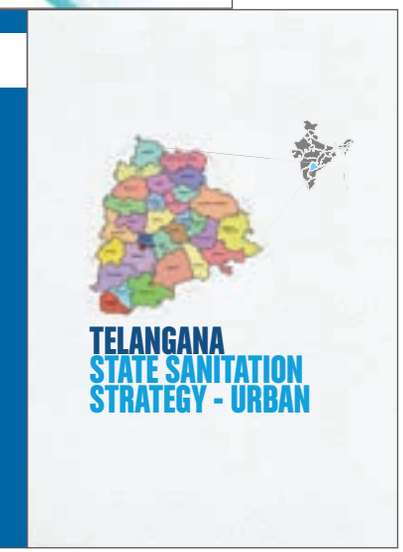
GIZ and its state-level partners developed and followed a unique consultative approach for the development of SSS that is systematic, stepwise, participatory and owned and driven by the states. A multi-stakeholder State Level Sanitation Committee was constituted to provide guidance and data inputs for the preparation of SSS.

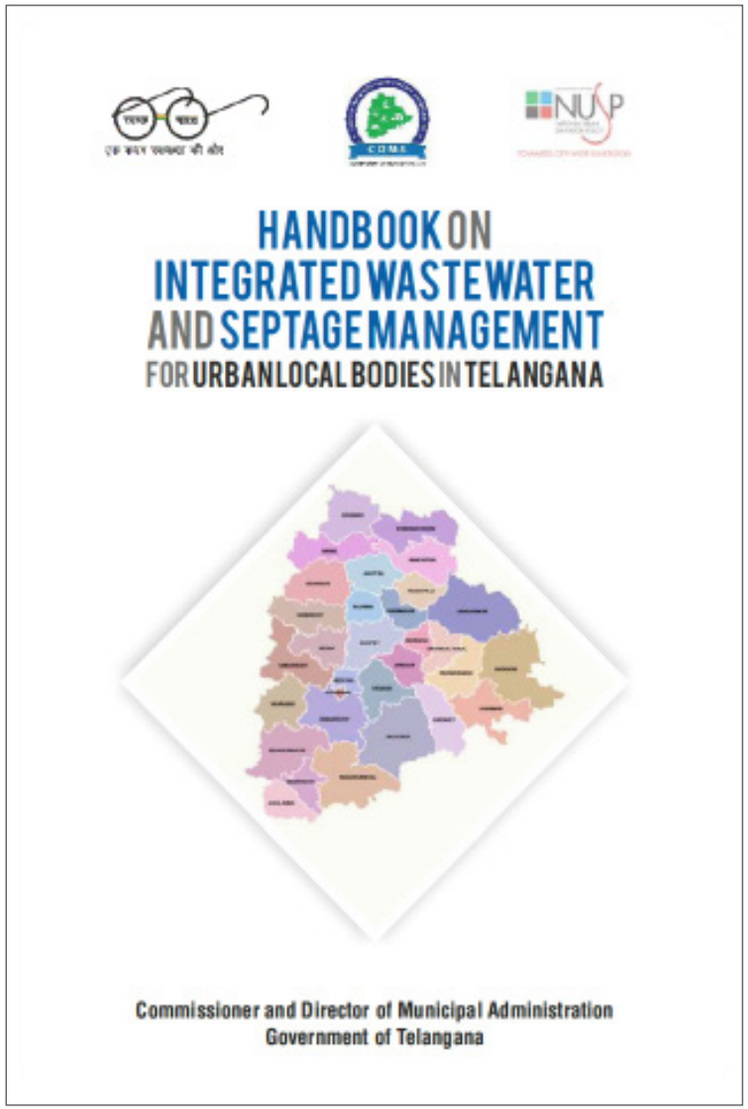
The preparation of an Implementation Framework for key areas (issues) was the key aspect of the SSSs. Kerala and Telangana were identified for preparing a detailed implementation framework for key areas requiring immediate action. GIZ supported the States to realise priority actions and initiate action on the ground. A special focus was placed on strengthening areas that were instrumental to ensuring the successful implementation of the SSS.

The efforts towards developing and implementing SSS for effective and sustainable implementation of action areas have helped these states to significantly improve their sanitation situation, proving that the SSS need not be an unused document but a plan that supports action on the ground. For example, the recommendations of the SSS were implemented under various programmes in Telangana. Further, the Government of Telangana promoted innovative approaches and knowledge dissemination in the water and sanitation sector through the Sanitation Hub and earmarked seed funding of Rs. 25 crores (approximately 3.2 million USD), proposed to be set up at Administrative Staff College of India, Hyderabad. This fund will likely attract investments under corporate social responsibility.

> "The SSS for the State of Kerala provided a focus on liquid waste management ensuring a definite strategic holistic approach to wastewater. State institutions have appreciated the support provided by GIZ and acknowledge that GIZ has been instrumental in bringing all the stakeholders together and creating a participatory model for sanitation."
>
> **Senior official Suchitwa Mission.**







Fostering Integrated Wastewater and Septage Management Approach

A key outcome of the GIZ SNUSP programme was the State Sanitation Strategies in the three states Kerala, Andhra Pradesh and Telangana which highlighted the integrated approach to wastewater and septage management. Taking the agenda forward, GIZ supported the Government of Telangana in developing a **'Handbook on integrated wastewater and septage management for ULBs in Telangana'** in 2018.

The handbook promotes conjunctive use of conventional and non-conventional sanitation systems to address the sanitation needs of a city incrementally. It serves as a guidance document to ULBs to systematically develop plans as well as to develop and implement appropriate holistic sanitation approaches to address wastewater (including septage) issues to achieve the objectives of the SSS.

Some of the recommendations of the handbook have been implemented by the ULBs of Telangana, Sircilla being one of them. GIZ supported Sircilla in carrying out a feasibility study for septage management which later led to the implementation of a faecal sludge management facility in Sircilla.

The concentrated efforts in integrated wastewater management as a holistic urban sanitation approach, have found their way into the Bill and Melinda Gates Foundation's supported Capacity Development initiatives for FSSM, anchored by NIUA. The framework of assessing city level wastewater generation has been developed to its full potential in the form of a core training module of the Capacity Development Normative and the Digital Strategy of the NIUA and has been upscaled for the training of municipal cadres all over India.

ASCI as a partner of the Bill and Melinda Gates Foundation followed the integrated wastewater management approach to undertake assessments for wastewater and faecal sludge management in the state of Andhra Pradesh and for rolling out faecal sludge treatment plants across the state.

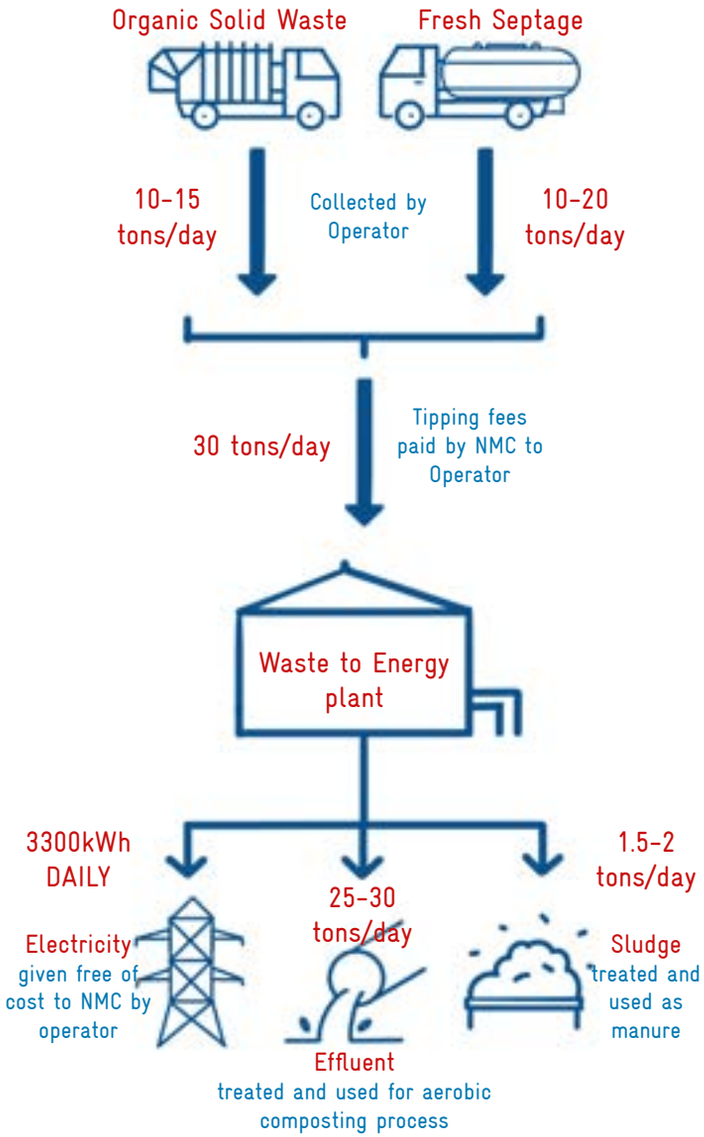
On similar lines, GIZ also supported the state of Kerala in developing the Integrated Wastewater and Septage Management Guidelines for ULBs in Kerala.

