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List of Abbreviations

BCM	Billion Cubic Meters
CAPEX	Capital Expenditure
CBO	Community Based Organizations
CPCB	Central Pollution Control Board
CPHEEO	Central Public Health and Environmental Engineering Organization
CSP	City Sanitation Plan
CTB	Community Toilet Block
GoMP	Government of Madhya Pradesh
HPEC	High Powered Expert Committee
HSC	House Service Connection
IUSP	Integrated Urban Sanitation Program
JNNURM	Jawaharlal Nehru National urban Renewal Mission
M&E	Monitoring and Evaluation
MoEF	Ministry of Environment and Forests
MoU	Memorandum of Understanding
MoUD	Ministry of Urban Development
MoHUPA	Ministry of Housing & Poverty Alleviation
MoWR	Ministry of Water Resources
MPSV	Madhya Pradesh State Sanitation Vision
NGO	Nongovernmental Organizations
NRCP	National River Conservation Program
NUSP	National Urban Sanitation Policy
O&M	Operation and Maintenance
PPP	Public Private Partnership
SHG	Self-help Groups
STP	Sewage Treatment Plant
TA	Technical Assistance
TNUDP	Tamil Nadu Urban Development Program
ULB	Urban Local Body
WASH	Water Sanitation and Hygiene
WSP	Water and Sanitation Program

Executive Summary

This synthesis report details the process, outputs and intermediate outcomes of the World Bank's Water and Sanitation Program (WSP) Technical Assistance (TA) to Support Government of India for implementation of the National Urban Sanitation Policy (P131963).

While access to sanitation in urban India is high, the collection, treatment and disposal of wastewater and septage (from on-site installations) is very poor and needs considerable improvement. Till date, network-based systems have been the predominant focus of Government interventions, however the treatment capacity created (30% of requirements in urban centers with population above 50,000) is underused and only about 20% of sewage generated in urban India is actually treated before disposal. Inadequate availability of funds for operation and maintenance, shortage of skilled manpower and regular staff and low number of house service connections (HSC) in the sewer network have also contributed to this underperformance. Attention to full-cycle management of on-site sanitation, including septage management, is sorely missing in the country despite 47% of urban households relying on on-site sanitation systems. This results in significant environmental and health impacts which disproportionately affect the urban poor.

Adoption of the National Urban Sanitation Policy (NUSP) in 2008 along with investments made through schemes sponsored by the Government of India and various State Governments have brought about marginal improvements in sanitation in cities and towns. However there does not exist a coherent planning and implementation framework in the urban centers, taking note of the NUSP and incorporating necessary elements for managing safely the full cycle of sanitation and cognisance of the needs of the urban poor, resulting in progressive initiatives not getting main-streamed.

The objective of this TA was to (i) strengthen urban sanitation services and target the urban poor by development of strategies for regulation, funds allocation, improved accountability mechanisms and implementation of inclusive sanitation policies at national level and in at least five states, with two of these low-income states (LIS). This was to be supplemented with (ii) enabling design and use of improved performance monitoring systems by Government of India, 3 states and 300 urban local bodies by 2015, and (iii) strengthen capacity of local urban government institutions to provide improved – inclusive and sustainable – sanitation services for all. This TA provides the building blocks for sustainable sanitation improvements which are being adopted and implemented as part of another TA (P131967) in Madhya Pradesh and Tripura to pilot and operationalize City Sanitation Plans (CSPs) towards outcome oriented sector improvements.

The areas addressed in this TA relate to the following specific goals of the NUSP:

1. **Open Defecation Free Cities**, achieving open defecation free Cities by promoting community-planned and managed toilets wherever necessary, for groups of households who have constraints of space, tenure or economic constraints in gaining access to individual facilities;
2. **Integrated City-Wide Sanitation**
    a. **Sanitary and safe disposal**, including **promoting proper functioning of network-based sewerage systems** and ensuring connections of households to them wherever possible; promoting recycling and reuse of wastewater and proper treatment; and **promoting proper disposal and treatment of sludge from on-site installations**

b. Proper o**peration and maintenance** of all sanitary installations

At the state level, the **TA supported five states in the adoption of the NUSP** of which four were LIS: The states of Maharashtra, West Bengal (LIS), Odisha (LIS) and Madhya Pradesh (LIS) were **supported in the development of state urban sanitation strategies**, while Tripura (LIS) which had already developed a state strategy was supported in the development of its septage management strategy going forward from its state strategy. The state sanitation strategies covered managing on-site sanitation, through provisioning access for the unserved and providing services along the full sanitation cycle (from safe collection to conveyance, treatment and disposal), while augmenting service facilities and service performance in wastewater management in existing and planned network systems. At the time of strategy formulation, there were clear funding lines available for the latter (through the national government programs), while funding lines for the former were expected to be activated in subsequent budgets. Subsequently, there has been delay (till date) in the formulation and announcement of new national government schemes (centrally sponsored schemes). While state sanitation strategies were developed in all the states, the Governments of Maharashtra, West Bengal and Odisha restricted themselves to implement only those items that had funding available from the national government schemes. Thus, some parts of the strategies got activated, without concomitant efforts on others. The other two state government, Madhya Pradesh and Tripura, have taken forward the strategy and are planning/implementing sanitation improvements with the financing provisions enabled through the state government or existing national government schemes which they had access to, thus implementing the state strategy as intended.

The TA had to **follow multiple strategies towards the goals** that it had set forth. While the states were assisted in the formulation of state sanitation strategies, further movement on this was deemed possible only where state political and administrative priorities recognizing sanitation for the urban poor were backed by state government budgetary commitments (Madhya Pradesh) or where the state identified potential financing channels (Tripura) that competed with other priorities. Thus, work on the sanitation strategy and later septage management moved forward beyond state strategy formulation in these two states (both low income states):

- Having developed an integrated urban sanitation program, the Government of Madhya Pradesh prepared a **state sanitation vision estimating the capital and operation and maintenance (O&M) estimates, prioritization and institutional framework to improve sanitation.** The Government has committed INR 4,080 million (US$ 66 million) for construction of individual, community and public toilets. A total of 187,511 individual toilets and 607 community toilets have been sanctioned of which a total of 50,000 individual toilets and 253 community toilets have been constructed.

- The state of **Tripura has developed and adopted the state septage management strategy**, which details investment estimates, institutional framework and implementation plan for septage management for all urban areas in the state. The Government of Tripura has also developed the detailed project report for one pilot demonstration project on septage management to be implemented with financial support from the Government of India. This project will provide key learnings and build capacity at the state and local levels to undertaken similar projects across the state.

At the central level, the **TA supported the Ministry of Urban Development (MoUD) as the nodal agency in coordinating planning of the urban sanitation sector** by a) developing integrated service delivery models

and incorporating alternate models for on-site fecal sludge management; b) improving the sustainability of existing network based solutions for sanitation service delivery; and c) improving performance monitoring through city ratings.

This was addressed by providing **support to the Central Government to evaluate alternate models for sanitation service delivery in the country**, apart from the solely network-based systems currently implemented in the country. Successful on-site sanitation models and the policy, financing, and institutional aspects were considered to develop relevant models for the country. The financing requirements for on-site sanitation management options was also estimated for the country.

The **TA further supported the Central Government to develop guidance material to address current inadequacies in the provisioning and management of sanitation infrastructure created** (largely sewerage infrastructure created under various Central and State Government schemes). The TA looked at **successful models of capital financing for sewerage projects** available from Tamil Nadu and the impact of this model in improving household connectivity to networks. The TA also **evaluated sewerage projects (through field visits, studies and analysis of available data in the public domain) in the country with successful O&M cost recovery models**, to identify best practices to operationalize and sustain the sanitation service delivery plans of various cities in the country. The TA further **assisted in development of the advisory on septage management**, which has been issued by the Central Government providing guidance to states and cities in developing septage management schemes. The septage management in urban India has been released as an advisory by the Govt. of India in January 2013 and the others will also be released as by guidance notes by the Govt.

To further the NUSP objectives, the following **guidance identifying best practices and demonstrating successful case studies from within India and other countries** notes were also developed – (i) Recycling and Reuse of Treated Wastewater and (ii) Community slum sanitation in India: A Practitioner's Guide.

