Performance Measurement Framework for Urban Water and Sanitation

Volume I: Approach and Framework

CEPT University

May 2010

performance assessment system

PERFORMANCE MEASUREMENT FRAMEWORK FOR URBAN WATER AND SANITATION

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Acknowledgements

The Performance Assessment System (PAS) Project was initiated in early 2009. The development of the Performance Measurement Framework for the Project was a key activity in the initial phase. Fortunately for us, the Government of India's Service Level benchmark framework was available as a basis to further develop our work. The PAS project's performance measurement framework has also drawn on an intensive review of international literature on performance benchmarking in the urban water and sanitation sector, as well as the use of such information in various countries by different stakeholders such as utility associations, national governments and regulators.

The initial drafts of this framework were discussed in a series of consultative meetings. Our work has benefited from the insights of a large number of resource persons. We particularly acknowledge feedback from members of the PAS Project's Project Advisory Committee and from participants at the Expert's group meeting held in Ahmedabad in September 2009.

The work on this review and measurement framework was carried out by a team led by Meera Mehta and Dinesh Mehta with able contribution and support from Mona Iyer, Anitha Immanuel, Poorva Lalbhai and Maitri Patel at the CEPT University. The framework and the checklist were discussed extensively with PAS partners. They have contributed significantly to the development of the checklist and its field testing. We would like to acknowledge the support of the entire team of partners, particularly Manvita Baradi, Meghna Malhotra, M.C. Mehta and Arvind Singh of the PAS team from the Urban Management Centre, and Sneha Palnitkar, N. Kusnur and Gautam Kirtane of the PAS team from the All India Institute of Local Self Government. The report was edited by Anjali Sen Gupta.

The Performance Measurement Framework is being used in over 400 urban local bodies in the two western states of Gujarat and Maharashtra. As several other states in India begin to launch state-wide performance assessment, the lessons and experiences in using this framework in Maharashtra and Gujarat will be valuable. We see this as an evolving piece of work that will benefit from this experience.

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Abbreviations

ADB	Asian Development Bank
ADERASA	Association of Water and Sanitation Regulatory Entities of the Americas
ASDWA	Association of State Drinking Water Administrators
AWWA	American Water Works Association
BESSY	Benchmark and Statistic System
BOO	Build, Own, Operate
BOT	Build, Operate, Transfer
CA	Chartered Accountancy
CASCWUA	Central Asia and South Caucasus Water Utilities Association
CDM	Clean Development Mechanism
CIB	Continuous Improvement and Benchmarking
CMAG	City Managers Association of Gujarat
CPHEEO	Central Public Health and Environmental Engineering Organisation
CRA	Water Regulatory Council
CUs	Commercial utilities
CV	Coefficient of variation
DANVA	Danish Water and Wastewater Association
DEs	Data elements
DMA	Directorate of Municipal Administration (Maharashtra)
DoM	Directorate of Municipalities (Gujarat)
EPA	Environment Protection Agency
ESC	Essential Services Commission
ESR	Elevated Service Reservoir
EU	European Union
EUREAU	European Federation of National Associations of Water and Waste Water Services
EWURA	Energy and Water Utilities Regulatory Authority
FIPAG	Fundo de Investimento e Património de Abastecimento de Água (Water Supply and Asset Holding Fund)
GIS	Geographic Information Systems
GMARP	Gujarat Municipal Accounting Reform Project
GMFB	Gujarat Municipal Finance Board
GoG	Government of Gujarat
GoI	Government of India
GoM	Government of Maharashtra
IBNET	International Benchmarking Network for Water and Sanitation Utilities
ICE	Information, Communication and Entertainment (a special consumption ta
ISIP	Information System Improvement Plan
IWA	International Water Association
JMP	Joint Monitoring Programme
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
km	kilometre
KPIs	Key Performance Indicators

LDG	Local Development Grant
lpcd	litres per capita per day
MIS	Management Information Systems
MoLG	Ministry of Local Government
MoU	Memorandum of Understanding
MoUD	Ministry of Urban Development
MoWI	Ministry of Water and Irrigation
MSW	Municipal solid waste
NEBC	North European Benchmarking Corporation
NFHS	National Family Health Survey
NG	Nirmal Gujarat
NIS	NWASCO Information System
NIUA	National Institute of Urban Affairs
NPR	National Performance Report
NRW	Non-Revenue water
NWASCO	National Water and Sanitation Council
NWI	National Water Initiative
NWSC	Nairobi Water and Sewerage Company
O&M	Operation and Maintenance
OFWAT	Office of Water Services
ONEA	National Office of Water and Sanitation
OPA	Overall Performance Assessment
PAS	Performance Assessment System
patraks	Set of standard formats
PERPAMSI	Persatuan Perusahaan Air Minum Seluruh Indonesia
PI	Performance Indicators
PIPs	Performance Improvement Plans
PMF	Performance Measurement Framework
PSP	Private sector participation
PWCs	Provincial water companies
RALG	Regional Administration and Local Government
RC	Residual Chlorine
SALGA	South Africa Local Government Association
SAWUN	South Asian Water Utilities Network
SDE	Sénégalaise des eaux
SEAWUN	South East Asian Water Utilities Network
SG	Swarnim Gujarat
SGBA	Sant Gadge Baba Awards
SGG	Swarnim Gujarat Goals
SNIS	National Sanitation Information System
SNMA	Sujal and Nirmal Maharashtra Abhiyan

SONES	Société nationale des eaux du Sénégal
SRS	Special Regulator Supervision
SLB	Service Level Benchmarks
SWM	Solid waste management
TDS	Total dissolved salts
TERI	Tata Energy and Resources Institute
TFC	Thirteenth Finance Commission
UARL	Unavoidable Annual Real Losses
UDD	Urban Development Department
UHRC	Urban health resource centre
UIDSSMT	Urban Infrastructure Development Scheme for Small & Medium Towns
UIPM	Urban Indicators and Performance Measurement
ULBs	Urban local bodies
UN	United Nations
UNDP	United Nations Development Programme
USERS	Urban Services Environmental Rating System
UWSAs	Urban Water Supply and Sewerage Authorities
UWSS	Urban Water Supply and Sanitation
VEWIN	Vereniging van Waterbedriven in Nederland (Association of Dutch water companies)
VUWSDP	Vietnam Urban Water Supply Development Project
VWSA	Vietnam Water and Sewerage Association
WDS	Water Distribution Station
WHO	World Health Organization
WOP	Water Operators Partnership
WSAA	Water Services Association of Australia
WSP	Water and Sanitation Program
WSS	Water Supply and Sanitation
WSSD	Water Supply and Sanitation Department
WTP	Water Treatment Plant

Executive Summary

Introduction

Access to water and sanitation services in urban India is widespread, but little is known about the quality and level of service, and coverage of the poor households. A key challenge in the sector in India is the lack of adequate and reliable information. Very little is known about the quantity of water made available to people, non-revenue water, quality of water and coverage of poor households. For new investments in water and sanitation to be effective, it is important to assess the performance of the existing system, as well as ensure its sustainability and reach for the poor and unserved.

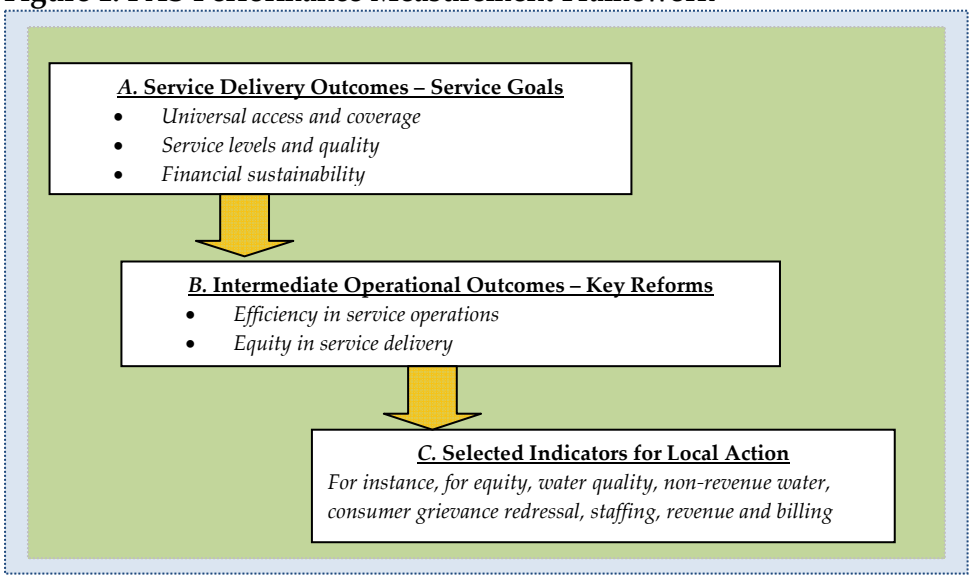
It is in response to this situation that the Centre for Environmental Planning and Technology (CEPT) University is implementing the Performance Assessment System (PAS) Project, which is funded by the Bill and Melinda Gates Foundation. Its overarching aim is to develop performance assessment systems for urban water supply and sanitation at local and state levels. The PAS Project has three main components: (a) Performance Measurement; (b) Performance Monitoring; and (c) Performance Improvement. This report presents the Performance Measurement Framework (PMF) developed for the first project component. The report is in two volumes. Volume I describes the approach and framework, and Volume II presents the definitions and reliability grades of performance indicators as well as the detailed questionnaire used for data collection from each urban local body. The PMF is being implemented in Gujarat and Maharashtra in over 400 cities. The proposed PMF draws on the Government of India's ongoing initiative of standardised Service Level Benchmarks (SLB) for urban water supply and sanitation sectors developed by the Ministry of Urban Development (MoUD). The framework also draws on an extensive review of previous benchmarking efforts globally and in India. Figure 1.1 (see Chapter 1) outlines the process of developing the framework.

PAS Performance Measurement Framework

The PAS PMF includes the overall approach, key indicators for performance measurement and reliability assessment to respond to data quality issues.

Approach and Key Indicators in Performance Measurement: Figure 1 outlines the approach to PFM for the PAS Project. The key performance indicators are distinguished for service delivery outcomes (or main goals of public services) and intermediate operational outcomes that reflect the plans and reforms needed to achieve the service delivery goals. This enables distinct identification of goals and reforms needed to achieve these goals. Goals are identified on the basis of a review of the Government of India (GoI) and state government objectives. Table 2.1 (in Chapter 2) provides details of key service goals and related benchmarks for: (a) universal coverage; (b) levels and quality of services; and (c) financial sustainability.

Figure 1: PAS Performance Measurement Framework



Intermediate outcomes reflect reforms needed to achieve the service goals as illustrated in Figure 2.2 (in Chapter 2). Many programmes by the GoI and some state governments have linked programme funding to the implementation of key reforms that represent such intermediate outcomes. For example, under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) two key reforms focus on access for the poor and on ensuring financial sustainability in operations through full recovery of operation and maintenance costs through user fees. Based on this, 10 key reforms cutting across the three sub-sectors have been identified, as shown in Table 2.2 (in Chapter 2).

In the PAS PMF, additional indicators have also been identified for local government actions to improve performance on equity, non-revenue water, water quality and cost recovery. While goals and reform indicators will be monitored by both higher levels and local governments themselves, indicators for local action are more suitable for local level planning and monitoring. (See Table 2.3 in Chapter 2.)

Reliability assessments for data quality: Data reliability scales have been developed for each indicator. Five scales of reliability are used: A+ being the highest reliability (fully automated systems for data management) and D being the lowest (no records maintained). The questionnaire used for PAS includes questions on data sources and data management for all key information. An advantage of this approach is that it eliminates subjective assessment of reliability estimates.

Use of PAS in state and local monitoring systems: Drawing on national and international experiences of benchmarking, it is evident that the effective use of performance indicators is essential to ensure its sustainability. The PMF has been developed with an idea of creating the necessary institutional incentives at both state and local levels. These institutional incentives result from the accountability faced by the urban local bodies (ULBs). Under the monitoring and improvement components of the PAS Project, PFM will be used for upward accountability through national and state monitoring, internal accountability through use of PFM in ULB level processes and downward accountability to customers through an effective consumer grievance redressal system.

Process of Developing the Performance Measurement Framework

The PAS performance measurement framework draws on the MoUD's SLB initiative as well as a review of international efforts, past studies in India and use of performance information at the state and local levels. Figure 1.1 (in Chapter 1) highlights the overall process followed in its development.

Review of international efforts in benchmarking: Over the past two decades, there have been a number of efforts to develop and standardise the approach to benchmarking in the water sector. Notable among them are the efforts of the International Benchmarking Network for Water and Sanitation Utilities (IBNET), American Water Works Association (AWWA) and the International Water Association (IWA). IBNET and AWWA provide ready–to-use templates and a web platform for data collection, analysis and dissemination of results. The benchmark indicators relate to coverage, service levels, efficiency and financial viability. Benchmarking has been used by utility associations in several different countries and regions for comparative assessments and process benchmarking. National governments have used benchmarking initiatives for performance-based grants. Regulatory agencies use comparative benchmarking to drive improvement in service performance. In other contexts, government owners use performance-based contracts as a regulatory tool.

Review of benchmarking studies and use of performance measurement in India: A few studies have been carried out for performance benchmarking in the water and sanitation sector in India. Unlike the international experience, these studies have been piloted in a few cities as 'one-off' exercises. Some of the issues related to standard definition and measurement that emerged through these few studies have been addressed in the recent GoI initiative to develop the SLB. In addition, performance information is being increasingly sought in reform-linked programmes, such as the JNNURM, as well as for various awards by state governments. State governments also collect performance information in their routine monitoring, though the reliability of this is not always ensured. The recommendation by the 13th Finance Commission that requires state governments to use benchmarking to access performance-based grants provides an incentive for state governments to make PAS activity more systematic, regular and reliable.

Various state governments have made use of urban water supply and sanitation (UWSS) performance information for their routine monitoring. Our review mainly focuses on the efforts in Gujarat and Maharashtra. UWSS performance information in Maharashtra has been used in that state for three types of activities: (a) their own reform-linked investment programme, that is, the Sujal and Nirmal Maharashtra Abhiyan (SNMA); (b) for an innovative and home-grown sanitation award scheme called the Sant Gadge Baba awards; and (c) for their regular routine monitoring. As compared to the national and state level studies and programmes, there is very little effort to understand and review the processes at the local level by ULBs. In Gujarat and Maharashtra the ULBs themselves are the service providers. It is important to involve the ULBs in data capture, analysis and review, and in the preparation of monitoring reports. ULBs can use PAS indicators for decision-making and for dissemination to the consumers. Mapping of some key processes and their assessment to improve information flows within a ULB is also necessary to improve decision making and increase efficiency.

Pilot test of Performance Measurement Framework: The PMF was pilot tested in 32 cities in the two states. The first step in pilot testing was to develop a questionnaire for data capture along with detailed guidelines. The questionnaire was developed as a spreadsheet to simultaneously generate key indicators. The key lessons drawn were in terms of the process of data capture and measures needed to address data availability and reliability. Based on the results and lessons from pilot tests as well as feedback from the Expert Group meeting held following the pilot tests, the questionnaire and PMF tool were finalised for the state-level roll out.

Stakeholder consultations: A number of different consultations were carried out during the development of the PMF. The main purpose of these consultations was to share the PMF tool with both local and state level stakeholders, and share the results emerging from the pilot tests. For this purpose, a number of meetings and workshops were held in both the states. Specific meetings with pilot city representatives were also held for orientation and to familiarise participants with the need for

performance measurement. These consultations have been carried out throughout the process of developing and pilot testing the PMF. They have both contributed to the conceptual issues, and helped to create awareness about the PAS Project. After the first round of surveys, the results will again be shared with these stakeholders through meetings, workshops and the web portal being set up for the PAS Project.

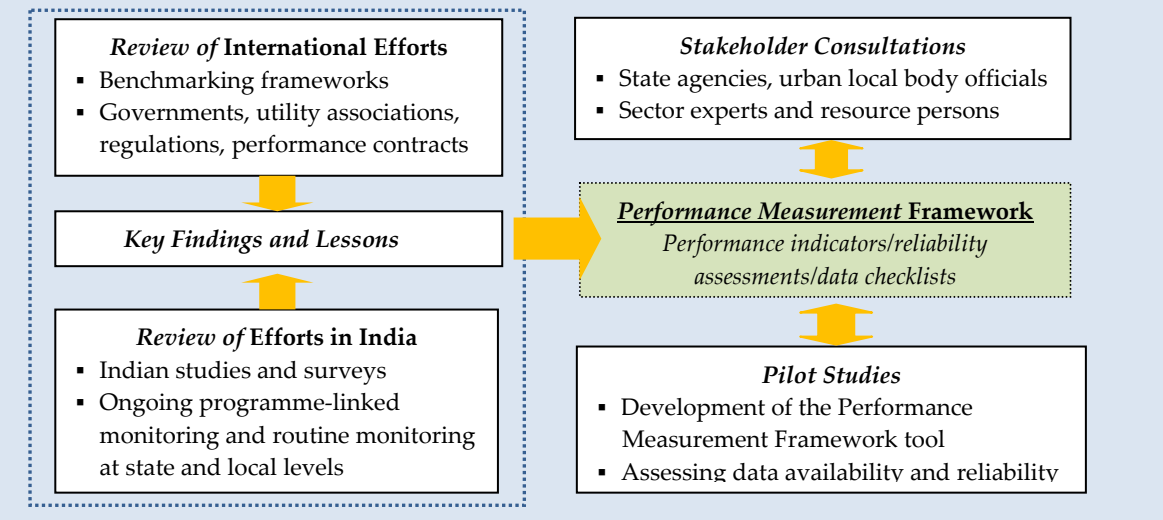
1. Introduction

Though access to water and sanitation services in urban India is widespread, there is not enough information about the quality and level of service, and coverage of poor households. This lack of adequate and reliable information is a key challenge in the sector in India. Very little is known about the quantity of water made available to people or of non-revenue water, or about quality of water and coverage of poor households. For new investments in water and sanitation to be effective, it is important to not only assess the performance of the existing system, but to also ensure its sustainability and reach for the poor and unserved sections of the population.

It is in response to this situation that Centre for Environmental Planning and Technology (CEPT) University is implementing the Performance Assessment System (PAS) Project, which is funded by the Bill and Melinda Gates Foundation. Its overarching aim is to develop a set of key performance indicators for urban water and sanitation, develop an assessment system at local and state level, and link the planning and fund allocation process to performance. The PAS project has three main components: (a) Performance Measurement; (b) Performance Monitoring; and (c) Performance Improvement. This report presents the Performance Measurement Framework (PMF) developed for the first component. The PMF has been developed for state-wide implementation in Gujarat and Maharashtra. It is being used to develop a water supply and sanitation performance profile for each of the over 400 urban local bodies (ULBs) in these two states. The results will be used for comparative monitoring and developing improvement plans.

The PMF draws on the Government of India's ongoing initiative of standardised Service Level Benchmarks (SLB) for urban water supply and sanitation sectors. For both Gujarat and Maharashtra, the year 2010 is a landmark – it is the golden jubilee year of their formation from the erstwhile Bombay state. Both state governments have ambitious programmes and targets for the golden jubilee year through the ongoing programme initiatives: the Sujal and Nirmal Maharashtra Abhiyan in Maharashtra and Swarnim Gujarat Goals (SGG) in Gujarat. Efforts have been made to link the PMF to these goals and reforms. The PMF also draws on an extensive review of previous benchmarking efforts internationally and in India.

Figure 1.1: Iterative Process of Developing PAS Performance Measurement Framework

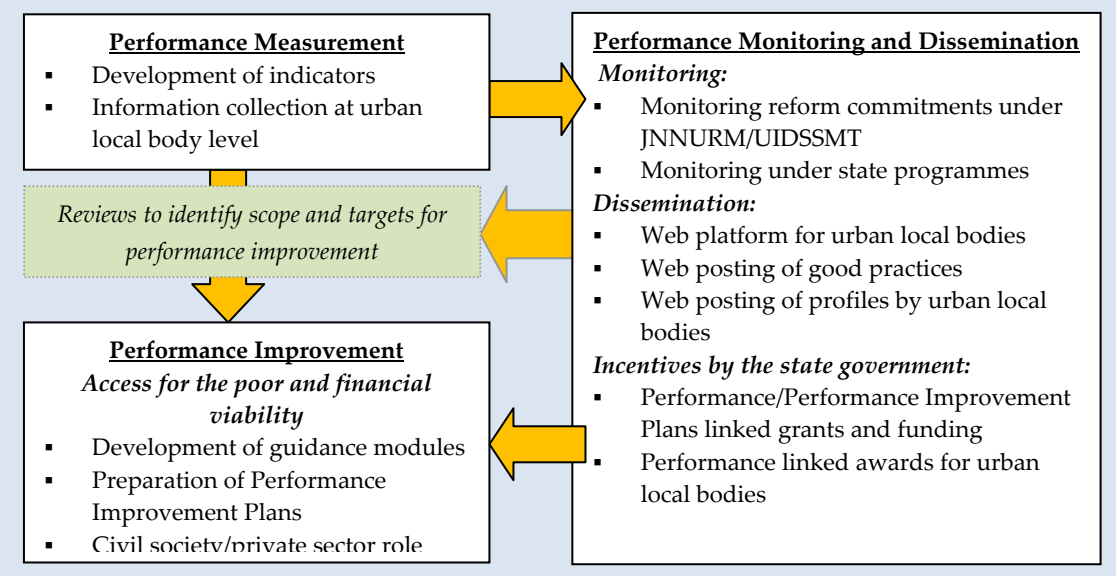


It includes key performance indicators for goals and reforms using an accountability framework. Efforts were also made to develop indicators to capture equity concerns and indicators for local level actions for performance improvement. A key lesson from previous such efforts in India has been the lack of reliable data. To assess this, the proposed PMF includes an approach to reliability assessment drawing on reliability assessment under the SLB as well as other international efforts.

A questionnaire was developed for data capture. This was field tested through pilot studies in each state and lessons were incorporated in the final questionnaire and in the guidebook. Extensive stakeholder consultations were carried out during the process of developing and pilot testing. Using this questionnaire, information is now being collected from all the 400 ULBs in Gujarat and Maharashtra.

Box 1.1: Performance Assessment System Project

The **Performance Assessment System** (PAS) Project aims to build an information system for all urban local governments in two states of India (Maharashtra and Gujarat). It aims to develop a reliable and sustainable PAS for urban water and sanitation services. It includes: **Performance Measurement, Performance Monitoring, and Performance Improvement**.



Performance measurement refers to development and implementation of measurement metrics. These relate to development of indicators for performance on service goals and reforms measures. ***Performance monitoring*** includes setting up appropriate systems at the state level for annual and real-time information, and detailed analysis of indicators, developing benchmarks, and documenting good practices. A dedicated web platform will be set up in each state to host this information with access by urban local bodies and other stakeholders. Performance monitoring will be also linked to performance linked grants, monitoring performance on reform commitments under the Jawaharlal Nehru National Urban Renewal Mission and rewards for better performing local governments. ***Performance improvement*** relates to use of information to improve service performance. The Project will provide support to local governments to develop performance improvement plans for reaching the poor and unserved, and increasing financial viability.

2. PAS Performance Measurement Framework

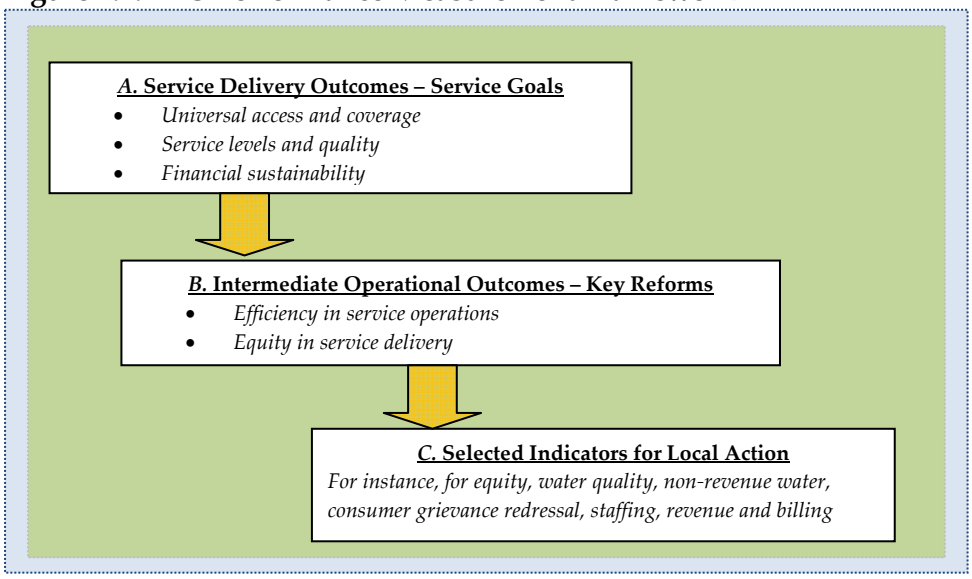
The PAS Performance Measurement Framework (PMF) is developed for urban water supply and sanitation, where sanitation includes management of excreta, wastewater and municipal solid waste including collection and disposal. This chapter presents the approach and key indicators for performance measurement. It also outlines the approach to reliability assessment to respond to data reliability issues.

2.1 Approach and Key Indicators in Performance Measurement

Figure 2.1 outlines the approach of Goals – Reforms – Local Actions as the performance measurement framework for the PAS Project.

The key performance indicators are distinguished for service delivery outcomes (or main goals of public services) and intermediate operational outcomes that reflect the plans and reforms needed to achieve the service delivery goals. This enables distinct identification of goals and reforms needed to achieve these goals. In the PAS performance framework additional indicators have also been identified for local government actions to improve performance on selected key reform areas such as equity, non-revenue water, water quality and cost recovery. While goals and reforms will be monitored by both higher levels and local governments themselves, indicators for local action are more suitable for local monitoring and for performance improvement planning.

Figure 2.1: PAS Performance Measurement Framework



A. Service Delivery Outcomes – Service Goals

Based on a review of objectives of the Government of India and the two state governments, the main service goals are for: a) universal access and coverage, b) adequate levels and quality of services, and c) financial sustainability in service operations. The SLB initiative of the Government of India refers to these goals as "benchmarks". Drawing on the SLB Initiative, and the Government of Maharashtra's SNMA and Government of Gujarat's SGG, the PMF has identified key service goals – five each for the three sub-sectors of water supply, wastewater and sold waste management. Table 2.1 provides details of these goals and related targets generally set out under these government initiatives.

