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State of Urban Water and Sanitation in India



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State of Urban Water and Sanitation in India

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FOREWORD

Water Sanitation and Hygiene is an issue of serious concern in several developing countries. Urban areas of these countries are already strained under current demands, which would be further exacerbated with rapid urbanisation. In India, for instance the urban population is projected to increase to 50 per cent of the total population of the country by 2030, raising concerns over the rising challenges on urban water supply and sanitation infrastructure. Despite the several dedicated programs on sanitation in India, it still has the largest number of population (477 million) practicing open defecation.

Over the past five decades USAID has been working towards ending extreme global poverty and enabling resilient, democratic societies to realize their potential across the world. In India, USAID has been working extensively on sanitation and particularly supports the Government of India through provision of technical expertise, building partnerships, sharing best practices and innovative development models, and capacity building for realizing the goals of SBM (Urban). USAID is working closely with the Ministry of Housing and Urban Affairs (MoHUA) to contribute to India's vision of extending clean water and sanitation services to the urban population.

The report entitled: State of Urban Water and Sanitation in India includes a collection of assessments highlighting the policies, progress and possible solutions in Water and Sanitation in urban India which is a part of the three year (2014-2017) collaborative program on 'Strengthening Water and Sanitation in Urban Settings of India' funded by the USAID and undertaken by TERI University along with Coca-Cola and TERI. The project aimed at creating enabling conditions to achieve the sanitation targets for India and contributes to the Government of India's Swachh Bharat Mission (Urban).

This report being brought out after three years of SBM, covers issues that are vital to further the progress in realizing the sanitation goals and attempts to provide specific insights to aspects that require critical attention. The analysis and recommendations provided here would be of benefit in improving future policy and investment decisions in the Urban Water and Sanitation sector in India.



Paul Aiyong Seong
Deputy Office Director
Office of Social Sector Initiatives (OSSI)
USAID India



FOREWORD

I am glad to share with readers the report entitled: *State of Urban Water and Sanitation in India*, which is an important milestone emerging from a three-year collaborative program undertaken by TERI University, Coca-Cola India and USAID on 'Strengthening Water and Sanitation in Urban Settings of India'. This project aimed at creating enabling conditions to achieve the sanitation targets for India and contributes to the Government of India's Swachh Bharat Mission (Urban). The project has both immediate and long-term impacts on the sector and is useful to sector practitioners and policymakers alike.

Coca-Cola India recognizes the impact it has on communities in which it operates and works towards changing the lives of these communities. The company is committed to sustainable development and inclusive growth and some of the key areas of focus has been issues relating to water, sanitation, environment, healthy living, social advancement and promoting gender equality and empowerment of women over the past several years.

As part of our sustainability efforts we aim at providing safe drinking water, promoting preventive health care and sanitation including contribution to the "Swachh Bharat Mission" set-up by the Central Government for promotion of sanitation. This project has been an important contribution to the social, economic and environmental progress of India.

I am delighted that the report is released at a time when the Swachh Bharat Mission has completed three years – and the findings and recommendations it presents will be useful to policy makers and practitioners of the urban water and sanitation sector in India.



Shubha Sekhar
Director, CSR & Sustainability
Coca-Cola India and South west Asia



PREFACE

This publication is part of a three-year (2014–2017) collaborative programme undertaken by TERI University along with USAID, Coca-Cola India and TERI, titled Strengthening Water and Sanitation in Urban Settings of India. In line with the objects of the national missions, the programme focuses on strengthening urban water and sanitation programmes through skill development, community-based solutions, innovation, and local action and achieved its objectives through many independent and interdependent activities.

This comprehensive report is one such activity based on rigorous consultations with stakeholders and data collected over three years. It provides an opportunity to strengthen two flagship missions of the Government of India, namely the National Skill Development Mission and the Swachh Bharat Mission (Clean India). These missions warrant a two-pronged approach, comprising (1) capacity expansion of hardware and infrastructure and (2) strengthening the capacities of institutions and stakeholders to achieve the missions' objectives.

The decision to focus mainly on sanitation was deliberate as India's progress in achieving the targets set under the Millennium Development Goals (MDGs) is far more impressive for sustainable access to safe drinking water when compared to that on sanitation. More than half the global population defecating in the open lives in India. As such, a focused attention on improved sanitation would contribute significantly towards achieving the Sustainable Development Goal 6, namely 'Ensure availability and sustainable management of water and sanitation for all'. Although the last few decades have seen major changes in sanitation policies and regulation, the Swachh Bharat Mission (SBM) is a mega push in the nation's war against poor sanitation.

Interestingly, the SBM embodies the spirit of the sustainable development goals that call upon all goals to be looked upon as integrated and indivisible. The Swachh Bharat Mission extends far beyond achieving SDG 6 because the mission also contributes to six more SDGs: poverty eradication (SDG 1), ending hunger by improved nutrition (SDG 2), ensuring healthy lives and promoting well-being (SDG 3), education (SDG 4), gender equality (SDG 5), and inclusive cities (SDG 11). The present publication is a modest but important step in capturing the country's journey thus far and in providing inputs for strengthening water and sanitation services in its cities.

The project initiated dialogues on many fronts across disciplines and stakeholders. As part of the project, a series of stakeholders' consultation workshops were held at the regional level, culminating in a national workshop, with participation from diverse groups of stakeholders, which helped to shape these findings.

I am glad to share with you the report on the State of Urban Water and Sanitation in India, the result of dedicated efforts by leading practitioners and academicians in the water and sanitation sector of the country. Not only does the report review the policies on these subjects, but it also provides an analysis of the progress made and further possible solutions.

The policy section of the report is a comprehensive collection and analysis of past and current policies, plans, and programmes on urban water and sanitation. The progress section traces India's progress in the sector especially through the lens of three years of Swachh Bharat Mission, assessed nationally and for selected cities, one from each region. The socio-economic aspects of the sector with case studies of three cities, namely Agra, Delhi, and Ludhiana, as well as the missing links in the sector, have been reviewed independently as separate chapters. The section on possible solutions analyses three key aspects: (1) the role of corporate houses and their potential to contribute to urban sanitation, (2) the role of urban small water enterprises including their potential and the challenges they face, and (3) various models of financing urban sanitation. The concluding chapter of the report provides, recognising the complexity of issues in urban sanitation, specific recommendations which may help not only in achieving the goals of the SBM (U) in the remaining two years of



the mission period but also in integrating improved urban water and sanitation management into the overall plans for the country's development in the long run.

The report is timely with the mission having completed three years, and yet with enough time remaining for decision-makers to take on board the analysis of the mission's progress that this report offers and the possible future directions.



Leena Srivastava

Vice Chancellor, TERI University



ACKNOWLEDGEMENTS

It is a matter of immense satisfaction to me to present the report State of Urban Water and Sanitation in India. On behalf of TERI University and TERI, I would like to take this opportunity to express my deep sense of appreciation to all those who came together to develop this report.

The report is a comprehensive collection and analysis of past and current policies, plans, and programmes on urban water and sanitation with a focus on the ongoing Swachh Bharat Mission (Urban) and the current scenario. Taking a cross-disciplinary approach, several leading professionals and academicians have pooled their expertise in preparing the report.

A special note of gratitude to our partners, namely USAID and Coca-Cola India, for playing an active role and for guidance and motivation throughout the three years of collaboration.

I would sincerely like to thank our lead authors – Dr Renu Kohsla, Ms Manvita Baradi, Ms Meghna Malhotra, Ms Naina Lal Kidwai, Ms Poonam Sewak, Ms Amanda Gimble, Dr Meera Mehta, Dr Dinesh Mehta, Dr Girija Bharat, Ms Mary Abraham, Mr Ankit Tulsyan and supporting authors Ms Prapti Verma, Ms Shipra Saxena, Ms Zara Juneja and Mr Gaurav Shringi– who have worked collaboratively on the chapters of this report and undertook several rounds of revisions as suggested by the peer reviews.

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The support extended by the municipal commissioners, mayors, and officials of the urban local bodies of Gangtok, Pune, Karnal, and Tiruchirappalli during the field visits is gratefully acknowledged, and sincere thanks are also due to the municipal commissioners and officials of the urban local bodies of Indore, Bhopal, Greater Vizag, Surat, and Mysuru for the help that contributed to the project team’s understanding and mapping of the factors that led to the success of the five cities in the matter of sanitation.

Credit is also due to the officials of the Ministry of Housing and Urban Affairs (MoHUA), urban local bodies, multilateral and bilateral organizations, NGOs, academic institutions, and other stakeholders who participated in the national and regional stakeholder consultation workshops in Chennai, Kolkata, Ahmedabad, and Delhi and provided the much-needed inputs and insights.

All the team members and support staff deserve special thanks for their assistance in the form of secretarial work, support for design, layout, and production of this publication including its cover. Especially grateful to Mr. Yateendra Joshi for his overwhelming support extended in copy editing this publication.

I am hopeful that the Swachh Bharat Mission (Urban) under the MoHUA, urban local bodies, funding organizations, and my colleagues in the sector will find this report useful and leverage it to make the mission even stronger over the next two years.



S K Sarkar

Distinguished Fellow and Senior Director, TERI



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LIST OF ABBREVIATIONS

ADB:	Asian Development Bank
AMRUT:	Atal Mission for Rejuvenation and Urban Transformation
AUWSP:	Accelerated Urban Water Supply Scheme
BSUP:	Basic Services for Urban Poor
CAG:	Comptroller and Auditor General of India
CDP:	City Development Plan
CLTS:	Community Led Total Sanitation
CT:	Community Toilets
CTC:	Community Toilet Complexes
CPCB:	Central Pollution Control Board
CPR:	Centre for Policy Research
CSP:	City Sanitation Plan
CSR:	Corporate Social Responsibility
DUSIB:	Delhi Urban Shelter Improvement Board
GoI:	Government of India
GVMC:	Greater Vishakhapatnam Municipal Corporation
ICT:	Information and Communication Technologies
IEC:	Information, education, and communication
IHHL:	Individual Household Latrine
ILCS:	Integrated Low-Cost Sanitation Scheme
INR:	Indian rupees
JMP:	Joint Monitoring Programme of WHO and Unicef
JNNURM:	Jawaharlal Nehru National Urban Renewal Mission
LPCPD:	Litres per capita per day
MDG:	Millennium Development Goal
MLD:	Million Liters per Day
MoHUA:	Ministry of Housing and Urban Affairs
MoHUPA:	Ministry of Housing and Urban Poverty Alleviation
MoSPI:	Ministry of Statistics and Programme Implementation
MoUD:	Ministry of Urban Development
MSW:	Municipal Solid Waste
NCT:	National Capital Territory
NFHS:	National Family Health Survey
NGO:	Non-governmental Organization
NIUA:	National Institute of Urban Affairs
NRW:	Non-revenue water
NSSO:	National Sample Survey Office
NUSP:	National Urban Sanitation Policy
O&M:	Operation and Maintenance

OD:	Open Defecation
ODF:	Open Defecation Free
PHED:	Public Health and Engineering Department
PIU:	Programme Implementation Units
PMU:	Programme Management Units
PPP:	Public-Private Partnership
PT:	Public Toilet
RAY:	Rajiv Awas Yojana
RUDISCO:	Rajasthan Urban Drinking Water Sewerage & Infrastructure Corporation Limited
SACOSAN:	South Asian Conference on Sanitation
SBCC:	Social And Behavioural Change Communications
SBK:	Swachh Bharat Kosh
SBM:	Swachh Bharat Mission
SBM(U):	Swachh Bharat Mission (Urban)
SDG:	Sustainable Development Goals
SLB:	Service level benchmark
SS:	Swachh Survekshan Survey
SSS:	State Sanitation Strategy
STP:	Sewage Treatment Plant
SWACHH:	Swachhata Augmentation through Corporate Helping Hands
SWM:	Solid waste management
TPD:	Tonnes per day
UIG:	Urban Infrastructure and Governance
UIDSSMT:	Urban Infrastructure Development Scheme for Small and Medium Towns
ULB:	Urban Local Body
UN:	United Nations
UNICEF:	United Nations Children's Fund
UMC:	Urban Management Centre
USAID:	United States Agency for International Development
UT:	Union Territory
VAMBAY:	Valmiki Ambedkar Awas Yojana
WASH:	Water, Sanitation and Hygiene
WHO:	World Health Organization
WSS:	Water Supply Services

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EXECUTIVE SUMMARY

The *State of Urban Water and Sanitation in India* report emerges from a three-year (2014-2017) collaborative program funded by the USAID and undertaken by TERI University, Coca-Cola and TERI on ‘Strengthening Water and Sanitation in Urban Settings of India’ and encapsulates the journey India has undertaken in the urban water and sanitation sector. The report aims to be a comprehensive collection and analysis of past and current policies and programmes and provides insights into the reasons for several gaps that become apparent when the sector is viewed holistically. The extensive review of international, national, and state-level reports draws upon a rich collection of secondary literature.

A series of stakeholders’ consultation workshops were held at regional and national levels as part of the study, with participation from diverse groups of stakeholders including policymakers at the national, state, and city levels, donor organizations, academia, and sector experts including water and sanitation professionals. These workshops provided primary data from the northern, north-eastern, eastern, southern and western regions of the country. Primary data were also collected from the following cities: Agra, Delhi, Karnal, and Ludhiana (northern region), Gangtok (north-eastern), Visakhapatnam, Mysuru and Tiruchirappalli (southern), Pune, Surat, Bhopal and Indore (western). The report is divided into three broad sections, namely policies (Chapters 2,3), progress (Chapters 4-7), and possible solutions (Chapters 8-11).

Overview

The rapid increase in urbanization in India is expected to continue in the decades ahead, pushing urban population from 31% at present to 50% in 2030. This raises concerns over the development of infrastructure services for water supply and sanitation to serve the urban centres. India has been in the limelight for poor sanitation for several years and often mentioned

as the country with the largest share of people defecating in the open. In addition, safe management and disposal of human excreta, an important aspect of improved sanitation, are yet to get the required attention in several Indian cities. Lack of access to safe water and sanitation has extensive negative impacts on health and the economy. The Water and Sanitation Program (WSP) of the World Bank estimated the cost of poor sanitation in India in 2006 at 2.4 lakh crore, or 1 trillion, rupees (53.8 billion US dollars)—6.4% of the country’s gross domestic product. Although several national programmes since 1951 have contributed significantly to the sector’s progress, especially during the period 2000–2015, urban sanitation services continue to be grossly inadequate given the rising population, exponential growth of urban centres, problems related to land tenure, etc. The Swachh Bharat Mission (SBM), launched in October 2014, accorded high priority to sanitation in the country’s development agenda. As a nationwide mission, the SBM is one of the biggest ever drives in sanitation and received immense attention from all stakeholders. Along with other important urban infrastructure initiatives, namely the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and the Smart Cities Mission, the SBM is expected to support the cities in achieving the goals of complete elimination of open defecation and scientific management of the entire municipal solid waste.

National-level policies and programmes

The Swachh Bharat Mission has assimilated many lessons from the past initiatives in the urban sanitation sector. The analysis of the sanitation policies and programmes highlights the scope for further improvement through such measures as:

- 1 Reforms and a sound modernization programme to support initiatives at the levels of the state and urban local bodies (ULBs)

- 2 Performance-based transfer of funds
- 3 Focus on the participatory approach to help in making the services sustainable
- 4 Institutionalization of sanitation processes for ULBs to plan and monitor
- 5 Allocation of public funds to stimulate demand for sanitation services.

Regional assessment of progress in urban sanitation

The assessment of the status of sanitation (especially ODF) in each of the five regions indicates that progress has been far from uniform: the western region and the southern region have fared better overall, and the eastern region has fared far better than the northern region (except the union territory of Chandigarh). Chhattisgarh and Jharkhand have also improved markedly in terms of city sanitation rankings. The other regional toppers are Gujarat followed by Madhya Pradesh in the west, Andhra Pradesh in the south, and Mizoram in the North-East. Uttar Pradesh has performed well in terms of achieving the targets for individual household latrines (IHHLs) compared to the other states in the northern region. Odisha in the eastern region, Tripura in the north-eastern region, and Karnataka in the southern need to improve their performance across all sub-domains. The regional stakeholder consultation workshops undertaken as a part of the study highlighted the gaps and areas for improvement in three important aspects, namely technical arrangements, an enabling environment for public-private partnerships, and knowledge sharing for improving the standards of sanitation services.

Sanitation choices in slums

India's urban growth has been markedly uneven, with slums and informal settlements, located along the peripheries of cities, lacking such basic services as drinking water and sanitation. Such inequities produce large growth differentials that add to the challenge and the costs of delivering essential services such as water and sanitation to distant areas and beyond the municipal boundaries. Making the slum population (that majority of the city's poor) inclusive,

equal, integrative, and green demands a fresh communitarian narrative. Several slums are located along the edges of sanitation corridors on untenable lands. Servicing slums on ecologically fragile lands, besides being additionally complex, is also fraught with legal problems. Several cities lack underground sewerage networks and even when they exist, they do not cater to the slums along the peripheries. Poor drainage is predominantly responsible for low incomes and poses a serious threat to health. The impact of such exclusive development is worse on the slum dwellers, mainly women, who are rendered even more vulnerable. In keeping their commitment to meeting their sanitation targets, ULBs face many challenges, some of which are listed below.

- 1 The issue of informal space and untenured lands occupied by slum dwellers, new migrants, and low-income households
- 2 Exclusion of slum dwellers and population living in unplanned areas from planned interventions
- 3 Environmental and legal issues of servicing slums occupying ecologically fragile lands
- 4 Non-engagement of communities, specifically slum dwellers, in governance

Analysis of sanitation scenario

The Swachh Survekshan 2017 ranked Indore, Bhopal, Visakhapatnam, Surat, and Mysore – in that order – as the five cleanest cities in the country. An integrated participatory approach to being open-defecation-free (ODF) and improving solid waste management transformed the sanitation scenario in Indore, catapulting it from the 149th position in 2014 to the first position in 2017. Integrated efforts through community mobilization; information, education, and communication (IEC); and technical interventions enabled Bhopal to overcome the challenges of OD in the slums to become the second cleanest city. The Smart Cities Mission, along with the SBM, prompted the Greater Visakhapatnam Municipal Corporation (GVMC) to adopt the multi-stakeholder approach to accelerate sanitation interventions, which made Visakhapatnam the third cleanest city. Surat, which had witnessed an outbreak of plague in 1994, became the fourth cleanest city, thanks to the fillip provided by the SBM. Lastly, despite increasing competition,



Mysuru managed to be among the top five by sustaining its cleanliness initiatives that had earned the city the first position in 2015 and 2016. The five cleanest cities of 2017 have demonstrated the success of the integrated approach to addressing local issues in translating the political commitment at the national level into action at the local level. The factors shared by these five cities include

- 1 Strong political will
- 2 Effective planning and enforcement
- 3 Involvement of key stakeholders
- 4 Inclusive solutions to address the needs of a heterogeneous population
- 5 Planning for financial sustainability of sanitation infrastructure
- 6 Healthy competition and measurement of success.

Three years of Swachh Bharat Mission

The Swachh Bharat Mission has proved to be one of the most effective nationwide missions so far because it has focused on such core areas of sanitation as eliminating OD and eradicating manual scavenging, promoting appropriate behavioural changes, managing solid waste by modern and scientific methods, capacity building of the ULBs, and encouraging the private sector to contribute to capital and operational expenditure.

Andhra Pradesh, Chandigarh, Chhattisgarh, Gujarat, Haryana, Jharkhand, Madhya Pradesh and Maharashtra are now ODF. Many of the ULBs have taken up innovative initiatives. In the last three years of the SBM, 3.1 million IHHLs have been constructed in urban areas of the country as against the five-year mission target of 10.4 million toilets to be built by 2019. The increase in constructing IHHLs, community toilets, and public toilets indicate that end-to-end solutions are required to support the entire sanitation ecosystem as well as sewage treatment capacities of cities. Management of solid waste (SWM) offers great scope for improvement. Although some cities are aiming at the ODF-plus status by adequate SWM, sewerage lines, and storm water drains, many continue to lag behind in incorporating the holistic

approach that encompasses managing faecal sludge and septage in planning for sustainable sanitation.

The missing link in the sanitation service chain

According to the 2011 census, 81.4% of the households had access to toilets within the premises. Of these toilets, only 32.7% had piped sewer connections, of which 44.6% were connected to either septic tanks or soak-pits. Only 7.0% of all waste water generated in cities of India is safely disposed of. These figures indicate the immense task that confronts the ULBs of de-sludging the toilets regularly and transporting the sludge to sewage treatment plants (STPs). The ongoing SBM offers a very definite prescription for improving sanitation, focused entirely on containment. The mission provides funds to build toilets—but not for the related infrastructure to collect, transport, and treat the stuff that fills them, nor does it compel cities to provide these crucial links in the sanitation service chain. However, AMRUT, launched in 2015, does emphasize septage management including that of faecal sludge. The National Policy on Faecal Sludge and Septage Management (FSSM) (MoUD 2017) clearly states the need to buttress toilet construction under the SBM with appropriate mechanisms for collection, transport, and treatment of septage. The missing links in the sanitation value chain are given below.

- 1 Empowered ULBs
- 2 Adequate funds
- 3 Streamlined programme to design and execute sewerage projects in phases
- 4 Connections to sewerage networks and their operations and maintenance
- 5 Appropriate technology for STPs
- 6 Integrated approach to sanitation
- 7 Suitable regulatory measures and enabling environment
- 8 Converged data and knowledge management

Leveraging corporate engagement

The engagement of corporate houses in the WASH sector in general, and in the sanitation sector in



particular, has seen renewed momentum owing to the high visibility gained by spending on the SBM, which has encouraged many companies to fund construction of toilets through the Swachh Bharat Kosh, and even to get involved in technical aspects, marketing, and outreach. Yet, despite substantial support from the corporate sector, the scope for corporate engagement in urban sanitation is far wider in terms of both needs and opportunities in the urban sanitation space in complementing the funds from the central government and the state governments. The Swachh Bharat Kosh and the recently launched SWACHH portal as a crowdfunding platform to encourage private-sector participation in the initiatives undertaken by ULBs as part of the SBM were two significant steps to facilitate corporate engagement in sanitation.

Decentralized supply of drinking water

Approximately 32% of India's population lacks access to safe treated water, and approximately 89% of the people in cities that are not part of the Smart Cities Mission get less than 135 litres of water per capita per day; for about 60% of the population served by piped water, the supply is less than 3 hours a day. The problem is even more acute for the low-income communities along the peripheries of cities. However, in the last decade, this void is being increasingly filled by small water enterprises (SWE), which offer a quick, decentralized, and complementary solution to piped water supply in smaller towns and urban slums in many states including Andhra Pradesh, Bihar, Karnataka, Punjab, and Rajasthan. However, these urban safe water enterprises (USWEs) need a more conducive and enabling environment that allows fair pricing and self-regulation and is backed by political will and funding, if they are to realize their potential to serve the urban poor quickly and cost-effectively.

Financing options

For the vast majority of the urban poor who lack improved sanitation services, lack of finance is a major challenge. The ambitious goal of the SBM can be achieved if the current incentive, in the

form of a subsidy that covers 30%–50% of the cost of building a toilet, is leveraged to raise additional funds through market-based resources by facilitating innovative finance. Innovative models of financing can complement the subsidies from the SBM (Urban) to not only increase the proportion of the target population with access to sanitation but also to contribute to improved use and sustainability of sanitation services. A few sources of finance for sanitation are listed below.

- 1 Microfinancing institutions
- 2 Housing finance institutions
- 3 Commercial banks to advance loans for sanitation to households and self-help groups
- 4 Urban cooperative banks and urban credit cooperative societies
- 5 Funds set aside by companies to discharge their corporate social responsibility
- 6 Investors seeking greater social impact and crowdfunding through web-based platforms or social networking sites

Recommendations

Improving the performance of India's water and sanitation sector is critical to meeting the ever-increasing needs of the country's urban population, and the mindset of the sector needs to change from the single-minded pursuit of creating physical assets to issues of equity, quality of service delivery, and sustainability. The present report, makes an attempt to promote the notion that becoming open-defecation-free (ODF) is not the end but an important milestone in the journey to make India clean and green. The recommendations are:

1. Improve the regulatory mechanism

- 1.1 Establish a legal framework with principles and norms to guide the implementation of safe and sustainable urban sanitation.
- 1.2 Devolve power to ULBs and introduce stringent regulatory measures in scientific management of solid waste, faecal sludge and septage for strict enforcement of the 'polluter-pays' principle.
- 1.3 Incentivize scientific management of faecal

sludge and promote entrepreneurship in this area.

- 1.4 Improve synergies between the government and NGOs in implementing water and sanitation schemes in ULBs.

2. Enhance capacities of ULBs

- 2.1 Educate, motivate, and mobilize households and communities towards enhanced engagement in planning and implementing sanitation services and in the operation and maintenance of IHHLs, CTs, and PTs.
- 2.2 Develop training and capacity-enhancement programmes and refresher courses covering all aspects of sustainable sanitation for the staff of ULBs.
- 2.3 Improve the capacity of ULB officials to undertake preventative maintenance of sanitation infrastructure networks.
- 2.4 Enhance institutional, financial, and human-resource capacities of ULBs for improved management of faecal sludge and septage.
- 2.5 Impart the required skills to those engaged in plumbing, mechanical de-sludging of septic tanks or soak-pits, and transporting the sludge and combine the training with offers of immediate placement.
- 2.6 Enhance the capacities of NGOs and other partners to engage themselves effectively in the entire water, sanitation, and hygiene (WASH) sector.

3. Undertake appropriate planning and implementation of sectoral programmes

- 3.1 Streamline programme design, sequencing, and phasing of sewerage projects in ULBs.
- 3.2 Promote sustainable sewage treatment systems by providing an appropriate mix of centralized and decentralized processes based on local requirements and conditions.

- 3.3 Promote the engagement of the corporate sector and provide an enabling environment for implementing innovative replicable models of supplying safe drinking water, improved sanitation, and septage management in urban areas.

- 3.4 Encourage decentralized planning with community-based monitoring systems, especially in low-income urban settlements, to ensure equitable and inclusive planning and implementation.

- 3.5 Provide a conducive enabling environment for decentralized USWE to ensure access to safe drinking water for a larger proportion of population.

4. Foster an enabling environment for financing

- 4.1 Encourage ULBs to implement self-financed projects (for example, Surat Municipal Corporation's energy generation and sale of recycled water from a tertiary treatment plant).

- 4.2 Extend policy support for sanitation financing; for example, a policy of setting aside at least 1% of the adjusted net bank credit for water and sanitation credit under priority sector lending (PSL) to encourage banks to provide loans for sanitation.

- 4.3 Include appropriate national and local sources of funds in CSPs and allocation of funds for innovative and sustainable sanitation models.

5. Improve data management, monitoring, and review

- 5.1 Improve the collection and management of data on access to water and sanitation services including collection and disposal of septage and on networks related to water supply and collection, transport and processing of waste.

- 5.2 Review the monitoring mechanisms to emphasize quality over quantity in reporting progress

CHAPTER - 01

INTRODUCTION

1.1 About the Report

This report, titled the 'State of Urban Water and Sanitation in India', emerges from a three-year study on strengthening water and sanitation services in urban India and encapsulates the country's journey in that sector. The report aims to be a comprehensive collection and analysis of past and current policies and programmes and provides insights into several gaps that become apparent when the sector is viewed holistically to get a macro picture of the policies and programmes, supplemented by analysing the performance of selected cities. An extensive review of international, national, and state-level reports, Census 2011, data from two years of *Swachh Survekshan* (Hindi for cleanliness survey), and data from management information system (MIS) of the Swachh Bharat Mission (Urban) portal have all provided a rich collection of secondary literature.

A series of stakeholders' consultation workshops at regional and national levels were held, with participation from diverse groups of stakeholders including policymakers at the national and state levels, donor organizations, academia, sector experts, water and sanitation professionals, multilaterals, non-governmental organizations, and sanitation coordinators of various urban local bodies (ULBs). These workshops provided primary data from all the five zones of the country, namely northern, eastern, southern, western, and north-eastern. Primary data were also collected from the following cities: Agra, Delhi, Karnal, and Ludhiana (northern region); Gangtok (north-eastern); Visakhapatnam, Mysuru and Tiruchirappalli (southern), Pune, Surat, Bhopal and Indore (western).

The structure of the report

This report is divided in three broad sections, as given below.

Section A. Policies

The section on policies attempts not only to highlight supply–demand gaps, factors that contributed to success, and challenges, but also to understand performance through the lens of policy and programmes at national (**Chapter 2**) and state (**Chapter 3**) levels. Primary data from the regional and national stakeholders' consultation workshops and the analysis of those data are presented in **Chapter 3**.

Section B. Progress

The section on progress reviews India's progress in the urban water and sanitation sector. **Chapter 4** discusses the socio-economic aspects of the sector and examines and analyses the scenarios in three cities, namely Agra, Delhi, and Ludhiana. **Chapter 5** analyses data from five leading cities that were part of the *Swachh Survekshan* 2017, namely Bhopal, Indore, Mysuru, Surat, and Visakhapatnam, and to reveal various aspects of these cities that helped them to attain top positions with respect to sanitation in urban India. **Chapter 6** analyses and presents the achievements under the Swachh Bharat Mission (SBM Urban) for the past three years in an attempt to encapsulate the ideas and strategies that have worked and thus to pave the way forward. **Chapter 7** dwells in detail on the urban sanitation chain and uncovers the missing links in the sector.

Section C. Possible Solutions

The solutions elaborated upon in this section are for solving the problems faced by the sector. **Chapter 8** encapsulates the contributions of corporate houses in taking the WASH agenda forward as part of discharging their corporate social responsibility (CSR). **Chapter 9** focuses on urban water services and the effectiveness of decentralized models of supplying drinking water in India in reaching out to low income communities.



Financing is essential to ensure adequate and clean toilets and their proper maintenance, which is why, under the SBM (Urban), a partial incentive subsidy is provided to households that lack access to sanitation services. **Chapter 10** dwells on this important aspect of financing urban sanitation. The concluding chapter (**Chapter 11**) offers specific recommendations.

Each of these chapters has been contributed by sector experts and professionals and is backed where required by an extensive survey of literature, the regional stakeholder consultation workshops mentioned earlier, analyses of data, and interactions with officials of the central Ministry of Urban Development (MoUD) (now Ministry of Housing and Urban Affairs (MoHUA)) and of the state governments, municipal commissioners, and chairpersons of relevant committees to get first-hand accounts of successes as well as challenges. In October 2017, the SBM (Urban) completes three years, and the insights offered by this report will help in devising strategies for the next two years of the mission with a targeted approach.

1.2 Sustainable Development Goals on Water and Sanitation

The Millennium Development Goals (MDGs) have been an influential framework that has received

unprecedented political commitment and reflect a strong consensus on eradication of poverty, universal access to water and sanitation, and other key priority areas. Although the MDGs have helped to leverage political and economic support to many developmental issues, the objectives of MDGs are far from being achieved in some sectors. The design of Sustainable Development Goals (SDGs) has drawn on learnings from the MDGs. Goal 7 of the MDGs, which is aimed at ensuring environmental sustainability and addressing the challenges to access to water and sanitation services, has led to tremendous improvements in access to water worldwide. According to the Joint Monitoring Report Update 2017 (WHO-UNICEF Report), 6.5 billion people (89% of the global population) have access to at least a basic service to obtain drinking water (Figure 1.1) and 4.6 billion (71% of the global population) have access to a safe source of drinking water; however, 844 million (7.5%) have no access to even a basic drinking-water service. Of the 5.0 billion (68%) that have access to at least a basic sanitation service (Figure 1.2), nearly 2 billion (39%) have access to safe sanitation services. By 2015, 154 countries had achieved at least a basic level of sanitation. Although about 2 billion people globally have gained access to improved sanitation services since 1990 (JMP 2014, JMP 2017) and substantial progress has been made under the MDGs, those that remain behind need to be provided such access by 2030, if the agenda of the SDGs are to be fulfilled.

By 2015, 181 countries had achieved over 89% coverage with at least basic services.

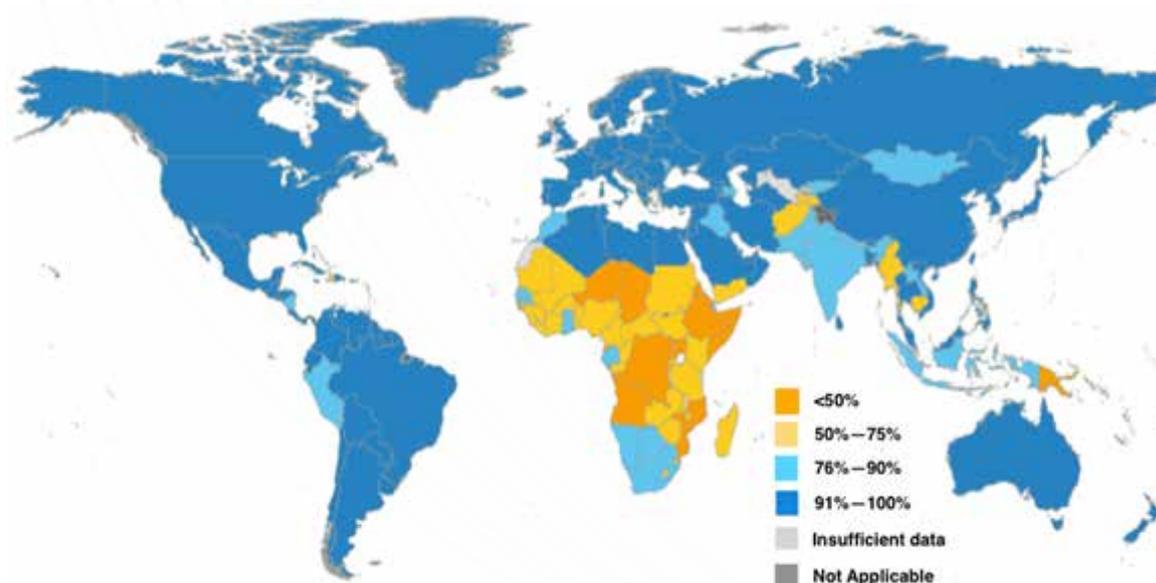


Figure 1.1 Progress in drinking water access globally under the MDGs (Source: JMP 2017)

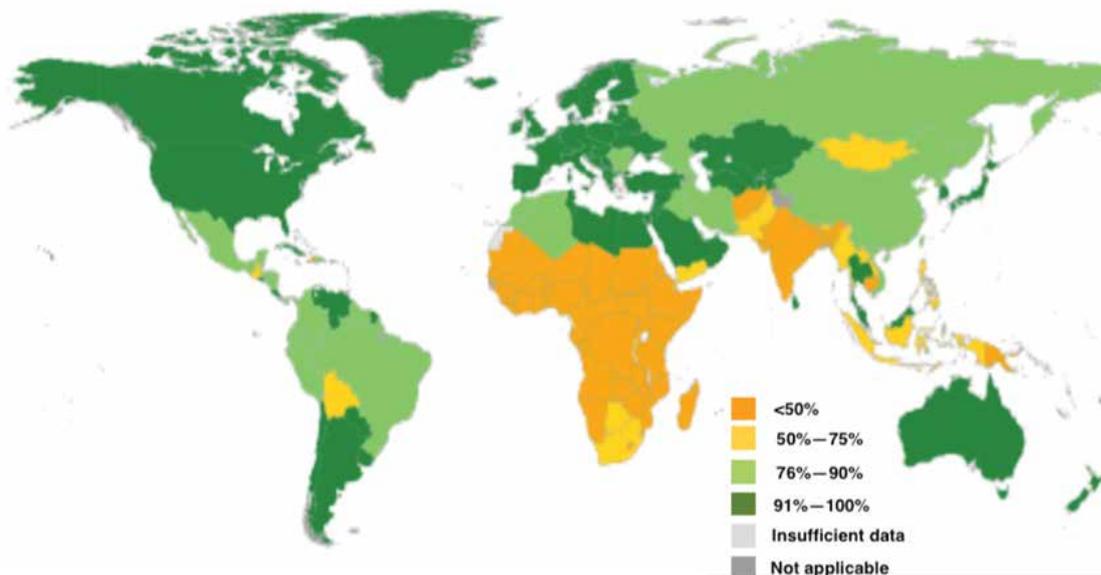


Figure 1.2 Progress in sanitation under the MDGs (Source: JMP 2017)

The sustainable development goals are a unique opportunity to evolve a system of global accountability and commitment by channelizing resources for capacity-building of governments and relevant stakeholders. Goal 6 of the Agenda 2030 aims to ‘ensure availability and sustainable management of water and sanitation for all’ and has put forth a set of six targets (Figure 1.3) and two provisions to achieve the goal (UN 2014). Achieving SDG 6 would require concerted efforts across multiple domains and sectors because access to safe water and to improved

sanitation are vital links through which various SDGs and other development objectives are connected, such as Goal 1 (No Poverty), Goal 3 (Good Health and Well-Being), Goal 4 (Quality Education), Goal 5 (Gender Equality), and Goal 11 (Sustainable Cities and Communities). Improved water and sanitation services will lead to improved health, which, in turn, will increase school attendance, especially amongst adolescent girls—and inclusive and quality education for all will contribute to reducing poverty.

	<p>(6.1) By 2030, achieve universal and equitable access to safe and affordable drinking water for all</p>		<p>(6.2) By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations</p>
	<p>(6.3) By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally</p>		<p>(6.4) By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity</p>
	<p>(6.5) By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate</p>		<p>(6.6) By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes</p>
	<p>(6.A) By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies</p>		<p>(6.B) Support and strengthen the participation of local communities in improving water and sanitation management</p>

Figure 1.3 Targets under Sustainable Development Goal 6 (Source: Sustainable Development Knowledge Platform)

About 2.3 billion people still lack access to improved sanitation and 892 million practise open defecation (OD) worldwide (JMP, 2017). India has made significant progress in the water sector under the MDGs: 91.7% of the country's population has access to improved sources of drinking water; however, in the sanitation sector, only 56.4% have access to improved sanitation and hence the targets have not been met.

India's sanitation crisis is a global concern, and achieving the goals of sanitation in India would help achieve SDG 6 globally

Although the number of people practising OD decreased from 564 million (JMP 2015) to 477 million (JMP 2017), India still has the largest number of people practising OD, far more than Indonesia, which ranks second in this matter. These large numbers are in spite of India's budget for sanitation being the highest among the budgets of other developing countries. India's sanitation crisis is a global concern, and achieving the goals of sanitation in India would help to achieve SDG 6 globally.

1.3 Progress of Water and Sanitation (Urban) in India

Lack of access to safe water and sanitation has adverse impacts on health and negative social and economic impacts. Women and girls are affected far more, because the lack not only affects their health but also makes them vulnerable to sexual violence, thereby thwarting all efforts to secure for them a healthy and economically productive life. Poor sanitation also affects children's ability to learn in several ways. Poor environmental conditions in the classroom can make both teaching and learning particularly difficult. Diarrhoea and related diseases, malaria, and helminth infections force many schoolchildren to miss school. In India, according to the Ministry of Health and Family Welfare, 0.12 million children under the age of five succumb to diarrhoea every year (MoHFW 2017).

A study carried out by the Water and Sanitation Program (WSP) of the World Bank on economic impacts of poor sanitation estimated the adverse economic impacts in 2006 due to inadequate sanitation in India at Rs 2.4 trillion (\$53.8 billion), or about Rs 2180 (\$48) per person, and about 6.4% of India's GDP (World Bank, 2010). The World Health Organization maintains that a dollar spent on sanitation saves nine dollars spent on health, education, and economic development (WHO, 2007).

To meet the targets of the SDGs, the Government of India has introduced various national and state-level policies and programmes for adequate water and sanitation facilities in urban and rural areas. In the post-colonial period, India has adopted a centralized approach to sanitation. However, given the shortage of water and the cost of sewage systems, increased attention has to be given to promoting the management of faecal sludge.

India made significant progress with respect to the MDGs from 2000 to 2015 in urban sanitation (Figure 1.4) and access to drinking water (Figure 1.5). However, the high population pressure, exponential growth of cities as a result of migration from rural areas, uneven spatial urbanization in the city, issues related to land tenure, etc., make the task of providing basic urban services, especially sanitation, a complex one. The current status of sanitation in India – 88% of its urban population has access to sanitation – is shown in Figure 1.6, although the scenario improved between 2000 and 2015 (JMP 2017) (Figure 1.4). As can be seen in Figure 1.6, the extent of OD has decreased over time and the percentage of population with sewer connection has increased. However, wastewater treatment does not show significant improvement as compared to other indicators. In the case of access to drinking water, a large proportion of people in urban India have access to improved drinking-water services, and this proportion has remained more or less unchanged since 2005 (Figure 1.5). It is noteworthy that although piped water supply shows a small dip in the numbers, the number of premises with access to water has increased, an increase that probably indicates that the urban population resorts to sources of drinking water other than piped supply.

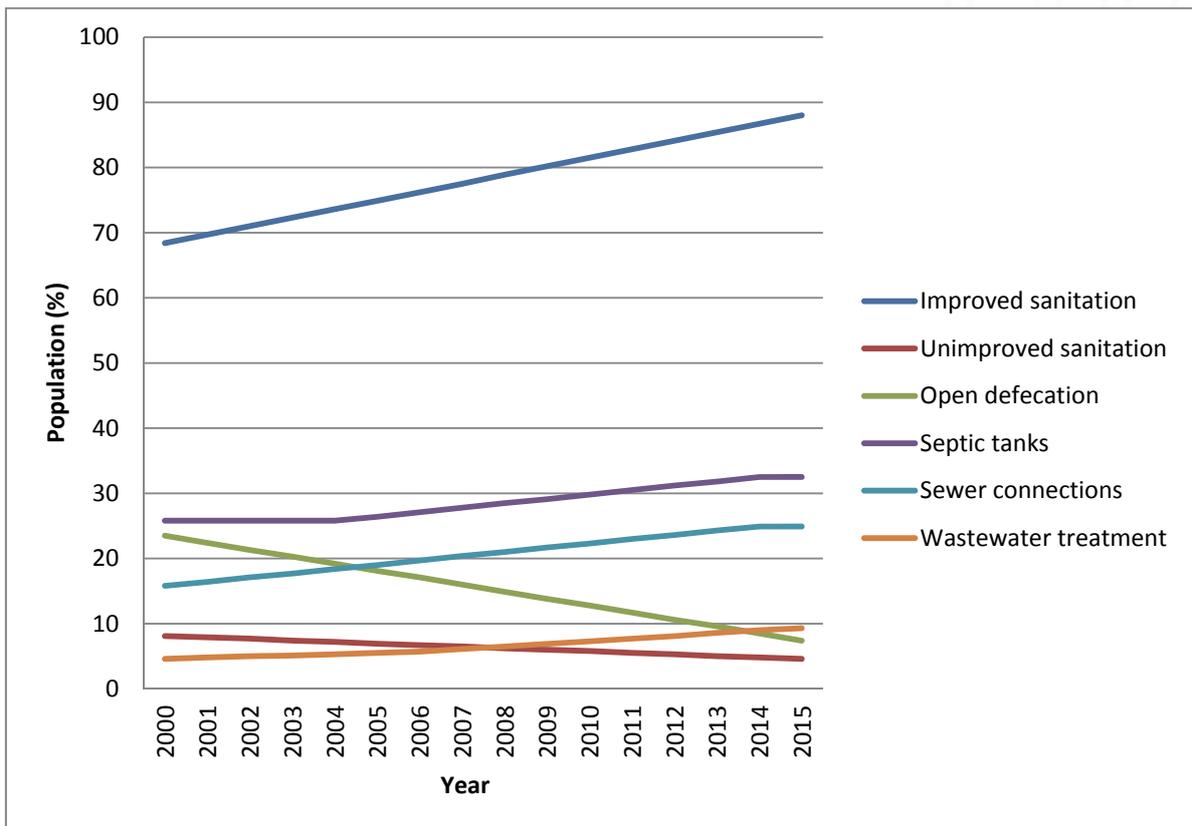


Figure 1.4 Progress in urban sanitation in India: 2000–2015 (Source: JMP 2017)

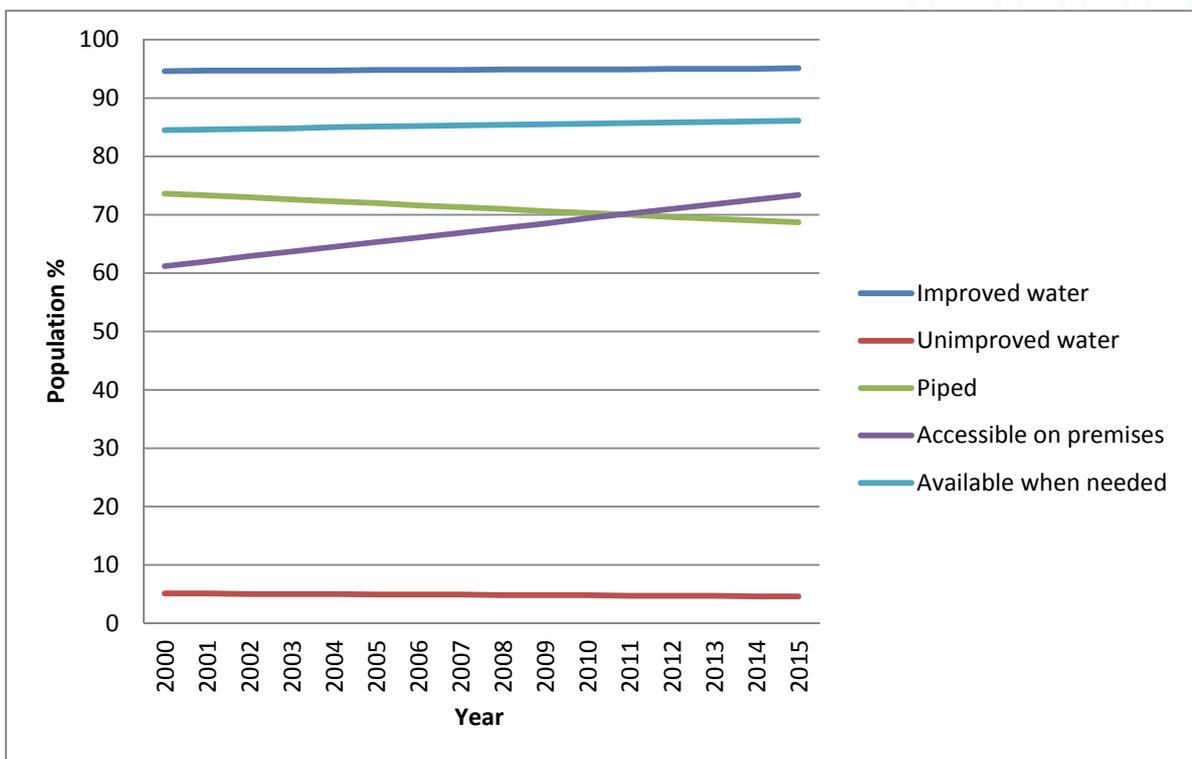


Figure 1.5 Progress in supplying drinking water (urban) (Source: JMP 2017)

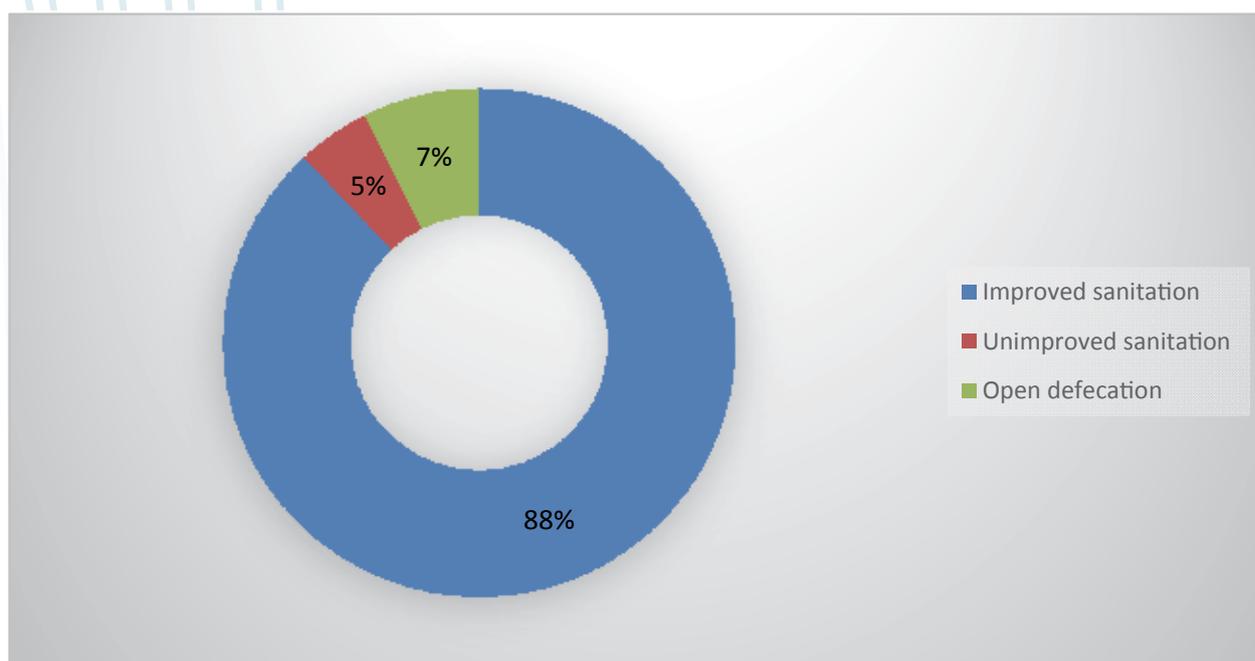


Figure 1.6 Status of urban sanitation (percentage) in India (Source: JMP 2017)

1.4 Landmark Developments in Urban Sanitation in India

One of the earliest efforts in sanitation in India was undertaken in 1898 when, due to a rampant outbreak of cholera and plague, the British parliament passed an act and formed a trust, namely the Bombay Improvement Trust. The trust was given the responsibility of creating a healthier city. Post-independence, in 1948, the MoUD was formed because it was felt essential to have an entity specifically charged with looking after urban areas. In 1951, sanitation and water supply were added to the national agenda as part of India's first five-year plan.

Initiatives such as the Integrated Low-Cost Sanitation Scheme (ILCS) launched in 1980/81 were instrumental in laying the foundation of the country's urban sanitation sector. In 1993, the 74th amendment to the Constitution of India included sanitation, solid-waste management, and other services in the portfolio of ULBs. In 2001, the 'Valmiki Ambedkar Awaas Yojana (VAMBAY)', a scheme to promote mass housing, was launched to improve the conditions of slum dwellers and to provide them an enabling urban environment by building new dwelling units, upgrading the existing ones, and constructing community toilets (MHUPA, n.d.).

In 2005, a massive mission on urban renewal was launched, named the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). The two sub-missions under JNNURM were Urban infrastructure and governance (UIG) and Basic services to the urban poor (BSUP) including water supply, sanitation, and integrated development of slums (MoUD, 2011). The National Urban Sanitation Policy (NUSP), launched in 2008, shifted the paradigm from creating large infrastructure projects to developing human capital through awareness creation and behavioural change in people.

In 2010, India also signed the UN convention on human rights amendment, recognizing water and sanitation as a human right (Squatting Rights, 2012). The Government of India launched another mass housing scheme, the Rajiv Awaas Yojana (RAY), in 2012, which envisaged a 'slum-free India' with inclusive and equitable cities in which citizens would have access to basic services, civic amenities, and a decent shelter. The integrated low-cost sanitation scheme was carried over to the 12th five-year plan as well (2012/13–2016/17) with revised cost estimates and features (MoHUPA, 2012). Figure 1.7 captures the journey of the urban sanitation sector over the past few decades.

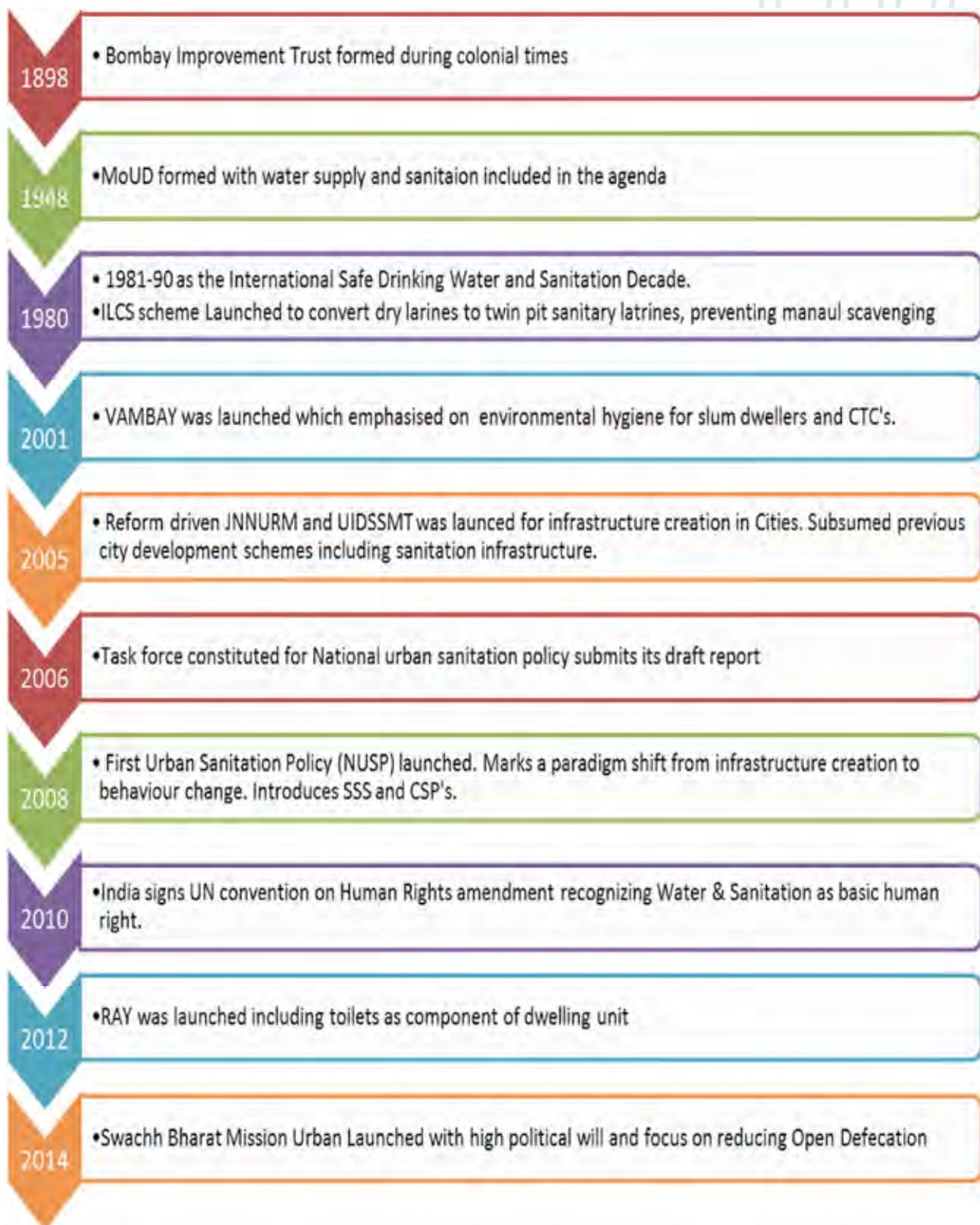


Figure 1.7: Evolution of water and sanitation policies and programmes in India

1.5 Swachh Bharat Mission (Urban)

Recognizing the need to improve sanitation services and realizing the gaps in the sector, the Prime Minister of India gave a clarion call from the ramparts of the Red Fort on 15 August 2014, the Independence Day, to make India free of OD by 2 October 2019, the 150th birth anniversary of Mahatma Gandhi, as a tribute to the 'Father of the nation'. This led to the rolling out of the biggest ever drive on sanitation in India, the Swachh Bharat Mission (SBM) to achieve total sanitation. The mission has two sub-programmes, namely SBM (Rural) and SBM (Urban), and has unprecedented political support. The scheme has

Swachh Bharat Mission is the biggest ever drive in sanitation in India, which has imbibed lessons from the past policies and programmes in the sector

mobilized nearly \$25 billion from the government, the private sector, and civil society. With an investment of about \$10 billion for SBM (Urban), the MoHUA steers the programme at the national level and coordinates the activities through respective project monitoring units (PMUs) at the state level and through project implementation units (PIUs) at the level of ULBs.

Other important initiatives in urban sanitation are the Atal Mission for Rejuvenation and Urban

Transformation (AMRUT) and Smart City, which are linked to the SBM. The AMRUT programme makes states equal partners in planning and implementing projects, thus actualizing the spirit of cooperative federalism. Some of the main thrust areas of the AMRUT initiative are listed below.

- Water supply systems (including augmentation of existing water supply systems and rehabilitation of old water supply systems)
- Decentralized and networked underground sewerage systems (including augmentation of existing sewerage systems and sewage treatment plants)
- Faecal sludge management (cleaning, transport, and treatment in a cost-effective manner)

The core infrastructure elements of the Smart City initiative include smart management of water supply and sanitation (including solid-waste management) with latest tools and techniques.

The Swachh Bharat Mission has taken the form of a people's movement because of strong political will and concerted efforts by all stakeholders including civil society organizations and non-governmental organizations (NGOs). India cannot afford to miss this golden opportunity. The global community is intently watching the outcome of such a massive programme and its impact on environmental sanitation. Achieving the goals of SBM by 2019 would be a historical milestone for global sanitation as it would expedite achieving the targets of SDG 6.

SECTION A - POLICIES

CHAPTER - 02

ASSESSMENT OF NATIONAL-LEVEL POLICIES AND PROGRAMMES IN INDIA'S URBAN WATER AND SANITATION SECTORS

The growth in urban population has outpaced the space available for living, and organized housing schemes have forced large populations to live within small spaces, resulting in ghettos – often referred to as slums – or congested housing, where it is difficult to provide sanitation facilities and access to piped water supply. People living in slums are particularly vulnerable to the ill-effects of unsafe drinking water and poor sanitation. India's 2011 census puts the number of households in urban slums at 64 million, and the 69th round of the NSSO (2012) survey puts the number at 88 million. Burgeoning population growth and migration from rural areas have been putting unprecedented pressure on urban infrastructure in India.

The JMP Report (2017) estimates that out of India's total urban population, 95.1% has access to safe drinking water and 68.7%, to piped water supply. In the urban sanitation sector, 88.0% has access to improved sanitation, 4.6% uses unimproved sanitation, and 7.4% resort to OD. With increasing slum population, widening inequality in incomes, and widespread poverty, the challenges in providing access to safe drinking water and sanitation will be increasingly tougher. In such a scenario, India needs to explore smarter and sustainable ways of improving the quality of life by effective policies and programmes for the urban water and sanitation sectors.

The Constitution of India entrusts the responsibility of water supply and sanitation services to the state governments, and the states, in turn, have generally delegated that responsibility to ULBs at the city level. The central government has been assisting the state governments in improving the coverage of water and sanitation facilities, and national policies, drawn up

by the central government, have had a tremendous impact on the provision of urban water and sanitation services by the ULBs. The following sections trace the evolution of these policies in India, the impact of these policies and programmes, and the thrust of the SBM on eradicating OD.