All the advisory notes - on septage management, recycling and reuse of wastewater and capital financing and cost recovery in sewerage schemes and community slum sanitation - **provided guidance to national government and states on options for sanitation improvements based on national and international experience and best practices**. Key learnings (which also form part of the team's recommendations to Government agencies) presented in the various advisory and guidance notes relate to the following aspects:

- Investments for improving urban sanitation were estimated to amount to capital requirement of INR 5,193 billion (US $ 83.75 billion) and an operating expenditure requirement of INR 2,647 billion (US $ 42.69 billion) over the 2012-2032 period. About 30 percent of the investment is anticipated from the household sector.
- The note on wastewater recycling and reuse in urban India focuses on elucidating the economic benefits of wastewater recycling from the perspective of public spending. The key benefits of wastewater recycle and reuse include
    - Recycled wastewater can serve as an additional source of water
    - Provides an additional source of revenue for utilities
    - Recycling of nutrients through wastewater recycling
    - reduction in groundwater pumping requirement
- The note on capital financing and cost recovery options for sewerage schemes highlights successful financial management practices adopted by ULBs in India when implementing sewerage schemes. The key findings from this study are:

- **Public deposits** can be effectively used to meet a share of the capital funds required. In the absence of these public deposits, the loan amount would have to increase by an equivalent amount.
- In addition to the traditional avenues of cost recovery, other ways of meeting costs can be used such as **sale of treated water to industries** and **power generation at the treatment plants** that helps reduce energy costs which help to meet the cost of operations.

- The advisory on septage management discusses the approach required and options for the collection, transportation, treatment and disposal of septage, along with the need for regulation and monitoring by ULB/city utilities.

These **recommendations have provided guidance to national and state governments** to plan and sustain investments, and are **likely to be embedded in the design of new schemes of the government** (Smart cities and National River Conservation Program). Given that both the NUSP and the recently announced program (Swachh Bharat Mission) aiming to make the country open defecation free, have proposed community sanitation as an integral option to reaching this goal, the MoUD also plans to make practitioner's manual on slum sanitation guide available to states to help them in their planning and management of community sanitation facilities.

The TA also **supported the Central Government in the biennial rating of cities on sanitation indicators**. The approach and evaluation methodology was revised for the second round of city rating through consultations with the CPHEEO and the MoUD. The survey for the second round of ratings covering 476 cities is currently underway and is expected to be completed by April 2015.

To summarize, this TA contributed to the following:

Intermediate Outcomes	***Indicators****	***Results***
Urban WSS policy agreed by stakeholders and approved by cabinet (either gazetted as part of a national policy or as a stand alone policy)	1) Supporting the adoption of NUSP in at least 5 states by 2015 of which at least two would be in low income states.	**Achieved.** 4 states (Maharashtra, West Bengal, Odisha and Madhya Pradesh) supported to develop state sanitation strategies; 1 state of Tripura supported to develop septage management strategy.
	2) Policy and reform elements are also embedded in national funding programs (e.g. JNNURM, Five Year Plans).	**Partially Achieved** Elements of reforms flowing from the guidance notes (cost recovery principles) are being considered in new program formulations.

Intermediate Outcomes	*Indicators*[*]	*Results*
Government agency with clear mandate to lead and coordinate the policy development and planning of the urban WSS sector	Helping MoUD and MoHUPA to deepen sector engagement and strengthen advisory/ monitoring functions performed by them.	**Achieved.** The following advisory notes have been prepared as part of this TA: Financial Requirements of Urban Sanitation in India: An Exploratory Analysis; Septage management in urban India; Approaches to Capital Financing and Cost Recovery in Sewerage Schemes Implemented in India: Lessons Learned and Approaches for Future Schemes; Recycling and Reuse of Treated Wastewater; Community slum sanitation in India: A Practitioner's Guide.
Formal programmatic urban water and sanitation services coordinating mechanism with the government that involves all development partners	Development partner coordination being undertaken for specific programs - (e.g. City Sanitation Plans, Service Level Benchmarking). This coordination model is being adopted for other MoUD programs – expected to be formalised through a formation of a committee as a process to enable regular and frequent donor coordination through meetings (at least 5)	**Achieved.** Number of informal meetings were held with development partners while developing the septage management advisory. Have utilized this for various elements of UWSS programmatic approach
An annual review in place to monitor urban WSS performance and to set new targets and priorities/investment plans.	Annual review initiated through Service Level Benchmarking, and Sanitation Rating of Cities (biennial).	**Achieved.** The rating methodology has been revised and is being used in the 2nd round of rating of cities currently underway.

The TA **provided assistance to central government and the states in putting in place various elements identified as necessary for sector improvement**, including planning, provisioning and monitoring processes. The TA also **identified the need for the cities to see opportunities for financial recovery** of investments through reuse and recycle strategies, to strengthen the incentive for investment in sanitation improvements; and moved forward on this through identification of opportunities and highlighting best practices that have served this goal. Some of the recommendations of the TA are being considered for inclusion in the newer centrally sponsored schemes, such as the National River Conservation Program. Going forward, the TA is in the process of getting the guidance notes released as MoUD advisories and to embed a few key principles in scheme design of the state governments.

The sanitation strategies developed for the states of Madhya Pradesh and Tripura have provided a framework for sanitation improvements in the state. Future support would be well advised to build upon the current developments and harness the capacities and prioritization that has been achieved with these states. In future, these states and the cities therein are likely to accelerate their progress in implementing urban sanitation interventions, assisted by demonstration of improved sanitation and wastewater management through septage management systems, re-cycling/re-use and implementation of national advisories in these realms.

1 Background

India's urban population is witnessing rapid growth with United Nation's (UN) projections of the urban population reaching 590 million by 2030, which implies an addition of 10 million urban dwellers per year. While access to sanitation in urban India is high, the collection, treatment and disposal of wastewater and septage (from on-site installations) is very poor and needs considerable improvement. Less than a third of the wastewater generated is properly treated and disposed of, and no treatment exists for the septage generated from on-site facilities in the country. This results in significant environmental and health impacts which disproportionately affect the urban poor.

1.1 Status of sewage generation and treatment in India

Urban India is characterized by partial provision of sewerage networks in Indian cities (covering less than a third of households), high proportion of on-site sanitation systems (septic tank systems and pit latrines), serving about 47 per cent urban households (Census, 2011); with little or no treatment and poorly maintained public and community toilets.

Environmental pollution from untreated sewage and wastewater is widespread — the discharge of untreated sewage is responsible for contamination of 80% of fresh water resources in the country. Sanitation rating of 423 class-I cities done in 2009-10 by Ministry of Urban Development (MoUD) revealed that only 39 cities passed the water quality tests.

Sewage treatment capacity is 30% of what is required in India's cities and towns; only 200 of the 7900 cities/towns in India have even a partial sewerage network and even large cities have a significant share of on-site sanitation provision.

Existing treatment capacity (sewage and wastewater) is underused — capacity utilization is about 66% of existing sewage treatment facilities (Central Pollution Control Board (CPCB), 2013), indicating that only about 20% of sewage generated in urban India is treated before disposal. Household connectivity to networks is also a challenge (CPCB, 2013).

Performance of the existing wastewater treatment infrastructure also needs attention; as recent evaluations of existing treatment plants in the country presents a discouraging picture vis-à-vis the actual treatment performance of sewage treatment plants (STP), wherein an evaluation of 152 STPs constructed in the country under the National River Conservation Program (NRCP) found that 49 of 114 operational STPs[1] did not meet CPCB discharge standards for treated wastewater. Major challenges resulting in underperformance of STPs have been identified as:

- Increasing gap between requirement of sewage treatment infrastructure and actual pollution load being tackled due to continuous increase in population in towns and inadequate planning. While the availability of financial resources may not be a limiting constraint, inadequate and delayed planning, space constraint and difficulty in siting of land for wastewater infrastructure are significant challenges to address gaps in provisioning of sanitation infrastructure.

[1] Of 152 STPs evaluated, 9 were under construction, 29 were not operational and 49 were not meeting CPCB effluent discharge standards for biochemical oxygen demand (BOD).

- Delays in completion of schemes due to lack of inter-agency coordination at field level, delays in acquisition of land for STP and pumping stations, contractual problems, court cases, etc. leading to cost overruns.
- Shortage of skilled manpower and regular staff and inadequate funds for operation and maintenance (O&M) of the sewage treatment infrastructure. This is exacerbated by the reluctance of urban local bodies (ULB) to charge user fees and lack of a sustainable O&M financing plan for servicing the sewerage infrastructure created.
- Erratic/ non-availability of power supply for operation of operation of assets
- Under – utilization of STPs, in some cases, due to low house service connections (HSC) in the sewer network or absence of upstream systems such as branch sewers and house connections. This results from a misguided focus on just creation of asset without sufficient focus on the operation and maintenance of the asset.
- Lack of involvement of civil society in the programme, including lack of citizen engagement and support for completion of the project and connection with the network post commissioning.