Table 2.1: Service Goals: Key Performance Indicators and Benchmarks

<table>
<tr><th>Goals</th><th>Water supply</th><th>Sanitation/wastewater</th><th>Solid waste management</th></tr>
<tr><td rowspan="2">Universal access and coverage</td><td rowspan="2">1. Coverage: % of households with individual connections to water supply network (100%)</td><td>1. Coverage: % of households with access to individual toilets (100%)</td><td rowspan="2">1. Coverage: % of households and establishments covered by municipal daily door-to-door SWM services (100%)</td></tr>
<tr><td>2. Coverage: % of households with individual connections to sewerage network (100%)</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td rowspan="3">Service levels and quality</td><td>2. Per capita supply of water in litres per capita per day (lpcd): (172 lpcd for metro cities, 155 lpcd for other cities with sewerage and 92 lpcd without sewerage)</td><td>3. Collection efficiency: % collection of wastewater generated where sewerage/underground drainage exists (100%)</td><td>2. Collection efficiency: % collection of solid waste generated in the city (100%)</td></tr>
<tr><td>3. Continuity of water supply: (i) short term: daily supply at regular hours; (ii) 24*7 over time</td><td rowspan="2">4. Sewage treatment: % Capacity to treat wastewater collected through sewerage/open drains to required standards (100%)</td><td>3. Segregation: % of waste at disposal/treatment point segregated (100%)</td></tr>
<tr><td>4. Quality of water supplied: % of samples at WTP and consumer end meeting the required standards (100%)</td><td>4. Recycling: % of total solid waste recycled or processed (>80%)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Financial sustainability</td><td>5. Cost recovery: % recovery of O&M costs for water supply through ULB level taxes and charges (100%)</td><td>5. Cost recovery: % recovery of O&M costs for wastewater through ULB level taxes and charges (100%)</td><td>5. Cost recovery % recovery of O&M costs for SWM through ULB level taxes and charges (100%)</td></tr>
</table>

Note: Figures in brackets are the goals (benchmarks) under the GoI's SLB Initiative. Some benchmarks have been adjusted to reflect the Central Public Health and Environmental Engineering Organisation (CPHEEO) norms or the situation at the state level. For per capita supply refer CPHEEO (1999) Table 2.1, p. 11.

a. Universal access and coverage of services – Over the past few years, there has been greater recognition of the need to provide individual household-level services to all residents in an urban area. This is in response to demand pressures and rising income levels in urban areas. However, the articulation of this goal across the three different sub-sectors varies considerably:

- ***Water supply:*** In the last decade, basic access to water supply services in Indian cities has reached 96 per cent of the urban population. However, less than 50 per cent of population has

access to individual household-level water connections.[1] This highlights the importance of moving from community-level water provision to focussing on the goal of ***universal access to individual water connections.*** Universal access would also imply that the population residing in slum settlements has individual household level connections.

- ***Sanitation and wastewater:*** The situation in urban areas is quite bad regarding sanitation. It is estimated that around 75 per cent of the urban population has access to sanitation, but only about one-third of the households have individual toilets. The key concerns in urban sanitation relate to excreta disposal. Sewerage system exists in 35 per cent of large cities and, even in these, the average coverage is limited to 58 per cent of the population.[2] Thus, for sanitation access, two goals are important: ***universal access to individual toilets, and connection to a sewerage network***. It is likely that sewerage access remains a long-term goal for many smaller cities.

- ***Solid waste management:*** Solid waste services in urban India have received considerable importance in recent years due to the Supreme Court of India's directions to all urban local bodies (ULBs). There is a specific focus on door-to-door collection and segregation of waste. Thus, ***universal access to door-to-door services*** is an important service goal in India. It essentially refers to the proportion of total households that are provided such door-to-door services by a municipal authority for collection of solid waste.

b. Adequate levels and quality of services – The indicators for these goals relate to nationally agreed standards. The specific indicators for each sub-sector include:

- ***Water supply:*** The goals for level and quality of water supply services have generally been based on the norms set out by the Central Public Health and Environmental Engineering Organisation (CPHEEO) of the Government of India (GoI).[3] While these norms are used as design standards, in actual service delivery ULBs supply water for an average of two hours a day and the quantity of water supplied is often less than what the standards prescribe. Thus, the service goal for quality combines aspects related to *quantity* (per capita water supply), *continuity* (days and hours of water supply) and *quality* (of meeting the national norms in all seasons). In recent years, one concept that has captured the imagination of many policymakers is the ***24*7 water supply*** that helps to address aspects of quantity, continuity and quality of water supply.[4]
- ***Sanitation and wastewater:*** For wastewater, the emphasis on service quality is essentially in terms of proper collection of wastewater and quality of treatment to ensure that the norms for wastewater effluents set by national (CPHEEO and Central Pollution Control Board) and state agencies (such as the State Pollution Control Boards) are met effectively. This necessitates

[1] Based on analysis reported by JMP (2008). This may be even more pronounced as more detailed inquiry in India based on a recent countrywide Health Survey suggests that overall access to basic services is 95 per cent as compared to the JMP projections of 96 per cent. National Family Health Survey (NFHS) was conducted in 2005-06 which provided country- and state-wide estimates for urban areas. See UHRC (2008) for NFHS results.

[2] As given in NIUA (2005): The study covered 300 cities including metropolitan and selected Class I and II cities.

[3] CPHEEO 1999a, 1999b and 1999c. These largely reflect the international norms as set out by the World Health Organization (WHO).

[4] Besides providing continuous water supply, 24*7 helps to avoid excessive use through better demand management, and to improve water quality as the seepage into pipe network is avoided. Continuous supply also enables use of consumer metering. It would be less expensive if all the coping costs are taken into account. Finally, it makes it possible to provide continuous water supply all consumers, including poor households, who are otherwise unable to afford the storage costs to ensure continuous supply in their dwellings. (Refer Dahasahasra 2007 and Jacobs 2007.)

adequate capacity for both collection of wastewater and treatment. Consumer grievance redressal is also critical in ensuring service quality.

- ***Solid waste management:*** The focus in solid waste management (SWM) is on ensuring quality of collection, especially to ensure segregation of municipal waste to meet the standards as laid down by the GoI in the Solid Waste Management and Handling Rules, 2000.

c. Financial sustainability in service operations – In improving water and sanitation services, an emphasis is generally needed on financial sustainability. For example, previous studies suggest that most cities in India fail to recover their operation and maintenance (O&M) costs.[5] In India, the emphasis is placed on recovery of O&M costs, as the capital investments in urban WSS is usually supported with grant funds from state and national governments. For example, under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), capital funds for water supply and sanitation is provided by the national and state governments as grants on a condition that ULBs will achieve 100 per cent recovery of their O&M costs through local charges and taxes. The key indicators across the three sub-sectors thus focus on assessing the extent of recovery of O&M costs. An important aspect here is to properly measure O&M costs including provision for regular and preventive maintenance. Often, ULBs do not provide for adequate preventive maintenance needed to ensure infrastructure sustainability.

B. Intermediate Outcomes – Key Reforms

Intermediate outcomes reflect reforms needed to achieve the goals or service delivery outcomes. To identify the key reform measures, specific actions needed to achieve the service goals were identified. This is illustrated for water supply in Figure 2.2.

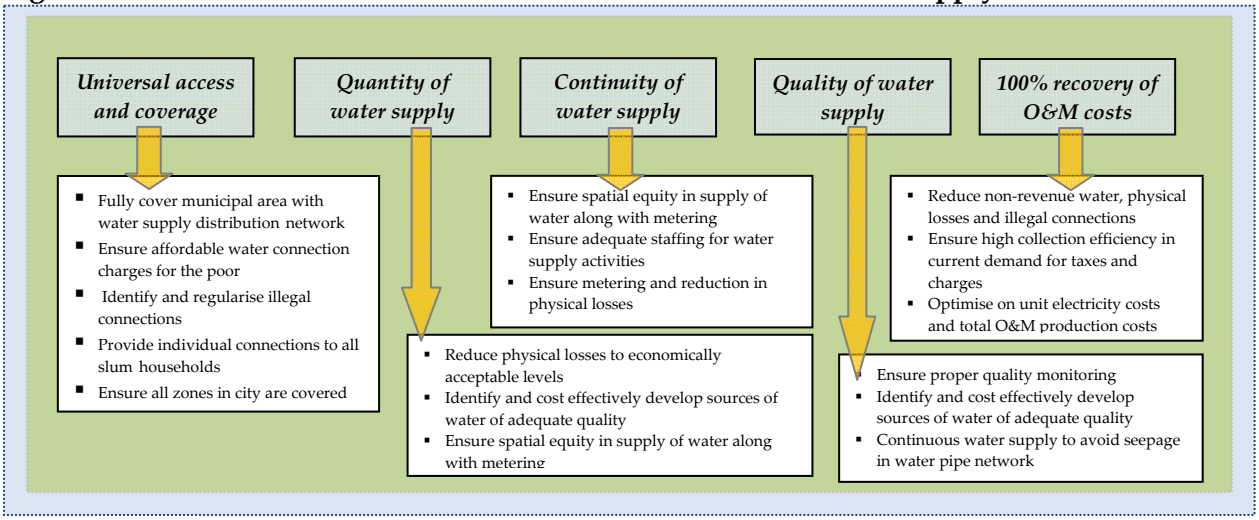
Many programmes by the Government of India and some state governments have linked programme funding to implementation of key reforms. For example, under the JNNURM two key reforms focus on access for the poor and on ensuring financial sustainability in operations through full recovery of O&M costs through user fees. Similar measures are also envisaged under the programmes of the two state governments: the Sujal Nirmal Maharashtra Abhiyan (SNMA) of the Government of Maharashtra and Swarnim Gujarat of the Government of Gujarat.[6] The review of other national and international benchmarking efforts also suggests several intermediate outcome indicators that need to be captured. A key gap in the current benchmarking efforts relates to measuring equity in service delivery. In low and medium income countries like India, with nearly one-fifth of urban population residing in slums, it is important that equity in service delivery is captured in performance assessment.

Based on these factors, key reforms have been identified and grouped in those related to: (a) efficiency in service operations; and (b) equity in service delivery. An effort has been made to identify reforms and related key performance indicators for which it is possible to specify benchmarks. It is likely that some of the indicators suggested for local action in the next section may move here after the first round of comparative assessments are completed across all the cities.

[5] For example, in the MoUD and ADB (2007) study only seven out of 20 cities, and in the CRISIL (2007) study only three out of 10 cities, covered their O&M costs through local taxes and charges for water supply. An older study of 300 towns and cities also reports that 80 per cent were unable to cover their O&M costs for water supply (NIUA 2005).

[6] The reforms under these programs are captured to some extent in Annex A.

Figure 2.2: Illustrative Reforms to Achieve Service Goals for Water Supply



a. Efficiency in service operations is a key aspect for improving service delivery. This helps in improved services as well as reduction in costs. Drawing on various earlier efforts and commonly accepted good practices identified in Table 2.2, a set of key performance indicators (Table 2.3) have been identified.

Table 2.2: Possible Reform Actions to Achieve Service Goals for all Sub-sectors

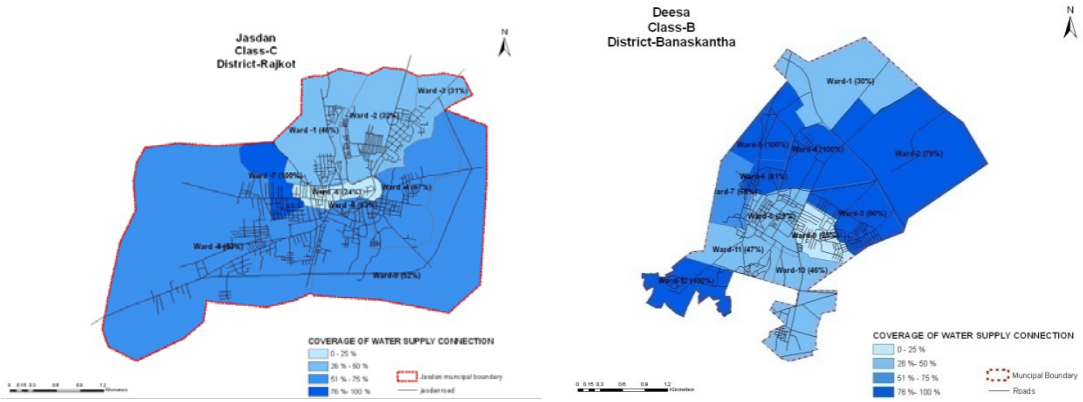
	Reform actions
	Efficiency in service operations
1	Ensure reduction of non-revenue water to acceptable benchmark levels
2	Ensure treatment of wastewater to acceptable standards
3	Plan for reuse of wastewater for unbilled uses (for example, parks) and for billed uses (for example, industry/agriculture)
4	Ensure that solid waste disposed through landfill is through scientific landfill sites
5	Efficiency in consumer grievance redressal as per service charter for all three sub-sectors
6	Introduce full metering and ensure functioning for all water supply connections
7	Improve collection efficiency of current demand for: (a) water supply; (b) wastewater; and (c) SWM
	Equity in service delivery
8	Ensure access to individual connections/services for all households across different zones in the municipal area for water supply, wastewater and solid waste collection
9	Ensure full coverage of individual services in slum settlements for all three sub-sectors

For water, the emphasis on efficiency is captured through two critical parameters related to reduction of non-revenue water (NRW) and extent of metering of water connections. Both are important steps in moving towards the service goal of 24x7 water supply and improving overall efficiency in service delivery. For wastewater and SWM, the emphasis is on quality of wastewater treated and scientific disposal of municipal waste as well as the extent of reuse of wastewater or recovery of municipal waste. The approach to implement improved service levels also reflects a goal of strong consumer orientation as reflected in the service charters for urban local governments and adherence to these in meeting consumer grievances. For urban local governments, consumer complaints are linked with adequacy of services. Thus, efficiency in addressing and resolving consumer grievances is an important measure of good service delivery.

Efficiency in collection of local taxes and charges is important in achieving financial viability. This is an important aspect that needs emphasis before resorting to tariff increases to avoid passing costs of inefficiencies onto consumers.

b. Equity in service delivery: Two aspects of equity are important for delivery of water supply and sanitation services in Indian cities. In most Indian cities there is considerable spatial variation in access to individual services due to inadequate network. These variations can be minimised by extending trunk and distribution network in unserved areas. For measuring spatial variations in service levels, it is important to define the spatial unit of measurement. Generally information within a ULB is available for many different spatial units. For example, population information is available for census wards, which are different from the electoral wards. There are also administrative zones, water supply zones and solid waste zones. Given the diversity of spatial units at which information is maintained in Indian cities, a flexible approach has been adopted for the PAS Project. Information about various zones in a city is mapped and analysis is done through maps. An indicator for spatial equity in services is captured through coefficient of variation. This analysis will also be backed by appropriate representation on maps for ease of visualisation. Under the PAS Project, basic maps will be prepared for all ULBs to enable spatial analysis of selected key indicators (Figure 2.3).

Figure 2.3: Spatial Analysis Using Maps



A second set of equity concerns relate to problems faced by slum dwellers in accessing water and sanitation services through individual connections. While it is common in most Indian cities to provide shared services in slum areas, slum residents have poor access to individual services. This may be due to policies that link provision of house level service to tenure issues, high cost of connection relative to income or procedural issues that require time and effort to overcome bureaucratic hurdles. Equity in service provision is captured by an indicator that reflects coverage of household level individual services (for water supply, sewerage, toilets and door-to-door solid waste collection) in slum settlements.[7] Slum settlements include both notified and non-notified settlements; special efforts may be required to identify all slum settlements.

[7]The definition of slum areas used is as adopted by the Census of India 2001 as follows: i) All areas notified as 'Slum' by state/local government and UT administration under any Act; ii) All areas recognised as 'Slum' by state/local government and UT administration, which have not been formally notified as slum under any Act; iii) A compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities. However, for cities smaller than 100,000 population, settlements with at least 25 households are also considered as slum settlements as per the Draft Slum Policy of the Government of Gujarat.

Table 2.3: Key Performance Indicators and Benchmarks to Monitor Reforms

	Performance indicator	Benchmark
	Efficiency in service operations	
1	% of non-revenue water to total water supply*	<25%*
2	% of wastewater samples treated to required standards*	100%*
3	% of wastewater reused for billed or unbilled uses*	>20%*
4	% of municipal solid waste disposed off through scientific landfill sites*	100%*
5	Efficiency in consumer grievance redressal as per service charter for all three sub-sectors*	100%*
6	% of total water supply connections with functional meters*	100%*
7	% collections to current billed demand for all three sub-sectors*	>90%*
	Equity in service delivery	
8	Coefficient of variation (standard deviation divided by mean) of zonal values of indicator denoting % of households with individual household level connection/service and per capita for water supply, wastewater and solid waste collection**	0
9	% of slum households with: (a) individual water connections; (b) individual toilets and sewerage connections; and (c) and door-to-door solid waste management collection	100%

*Note: Indicators with asterisks (*) are covered under the GoI's SLB Initiative; ** The coefficient of variation (CV) or 'relative variability' equals the standard deviation divided by the mean. It is expressed as a ratio.*

C. Indicators for Local Action

Under the PAS performance measurement framework (PMF), the concept of additional indicators for local action has been introduced for some of the key performance indicators. These indicators are often referred to as 'drill-down' indicators as they serve two important purposes. First, they provide more details on the key performance indicators and help explain the indicator better to the utility managers. Second, and more importantly, these indicators help in identifying local actions required to achieve improved performance on service goals and reforms.

Table 2.4 provides details of categories of local action indicators across the main goal and reform themes. Some of these are described further along with illustrative indicators. It is expected that, as the local ULBs become familiar with PAS and begin to use it more effectively for local level planning and decision-making, there may be a need to develop more indicators for local action and refine the ones suggested here.

Table 2.4: Categories for Local Action Indicators

Goals and reform themes	Category of local action indicators
Access and coverage	Coverage of utility network across the city
Service levels and quality	Quantity of water supply
	Quality of water supply
Financial viability	Unit costs and revenues
	Tariffs and billing
Goals and reform themes	**Category of local action indicators**
Efficiency	Non-revenue water and physical losses
	Storm water network
	Complaint redressal
	Staffing
Equity	Equity across slum settlements

Access and coverage: An analysis of the gaps in service provision of household connections requires an assessment of the distribution or collection network in the city. Table 2.5 lists the related indicators.

Table 2.5: Indicators for Local Action: Access and Coverage

	Storm water drainage
Coverage of utility network across city	% of inhabited municipal area covered with water supply distribution network
	% of inhabited municipal area covered with sewerage network
	% of inhabited municipal area covered with sewerage and sullage network
	Coverage of storm water drainage network

Quantity and quality: For water supply, the most common problem generally articulated is the lack of availability of sources to meet the current and projected demand. This requires an assessment of availability of total supply from current sources and through ongoing projects. In case of issues related to water quality monitoring, it would be necessary to assess quality at all critical points such as a source, water treatment plant, water distribution system and at the consumers' end to identify the probable location of the problems. Table 2.6 provides illustrative indicators.

Table 2.6: Indicators for Local Action: Quantity and Quality for Water Supply

	Water supply
Quantity	Percentage of estimated water demand over next three years to available supply from all current sources and immediate plans to augment through ongoing projects (%)
	% of connections that are metered
	% of meters that are functional
	Average consumption per connection (for residential and others) where consumer meters are in place and are functional (litres/day)
Quality	Quality of water supply at source (fluoride)
	Quality of water supply at water treatment plant (residual chlorine (RC), bacteriological, total dissolved salts (TDS))
	Quality of water at elevated service reservoir level (RC, bacteriological, TDS)
	Quality of water at consumers' end (RC, bacteriological, TDS, fluoride)

Non-revenue water and physical losses: A key aspect among most water utilities worldwide is to focus on managing NRW to acceptable limits. In many countries, performance contracts with public or private water utilities use NRW as a key performance measure.[8] Despite the importance of NRW to ensure efficiency in service provision and avoid unnecessary leakages and losses, this has not received adequate emphasis in most Indian cities and in the water sector in India in general. Under JNNURM and in Maharashtra, water audits have been advocated to avail funding for water sector projects. This has made it possible to find out the extent of NRW including physical losses and unauthorised use through illegal connections. Given a scenario that most cities in India do not practice metering, the challenge is to devise simple methods that can be used to estimate water supply and water consumption.

Based on the literature available for non-revenue water assessment, management of physical losses, and the emerging experience from selected cities in Maharashtra, three types of indicators for local action have been identified (refer to Table 2.8).

The first set of indicators identifies the share of ***different components of NRW*** drawing mainly on the water balance approach developed by the International Water Association (IWA) (Table 2.7). The IWA

[8] For example, this measure is used in the annual performance contract between ONEA, the public water utility in Burkina Faso, and the national government of Burkina Faso. Similarly, the utility in Uganda uses physical losses as one of the performance indicators for its internal contracts. On the other hand, in Senegal this is an important parameter in performance contracts between the private operator (SDE) for urban water services, SONES the asset holding company and the Water Department, Government of Senegal. Refer to Baieti *et al*. (2006), Tremolet (2005) and Brocklehurst (2004) for more details and cases.

distinguishes between authorised consumption and water losses. Unbilled authorised consumption may consist largely of supply to parks, temples and such other uses that are not charged. In most Indian cities apparent losses largely comprise unauthorised use of water through illegal connections. While this has been difficult to measure, a few cities in Gujarat and Maharashtra have taken steps to identify and regularise illegal connections. The real physical losses are likely to be high, especially in cities with old distribution networks and in service connections that lack adequate maintenance and quality control. While it may be possible to estimate leakage on transmission and distribution mains, it would be difficult to estimate leakage on service connections because of unauthorised consumption from illegal connections. An indicator is suggested to capture the regularisation of all identified illegal connections.

Table 2.7: Water Balance Chart from International Water Association

System input volume	Authorised consumption	Billed authorised consumption	Billed metered consumption	Revenue water
			Billed unmetered consumption	
		Unbilled authorised consumption	Unbilled metered consumption	Non-revenue water
			Unbilled unmetered consumption	
	Water losses	Apparent losses	Unauthorised consumption	
			Customer metering inaccuracies	
		Real losses	Leakage on transmission/distribution mains	
			Leakage and overflow at utility's storage tanks	
			Leakage on service connections up to point of customer metering	

Source: Alegre et al. 2006, Table 60, p. 128.

A second set of indicators assess performance in relation to the network characteristics. Two indicators for losses per connection per metre of pressure levels, and losses per kilometre (km) of main network help assess the extent to which physical losses can be economically managed. The indicator for Unavoidable Annual Real Losses (UARL) measures the lowest technically achievable real loss for well managed and well maintained systems with more than 5,000 service connections. Based on UARL, an Infrastructure Leakage Index can be calculated as a ratio of current annual volume of real losses to UARL.

The third set of indicators for local action helps to measure the financial impact of physical losses. One indicator measures the annual costs of real losses and the other indicator measures annual revenue loss from NRW. This indicator is relevant in those ULBs that levy water charges through meters and have a high proportion of connections monitored through functional meters.

Table 2.8: Indicators for Local Action: Non-revenue Water

Water balance	% Authorised and unbilled consumption to total supply
	% Losses from source to water treatment plant (WTP)
	% Losses from WTP to water distribution station (WDS)
	% Losses from WDS to final consumption (includes both leakage on service connections and unauthorised consumption)
	% of identified illegal connections that are regularised
Indicators for operational assessment of water losses	Water losses per connection (litres)
	Real losses per service connection per month per meter (head) pressure (litres)
	Water losses per mains length (litres)
	Unavoidable Annual Real Losses (UARL) (million litres)
	Infrastructure Leakage Index (ratio)
Indicators for financial impact of water loss	Annual cost of losses (real and apparent) (rupees)
	Annual revenue loss from NRW (rupees)

Sources: Compiled from IBNET, Alegre et al. 2006 and Agarwal 2008.

Complaint redressal and staffing: Complaints from consumers are an important measure of service delivery. A set of indicators related to complaints and staffing are listed in Table 2.9, to provide a more detailed look at the nature of complaints and the staffing pattern. For complaint redressal it is important to find out the share of different types of complaints that are received for each of the three sub-sectors. Table 2.9 lists the more common complaints from those listed in the service charters used in most cities. These indicators need to be reviewed and refined based on results from pilot studies. For staffing, adequacy of staff could be a key issue, especially in smaller towns. At present, in both Gujarat and Maharashtra there is a cap on any new recruitment by municipalities. It is therefore useful to assess the extent to which the approved positions have been filled for each of the three sub-sectors. Also, details on total staff in relation to operational size of the ULB in terms of total connections or road length for sweepers is important. Once comparative information across cities is available, useful benchmarks can be developed.

Table 2.9: Selected Indicators for Local Action: Efficiency in Complaint Redressal and Staffing

	Water supply	**Wastewater**	**Solid waste management**
Complaint redressal	1. Total complaints in water supply per 1,000 connections per year	1. Total complaints in wastewater per 1,000 connections	1. Total complaints in solid waste per 1,000 households
	2. Complaints for pipe breaks and leakages per 1,000 connections per year	2. Complaints for sewerage blocks per 1,000 sewerage connections per year	2. Complaints related to garbage collection per 1,000 households per year
	3. Complaints for low pressure per 1,000 connections per year	3. Complaints for damaged/overflowing manholes per 1,000 sewerage connections per year	3. Complaints related to street sweeping per 1,000 households per year
	4. Complaints for water quality per 1,000 connections per year	4. Complaints for leakage/overflowing lines per 1,000 sewerage connections per year	4. Complaints related to odour/nuisance due to dumpsites/transportation, etc. per 1,000 households per year
Staffing	5. % of staff recruited for water supply to total sanctioned staff strength as per type of ULB	5. % of staff recruited for wastewater to total sanctioned staff strength as per type of ULB	5. % of staff recruited for solid waste management to total sanctioned staff strength as per type of ULB
	6. Total staff (regular and contract) per 1,000 water supply connections	6. Total staff (regular and contract) per 1,000 wastewater connections	6. Total staff (regular and contract) per 1,000 households
			7. Total sweepers per km of road length swept

Costs, revenue and billing: Unit costs and revenues are estimated for assessing across cities. Given the fact that ULBs often do not segregate costs and revenues across different services, combined O&M cost recovery from local sources is also assessed across all three sub-sectors. Table 2.10 provides illustrative indicators.