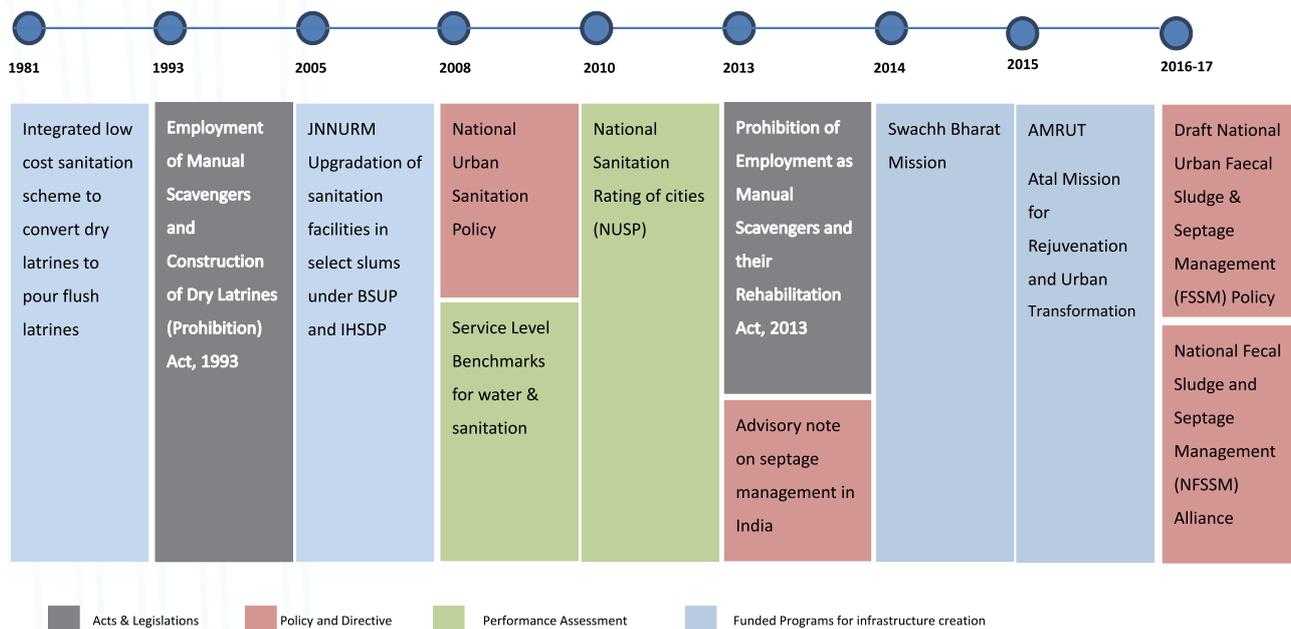
2.1 National urban sanitation policies in India and their evolving paradigm

Efforts to improve the poor sanitation scenario in the country have been made both nationally and at the state level since independence; initially they were part of the national five-year plans formulated by the Planning Commission. Sanitation was included in the Government of India's first five-year plan (1951/52–1955/56), but the focus of the central government in the 1950s was largely on housing and redevelopment of slums, and the Slum Areas (Clearance and Improvement) Act, 1956, was formulated during this period.

In the 1960s and 1970s, urban policy in India began taking a more concrete shape. Promoting planned development of cities through the implementation of master plans was a focus area. By the 1980s – the 1981 Census revealed that 23.3% of India's population lived in cities – most cities were characterized by inadequate infrastructure, poor planning, and unimproved sanitation facilities. The focus of the central government then shifted from urban policy to infrastructure development.

In 1980/81, sanitation for the urban poor was supported through a subsidy for low-cost toilets under the ILCS scheme of Government of India (GoI)

Figure 2.1 Initiatives in the sanitation sector in India: A timeline



Source: (Urban Management Centre, 2014)

and similar schemes of state governments. The scheme was launched to replace service latrines, which required manual scavenging.

Sanitation became a responsibility of the local governments only with the passing of the landmark 74th Amendment to the Constitution in 1992, which recognized cities and towns as the third tier of the government by setting up ULBs. Another scheme aimed at building community toilets for slum dwellers as part of the national Valmiki Ambedkar Awas Yojana (VAMBAY) scheme was launched in 2001 (Ministry of Urban Development 2011).

The Jawaharlal Nehru National Urban Renewal Mission (JNNURM), launched in 2005, was a massive urban renewal programme targeting integrated development of urban infrastructure in 65 cities (accounting for 42% of India’s urban population). The smaller cities were similarly served by another scheme, namely Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT). The mission mandated reforms and preparation of city development plans (CDPs) to document how the ULBs intend to develop land use, transport, and other basic infrastructure including sanitation services. Funds were provided, and the focus was on creating networks of sewage lines and treatment facilities.

However, all the funds allocated to the sanitation sector were spent on constructing underground sewerage projects. (MoUD 2014).

At the national level, the infrastructure-driven approach began to change towards a holistic, integrated, people-centred approach with the release of the National Urban Sanitation Policy (NUSP) in 2008. The NUSP marked a sea change in sanitation policy and moved away from prescribing piecemeal infrastructure solutions such as construction of toilets or sewage treatments plants (STPs) to behavioural change and to planning and implementing measures related to sanitation across sectors. It also emphasized that improvements in the sanitation sector, whether relating to augmenting of infrastructure, service improvements, management solutions, or behavioural change campaigns, should be implemented through city sanitation plans (CSPs) that outline and analyse the current sanitation situation, needs, local context, and availability of financial and human resources (Urban Management Centre 2014) (Fig 2.1). The following section provides an overview of specific urban sanitation programmes and initiatives spearheaded by the central government over the last 25–30 years.

The year 2010 marked the launch of *Nirmal Shahar Puraskar* (Clean City Award), designed along the lines

of the *Nirmal Gram Puraskar* (Clean Village Award), to honour cities that become totally free of OD and achieve safe disposal of all their waste. In all, 423 cities were rated on their achievements and processes concerning sanitation by MoUD (MoUD 2016) with the assistance of several multilateral and bilateral donors. The salient findings of the exercise are given below.

programmes of urban sanitation undertaken worldwide. Under the SBM, states and cities have been funded generously; a stringent ODF protocol has been introduced – and is being followed – to ensure that they are ODF; a number of partnerships have been entered into to help in implementing the mission; and a variety of measures have been taken to facilitate the procurement of required materials and services

- 185 cities in the red category (in need of immediate remedial action).
- 234 cities in the black category (needing considerable improvement).
- Only 4 cities qualified for the blue category (recovering but still diseased).
- No city was green and healthy (healthy and clean city).
- No city in India could claim to be free of OD.
- More than 50 cities reported collection of at least 90% of the total human excreta generated.
- 380 cities reported collecting and treating less than 40% of the total human excreta, and even that was not safely disposed of.
- 24 cities reported collecting more than 80% of solid waste generated.
- Only 39 cities passed all 3 basic parameters of WQ at the consumer end: turbidity, residual chlorine, and thermo tolerant coliform bacteria (TTC).

This pilot project gave a reality check on the state of affairs in the water and sanitation sector in urban areas and served to re-emphasize that if cities are to be managed efficiently, we need to not only fill the existing lacunae in infrastructure and services but also anticipate future needs. Thus, these efforts were not particularly effective in ensuring a safe sanitary environment in urban India because they were not comprehensive enough to fully address the country's sanitation challenge. In terms of meeting the sanitation needs of all sections of urban society, the efforts were inadequate and failed to bring in the behavioural changes required to ensure that the sanitation facilities created are not only used but also maintained properly. However, the lessons learnt while implementing these policies paved the way for the SBM, launched in October 2014.

The Swachh Bharat Mission (Urban), with an investment of 62 billion rupees (about 10 billion dollars), is one of the most comprehensive

by states and cities. The priority accorded to the SBM by the (MoHUA) is reflected in its various initiatives to get the states to build toilets, improve municipal waste management, campaign for behavioural change, and make the general public more aware of the importance of hygiene.

Two other important initiatives in urban sanitation that are linked with the SBM are AMRUT (MoUD 2015) and Smart Cities: although both have a wide array of objectives pertaining to urban development, sanitation is an important component. AMRUT makes states equal partners in planning and implementation of projects, thus actualizing the spirit of cooperative federalism. Both AMRUT and Smart Cities give the states the option to choose the cities to be funded through the mission, and both also focus on augmenting water supply, which is not a component of the SBM. A decentralized and networked sewerage system is a common link between the targets of the SBM and AMRUT, and all three – SBM, AMRUT, and

Smart Cities – have set targets for adequate sanitation services, household toilets with water supply, and improvement of solid-waste management (SWM). Table 2.1 presents the objectives and points of

convergence between SBM (U), AMRUT, and Smart Cities and highlights the synergy among the three missions.

Table 2.1: Highlights of SBM (U), AMRUT, and Smart Cities			
	SBM (Urban)	AMRUT	Smart Cities
Objectives	<ul style="list-style-type: none"> • Eliminate open defecation. • Eradicate manual scavenging. • Manage municipal solid waste by modern and scientific methods. • Effect behavioural changes to ensure hygienic practices. • Generate awareness about sanitation and its effect on public health. • Augment the capacities of urban local bodies. • Create an enabling environment for private-sector participation in capital expenditure (CAPEX) and in operation and maintenance (Opex). 	<ul style="list-style-type: none"> • Ensure that every household has access to a tap with assured supply of water and a sewerage connection. • Increase the amenity value of cities by developing greenery and well-maintained open spaces such as public parks. • Reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). 	<p>Promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment, and ‘smart’ solutions. The core infrastructure elements are given below.</p> <ul style="list-style-type: none"> • 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 • Health and education
Points of Convergence		In both schemes, the states can choose the cities to be funded under these initiatives.	
	Focus on waste management including sanitation services and solid-waste management		
		Increasing water-supply connections as well as augmentation of existing water supply	
	Decentralized, networked underground sewerage systems, including augmentation of existing sewerage systems and sewage treatment plants		
	All household toilets being constructed under SBM are built in tandem with water supply arrangements.		

2.2 National urban water policies in India

The year 1979 marked the launch of Integrated Development of Small and Medium Towns (IDSMT), a centrally sponsored scheme by the GoI to provide urban infrastructure and services and generate economic growth and employment in small and medium towns with population less than 100 000. The scheme included 231 towns, in different states and union territories, selected on the basis of the ratio of urban population in the state to the total urban population in the country (Batra, 2009).

In 1994, a centrally sponsored scheme, namely Accelerated Urban Water Supply Scheme (AUWSP), was formally launched by the GoI for providing water to towns with population less than 20 000 (as per the 1991 census). Central assistance was given to state governments in the form of matching grants (50:50, the central government to match the amount raised by the state). In case of union territories, 100% financing was available from the centre.

With the launch of JNNURM and UIDSSMT (a strategic programme linked to reforms), the GoI proposed to use its resources to incentivize, leverage, and support the reform efforts at the state and ULB levels to ensure universal access to services by providing incentives for more efficient utilities and creating an enabling regulatory environment (the UIDSSMT programme also subsumed two earlier schemes related to water supply, namely IDSMT and AUWSP).

AMRUT was launched in 2015, after JNNURM and UIDSSMT, to provide water taps to all urban households, augmenting water supply to 135 litres per capita per day.

2.3 Performance measurement in urban water and sanitation sectors

Service-level benchmarking

In 2008, the MoUD initiated service-level benchmarks (SLBs) for water supply, sewerage, SWM, and storm water drainage services and launched them in 2010. A pilot project to implement these benchmarks for municipal services was initiated in 28 cities. The benchmarks (Table 2.2) were meant to stipulate a set of parameters for minimum standards of performance that are commonly understood and used by all stakeholders across the country. The initiative aimed to overcome the challenges that were encountered in earlier benchmarking exercises in following ways.

- Uniform set of indicators, definitions, and calculation methodology to enable meaningful comparisons
- Provision of service benchmarks to create consensus on desired service standards
- Data reliability grades to highlight and address issues of data quality
- Self-reporting by ULBs, as against consultants, to ensure ownership of data
- Emphasis on planning to improve performance based on the data generated on SLBs

Table 2.2: Service-level benchmarks in water supply, sewage management, and municipal solid waste

Indicator	National benchmark
Water supply	
Coverage of water supply connections	100%
Daily per capita supply of water	135 litres
Extent of metering of water connections	100%
Extent of non-revenue water (NRW)	20%
Availability of water supply	24 hours
Quality of water supply	100%
Efficiency in settling complaints from consumers	80%
Cost recovery in water supply services	100%
Efficiency in collection of water supply charges	90%
Sewage management (sewerage and sanitation)	
Coverage of toilets	100%
Coverage of sewage network services	100%
Collection efficiency of sewage network	100%
Adequacy of sewage treatment capacity	100%
Quality of sewage treatment	100%
Extent of reuse and recycling of sewage	20%
Efficiency in settling complaints from consumers	80%
Extent of cost recovery in sewage management	100%
Efficiency in collection of sewage charges	90%
Solid-waste management	
Household-level coverage of solid-waste management services	100%
Efficiency of collection of municipal solid waste	100%
Extent of segregation of municipal solid waste	100%
Extent of municipal solid waste recovered	80%
Extent of scientific disposal of municipal solid waste	100%
Efficiency in settling complaints from consumers	80%
Extent of cost recovery in solid-waste management services	100%
Efficiency in collection of solid-waste management charges	90%

States such as Gujarat, Karnataka, Madhya Pradesh, Maharashtra, and Odisha had scaled up the benchmarking exercise to cover a large number of cities, which inspired other states to adopt similar strategies, thereby improving sectoral performance.

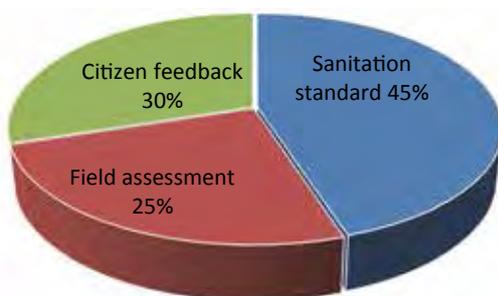
Swachh Survekshan

One of the latest initiatives of MoUD was the Swachh Survekshan Survey conducted in 2016 and 2017 by the Quality Council of India, wherein cities were ranked on cleanliness and sanitation. The objectives of the survey were to measure the level of sanitation in selected cities, recognize the efforts made to improve sanitation, and promote a spirit of healthy competition among cities. This was meant to help the cities know where they stand in relative as well as absolute terms and what more needs to be done by each city to ensure proper sanitation.

The Survekshan methodology was divided into three components (Figure 2.2):

- Sanitation Service standards through municipal documentation
- Independent observation/Field Assessment
- Feedback from citizens.

Figure 2.2 Criteria of ranking in Swachh Survekshan 2017 (weightage in percentage)



The components under which the cities were assessed had many predefined elementary parameters, such as door-to-door collection of municipal solid waste (MSW), street sweeping, waste treatment facilities,

landfill, remediation of dumps, toilets in individual households and community toilets, and the extent of OD, as well as such broader measures as capacity building, for example SBM e-learning courses, education and communication aimed at behavioural change, and effective municipal administration. A team of trained assessors captured the level of sanitation in the participating cities on the ground by collecting data, recording responses, and gathering geo-tagged photographic evidence from many locations within each city, and the results were carefully mapped for maximum coverage. Besides the sanitation standards, field assessment and feedback from citizens were also important criteria for ranking the cities.

In 2016, 73 cities, each with population above 1 million, and state capitals were ranked: Mysuru was judged the cleanest city, followed by Chandigarh and Tiruchirapalli, whereas Dhanbad was ranked the lowest. Such a ranking based on field surveys has been a particularly progressive step in monitoring programmes that are part of the SBM and an instrument leading to greater efforts to improve sanitation, reorientation of attitudes of ULBs and of citizens, and improvements on the ground. About 0.1 million citizens participated in the survey across 73 cities by giving feedback, which was collected through an interactive voice response system (IVRS) wherein citizens were asked to respond to a questionnaire comprising six objective questions. This idea triggered a healthy competition among the ULBs and led to rapid progress in improving sanitation standards.

In 2017, a similar survey was carried out in 434 smaller cities and towns, which were part of AMRUT; these were ranked for cleanliness and sanitation. Indore was declared the cleanest city (with a total score of 1807.72 out of 2000), followed by Bhopal and Visakhapatnam (MoUD 2017). Swachh Survekshan 2017 also brought to light the status of infrastructure and service delivery related to SWM in these cities across the country. Feedback from citizens was an important feature of this survey: 3.7 million citizens in these cities participated in the survey through various channels including 1.2 million who did so through the Swachhta app.

Swachh Survekshan 2018 has now been launched covering all the 4041 statutory towns in India. This is the first ever pan-India sanitation survey involving

about 400 million people and is the largest ever sanitation survey in the world. The survey will cover 500 cities, each with a population up to 100 000, along with capitals of states and union territories, which will be given all-India ranking; another 3541 cities, each with a population less than 100 000, will be given state and zonal ranking. The focus will be on processing and innovation, outcomes, sustainability, and validation by citizens and on-ground scrutiny.

Although the SBM is a flagship programme on sanitation, which has garnered support from the highest office in the country, the relevance and achievements of earlier programmes cannot be discounted.

2.4 Analysis of policies in urban water and sanitation sectors

Urban water

The scheme for small and medium-sized towns, namely IDSMT, operational from 1979 to 2005, was not focused solely on water supply; it was aimed at integrated development. Under the scheme, both the central government and the respective state governments funded local bodies in the form of a grant. A total of 1854 towns and cities, each with a population of 0.5 million, spread over 33 states and union territories, were the beneficiaries of the scheme. The total central allocation was 10.7 billion rupees and that of the states was nearly 7 billion rupees. More than 90% of these funds were in fact spent. However, the implementation of the scheme faced several difficulties: the states did not always release the funds on time; the implementing agencies lacked adequate capacity to execute the projects that were part of the scheme; land free from any encumbrance was not often available for the projects;

the implementing agencies frequently changed the specified locations; and so on (NRCDDP, no date).

The Accelerated Urban Water Supply Programme of the central government stipulated emphasis on the whole-town approach, treatment of water supply as a public utility rather than a service, and effort to secure greater participation and investment from the private sector to make the schemes self-sustaining. The programme was implemented by CPHEEO, which was operationally integrated with state public health engineering departments or water supply and sewerage boards and ULBs for the facilities to supply water.

Since its launch in 1993/94, AUWSP has sanctioned 575 schemes, and 2151 small towns were to be covered. By 2001, 200 schemes (35%) had been completed, 274 schemes were ongoing, and 101 were yet to be taken up (CAG 2002). Of the 1025 towns that were identified as facing severe challenges in 18 states, only 201, in 15 states, had been covered; not a single such town of the 98 identified in the states of Assam, Bihar, and Sikkim had been covered whereas none was identified in Arunachal Pradesh, Gujarat, Jammu and Kashmir, Karnataka, and Rajasthan.

Later, on the basis of information up to 2010 received from different state governments, water-supply schemes in 1022 towns were reported as completed, commissioned, or partly commissioned; five of the schemes had been dropped by the state governments; and the remaining projects for 217 towns were under various stages of implementation (MoUD 2012).

Two landmark initiatives of the central government, namely JNNURM and UIDSSMT, were launched in 2005. 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 (Table 2.3).

Table 2.3: Shares (%) of central government, state governments, and urban local bodies (ULBs) in JNNURM

Category of city, town, or urban agglomeration (population in 2001)	Urban infrastructure governance			Basic services to urban poor	
	Grant (% share)			Grant (% share)	
	Central Govt.	State Govt.	ULB or para-statal or loan from financial institutions	Central Govt.	State, ULB, or parastatal including contribution from beneficiary
Population above 4 million	35	15	50	50	50
Population more than 1 million but less than 4 million	50	20	30	50	50
North-eastern states and Jammu and Kashmir	90	10	—	90	10
Other than those mentioned above	80	10	10	80	20
For setting up desalination plants: within 20 km from seashore or other urban areas facing water scarcity due to brackish water or non-availability of surface sources	80	10	10		

The sector-wise allocation of funds under the UIG component of JNNURM is depicted in Figure 2.3 and the funds allocated, released and utilized under this scheme in Figure 2.4. Water supply was part of JNNURM’s UIG component: a total of 186 projects were approved in the water-supply sector, which amounted to 31% of the projects from the sector (JNNURM 2014).

By August 2014, a total of 599 projects had been sanctioned under UIG (Figure 2.4); of these, about a third (186 projects) were related to water—however, only 71 projects had been completed (JnNURM, 2014)

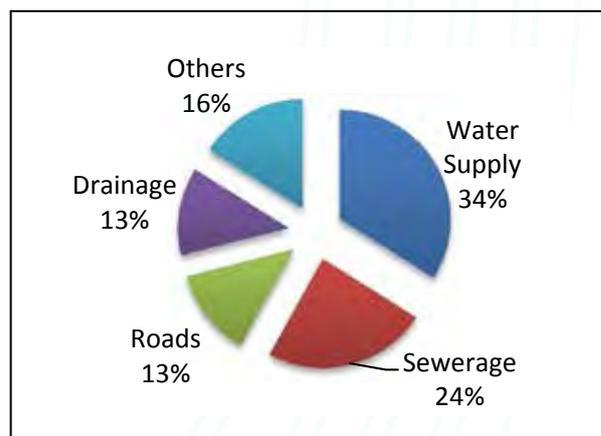


Figure 2.3: Sector-wise allocation of funds under the UIG component of JNNURM

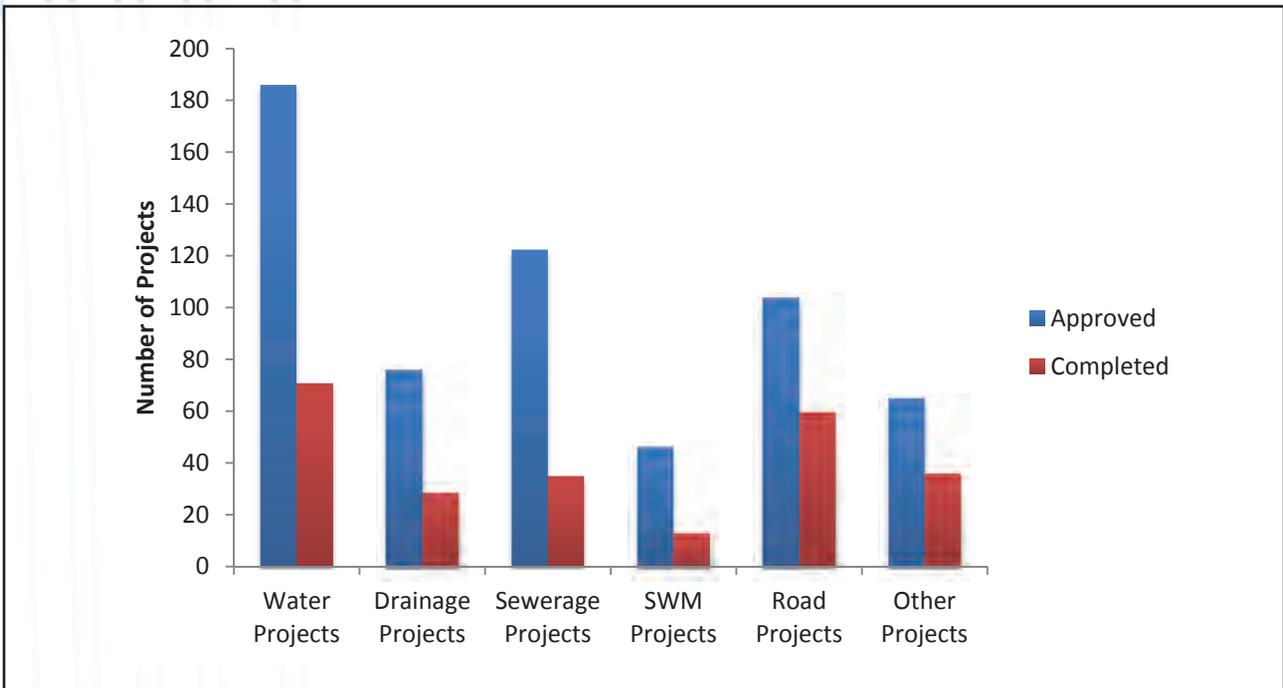


Figure 2.4 Completed or approved projects under UIG component of JNNURM (2014)

For UIDSSMT, funding was to be divided between the central government (80%) and the state government (10%), and the remaining 10% was to be raised by the nodal agencies or implementing agencies as loan from financial institutions. Under UIDSSMT also, 52% of the

projects (Figure 2.5) were related to water supply and claimed 55% of the total funds (Figure 2.6). However, of the 597 water-supply projects undertaken, only 285 had been completed by 2014 (JnNURM, 2014).

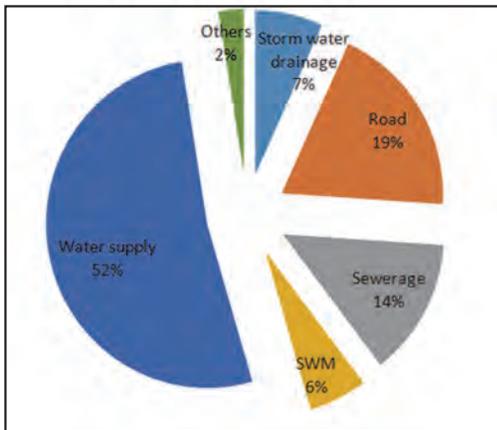


Figure 2.5: Project allocation in UIDSSMT, by sector

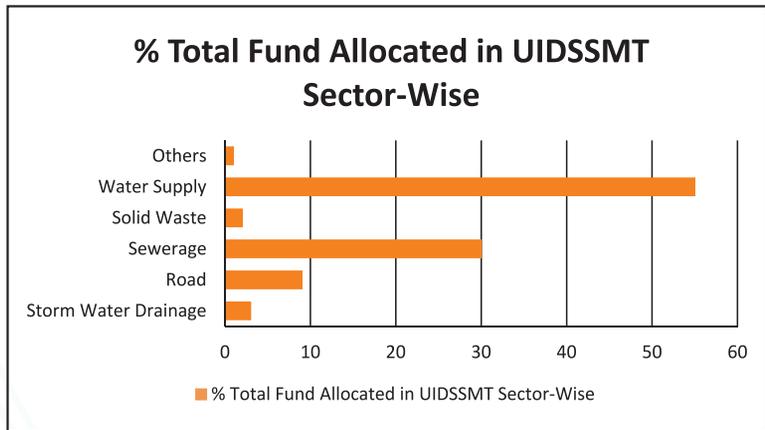


Figure 2.6: Fund allocation in UIDSSMT, by sector (in 2014)

The other component of JNNURM, namely BSUP, mandated all ULBs to undertake reforms to alleviate urban poverty to provide basic services (including water supply and sanitation) to all poor including security of tenure, and improved housing at affordable prices and ensure delivery of social services of education, health and social security to poor people (JnNURM); the component received 21% of the funds allocated by the GOI, of which more than 62% was given to only five states (Figure 2.7), with Maharashtra receiving the largest share (20%) of the funds (Kamath & Zachariah, 2015).

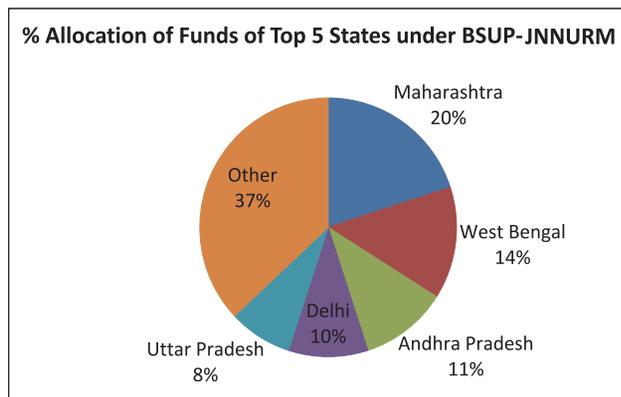


Figure 2.7: Top five states in allocations from central government for the component 'Basic services to urban poor' as part of JnNURM (Source: (Kamath & Zachariah, 2015)

The Planning Commission [now the NITI Aayog] had envisaged for JNNURM, for the duration of the mission (2005/06–2011/12), a little over 660 billion rupees; the actual budgetary allocation was 450 billion rupees. Of this allocation, 405 billion was released for various components of the mission, namely UIG, UIDSSMT, BSUP, and Integrated Housing and Slum Development Programme (IHSDP) (CAG 2012).

The lack of adequate capacity, especially at the municipal level, had slowed down the projects and affected their implementation adversely in many ways. Apart from this, JNNURM followed a conditional funding policy, and it is often argued that because of such a policy, the new projects funded under the mission could not be designed to improve service levels and hence, not enough final consumers or beneficiaries were adequately served—an outcome that could have been avoided had the city development plans been rigorous and the shelf life of projects identified more precisely (Kantak, 2010).

After JNNURM came AMRUT, launched in 2015 by the prime minister to focus on urban renewal projects and to provide infrastructure that would ensure robust networks for sewage and water supply in urban areas. The mission's aim was to provide water and sewerage facilities to all and augment water supply to ensure 135 litres per capita per day.

Urban sanitation

In the past, urban sanitation did not receive adequate attention at the national level as compared to rural sanitation, which attracted several centrally sponsored programmes such as the Central Rural Sanitation Programme, Total Sanitation Campaign, and Nirmal Bharat Abhiyan. Urban sanitation has mostly been approached either as part of such plans to develop city infrastructure as the Integrated Urban Development Plan (IUDP) in 1974, Integrated Development of Small and Medium Towns (IDSMT) in 1979, Mega City Schemes in 1994, and JNNURM in 2005 or as part of slum improvement plans and initiatives related to habitat, such as the Environmental Improvement of Urban Slums (EIUS) in 1972, National Housing Policy in 1988, National Slum Development Policy (NSDP) in 1996, VAMBAY in 2001, Basic Services to Urban Poor (BSUP) and Integrated Housing and Slum Development Programme in 2006, National Urban Housing and Habitat Policy in 2007, and the Rajiv Awaas Yojana (RAY) in 2012.

Unfortunately, access to sanitation facilities in both the approaches was compromised in the larger goal of city and slum development. In urban development plans, water-supply services have received greater allocation of funds than the sanitation sector has, and even within the sanitation sector, especially in larger cities, greater investments were made on building sewerage systems and wastewater treatment plants than on sanitation facilities such as improved toilets.

The Integrated Low Cost Sanitation Scheme, launched in 1980/81, which could be considered as the first dedicated central programme, supported construction of dry latrines and subsidized the conversion of dry latrines into water-seal twin-pit sanitary latrines in urban areas and has also been partly successful. The scheme was implemented in 1534 towns, each with a population of 0.5 million or less, 650 of which had

Table 2.4: Analysis of India's policies in urban water sector				
	1979–2005	1992–2005	2005–14	2015
	IDSMT	AUWSP	JNNURM	AMRUT
Finance	Central govt 60% and state govt 40%	Central govt 50% and state govt 50%, including 5% from beneficiary or town	Central share can vary from 35% for the largest cities to 90% for cities in the north-eastern states.	Central share is 50% for cities with a population less than a million and 33.3% for the rest. Total 500 billion rupees as central assistance (PIB, MoHUA, 2017)
Institution	MoUD	MoUD	MoUD	MoUD
Targets	Improving infrastructure and helping to create durable public assets in towns or cities with population up to 0.5 million	Systematic water supply, access to safe water, and better quality of life for towns with population less than 20 000	Reform-linked grants for urban infrastructure with an outlay of 540 billion rupees	Providing water taps to all urban households, augmenting water supply to 135 litres per capita per day, adequate sewerage and drainage networks
Achievements	More than 90% of budgeted amount spent; 1854 towns spread over 33 states or union territories benefited	575 schemes sanctioned since 1993/94 and 2151 small towns were to be covered. Of these, by March 2001, 200 schemes (35%) completed, 274 schemes ongoing, and 101 were to be taken up.	By March 2014, over 319 water and sewerage projects with an outlay of more than 390 billion rupees and another 753 water and sewerage projects under UIDSSMT with an outlay of 226.6 billion rupees (NIUA, 2015)	Investments in basic urban infrastructure (billion rupees): Uttar Pradesh, 42.4; Tamil Nadu, 41.5; Maharashtra, 67.5; Haryana, 25.4; Chhattisgarh, 21.9; Manipur, 1.8; Sikkim, 0.39 (PIB, MoHUA, 2017)
Lessons learnt or challenges	Non-availability and non-release of their matching share by state governments in time, inadequate capacity of implementing agencies to execute projects	Absence of proper tariff structure, no regular testing of water samples, non-maintenance of assets records, absence of community participation, increased incidence of water-borne diseases (CAG, 2002)	Inadequate institutional capacity, slow implementation of projects, and conditional funding policy. City development plans not rigorous enough and the shelf life of projects not clearly identified.	
Impact/Outcome	Kicked off an integrated development approach for small and medium cities which reduced the load on metro cities on Delhi, Mumbai, Kolkata and Chennai.	Provided water supply on cities with lower economic base, often neglected by States.	Till Aug 2014, only 71 out of 186 water supply projects got completed.	

abolished manual scavenging of toilets. HUDCO was given the responsibility to implement 871 projects under the scheme. In terms of physical coverage, whereas the physical target was 4.89 million toilets (to be constructed anew or converted from the existing ones), the actual number was only 2.2 million, or about 45%, indicating poor performance—and even after building these toilets, approximately 12% of the households were not using them (MoHUPA 2007).

Some of the reasons for the marginal performance of the scheme are the absence of subsidy for building the required superstructures, lack of sufficient space, poor recovery of loans from individual beneficiaries, confining the scheme to towns with population of less than 0.5 million, and inadequate (45%) subsidy, which was insufficient for the financially weaker among the beneficiaries (MoHUPA 2014).

In 2008, ILCS was revised in the light of the lessons learnt through the evaluation study and revised yet again under the 12th five-year plan. The key modifications were extending the subsidy to include superstructures, limiting the scheme to households in the economically weaker section (EWS), removing the loan component, increasing the central share in the subsidy, and increasing the amount of subsidy for each household to 15 000 rupees (18 750 rupees in hilly areas) per unit (with another 15% for bi-digesters and eco-san toilets). Also, the scheme was to be implemented by the Ministry of Housing and Urban Poverty Alleviation (MoHUPA) directly instead of HUDCO, which, instead of implementing the projects, was asked to provide technical support such as appraisal of project proposals submitted by the state governments or union territories. Funds were also provided for involving and incentivizing neighbouring states, and 1% of the funds were earmarked for the ministry, to be retained and used for management information systems, a monitoring system, capacity building, and for information, education and communication (IEC) components (MoHUPA 2014).

Under the 12th five-year plan, the proposal was to convert 208 323 insanitary latrines into sanitary ones and also to construct 51 667 new toilets for beneficiaries from the EWS (MoSJE, 2012); the budget for the proposal was 4.8 billion rupees, of which the central government's share was 3.67

billion: the balance was to be borne by the state and the beneficiaries in a ratio of 3:1. However, the 2011 census recorded that in urban areas, nearly 208 000 latrines continue to be cleaned manually by workers, with more than 50% (106 000) of such latrines being in Uttar Pradesh alone (PTI 2012).

The National Urban Sanitation Policy, launched in 2008, marked a watershed in India's urban sanitation sector. The policy called for a paradigm shift in the approach to urban sanitation—from infrastructure development to behavioural change. The specific goals of the policy were creating awareness and changing the behaviour in relevant ways to make cities free of OD and to integrate their sanitation services by reorienting institutions, mainstreaming sanitation, ensuring sanitary and safe disposal of excreta and liquid waste, and operating and maintaining all sanitary installations efficiently. The national policy also provided a draft framework for sanitation strategies at the state level and sanitation plans at the city level. A separate body, namely the National Advisory Group on Urban Sanitation (NAGUS), was formed to provide advisory and technical support to the central government and the state governments in implementing and institutionalizing the various components of NUSP and in running the award scheme effectively.

By 2012, 29 out of 35 states were engaged in preparing state sanitation plans, and 158 cities were developing city sanitation plans (Dasra 2012). Service-level benchmarking of urban services was piloted and scaled up to more than 1756 cities. A shift in focus from infrastructure to service delivery was also seen.

However, there is a growing recognition that the quality of these plans is highly uneven and that the gap between funding and execution of subnational plans is wide. Despite the plans, many stakeholders note that the failure of NUSP in channelling investments into municipal-level plans to support their implementation and the absence of any concrete improvement in urban sanitation (Elledge and McClatchey 2013).

Even in 2012, 12% of those living in Indian cities defecated in the open and only 60% had access to improved sanitation facilities (Figure 2.8) (JMP 2014). The 2011 census recorded that 13.75 million, or 17.4% of India's urban population, lived in slums and

4.67 million, or 34%, of them had no latrines nearby—more than 2.6 million, or 50% of those living in slums, defecated in the open (MoHUPA 2013).

The 12th five-year plan (2012/13–2016/17) records that 4861 cities and towns in India are without any

sewerage network and almost 50% of the households even in metro cities such as Bangalore and Hyderabad lack sewerage connections; 37% are connected to open drains; and another 18% are not connected at all (Planning Commission 2012).

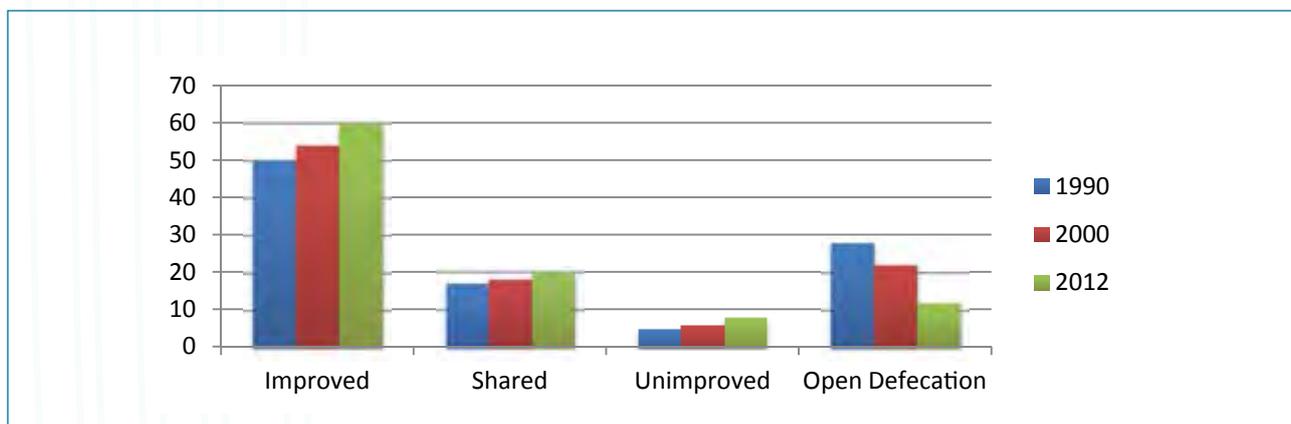


Figure 2.8: Percentage of urban population using sanitation facilities (Source: JMP 2014)

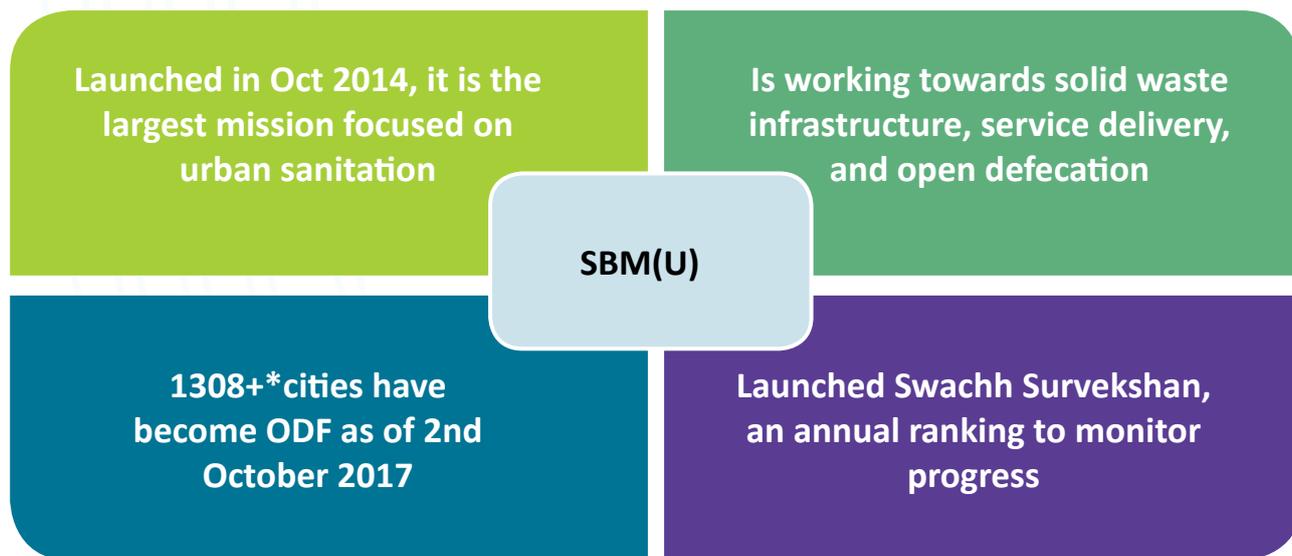


Figure 2.9: Highlights of Swachh Bharat Mission (Urban)

*This does not include slippage data

The Swachh Bharat Mission (Urban) (Figure 2.9) is India’s first mission dedicated to urban sanitation and incorporates the principles outlined in the NUSP. It is a massive programme with an estimated cost of 620 billion rupees. Some unique features of the mission include inviting private-sector participation, greater political will, and an online monitoring system. The overall target of the mission is to construct 10.4 million units of individual household toilets and 508 000 units of community and public toilets in urban areas (MoUD

2014) (Figure 2.10). Of the total cost of 620 billion rupees, the Gol is to contribute 146.23 billion and the states and ULBs, 48.74 billion (Figure 2.11). The remaining amount is to be generated through other sources in the form of contribution by beneficiaries, user charges, funds set aside to discharge corporate social responsibility (CSR), contributions from the private sector, and a cess levied for the purpose, to name a few (Dasgupta et al. 2015).

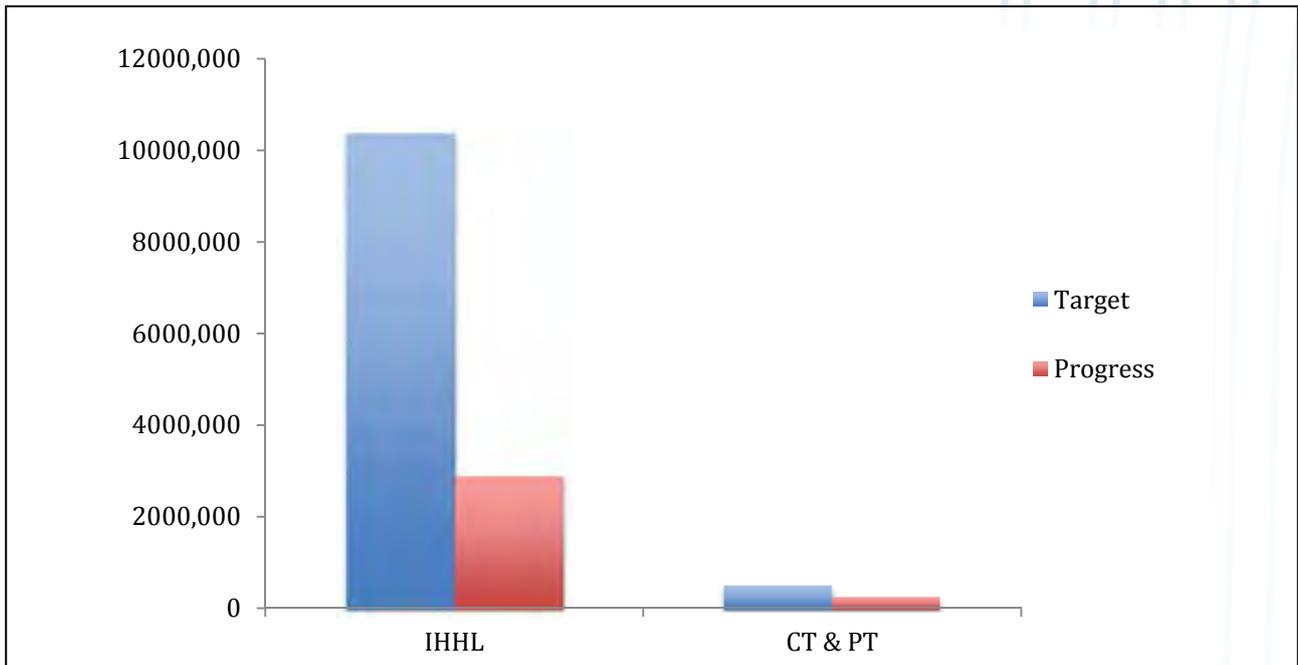


Figure 2.10: Targets and achievements of Swachh Bharat Mission (Urban) (Source: Swachh Bharat (Urban) realtime Data)

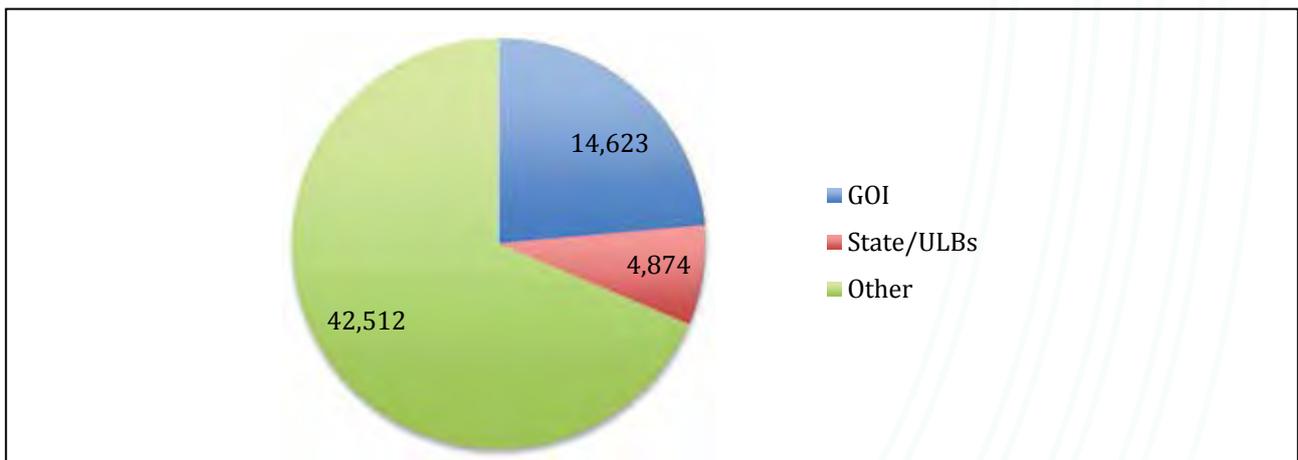


Figure 2.11: Funding distribution (in Crore) of Swachh Bharat Mission (Urban) (Source: Swachh Bharat (Urban) realtime Data)

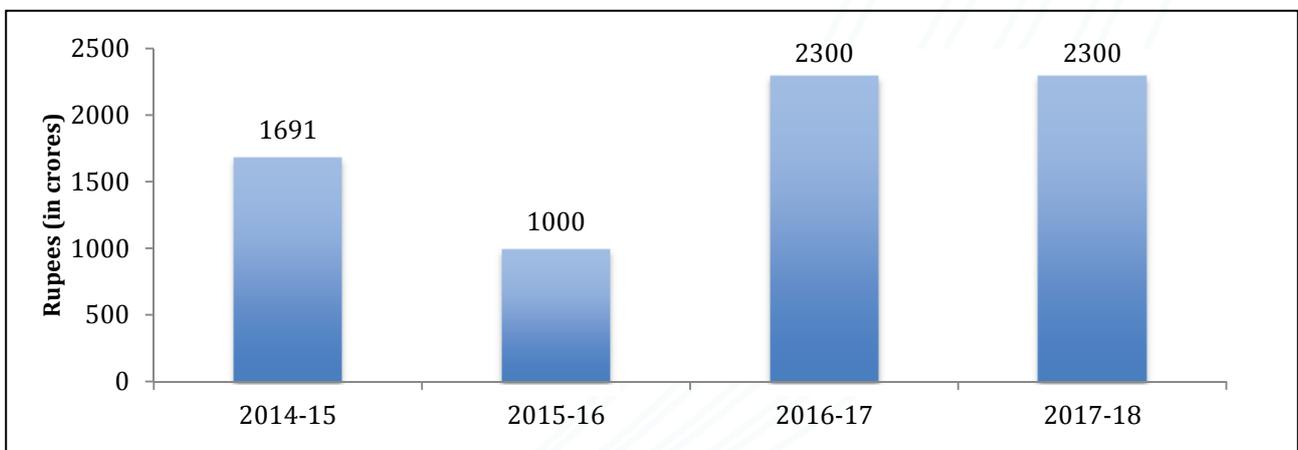


Figure 2.12: Allocation for Swachh Bharat Mission (Urban) (In crores of rupees) (Source: CPR 2017)

In the financial year (FY) 2017/18, the allocations for SBM-Urban by GoI stand at 23 billion rupees (Figure 2.12), the same as those in 2016/17, but more than double the revised estimates (RE) for FY 2017/18, the fourth year of the mission. So far, that is, over the four years, 72.91 billion rupees, or 49% of the GoI's total share, has been allocated to states (CPR, 2017). Further, 45% of the total amount released in 2016/17 has been for constructing individual household latrines (IHHLs) and community and public toilet seats (CT/PTs). By the beginning of 2017, 110 665 CT/PTs and 2 918 669 IHHLs had been constructed (CPR, 2017). However, expenditure on IEC has remained low: 400 million rupees were released for IEC as on 18 January

2017 for 2016/17, 17% less than that for 2015/16 and less than half of that for 2014/15 (CPR, 2017) (Figure 2.13)

Although urban sanitation has gathered momentum with the launch of SBM (Urban), some grey areas remain, including the costs of connecting the toilets to sewer networks, facilities for hand-washing, service level, and user fees for community toilets, which have not been addressed adequately in the guidelines. A detailed analysis of SBM (Urban) is presented in Chapter 6.

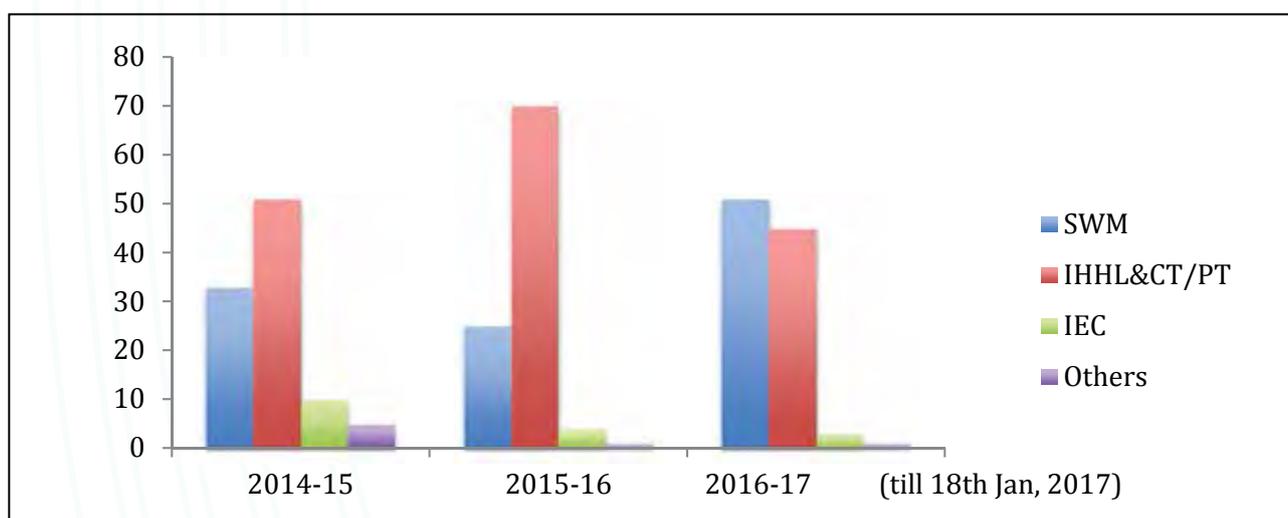


Figure 2.13: Allocations for different components of Swachh Bharat Mission (Urban) (Source: CPR 2017)

Table 2.5: Analysis of India's policies in sanitation sector					
	1981	2001	2005–2014	2014	2015
	ILCS	VAMBAY	JNNURM	Swachh Bharat Mission	AMRUT
Finance	Central subsidy is 75%; state subsidy is 15%; and share of beneficiaries is 10%.	Central govt contributes 50% and state govt contributes 50%: 20% of the funding under VAMBAY was for sanitation.	Central govt share can vary from 35% in the largest cities to 90% for cities in the north-eastern states.	Investment of 620 billion rupees (about \$10 billion); GoI is giving 146 billion rupees and the states and ULBs, is 48.7 billion.	Central govt share is 50% for cities with populations less than a million and one-third for the rest. Total 500 billion rupees as central assistance (<i>PIB, MoHUA, 2017</i>)
Institutions	Initially with Ministry of Home Affairs, later through Ministry of Social Justice and Empowerment, in 1989/90 to MoUD, and from 2003/04 onwards to Ministry of UEPA/HUPA.	MoUD, respective ministries in state governments, and ULBs	MoUD, respective ministries in state governments, and ULBs	MoUD, respective ministries in state governments, and ULBs	MoUD, respective ministries in state governments, and ULBs
Targets	Conversion of individual dry latrines into pour-flush latrines, thereby doing away with manual scavenging	Construction and upgrading of dwelling units for slum dwellers and providing community toilets under Nirmal Bharat Abhiyan	Reform-linked grants for urban infrastructure with an outlay 540 billion rupees	Eliminating open defaecation, achieving universal sanitation coverage, and improving cleanliness. Construct 10.4 million units of individual household toilets and 508 000 units of community and public toilets in urban areas	Providing sewerage and drainage networks in cities with populations greater than 100 000
Achievements	Constructing or converting over 2.8 million latrines to liberate over 60 000 scavengers (MoHUPA 2010)	Central govt has given 5.2 billion rupees for building or upgrading of 246 035 dwelling units and 29 263 toilet seats (Indianyojana)	By March 2014, more than 319 water and sewerage projects with an outlay of 390.78 billion rupees and another 753 water and sewerage projects under UIDSSMT with an outlay of 226.62 billion rupees (NIUA, 2015).	By July 2017, 179 901 community and public toilet seats and 3 586 763 individual household latrines had been completed (MoHUA, 2017)	Investments in basic urban infrastructure (billion rupees): Uttar Pradesh, 42.4; Tamil Nadu, 41.5; Maharashtra, 67.5; Haryana, 25.4; Chhattisgarh, 21.9; Manipur, 1.8; Sikkim, 0.39 (PIB, MoHUA, 2017)
Lessons learnt or challenges	No subsidy for building superstructures, lack of sufficient space in completed areas for constructing twin pits, poor recovery of loans from individuals		Lack of adequate institutional capacity, slow implementation of projects, and conditional funding policy. City development plans should have been rigorous and the shelf life of projects clearly identified		
Impact or outcomes	Andhra Pradesh, Assam, Nagaland, and West Bengal stated that they have no dry latrines. Andhra Pradesh, Assam, Nagaland, and West Bengal stated that they have no dry latrines.	Successful in providing affordable houses to the urban poor; scheme merged into JNNURM later	By the end of 2014, 68 out of 154 water-supply projects and 34 out of 110 sewerage projects were completed (JNNURM, 2014).	796 cities free of OD; 100% door-to-door waste collection from 43 274 wards, 22.2% of total waste processed (MoHUA, 2017)	

The AMRUT mission, launched in 2015, also gives importance to the bricks and mortar component, mostly sewerage, drains, and septage management, which involves cleaning, transport, and cost-effective treatment of such waste along with mechanical and biological cleaning of sewers and septic tanks. The national-level policies and programmes on urban water supply and sanitation are mapped comprehensively in Table 2.4 and Table 2.5 respectively.

2.6 Conclusion

In India, the central government has been assisting the state governments in improving the coverage of water and sanitation facilities. Policies and programmes for the purpose have evolved over the years by undertaking reforms, incorporating information and communication technologies (ICT), and modernization and accountability mechanisms at the national, state and ULBs levels. These measures have helped many ULBs to move towards becoming autonomous, accountable, and customer-oriented service providers with enhanced efficiency and effectiveness.

The current focus of the central government is on service delivery and sustainability of services. The lessons from the past have been that the traditional engineering-driven approach has not been effective: a participative approach that integrates social,

environmental, professional, and technical skills is more likely to succeed in making policies and programmes in the urban water and sanitation sector more effective.

Meeting the goals of the urban water and sanitation sectors requires a wide range of measures, including consolidation of policy reforms, capacity building of the sector, and participatory and demand-responsive approaches. The government on its part should ensure that public funds are allocated principally to promote and stimulate demand generation and infrastructural development for managing and processing solid waste and septage. The regulations that govern waste management could be reviewed based on strict enforcement of the polluter-pays principle, and ULBs on their part need to devise innovative ways to raise funds through tariffs in order to sustain the infrastructure and assume greater responsibilities for service delivery.

In the coming years, India, with its huge rural-to-urban migration, will face major challenges in the water and sanitation sectors, which will make the current business-as-usual approach highly untenable. Improving the sectors' performance is critical for meeting the growing needs of the urban population, and the sectoral mindset needs to change from focusing only on asset creation to dealing with issues of equity, quality of service delivery, and sustainability.

CHAPTER - 03

REGIONAL ASSESSMENT OF URBAN WASH POLICIES AND PROGRAMMES

3.1 Rationale and approach

The 74th Amendment, 1992, to the Constitution of India empowered state and local governments to cater to the water and sanitation sector. Sanitation being a state subject, the achievements in this sector depend mainly on the initiative taken by the urban development departments of state governments. To strengthen the national-level SBM, several states, including Gujarat, Madhya Pradesh, Maharashtra, and Kerala, have launched state-level sub-missions.

This chapter carries forward the discussion on, and the assessments of, national-level policies and programmes covered in the previous chapter to regional-level assessment. For the purpose, India has been divided into five regions: northern, north-eastern, eastern, southern, and western. Each region comprises a few states—the classification is the same as that used in Swachh Survekshan 2017.

The chapter draws mainly on three sources of data.

- 1) **Secondary literature:** mostly Census 2011, reports of international and national agencies, and JMP Updates
- 2) **Data analysis** of the SBM (Urban), Swachh Survekshan 2017, and Open Defecation Free mission of the MoUD, Government of India
- 3) **Regional-level stakeholder consultation workshops** held between September 2015 and March 2016 in four regions (the northern and the north-eastern regions were combined for the purpose) followed by a national workshop in December 2016. The participants in these workshops were drawn from the state governments, ULBs, donor agencies, bilateral and multilateral aid agencies, NGOs, and academic and research institutions and also included local stakeholders. Findings from these workshops were also incorporated to strengthen the study design.