Improved Functioning of Public and Community Toilets

India was declared 'Open Defaecation Free' (ODF) in 2019 due to the resounding success of its flagship development programme SBM. This was a major accomplishment for the country since at the time of the Census 2011 nearly 12% of the country's urban population defaecated in the open. The ODF status had been made possible through the construction of approximately 66 lakh individual household toilets and approximately 6.4 lakh seats of community and public toilets across the country. After the achievement of the ODF status, the MoHUA launched the SBM ODF+ and ODF++ protocols, with a focus on achieving holistic sanitation. The ODF+ protocol focused on the operation and maintenance of community and public toilets by ensuring their functionality and proper maintenance to ensure their continued usage.

To achieve and sustain an ODF status for cities, GIZ supported the MoHUA in developing the National **'Advisory on Public and Community Toilets'** in 2018. The advisory detailed aspects related to planning, designing, construction, operation and maintenance and management of public and community toilets to achieve sustainable standards of public sanitation services.

GIZ's earlier experience in supporting the state of Andhra Pradesh in developing 'Guidelines for Public and Community Toilets' 2016 and on the ground learnings from Tirupati and Shimla in the area of public and community toilets during the GIZ predecessor sanitation programme (SNUSP) added value while preparing the National Advisory.



Schematic of the Waste to Energy Process

B. Innovative pathways for upscaling and financing

Technical (relating to technology and design) and managerial (relating to processes and operational models) light house projects reflect one of the key focus areas of GIZ's contributions to the urban sanitation sector. The main measures include the implementation of on the ground interventions through well-performing partners, validation of on ground experience and dissemination leading to up-scaling. Selected projects are exemplified below:

Waste to Energy Project, Nashik (Maharashtra)

India's developing cities have diverse waste streams that are not managed effectively. Managing these waste streams to produce economically beneficial products can prove to be a winning solution for the Government. This is what prompted GIZ (commissioned by BMUV in 2017) to extend its support to the Nashik Municipal Corporation's innovative 'Waste to Energy' project.

The project demonstrates the innovative concept of combined treatment (co-fermentation) of septage and organic solid waste for the generation of biogas that can be utilised for generating electricity through a sustainable business model.

Food and vegetable waste (10-15 tons per day) from restaurants and hotels as well as septage (10-20 tons per day) from community toilets is being used as raw material in the bio-digester. A high-rate bio-digester at the plant ensures adequate quantities of biogas (2100 cubic meters per day) production for energy conversion. The biogas generated in the process is being utilised for the production of electricity (3300 kWh daily) in a combined heat and power plant.

The project has been implemented through a DFBOOT (Design, Finance, Build, Own, Operate and Transfer) model to ensure additional investment and sustained operation in the long run. This model helped reduce investment costs for the public sector as the investment was brought in by the private company. They also recovered costs through electricity generation and service fees. This assisted in achieving sustainability in operation through "fair" contract arrangements. The closed-loop cycles help create additional climate mitigation benefits when it comes to reducing the carbon footprint and improving resource efficiency.

Odisha Hockey Men's World Cup-2018, A large-scale Zero-Waste Event

Effective waste management at large national and international events is a priority and a test of systems' effectiveness at the municipal level to deal with the pressure of managing such events. Demonstrating effective waste management systems at large-scale events can set an example while also creating awareness of the environmental impacts and challenges of managing such events.

GIZ supported the Odisha State Government, the Bhubaneshwar Municipal Corporation and the Department of Sports and Youth Services in preparing the city for the Men's Hockey World Cup in 2018. GIZ supported measures for integrating appropriate and sustainable practices for waste management at the event. Efforts involved making a zero-waste plan for the stadium by detailing out the routing and transportation of waste as well as placement of bins and other minute details along with onsite processing of organic waste and secondary sorting of dry waste.

All the waste generated at the stadium was collected in organic and recyclable waste fractions. Keeping the SWM Rules 2016 in mind, the organic fraction was composted at the site for which an organic waste composter machine and related equipment were installed. The generated compost was utilised within the campus. An on-site facility was set up for the recyclable fraction; to manually sort and segregate it further - into plastic, paper cups, cardboards and metals.

Showcasing innovative waste management initiatives at large events provides a unique platform for creating awareness however, replication of such initiatives has proven to be challenging due to various reasons. These aspects and initiatives still need to be analysed and developed further for better uptake.

Waste segregation at the Kalinga stadium during the Men's Hockey World Cup 2018

Improved on-site containment system in KILA, Thrissur

Decentralised Wastewater Treatment Systems, Kerala

Though most towns/cities in India rely on on-site sanitation systems, the construction quality of these systems, especially in terms of design, is often poor. Most are rudimentary systems - either simple pits or inappropriately designed septic tanks. This leads to groundwater and surface water contamination. The adoption of alternative systems has not been successful as there are not enough convincing options in the market from a cost-effective, simple implementation and operation and treatment performance perspective. GIZ thus set out to demonstrate appropriate technological options for the cost-effective treatment of wastewater at the household level.

Considering the above, the Kerala Institute of Local Administration (KILA) and GIZ collaborated to demonstrate various small scale and affordable household wastewater treatment systems for the staff residential quarters within the KILA campus, Thrissur. GIZ supported KILA in conceptualising, detailed planning, designing and implementing the project. Various on-site wastewater treatment solutions viz. various types of septic tanks (two-chamber settler, with anaerobic baffled reactor and filter), various types of prefabricated septic tanks (horizontal, vertical, using materials like Reinforced Concrete Cement, Linear Low Density Polyethylene), twin pits, Defence Research and Development Organisation's (DRDO's) Biodigester system's, greywater treatment systems (for kitchen and bath water) and Decentralised Wastewater Treatment System (DEWATS) were implemented at KILA campus in 2020. All the treatment systems are now operated and maintained by KILA.

This project allowed testing of various small-scale wastewater treatment systems and checking their relevance to the context of Kerala. KILA being a state institute of learning and training of high prominence, these systems have become working models for demonstration, learning and dissemination that may be useful for all who attend training programmes at KILA and can support the scaling up of innovative wastewater management approaches.

Integrated Wastewater Management System for Kochi, Kerala

A city has many types of sanitation systems. Integrating these multiple systems for overall, effective sanitation improvements might be more valuable for overall sanitation goals. At present, many of India's cities and towns rely on on-site sanitation systems (septic tanks). Managing black and grey water from urban settlements is especially challenging in mostly flat areas, that have narrow streets and have a high water-table.

The coastal town of Kochi is one such town with a high water-table, narrow streets and flat topography. It thus requires an innovative solution to manage its domestic wastewater. GIZ is supporting Kochi's Municipal Corporation (KMC) in piloting an integrated solution to manage the black and grey water together with the Suchitwa Mission and the Kerala Water Authority for three wards (North and South Edakochi and Perumbadappu) of KMC benefitting around 30,000 people.

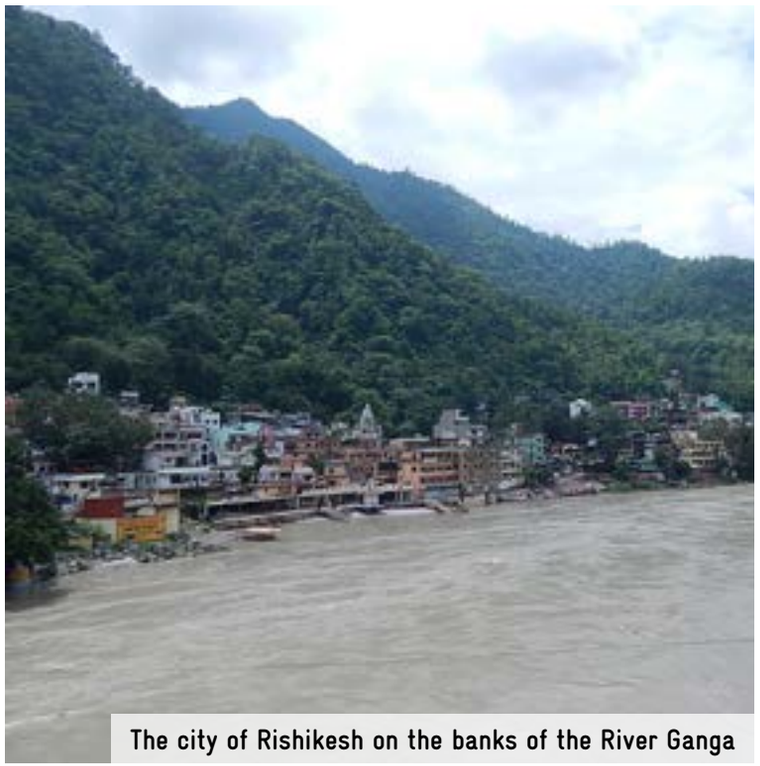
Septage from the existing containment systems (septic tanks) is collected by desludging operation and treated in a septage treatment facility. A shallow, solids-free sewer system has been proposed to collect the greywater from households and the overflow (supernatant) from the septic tanks for treatment in decentralised wastewater treatment plants. The project has been funded under the AMRUT scheme. The construction for the project is to be initiated after necessary Government procedures.