For measuring collection efficiency two aspects are important. First an estimate of total year-end receivables in relation to total annual operating revenues allows an easy assessment of the magnitude of the problem. It also enables comparison across other utilities as this is an important indicator in most utility benchmarking efforts in the water sector. Second, pilot studies suggest that arrears form a major portion of the accounts receivable in many instances. ULBs can focus on increasing the efficiency of arrear collection and introduce innovative incentive mechanisms for it.

Table 2.10: Selected Indicators for Local Action: Cost, Revenue and Billing

	Water supply	Wastewater	Solid waste management
Overall cost recovery	Recovery of total O&M costs for water, wastewater and SWM from local taxes and charges (%)		
Unit cost	Unit electricity cost per production of water supply (Rs/Kl)		
	Unit O&M cost of production of water supply (Rs/Kl)	Unit O&M cost of conveyance and treatment of wastewater (Rs/Kl)	Unit O&M cost of solid waste management (Rs/tonne)
Unit revenue	Average revenue per water connection (Rs)	Average revenue per sewerage connection (Rs)	Average revenue per household (Rs)
Collection efficiency	Collection period for water supply charges (days)	Collection period for wastewater charges (days)	Collection period for SWM charges (days)
	Billed arrears to total billed demand (%)	Billed arrears to total billed demand (%)	Billed arrears to total billed demand (%)

Flooding Incidents: Another aspect related to network efficiency for storm water is the incidence of water logging/flooding in cities. Table 2.11 lists the related indicator.

Table 2.11: Selected Indicators for Local Action: Efficiency of Storm Water Network

	Storm water drainage
Efficiency of storm water network	Incidence of water logging/flooding

Equity: The equity concerns faced by those residing in slum settlements in accessing water and sanitation services has generally been attempted through adequate provision of shared services. However, in the past years, the focus has shifted to individual household level water and sanitation services in slum areas. Thus, local action needed to improve the access of slum residents to individual household level services becomes important. The indicators for local action are identified to capture this aspect.

For ensuring equity, it is important for the ULB to ensure that average monthly bills for these services for the general population, especially for slum settlements, are within an acceptable range of affordability. While detailed data on household income for each city is not available, state-wide average incomes for the poor may be used for estimating the average bill as a share of average monthly incomes. While no commonly accepted standards are available, generally up to 2.5 per cent of monthly household income is considered as affordable total expenditure on these services.[9] Current data systems at city level do not permit an assessment of total bills or revenues generated from residential connections. A separate assessment for slum settlements is even more difficult. Yet, an effort will be made to review the possibility of generating this data for inclusion during the second round of data collection.

Measures and indicators discussed in Table 2.12 will also help to address inequities in coverage across different zones in the city. This can be useful in preparing infrastructure proposals.

[9] For example, the Environment Protection Agency (EPA) in the USA has historically used 2.5 per cent of monthly household income as its affordability criterion for water and wastewater services (ASDWA n.d.).

Table 2.12: Selected Indicators for Local Action: Equity

	Water supply	Wastewater
Equity across slum settlements	Population per shared/community stand post in slum settlements	Population per toilet seat in community toilets in slum settlements

It is expected that after the completion of the first round of surveys in all cities of Gujarat and Maharashtra, and the use of local action indicators at city level, it will be possible to identify more indicators as appropriate from the detailed questionnaire developed under the PAS Project.

2.2 Reliability Assessment of Key Performance Indicators

Past experience of reliability assessments: Reliability assessment of key performance indicators is important when a comparison is made across cities and different service providers. The two key international benchmarking frameworks for water supply industry have used reliability assessment. The International Benchmarking Network for Water and Sanitation Utilities (IBNET) provides a simple framework of reliability through 'confidence-bands' as described in Table 2.13. The reliability framework of the IWA also uses the concept of data reliability and accuracy for its input data (refer to Table 2.14). It uses accuracy bands with ranges from (+/-) 5 per cent to > (+/-) 50 per cent. Based on this bands for reliability are developed, ranging from highly reliability data based on sound records to lowest reliability based on extrapolation or unreliable data.

Table 2.13: Confidence Band Definitions from IBNET

Band	Description
A	Based on reliable records, procedures, investigations or analyses, that are properly documented and recognised as the best available
B	Generally as in band A, but with minor shortcomings, for example, some documentation is missing, the assessment is old, or some reliance on unconfirmed reports or extrapolation is made
C	Extrapolation from a limited sample for which Band A or B information is available
D	Based on the best estimates of utility staff without measurement or documented evidence

Source: Based on IBNET Toolkit Instructions from website: www.ib-net.org

Two of the previous efforts in India on performance assessment (NIUA 2005 and MoUD-ADB 2007) did not provide reliability scales. Another study on performance assessment carried out by CRISIL Advisory Services discussed the reliability concerns (CRISIL 2007). This framework has been developed further under the standardised Service Level Benchmarks (SLB) initiative of the GoI. It uses similar principles as those of the IBNET and IWA, but provides reliability estimates through a series of objective measures (refer Table 2.15 for a sample reliability assessment under the SLB). The SLB initiative has developed reliability scales for all the key performance indicators. Given the severe data availability issues, the SLB approach provides clear directions on assigning reliability levels.

Table 2.14: Accuracy and Reliability Bands of IWA

Accuracy band	Associated uncertainty	Reliability band	Definition
0-5%	Better than or equal to ±5%	☆ ☆ ☆	Highly reliable data source: data based on sound records, procedures, investigations or analyses that are properly documented and recognised as the best available assessment methods
5-20%	Worse than ± 5%, but better than or equal to ±20%	☆ ☆	Fairly reliable data source: worse than ☆☆☆ but better than ☆
20-50%	Worse than ±20%, but better than or equal to ±50%	☆	Unreliable data source: data based on extrapolation from limited reliable samples or on informed guesses
>50%	Worse than ±50%		

Source: Alegre et al. (2006) Table 2, p. 14.

Table 2.15: Reliability Assessments under SLB Initiative

Continuity of water supply			
Definition	Continuity of supply is measured as: Average number of hours of pressurised water supply per day		
Description	Continuity = a, Where a is the average number of hours of pressurised supply (hrs)		
Frequency of measurement: Monthly		**Spatial unit of measurement**: Zone/DMA level	
Reliability A	**Reliability B**	**Reliability C**	**Reliability D**
Calculation based on detailed operational records at each of the valve operating points. Pressure adequacy and number of hours of supply at consumers' end is assessed on basis of statistically valid sample survey, across all zones in the city.	Calculation based on detailed operational records at each of the valve operating points. Pressure availability at the consumers' end is assumed to be adequate and meeting the stated norms.	Not applicable	Estimation of number of hours based on feedback from field level engineers. Zone-wise data is not available.

Source: MOUD (2009), op. cit.

Reliability assessments for data quality: The PAS project has adapted the reliability scales of the SLB approach and the IBNET. Thus, reliability scales have been developed for all the key performance indicators for goals and reforms. Table 2.16 explains the reliability scales for an indicator along with possible actions for improving reliability of the information. Five scales of reliability are used: A+ being

Table 2.16: Approach of Reliability Assessment under PAS Project

Reliability score	Description	Actions needed to achieve reliability
A+	Automated data systems linked to GIS platform, and regularly updated	Develop GIS linked computerised registers, among others
A	Automated data systems, with regular updating	Computerise system of data capture and analysis to generate information for performance indicators on a regular basis
B	Manual systems of data recording, with periodic updating	Introduce proper manual registers and log books, and so on, as appropriate with at least periodic updating
C	Partially developed manual systems of recordings, with extrapolation of missing data.	Develop a system of manual records for registers, log books, etc
D	Estimates as reported by the service provider without appropriate systems of data recording	–

Note: This approach has been adapted from the IBNET's reliability bands and the GoI's SLB initiative.

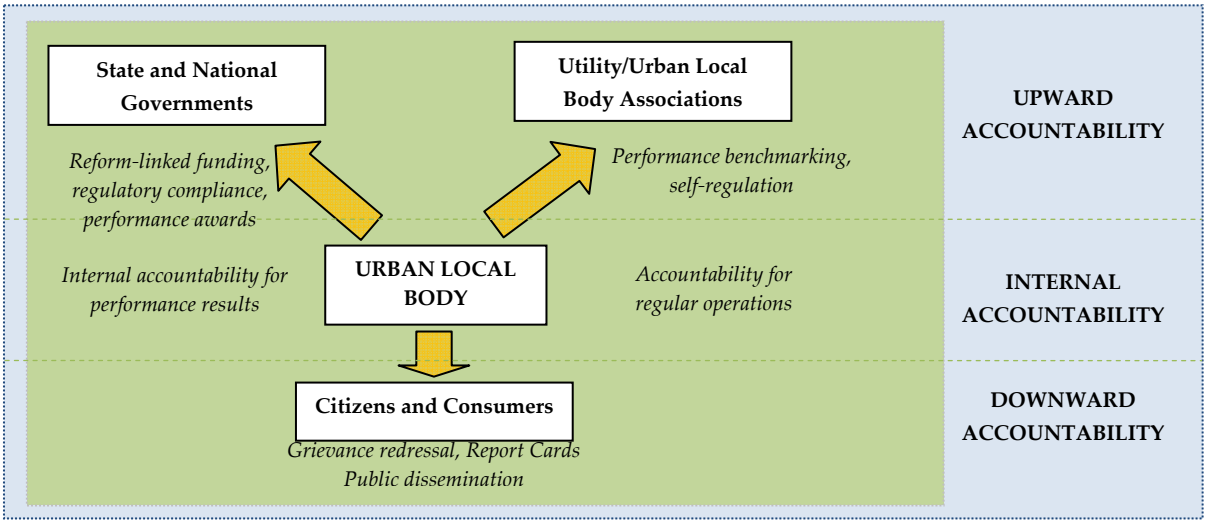
The highest reliability (fully automated systems for data management) and D being the lowest (no records maintained). Questions related to data systems and data management are included in the questionnaire. This enables direct computation of reliability from the questionnaire rather than subjective assessment of reliability in other performance measurement practices.

Reliability scales have been developed for all key performance indicators. When reliability measures are associated with each key performance indicator, it enables a transparent and consistent comparison across all ULBs. It also informs ULBs about the quality of their existing data systems, and encourages them to keep making improvements in their data management. After the first round of surveys, key actions for improvements in data systems will be explored with selected ULBs. In addition, where appropriate, state-wide information system improvement efforts will also be supported.

2.3 Linking PMF to Accountability in State and Local Monitoring Systems

A key issue in performance measurement relates to its use within an organisation. Currently there are few incentives or a limited framework of 'rewards and punishment' linked to service delivery in most ULBs in India. Drawing on the national and international experiences in such benchmarking, it is recognised that there must be effective use of performance indicators at the local level to ensure its sustainability. The performance measurement framework (PMF) in the PAS Project has thus been developed to create the necessary institutional incentives at both state and local levels, which will promote its use and work towards improving performance. These institutional incentives are seen within the framework of accountability faced by the ULBs. In the local governance system in India, ULBs are faced with three types of accountability as illustrated in Figure 2.4: upward, downward and internal accountability within the local body.

Figure 2.4: Accountability and Incentives for Performance Measurement and Monitoring



Upward accountability is of two types: mandatory requirements generally to higher levels of government (for example, state and/or national governments, or where relevant, to a regulator); and voluntary requirements to associations of ULBs which are often engaged in benchmarking across their members. As a mandatory requirement, ULBs are required to routinely report to higher levels of governments. For example, under the JNNURM, every participating city is required to provide a quarterly progress report on a set of reform agenda indicators. Similarly, the state-level programmes – Nirmal Gujarat in Maharashtra and the Sujal Nirmal Maharashtra Abhiyan – require periodic information from ULBs. A key 'incentive' for the ULB and state government to use PAS will be to systematise the information at the ULB

and state level. A few cities have JNNURM cells focus largely on monitoring project implementation but do not have information on all aspects of the reform agenda. More recently, the 13th Finance Commission in its recommendations to the GoI has suggested a General Performance Grant for all local bodies in India linked to service performance for all ULBs. This Finance Commission recommendation provides an incentive for state governments to develop state-wide performance monitoring systems. However, as evident from the JNNURM experience, ULB capacities are limited to generate this information. The PAS PMF provides information that is on-line and in real time at both the ULB level and at the state government level to comply with the 13th Finance Commission recommendation and be eligible for performance grants.

Along with programme-linked monitoring, both states do have some form of routine monitoring. However, a more systematic incorporation of performance information in such monitoring is needed. A few countries such as Brazil and the Netherlands have included performance monitoring system and benchmarking into their water-related legislation and this provides an incentive to undertake performance measurement on a regular basis. This can be aided by the production and dissemination of a regular annual report on Sector Performance Assessment as is being done in many countries such as Australia, Brazil, the Netherlands, Zambia and Uganda. For states in India to adopt similar legislations, it will be necessary to explore possibilities of inclusion of performance monitoring in either the national-level water legislation or in the relevant state-level municipal legislation.

For voluntary reporting by the ULBs, the experience of the City Managers Associations in the states of Gujarat and Karnataka provide some useful lessons. In Gujarat the association collected information on key performance from a select group of municipalities in 2007. However, this has not been repeated again. On the other hand, in Karnataka, the City Managers Association has been working closely with the state government for the past five years. It would be useful to also explore the possibilities of making such voluntary reporting in Gujarat and Maharashtra based on PAS indicators.

Internal accountability Each ULB has its internal processes of accountability. Such accountability measures include some performance results for the ULB (for example, under the JNNURM reform commitments for cost recovery or access for the poor) or accountability in regular operations that are defined by internal processes linked to job descriptions of various staff dealing with water and sanitation. Key performance results for internal accountability on aggregate finances of the ULB and on ongoing projects are routinely collected. Many of these processes are linked to information flows within various tasks of urban water supply and sanitation departments. The information system for each of the ULBs has evolved internally over time, on its own, based on their requirements for regular functioning. Though regular reporting is done by lower levels of staff, the information collected is not generally useful to make informed decisions (for example, operation details are maintained for each pump, though quantities drawn by each pump are not noted).

Within the PAS framework, monitoring by the ULB will be enhanced through graphical interface modules, such as 'dashboards', for quick review and decision making. The dashboards are being developed by grouping together key and reform-based indicators with respect to likely action or decision areas of the ULB. The PAS project further intends to make a difference by including some key performance indicators related to water (for instance, cost reduction in supply, access to poor). For accountability in regular operations, the PAS Project will map a few key processes at the local level (see the description in section 3.2 on process mapping within ULBs), and examine process improvements to improve internal accountability.

The internal accountability is also linked to institutional structures in service delivery. Global experience suggests a preference for operational autonomy in planning and service operations, through autonomous

utilities owned by local or state governments. However, in India, and particularly in the two states of Gujarat and Maharashtra, such separation of operations is not practiced. It is the local governments that provide water and sanitation services directly through their own departments. The accountability structures and the incentive systems for performance in a local government structure are likely to be different from those for an independent utility. It will thus be useful to explore and design appropriate performance linked accountability and incentives in local government.

Downward accountability refers to a ULB's response to the residents or customers in terms of services provided. Information sharing with citizens by ULBs in India is, in general, very weak. Performance indicators of services, when available, are rarely shared with citizens and civil society organisations. E-governance (that is, use of websites, and Internet) for citizen interaction is often limited to payment of taxes. Procurement decisions are still not open and transparent. It was for these reasons that the JNNURM reform agenda includes promoting downward accountability of urban local governments to its residents. It requires state governments to enact a public disclosure law and provide information on a range of financial transactions to citizens. It also requires states to promote community participation through ward committees and 'area sabha' to be constituted under a community participation law. Despite the fact that these reforms are mandatory, many states have not yet constituted such laws. A few states that have complied with these requirements have enacted the laws but have made little effort to implement them. Citizens have to take recourse to the "Right to Information" Act, a national legislation that empowers citizen to obtain information from public entities.

Downward accountability is often articulated through an effective consumer grievance redressal system and through a transparent sharing of information. In many Indian states, the ULBs are required to have a citizen charter that lists the obligations of the ULB towards citizens and also identifies response time in addressing citizen grievances. While the consumer grievance system exists in many ULBs, its effective functioning has been a major issue. In most cases, citizens have to personally visit the ULB office to lodge a complaint. However, in a few cities, there are attempts to evolve a system of citizen interaction through call centres, toll-free numbers and SMS services. These systems record all the complaints received and track them till they are redressed. E-governance practiced in many ULBs allows citizen grievances to be recorded and tracked. However, it is seen that detailed analysis of nature of complaints and response time is not undertaken. There are no conscious efforts to analyse complaints in future planning and staff appraisals. Further strengthening is needed to improve the interaction with citizens and to promote use of analysis of consumer feedback in service planning. With self-assessment of property taxes, residents in many cities can compute their own taxes and pay them on-line. These initiatives have helped in improving citizen interaction. The PAS web portal intends to make a difference in increasing ULB-citizen interaction in provision of water and sanitation services. It will also enable citizens to become better informed about the performance of ULBs on water and sanitation.

3. Process of Developing the Performance Measurement Framework

The PAS performance measurement framework (PMF) described in the previous chapter was developed through an intensive review of international benchmarking efforts, past benchmarking studies in India and use of performance information at the state and local levels. It also draws upon the indicators developed under the Ministry of Urban Development's (MoUD's) standardised Service Level Benchmarks (SLB) initiative. Based on the review, a preliminary framework was developed along with a detailed questionnaire which was pilot tested in both states. In addition, a number of consultations were carried out with government officials, experts and resource persons. Figure 1.1 (in Chapter 1) highlights the iterative process that was followed. This chapter provides brief highlights of the process.

3.1 Review of International Efforts in Benchmarking

Since the mid 1990s, increasing attention has been paid to benchmarking performance of urban water service providers. The benchmarking concept was introduced in the private sector in 1981 by Xerox to identify the best performers in the sector and to adopt the best practices to achieve better performance. Since then the benchmarking framework has been adopted by different types of industry groups, governments, regulators, trade associations, academic associations and consultancy firms to manage, supervise or regulate service quality using performance indicators.

The initial development in benchmarking in the water sector was in Europe and North America. More recently, a number of efforts have been made to develop benchmarking frameworks specifically focused on the water and sanitation sector. These have been adapted for use by different players including utility associations, governments and regulators. Use of benchmarking in developing countries has gained increased momentum particularly through utility associations and governments. Indicators of performance are also increasingly used in performance-based contracts between governments and public utilities as well as private service providers.

Development of benchmarking frameworks for the water sector: Over the past years, there have been a number of efforts to develop and standardise the approach to benchmarking in the water sector. Among them some notable efforts have been made by the International Benchmarking Network for Water and Sanitation Utilities (IBNET) of the World Bank; the American Water Works Association (AWWA); and the International Water Association (IWA). Both IBNET and AWWA provide ready-to-use frameworks and a platform for data collection, analysis, quality check, dissemination of results and networking for the participants. These frameworks provide indicators for coverage, service levels, efficiency and financial viability.

The use of IBNET spans across 85 countries and over 2,000 utilities. It provides a platform for posting time-series information across participating utilities with user-friendly query features. IBNET has made some efforts to add specific indicators that focus on equity and access for the poor (see Box 3.1)

The IWA provides a baseline framework and guidelines for operators or associations that want to undertake benchmarking. Its framework has been used in many European countries. More recently, the IWA has initiated support to Water Operators Partnership (WOP) being developed with United Nations (UN) support. WOPs have become active in Africa and South-East Asia. At a regional level, the Asian Development Bank (ADB) has provided support to benchmarking efforts and facilitated development of utility data books across utilities in different sub-regions and countries in Asia. The IBNET and IWA have developed systems that enable monitoring of performance over the years, unlike ADB utility data books which have been largely a one-off effort.

Table 3.1: Frameworks and Indicators: IBNET, IWA and ADB Utility Data Books

IBNET system	IWA system	ADB (utility data books)
Consists of a 'dataset' broadly covering aspects of utility information, service area, water and sewerage service, financial and customer information. The indicators are drawn from the above dataset, along with additions of utility specific indicators. *No. of data items: 148* *No. of Performance Indicators (PI): 27 (including water and wastewater)*	Consists of broadly four parts, namely, 'data elements' that feed into variables used for the performance indicators. PIs are analysed further with respect to 'explanatory factors', and with reference to 'context information'. *No. of variables: 232* *No. of PIs: 170 (for water only)*	Consists of a set of PIs and utility profiles that are used for comparative performance across major utilities. *No. of PIs: 10 (for water only)*

Box 3.1: IBNET: Equity and Access for the Poor

Recognising that the vast majority of developing-country utilities fail to deliver services to significant populations residing within their nominal service areas, IBNET has introduced special indicators that focus on equity sand affordability aspects. This would help in measuring performance in serving poor consumers, along with other measures of efficiency and financial sustainability. IBNET has added two types of indicators:

a) those focussing on access to water and sanitation services for the poor – captured through an indicator of pro-poor options such as a standpost or community-managed kiosks for water, and shared toilet facilities; and

b) those focussing on affordability by assessing whether the utility offers a flexible/amortised repayment option to spread the costs of connection to the water network, and assessing the monthly water bill for a household consuming 6 M^3 of water per month through a household or shared yard tap (but excluding the use of standposts).

Source: Based on Evans (n.d.) and the list of indicators reported on the IBNET website (www.ib-net.org) as retrieved on April 16, 2010.

Box 3.2: IWA's Performance Benchmarking Framework

The International Water Association (IWA) has developed an extensive performance measurement system with sub-components of data elements, variables, performance indicators and context information. Under the IWA system, 'data' is derived from the 'data elements' or DEs; various DEs are used to generate variables, which in turn are combined to produce the performance indicators. The 'variable' has two aspects: the numerical value (resulting from measurement/record), and the grade that represents the quality of the data. Context information can also be generated from the variables in the IWA system. A fifth and important component of the IWA system is 'explanatory factors' or driving factors, which can be used to interpret the performance indicators (PIs) better. Explanatory factors can be certain variables themselves, PIs or even context information, as all of these help to understand the PIs clearly.
Source: Alegre et al. (2006).

Both IBNET and IWA highlight the importance of reliability of information and resultant indicators. Both also suggest methods for assessing the reliability of indicators and related level of confidence. However, interestingly, actual results for different utilities do not always provide reliability assessments. For example, the utility results, as reported on the IBNET website, do not provide reliability bands for any of the results posted on their websites.

Performance benchmarking in the water sector: Over the past two decades benchmarking in the water sector has been widely used by different actors including: (a) utility associations in several different countries and regions, mainly for comparative assessments and process benchmarking; (b) national governments for improved information systems that can then be used for performance-based sector

funding, and process benchmarking; and (c) for regulation – both by regulators as well as through performance-based contracts.

Table 3.2: Use of Performance Information around the World

	Utility associations	Government	Regulation
Coverage	National and regional level	National and state (province) level	National and regional level
Examples	Utility associations in Africa, South-East Asia, Australia, Netherlands, South Africa, Canada, Vietnam and Indonesia	*Performance monitoring*: Brazil, Australia, Tanzania and South Africa *Performance-based funding*: Ecuador, Uganda and Tanzania	*Regulators*: UK, Zambia and Philippines *Performance-based contracts*: Senegal, Uganda, Burkina Faso, Malaysia and Bangkok
Objectives	▪ Sharing information across utilities ▪ Promote process benchmarking	▪ Support decision making and improvement plans, promote process benchmarking ▪ Funding as incentive for improved performance	▪ Comparative regulation ▪ Review against agreed performance targets in contract
Major themes	Service levels, finance, consumer services, environment	Service levels, consumer services, finance, environment, health and asset management	Service levels, consumer services, finance
Frequency of measurement	Annual (Netherlands: once in three years)	Annual	Annual

Utility associations: In many countries, utility associations have undertaken benchmarking as a voluntary tool for performance assessment for its member operators (see Box 3.3). Participation in a benchmarking exercise is usually charged through a fee. In Europe, utility associations in the Netherlands and Denmark have been using benchmarking as a tool since the late 1990s, and have well-established metric and process benchmarking. They have been actively promoting benchmarking in other European nations and have established the North European Benchmarking Corporation for regional comparative performance assessment. As a result of benchmarking efforts by these utility associations, it has at times been made a statutory requirement as in the Netherlands or Australia.

Box 3.3: Performance Benchmarking by Selected National Utility Associations

The Netherlands: Vereniging van Waterbedriven in Nederland (Vewin), which is the association of Dutch water companies, and the Association of Dutch Water Boards are two key players in water supply and treatment of wastewater, while municipalities are responsible for collection and discharge of wastewater. All 10 water companies and 26 regional water authorities of the Netherlands are members in Vewin and Dutch Water Boards, respectively. The associations have taken up process benchmarking in the areas of water quality, service levels, environmental performance, finance and efficiency. Performance assessment of the services provided by utilities is conducted once in every three years, while financial assessment is done every year. The revised Drinking Water Act 2008 has made the process of benchmarking mandatory for all players in the water sector in the Netherlands. As the founder member of the Northern European Benchmarking Cooperation (NEBC), Vewin is also associated with benchmarking efforts at an international level.

Denmark: Benchmarking initiatives started in 1999 by the Danish Water and Wastewater Association (DANVA) have led to the development of a web-based reporting and analysis system known as BESSY (Benchmark and Statistic System). Other processes initiated by the benchmarking exercise include the preparation of customer surveys, process of benchmarking projects, definition of service level targets and related indicators. As a member of the EUREAU and IWA, the DANVA has influence in matters relating to EU regulations and directives in the sector. It is also part of the NEBC and is actively involved in the research and exchange of experience within the sector.

NEBC: The Northern European Benchmarking Cooperation was established by a group water associations and utilities of Denmark, Finland, the Netherlands, Norway and Sweden in 2004, is an initiative to promote benchmarking and sharing of best practices across utilities/associations. The benchmarking framework of the NEBC is based on IWA's framework, and a web-based tool has been developed for using the framework. Key areas of performance assessment are water quality, reliability, service quality, sustainability, finance and efficiency at three levels, namely ***basic, metric and advanced***. Metric benchmarking helps identify areas for improvement, while advance benchmarking helps to identify the processes needed. The three levels of benchmarking help utilities participate at a level that is appropriate to their development requirements.

Vietnam: The Vietnam Water and Sewerage Association (VWSA) started the benchmarking exercise primarily to create a database for water and sanitation costs for national reference for industry stakeholders. Sixty-seven provincial water companies (PWCs) participated for assessment of technical, financial, human resources and environmental aspects; data for three years, from 1997-2000, was collected. This initiative gained further thrust through the 'performance grant' component of the World Bank-funded Vietnam Urban Water Supply Development Project, where funds to the PWCs were to be disbursed on the basis of the performance results of the 2001 benchmarking exercise. Vietnam is a member of the South East Asian Water Utilities Network and has the support of regional partners to further strengthen its benchmarking initiative.