3.2 Assessment of Policies and Programs

The five regions are briefly reviewed state by state to present the current state of water and sanitation including the ongoing swachhta mission and any other key programmes. Some good practices are also highlighted so that other regions and states can adopt those practices. The states within each region are compared on the basis of predefined outputs, followed by a similar comparison of the five regions.

3.2.1 Northern region

The northern region comprised six states: Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Uttarakhand, and Uttar Pradesh and two union territories (UTs), namely NCT of Delhi and Chandigarh.

According to the 2011 census, the population of the entire northern region is about 300 million (25% of the country's total population), and the region constitutes about 20.3% of India's total area. The largest state in the region in terms of both area and population is Uttar Pradesh (23.84% of the region's area and of 54.1% of its population). In terms of urbanization, Punjab ranks first among the states (37.48% of its population is urban), and Delhi is almost entirely urbanized (97.50%).

Water supply in the region is mainly from rivers and groundwater. According to the 2011 census, Punjab had the highest water supply coverage (almost 90%) in the region, followed by Delhi (approximately 81% of the total population has access to piped tap water). The status of water supply in the northern region, in terms of the proportion of households with access to drinking water and of those with access to water for use in toilets, is shown in Fig. 3.2

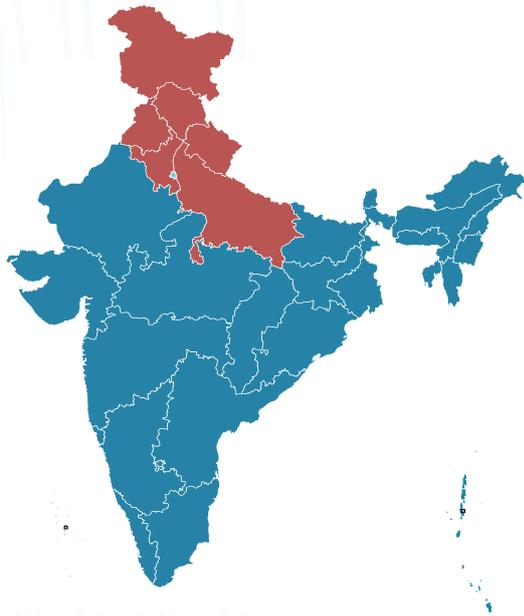


Figure 3.1: Northern region of India

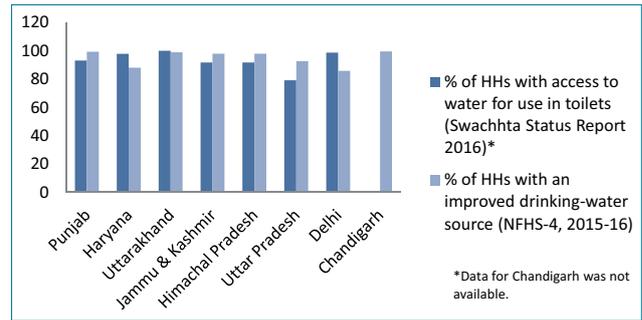


Figure 3.2: Water for drinking and for use in toilets in northern India

The problem of unequal distribution of water is another challenge in Delhi. The poor and the under-privileged in Delhi are supplied water at subsidized rates, but the supply is neither regular nor adequate, leading to long queues for fetching water from tankers. In Uttarakhand, groundwater is the major source of water. In 2015, Jammu faced acute water shortage because the public health engineering department had to curtail the operations of pumping stations and filtration plants because the machinery had clogged up following flash floods in the River Tawi (The Tribune, Chandigarh, 16 July 2015).

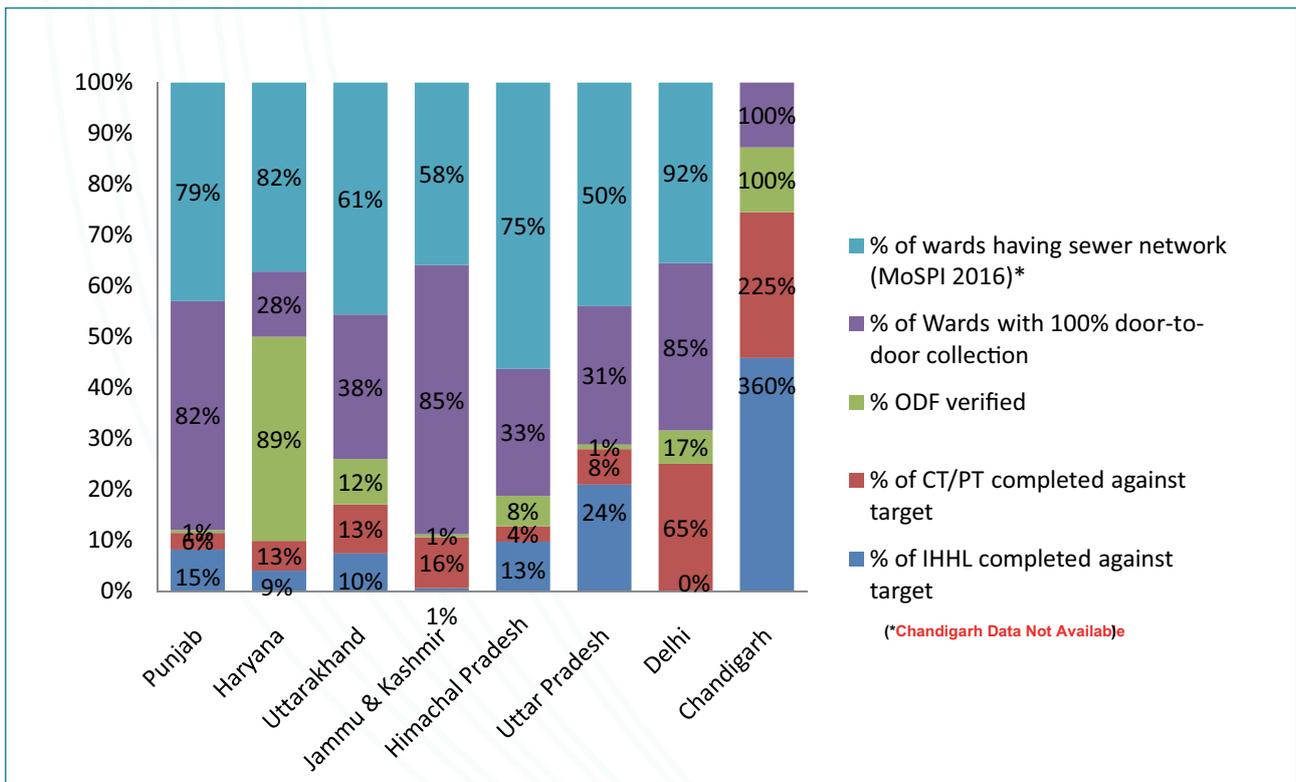


Figure 3.3: Status of sanitation services in northern India

In terms of sanitation, **Fig. 3.3**, almost 90% households in Delhi have toilets within the premises. However, the slum population in Delhi has also risen considerably, and the number of people that had to resort to OD in the city was 0.11 million (Planning Department, Govt of Delhi, 2013). Open defecation has severe impacts on health in Delhi. The Baseline Survey (2012) by Mission Convergence in Delhi found that 52% of the children living in slums and unauthorized colonies defecated in the open: this proportion was as high as 79% for children less than 3 years old (MDWS 2012). New Delhi Municipal Council (NDMC) is the only ULB in Delhi that has been certified ODF (SBM 2017 <<http://sbmodf.in>>)—civic bodies such as the municipal corporations of South Delhi, East Delhi, and North Delhi are far behind.

The census in 2011 showed that Uttar Pradesh had the highest percentage of OD in the region (14.8% of the total population), and the fact that only 13 cities out of the 654 cities in Uttar Pradesh has applied for ODF verification to MoUD speaks for itself—5 (4 are cantonment boards) of them have been declared ODF

Statistics and Programme Implementation (MoSPI), 57.5% of the wards (which are smaller administrative units) in Jammu and Kashmir were connected to a sewer network, the state continues to be the lowest in the region, the figures for other states being as follows: Delhi (92.1%), Haryana (82.4%), Himachal Pradesh (75%), Punjab (78.5%), Uttar Pradesh (50.3%), and Uttarakhand (61.4%) (MoSPI 2016). In the case of functional sewage treatment plants (STPs), Delhi has the highest designed capacity (2693.7 million litres a day) as well as operational capacity (2671.2 MLD), with 34 operational STPs. On the other hand, Uttarakhand had the lowest designed capacity (152.9 MLD) and the lowest operational capacity (90.75 MLD), with only 10 operational STPs (CPCB 2015).

Solid waste is managed better in Delhi and Chandigarh than in other states of the region. Shortage of landfill sites is a major constraint to SWM in Uttarakhand. Uttar Pradesh has introduced an innovative approach to integrated management of municipal solid waste (MSW). The National Green Tribunal (NGT) has approved Haryana’s proposal to set up 14 SWM

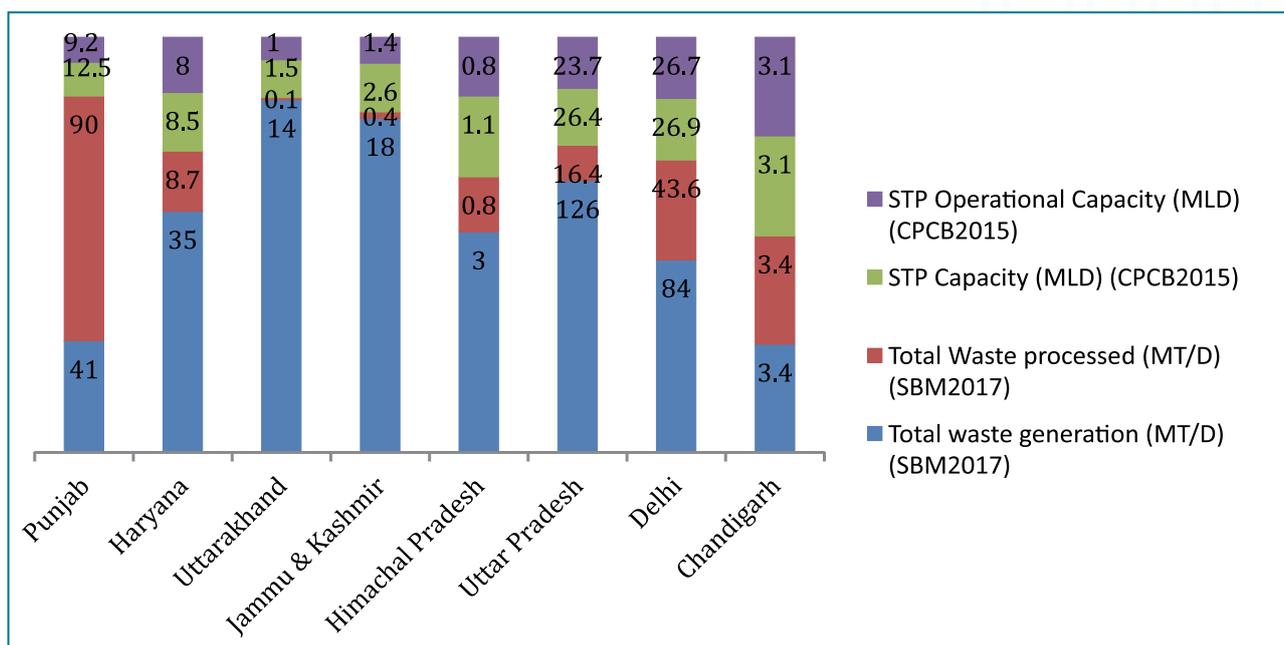


Figure 3.4: Management of solid and liquid waste in northern India (All figures are in hundreds)

as of 2nd Oct 2017 . Chandigarh was declared ODF in September 2016 and certified again after six months.

In the context of sewerage network, Jammu and Kashmir has the lowest percentage of piped sewer system (25.3%) in the northern region (Census of India 2011) and Chandigarh, the highest (85.9%) (Fig. 3.4). Although, according to the central Ministry of

centres under a centralized scheme instead of allowing each municipality to have its own disposal mechanism.

To augment water supply for meeting the rising demand in Delhi, the Government of Delhi proposes to construct a reservoir, namely the Renuka reservoir, on River Giri. In July 2015, the Chief Minister of Delhi

launched Sujala Dhara, a project to produce potable water from sewage water by adequate treatment, including chlorination, from a treatment plant in Keshopur. The Govt. of Delhi also launched the Swachh Delhi Abhiyaan in November 2015 on the lines of the SBM. Under this programme, the public can upload photographs of garbage or of construction and demolition waste using the 'Swachh Delhi app'; the corporations are expected to clean up such garbage and waste promptly. Although the app recorded 60 000 downloads and over 43 000 complaints, the initial enthusiasm waned soon.

The Uttarakhand Urban Sector Development Investment Program (UUSDIP) is supported by the Asian Development Bank (ADB), the components of which include water supply, wastewater treatment, slum improvement, and SWM. About 1.9 million people in Dehradun, Nainital, and Haridwar are expected to benefit from increased access to sustainable urban infrastructure and services of better quality. By 2017, 0.64 million had already benefitted from improved water supply and the next phase of the project is currently in progress (ADB 2017). Uttarakhand also won the National Urban Water Award twice, in 2008 and in 2011, for innovative technologies in the sector. In Uttar Pradesh, the Agra Water Supply Project – Gangajal – a project assisted by the Japan International Cooperation Agency (JICA) was implemented to source drinking water from the Ganga for Agra and Mathura.

One of the major initiatives in Haryana in the state government's annual plan 2015/16 was the augmentation of water supply in all towns of Haryana: in November 2014, the chief minister launched Swachh Haryana – Swachh Bharat Abhiyan to realize the dream of the national flagship programme, namely the SBM.

In Himachal Pradesh, Shimla is the only city covered under JNNURM. In Punjab, The Punjab Water Supply and Sanitation Board has executed and completed many projects including the Water Supply and Sewerage Project and the Urban Renewal Project for Water Supply and Sewerage services, both with assistance from the World Bank; the Water Supply and Sewerage Projects with assistance from HUDCO; a project to prevent pollution of River Satluj; a sewerage project with assistance from JICA; and the AUWSP. In Jammu and Kashmir, a major project is the Augmentation of Water Supply to Jammu City from

River Chenab, estimated to cost 8.86 billion rupees, to provide additional 240 MLD of drinking water to the city. Another project in the state was the Jammu and Kashmir Urban Sector Development Investment Program (JKUSDIP), financed by the ADB and undertaken by the Economic Reconstruction Agency (ERA) in 2013. The project is to be completed in 8 years and includes water supply, sewerage, sanitation, drainage, and SWM; the first tranche was received in 2017, and the second was being processed.

As part of the Smart Cities mission, Uttar Pradesh has 13 cities; Punjab has 3 and Haryana has 2; and Chandigarh, Delhi, Himachal Pradesh, Jammu and Kashmir, and Uttarakhand have 1 city each included in the mission.

Good practices

1. Innovative Practices by New Delhi Municipal Council. Under the Smart Cities initiative, NDMC has developed toilets (Fig. 3.5a) with sensor-based doors, LED lights, advertisement panels powered by solar cells, sensor-based water taps, vending machines on the lines ATMs for water, sanitary napkins, and snacks, and also a facility to provide feedback (Fig. 3.5b).



Figure 3.5 (a), (b): Smart sanitation initiatives in Delhi

(Source: smartcities.gov.in)

Brightly coloured mascots have also been launched, which will try to prevent people from relieving

themselves out in the open in Lutyens' Delhi, with the New Delhi Municipal Council (NDMC) deploying 28 'Swachh Sewaks' for the task (Fig. 3.5c).

2. Involvement of non-governmental organizations in improving waste collection. Chintan, a Delhi-based NGO, works on all aspects of solid waste including providing waste management services to waste generators, training waste pickers to offer professional services from e-waste handling to collection at the doorstep, and facilitates waste handling in Delhi, Haryana, Jammu and Kashmir, and Uttar Pradesh.



Figure 3.5 (c): NDMC deploying mascots to create awareness for ODF mission

Table 3.1: Progress of Swachh Bharat Mission in northern India

State or union territory	IHHL (up to April 2017)		CT/PT (Until April 2017)		% ODF verified (SBM 2017)	Door-to-door waste collection in Wards			Waste		State SBM Missions
	No.	% Target met	No.	% Target met		100% collection	Total No.	% With 100% collection	Total waste generation (MT/D)	Processed (% of total)	
Punjab	28 931	15	660	6	1	2 544	3 093	82.25	4 100	22	
Haryana	19 345	9	1 330	13	89	412	1 449	28.43	3 490	25	Swachh Haryana - Swachh Bharat Abhiyan
Uttarakhand	4 136	10	339	13	12	270	706	38.24	1 400	00.7	
Jammu and Kashmir	805	1	615	16	1	989	1 163	85.04	1 792	02	
Himachal Pradesh	1 675	13	35	4	8	167	502	33.27	300	25	
Uttar Pradesh	280 502	24	4 930	8	1	3 516	11 290	31.14	12 650	13	
Delhi	15	0%	7270	65	17	232	272	85.29	8400	52	
Chandigarh	21999	360%	2200	225	100	26	26	100.00	340	100	

Source: SBM 2017

3.2.2 Eastern region

The eastern region comprises the states of Bihar, Chhattisgarh, Jharkhand, Odisha, and West Bengal, and the UT of Andaman and Nicobar Islands and accounts for 12.72% of the country's total area and 24% of its population. Bihar has the highest population (10.3 million); West Bengal is the most urbanized state (31.89%) and Bihar is the least urbanized state (11.3%) whereas the all-India average is 31.16% (Census of India 2011).

Chhattisgarh (62.5%) and Andaman and Nicobar Islands (97.9%) have the highest percentage of piped tap water supply and Bihar (20%), the lowest, (Fig. 3.7) whereas the all-India average is 70.6% (Census of India 2011). In 8 districts in West Bengal and in 15 in Bihar, groundwater is severely contaminated with arsenic.

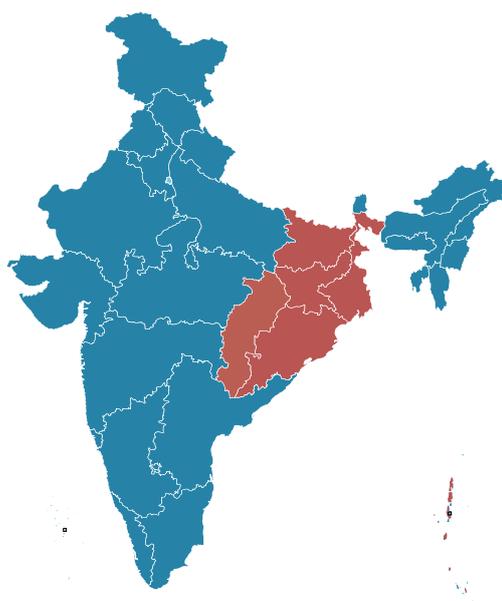


Figure 3.6: Eastern region of India

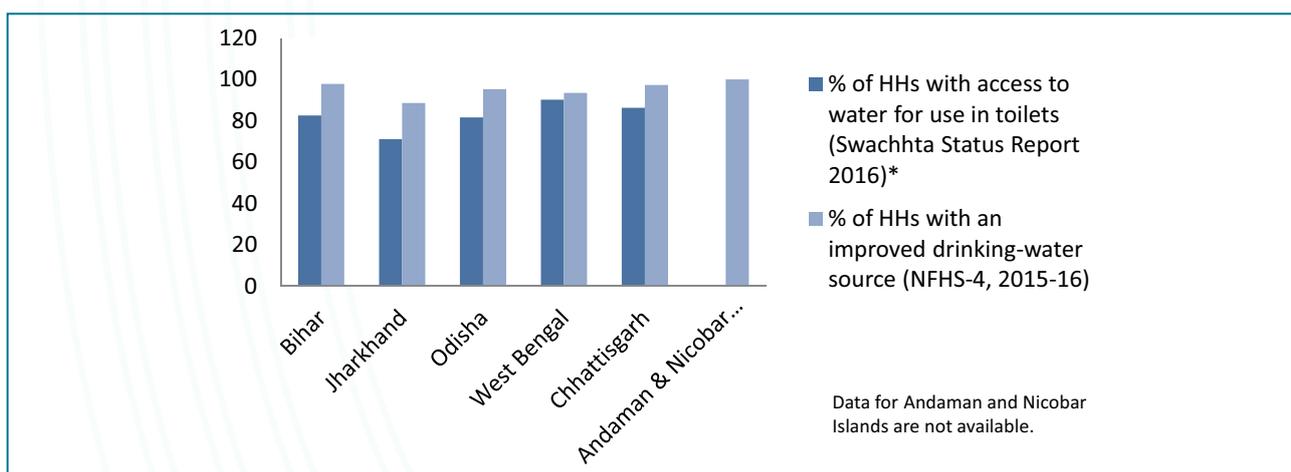


Figure 3.7: Water for drinking and for use in toilets in eastern India

Odisha is the poorest in terms of access to toilets: only 58.8% of urban households have access to water-seal type of latrines (the national average is 72.6%), and 33.2% households have to resort to OD (the national average is 12.6%). In terms of ODF verification Chhattisgarh has been declared 100% ODF as on 2nd October 2017, and Odisha, West Bengal, and A&N Islands have 0% ULBs verified as ODF (SBM 2017) (Fig. 3.8).

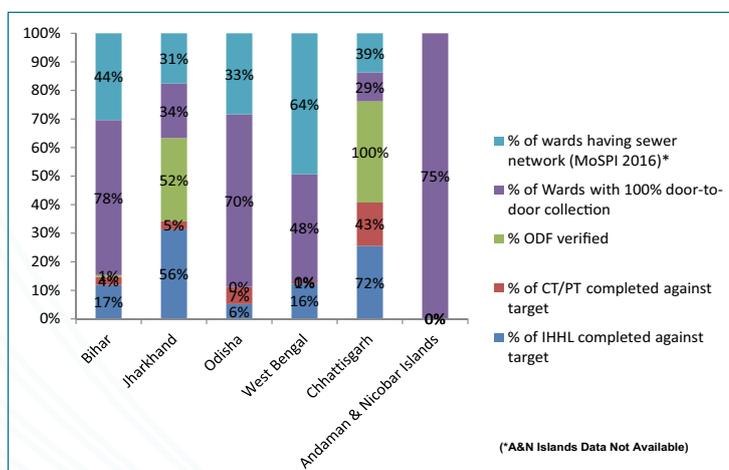


Figure 3.8: Regional assessment of urban sanitation scenario in Eastern India

Solid waste management is only partly functional in almost all the eastern states. The state review report (2012) by the Central Pollution Control Board states that until 2012, Bihar did not treat any of the solid waste generated in its cities. West Bengal had the highest capacity to treat sewage (416.9 MLD, 28 STPs) and Bihar, the lowest (124.55 MLD, 6 STPs) (CPCB 2015).

In the Swachh Survekshan Survey 2017, Bihar was ranked the lowest in the region, with Bagaha being placed at 432, whereas Ambikapur in Chhattisgarh was ranked 15, the highest in the region.

As part of the Smart Cities mission, West Bengal has 4 cities, Bihar has 3, Chhattisgarh and Odisha have

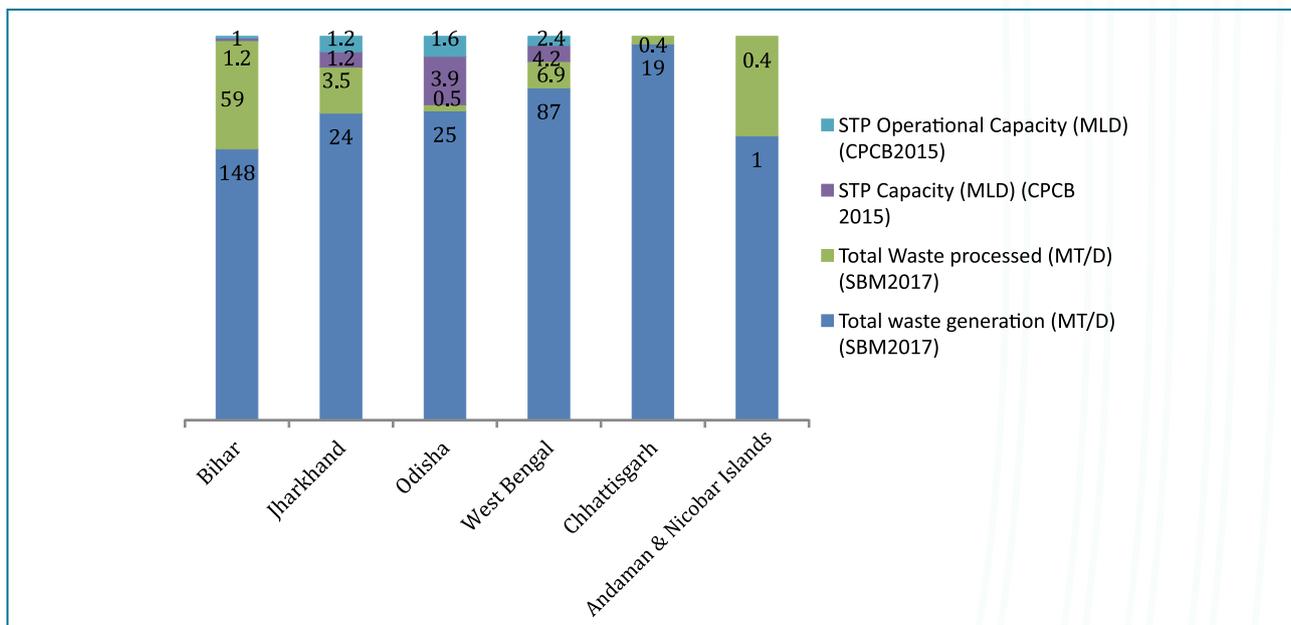


Figure 3.9: Management of solid and liquid waste in Eastern India (All figures in hundreds)

Scientific disposal and treatment of MSW is lacking in all the states; however, Kolkata has recently taken progressive steps in this direction: in 2016, Kolkata's Solid Waste Management Improvement Project (KSWMIP) won the C40 Award for the Best Solid Waste Project. The project had managed to segregate 60%–80% (depending on site) of the waste at source, with further segregation at transfer stations. Transferring the waste directly to sanitary landfill sites or through transfer stations has reduced open dumping by 35%, or by 120 tonnes per day (TPD) (C40 2017). In Chhattisgarh, the Raipur Municipal Corporation has signed an agreement with Kivar Environ, Bengaluru, for an integrated MSWM project (at a cost of 1.1 billion rupees) on a public–private partnership basis (Lanjewar; Sharma; Mahishwar, 2014)

In terms of implementing JNNURM, Andaman and Nicobar Islands had the smallest budget under the UIDSSMT scheme, and no project has been completed in the union territory so far. Only water supply projects have been taken up so far in Bihar and Sikkim; some SWM projects have been implemented in Jharkhand; and some sanitation and sewerage projects in Odisha and West Bengal.

2 each, and Jharkhand and Andaman and Nicobar Islands have 1 each included in the mission.

Good practices

Involvement of NGOs. Nidan, a Patna-based NGO, started the Integrated Water and Sanitation Programme in 10 slums of Patna, a project supported by WaterAid in 2010, to improve the conditions in slums with regard to WASH facilities. Members of the NGO act as 'sanitation champions' to mobilize households for better sanitation and also continually send out messages aimed at behavioural changes, a practice that plays a key role. Nidan also holds group meetings, runs slum education centres, and spreads awareness of WASH through schools.

Another NGO, Water for People, has been working in West Bengal especially to mitigate the adverse effects of arsenic pollution and to reduce it. The South Asian Forum for Environment (SAFE) follows an integrated community-based intervention model on water and sanitation issues in slums of Kolkata to improve the utterly unhygienic and unsanitary conditions that prevail in the slums, mainly because potable water is scarce.

Table 3.2: Progress of Swachh Bharat Mission in eastern India

STATE	IHHL(up to April 2017)		CT/PT (up to April 2017)		% ODF verified	Door-to-door waste collection in wards			Waste		State SBM programme
	No.	% Target met	No.	% Target met		100% collection	Total No.	% With 100% collection	Total generated (MTD)	Pro-cessed (% Of total)	
Bihar	92 177	17	970	4	1	2584	3321	77.81	14 820	40	
Jharkhand	130 013	56	680	5	52	282	828	34.06	2350	15	
Odisha	22 612	6	1159	7	0	1387	1975	70.23	2460	2	
West Bengal	125 944	16	185	1	0	1360	2816	48.30	8675	8	Nirmal Bangla
Chhattisgarh	251 674	72	7,690	43	100	923	3,232	28.56	1896	2	
A&N Islands	0	0	0	0	0	18	24	75	100	35	

Source: SBM 2017

3.2.3 North-Eastern region

The north-eastern region (Fig. 3.10) comprises the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura (accounting for approximately 8% of India's area and 4% of its population). Arunachal Pradesh is the largest state; Assam, the most populous; and Mizoram, the most urbanized (52.11% of its population lives in urban areas) (Census of India 2011).

The terrain consists mostly of hills and valleys, a topography that limits infrastructure development with regard to water supply and sewerage. Sikkim has the highest percentage of piped water coverage (92.1%) in the region (Fig. 3.11), much higher than the national average of 70.6%. Although Arunachal Pradesh also enjoys good coverage, its capital Itanagar faces water shortage due to growing population.

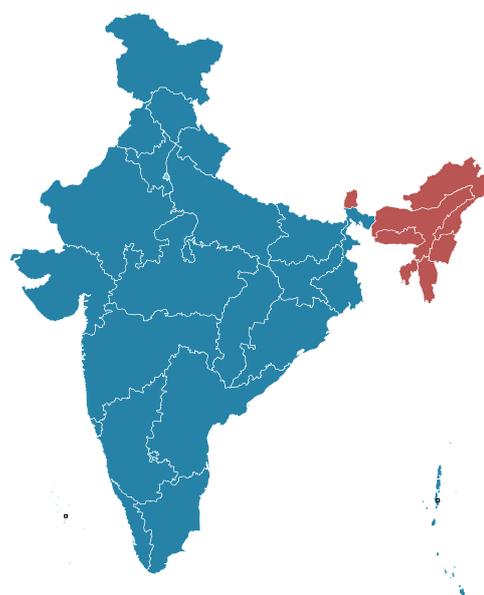


Figure 3.10: North-eastern region of India

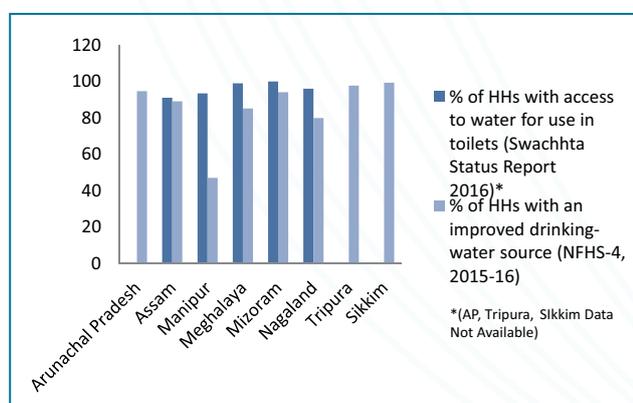


Figure 3.11: Water for drinking and for use in toilets in north-eastern India

In Tripura, a number of water-borne diseases claimed over 113 lives, and a report of the North-eastern Regional Institute of Water and Land Management (NERIWL), in 2013, found 2931 habitations contaminated with fluoride, nitrate, iron, or arsenic (Bhattacharjee, 2013)

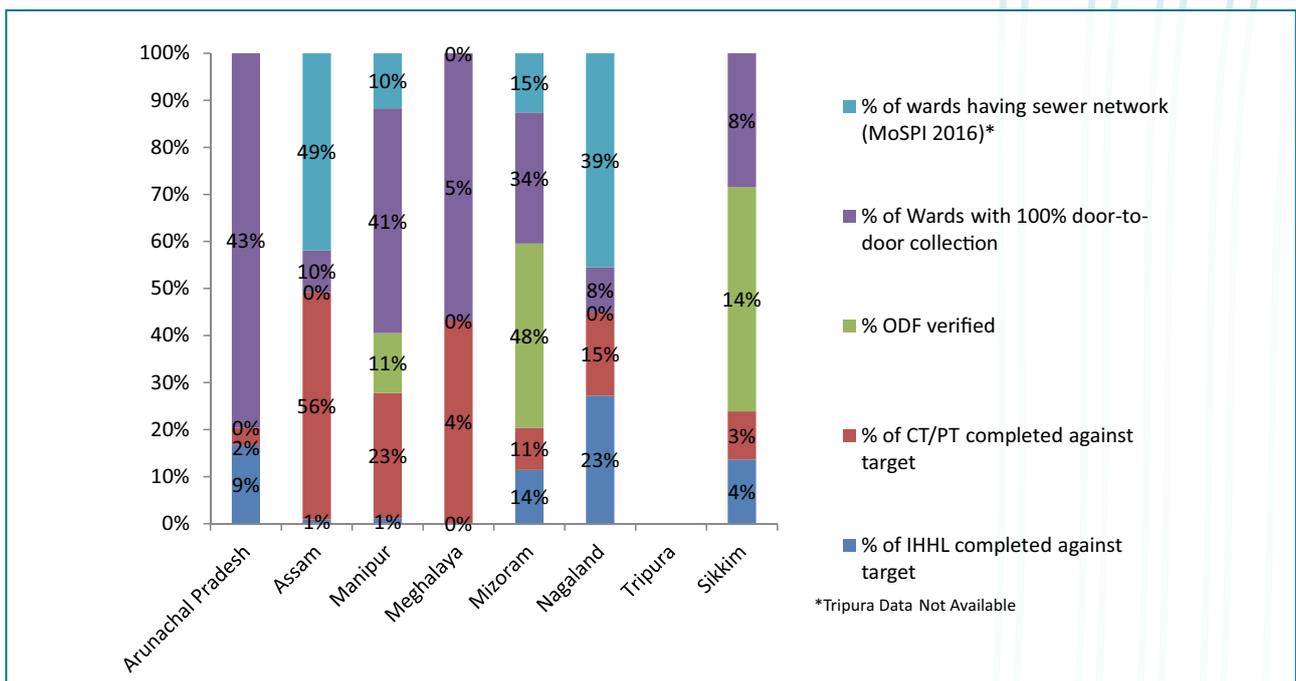


Figure 3.12: Urban sanitation in north-eastern India

Urban sanitation facilities in the region (Fig 3.12) are not on par with the national standards. Although most urban households have water-seal latrines, close to national average of 72.6%, they are not connected to a network of sewage lines. According to Census 2011, Meghalaya had the highest percentage of households with water-seal latrines (82.9%) and Tripura, the lowest (50%) (Census of India 2011). In Mizoram, 71.3% of the households used septic tanks whereas in Tripura, only 37.6% did so. In terms of construction of IHHL, Nagaland, with 3961 completed units, led the region, and in Assam 1988 toilets of the CT/PT type have been with constructed so far. Tripura has the least number of toilets constructed so far in the north-east region. Of the targets set under the SBM, the Arunachal Pradesh government has met 84.05% of the targets set for IHHLs, 34.62% for those set for community sanitary complexes (CSC), and 9.08% of those for solid and liquid waste management (SLWM) components (Northeast Today, 23 March 2017).

According to an inventory of STPs (Fig. 3.13, Sikkim is doing well in the north-eastern region: the state has 11 municipal STPs with a combined designed capacity of 31.88 MLD and operational capacity of 8 MLD, although only 1 plant is operational; the capacity in all the other states is almost negligible (CPCB 2015).

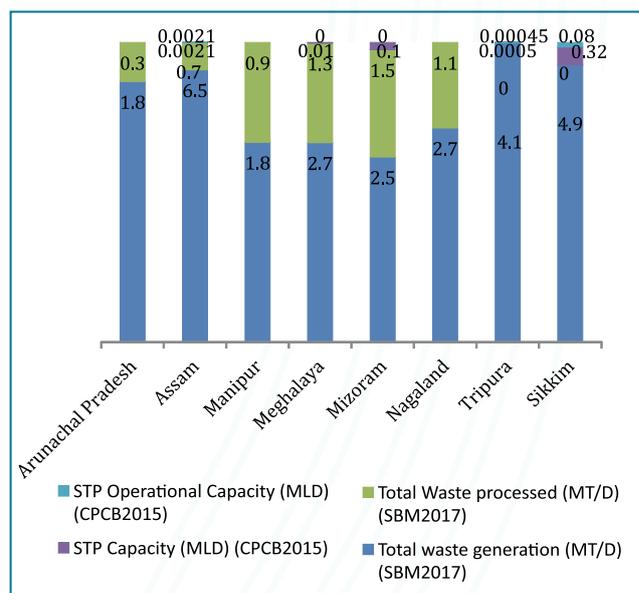


Figure 3.13: Solid liquid waste management in north-east region of India (All figures in hundreds)

Mizoram has achieved considerable progress in being ODF: by July 2017, out of 23 urbanized areas of Mizoram, 17 (70%) had declared themselves ODF; 16 were certified as ODF and the status re-verified after 6 monthly re-evaluation. In Manipur, 5 out of 27, or 19% of the cities, and in Sikkim, Mangan, in North Sikkim, was the only 1 out of 7 to be independently verified as ODF. However, not a single city or town in Arunachal Pradesh, Meghalaya, Nagaland, and Tripura has been declared ODF so far (MoUD 2017). All the states in this region have one smart city each under the Smart Cities mission.

Table 3.3: Progress of Swachh Bharat Mission in north-eastern India

State	CT/PT (up to April 2017)		CT/PT (up to April 2017)		% ODF verified	Door-to-door waste collection in wards			Waste		State SBM programme
	No.	% Target met	No.	% Target met		100% Collection	Total No.	%With 100% Collection	Total generated (MT/D)	Pro-cessed	
Arunachal Pradesh	1 056	9	9	2	0	18	42	42.85	181	15	
Assam	736	1	1 988	56	0	92	888	10.30	650	10	
Manipur	237	1	140	23	11	130	315	41.26	176	50	
Meghalaya	1	0	15	4	0	6	114	5.26	268	50	
Mizoram	2 349	14	53	11	48	66	193	34.19	253	58	
Nagaland	3 691	23	70	15	0	19	234	8.11	270	40	
Tripura	1	0	0	0	0	0	244	0	407	0	
Sikkim	1627	4	20	3	14	4	48	8.33	49	0	

Source: SBM 2017

3.2.4 Southern region

The southern region comprises the states of Andhra Pradesh, Kerala, Karnataka, Tamil Nadu, and Telangana and the UTs of Lakshadweep and Puducherry, with 19.31% of India's area and 21% of its population. About 60% of the population lives in permanent housing structures and 67.8% population of this region has access to tap water.

Karnataka is the largest state by area and Tamil Nadu, the most populous and the most urbanized (48.45%). Andhra Pradesh and Telangana are the least urbanized: only a third of the population lives in urban areas. Lakshadweep is more urbanized (78.07%) than Puducherry.

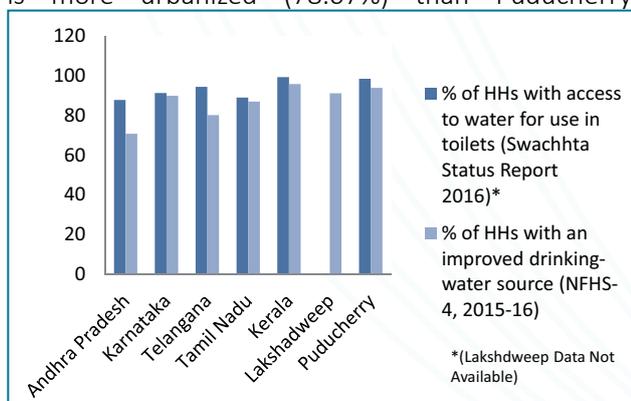


Figure 3.15: Water for drinking and for use in toilets in southern India

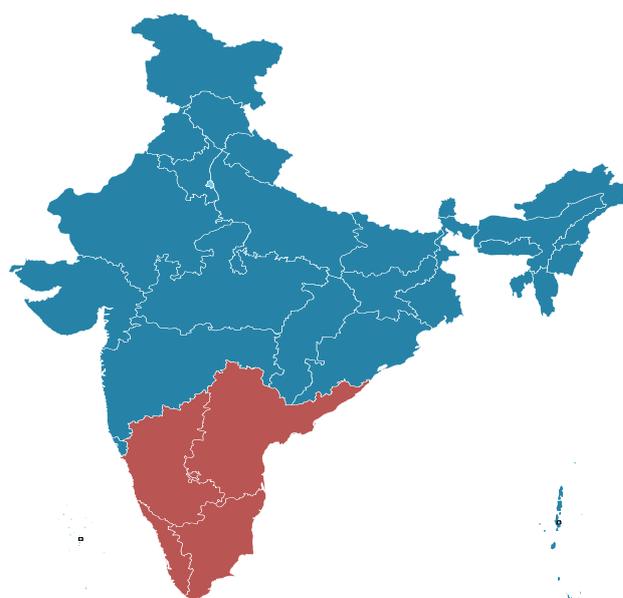


Figure 3.14: Southern region of India

In Andhra Pradesh and Telangana, 83.5% of the urban population has access to piped tap water, the highest proportion in the region, whereas the figure is only 34.9% for Kerala. Everybody in Puducherry has access whereas in Lakshadweep only 16.9% of the population is served by piped water supply. Access to water, whether for drinking or for toilet, is very high in this region (MoSPI 2017 and IIPS 2017) (Fig. 3.15). Tamil Nadu, Andhra Pradesh, and Lakshadweep are the only ones in this region to use large-scale desalination plants, and more are being built.

In 2016, three desalination plants based on the low-temperature thermal desalination (LTTD) technology were successfully commissioned, one each in Kavaratti, Minicoy, and Agatti islands of Lakshadweep the costs were 50 million, 104 million, and 164 million rupees, respectively (Ministry of Earth Science 2016). In Chennai, two plants are already running and two more are to be constructed.

The southern region is better served by sanitation services (Fig. 3.16) than other regions. Kerala has the highest (97.43%) proportion of urban households with water-seal latrines; the proportion in Tamil Nadu, although the lowest in the region, is high (66.5%) and close to the national average of 72.6% (Census of India 2011). Karnataka leads in terms of sewerage infrastructure: 53.3% of the households are served by piped sewer systems (the national average is 32.7%), whereas in Kerala, the proportion is only 14.3%. It is noteworthy that although only 27.9% of the households in Tamil Nadu are connected to a network of sewers, the proportion is as high as 99% in the core areas of Chennai city. In terms of STPs, Tamil Nadu leads this region (1140.83 MLD of operational

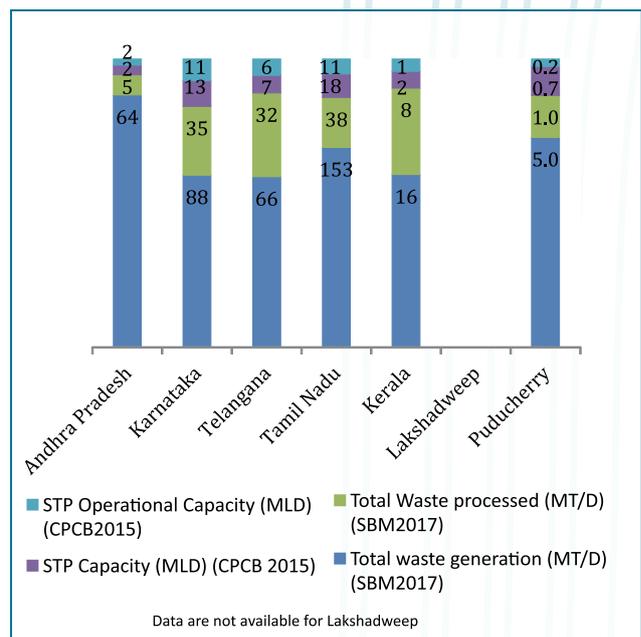


Figure 3.17: Solid liquid waste management in the southern region of India (All figures in hundreds)

Kerala leads the region in waste processing (Fig. 3.17). Tamil Nadu has accorded the highest priority to underground sewerage and wastewater treatment plants across all local bodies (ADB & IMAC 2014) and is one of the few states to prepare a comprehensive programme for providing sewerage networks with sustainable financing and user charges for sewerage connections. In Andhra Pradesh, the gap between generation and treatment of wastewater is large (State Level Sanitation Committee, Govt of Andhra Pradesh 2016). Improper management of septage has led to sewage and septage being disposed into water bodies in and around the cities without any treatment in more than 100 ULBs of the state. Out of 1688 MLD of water supplied to the ULBs in the state, approximately 1086 MLD is released as waste water. Also, the total quantity of MSW generated in the state of Andhra Pradesh is 6440 TPD, of which 5796 TPD is collected and 550 TPD is treated (Central Pollution Control Board 2012). However, Andhra Pradesh is amongst the few states in India to have set up waste-to-energy plants using the cluster approach. Andhra Pradesh also established the Swachha Andhra Corporation in 2015 to implement the SBM.

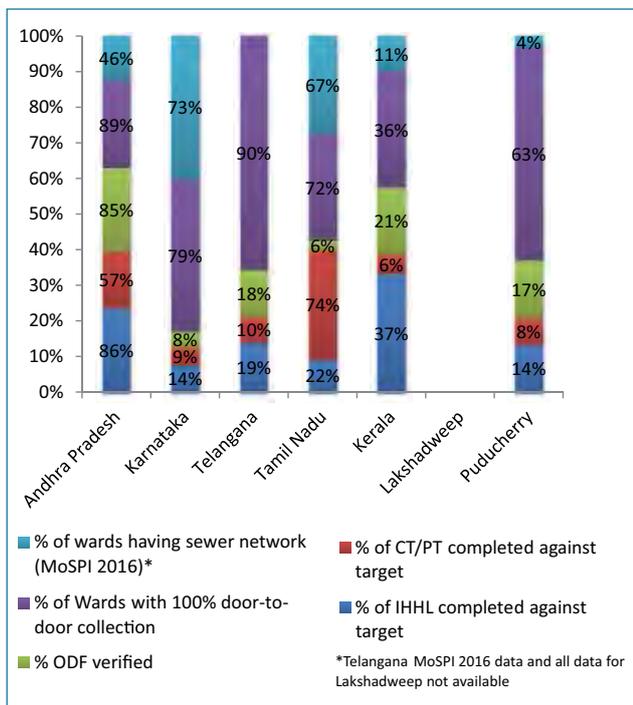


Figure 3. 16: Sanitation services in southern India

capacity and 33 functional plants out of 73) whereas Kerala, with operational capacity of 112.87 MLD and with 6 functional STPs out of 10, ranks the lowest in the region (CPCB 2015).

With regards to the progress to eliminate OD, by October 2017, 26% of the cities in the region (321 out of 1223) had declared themselves as ODF; the claim of 15.2% (186 cities) was verified once by the Quality Council of India, an independent third-party agency commissioned by MoUD. Andhra Pradesh was one of

the first states to declare 100% of its ULBs (110 cities) as ODF. Currently, 93 cities have been re-verified as ODF after the six monthly process of re-evaluation.

The Government of Tamil Nadu created a special fund for SWM with an initial budget of 1 billion rupees in 2013-14. On the other hand, inefficient water treatment and SWM systems in Kerala have resulted in river pollution. Setting up of the Suchitwa Mission in Kerala led to the development of the Kerala State Sanitation Strategy, drawn up in February 2015. Kerala has also been proactive in introducing decentralized waste management schemes in some cities; for example, in Kochi Municipal Corporation, 350 apartment complexes were covered under this initiative (CMC, no date). In Kerala, 1 city (Kochi) has been selected to be developed as a SMART City and 9 cities under AMRUT.

Except Lakshadweep, all states and UTs in the region

**Andhra Pradesh was
one of the first states to
declare 100% of its ULBs
(110 cities)**

implemented projects under various schemes of the JNNURM. Andhra Pradesh, with 52 approved projects, topped the list although most of them are yet in the transition phase. In Karnataka, with support from the World Bank, Hubli, Belgaum, and Gulbarga were to get 24 x 7 water supply in 2008. Also, under the chief minister's Nagara Neeru Bhagya Programme, 24 x 7 drinking water supply schemes were being implemented in 13 districts and 20 towns. The Karnataka State Pollution Control Board has made STPs and reuse of treated water mandatory for all residential complexes with 50 or more dwellings.

Puducherry's daily per-capita waste generation, estimated at 500 g, is higher than the national average (Pondicherry Urban Development Agency 2014) and nearly 200 TPD of MSW is being generated currently

(MoUD, no date). With the projected population of 800186 in 2020, it is estimated that 16 000 tonnes of MSW would be generated in that year (Pondicherry Urban Development Agency 2014). Therefore, a project to dispose of MSW through incineration is proposed with financial assistance from JICA.

The recently carved out state of Telangana launched the Swachh Telangana Mission in 2015 to make all cities in the state ODF by 2019.

Good practices

Micro-credits for toilet construction. In Tiruchirappalli, Tamil Nadu, Gramalaya, an NGO, promotes access to water supply and sanitation services for the poor through microcredit. Currently, Gramalaya is working in all the 186 slums within the municipal administrative boundaries. In 2000, Gramalaya in cooperation with WaterAid, launched an initiative to renovate toilets in households of the urban poor and to establish a community-based system for operation and maintenance. As a result of the large-scale public outreach campaign to generate awareness and involve the community in maintaining the toilets, Tiruchirappalli was ranked 8th in sanitation ranking among 434 cities in the recently concluded Swachh Survekshan 2017. The NGO is now working also in other parts of Tamil Nadu, Andhra Pradesh, Karnataka, Telangana, and Puducherry.

Table 3.4: Progress of Swachh Bharat Mission in southern India

State or union territory	IHHL (up to April 2017)		CT/PT (up to April 2017)		% ODF verified	Door-to-door waste collection in wards			Waste		State SBM programme
	No.	%Target met	No.	%Target met		100% collection	Total no.	% with 100% collection	Total generated (MTD)	Processed (% of total)	
Andhra Pradesh	349 932	86	12,176	57	85	3072	3455	88.91	6440	8	Swachha Andhra Mission
Karnataka	125 296	14	3270	9	8	4146	5276	78.58	8784	40	
Telangana	72 550	19	1584	10	18	1766	1967	89.78	6628	49	Swachh Telangana Mission
Tamil Nadu	303 849	22	44 290	74	6	9182	12,820	71.62	15 272	25	
Kerala	65 976	37	265	6	21	1280	3536	36.20	1576	50	Suchitwa Mission
Lakshadweep	Data not available										
Puducherry	2422	14	100	8	17	81	129	62.79	495	20	

Source: SBM 2017

3.2.5 Western region

The western region comprises the states of Goa, Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan and the UTs of Daman and Diu and Dadra and Nagar Haveli. The region accounts for 39.35% of the total area of the country and 26% of its population (Census of India 2011).

Goa has the highest urbanization percentage (62.17%). Amongst the two UTs, Daman and Diu is more urbanized (75.17%). Slum population is also very high in the region with Madhya Pradesh having the highest proportion (31.99%); also, Jaipur and Mumbai have very large slum populations.

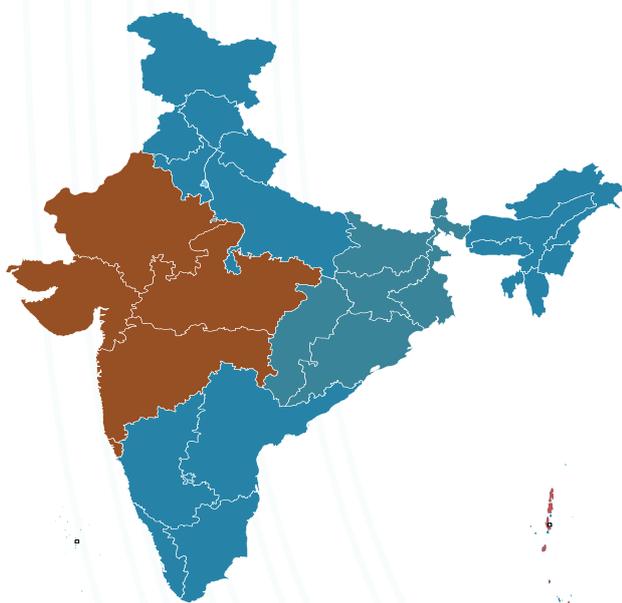


Figure 3.18: Western region of India

Goa ranks first in terms of piped water supply (90.2% households) and Madhya Pradesh ranks last (62.2%) (Fig. 3.19). Daman and Diu is ahead of Dadra and Nagar Haveli. Availability of water is a major problem in Madhya Pradesh and Maharashtra, and is becoming increasingly severe as the overexploitation of groundwater continues and the water table continues to recede in some districts.

Gujarat is ahead of other states with the highest proportion of water-seal latrines (85.2%) as per Census of India 2011. Almost all the states in this

region are dependent on septic tanks for sewage disposal and more than 50% of urban population uses them; only in Gujarat the piped sewer system covers 60.4% of the households. Sewage treatment is a key issue in Madhya Pradesh: Indore generates 204 MLD of sewage but the treatment capacity is only 78 MLD and Bhopal generates 334.75 MLD but the treatment capacity is only 22 MLD—these gaps are the major cause of river pollution in Madhya Pradesh (PFI 2012). According to the recent inventory, Maharashtra has the highest capacity (5160.36 MLD) to treat sewage in the region: the operational capacity is 4683.9 MLD and 60 out of the 76 STPs in the state are functional. Goa has the least capacity in the region: the operational capacity is only 34.5 MLD (CPCB 2015).

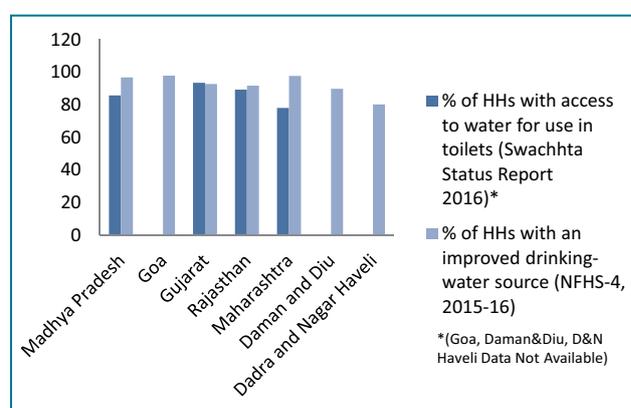


Figure 3.19: Water for drinking and for use in toilets in western India

As of 2nd October 2017, 65%, or 748 out of the 1140 cities in the region, had declared themselves ODF, and has been verified by the Quality Council of India. Gujarat, Maharashtra, and Madhya Pradesh have been front runners in the region. However, no city in Goa or the UTs of Daman and Diu and Dadra and Nagar Haveli has declared itself ODF.

Indore and Bhopal in Madhya Pradesh were ranked the top two cleanest cities in India by Swachh Survekshan 2017, a significant jump from their rankings in 2014. In Rajasthan, 18 of 29 cities were not among the first 300; 13 were in the bottom 100; and Bundi, the highest in the state, was ranked 171.



Figure 3.20: A compartmentalized garbage pick-up truck in Indore

In the SWM sector (Fig. 3.21), Gujarat has done better although there is scope for improvement. The total solid waste generated from all the urban areas in Gujarat amounts to 8566.54 TPD, of which 17.58% is put into treatment systems, 63.21% is thrown into open dumps, and only 1.63% is disposed of through scientific landfill sites (SLF) after due treatment, and the rest (about 17.5%) is left unattended (State of Environment Report Gujarat, 2012). Ahmedabad has the biggest secured and engineered landfill site in Asia at Gyaspur, which has a capacity of 1.15 million tonnes.

Maharashtra generates 18884 MT of MSW a day (MPCB 2013), approximately 11% of which is treated (CPCB 2012). In Rajasthan, 61% households in urban areas have proper arrangement for garbage disposal (NSSO 2013). Solid waste management is poor in both the UTs in this region: the waste is simply dumped in the open.

In the sanitation sector (Fig. 3.22), Gujarat has launched its own mission, namely the Mahatma Gandhi Swachhata Mission (MGSM), which aims at a green Gujarat that will be a zero-waste state, free of

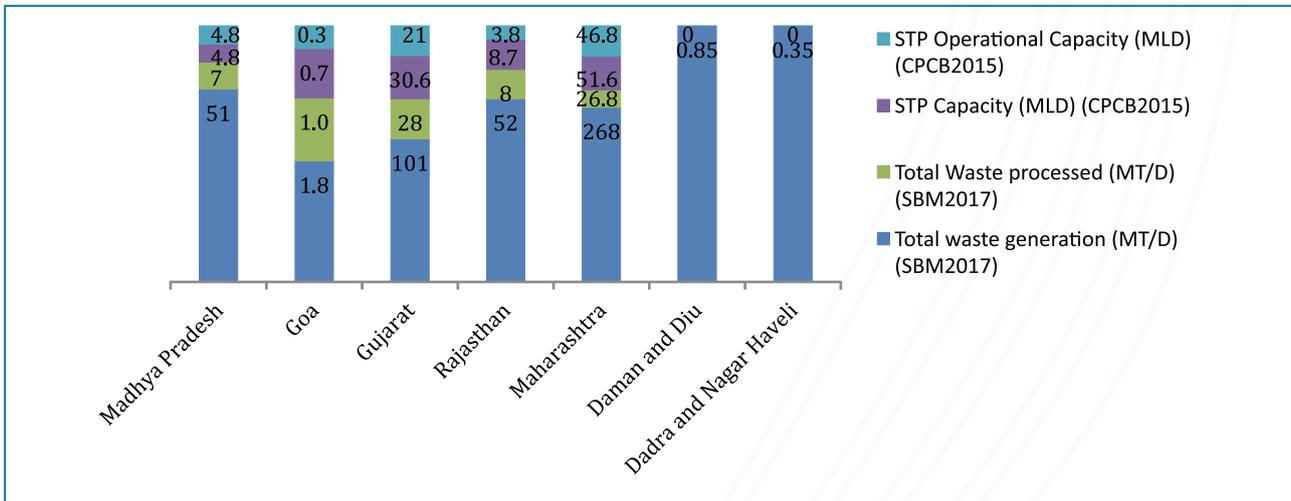


Figure 3.21: Management of solid and liquid waste in western India (All figures in hundreds)

In Madhya Pradesh, 68% of solid waste is thrown either in the open or into the drains, 23% in public dustbins, and 4% is dumped in landfills (PFI 2012). The quantity of MSW generated in the ULBs of Madhya Pradesh is 6678 MTD (MPPCB 2015), of which 4298 TPD is collected and 802 TPD is treated (CPCB 2015).

dust and OD. As part of the mission, 100000 individual toilets were sanctioned in 2013/14 under the Nirmal Gujarat Individual Toilets scheme; 1034 pay-and-use toilet blocks have been constructed; and 157 water supply schemes and 150 underground drainage schemes have been implemented so far (MGSM 2017).