The project aims to minimise pollution levels in the backwaters and canals by capturing and treating wastewater upstream. By implementing treatment systems and discharging untreated wastewater to watercourses, the contamination of groundwater will also be curtailed. KMC has planned to replicate this approach in other wards of Kochi.

Roadside open drains posing a sanitation challenge in Kochi

Integrated approaches towards *Ganga* Rejuvenation –Rishikesh

Like many other cities in the *Ganga* basin, Rishikesh with a population of more than one lakh, is confronted with infrastructure challenges: not all households are connected to the sewer network and almost half of them are dependent on on-site sanitation systems. Wastewater from these systems is invariably entering the *Ganga* river without adequate treatment. To manage this problem, a Septage Management Protocol (SMP) supported by GIZ was notified by the state Government in 2017. The SMP mandates effective septage management across all 91 towns of Uttarakhand. Since 2018, the state has prioritised the implementation of the protocol in 15 *Ganga* towns of Uttarakhand with the aim of achieving citywide sanitation and clean *Ganga*.



The city of Rishikesh on the banks of the River Ganga

Under this initiative, the State Program Management Group (*Namami Gange*), Urban Development Department and the Indo-German cooperation project – Support to *Ganga* Rejuvenation (SGR) worked together with the Rishikesh Municipal Corporation and local stakeholders towards integrating different approaches for holistic liquid waste management, encompassing integrated approaches of river basin management. The ULB along with the parastatals – *Jal Nigam* and *Jal Sansthan* formed a Septage Management Cell (SMC) to implement septage management activities at the city level. The integrated approach adopted at Rishikesh included, a detailed household survey and geo-spatial mapping of sanitation systems for around 10,000 households. This helped in the design of an appropriate system of septage and wastewater management for both sewered and non-sewered areas. Gender-inclusive public participation ensured a thorough approach for effective data collection.

At present, scheduled and regulated desludging from identified households is carried out by the ULB. Faecal sludge is discharged at designated sewer chambers for co-treatment at the newly constructed 26 MLD sewage treatment plant. For residents, the application of an integrated city sanitation strategy brings about noticeable benefits in terms of a transparent tariff structure and hassle-free tank emptying services institutionalised through the ULB. For effective service delivery, the ULB has set up a free public hotline to advise citizens on household sanitation issues. Further, the survey findings shall be used to extend household connectivity with planned sewerage interventions in Rishikesh with the KfW Development Bank's support.

The Rishikesh approach has been very successful and recognised beyond the city borders. The SMCs of other *Ganga* towns are adopting the Rishikesh model and project preparation for integrated wastewater and septage management is in progress. State Authorities have directed SMCs across all *Ganga* towns to adopt similar holistic and integrated approaches and across all ULBs of Uttarakhand in the long term.

Improvements to Site Conditions in Gagillapur (Telangana) - A PPP Project

With the develoPPP funding programme, BMZ promotes private sector activities where entrepreneurial opportunities and development policy potential meet. Companies that want to invest sustainably in a developing and emerging country and expand their local operations can receive financial and technical support under the programme.

Under the develoPPP programme, GIZ and Hörmann KG (a private company) came together to jointly support the project on 'Improvements to Site Conditions in Gagillapur' in association with Dundigal Municipality (Medchal-Malkajgiri District), and the Commissioner and Directorate of Municipal Administration, Telangana as Partners.

The project was involved in providing technical support in the preparation of a detailed project report for solid waste management, digital data documentation exercises towards the formulation of the master plan of the newly formed municipality and, preparing a detailed master plan for the Gagillapur ward. The project encompasses awareness generation, ensuring collection and segregation of waste, recyclable waste reselling into the market as well as financial sustenance of waste collectors. Liquid waste management (through leachate and stormwater management) at the dumpsite and lakefront improvements for Gagillapur were also planned.

Structurally, the develoPPP project in Gagillapur is a one-of-its-kind, bringing together an international development agency, the private sector, the community and local administration for the development of a rapidly growing peri-urban location in a developing economy.

"We support a social development agenda in areas of priorities and with specific projects because it is, for us, a matter of principle to be concerned about things which happen around us. In India, we have enhanced our work at the grassroots level tremendously through the technical input and established presence of GIZ and look forward to creating a sustainable and long term impact through our interventions"

Martin J Hormann,
Shareholder, Hörmann Group.

A sanitation worker collecting segregated solid waste in Gagillapur

Waterbody improvement works under SMIF-TN programme in Pudukkottai Municipality

Sustainable Municipal Infrastructure Financing - Tamil Nadu

Tamil Nadu is one of the most industrialised states in India and thus counts for a growing urban population (currently around 35 million people, that is, 50% of the total state population). In order to meet the infrastructure requirements for the increasing population and the consequent financing requirements of the ULBs of Tamil Nadu for undertaking urban infrastructure projects, the Government of Tamil Nadu had established the Tamil Nadu Urban Development Fund (TNUDF). TNUDF avails funds from the Government of Tamil Nadu as well as loans from bi/multi-lateral agencies including KfW Bank. The Sustainable Municipal Infrastructure Financing – Tamil Nadu (SMIF-TN) programme, with the assistance of Financial Cooperation (FC) through KfW was launched in 2008 in order to improve the living conditions of residents in urban areas by constructing urban infrastructure and improving water supply, sewerage, storm-water drains, water bodies, energy-efficient street lights and parks. Beyond strengthening infrastructure, the programme also strengthens/ broadens the ULB's options through the facilitation of pooled financing and private sector participation in infrastructure development through joint venture and public-private partnerships. It puts them in a better position to plan and carry out projects.

The FC project relies on innovative approaches to municipal financing including loans, capital grants and funds for developing the municipal bond market as well as funds for developing the capabilities of the functionaries across the project lifecycle. These promote not only a better and more reliable water supply and sanitation service and thus an improvement of health, but also enhance environmental protection and contribute to local economic growth. By strengthening local players sustainably, municipalities have more opportunities to independently finance their infrastructure and thus directly meet the current and future challenges of urban development.

C. Building Capacities and Competencies

Capacity development in cooperation with effective institutional partners is the bridging tool between the demonstration of solutions and institutional development. This knowledge is then validated, disseminated and integrated into policy dialogue in cooperation with partners. Over the years, the GDC has teamed up with Government and other partner organisations to build capacities best suited for the contextual requirements. The approach to building capacities and competencies has been to create an enabling environment through awareness generation, dissemination, networking for scale-up, handholding and coaching to effect appropriate planning and implementation. Selected interventions are exemplified below:

Capacitating cities for the city led sanitation planning process (Andhra Pradesh, Kerala, Telangana and Uttarakhand)

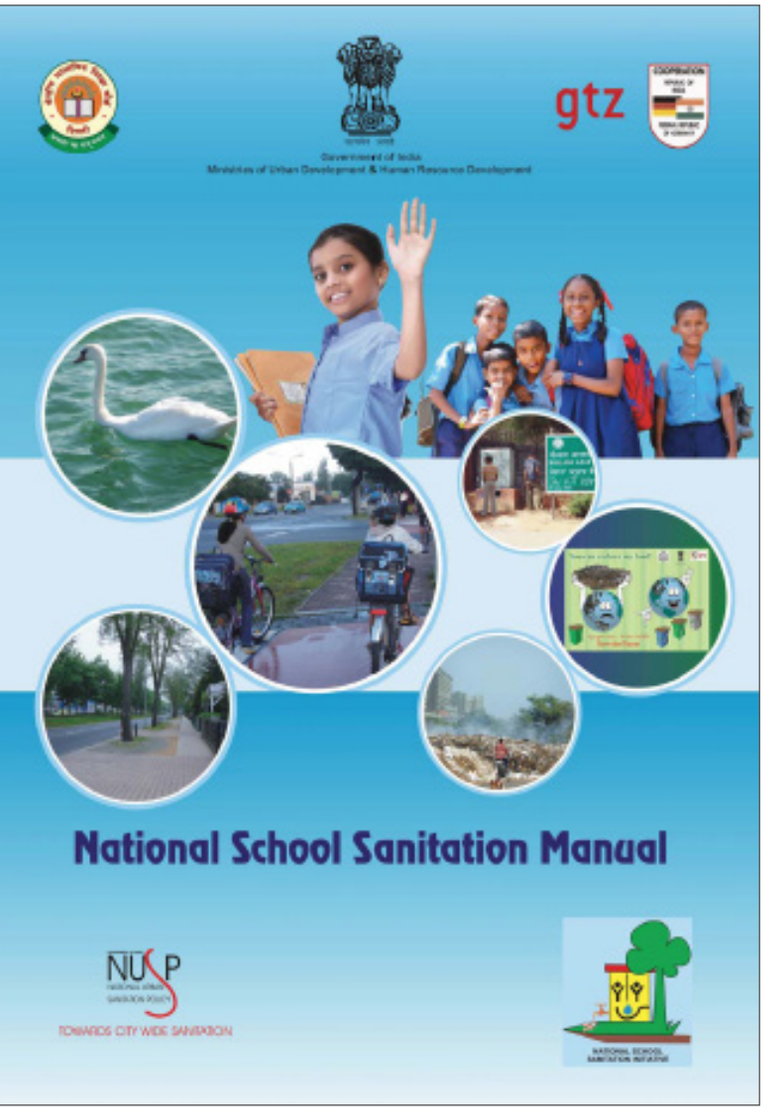
The NUSP urged cities and towns to formulate their City Sanitation Plans (CSPs) in overall conformity to the Policy. GIZ in partnership with the State and Local Governments supported a city-led sanitation planning process as enshrined in the NUSP. The GIZ Sanitation Programme (SNUSP) in its first phase supported six cities (Shimla, Raipur, Nashik, Tirupati, Kochi and Varanasi) in preparing CSPs.