1.2 Investment requirements to achieve universal sanitation

Cost variation between extending sewerage systems or other urban sanitation systems is significant — estimates to improve sanitation exclusively through sewerage systems over the next 20 years is INR 2,427 billion (US $ 39.14 billion) (2012 – 2031; Report on Indian Infrastructure and Services; High Powered Expert Committee (HPEC) 2011), greater than all the investments in urban sanitation during the different plan periods (total grants by Central Government on sewerage projects from 2006 – 2014 amounted to INR 192.3 billion (US $ 3.10 billion); INR 299.69 billion (US $ 4.83 billion) proposed under the Twelfth five year plan). This also implies a per capita investment of INR. 4,704 (US $ 75.87) or a household investment of INR 23,520 (US $ 379.35) (for a family of five).

It is important therefore to either source additional funds or better leverage the funds currently allocated to enhance the utilization of the same and rapidly enable a larger number of cities and towns to create and manage sanitation infrastructure. On the other hand, estimates of capital investments required for collection, treatment and disposal of septage (septic tank sludge) is about INR 6,000 /household, or about 25 percent of the cost of sewerage systems.

1.3 Government efforts to provide adequate sanitation

Various reform initiatives have been launched by central, state and local governments to address the service delivery shortfalls in urban water supply and sanitation. In 2005 an estimated 60 percent of the USD 20 billion under the Jawaharlal Nehru Urban Renewal Mission (JNNURM) was allocated to investments in urban water supply and sanitation (UWSS) services spread across 63 urban centres. Under this initiative, state and local governments were required to implement a set of reform conditions such as the decentralization of service delivery, improved accounting, recovery of operating costs and adoption of public private partnerships (PPP) in service delivery to achieve universal access to services, financial sustainability, transparency and accountability in service delivery and management.

Recognizing the need to improve urban sanitation, the MoUD in 2008 approved and adopted a National Urban Sanitation Policy (NUSP) with a vision to make “urban India clean, healthy and liveable and ensure

sustained public health and environmental outcomes for all their citizens with special focus on hygienic and affordable sanitation facilities for the urban poor and women." The specific goals of the policy are (i) awareness creation and behaviour change, (ii) open defecation free cities, (iii) integrated city wide planning. Since sanitation is a state subject, the policy also required states to develop State Sanitation Strategies and cities to develop City Sanitation Plans (CSP).

Although the NUSP, septage management advisory and centrally sponsored schemes, have brought about improvements in sanitation in cities and towns, these have not been main streamed and a lot more needs to be done to improve urban sanitation in the country. It is also to be pointed out that the centrally sponsored schemes and most state level schemes have only focused on provision of individual household toilets or sewerage systems. On-site sanitation management, including septage management, is sorely missing in the country despite 47 percent of urban households relying on on-site sanitation systems.

1.4 Need for Technical Assistance

While the MoUD has taken up several initiatives to strengthen sector planning and monitoring (i.e. CSPs, Service Level Benchmarking (SLB), City Sanitation Ratings), there has been limited action on deeper sector reforms (i.e. city wide planning, cost recovery, sustainability of investments). Consequently, there is little improvements in urban sanitation and the sector continues to suffer from lack of understanding, accountability and service orientation.

In this context, the World Bank through WSP is supporting Central, State and Local Governments to increase their ability to implement sector reforms through:

- Assistance to develop State Sanitation Strategies.
- Analytical and advisory support to address gaps in existing models of implementation, including planning, design and financing, and develop guidance notes to improve delivery of sanitation services.
- Improved monitoring and evaluation with respect to the second round of rating of cities.

2 Overview of Technical Assistance

This technical assistance (TA) has sought to support the NUSP, by providing technical assistance to national government , states / service providers in (i) developing state sanitation strategies to create an enabling environment and develop a framework approach to addressing the sanitation challenge; (ii) improving capacity of states and ULBs to undertake reforms and improve urban sanitation service delivery, and (iii) improving monitoring and evaluation approach for measuring service delivery (through the second round of rating of cities on sanitation indicators).

The areas addressed in this TA relate to the following specific goals of the NUSP:

1. **Open Defecation Free Cities**, achieving open defecation free Cities by promoting community-planned and managed toilets wherever necessary, for groups of households who have constraints of space, tenure or economic constraints in gaining access to individual facilities;
2. **Integrated City-Wide Sanitation**
   a. **Sanitary and safe disposal**, including **promoting proper functioning of network-based sewerage systems** and ensuring connections of households to them wherever possible; promoting recycling and reuse of wastewater and proper treatment; and **promoting proper disposal and treatment of sludge from on-site installations**
   b. Proper o**peration and maintenance** of all sanitary installations

2.1 Results Framework

Table 1 summarizes the intermediate outcomes, indicators, and achievements resulting from this TA.

Table 1: Results framework for the Technical Assistance

Intermediate Outcome(s) *	***Indicator(s)*** *	***Results***
Urban WSS policy agreed by stakeholders and approved by cabinet (either gazetted as part of a national policy or as a standalone policy)	National Urban Sanitation Policy (2008) is at an early stage of operationalization. WSP TA is directed at 1) Supporting the adoption of NUSP in at least 5 states by 2015 of which at least two would be in low income states. 2) Policy and reform elements are also embedded in national funding programs (e.g. JNNURM, Five Year Plans).	4 states (Maharashtra, West Bengal, Odisha and Madhya Pradesh) supported to develop state sanitation strategies and the state of Tripura supported to develop septage management strategy. Elements of reforms flowing from the guidance notes (cost recovery principles) are being considered in new program formulations.
Government agency with a clear mandate to lead and coordinate the policy development and planning of the urban WSS sector	Ministry of Urban Development (MoUD) has the mandate to lead & coordinate policy & planning for UWSS sector. Their efforts are also supported by the Ministry of Housing & Poverty Alleviation (MoHUPA). WSP TA is directed at helping MoUD and MoHUPA to deepen sector engagement and strengthen advisory/ monitoring functions performed by them.	Advisory notes on: Financial Requirements of Urban Sanitation in India: An Exploratory Analysis. Septage management in urban India Approaches to Capital Financing and Cost Recovery in Sewerage Schemes Implemented in India: Lessons Learned and Approaches for Future Schemes Recycling and Reuse of Treated Wastewater Community slum sanitation in India: A Practitioner's Guide
Formal programmatic urban water and sanitation coordinating mechanism with the government have a that	Development partner coordination being undertaken for specific programs (e.g. City Sanitation Plans, Service Level Benchmarking). This coordination	Development partners (JICA, GIZ and ADB) consulted and coordinated during the preparation of the septage management advisory

Intermediate Outcome(s) *	*Indicator(s)* *	*Results*
involves all development partners	model is being adopted for other MoUD programs - expected to be formalized through a formation of a committee as a process to enable regular and frequent donor coordination through meetings (at least 5).	

2.2 TA Delivery Process

Technical support has been extended to national, state, local government agencies and utilities to inform and develop the capacity of decision makers on models and strategies for improved and inclusive service delivery arrangements. TA was delivered in close coordination and consultation with the Government of India and various State Governments. The activities included analytical pieces, development of advocacy material, field notes, workshops, study tours, policy briefs, technical reviews, and interactions with global experts.