Indonesia: PERPAMSI, the national water suppliers' association representing all the local utilities in Indonesia, started benchmarking efforts in 2001. However, problems faced in data collection, verification and analysis led to another initiative in 2002. Key objectives of PERPAMSI have been to represent utilities, lobby for policies and regulations, disseminate information between utilities on innovative approaches, and conduct performance assessment. In the 2002 initiative, 80 out of 306 utilities participated, and the process looked at technical, financial, managerial and customer satisfaction aspects. In the second phase that began in 2007, emphasis has been to develop a more sustainable system. Training workshops have been conducted at the province and central level. The data is collected and verified by the utilities at the province level and is sent to the central offices for analysis and dissemination. Interestingly, after five years, PERPAMSI has not been able to increase the number of participation utilities in the benchmarking process.

Sources: The Netherlands: Accenture (2006); Denmark: Bastrup (2005); NEBC: NEBC (2008) http://www.waterbenchmark.org/content/documents.html; Vietnam: Sharifian (2002); Indonesia: Brenner (2005).

Amongst developing countries, a few national utility associations such as in Indonesia and Vietnam have also started benchmarking which has been supported by the national governments. Following the UN's support for setting up the WOPs, regional utility associations have also taken up benchmarking, as in Africa and South-East Asia.

An industry-wide benchmarking approach has been adapted in the water sector by utility associations through two formats: (a) metric benchmarking that focuses on quantitative comparison on key performance indicators (of the type listed in the Annex tables) across 'water utilities'[10] or over time in the same utility; and (b) process benchmarking that focuses on learning from best performers who concentrate on the underlying utility processes to improve performance. A large body of experience is available for use of metric benchmarking in both developed and developing countries – essentially, comparative reporting of performance indicators.

Compared to metric benchmarking, ***process benchmarking*** has not evolved much in the water sector. In some instances, metric benchmarking over a period of time has organically evolved to process benchmarking. In general, however, adoption of process benchmarking in Europe seems to have been largely voluntary and non-systematic in nature.[11] There are some examples of its use in customer services process benchmarking facilitated by the IWA and Water Services Association of Australia (WSAA) (see

[10] The term 'utilities' is used more broadly here to encompass various forms of service providers including, amongst others, autonomous public utilities to departments within urban local governments.
[11] Parena *et al*. 2002.

Box 3.4). The WSAA has also carried out process benchmarking exercises for asset management.[12] The Asian Development Bank (ADB) has also supported process benchmarking in Asia through twinning arrangements between utilities as well as training activities for continuous improvement in key service areas.

Box 3.4: Examples of Process Benchmarking Supported by Utility Associations

Customer Services Process Benchmarking in Australia: The Water Services Association of Australia (WSAA) has initiated the project in 2000 for industry performance comparison by providing robust, comparable and internally consistent operational and capital benchmarking information on water supply and wastewater reticulation for WSAA members. In 2002, the WSAA carried out a study with the UMS group (an international utility management consulting firm) against a broader peer group of global participants, including water, gas and electric utilities from Australia, North America, the UK, Europe and South America. The study analysed, at a detailed level, the cost to serve; it provided insights into best practices for key customer service processes such as order fulfilment, revenue collection and field response. Overall, the key finding was that WSAA participants, in general, had a high level of performance compared to UMS' global database and about a 14 per cent industry cost saving opportunity when compared to overall WSAA best performers. A 're-run' of the study was done in 2006 with an increased number of international participants.

***Continuous Improvement and Benchmarking (CIB*)**: The Water Operators Partnership (WOPs) in Asia, a collaboration between the Asian Development Bank and the Global Water Partnership, works to enable water utilities to improve service coverage and delivery, financial sustainability, and other aspects of their performance. One of the aspects addressed is Continuous Improvement and Benchmarking (CIB), which involves collecting, analysing and comparing key performance data of water and sanitation utilities and, on the basis of analysis, developing a strategy and work programme to improve specific aspects of a utility's performance on a continuous basis. CIB workshops have been conducted for water utilities networks. Member utilities have also agreed to participate in the WOPs' CIB programme—SAWUN: 21 utilities, SEAWUN: 17 utilities and CASCWUA: 11 utilities.

Sources: Australia: IWA 2006; CIB-Asia: ADB 2005.

***Government initiatives*:** National-level performance measurement and benchmarking have been initiated by governments in several countries, often with support from an international association or a national funding agency (see Box 3.5). Brazil, Australia and South Africa have institutionalised performance monitoring and benchmarking. Australia has the most experience in successful benchmarking at the state level and has recently undertaken a national-level initiative. Brazil, through the National Sanitation Information System (SNIS), has considerable experience and has been slowly increasing the number of participants. These efforts are backed by appropriate statutes as the development of a sector information system is included in the Water Law in Brazil. South Africa adopted benchmarking in 2001 as an initiative of its utility association, but failed to operationalise it. Subsequently, a national initiative was started in 2006.

Box 3.5: Selected Government Initiatives in Performance Benchmarking

Brazil SNIS: A national information system established in 1996 for water and sanitation sector in Brazil, the National Sanitation Information System (SNIS) has now become a database with over 10 years' historical data. The Water Law of Brazil provides for the establishment of a *National Information System for Water Supply, Sewerage, Solid Waste and Drainage* sector. The performance criterion for utility operators in the allocation of federal resources is a crucial element in the law. The Growth Acceleration investment programme of the government (2007-2010) with a fund allocation of US$ 23 billion would be result-based, and thus depends largely on SNIS information. Coverage of SNIS, in 2007, has been over 70 per cent of the municipalities in Brazil. The SNIS generates over 80 indicators related to technical performance, financial viability and customer satisfaction. There are two levels of data within the SNIS: the

[12] Foley 2005.

utility level and the municipality level, as regional utilities in Brazil serve different municipalities. The annual SNIS cycle consists of the data collection process, data quality control and transfer of data to the SNIS database, data analysis and reports, and dissemination of reports. SNIS Innovations have been in terms of outsourcing data quality control to a private firm, which initially was handled by the SNIS team. Additionally, other processes have been outsourced such as providing helpdesk services to utilities, verifying whether data has been received from utilities, and follow up on returning data forms to SNIS.

Australia: As part of the National Water Initiative (NWI), each year the state governments report on benchmarking of services and pricing for urban water delivery. A National Performance Report (NPR) on water supply and sanitation sectors has over 150 indicators related to social data, health, environmental and financial aspects. The annual NPR cycle consists of data collection by the Water Services Association of Australia (WSAA) or states, collation of information by the WSAA as per agreed requirements of the NWI, auditing of information by the WSAA or states as per standards agreed by the NWI, and preparation of reports by the WSAA. The NWI has been able to ensure consistency between WSAA and NWI indicators. A key NWI innovation is the auditing process that ensures a consistent approach to issues of independence, level of expertise and adherence to relevant standards. The audit process assesses data collection (whether based on sound records and satisfactory processes/systems) and quality of data (whether data matches previous reports, missing or unusual data which may suggest data manipulation). Where the data fails to meet auditing standards, it is not published in the NPR.

South Africa: The initial efforts for performance benchmarking for the water and sanitation sector were initiated by the South Africa Local Government Association. Following this unsuccessful attempt, these were taken over by the government through the Water Research Commission and named the National Water Services Benchmarking project. A key feature of the project is to initiate both metric and process benchmarking. The benchmarking project has over 60 indicators related to service delivery, finance, customer satisfaction, human resources and environmental aspects. The annual cycle consists of data collection (data entry on web-based system restricted to designated staff at municipality), data checking and auditing, and publishing of performance indicators.

Tanzania*:* Water supply and sewerage services in Tanzania are provided by Urban Water Supply and Sewerage Authorities (UWSAs), and are monitored on the basis of memoranda of understanding (MoUs) signed with the Ministry of Water and Irrigation (MoWI). These MoUs set performance targets that are to be achieved for each UWSA over three years, after which targets are refined. Initially, the monitoring process was done manually through the analysis of reports that were generated monthly. This process was quite cumbersome given the fact that data accuracy was an issue, and therefore had to be validated. Also, the lack of an understanding about reporting data for the key performance indicators did not allow comparisons across UWSAs. In 2006, a computerised information system, 'Majls' was established. The database content was designed to generate reports based on the MoUs. Additionally, it also consisted of a set of data sheets relating to technical, commercial, human resources and financial information. These were filled in by the UWSAs on a monthly basis, and at the end of a fiscal year. Majls is currently administered by the Energy and Water Utilities Regulatory Authority, which is responsible for monitoring all the UWSAs and other commercially run water utilities. Majls also has an internal MIS component for the utilities so that the UWSAs can analyse their own data, monitor trends and track their progress towards targets. Data accuracy is improved over time through feedback given to the UWSAs on submission of their annual reports.

Sources: Brazil: Marinho (2008); Australia: Essential Services Commission (2004) http://www.esc.vic.gov.au/public/Water/Regulation+and+Compliance/Performance+reports/Water+performance+reports/Performance+reports.htm; South Africa: Water Research Commission (2004); Tanzania: Kingu and Schaefer (2008).

Box 3.6: Selected Examples of Performance-linked Funding

***Ecuador*:** In 2004, the Ministry of Economy and Finance decreed that national government transfers to the water and sanitation service providers be linked to their performance, specifically operational efficiency, institutional separation and the degree of autonomy from the municipal administration. By this decree, a 10 per cent tax was levied on the revenues from the Special Consumption Tax (ICE) which have so far formed a part of the municipal administration's kitty. This has ensured that the municipalities have incentives to adopt tariffs that cover operating costs, and adopt autonomous management models. Financial incentives were given to those municipalities that introduced a delegated management model. The incentives are calculated on the basis of a formula that captures the level of delegation to an autonomous provider and the extent of cost recovery achieved. In addition, technical assistance was provided for the

delegation process by autonomous service providers. The level of government transfers are now higher for poorer municipalities, and also to those that have improved their service delivery and adopted more sustainable institutional arrangements through autonomy in their functioning.

***Uganda and Tanzania*:** Performance-linked funding in Uganda and Tanzania is in the form of Local Development Grant (LDG), where transfer of funds to local governments is based on achieving certain minimum reform requirements. The requirements are assessed on the basis of performance measures related primarily to financial management. The capital funding is given to those local governments that qualify in terms of an entire project cycle. Additionally, the governments performing well are given 20 per cent more and the ones performing poorly are given 20 per cent less of their LDG allocation. Capacity-building grants are also provided to those local governments that have capacity-building plans in place. The local governments are given extended time limits to ensure they meet the minimum requirements to avail the LDGs. These pertain mainly to the functional capacities of local governments in terms of development planning, finance management, internal audit, revenue performance improvement and capacity-building initiatives. The assessment in terms of performance measures relates to linkages of the development plan with the budget, staff functional capacity, capacity-building linkages with the plan, accountability performance, operation and maintenance of investments, and functionality of the water and sanitation department.

Sources: *Ecuador: Drees-Gross http://www.esc.vic.gov.au/public/Water/Regulation+and+Compliance/Performance+reports/Water+performance+reports/Performance+reports.htm (2005), World Bank (2005); Uganda: MoLG (2005), Tanzania: World Bank (2006) and RALG (2006).*

Use of performance information for regulation: Performance information and benchmarking have been used by regulators to oversee water and wastewater services in a number of countries (see Box 3.7). Regulatory agencies in the UK and in the Australian state of Victoria have been employing benchmarking successfully as a regulatory tool to monitor water and wastewater services under their jurisdiction since the mid-1990s. The systems are well developed in both cases and have been internalised by utilities in their own management information systems. It also plays a key role in the price regulation of the services. Regular target setting, testing for compliance and linking compliance with financial incentives has ensured continuous performance improvement over time. In Zambia a similar role has been played by the regulator, the National Water and Sanitation Council (NWASCO). The regulatory agencies of the Philippines and Mozambique have adopted benchmarking more recently. Linking performance with financial incentives and compulsory participation has resulted in the realisation of some benefits, despite some problems in the adoption of the frameworks. Performance information has also been useful for comparative regulation and to create healthy competition amongst utilities. This approach is being used by most water regulators reviewed.

Box 3.7: Use of Performance Benchmarking for Regulation in Selected Countries

***UK-OFWAT*:** OFWAT is the independent economic regulator of the water and sewerage industry in England, established in 1989 when the water and sewerage companies were privatised. Its primary role includes: price determination, ensuring quality service to consumers by water companies, monitoring companies' performance by setting efficiency targets and encouraging competition where it benefits the consumers. It regulates over 34 companies with a consumer base of 54 million. Annual reports are submitted by OFWAT to the respective ministries, which are to be presented before the Parliament. Overall Performance Assessment (OPA) was used as a mechanism to incentivise performance across a range of service areas. OPA is determined by measuring performance against service indicators, which are weighted to reflect consumer priorities. The performance score achieved by companies is taken into account when OFWAT reviews its price setting on consumer charges. Companies that have performed better are allowed to charge their consumers more than companies that provided poor services. As the sector has now reached acceptable levels of service delivery, OFWAT uses OPA to also capture the innovative service measures taken up by companies to address the consumers' changing requirements. Many of the current OPA measures focus on the reliability and response times of companies. They do not measure the quality of the company's response. There has been a consensus among stakeholders for some time that the qualitative aspects of service need to be incentivised. As a result OFWAT plans to now introduce a new 'service incentive mechanism' that will focus more on the quality of service and the

actual customer experience. OFWAT also uses comparative competition as an important regulatory tool. For this, it compares the companies in terms of bills, service levels, quality compliance, leakage, operational costs, capital expenditure, relative efficiency, network activity and financial performance. Comparative competition has enabled efficiency and service improvements when setting price limits, thus benefiting both customers and the environment, leading to better services at lower costs. It also does systematic international comparisons to put the UK companies in a wider context, in relation to similar enterprises that have a distinct corporate identity and independence.

Zambia: The National Water Supply and Sanitation Council (NWASCO) is the autonomous regulator established by an Act of Parliament to ensure the quality of service provision as per standards. The NWASCO regulates the 10 commercial utilities (CUs) which were set up under sector reform in Zambia. The CUs are filly owned by the municipalities and cater to 84 per cent of the urban population. The lean structure of the NWASCO (a staff of 16) is complemented by part time inspectors trained for the specific purpose, and water watch groups comprising volunteer consumers to ensure public participation. The key regulatory tools developed by NWASCO include: licensing measures to be undertaken by CUs, performance guidelines, NWASCO Information System (NIS), benchmarking and a Special Regulator Supervision (SRS) tool. Guidelines developed include minimum service levels, accounting standards, human resource development, extension of service to peri-urban areas, and cooperative governance. Using the NIS, NWASCO prepares an Annual Sector Report each year. This report provides performance details and benchmarks, and also ranks providers. The top three CUs are rewarded during the launch; the worst-performing ones are reprimanded. The SRS is an enforcement tool used by NWASCO whereby utilities which perform poorly have to submit performance improvement plans and monthly reports that highlight progress achieved against these plans. Performance targets have been included in the staff incentive packages by the CUs. Over the past years, use of regulation has resulted in performance improvement for different CUs.

Latin America: ADERASA, the Association of Water and Sanitation Regulatory Entities of the Americas, represents regulators from 10 Latin American countries. The key objectives of ADERASA are to promote cooperation and coordination of efforts in the development of the water sector in Latin America by facilitating the exchange of experiences and collaboration around common initiatives in the field of regulation. As countries are at different stages of development, it provides an opportunity for south-to-south learning. Further, many of the tools can be generic and regional efforts in developing them would be valuable. As one of the main tools, ADERASA has encouraged performance monitoring. Its use in decision making – while promoting accountability within the system – also supports developmental activities in a cost-effective manner, and encourages information and best practice sharing. ADERASA uses the IBNET and IWA performance frameworks as a guide and has developed about 80 indicators on different aspects of both the sectors. Data quality and analysis is also done with the help of the IWA analysis tool, and external agencies are also contracted to analyse the data sets.

Mozambique: The Delegated Management Framework, formulated after the National Water Policy in 1995, gave the Water Supply and Asset Holding Fund (FIPAG) the overall responsibility for water and wastewater services. Initial funding and activities for rehabilitation, expansion and efficient operations has now made it possible to use regulation more effectively. The Water Regulatory Council (CRA) was given responsibility for regulating water services, through regulatory function is also shared with the municipalities. The key values of the CRA include: universal services, accountability and transparency. CRA also has defined strategies for regulating services in the peri-urban areas. Under the regulatory framework, it is compulsory for utilities to participate in the benchmarking process for water quality, access to service, customer care, planning and reporting, investment evaluation, and commerce and finance. Under the monitoring framework of the CRA, key performance indicators have been developed, and utilities can select the indicators that are most suitable to their objectives. CRA has developed custom-made software, the Outcome Protection System, for this purpose. The software enables CRA technical staff to access the service quality by category, city and sub-system, and produce a range of reports of the service quality to suit the needs of the government, or as communication to the assets' owner or operator, or simply for the purpose of conveying information to the community and public.

Australia: The Essential Services Commission (ESC) is the independent economic regulator for the state of Victoria. Since 2004, it has undertaken inquiries into government processes for setting South Australia Water's water and wastewater charges. As water and wastewater services are not regulated services, the commission has no other regulatory role in relation to them. The Commission's objective is to inform the customers about the level of service and to make information available to other stakeholders. The Commission seeks to initiate competitive comparisons across businesses. Over the past five years, annual reports have been published each year by the ESC. The experience

suggests that the public disclosure and reporting of information can be a strong driver for performance. Key areas of reporting are affordability for consumers, customer services, network reliability, water quality, conservation and environment and historical performance. The data provided by businesses are independently audited, and businesses are given an opportunity to comment on their performance. However, the Commission is not responsible for regulating or driving improvement in reporting.

Sources: UK: OFWAT (2009); Zambia: Chanda (2006), Mbilima (2008), NWASCO (2008); Latin America: Carton and Molinari (2007); Mozambique: Alvarinho (2007), Beete (2007), Cistac (2007), Remane and Shellshear (2007); Australia: Essential Services Commission (2004) and (2010).

Use of performance indicators for regulation is also through ***performance-based contracts***. A number of different forms of such contracts have been used within the water sector (refer Box 3.8). These may be between the government and service providers such as the ones used in Uganda, Burkina Faso, Johannesburg and Senegal (see Box 3.8) or with staff in utilities such as in Durban, Nairobi and the National Water and Sewerage Corporation (NWSC) in Uganda. The contracts made with utilities "serve to define roles and responsibilities as well as establish performance targets within set time frames. They can also limit day to day political interference."[13] Performance contracts are also used internally within the utility, such as with staff to achieve targets backed by both incentives and rewards. These are either directly with individual employees (as in Kenya or eThekwini municipality in South Africa) or with units within the utility as done by the NWSC in Uganda.

Box 3.8: Use of Performance-based Contracts in the Water Sector

Use of Performance Contracts between Government and Water Utilities: Performance-based contracting is based on the clear identification of sector development goals and resources, and the roles and performance that service providers need to achieve. They impose strict time-bound performance targets to be achieved by the public or private service providers along with incentives linked to improved performance. Performance targets may include the level and quality of service, management and operational efficiency, financial and investment requirements, and institutional improvement. Such contracts need to be the outcome of a shared vision between the government and the utility, which in turn helps define resources and financing needed to realise the vision.

A number of countries in Africa use performance contracts with their utilities to guide sector reforms and to achieve targets. These contracts also help to move towards efficient and financially sustainable water utilities. Countries that use such contracts with the public utilities include: Uganda, Burkina Faso and Kenya. In Senegal, a similar performance contract is between the public asset holder (SONES) and private operator (SDE), which is backed by a financial model that facilitates target setting and performance monitoring within a framework of financial equilibrium. The contract incorporated targets to be met for two parameters of leakage and bill collection by the private operator, based on which revenue would be generated for the operator.

Use of Performance Contracts within Utilities: Often the utilities translate their commitments with the national governments to use contracts internally with staff to ensure that the targets are actually met through the cumulative efforts of all staff within the utility. Individual performance contracts for senior staff are a practical tool to improve financial viability and to meet other targets. "At both Nairobi Water and Sewerage Company (NWSC) in Kenya and eThekwini municipality in Durban, South Africa, all senior management staff have agreed to five-year performance contracts, and are accountable to the Board of Directors or the municipal council. All employees have clear performance targets that are reviewed annually." (Mehta et al. 2007, p. 17)

The NWSC in Uganda provides water services in Kampala as well as in 14 other towns. It has introduced performance contracts through an internal bidding system where the winning management team enters into an Area Management Contract with the NWSC headquarters. The contract lays down the performance to be achieved, incentives for good performance and penalties for poor performance or failing to meet the agreed targets. These contracts were made with units in all the towns. Within Kampala the Area office in turn entered into contracts with the branch offices. Incentive

[13] Mehta *et al.* (2007) p. 17.

mechanisms used performance indictors related to: cash operating margins, unaccounted-for water, working ratio, days receivable ratio and connection efficiency.

Use of Performance-based Service Contracts: Use of performance information can also be valuable for making the typical conventional service or short-term management contracts performance based. This requires providing clear incentives linked to improved performance and disincentives or penalties for failing to meet agreed performance levels. Payments for service are linked to actual results achieved. "Such an approach could be especially attractive in situations where the government has decided to keep the water utility under public management, but is looking for ways to capitalise on the technical expertise and potential efficiency of the private sector." (Kingdom et al. 2006, p. vi) Such contracts can be developed for any services provided by the private sector for activities such as reduction of non-revenue water, efficiency improvement in billing and collection systems, or meeting targets for new connections or consumer grievance redressal.

Kingdom et al. (2006) discuss such contracts for reduction of non-revenue water. They emphasize that "the driving factor when designing a performance-based service contract for NRW reduction is to establish an incentive framework that encourages the private sector to deliver results in the most cost-effective manner and allocates risk appropriately between the parties. Key lessons from the cases reviewed include the need to leave sufficient flexibility to the private partner, to set appropriate and realistic targets, and to limit cost. In the context of most water utilities in the developing world, the challenge will be to find a balance between accountability for end results on one side and a cost-effective level of risk transfer to the private sector on the other side." (Kingdom et al. 2006, p. vi)

Sources: Mehta et al. (2007) for NWSC (Uganda), Nairobi, Senegal, Burkina Faso and South Africa; Baietti et al. (2006) for NWSC (Uganda) and ONEA (Burkina Faso); Brocklehurst et al. (2004) for Senegal; Mugisha et al. (2004) for NWSC (Uganda); and Kingdom et al. (2006) for NRW related contracts.

While the use of performance contracts has been common in many African and South-East Asian countries, these have been preceded by institutional reforms that have generally helped to establish operational autonomy of the service provider in urban settings. Thus, the use of such contracts would necessitate appropriate sector reforms that make it possible to use the system of incentives and penalties effectively.

3.2 Review of Benchmarking Studies and Use of Performance Measurement in India

This section reviews the development and use of performance information for urban water and sanitation sector in India. First, it provides a review of various studies that have been carried out for performance benchmarking in the water and sanitation sector that have been done in India over the past decade. Some of the issues that emerged through these studies are being addressed through the recent initiative of the Government of India to develop SLBs. In addition, performance information is being increasingly used in reform-linked programmes, including the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) as well as for various awards by state governments. State governments also collect performance information in their routine monitoring, though the reliability of this is not ensured, and information collection may also tend to be ad hoc. The recent recommendation by the 13th Finance Commission to require the state governments to make this information available to access performance-based grants provides an incentive to make this activity more systematic, regular and reliable.

Review of past studies in India: Over the past decade, there have been three major efforts to measure performance for urban water and sanitation in selected cities (refer Table 3.3 and Box 3.9 for details). Their purposes have varied, ranging from providing baseline information to exploring the possibility of introducing benchmarking practice to cities in India. While the National Institute of Urban Affairs (NIUA) study has covered all class I cities, the CRISIL Advisory Services and ADB studies were limited to about 20 cities each. These have been largely a one-time effort and have used different indicator sets. Annex Table A2 provides highlights of results across a few cities in India drawing on the results from the ADB and

WSP studies. While both studies were published in the same year, there is some variance on results for some indicators. This makes it difficult to prepare comparative assessments across cities and evolve benchmarks. For example, the CRISIL study states: "coverage, metering and production statistics are not fully reliable. Therefore, there is no data to support a decision to choose between non-revenue water (NRW) reduction and capacity addition as a means to improve the quantity of water supplied to the consumers" (p. 5). The NIUA study also emphasises the difficulty in getting the necessary data.

Table 3.3: Review of Past UWSS Performance Benchmarking Studies in India

Description and sponsors	Survey year	Purpose	Coverage of cities	Nature and type of sub-sectors and indicators
NIUA study sponsored by CPHEEO	1999-00	To determine the status of water supply, sanitation and SWM services	300 Class I towns and cities in India	Water supply, sanitation and SWM sectors; 18 indicators in water supply, 8 indicators in wastewater and sanitation, and 11 indicators in SWM
CRISIL Advisory Services study sponsored by WSP	2003-04	To create awareness about benchmarking and develop performance indicators	13 utilities in Phase 1 and 16 utilities in Phase 2.	Water and wastewater; 12 indicators related to coverage, production and consumption, financial and resource management
Utility data book sponsored by ADB and MoUD	2007	To provide baseline information for JNNURM cities, to initiate benchmarking in operations and annual business planning, and promote transparency	20 cities: 15 Municipal corporations, 2 city boards, 2 municipalities, and a private operator	Water supply; 13 indicators related to coverage, availability and consumption of water, metering, financial and human resources management

Sources: NIUA (2005), CRISIL (2004), ADB (2007). The abbreviations: ADB: Asian Development Bank, CPHEEO: Central Public Health and Environmental Engineering Organisation, JNNURM: Jawaharlal Nehru National Urban Renewal Mission, MoUD: Ministry of Urban Development, NIUA: National Institute of Urban Affairs, WSP: Water and Sanitation Program.

Box 3.9: Urban Performance Benchmarking Studies in India

NIUA Report for UWSS in 300 Towns*:* This major study was done in 1999-00 for all metropolitan and Class I and II towns in India covering both physical and financial aspects of water supply, wastewater and solid waste management. Besides assessing the current situation, the focus was also on determining investment requirements. The study was done by the National Institute of Urban Affairs (NIUA) and funded by the Central Public Health and Environmental Engineering Organisation (CPHEEO). Though not specifically a benchmarking study, it assessed performance across s large number of towns. However, it also suggests that the data can be used for inter-city comparisons, and thus is one of the first Indian studies with an intrinsic suggestion for employing benchmarking practice in the sector. Despite considerable efforts, data gaps and reliability of data remained an issue.