In the second phase of the GIZ Sanitation Programme, training and handholding support was provided to more than 50 ULBs in four states for the development of CSPs (10 ULBs in Andhra Pradesh, 14 ULBs in Kerala, 10 ULBs in Telangana and 24 ULBs in Uttarakhand). For facilitating and strengthening this process, GIZ in cooperation with CSE, New Delhi developed an innovative and unique training and handholding programme for the preparation of CSPs. This linked training programmes to the application of training measures on the ground and capacitating cities to become the driving agent in the sanitation sector.

Collaboration with training and knowledge institutions such as KILA and Doon University, Uttarakhand were established to train master trainers and build the ground for further upscaling of this approach to all cities and towns in the states (Kerala upscaled the CSP planning process across all ULBs in the State).

The city-led CSP process also led to the implementation of innovative projects in various ULBs (e.g. planning and implementation of faecal sludge treatment facility in Sircilla, Telangana and Rudrapur, Uttarakhand).

The ultimate goal of this approach was not only to train, handhold and guide towns to prepare and implement their CSPs but to capacitate state and city level urban development agencies to take this process forward and facilitate the improvement of the sanitation sector in their respective state.



Supporting the National School Sanitation Initiative, Government of India

The Ministry of Human Resource Development (now Ministry of Education) and the Ministry of Urban Development (now MoHUA) in collaboration with GIZ had launched (2009) the 'National School Sanitation Initiative' to improve the sanitation situation in schools and inculcate good sanitation habits among school children in an attempt to inspire, acquaint and celebrate excellence towards school sanitation at the national level.

The National School Sanitation Rating was a key instrument of the NSSI. The School Sanitation Ratings had been instituted to recognise those schools that were taking significant steps toward effective sanitation and improvement in service delivery leading to the desired behavioural and attitudinal changes towards hygiene and sanitation.

In line with the NSSI, GIZ also supported nearly 47 schools across 5 cities (Delhi, Raipur, Shimla, Tirupati and Vasai Virar) to demonstrate how schools could significantly improve their sanitation conditions through improved O&M, limited funds, IEC and behavioural change.

The NSSI was followed by the National '*Swachh Bharat Swachh Vidyalaya*' initiative in 2014 to ensure that every school in India has a set of functioning and well-maintained water, sanitation and hygiene facilities. The '*Swachh Vidyalaya Puraskar*' initiative in 2016 had the explicit purpose to honour schools that have undertaken significant steps toward fulfilling the mandate of the *Swachh Vidyalaya* Campaign. It is foreseen that school children will act as ambassadors to create a sustainable model for awareness generation on sanitation and hygiene-related issues through such initiatives.

D. Community Engagement for Sustainability

Community engagement (participatory planning) in developing and providing sanitation services is the key to ensuring their sustainability, ownership and accountability. Often there is a gap between what communities need and what projects are providing. This gap can be overcome if people living within an intervention area are involved in the assessment of the problem, the development of solutions and, the implementation process. Selected GIZ experiences in this area are exemplified below:

'Eyes on the Canal' Project - Reimagining Buckingham Canal, Chennai

Chennai saw unusually heavy rainfall in 2015, which caused massive flooding in the city. Illegal developments and inadequate levels of flood preparedness were identified as the primary causes of the flooding. Moreover, the floods distinctly brought out the reality of climate change, prompting both the Government as well as citizens to action. Against this backdrop, the 'Eyes on the Canal' project for reviving the Buckingham Canal in Chennai was initiated.

'Eyes on the Canal' was an exercise in participatory planning to make a limited stretch (3.5 km) of Buckingham Canal a liveable place for the residents of Chennai. The initiative involved various activities such as awareness walks, community mapping exercises, stakeholder engagement meetings and an open-ideas competition to generate interest and ownership of the canal, which has suffered from collective abandonment.

The initiative was able to compile insights and understand the problem areas and the potential for improvement. A 'creative urban design solutions' competition was launched to tackle climate change effects on the canal and upgrade local livelihoods for a 3.5 km stretch of it.

People living on the banks of the canal or from the city, along with domain experts participated in the competition to find solutions. Three winning entities were supported to develop detailed proposals for their implementation. This well-received and highly visible community engagement initiative was used to encourage further multi-stakeholder and multi-level climate-proof, urban development interventions.

Buckingham Canal, Chennai

Community participation for developing designs in Kochi

Ente-Kochi and Co(_Vai_) Design - Integrated Urban Development Initiatives

The Kochi Municipal Corporation (KMC) jointly with GIZ initiated the Urban Lab known as '_Ente_-Kochi' (Malayalam for 'My Kochi'), a multi-stakeholder participatory planning process that fostered creativity, innovation and public awareness on issues of sustainable urban development. _Ente_-Kochi aimed at strengthening the concept of cross-sectoral cooperation and developing a joint understanding of Integrated Urban Development in Kochi leading to identifying a set of potential locations for pilot approaches in Kochi.

'_Ente_ Kochi', was designed to comprise of an envisioning exercise as well as an urban design competition to facilitate community engagement. It was structured in a participatory process with various workshops and events in 2019. The visioning exercise highlighted seven challenges for which ideas had to be developed. It was decided by the stakeholders involved, to focus on the development of the Mullassery Canal in Ernakulam for the 'Urban Design Competition', one of the seven challenges identified. The national-level Urban Design Competition aimed to jointly 'design the future city' of Kochi. It envisaged planning and then facilitating the implementation of an integrated civic project that is of key relevance for the sustainable development of Kochi.

Participation in the competition reflected the significance of Kochi's blue-green infrastructure as a key constituent of its identity as a coastal city, and its direct impact on the quality of public life in the city. Three winners were selected in September 2020. The winning teams got an opportunity to present their ideas to the concerned authorities in Kochi.

Taking this forward, a national-level urban design competition 'Co(_Vai_) Design' was initiated by the Coimbatore City Municipal Corporation (CCMC) jointly with GIZ in 2021. It aimed to generate dynamic, climate-responsive and integrated design interventions that revitalise an urban area in the city of Coimbatore in a contextually sensitive and sustainable manner. The area identified for Urban Design Competition was the Koundampalayam area, adjacent to the Sanganoor Pallam located in Ward No. 9, West Zone of Coimbatore Municipal Corporation.

The learnings from '_Ente_-Kochi' and 'Co(_Vai_) Design' interventions, concluded, the concept of urban design competitions is very effective to generate integrated design ideas.

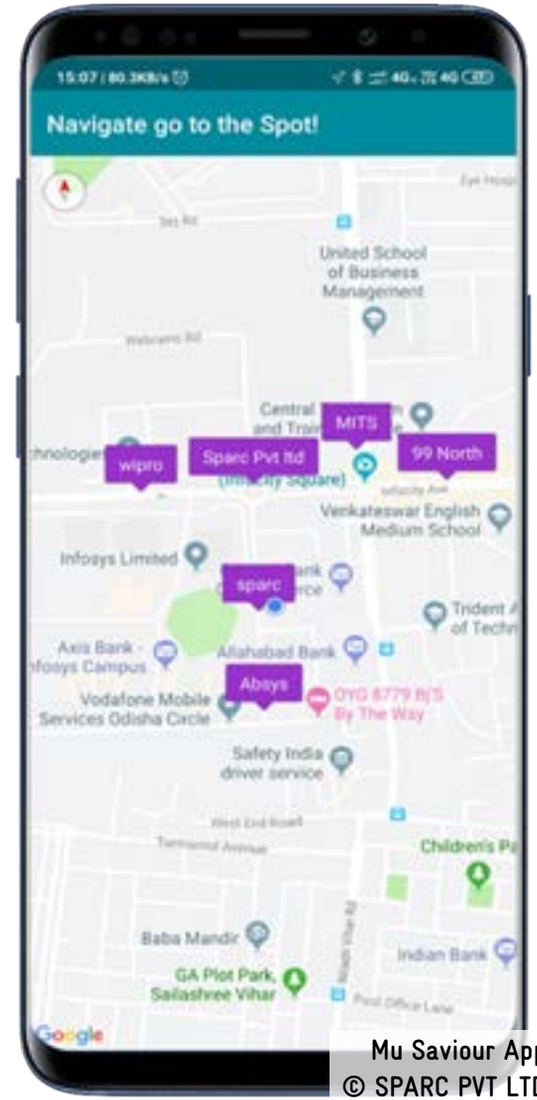
'*Mu* City Saviour' App to combat urban flooding in Bhubaneswar

The city of Bhubaneshwar in Odisha, which has been facing frequent floods in the recent past due to climate change is experimenting with an Information and Communications Technology (ICT) based solution, the technical-cum-social measure of a mobile application (app in short). The '*Mu* City Saviour' (Odia for 'I am city saviour') App, was developed by the Bhubaneswar Municipal Corporation and Bhubaneswar Smart City Limited (BSCL) in partnership with GIZ, using a co-creation methodology by involving citizens of the pilot area - Nayapalli and Shatabdi Nagar in Bhubaneshwar.