Specifically, the assistance included the following:

a. Development of state sanitation strategies - which includes providing guidance and support to state governments for development of state sanitation strategies as envisioned under the NUSP. This was achieved through extensive interactions with the States and a mix of small, medium and large ULBs therein to develop a framework encompassing the policy, legislative, institutional and financing aspects for sanitation service delivery in the State. Relevant State Departments such as Urban Development, Public Health and Engineering were involved in the consultations.

b. Support was provided to the Central Government first to evaluate alternate models for sanitation service delivery in the country, apart from the network-based model being implemented in the country. Successful on-site sanitation models and the policy, financing, and institutional aspects that enabled implementation of these models in other countries were demonstrated through case studies and in discussions with the CPHEEO. The TA evaluated an alternate financing framework wherein a combination of network and on-site sanitation management options were evaluated for the country, and developed financing estimates based on the same. The TA further assisted in development of the advisory on septage management, which has been issued by the Central Government providing guidance to states and cities to plan and implement septage management schemes.

c. TA further supported the Central Government to develop guidance documents to address current inadequacies in the provisioning and management of sanitation infrastructure created (largely sewerage infrastructure created under various Central and State Government schemes). The TA looked at successful models of capital financing for sewerage projects available from Tamil Nadu, and the impact of the adopted model in improving household connectivity to networks. The TA also evaluated sewerage projects in the country with successful O&M cost

recovery models, to identify best practices to operationalize and sustain the sanitation service delivery plans of various cities in the country. The evaluation of projects and practices was undertaken through field visits and consultations with State and cities to observe and document the best practices implemented in cities and towns, and supplemented with publicly available information. More than 15 cities and towns were visited to identify best practices addressing the typical inadequacies of sewerage infrastructure across the country.

d. Coordination with development agencies was also an integral element of the TA and the combined advocacy of the development partners (GIZ, ADB and JICA) convinced the government on the need to accord importance for septage management. Numerous meetings and discussions were held with the development partners and their inputs helped in enriching and improving the advisory on septage management.

e. Support towards implementation of the biennial rating of cities including developing methodologies, training of survey agencies, and undertaking analysis and documentation of the results. This involved revision of the erstwhile methodology to improve the approach adopted for rating. Several rounds of consultative discussions with the MoUD and the Central Public Health and Environmental Engineering Organization (CPHEEO), the technical wing of the MoUD, helped identify the metrics in the rating methodology that required changes, which were suitably converted into measurable indicators. The specific approach and the changes from the previous methodology are discussed in more detail later when discussing the outputs of the TA.

2.3 Overview of Intermediate Outcomes

The three intermediate outcomes were largely achieved through a range of different activities and outputs targeted towards the Central and State Governments, and are discussed briefly in the following section.

Support to the Development of State Sanitation Strategies

The NUSP required states to develop sanitation strategies. Further, sanitation is a state subject in India. State Sanitation Strategies provided the vision, goal and the framework for improving urban sanitation in the state. The strategy also provided the policy and legal framework for cities to plan and improve sanitation. The TA supported five states in the adoption of the NUSP of which four were low income states (LIS). The states of Maharashtra, West Bengal (LIS), Odisha (LIS) and Madhya Pradesh (LIS) were supported in the development of state urban sanitation strategies, while Tripura (LIS) which had already developed a state strategy was supported in the development of its septage management strategy going forward from its state strategy.

At the time of strategy formulation, there were clear funding lines available for the latter (through the national government programs), while funding lines for the former were expected to be activated in subsequent budgets. Subsequently, there has been delay (till date) in the formulation and announcement of new national government schemes (centrally sponsored schemes). While state sanitation strategies were developed in all the states, the Governments of Maharashtra, West Bengal and Odisha restricted themselves to implement only those items that had funding available from the national government schemes. Thus, some parts of the strategies got activated, without concomitant efforts on others. The other two state government, Madhya Pradesh and Tripura, have taken forward the strategy and are planning/implementing sanitation improvements with the

financing provisions enabled through the state government or existing national government schemes which they had access to, thus implementing the state strategy as intended.

Analytical and advisory support to strengthen the capacity of national and state / local governments strengthened for adoption of improved service delivery arrangements

In order to support the national urban sanitation policy for improved service delivery, as well as address various capacity constraints identified through assessment of existing sewerage projects implemented in the country, a number of studies were carried out to mitigate specific constraints. Key constraints towards both provisioning of infrastructure and maintenance of the assets created for sustained service delivery have been discussed earlier in this synthesis report. The TA focused on addressing the key gaps through development of guidance notes on: (i) an assessment of investment needs to improve urban sanitation, (ii) recycling and reuse of wastewater, (iii) capital financing and cost recovery of sewerage systems, (iv) septage management, and (v) community slum sanitation. The studies resulted in guidance notes in each of the above topics that will provide guidance and the building blocks for improved service delivery.

All the advisory notes - on septage management, recycling and reuse of wastewater and capital financing and cost recovery in sewerage schemes and community slum sanitation - **provided guidance to national government and states on options for sanitation improvements based on national and international experience and best practices**. Key learnings (which also form part of the team's recommendations to Government agencies) presented in the various advisory and guidance notes relate to the following aspects:

- Investments for improving urban sanitation were estimated to amount to capital requirement of INR 5,193 billion (US $ 83.75 billion) and an operating expenditure requirement of INR 2,647 billion (US $ 42.69 billion) over the 2012-2032 period. About 30 percent of the investment is anticipated from the household sector.
- The note on wastewater recycling and reuse in urban India focuses on elucidating the economic benefits of wastewater recycling from the perspective of public spending. The key benefits of wastewater recycle and reuse include
    - Recycled wastewater can serve as an additional source of water
    - Provides an additional source of revenue for utilities
    - Recycling of nutrients through wastewater recycling
    - reduction in groundwater pumping requirement
- The note on capital financing and cost recovery options for sewerage schemes highlights successful financial management practices adopted by ULBs in India when implementing sewerage schemes. The key findings from this study are:
    - **Public deposits** can be effectively used to meet a share of the capital funds required. In the absence of these public deposits, the loan amount would have to increase by an equivalent amount.
    - In addition to the traditional avenues of cost recovery, other ways of meeting costs can be used such as **sale of treated water to industries** and **power generation at the treatment plants** that helps reduce energy costs which help to meet the cost of operations.

- The advisory on septage management discusses the approach required and options for the collection, transportation, treatment and disposal of septage, along with the need for regulation and monitoring by ULB/city utilities.

Also, discussions with the MoUD and states during and on preparation of the guidance document have raised their understanding and appreciation of key recommendation of the guidance documents, namely, the option of and need for on-site sanitation, option of connection deposits from households to meet a portion of the capital expense, energy recovery systems and wastewater recycle and reuse to reduce operation and maintenance costs. As these ensure sustainability of the investments, they are likely to be embedded in future programs (Smart cities and National River Conservation Program) implemented by the national and state governments. To this end, the guidance documents have greatly contributed to raising awareness and building capacities of the national and state governments to realize the NUSP vision as well as rethink and redesign sanitation programs. Given that both the NUSP and the recently announced program (Swachh Bharat Mission) aiming to make the country open defecation free, have proposed community sanitation as an integral option to reaching this goal, the MoUD also plans to make practitioner's manual on slum sanitation guide available to states to help them in their planning and management of community sanitation facilities.

Coordination with development partners

Building on WSP's past experience in convening and engaging with development partners, this TA also coordinated and worked closely with development partners (GIZ, ADB and JICA) on the septage management agenda. The combined advocacy of the development partners convinced the government on the need to accord importance to septage management. Numerous meetings and discussions were held with the development partners during the development of the septage management advisory and their inputs contributed to improving the advisory.

Capacity of national government strengthened for improved monitoring and evaluation

The NUSP also suggested rating of cities on sanitation indicators. A total of 19 indicators divided across three categories of outputs (50 points), process (30 points) and outcomes (20 points) were identified and cities were to be scored on their performance on these indicators. A detailed (revised) methodology and approach was developed in consultation with the MoUD. This methodology is now being used in the second round of rating of cities currently being completed. The revised methodology builds on the previous approach and methodology used in the first round of rating. These are discussed in more detail in a later section discussing the specific outputs of this TA.

3 Overview of Outputs

Various outputs have been developed during the course of this TA to support the objectives and intermediate outcomes discussed earlier. These are discussed in brief in the following sections, and the complete outputs are available in the Annex to this Synthesis Report.

3.1 Outputs related to support in development of the State Sanitation Strategy

The TA supported five states in the adoption of the NUSP of which four were low income states (LIS). The states of Maharashtra, West Bengal (LIS), Odisha (LIS) and Madhya Pradesh (LIS) were supported in the development of state urban sanitation strategies, while Tripura (LIS) which had already developed a state

strategy was supported in the development of its septage management strategy going forward from its state strategy. However, for reasons elaborated earlier, Government of Madhya Pradesh sanitation strategy and Government of Tripura septage strategy are described in detail below.