UWSS Utility Data Book for 20 cities: This study by the Ministry of Urban Development, Government of India (MoUD, GoI), and the Asian Development Bank (ADB) was for 20 Indian cities which are covered under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), and focused on 10 key indicators. A workshop was conducted to help the participants understand benchmarking as a tool for performance measurement and determine the most appropriate performance measurement indicators. The compilation of a performance assessment data book and benchmarking for the water utilities was envisaged to be an important step for performance improvement activities. Availability of reliable performance information for planning and monitoring is recognised as an important factor in sustaining the reforms under this programme. The report acknowledges that despite the effort to make the data as reliable as possible there are some inconsistencies and estimates in the information provided by the utilities.
A clear message from this study was the need to focus on 24x7 water supply to achieve better services while ensuring financial sustainability. It provides a standardised utility profile for each city, inter-city comparisons and a list of good

practices. This compilation uses the standard indicators as in other utility data books developed with support from the ADB for cities in Asia, and thus makes it possible to compare Indian cities with their counterparts in Asia.

UWSS Performance Benchmarking: A similar performance assessment and benchmarking project was undertaken by the MoUD in partnership with the Water and Sanitation Program-South Asia in response to the need for better baseline data on the performance of water utilities in urban India to support the JNNURM programme. The study was carried out by the CRISIL Infrastructure Advisory Services. The project was carried out in two phases. The first phase covered 13 utilities in 2003-04 and focused on creating awareness about benchmarking and its benefits as a tool for improvements in this sector. It helped to develop locally relevant and useful performance indicators. In the second phase, 16 cities were taken up in 2006 with the objective to scale up and identify measures to improve existing data collection systems for future benchmarking efforts. However, only 10 utilities provided the required data. A major innovation was to assess data quality and introduce a reliability scale. Two cycles of data collection were done to ensure consistency of the collected data and to understand the data collection system.

The completion of the second phase of the project has reinforced the importance of benchmarking as a performance improvement tool by the utilities and the need to institutionalise it. It customised IBNET indicators in the Indian context and did detailed assessment across 12 key performance indicators. The focus on reliability assessments paved the way for incorporating this aspect in detail in the recent SLB Initiative by the GoI.

Urban Services Environmental Rating System (USERS): The Government of India undertook a project with United Nations Development Programme (UNDP) and Tata Energy and Resources Institute (TERI) to develop a regulatory mechanism that would enable monitoring, information sharing and adoption of best practices in the water supply sanitation and solid waste management sectors. Referred as the 'Urban Services Environmental Rating System' (USERS), this initiative aimed to develop a framework for benchmarking, test it in a few cities and disseminate across other cities. A set of indicators were developed in consultation with different stakeholders for all the three sectors. The performance indicators for the utilities would be used to identify information gaps, prioritise issues, identify targets, improvement measures and allocation of funds. Apart from benchmarking against targets, it also encourages inter-utility benchmarking, which could eventually be used to develop a rating system as an indicator of municipal services. The cities of Delhi and Kanpur were identified as the pilot cities. The benchmarking initiative was to be extended to other cities after the pilot phase; however, no literature is available to review the progress of the project.

Urban Indicators and Performance Measurement (UIPM): The City Managers' Association of Gujarat (CMAG) with technical assistance from International City/County Management Association (ICMA) and financial assistance from USAID had undertaken a programme to introduce benchmarking as an analytical tool for policy makers to support the decision-making process in 2000. The performance assessment in this programme was applicable to all infrastructure aspects that come under the jurisdiction of a municipality and the financial aspects. The performance measurement results analysis was envisaged to be used to address issues of infrastructure and municipal finances in urban governance. The project aimed at providing urban local bodies, decision makers/implementation agencies with an analytical tool, which would enable effective planning and decision making. The study sought to analyse the situation of the urban local body (ULB) with regard to financial situation and service delivery. The indicators were developed to determine service levels, service coverage and its costs and efficiency. An overall ranking of various services and a comparison of 10 ULBs was done. The long-term objective of the study was to develop a management information system to collect and document the data in the required format, which would enable continuous monitoring of performance over time in a municipal body as well as comparison with other ULBs. The study would also heighten sensitivity and awareness of stakeholders towards urban management issues and create a healthy competition to improve performance.

CMAG used the UIPM study to advocate for uniform accounting codes in cities across Gujarat and numerous handholding workshops were organised to promote use of performance information. For example, Surat Municipal Corporation (SMC) which had a poor coverage of services to slum population under the study introduced several improvements. Today SMC provides piped water supply to 95 per cent and sewerage network to 97 per cent of its population. The UIPM programme was adopted by other city network associations in states of Madhya Pradesh and Karnataka and also served as a learning tool for associations of Indonesia.

Sources: Refer Tables 3.3 and 3.4.

In addition to the WSS-specific studies, a few other efforts have focused on a wider scope encompassing all urban services, environment and customer satisfaction (refer Table 3.4 and Box 3.9 for details). In these, water and sanitation are included as part of city level civic services.

Table 3.4: Performance Benchmarking for All Urban Services

Description and sponsors	Survey year	Purpose	Coverage of cities	Nature and type of sub-sectors and indicators
TERI study sponsored by UNDP	2002	To develop a mechanism for monitoring, information sharing and adoption of best practices	Pilot testing of the USERS in Delhi and Kanpur	Quantity and quality of drinking water, sewage treatment, solid waste collection, and satisfaction levels of citizens
UIPM study of Gujarat by CMAG	2000	To introduce benchmarking as an analytical tool for policy makers to support the decision making process	10 cities: 6 municipal corporations and 4 municipalities (Class A) in Gujarat	Service levels and coverage, costs, quantity and quality of drinking water supply, sewage treatment, roads and storm water drainage, streetlights, solid waste management, staff efficiency, health

Sources: TERI (2002), CMAG (2001).
The abbreviations stand for: CMAG: City Managers' Association of Gujarat, TERI: Tata Energy and Resources Institute, UIPM: Urban Indicators and Performance Measurement, UNDP: United Nations Development Programme, USERS: Urban Services Environmental Rating System.

Use of performance information in national reform-linked funding programme: Over the past five years, use of performance information has been envisaged under the new national programme, JNNURM, which was launched by the GoI in 2005. Funding under the JNNURM is linked to ULB commitments on selected reforms. The JNNURM envisages significant investments with a commitment of Rs 50,000 crore (about US$11 billion) by the GoI over a seven-year period till 2012. Interestingly, while the JNNURM funds are available for all urban infrastructure, water supply, sewerage, sanitation and drainage comprise about 73 per cent of projects sanctioned by 2010 and 81 per cent of total project costs approved.[14] Thus, UWSS is an important component of investment funding through this national programme.

The programme requires all participating ULBs to commit to selected mandatory reforms along with a timeline. In addition, the respective state governments also have to commit to mandatory state-level reforms. With reference to the urban water supply and sanitation sector, key areas of reforms include commitments on: *equity* – coverage and funding for the urban poor; *financial viability* – recovery of operation and maintenance costs through local revenues including property tax and reasonable user charges as well as improved financial systems; *accountability* – public disclosure of performance parameters and service levels, and improved consumer links through e-governance. The ULBs are also expected to introduce the necessary administrative structural reforms and public private partnerships to enhance efficiency in delivery of civic services. The reform commitments outlined under the JNNURM have been signed by nearly 700[15] ULBs across India.

[14] Based on monitoring reports retrieved from the JNNURM website (http://jnnurm.nic.in) on January 2010.
[15] This is estimated on the basis of 62 cities covered under the main JNNURM component and about 635 cities and towns under the UIDSSMT component. While the MoAs signed by the 62 cities are available on the JNNURM website, those for the 635 cities under UIDSSMT are not easily available in the public domain.

Table 3.5: UWSS-related Performance Parameters in Reforms under the JNNURM

At state government level	
1. Public Disclosure Law	Enactment of Public Disclosure Law to ensure release of quarterly performance information to all stakeholders, particularly information on financial and operating parameters; also service levels for various services being rendered by the municipality
2. Community participation	Enactment of Community Participation Law to institutionalise citizens' participation and introduce concept of area sabhas (that is, local committees)
3. Service delivery responsibility and accountability	Transferring special agencies for civic services to urban local bodies and accountability platforms for service providers in transition
At urban local body level	
4. E-governance	Focus on transparent administration, quick service delivery, effective management information systems, and improvement in service delivery links
5. Municipal accounting	Accounting systems based on double-entry and accrual principles, leading to better financial management, transparency and self-reliance; development of state manual, transition to double-entry accrual systems, external auditing
6. Property tax	Establishing a transparent and equitable property tax regime; Full coverage of property tax to all taxable properties, geographic information system-based property tax systems, efficient property tax collection systems
7. O&M cost recovery through levy of reasonable user charges	Focus on securing effective linkages between asset creation and maintenance, ultimately leading to sustainable delivery of urban services; policy on user charges enabling full recovery of operation and maintenance costs, volumetric based tariff, reduction in non-revenue water
8. Internal earmarking of funds for urban poor	Focus on earmarking of funds in local city budgets specifically for services for urban poor; budget allocation for service delivery specific to urban poor; accounting and budget systems to track revenue and expenditure on services for urban poor
9. Provision of basic services for urban poor	Focus on provision of basic services at affordable prices including water supply and sanitation and housing
10. Byelaws on use of recycled water*	Focus on framing byelaws related to reuse and recycling of wastewater
11. Structural reforms and PPP*	Focus on urban sector management such as organisation structure, decentralisation where necessary, improved coordination mechanisms amongst city level agencies, and PPP models for more efficient delivery of civic services.

Source: Based on MoUD (2005). Reforms marked with an asterisk (*) are the optional reforms.

An implicit prerequisite for the success of reform linked programmes envisaged under the JNNURM is the ability of national and state level agencies to monitor performance on these reforms. Under the JNNURM, appropriate institutional arrangements have been developed for such monitoring at the state and national level with assessments conducted through independent institutions. However, such monitoring also requires capacity at the local level among ULBs and other service providers, especially for reforms related to key basic services such as water supply, sanitation and solid waste management. While most cities and state governments do have large volumes of data, these are often not analysed and no systematic approach is available for standard indicators. Thus capacities will need to be built at the local and state government levels to track reform implementation meaningfully.

Performance benchmarking through standardised Service Level Benchmarking (SLB): A recent initiative of the GoI attempts to address some of the issues facing UWSS benchmarking in India. It aims to develop a set of standardised service level indicators and related benchmarks for water supply, wastewater, solid waste management and storm water drainage. The main objectives of the SLB framework are to develop a common minimum framework for monitoring and reporting on service level indicators along with the guidelines to operationalise the framework in a phased manner, to support cities to develop an Information System Improvement Plan to improve quality and reliability of information, and to encourage the adoption of this framework for performance monitoring as well as for formulating performance improvement plans.

In the first phase of SLB development, a series of indicators have been developed through a consultative process for each of the four sub-sectors (see Table 3.6). For each indicator, its definition, means of measurement, and frequency and jurisdiction of measurement and a reliability scale have been developed. The detailed work was carried out by a core group of experts from various institutions over the past two years. Under the MoUD's leadership, the SLB framework has been piloted in 26 cities across India. The availability of such a nationally agreed and mandated basic set of standardised indicators makes it possible to gradually develop a state-wide performance benchmarking system that can be later scaled up to other states.

Table 3.6: Government of India's Standardised Service Level Indicators and Benchmarks

	Water supply	**Benchmark**		**Wastewater**	**Benchmark**
1	Coverage of water supply connections	100%	1	Coverage of toilets	100%
2	Per capita supply of water	135 lpcd	2	Coverage of wastewater network services	100%
3	Extent of metering of water connections	100%	3	Collection efficiency of wastewater network	100%
4	Extent of non-revenue water	20%	4	Adequacy of wastewater treatment capacity	100%
5	Continuity of water supply	24 hours	5	Quality of wastewater treatment	100%
6	Efficiency in redressal of customer complaints	80%	6	Extent of reuse and recycling of wastewater	20%
7	Quality of water supplied	100%	7	Extent of cost recovery in wastewater management	100%
8	Cost recovery in water supply services	100%	8	Efficiency in redressal of customer complaints	80%
9	Efficiency in collection of water supply related charges	90%	9	Efficiency in collection of sewerage related charges	90%
	Solid waste management	**Benchmark**		**Storm water drainage**	**Benchmark**
1	Household level coverage of SWM services	100%	1	Coverage of storm water drainage network	100%
2	Efficiency of collection of municipal solid waste	100%	2	Incidence of water logging/flooding	Zero
3	Extent of segregation of municipal solid waste	100%			
4	Extent of municipal solid waste recovered	80%			
5	Extent of scientific disposal of municipal solid waste	100%			
6	Extent of cost recovery in SWM services	100%			
7	Efficiency in redressal of customer complaints	80%			
8	Efficiency in collection of SWM related user charges	90%			

Source: MoUD (2009).

The SLB initiative also puts emphasis on issues around data reliability. For each of the 28 indicators across different sub-sectors, reliability scores have been worked out depending on the manner in which data required for the specific indicator is captured, recorded and analysed. Each reliability level has been developed on the basis of reliability of data source and its accuracy. This approach is developed on the basis of previous studies and knowledge about likelihood of available information among Indian cities. While a reliability score of 'A' suggests the highest level of reliability, lower levels would suggest that the urban local authority/utility needs to improve its data and monitoring systems. Table 2.15 in the previous chapter provides an illustration of the development of such reliability scales.

The 13th Finance Commission which recently gave its recommendations to the GoI has suggested a General Performance Grant for all local bodies in India. For ULBs this grant is estimated to range from about Rs 850 crore (US$185 million) in 2011-12 to Rs 8,000 crore (US$1.85 billion) by 2014-15. This grant requires the

state governments to assess and publish information on service performance. To quote, "For a start, State Governments must notify or cause all the municipal corporations and municipalities to notify by the end of a fiscal year (31 March) the service standards for four service sectors – water supply, sewerage, storm water drainage, and solid waste management proposed to be achieved by them by the end of the succeeding fiscal year. These levels may be different for different municipalities. We envisage such a commitment to be achieved through a consultative process with the local bodies. Such a notification will be published in the State Government gazette and the fact of publication will demonstrate compliance with this condition" (GoI 2010, p. 169). This recommendation provides an incentive for state governments to develop state-wide performance monitoring systems. However, as with the JNNURM experience earlier, this will require local capacities to generate the base information and gradually improve the quality and reliability of information.

Use of performance information at state level: Various state government efforts have also made use of UWSS performance information for their own programmes, for constituting performance awards as well as for their regular routine monitoring. Our review focuses mainly on the efforts in Gujarat and Maharashtra. UWSS performance information in Maharashtra has been used in Maharashtra for three types of activities: (a) the government's own reform-linked investment programme, namely Sujal and Nirmal Maharashtra Abhiyan (SNMA); (b) for an innovative and home-grown sanitation award scheme called the Sant Gadge Baba awards; and (c) for the government's regular routine monitoring (refer to Box 3.10).

Box 3.10: Use of Performance Information in Maharashtra

SNMA: Sujal Nirmal Maharashtra Abhiyan (2009-2012) is a state-level reform linked investment programme initiated by the Government of Maharashtra (GoM) for improving the service delivery of basic water supply and sanitation infrastructure in urban areas. Key reform outcomes as envisioned in SNMA include: full coverage of individual water supply connections to households, full metering of all bulk and individual connections, migration from single entry to double entry financial systems, water and energy audit for water supply systems, identification and regularisation of illegal connections, preparation of city sanitation plans, etc. Scores are allotted to each urban local body (ULB) based on its performance in the above areas. Funding for reforms is available to all ULBs and reforms are required to be done before embarking on major capital investments to increase capacity for water supply or extending utility networks. Annex Table A6 provides a summary of SNMA reforms at ULB level and respective weightages.

Sant Gadge Baba Awards **(SGBA, 2002)** were initiated by the GOM to promote cleanliness in rural areas. After the great success of SGBA in rural Maharashtra, the GoM initiated the same awards for urban areas in 2002. The awards are meant to incentivise ULBs for improving public and individual cleanliness including open defecation free status, adequate supply of clean drinking water, management of wastewater and solid wastes, and overall enhancement of public health. All ULBs are eligible to apply; the winners are identified through a transparent process starting at the district level. Awards are presented to ULBs in different categories with a focus on the extent of improvement achieved. Annex Table A7 provides a summary of SGBA reforms at ULB level and respective weightages.

Routine Monitoring by Department of Urban Development: The Directorate of Municipal Administration (DMA) is the nodal agency responsible for all the municipalities in the state. The central and state funds are directly disbursed to ULBs or through the collector when administrative approval is required. In the monitoring process, the collector holds monthly review meetings, and DMA representatives conduct quarterly review meetings. Information is collected on a quarterly basis by the district collector with consolidation taking place at the divisional level. There is, however, no uniform system of data collection and aggregation at the state level at present.

Sources: SNMA: GR of GoM (2008); SGBA: WSSD (2002); Routine monitoring – based on discussions with GoM officials.

The Gujarat government, on the other hand, does not have a specific UWSS reform linked investment programme, but has introduced a common information system for regular routine monitoring. A newly

constituted Gujarat government municipal award uses performance information to recognise and reward ULBs which have made remarkable progress in urban service delivery (refer to Box 3.11).

Box 3.11: Use of Performance Information in Gujarat

Regular Monitoring by Department of Urban Development: The state level monitoring framework involves a set of standard formats ('patraks') used to collect service related information of water supply, sanitation and finance. While some of the performance information is reported on a monthly basis, the finance information is on an annual basis. Information related to water supply and sanitation is reported to the Directorate of Municipalities (DoM) within the Urban Development Department, and finance information is reported to the Gujarat Municipal Finance Board (GMFB). Similarly, in the case of grant transfers under devolution from the state to local governments, a quarterly monitoring and reporting system is in place. However, there is a need for on-ground verification of asset creation and performance improvements. In general, there is only limited reporting of performance information and most of is not backed by a detailed database. New efforts are being now made to develop a common database across all municipalities that can be used for meeting various monitoring needs. Annex Table A9 provides a summary of reports used for regular monitoring.

Performance Monitoring under Nirmal Gujarat (NG) and Swarnim Gujarat (SG) (2007): NG is policy initiative of GoG aiming at clean air, water and land in Gujarat. All recent state programmes and initiatives in the arena of water, sanitation, energy efficiency and CDM fall under this programme launched in 2007. It focuses on delineating scope for participating 25 state government departments and all municipalities with a holistic approach, by facilitating them to plan and develop strategy for implementation internally. Under SG, the GoG has an ambitious set of goals to celebrate its golden jubilee as it was set up 50 years ago. Both NG and SG goals are being monitored at the highest level and feedback is received from nodal officers of different departments. This programme monitoring also encourages cross-learning between the department and ULBs.

Best Municipality Awards in Gujarat (2009) was launched by Urban Development Department (UDD) of GoG. The nodal agency for conducting the evaluation of ULBs is the GMFB. The performance of ULBs under various schemes proposed by state and central government is reviewed for 2006-07 and 2007-08. The award scheme is based on a 100 point system given to each ULB in various parameters related to administration, finance and planning. All four classes of ULBs in the state (A, B, C and D Class) are evaluated differently. The first two ULBs in each class and their chief officers are awarded for their efforts. Unfortunately, again, service performance information is not included in this award.

Sources: Regular monitoring and performance monitoring under NG and SG: based on discussions with concerned officials; Municipal Awards: GoG (2009).

The Government of Gujarat (GoG) has also supported state-wide development of accounting and property tax systems for all municipalities in the state (refer to Box 3.12). This not only provides a uniform system of accounting across ULBs but also facilitates faster and more simple retrieval of information on income and expenses in service delivery, which can be further used to design financial performance improvement plans. Similar state-wide efforts are needed to improve the quality of UWSS performance information.

Box 3.12: Gujarat: State-wide Efforts to Improve Quality of Information

Computerised Property Tax Systems for Municipalities in Gujarat (2008) is implemented by Gujarat Municipal Finance Board (GMFB) in coordination with All India Institute of Local Self-Government (AIILSG), Ahmedabad Regional Centre. AIILSG carried out survey, data entry, and software development for a property tax system for all 141 municipalities of the state. This is the first such state-wide effort in India. The programme also included training for municipality staff in the operation and management of software and the overall system. As an outcome of this exercise all municipalities have computerised databases for property tax and the associated software helps to generate regular bills for property tax.

Gujarat Municipal Accounting Reform Project (GMARP, 2005): GMARP has been developed and is being coordinated by the City Managers' Association Gujarat (CMAG) with support of GoG, UDD and GMFB since November 2005. The CMAG first supported accounting reforms based on National Accounting Manual published by the Comptroller and Auditor General of India. Under the project, local chartered accountancy firms were appointed to implement a computerised, accrual-based, double-entry accounting system in all municipalities in Gujarat. This is being funded through GoG grants. The support to municipalities is planned to be gradually phased out with the expectation that the ULBs will either develop internal capacity or meet the costs of outsourcing this from their own funds. The main outputs include: (a) preparation of balance sheets; (b) municipal fixed asset valuation; and (c) budgetary reforms.

Sources: Based on discussions with concerned agencies and officials.

ULB level processes for data capture, review and use of performance information: As compared to national and state level studies and programmes, there is very little effort to understand and review the processes at the local level by ULBs. As in Gujarat and Maharashtra, ULBs themselves are largely the service providers these processes include data capture, analysis and review, preparation of monitoring reports for upward accountability to national and state governments, use of information for decision making and for dissemination of results, especially to the consumers.

As per the current practices in most ULBs and the UWSS sector in general in India, the emphasis in infrastructure planning for water supply within ULBs is on new investments, largely for expanding source capacity or extending distribution network to new areas. At best, the focus is also on rehabilitation of existing distribution network though the emphasis tends to be on augmentation of storage capacity or the pipe network rather than reducing physical losses. Table 3.7 identifies an illustrative set of processes for water supply operations to meet the overall goals of full coverage at adequate service levels, while ensuring financial sustainability. These processes will need to be mapped and assessed in detail at the ULB level for data capture, analysis, review, and performance improvement. As such studies have not been done in Indian cities, detailed process studies were undertaken in two ULBs in Gujarat to gain preliminary insights in a few of these selected processes.

Table 3.7: Illustrative ULB Processes for Performance Improvement in Water Supply

Water production, supply and distribution	
Water production and supply	Process for production and supply of water to different zones – quantity of water, hours of supply and water quality
	Process for water quality surveillance
Extension of distribution network	Process for extending distribution network to uncovered areas
	Process for providing internal distribution network in slum settlements
Maintenance of distribution network	Plans for reducing physical losses through leakage management and other processes
	Developing and carrying out regular maintenance plans for distribution network
Consumer relations	
Consumer connections	Process for new connections and recording
	Process for new residential connections in slum areas
Illegal connections	Process for identifying and regularising illegal connections
Consumer grievance redressal	Process for receiving, recording and addressing consumer complaints related to water supply
Tariff setting	Process for setting tariffs for water consumption and for new connections, including separately for the poor
Billing and collection	Process for billing to consumers and collection of payments

Source: Based on process studies in two cities in Gujarat under the PAS Project.

Figure 3.1: Process Chart for Water Production in a City in Gujarat

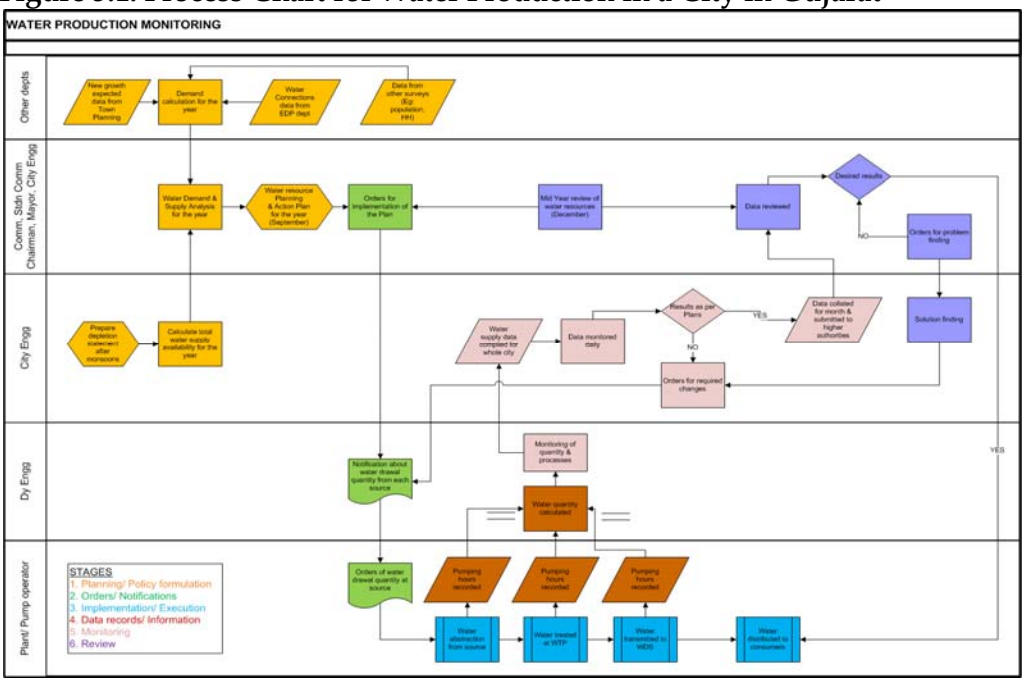
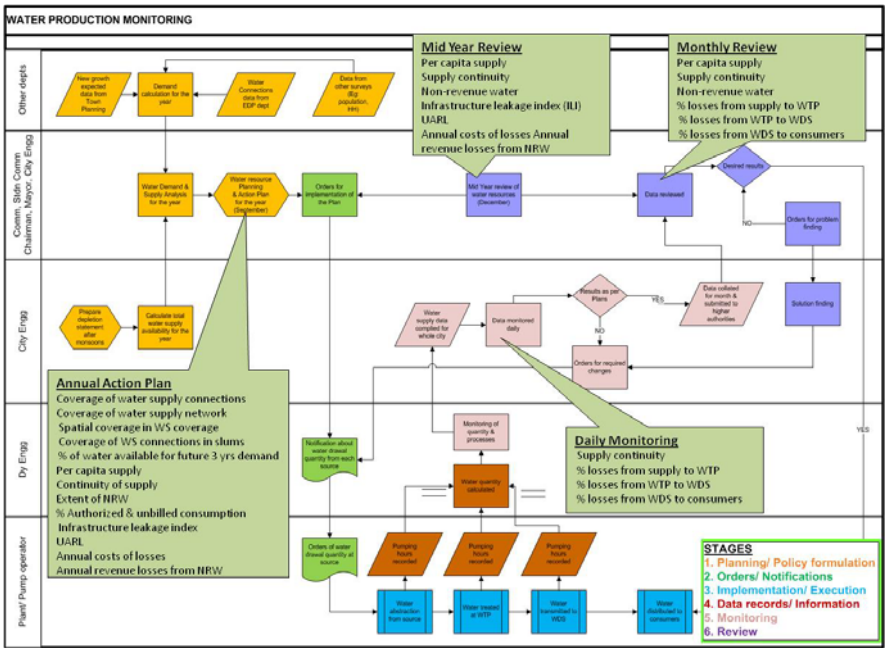


Figure 3.1 illustrates the process for water production monitoring in a city in Gujarat. It took considerable studies by the PAS Project team to draw up such process charts for a few key areas of operations. These studies revealed that as part of routine daily operations, a large amount of information is collected in the field but not always analysed. Using such process charts, it was possible to identify the key stages of decision making where some target setting and monitoring would be possible (that is, at the level of wards and zones in terms of operating hours, quality and complaint redressal). It was also possible to identify some key information that is not collected at present (for example, information on water pressure). Thus, more effort will be needed on introducing process reengineering for use of information for improved performance as illustrated in Figure 3.2. Further studies are planned to be taken up after the first round of data collection is completed.