'*Mu* Saviour' App, an interactive digital solution, works through data (evidence-based information) exchange on a real-time basis between citizens and the municipal administration; enabling city officials to act accordingly and keep drains clean to reduce the impact of urban flooding. This prevents flood episodes while also creating awareness about climate change and its impacts on cities.

This digital solution merges three of the current global trends – climate change adaptation, digital transformation and urban development while keeping citizens involved and informed. As an open-source technology, it can be easily replicated for other cities in India and globally that face the problem of floods due to blockages in stormwater drains. This innovative approach has been recognised with the BSCL winning the prestigious Smart City Empowering India Awards for it, in 2020.

Digital solutions for community participation in problem identification and reporting are proving to be successful as seen from the data collected under the '*Mu* Saviour' App. The data collected is more accurate and is being used to improve services. The scaling-up of this approach is in its trial phase and needs further assessments for improvement.



Mu Saviour App
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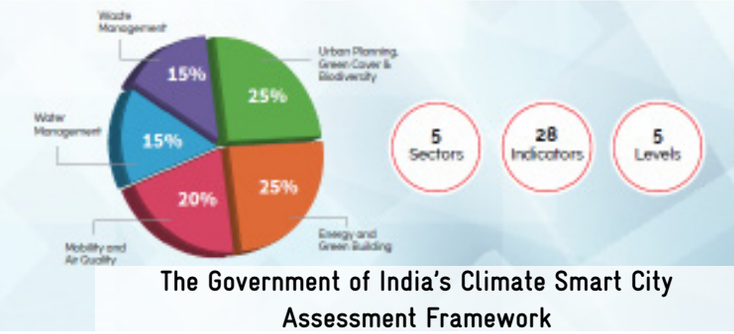


The Government of India's Climate Smart City Assessment Framework

E. Sanitation and Climate

Keeping sustainability in mind, linking sanitation with climate mitigation and adaptation strategies, and fund allocation for climate action or risk reduction is sensible and crucial. Including climate resilience strategies in sanitation infrastructure and practices is central to ensure the sustainability of those systems and approaches. Some of the key interventions with significant climate change emphasis are highlighted below:

Supporting Climate Smart Cities Assessment Framework (CSCAF), Government of India

Taking serious climate change into consideration, the MoHUA launched the **'Climate Smart Cities Assessment Framework'** for the 100 Smart Cities in 2019 with the support of GIZ and NIUA. This is a first-of-its-kind cities assessment framework on climate-relevant parameters for Indian cities. The objective is to provide a clear roadmap for cities and in effect, urban India as a whole, towards combating climate change while planning and implementing their actions including investments.

The framework has 28 diverse indicators across five categories namely; (i)Energy and Green Management Buildings, (ii)Urban Planning, Green Cover & Biodiversity, (iii)Mobility and Air Quality, (iv)Water Resource Management and (v)Waste Management. The Climate Smart Cities Assessment Framework shall serve as a tool for cities to assess their present situation and shall facilitate cities to adopt, implement and disseminate best practices and further to set standards in comparison to the international efforts towards green, sustainable and urban resilient habitats. A 'Climate Smart Cities Self-Assessment Tool (CSC-SAT)' has also been developed as an add-on that provides users with an option to assess the greenhouse gases potential emission and subsequently the 'Potential Emission Reduction'.

The CSCAF has been designed for an annual assessment. It was last revised in 2020 based on the experience of phase 1 implementation and feedback received from cities. The future assessments will not be limited to the 100 smart cities but open to 500+ cities in the next five years and all 4000+ ULBs in India in the long run.

'*HARIT*' – A Circular Economy approach for Maharashtra

The Swachh Maharashtra Mission initiated '*HARIT*', an initiative to certify and market products made from urban solid waste. '*HARIT*' (Sanskrit for 'green'), was conceptualised as a brand of compost, that addressed municipal waste recycling in a circular economy framework. This initiative also aimed to improve soil quality and promote sustainable agriculture practices by closing the urban-rural nutrient cycle.

GIZ (ProSoil Project) had been supporting the *Swachh* Maharashtra Mission in planning, scientific processing of waste and also developing and testing products like organic compost, phosphate-rich organic manure and Terra Preta from urban organic waste as organic inputs in agriculture.

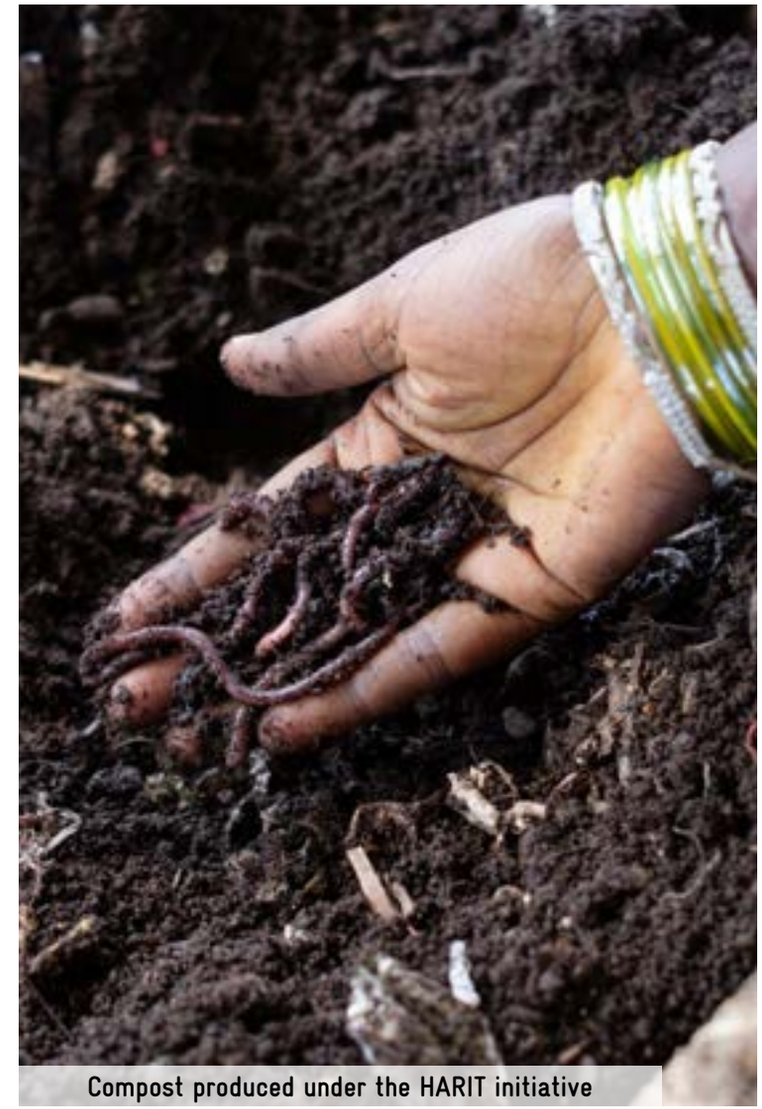
To support the process of the product reaching buyers, a digital application '*HARIT*' was developed and implemented by GIZ. '*HARIT*' is an application developed and designed for a user-friendly Supply Chain Management ICT platform using Blockchain technology for the compost value chain. It is available online as an Android mobile application.

The *HARIT* initiative thus intends to prevent organic waste from ending up in landfill sites helping reduce greenhouse gas emissions. The quick and direct connection between buyer and seller also reduces emissions thus making the entire system more climate-sensitive.

Apoorva, a 35-year-old farmer from the village of Peth in Maharashtra, has become one of the test users of the *HARIT* Ticker. He explains: "*The new digital trading platform for compost gives me the opportunity to directly order high-quality organic compost from the city quickly and easily*". Apoorva receives compost directly from the nearest urban composting plant in Nashik or from farmers' organisations in the village.