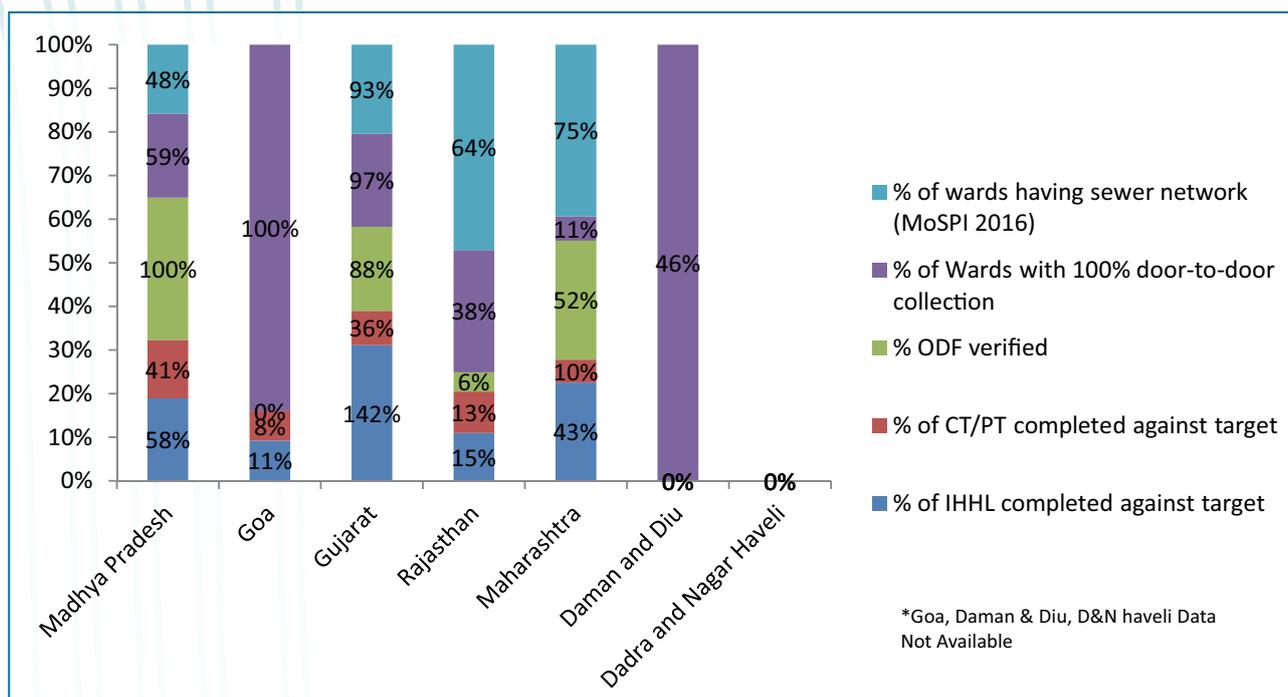


Figure 3.22: Status of sanitation services in western India

In Madhya Pradesh, The Urban Water Supply and Environmental Improvement Project, or Project UDAY, funded by ADB, was implemented in four cities and completed in 2013; the project improved water supply for 5.6 million people, wastewater management for 0.5 million, and SWM for 4.7 million (ADB 2016).

In 2010, the Maharashtra Sujal and Nirmal Abhiyan (MSNA) was launched to enhance water supply and sewerage (WSS) services provided by ULBs. The initiative aimed at providing universal access to sewers, piped water of high quality, full treatment of wastewater, and abolition of OD; covered 247 ULBs, leaving out only five cities (which had been already covered under the JNNURM); and was successful in delivering 24 × 7 water supply in Amravati and Malkapur. However, the project ended after three years (Indian Express, 1 March 2017). In response to the launch of the SBM in October 2014, the Govt of Maharashtra also launched the Swachh Maharashtra Mission in Urban areas (SMMU), which is being implemented by the Urban Development Department, and a special mission directorate has been established for SMMU. The mission’s approach is outlined as *Swachhata Saptapadi*, which roughly translates to seven steps to cleanliness, and includes participation of people in the campaign, construction of toilets, awareness about waste segregation, safe

and scientific methods of managing solid and liquid wastes, and promoting green and open spaces (Govt. of Maharashtra).

In Rajasthan, the Re-Organization Jodhpur Water Supply project is funded by the Agence Française de Développement (AFD) to ensure clean and safe potable water for Jodhpur city and, in the future, to its suburbs. AMRUT, with a total allocation of about 32 billion rupees, will cover 29 cities in Rajasthan (RUDSICO 2017). As part of the Smart Cities mission, Daman and Diu, Dadra and Nagar Haveli, and Goa have proposed one city each; Rajasthan-four; Gujarat-six; Madhya Pradesh-seven; and Maharashtra-ten.

Good practices

Technology for improved access to toilets. Shelter Associates, an NGO working in Maharashtra and based in Pune, has been working in the water and sanitation sector for the past 20 years. The organization partners with the urban poor, particularly women, in informal settlements to facilitate and to provide technical support for community-managed slum rehabilitation, housing, and essential services projects. To identify slums where sewer lines are already laid out and to

support slum dwellers in building toilets, the NGO uses the GIS technology; has already built over 1000 community toilets in Pune slums and over 120 individual toilets in Sangli; undertaken projects in five cities in Maharashtra; and has impacted 70000 people.

Technology for integrated SWM in Jabalpur Municipal Corporation, MP. A system for collecting and managing garbage was initiated by the JMC to ensure effective collection, transport, and processing or disposal of waste. The key features of the initiative include ensuring waste collection, door-to-door

collection, tracking and monitoring of waste through RFID tags on household garbage bins, collection and monitoring from public bins (semi-underground bins) through bin-level sensors, vehicle tracking and monitoring system VTMS), and estimation of solid waste generation to help in planning for disposal of waste and its utilization in waste-to-energy plants (MoUD 2017). The project, scheduled to be completed in 2018, has enabled Jabalpur to control and manage the collection, transfer, and disposal of solid waste effectively. The cost of using RFID tags is nearly 1.6 billion rupees and that of VTMS, 130.76 million rupees.

Table 3.5: Progress of Swachh Bharat Mission in western India

STATE	IHHL (up to April 2017)		CT/PT (up to April 2017)		% ODF verified	Door-to-door waste collection in wards			Waste		State SBM Programme State SBM Missions
	No.	% Target met	No.	% Target met		100% Collection	Total No.	% with 100% collection	Total generated (MTD)	Processed (% of total)	
Madhya Pradesh	421 879	58	16 610	41	100	4136	6999	59.09	5079	14	
Goa	914	11	40	8	0	192	192	100.00	183	52	
Gujarat	575 110	142	11 010	36	88	1529	1572	97.26	10 145	28	Mahatma Gandhi Swachhata Mission
Rajasthan	86 895	15	3558	13	6	2010	5247	38.31	5247	16	
Maharashtra	382 444	43	5865	10	52	748	7 054	10.60	26 820	10	Swachh Maharashtra Mission (Urban)
Daman and Diu	0	0	0	0	0	13	28	46.43	85	0	
Dadra and Nagar Haveli	0	0	0	0	0	0	15	0.00	35	0	

Source: SBM 2017

3.6 Perspectives of stakeholders from national and regional stakeholder consultation workshops

Regional stakeholder consultation workshops were held in Delhi (for the northern and north-eastern regions), Kolkata (eastern region), Chennai (southern region), and Ahmedabad (western region) between September 2015 and March 2016, followed by a national workshop in Delhi in December 2016. The deliberations focused on issues and challenges in water and sanitation systems in the respective regions. Key policy and institutional drivers of sustainable water supply and sanitation were discussed. These discussions provided important insights into the scale of the problems arising from the growing demand for water and sanitation facilities in urban areas following rapid urbanization. The workshops helped in identifying important issues in all the regions and challenges in achieving the objectives of the SBM (Urban).

The stakeholders – a total of 158 – represented 32 cities or towns (metropolitan cities, large cities, and small towns) and were drawn from government departments, multinational organizations, private-sector enterprises, NGOs, academic and research institutions, and students pursuing research on WASH; NGOs were particularly well represented.

The key outcomes of the stakeholder workshops were as follows.

- Exchange of knowledge and data on various urban WASH-related activities in the country and recommendations for corrective actions
- Reality check for urban WASH in India with prioritized pathway for corrective steps
- Knowledge dissemination among stakeholders on critical gaps in urban WASH

The key highlights and recommendations of the national and regional workshops are presented in Box 3.1.

Box 3.1: Key highlights and recommendations

- Pay attention to three important aspects, namely technical arrangements, robust arrangements for public-private partnerships (PPP), and knowledge sharing
- Adopt the build-use-maintain-treat approach. Treatment of faecal sludge creates a business opportunity for entrepreneurs.
- Engage researchers and the academia effectively.
- Prepare a road map for collaborative action to achieve sustainable solutions.
- Involve every citizen in achieving the objectives of the SBM. As the Swachh Survekshan 2017 showed, ranking the 500 cities on their level of sanitation encourages the citizens to participate.
- Ensure sustainable sanitation infrastructure and practices by engaging communities and raising funds for the operation and maintenance of toilets.
- Build and use appropriate databases, map the spatial distribution of the existing situation, and develop standardized tools and guidelines for evidence-based decisions.
- Develop suitable alternatives to centralized water distribution systems, because ULBs have limited resources to cater to the demands of residents.
- Make greater use of information technology in building WASH infrastructure, mobilizing communities, generating demand, social marketing, and sharing costs.
- Make micro credit loans available for sanitation infrastructure to help women in mobilizing the much-needed funds for toilet construction.
- Recognize that lack of toilets, inadequate space for their construction, and tenure rights are problems that are particularly serious in congested slums.
- Take a flexible approach: neither centralized systems nor decentralized systems can be the only solution—deploy an appropriate mix of both.
- Make substantial improvements in implementing and monitoring the schemes and policies introduced over time by the respective state governments and ULBs; in particular, governance and technological interventions offer significant scope for improvement.

3.7 Comparison of regions on broad sanitation indicators

In terms of regional performance, the northern-region workshop offered a noteworthy insight, namely that although the policy framework is theoretically correct, it cannot solve some issues on the ground, because the gaps in and challenges to the WASH sector are not related to infrastructure alone but call for a change in the mindset of people. Sustained and cumulative interventions addressing the issues and challenges will help to achieve the goals of the SBM. Analysis of secondary and realtime data from the frame of outcome indicators also suggests that only 9% of the cities (102 out of 1114) in the northern region have become ODF and only 6% (7 out of 114) of the cities covered by AMRUT in the region find a place in the top 100 in the Swachh Survekshan 2017 rankings. Serious efforts are required in Uttar Pradesh and Rajasthan, which have performed the worst in the last two national ranking as well as in the ODF mission.

In the north-eastern region, Mizoram and Sikkim have been doing exceptionally well. Aizwal won the award for the cleanest north-eastern capital and Gangtok, for the cleanest city. The regional workshop highlighted that hilly terrain continues to be the biggest challenge and that the ADB has been a significant support in the development of infrastructure. Although the region is only 7% ODF, 48% (11 out of 23) of the cities in Mizoram, 11% (3 out of 27) in Manipur, and 14% (1 out of 14, namely Mangan) in Sikkim have been declared ODF. Arunachal Pradesh, Meghalaya, and Tripura need to strive harder because not a single city in these states is ODF and none made it to the top 100 in Swachh Survekshan 2017.

The urban WASH sector faces many challenges in eastern India. The regional workshop, along with such sources as the census and secondary literature, suggested that the eastern region faces very high population pressure and serious problems related to water quality including contamination with arsenic, iron, and bacteria, rampant OD, and poor management of solid and liquid waste. The realtime SBM data confirm that the number of cities independently verified as ODF is 32% in the eastern region, Chhattisgarh (100%, 168 out of 168 cities ODF

) and Jharkhand (52%, 22 out of 41 cities) being the top performers. Also, the performance of the region in Swachh Survekshan 2017 has been poor, with only 16% (9 out of 55) of AMRUT cities in the top 100—significant work needs to be done in the region.

The southern-region workshop in Chennai suggested that the region has fared better than the northern and eastern regions, probably because of a number of sustained sanitation initiatives, active NGOs, inter-personal communication strategies, change in the mindset of people (possibly due to higher literacy), etc. However, sustaining this progress is a challenge, and a paradigm shift is urgently needed from engineering to the systems approach.

The realtime data suggest that by 2nd October 2017, 26%, or 321, cities in the region had applied for ODF certification and 15% (186) were verified as ODF by an independent agency. Similarly, 42% (6 out of 14) cities were in the top 25 in Swachh Survekshan 2016 and 28% (31 out of 111) AMRUT cities were in the top 100 in Swachh Survekshan 2017. Out of 6 cities that were in top 25 in 2016, 3 scored a lower rank in 2017 and 3 scored a higher rank, especially with Mysuru losing the top spot.

Stakeholders in the western-region workshop suggested that the region had been doing very well, the leading states being Gujarat, Madhya Pradesh, and Maharashtra. The Govt of Maharashtra launched the SMMU in line with the SBM and also introduced ODF+ and ODF++ as higher categories to designate even better sanitation services. Similarly, Gujarat launched the MGSM. These and similar efforts are reflected in the Swachh Survekshan, in which many cities in the region received top rankings in both 2016 and 2017. Out of 73 cities that participated in 2016, 13 were in top 25, and 36% (52 out of 142) in AMRUT were in the top 100 in 2017. In terms of ODF too, 68% (783 out of 1140) of the cities declared themselves ODF, and the status was confirmed for 65% (748 out of 1140) after due verification.

The regional-level output indicators are summarized in Table 3.11 for a broad comparative analysis of sanitation by region.

Table 3.6: Broad outcome indicators of sanitation, by region

Region	No of ULBs	Share (%) in India's total population (2011 census)	Urbanization (%) (2011 census)	Cities (%) verified ODF by third party (SBM ODF Data 2017)	No. of AM-RUT cities participating in Swachh Survekshan 2017 (SS 2017)	Cities in top 100 in Swachh Survekshan 2017 (no. and %) (SS 2017)
North	1114	25	29	8.7	114	7 (6%)
North-east	226	4	18	7	12	1 (08%)
East	599	24	21	31.8	55	9 (16%)
South	1223	21	41	15.2	111	31 (28%)
West	1140	26	36	65.6	142	52 (37%)

Sources: Census 2011 and SBM 2017

3.8 Conclusion

The sanitation sector has witnessed tectonic shifts in the last three years and will continue to do so. To bring in changes, technical interventions alone are not enough: behavioural changes are even more important. Community participation is essential if the interventions are to be sustainable. A drastic change in the mindset is called for, and local organizations have a key role to play in ushering in changes in the sector.

A major problem in all cities was the management of both solid and liquid waste. Septage is not being managed adequately, and such poor management has led to contamination of water bodies in major urban

areas, thereby contaminating the groundwater as well. On-site sanitation is considered a private matter but affects all. Management of faecal sludge needs to be accorded priority, and India's septage management policy needs to be reviewed with a view to promoting joint ownership of on-site sanitation systems.

Capacity building and incentives are the need of the hour along with an overarching policy framework for the sector. Urban sanitation is dealt with in a piecemeal manner at present whereas the problem is multidimensional and requires a holistic approach: economic growth, urbanization, public health, and the environment (including climate change)—all affect urban sanitation.

SECTION B - PROGRESS

CHAPTER - 04

LIVING WITHOUT SANITATION CHOICES IN URBAN SLUMS

Urbanization is a paradox. Whereas ‘good’ urbanization generates wealth, disorderly development spawns the urbanization of poverty and vulnerability, producing a sizable and persistent gap between the rich and the poor. Definitive expressions of such inequality are the slums and low-income settlements in cities, part of urban environmental sinks where people live in makeshift houses with poor access to even basic services, and where communities are fragmented and culturally disconnected.

Urbanism is about the urban way of life—the people who live in cities and the multiple social processes that happen in these urban geographies. The traditional urban narrative on the other hand is about the built environment: housing, commercial centres and industries, infrastructure networks, transport, etc. Such physicality, often unmindful of the people who use the infrastructure and of their diverse economic, social, cultural, and ecological needs and their footprint, is responsible for urban polarities and inequities.

Urban areas grow both demographically and geographically. Many poor people come to live in cities hoping for a better life but continue to be deprived: they earn less; live in impermanent houses on insecure lands or on the city’s edge, far from workspaces; get access to shared services; subsist in overcrowded, unsanitary, and unhealthy environments; have low access to good health and education opportunities; have weak and fragmented social and community networks and support systems. These poverties cumulate and deepen vulnerabilities—and need urgent attention if the benefits of urbanization are to be uniformly distributed.

Of all the harms from disordered urbanization, living in slums is often the most damaging. Slum dwellers, the poor, and the marginalized (women, new migrants, climate and economic refugees, etc.), get trapped in a brutal cycle of vulnerability and incapability, escape from which is possible only through serious policy reform, resource provision, capacity creation, and informed conversations on changing practice.

Table 4.1: Distribution of households by availability of latrine facilities: 2011 (all figures in millions)

Area	Total households ^a	Households with latrines on premises	Households without latrines on premises	Alternatives when no latrines on premises (percentage)	
				Public latrines	Open defecation
Urban	78.87	64.16 (81%)	14.70 (19%)	6	12.6
Slum	13.75	9.07 (66%)	4.67 (34%)	15.1	18.9

^aexcludes institutional households

Source: Census of India 2011: Tables on housing stock, amenities and assets in slums

Water and sanitation facilities in slums are usually well below the level enjoyed by the rest of the city as (Table 4.1). Even where there is willingness, servicing slums is considered problematic owing to the questionable status of land tenure, organic geographies, high densities, and distance from trunk infrastructure (infrastructure usually provided by the government, 'branches' from it to be developed locally). The poor have to use a variety of means, often at high cost, to get water and are forced to use dirty community toilets or defecate in the open or flush the excreta down open drains, adding to pollution of the land and of water sources. Additionally, the unhygienic conditions lead to greater incidence of diseases—making adults less productive, keeping children away from school, and using up a large part of the poor household's income for health care. Women, who are usually the ones to fetch water, risk being abused, suffer the indignity of having to defecate in the open, and thus suffer disproportionately because of inadequate water and sanitation facilities.

This chapter takes a deeper look at available data on urban areas to analyse and to distil trends, progressions, and gaps, for some compelling 'unthink' on urban policy and programmes in the context of water and sanitation. The data include figures from the census in 2001 and in 2011. The chapter also examines and compares data on urban slums in Agra and Ludhiana collected by the Centre for Urban and Regional Excellence (CURE) between 2014 and 2016 (as part of preparing 'Slum-free City Plans of Action' under the Rajiv Avas Yojana) and data from 559 slums in Delhi generated during the same period by Delhi Urban Shelter Improvement Board (DUSIB) with the support of the National Institute of Urban Affairs (NIUA).

4.1 The urban context in India

Urban India is growing but the progress is unhurried: urban India added a little over 1.15% slummiannually to the population of cities and towns since 2001 (Census of India 2011); the 286 million city dwellers comprise only 27.82% of India's total population. The World Bank report 'Leveraging Urbanization in South Asia', however, alludes to considerable hidden urbanization (World Bank 2015). Using the agglomeration index, a globally applicable alternative measure of urban concentration, the report projected the proportion of India's population living in areas

with urban-like features in 2010 at 55.3%—double the census figures.

India has 7935 census towns. Of these, 30 are multicity agglomerations or 'a continuously lit belt of urbanization containing two or more cities, each of which has a population of at least 100 000 living within its administrative boundaries' (World Bank 2015). While this symptomizes urban sprawl, it also points to the rise of the Indian small town with population between 0.1 million and 1 million from 2009 (Nielsen and CII 2012).

India's urban growth is highly uneven. The larger cities are growing faster at their peripheries; Delhi, for example, grew by 1.9% annually between 2001 and 2011, whereas Gautam Budh Nagar, its immediate neighbouring district, grew at 4.1% year on year (Ellis and Roberts 2016). Cities are also patchy within, with denser edges and thinner cores. Additionally, 'the proportion of built-up area outside a city's official boundaries exceeds that within its boundaries' (Ellis and Roberts 2016, p. 3). Such bumpiness produces wide growth differentials that add to the challenge and the cost of delivering service at a distance and beyond the municipal boundaries.

There is a wide and unmistakable prosperity gap between large cities and their neighbourhoods or the smaller cities. The Prosperity Index, a composite index of subnational performance that assesses districts according to their levels of poverty, productivity, and growth, used by the World Bank, found that the largest seven cities in India, namely Bangalore, Chennai, Delhi, Gautam Budh Nagar (Noida), Greater Mumbai, Hyderabad, and Kolkata, significantly outperform the country's average (Ellis and Roberts 2016). These cities are large also because of their high economic development prospects. However, in the early years of the 21st century, these cities began to see a drop (16%) in their share of manufacturing employment within 10 km of the city centre. In contrast, manufacturing employment on the immediate periphery jumped almost 12%. High wealth ranking thus hides the disparities within and across the success indicators. For example, Kolkata's high rank, says the report, 'is driven by its productivity performance, while its performance on both the poverty and growth components is just average' (Ellis and Roberts 2016).

4.2 Slums in transformation

Slums and poverty are an expression of urban inequality and uneven growth. Almost 65.5 million people (census 2011) live in slums in cities, mostly in the large metropolises, and make up 17.4% of the total urban population; in other words, one Indian in every five lives in a slum. Possibly many more live in slummy environments, not categorized as slums, such as in the dense edges of a city. Further, the 2011 census, based on the official poverty line, estimated urban poverty at 13.7%. The share of scheduled castes and other backward castes within the urban poor and slum communities is always higher than the national average (National Buildings Organization 2013).

nearly 2.3 million slum households were added to the total in the 1990s, only 0.6 million were added in the first 12 years or so of the 21st century. (4) Although imperceptible, the number of people living in slums was also beginning to decline: from 23.5% to 22.4% between 2001 and 2011. This could be the result of shrinking families (average family size decreased from 5.2 to 4.7; Census 2011) or of improving economy and the ability of the poor to earn better or the increasing availability of affordable housing. (5) Slum populations vary with city size; the metro cities have more slums and slum dwellers: the 27 million-plus cities account for 33.79% of India's total slum population (National Buildings Organization 2013). Delhi has twice the number of slums and three times the slum

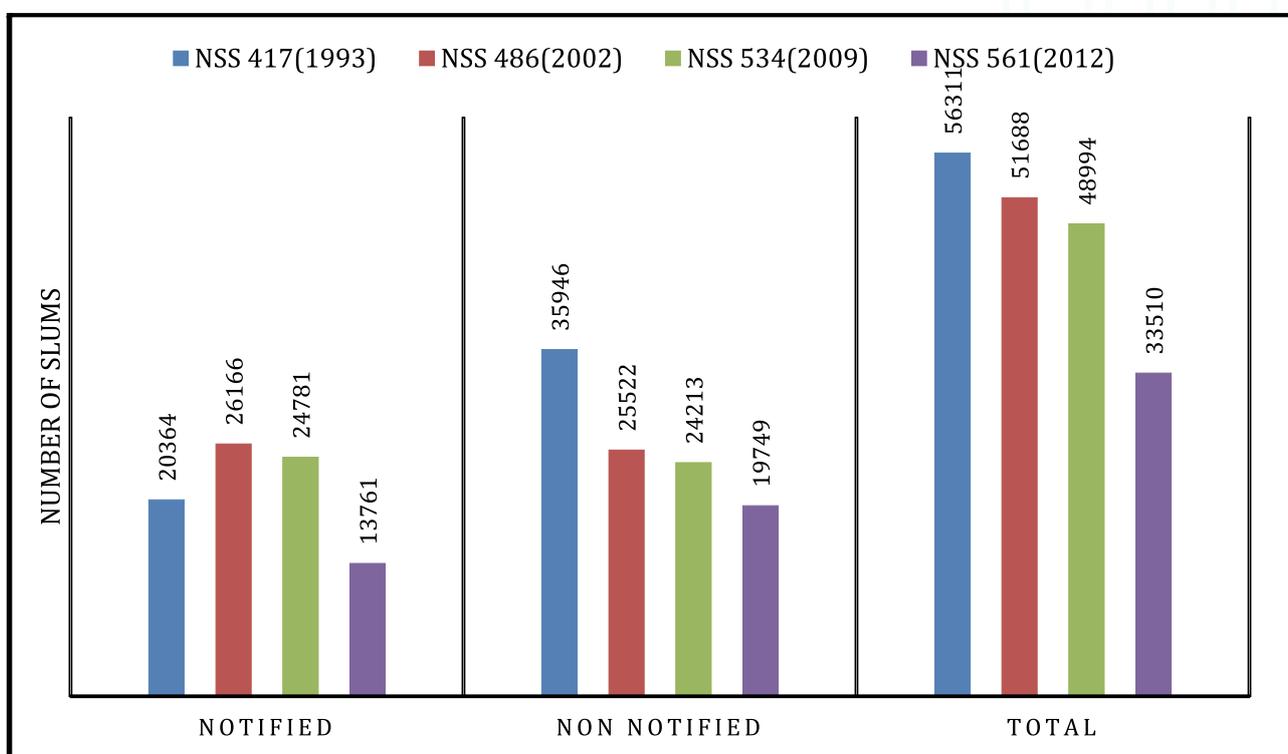


Figure 4.1: Number of slums in India

Source: National Sample Survey Office (NSSO), NSS Report No. 417, 486, 534, and 561

Six distinctive trends related to slums and poverty can be extracted from the Census and NSSO data. (1) The number of slums declined between 1993 and 2012 by nearly 50% (NSSO 1993, 2002, 2009, 2012) (Fig. 4.1). (2) Paradoxically, the number of slum households rose from 5.9 million to 8.8 million, indicative of the rising densities of fewer settlements. (3) The pace of growth of slum households is now less brisk. Whereas

population that Agra has, and Ludhiana, despite being an industrial city, has only half the slum population of Agra (Fig. 4.2). (6) The sex ratio in slums is better than the national average: the all-India average is 924 women : 1000 men whereas for slums, it is 928 : 1000 (Census 2011).

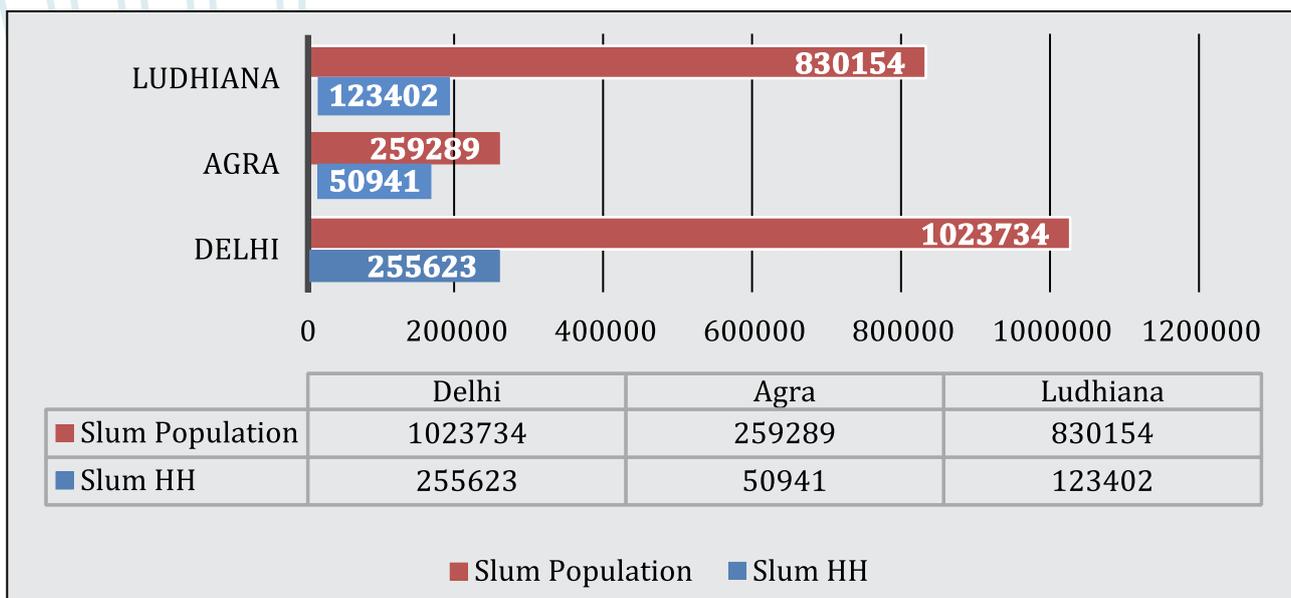


Figure 4.2: Number of slums in Delhi, Agra, and Ludhiana (2014/15)

Are the slums actually declining or are they morphing? The idea of ‘hidden slummization emerges from the predictions made in a World Bank report (Ellis and Roberts 2016). However, it is hard to arrive at a reasonably reliable estimate as yet: suffice to say that because the poorer people are concentrated along the peripheries of cities and therefore poorly served, the proportion of hidden slumminess may be higher than in the city itself.

4.3 Serving slums: unequal options

Three basic and must needs of a good living city is, to provide its people clean drinking water, toilets within homes, and proper drainage. Often, though,

what cities must supply and what they actually do are two very different things. Despite water being a survival need, only 62% of urban households had access to treated water sources in 2011 (Census 2011). Refreshingly, the magic figure for slums was a notch above that for non-slum households, at 65%, simply because slums get utility water, although from common or community taps (Census 2011). Two disparities in water delivery show up in the three cities mentioned earlier (Fig. 4.3): the coverage for home taps ranged from 11% in Delhi’s slums to 60% in Agra, with Ludhiana, at 25.44%, between the two and, even when averaged over the three cities, the proportion (32%) is only about half the national average (62%).

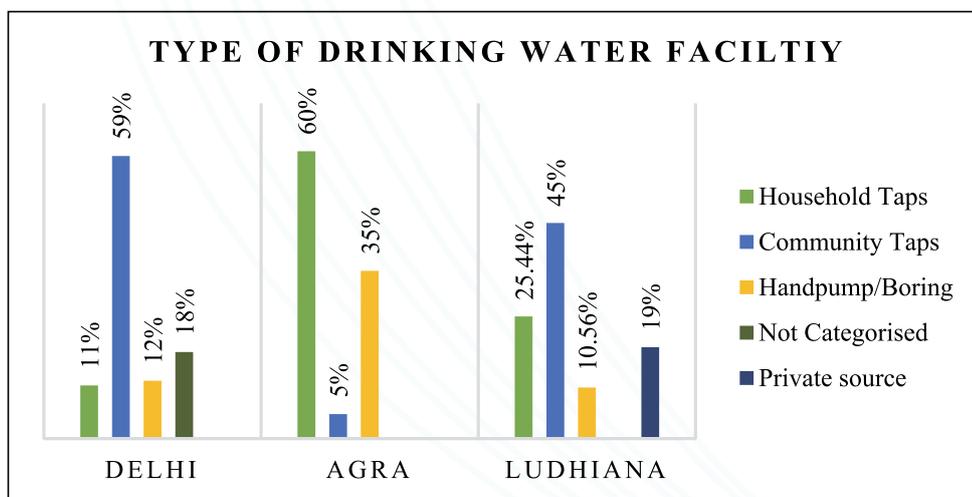


Figure 4.3: Type of drinking water facilities in slums of Delhi, Agra, and Ludhiana

Building toilets is a key state priority under the SBM. In 2011, 81% of urban households and 66% of slum households had home toilets; 21% of slum households used community facilities; and 26% slum households had to resort to OD (Census 2011). Slums in Agra and Ludhiana recorded a higher proportion of home toilets, in slums – 78%

in Agra and 70% in Ludhiana – whereas in Delhi, the proportion was a dismal 15%, with another 48% being served by community toilets (Fig. 4.4). The three years of the SBM should have increased the number of home toilets and reduced OD (Table 4.2), with Delhi focusing on community facilities and Agra and Ludhiana on personal toilets. Despite the addition of toilets, all three were given a lower rank by the **Swachh Survekshan 2017** ranking of 434 cities than that given in 2016. Further, the survey recorded 118 cities to be ODF; however, if these cities are to be ODF forever, community toilets cannot be the default solution. Eventually, people will have no choice other than OD when these community toilets

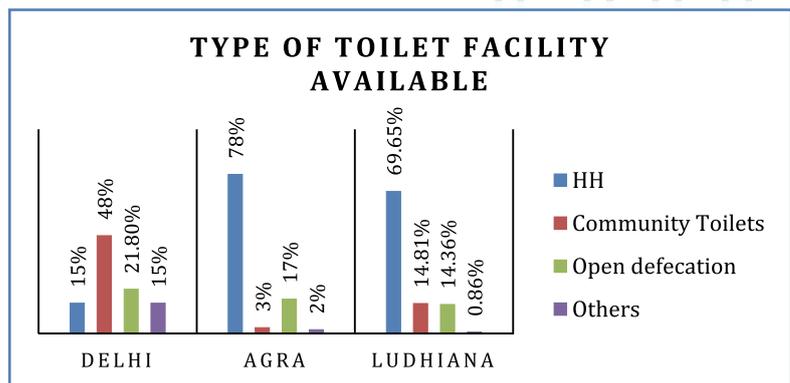


Figure 4.4: Type of toilet facilities in slums of Delhi, Agra, and Ludhiana

either break down, get too filthy to use, or are simply insufficient for the growing population and therefore not always available when required.

City	Household toilets constructed	Household toilets under construction	# Public toilets (seats)	# Community toilets (seats)
Delhi	15	10	585 (3624)	506 (12934)
Agra	5053	2289	3 (65)	33 (523)
Ludhiana	6899	755	19 (79)	1 (10)

Table 4.2: Toilets constructed or under construction under the Swachh Bharat Mission (Urban): 2017

Source: Swachh Bharat Mission Urban 2017

Stand-alone toilets do not make a city clean by themselves but must be connected to appropriate conveyance and treatment systems. Not all cities, though, have underground sewerage lines, conventional or simplified, that reach all households in all types of settlements. Sewerage network, where available, is mostly in the core areas of cities and not at the peripheries where most of the poor live. Even in areas in which households are connected so a sewerage network, slum and low-income settlements are often not connected to it. This gap increases the possibility that many new toilets based on simple treatment technologies (soak pits, septic tanks, or discharge into the drains) will be environmentally harmful. In Delhi, Agra, and Ludhiana, none of the slum areas was connected to a sewerage network. Whereas 65% of the households in Agra and 42% in

Ludhiana had private septic tanks, 50% of household in Delhi are connected to shared septic tanks (Fig. 4.5).

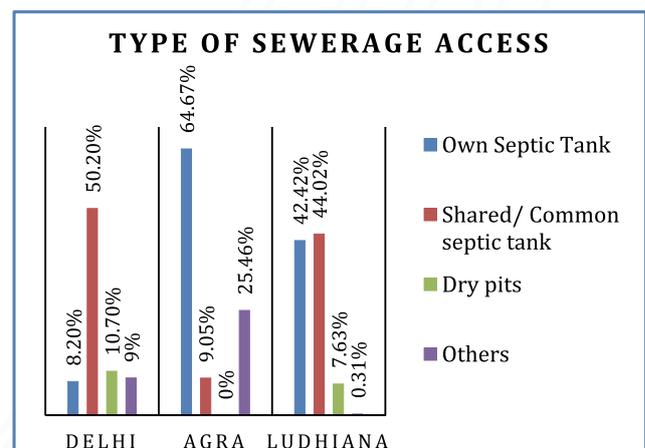


Figure 4.5: Access to sewerage network in slums of Delhi, Agra, and Ludhiana

Poor drainage is predominantly responsible for the slummy conditions in low-income settlements. With improved water supply but no drains to carry it away, open stretches of land serve as soak pits, saturated with dirty water, and pose a serious threat to health: only 37% of slum households have covered drains and another 44% have open drains (Census 2011) (Fig. 4.6). Remarkably, the corresponding numbers for urban households overall are not very different, being 44% and 37%, respectively.

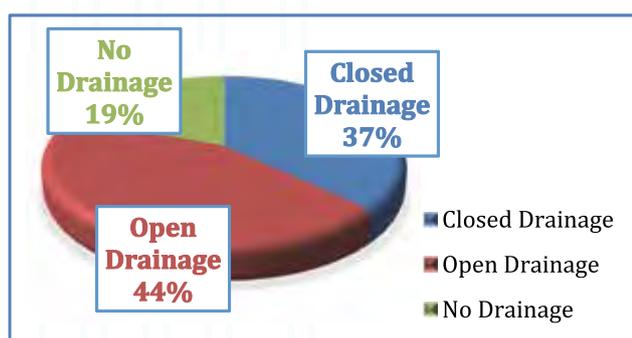


Figure 4.6: Type of drainage available to slum households in India

Source: Census 2011

4.4 ‘Unthinking’ slum sanitation and thinking inclusion

Investing in sanitation is about building better cities. This requires that the benefits of water and sanitation flow to all, especially to the poor and the marginalized communities, with a quality of service that is ecologically and culturally sustainable—and that this goal be secured by gathering the wisdom and strengths of all communities and involving them in the processes of development. Such an ‘inclusive’ narrative entails some serious change from bureaucratic and top-down planning to community-led and bottom-up development. Decentralizing planning down to the neighbourhood level for a slum makeover necessitates understanding the causes, consequences, and complications of disordered urbanization. Four critical factors that cause slums to stay slummy are discussed below.

4.4.1 ‘Informal’ existence and untenured lands.

Slum dwellers, new migrants and low-income households basically exist in the informal space: without proof of identity, working in the informal sector, which, in 2012, accounted for over 90% of India’s workforce (National Statistical

Commission 2012), living on informal lands, and relying on ties of family, religion, or ethnicity rather than on the state for survival. Often such lands are occupied for decades, yet their untenured status signifies a ‘temporariness’ and ‘illegitimacy’ that denies their occupants fair and levelled access to services, entitlements, and opportunities. Instead, slums are offered inadequate, shared, poorly maintained, and un-networked services, leading to lasting vulnerability and poor productivity.

4.4.2 Exclusion. In cities, economic class and land ownership override traditional socio-cultural exclusions. Slum dwellers and people living in unplanned areas in general do not get counted and are left out in planned interventions. Amid the poor, some groups are more marginal than others, such as the newly migrated, tenants, women, the elderly, children, those with disabilities, minority groups, the poorest, and informal workers. Such groups have negligible access to local institutions, democratic spaces, or interactional processes that could respond to their special needs. These barriers may be invisible, but are concrete enough to keep the poorest away from any rightful access to urban services.

4.4.3 Environmental degradation. Unplanned urbanization is a major cause of degradation of urban environments, especially as it extends gradually to, and builds on, fragile lands. Overpopulated cities are also prone to overexploiting their natural resources, the depletion intensified by unfair distribution. Slums suffer from both high density and bad geography: many are located on untenable lands along the edges of sanitation corridors. Servicing slums on ecologically fragile lands, besides being a complex and challenging task, is also fraught with legal complications. If not served properly, these settlements build up a substantial ecological footprint, visible in such forms as overflowing waste and wastewater in poorly drained settlements, which form cesspools in empty lots or permeate the soil, polluting groundwater aquifers. The harmful impacts of degraded environments on health become critical when houses are small, overcrowded, and substandard—evident from the damp and mouldy walls.

4.4.4 Unengaged governments. Governments usually find it hard (and threatening) to engage people in a dialogue and prefer to plan for them instead. Over the years, urban institutions have developed practices that are entrenched, unable to entertain disruptive, innovative, or diverse ideas that may emerge from communities engaged in a dialogue with the state. No pathways exist at present that connect people and cities—pathways that may enable ground-level solutions to get incorporated into infrastructure design. On the other hand, service institutions have also become more complex and functionally fragmented and lack the capacity for community processes. Together, these factors contribute to a reluctant city, uninterested in creating democratic spaces and institutionalized forms of participation. The fact is that changes are generally more sustainable if people are involved in matters of governance that affect their lives.

4.5 Sanitation choices in urban slums: a new green urbanism

De-slumming cities, that is making them inclusive, equal, integrative, and green, demands a fresh communitarian narrative. While seemingly complicated, with some re-imagination and capacity creation it is very much possible to upgrade slum settlements; incorporate them within the city's infrastructure, systems and ecology; and to do so on a city scale. Many successful ground models have shown what cities can do in partnership with people. A few critical pieces for this new and green urban architecture are discussed below.

Formalization of slum dwellers, the poor, new migrants, and other marginal communities is the centrepiece of inclusive development. Urban local governments must recognize that the poor contribute significantly to a city's vigour, productivity, and culture, and are hence integral to its growth. The poor must be accepted as 'legitimized citizenry' with entitlements equal to those of the rest of the citizens and be part of the city-community conversations. Recent initiatives of the Government of India – *Aadhar* (the unique personal identity card) and *Jandhan* or the financial inclusion scheme – are clearly legitimizing the poorest and helping in ensuring that development resources

reach the intended beneficiaries. These efforts must be combined with (1) skill development (by connecting to the National Urban Literacy Mission) that would enable the poor to earn more and escape the poverty trap and (2) creation of democratic spaces that would enable the poor to participate in the processes of development and to claim their rights.

The second most crucial piece in the inclusion architecture relates to land and land tenure. Security of tenure has four key benefits. (1) A secure tenure unlocks people's own investments in upgrading their homes by adding taps, toilets, and electricity, paving pathways, paying for waste collection, etc. (2) A stable tenure augments the state's resources in several ways; for example, when people spend money on constructing home toilets, the government saves on constructing community facilities and on the recurring costs of maintaining them. Home toilets also make for better health. Because people fall ill less often, the burden on health services is lower and productivity improves. (3) Secure tenure encourages people to plan for their future, send children to school regularly, invest in businesses for higher income, and so on. (4) Improved and integrated communities reduce social conflicts and close the gap between the haves and the have-nots.

The default city slum development policy should be in situ upgrading (infrastructure alone) or redevelopment (both infrastructure and housing). Majority of lands under slum occupation are tenable and owned by the local body or the state. These lands can be improved by installing simple sewer lines within slums but networked to city sewers and treatment systems that enable home toilets and good drainage, piped water supply with taps at home, and solid waste collection services at the doorstep for a clean environment. Where land is owned by another public or private agency, the city must offer de facto short-term tenure up to 5 years, with comparable, simplified infrastructure and decentralized or de-engineered treatment systems across the sanitation value chain. CURE's work shows that upgraded slums become pulsing economies within 3–5 years (Box 4.1). Slums originate close to sites of work. By letting people stay close to where they work, cities would spend less on extensive transport systems to move people from home to work and back. At the same time, it is particularly important not to create peri-

Box 4.1: Networking for toilets and place identity

Safeda Basti is a small slum settlement in east Delhi, facing two threats: eviction and safety for women and young girls from sexual harassment, especially when defecating in the open. To help in building home toilets, CURE worked with the people and with the support of the Delhi Urban Shelter Improvement Board (DUSIB), which agreed to invest in a simple sewer line that would convey faecal matter from home toilets into the neighbourhood trunk sewer. People used their savings to contribute one-third of the cost of the system and built home toilets. They were also actively involved in planning the engineering, participated with enthusiasm, and worked with the contractor in implementing the plan and in overseeing construction.

urban belts of the poor and the excluded, increasing inequality and marginalization.

The service-level benchmark for slum households, as for the rest of the city, should be taps and toilets at home. Meeting this benchmark calls for a major shift from community and shared facilities to privately owned facilities. Services should be connected to the city's trunk infrastructure or to innovative decentralized systems devised to ensure full integration: slum sewers to city sewers, water pipelines to city supplies, covered surface drains to city storm water drains (Box 4.2), and door-to-door collection services to dispose of solid waste. These service-delivery plans must be set within the particular ecological context of the city and particular settlements, especially those that are on or close to ecologically sensitive sites, such as water bodies, rivers, biodiversity and forested areas, natural slopes, and storm water drains (Box 4.3 and 4.4).

Services customized to suite different types of houses, home spaces, and family structures and are affordable are crucial. Although such customization increases the range and diversity of interventions, it also contributes to long-term sustainability and city transformation. Houses in slums are semi-permanent or permanent; temporary or makeshift (*kuchha*) houses or dilapidated houses account for only 4% (Census 2011). Temporary structures would need retrofitting to build toilets; for example, building a toilet on the first floor (a floor above the ground floor) entails supporting the ceiling and simple steps or a ladder to reach the toilet. Portable toilets with annual extraction contracts could be solutions for tenants. Housing with reliable basic services will make its occupants more productive, which benefits all, especially those whose homes double as workspaces for production, storing, and vending.

Box 4.2: Decentralized wastewater treatment system

In Agra, a bio-remedial decentralized wastewater treatment system (DEWATS) was constructed over a dirty storm water drain running past the Kuchpura settlement by the Centre for Urban and Regional Excellence (CURE). People participated in the planning, construction, operation, and maintenance of the system, which has transformed Kuchpura's living environment and land wealth. Three unintended benefits of the system were the reduction in untreated sewage discharged into River Yamuna, a changeover from sewage-based to clean water urban farming, and a water-resilient community.

Box 4.3: Slope restoration to reduce flooding

Residents of *Nepali Basti*, on the edges of the Aravalis in Delhi, face recurring floods during rains. A mine pit that served as a water reservoir was rendered ineffective because of deposits of non-degradable waste. Work to restore the slope has been initiated and involves four items: removing the solid waste from the slopes and setting up a door-to-door waste collection system, building cascading water channels to treat community wastewater as it flows to the mine pit, building a living edge with reed beds to treat stagnant water in the pit, and greening the slope with local plants that will stabilize the soil, enhance recharge of groundwater, and use water from the pit.

Cities will be truly inclusive when the poor, especially the excluded groups, take their rightful place at the decision-making table, are part of the dialogue, can articulate their demands, and claim their rights. City administration must partner with NGOs for mobilizing and organizing people into community-based organizations. At the same time, the authorities must understand communitarian processes, value them,

A new-world urban agenda is enshrined in the 17 Sustainable Development Goals and 169 targets. India is committed to contribute to achieving these targets and, consequently, to making a fundamental shift from its current patchy urbanism to comprehensive development where the marginal are brought into the mainstream. Inadequate basic urban services will constrain the potential of people and the cities

Box 4.4: Revitalizing social networks for community rainwater harvesting and water resilience

Agra, once a water-resilient city with numerous wells, ponds, tanks, a flowing river, storm water drains, etc. now faces acute shortage of water because of inadequate municipal supply and indiscriminate use of groundwater, which has damaged the area's water ecosystem. To restore the city's groundwater aquifers, indigenous knowledge was tapped to achieve a shared goal. Traditional practices in the community were revived to conserve water, to harvest rainwater, and to recharge groundwater. Five community rainwater harvesting structures have been built, linking rooftops of schools, mosques, and temples to shared underground collection tanks. These tanks stored half a million litres of water in 2016 for use in the dry summer. The model is integrated within Agra's other plans under the Smart Cities mission for future scale-up.

and be capable of measuring their quality. Cities must create non-exclusionary and democratic platforms where creative and non-conventional solutions can be discussed and information shared with people openly to assist them in making proper decisions. In cities, such participation promotes community ownership, nurtures ideas and innovations that respond to people's needs, and facilitates conversations between polarized communities, breaking down barriers and sociocultural hegemony. Cities must spawn systems that can incubate diverse, innovative, and decentralized community solutions and be the accelerators in replicating and scaling up those solutions.

in which they live to be productive—and so will the conventional urban water supply and sanitation systems that exclude the poor. Full benefits of good urbanization will be realized only by disruption, a disruption that not only connects all the services and their value chains – water, sanitation, source, conveyance, treatment, recovery and reuse – but also those poor people for whom these services have been critical and constraining and who need to be given the chance to choose their solutions.

CHAPTER - 05

ANALYSIS OF CITY-LEVEL SANITATION SCENARIO

5.1 Background

Ever since its launch in 2014, the SBM has drawn tremendous attention to the issue of sanitation across the country. Along with other urban initiatives such as the Smart Cities Mission (SCM), AMRUT, the SBM has provided the much needed fillip to improve sanitation in urban India. By mid-2017, the SBM (U) had declared 647 cities ODF and the Swachh Survekshan Survey 2017 conducted for 434 AMRUT cities added 118 more, highlighting 15 per cent of Indian cities to be ODF. Andhra Pradesh, Chandigarh, and Gujarat have been the national leaders with commendable and equitable achievement across all their ULBs; however, several cities in other parts of the country, especially in Bihar, Odisha, Punjab, and West Bengal, are far behind, with not a single ULB being ODF.

The main objective of this chapter is to draw insights from the underlying success factors and circumstantial differences that have led to improved sanitation in the leading cities. This chapter aims to assess the best practices on sanitation adopted by the top-performing cities and to highlight the salient features of success for replication and extension to other urban areas in the country that need to be ODF by 2019.

The chapter is largely based on a desk study of implementation experience collected through secondary and primary data sources. Most of the secondary data were collected through the online portals of the SBM (U), Swachh Survekshan, municipal corporations, etc. and other sources of secondary data and reports. Primary data were collected through direct interactions with municipal corporations. The approach to preparing the city case study involved three steps.

- 1 Five cities, namely Indore, Bhopal, Visakhapatnam, Surat and Mysuru were chosen across the country based on their performance and recognition as the cleanest cities in the Swachh Survekshan 2017.
- 2 The five cities were assessed based on a few broad indicators, as shown in Table 5.1.
- 3 Conclusions were drawn based on the salient factors contributing to success and the lessons learnt.

Table 5.1: Indicators for assessment of sanitation in selected cities

No.	Indicator	Description
1	Service delivery and infrastructure in sanitation and SWM	<ul style="list-style-type: none"> - Population with access to toilets - Slum population with access to toilets - Toilets constructed (IHHL, CT, and PT) - CT and PT in public spaces - User-friendly CT and PT (gender friendly, well lit, disabled friendly) - Households connected to sewer networks or practising on-site safe disposal - CT/PT connected to an on-site safe disposal system or a sewer network - Wards covered by door-to-door solid-waste collection system; percentage of solid waste transported daily - Sweeping and cleaning in all notified commercial areas and wards - Availability of litter bins at appropriate places - Provision of waste-to-energy or composting plants - Scientific landfilling, remediation done at landfill site
2	Governance and institutional factors	<ul style="list-style-type: none"> - Political will - Institutional convergence - Stakeholder participation - Involvement of private sector - Role of NGOs and CBOs - Role of Self-Help Groups (SHGs)
3	Financial and economic factors	<ul style="list-style-type: none"> - Cost structure - Source of finance (corporate funds) - Financial planning
4	Sustainability	<ul style="list-style-type: none"> - Operation and maintenance (O&M) - Resolution of complaints - Realization of user charges
5	Technological innovation	<ul style="list-style-type: none"> - Technology options - Technology for monitoring
6	Capacity enhancement and IEC	<ul style="list-style-type: none"> - Capacity building of ULBs staff, NGOs, SHGs, or stakeholders - IEC and behavioural change activities

5.2 Five cleanest cities in India and salient factors for success

The Swachh Survekshan 2017, a survey commissioned by the MoUD through the QCI to assess the progress and impact of the SBM since its launch in October 2014, ranked Indore, Bhopal, Visakhapatnam, Surat, and Mysuru as the five cleanest cities in the country. The rankings were instituted to foster healthy competition among cities, which were ranked on the parameters of collection of MSW and its transport, processing, and disposal, status in terms of OD, capacity-building programmes, and education and behavioural change. Results from the Swachh Survekshan 2017 call attention to the remarkable progress of some of the cities such as Indore and Bhopal, which had been ranked 25 and 21 respectively in the Swachh Survekshan 2016, in all

facets of sanitation to become the top two cleanest cities in the country. The Greater Visakhapatnam Municipal Corporation (GVMC) and Surat that had already made phenomenal improvements in the sanitation sector and were ranked fifth and sixth cleanest cities respectively in 2016, also improved and were ranked third and fourth respectively in the most recent assessment. Surat had prioritized hygiene and sanitation since the outbreak of the plague in 1994 and made a significant improvement in the last two years to move from no. six to no. four. Ranked first for two consecutive years (2015 and 2016), Mysuru continued the several sanitation and SWM initiatives to remain among the first five despite the giant leaps by the other four cities in the 2017 Swachh Survekshan Survey. The salient features of the five cities are summarized in Table 5.2.

Table 5.2: Salient features of the first five cities

Parameter	Indore	Bhopal	GVMC	Surat	Mysuru
Geographical area (km ²)	275	413	625	326	128
Total population (millions)	1.96	1.92	1.96	4.47	0.89
Total number of slums	502	380	742	334	172
Proportion of population living in slums (per cent)	17	48.65	44	17.18	26
Rank in 2017 (434 cities and towns)	1	2	3	4	5
Rank in 2016 (73 million-plus cities)	25	21	5	6	1
Rank in 2014 (476 cities and towns)	149	105	205	63	1
Overall score in 2017	1808	1800	1797	1762	1743
Score in municipal self declaration	875	830	869	849	833
On-site observation	436	483	459	425	460
Citizen feedback	497	488	469	489	450
Solid waste collection and transport	360	352	360	352	360
Solid waste processing and disposal	180	121	149	142	174
ODF	250	270	270	270	215
Capacity-building efforts	45	45	45	45	45
No. of citizens sharing feedback	80 753	63 307	192 651	170 690	63 307

Source: Municipal corporations of Indore, Bhopal, GVMC, Surat, and Mysuru and Swachh Survekshan 2017

These five cities have applied a combination of solutions and interventions to tackle a gamut of issues around sanitation and solid waste to be the top five

cities in the country. The Swachh Survekshan scores of the cities is detailed in the figure below;

	Indore	Bhopal	GVMC	Surat	Mysuru
Overall score in 2017	1808	1800	1797	1762	1743
Score in municipal self declaration	875	830	869	849	833
On-site observation	436	483	459	425	460
Citizen feedback	497	488	469	489	450
Solid waste collection and transport	360	352	360	352	360
Solid waste processing and disposal	180	121	149	142	174
ODF	250	270	270	270	215
Capacity-building efforts	45	45	45	45	45
No. of citizens sharing feedback	80 753	63 307	192 651	170 690	63 307

Figure 5.1. Swachh Survekshan ranking of the five cleanest cities

The salient factors that led to success in these five cities are discussed below.

5.2.1 Strategic planning

The Swachh Bharat Mission provided a strong political will to win the support of the sanitation sector from the central and state governments, ULBs, the public sector, corporate houses, NGOs, and civil society. The mission, along with other urban initiatives, has helped these cities to adopt strategic plans for addressing both technical and non-technical aspects related to citywide development of the sanitation sector for service delivery, mobilization of resources, technical assistance, behavioural change, IEC, and development of the capacity to enhance community engagement. Comprehensive sanitation planning under the SBM included city-level sanitation plans, and state sanitation strategy, that outlined the key actions for realizing the goal of achieving ODF, the results being quicker in some of those cities that have been recognized as the cleanest in the country.

5.2.1.1 Service delivery and infrastructure

Ranked 149th in 2014, **Indore** won the first position in 2017. The city has commendable achievements to its credit in providing all the households with access to sanitation services (100per cent coverage) and

dramatic improvements in collection, transport, and disposal of MSW. The city had a strong focus on demand generation, visible in the increase in the proportion of households with access to IHHL to 94.33per cent (from 85per cent in 2014) and construction of 19 486 IHHL, 50 CT, and 72 PT between 2014 and 2017, thereby meeting 90per cent of the target. Despite high population density and generating 950 TPD of solid waste, the city achieved 100per cent collection efficiency, deployed waste-pickers working in the informal or unorganized sector in more than 50per cent of the wards, and sustained waste segregation at all stages of processing in more than 75per cent of the wards.

'Our aim is to top the list of cities taking part in the cleanliness survey.'

Malini Gaud Mayor, Indore

Indore also has two sanitary landfill sites, and a 20 MW waste-to-energy plant is under construction. All the waste is processed, and most of the bulk garbage generators practise decentralized or on-site composting and have their own waste-processing plants. Indore also reuses 100per cent of its plastic waste in construction and repairs of roads and as fuel in cement plants (Swachh Survekshan 2017 and primary data collected from Indore Municipal Corporation).

'The residents, youth, school students, several professional organizations, NGOs, and community-based organizations along with the municipal corporation have endeavoured towards a result-oriented achievement in keeping with the mission Bhopal No. 1.'

Chavi Bharadwaj, Municipal Commissioner, Bhopal

Bhopal, the capital city of Madhya Pradesh and the second cleanest city in India, also witnessed an increase in households with access to IHHL from 79.2per cent in 2011 to above 95per cent in 2017. With a very large proportion (48per cent) of its population living in slums, being ODF was indeed a challenge for Bhopal, which has built 32 506 IHHL, 50 CT, and 245 PT since 2014. Bhopal also collects 90per cent of the 800 TPD of MSW it generates. More than 80per cent of the wards are covered by door-to-door collection of MSW by engaging waste-pickers in more than 50per cent of the wards, although waste segregation has not been sustained in more than 75per cent of the wards, and 75per cent of the wards collect charges for collection of solid waste. The first biomethanation plant in Madhya Pradesh to produce biogas to power streetlights, etc. began production from January 2017 in Bhopal and another waste-to-energy plant is under construction. The biomethanation plant with a capacity of 5 TPD of organic waste produces 300 cubic metres of biogas and 15 tonnes of manure a day. The plant runs as a PPP and is estimated to collect about 2 tonnes of waste from residential colonies and 3 tonnes from vendors. Bhopal does not have a sanitary landfill site or a waste-processing plant (Swachh Survekshan 2017 and primary data collected from Bhopal Municipal Corporation).

To be ODF, the **GVMC** accelerated the construction of IHHL, CT, and PT and had achieved that goal by 2 October 2016. More than 95per cent of the applications received for IHHL have been verified and 90per cent of the targets for CT and PT have been met. In addition to building 12 713 IHHL, 218 CT, and 115 PT, 60 CT and 19 PT were renovated. The Swachh Survekshan indicated more than 75per cent of the CT and PT as being gender friendly, well lit, and connected to on-site safe disposal systems or sewer networks. The municipal corporation strategized the approach to community sanitation ward by ward, mapping the entire city in terms of sanitation facilities and monitoring progress ward by ward to meet the

targets, retrofitting public conveniences, and forming ward committees. The city has also achieved 100per cent door-to-door collection of waste and collection of user charges in more than 70per cent wards. The entire waste generated in the city is transported to the processing sites: SWM has also been markedly improved in the city that generates about 900 TPD of solid waste. Almost 100 per cent of the wards are covered by door-to-door waste collection, waste is segregated in 75per cent of the wards, and 75per cent of all notified commercial areas are swept twice a day. Waste-pickers are involved in the collection of waste. All bulk garbage generators (more than 100 kg a day) in the city practise on-site or decentralized composting. Remediation of existing dumps is also being carried out, and new scientific landfill sites have been developed. A 15 MW waste-to-energy plant was proposed by the GVMC as a PPP jointly with Jindal Urban Waste Management (Guntur) Ltd. Clean-city campaigns have also been extended to other public spaces in the city, with Visakhapatnam railway station being ranked the cleanest in the country and the union shipping ministry ranking Visakhapatnam port the second cleanest in India (Swachh Survekshan 2017 and primary data collected from GVMC).

'The SBM campaign is not a one day affair. We are looking at 100 hours per year to keep the city clean.'