The sanitation and septage strategy of Madhya Pradesh (Integrated Urban Sanitation Program (ISUP)) and Tripura are appended as Annex 1 and 2 to this report. Assistance provided to these two strategies is **envisioned to be transformational and result in improving the sanitation service delivery in these two states through adoption of new sanitation and septage management models that focus on asset creation as well as ensuring sustainability of any proposed sanitation arrangements.**

3.1.1 Integrated Urban Sanitation Program (Madhya Pradesh)

With 22.5 percent of urban households in the state of Madhya Pradesh not having access to individual household toilets, only 20 percent of the households on sewer systems and with no treatment to 50 percent of the households on septic tanks, the infrastructure inadequacies across the service delivery chain are a cause of concern as they endanger the health and environment. A baseline situation assessment was undertaken to understand the prevailing sanitation levels in the state, the existing institutional arrangements and the roles and responsibilities of the different institutions in the delivery of sanitation services. Based on the the baseline assessment, an integrated urban sanitation program (IUSP) has been developed by Government of Madhya Pradesh (GoMP). The IUSP signaled the government's intent to eliminate open defection and for safe collection, treatment and disposal of all human excreta and liquid wastes generated in the households. The salient features of IUSP are discussed in the following sections:

I. Access to household sanitation

a) All urban dwellers will have access to safe and hygienic sanitation facility in household or community, so that no one defecates in the open.
b) Adequate availability and satisfactory upkeep of public/common sanitation facilities in all urban spaces.

II. Safe collection and treatment

(a) Sanitary and safe disposal of human excreta and liquid waste from all sanitation facilities in urban areas.
(b) Establish appropriate systems of operations and maintenance of the disposal system, ensuring financial sustainability or adequate financial flows to operate system unhindered.

III. Institutional Mechanisms for Urban Sanitation

Two levels of institutional arrangements were proposed, one for facilitation and advocacy and the other for implementation.

IV. Facilitation and advocacy framework

The state level committee headed by the Principal Secretary, Urban Development Department will provide strategic guidance and undertake periodic review to monitor and evaluate the program, the district level committee headed by the Collector will review and provide guidance to plans prepared by the cities and the city level committees will be responsible for preparation of the plans.

V. Implementation framework

State and city level urban sanitation cell have been proposed to assist with the implementation of the program. The state level sanitation cell headed by the Commissioner, Urban Development Department, will be responsible for providing technical guidance and facilitating interdepartmental coordination for preparation and implementation of plans while the city level sanitation cell headed by the chief municipal officer will be responsible for preparing city level sanitation improvement plans.

Building on the IUSP, the Government of Madhya Pradesh has prepared the Madhya Pradesh State Sanitation Vision (MPSV) that articulates service delivery targets to achieve inclusive and affordable access to sanitation in urban areas in the state by 2025. Taking Census 2011 sanitation baseline as a starting point, the MPSV articulates state wide sanitation service targets, estimates investments required to achieve these targets and details the institutional framework and financing mechanisms to drive implementation to enable achieve the goal of sustainable affordable and universal access to sanitation by 2025. The Government has committed INR 4,080 million (US $ 66 million) for construction of individual, community and public toilets. A total of 187,511 individual toilets and 607 community toilets have been sanctioned of which a total of 50,000 individual toilets and 253 community toilets have been constructed.

3.1.2 State Septage Management Strategy for Urban Centres in Tripura

Urban sanitation in Tripura is characterized by:

- Large proportion of households (98 percent) having access to household sanitation facilities;
- Significant share of on-site sanitation arrangements amongst households with access to sanitation;
- Significant number of insanitary latrines
- Absence of arrangements for safe septage collection, conveyance treatment and disposal

Taking these into consideration, the Government of Tripura set out to develop a comprehensive strategy for the safe management of septage in urban Tripura.

I. Goals:

The priority goals would be:

- Identification of specific sites and situations where application of septage to land is allowed after due process, enabling treatment and disposal of septage at such approved facilities under adequate supervision and oversight;
- Creation of the infrastructure needed for effective liquid waste management from households and establishments through capital investment and institution building or through collaborative arrangements, both being accountable to the residents through the ULB;
- Achievement of a high level of compliance with requirements and practices that are clear, effective, achievable and enforceable;
- Ensuring financial and process sustainability of the elements of septage management; and
- Ensuring safety of households, septage workers and the general population.

II. Institutional arrangements:

The strategy defines the institutional arrangement to be instituted for septage management across the state comprising state level and ULB levels responsibilities with clearly defined roles and responsibilities.

III. Planning and financing arrangements:

This included development of a regional strategy focusing on cluster approach for project development, communication and outreach plan, and financing strategy including provisioning for capital expenditures and planning for tariff setting.

IV. Implementation arrangement:

This included preparation of septage management plans, standard setting, service delivery, regulation, coordination, monitoring and evaluation and capacity building.

The State has adopted the Septage Management Strategy for Urban Centres in Tripura, and developed an implementation roadmap identifying town clusters to be serviced through a regional septage treatment facility. The state has further developed a detailed project report for a pilot septage management project in the town of Bishalgarh. The pilot project encompasses all the aspects included in the state septage strategy and will provide a roadmap for state-wide scale up. The project has been submitted to the Central Government for financial support, and has been given in-principle approval for implementation. The project is likely to be implemented over the next two years, with support from the Water and Sanitation Program (WSP) on the design, procurement and capacity building components. This is likely the first project in the country to plan, design and allocate finances for a specially designed septage management system, including a stand-alone septage treatment facility. The experience and knowledge gained from implementation of the Bishalgarh pilot project will also be shared with other states, and the Central Government.

3.2 Support in capacity strengthening through analytical and advisory support for improved service delivery

This TA contributed to the Government of India's sector goal of improving delivery of sanitation through analytical and advisory support aimed at addressing established capacity constraints through delivery of the following guidance notes:

3.2.1 Investment estimates for improving urban sanitation

Considering that less than a third of urban India is served through network based system, there was a need to explore an alternate trajectory for providing sanitation solutions for the complete sanitation cycle, keeping in mind the mix of urban sanitation arrangements, and examining other enabling investments that would need to be made. This exercise used the 2006-11 data on urban sanitation arrangements to model the likely changes to household sanitation over the 2011-31 period. This model was supplemented with available data on wastewater collection and treatment infrastructure, to examine the infrastructure requirements and hence investment needs. In light of the NUSP, the model also incorporated provisions for increasing household sanitation access and for the safe collection and treatment of excreta from households dependent on onsite sanitation. Provision has been made for awareness creation and capacity building of relevant stakeholders, supplementing investments in infrastructure.

The model indicates the following projections based on current trends:

- Urban India will more than double – in terms of households – over the 2011-31 period, and connect an additional 89 million households to the sewer network.
- By 2031, households using on-site sanitation arrangements will continue to co-exist, but be relegated to about a third of the households.
- Wastewater collection and treatment capacities will need to expand to capture 74 percent of the generation and treat 86 percent of the wastewater generated.

- Septage facilities would progressively expand to manage the emptying and treatment of the households using toilets connected to septic tanks and pit latrines.

Estimates on financial investments required:

- The model estimates a capital requirement of INR 5,193 billion (US $ 83.75 billion) and an operating expenditure requirement of INR 2,647 billion (US $ 42.69 billion) over the Financial Year (FY) 2012-32 period.
- The loading of capital expenditure is higher in the second five year period (2018-22) in order to address infrastructure deficiencies, while the operating expenditure increases over the later periods.
- There is a significant share of investment anticipated from the household sector – about 30 percent of the total capital expenditure – for the urban sanitation transition to happen on assumed lines.
- The additional elements of community sanitation facilities and septage treatment are incorporated to achieve meaningful results during the transition period, provide alternatives to the current practice, and protect freshwater sources urgently.
- Programmatic support requirements for behavior change, administration, capacity building at states and ULBs and project management support for treatment facilities is estimated at about 12 percent of capital investments.

The note provides details of the investment estimates required to address the full cycle of sanitation. As it advocated on-site sanitation arrangement as an option to improve sanitation, it led to the government developing an advisory on septage management. Further, recognizing the investment required for operation and maintenance, and in keeping with the goal of the NUSP to sustain sanitation investment, the government also felt the need to explore options to meet the capital and operation and maintenance requirements.

3.2.2 Wastewater recycling and reuse

Urban India faces significant challenges in terms of availability of adequate water supply and sanitation infrastructure. Water supply in most cities and towns is often insufficient to meet the growing demand for water by all economic sectors. Collection, treatment and reuse of the municipal wastewater provides an opportunity for not only environmental clean-up, but also to meet the increasing water needs of different economic sectors. In addition to recycled wastewater becoming an additional and valuable water source, there are opportunities to recover nutrients and energy from wastewater. It is estimated that if 80 percent of urban wastewater could be collected and treated by 2030, there would be a total volume of around 17 billion cubic meters (BCM) per year; an increase of around 400 percent in the volume of available treated wastewater. This additional 17 BCM treated wastewater resource, if captured, treated safely and recycled, is equivalent to almost 75 percent of the projected industrial demand in 2025 (Ministry of Water Resources (MoWR), 2006) and almost a quarter of the total projected drinking water requirement in the country.