Figure 3.2: Process Reengineering to Introduce KPIs in Water Production Monitoring



3.3 Key Lessons from Review of National and International Efforts

The reviews in the previous sections highlight the increasing recognition and emphasis on the need to develop systematic measurement of service performance and to use these for improving delivery of water and sanitation services. The types of efforts have ranged from developing standardised frameworks for performance measurement (for example, by IBNET, IWA and under the GoI's SLB Initiative) to carrying out periodic studies of performance levels across service providers. Many governments and utility associations have also taken up comparative benchmarking on a regular basis, increasing their efforts to make results widely available and promoting ready comparisons through use of web-based technology to enable user-led query mechanisms. Performance information has also been used for regulation in different settings by regulators and in performance contracts. The latest innovation has been to develop performance-based funding to local service providers by donors and higher levels of government. Key findings from the Indian experience and lessons from international experiences are identified here.

Measuring performance: Past experience in India highlights the wide variation in indicators used across different studies as well as across different programmes, though the recent effort of the GoI under the SLB Initiative provides a standardised set of service indicators with related definitions.

- ***Common standard definitions and local choice of indicators:*** Interestingly, international experience suggests that while the efforts to develop standardised performance indicators (for example, by the IBNET and IWA) have helped to evolve standard definitions, the actual choice of key indicators has been through a local process. It is possible that a similar process will be needed in India where the state governments can use the SLB as a guiding framework.

- ***Indicators for monitoring versus local actions for performance improvement:*** Measurement of performance can be for benchmarking or regulation which requires a few key performance indicators (KPIs) that match with the overall sector goals and key reform areas to achieve efficiency and equity. These need to be identified carefully in the given context. Benchmarks for these would also need to be set in relation to sector goals and key strategies. On the other hand, more detailed indicators may be needed for designing and monitoring performance information at the local level. These would ideally be derived from an understanding of underlying processes.

- ***Absence of equity related indicators:*** In general, most benchmarking frameworks do not address the equity issues. While under the JNNURM reforms in India, the concerns about equity have been raised, lack of clear definitions makes it difficult to measure and monitor these properly. The IBNET has also attempted to develop a few key indicators to address equity concerns.

Improving quality and reliability of information: The review of studies and performance assessments in India clearly highlights the need to focus on ensuring good quality and reliable information, without which any comparisons or use of this information become difficult. The international literature also highlights its importance. However, it is interesting to note that in most benchmarking reports and comparative performance assessments, quality of information is not reported explicitly. Based on the review, a number of lessons have been identified to ensure that quality of information is assessed and gradually improved over time.

- ***Capacity building support to service providers:*** At initial stages of benchmarking, the local service providers often lack the capacity to collect the necessary data and develop indicators. In many cases agencies have resorted to outsourcing components of performance measurement when the in-house capacity is insufficient or stretched for such exercises. For example, in Brazil, for SNIS, this has included activities such as providing helpdesk services to local service providers, verification of data received from the utilities and follow up on returning data forms to SNIS.

- ***Standardised measurement of information quality and improvements over time:*** Given the concerns over quality of information, it is essential to develop a standardised approach to measurement of quality of information used for developing key indicators. This is essential to measure information quality across a large number of service providers as well as to measure improvements in information quality over time.

- ***Supporting information system improvements:*** The approach to measurement should be linked with identifying the steps needed to improve information quality. This will enable each service provider to identify ways in which it can improve quality of information. Such improvements may also be achieved through state level policies (for example, through state-wide adoption of double entry accrual accounting or improving slum information through surveys in all slum settlements as being done in Gujarat)

Regular monitoring of performance: The review highlights the wide variety in how performance information could be used, ranging from benchmarking initiatives by utility associations and governments to regulators who also have tended to generate regular reports and used this for comparative regulation and to create healthy competition across service providers. Essentially the key to these various uses lies in regular monitoring of performance information through different efforts. To ensure that this happens regularly and is made available to stakeholders, a number of lessons emerged from the review:

- ***Regular reports and dissemination:*** Most benchmarking efforts generate regular annual reports of comparative assessments. This is important as it helps to create a discipline of regular reporting. It is important that such reports are shared with the service providers and are made accessible to other stakeholders through appropriate dissemination channels. Experience with many efforts also suggests that public disclosure can be a strong driver for performance.

- ***Role of technology:*** Technology plays a critical role in developing and disseminating regular reports on comparative assessments. Web-based tools are increasingly being used for data capture and standard analysis to generate and update reports in real-time. With the advent of geographic

information systems (GIS) there is an increasing use of linking comparative analysis to maps for analysis and more user-friendly visual presentation. Experience also suggests the need for custom-made software that can help ease tasks in a cost effective manner, as suggested by the experience of CRA in Mozambique.[16]

- ***Use of performance monitoring for funding:*** Use of monitoring is more commonly done when linked with funding. However, this requires careful design of the funding programme with appropriate performance-linked incentives and disincentives. It also necessitates a rigorous monitoring regime with reliable information. The funding generally is linked to setting out local level targets for improved performance.

Linking monitoring to improved performance: While regular monitoring has become increasingly common, the use of this information to improve performance, however, has not been as common. While there have been some attempts at process benchmarking, these attempts have been less systematic, and require greater attention and efforts.

- ***Need for rigorous peer-to-peer benchmarking:*** While regular reports are generally made in most performance benchmarking efforts, these are more in the nature of utility-wise reports. With benchmarking being now done across many regions and countries using standard definitions, there are clearly more opportunities for such analysis. However, compared to other sectors (such as, for example, in microfinance[17]) our review did not find such analysis to be very commonly done.[18] Such peer-to-peer analysis is essential to identify benchmark values for key performance indicators. It would also enable more meaningful use of performance results by individual utilities to arrive at appropriate targets for performance improvement.

- ***Process reengineering for performance improvement:*** While process benchmarking is recognised as an important outcome of comparative assessments, it has been not taken up in a systematic manner. More work is needed to assess and map out the existing processes that determine both information capture and review as well as for improving performance. Such studies can draw on the business process mapping used in many industries. This will help define performance improvements that can be achieved through process reengineering, rather than the traditional emphasis in the water and sanitation sector on new capital investments.

- ***Incentives for improved performance:*** Use of performance contracts has been increasingly used by governments with service providers as a way to meet the sector goals and reform agenda. As this is regularly reviewed and used in conjunction with funding, it provides incentives for utilities to improve performance. Some utilities, such as the NWSC in Uganda, have also used the concept of performance-based contracts within the utility. Thus incentives for improved performance need to be built into upward (external) accountability as well as within the service provider as an internal

[16] Alia and Shellshear (2007) and Gilles (2007).

[17] For example, in the microfinance sector, Mixmarket does an annual benchmarking report that provides results for nearly 60 key performance indicators grouped in themes such as: financial structure, outreach, financial performance, efficiency, productivity, etc. The peer groups for analysis include: age, outreach, type of institution, scale, sustainability, region and target market. (Mix, 2007)

[18] One exception, however, was the use of international comparisons carried out by OFWAT for a set of about nine indicators including: customers' bills, unit costs, customer service levels, water quality, environmental performance, water balance, water efficiency, leakage, and network activity. This is done across utilities selected carefully to reflect distinct corporate identity and independence. The results are used to challenge all companies to deliver a better service. (OFWAT, 2008)

system of accountability for outputs and results.[19] This would require capacity building support and simple methods and tools that can be used by service providers to determine performance targets and track performance over time.

Ensuring sustainability of performance assessment systems: Given the past trend of several one-time studies in India, it is important to plan from the outset to ensure long-term sustainability of performance assessment systems. While it is difficult to clearly lay down specific steps for this, a number of factors could be identified that would promote sustainability:

- ***Regular use at national, state and local levels:*** The most important factor in sustainability is the regular use of performance information and comparative analysis generated. This may be through its use at state or national levels by linking it to performance-based funding, regulation or for use in performance contracts with service providers. Alternatively it may be regular use within the service provider organisations through internal processes for monitoring and performance rewards. In initial years, there may also be a concern with sharing of results widely, especially by the relatively poorly performing service providers. In such situations, political will is an important factor for successful institutionalisation of a benchmarking project.

  It is also interesting that sustainability requires good use of performance benchmarking information and that widespread use first requires standard, comparable and reliable (trustworthy) information across a sizeable (all for links to inter-governmental transfers) number of service providers. The need for regular reporting – as seen in the regulators in the UK, Australia and Zambia – have led to well-developed systems which are then internalised by utilities in their own management information systems. This makes it easier to ensure sustainability.

- ***Importance of scale:*** While not essential, another key aspect of sustainability is scale achieved through universal coverage across all service providers in a given jurisdiction. This is important for a number of reasons. First, this makes it possible for state and national governments to use this information to funding and routine monitoring. Over time, this can become mainstreamed in government processes.

  Second, scale also forces identification of more cost-effective methods for data capture and analysis, as well as for data systems improvements. Some level of data collection is done by most service providers often for their own management and/or to report to higher levels of government or regulators. The presence of many data collection systems can be cost intensive, especially for smaller utilities. Thus, the introduction of a new data collection regime needs to be aligned with the existing system, to control costs for data collection and to make benchmarking an improvement tool rather than a burden.

  Finally, universal coverage makes it easier for higher levels of government to justify allocating budgets. In general, compared to voluntary participation under schemes run by utility associations, government involvement makes it mandatory and ensures universal participation.

- ***Role of government to provide mandate:*** While some developed countries such as the Netherlands and Australia do have regular benchmarking being carried out by their utility associations, in most developed countries it is through the mandate provided by governments (for instance, in

[19] This is also the approach suggested in the literature on new public management as a means to improve utility performance. See Baieti *et al*. (2006)

Brazil, Tanzania and South Africa) or government agencies such as the regulator (for example, in Zambia and the Philippines). Similarly, some countries such as Brazil have incorporated the setting up of a National Information System in their Water Law.

3.4 Pilot Test of Performance Measurement Framework

The Performance Measurement Framework (PMF) described in Chapter 2 was pilot tested in Gujarat and Maharashtra. The first step in pilot testing was to develop a detailed questionnaire for data capture. Key lessons from pilot studies were drawn in terms of the process of data capture and measures needed to address data availability and reliability. Based on the results and lessons from pilot tests as well as feedback from the Expert Group meeting held following the pilot tests, the questionnaire and PMF tool were finalised for the state level roll out.

Development of PMF Tool: The overall PMF Tool included: (a) detailed definition of all indicators; (b) development of reliability scores for all key indicators; and (c) a detailed questionnaire for data capture to generate key performance indicators (KPIs)[20] as per the performance framework. Volume II of this report provides the full set of indicators with detailed definitions and reliability assessment and scores for all KPIs.[21]

- ***Development of a questionnaire:*** The process of developing the questionnaire was iterative. The CEPT team initiated the process by identifying the required information for assessing the PFM indicators as well as reliability levels for all KPIs. To develop a standardised, comparable and consistent reliability assessment across all ULBs, it was necessary to add a number of standard qualitative questions. A preliminary checklist was developed by CEPT in consultation with the PAS partners (UMC, AIILSG) and other stakeholders. The process of development of this questionnaire and its pre-testing took nearly three months.

  In Gujarat, a major information system improvement has been in the area of finance. As per the Gujarat Municipal Accounting Reform Project (GMARP 2005), all the 141 municipalities in Gujarat (excluding municipal corporations) have now transitioned to computerised double entry accrual based accounting systems. The data checklist has been developed to ensure easy retrieval of information related to finance.

- ***Scope of questionnaire:*** The questionnaire was developed keeping in mind that the water supply and sanitation services provision is undertaken by the local governments. This played a key role in the organisation of the questionnaire as various sections were organised on the basis of the departments functioning within ULBs. It has 10 sections including those related to water supply, sewerage and sanitation, solid waste management, consumer grievance redressal, staffing, services in slum settlements, and finance. It also captures information at the lowest spatial unit of the city for the KPIs related to coverage and some aspects of service levels in order to assess spatial variation in related indicators.

  The questionnaire also captured questions related to reliability assessment. This was necessary as the state-wide performance assessment needs to do a systematic measurement of reliability through direct questions on records and documentation for data capture in the ULB.

[20] KPIs include indicators for goals and reforms across all three sub-sectors.

[21] A detailed manual for data capture has also been prepared by the Urban Management Centre incorporating the guidelines as well as other instructions for ULBs and enumerators.

- ***Linking questionnaire with PMF indicators and KPI reliability:*** The questionnaire was developed as a standard spreadsheet with inbuilt links to generate all performance indicators and the reliability scores for all KPIs. This enables the ULB to assess its performance at the end of data capture.

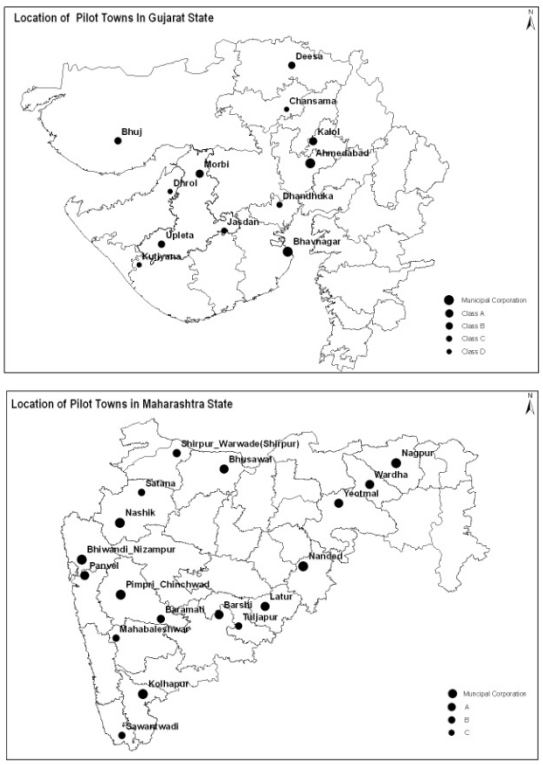
Pilot testing of the PMF tool: The PMF tool was pilot tested in 30 cities across Gujarat and Maharashtra. The selection of ULBs for pilot tests was done in consultation with the respective state governments. It was ensured that the selected ULBs included each class of ULB (refer to Table 3.8). Four pilot cities were also included in the GoI's SLB Initiative. The process started with a workshop where cities were briefed on the project objectives and their role in developing performance measurement systems. Various state agencies were also part of the workshop. A critical aspect was to test the process of data collection as well as identify any issues in data availability and reliability.

In Gujarat, 12 pilot cities were selected, including one city under the GoI's SLB Initiative. In Maharashtra, 18 pilot cities were chosen, including three cities under the SLB Initiative. Table 3.8 and Figure 3.3 provide details. In both states, the data collection process involved field visits to municipal offices, interactions with the chief officer and department heads, and also specific site visits to sources of water production, slum settlements, etc. Moreover, in Maharashtra, the process included orientation and capacity building workshops.

Table 3.8: Pilot Cities Selected in Gujarat and Maharashtra

Class	Gujarat	Maharashtra
Municipal corporation	1. Ahmedabad	1. Nagpur
		2. Bhiwandi-Nizampur
	2. Bhavnagar	3. Pimpri Chinchwad
		4. Nasik
		5. Kolhapur
		6. Nanded
Class A	3. Kalol	7. Bhusawal
	4. Morbi	8. Barshi
		9. Latur
		10. Wardha
		11. Yavatmal
		12. Panvel
Class B	5. Bhuj	13. Baramati
	6. Deesa	14. Shirpur-Warwade
	7. Upleta	
Class C	8. Jasdan	15. Sawantwadi
	9. Dhandhuka	16. Tuljapur
		17. Satana
		18. Mahabaleshwar
Class D	10. Chanasma	
	11. Dhrol	
	12. Kutiyana	

Figure 3.3: Pilot Cities



Key lessons from pilot tests: The pilot studies helped to give an insight into the ground level situation of water supply and sanitation systems in different types of cities in terms of data availability, capture and flow of information. Key findings identified from pilot studies are discussed below:

- ***Issues in data availability and information processing:*** In general, while ULBs seemed to gather a large volume of data generated on routine operations, these were not always analysed and used adequately to monitor system performance. This was compounded by the fact that many ULBs, particularly the small ones, have very limited technical staff (often just one person) who manages several functions in addition to water supply and sanitation. This suggests that identification of processes by which WSS data is generated, analysed and monitored at ULB level is essential. Such process mapping would help improve data availability and reliability, and its processing and use at the local level. This has been already initiated under the PAS Project and further work is planned after the first round of surveys is completed.

  Pilot studies also helped to identify critical gaps in data availability or more often in information processing, including for assets, relationship between households and connections, household level sanitation facilities, water production and supply, wastewater collection and treatment, and services in urban poor or slum settlements. In some aspects such as for monitoring of water quality and consumer grievance redressal, while some data is available, the results indicate possible problems with processes and proper reporting. Similarly, while data for ULB assets for water supply, wastewater and solid waste management (SWM) are generally available, the WSS department does not have ready access to this information in a meaningful way. More importantly, records are not updated in terms of asset conditions, and proper maps with utility/pipe networks are generally lacking. As a result, they are not used to develop systematic maintenance plans. Similarly, while most ULBs do have basic information on the existence and location of slum settlements, updated information on levels of quality of services is generally not available. This again makes it difficult to make use of this information for developing city-level plans to provide universal access to services for the urban poor.

  These gaps in information processing practices point to the need to develop a systematic assessment of data reliability so that improvements can be planned and measured in subsequent rounds.

- ***Spatial organisation of information:*** A key issue in the organisation of information relates to different spatial units identified for different operations. The electoral wards, water zones, solid waste zones, administrative zones, etc, are often different; each department within the ULB maintains the information for its respective boundaries. It was often difficult to reconcile these boundaries and collate the information pertaining to each of these zones.

- ***Participation of local institutions with data collection and assessment process:*** The pilot studies also highlighted the need to involve local institutions such as local colleges, non-governmental organisations and state level associations in supporting data collection as well as regular updating, monitoring and use especially for data related to services in slum areas. These efforts are planned to be taken up after the first round of data collection is completed.

3.5 Stakeholder Consultations

A number of different consultations were carried out during the process of PMF development. The main purpose during the development of the framework was to share initial development of the PMF tool with both local and state level stakeholders. During the pilot testing stage, a number of meetings and workshops were held in both the states for orientation and to familiarise participants with the need for performance measurement and its use.

Initial meetings with government agencies: As a process of introducing the state governments to the PAS Project, state-level meetings were conducted both in Gujarat and Maharashtra. In Maharashtra, this was with the Water and Sanitation Department and in Gujarat with the Urban Development Department. Participation in these meetings was from various state-level agencies as well as officials.

Apart from the general departmental meetings, specific meetings with other state level organisations in the UWSS sector – such as with the Gujarat Water Supply and Sewerage Board, Gujarat Water Infrastructure Limited, Gujarat Urban Development Mission and Directorate of Ministries – were conducted. The major areas of findings were in terms of the resource availability at the state level, water pricing, programmes/schemes for UWSS development, and reporting formats for various areas of UWSS.

Along with this, meetings were conducted with the City Managers' Association of Gujarat to understand the Gujarat Municipal Accounting Reforms Programme, the likely convergence of these data systems for purposes of the PAS programme, and city level information that could be gathered.

Similar meetings were also held with a few agencies in Maharashtra including the Maharashtra Jal Pradhkaran and Directorate of Municipalities. In addition, in Maharashtra, a State Cell has been set up which provided inputs in the development of the PFM tool.

In addition to these state level meetings, the PAS Project was also part of the Steering Group set up by the GoI for launching the pilot phase of the SLB Initiative. This has provided a good link with the GoI initiative. The PAS performance measurement framework draws on the SLB Initiative.

State-level stakeholders' workshops: In each state, workshops were held to introduce the PAS Project, and the need for such a system given the sector's development. The preliminary performance framework and associated questionnaire were discussed at these meetings. Based on the discussions and suggestions, revisions to the framework and questionnaire were incorporated. To brief various state level organisations and the chosen pilot cities about the PAS programme and need for such performance assessment, workshops for the state-level stakeholders, along with the pilot cities, were conducted in both the states.

Feedback from national resource persons: The preliminary designs were also shared with the PAS Project's Project Advisory Committee to get its feedback. After the pilot cities surveys in Gujarat and Maharashtra, a special review meeting was held at the CEPT University on September 18, 2009, to discuss the results and compare experiences. The external resource persons at this meeting included national experts and representatives of leading national institutions such as National Institution of Urban Affairs, Arghyam Foundation and Administrative Staff College of India, besides leading non-governmental organisations, individual consultants and academics.[22]

These consultations have been carried out throughout the process of developing and pilot testing the performance measurement framework. They have contributed not only to brainstorming conceptual issues, but also helped in creating awareness about the PAS Project. After the first round of surveys, the results will again be shared with these stakeholders through meetings, workshops and the web portal being set up for the PAS Project.

[22] See Mehta and Mehta (2009) for a report based on this meeting.

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Annexure: Tables

Table A1: Indicator Sets used in IBNET, IWA and ADB Utility Data Book

	IBNET	IWA	ADB (Utility Data Books)
Access and coverage	Household connections and population served	Resident population covered by service connections	Household connections and population served
Service levels and quality	Quantity, continuity and quality of service	'Physical' indicators such as quantity, continuity and quality of service	Production and consumption
Financial sustainability	Operating ratios	Capital and investment costs, operating ratios	Operating ratio
Efficiency in service operations	NRW estimations, tariff and user charge levied, staffing and customer satisfaction	'Operational' indicators of NRW estimations, tariff and user charge levied, staffing and customer satisfaction	UFW, staffing and collection efficiency
Equity in service delivery	Population with access to water through public standposts Monthly water bill for a household consuming 6 m^3 of water through a household or shared yard tap		

Table A2: Comparative Information on Key Indicators: ADB and WSP Utility Benchmarking (2007)

Category	Indicators	Bangalore		Chandigarh		Chennai		Indore		Jamshedpur		Rajkot	
		ADB	WSP	ADB	WSP	ADB	WSP	ADB	WSP	ADB	WSP	ADB	WSP
Service coverage and operational performance													
1. Coverage	Population covered (%)	93	91	100	100	89	98	77	54	74	79	98	98
2. Water balance	Water production (lpcd)	185	143	332	290	131	108	108	102	808	608	146	126
	% Metered connections	95.5	90	79.0	71	3.5	4	0.1	0.0	0.9	1	0.4	0.4
	Unaccounted for water (%)	45	40	39	18	17	16	n.d.	20	13	9	23	11
3. Service levels and quality	Water consumption (lpcd)	74	85	147	239	87	95	87	81	203	554	101	112
	Water availability (hours/day)	4.5	2.5	12.0	12.0	5.0	3.0	0.8	0.8	6.0	6.0	0.3	0.3
Financial performance													
4. Cost efficiency and staff productivity	Cost/Kl of water production	10.1	11.1	3.9	4.6	6.1	34.7	13.2	12.8	2.4	3.4	2.8	10.2
	Power cost/operating cost (%)	65	n.a.	60	63	33	8	57	74	57	40	28	27
	Staff/1,000 connections	5.2	3.3	8.6	10.7	13.3	12.6	18.7	8.8	5.6	6.9	1.1	1.1
5. Cost recovery and tariffs	Non-revenue water (%)		49		25		16		50		9		12
	Collection performance (%)	112	57	94	100	152	37	89	n.a.	100	n.a.	45	0
	Operating ratio	0.8	1.0	1.4	1.3	0.4	1.4	5.3	5.5	0.6	0.9	1.6	6.6

Sources: Based on information from CRISIL (2007) and Ministry of Urban Development and Asian Development Bank (2007).

Table A3: Indicators used in Performance-Linked Funding Programmes

	JNNURM	SNMA
Water supply		
Coverage	Population covered by piped water supply, number of household level water connections	
Service levels and quality	Quantity of water supplied and per capita supply, with hours of water supplied in a day	Hours of water supplied in a day
Financial sustainability	O&M cost recovery and unit cost for water produced	Expenditure towards O&M and depreciation
Equity in service delivery	Per capita supply of water and continuity of supply	Provision of access to water supply
Efficiency in service operation	Quantity of NRW, along with number of connections that are metered; consumer redressal systems	Introduction of consumer metering system and consumer redressal systems
Sanitation and wastewater		
Coverage	Households with individual toilets/low cost sanitation units, along with population covered by sewerage network	Connecting public and individual toilets to the sewerage network
Service levels and quality	Quantity of sewage treated and means of disposal	
Financial sustainability	O&M cost recovery and unit cost for wastewater	
Equity in service delivery		Access to sanitation in slums
Efficiency in service operation	Consumer redressal systems	Introduction of user charges and consumer redressal systems
Municipal solid waste management		
Coverage	Primary collection of waste in cities	Primary collection of waste in a segregated manner: compulsory reform
Service levels and quality	Source segregation and waste treated	Source segregation, treatment of waste and scientific disposal of waste
Financial sustainability	O&M cost recovery and unit cost for SWM operations	
Equity in service delivery		
Efficiency in service operation	Consumer redressal systems	Introduction of user charges and consumer redressal systems

Sources: JNNURM: MoUD (2005), SNMA: Government of Maharashtra (2008).