Miling Torwane, Municipal Commissioner, Surat

Surat's cleanliness campaign that began after the outbreak of plague in 1994 was strengthened in the last three years. Several innovative initiatives were introduced for improving the cleaning of roads, access to pay-and-use CT, etc. since 1995/96, which have been sustained and are now being strengthened to meet the current requirements: 6130 IHHL, 73 CT, and 97 PT were constructed, all connected to water supply and sewerage networks. These efforts enabled the city to be ODF by July 2016. All of the 1750 TPD of MSW is collected, including door-to-door collection; more than 70per cent wards collect user charges; and 100per cent of the waste is transported to processing sites. The city is also aspiring to be a zero-waste city: the proposed waste-to-energy plant (700 TPD capacity) is expected to generate approximately 12 MW of power (Swachh Survekshan 2017 and primary data collected from Surat Municipal Corporation).

Mysuru, the third largest city in the southern state of Karnataka, has a legacy of cleanliness attributed to the royal patronage under the Wodeyar dynasty. The Wodeyars developed Mysuru as one of the best planned cities in the country nearly 150 years ago and implemented adequate measures for SWM and sewage treatment ensuring efficient waste disposal in the city. Being the cultural capital of the state, the city is also a major tourist hub and hence the Mysuru City Corporation has persistently led several initiatives to implement the sanitation agenda strategically for many years to become the cleanest Indian city in 2015 and 2016. The corporation built 330 IHHL, 6 CT, and 19 PT between 2014 and 2017 to achieve 100per cent coverage in terms of the access of households to toilets,

and the city became ODF in September 2016. Mysuru also has an extensive sewage network (98per cent households are connected to the network) and three STPs with a combined capacity of 140 MLD. Mysuru also has effective strategies in place to collect the 402 TPD of solid waste it generates and has one scientific landfill. The entire waste is collected, transported, and processed: all 65 wards in the city are zero-waste and bulk waste generators (mostly markets) have on-site composting plants. Being a tourist city, all the wards are swept and cleaned regularly, with special efforts during festivals such as Dussehra with dedicated staff for the purpose (Swachh Survekshan 2017 and primary data from Mysuru City Corporation). The relevant statistics of the five cities are summarized in Table 5.3.

Table 5.3: Sanitation service delivery and infrastructure in the five cleanest cities in India

Parameter	Indore	Bhopal	GVMC	Surat	Mysuru
Access to IHHL	100	100	100	100	100
Proportion of population living in slums (per cent)	17	48	44	18	26
Proportion of slum population with access to toilets (per cent)	100	100	100	100	100
Total no. of IHHL	19 486	32 506	12 713	6130	330
Total no. of CT	50	50	218	73	6
Total no. of PT	72	245	115	97	19
Total no. of STPs	3	8	1	8	3
Proportion of waste-pickers from informal sector in collection of MSW (per cent)	> 50	> 50	> 50	> 50	> 50
Generation of MSW (TPD)	950	800	1020	1750	402
Door-to-door collection of MSW (in %)	> 80	> 80	> 80	> 80	> 80
Collection efficiency (per cent)	100	90	95	100	100
No. of scientific landfill sites	2	1	1	1	0
No. of waste-to-energy plants	1 (u c)*	1 (u c)*	1 (15 MW)	1 (u c)*	0
No. of STPs	3	8	3	8	3
Capacity of STPs (MLD)	365	Not available	76	929	140

Source: Municipal corporations of Indore, Bhopal, Visakhapatnam, Surat, and Mysuru

*under construction

5.2.2 Governance and institutional factors

Recent years have witnessed remarkable efforts by the government, civil society, and the private sector to accelerate the coverage and quality improvement of water and sanitation facilities in all the five cities. Issues of equity and access have been effectively addressed with improvement in planning, implementation, management, and monitoring of sanitation services. The three-tier institutional framework comprises the central government, the respective state government, and the municipal corporation. The central government, through the MoHUPA, engages in policymaking, financing, institutional set-up and monitoring; the respective state govt draws up state-specific policies, strategies, and guidelines and also has a role in financing, institutional set-up, and monitoring; and the respective city municipal corporations frames the relevant by-laws, plans for the infrastructure and implements the plans, and provides the requisite services through the public health and engineering department. Other departments such as city planning, information technology and e-governance, human resource development, and general administration also support the above agencies.

One common thread that stands out as a factor for the success of Indore, Bhopal, Visakhapatnam, Surat, and Mysuru is the partnerships and stakeholder engagement for achieving the desired goals. In Bhopal and Indore, ADB and WaterAid have played an important role in improving the sanitation sector. Various national, bilateral, and multilateral organizations have supported the GVMC; USAID, WSUP, and the Bill and Melinda Gates Foundation have also provided technical or financial support; and the United States Trade and Development Agency has signed a memorandum of understanding (MoU) to support Visakhapatnam in the SCM. Public-private partnerships for contributing towards capital and operating expenses have been established. The Mysuru City Corporation is supported by IL&FS Environmental and Infrastructure Ltd and Jamshedpur Utilities & Services Company (Jusco) in meeting the city's needs related to SWM.

5.2.2.1 Stakeholder participation and corporate involvement

Recognizing the chief role of stakeholders' participation, all the five cities have worked towards

participatory stakeholder relationships. Local community support in management and payment of tariffs, NGOs for community mobilization, technical or advisory support from consultancies, and support in monitoring and coordination from consultancies such as KPMG as city support units in Indore and Bhopal have facilitated the setting up of a robust monitoring and evaluation mechanism. Help from several corporate houses and CSR funds have also been channelized towards sanitation initiatives in these five cities. These include Eicher Foundation and Kores India in Indore and Bharat Heavy Engineering Ltd in Bhopal. Rashtriya Ispat Nigam Ltd, Visakhapatnam Steel, Dredging Corporation of India Ltd, Visakhapatnam Port Trust, and Coca-Cola India have supported capital investment for improving sanitation in Visakhapatnam and, under the SCM, corporate houses such as IBM have also supported GVMC in meeting such challenges as waste management and citizens services. Mysuru Municipal Corporation has received support from corporate houses including J K Tyres for construction of latrines and Infosys for the sanitation initiative.

5.2.2.2 Role of non-governmental and community-based organizations and self-help groups

All these cities have a strong stake from NGOs. Engagement of residents' welfare associations, SHGs, and slum-level federations in needs assessment, community mobilization, community-level mapping and planning, carrying out interventions, and monitoring has hastened success in these cities. The Indore Municipal Corporation attributes its success to the involvement of six NGOs and about 450 volunteers, who have worked assiduously to connect with the city's residents. Participatory approaches followed in these cities have been the key to success with the continued engagement of NGOs and volunteers as motivators for door-to-door waste collection. Even after their city being recognized as the cleanest city in India, these volunteers and NGOs have worked towards achievement of 100per cent segregation by 2 October 2017 in Indore. Such NGOs as Basics and Human Matrix in Indore; Sanidhya, Avarutti, and Sahara Manch in Bhopal; Bapuji Rural Enlightenment and Development Society, AITUDC, and SAADIMPU Committee in GVMC; and Federation of Mysuru City Ward Parliaments and other NGOs in Mysuru have supported the sanitation drive. GVMC also has a strong support from international NGOs

such as CARE, WaterAid, Plan, and World Vision India.

5.2.2.3 Citizens' partnership

Citizens' partnership has been one of the main factors for the success of the sanitation agenda in all the cities. Tremendous support from citizens and residents' welfare associations in Indore enabled the city to make rapid progress. Local NGOs, CBOs, and residents' welfare associations have played an important role. For improved public participation, the GVMC made residents partners in integrated management of MSW.

'I believe the ardent efforts of and cooperation of all the stakeholders will continue and Bhopal will radiate as the halo on the country.'

Alok Sharma, Mayor, Bhopal

Citizens were active in providing feedback in all the five cities as part of the Swachh Survekshan 2017 and also showed keen interest in cleanliness and sanitation drives within their respective cities (of the total population of the respective city, 4.11per cent gave feedback and thus participated in Swachh Survekshan 2017 in Indore, 3.29per cent in Bhopal, 9.83per cent in GVMC, 3.82per cent in Surat, and 7.13per cent in Mysuru).

5.2.3 Financial and economic factors

5.2.3.1 Cost structure

The average cost of constructing a unit of IHHL in Bhopal was 13000 rupees; in Surat and Mysuru, it was 15000 rupees; in Indore, 16 700 rupees; and in GVMC, 17000. A subsidy of 12000 – 15000 is available per unit, comprising 4000 rupees from the central government and about 9000 – 11000 from the respective state government, the balance being borne by the individual households. In some cases, NGOs and SHGs have provided interest-free loans for the purpose, and Mysuru offers a credit for building IHHL. Corporate houses have also funded the construction of CT or PTs and toilets for schools as well as IHHL in GVMC and Mysuru. To manage MSW, user charges are levied to recover costs and to contribute to financial sustainability in Indore, Bhopal, GVMC, and Surat. Indore, for instance, charges each household 60 rupees a month whereas commercial establishments are charged 90 rupees a month plus 3 rupees

per kilogram of bulk waste generated. Collection efficiency of user charges in Indore is 40-50per cent in residential areas and 90per cent in commercial areas. In Bhopal, monthly user charges are 30 rupees for each household and 60 rupees from each commercial establishment.

5.2.3.2 Sustainability

'Moving ahead in the sanitation drive, Indore is working towards 100per cent segregation of household waste and will continue to be the cleanest city in the year 2018 as well.'

Malini Goud, Mayor, Indore

All the five cities have witnessed dramatic improvements in sanitation services. Sustenance of the services provided is crucial. Sustainability aspects have been outlined within the city sanitation plans of the respective cities with details on the financial mechanism for covering the costs of the O&M of these services. Most of these city corporations have made cost recovery a part of several interventions. All these cities were able to collect user charges for the disposal of solid waste in more than 75per cent of the wards. Some cities have formed PPP to cover the costs of O&M of infrastructure for improved sanitation. Indore plans to cover O&M costs from user charges for the disposal of solid waste and from the materials recovered from it. All the CT in Indore were revamped to make them user friendly: 35per cent of these CT are operated by Sulabh International and the rest by the corporation, based on charging users to make the running of the CT sustainable. The corporation also plans to improve the services of CT and PT further through innovative business models adopted elsewhere in the country.

These city case studies show the efforts made to ensure financial sustainability of the interventions. Surat Municipal Corporation's tertiary treatment plant (TTP) for waste water recycling and reuse recovered 99.2per cent of the costs through user charges: in 2013/14, these charges amounted to 2.71 billion rupees whereas the expenditure on O&M was 2.73 billion. Plastic-waste collection centres set up in 2008 in Bhopal and in 2011 in Indore also run as a PPP. Each of these centres covers about 25 wards and generates a thousand rupees a day as profit. The

capital expenditure (about 1.25 million rupees) for the plant was borne by the respective city municipal corporations. The operational expenditure of 0.81 million rupees a month is recovered through selling the plastic waste to road development authorities and cement factories, which use it as fuel. In Indore, the municipal corporation sells the plastic waste to Vikram Cements at 5–7 rupees per kilogram. The cement plants also saved more than 140 million rupees in two years by using plastic waste as fuel instead of conventional fuels. The environmental benefits of reducing carbon emissions from coal used as fuel have also helped to improve the environmental sustainability of the cement plant. In Bhopal, the annual O&M costs – of 10.5 million rupees – to produce 100 000 units of energy annually from the biomethanation plant are recovered and the unit makes a profit of about half a million rupees a year.

5.2.4 Technological innovation

5.2.4.1 Sanitation apps

The Ministry of Urban Development, Google, and August Communications have developed a tool, namely the Google Maps Toilet Locator, to locate functional public toilets in Indore, Bhopal, Delhi, and four other cities in the National Capital Region (Faridabad, Ghaziabad, Gurugram, and Noida). This Swachh app can be used to locate and access public toilets near malls, hospitals, bus and railway stations, public and community complexes, etc. In October 2016, IMC launched Indore 311, an app for enabling citizens to lodge complaints related to garbage and unclean spots by clicking pictures and uploading them along with geo-tagging. The complaints automatically reach the concerned official and are expected to be redressed within 24 hours. The corporation plans to launch another app soon for real-time monitoring of service, which will also allow users to reschedule the door-to-door waste collection according to their convenience. Suitable transport is available to cater to such household collection. The Swachh Map app launched by the MoUD was adopted by the Bhopal Municipal Corporation. The app also enables citizens to capture and report garbage sites, and the ward supervisor receives a complaint alert. Citizens are notified of the action taken with photographs as evidence. The app also allows citizens to post on social media and thus to spread the word and

encourage response. More than 1.2 million people have downloaded the app across the country, about 0.1 million of which live in the top five cleanest cities.

5.2.4.2 Technological innovations in monitoring

All the five cities have adopted technological innovations in monitoring service delivery. Fitting garbage trucks, vans, dumpers, and so on with tracking devices based on the global positioning system (GPS) or radio frequency identification (RFID) tags has improved collection efficiency in these cities. In each, more than 75 per cent of the area is served by such GPS- or RFID-fitted vehicles. All households in Indore are mapped on GIS and monitored for door-to-door collection of waste.

All the five cities have also initiated ICT-based attendance systems for better monitoring of employees. Municipal officials in Indore reported during discussions that the biometric Aadhar-linked attendance systems have improved work efficiency phenomenally. (Aadhar is an identity card issued by the central govt to every Indian.)

5.2.4.3 Pre-cast toilets

Pre-cast toilets have proved useful in meeting large-scale sanitation needs quickly because these toilets, pre-cast in a concrete box at the yard and then cured, plastered, painted, and fixed with tiles and side walls, can be hoisted using a crane and lowered into position wherever required. In Visakhapatnam, the cost of each unit was 23 000 rupees (including the costs of materials, the bio-digester, and transport). Such pre-cast toilets have made it possible for several corporate houses to contribute to improving sanitation in schools to meet the goals of the SBM sooner.

5.2.4.4 E-toilets

Surat, Mysuru, and GVMC installed e-toilets (the cost is about 0.7 million rupees for each unit) in market places and other public spaces within the municipal limits. These smart toilets can be used after paying a user fee of 2 rupees. The toilets are flushed automatically before and after use and have sensors for water level. Designed to withstand extreme weather conditions, these toilets in Visakhapatnam remained intact even after the Hudhud Cyclone in 2014.

5.2.5 Capacity development and information, education, and communication

Several capacity-building programmes have been conducted for ULB staff, NGOs, and SHGs. More than 90 per cent staff in sanitation or public health departments have completed more than five eLearning courses on the SBM portal in all the five cities. Capacity-building programmes are being conducted at the ward level based on guidelines from the MoUD in all these cities. Accordingly, capacity-building programmes have been conducted in all the five cities for all the employees enrolled on the SBM portal (holding the rank of Sanitary Inspector or Assistant Engineer and above). Interactions with city officials revealed that training and capacity building of officials have been the key to sustaining the programmes in all the five cities. Indore conducted more than 35 capacity-building programmes for a total of 670 participants. In Bhopal, the training of sanitary inspectors and masons was immensely useful in constructing toilets on a large scale.

These cities have also collaborated with local institutions for design, implementation, and dissemination of the communication strategy. With a strong communication strategy in place, the cities have employed several innovative ways to sensitize communities and to motivate them to support the entire sanitation drive. Several IEC programmes were undertaken in these cities using all media platforms for promoting the desired behavioural changes and improving participation of citizens in the mission. Indore Municipal Corporation carried out the Dabba Gang and Roko Toko campaigns to curb OD and several nukkad nataks (street plays), held rallies, and put up wall paintings (1500 m² across the city) and slogans to encourage the desired behavioural change. Twenty short films were produced and screened in multiplexes and on swachatha raths (vehicles fitted with large screens to show these movies). Digital media and social media including Facebook, WhatsApp, and Twitter were widely used. The melodious voice of the notable singer Shantanu Mukherjee (Shan) captured the hearts of the residents, who participated actively in improving the cities they live in. In addition, the message of cleanliness were conveyed through graffiti and murals as well. The success of Bhopal has been

attributed to such popular IEC campaigns as (1) Doctor Aap Ke Dwar [doctor at your doorstep], (2) Swachh Map app, (3) Shiksha Chaupal [education at the street corner], (4) Swachta Ki Path Shala [school of cleanliness], and several other thematic drives. Shiksha Chaupal brought the administration and the citizens (mainly slum-dwellers) closer to each other to address the needs of the people and to solve their problems.

In Visakhapatnam, GVMC managed to make a considerable impact through IEC, broadcasting and telecasting messages and spreading them through other mass media, street plays, short films, advertisements in cinema halls, etc. Surat put up hoardings and banners, distributed pamphlets, campaigned through Facebook, Twitter, and other social media etc., and also used radio jingles. All the five cities used all the OD sites to display Asli Tarraki [real development, an awareness campaign] hoardings and Asli Tarraki standees, banners, wall paintings at CT and PT; hoardings at prominent places and placed advertisements for Swachh Survekshan 2017; and undertook other strategically planned thematic cleanliness drives.

5.3 The big leap of first five cities

India's top four cleanest cities made tremendous improvements in sanitation in three years: Indore was ranked 149 in 2014 and rose to the first position in 2017; Bhopal was no. 105 in 2014 but claimed the second position in 2017; Visakhapatnam rose from no. 205 to no. 3; and Surat, no. 63 in 2014, claimed the fourth position in 2017. All these cities met the target of 100 per cent coverage in terms of access to sanitation. One major factor in the success is the recognition and implementation of access to the poorer households. These cities have large populations living in slums (Bhopal, 48 per cent; GVMC, 44 per cent; Mysuru, 28 per cent; Surat, 18 per cent; and Indore, 17 per cent) that lacked basic sanitation facilities. These populations were specifically targeted through construction of IHHL (where space and land tenure posed no problems), CT, and PT. The five cities are also far ahead of other cities in their respective regions in terms of improved management of MSW, and concisely captures their spectacular success.

Integrated strategies for the quality sanitation service at Indore

Indore has built a strong reputation as a dynamic city putting forward integrated strategies for providing quality sanitation services to the public. The strong political will of the prime minister was echoed by the chief minister and the state urban development minister, the commissioner, and the mayor of IMC and all the comparators (peoples' elected representatives on the municipal council).



Figure 5.2 Improvement in IHHL and household's access to sewage network in Indore

The Indore Municipal Corporation got rid of 1185 bins placed at various locations across the city (these bins were obstacles to efficient management of solid waste) and cleared 600–700 sites that were being used as open dumps through meticulous micro-planning and implementation involving NGOs and other social sectors. Door-to-door campaigns were undertaken by volunteers from NGOs. The corporation deployed 500 small tippers, each with separate bins for dry waste and wet waste (a separate unit for sanitary waste to be soon added). These vehicles not only ensured collection of waste from narrow lanes but also improved efficiency by transporting this waste to transfer stations, thereby reducing both distance and time (from 40 km to 12 km). The corporation also improved the collection and transportation efficiency by redesigning vehicles to increase the capacity of each from 1.8 m³ to 3.3 m³. These measures saved fuel worth 2–3 million rupees every month.

To make the city litter free, plastic or polythene bags were banned and spot fines (100 – 100 000 rupees) imposed for violating the ban. All manufacturers of such bags in the city were banned from producing them and transporters were fined 4500 rupees if they transported plastic or polythene bags to the city. Similarly, spot fines (half a rupee per head) were charged on wedding processions to pay for the extra costs of cleaning the roads.

Phenomenal progress was made in making Indore dust free. Sweeping and cleaning are undertaken 3–5 times a day. Commercial areas are cleaned after the market closes. For instance, the *Sarafa market* is cleaned between 2.30 a.m. and 5 a.m.

Mechanical road cleaning is undertaken by International Waste Management Pvt. Ltd, a fully owned subsidiary of the National Cleaning Company, Kuwait, using 15 roadsweeping Elgin Pelican machines. Mechanical road cleaning has done away with 800 dumpers of dust, lowering the levels of respirable suspended particulate matter (RSPM) from 140 µg/m³ to 80 µg/m³.

The city's commendable progress in sanitation and solid waste management has been made possible through the following ;



Figure 5.3 Measures taken by Indore Municipal Corporation for sanitation and SWM

Tailor-made innovative solutions for addressing the challenges in all 85 wards have enabled Indore to be the cleanest Indian city.

Community-led initiatives towards a clean Bhopal

The capital city of Madhya Pradesh, Bhopal has undergone major transformations in recent years. Bhopal's community-led initiative in cleaning the city has been successful with strong support from the city corporation. Inspired by 'spot-fixing' (cleaning small stretches, or 'spots', of road each week) undertaken by The Ugly Indians, an anonymous group of motivated volunteers who clean Indian streets, the Bhopal I-Clean movement was initiated by a group of dedicated city enthusiasts in January 2014. Several volunteers have supported the cleanliness movement and also sensitized the city residents to issues of health, sanitation, and cleanliness.

With 49 per cent of its population living in slums, Bhopal was one of the biggest challenges to being ODF. The city corporation, however, worked upon renovation and construction of CT and PT for improvement of service delivery and undertook several motivational programmes for eliminating OD. The city's municipal corporation attributes its success to a large extent to IEC campaigns such as Doctor Aap Ke Dwar in effectively changing the social behaviour to eliminate OD. The campaign organized 64 camps covering about 30 wards with participation of 20 370 people to construct 25 000 toilets. The campaigns were undertaken to make Bhopal ODF, to bring about behavioural changes, to ensure safety of women, and to promote menstrual hygiene. The strategy for behavioural change included surveys, awareness programmes, training, and mega events that included health camps. Other IEC campaigns such as Shiksha Chaupal and Swachta Ki Path Shala and several thematic drives were successful in breaking down the barriers to behavioural changes and thus contributed to the success of the city.

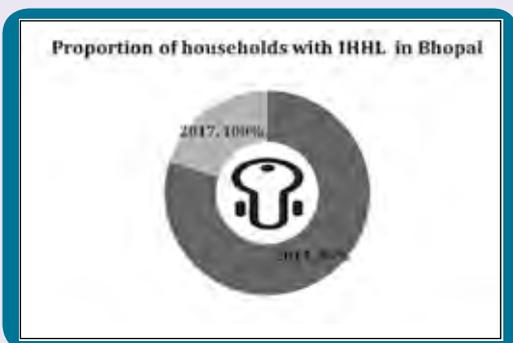


Figure 5.4 Improvement in IHHL in Bhopal

Multi-stakeholder approach for improved sanitation in Visakhapatnam

The multi-stakeholder approach has enabled the city to achieve its goals of improving access and equity in sanitation. Launch of SBM and SCM has given the much-needed fillip to the sanitation sector of the city. Collective and coordinated efforts by GVMC and other stakeholders including bilateral organizations such as USAID, International organizations such as Water and Sanitation for Urban Poor (WSUP), and the Bill and Melinda Gates Foundation have provided technical and financial support to the GVMC. The United States Trade and Development Agency has also signed an MoU to support Visakhapatnam in the SCM. The two missions, SBM and SCM, encouraged participatory planning and implementation. Public–private partnerships were conceptualized for contributing towards capital and operating expenses. User charges have been levied to recover costs and to contribute to financial sustainability. Many CT were constructed with financial support from the private sector. Operation and maintenance of majority of the CT are undertaken by Sulabh International, and GVMC has made efforts to increase the awareness and commitment of several stakeholders including civic bodies and the urban poor by actively engaging them in addressing critical constraints to scaling up sanitation chain services. Sites of OD were identified and *Swachagrahi* volunteers were posted at these areas to escort those defecating in the open to the nearest PT.

Funds from several corporate houses including those earmarked for discharging CSR were channelized towards extended support to sanitation initiatives in the city. The corporate houses included Rashtriya Ispat Nigam Ltd, Visakhapatnam Steel, Dredging Corporation of India Ltd, Visakhapatnam Port Trust, and Coca-Cola India.

International NGOs such as CARE, WaterAid, Plan, and World Vision India also helped the GVMC in its efforts, and local NGOs such as Bapuji Rural Enlightenment and Development Society (BREDS), AITUDC, and SAADIMPU Committee have worked tirelessly in partnership with the GVMC to mobilize communities, bring about behavioural changes, and implement some of the projects. Many residents' welfare associations have also participated actively in several initiatives: GVMC also managed to elicit participation from a large number of residents, evident from the highest number of citizens (192 651, or nearly 10per cent of the city's population) who provided feedback to the Swachh Survekshan 2017.

Smart City Surat for Zero-Waste City

Unprecedented urban growth has made Surat the eighth largest city in India. The city's population has almost doubled since 2001, thereby putting greater pressure on urban infrastructure. The Mahatma Gandhi Swachhata Mission(MGSM) was launched in Gujarat on 26 February 2014 to make Gujarat ODF, zero-waste, dust free, and green. The first three months of the MGSM witnessed intensive sanitation drives by all municipal corporations in the state including Surat. Zero-waste policy, 100per cent collection and scientific disposal of solid wastes, improved drainage (100per cent households connected to sewage networks), and construction of IHHL for being ODF were some of the highlights of the mission, which helped Surat realize its objective of providing every household with access to IHHL by 2014.

Several sanitation initiatives undertaken in the municipalities were further augmented with the launch of the SBM. Surat has introduced innovative interventions to reuse all of its solid and liquid wastes. Also, as a smart city, technological interventions have provided a further boost to sanitation interventions. An integrated command and control centre, named the Smart City Centre (SMAC centre), which uses an intelligent operations centre (IOC) for integrating and drawing data from different domains and applications, was introduced in Surat, Swachh Bharat being an important component of the SMAC centre.

Surat also has the largest TTP in India, with a capacity of 40 MLD. The plant is operated by a contractor, M/s Enviro Control Associates, jointly with M/s Hyflux, Singapore. The capital cost of the project is 850 million rupees. The recycled water is supplied to industries at 18.2 rupees for every 1000 litres (fresh water is supplied at 23 rupees for every 1000 litres). After the initiation of the TTP, the Surat Municipal Corporation was able to increase the quantity of water supplied to Pandesara Industries from 50–55 MLD to 75–80 MLD. Recycling waste water has had several benefits: it has decreased the pressure on fresh water resources, reduced the dependence of industrial units on groundwater, checked the diversion of fresh water for non-potable purposes, and helped in conserving water resources for use during scarcity. The plant recovered 99.2 per cent of its operating cost in 2013/14.

Decentralization for a zero-waste Mysuru

A zero-waste project was initiated in 2001 at Vidyaranyapuram in Mysuru as part of the Karnataka Urban Infrastructure Development Project supported by the ADB. A composting facility with a capacity of 200 TPD was set up on 2 hectares of land in partnership with M/s Excel Industries, and with M/s Vennar Organic Fertilizers Ltd as the developers. The plant is operated and maintained by IL&FS Co. as a PPP model.

'We will work towards the next phase of sustainable sanitation and sustain the efforts made.'
 Manish Singh, Municipal Commissioner, Mysuru

The Mysuru City Corporation (MCC) successfully implemented a decentralized SWM programme by setting up more zero-waste plants for the entire city. This programme was first tested on a pilot scale in a few zones and is now being extended to all the nine zones to cater to 65 wards. All the waste, 402 TPD, is segregated and transported to these zonal waste management units operated by SHGs. The corporation undertook thorough micro-planning for all these pilot wards. Every household was provided with two bins for collection of segregated wastes. Members of SHGs are actively engaged in door-to-door awareness creation campaigns to promote segregation: more than 80 per cent of the waste collected is now segregated. The zero-waste centres are operated by SHG members, who work along with one employee of the MCC for each centre. Such NGOs as the Ramakrishna Ashram have regularly conduct cleanliness drives. Rajiv Sneha Balga, another NGO, has also worked towards improving sanitation and organized events such as a cleanliness week.

The city ranks high on sanitation with 100 per cent households with access to latrines. A large percentage of households (98 per cent) are also connected to the sewage network.

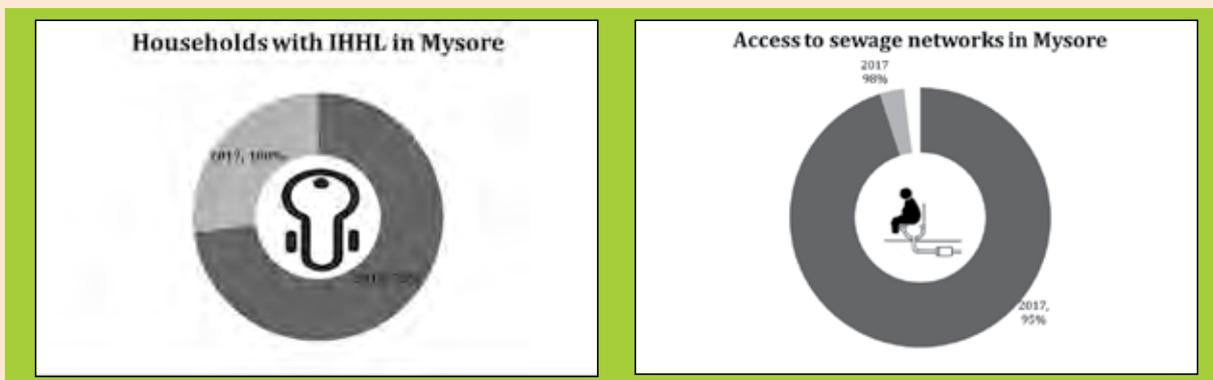


Figure 5.5 Improvement in IHHL and household's access to sewage network in Bhopal

The Mysuru City Corporation has approved a detailed project report (DPR) for a new 150-tonne compost plant, which will also adopt such innovations as refuse-derived fuel (RDF) and a biogas plant.

5.4 Lessons learnt from success stories

5.4.1 Common factors of success

Each city has a different context on account of the inherent geographical, social, economic, environmental, and institutional diversities, which pose varied challenges to sanitation services. Some of the factors common to the success of the five cities are discussed below.

5.4.1.1 Political will

The Swachh Bharat Mission has enjoyed political momentum from the central government, emphasizing the achievement of the envisioned goals by 2019 to mark the 150th birth anniversary of the Father of the Nation, Mahatma Gandhi, as a tribute to his memory. As a flagship programme of the prime minister, the Prime Minister's Office (PMO) has played an important role in monitoring progress and coordinating with several departments to facilitate implementation. As seen in these case studies, the state governments of Madhya Pradesh, Andhra Pradesh, and Gujarat have been keen to align themselves with the national agenda and have played an important role in providing policies, guidelines, funds, and institutional set-up and in monitoring, whereas the ULBs have shown strong leadership and political will in implementation at the city level. The respective city commissioners have strongly backed the mission and motivated the officials and other stakeholders to participate actively in the efforts. The leadership of the respective commissioners has demonstrated a strong political will for accelerating sanitation interventions, an important factor that has translated the SBM goals into actions in these cities.

5.4.1.2 Effective planning and enforcement

Interactions with all the city corporations revealed that the main factor for success has been integrated planning and enforcement. Under the SBM, state sanitation strategy and city sanitation plans have been made mandatory. This mandate has developed a planning culture at the state and the city level. Since most of the problems are decentralized, cities have developed integrated micro planning to address the unique issues. The success of the cleanest city, Indore, has been largely attributed to integrated micro

planning coupled with strict enforcement.

5.4.1.3 Involvement of key stakeholders

Government leadership, with active participation of local stakeholders including NGOs, CBOs, and residents' welfare associations in effective implementation; ownership by the local communities; and funds from the corporate sector have helped in overcoming some of the financial and socio-economic challenges. The case of Visakhapatnam has highlighted the impact of stakeholder participation including the private sector on the implementation of the sanitation plan.

5.4.1.4 Inclusive solutions to address needs of heterogeneous population

The five cities have emphasis on inclusion to address the needs of their heterogeneous populations. The sanitation needs of low-income households, especially those in the slums, have been addressed effectively in all the five cities to tackle OD in slums, a major constraint to being ODF. All five cities have also initiated gender-friendly CT and PT. Two 'she-lounges', or exclusive PT for women equipped with such facilities as vending machines for sanitary napkins, units to dispose of such napkins, mirrors, and an ATM, with aesthetically designed interiors, and maintained by women, were set up in Bhopal. These gender-friendly toilets are safe, convenient, and hygienic. Bhopal has also introduced PT for transgender population, the first of its kind in Bhopal.

5.4.1.5 Planning for financial sustainability of sanitation infrastructure

Both SBM and SCM encourage participatory planning and implementation. Public-private partnerships were conceptualized for contributing towards capital and operating expenses and user charges levied to recover costs and to help in achieving financial sustainability.

5.4.1.6 Healthy competition and measurement of success

The Swachh Survekshan, a survey to assess the cleanliness of cities, is undertaken by the MoHUA. The survey ranks cities on important aspects of SWM and sanitation to foster healthy competition for improving cleanliness standards. The Swachh Survekshan ranked 73 cities across the country in 2014 and 434 cities in 2017. These results have proved encouraging to the desiring ULBs.

5.4.2 Measures of overcoming sectoral challenges

5.4.2.1 Observable improvements in sanitation as a motivating factor for improvement of people's perception and participation

Observable improvements in sanitation in their respective cities have led to improvement in people's perception of sanitation and hygiene. The Swachh Survekshan results highlight improvement in people's perception of door-to-door waste collection from households, availability of dust bins, maintenance of CT and PT, availability of urinals and toilets, and an overall improvement in cleanliness in the region (above 96 per cent reported improvement for all the cities). Such improved perception has also contributed to greater participation and has motivated people to change their behaviour in ways that promote better sanitation. A series of measures to improve city sanitation along with IEC have immensely contributed to eliminating OD, especially in Indore and Bhopal.

In several urban areas, space constraints, tenure, and ownership of house or property hinder the construction of IHHL. Community toilets have to a large extent addressed these factors.

5.4.2.2 Addressing inequity

Indian cities make stark distinctions between high-income areas and low-income areas. The high-income areas enjoy assured water supply and improved sanitation facilities connected to the sewerage system or to septic tanks. The low-income areas usually face inadequate water supply and poor sanitation services. A holistic approach to sanitation under the SBM and the SCM has improved both water supply and sanitation.

5.4.2.3 Meaningful partnerships

The case study indicates meaningful partnerships between Government, Community, NGOs and Private sector an important factor that determines success.

5.4.2.4 Corporate involvement and funds from bilateral organizations to address financial constraints

Considering the huge capital investment required for key infrastructure in sanitation, involvement of

the corporate sector and bilateral agencies in the form of financial assistance has been of considerable help in implementing the ongoing missions in Indore, Visakhapatnam, and Surat. The Swachh Bharat Kosh and the recently launched Swachh portal have made it easier to allocate CSR funding to sanitation.

5.5 Conclusion

These five cities in India have successfully demonstrated that integrated approach to local issues has translated the national political commitment into action on the ground. A strong political will at the city level, with the city corporations leading the programme with effective city-level micro plans, has worked well in overcoming crucial sanitation barriers. Micro-planning incorporating unique, innovative, and tailor-made solutions to cater to the needs of heterogeneous populations have ensured equity and access in several cities. Stringent enforcement of the plans with punitive and remunerative measures and immediate action on service delivery have together brought in change at the field level. All the cities have achieved their success through active participation of stakeholders. Cities such as Visakhapatnam have shown how the private sector can play an important role in surmounting financial barriers in the form of large investments required for implementing large-scale programmes. Local and international NGOs and citizens have played a crucial role in overcoming barriers in the form of entrenched behaviour. Financial planning has been an important aspect in ensuring sustainability of the initiated projects. The tertiary treatment plant in Gujarat and several other initiatives in other cities have shown that resource recovery determines success. Levying user charges for basic service delivery has also helped to recover the cost of O&M of sanitation infrastructure and SWM.

Indore, Bhopal, Visakhapatnam, Surat, and Mysuru were ranked by the Swachh Survekshan 2017 as the five cleanest cities in India, and this recognition has paved the way for demonstrating success to other urban areas. The results of the Swachh Survekshan 2015 and 2016 motivated these cities, especially the first four, to leapfrog from being ranked 149, 105, 205, and 63 in 2015 to 1, 2, 3, and 4.

CHAPTER - 06

THREE YEARS OF URBAN SANITATION UNDER SWACHH BHARAT MISSION

6.1 Swachh Bharat Mission (Urban): an overview

The Swachh Bharat Mission, launched in October 2014, is one of the most widely disseminated programmes in India and enjoys strong political support. The clarion call to participate in the mission coming from the prime minister of the country and his appeal to the nation to make the country 'open-defecation free' by 2nd October 2019 makes it a unique initiative. Apart from eliminating open defecation, the mission has a few other targets as well:

- modern and scientific solid waste management
- effective behavioural change for healthy sanitation practices
- awareness generation about sanitation and its implications for public health
- capacity building of urban local bodies
- eradication of manual scavenging
- promoting private-sector participation in capital expenditure and operation and maintenance.

Guidelines for the SBM (Urban) were circulated in October 2014 to provide states and cities with a road map for implementing the components of the SBM (U). The guidelines were revised in August 2017 to provide more flexibility to states to decide their mission targets and to help cities to accelerate the implementation of the mission. The protocol for ODF was made more stringent and a large number of facilitating partnerships were entered into for help in implementing the SBM (U). This chapter attempts to highlight the achievements of the mission over the past three years and to assess the issues and challenges that face the urban sanitation sector.

6.2 Swachh Bharat Mission (Urban) and its targets

Individual household latrines: The mission mandates that no household shall engage in OD, that no new insanitary toilets shall be constructed during the mission period, and that the existing pit latrines shall be converted to sanitary latrines. Thus the target group for construction of household units of toilets comprises the following: 80% of the households that resort to OD, all households with insanitary latrines, and all households with single-pit latrines (SBMU Guidelines 2017). A subsidy of Rs 4000 is provided by the central government to each household for constructing IHHL, and the balance is met from a subsidy by the state and the ULB, which should ensure that all household toilets being constructed under the SBM are built in tandem with water supply arrangements made by the ULB. The beneficiary households will be responsible for the operation and maintenance of the household toilets. The guidelines reiterate the fact that ULBs will need to carry out periodic de-sludging of pits and accelerated implementation of ODF strategies and initiatives to prevent the households reverting to OD.

Community toilets: It is estimated that 20% of the urban households currently resorting to OD cannot build toilets at home owing to space constraints and hence CT will be built to address the needs of such households (SBMU Guidelines 2017). The mission has made it mandatory for all CT constructed under the mission to have a minimum of five-year maintenance contract. The central government offers an incentive in the form of 40% grant or viability gap funding (VGF) for each CT block constructed. The base cost of a unit of CT is taken as Rs. 98000 per seat. The state government is to contribute a minimum of 40% of the cost to match the share of the central government. In the north-eastern states, UTs, and special-category states, the share of the central government is higher.

Public toilets: Adequate PT with water supply are being built in each city under the SBM (U) to meet the needs of the city's floating population. The central government's incentive for constructing PT and urinals is the same as that for CT (40% for each toilet block constructed). The base cost of a unit of PTs is also taken as Rs 98000 per seat, with the state government contributing a minimum of 40% of the total. Additionally, states and ULBs may also identify land for PT and leverage that land and advertising space to encourage the private sector to construct and manage PT through as a PPP. Additional funding support by any other means can also be used, and ULBs may also put up mobile toilets as PT. All PT constructed under the SBM must also have a minimum five-year maintenance contract.

Municipal solid waste management: Management of MSW by waste segregation and storage at source, primary collection, secondary storage, transport, secondary segregation, resource recovery, processing, treatment, and final disposal are covered in the SBM (U) guidelines. The respective ULBs are to prepare a DPR in consultation with state governments (smaller cities are to form clusters to become viable entities to attract private investment). The report should be in alignment with the goals of the central government, as outlined in NUSP 2008, SWM 2016 rules, advisories, CPHEEO manuals (including cost-recovery mechanisms), O&M practices, and SLBs. The entire cost of preparing the DPR shall be reimbursed by the central government. The states are free to choose the technology for SWM projects, toilets, and street sweeping. Waste-to-energy and SWM projects are eligible for government grants or for VGF. The central government's incentive for the SWM projects will be in the form of a maximum of 35% grant or VGF for each project, and the state government will contribute at least 40%.

Information, education, and communication and awareness campaigns: Communication aimed at

behavioural change is a key strategy under the SBM (U) to ensure that sanitation as an issue is mainstreamed with the general public at large. The communication strategy should include the problems of OD and manual scavenging, hygienic practices, and proper use and maintenance of toilet facilities (household, community, or public) and the related consequences for health and the environment. The communication materials should be synchronized with those related to the SBM (Rural) and should be designed in consultation with the Ministry of Information and Broadcasting and the Ministry of Health and Family Welfare. A total of 15% of the total central allocation is earmarked for this component with 12% earmarked for the states to undertake massive public awareness campaigns on sanitation and to establish its link to public health, hygiene, and the environment through various channels including broadcasts, social media, documentaries, plays, and workshops, and 3% is earmarked for MoHUA to draw up a national media campaign and to develop standard campaign tools for effective awareness of and communication on sanitation. At least 50% of the funds are to be utilized at the ULB level.

Capacity building: States are supposed to propose extensive capacity-building activities, to be implemented in the mission mode, to achieve the objectives of SBM (U) within the stipulated time. All ULB staff are required to register for and complete with certification the e-learning training modules that have been compiled on the e-courses portal www.swachhbharaturban.in. Of the total central allocation under the SBM, 3% is earmarked for capacity building and office and administrative expenses (CB & AE) of states and ULBs. At least 50% of the funds are to be utilized at the ULB level. States and ULBs should identify relevant officials (both senior officials and field staff) for training and draw up a calendar of training for them. The annual target set by the mission in various categories of IHHL, CT, PT, and SWM are given in Table 6.1.

Table 6.1: Annual target set by SBM in various categories of IHHL, CT, PT, and SWM

Component	2015/16	2016/17	2017/18	2018/19	Overall target
IHHL	2 500 000	3 500 000	3 500 000	900 000	10.4 million units
CT and PT	100 000	204 000	204 000	-	0.508 million units
SWM: 100% collection and transport (no. of cities)	1000	1500	1500	41	To achieve scientific SWM in 4041 cities and towns for 306 million people
SWM: 100% processing and disposal (no. of cities)	100	1000	1000	1941	

Source: http://swachhbharaturban.gov.in/writereaddata/Mission_Yearwise_Targets.pdf

6.3 Funding under Swachh Bharat Mission (Urban)

The Government of India has estimated the cost of implementing the SBM (U) at 620 billion rupees, of which the central government's share is 146.23 billion and that of the state governments or ULBs is about 48.74 billion. The balance is being generated through

funds set aside for CSR, Swachh Bharat Kosh (SBK) contributed by the private sector, Swachh Bharat cess, etc. The allocation for SBM (U) from the central government was 23 billion rupees in 2016/17 and the same amount in 2017/18. Four financial years into the scheme, 72.91 billion rupees (nearly half of the central government's total share) has been allocated to the states (Figure 6.1).

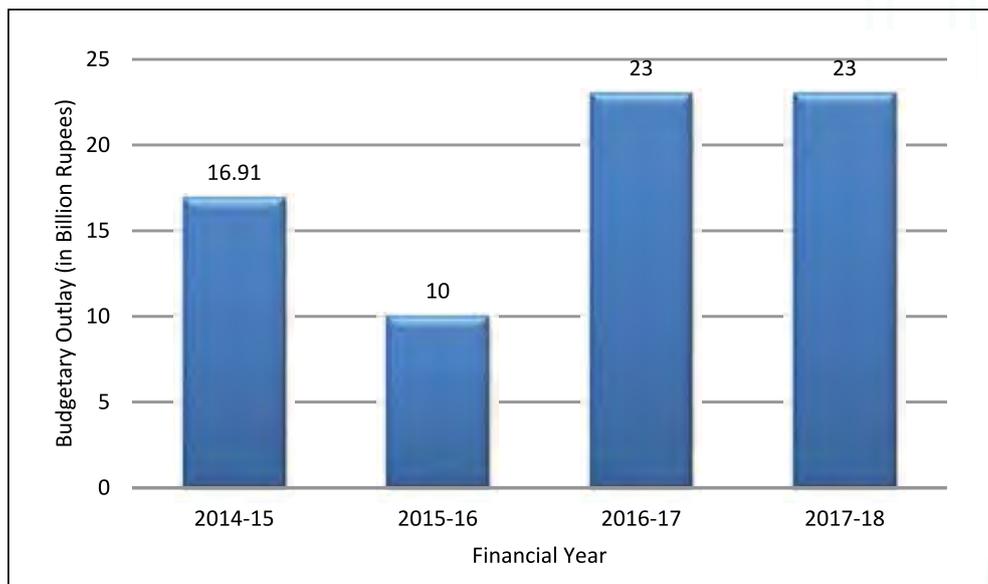


Figure 6.1: Budgetary allocation for SBM (U) by the central government
(Source: India Expenditure Budget, 2017/18, MoUD)

About 60% (87.73 billion) of the central government's share is allocated to projects based on normative criteria, which is standard. About 20% (29.246 billion) is allocated based on performance, and 15% (21.94

billion) is meant for awareness generation and IEC (of which the MoHUA retains 3%). The allocation for CB & AE is 3% (4.387 billion) and that for research and CB&AE of MoHUA is 2% (2.925 billion) (Figure 6.2).

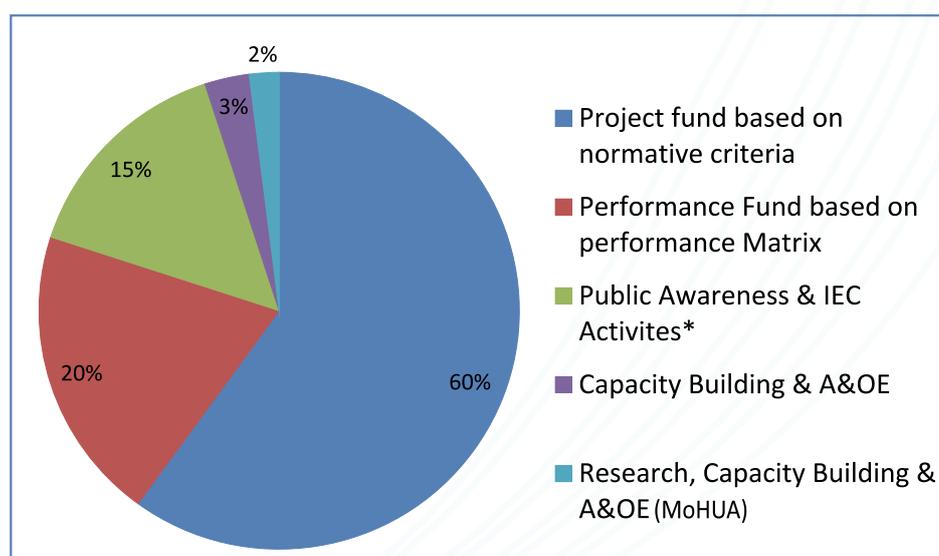


Figure 6.2: Allocation of central government funds for SBM (U)

*3% of which to be retained by MoHUA

6.4 Strategy and structure for implementation

In order to give a quick start to the SBM, the states were asked to submit a brief concept note on the state sanitation strategy (SSS) to the MoUD (now MoHUA). This note was supposed to be part of their initial proposal to claim the first instalment under

limited to, third-party evaluation, impact evaluation studies, etc. All states and UTs and the 4041 urban habitations covered under the mission are required to submit progress reports online through this MIS. The Prime Minister's Office oversees the progress of the mission and monitors the MIS reports. The implementation structure of the SBM (U) comprises three tiers, namely the national level, the state level, and the ULB level (Figure 6.3).

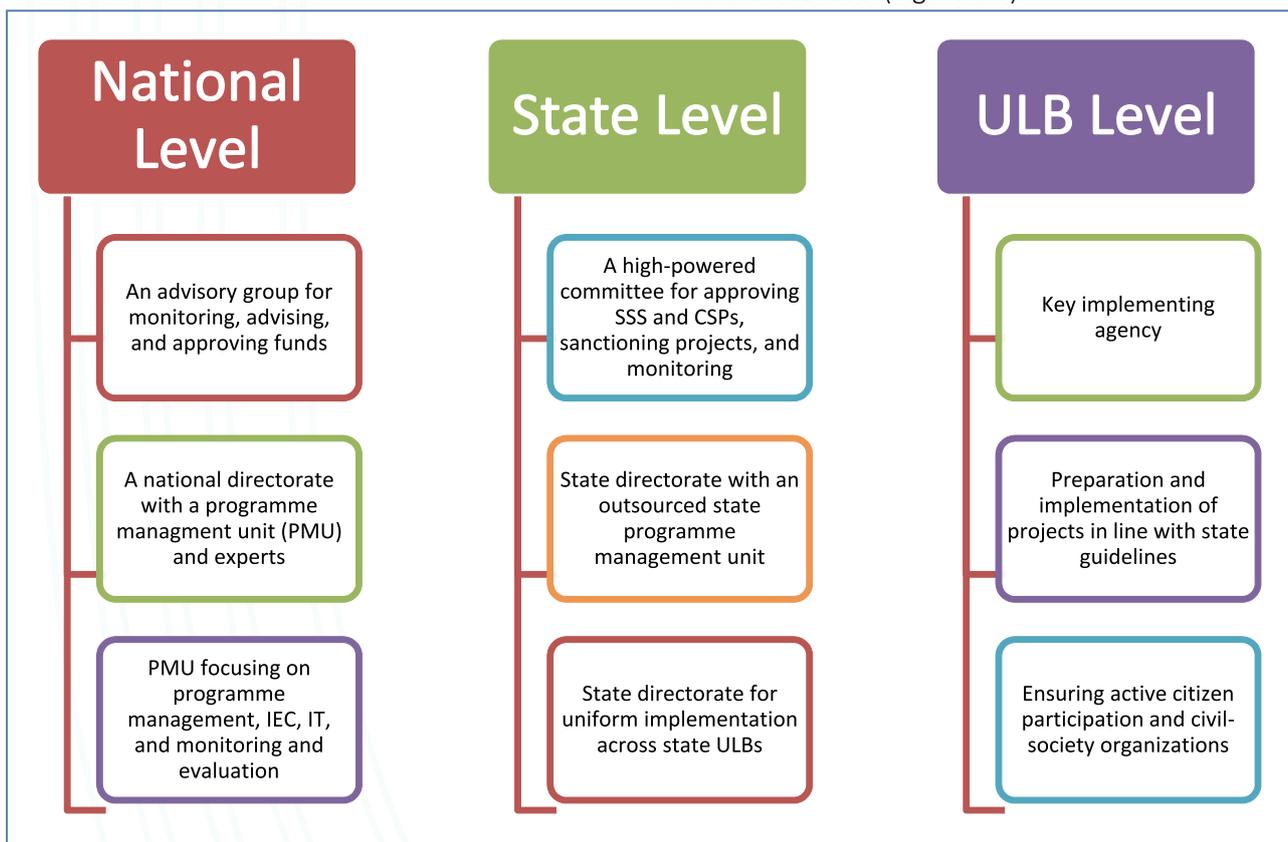


Figure 6.3: Three-tier implementation structure of SBM (U)

the SBM (U). For further instalments, the states were asked to start preparing city sanitation plans (CSPs) for each city and the SSS as per the National Urban Sanitation Policy (NUSP 2008). On acceptance of the state government's proposal by the ministry, the first instalment of funds was to be disbursed to the states or UTs in the proportions given in Figure 6.2. Although, for releasing the first instalment, the 20% allocation based on performance was not held back.

Given the scale of the mission, a comprehensive and robust IT-enabled MIS has been established by the MoHUA for real-time tracking of targets and achievements. Monitoring also includes, but is not

6.5 Analysis of the progress made so far

Indore was the cleanest city in India (with a total score of 1807.72 out of 2000), followed by Bhopal and Vishakhapatnam in the Swachh Survekshan 2017 (MoUD 2017). However, the progress is limited to a few states. Of the top 100 cities, Madhya Pradesh and Gujarat account for 44. Chhattisgarh and Jharkhand have also fared well whereas cities in Bihar and Uttar Pradesh have not. Only 45 cities had kept more than 75% of their commercial areas clean. In terms of Community Toilets and Public Toilets, Vishakhapatnam turned out to be the only city in the country in which

more than 75% of the Community/Public Toilets were gender, child, and disabled-friendly (SBM (U) 2017).

6.5.1 Toilets (household, community, and public)

The primary focus of the SBM (U) has been on making cities ODF. Under the targets for IHHL, in the last 2.5 years of the SBM, 3.1 million IHHLs, or only 30% of the target, were constructed in urban areas of the country as against the five-year mission target of 10.4 million toilets to be built by 2019 (SBM (U) 2017) (Figure 6.4). Additionally, 115000 CT and PT were constructed, amounting to only 22% of the target (SBM (U) 2017) (Figure 6.5).

According to the Swachh Survekshan Survey (2017) of 434 AMRUT cities (population greater than 0.1 million), the Quality Council of India (QCI) declared 118 AMRUT cities to be ODF after third-party assessment (SBM (U) 2017) as of Jan 2017. As on 2nd October 2017, 1308 cities and towns were ODF (Swachh Survekshan data). This shows that around 30% of the cities and towns in India are ODF. Madhya Pradesh, Chhattisgarh, Chandigarh are declared as well as verified as 100% ODF while, Andhra Pradesh, Gujarat, Maharashtra and Haryana have self-declared themselves as 100% ODF. In States such as Bihar, Odisha, UP, and West Bengal virtually no ULB is ODF. The status (as on 2nd October 2017) is presented in Figure 6.6.

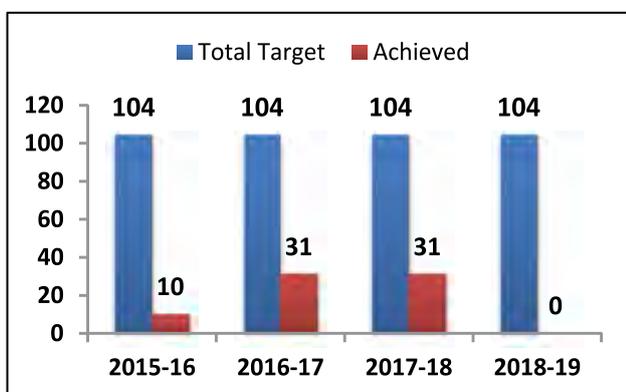


Figure 6.4: Progress of IHHL construction (in lakhs) under SBM (U)

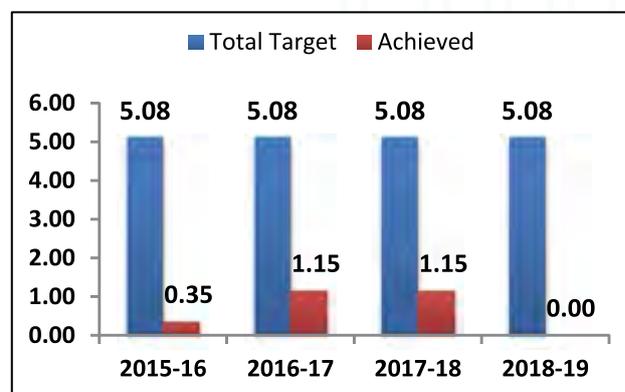


Figure 6.5: Progress of CT and PT construction (in lakhs) under SBM (U)

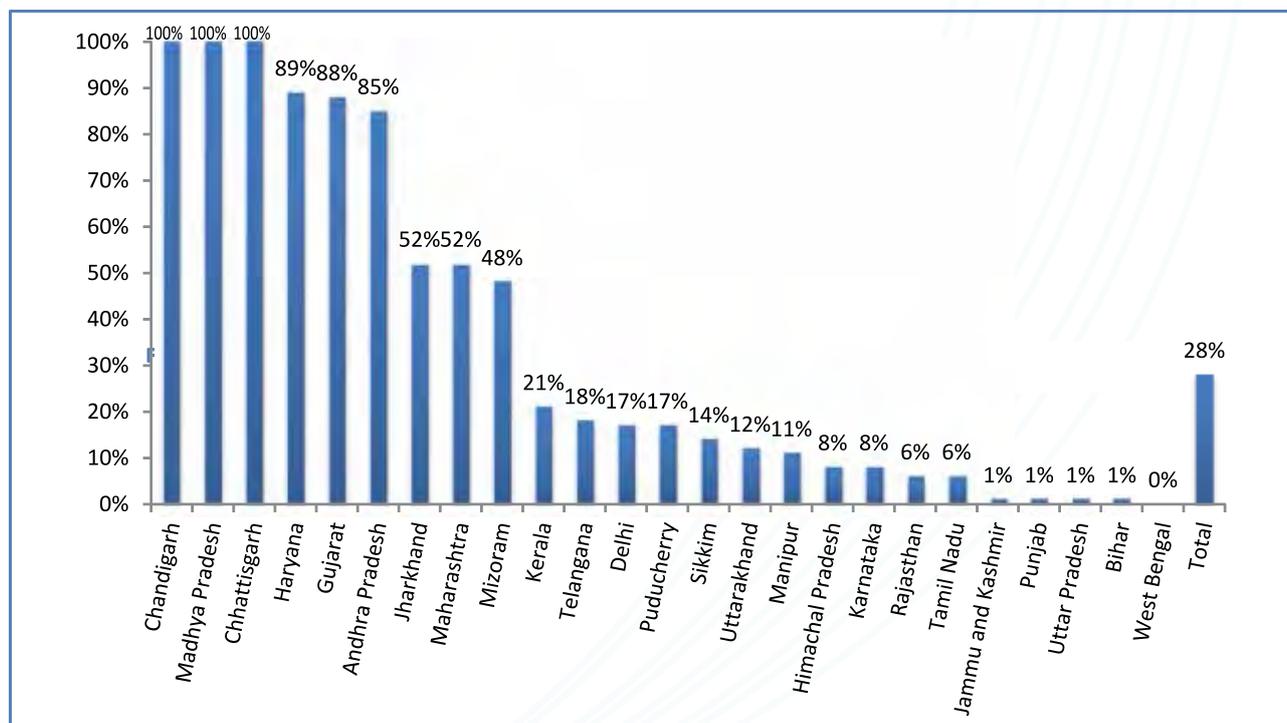


Figure 6.6: Proportion of open-defecation free cities, by states, verified by QCI. Source: Realtime ODF data

Although the progress is not commensurate with the target, the speed of construction has picked up. In 2015/16, only 13% of the total mission target for IHHL was achieved nationally; the figure increased to 28% in 2016/17, a change of 15 percentage points (Deshpande and Kapur 2017). In terms of progress in CT and PT, Tamil Nadu and Delhi have been leading, meeting 73% and 62% of the targets respectively.

6.5.2 Municipal solid waste management

According to the Task Force on Waste-to-Energy, India generates 170 000 TPD, or 62 million tonnes (Mt) per year, of MSW (Planning Commission 2014). The daily average per capita generation of waste in India is 0.11 kg (GIZ 2015). Of the 62 Mt, only 43 Mt is collected. Out of 43 Mt collected, 11.9 Mt is treated and 31 Mt is dumped in landfill sites (Lahiry 2017).

Under the SBM (U), 42948 (out of 81065) wards have achieved 100% door-to-door collection of solid waste (Figure 6.7); 23.14% of the total waste collected is processed (SBM (U) 2017). According to the Swachh Survekshan 2017, 297 cities (out of 434) have achieved door-to-door waste collection in more than

80% of the wards.