This note on wastewater recycling and reuse in urban India focuses on elucidating these economic benefits (and in some cases also the financial benefits) of wastewater recycling from the perspective of public spending. It also provides supporting information on the evolution and current practices of wastewater recycling internationally and the international and national regulatory and policy framework guiding the practice of wastewater recycling. Taking cognizance of these, the guidance document presents possible strategies for city and state planners and policy makers to initiate the discourse on wastewater recycling and

reuse in the local context for a planned movement forward. The key benefits of wastewater recycle and reuse are detailed below:

A. Recycled wastewater: an additional source of water

1. Recycled wastewater and its sale to industrial customers, frees up fresh water hitherto used, which could be used to augment and meet the ever increasing water needs This option is less expensive as compared to other options to augment existing water supplies from distant water sources or expensive treatment such as desalination.
2. Use of treated wastewater can provide industries with a reliable source of water supply, and in most cases, a supply that is cheaper than fresh water. This can result in significant cost savings for the industrial enterprises given that the water tariffs for industrial use are steep and rising consistently.
3. Recycled wastewater could also play an important role in providing a reliable source of water for agriculture. In India, the urban wastewater generated (estimated currently at about 38,000 MLD), if treated and channeled to meet agricultural irrigation requirements, would provide 14 BCM of irrigation water, which could potentially irrigate an area ranging between 1-3 million hectares (ha), depending on the type of crop cultivated and its irrigation requirement.

B. Source of revenue for utilities:

1. Utilities, with well-functioning STPs, are in a position to sell the treated effluent to industrial customers depending on the need and availability of other water sources. Utilities may charge these industrial customers for this recycled wastewater based on the required level of treatment provided and quality of wastewater. By 2030, treated wastewater from Class I and II[2] cities has the potential to meet about a quarter of the current industrial water demand (17 BCM including the water demand for energy production in the country).

C. Nutrients recycling through wastewater recycling:

1. In addition to being a water resource, wastewater also contains valuable nutrients (nitrogen, phosphorus and potassium, among others), which aid in crop growth and could reduce the need for synthetic fertilizers in India by up to 40 percent. Wastewater, a valuable source of plant nutrients, needs to be viewed as an economic resource by the planning authorities at the national, state and local levels. Analysis presented in various studies also suggests a 30 percent increase in annual farm income to farmers utilizing treated and untreated wastewater for irrigation as compared to freshwater. The increase in farm income is a result of an increase in yield, multiple cropping seasons, and lower fertilizer requirement.

D. Reduction in groundwater pumping requirement:

1. The use of treated wastewater for irrigation also has potential to reduce groundwater irrigation, and hence pumping and the associated energy requirement and associated costs.

2. Conservation of energy as a result of using wastewater for irrigation has a concomitant benefit of reducing detrimental greenhouse gas (GHG) emissions that would have been generated during the production of an equivalent amount of electricity.

[2] Class I and II cities together refer to cities with a population above 50,000

The Wastewater Recycling Advisory Note has been shared with the MoUD, and will be published as a guidance document by MoUD to facilitate implementation of such schemes by States and ULBs across India. This work, focused on network systems, will be supplemented with reuse and recycling models that are applicable for non-network systems and will form part of future TA, to provide comprehensive guidance to cities and towns when implementing integrated solutions for sanitation management.

3.2.3 Capital financing and cost recovery options for sewerage schemes

This output has been developed with the aim of highlighting successful financial management practices adopted by ULBs in India when implementing sewerage schemes. The aim of the guidance note is to share successful capital financing and cost recovery practices adopted by ULBs in India and enable improvement in provisioning of sewerage systems and ensure availability of sufficient funds for proper O&M of the schemes implemented.

Low provision of facilities for wastewater treatment, ineffective treatment of wastewater and existing treatment facilities working below par contribute to the discharge of partial or untreated wastewater, and are responsible for more than 80 percent of the pollution in surface waters in India. Sewage treatment capacity is 30 percent of what is required in class I and class II cities. This is further exacerbated by the fact that existing treatment capacity is underused, with capacity utilization estimated to be about 66 percent of existing sewage treatment facilities (CPCB, 2013). Therefore, only about 20 percent of sewage generated in urban India is actually treated before disposal. The efficacy of treatment provided by existing STPs is also under question; some of the major causes for the underperformance of existing STPs include inadequate and delayed planning, lack of availability of land and inaccurate estimation of treatment capacity required, delays in completion of schemes due to lack of inter-agency coordination at the field level, shortage of skilled manpower and regular staff, and inadequate availability of funds for O&M of the system. Another key limitation to the implementation of these projects is the underutilization of STPs, in some cases, due to low HSC in the sewer network or absence of upstream systems such as branch sewers and house connections.

Capital Financing of Sewerage Schemes in Tamil Nadu

A mix of grant funds, loans and public equity through deposit collection were utilized for implementing the sewerage projects in Tamil Nadu. The proportion of grants in projects implemented with support from the Government of India (under the National River Conservation Program (NRCP) of the Ministry of Environment and Forests (MoEF)) is relatively higher as compared to projects implemented through support under the projects funded through World Bank Support (under the Tamil Nadu Urban Development Program (TNUDP)). The share of loan and contribution made by ULB/public is higher in the TNUDP projects.

A unique feature in all schemes is that a portion of the capital expenditure (CAPEX) is funded through collection of public deposits levied on households, which is the ‘one-time non-refundable deposit’ obtained from the users. This money is structured as a nonrefundable one-time deposit from the project beneficiaries. The advantages of this deposit contribution from the public have been: (i) accountability on the part of the ULB to provide timely, quality services; (ii) ensuring that households connect to the network

upon completion of the project;[3] and (ii) reduced debt servicing costs and therefore the user charge by up to INR 30- 50 (US $ 0.48 – 0.81) per household per month.

Key findings from the review of capital financing of schemes implemented in Tamil Nadu are:

- **Public deposits** can be effectively used to meet a share of the capital funds required as demonstrated in various towns across Tamil Nadu.[4] This formed the public equity in the project. This provides two benefits: a) it ensures that households connect to the sewer network upon completion of the project; and b) this public contribution also partly finances the capital cost of the sewer projects.
- In the absence of these public deposits, the loan amount would have to increase by an equivalent amount. The impact of that would be an increase in the annuity payable, subsequently translating into higher costs for ULBs and user fee payable by citizens (up to INR 50/household/month).

Review on Cost Recovery Approaches for O&M of Sewerage Scheme

An analysis of operational expenditures and revenues of various ULBs across the country reveals that they have adopted a variety of measures to recover O&M costs.

1. **User fee:** All ULBs in Tamil Nadu and several others in other Indian states collect a recurring fee called the 'user fee' which is meant to cover all or a portion of O&M cost of the sewer systems;
2. **Property tax**: For some ULBs, especially those outside Tamil Nadu, user fee collection in itself is not sufficient to meet full costs of operation. There are other sources of income that meet the O&M costs of sewer systems. Predominantly, these arise from the water and drainage tax component of the property tax; and
3. **Deposit collection to reduce debt burden:** This practice is unique to the schemes implemented in Tamil Nadu where deposits are collected from the public (beneficiaries) even before project commissioning. While the deposits collected goes towards meeting the capital expenditure until such time as the project is completed in all respects, all deposits which are collected after commencement of project go into a revenue account to meet O&M costs.[5]
4. **Other methods of meeting costs:** There are several other ways of meeting costs such as sale of treated water to industries and power generation at the treatment plants that helps reduce energy costs which help to meet the cost of operations.

[3] There is an additional expense for connection that has to be borne by the household after the network is operational, in addition to the public deposit contributed. Since the payment of the public deposit, which is ~INR 5,000/household is a substantial investment already made by the household, its payment encourages households to make the balance (but smaller) additional investment for connection and plumbing within the house, thereby improving network utilization.

[4] GoTN has instructed cities vide a government circular that deposits cannot exceed INR 5,000 per household (as a weighted average amount for the city) In order to adhere to this, a graded structure was devised in most cities based on the plinth area, such that the weighted average amount for the entire city amounts to INR 5,000/ household.