Table A4: Performance Information in Municipal Awards in Gujarat and Maharashtra

	Municipal Awards of GoG	SGBA
Water supply		
Coverage		Improve/increase water supply scheme: compulsory reform
Service levels and quality	Quantity of water supplied	Water availability and quality of water supplied: compulsory reform
Financial sustainability	Expenditure incurred (<50%) against revenue earned	Water tax improvement: compulsory reform
Equity in service delivery	Increase in water supply and distribution network within slums	Provision to special classes during water scarcity/shortage: compulsory reform
Efficiency in service operation	Collection efficiency (>90%), along with the cost of electricity for water produced	Consumer satisfaction reports: compulsory reform
Sanitation and wastewater		
Coverage		Toilet management
Service levels and quality	Collection efficiency of wastewater	Adequacy of treatment capacity: compulsory reform
Financial sustainability	Expenditure incurred (<50%) against revenue earned	Financial management
Equity in service delivery	Increase in wastewater network within slums	Provision of access to toilets in slums: compulsory reform

Efficiency in service operation	Collection efficiency (>90%) is monitored.	Effective wastewater disposal systems. Consumer satisfaction reports: compulsory reform
Municipal solid waste management		
Coverage	Primary collection of municipal waste	
Service levels and quality	Segregation at source	Treatment of waste and scientific disposal: compulsory reforms
Financial sustainability	Expenditure incurred (<50%) against revenue earned	
Equity in service delivery		
Efficiency in service operation	Collection efficiency (>90%) is monitored	Consumer satisfaction reports: compulsory reform

Sources: Municipal Awards: GoG (2009), SGBA: Government Resolution No./NSA2007/C.R.64/WS-21, dated 26/10/2007.

Table A5: Performance Information in Regular State Monitoring in Gujarat and Maharashtra

	Monitoring under NG/SG	Monitoring By DMA in Maharashtra
Water supply		
Coverage		No. of residential, non-residential and public connections
Service levels and quality	Per capita water supplied (100 lpcd) and quality of water supplied (100%)	Per capita water supplied and quality of water supplied
Financial sustainability	Reporting of various taxes collected	Reporting of various taxes collected
Equity in service delivery	Reporting of slum settlements and in-situ schemes implementation	Reporting on budget allocation and expenditure related to water supply in slums
Efficiency in service operation	Staff management and e-governance: key goals	Reporting on illegal connections and actions taken to regularise them
Sanitation and wastewater		
Coverage	Monitoring of sanitation facilities and underground sewerage system	No. of individual and public toilets; population served by sewerage network
Service levels and quality	Staff management and e-governance: key goals	
Financial sustainability	Reporting of various taxes collected	Reporting of various taxes collected
Equity in service delivery	Reporting of slum settlements and in-situ schemes.	Reporting on budget allocation and expenditure related to toilets in slums
Efficiency in service operation	Staff management and e-governance: key goals	
Municipal solid waste management		
Coverage	Primary collection for residential and commercial properties	Primary collection for residential and non residential properties; reporting on primary collection for special waste
Service levels and quality	Scientific disposal of waste	Disposal of waste
Financial sustainability	Reporting of various taxes collected	Income and expenditure related to cleaning
Equity in service delivery	Reporting of slum settlements and in-situ schemes	
Efficiency in service operation	Staff management and e-governance: key goals	

Sources: *NG/SG: Based on details given by urban local bodies during field work in Gujarat; DMA: Satara NP (2009).*

Table A6. Performance Improvement Measures for SNMA Reform

1.	**Water supply management**
1	Identification and authorisation of unauthorised connections
2	100% billing and recovery system (PSP)
3	Programme of water audit, energy audit and rehabilitation
4	Private sector participation in overall O&M
5	To increase the water supply hours

6	To cover the complete expenditure towards O&M and depreciation
7	Consumer metering
8	Incentives to pay arrears towards water bills, 'New Revised Nirbhay Yojana'
9	100% consumer redressal
10	Urban bye-laws for rain water harvesting and related incentives
2.	**Toilet management**
1	Survey of the individual and public toilets in the city and necessary provision in annual budget
2	Repair and construct public toilets in city and slums (specific reference to gender sensitivity)
3	Private sector participation (BOT/BOO) or NGO for the efficient O&M of the public toilets in the city
4	Connect the public and individual toilets to sewerage system in the city
5	To abandon open defecation
3.	**Wastewater and sewerage**
1	To connect the properties with sewerage system
2	Reuse of water (decentralised process on wastewater and other advanced technologies)
3	To levy user charges
4	Check quality of treated wastewater
4.	**Solid waste management**
1	Segregation at source
2	Door to door collection of segregated waste, 'Ghantagadi system'
3	Treatment plant (centralised and decentralised using appropriate technology and private sector participation)
4	Separate collection of waste from vegetable and mutton market, hotels
5	Levy user charges
6	Sanitary landfill facility

Sources: SNMA: Government of Maharashtra (2008).

Table A7. Performance Indicators for Sant Gadge Baba Awards (SGBA)

	COMPULSARY REFORMS
1.	**Water supply and management**
1.	Water availability as per norms (lpcd)
2	Attempts to improve/increase water supply schemes
3	Quality of supplied water (annually)
4	Water supply audit and improvements
5	Water tax improvement
6	Provision during water shortage/scarcity, supply to special classes
7	Consumer satisfaction report
2.	**Wastewater management**
1	Wastewater treatment capacity
2	Expenditure and recovery
3	Financial management
4	Consumer satisfaction report
3.	**Sanitation (toilet) management (individual, public, toilets)**
1	Public places/toilet facility for floating population
2	Toilet facilities in slums, residential area, public/administrative buildings, schools (gender and age sensitivity)
3	Innovative models adopted for construction of toilets
4	Consumer satisfaction report
5	Information, education and communication for defecation free city, public health, IEC
4.	**Solid waste management**
1	Implementation of central government's MSW Rules, 2000
2	Effectiveness and implementation of ban on plastic use and penalising actions
3	Improvements/innovations in solid waste management
4	Consumer satisfaction report

	OPTIONAL REFORMS
1	Implementation of urban facilities, surroundings, betterment of roads, beautification and development
2	Encroachment removal, prevention of unauthorised construction
3	Education, social facilities, mother-child welfare
4	Human resources, financial management and good governance
5	Financial progress, employment, poverty alleviation

Source: Government of Maharashtra – Government Resolution No./NSA2007/C.R.64/WS-21,dated 26/10/2007.

Table A8: Department-wise Data Requirements for ULBs in Gujarat

	I. Water Works Department
1.	Asset registration and regular maintenance
2.	Water production and supply
3.	Water quality surveillance
	II. Drainage Department
4.	Asset registration and regular maintenance
5.	Sewage treatment and disposal
6.	Sewage treatment effluent quality surveillance
	III. SWM Department
7.	Asset registration and regular maintenance
8.	SWM treatment and disposal
	IV. Finance and Taxation
9.	Water/drainage connections records, preparation of bills and cost recovery, tariff schedule
10.	Finance-Budget allocation and expenditure
	V. UCD/SLUM Cell
11.	Slum population and other services related data.
	VI. General Administration
12.	Staffing and management
13.	Boundaries and demography
	VII. Public Relations Department
14.	Consumer grievance and complaint recording system

Table A9: UWSS Information in Reports for Routine and Programme Monitoring in Gujarat

Report no.	Department of Urban Development	Frequency
	Water	
9	Drinking water source and chlorination details	Monthly
10	Drinking water chlorination and testing	Monthly
11	Details of active leakages	Monthly
14	Details of school tours organised at water works every Saturday	Monthly
24	Details of drinking water facilities in government primary schools	Monthly
	Sanitation	
1	Pay and use toilet	Quarterly
1A	Details of completed pay and use toilets	Quarterly
2	Details of individual toilet programme	Quarterly
23	Information regarding toilet facilities available in government primary schools	Monthly
	Solid waste management	
3A	Door to door collection details (for domestic properties)	Monthly
3B	Door to door collection details (for commercial properties)	Monthly
4	Sanitation Tax-related information	Annually
8	Information related to street sweeper motivation programmes	Annually
15	Information related to cleaning of schools	Monthly
16	Information related to cleaning of vegetable markets	Monthly
5	Information related to door to door collection of solid waste and its transportation	Monthly

6	Information related to transportation of solid waste	Monthly
	Finance	
26	Total Tax Collection Statement (Including Education Cess)	Annually
27	Heading-wise Tax Collection Statement	Annually
27A	Details of reforms for Tax Collection	Annually
35	Details of double entry accounting system implementation (GMARP)	Quarterly
36	Details of other audits done by ULBs	Annually
39	ULB Budget details	Annually
40	Details of the proposals for the revision of existing taxes and charges	Annually
45	Income and Expenditure Statement	Annually
46	Grouping of the Schedules to Balance Sheet	Annually
47	Information related to Professional Tax (category-wise)	Annually
	Reports received by Gujarat Municipal Finance Board (GMFB)	
	Finance	
1	Statement of Total Income	Annually
2	Statement of Total Expenditure	Annually
3	Details of Property Tax Billing and Collection	Annually
5A	Details of Revenue Grant	Annually
5B	Details of Capital Grant	Annually
7	Information related to wages of sweepers	Quarterly
8	Information related to details of salary of municipal staff	Quarterly
9	Information related to various taxes levied by the municipality	Annually
10	Information related to status of collection various taxes	Annually
11	Information related to total tax collection (including Education Cess)	Annually
12	Information related to implementation of Area Base Property Tax System	Annually
13	Information related to comparative information regarding Area Base Property Tax	Annually

Source: Based on details given by urban local bodies during field work in Gujarat.

Table A10: Details of UWSS Information in Revised Reporting Formats

Report no.	Department of Urban Development (UDD – Central Data Management Cell)	Frequency
	Water	
1-A	Planning drinking water	Monthly
1-B	Approved projects under UIDSSMT	Quarterly
1-C	Progress under Amritdhara and 12th FC	Quarterly
	Sanitation	
1	Underground drainage	Annually
3-A	Pay and use toilets' progress report	Quarterly
3-B	Pay and use toilets' NGO-wise details	Quarterly
3-C	Pay and use toilets' NGO-wise status	Quarterly
3-D	Progress report under Nirmal Shauchalya Yojana	Quarterly
3-E	Pay and use toilets – physical and financial planning	Quarterly
3-F	Individual toilets – physical and financial planning	Quarterly
	Solid waste management	
4-A	SWM door to door collection	Monthly
3B	SWM vermin-compost details	Monthly
	Finance	
7-A	Demand of tax – current year	Annually
7-B	Tax recovery	Annually
7-C	Professional tax	Annually
7-D	Maintenance exp.	Quarterly
7-E	Establishment exp. details	Annually
9	Financial management	Annually
	Slums	
5-A	Slum areas – infrastructure facilities	Quarterly
5-B	Slum areas – construction of new houses	Quarterly
6-A	Umeed – centres	Monthly
6-B	Umeed – for municipalities where there are no Umeed centres	Monthly
	Governance	
8	E-governance	Quarterly
11-A	Establishment details of municipalities	Annually

Source: From the Urban Development Department, Government of Gujarat website: http://udd.gujarat.gov.in/Default_files/VCPatrakwise.htm, Retrieved May 18, 2010; and details of frequency as given by urban local bodies during field work in Gujarat.

Table A11: Reports Used by State Agencies for Monitoring in Maharashtra

Report no.	Directorate of Municipal Administration (DMA)
	Water Supply
22 A	Water connections and their rates
22 B	Checking of water samples in public health laboratory
22 C	Water supply expenditure
23	Information of water supply schemes
	Sanitation
62	Information on wastewater systems like type of system, toilet connections, and tax levied
	SWM
63 A	Sources of waste, collection and transportation
64	Details of street sweeping
	Finance
14 & 46	Information related to income and ward wise expenditure on cleaning for past five years
65	Information related to expenditure on infrastructure in urban sector for past five years
	Slums
42	Information related to demographics, tenure, budget allocation and expenditure related to water supply and sanitation.

Source: Based on formats in Annual Inspection Reports prepared ULBs for routine monitoring. See for example Satara NP (2009).

Performance Measurement Framework for Urban Water and Sanitation

Volume II: List of Indicators and Reliability Assessment

CEPT University

May 2010

performance assessment system

PERFORMANCE MEASUREMENT FRAMEWORK FOR URBAN WATER AND SANITATION

VOLUME II: LIST OF INDICATORS AND RELIABILITY ASSESSMENT

CEPT University

May 2010

CONTENTS

Introduction

Over the past many years, a significant number of Indians, especially the poor, have had to rely on unsafe sources of water supply and suffer inadequate water and sanitation services. Very little is known about the quantity of water made available to people, non-revenue water, quality of water and coverage of poor households. A key challenge in the sector in India is the lack of adequate and reliable information. For new investments in water and sanitation to be effective, it is important to assess the performance of the existing system, as well as ensure its sustainability and reach for the poor and unserved.

It is in response to this situation that the Centre for Environmental Planning and Technology (CEPT) University is implementing the Performance Assessment System (PAS) Project, which is funded by the Bill and Melinda Gates Foundation. Its overarching aim is to develop performance assessment systems for urban water supply and sanitation at local and state levels.

This report is an accompanying publication to Volume I of 'Performance Measurement for Urban Water Supply and Sanitation'. Volume I dealt with approach and framework. This volume presents descriptions and definitions of the key performance indicators (KPI) for water supply, wastewater and solid waste management. Reliability assessment for each KPI is also explained. The report also includes descriptions and definitions for more detailed local action indicators.

The annexure to this Volume further has the Performance Assessment System (PAS) questionnaire that would be used for data collection and generation of key and local action indicators. The questionnaire covers aspects related to general demographics, water supply, wastewater, municipal solid waste management, information on slums, finance, etc. The questionnaire is essentially an excel workbook with validation checks in-built into it as well as automatic generation of the key performance and local action indicators. It is developed to handle both quantitative and qualitative datasets related to the various areas mentioned above. The qualitative datasets are essential to assess and generate the reliability of the quantitative datasets. The reliability grades are calculated based on the band description as listed in this report.

Abbreviations

BOD	Biochemical oxygen demand
CBO	Community-based organisation
COD	Chemical oxygen demand
CPHEEO	Central Public Health and Environmental Engineering Organisation
cu m	cubic metre
DCB	Demand Collection Balance
ESR	Elevated service reservoir
GIS	Geographic information systems
Ha	Hectare
HH	Household
ILI	Infrastructure Leakage Index
Kl	Kilolitres
km	Kilometre
KPI	Key performance indicator
m	metre
m^3	metre cubed
MSW	Municipal solid waste
NGO	Non-governmental organisation
no.	Number
NRW	Non-revenue water
O&M	Operation and maintenance
PAS	Performance Assessment System
QN	Question number
RC	Residual chlorine
Rs	Rupees
STP	Sewage treatment plant
SWM	Solid waste management
TDS	Total dissolved salts
UARL	Unavoidable Annual Real Losses
ULB	Urban local body
WDS	Water distribution station
WTP	Water treatment plant

1. Key Performance Indicators

The PAS Performance Measurement Framework has outlined service goals and reform actions under the broad categories of access and coverage, service levels and quality and financial sustainability.

1.1 Summary of Key Indicators for Goals for Water, Wastewater and SWM

	Water supply	Wastewater	Solid waste management (SWM)
Indicators for goals			
Access and coverage	1. Coverage of water supply connections at household level	1. Coverage of households with access to individual toilets	1. Household level coverage of SWM services
		2. Coverage of households with individual connections to sewerage network	
Service levels and quality	2. Per capita supply of water	3. Collection efficiency of wastewater network	2. Efficiency of collection of municipal solid waste
	3. Continuity of water supply	4. Sewage treatment capacity	3. Extent of segregation of municipal solid waste
	4. Quality of water supplied		4. Extent of municipal solid waste processed and recycled
Financial management	5. Extent of cost recovery (O&M) in water supply services	5. Extent of cost recovery (O&M) in wastewater management	5. Extent of cost recovery (O&M) in SWM services
Indicators for reform actions			
Efficiency in service operation	6. Extent of non-revenue water	6. Quality of wastewater treatment	6. Extent of scientific disposal of municipal solid waste
		7. Extent of reuse and recycling of wastewater	
	7. Efficiency in redressal of customer complaints	8. Efficiency in redressal of customer complaints	7. Efficiency in redressal of customer complaints
	8. Extent of functional metering of water connections		
	9. Efficiency in collection of water supply-related charges	9. Efficiency in collection of sewerage-related charges	8. Efficiency in collection of SWM-related user charges
Equity	10. Spatial variations in coverage of water supply connections	10. Spatial variations in coverage of households with access to individual toilets	9. Spatial variations in household level coverage of SWM services
	11. Spatial variations in per capita water supply	11. Spatial variations in coverage of household connections to sewerage network	
	12. Coverage of water supply connections in slum settlements	12. Coverage of toilets in slum settlements	10. Household level coverage of SWM services in slum settlements
		13. Coverage of household connections to sewerage network in slum settlements	

1.2 Definition and Description of Key Indicators

Water Supply

Water supply	Unit	Description
Access and coverage		
1. Coverage of water supply connections	%	The indicator captures the extent of the household/individual water supply connections in the ULB. It is an important factor to measure the extent of service delivery of the ULB.
		Total households connected to the water supply network with a private (not shared) service connection, as percentage of total households in the ULB
Service levels and quality		
2. Per capita supply of water	lpcd	This indicator captures the quantity of treated water that is supplied to the consumer daily. It is the aggregate of all sources of water from which the ULB supplies water. This quantum of water is to include only treated water that goes into the distribution system.
		Total treated water supplied per day into the distribution system expressed by population served
3. Continuity of water supply	Hours	This indicator captures the number of hours of supply at the consumers' end. This indicator coupled with the per capita supply of water denotes a key aspect of the service delivery of the ULB.
		Continuity of supply is measured as: Average number of hours of pressurised water supply per day
4. Quality of water supplied	%	This indicator captures the extent of samples for residual chlorine and bacteriological tests, and fluoride and TDS tests for surface and ground water sources, that have passed (at treatment plant and consumer end) as per the standards.
		Percentage of water samples that meet or exceed the specified potable water standards and sampling regime, at treatment plant outlet and consumer points as defined by the CPHEEO
Financial management		
5. Cost recovery (O&M) in water supply services	%	This indicator captures the revenues (taxes, user charges, fees) recovered by the ULB against the expenses incurred. This denotes the cost control measures, if any, that need to be considered by the ULB, and also a critical factor in tariff charges.
		Percentage of total operating revenues from water supply-related charges to total operating expenses on water supply
Efficiency in service operations		
6. Extent of non-revenue water	%	This indicator captures the quantum of water losses occurring through physical losses, unauthorised consumption, and authorised but unbilled consumption. It indicates the extent of revenue losses incurred by the ULB.
		Difference between total water produced (ex-treatment plant) and total water sold expressed as a percentage of total water produced. NRW includes: (a) consumption which is authorised but not billed, such as public standposts; (b) apparent losses such as illegal water connections, water theft and metering inaccuracies; (c) real losses which are leakages in the transmission and distribution networks
7. Efficiency in redressal of customer complaints	%	This indicator captures the number of complaints made by consumers that have been redressed by the ULB, as per service charter standards. It is an important indicator and a direct assessment of customer satisfaction levels.
		Total number of water supply-related complaints redressed within time as stipulated in service charter of the ULB, as a percentage of the total number of water supply-related complaints received in the year

Water supply	Unit	Description
Efficiency in service operations		
8. Extent of functional metering of water connections	%	This indicator captures the extent to which the connections that are metered and functional. Functional metering of connections is an important aspect in understanding the accuracy of consumption quantities in each city.
		Total number of functional metered water connections expressed as a percentage of total number of water supply connections (including public standpost connections)
9. Efficiency in collection of water supply-related charges	%	This indicator captures the extent of collection of revenues that are billed by the ULB. It denotes the revenues that are due to the ULB, and hence an important factor in its cost recovery efforts.
		Percentage of current year revenues collected from water supply related taxes and charges as a percentage of total billed amounts (for water supply)
Equity		
10. Coverage of water supply connections in slum settlements	%	This indicator captures the number of individual water connections that are provided by the ULB in slum settlements. This assesses the level of service delivery to the urban poor.
		Total households in slum settlements connected to water supply network with a private (not shared) service connection, as percentage of total households in all slum settlements in the ULB
11. Spatial variations in coverage of water supply connections	CV	This indicator captures the variations in coverage of connections across wards within an ULB. Spatial variation with a value '0' implies there are no variations in coverage across the wards in the city.
		Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "total households connected to the water supply network with a private (not shared) service connection, as percentage of total households" (indicator 1 above)
12. Spatial variations in per capita water	CV	This indicator captures the variations in per capita supply across wards within an ULB. Spatial variation with a value '0' implies there are no variations in per capita supply across the wards/zones in the city.
		Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "Total treated water supplied into the distribution system expressed by population served per days of water supplied" (indicator 2 above)

Wastewater

Wastewater	Unit	Description
Access and coverage		
1.Coverage of households with access to individual toilets	%	This indicator captures the number of households with access to individual toilets. It is an important indicator that assesses the level of sanitation services in the city.
		Total number of households with access to individual toilets as a percentage of total number of households in the city.
2. Coverage of households with individual connections to sewerage network	%	This indicator captures the extent of coverage in terms of individual sewerage connections for each household. This indicator is significant in estimating the level of sanitation services in the city.
		Total number of households with individual connections to sewerage network as a percentage of total number of households in the city.
Service levels and quality		
3. Collection efficiency of sewerage network	%	This indicator captures the quantity of wastewater that is collected at the treatment plant for treatment. This is an important indicator to understand the efficiency of the network in collecting and conveying the wastewater to the treatment plant.
		Quantum of wastewater collected at the intake of the treatment plant to the quantity of wastewater generated (as per CPHEEO, 80% of water consumed is wastewater generated)
4. Sewage treatment capacity	%	This indicator captures the adequacy of treatment plants to treat wastewater collected to secondary treatment standards. This is important to measure as in most cities where treatment plant exists, it is not functional.
		Quantum of wastewater treated to secondary treatment standards (removal of BOD and COD) as a percentage of normative wastewater generated.
Financial management		
5. Cost recovery (O&M) in wastewater management	%	This indicator captures the revenues (taxes, user charges, fees) recovered by the ULB against the expenses incurred. This denotes the cost control measures, if any, that need to be considered by the ULB, and also a critical factor in tariff charges.
		Percentage of total operating revenues from sewerage related charges to total operating expenses on sewerage network services
Efficiency in service operations		
6. Quality of wastewater treatment	%	This indicator captures the quality of wastewater that is released into the environment after treatment. This is important to monitor as it assesses if the wastewater has been adequately treated before being released.
		Total number of wastewater samples (BOD and COD) that have passed to number of wastewater samples conducted, at the outlet of the treatment plant
7. Extent of reuse and recycling of wastewater	%	This indicator captures the quantity of wastewater that is reused after treatment for purposes like irrigation, gardening, etc. This is an important indicator as it helps to assess the efficient use of the available water resources.
		Quantity of wastewater that is recycled or reused as a percentage of quantity of wastewater received at the treatment plant.
8. Efficiency in redressal of customer complaints	%	This indicator captures the number of complaints made by consumers that have been redressed by the ULB, as per service charter standards. It is an important indicator which directly assesses the consumer satisfaction level.
		Total number of wastewater-related complaints redressed within time as stipulated in service charter of the ULB, as a percentage of the total number of wastewater-related complaints received in the year

Wastewater	Unit	Description
Efficiency in service operations		
9. Efficiency in collection of sewerage related charges	%	This indicator captures the extent of collection of revenues that are billed by the ULB. It denotes the revenues that are due to the ULB, and hence an important factor in its cost recovery efforts.
		Percentage of current year revenues collected from wastewater-related taxes and charges as a percentage of total billed amounts (for wastewater)
Equity		
10. Spatial variations in coverage of households with access to individual toilets	CV	This indicator captures the variations in coverage of sewerage connections across wards within a city. Spatial variation with a value '0' implies there are no variations in coverage across the wards in the city.
		Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "total households connected to the sewerage network, as percentage of total households" (indicator 1 above)
11. Spatial variations in coverage of household connections to sewerage network	CV	This indicator captures the variations in coverage of toilets across wards within a city. Spatial variation with a value '0' implies there are no variations in coverage across the wards in the city.
		Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "total households with individual toilets, as percentage of total households" (indicator 1 above)
12. Coverage of household connections to sewerage network in slum settlements	%	This indicator captures the extent of sewerage network connections in the slum settlements. This is relevant to measure as it gives the level of services that are provided to the urban poor.
		Total number of slum households connected to sewerage network as a percentage of total number of slum households
13. Coverage of individual toilets in slum settlements	%	This indicator captures the number of individual toilets that are provided in slum settlements. This is relevant to measure as it gives the level of services that are provided to the urban poor.
		Total number of slum households with individual toilets as a percentage of total number of slum households

Solid waste management

SWM	Unit	Description
Access and coverage		
1.Household level coverage of SWM services	%	This indicator captures the door-to-door collection of municipal solid waste (MSW). This is relevant as it forms a major part in the quantum of waste that can be treated, and scientifically disposed.
		Total number of households with door-to-door collection of MSW to the total number of households in the city
Service levels and quality		
2. Efficiency of collection of municipal solid waste	%	This indicator captures the total quantum of waste that is collected at the treatment and/or disposal sites. This is relevant as it forms a major part in the quantum of waste that can be treated/ disposed.
		Quantum of waste that is collected at the treatment/disposal sites to the total quantity of waste that is generated in the city
3. Extent of segregation of municipal solid waste	%	This indicator captures the segregation of waste, typically as dry and wet waste, but ideally as biodegradable and non-biodegradable waste. Segregated waste enables increased efficiencies in treatment, recycling and scientific disposal of waste.
		Quantity of segregated waste received at treatment/disposal sites to the total waste collected by the service providers
4. Extent of municipal solid waste processed/recycled	%	This indicator captures the quantity of waste that is recycled or processed at the treatment plant.
		Quantum of waste that is recycled or processed to the total waste that is collected by the service providers
Financial management		
5. Extent of cost recovery (O&M) in SWM services	%	This indicator captures the revenues (taxes, user charges, fees) recovered by the ULB against the expenses incurred. This denotes the cost control measures, if any, that need to be considered by the ULB, and also a critical factor in tariff charges.
		Percentage of total operating revenues from SWM-related charges to total operating expenses on SWM
Efficiency in service operations		
6. Extent of scientific disposal of municipal solid waste	%	This indicator captures the quantum of waste that is disposed in scientific engineered landfills. This is an important indicator as it assesses the amount of waste that is safely disposed as against waste that is disposed in open dumps.
		Quantum of waste that is disposed in scientific/compliant landfills to the total quantum of waste disposed in compliant and open disposal sites
7. Efficiency in redressal of customer complaints	%	This indicator captures the number of complaints made by consumers that have been resolved by the ULB, as per service charter standards. It is an important indicator which directly assesses the consumer satisfaction level.
		Total number of SWM related complaints redressed within time as stipulated in the service charter of the ULB, as a percentage of the total number of SWM-related complaints received in the year
8. Efficiency in collection of SWM-related charges	%	This indicator captures the extent of collection of revenues billed by the ULB. It denotes the revenues that are due to the ULB from taxes and charges.
		Percentage of current year revenues collected from SWM-related taxes and charges as a percentage of total billed amounts (for SWM)

SWM	Unit	Description
Equity		
9. Spatial variations in household level coverage of SWM services	CV	This indicator captures the variations in door-to-door coverage of SWM across wards within an ULB. Spatial variation with a value '0' implies there are no variations in coverage across the wards in the city.
		Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "total households with door-to-door collection of MSW, as % of total households" (indicator 1 above)
10. Household level coverage of SWM services in slum settlements	%	This indicator captures the number of households serviced by door-to-door MSW collection in slum settlements. This measures the service level provision to the urban poor.
		Total households in slum settlements serviced by door-to-door collection of MSW as a percentage of total number of households in slums.