The CSCAF and the *HARIT* initiative are both examples of integration of climate-sensitive features in urban development interventions, a positive contribution towards fulfilling the SDGs.

HARIT™
MAHA City Compost



Compost produced under the HARIT initiative

04

Emerging challenges and priorities

India's urban sanitation journey is well on its way with enhanced coverage and improved service levels. It is moving towards sustainability of systems through innovative approaches and technologies, through ambitious time-bound missions (SBM, AMRUT, NMCG, SCM), result-linked investments and enabling policy commitments (NUSP and NFSSM). India is one of the faster-moving South Asian countries in addressing urban sanitation as a national priority.

Initiatives under the Indo-German collaboration have set forward-looking trends that need to be reiterated to achieve the goal of sustainable, liveable and resilient cities. **Policies** have been **converted to action on ground** through actionable guidelines, manuals, and standard operating procedures like the Integrated Wastewater Management Framework and Guidelines for Community and Public Toilet management. **Integrated and inclusive technology and management approaches** have set in motion the move towards multiple technology systems. The **role of technology** in effectively **delivering services** and **improving operation and maintenance** of assets cannot be emphasised enough.

Traditional highly capital-intensive sewer networks and sewage treatment plant-driven investments are increasingly being replaced by

View of a part of a typical low-income housing area in urban India

relatively **low capital intensive, cost-effective and low/easy-to-maintain** decentralised semi-central shallow solid-free sewer networks with treatment (like in Kochi) and non-networked solutions. This is exemplified through the construction of decentralised treatment solutions complementing centralised systems in Kerala. Waste to energy projects are gaining traction like the project in Nashik as also the use of digital platforms for linking waste producers to waste processors and users of by-products like the HARIT initiative.

The **role of communities and partnerships** in concept development (e.g. Ente-Kochi) and service delivery (like operation and maintenance of public toilets by private service providers in Andhra Pradesh) are also being taken up in many forms. Elements of **circular economies and reduce-reuse-recycle** in solid and liquid waste are being incorporated. Of particular importance is the focus on tertiary treatment of treated wastewater for industrial and non-potable use, which is gaining traction in many cities and states. Governments are increasingly considering **climate change** as an important element to be **incorporated into programmes and project designs**. The CSP training programmes highlighted the necessity of a **360-degree approach towards capacity development**–training, handholding and supporting Government and other agencies at different levels to plan and implement holistic and sustainable solutions. All these efforts were supported through the GDC and are aimed at creating citizen-centric service delivery and enhancing the ease of living of urban residents. Activities under Indo-German Cooperation thereby helped in creating enabling policies and by financing well-articulated and prepared projects, the resulting examples are contributing their share to India's future sanitation story.

However, given the scale that India has to achieve (sanitation coverage and improved services for 7935 cities-as per the 2011 census), the variance in climate and topography, a **one-size-fits-all policy and programme approach will not deliver results**. The **way forward** lies in strengthening the federal decentralised governance with **state governments leading and developing appropriate state sanitation strategies and plans for their cities and the national Government playing an enabling and supporting role**.

This chapter aims to highlight possible emerging challenges and priorities based on the understanding of the described key trends in thinking, approaches and achievement of the various efforts of the Government as well as the learnings from the specific implementations under Indo-German development cooperation.

The successes of the efforts in the last decade have set the stage for universal access to sanitation in India. However, to reach the goal of liveable, resilient cities, various efforts are still required. There are still challenges to overcome. Reducing water demand and managing the wastewater footprint remains a primary challenge. With limited new sources for augmenting urban water supply, other than recycling treated wastewater, the focus of wastewater and sanitation needs to be 'better management' so that the systems deliver within the existing constraints. The key challenges and ways to better manage these systems are detailed further in the next pages:

Priority Action Areas

- Good governance
- Capacity development
- Holistic behaviour change
- Planning for disaster response
- Gender & social equity
- State-level long-term sanitation perspective and planning
- Strengthening Data Management through Digitalisation
- Contextualisation of wastewater treatment

Vision of an integrated and inclusive city

Good Governance

- Urban sanitation is a governance challenge, critical for national growth and inclusive development. Devolution of powers and funds, as enshrined in the 74th Constitution Amendment, have not yet taken place in full and true spirit. Decentralisation at the city level has been effected without providing sufficient support to ULBs for assuming additional tasks and functions. The lack of capacities of ULBs (all levels, staffing, qualification, management and finance) is a key shortcoming that needs to be addressed. ULBs remain weak and short of finances. Therefore, strengthening the ULBs with devolution of funds and executive powers to plan and implement context-specific sanitation solutions may be considered as a way of improving sanitation governance.

- Sanitation in India is managed by multiple Government departments resulting in fragmented institutional roles and responsibilities. This can only be addressed if there is a strong governance leadership at the national and state levels, to steer the agenda of urban sanitation in the coming decades.

- Addressing urban sanitation is about addressing growing conflicts over water and wastewater management both at the state level and national level. These conflicts manifest as inter-state water conflicts, intra-state conflicts, rural-urban, intra urban, agriculture-industry and environment-development conflicts.

- Making urban sanitation a national priority that is beyond the focus of specific short-term programmes and projects, as a national long-term priority, can only be addressed as a governance challenge and not a sectoral problem. As a way to support states to develop their state-wide and city-specific urban wastewater and sanitation strategies, national policies and missions could limit funding for short-term urban sanitation infrastructure programmes of the states.

- Sanitation related infrastructure failure due to poor operation and maintenance is another challenge that cities face. Improving the functionality of existing sanitation infrastructure and its operation and maintenance is a critical priority. This will require state Governments to ensure that all hurdles – contractual to financial – are addressed on priority before new infrastructure is created.

- Outcome based funding (instead of traditional output-based funding) for urban sanitation infrastructure could be earmarked from tax devolution to states; granting the states and cities appropriate funds to implement their sanitation strategies. With national funding for infrastructure devolved to state Governments and cities, collaborative mechanisms between centre-state and cities may be developed. These mechanisms can be joint learning and sharing platforms for regular review and monitoring of progress and actions, technical assistance support mechanisms and capacity development.

"If cities need to ensure affordable sanitation for all and affordable treatment of wastewater, then on-site systems could be re-engineered so that waste gets collected from each household, transported and treated. There is no need to build long distance pipelines for supply of water or even longer distance pipelines for taking back the wastewater for treatment. But most importantly, we have learnt that if this urban-industrial wastewater is treated for reuse then water is not lost. More importantly, our rivers will not be lost. This is where implementation is now focused".

Dr. Sunita Narain
Director General, Centre for Science and Environment

Indo-German Dialogue for Ganga Rejuvenation in Uttarakhand

State-level long-term sanitation perspective and planning

- The NUSP (2008) had laid out the development of state sanitation strategies and city sanitation planning, as priorities. Only some states have developed long-term strategies. All states should be encouraged to develop their long-term strategies based on town-level plans / master plans for appropriate sanitation systems and investment plans for a 20-30 year long period.

- To facilitate sanitation improvements on the ground, the Policy-Programme linkage needs to be strengthened so that improvements are implemented on the ground by states.

- A sustainable perspective for sanitation management requires that State Sanitation Strategies and City Sanitation Plans do not end up as formal reports but are updated regularly and incorporate citizen consultation-based priorities. Having a mechanism of regular public review and consultation may result in improved integrated and inclusive strategies and plans. The process of citizen consultation takes time and this aspect should be incorporated into plans too.

- The NUSP (2008) had identified a set of policy commitments that need to be developed further and new priorities to be added. Therefore, revising and updating NUSP as guidance for next-generation priorities will support the provision of continuous sanitation improvements.

- As we move towards a more complex and diverse agenda for urban sanitation, given the diversity of Indian climate and topography, the days of one scheme and one technology solution for all of India are over. A 'one-size fits all' solutions approach for urban sanitation and wastewater management infrastructure is not sustainable.

- States need to lead by identifying their 20-30 year-long urban sanitation and wastewater vision and strategy and funding for a diverse solution portfolio.

- Defining diverse scenarios in a state along with a menu of suitable options for urban sanitation infrastructure, and budget estimates in a state sanitation strategy can prove to be very helpful to states to implement appropriate solutions.

- National missions through technical assistance, sanitation funding and capacity development support to encourage states to develop context-specific solutions that suit local conditions in the cities.

- The World Bank and Asian Development Bank have incorporated non-networked sanitation systems for septage management as an integral part of their urban sanitation infrastructure support funding. This ensures citywide integration of sanitation solutions for everyone. A similar approach is needed in all cities to ensure safe sanitation and environment.

Planning long-term for inclusive and resilient cities

Stakeholder awareness building an inclusive participatory approach

Holistic Behavioural Change and Capacity Development

- The first step toward achieving total sanitation is to elevate the consciousness about sanitation in the mind of all key stakeholders especially Government agencies, municipal agencies and most importantly, amongst the people. Advocacy in terms of greater awareness is required, to highlight the priority of urban water, wastewater and solid waste management, as long-term challenges to India's development. While planning IEC campaigns, authorities are encouraged to shift from the current and traditional 'delivery based' approach to an 'outcome based' approach.