[5] While all public deposits are aimed to be collected prior to project commissioning to contribute towards the project CAPEX, in reality, deposit collection from all targeted households can extend beyond commissioning, whence CAPEX funding requirements have already been met. In such cases, the deposit collected can go into a revenue account.

a. **Reduction in O&M costs due to power generation:** A study across eight cities in the country indicated that power generation within STPs has proved to have reduced nearly 50 percent of the O&M cost and have met up to 80 percent of energy costs; and
b. **Sale of treated wastewater:** Cities that have sold their treated wastewater have recovered up to 200 percent of their cost of operations. This provides an excellent opportunity for cities with industrial activity to generate revenue for their O&M needs.

This output has been shared with the MoUD to be released as an Advisory to States and Cities provides a way forward to ensure the sustainability of network based systems. A few principles such as collection of deposits for house service connections, energy recovery and wastewater recycle and reuse could be embedded as mandatory requirements in new centrally sponsored schemes.

3.2.4 Septage management

According to census 2011, around 81 percent of urban households have access to toilet facilities within the household premises, 6 percent access community / public toilets, and 12 percent are forced to resort to open defecation. Thus, nearly 10 million households in urban India still defecate in the open.

Further, Census 2011 indicates that 47 percent of the urban households rely on on-site sanitation (38 percent on septic tanks and 9 percent on pits) with little or no treatment. Information on the design, construction, frequency of emptying, treatment and disposal of septic tanks and pits is very limited. While the private sector plays a large role in the emptying of septic tanks, very little if any treatment exists for the septage collected from the septic tanks and more often than not the collected septage is disposed without any treatment endangering health and environment.

The NUSP emphasized the need for proper collection, treatment and disposal of sludge from on-site installations, namely septic tanks and pit latrines. While the policy accords importance to the collection, treatment and disposal of sludge from on-site installations, there is no policy or regulation on septage management. Other than the Bureau of Indian Standards (BIS) and the CPHEEO guidance on the design and construction of septic tanks, no other information is available for the proper collection, treatment and disposal of septage. Recognizing, the growing reliance, importance and the need to improve septage management, MoUD has developed the septage management advisory to provide guidance to states and cities on policy, technical, regulatory and monitoring aspects.

The guidance note discusses the approach required and options for the collection, transportation, treatment and disposal of septage. The note also discusses the need for regulation and monitoring by ULB/city utilities, the basics of financial management in such schemes and the O&M requirements and typical challenges faced in septage management schemes.

This advisory has been issued by the MoUD, and provides guidance to states and cities on septage management. This is the first attempt in the country to provide a framework for septage management, and highlighted the need for this in the country. Some states have since developed state sanitation strategies and state septage management strategies, and several others are actively contemplating developing a state-wide roadmap for the management of septage generated in the state.

3.2.5 Practitioner's guide to community slum sanitation

The NUSP recommended development of special strategies for slums and poor settlements as an integral part of the CSPs. But the significant presence of slums in Indian cities (estimated between 9 and 14 million –

or 12 to 16 percent of India's 79 million urban households), and the specific difficulties that these settlements face in accessing basic sanitation (and other) services, demanded a greater understanding of the conditions, and exploration of strategies used to address these.

Based on the experience of slum sanitation initiatives implemented in a number of urban centers in India, over the last decades, this guide draws out the critical drivers that appear to explain some facets of successful community slum sanitation initiatives. Initiatives from the cities of Ahmedabad, Pune, Mumbai, Bhopal, Trichy, and Kalyani are used as the examples to learn from (based on convenience and easy availability of information). A set of generic steps are identified and described in the guide for the preparation, planning, implementation, and monitoring and evaluation stages of community sanitation initiatives.

The Guide is aimed at assisting state urban development departments and agencies, ULBs, Water Supply and Sewerage Boards, Public Health and Engineering Departments, nongovernmental organizations (NGOs), community based organizations (CBOs) or self-help groups (SHGs), as well as the private sector consultants, contractors and other services providers. The Guide has been drafted such that personnel with diverse educational backgrounds and training can easily understand and, hopefully, apply it with necessary adaptation, in their work.

The Guide does not recommend a single set of solutions either for technology or for approaches, but serves as resource material for options on planning, implementation, and (&M of community sanitation solutions for urban areas. The options, tried and tested in these cities, have to be considered in light of the local conditions, before adapting them as relevant.

Drivers of Successful Slum Sanitation Initiatives

The review of the cities led to the identification of the following factors or drivers of successful slum sanitation initiatives. These are described below and the key considerations and discussions under each of the drivers is detailed in the annexed report.

1. Enabling frameworks for slum sanitation (tenure and provision of services)
2. Political will, executive engagement and local government institutional capacities
3. Addressing indignity and promoting public health
4. Promote participation of the poor and institutionalize special roles for women
5. Choice of location, technology and design features
6. Frameworks for partnerships and contracts
7. Empower communities to take the responsibility of managing community toilets
8. Management models and financial viability as key elements for successful long-term operation
9. Performance monitoring and evaluation: Instituting a monitoring and evaluation (M&E) framework

The full cycle of activities for slum sanitation initiatives can be clustered into three broad stages:

A) Preparatory and planning stage;

B) Implementation stage; and

C) Monitoring and evaluation stage

Each of the above stages includes a number of activities and tasks, and many of these are iterative in nature, for example, the baseline and mapping of slums can either be done in one stretch, or broken down into

phases over time or areas, so that it does not become a bottleneck to starting some of the other activities early.

The community slum sanitation practitioner's guide has been shared with MoUD to be released as an Advisory to States and cities. This is intended as a tool to improve sanitation service delivery for the un-served population and the urban poor residing in slums, and ensure sustainability of sanitation provisions made in such contexts. Given that both the NUSP and the recently announced program (Swachh Bharat Mission) to make the country open defecation free have proposed community sanitation as an integral option to reaching this goal, the MoUD plans to make this guide available to states to help them in their planning and management of community sanitation facilities. Support under future TA will help operationalize this guide in a few communities in low-income states.

The guidance notes are attached as Annexes 3 – 7 to this report.

3.3 Support toward capacity of national government strengthened for improved monitoring and evaluation

The TA also supported the development of an approach and methodology for the second round of rating of cities on sanitation indicators. This methodology developed in consultation with the Ministry MoUD is being used for the second round of rating of cities.

Based on the experience and findings from the First Round of Sanitation Rating of Class I Cities conducted over 2009-10, the Second Round (2014-15) provided an opportunity to update and improve the methodology for greater validity and reliability. Two main improvements were made:

a) The output indicator 1. A. ii (*Access and use of toilets for floating and institutional populations - adequate public sanitation facilities):* This is now being measured as an estimation of the number of latrine seats and urinals for men, women, girls and boys, based on sample locations. A national level distribution across cities for these indicators will become possible per 1000 (relevant sub-group) of population. (This could be useful in determining adequacy and norms for future apart from comparing cities).

b) The outcome indicator C *(Incidence of diarrheal diseases in the City*): was earlier to compare across three years official statistics on diarrheal diseases reported for the city. This was not found to be robust as availability of data posed a problem – leading to partial picture for some cities in respect of this indicator. Therefore, a slum location based estimate of incidence of diarrheal diseases has been introduced.

Preliminary results from on-going studies show both the above changes are yielding good results.

Other changes included verification of whether the City/ULB had complied with the Manual Scavenging (Prohibition) Act of 2013, and rules drafted thereunder, including but not restricted to awareness about the above, conduct of survey to establish the number of persons engaged in such occupations, and remedial steps taken as stipulated by law.

In indicators relating to availability of latrines in slum locations, research agencies were trained to attempt measuring actual use of latrines – not just physical availability – by having investigators to interact with slum dweller respondents. (Item 1.A.i).

The detailed approach and methodology is attached in Annex 8 as an output for review. Key features of the methodology are summarized below:

I Three Categories of Indicators

The rating exercise will involve three categories of indicators:

1. Output Indicators: These pertain to the city having achieved certain results or outputs in different dimensions of sanitation ranging from behavioral aspects and provision, to safe collection, treatment and disposal without harm to the city's environment. *There are eight main output-indicators accounting for 50 points of the total of 100 points.*

2. Process related indicators: These indicators pertain to systems and procedures that exist and are practiced by the city agencies to ensure sustained sanitation. *There are seven main process-indicators accounting for 30 points of the total of 100 points.*

3. Outcome Related indicators: These indicators include the quality of drinking water and that of water in water-bodies of city, as also an indicator pertaining to the incidence of diarrheal disease in the city. *There are three main outcome-indicators accounting for 20 points of a total of 100 points*[6]*.*

II Sources and Methods of Data Collection

The survey agency will thus need to use a combination of published information and estimates available with city agencies (including the 2009-10 first round Rating data in case of more than the 400 cities) that it will duly validate and cross-check by means of short field-visits to make physical observations (using text, audio, photo and video documentation); and hold limited interactions with local residents, users, etc.