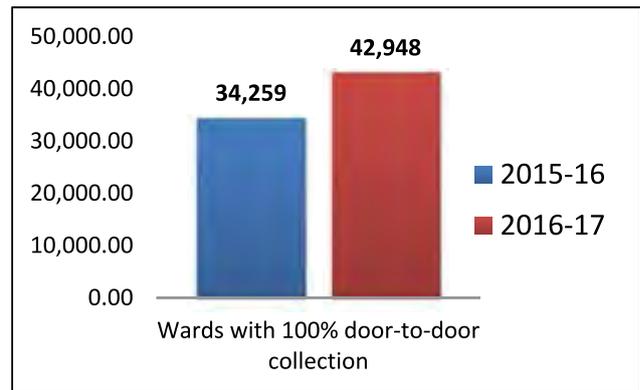


Figure 6.7: Status of door-to-door collection of solid waste

A Rapid Survey on Swachhta Status, Swachhta Status 2015, was conducted by the NSSO during May-June 2015 alongside its regular 72nd Round (July 2014 – June 2015) survey covering 2907 sample urban frame survey (UFS) blocks (MoSPI 2017). The number of households surveyed was 41538 in urban India. This report gives a snapshot of the status of sanitation in urban and rural India focusing on areas that need a targeted approach (Figure 6.8).

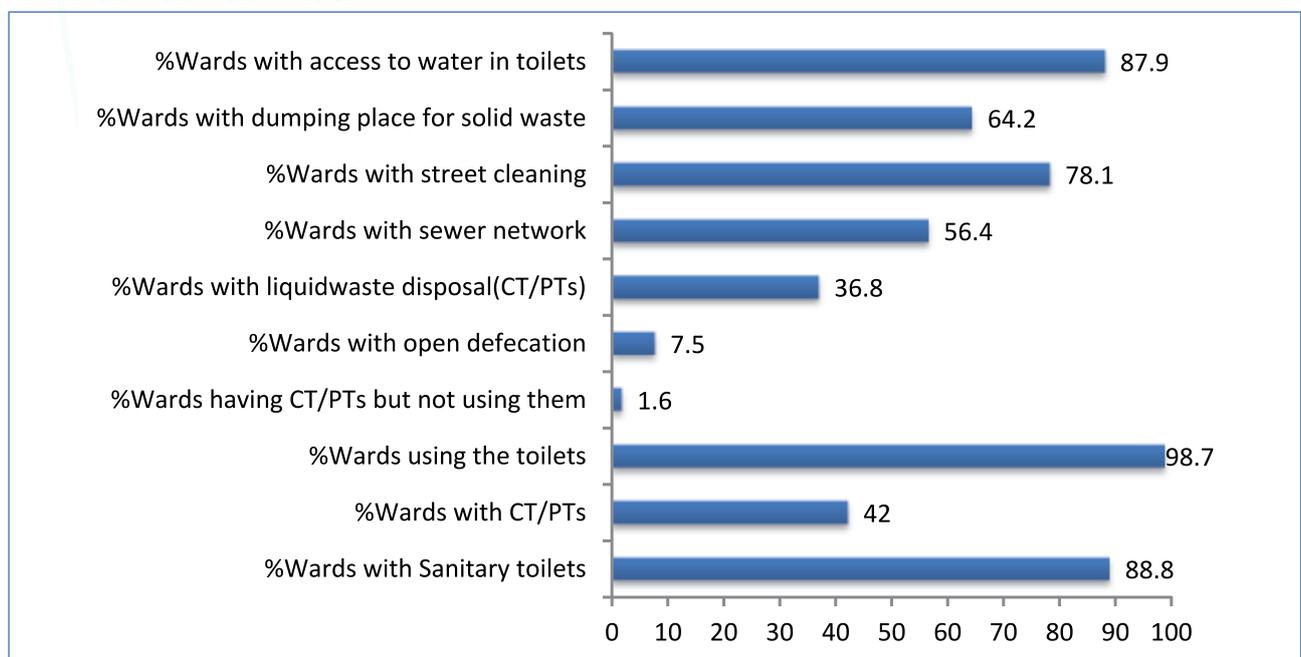


Figure 6.8: Progress in sanitation (percentage of wards) by 2014/15 (Source: MoSPI 2017)

6.6 Factors that led to progress

6.6.1 Policy and governance

Under the SBM (U), the Government of India has introduced effective policy interventions and focused on strengthening its governance. Programme management units (PMUs) at the central as well as at the state level and programme implementation units (PIUs) at the city level have been set up for smooth implementation of the SBM (U) projects. A state mission directorate (SMD) is also located within the urban development department (UDD) of each state and UT. The directorate creates a uniform structure across the state for planning, designing, project preparation, appraisal, sanction, and implementation of sanctioned projects under the mission at the ULB level, adhering to the advisories issued by the National Mission Directorate from time to time (MoHUA 2017).

Further, monitoring also includes third-party evaluation, impact evaluation studies, etc. The evaluation of the mission is undertaken during the course of its implementation to effect mid-term course correction and to align the mission to achieve its objectives. Swachh Survekshan is one of the monitoring tools implemented by the MoUD and was conducted in 434 AMRUT cities in January 2017 with assistance from the QCI. The ministry also plays the facilitator, identifying the good practices carried out in selected municipal corporations and ensuring that officials from other municipal corporations undertake exposure visits to the selected municipal corporations to explore whether the good practices can be replicated in their respective local bodies (NIUA 2016).



Figure 6.9: GPS enabled SWM trucks

Another welcome step has been the contract with the Directorate General of Supplies and Disposal (DGS&D) for procurement of goods and services in the urban sanitation sector. The contract enables the state- and central-government-owned entities to buy the required goods at DGS&D-specified prices and standard specifications.

To enhance operational transparency and efficiency, arrangements have been made with two communication utilities, namely MTNL (Maharashtra Telephone Nigam Ltd, in Delhi and Mumbai) and BSNL (Bharat Sanchar Nigam Ltd, in all other parts of India) to provide vehicle tracking and monitoring systems to all ULBs through e-SBM (Figure 6.9). The systems would include GPS-based monitoring of the fleet, MIS for waste collection and transport, and real-time short messaging service (SMS) to report vehicle breakdown and maintenance. The Pimpri Chinchwad Municipal Corporation (PCMC) has deployed a GPS-based vehicle tracking system, which is working well and involved only a low capital cost for deployment.

6.6.2 Infrastructure and service delivery

Planning service delivery and supporting infrastructure is a particularly critical part of municipal solid waste management (MSWM), and the SBM (U) has given greater attention to MSWM in terms of budgetary allocation as well as the capacity of service delivery. The stages of waste handling, such as on-site waste storage, door-to-door collection, secondary storage, hauling to processing sites, loading and unloading, and hauling to the final disposal sites are all inter-dependent on the development of basic infrastructure. Unless the ULBs have adequate staff to carry out these jobs, the operational efficiency will not be optimum.

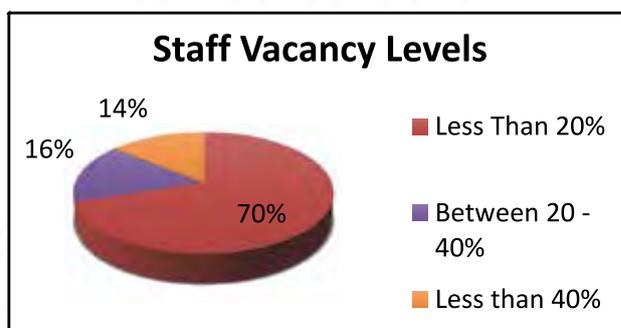


Figure 6.10: Levels of staff vacancy in 434 cities (Source: Swachh Survekshan 2017)

The Swachh Survekshan 2017 reveals that in 304 of the 434 cities, the shortfall in staff is below 20% (Figure 6.10) (in other words, more than 80% of the staff positions are filled) and in 60 cities, the shortfall is more than 40%. Of these 60 cities, only one city is within the top 100—all the remaining are not even in the top 200. This conveys an important correlation between adequate staffing and the level of sanitation in a city.

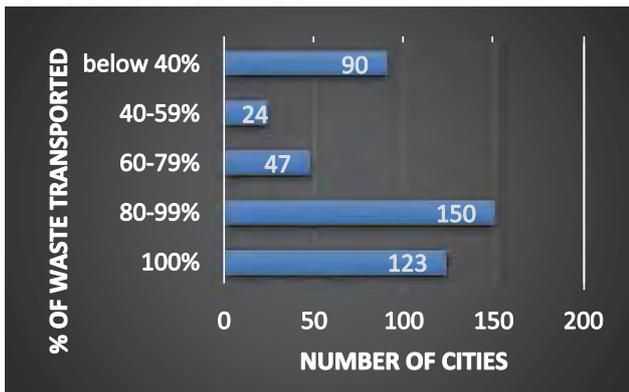


Figure 6.11: Percentage of Waste Transported in 434 AMRUT Cities

The Swachh Survekshan 2017 also showed that of the 434 cities, 297 collect more than 80% of solid waste from door to door; 273 cities have adequate infrastructure and transport facilities to transport more than 80% of the waste generated in the city to such other facilities as sanitary landfills and waste treatment plants (Figure 6.11); and in 82 out of these 273 cities, ULBs process more than 80% of the waste they collect.

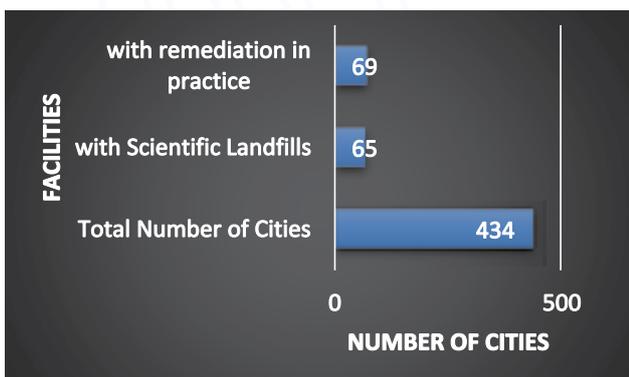


Figure 6.12: Waste disposal facilities

Waste treatment plants in 104 cities are functioning at more than 80% efficiency; 65 cities have scientific landfills; and 69 cities practise remediation of existing dumps (Figure 6.12).

6.6.3 Technology

Use of technology is critical to the implementation of SBM. Several technological interventions have been made at various levels of governance, monitoring, attendance system, service delivery, etc. The first among them is the installation



Figure 6.13: Swachhata app

of ICT systems for monitoring attendance at the ULB level. Some 232 cities out of 434 have implemented such systems to monitor the attendance of their employees.

Tracking systems based on GPS have been installed in most of the vehicles of municipal corporations, so that their locations could be tracked in real time and immediate action taken for any deviation from the route: 165 cities out of the 434 cities have GPS devices in more than 75% of their vehicles and 126 cities transport more than 80% of the waste to designated places.

The Swachhata app (Figure 6.13) of MoHUA is another major technological intervention, which has various interfaces for citizens, for ULB officials, and a dashboard where cities are ranked based on their score. There is still room for more innovative technology-based interventions to make the systems even more efficient.

6.6.4 Finance

One very important driving force in proactive involvement of states is the conditional release of funds by the central government. The share of each state in the total funds allocated to the SBM from 2014 to 2019 is based on the number of statutory towns, their populations, and the population resorting to OD. The release of the first instalment is contingent on the states submitting a proposal based on anticipated demand and its sanitation strategy. Subsequent instalments are released based on utilization certificates of previous grants, physical and financial progress, and other indicators approved and desired by the National Advisory and Review Committee (NARC). The amount of funds released by the central

government has varied over the years. Initially, in 2014/15, 51% of the allocated amount was released; in 2015/16, it was over 100%. In 2016/17, the pace of release increased significantly, accounting for 41% of the total amount released since the launch of the mission. By 18 January 2017, 61% of the amount

set aside for that financial year had been released (Deshpande and Kapur 2017). Figure 6.14 shows the amounts released up to January 2017 for each state as percentages of the total amounts allocated to the states.

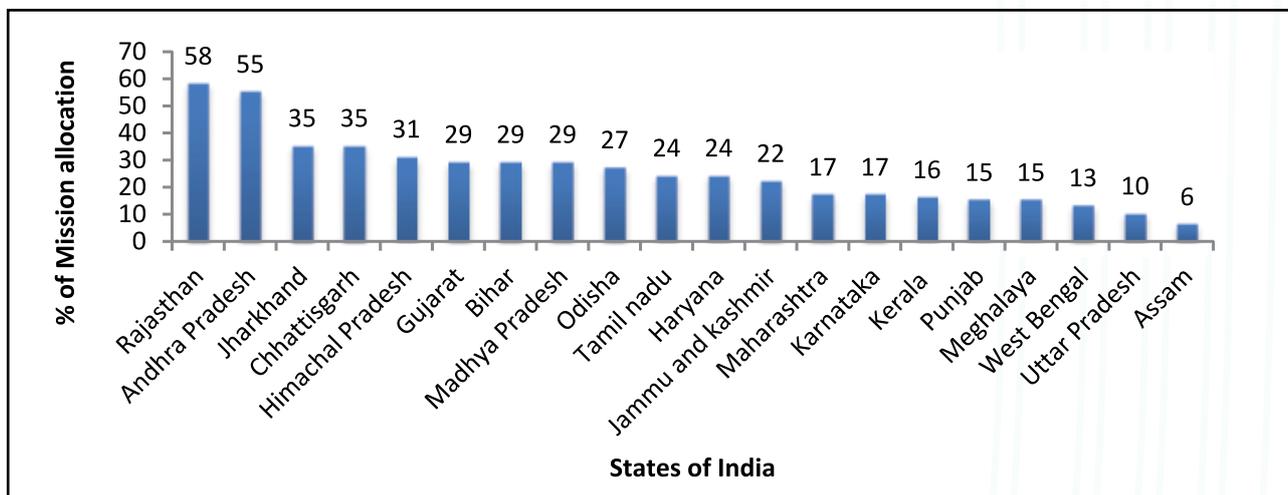


Figure 6.14: Amounts released up to January 2017 to states as percentages of total amounts allocated to states (Source: CPR, Budget brief, 2017)

The learnings from the earlier efforts clearly indicate that merely focusing on toilet construction would not lead to a state or a city being ODF; it is necessary to invest in social and behavioural change communications (SBCC). The mission recognizes this and has earmarked as much as 15% of the outlay for this component, with 12% to be granted to the states for the purpose. However, the release of funds for this component (IEC) has been slow. Other important sources of financial support to the mission are the Swachh Bharat Kosh (SBK) created to facilitate channelization of philanthropic contributions and CSR funds. In 2014/15, the SBK received about 50 million dollars (Norman and Renouf 2016). The Swachh Bharat cess (SBC) introduced in late 2015, is in the form of an additional 0.5% component on service tax, which is applied to a wide range of services including insurance, hotels, and restaurants. The central government hopes to raise nearly 150 million dollars annually through the cess.

more focused on toilet construction during the first year of the mission but the share of SWM increased in the next financial year. In 2015/16, 70% of the total money released under SBM (U) was for construction of IHHL, CT, and PT, and 25% was for SWM. In 2016/17, up to 18 January 2017, the share of construction activities decreased to 45% whereas that for SWM increased to 51%; IEC accounted for only 3% of the total in 2016/17 up to 18 January 2017, down from 4% in 2015/16 (Figure 6.15) (Deshpande and Kapur 2017).

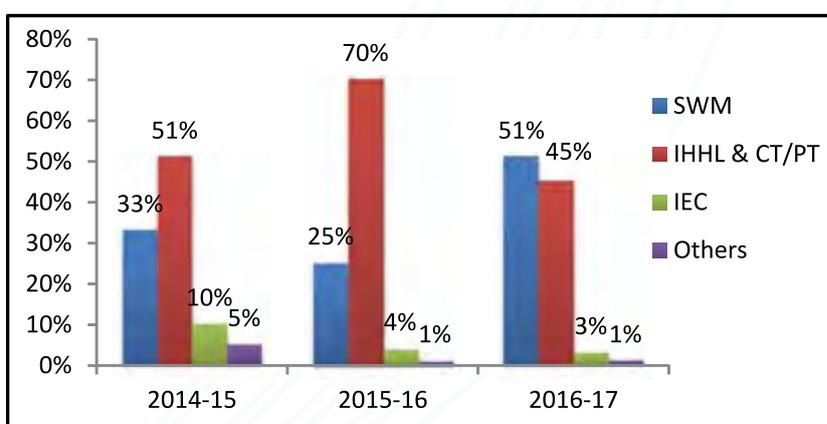


Figure 6.15: Shares (%) of different components of SBM (U) in funds released

Also, funding under the SBM (U) was

6.6.5 Corporate engagement

The corporate sector in India responded enthusiastically to the government’s call to action for the SBM (U) and specifically for WASH initiatives. The government has also made it mandatory to channel 30% of the CSR funding to the SBM (Bhaumik 2017). The Swachh Bharat Kosh has been set up to attract CSR funds from the corporate sector and contributions from individuals and philanthropists. Donations to the SBK, other than the sums spent on discharging CSR under sub-section (5) of Section 135 of the Companies Act, 2013, are eligible for 100% deduction under Section 80G of the Income Tax Act, 1961. This is applicable to the assessment year 2015/16 and subsequent years (Ministry of Finance 2017).

activities as the construction and repair of toilets and water supply to the toilets (The Hindu Business Line, 18 Oct. 2016). In addition to SBK, the SWACHH portal has also been launched, which is described as Swachhata Augmentation through Corporate Helping Hands. It is a crowd-funding platform to spearhead the engagement of the private sector in city-level initiatives of SBM.

The corporate sector has launched many more notable initiatives to help in solving problems related to the urban WASH sector. GMR Varalakshmi Foundation (GMRVF), the CSR arm of the GMR Group, has built model pay-and-use toilets in Hyderabad and Bangalore. In addition, the foundation has supported over 660 families in constructing individual sanitary



Figure 6.16: Top five donors to Swachh Bharat Kosh (Source: Hindustan Times, July 2016)

Since its launch in September 2014, the Swachh Bharat Kosh has received 4.12 billion rupees (RTI, as of July 2016) including interest (Figure 6.16) (The Hindu Business Line, July 2016). Of this, the Union finance ministry that administers the fund has already sanctioned 3.82 billion rupees to different states for implementing sanitation projects. Official data show that the fund’s top donors have also remained largely the same in the last one year. According to the operational guidelines for the fund, the donations will be used for “improving cleanliness levels in rural and urban areas, including in schools” through such

lavatories and the construction and renovation of about 60 school toilets at different locations. JSL Architecture Ltd, a subsidiary company of Jindal Steel Ltd, evolved the concept of porta toilets made of stainless steel and housed in second-hand but refurbished containers.

Of the companies that have undertaken CSR activities over the last three years, about 90% have done so in the WASH sector, carrying out a total of 164 programmes (Figure 6.17). Of these, 38% were public-sector undertakings (Samhita Report 2016).

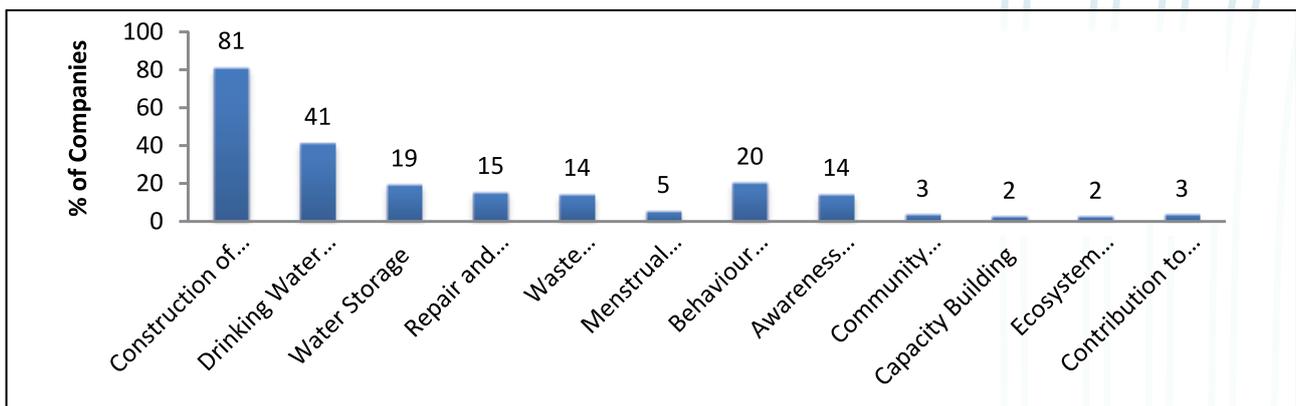


Figure 6.17: Corporate social responsibility in WASH sector, by type of intervention (Source: Samhita Report 2016)

6.6.6 Citizen partnership

At the launch of the SBM, the prime minister of India personally appealed to the citizens to give 100 hours of service every year to make their surroundings clean. He also involved eminent personalities such as Anil Ambani, Amitabh Bachchan, Priyanka Chopra, Kamal Hassan, Shilpa Shetty and Sashi Tharoor. City corporations took the cue and also signed up Swachhata ambassadors: for example, Salman Khan was signed by the Mumbai Municipal Corporation; Juhi Chawla, Shankar Mahadevan, Deepa Malik, and Arunima Sinha were signed by the New Delhi Municipal Corporation; and Mahima Chaudhary, by the Municipal Corporation, Faridabad (MCF).

To make India clean, the SBM (U) has reached out to citizens in multiple ways. The Swachh Survekshan 2017 assigns a weighting of 30% for citizen feedback. Organizing thematic drives around cleanliness are also given some weighting in the ranking methodology. This was evident from the fact that about 100 000 citizens participated in Swachh Survekshan 2016, and about 1.8 million citizens across 434 cities did so in 2017. The Swachhata app, launched by the MoUD for attending to citizens' grievances, recorded more than a million downloads.

A number of innovative and engaging awareness generation and behaviour change programmes were undertaken. For example, in Faridabad, an awareness drive was conducted between 5 a.m. and 8 a.m.

wherein citizens were educated about the ill effects of OD on health. The citizens were informed about, and motivated to avail themselves of, the incentive offered by the municipal corporation of Rs 14 000 per unit for constructing IHHLs, and those with space constraints were motivated to use nearby CT.

Similarly, the Greater Hyderabad Municipal Corporation (GHMC) conducted mass awareness campaigns based on Gandhian philosophy, requesting a continuous change within the system. A total of 69,673 citizens actively submitted feedback on the city's cleanliness status.

The Rewa Municipal Corporation created a world record on 13 January 2017 for the largest assembly of people that formed the shape of a dustbin under Swachhata Survekshan 2017 to persuade people to use dustbins. A total of 6574 children from different schools participated in the event (Figure 6.18). The city was honoured by an entry in the Golden Book of World Records for the largest human depiction of a dustbin. The Indore Municipal Corporation, which won the award for being the cleanest city in the country, also adopted awareness generation campaigns including street plays, paintings, and murals. The adoption of the unique 'Roko-Toko' initiative gained attention, in which schoolchildren raised an alarm, by using metal boxes as drums, whenever they came across people defecating in the open.



Figure 6.18: Rewa Municipal Corporation's depiction of the dustbin, a symbol of cleanliness, achieved by getting people together to form the appropriate shape

6.7 Innovative practices

The current focus of the central government is on sustainability and on delivering water and sanitation services. These objectives could be achieved by developing the institutional and regulatory capacities of the sector by clearly defining the role of various actors at the state and local level in line with the decentralization mandated by the 74th Amendment to the Constitution of India. Meeting the sanitation goals requires a wide range of measures, including consolidation of policy reforms, capacity building of the sector, and participatory and demand-responsive approaches, which is why this section showcases a few good practices through five case studies, namely (1) innovations in processing waste in Jabalpur (the waste-to-energy plant), (2) innovations in maintaining Indore clean (sweeping at night), (3) segregation and composting in Ambikapur in Chhattisgarh, (4) innovative waste management policies and initiatives in Gangtok, and (5) innovations in engaging citizens in Bhopal (the Bhopal I-Clean initiative).

6.7.1 Innovations in processing waste in Jabalpur: the waste-to-energy plant

Waste-to-energy plants have been highly cost intensive, because of which their full potential has not yet been realized in India. In addition to that, the waste collected in India is mixed, and the value of RDF remains low. There is also the lack of conducive policies by the government to promote waste-to-energy plants. By November 2016, five such plants were either operational or being tried in India, with

a total power generation capacity of 66.5 MW. At present, 53 plants are at various stages of construction or tendering in different parts of the country with a total capacity of 405.3 MW (MNRE 2016).



Figure 6.19: Waste-to-energy plant site in Jabalpur, Madhya Pradesh

Jabalpur Municipal Corporation (JMC) in Madhya Pradesh has installed an 11.5 MW waste-to-energy plant under a PPP (Figure 6.19) arrangement. Work on the plant began in February 2014 and the plant was commissioned in February 2016.

The waste collected is sent to the plant in Kathonda for conversion into energy. The plant uses mixed waste and incinerates garbage of all types without segregation, using the mass-burning technology. The diversion of 600 TPD of waste to the plant and scientific processing of that waste have made the city hygienic and clean.

6.7.2 Innovations in maintaining Indore clean: sweeping at night

Indore is the largest city in Madhya Pradesh. The Indore Municipal Corporation has embraced multiple strategies from constructing toilets to composting vegetable waste to achieve the status of India's cleanest city in *Swachh Survekshan 2017*.

One of the interesting innovations that the IMC has adopted to keep the city clean is mechanized sweeping of roads at night. The city deploys 12 machines for the purpose. Each machine cleans 35 km of road length a day. The machines make multiple rounds between 10 p.m. and 6 a.m. daily to cover major roads of the city to ensure that they are clean.



Figure 6.20: Mechanized sweeping at night in Indore

The machines pick up fine dust, litter, debris, nuts and bolts, pebbles etc. from smooth as well as rough or uneven surfaces. Powerful suction pumps also help in reducing air pollution by removing dust from roads in the city. Such mechanized sweeping supplements manual sweeping by IMC staff and the combination is unparalleled in keeping the city clean.

According to the State Pollution Control Board, a substantial reduction in air pollutants has been observed in the past few months as a result of the ongoing cleanliness drives in the city under the SBM (U).

6.7.3 Segregation and composting in Ambikapur, Chhattisgarh

Ambikapur Municipal Corporation in Chhattisgarh has shown the benefits of persistent efforts to segregate waste at source (Figure 6.21). All the 48 wards in the city are free of garbage bins. The idea of converting garbage into a resource is not new but implementing it successfully is an achievement.



Figure 6.21: Waste segregation in Ambikapur

On realizing the increasing costs of waste management, Ambikapur Municipal Corporation initiated training, general awareness, and selection of needy women from women's SHGs to participate in segregation of waste at source and household composting. Initially, the city had 623 container bins distributed throughout the city; these were removed in phases and the city is now free of such bins. The segregation begins at home, by means of red and green boxes given to each household: red boxes for inorganic waste and green boxes for organic waste.

The segregated waste is then brought to one of the 17 solid-liquid resource management (SLRM) centres (Figure 6.22) in the city. Recyclable, organic, and non-recyclable items are packed separately after segregation and sent to the central treasury for tertiary segregation of plastics, metal, and electronic items, which are then sold as raw materials for recycling to manufacturers chosen by the administration. Organic waste is used in biogas digesters and composted.



Figure 6.22: A solid-liquid resource management centre in Ambikapur

By April 2017, the corporation had earned 1.34 million rupees (0.95 million from user charges and 0.39 million from sales). Inspired by the success of this model, the Chhattisgarh Urban Development Department has decided to replicate the project across the state, giving a boost to the SBM (U).

6.7.4 Innovative waste management policies and initiatives in Gangtok

Gangtok, the capital city of Sikkim, has launched major initiatives as part of an extensive plan for managing MSW in the state. By formulating and implementing policies to curb the disposal of solid waste, Sikkim has become one of the cleanest states in India. Some of the initiatives include setting up of small-scale enterprises

by involving various women SHGs, introducing a buy-back policy for milk pouches (Figure 6.24) to reduce the amount of plastic waste generated, banning of plastic water bottles in government meetings, and setting up a unit to recycle tetra paks in collaboration with the Indian Army.



Figure 6.23: Awareness generation programmes in schools in Gangtok

The municipal corporation has 17 trucks of different sizes and 82 sanitation workers to collect waste from all parts of the city. To fund the system, a garbage collection fee has been imposed on commercial establishments. Those who dump garbage in the drains are fined Rs 5000 (approximately \$76) every time. The government banned the sale of polystyrene (Styrofoam) in the state. In addition to this, uncontrolled burning of garbage was prohibited. For electrical or electronic equipment, a collection centre was set up by the Gangtok Municipal Corporation in association with the Department of Information Technology.



Figure 6.24: Buy-back policy for milk pouches in Sikkim

Along with such policy measures, massive awareness generation campaigns were run in schools along

with training programmes on waste segregation. The involvement of citizens also played an extremely important role in making the city clean and ODF. Sikkim has set an example for the rest of the country to follow.

6.7.5 Innovations in engaging citizens in Bhopal: the Bhopal I-Clean initiative

In 2014, a group of six citizens in Bhopal came together and initiated a cleanliness initiative called Bhopal I-Clean. Bhopal Municipal Corporation supported this warm gesture by the citizens by getting actively involved and providing suitable equipment for removing garbage. The municipal officials often encouraged the team by visiting the volunteers and helping them in the cleanliness drive. The people jointly took the responsibility to maintain the area clean and also to beautify it. Additionally, the teams of volunteers started a campaign to ask members of the public to donate old newspapers and other unwanted items or scrap: this stuff was sold and the proceeds



Figure 6.25: Cleaning the city initiatives by I-Clean in Bhopal

were used for buying the accessories used for the cleanliness drive.



Figure 6.26: City walls in Bhopal painted with tribal art

Since the launch of the initiative, people from different professions, irrespective of caste or creed, have cleaned and painted 128 spots, which include residential areas, schools, hospitals, and parks. The I-Clean team now has 200 members who take up a dirty spot every Sunday to clean, paint any walls or pillars nearby with terracotta colours, and decorate the walls with tribal art using white paint (Figure 6.26).

Members of the teams dedicate 3–4 hours every Sunday morning to clean up a spot, sending a strong message to the general public. Local residents contribute Rs 50 every month to buy paint, brushes, buckets, etc. and promise to keep the spot clean. The I-Clean Bhopal initiative has set an example for other cities to emulate.

6.8 Conclusion

The Swachh Bharat Mission recognizes the need to go beyond infrastructure. Conducting population-based surveys to determine household use of sanitation facilities, which is the internationally agreed-upon indicator used by the JMP to compare progress across countries, would act as a reality check to assess the level of sanitation.

So far, 3.1 million IHHL, or 30% of the target, have been built. The increase in the construction of IHHL, CT, and PT indicates the requirement for end-to-end solutions that support the entire sanitation ecosystem as well as sewage treatment capacities of cities. Although the number and extent of sewer connections in urban India have increased steadily under the SBM (U), reports indicate that only 6.7% of faecal matter is safely disposed of due to lack of proper faecal sludge management (FSM). At present, faecal sludge generated through on-site systems is not properly managed and crucial links between generation and eventual disposal are missing. An approach that offers end-to-end solutions to FSM is critical to ensure sustainability and comprehensive solutions to the problem of ensuring sanitation. Urban sanitation programmes should accord priority to FSM, and the two missions, namely AMRUT (which aims at septage treatment and management) and the SBM (which

aims to make India ODF) should come closer. Being ODF should not be restricted merely to abolishing OD but extended to proper disposal of faecal matter to reduce its ill effects. The policy guidelines issued by the MoUD on faecal sludge and septage management (FSSM), released in February 2016, are a welcome step in this direction. A few states, such as Delhi, Gujarat, Maharashtra, Odisha, and Tamil Nadu, have developed state-level guidelines for septage management, and more states are expected to follow.

Although some cities are moving towards the ODF-plus status through proper management of solid waste and laying sewerage lines and storm water drains in addition to being ODF, several cities lag behind in adopting such a holistic approach to sanitation. The sustainability of the interventions would also depend on the investment in human development and environmental governance. The sanitation status of cities and states also shows vast disparities: Madhya Pradesh, Chhattisgarh, Andhra Pradesh, Chandigarh, and Gujarat have been declared ODF, whereas not a single ULB in the cities in Bihar and Odisha is ODF.

Solid waste management offers great scope for improvement. The Swachh Survekshan 2017 indicates that only in 297 cities of the total 434 assessed is door-to-door collection of waste in more than 80% wards and only 273 cities have adequate infrastructure and transport facilities to transport the waste. Solid waste management also needs to extend to reducing and recycling. The current statistics on waste treatment are dismal, with waste treatment plants in only 104 cities functioning at more than 80% efficiency, 65 cities with scientific landfills, and 69 cities practising remediation of existing dumps.

Corporate houses in India have shown their involvement mostly in the conventional role of funding targeted mainly at rural areas. Given the unprecedented buzz and energy that the SBM has created around sanitation in India, there exists a huge opportunity to build on this momentum, and the involvement of corporate houses needs to go beyond creating infrastructure to ensuring sustainable sanitation.

CHAPTER - 07

THE SANITATION VALUE CHAIN: MISSING LINKS AND THE WAY FORWARD FOR URBAN INDIA

7.1 Background

The World Health Organization (WHO) Commission on Social Determinants of Health (CSDH) in 2006 posed a provocative question (Marmot 2006) on public health:

“Why do we keep treating people for illnesses only to send them back to the conditions that created illness in the first place?”

The conditions in the above statement imply the urban setting, especially settlements of the urban poor typically characterized by inadequate supply of water, poor sanitation services, unhygienic conditions, poor housing, and overcrowding. Sanitation, or safe management of human excreta, including its safe confinement, treatment, and disposal, is a key determinant of health. Poor sanitation has a huge impact on public health in India. Nearly 12%, or 9.5 million, urban households in India do not have access to toilets (Census of India 2011), and members of those households defecate in the open, exposing infants and young children to faecally transmitted infections (FTIs): 23 million children in urban India are at risk of diseases due to poor sanitation (MoUD 2011) and stunting in Indian children has been attributed to OD (Spears 2013). Improper treatment and disposal of waste water also poses serious risks to health and the environment: discharge of untreated domestic or

municipal waste water has contaminated 75% of all the sources of surface water across India (NUSP 2008).

Yet, sanitation in urban India was accorded low priority until the beginning of 2005, when the worsening situation of urban sanitation prompted the central government and the state governments to address the problem. However, so far, most sanitation initiatives in the urban sector have been piecemeal and focused mostly on infrastructure development. The Nirmal Bharat Abhiyan (NBA) for rural areas (known earlier as the Total Sanitation Campaign, or TSC, and now part of the SBM) focuses on the provision and use of toilets and takes a comprehensive, demand-driven, people-centred approach to deal with sanitation. The mission intends to make the country free of OD by providing toilets (IHHTs) to every household that does not have one and by making available PT and CT where providing IHHTs is not possible for various reasons.

The focus of the mission is mainly on constructing toilets: by mid-2017, more than 3.1 million IHHTs and nearly 115 786 PT or CT had been constructed (SBM (U) portal). Similar emphasis is also required on improvements across the value chain that includes collection or emptying, storage, transport, treatment, and reuse (Figure 1), because the agenda of sanitation is not only to stop people from defecating in the open for social reasons but also to protect the environment from contamination, and people from health hazards due to such contamination, through safe disposal of faecal matter.

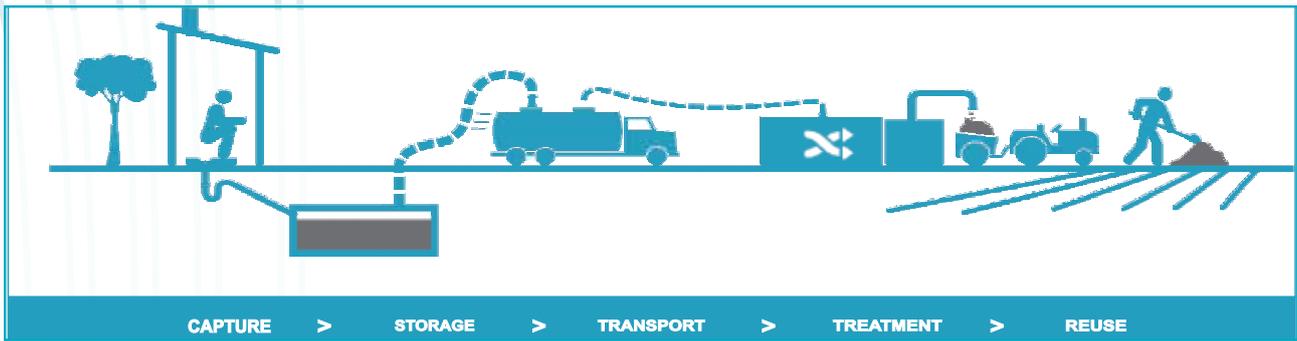


Figure 7.1: Sanitation service chain

This chapter discusses the status of various links in the sanitation value chain, explores the reasons for present conditions, and provides recommendations to supply the missing links.

The ongoing SBM offers definitive prescriptions for improving sanitation, focused entirely on containment, and the mission’s implementation is based on the number of households that lack access to toilets. Construction of toilets is funded by the central and the state governments. Funds are also given for mobilizing demand, that is enabling behavioural change towards using toilets. Regarding collection, the mission prescribes connections to existing sewer networks, stipulating that any new toilet within 30 metres from an existing sewer network should be connected to it and septic tanks or twin soak-pits provided to the rest. However, no funds have been allocated for collection, transport, or treatment infrastructure, nor any mandate given to cities to focus on these links in

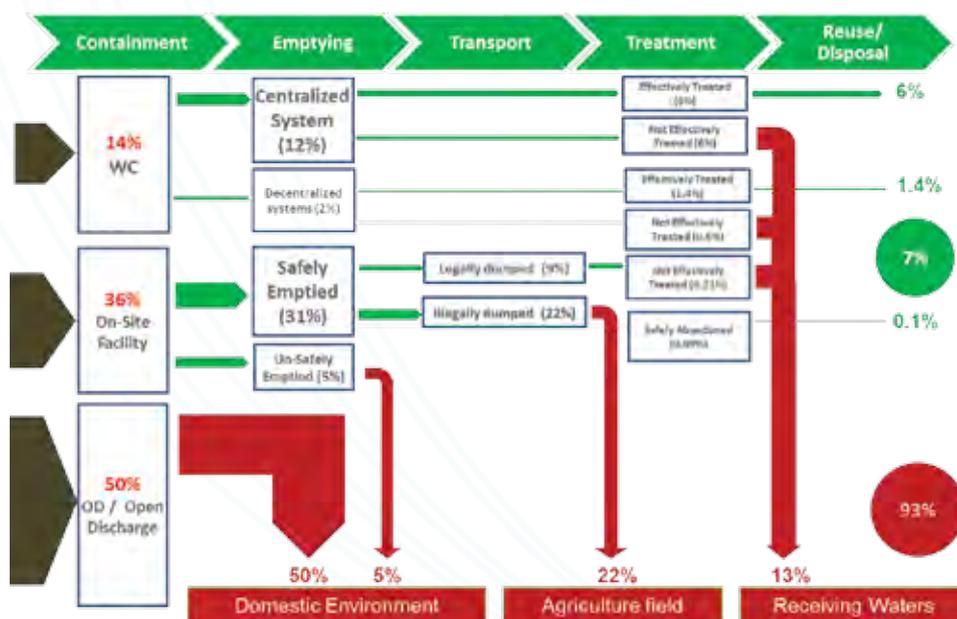
the sanitation service chain on their own.

However, AMRUT, launched in 2015, does emphasize septage management including faecal sludge management, which involves cost-effective cleaning, transport, and treatment along with mechanical and biological cleaning of sewers and septic tanks.

Also, the recent *Primer on Fecal Sludge and Septage Management* (MoUD 2016) clearly states that the focus of the SBM on toilet construction should extend to proper collection, transport, and treatment, which need urgent attention.

7.2 Missing links in the sanitation value chain: issues

The sanitation value chain in urban India has been patchy. A flow diagram (Figure 2) tracing the path of sewage in urban India shows that only 6.7% of all waste



Data Source Census 2011

Figure 7.2: Path of sewage in urban India (Source: Census 2011), CDD 2016)

water generated is safely disposed of: a staggering 93.3% of the waste water – including that emptied through centralized systems and on-site sanitation systems – is either discharged on open lands and farmland or in water bodies, and of the waste water emptied either through centralized and decentralized systems or through other means, 34.8% is conveyed to treatment plants or proper disposal sites and only 6.7% is treated (CDD Society 2016).

7.2.1 Collection

As mentioned earlier, about 12% of the total households in India, or roughly 40 million people, resort to OD, in vacant fields, bushes, water bodies, next to railway tracks, and so on (Figures 3 and 4). If the proportion of households with access to toilets is restricted to ‘improved latrines’ (with piped sewer connections, septic tanks, and improved pit latrines), the figure falls to 77.3%; if improved pit latrines are excluded, to 70.9%; and even lower if the dysfunctional or partly functional toilets – because of hasty and uninformed construction

choices – are excluded¹. An oft-cited reason for households not using their toilets is lack of water supply and shallow pits, which means that these will get filled soon.

About 20% of the households in urban areas lack toilets and depend on shared toilets. Approximately 17.4% of the urban population lives in slums. Of that 17.4%, 36.1% lives in notified slums; 27.6%, in recognised slums; and 36.3%, in identified slums. The proportion of households with toilets in slums is 66% at the national level, far lower than 81.5% at the pan-city level. A majority of these households thus have to depend on using CT or PT.

The Joint Monitoring Programme (JMP) of WHO-UNICEF does not consider such shared facilities as improved sanitation. Also, many CT and PT lie unused because of lack of water supply, clogged drains, lack of privacy, limited hours of operation, etc.—revealing the wide gap at the collection stage itself in the sanitation value chain.

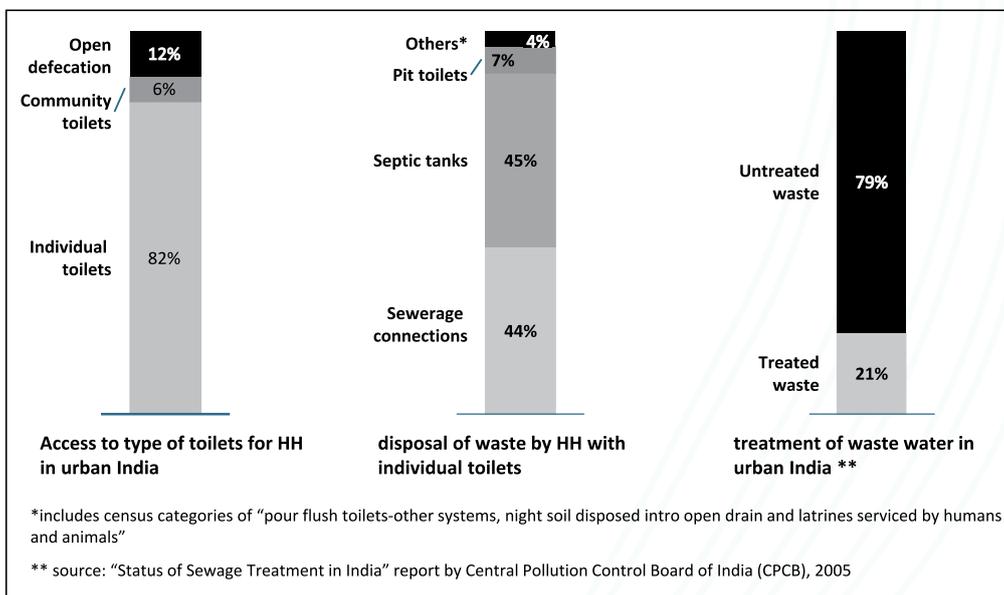


Figure 7.3: Access, containment, and transport of sewage (compiled from data from the 2011 census)

¹The purpose of doing so would be due to the fact that the census data do not clearly demarcate between improved twin-pit latrines (which are now benchmarked as the minimum criteria for having a toilet) and single-pit latrines. Census describes ‘slab/ventilated improved pit latrines’ as those that have a provision for night soil to fall directly into the pit underground, have a slab/platform to prevent water from entering the pit, are easy to clean, and have a ventilation pipe overhead.

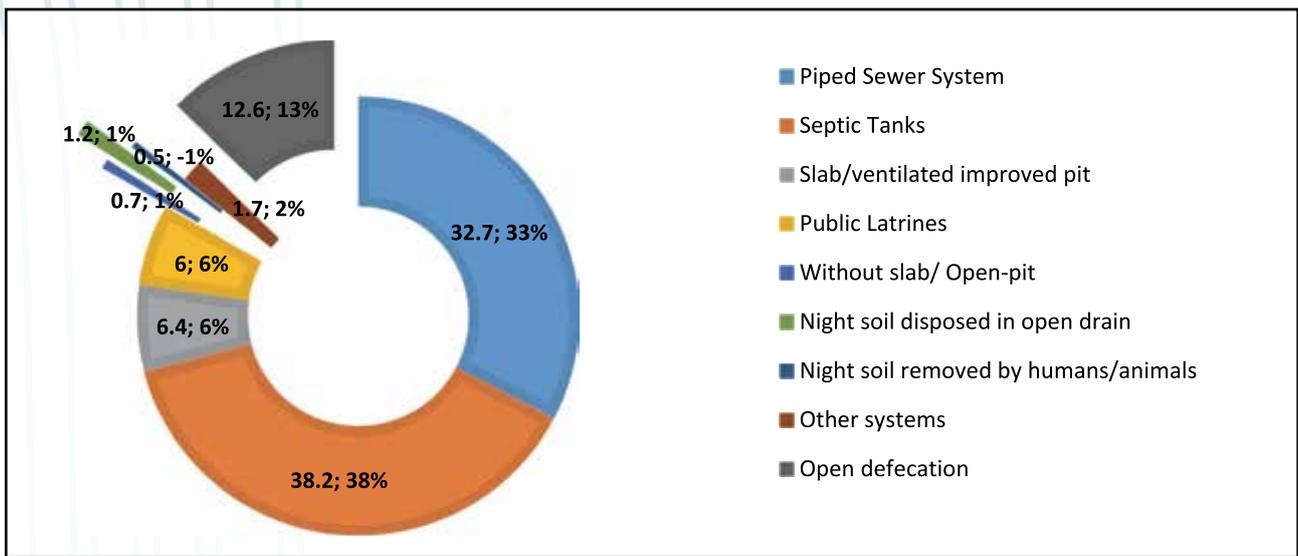


Figure 7.4: Types of toilets in urban India

7.2.2. Emptying

Although 81.4% of the 79 million urban households have toilets, 56%² of these toilets are dependent either on-site sanitation systems such as septic tanks and pits or do not have one. 'A large part of the waste water would be seeping into the soil since the construction quality of the tanks buried underground in populated areas is often poor' (Kumar et al. 2016). About 5% of these toilets discharge faecal matter into open drains, do not have covered pits, are cleaned by people, or scavenged by animals, and thus pose a serious risk to health and contaminate the environment. The Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 2013, makes it unlawful for anyone to engage or to allow to engage in manual scavenging and thus not only eliminates a health risk but also protects the dignity of people by preventing them from undertaking this task. This then leads to the issue of lack of scheduled de-sludging in India.

Urban local bodies are inconsistent in de-sludging septic tanks and soak-pits. Conventionally, households identify the need to de-sludge only when their toilets fill up and faecal matter is not drained any longer and therefore call in a private de-sludging agency. Cities lack systematic and accurate data on households with toilets connected to septic tanks and pits. Even when,

under the SBM, cities have been generating geo-tagged data on IHHTs, the data are not used or built upon for developing a schedule for de-sludging.

Also, according to the guidelines given by the SBM, IHHTs would include conversion of dry and single-pit latrines into twin-pit latrines, since these are now identified as the most basic type of toilet that qualifies to be considered 'safe'. However it is unlikely that all such IHHTs would be effectively covered due to under-reporting and feasibility issues such as space constraints. Hence, the scope to improve this section of the sanitation value chain is wide, and such improvement is all the more important because, as mentioned earlier, 75% of water sources across India are contaminated because of poor sanitation (NUSP 2008).

7.2.3 Conveyance or transport

Conveyance systems are another weak point of the sanitation infrastructure. Of the 81.4% households with toilets, only 32.7% had piped sewer connections (Census of India 2011). These connections include illegal connections. A larger chunk (44.6%) of these toilets are connected to either septic tanks or soak-pits, which shows the magnitude of work for the ULBs in de-sludging the toilets regularly and

²The figure is derived after discounting the 12.6% urban households that do not have access to toilets.

transporting the waste to STPs. However, this work is rarely undertaken: as mentioned earlier, households consider de-sludging only when the pits or tanks are filled to capacity, and since most of the on-site pits or tanks are built larger than the prescribed standards, it takes years before the stage is reached. Therefore, only 2%–4% of septic tanks and pits are cleaned annually in most ULBs (MoUD 2016).

A major proportion of the emptied sludge is discharged into open fields and water bodies, more so when private contractors undertake the task. Even

in New Delhi, only 1% of the faecal matter collected after de-sludging septic tanks or pits is transported to the STPs and treated.

Due to the lack of data on locations of septic tanks and soak-pits, ULBs are unable to set up a schedule for regular de-sludging. No systematic information on the demand for de-sludging services is available. This information gap makes it difficult for ULBs that provide services for de-sludging to estimate the number, type, and size of tankers or trucks required to constitute a fleet for the task.



Figure 7.5: Manual emptying of a soak-pit (left) and disposal of sewage into an open drain adjacent to water facilities

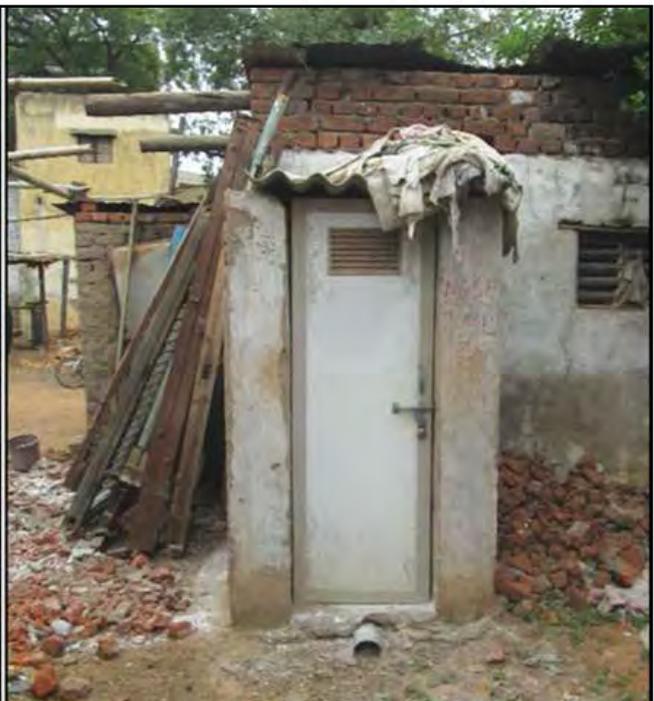


Figure 7.6: An unused household latrine used as a store (left) and an inappropriate outlet for sewage from a household latrine (right)

7.2.4 Treatment and disposal

Indiscriminate discharge of untreated sewage is the single major polluter of water sources in India: only 6.7% of all waste water generated is safely treated and disposed of (Figure 7.1). Of the 816 municipal STPs in India, only 64% (522) are working; the rest are either dysfunctional or under construction or only at the proposal stage (Figure 7.7) and their total installed capacity is 22 963 million litres a day (MLD) whereas sewage generation is estimated at 61 754 MLD (CPCB, 2016).

Additionally, as mentioned earlier, the ‘treatment’ link in the sanitation chain is also weak because of insufficient infrastructure, lack of regulation of private de-sludging operators, and lack of technical capacity of the ULBs for O&M of STPs and for FSM.

Considering the amount of sludge, septage treatment infrastructure is virtually non-existent.

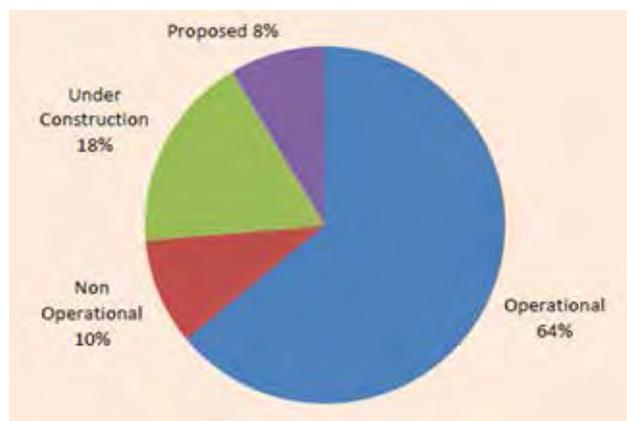


Figure 7.7: Status of sewage treatment plants in India

Source: (CPCB, 2016)

Box 7.1

Failure of a sewage treatment plant

Kathlal is a small municipality in Kheda district in Gujarat, with a population of 22 071 in 2011. In 2016, the municipality inaugurated its first STP, which had a capacity of 4.75 MLD and cost 187.7 million rupees with funding under the Gujarat State Urban Development Mission. The operation and maintenance contract was awarded to a private operator—who withdrew unilaterally from the contract because of the inability to pay for electricity for the STP, thereby putting the plant out of operation (Figure 7.8).



Figure 7.8: An out-of-service sewage treatment plant in Kathlal, Gujarat

7.3 Missing links in the sanitation value chain: reasons

Despite six decades of experience with national sanitation efforts and widespread acknowledgement amongst the sector experts of the significance of approaching sanitation in its entirety, the

implementation framework has been fragmented. Although the approach has evolved from merely providing toilets to emphasizing sanitation efforts through systematic CSPs, its implementation has faltered. The following section summarizes the reasons for the gaps or missing links in the sanitation value chain.



7.3.1 Devolving powers to urban local bodies

The Constitution (Seventy-Fourth Amendment) Act, 1992, was an initiative that gave constitutional recognition to ULBs along with the constitutional right to exist, and the 12th schedule to the Constitution lists the obligatory functions. While state governments have ratified the 74th Amendment, they have found it difficult to implement its provisions in spirit. One of the main issues for devolution of functions to ULBs has been the matching revenue sources.

The Jawaharlal Nehru National Urban Renewal Mission sought to ensure transfer of the functions listed in the 12th schedule including core municipal functions of water supply, drainage, and sewerage, to ULBs. However, the actual transfer of these powers is awaited. The new and upcoming projects in the water and sanitation sector are designed and implemented by state-level parastatals and hence take a supply-driven approach instead of following a demand-driven process.

Even the NUSP calls for formulation of state-level sanitation strategies that clearly outline institutional responsibilities, resources, and capacities of ULBs and of the state governments. The policy recommends that if the ULBs currently lack technical and financial capacities and human resources, the state governments should work towards building their capacities and empower them to undertake widespread sanitation improvement in their cities. The state should also provide ULBs with financial and human resources necessary to discharge their functions.

Although the latest programme guidelines for providing toilets to individual households allow ULBs and beneficiaries greater flexibility in choosing the locations of toilets, in their construction, and, to some extent, in designing them, the SBM continues to be supply driven with constant pressure on ULBs to meet the targets set by the state government.

In many states, the role of building sewerage and drainage infrastructure still rests with state parastatals and boards. In Gujarat, for instance (Table 7.1), the programme to construct underground drainage is completely state led, with limited role for ULBs because of concerns about their capacities and capabilities, and parastatal agencies such as the Gujarat Urban Development Company (GUDC) and the Gujarat Water Supply & Sewerage Board (GWSSB) hold wide-ranging powers to oversee urban infrastructure and management. These institutions currently define almost all sanitation projects and programmes that need to be undertaken by the ULBs. As a result, ULBs have been left with only maintenance functions and are dependent on higher levels of the government for undertaking any large-scale improvements in urban service delivery.

Most ULBs have very limited institutional, financial, and staff capacity to improve sanitation provision and septage management. Public funding for septage management is inadequate, which makes such management dependent on external assistance, which, in turn, results in lack of commitment and of ownership and in low revenues to the ULBs.

Table 7.1 Fragmented responsibilities across the sanitation value chain: a case of Gujarat

Component of infrastructure development	Collection	Emptying and conveyance	Treatment	Re-use
Construction	IHHT: individuals, contractors under state or central schemes, and ULBs PT and CT: ULBs	ULBs, GWSSB, GUDC, Gujarat Urban Development Mission (GUDM)		Private operators
Funding	IHHT: state or central govt PT and CTs: ULBs, state govt	ULBs, GUDM		ULBs, GUDM, GUDC
O&M	IHHT: individuals PT and CTs: ULBs or private contractors	IHHT: ULBs PT and CT: ULBs or private contractors	On-site sanitation systems: private STPs STPs: ULBs or private operators	Private firms

Source: Urban Management Centre, Ahmedabad

7.3.2 Inadequate funding

The high-power expert committee's Report on Indian Urban Infrastructure and Services (ICRIER 2011) puts the investment for the sewerage sector over 2012–2031 at 242.68 billion rupees based (2009/10 prices). Adjusted for inflation, this figure becomes 3786 billion rupees.

The total funding available under AMRUT for the period 2015–2020 is 500 billion rupees, which includes funding for all sectors covered under AMRUT. Additionally, the grant available to ULBs through the 14th Finance Commission amounts to 871.43 billion rupees. As stipulated in the guidelines, this grant, to be disbursed in a ratio of 90:10 as the basic grant and a performance grant, can be used by ULBs for all basic services. Estimates suggest that about a third of this funding is being used for sanitation works.

That leaves a huge gap in the funding required for extending sewerage networks and ensuring treatment and safe disposal of waste water.

It is important for cities to unlock revenue streams from treated waste water. The Surat Municipal Corporation has been successfully generating energy from captured methane from its treatment plants. Similarly, Navi Mumbai sells its treated waste water to industries.

7.3.3 Streamlining programme design and phasing of sewerage projects

Implementation of infrastructure projects depends on availability of funds. Often, the priorities assigned by the implementing agencies are not aligned with the needs of people. For instance, although the GUDM's plan to have underground sewers in all its ULBs is commendable, the project prioritizes the creation of underground sewage network over building STPs (which is part of the second phase) and connecting households and other properties to the network (which is part of the third phase).

7.3.4 Deficits in connectivity, repairs, and operations

The connectivity and repairs of sewerage networks in urban India leave a great deal to be desired. Even in cities that are served by sewers, the backlog is huge.

Most urban growth happens at the fringes of existing cities and in peri-urban areas, and sewerage networks in these areas are either scant or, in most cases, missing altogether.

Even in areas that do have sewerage networks, in most cases they require electricity for pumping the sewage to the STPs. The networks are often neglected and therefore clogged and rendered non-functional. Cities lack the capacity to undertake any preventative maintenance and continue to respond only to breakdowns, resorting to fire-fighting. Bengaluru, for example, was stretched to repair its 3610 km long system (in 2012) and also needed to add 4000 km of sewer lines to service the entire city (Centre for Science and Environment, 2012).

On the other hand, Class A municipalities (ULBs), in which STPs have been constructed by the state government, are neither directly involved in decision-making nor have a role in O&M for the initial 2–3 years of commissioning of the STPs. However, these cities lack the financial capacity to pay for O&M once the state government hands over the plants to them. For example, Patan, a class A municipality in Gujarat, faces a deficit of 20% in O&M expenses despite improved tax collection and despite making no improvements or expansions in its other departments such as water supply, fire, health, education, civic amenities, and solid waste (Urban Management Centre, 2014).