- Behaviour change is instrumental in sustaining sanitation improvements. Measures to address behaviour change have contributed positively to infrastructure implementation and its sustainable usage. These efforts need to be continued as a long-term priority for effective sanitation improvements. Improved sanitation can ensure improved public health and environmental outcomes only if considerable changes in behaviour and practice take place across the spectrum of society.

- All end-users must be made aware of the ownership responsibility linked to the sanitation services provision. All end-users of sanitation services must oblige corresponding responsibilities, namely, to use sanitation services responsibly with due care and to pay for the services provided. Stakeholders should be educated and encouraged to bring into effect a positive behaviour shift from the current 'resource users' to 'resource managers' approach.

- Capacity development is more than just developing the capacities of individuals through training. It is also more than just institutional development that sometimes comes in the form of re-structuring and reform/privatisation mandates. To address capacity development holistically and also to de-link it from programmes and missions, an approach, 'Capacity Development Effectiveness Ladder' has been proposed by NIUA, based on a critique of urban sanitation capacity development in India. Adoption and practice of this approach may be explored to support holistic capacity development.

- Capacity development is undertaken by Government programmes or missions and on the completion of the programme or mission, is stopped. Instead, it needs to be intrinsic to all future programmes and missions and a continuous process.

- Developing an independent national nodal agency (with active engagement of regional and state-level research institutions and universities) that anchors a national learning and capacity development mandate can prove to be instrumental in institutionalising urban sanitation capacity development.

- For effective capacity development measures, it is important to create a pedagogy that supports the development of teaching materials and trainers. This can provide quality control and assurance for learning collaterals and training modules being developed.

- Integrating sanitation capacity development initiatives with existing missions like the Karmayogi Integrated Government Online Training-iGoT platform or any other national capacity development initiative of the Government of India will be a useful boost for the institutionalisation efforts. Linking with the national Digital Learning Management Systems Platform can also prove to be beneficial.

Community consultation meeting at Kochi

Planning for Disaster Response

- The long-term effects (higher temperatures, flooding, sea-level rise) and impacts of climate change on the sanitation sector need to be understood and means to avoid, minimise and mitigate these effects need to be incorporated into planning and designing sanitation interventions. Climate change is likely to increase the variability of water resources which will consequently affect the sanitation sector.

- COVID-19 and prior to that the Chennai floods of 2015, exposed the great humanitarian challenge that disasters pose to cities and the need for strengthening systems at the state and city-level to address them.

- The MoHUA came up with an advisory on setting up Emergency Response Sanitation Units (2019) in major cities and serve the city and neighbouring areas. The advisory provides technical and managerial guidance for ensuring workers' safety during sewer and septic tanks cleaning. Its implementation, despite remaining a challenge, needs to be tried out to ensure workers' safety.

- Improving the "systems effectiveness" of disaster response at the state and city level, a Resilient Urban Sanitation Response Framework was developed by NIUA and applied to document the sanitation response of Indian Cities to COVID-19. This framework prepares cities to be resilient. However, the challenge will be to involve cities to adopt this framework.

- Capacity development for disaster response is required. To be well-prepared, the Resilient Urban Sanitation Response Framework and other frameworks to assess the effectiveness of a disaster response need to be understood and adopted by cities.

- Climate-resilient urban development approaches that address disaster preparedness aim for liveable, smart, climate-resilient cities with significant measurable improvements. To achieve this goal, roadmaps and frameworks for Indian cities to combat climate change have been developed. This would feed into development programmes and interventions, capacities of city officials, and systems improvements. The challenge is to ensure authentic, adequate and reliable data for regular assessments and improvements. Systematic data collation needs to be a priority.

- Effectiveness of state and sub-division level systems related to HR, stocks and materials can be improved through up-to-date records of sanitation services, including regular and contract staff contact details, health and life insurance of all staff including contract employees, disaster response stockpiling and review.

- Protocols for state-city level regular review, disaster response time coordination, state-level protocols for inter-departmental coordination and collaboration with state and national disaster management agencies need to be strengthened.

A house in Kochi effected during the 2018 Kerala floods

Strengthening Data Management through Digitalisation, Gender and Social Equity components

- Digital approaches for urban sanitation solutions have the potential to strengthen assessments, data collection and management, planning, delivery of services, quality control and management as well as improve opportunities for scaling up. Such approaches have been attempted in some cities and require effective scaling up.

- Extensive and intensive use of ICT based technology will serve as a critical lever to break silos and integrate sanitation interventions across all levels and thereby providing the desired speed and scale for effectively managing sanitation. The premise is that technology is an important tool, not the only tool, and certainly not the goal in itself.

- Authorities need to establish robust real-time database and information systems to meet multiple objectives of collecting and analysing data, reporting, monitoring, decision-making, service level benchmarking, performance measurement, impact measurement, informed planning, evidence-based policymaking, designing performance improvement strategies and plans, promoting research, spurring innovation and prioritizing scarce resources.

- Current sanitation-related policies mention gender aspects but lack specific provisions[12] and practical mechanisms for incorporating gender in all dimensions of urban sanitation– from representation in planning, governance, operations and research to policy formulation in water and sanitation. Such efforts would be a step towards gender inclusiveness.

- Auditing of gender representation in all orders, communications and learning collaterals reviewed by involved stakeholders would ensure right messaging. Progress in providing sanitation services has not occurred equally, with a range of inequalities in who can access and benefit from sanitation services. This inequality needs to be addressed across all urban development issues, especially sanitation. The urban poor, sanitation workers and persons who were manual scavengers need to be given specific attention for breaking stereotypes, upskilling, livelihood opportunities and rehabilitation.

- The socio-cultural biases against sanitation and sanitary work need to be targeted, efforts should be made for addressing the social stigma associated with sanitation-related work (be it collection of waste, cleaning of toilets, cleaning of septic tanks, etc.) in order to grant it the same dignity of labour as accorded to any other occupation / job. Respect to the dignity of labour needs should be ingrained in the national consciousness.

- Promoting gender and social equity is a key aim that requires to be addressed across all sanitation interventions and services. A multitude of successful models across cities and states is available. They need to be scaled up to ensure the delivery of services to the poor, with a special focus on women and children. The role of communities and partnerships in service delivery needs to be taken up in many forms.

Gender-sensitive public toilets in Tirupati

Contextualisation of Wastewater Treatment Norms

- Given the scale and variability of conditions in urban India, sanitation approaches and systems implemented do not perform as expected. Towns have separate black and grey water streams, cities with sewer networks have combined flows and also have pockets that are not covered by sewer networks.

- The performance standards of wastewater treatment and disposal need to be elucidated based on the type of wastewater stream or based on the treatment and end-use objectives.

- Choice of treatment technology or treatment objective is usually incompatible with the local conditions – like requirements of water resource management or the socio-ecological and economic conditions. This results in standards not being achieved.

- Developing and implementing multiple innovative, integrated approaches with suitable standards linked to closed-loop approaches instead of linear flows may be more sustainable.

- Improving urban water use efficiency, with a priority focus on circular economy promotes the reuse of treatment by-products. Such an approach along with the promotion of dual plumbing systems in residential areas and non-networked sanitation systems that do not require high water flows in sewers may be a priority action area.

- Of particular importance is the focus on tertiary treatment of wastewater for industrial and non-potable reuse, which is gaining traction in many cities and states.

- While developing/revising standards and norms for effective wastewater treatment the state and national level contexts need to be considered. This context can best be provided by national bodies and departments and other relevant stakeholders to define treatment objectives and therefore the required standards without creating any adverse environmental impact.

- Stringent norms for wastewater treatment have been introduced in India at the behest of judicial intervention by the National Green Tribunal. Without improving the functionality of existing sewage treatment plants, simply making the norms more stringent, will not help with compliance.