III Three size-class of cities

The rating will be carried out separately for three sub-categories as presented in Table (2).

Table 2: Distribution of Cities across Population Size-Classes

	Population Size Class	Population Size	No. of Urban Towns
1	Metros	More than 5 million	5
2	Big Class I	One million up to 5 million	41
3	Other Class I	1,00,000 up to One Million	430
	All Class I Cities		476

Source: Census of India, 2011. Note: Metros house 44.23 million and Big Class I another 71.49 million people.

[6] The weights for output, process and outcome indicators are valid for the second round of rating too. In later years, with improvements in the situation of cities and better availability of data, greater importance and hence, weights will be accorded to outcome indicators.

The list of indicators for the second round of sanitation rating is included in Table (3).

Table 3: Indicative Objective Rating Chart for Sanitation In Cities		
No	INDICATORS	Points*
1	OUPUT-RELATED	50
A	City is free of Open Defecation (sub-total)	16
i.	Access to and use of toilets by urban poor and other un-served households (including those in slums and informal settlements) – either by individual or by community sanitation facilities	4
ii.	Access and use of toilets for floating and institutional populations	6
iii.	No open defecation visible	2
iv.	Completely eliminate manual scavenging (service latrines); and provide tools, equipment and personal protection equipment to all sanitary workers, in order for them to safely manage septage/sludge from pits, septic tanks, drains and sewers (i.e. without exposing them to the hazard of direct contact with excreta)	4
B	Proportion of total human excreta generation that is safely collected (6 points for 100%)	6
C	Proportion of sewage/septage generation that is treated and safely disposed of (9 points for 100%)	9
D	Proportion of treated wastewater / septage that is re-cycled and re-used for non-potable applications	3
E	Proportion of total storm-water and drainage that is efficiently and safely managed (3 points for 100%)	3
F	Proportion of total solid waste generation that is regularly collected (4 points for 100%)	4

Table 3: Indicative Objective Rating Chart for Sanitation In Cities		
No	INDICATORS	Points*
G	Proportion of total solid waste generation that is treated and safely disposed of (4 points for 100%)	4
H	City wastes cause no adverse impacts on surrounding areas outside city limits (5 points for 100%)	5
2	PROCESS-RELATED**	30
A	M&E systems are in place to track incidences of open defecation	4
B	All sewerage systems in the city are working properly and there is no ex-filtration (Not applicable for cities without sewerage systems)	5
C	Septage / sludge is regularly cleaned, safely transported and disposed after treatment, from on-site systems in the city (Maximum 10 marks for cities without sewerage systems)	5
D	Underground and Surface drainage systems are functioning and are well-maintained	4
E	Solid waste management (collection and treatment) systems are efficient (and are in conformity with the MSW Rules, 2000)	5
F	There is clear institutional responsibility assigned; and there are documented operational systems in practice for b)/c) to e) above	4
G	Sanctions for deviance on part of polluters and institutions is clearly laid out and followed in practice	3
3	OUTCOME-RELATED	20
A	Quality of drinking water in city compared to *baseline*	7

Table 3: Indicative Objective Rating Chart for Sanitation In Cities		
No	INDICATORS	Points*
B	Water quality in water bodies in and around city compared to baseline	7
C	Incidence of diarrheal disease (in sample slum settlement/s)	6
* The marks for the above indicators will be revised every two to three years. Over time, indicators about more stringent conditions e.g. no-urination, or spitting in open/public spaces, etc. will be introduced as indicators. The weights accorded to each category and specific indicators will also be revised. In the current Round 2 of the Rating exercise, the weightage of outputs, processes and outcomes have been retained at 50, 30 and 20 per cent. A few indicators have been refined and or detailed. ** In this context, bigger cities may consider instituting good practice systems that comply with ISO (International Standards Organization) and/or BIS (Bureau of Indian Standards) process systems.		

The approach and methodology details the procedures for the survey, data to collect, analysis and how to score for all the indicators. The survey firms engaged by the MoUD have been trained and they are in the process of conducting the second round of ratings which will be completed by April 2015.

4. Learning and Recommendations

The TA provided assistance to GoI and the states in putting in place various elements identified as necessary for sector improvement, including planning, provisioning and monitoring processes. The TA in course of its work also identified the need for the cities to see opportunities for financial recovery of investments through reuse and recycle strategies, to strengthen the incentive for investment in sanitation improvements; and moved forward on this through identification of opportunities and highlighting best practices that have served this goal.

Thus, the TA to Central and State Government has aimed at creating an enabling environment and developing a structured approach to address the full cycle of sanitation. Specific capacity constraints and enablers such as improving wastewater recycling, provisioning of community sanitation, inclusive provisioning of sanitation infrastructure, improving cost recovery and hence ensuring sustainability of investments, all deemed as essential components of the NUSP, are targeted through guidance documents on these subjects that build capacity of the national and state governments to incorporate the learnings in the design of new program / projects. The TA also focused on the current lack of on-site sanitation management in the country and the need for the same. Finally, the TA focused on the issue of monitoring, and measuring service delivery through a rating of cities.

Overall, the TA has thus helped in anchoring various elements of the national urban sanitation policy in a few states, advocating and promoting septage management in the country and in support of a few goals of NUSP, promoted the reuse of wastewater and brought a focus on the sustainability of investments

(operation and maintenance). Going forward, the TA will be working with the government to have synthesis reports of these guidance notes released as advisories of the Ministry of Urban Development and also work with them to embed a few key principles in new centrally sponsored schemes of the Government of India.

The engagement with the states of Maharashtra, Madhya Pradesh, Odisha, West Bengal and (later) Tripura in the formulation of state strategies highlighted two significant aspects: (a) need for clarity on financing channels for implementing the strategy especially in the areas of provisioning access for the poor through individual or community facilities, and (b) need to learn from other experiences in operationalizing and sustaining facilities addressing the full cycle of sanitation. The latter was also acerbated by the prevailing paradigm favoring centralized solutions (network based) and low cost recovery experiences.

These concerns were also discussed and recognized at the national level, however due to budgetary non-provisioning, the felt need to restructure the existing national program (the JNNURM) and the seeming prioritization of investments that could be grounded fast in an election year, coupled with the initial review and rethink by the new government (taking over in May 2014), the financing provision issue remained as-is, till the announcement of Swachh Bharat (Urban) Mission on October 2nd 2014 (with guidelines being issued in December 2014). Sensing the lack of movement on this issue, the TA had to follow multiple strategies towards the goals that it had set forth. While the states were assisted in the formulation of state sanitation strategies, further movement on this was deemed possible only where state political and administrative priorities recognizing sanitation for the urban poor were backed by state government budgetary commitments (Madhya Pradesh) or where the state identified potential financing channels (Tripura) that competed with other priorities. Thus, work on the sanitation strategy and later septage management moved forward beyond state strategy formulation in two states (both LIS)

In case of Madhya Pradesh, implementation of the sanitation strategy has progressed with the state government's funds for the construction of individual and community toilets, while awaiting formulation of new centrally sponsored schemes to support the wastewater and septage collection and treatment infrastructure. The newly launched Swachh Bharat Mission which aims to make the country open defecation free will further strengthen the government's sanitation initiative. One of the key lessons of working in a remote State like Tripura was that considerable traction on policy implementation can be gained by working at multiple levels viz. State and city level institutions. The training workshops and surveys on ground helped build capacities and prepare the State and the ULB (Bishalgarh town) for implementation.

The sanitation strategies in the states of Madhya Pradesh and Tripura have provided a framework for sanitation improvements in the state. Future TAs would be well advised to build upon the current developments and harness the capacities and prioritization that has been achieved with these states. In future, these States and cities therein are likely to accelerate their progress in implementing urban sanitation interventions, assisted by demonstration of improved sanitation and wastewater management through Septage Management systems, re-cycling/re-use and implementation of national advisories in these realms.