7.3.5 Inappropriate technology in sewage treatment plants

A staggering 38% of urban India is dependent on on-site sanitation systems or decentralized systems (Census of India 2011), and a pan-Asia report in 2010 estimated that by 2017, about 148 million urban residents will have septic tanks (AECOM and SANDEC 2015). At present, 302 Class-1 cities and 467 Class-2 towns are without sewage treatment facilities. Yet, there was a distinct preference for centralized engineering solutions until recently—FSM began to be emphasized only after the MoUD released its FSM advisory and policy.

Sewage generation from Class-1 cities and Class-2 towns was estimated at 38 254.82 MLD, of which only 11 787.38 MLD (31%) is being treated (CPCB 2009). Even the existing treatment capacity is not effectively

utilized because of poor O&M of STPs and sewage pumping stations, which leads to nearly 39% plants not conforming to the general standards prescribed under the Environmental (Protection) Rules for discharge into streams (CPCB 2005). In many cities, the existing treatment capacity remains underused while sewage is discharged in large quantities without treatment in the same cities. Auxiliary power back-up facility is required at all the intermediate and main pumping stations of all the STPs (CPCB 2005).

All these lead to the issue of appropriate selection of a sustainable sewage treatment system, whether with centralized or decentralized design, and the selection of appropriate treatment processes and technologies capable of meeting the requirements. The appropriateness of the technology should be based on effluent quality, process complexity (and hence adequately trained staff), ease of O&M, process reliability, environmental issues, land requirements, and treatment costs.

Recently, the Consortium for DEWATSTM Dissemination (CDD), along with Devanahalli municipality and the Govt of Karnataka, with support of the Bill and Melinda Gates Foundation (BMGF), set up a plant to treat faecal sludge in Devanahalli and established processes for safe de-sludging of septic tanks, the treatment of sludge, and its reuse as manure.

7.3.6 Lack of an integrated approach to sanitation

As recommended in the NUSP, city governments are to prepare their CSPs based on demand and need, local context, availability of technology, and financial resources, and investments in sanitation should be made in the light of these CSPs. To guide sanitation improvements in cities, it is important to make an integrated sanitation plan to guide the overall implementation and to coordinate different schemes and programmes.

7.3.7 Weak regulatory measures and enabled environment

Engagement of the private sector Although a state-run utility is seen as the first choice, it is important for ULBs to engage with the private sector to ensure provision of sanitation services. This measure will

help the ULBs, already short on staff, to offer efficient services to citizens. The faecal sludge treatment plant in Devanahalli mentioned above has empanelled private operators to de-sludge septic tanks and to empty the sludge from the treatment plant regularly. The National Urban Livelihoods Mission (NULM) and the SBM also need to come closer.

Enforcement of regulations At the central and the state levels, the CPCB and the state pollution control boards are expected to notify the norms for STPs to ensure that their discharge meets the specified parameters. The regulations on FSM are implemented by ULBs by ensuring that septic tanks are designed to meet the set standards and are de-sludged regularly and safely. However, ULBs are often too weak to enforce the by-laws related to buildings that specify appropriate sizes for septic tanks.

7.3.8 Lack of converged data and knowledge management

Data management is a systemic issue, which, if undertaken properly, would help to inform a city's decision-making with regard to connecting nearby households to sewer networks or to schedule de-sludging of toilets that depend on on-site sanitation systems. Proper data would not only result in efficient service delivery but also boost revenue collection.

The Urban Management Centre in Ahmedabad has prepared a knowledge management tool that incorporates such features as bringing data from multiple sources and departments to a single repository. The data are compiled by filtering relevant information and presented for assessment. The tool is dynamic, and data can be updated regularly. All data are presented in a print-friendly format for reporting. The tool can help ULBs to pool all the data pertaining to sanitation activities in a given city.

Although Indian cities are keen to offer every city dweller access to a toilet and realize that such access is important for both personal dignity and safety, they must realize that providing access represents only the first link in the sanitation value chain. Any chain is only as strong as its weakest link: any missing or weak links can have dire consequences for the entire city.

SECTION C - POSSIBLE SOLUTIONS

CHAPTER - 08

THE NEED OF THE HOUR: LEVERAGING CORPORATE ENGAGEMENT FOR URBAN SANITATION

8.1 Introduction

Of the 1.1 billion people in the world who defecate in the open, more than half live in India alone (Dasra 2012). Layered in behavioural, social, and cultural complexities, the harmful effects of poor sanitation in India continue to have a severe impact on health, education, productivity, and the economy and keep India from becoming a truly developed country. In an effort to re-energize the sector and as a call to action unprecedented in its force and reach, the Government of India, through its Swachh Bharat Mission (SBM), has pledged to make India open-defecation free by 2019. Although some corporate houses have been active in India's WASH sector before, this ambitious target necessitates their involvement beyond the conventional role of funding targeted mainly at rural areas. Instead, to achieve the required speed, scale, and sustainability, India must leverage the strengths of its private sector as well as address the often unrecognized and misconstrued sanitation problem in urban spaces. Moving ahead, this will be critical given India's rapidly growing urban areas with a burgeoning urban population in dire need of adequate sanitation services.

8.2 India's 53.8 Billion Dollar Problem

The magnitude of the sanitation crisis in India cannot be overstated, given its significant social, economic, and environmental repercussions. Globally, 88% of diarrhoeal deaths are due to lack of access to proper sanitation facilities (Prüss-Üstün et al. 2008). In India, diarrheal diseases account for 1600 deaths daily (WHO). Due to its adverse economic impacts, the cost of inadequate sanitation amounts to 6.4% of India's GDP and the loss of 73 million working days. Furthermore, over 73% of all faecal sludge generated in urban India is released untreated in

the environment (IndiaSpend 2016 and CPCB 2016). Collectively, it means that India's sanitation crisis is a 53.8-billion-dollar (2.4 trillion rupees) problem. To put things in perspective, the annual expenditure budget for the fiscal year 2016/17 of the central government was only a little over \$300 billion (MoF 2016).

8.2.1 Illusory statistics and India's misconstrued urban sanitation problem

In urban India, the extent of the sanitation problem is often misunderstood. When viewed in totality, data suggest that rural India is far worse off than urban India in terms of adequate sanitation services and thus requires more attention and investment from multiple stakeholders including corporate houses. For example, according to the 2011 census, access to improved sanitation for households in rural India was a mere 31% vis-à-vis 81.4% in urban India. In other words, only 18.6% of urban households are without toilets. Moreover, in urban areas, the proportion of houses with improved toilets and water supply increased from 46.1% in 2001 to 72.6% in 2011, and that of houses with pit toilets decreased from 14.6% to 7.1% (Census of India 2011). Thus, urban India seems to be far better off than rural India in terms of physical infrastructure. However, when the same data are bifurcated to take into consideration the urban poor, the picture changes. Here, it is important to note that the 2011 census states that one in six Indians lives in an urban slum, the hub of India's urban poor.

The third National Family Health Survey (NFHS), in 2005/06, reported that 83.2% of the total urban households and 95.9% of the non-slum population have access to sanitary toilets (either flush or pit) whereas the figure for the total slum households is only 47.2%. Furthermore, according to the MoUD, in notified slums (slums registered by the municipality),

17% of the population is without access to improved sanitation. However, in non-notified slums, the average is 51% (MoUD 2008).

Two variables play a critical role in urban sanitation: availability of space and population density. As outlined above, inadequate sanitation is often compounded in urban slums. Here, the crowded living conditions, open drainage, and lack of maintenance of existing sanitation facilities contribute to the outbreak and spread of diseases, posing significant health risks to these vulnerable populations. Even for those that have access to improved sanitation, the quality of these services remains inadequate and unequally divided amongst the population (JMP 2015). As India confronts rapidly expanding slum populations, with over 50 million people forced to defecate in the open (Dasra 2012), the problem and associated health risks will continue to grow rapidly if left unchecked.

8.2.2 Management of solid and liquid waste

In the urban context, a particularly important component that requires significant attention is the management of solid and liquid waste. Managing human waste safely requires a mechanism to ensure that handlers do not come in contact with human waste, which is disposed of safely without affecting the environment. The benefits of sanitation are maximum if all have access to good-quality toilets and if the entire waste is treated properly. If there is no universal access to toilets and if even a small proportion of waste water remains untreated, the entire population has to put up with a filthy environment and faces increased incidences of waterborne and vector-borne diseases, and municipalities and individual households have to spend more on water treatment. In urban spaces with a higher density of populations, this becomes even more complex as there is often extreme pressure on the infrastructure due to over-utilization and poor maintenance.

Even where access to sanitation is available, many urban residents use toilets that are not connected to underground sewerage networks. It is estimated that 75%–80% of water pollution by volume is from domestic sewerage (WaterAid 2015). In a rating

exercise undertaken by the MoUD in 2010, it was observed that none of the 423 cities that were rated was healthy and clean—in fact, about 190 cities were reported to be on the verge of an environmental crisis (WSP 2010). Further, faecal sludge is the human waste from on-site sanitation (that is systems below the ground, not connected to sewers). In India, nearly 1200 cities have fully on-site sanitation systems. And even where treatment facilities exist, 40% do not comply with the basic standards (CEPT University, NFSSM Alliance). These jarring statistics are further illustrated by Figure 8.1. Furthermore, it is also important to mention that manual scavenging, although prohibited, is widespread across India. Both the issue and the lack of data on it must be addressed.

Today, while there is an emerging recognition of the importance of septage management, a great deal still needs to be done in terms of advocacy, planning, execution, and capacity building to create sustainable business models of septage management.

INDIA'S SANITATION DIVIDE

City dwellers are more likely than people in rural areas to have flushing toilets, but only one-third of those toilets are connected to underground sewers; the rest go to septic tanks.

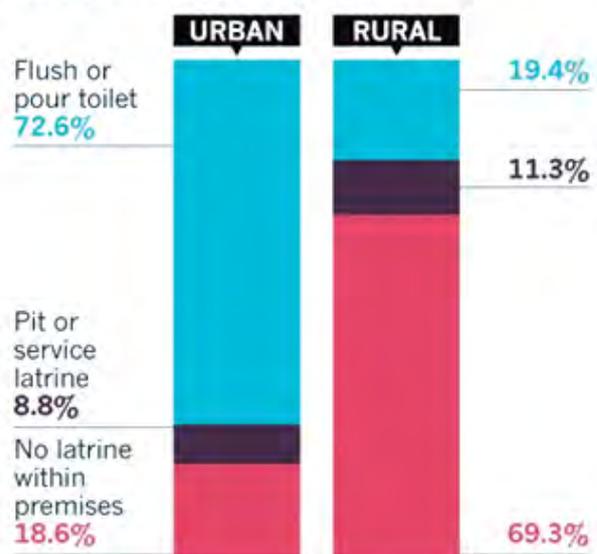


Figure 8.1. India Sanitation Divide

Source: Narain, Sunita., June 2012, *Sanitation For all, Nature*, Vol 486, Macmillan Publishers., pp:185.

8.3 Corporate engagement in sanitation: going beyond funding

The engagement of corporates in the WASH sector in India, specifically the sanitation sector, is not a new phenomenon. However, what is unprecedented today is the renewed buzz and energy around the call to action to corporate houses. Spurred on by the Swachh Bharat Mission, India Inc. has been given the opportunity to spend on a specific cause with high visibility. And unsurprisingly, many corporate houses have responded enthusiastically to this call to action, with a majority leveraging Section 135 of the Companies Act, 2013, which has provisions also for the water and sanitation sector.

It is important to acknowledge that both in the letter and in the spirit, the government’s call to action to corporate houses envisages support beyond merely funding or building toilets. The guidelines issued by the Ministry of Drinking Water and Sanitation (MDWS), launched first using the platform of the India Sanitation Coalition, assert that ‘the creativity and efficiency of the corporate sector, and their management and financial resources can help in achieving the vision of a Swachh Bharat’ (MDWS 2016). Thus, corporate support can be as basic as mere financial assistance, by way of the Swachh Bharat Kosh, or extend to getting involved through technical expertise, marketing excellence, and outreach. The hope is that corporate houses engage not through a hollow compliance-driven approach but through a constructive, value-driven approach, to have a greater stake in the success of the programme and to earn greater goodwill and brand equity. By letting corporate houses remain as mere funders, India will lose out on the opportunity to leverage the value additions that this group can offer, particularly in the realms of innovation in technology, project management, and scalability.

8.3.1 Current trends in corporate social responsibility related to sanitation

With the aim to capture current CSR trends in the sector, the India Sanitation Coalition recently facilitated a report anchored by Samhita Social Services, a partner of the coalition, titled CSR in WASH: What are India’s top companies up to?, looking at the 100 companies with the largest CSR budgets

on the BSE 500. The report recorded that 90% of these companies have at least one CSR programme in WASH. The breakdown of the nature of companies (Figure 8.2) shows that heavy engineering and manufacturing industry topped in both the number of programmes and the number of companies. However, 75% of the companies were supporting programmes related to infrastructure creation, i.e. construction of toilets and water facilities, with limited attention to programmes aimed at behavioural change. Only a handful of companies were engaged across the value chain of sanitation that includes all the components of build, use, maintain, and treat (BUMT). Some companies are also implementing O&M programmes (Samhita 2016).

An important finding of the report was that most of these WASH programmes are concentrated in rural areas (Samhita 2016).



Figure 8.2. Categories of 90 top corporate houses with programmes in the WASH sector (Source: Samhita 2016)

8.3.2 Corporates and the urban–rural divide

According to the report’s findings (Samhita 2016), 86 of the 100 surveyed companies published information on geographical coverage. Of that, 52% were focused exclusively on rural areas; 17%, on urban areas; and the remaining 31%, on a mix of both rural and urban areas (Table 8.1).

Table 8.1: Focus (rural or urban) of corporate houses with programmes in the WASH sector

WASH in Rural vs Urban Areas				
		Urban Coverage		
		No	Yes	Total
Rural Coverage	No	-	17%	17%
	Yes	52%	31%	83%
	Total	52%	48%	100%

(Source: Samhita 2016)

The clear preference of corporate houses for rural areas may be due to stakeholder interest in terms of community engagement around factories, availability of space for construction, and ease in dealing with rural leadership structures such as panchayats.

Closer examination of data on both the 17% focused on urban areas and the 31% that focused on a mix of urban and rural areas in their engagement with the WASH sector shows that a majority of companies worked with schools and construction in municipalities and some were also engaged in such peripheral activities as *swachhata saptahs* (cleanliness weeks), organized mostly close to the respective corporate headquarters and often seen as a branding exercise in which the top management could also participate. Other awareness drives included those centred on information, education, and communication and on behaviour change communication, water purifier plants, and biodigesters for slums and community households.

Urban sanitation is thus both a pressing need and an excellent opportunity for corporate houses to discharge their CSR. At present, a majority continues to focus the efforts on rural areas: to shift the focus to urban areas, it is important to recognize both the challenges and the opportunities that exist in cities.

8.4 Corporate engagement in urban sanitation: challenges and opportunities

Engagement in urban sanitation poses many challenges to corporate houses. Multiple reasons have been cited for this, spanning technical, operational, and administrative issues together with limited availability of space and high population density. Furthermore, some corporate houses cite, as one of the reasons for their preference for rural areas, the strain associated with the red tape, or the bureaucratic working culture, of ULBs and the consequent difficulty in navigating the complex urban organizational structures. Therefore, the small number of companies engaged in urban sanitation can be due to such barriers as the lack of usable knowledge on best practices and scalable models in the urban space, misconstrued understanding of the problem based on available data, the inability – real or perceived – to find the right implementation partners, and the difficulty to quantify impact as well as the difficulty in traversing

government networks.

However, while these challenges exist, both the need and the opportunity for corporate houses to enter the urban sanitation space remain. Capital expenditure alone for the SBM (U) is more than 1.3 trillion rupees (Dasgupta et al. 2015). The overall target of the SBM, which covers 4041 statutory towns, is to construct 10.4 million units of IHHT and 0.508 million units of CT and PT in urban areas. To improve access to sanitation services, seven key mission objectives have been identified, which are mentioned in Chapter 6. To complement the funds put up by both the centre and the states, the central government is looking to other sources in the form of contribution from beneficiaries, user charges, CSR funds, and the private sector, amongst others. Additionally, the guidelines point to how the government is also looking towards the private sector for support with public toilets (Dasgupta et al. 2015). Undoubtedly, the sheer scale and envisioned pace of SBM (U) both necessitate and provide the opportunity for engagement of the corporate sector—what is required then is the creation of an enabling ecosystem to encourage and support that sector.

In fact, the government has opened many avenues to make it easier for the corporate houses to participate in the SBM including the creation of a *Swachh Bharat Kosh* and the recently launched SWACHH portal (SWACHH being short for *Swachhata* Augmentation through Corporate Helping Hands). The *Swachh Bharat Kosh* is a special corpus set up by the government two years ago to mobilize funds for the SBM and it expects to attract funds from potential donors comprising public and private companies in addition to philanthropists. The *SWACHH* portal is a crowd-funding platform to spearhead the engagement of the private sector in city-level initiatives of the SBM.

From its launch in September 2014 up to July 2016, the *Swachh Bharat Kosh* received 4.12 billion rupees, including interest (Figure 8.3). Of this, the union Ministry of Finance, which administers the fund, has already sanctioned 3.82 billion rupees to different states for implementing sanitation projects. The fund's top donors have also remained largely the same, with Mata Amritanandamayi Math, with a contribution of 1 billion, continuing to be the largest donor, followed by Larsen & Toubro (0.6 billion). Other top contributors

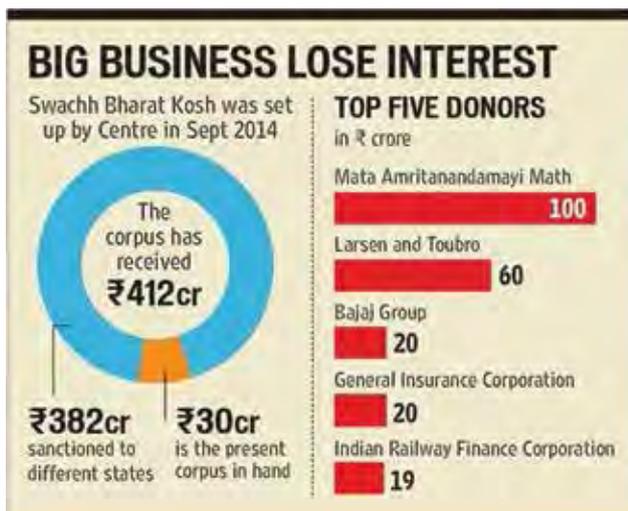


Figure 8.3. Contributions to the Swachh Bharat Kosh

* Hindustan Times, July, 2016

include the Rural Electrification Corporation, Indian Railway Finance Corporation, IFFCO, ITC Ltd, and Nuclear Power Corporation. According to the operational guidelines for the fund, the donations will be used for 'improving cleanliness levels in rural and urban areas, including in schools' through such activities as the construction and repair of toilets and providing water supply to the toilets (The Hindu Business Line 2016).

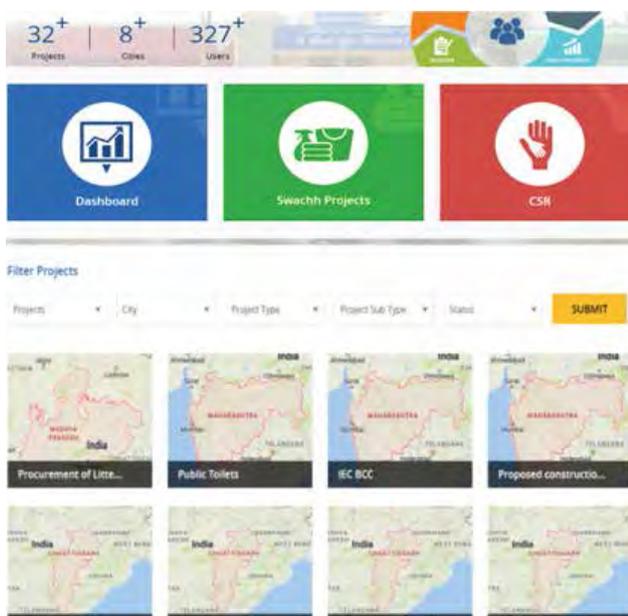


Figure 8.4.: Swachh website

*www.swachh.org

Many companies have expressed some reservations

about donating a large sum to a single corpus and instead prefer to work on projects with direct accountability and project management. In order to align with this thinking, the MoUD launched the **SWACHH** portal to offer a working interface for collaboration between ULBs and corporate houses along with willing entrepreneurs along the sanitation value chain. The platform aims to connect city municipal commissioners with private individuals and companies interested in funding and getting involved in city-level SBM projects of building toilets and infrastructure or services related to solid waste management (Swachh.org 2016). The platform lists the following as its objectives: encourage private-sector participation in ULB initiatives of the SBM; attract private-sector capital and expertise to bridge gaps in funding of the SBM; expedite SBM targets and provide a transparent monitoring mechanism; and provide a hassle-free process for corporate houses to choose, invest in, and monitor the projects (Swachh.org 2016). The platform presents a series of projects mentioning types, sub-types, cost, and duration (Figure 8.4) for companies to pick from, along with the status of work for existing projects and project reports. The projects could be of interest to corporations as potential CSR interventions or even for smaller entrepreneurs as a for-profit activity.

Thus, the government has taken steps to create tools in order to facilitate the engagement of the corporate sector in sanitation. As outlined above, under SBM (U), some initiatives are aimed specifically at urban spaces, inviting corporate houses to enter into partnership frameworks with city-based governing bodies. However, despite setting up these facilitatory tools, the engagement of the corporate sector in the space of urban sanitation falls short of the need.

8.5 Moving the needle: the need to create a supportive ecosystem

To move the needle and both invite and attract more corporate houses to engage in the urban sanitation sector, they must be exposed to and understand both the challenges and opportunities at hand. To do this, they need to be integrated into a transparent and permeable sanitation ecosystem to enable partnerships, knowledge sharing, capacity building

initiatives, and a platform for communication and exchange. This includes incorporating small and medium enterprises (SMEs) into the mix, and in turn encouraging private–public partnership models that encourage innovation of affordable yet aspirational products. Entrepreneurship across the sanitation value chain will play a critical role in converting those who resort to the practice of OD to those who practise safe sanitation. Undoubtedly, there is also a huge opportunity for corporate houses to tap the urban market for sanitation and engage in the realms of innovation and supply chains that are urgently required to propel the sanitation sector forward.

The India Sanitation Coalition was formed with a vision to enable and to support such an ecosystem, seeking to be an aggregator of knowledge and networks with nationwide outreach, focusing on models for achieving sustainable sanitation in alignment with the SBM and its goals. While the coalition, through its network of partners, addresses both rural and urban sanitation, it recognizes the importance of urban sanitation and the role that corporate houses can play to achieve the required impact and scale. In particular, the coalition maintains that it is important to view the corporate sector not merely as a funder but as a partner. When thinking of the role of the corporate sector in the sanitation space, particularly urban, we must base this on the value additions the sector can make as well as those it can benefit from. These value additions could range from last-mile connectivity in terms of advocacy, skill development and capacity building, and ecosystem building including provision of products and services to a natural progression of their own businesses and alignment with CSR and ensuring the shift towards sustainable models for sanitation.

It is also important to recognize the many corporate houses who are already working actively in the sector in ways beyond mere funding and can serve as examples for others to emulate. These corporate houses are of five types or categories: 1) those with a business interest including provision of products and services combined with social development, such as companies making fast-moving consumer goods (FMCG); 2) those with a stakeholder interest, such as companies engaged in the community supply chain; 3) those who have chosen to invest in social development as part of their CSR; 4) those that act

as catalysts with competencies that can have a cross-cutting impact when deployed on a large scale, such as media and technology companies; and 5) those that engage in volunteering with a focus to create a company culture of caring beyond the business focus, driving loyalty and satisfaction amongst employees.

Two examples of successful corporate engagement models that cut across the above categories warrant mention, namely the Reckitt Benckiser (RB) collaboration under its Dettol brand with NDTV for the *Banega Swachh India campaign* and Hindustan Unilever's *Swachhata Doots initiative*. The Dettol campaign is a 5-year programme developed to address the issue of sanitation through driving behaviour change and improving sanitation facilities. With a commitment to invest 1 billion rupees, RB has been successful in ensuring mass reach through collaboration with catalysts like NDTV and Facebook. *Swachhata Doot*, on the other hand, is an example of a successful volunteering model. It is an initiative under *HUL's Swachh Bharat, Swachh Aadat* programme that aims at creating awareness about the need to adopt *Swachh Aadat* (clean habits) in rural India and involves workers across HUL's network of factories, harnessing the power of the mobile telephone to reach the rural populace.

By creating a supportive ecosystem, such examples can be adapted for the urban sanitation space and shared widely so that other corporate houses can also be encouraged to join and create partnerships across stakeholders and the value chain.

8.6 Conclusion: the way forward

Urban India is undoubtedly growing exponentially. By February 2016, about 377 million of India's total population of 1.21 billion were urban dwellers. With more than 10 million people migrating to cities and towns every year, the total urban population is expected to be 600 million by 2031 (Global Commission on the Economy and Climate 2016). The problem is compounded by the fact that most of this growth will be concentrated in a few cities. It is therefore imperative that such critical issues as providing adequate sanitation services are addressed concurrently and the right players, who understand the importance of sustainability and scale, are brought

in. This, in turn, necessitates the involvement of the corporate sector.

Given the unprecedented buzz and energy that the SBM has created around sanitation in India, the opportunity to build on this momentum is indeed huge. A supportive and enabling ecosystem must now be created to help to sensitize corporate houses to the problem of providing sanitation services, facilitate impactful partnerships, and leverage their strengths. Although sanitation may not be the business focus of a company, support through CSR funds and volunteering would go a long way in making India ODF. Similarly, corporate houses already engaged in such related sectors as education and health can also seamlessly move into the sanitation space with the right support. To achieve sustainable sanitation, it is imperative that we re-imagine the role of the corporate sector beyond funding and infrastructure creation to that of a partner.

Moving forward, as is being anchored by the India Sanitation Coalition, it is critical to first undertake a mapping exercise to understand which corporate houses are doing what in various capacities and

where. By doing this, the learnings and experiences can be shared across the sector and a catalogue of ideas created for other companies to refer to. Thereafter, corporate houses must be engaged for capacity building to better understand the situation, particularly in the context of urban sanitation in India. Based on this understanding, an ecosystem can emerge to facilitate a marketplace for matchmaking between corporate houses and other stakeholders including implementation partners. It is also important that corporates align their strategic interests with those of the SBM (U). In the long term, corporate houses can be further engaged in the urban sanitation sector through the creation of this supportive ecosystem that promotes knowledge sharing and capacity building and serves as a marketplace for partnerships and collaborations.

Therefore, to achieve the required speed, scale, and sustainability of India's mission to achieve long-term and safe sanitation for all, it is imperative, first, to recognize the severity of the problem of urban sanitation in India and, second, to re-imagine the role of the corporate sector to that of a partner. Thus, together, we can achieve a clean India!

CHAPTER - 09

DRINKING WATER SUPPLY FOR URBAN POOR: ROLE OF URBAN SMALL WATER ENTERPRISES

9.1 INTRODUCTION

Today, 54% of the world's population lives in urban areas, which reap the benefits of economies of scale and of industrialization. India, with about 7935 cities and towns and about 31% of its population, or 377 million people, living in urban areas (Census 2011), is part of this global trend of increasing urbanization. Further, 17% of India's urban population lives in slums.

Cities hold tremendous potential as engines of economic and social development, creating jobs and generating wealth. To reach their potential, a world class urban system is essential. This means providing basic services – water supply, sanitation, and sewerage – to the large and growing populace, especially the poor and the disadvantaged. This, in fact, is a national priority. However, exponential and unplanned growth of cities fuelled by migration is posing a key challenge to supplying water—in adequate amounts and of desirable quality. Among the many daily challenges faced by India's slum populations are inadequate and unsafe supplies of drinking water, leading to stressful coping mechanisms as people wait for water tankers for free supply of water or buy it at high cost.

With the emergence of 2532 new census towns (Census 2011) that are not urban statutory towns, there is a concern that these may grow unplanned or will have slum-type growth, delaying the delivery of piped water difficult or making it difficult. (A statutory town is that with a municipality, corporation, cantonment board, notified town area committee, etc.) Similarly, significantly faster expansion at the peripheries than at the core of a number of metropolitan cities is impacting the requirements of infrastructure and delaying access to piped water. Access to safe piped water is a priority of governments worldwide, including the Government of India, which has made

it a priority under its flagship initiative, namely Atal Mission for Rejuvenation and Urban Transformation (AMRUT). However, piped water has inherent challenges in terms of quantum, access, duration, and quality and is at risk from cross contamination due to leaking pipes as well as from lead from ageing pipes.

The political discourse around water supply for the urban poor pivots around free water: charging for water is viewed as a political threat. Although water is recognized as a state subject, MoHUA, which is responsible for national policy, has strongly advocated piped water systems for several years, as reflected in the state governments' plans. Yet, almost a third of slum households depend on groundwater sources for potable water, even though groundwater has become increasingly unfit for consumption virtually everywhere across the country. Although piped water supply for all is the ultimate goal for any public water utility, the urban poor cannot be left vulnerable until they all have access to piped water.

The last ten years have seen the rapid emergence of locally owned and managed small water enterprises (SWEs; in urban areas, USWE) in response to the challenge. Among them, water purification kiosks that sell affordable water to the poor have experienced significant success at the local level, filling a much-needed gap where water provision for the poor is limited to untreated groundwater or water that may have been re-contaminated during piped transmission. These successes point to the great potential of SWEs in addressing the crisis of drinking water and in helping to achieve the United Nation's Sustainable Development Goal 6.1, namely clean and affordable water for all.

However, USWEs can realize their potential to serve the urban poor quickly and cost-effectively only

through greater coordination, knowledge sharing, and a shift towards 'implementing at scale'. These efforts include a more conducive enabling environment that allows for fair pricing, self-regulation, and political and funding support and also mean clarifying the roles of government at the national and state level and the role of urban local bodies, who are ultimately responsible for water supply, and the roles of private sector aggregators and water entrepreneurs.

The narrative and findings that follow are based in large part on a study of the supply of drinking water to the urban poor in four cities, namely Hyderabad, Mumbai, New Delhi, and Visakhapatnam, conducted as part of the partnership between Safe Water Network and the United States Agency for International Development (USAID and Safe Water Network 2016).

Providing access to India's millions with access to safe water is a daunting task. More than 77 million people lack access to safe drinking water, a lack with serious consequences for their health (WHO 2015). Large cities are home to the majority of India's sizable urban slum population: 17% of households (or 65 million people) live in slums (Census of India 2011).

The number of households in slums varies among cities, from 15% in New Delhi to 44% in Visakhapatnam (Figure 9.1). The slum population is distributed across many states with Maharashtra, followed by Andhra Pradesh, being home to the highest proportion of slum households (Figure 9.2). As ULBs struggle to keep up water delivery services, the urban poor bear the brunt, especially those living beyond the pipe. More than 50% of the 14 million urban poor families in slums do not have access to clean tap water at home despite ULBs' efforts (Figure 9.3).

9.2 NEED

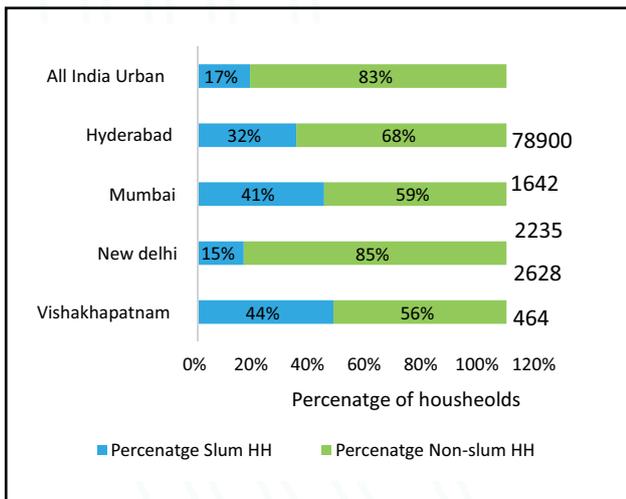


Figure 9.1: Slum Households as a percentage share of the total households (Census 2011)

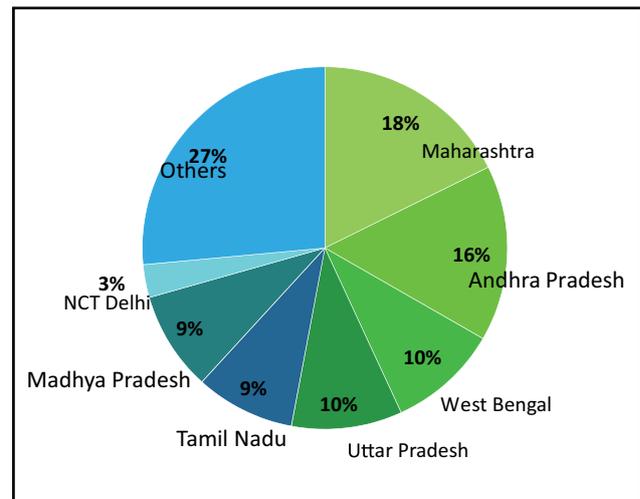


Figure 9.2: States with its respective share of slum population

As ULBs struggle to keep up the water delivery services, the urban poor bear the brunt, especially those living beyond the pipe. More than 50% of the 14 million urban poor families in slums do not have access to clean tap water at home despite ULBs' piped water efforts.

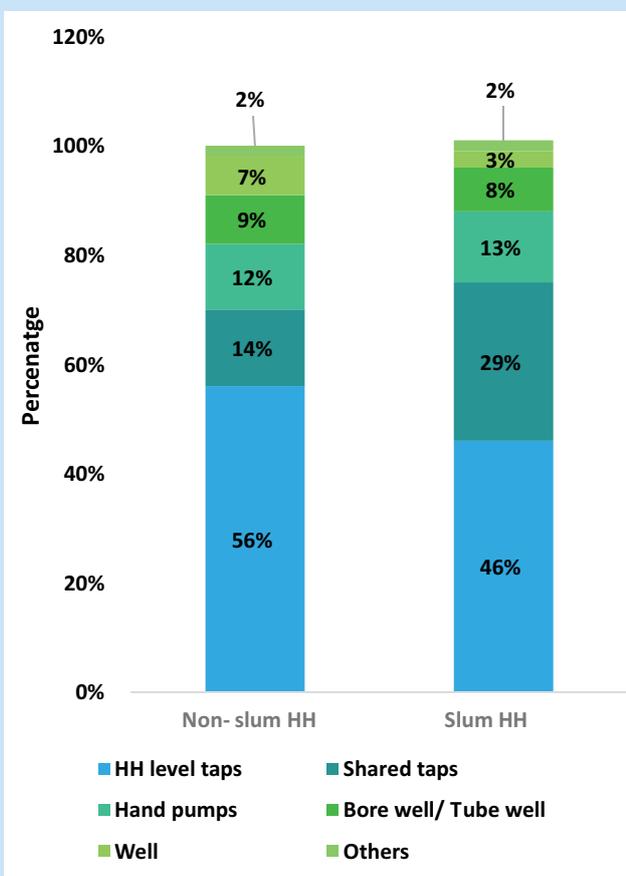


Figure 9.3. Primary Source of Drinking Water, Census 2011

32 million households

in India do not have access to safe treated drinking water

India loses

90 million work-days due to waterborne diseases (McKenzie and Ray, 2004)

6.4% points slippage

in slums with tap water as main source of drinking water between 2008 and 2012 [NSS 69th Round (Slums)]

9.3 GOVERNMENT PROGRAMS AND PRIORITIES

For ULBs, the priority has been to meet the service-level benchmarks, or the standards for piped water, set by the MoHUA. These benchmarks are

- 100% connectivity
- 100% treated water to all
- 24-hour water supply

9.3.1 Concept of 'Smart City'

The concept of a 'smart city' was introduced by the Government of India in 2015. The selected smart cities

hold a third of India's urban population. Only 43% of people living in these cities have been receiving water supply at or above the benchmark level (Figure 9.4). An investment of 980 billion rupees (\$15 billion) would be required to reach those below the benchmark in the next 5 years. The urban population living in 'non-smart cities' are behind their counterparts in the smart cities, with more than two-thirds receiving less than the benchmark of 135 litres per capita per day (LPCD) (Figure 9.5).

LPCD Water Supply

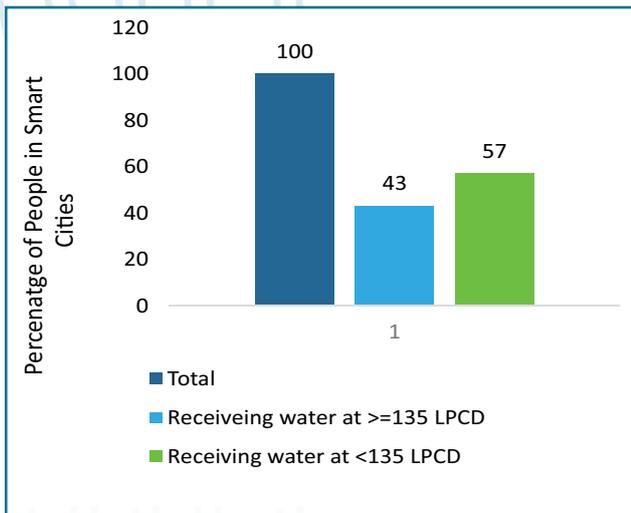


Figure 9.4 Percentage of People in Smart Cities with 135 LPCD Water Supply

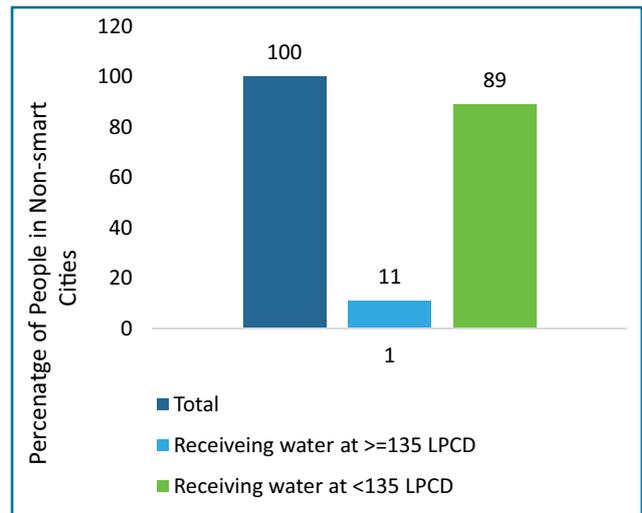


Figure 9.5 Percentage of People in Non-Smart Cities with 135

Development of the 100 cities under AMRUT and shaping them as economic hubs of the nation is the final goal. Among the 7935 cities and towns in India, 100 are covered under the Smart Cities Mission and another 400 through AMRUT. However, the remaining 7435 cities are to be supported through state government budgets.

Benchmarks for Indian public water utilities aim to provide 24-hour supply but 60% of the served population receives piped water for less than 3 hours a day.

- The benchmark for the duration of water supply is 24 hours a day, because continuous supply is less likely to be contaminated given the positive pressure in the pipes, preventing seepage of contaminated water.
- Fewer than five small ULBs covering a total of only 300 000 people meet the benchmark.
- Utilities need to improve the continuity of water supply

9.4 TAP WATER SITUATION

9.4.1 Inadequacy (Volume)

- Only about 25% of the urban population gets adequate supply (135 LPCD), largely in cities with a population of 0.5 million or more.
- In urban agglomerations with a population of less than 500 000, less than 10% of the population gets adequate water supply (Figure 9.6).
- Infrastructure of bigger cities claims a disproportionate share of spending compared to the smaller towns.

9.4.2 Inadequacy (Duration)

- Water supply is limited in terms of duration (hours per day) (SLB National Handbook 2010/11, Census 2011, citywide estimate provided by ULBs).
- Less than 1% of the population receives water round the clock (the 24/7 supply benchmark).
- Almost 60% of the population gets piped water for less than 3 hours a day (Figure 9.7).



Figure 9.6. Indian Public Water Utilities Water Supply



Figure 9.7. Indian Public Water Utilities LPCD (population in millions)

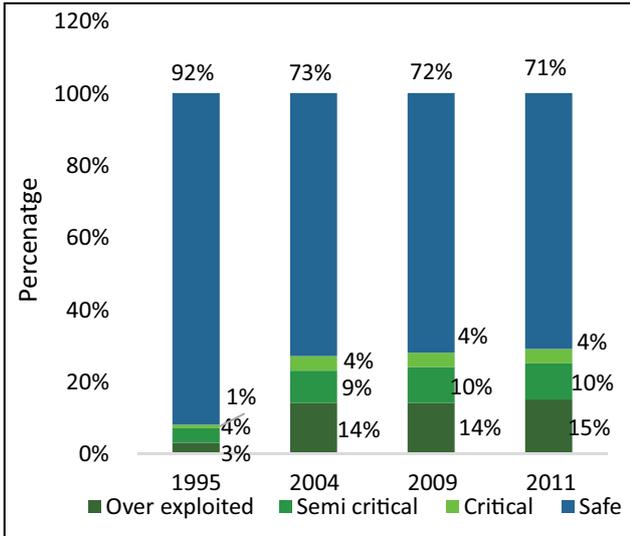


Figure 9.8 Share of Districts at Various Stages of Ground Water Development, India (1995-2011)

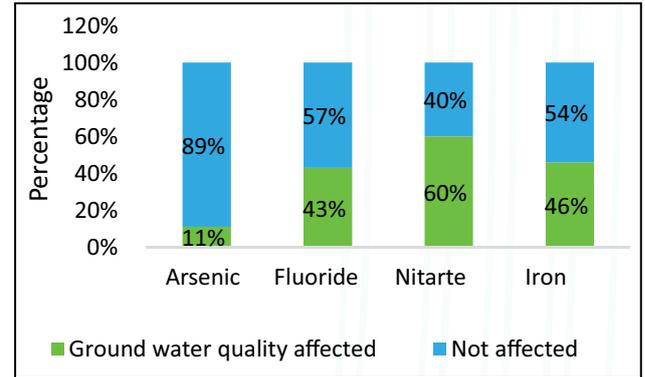


Figure 9.9 (a) Share of All Districts Affected by Various Geogenic Contaminants, 2014

20 % districts that have reached unsafe levels of ground water development between 1995 and 2011 (Ratio of Annual Groundwater Draft and Net Annual Groundwater Availability) (Figure 9.8)

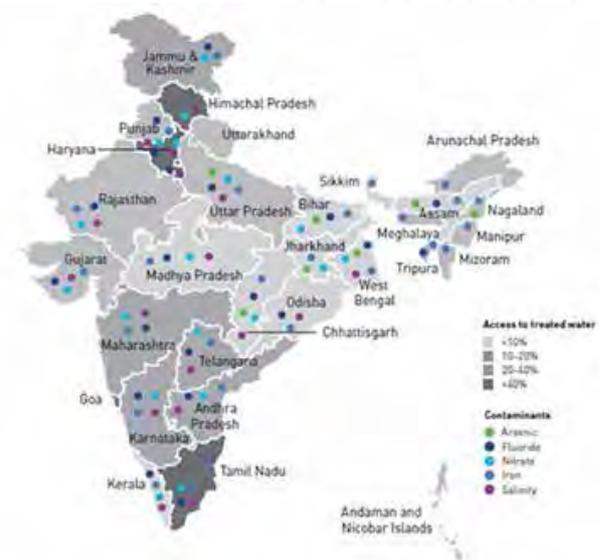


Figure 9.9 (b): Spatial distribution of water quality affected districts in India

25 out of 29 Indian states' ground water is contaminated with excessive levels of arsenic, fluoride, nitrate or iron or a combination of these

24% of the slum population relies on ground water sources for drinking purposes (Census of India, 2011)

9.5 PREVAILING DRINKING WATER SOURCES

Slum households rely either on personal sources of groundwater or those provided by the government, such as hand pumps, wells, and tube wells. About 50% of the demand for water in cities is met through groundwater, by means of at least 13 million bore wells (World Bank 2010). Based on the analyses by the Central Ground Water Board (CGWB) and PRS Legislative Research, groundwater was safe in 71% of the districts in India during 2005–2011 (Figure 9.9) (Suhag 2016, p. 3).

Availability of drinking water sources, and their affordability, varies with the income group, with fewer affordable options for the poor, who depend on groundwater, shared piped-water supply (common taps, the supply being unreliable), or tankers; SWEs can fill this gap in access to water quickly and at a lower investment, thereby ensuring reliable and safe supply of water to economically disadvantaged populations – the base of the pyramid – at affordable prices (Rs 5–10, or 7–14 cents, for 20 litres of water in a can)(Figure 9.10). Although this can meet the requirements of slum populations for potable water, they need water for other needs as well.

Table 9.1 Common characteristics of small water enterprises and their suitability for partnering with governments

Type of vendor	Wholesale	Distribution or walk-in customers		Direct
Typical delivery system	Private tankers or govt-authorized tankers	Local bulk packaged water	USWE kiosks (includes walk-in kiosks, vending machines, and other distribution channels)	Resale of piped water
Typical raw water source	Tube well, bore well, or illegally or legally drawn municipal water	Tube well, bore well, or legally or illegally drawn municipal water	Municipality water, private tankers, or bore well	Municipality water
Value added by SWE	Delivery at community or household level	Water treatment, home delivery	Water treatment, delivery at community or household level	Access and delivery at community or household level
Potential quality risk	Raw water quality, recontamination in tanker	Non-transparent and unreliable water treatment	Water quality testing often irregular	Recontamination in pipes
Quantity per capita	> 30 litres	up to 7 litres	up to 7 litres	10–20 litres
Quality	Generally non-potable; govt supplies may be potable	Potable	Potable	Potable and non-potable
Availability and reliability	On demand	On demand	8–24 hours availability daily	On demand
Seasonal variation	Yes	Yes	No	Yes
Affordability (cost per litre)	Rs 10–40 (15–60 cents)	Rs 100–200 (\$1.5–\$3.0)	Rs 10–75 (15 cents – \$1.12)	Rs 10–15 (15–22 cents)
Trigger for consumer	Insufficient water from household or community taps, etc.	Bad smell, colour, or taste of other sources; health episodes	Bad smell, colour, or taste of other sources; health episodes	Insufficient water from household or community taps

Kiosks are the most suitable SWEs for partnering with governments to provide affordable, reliable, and clean drinking water. As shown in Table 9.1, USWEs are better than private tankers, local bulk supply, and resale of piped water in terms of price, quality, and reliability – they can supply water 24/7 irrespective of season – and are often endorsed by ULBs or other local authorities, although a few are ad hoc.

Despite high costs, RO technology has vast acceptance among Indian CSWs due to ease of operation and “one stop” nature of solution (Figure 9.11).

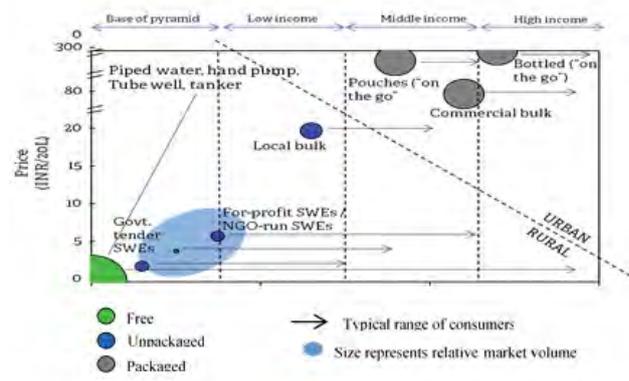


Figure 9.10. Affordability and Range of Various Drinking Water Sources by Income Group¹¹

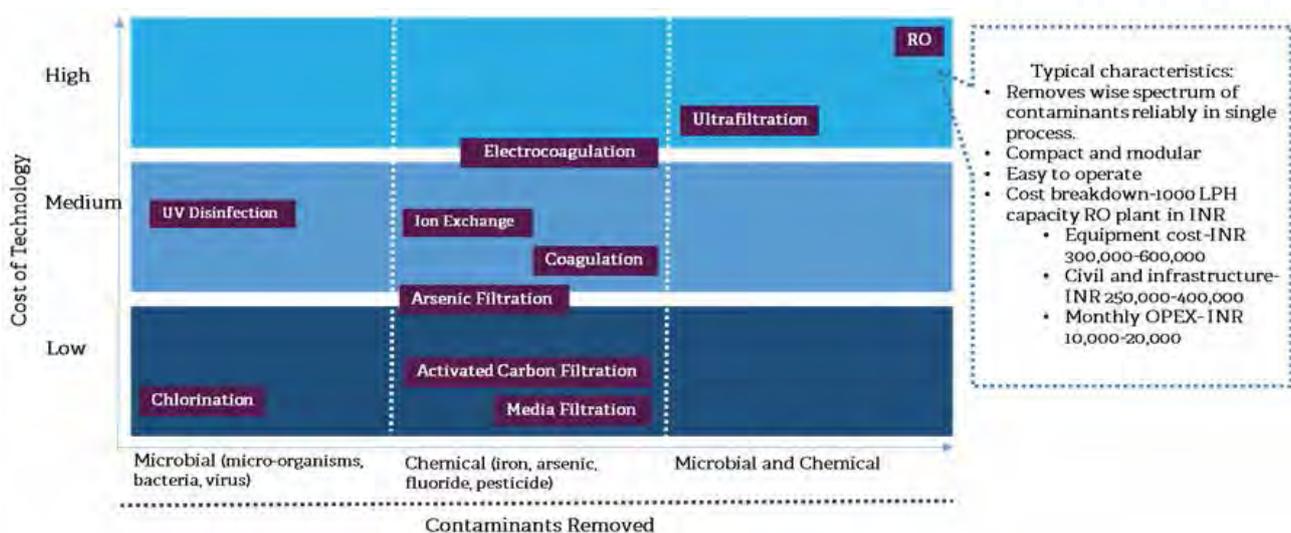


Figure 9.11: Schematic of cost and contaminant removal by water treatment technologies employed by CSWs in rural India

9.6 WHAT CONSUMERS SAY: Urban Poor Understand the Correlation between Water Quality and Health

After being established in rural areas, SWEs are now being increasingly accepted as a safe source of drinking water in peri-urban slums.

- Schemes involving SWE have been piloted at scale in rural areas with state government support in a number of states including Andhra Pradesh, Bihar, Karnataka, Punjab, and Rajasthan with varying degree of success owing to lack of capacity and supervision.
- Small water enterprises are gradually expanding in urban areas and the first few cities to pilot them are Bengaluru, Hyderabad, New Delhi, and Visakhapatnam (Figure 9.12).
- The Municipal Corporation of Greater Mumbai (MCGM), with 42% of the households in slums, does not endorse SWEs currently.
- Only treated water for drinking is supplied by SWEs; for all other needs, ULBs are required to deploy water tankers.
- Small water enterprises are a reliable source of treated drinking water and many have been set up by private operators to cater to the demand (Figures 9.13 and 9.14).

Greater numbers of USWEs lead to lower water collection time in slums, although the number of USWE distribution points and channels (including home delivery) needs to be increased.

Customers of piped water missed 3.1 work or school days in the last three months

Customers of tank water missed 2.9 work or school days in the last three months

Customers of USWEs missed 2.4 work or school days in the last three months (Figure 9.16)

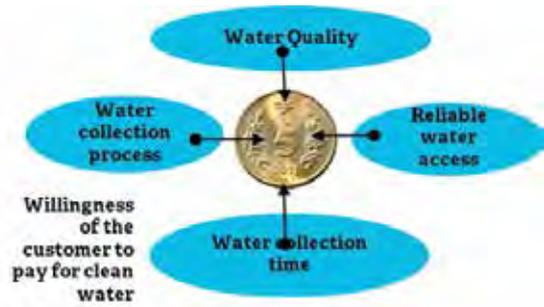


Figure 9.13. Quality, Availability, Collection Time and Process Reinforce Consumers' Willingness to Pay for Clean Water

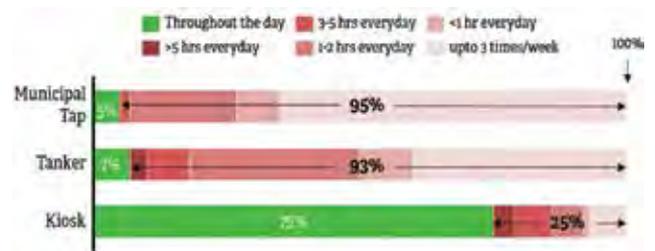


Figure 9.14. Drinking Water Availability and Frequency of Supply

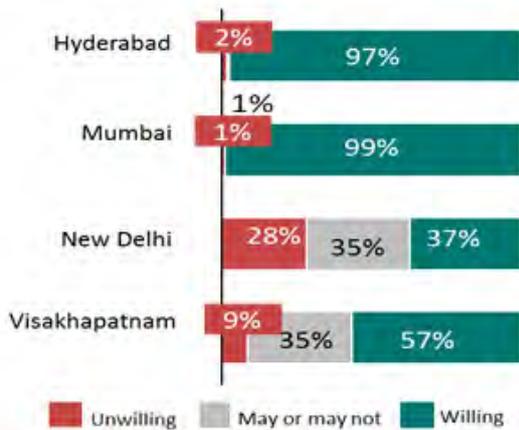


Figure 9.12. Willingness to pay INR 5/20 Litre

47%
Fewer females collect water from USWEs vs. those collecting piped water (Figure 9.15)

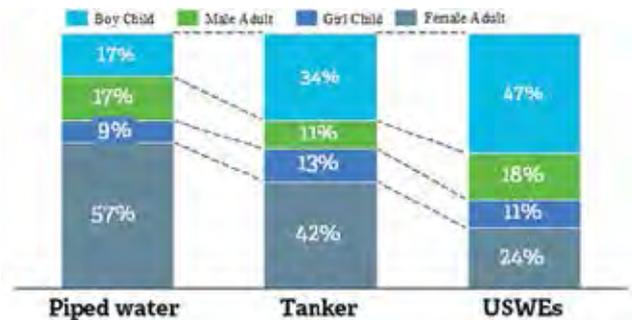


Figure 9.15. Responsibility for Water Collection

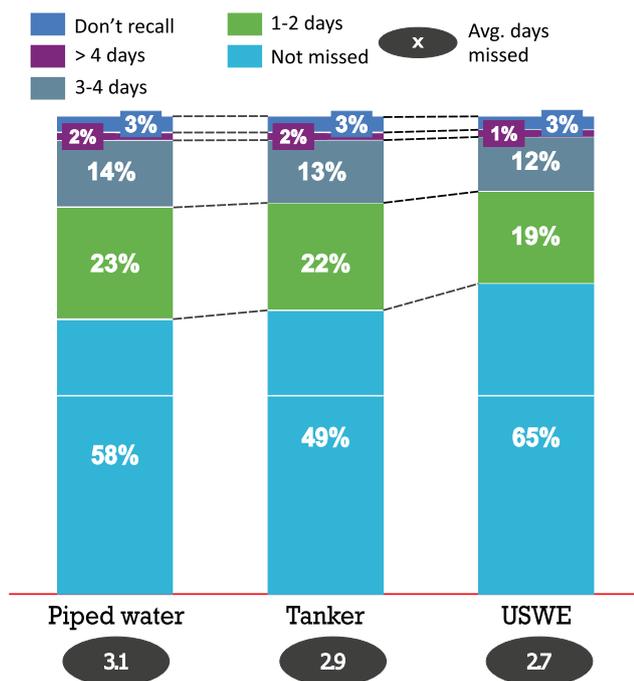


Figure 9.16. Average Number of Missed Work/ School Days by Primary Drinking Water Sources (for last 3 months)

9.7 POLICY AND ENABLING ENVIRONMENT

Deploying SWEs as a quick, decentralized, and complementary solution to piped water supply in urban slums is critical. Facilities provided by ULBs enable USWEs to provide access to water to the urban poor at affordable prices.

Table 9.2 Prevailing models of small water enterprises facilitated by urban local bodies and private entrepreneurs in four cities in India

City	Infrastructure provider			Governance	Pricing (for 20 litres, at kiosk)	Months to set up	No. of kiosks (up to June 2015)	Facilitation by contracting ULBs
	Land	Raw water source	Electricity connection					
Hyderabad	GHMC	GHMC (ULB provider of bore wells)	GHMC	Donor funded, ULB and NGO facilitated, SHG managed	Rs 4 (6 cents)	6–9	6	Local NGO supported with rent free building, electricity connection, and raw water access (bore well); GHMC also pays electricity bills for some kiosks
Mumbai	Local land owner	Private tanker (pay per use)	Provided along with building	Donor funded, NGO facilitated, SHG or private operator managed	Rs 10 (15 cents)	1–2	2	
New Delhi	Sulabh International	Private tanker (pay per use)	Part of Sulabh's mega toilet complex	Company owned, company operated (COCO)	Rs 10 (15 cents)	1	1	Not applicable
New Delhi	DUSIB	DJB (ULB provided bore well)	Relevant private power utility	ULB tendered or facilitated, COCO	Rs 3–4 (4–6 cents)	6–24	4 (15 ATWs)	Recommendation letters for land and electricity connection approval; access to bore well
Visakhapatnam	GVMC	GVMC (ULB provided bore well)	GVMC	ULB funded and facilitated, managed by self-help groups	Rs 2 (3 cents)	1	12	GVMC community hall with electricity connection, bore well

Infrastructure supported by ULBs for access to raw water, land, and building and electricity connections are significant costs that enable affordable pricing by USWEs whereas those set up without such facilities have to charge more for water to cover the increased costs. Those USWEs run by self-help groups seem to be covering kiosk-level operational costs but with no or insignificant savings for themselves or capital maintenance (except in Hyderabad, where operators are paid a fixed salary). This poses a threat to longer-term financial interest and technical sustainability.

Note: Sulabh International (New Delhi) and Apnalaya (Mumbai) do not have access to fixed raw water sources. They depend on tanker water supply.

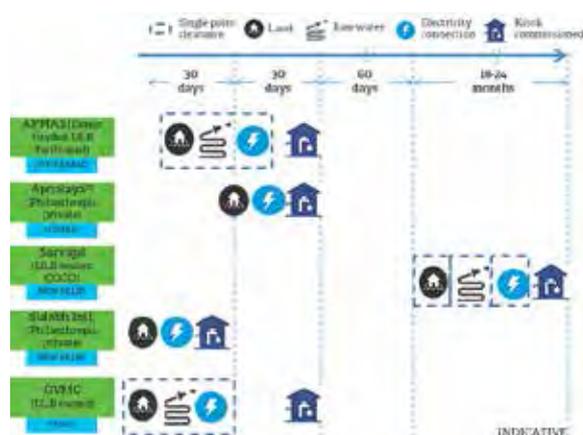


Figure 9.17. Setting up a USWE: Mapping Timelines for Approvals

9.7.1 FINDINGS:

- Time taken to set up a kiosk in cities is subject to clearance from multiple authorities. Approvals have been speedily provided only where the contracting ULB is the apex municipal body, for example in the case of Visakhapatnam.
- Approvals pertaining to securing land, raw water source, and electricity connection for USWEs are given by multiple authorities; for non-ULB-supported USWEs, it is a challenge to set up *kiosks*.
- Self-regulation standards need to be set up to govern water quality from SWEs.
- It took more than 24 months for New Delhi to pilot its first USWE (the city had floated a tender, inviting bids to set up kiosks).