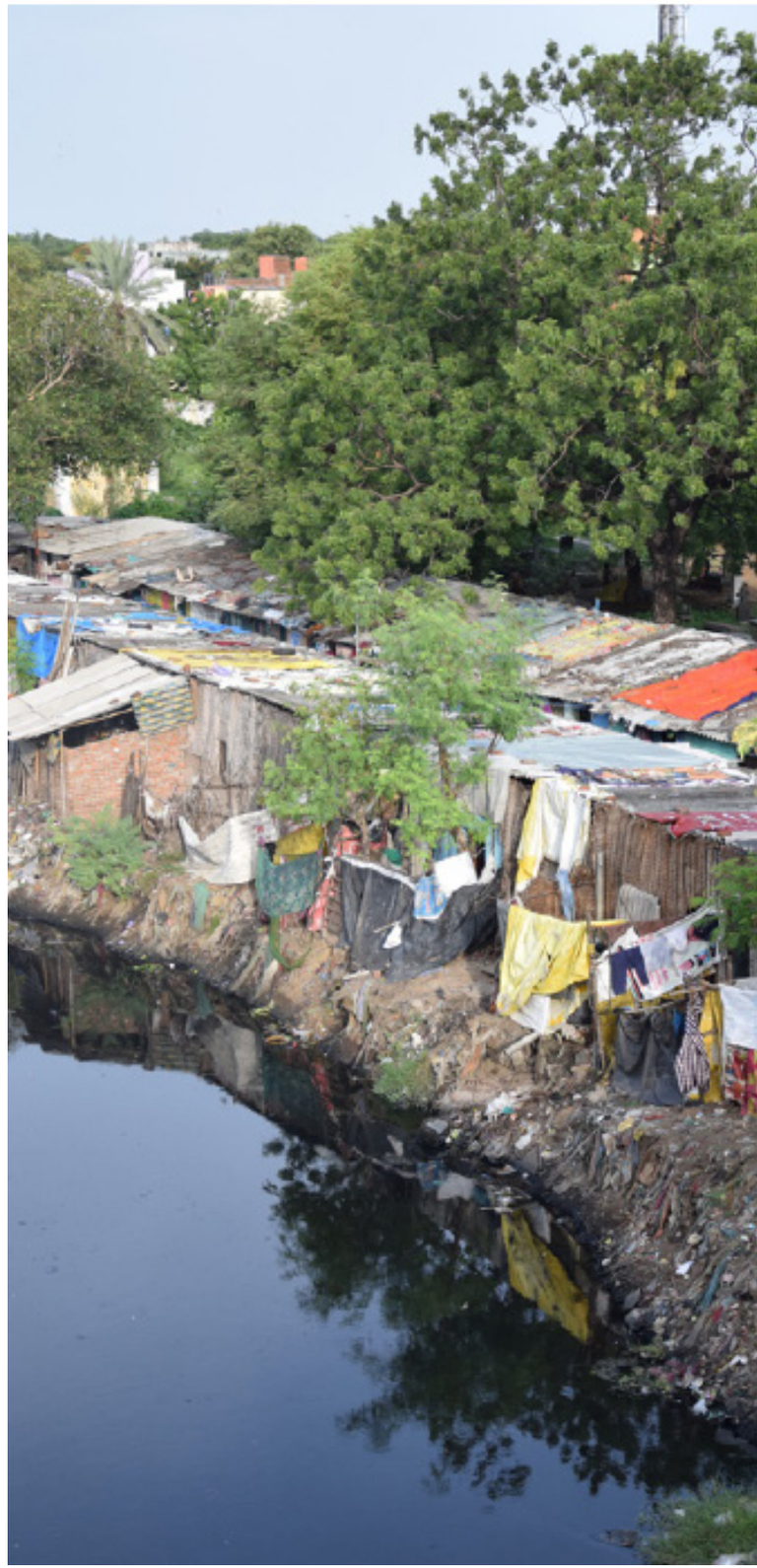
- Basing the wastewater treatment standards on the end-use priority of treated wastewater might prove to be easily implementable and encourage reuse. For example, the reuse of treated wastewater for agriculture, currently deterred by unnecessarily low Biological Oxygen Demand concentrations, can be encouraged by allowing less strict standards along with safety guidelines for reuse. Thus, the scope of applying cost-effective, nature-based solutions and technologies like decentralised wastewater treatment systems with minimal operation and maintenance costs may be implemented within the means of small and medium towns.

- All these efforts are aimed at creating citizen-centric service delivery and enhancing the ease of living of urban residents.

During the last decade various efforts related to sanitation and climate change have been implemented for sustainable and inclusive solutions for development in India, also contributing to global sustainable development efforts. The journey is not yet completed. Efforts for collaborations, sustaining achievements, building skills and knowledge, research and innovations need to continue to provide sustainable and inclusive sanitation for all.

"Urban sanitation journey, though well begun, is far from over. It will require our concerted and collective efforts to ensure that we can leave behind for our future generation cities and public spaces that are inclusive, safe, resilient and sustainable".

Mr. Hardeep Singh Puri
Minister of Housing and Urban Affairs, Government of India
at the National Conference on Future of Urban Sanitation in India
New Delhi, February 2020



Endnotes

1. Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), and other sanitation programmes.

2. MDGs – The MDGs were eight goals with measurable targets and clear deadlines (2015) for improving the lives of the world's poorest people. To meet these goals and eradicate poverty, leaders of 189 countries signed the historic millennium declaration at the United Nations Millennium Summit in 2000.

3. The provision of Finance Commissions was constituted by the President of India under Article 280 of the Indian Constitution to define the financial relations between the central government of India and the individual state governments. They are periodically commissioned to overcome fiscal imbalances.

4. "Three key pro-poor reforms, namely (a) earmarking of 25% of municipal budget for the urban poor for provision of basic services including affordable housing to the urban poor; (b) implementation of 7- Point Charter, namely provision of land tenure, affordable housing, water, sanitation, education, health and social security to the poor in a time-bound manner ensuring convergence with other programmes and (c) reservation of 25% of developed land in all housing projects, public or private, critical for slum improvement."

5. SLBs evaluate the performance of cities through measurable indicators; such as provision of water supply, wastewater, solid waste management, and storm water drainage (as chalked out in CSPs prepared under the NUSP).

6. The Nirmal Shahar Puraskar for urban sanitation was prompted by the success of parallel work in rural sanitation and the Nirmal Gram Puraskar. It covered cities (423 cities in 2010) with population above 100,000 covering 72% of urban India

7. These requirements aim for holistic development of heritage cities. This includes revitalisation of linked urban infrastructure for heritage assets such as monuments, ghats, temples etc. along improving livelihoods, skills, cleanliness, security, accessibility and service delivery.

8. The policy was looking at sanitation systems predominantly from a centralised sewer network perspective and has set the target of universal access to sanitation, open defaecation free cities, grey and black water treatment and wastewater reuse / recycling. Awareness building, capacity development and community involvement in the planning process are significant corner stones emphasised in the policy.

9. CPHEEO is a technical wing of the Ministry of Housing and Urban Affairs (MoHUA).

10. CPHEEO, Manual on Sewerage and Sewage Treatment, (2013): p. 1-2.

11. Loan Agreement for the project "Madhya Pradesh Urban Sanitation and Environment Programme" for Euro 50 million Reduced Interest Loan and Euro 2.5 million grant. The broad objective of the Project is to improve facilities for water supply, sanitation and

sewerage treatment plant in selected towns of Madhya Pradesh, improve solid and liquid waste management and disposal systems, improvement of surface drainage systems for flood mitigation in selected towns of Madhya Pradesh.

12. While inclusion is there in NUSP 2008, gender is missing from the policy guideline.

Links and References

Factsheets and other knowledge material referred to in this publication are available on the SuSanA platform - a key knowledge base in the sector.

https://www.susana.org/en/knowledge-hub/resources-and-publications/library/details/4432

1. SBM 2.0 - https://sbmurban.org/storage/app/media/pdf/swachh-bharat-2.pdf
2. AMRUT 2.0: https://mohua.gov.in/upload/whatsnew/61792765b5387AMRUT-Operational-Guidelines.pdf
3. Smart Cities Mission https://smartcities.gov.in/
4. Namami Gange: https://nmcg.nic.in/NamamiGanga.aspx
5. Swachh Survekshan 2022: https://sbmurban.org/storage/app/media/pdf/SS2022-Toolkit_1st-February%202022_Final_compressed.pdf
6. National Urban Sanitation Policy, 2008 - https://mohua.gov.in/upload/uploadfiles/files/NUSP_0.pdf
7. National Policy on Faecal Sludge and Septage Management, 2017 - http://cpheeo.gov.in/upload/uploadfiles/files/National%20Policy%20on%20Faecal%20Sludge%20and%20Septage%20Management.pdf
8. Manual on Sewerage and Sewage Treatment Systems, 2013, GoI - http://cpheeo.gov.in/cms/manual-on-sewerage-and-sewage-treatment.php
9. Handbook on Service Level Benchmarking, GoI, 2009 - http://cpheeo.gov.in/upload/uploadfiles/files/Handbook.pdf
10. CITIIS and Maturation Framework - https://www.niua.org/citiis/content/our-approach
11. Urban Water Supply and Wastewater Policy Framework - https://niua.org/intranet/sites/default/files/414_0.pdf
12. Resilient Urban Sanitation Response Framework - https://niua.org/scbp/sites/default/files/Resilient_Urban_Sanitation_Response_Framework3.pdf
13. GIZ Sustainable Urban and Industrial Development - https://www.urban-industrial.in/
14. develoPPP - https://www.developpp.de/en/
15. BMZ Water Strategy, 2017 - https://www.bmz.de/resource/blob/23756/d327938357c8b6cf5962e8dcd1f27ec5/Strategiepapier390_BMZ%20Water%20Strategy
16. Compendium of Sanitation Systems and Technologies, EAWAG, 2014 - https://www.eawag.ch/en/department/sandec/publications/compendium/
17. Guidelines on Sanitation and Health, World Health Organization, 2018 - https://www.who.int/publications/i/item/9789241514705

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