Box 9.1: Recommended performance standards for SWEs

After assessment of SWEs on their Social, Operational, Financial, Institutional and Environmental (SOFIE) criteria, the following indicators were proposed for self-regulation by SWE implementers and aggregators so that safe, reliable and affordable supply of potable water can be delivered to those beyond the pipe. The central tenets of SWEs is equity, inclusiveness and sustainability so that affordable water reaches the poor and this generation does not miss out on the economic good that water brings.



Figure 9.18. 3600 sustainability of SWEs: Recommended Performance Standards for SWEs - SOFIE sustainability

Box 9.2: Balancing Safe Water for The Poor and within The Political Environment

Key Takeaways:

- Free water continues to be a political priority to win the support of the urban poor. This gesture reduces the willingness of users to pay for water, and USWE implementers and NGOs face challenges when supplying water even at affordable prices.
- For ULBs, SWEs are not a priority, owing to the single-minded focus of ULBs on piped water supply. Although piped water is imperative, SWEs are an easy, decentralized option for safe and reliable supply of water to augment other mechanisms of delivering potable water.
- Site selection for USWEs should be need based for the public good rather than influenced by local politicians or dictated by a few. Planning for optimal utilization of various water sources is best undertaken by ULBs; such planning will also ensure coordination between piped water and water kiosks.
- The feasibility of supplying piped water to all the urban poor needs to be assessed and the urban poor need to be made aware of these considerations.
- Re-contamination of water during transmission also needs to be examined.

9.4 RECOMMENDATIONS

Urban small water enterprises can fill a much-needed gap in urban slums where water supply to the poor is limited to untreated groundwater or water that may have been re-contaminated during piped transmission owing to intermittent water supply.

For a capital investment of half a billion dollars (approximately \$592 million at \$40 000 per kiosk, \$25 000 for a system, and \$15 000 for programmes) or 37 billion rupees (\$1 per person per year (at \$40 000 per kiosk and a capital expenditure of \$16.91 per person), USWEs can provide 35 million people, or about 50% of urban slum dwellers, with sustainable access to

safe water. About 14 800 USWEs are needed with distribution capabilities to serve 35 million people. Each USWE with distribution capabilities can serve about 4 average-sized slums. This would provide safe drinking water immediately, and would ensure that an entire generation can enjoy good health while the government rolls out its piped water system for full coverage of the country's population.

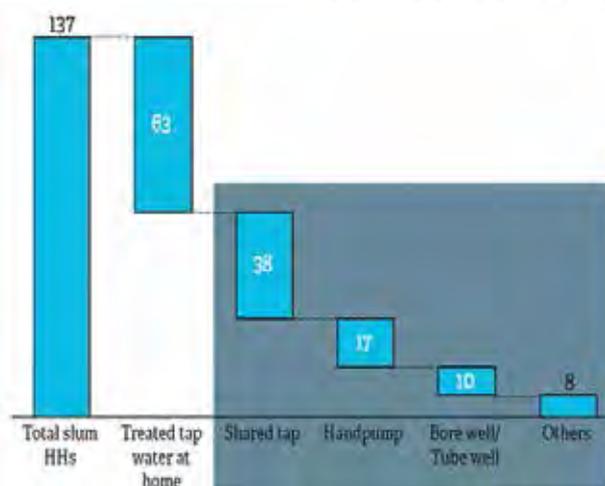


Figure 9.19. Opportunity for SWEs to Serve Urban Poor (lakh households) (Census, 2011; assumes 4.7 members per HH)

For USWEs to reach their potential to serve the urban poor quickly and cost-effectively, a more conducive enabling environment is needed that allows for fair pricing, self-regulation, and political and funding support. A number of recommendations for consideration are outlined below.

- Urban small water enterprises need to be facilitated with a policy environment that officially sanctions them and legitimizes their function within the administrative water governance framework of the ULB. This would enable setting and monitoring standards and facilitate funding to provide treated, affordable drinking water. A single-window award of license to operate by an ULB will signal multiple authorities to refrain from imposing regulatory hurdles that can drive up the cost of operations.
- Benchmarks are needed for USWEs to standardize service and compare performance across USWEs. This can be achieved by the introduction and adoption of mutually acceptable USWE benchmarks against which the performance of USWEs can be measured by ULBs and Rural Water Supply Scheme (RWSS), and of tools that enable USWEs to self-regulate, supplemented by social

or external audits. Monitoring and evaluation of performance on social, operational, financial, institutional, and environmental (SOFIE) criteria should govern inclusive and equitable water access, quality, reliability, and fair pricing.

- Pricing needs to be both affordable and fair. The prescribed price of Rs 2–3 (3–5 cents) for 20 litres of water is financially unsustainable at current volumes as it does not cover the monthly operating costs, maintenance fees, and provision for large-value spares. In the urban context, a price of Rs 5–7 (7–10 cents) for 20 litres seems sustainable, given the cost structure and volumes. Those USWEs that enjoy some facilities by ULBs have lower capital investment as they receive subsidized water supply using legitimate bore wells or other water sources, rent-free or low-rent land and building, and electricity connections. These facilities can bring down the price, making water affordable to the poor.
- Risk mitigation strategies for ULBs and aggregators are essential for thriving PPPs. The biggest risk that ULBs face is of failure to adhere to quality, pricing, and continuity of operations. The risk can be addressed by engaging responsible social entrepreneurs or reputable non-profits with a track record of execution with commensurate warranties. Competitive bids are often secured by equipment manufacturers, with little interest in

long-term sustenance once the profits from the sale of equipment are realized. Aggregators of USWE, on the other hand, face risks, such as non-availability of raw water, low demand, restrictions imposed by authorities without jurisdiction, and dealing with those who benefit from the current gaps in reliable access to water.

9.5 WAY FORWARD

To scale USWEs to address the drinking water challenges in urban India and meet the needs of the 35 million people or about 50% of urban slum dwellers, with sustainable access to safe water, requires a focused effort among a range of sector stakeholders and a combination of actions described in the illustration below.

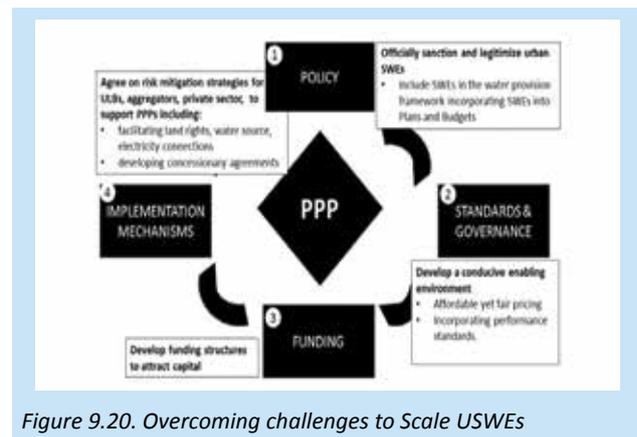


Figure 9.20. Overcoming challenges to Scale USWEs

CHAPTER - 10

FINANCING OPTIONS FOR URBAN SANITATION IN INDIA

Access to toilets and other sanitation services required for privacy, healthy living conditions, and a clean environment – generally defined to encompass the safe collection of human excreta and the management, treatment, and disposal or drainage of solid waste – has multiple impacts on improving health, safety, and educational access (CEPT 2014). Over the past three years, the Swachh Bharat Mission has emphasized urban sanitation to a degree never seen before. Although the mission design focuses on constructing toilets and making cities free of open defecation, equal emphasis is needed on leveraging credit and other innovative sources of finance if the SBM is to deliver results on the ground. This chapter highlights the importance of finance for sanitation in achieving the goals of the SBM, outlines potential options for financing keeping in view the development of the financial sector in India, and suggests key measures to scale up such finance.

10.1. The urban sanitation gap

The last census, in 2011, showed some startling statistics. In urban India, 62 million people had no access to toilets, of which 42 million (12%) practised open defecation (OD), and 20 million (6%) used public or shared toilet facilities. The situation was far worse in smaller cities (population below 100 000), with approximately 22% of the population resorting to OD. The 69th round of the National Sample Survey (NSS), conducted in 2012, estimated a significantly higher number of people – 94 million (25%) – using shared toilet facilities. The joint monitoring programme (JMP) of WHO-UNICEF does not consider shared facilities as improved sanitation facilities. By this standard, the gap in sanitation services in India is huge.

‘The notion of indoor sanitation is not new in India. One of the earliest records of indoor plumbing anywhere in the world, dating circa 2800 BC, comes from several sites of the so-called Indus Valley Civilisation . . . This prior fact of India’s sanitary

contribution to the world seems paradoxical given the countrywide dearth of individual and public toilets as well as the pervasive nature of open defecation today’ (Jha 2010). In contemporary India, urban areas are considered engines of economic growth. Urban areas are prosperous and contribute over two-thirds of national income. Despite this, a large number of urban houses lack toilets and their members practise OD.

It is often assumed that those who practise OD in urban areas live in slums. India’s slum population in 2017 is estimated at 104 million, or approximately 9% of the total projected national population of 1.28 billion (MoHUA 2010). Lack of space and tenure-related issues are cited as hindrances to building toilets in slum areas. In absence of individual household latrines (IHHLs), slum dwellers are forced to rely on community toilets (CTs).

CEPT University surveys carried out in Gujarat and Maharashtra suggest that whereas lack of space for constructing toilets is an important factor, lack of finance is also an important factor

However, building CTs in slum areas is no panacea. Although a few cities have well-functioning CTs, in many others they are in a perpetual state of disrepair and people are forced to resort to OD. Moreover, CTs entail large public expenditure because unit costs of these toilets tend to be high, and they require operation and maintenance support throughout their life cycle. In addition, CTs may also pose greater health hazards. For example, a systematic review by the Sanitation and Hygiene Applied Research for Equity (SHARE) Project of the London School of Hygiene and Tropical Medicine (LSHTM) (2014) stated, “a pattern of increased risk of adverse health outcomes

associated with shared sanitation compared to individual household latrines” (Heijnen et al. 2014).

The census of 2011 puts the number of households that did not have their own toilets at 14.7 million, which forms the latent demand for private (household) toilets in urban India. The actual number is possibly much higher, because the census counts toilets outside the premises but within a compound or a complex also as individual household toilets. When the data are disaggregated into slum households and non-slum households, nearly two-thirds of the demand is seen to come from the latter (Figure 10.1).

It does seem surprising that nearly 10 million non-slum households did not have a toilet. CEPT University surveys carried out in Gujarat and Maharashtra (Figure 10.2) suggest that although lack of space for constructing toilets is an important factor, so is lack of finance (Mehta and Mehta 2014).

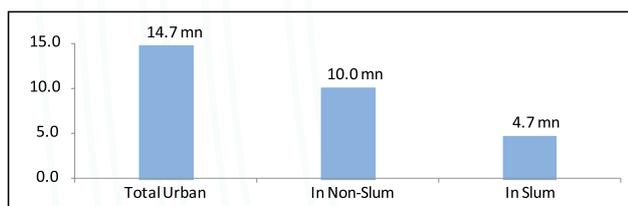


Figure 10.1: Households without individual toilets in urban India (Source: Census 2011)

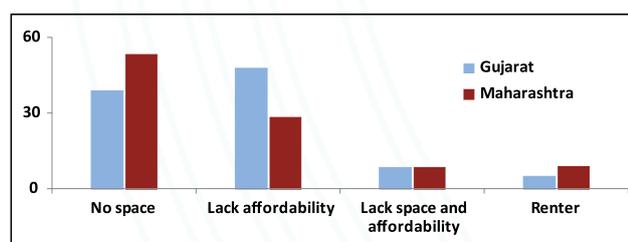


Figure 10.2: Reasons for lack of household toilets (Source: household surveys in Gujarat and Maharashtra under the PAS Project at CEPT University in 2010)

10.2 Swachh Bharat Mission (Urban): a results-based initiative

The Government of India has introduced its ambitious programme of making India ODF free (ODF) by 2019 under the SBM. Three specific targets have been set for the sanitation component of the SBM (U): (1) 10.4 million IHHLs, (2) 0.25 million seats in CTs, and (3) 0.26 million seats in PTs (Table 10.1). The focus is on

IHHLs, but where it is difficult to construct them, CTs are proposed instead. Public toilets at such locations as tourist places, markets, bus stations, near railway stations, and places of public recreation are also planned, expected to be built through public–private partnerships (PPP). For both CTs and PTs, the revised guidelines provide for viability gap funding (VGF).

The urban sanitation component of the SBM (U) aims to make all cities ODF by increasing access to individual toilets: ensuring that they are used requires a demand-driven approach where households take the responsibility for managing the construction of their toilets and are free to supplement the subsidy with their own money if they want toilets of higher quality. Unlike most such programmes in the past that subsidized the entire cost of construction, the SBM (U) covers only 30%–50% of the cost. For example, in Maharashtra the prevailing cost of building a toilet is Rs 25 000 – 45 000 but the subsidy is fixed at Rs 12 000 (Rs 4000 from the Government of India and Rs 8000 from the Government of Maharashtra), which accounts for approximately 28%–48% of the total cost.

Table 10.1: Building toilets under the Swachh Bharat Mission (Urban): components and cost estimates

Component	Estimated cost, Rs (billions)	Funding
Individual household toilets	41.650	To cover 80% of families currently defecating in the open (based on data from 2011 census)
Community toilets	6.550	Unit cost of Rs 98 000 per seat with viability gap funding or grant up to 40%
Public toilets	-	To be done through public–private partnerships. The revised guidelines in 2016 provide for Rs 98 000 per seat with viability gap funding or grant up to 40%.
Solid waste management	73.660	90% in 2nd and 3rd year
Public awareness	18.280	-
Capacity building and administration	6.090	-
Total	146.230	

Source: Press Information Bureau (2014) and MoUD (2016)

Subsidies under the SBM (U) are tied to performance

or outputs. Initially, once an application is approved, only 50% of the subsidy is transferred to the bank account of the approved household; the balance is released only after the sanitation facility is built and verified on the ground by the urban local body or an independent verification agency appointed by the ULB. For this, a geo-tagged photo has to be uploaded on the SBM web portal, which adds transparency to the process. The scale of the SBM (U), makes it probably one of the largest such output-based aid (OBA) programmes for sanitation in the world: in most such initiatives elsewhere in the world, the average number of people served is about 142 000 (Castalia 2015).

10.3 Importance of credit for sanitation

The latent demand for sanitation in urban areas needs to be unlocked (Mehta and Mehta 2014a, 2014b; NHB 2015). The partial subsidy is expected to play a key role in this process. Under the SBM (U), the Government of India provides a subsidy of Rs 4000 for constructing an individual toilet, and most state governments have added another Rs 8000 from their own funds. The toilet costs in different states vary considerably, from about Rs 18 000 to Rs 40 000, depending on local costs and availability of a sewerage connection. Thus the subsidy covers only a part of the total cost; also, because it is output-based, households have to mobilize an additional amount of nearly Rs 12 000 to 34 000 upfront when they start the construction. Although some of the amount may take the form of credit by the supplier, the households need to leverage other resources including their own savings

and credit from elsewhere. The study by CEPT of some cities in Maharashtra cited earlier also suggests that many households aspire to toilets of superior quality and some would also like to add a bathroom when building a new toilet. The cost of such toilets goes up to more than Rs 50 000. This suggests that the SBM will need to ensure that households have access to credit in order to take up and complete the construction of toilets.

Recent data from monitoring the SBM (U) suggests that demand articulation, in terms of applications received, is keeping pace with the proposed targets. However, the pace of construction of these toilets is slow, and only 24% of the applicants have completed the construction (Figure 10.3). Inquiries by CEPT University in a few cities suggest that in most cases households are reluctant to take up the construction of toilets or find it difficult to complete the construction after starting it either because they cannot afford it or have no access to funds. Other state-wide surveys also suggest that affordability is a major constraint to building toilets in urban areas. The state survey conducted by CEPT University in Maharashtra in 2010, which covered 7690 households across the state, estimated that 34% did not have access to toilets in their homes. A study conducted in 2015 and supported by the Bill and Melinda Gates Foundation across five states in India also suggests that financial and space-related barriers probably contribute to the slow pace of construction of toilets. Access to finance is a key constraint: 63% of the respondents across the five states, and 76% respondents in Maharashtra, mentioned financial constraint as a barrier to toilet construction (IMRB 2016).

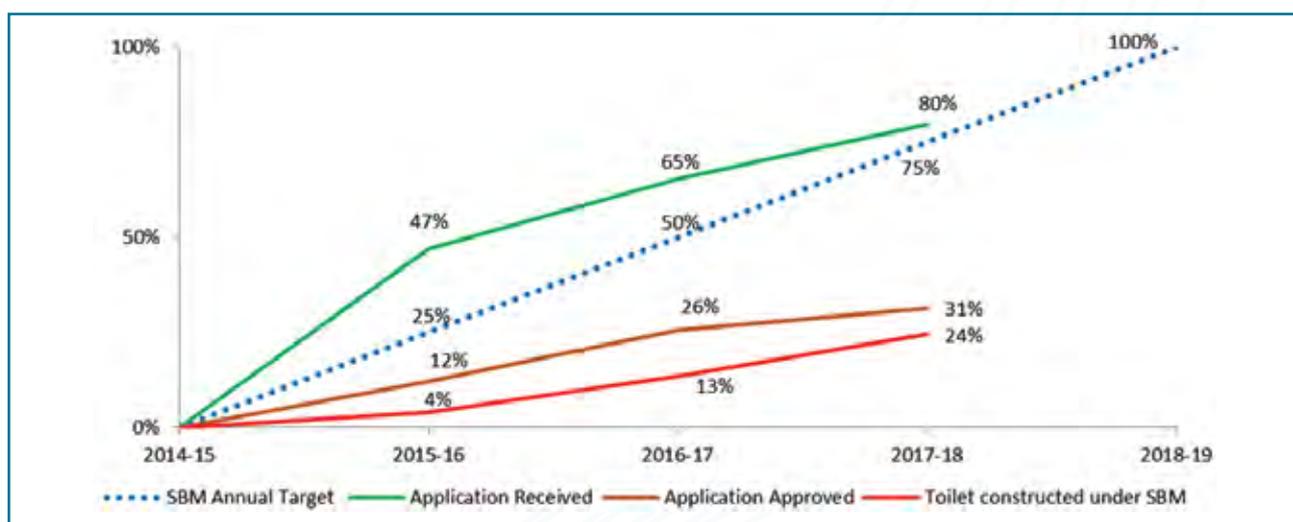


Figure 10.3: Process of Swachh Bharat Mission: targets, application, approval, and construction

(Source: MoUD 2017)

Access to credit will also complement the demand-based approach adopted by the SBM. Surveys (PAS Project, 2011) in some cities suggest that for many households, with access to credit, the toilet, with a bathroom and better finishing, becomes an aspirational good (PAS 2011). This measure, namely additional credit, will also help to avoid the problem of poor-quality toilets, which are abandoned over time, as has been found with many programmes involving contractor-built toilets.

The demand for credit for sanitation in cities is likely to be significant (Box 10.1). A rapid assessment by CEPT University suggests that nearly 50% of the target households (about 5 million) are likely to access credit

10.4 Innovative financing options

Several options for innovative finance to supplement the grants from the SBM (U) are discussed below (Table 10.2). Historically, support for sanitation for low-income households in urban areas has come mainly through programmes related to slum development and in the form of grants linked to NGOs. However, the NGOs have not been able to scale up their operations because the grants available to them have been limited. At the same time, the growth of the microfinance sector has led to initiatives by a number of organizations such as Water.org and the Michael and Susan Dell Foundation to support microfinance institutions (MFIs) to enable them to provide sanitation

Box 10.1: Demand for sanitation credit: what women said about taking loans to build toilets

“My daughters have grown up and it is **not safe for them to go out in the open at night**. Therefore I took a loan from a credit cooperative society for constructing a toilet.”

“I took a loan of Rs 5000 in 2009 through a self-help group for constructing a toilet because we had to **walk 20–25 minutes** to reach the community toilet.”

“Everyone in our house resorts to OD. Our **relatives do not visit us** as we do not have a toilet attached to the house. We think it is very important to have a toilet and are keen to take a loan for the purpose.”

“It was a long walk to the community toilets, and it is not possible to use them at night. **We left our home and rented a house with a toilet** because we cannot invest Rs 40 000 – 45 000 at once; we pay a rent of Rs 3000 instead.”

Suvarna Lokhande runs a tailoring business. She is a member of Sumananjali Bachat Gat, a joint-liability group started with Spandana in 2008. The group has ten members like Suvarna, each involved in different economic activities such as making papads, making laddus, running a beauty parlour, and tailoring. The members have been taking loans from a microfinancing institution since 2008, amounting to Rs 10 000 – 50 000. In 2013, Suvarna took a **loan of Rs 45 000 as an income-generating loan but constructed a toilet instead**. Before constructing the toilet, the family had to walk for 20 minutes to reach the community toilet. Moreover, it was very inconvenient during the rainy season and at night. Heavy traffic was another major problem. Therefore, Suvarna decided to construct an individual toilet.

Source: CEPT University (2016)

if enough of is made available easily and at affordable rates. The sum amounts to nearly 100 billion rupees, or about 1.5 billion dollars, assuming an average loan of Rs 20 000 to each such household.

loans to low-income households, particularly in rural areas (CEPT University 2016).

Table 10.2: Assessing potential sources and financing mechanisms for urban sanitation

Source or financing mechanism	Reach to target urban households without on-premises toilets	Current or potential interest in urban sanitation	Favourability of loan terms and ease of collateral terms
Microfinance (microfinance institutions or self-help groups)	High reach	Emerged in recent years; however, efforts needed to focus on urban areas	Favourable collateral terms but very high rate of interest
Housing finance institutions	Limited to only a few HFIs	Specific sanitation products not used, but can be introduced as part of housing improvement products; marked focus on urban areas	Potentially low-cost loans but stringent requirements for collateral a deterrent
Commercial banks	High, especially with the new financial inclusion policies	No focus on sanitation so far, but possible with the enabling policy for priority-sector lending (PSL)	
Funds for corporate social responsibility and local benefactors	Potential is high but limited experience in urban areas	Interest in sanitation and sanitation included in CSR; however, efforts needed to focus on urban areas	Not applicable (funds available as grants)
Social impact bonds or mutual funds	Potential is high, but agencies are few; new compact with urban local governments needed	Potential interest high due to strong evidence of health impacts, concerns for dignity and security of women, improved education outcomes	Potentially favourable but stringent requirements for capability of service agency and verification of outcome
Crowdfunding		Special section for sanitation exists on current portals. However, efforts will be needed to focus on urban sanitation	Most funds are likely to be grants or donations; for debt, credible local partners necessary

Source: Mehta and Mehta (2014)

10.4.1 Microfinance for sanitation Internationally, microfinance has played a role in leveraging household and community resources for constructing IHHLs and PTs and for latrine-cleaning services and suction truckers used for emptying pit latrines in countries such as Bangladesh, Burkina Faso, Lesotho, Pakistan, and Vietnam. In 2001, a revolving fund for sanitation was set up in Vietnam through support from the World Bank to provide loans to low-income households in Vietnam for sanitation facilities. To avail themselves of the loans, the households needed to join a savings and credit group of 12–20 people living close to one another. This revolving fund compares very favourably with other forms of public support for sanitation (Mehta 2008).

The microfinance industry has grown significantly in India. On the basis of updated data reported by lending institutions, the industry had a total loan

portfolio (outstanding loans) of 1069.16 billion rupees (\$17.8 billion) by the end of 2016/17 (Micrometer, March 2017, p. 8).

Loans amounting to least 7 billion rupees had been disbursed for toilets loans by September 2016. Although the number of financial institutions offering toilet loans has increased since 2005, only one MFI is driving 50% of the market (Dalberg 2017). For example, Water.org has been supporting MFI partners to develop products for loans for water and sanitation. In this context, MicroSave has initiated work on developing manuals to support product development. About 20 MFIs currently offer loans for toilets, and although the bulk of these loans are for rural households, some MFIs with reasonably sized portfolios have focused on urban households as well (Box 10.2).

The limited but very useful experience of a few MFIs that have supported urban sanitation loans suggests that it is possible to develop products that meet the demand for credit to build household toilets. However, compared to the potential demand, current efforts are limited and need to be scaled up.

the NBFC-MFI sector is likely to be transformed with increased competition amongst traditional NBFC-MFIs and the new SFB licensees: the latter will be able to collect deposits and offer other financial services to low-income groups, which may also help in lowering the lending rates for sanitation loans.

Box 10.2: Sanitation credit by microfinancing institutions

Gramalaya Urban and Rural Development Initiatives and Network (GUARDIAN) is a microfinance institution (MFI) promoted by Gramalaya, a pioneer NGO in the field of water and sanitation for more than two decades in Tamil Nadu. GUARDIAN was the first MFI in the world to lend to the communities who lack access to credit to build household toilets and to connect to piped water supply. By March 2016, GUARDIAN had 88 000 borrowers and lent 840 million rupees (\$14 million) and had an outstanding-loan portfolio of 190 million rupees (\$3 million) (GUARDIAN 2016).

Another MFI, Grameen Koota, with presence in Chhattisgarh, Madhya Pradesh, Maharashtra, Karnataka, and Tamil Nadu, has an active membership of over 1.5 million and had an outstanding-loan portfolio of 30 billion rupees (\$500) by February 2017, of which nearly 2 billion (\$33 million) was for urban water and sanitation loans in 2016 (Grameen Koota 2017). Evangelical Social Action Forum (ESAF) Microfinance, with its cumulative portfolio of 95 million rupees and nearly 14 000 loans, developed a water and sanitation loan product in 2008 with support from Water.org and has provided loans particularly in central India (Chhattisgarh, Madhya Pradesh, and Maharashtra): about a third of its clients in these states do not have household water connections and toilets (Paul 2014).

One of the reasons for the limited role that MFIs have played in urban sanitation space is that they have inadequate access to a credit line for lending to households or SHGs at reasonable rate of interest. The current policies require MFIs to devote at least 70% of their assets to income-generating loans, and sanitation loans do not fall under this category. However, sanitation lending is now a priority sector for lending for banks, which is likely to increase the access to credit for sanitation through MFIs. Although the demand for sanitation loans is sizeable, the cost of construction and availability of funds are major obstacles. Toilet loans are a new product for MFIs and require a shift from their existing product lines—such a shift is unlikely unless additional funds are available, preferably at a lower cost. With sanitation being considered as a part of priority-sector lending (PSL), more funds for sanitation loans can be made available to MFIs. In September 2015, eight non-banking finance companies (NBFC), including ESAF, were allowed to operate as small finance banks (SFBs).³ Therefore,

10.4.2 Housing finance institutions The housing mortgage market has seen phenomenal growth in recent years. A large number of financial institutions – commercial banks, housing finance institutions (HFIs), cooperative societies, etc. – provide housing loans. By March 2015, housing loans in India that were outstanding amounted to Rs 10.6 trillion rupees (\$177 billion). The share of HFIs was nearly 40%, with outstanding loans of Rs 5.6 trillion rupees (\$93 billion) (NHB 2016).

Toilets are an integral part of housing. A toilet loan can fit within the category of home improvement. Given the widespread reach of HFIs, with over 80 listed with the National Housing Bank (NHB) for refinance, the scope for introducing sanitation loans is considerable. However, HFIs have daunting mortgage requirements, and special lending terms will be needed for small toilet loans. Involvement of HFIs in lending for building toilets in urban areas is also constrained by the policy regime related to building regulations and

³In September 2015, Disha Microfin Private Ltd., Equitas Holdings Pvt. Limited, ESAF Microfinance and Investments Private Ltd., Janalakshmi Financial Services Private Limited, RGVN (North East) Microfinance Limited, Suryoday Micro Finance Private Ltd., Ujjivan Financial Services Private Ltd. and Utkarsh Micro Finance Private Ltd, were given permission to become small finance bank.

approvals. In many states, infrastructure services such as water supply and sanitation can be provided only in notified areas because providing such services may de facto grant tenure rights to non-notified slums. This constraint can be easily overcome by delinking service provision from tenure rights through special resolutions, as the state or local governments can generally override the provision (as is being done under the SBM in many states).

Commercial banks can include all their sanitation loans to households and to SHGs or MFIs, as priority-sector lending. Also, the new financial inclusion scheme, Pradhan Mantri Jan Dhan Yojana, which entitles every family to have a bank account, can make it easier to reach the right groups for sanitation loans

Even in non-slum areas, addition of toilets to existing houses often entails a long-drawn process of approval by the local authority. This is often expensive for many households because they are required to submit the drawings of existing houses approved earlier. Hence many such additions and toilet construction are 'informal' (i.e. without proper approvals). The process of approval for toilet construction needs to be made simpler, separating it from the usual process for approval of buildings.

10.4.3 Commercial banks Possibly, the largest source of funding for sanitation can be commercial banks, which can provide loans to households and SHGs. The revised guidelines for PSL released in July 2015 clearly recognize 'sanitation facilities including construction or refurbishment of household toilets' (RBI 2015). The guidelines also include 'bank credit to MFIs extended for on-lending to individuals and also to members of SHGs/JLGs for water and sanitation facilities as eligible' for categorization as priority sector under Social Infrastructure. Bank loans up to 50 million rupees for each borrower are included for building social infrastructure for various activities, namely schools, health care facilities, drinking-water facilities, and sanitation facilities including construction or refurbishment of household toilets and household-level improvements related to water

in habitations from Tier 2 (population 50 000 – 99 999) to Tier 6 (population less than 5000), thus effectively encompassing all habitations with population below 0.1 million in 2011 (RBI 2017).

Loans for toilets are likely to range from Rs 15 000 to Rs 35 000, and because SHGs are categorized as weaker sections, loans can also be included under that category for priority lending. This implies that it will be possible for banks to include all their sanitation loans to households and to SHGs or MFIs as PSL. Some of the new banks such as the IDFC Bank and Bandhan Bank are keen to have low-income portfolios, especially in new geographies.

With the inclusion of sanitation in the new PSL guidelines and given the very high priority placed on sanitation by the Government of India, it would be useful to encourage and support banks to provide loans for household sanitation. These loans are, however, new for most banks, and most banks are not inclined to advance such loans. The new financial inclusion scheme, namely Pradhan Mantri Jan Dhan Yojana, which entitles every family to have a bank account, can make it easier to reach the right groups for sanitation loans. It is in this context that it would be useful to explore facilitators such as banking correspondents and payment banks to support the other banks in extending such loans. The SHG–Bank Linkage Programme (SBLP) can also play an important role. In this context, facilitators such as Mahila Arthik Vikas Mahamandal (MAVIM, a corporation for economic development of women) in Mumbai (Maharashtra) or Kudumbashree in Thiruvananthapuram (Kerala) can be important players.

The guidelines by the Reserve Bank of India (RBI) for PSL do not stipulate a minimum requirement for sanitation as for agriculture and other sectors, which will encourage banks to provide loans for sanitation. For example, even if 1% of the PSL fund is earmarked annually for sanitation, it would bring in about 300 billion rupees every year, sufficient to meet the entire country's needs to finance sanitation (CEPT University 2016).

10.4.4 Urban credit cooperative societies and urban cooperative banks Urban cooperative banks (UCBs) had their genesis in urban credit cooperative societies (UCCS), which collect small amounts of money from individuals, thereby encouraging the habit to save, and use the collections for providing credit to small

businessmen and other individuals when required. In the nineteenth century, urban cooperative banking movement was launched in India after the success of the cooperative movement in Britain and in Germany. The Cooperative Credit Societies Act, 1906, gave a real push to the movement. Urban cooperative credit societies were initially organized on a community basis to meet consumption-oriented credit needs of their members. From their origin until today, such societies have mobilized savings from low-income urban groups and provided credit to their members. These societies are regulated by the Registrar of Societies at the state government level (NCUI 2012).

An urban cooperative bank is defined as a primary cooperative bank located in an urban and semi-urban area with a paid-up share capital of not less than 0.1 million rupees and which does admit any other cooperative society as a member. Such UCBs are primary credit providers in the sense that they perform the role of a primary lending unit in the credit hierarchy. The thrust of UCBs, historically, has been to mobilize savings from the middle- and low-income urban groups and offer credit to their members, many of which belong to the economically weaker sections. (More information on cooperative banks is available at the website of the RBI at https://www.rbi.org.in/scripts/fun_urban.aspx).

A number of UCBs of different sizes are spread across many states, although only five states account for approximately 79% of them: Andhra Pradesh, Gujarat,

Karnataka, Maharashtra, and Tamil Nadu. Urban cooperative banks were originally regulated by state governments but subsequently, in 1966, cooperative banks with paid-up share capital and reserves of 0.1 million rupees or more were brought under the Banking Regulation Act, 1949. However, regulation and supervision by the RBI was restricted to mobilization of deposits, provision of loans, investments required to maintain the statutory liquidity, and other banking functions. The remaining functions of the UCBs were governed by the Multi-State Cooperative Societies Act, 2002 (for UCBs operating across states) or the cooperative societies act of the state in which the UCB was registered. The multiplicity in regulation led to problems in performance, and the RBI has since encouraged consolidation of the sector. By the end 2015/16, India's cooperative banking sector comprised 1574 UCBs.

From the perspective of providing sanitation credit, UCBs and UCCSs can play an important role in financial inclusion. A large number of their borrowers are people of small means, such as traders, artisans, street vendors, and self-employed technicians such as carpenters and mechanics, and may also constitute the target segment for sanitation credit. **Box 10.3** provides an example of sanitation loans by a UCB and a UCCS in small towns in Maharashtra.

10.4.5 Corporate social responsibility The Companies Act, 2013 (CA, 2013), and with it the Companies Social Responsibility Policy Rules, 2014, were approved by

Box 10. 3: Sanitation loans by an urban cooperative bank and a society in Maharashtra

In Wai, about 75 km from Pune, self-help groups were encouraged to identify potential applicants for a programme to build toilets. As a result of this effort, three women applied to the Wai Municipal Council for a subsidy under the Swachh Maharashtra Mission. All the three applications were approved, and the first instalment (Rs 6000) of the subsidy released. To raise the remaining amount required for construction, the women were supported in approaching the Wai Urban Cooperative Bank. Each of the three borrowed Rs 20 000 from the bank at an interest rate of 11% for 1 year. They served as guarantors of one another, and the bank asked for no other collateral. The toilets were built and are being used. One applicant has already repaid the entire loan amount and the other two are paying the instalments regularly.

In Pathri, a town with a population of 45 000, in Parbhani district, over 100 members of a women's credit society, namely Kranti Jyoti Savitribai Fule Mahila Nagri Sahakari Credit Society, obtained loans to build toilets. The members of the society played a major role in creating awareness about toilets and provided loans to interested members. The loan were for Rs 15 000 – 25 000 for 18–24 months.

Source: CEPT University 2016

the parliament and were effective from 1 April 2014. Most important, the act included sanitation as a mandatory CSR activity by the Ministry of Corporate Affairs (notification dated 24 February 2014 by the Government of India). The Companies Act makes it mandatory for large companies to spend 2% of their three-year average annual profit on discharging their CSR. This landmark step makes India one of the first nations to make spending on social welfare a part of company law.

The act makes new models of social engagement possible and is expected to improve the pool and quality of funding received from the corporate sector. For example, CSR funds can be used not only to support NGOs but also to set up or assist business ventures involving social sanitation. Furthermore, CSR funds do not have to be in the form of the traditional grant; to improve their impact and potential efficiency, CSR funds can also be disseminated in the form of results-based grants or social impact bonds.

About 8000 companies, including the top 100 companies, across several sectors, fall under the act's ambit, generating an estimated 120–150 billion rupees (up to \$2 billion) in CSR spending annually. However, the current spending on sanitation through CSR is very low, estimated at a median value of 45 million rupees by the large corporate sector, or no more than 4–5 billion annually (Samhita 2016).

In 2014, the Government of India set up the Swachh Bharat Kosh (SWK), a fund that would be used for building toilets in schools in rural and urban areas. The fund was set up to attract CSR funds and contributions from individuals and philanthropists to achieve the objective of the SBM. However, total contributions to the fund so far are only about 1 billion rupees. The major contributors to the fund are public-sector companies; the private sector has mainly stayed away.

10.4.6 Social impact investment Investors in social impact have emerged globally, who accept lower returns on capital and look to maximize the impact of their philanthropic engagements. The Global Impact Investing Network (GIIN) estimated that 'potential investment by impact investors over the next ten years could be between \$400 billion and \$1 trillion' (Koh, Karamchandani, and Katz 2012). A survey by JP Morgan Social Finance and GIIN found that \$8 billion

was committed in 2012 and that impact investors had planned to commit another \$9 billion in 2013 (Saltuk et al. 2013).

Although social impact investment is at a nascent stage in India, the signs are promising: a three-year debt fund by the HDFC Mutual Fund recently mobilized more than 2.5 billion rupees (about \$40 million) for cancer cure in a joint initiative with the Indian Cancer Society. Also, the first development impact bond (DIB) in India was launched in Rajasthan for girls' education (Perakis 2014). Such funds are yet to be tried out for the sanitation sector in India. A framework for a development impact fund for sanitation in India was proposed by CEPT University, which was discussed at a round table organized by the National Housing Bank (CEPT University 2014). The proposal needs to be reconsidered by, and can be explored with, such agencies as Small Industries Development Bank of India (SIDBI) and the National Bank for Agriculture and Rural Development (NABARD).

10.4.7 Crowdfunding Crowdfunding is soliciting small amounts of fund from various investors through a web-based platform or social networking sites for a specific project, business, or social cause. Such funding is typically divided into categories, namely donations, rewards, peer-to-peer lending, and equity-based. Donation crowdfunding involves funding for social, artistic, or philanthropic purpose without any reward or return on funds. Reward crowdfunding offers the investors some existing or future tangible rewards such as consumer products and membership benefits as a consideration. In peer-to-peer lending, an online platform matches lenders with borrowers to provide unsecured loans at such interest rates as determined by the platform, and equity-based crowdfunding seeks funds from investors for early-stage companies in lieu of equity stakes through an online platform (PSA Legal Counsellors).

The idea of crowdfunding is not new to India: many social and religious functions at the community level are celebrated through crowdfunding. The concept of online crowdfunding, however, is new to the country. Crowdfunding is a relatively new financing mechanism that mobilizes funds from large number of people through Internet-based platforms and has transformed fundraising in many positive ways. With increasing access to the Internet, social media,

and awareness amongst people, the popularity of crowdfunding has soared and it has emerged as a multibillion-dollar global industry (World Bank 2013).

By the end of 2016, there were more than 1250 crowdfunding platforms across the globe. The amount raised through various crowdfunding platforms increased from \$1.5 billion in 2011 to \$16.2 billion in 2014, and within a span of one year, that is by 2015, this figure jumped to an astounding sum of \$34.44 billion. Asian market is the fastest growing geography with a growth rate of 210%. Many global platforms such as Indiegogo, Spacehive, Akvo, and Kiva as well as a few platforms from India such as Milaap and BitGiving mobilize loans and donations for local projects such as civic projects and social causes such as health, education, water, and sanitation.

Crowdfunding is a new and upcoming way to finance sanitation projects, but the concept is at a nascent stage in India. At present, only four crowdfunding platforms in India have mobilized funds for sanitation. The track record and reputation of the agencies in implementing similar projects and ensuring accountability in project delivery are crucial.

Milaap, a social enterprise based in Bangalore, launched an online micro-lending platform in June 2010 and is India's leading crowdfunding platform for personal and social causes. Up to April 2017, Milaap had successfully disbursed 820 million rupees with a repayment rate of 98.97%. The total number of loans was 74 125, impacting more than 0.3 million lives. Milaap enables people to give household loans for getting water connections or construction of toilets or renovation of toilets for individual households in rural and semi-urban areas. Milaap also funds schools catering to low-income communities to build additional and separate restrooms for boys and girls, and more than 6000 sanitation loans have been raised so far through the platform.

However, crowdfunding industry is at a nascent stage in India. The amount raised through crowdfunding in India in 2015 was only \$5.1 million, which is less than 0.02% of the entire funds raised through crowdfunding worldwide. At present, only four crowdfunding

platforms in India have mobilized funds for sanitation. Most of these funds were mobilized for MFIs or target beneficiaries. Donors (or investors as the case may be) look for credibility of the proposer. The track record and reputation of the agencies in implementing similar projects and ensuring accountability in project delivery are crucial. Donors also look for the potential impact of the investment on larger populations. An organization, the National Crowd Funding Association (NCFA) of India, has already been established to promote crowdfunding in the country; NCFA's mission is to support, educate, and establish the Indian crowdfunding market.

10.5 Policy support and the way forward

Given the ambitious target to make India ODF by 2019, it is clear that greater access to sanitation finance is crucial if the target is to be achieved. This chapter has highlighted a range of potential financial institutions that can provide sanitation finance. Discussions with financial intermediaries suggest that availability of funds for sanitation credit is not a major constraint—the major concerns relate to demand creation, reduction in the costs incurred by lenders, and perceptions of credit risk.

Demand for sanitation finance can be mobilized through support for awareness creation and aggregation of customers. For example, Grameen Koota (GK), a non-banking MFI, has used its own NGO, the Navya Disha Trust, for creating awareness amongst target customers to promote demand for sanitation credit, which is then met by loans from GK or other sources. GK and a few other MFIs have used technical assistance from Water.org to build awareness and create demand for sanitation credit. State government institutions such as MAVIM in Maharashtra, Tamil Nadu Corporation for Development of women (TNCDW) in Tamil Nadu, Kudumbashree in Kerala, Mission for Elimination of Poverty in Municipal Areas (MPEMA) in Telangana, and Society for Elimination of Rural Poverty (SERP) in Andhra Pradesh can also play an important role in creating awareness among SHGs and facilitating aggregation of customers. If some incentive is offered to banking correspondents and payment banks for bringing the debtors and the creditors together and thus being 'loan originators', as in the case of the Pradhan Mantri Awas Yojana (PMAY), more sanitation

loans can be disbursed.

More action is also needed on the policy front. Under the RBI regulations, banks need to lend 40% of their adjusted net bank credit (ANBC) to the priority sector, and the RBI guidelines for PSL in the agriculture sector stipulate 18% of the ANBC or credit equivalent of off-balance sheet exposure, whichever is higher, 7.5% of which is reserved for micro enterprises and 10% for advances to weaker sections. Water and sanitation loans come under another category. Reserving at least 1% of the ANBC for water and sanitation credit under PSL may give a fillip to this market and encourage banks to focus on sanitation.

At local level, suitable policies are needed related to building permissions. Often, approved plans for old buildings where toilets are needed are not available. Also, for some properties, land titles may not be clear. Toilet construction needs to be delinked from the normal process of approval for building plans.

For example, in both Gujarat and Maharashtra, no building approval is necessary for constructing toilets, and government funding for toilets is provided to all households regardless of tenure and without any special building permission, as stipulated in the SBM guidelines.

Campaigns for behavioural change are often considered essential to achieve the ambitious sanitation targets sustainably. However, it is equally important to pair such campaigns with a local ecosystem backed by demand-led schemes. Funding, although only one part of such an ecosystem, can play a major role in mobilizing communities and unlocking demand. If used well, some of the innovative mechanisms such as social impact investing and crowdfunding can also help to improve outcomes and to ensure greater accountability. Appropriate national and local mechanisms for city sanitation funds can help to capture different sources of funds and to support the development of the ecosystem.

CHAPTER - II

RECOMMENDATIONS

Progress in urban sanitation has been faster during the last three years under the Swachh Bharat Mission Urban (SBM U). The number of toilets – individual household latrines (IHHLs), community toilets (CTs), and public toilets (PTs) – has increased; the proportion of people resorting to open defecation (OD) in urban India has decreased from 23.5% in 2000 to 7.4% in 2015 (*JMP 2017*); door-to-door collection of solid waste now covers 43 000 wards (2016), up from 34 000 in 2015/16; more and more of waste is now processed, and the infrastructure to treat waste too is more extensive; and public awareness of, and sensitivity to, cleanliness in the country are now far greater. As of 2nd October 2017, the union territory of Chandigarh, and all towns and cities in Madhya Pradesh and Chhattisgarh, have been certified as ODF and Andhra Pradesh, Gujarat, Haryana, Jharkhand, and Maharashtra have declared their urban areas as ODF. Many of the urban local bodies (ULBs) have taken up innovative initiatives such as setting up an integrated command and control centre (the Smart City Centre, or SMAC) in Surat, GPS-based systems to track the collection of waste in a majority of cities with population above 1 million, and information- and communication-technology-based systems to mark attendance in 232 cities out of the 434 AMRUT cities surveyed in 2017. Several innovative efforts at promoting desirable changes in behaviour such as the *Roko-Toko* initiative in Indore to dissuade people from OD, the I-Clean initiative in Bhopal, and scheme to buy back dry waste, especially, milk pouches, in Durg, Gangtok, etc.

Although the SBM (U) has launched such unprecedented initiatives and sanitation is taking the form of a *jan andolan* (people's movement) for the first time, the mission continues to exert constant pressure on ULBs to meet the targets set by the state government. Most ULBs have very limited institutional, financial, and staff capacity to improve the provision of sanitation services and septage management. Public funding for septage management is inadequate for its proper management, and the ULBs are dependent on external assistance, which results in lack of ownership and low revenues to the

ULBs. A holistic and integrated approach to sanitation encompassing management of solid waste, septage, and faecal sludge and powered by effective leadership are the key to sustaining sanitation in cities.

Based on the in-depth review of past and current policies, programmes, and progress under the sanitation mission, regional-level stakeholder consultation workshops, analysis of the data from the management information systems for the SBM (U), and the results of Swachh Survekshan 2016 and 2017, this chapter presents five key recommendations from the study to develop an integrated and improved system for water and sanitation management in urban areas integrated with the overall plans for the country's development in the long run. These five key recommendations are given below.

- 11.1 Improve the regulatory mechanism
- 11.2 Enhance capacities of ULBs
- 11.3 Undertake strategic planning and implementation of sectoral programmes
- 11.4 Foster an enabling environment for financing
- 11.5 Improve data management, monitoring, and review

11.1 Improve the regulatory mechanisms

The Central Pollution Control Board (CPCB) and the state pollution control boards notify norms for the quality of effluent from sewage treatment plants (STPs). On the same lines, the regulations on the management of faecal sludge have to be implemented by ULBs by ensuring that septic tanks are designed to conform to the appropriate standards and also by ensuring regular and safe de-sludging. However, ULBs lack the requisite capacity to enforce the by-laws related to building plans that mandate the construction of septic tanks that meet the prescribed norms and standards. In several states, ULBs are responsible only for the maintenance of sanitation infrastructure, and depend on higher levels of state/central government's assistance for undertaking any

large-scale improvements in service delivery.

One example of the policy of enforcing sustainable management of waste is the introduction of co-processing under the Solid Waste Management Rules (2016) by the Government of India. Co-processing of waste stipulates that industrial units within 100 km from plants that produce refuse-derived fuel (RDF) replace at least 5% of their fuel requirements with RDF within six months of the notification of such a stipulation. Such rules encourage sustainable waste management.

Although the National Urban Sanitation Policy (NUSP) aimed at total elimination of OD and safe disposal of all human excreta also made it mandatory for each city to have a clear-cut sanitation plan and each state to have a clear-cut sanitation strategy, no mechanism exists to monitor the implementation of these plans and strategies.

The National Policy on Faecal Sludge and Septage Management (FSSM) (MoUD 2017) recognizes the importance of safe collection, treatment, and disposal of all human waste, and cities are encouraged to adopt innovative measures for managing faecal sludge through the AMRUT mission, which focuses on provision of sewerage facilities and septage management in 500 cities across the country. States are urged to include plans for FSSM in the state-level plans for implementing AMRUT. However, it is necessary to ensure that stringent regulatory and monitoring mechanisms are in place to bring about the desired improvements. The lessons learnt from the success of the Devanahalli municipality in managing faecal sludge are worth replicating and offer tremendous opportunities.

The case study of successful cities showed that cities such as Bhopal and Indore, which had secured only low rankings in 2014 and also in 2016 as part of the Swachh Survekshan, did identify the reasons for their low rankings and worked systematically to improve upon them to rank among the top five cleanest cities in 2017. Notable among many of the initiatives in Indore is the mechanism of levying high fines, banning plastics, and imposing fines even on vehicles entering the city carrying plastic bags for sale. The examination of factors that led to the success of the best-performing cities revealed the importance of strengthening effective synergies between the

government and the NGOs in implementing sanitation interventions and ensuring that they are sustained. More specific recommendations related to improving the regulatory mechanisms are as follows.

- 11.1.1 Establish a legal framework with principles and norms to guide the implementation of safe and sustainable urban sanitation.
- 11.1.2 Devolve power to ULBs and introduce stringent regulatory measures in scientific management of solid waste, faecal sludge, and septage for strict enforcement of the 'polluter-pays' principle.
- 11.1.3 Incentivize scientific management of faecal sludge and promote entrepreneurship in this area.
- 11.1.4 Improve synergies between the government and NGOs in implementing water and sanitation schemes in ULBs.

11.2 Enhance capacities of ULBs

Upgrading of the current capacity of the ULBs with latest technology and knowledge, making such capacity-building activities mandatory, and linking them with career advancement would help in integrating capacity building with rest of the development plans of cities, thereby closing the gap in capacity enhancement efforts to attain the goals of the SBM (U).

One of the key determinants of success in improved sanitation has been the improvement in the capacities of key institutions involved in smooth functioning of the urban water and sanitation sector, and it is essential to use the funds set aside for capacity building by the SBM (U), amounting to 3% of the total allocation.

The success story of Bangladesh in eliminating OD highlights the importance of strengthening the communities at the grass-roots level. Thus generating awareness and capacity building through training on maintenance of both household and community toilets is crucial for ensuring that household, community, and public toilets are used. Specific recommendations related to capacity enhancement are as follows.

- 11.2.1 Educate, motivate, and mobilize households and communities towards enhanced engagement in planning and implementing sanitation services and in the operation and

maintenance of IHHLs, CTs, and PTs.

- 11.2.2 Develop training and capacity-enhancement programmes and refresher courses covering all aspects of sustainable sanitation for the staff of ULBs.
- 11.2.3 Improve the capacity of ULB officials to undertake preventative maintenance of sanitation infrastructure networks.
- 11.2.4 Enhance institutional, financial, and human-resource capacities of ULBs for improved management of faecal sludge and septage.
- 11.2.5 Impart the required skills to those engaged in plumbing, mechanical de-sludging of septic tanks or soak-pits, and transporting the sludge and combine the training with offers of immediate placement
- 11.2.6 Enhance the capacities of NGOs and other partners to engage themselves effectively in the entire water, sanitation, and hygiene (WASH) sector.

11.3 Undertake strategic planning and implementation of sectoral programmes

An integrated sanitation plan is a prerequisite to improved sanitation. Such a plan guides the overall implementation and brings together different schemes and programmes. The city sanitation plans (CSPs) are to include detailed plans including those covering domestic wastewater services, solid waste management, and micro drainage services, backed by exhaustive strategies to meet the goals of the SBM (U). However, many cities are yet to adopt and adhere to such planning, and in a number of cities the implementation of infrastructure projects depends on timely availability of funds rather than on the requirements of people.

The city sanitation plans stipulate that areas inhabited by economically backward communities be accorded priority. However, most of the poor and the marginalized population live along the margins of cities and in peri-urban areas, which are marked by wide gaps in connectivity and poor condition of the sewerage network (if it exists at all). Similarly, the CSPs are to encourage the development of community-

based sanitation services and create opportunities and incentives for private-sector initiatives in developing sanitation services. However, only a few cities have incorporated these aspects into their plans; in most cities, the plans are limited to providing toilets.

Access to potable water is another gap in the peri-urban areas, which are inadequately served by piped water supply. This gap between demand and supply is being met by urban small water enterprises (USWE). These decentralized sources can supply safe drinking water and thereby fill the wide gap until universal supply of piped water becomes a reality. Such USWEs can reach up to 35 million people, or 50% of the slum dwellers, offering them sustainable access to safe water.

A few specific recommendations related to planning and implementation are as follows.

- 11.3.1 Streamline programme design, sequencing, and phasing of sewerage projects in ULBs.
- 11.3.2 Promote sustainable sewage treatment systems by providing an appropriate mix of centralized and decentralized processes based on local requirements and conditions.
- 11.3.3 Promote the engagement of the corporate sector and provide an enabling environment for implementing innovative replicable models of supplying safe drinking water, improved sanitation, and septage management in urban areas.
- 11.3.4 Encourage decentralized planning with community-based monitoring systems, especially in low-income urban settlements, to ensure equitable and inclusive planning and implementation.
- 11.3.5 Provide a conducive enabling environment for decentralized USWE to ensure access to safe drinking water for a larger proportion of population.

11.4 Foster an enabling environment for financing

The funding requirements for laying sewerage networks and ensuring proper treatment and safe disposal of waste water are immense, far greater than the allocations—which is why ULBs need to explore revenues from alternate sources such as

from sale of treated waste water to industries in Surat Municipal Corporation) to help in bridging the gap between the demand and supply of funds.

Although the SBM (U) is an improvement over the earlier sanitation programmes, it continues to be supply oriented and has not given enough emphasis to generating demand by supporting an eco-system of loans to the poor that would be sustainable. Such sanitation loans provided by microfinancing institutions (MFIs) are operational at the micro level in some cities such as Tiruchirappalli and Ahmedabad.

Other important sources of loans are housing finance institutions, commercial banks (for loans to households), self-help groups, urban cooperative banks and urban credit cooperative societies, funds earmarked for activities related to discharging CSR, investors seeking social impact, and crowdfunding through web-based platforms or social networking sites supporting the cause of proper sanitation. The *Swachh Bharat Kosh*, set up by the central government, has attracted contributions, in the form of funds set aside for CSR, from a number of private organizations. To increase the role of corporate houses in the WASH sector, it is important to create supporting ecosystems that help to sensitize corporate houses to the need for sanitation services. Cities could partner with corporate houses for CSR activities directly through the SWACHH portal <<https://swachh.org.in>>. Some specific recommendations to foster an enabling environment for financing are as follows.

- 11.4.1 Encourage ULBs to implement self-financed projects (for example, Surat Municipal Corporation's energy generation and sale of recycled water from a tertiary treatment plant).
- 11.4.2 Extend policy support for sanitation financing; for example, a policy of setting aside at least 1% of the adjusted net bank credit for water and sanitation credit under priority sector lending (PSL) to encourage banks to provide loans for sanitation.
- 11.4.3 Include appropriate national and local sources of funds in CSPs and allocation of funds for innovative and sustainable sanitation models.

11.5 Improve data management, monitoring, and review

Accurate and accessible data is crucial to strategic planning to develop sanitation services and for managing them efficiently. Data management is a systemic issue; if undertaken systematically, it helps cities to take informed decisions related to the choice of households to be connected to a sewer network or to schedule de-sludging of toilets that are not connected to such a network but use on-site sanitation systems instead. Such decisions arrived at by using data would not only result in efficient delivery of service but also prove more effective in revenue collection. Although data on toilet coverage are updated hourly under the SBM, several vital data pertaining to sanitation, such as the extent of door-to-door collection of waste, user charges, and capacities of waste-processing plants are yet to be collected systematically at the central level and are not accessible for use. A few specific measures related to the management, monitoring, and review of data are as follows.

11.5.1 Improve the collection and management of data on access to water and sanitation services including collection and disposal of septage and on networks related to water supply and collection, transport, and processing of waste.

11.5.2 Review the monitoring mechanisms to emphasize quality over quantity in reporting progress.

Improving the performance of urban water and sanitation sector in India is critical to meeting the ever-increasing needs of the country's urban population. The sectoral mindset also needs to change from the single-minded pursuit of creating physical assets to issues of equity, quality of service delivery, and sustainability. Unless there is a perceptible improvement in clean environment and treatment and disposal of wastes and unless such improvement is captured by a national-level survey that gives appropriate weighting to quality, lasting improvements will take a long time. This report makes an attempt to promote the notion that becoming ODF is not the end but an important milestone in the journey to make India clean and green.

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ANNEXURE

National Stakeholder Consultation Workshop	5th December 2016
Regional Stakeholder Consultation Workshop	Southern region on 14th October 2015 Eastern region on 24th November 2015 Northern and North-eastern regions on 12th January 2016 Western region on 18th February 2016
Cities	32 Small, medium and large metropolitan cities all across India
States	Pan India
No of Participants	158
Profile of Participants	Government officials from MoHUA, State Governments, City Commissioners, and experts from multilateral organizations, academic and research organizations, NGOs, CSOs
Key deliverables	<ul style="list-style-type: none"> • Policy Brief titled: Swachh Bharat Mission (Urban) towards cleaning India-A policy perspective (Published) • Discussion Paper titled: Faecal Sludge Management in urban India: Policies, Practices and possibilities • Newspaper articles in Economic Times on World Toilet Day (2015), IBN Live (on World Toilet Day 2015), The Goan (World Toilet Day 2016), World Water Day (2016), World Environment Day 2016, Banega Swachh India (2016)
Impact	<ul style="list-style-type: none"> • Important policy and implementation recommendations for the State and National Governments • The framework used in the report would be useful in developing the City Sanitation Plan or measuring its progress • The Policy Brief and Discussion Paper were dissemination among policy makers and sectoral experts to engage in a dialogue on critical issues related to Water and Sanitation • Articles in leading dailies dissemination of knowledge and information among citizens
Key outcome	<ul style="list-style-type: none"> • The recommendations from the Policy Brief and Discussion Paper were well received among the policy makers • Collaboration/networking with WASH (Urban) sector stakeholders includes, exchange of knowledge, data on various sectoral activities • Knowledge dissemination on critical gap areas in Urban WASH among stakeholders • International platform for agenda setting for Urban WASH in India • Strengthening international collaboration and sharing of best practices



About this Report

The *State of Urban Water and Sanitation in India* report emerges from a three-year (2014–2017) collaborative project funded by the USAID and undertaken by TERI University, Coca-Cola, and TERI, titled 'Strengthening Water and Sanitation in Urban Settings of India'. The report traces India's journey in the urban water and sanitation sector, aims to be a comprehensive collection and analysis of past and current policies and programmes, and provides insights into the reasons for several gaps that become apparent when the sector is viewed holistically.

The project has initiated dialogues on many fronts across disciplines and stakeholder groups. A series of stakeholders' consultation workshops were held at the regional level and at the national level as part of the study, with participation from diverse groups, which helped to shape this report.

The report is divided into three broad sections: the section on policies attempts not only to highlight supply–demand gaps, challenges, and factors that contributed to success but also to understand performance through the lens of policy and governance at national and state levels; that on progress traces India's progress in the sector, especially under the Swachh Bharat Mission (Urban), which is assessed at the national, state, and city levels; and the concluding section offers solutions.

The progress India is making under the Swachh Bharat Mission would extend far beyond achieving Sustainable Development Goal (SDG) 6, 'Clean water and sanitation', by contributing to many other SDGs as well: 'No poverty' (SDG 1), 'No hunger' (SDG 2), 'Good health and well-being' (SDG 3), 'Quality education' (SDG 4), 'Gender equality' (SDG 5), and 'Sustainable cities and communities' (SDG 11). This publication is a modest but important step in recording India's journey and strengthening water and sanitation services in its cities.



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