2. Reliability Assessments of Key Indicators

2.1 Water supply

Access and Coverage		
1. Coverage of individual water supply connections (%)		
Definition	Total households connected to the water supply network with individual service connection, as percentage of total households in the city	
Description	Coverage = (a/b)*100; where a: is the total number of households with individual water connection (no.) b: is the total number of households in ULB, as projected from Census or as reported by the ULB (no.)	
Reliability bands	***Households with individual service connections***	***Actions needed to achieve reliability***
A+	GIS database of property level details and water connections	Develop GIS linked computerised property tax, connection registers, etc
A	Computerised records; households served per connection and connections maintained, with periodic updation	Computerise property tax, connection registers, etc, along with household records
B	Manual records; households served per connection and connections maintained, with periodic updation	Introduce households served per connection and number of connections in manual records for property tax, connection registers, etc
C	Manual records of connections maintained; households served per connection as estimated or assumption of one household = one connection	Introduce household estimate in manual records for property tax, connection registers, etc, or develop a system of manual records for connection registers, etc
D	No records; as reported by ULB	–

Service Levels and Quality		
2. Per capita supply of water (lpcd)		
Definition	Total treated water supplied per day into the distribution system expressed by population served.	
Description	Per capita supply = a/b; where a: is the quantity of treated water supplied for a month, based on aggregate of daily water supplied into the distribution system, from various sources, for example, ex-treatment plant, treated bulk water purchase, water drawn from ground sources, and any other sources like desalinated water, rainwater harvesting (litres per day); *Quantity of water supplied in bulk to large water intensive industries to be excluded from this estimate of total supply.* b: is the population of the city, as projected from Census. In cases where cities have a substantial floating population, this is also included. (no.)	
Reliability bands	***Quantity of water produced***	***Actions needed to achieve reliability***
A+	Computerised systems linked to GIS database	Computerised records linked to GIS database at District Metering Area Zones
A	Computerised systems to enable daily monitoring of water supplied	Computerised records and analysis of measurement of water quantity supplied through bulk flow meters at WTP and WDS
B	Manual records; daily quantities of water supplied assessed by flow meters	Improved manual records of water quantity supplied through bulk flow meters at WTP and WDS
C	Manual records; daily quantities of water supplied assessed by pumping details	Improved manual records of pump operations and/or level measurements to measure quantity supplied at WTP and WDS, backed by periodic surveys using portable bulk flow meters
D	No records; as reported by ULB	–

Service Levels and Quality		
3. Continuity of water supply (hours)		
Definition	Weighted average of number of hours of pressurised water supply per day for a zone	
Description	Continuity = $\sum(a_i*(b_i/B))$;where a: is the average number of hours of pressurised supply in a day in a zone i (in hours) as measured for the last month b: estimated population or households in zone i as estimated from the census or as reported by the ULB, and B is total population or households in the city as estimated from Census or as reported by the ULB	
Reliability bands	***Hours of supply and population/households of zones***	***Actions needed to achieve reliability***
A+	Computerised system linked to GIS database for recording hours of supply	Computerised records linked to GIS database at District Metering Area Zones
A	Computerised systems of hours of supply	Computerised system for daily measurement of hours of supply in each zone
B	Manual records; hours of supply maintained for each zone.	Develop a system of manual records for hours of water supply in each zone on a daily basis and analysed daily and monthly, along with periodic estimation of population/households for each water zone
C	Manual records; hours of supply as reported by ULB for each zone.	Develop a system of manual records for hours of water supply in each zone on a daily basis and analysed daily and monthly
D	No records; hours of supply for city as a whole as reported by ULB.	–

Service Levels and Quality		
4. Quality of water supplied (%)		
Definition	Percentage of water samples that meet or exceed the specified potable water standards and sampling regime, as defined by CPHEEO	
Description	Quality of water supplied = (b/a)*100; where a: is the total number of water samples taken/conducted in a month, from WTP/bulk production points and consumer points (no.) b: is the total number of water samples that have passed the standard, taken from WTP/bulk production points, bore wells and consumer points (no.)	
Reliability bands	***Sampling locations, audit of water quality***	***Actions needed to achieve reliability***
A+	Automated systems, linked to GIS database. Proper sampling regimen for consumer end tests. Independent audits carried out regularly	Develop automated systems to monitor water quality at all locations (source, WTP/bulk production points, ESR and consumer), along with GIS database. Regular independent audits to be conducted
A	Automated systems to monitor water quality. Proper sampling regimen for consumer end tests. Independent audits carried out regularly	Introduce automated systems to monitor water quality. Regular independent audits need to be conducted
B	Manual records; monitoring at all locations. Proper sampling regimen for consumer end tests. Independent audits carried out occasionally	Develop a system of manual records for monitoring water quality at all locations. Independent audits to be carried out

Reliability bands	*Sampling locations, audit of water quality*	*Actions needed to achieve reliability*
C	Manual records; internal audits carried out	Develop a system of manual records for monitoring water quality for all locations. Internal audits to be carried out
D	No records; no audits conducted	–

Financial Sustainability		
5. Cost Recovery (O&M) in water supply services (%)		
Definition	Percentage of total operating revenues from water supply-related charges to total operating expenses on water supply	
Description	Cost recovery = (b/a)*100; where a: is the total annual operating expenses in water supply, excluding loan interest payment and depreciation b: is the total annual operating revenues in water supply from local sources and excluding revenue grants	
Reliability bands	*Accounting systems and segregation of budget heads*	*Actions needed to achieve reliability*
A+	Computerised accounting systems with accrual based double entry system. Clear segregation of budget heads related to water. Regular reporting of financial statements	Develop computerised accrual based double entry systems, with full migration from cash-based system. Accounting system to enable clear segregation of budget heads
A	Computerised accounting systems with accrual based double entry system, but parallel to cash-based system. Clear segregation of budget heads related to water. Regular reporting of financial statements	Develop computerised accrual based double entry system, enabling clear segregation of budget heads
B	Computerised accounting systems with accrual based double entry system, with partial segregation of budget heads related to water	Develop computerised accrual based double entry system
C	Cash-based accounting systems with manual records	Develop manual systems of cash based accounting systems
D	Not applicable	–

Efficiency in Service Operation		
6. Extent of non-revenue water		
Definition	Difference between total water produced (at source) and total water sold expressed as a percentage of total water produced	
Description	Non-revenue water = [((a-b)/a)*100]; where a: is the quantity of treated water supplied for a month, based on aggregated of daily water supplied into the distribution system, from various sources, for example, ex-treatment plant, treated bulk water purchase, water drawn from ground sources, and any other sources like desalinated water, rainwater harvesting (million litres per month); *quantity of water supplied in bulk to large water intensive industries to be excluded from this estimate of total supply.* b: is the total quantum of water sold/billed(million litres per month)	
Reliability bands	*Quantity of water sold and water produced*	*Actions needed to achieve reliability*
A+	Computerised systems linked to GIS database	Computerised records linked to GIS database at District Metering Area Zones

Reliability bands	*Quantity of water sold and water produced*	*Actions needed to achieve reliability*
A	Computerised systems to enable daily monitoring of water supplied, with records of metered quantities for all consumers	Computerised records and analysis of measurement of water quantity supplied through bulk flow meters at source, WTP and WDS, along with records on metered quantities for all consumers
B	Manual records; daily quantities of water supplied assessed by flow meters, with records of metered quantities for commercial and bulk consumers. Domestic consumption estimated based on periodic surveys	Improved manual records of water quantity supplied through bulk flow meters at source, WTP and WDS, along with records on metered quantities for bulk and commercial consumers. Domestic consumption estimates conducted through periodic surveys
C	Manual records; daily quantities of water supplied assessed by pumping details, with records. Consumption estimates assessed through spot surveys	Improved manual records of pump operations and/or level measurements to measure quantity supplied at WTP and WDS, backed by periodic surveys using portable bulk flow meters. Introduce consumption estimates in manual records, through spot surveys
D	No records; as reported by ULB	–

Efficiency in Service Operation		
7. Efficiency in redressal of customer complaints		
Definition	Total number of water supply-related complaints redressed within time as stipulated in service charter of the ULB, as a percentage of the total number of water supply-related complaints received in a year	
Description	Efficiency in redressal of customer complaints =(a/b)*100; where a: is the no. of water supply complaints redressed as per service standards over the past year(no.) b: is the total no. of water supply complaints received over the past year (no.)	
Reliability bands	***Complaints received and redressed***	***Actions needed to achieve reliability***
A+	Computerised records linked to GIS database	Introduce computerised systems with links to GIS database to monitor and analyse complaints received
A	Computerised records; complaints segregated and collated from various means	Develop fully automated complaint redressal system, with proper categorisation of complaints and capturing complaints made through various means
B	Manual records; complaints segregated and collated from various means	Develop a system of manual records for complaints received and redressed, with proper categorisation of complaints and capturing complaints made through various means
C	Manual records; no segregation or collation of complaints	Develop a system of manual records for complaints received and redressed
D	No records; as reported by ULB	–

8. Extent of functional metering of water connections (%)	
Definition	Total number of functional metered water connections expressed as a percentage of total number of water supply connections
Description	Extent of metered connections = (a/b)*100; **w**here a: is the number of metered connections that are functional b: is the total number of water connections (residential, commercial, institutional, industrial and others)

Reliability bands	*Metered connections that are functional*	*Actions needed to achieve reliability*
A+	GIS database of property level details and water connections, with information on meters and their functionality incorporated	Develop GIS-linked computerised property tax, connection registers, etc, along with incorporating details like metered connections and their functionality
A	Computerised records; information on meters and functionality assessed through periodic surveys	Computerise records of metered connections, and assess functionality of metered connections through periodic surveys
B	Manual records; information on meters and functionality assessed through periodic surveys	Develop a system of manual records for connections registers/billing records, along with periodic surveys on metered connections and their functionality
C	Manual records; estimates of metered connections that are functional	Introduce estimates on functional metered connections in manual records for connection registers, billing records, etc
D	No records; as reported by ULB	–

9. Efficiency in collection of water supply related charges (%)		
Definition	Percentage of current year revenues collected from water supply-related taxes and charges as a percentage of total billed amounts for water supply	
Description	Collection efficiency = [(a/b)*100]; where a: is the water supply revenues collected in the given year for the current demand b: is the total billed demand for water supply during the given year	
Reliability bands	***Demand Collection Balance tables***	***Actions needed to achieve reliability***
A+	Automated generation of DCB tables, linked to billing and collection systems, with regular updation. Accrual based double entry system	Develop a computerised system for demand and collection, linked to billing and collection, along with automatic generation of the tables. Computerised accrual-based double entry system
A	Manual records of DCB tables linked to billing and collection systems. Accrual-based double entry system	Develop a system of manual records of demand and collection. Manual records of accrual-based double entry systems
B	Manual records; accrual based double entry system, practiced in parallel to cash-based system	Develop a system of manual records for demand and collection. Develop manual systems for double entry accounting parallel to cash-based system
C	Manual records; no segregation of current year revenues vs. arrears. Cash-based accounting system	Develop a system of manual records for billing and collection, along with cash-based accounting system
D	No records; as reported by ULB	–

Equity in Service Delivery		
10. Spatial variations in coverage of water supply connections (ratio)		
Definition	Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "total households connected to the water supply network with an individual service connection, as percentage of total households" (indicator 1 above)	
Description	Coefficient of variation = standard deviation of 'a'/mean of 'a', where a: coverage, derived from number of households with individual water connections divided by total population/households in the ward/zone ***The coefficient of variation is '0', when coverage is the same across all the zones/wards in the city***	
Reliability bands	***Ward-wise households with individual service connections***	***Actions needed to achieve reliability***
A+	GIS database of property level details and water connections, for each ward/zone	Develop GIS-linked computerised property tax, connection registers, etc, incorporating ward level details on households served

Reliability bands	*Ward-wise households with individual service connections*	*Actions needed to achieve reliability*
A	Computerised records; households served per connection and connections maintained for each ward/zone, with periodic updation	Computerise property tax, connection registers, etc, along with household records, for each ward/zone
B	Manual records; households served per connection maintained for each ward/zone	Introduce households served per connection in manual records for property tax, connection registers, etc, at ward/zone level
C	Manual records of connections maintained; assumption of one household = one connection	Develop a system of manual records for connections as part of property tax, connection registers etc
D	No records; as reported by ULB	–

Equity in Service Delivery		
11. Spatial variations in per capita supply of water (ratio)		
Definition	Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "Total treated water supplied into the distribution system expressed by population served per days of water supplied" (indicator 2 above)	
Description	Coefficient of variation = standard deviation of 'a'/mean of 'a', where a: coverage, derived from number of households with individual water connections divided by total population/households in the ward/zone ***The coefficient of variation is '0', when coverage is the same across all the zones/wards in the city***	
Reliability bands	***Quantity of water produced, Zone-wise population/households***	***Actions needed to achieve reliability***
A+	Computerised systems linked to GIS database at WDS level. Estimates of zone-wise population/households through past trends/surveys	Computerised records with analysis of water production linked to GIS systems. Surveys conducted periodically to estimate population/households
A	Computerised systems to monitor daily production of water at WDS. Estimates of zone-wise population/households through past trends/surveys	Computerised records and analysis of measurement of water quantity supplied through bulk flow meters at WDS
B	Manual records; daily quantities of water supplied assessed by flow meters	Improved manual records of water quantity supplied through bulk flow meters at WDS
C	Manual records; daily quantities of water supplied assessed by pumping details	Improved manual records of pump operations and/or level measurements to measure quantity supplied at WDS, backed by periodic surveys using portable bulk flow meters
D	No records; as reported by ULB	–

12. Coverage of water supply connections in slum settlements (%)		
Definition	Total households in slum settlements connected to water supply network with individual service connection, as percentage of total households in all slum settlements in the ULB	
Description	Coverage = (a/b)*100; where a: is the total number of households with individual water supply connection in slums b: is the total number of households in the slums	
Reliability bands	***Number of households in slums and services***	***Actions needed to achieve reliability***
A+	Computerised records; household level connection details maintained	Computerise records of slum households and household level services provided
A	Manual records; household level connection details maintained	Develop manual recording systems of households and water connections provided

Reliability bands	*Number of households in slums and services*	*Actions needed to achieve reliability*
B	Recent surveys; households and connection details maintained	Conduct periodic surveys to assess the slum household nos. and basic services provided to each household
C	Past surveys; households and connection details maintained	Maintain records of past surveys conducted that give information of households and connections provided
D	No records; as reported by ULB	–

2.2 Wastewater

Access and Coverage		
1. Coverage of toilets at household level (%)		
Definition	Households with individual toilets within premise as a percentage of total households in the ULB	
Description	Coverage of toilets = (a/b)*100; where a: is the total number of households with individual toilets in the premises (no.) b: is the total number of households in the ULB (as per indicator 1 in water supply) (no.)	
Reliability bands	***Households with individual toilets in premises***	***Actions needed to achieve reliability***
A+	GIS database of property level details and toilet connections	Develop GIS-linked computerised property tax, connection registers, etc
A	Computerised records; households with toilets maintained, with periodic updation	Computerise property tax, connection registers, etc, along with household records
B	Manual records of households with toilet connections maintained; alternatively, this can be estimated on basis of periodic surveys	Develop a system of manual records of toilet connections, incorporating households with access to toilets
C	Manual records of properties with access to toilets in their premises. Assumption: 1 property = 1 household	Develop a system of manual records for property tax, connection registers, etc
D	No records; as reported by ULB	–

Access and Coverage		
2. Coverage of sewerage connections at household level (%)		
Definition	Households with individual connections to the sewerage network as a percentage of total households in the ULB	
Description	Coverage of sewerage connections = (a/b)*100; where a: is the total number of households with individual connections to the sewerage network (no.) b: is the total number of households in the ULB (as per indicator 1 in water supply) (no.)	
Reliability bands	***Households with individual toilets in premises***	***Actions needed to achieve reliability***
A+	GIS database of property level details and sewerage connections	Develop GIS-linked computerised property tax, connection registers, etc
A	Computerised records; records on households with individual sewerage connections maintained, with periodic updation	Computerise property tax, connection registers, etc, along with household records

Reliability bands	*Households with individual toilets in premises*	*Actions needed to achieve reliability*
B	Manual records of households with sewerage connections maintained.	Develop a system of manual records of sewerage connections, incorporating households connected to network
C	Manual records of sewerage connections. Assumption: 1 household = 1 connection	Develop a system of manual records for sewerage connections
D	No records; as reported by ULB	–

Service Levels and Quality		
3. Collection efficiency of wastewater network (%)		
Definition	Total quantity of wastewater collected, as measured at the inlet of treatment plants, as a percentage of total estimated wastewater generated in the ULB	
Description	Collection efficiency of wastewater networks = b/(a*0.8); where a: is the total water produced, including estimated water use from other sources as given by ULB and excluding losses (MLD) b: is the quantum of wastewater collected at the inlet of the wastewater treatment plant (MLD)	
Reliability bands	***Quantity of wastewater collected, quantity of water produced***	***Actions needed to achieve reliability***
A+	Computerised systems linked to GIS database	Introduce GIS database systems, linked to computerised systems, enabling analysis of collection efficiencies of the network
A	Computerised systems to enable daily monitoring of wastewater collected	Computerised records and analysis of measurement of wastewater collected at treatment plants
B	Manual records; daily quantities of wastewater assessed by flow meters	Improved manual records of wastewater collected through inflow meters at the intake of the plant
C	Daily quantities of wastewater estimated on the basis of dimensions of inflow channel	Introduce estimations of wastewater quantum based on dimensions of inflow channel to treatment plant
D	No records; as reported by ULB	–

Service Levels and Quality		
4. Adequacy of wastewater treatment capacity (%)		
Definition	Quantum of wastewater that can be treated to secondary treatment standards (removal of BOD and COD) as a percentage of total estimated wastewater generated in the ULB	
Description	Adequacy of wastewater treatment capacity = [b/(a*0.8)]; where a: is the total water produced, including estimates from non-ULB sources, and excluding losses.(MLD) b: is the quantity of wastewater that can be treated to secondary treatment standards (that is, removing oxygen demand as well as solids, normally biological) (MLD)	
Reliability bands	***Quantity of wastewater that can be treated, quantity of water produced***	***Actions needed to achieve reliability***
A+	Computerised systems linked to GIS database	Introduce GIS database systems, linked to computerised systems, enabling analysis of collection efficiencies of the network
A	Computerised systems to enable daily monitoring of wastewater that can be treated	Computerised records and analysis of measurement of wastewater treated to secondary treatment levels
B	Manual records; daily quantities of wastewater assessed by flow meters	Improved manual records of wastewater that can be treated based on outflow meters at treatment plant
Reliability bands	***Quantity of wastewater that can be treated, quantity of water produced***	***Actions needed to achieve reliability***
C	Estimated based on installed capacity of STP	Improved manual records of installed capacities of STPs
D	No records; as reported by ULB	–

Financial Sustainability		
5. Cost recovery (O&M) in wastewater services (%)		
Definition	Percentage of total operating revenues from wastewater-related charges to total operating expenses on wastewater services	
Description	Cost recovery =(b/a) * 100; where a: is the total annual operating expenses in wastewater, excluding loan interest payment and depreciation (in Rs) b: is the total annual operating revenues in wastewater from local sources and excluding revenue grants (in Rs)	
Reliability bands	***Accounting systems and segregation of budget heads***	***Actions needed to achieve reliability***
A+	Computerised accounting systems with accrual-based double entry system. Clear segregation of budget heads related to sanitation and sewerage. Regular reporting of financial statements	Develop computerised accrual-based double entry systems, with full migration from cash-based system. Accounting system to enable clear segregation of budget heads
A	Computerised accounting systems with accrual-based double entry system, but parallel to cash-based system. Clear segregation of budget heads related to sanitation and sewerage. Regular reporting of financial statements	Develop computerised accrual-based double entry system, enabling clear segregation of budget heads
B	Computerised accounting systems with accrual-based double entry system, with partial segregation of budget heads related to wastewater	Develop computerised accrual-based double entry system
C	Manual records. Cash-based accounting system	Develop manual systems of cash-based accounting systems
D	Cash-based accounting system	–

Efficiency in Service Operation		
6. Quality of wastewater treatment (%)		
Definition	Total number of wastewater samples (all key parameters as specified by the CPHEEO) that have passed to number of wastewater samples conducted, at the outlet of the treatment plant	
Description	Quality of treatment = (b/a)*100;where a: is the total number of wastewater samples conducted in a month (no.) b: is the number of wastewater samples that pass the specified secondary treatment standards in the given month (no.)	
Reliability bands	***Sampling locations, periodic audit of wastewater quality***	***Actions needed to achieve reliability***
A+	Automated systems, linked to GIS database. Proper sampling regimen wastewater quality tests. Independent audits carried out regularly	Develop automated systems to monitor wastewater quality, and linked to GIS database. Regular independent audits to be conducted
A	Automated systems to monitor wastewater quality. Independent audits carried out regularly	Introduce automated systems to monitor and analyse wastewater quality. Regular independent audits need to be conducted
Reliability bands	***Sampling locations, periodic audit of wastewater quality***	***Actions needed to achieve reliability***
B	Manual records. Independent audits carried out occasionally	Develop a system of manual records for monitoring wastewater quality. Independent audits to be conducted at least occasionally
C	Manual records; internal audits carried out	Develop a system of manual records for monitoring wastewater quality. Internal audits to be carried out
D	No records; no audits conducted	–

Efficiency in Service Operation		
7. Extent of reuse and recycling of wastewater (%)		
Definition	Quantum of wastewater recycled or reused as a percentage of wastewater collected by the sewerage network	
Description	Extent of wastewater recycled or reused = (b/a)*100; where a: is the quantity of wastewater collected (MLD) b: is the quantity of wastewater, recycled or reused for various purposes (MLD)	
Reliability bands	***Quantity of wastewater recycled or reused***	***Actions needed to achieve reliability***
A+	Computerised systems linked to GIS database	Introduce computerised systems with links to GIS database
A	Computerised systems to enable daily monitoring of quantity of wastewater recycled or reused	Computerised records and analysis of quantum of wastewater reused
B	Manual records; daily quantities of wastewater reused assessed by flow meters	Improved manual records of wastewater reused through outflow meters at the outlet of plant
C	Estimated based on channel dimensions	Introduce estimations of wastewater quantum based on channel dimensions
D	No records; as reported by ULB	–

Efficiency in Service Operation		
8. Efficiency in redressal of customer complaints		
Definition	Total number of wastewater-related complaints redressed within time as stipulated in service charter of the ULB, as a percentage of the total number of wastewater-related complaints received in the year	
Description	Efficiency in redressal of customer complaints =(a/b)*100; where a: is the number of wastewater complaints redressed as per service standards over the past year (no.) b: is the total number of wastewater complaints received over the past year (no.)	
Reliability bands	***Complaints received and redressed***	***Actions needed to achieve reliability***
A+	Computerised records linked to GIS database	Introduce computerised systems with links to GIS database to monitor and analyse complaints received
A	Computerised records; complaints segregated and collated from various means	Develop fully automated complaint redressal system, with proper categorisation of complaints and capturing complaints made through various means
B	Manual records; complaints segregated and collated from various means	Develop a system of manual records for complaints received and redressed, with proper categorisation of complaints and capturing complaints made through various means
C	Manual records; no segregation or collation of complaints	Develop a system of manual records for complaints received and redressed
D	No records; as reported by ULB	–

Efficiency in Service Operation	
9. Efficiency in collection of wastewater-related charges (%)	
Definition	Percentage of current year revenues collected from wastewater-related taxes and charges as a percentage of total billed amounts for wastewater
Description	Collection efficiency = [(a/b) * 100]; where a: is the current wastewater revenues collected in the given year for current demand b: is the total billed demand for wastewater during the given year

Reliability bands	*Demand Collection Balance tables*	*Actions needed to achieve reliability*
A+	Automated generation of DCB tables, linked to billing and collection systems, with regular updation. Accrual-based double entry system	Develop a computerised system for demand and collection, linked to billing and collection, along with automatic generation of the tables. Computerised accrual-based double entry system
A	Manual records of DCB tables linked to billing and collection systems. Accrual-based double entry system	Develop a system of manual records of demand and collection. Manual records of accrual-based double entry systems
B	Manual records; accrual-based double entry system, practiced in parallel with cash-based system	Develop a system of manual records for demand and collection. Develop manual systems for double entry accounting parallel to cash-based system
C	Manual records; no segregation of current year revenues vs. arrears. Cash-based accounting system	Develop a system of manual records for billing and collection, along with cash-based accounting system
D	No records; as reported by ULB	–

Equity in Service Delivery		
10. Spatial variations in coverage of toilets (ratio)		
Definition	Coefficient of variation (defined as standard deviation divided by mean) of ward values for "total households with individual toilets within premises as percentage of total households" (indicator 1 above)	
Description	Coefficient of variation = standard deviation of 'a'/mean of 'a', where a: coverage, derived from number of households with individual water connections divided by total population/households in the ward/zone ***The coefficient of variation will be '0', if coverage is the same across all the zones/wards in the city***	
Reliability bands	***Ward-wise households with individual toilets in premises***	***Actions needed to achieve reliability***
A+	GIS database of property level details and toilet connections, for each ward/zone	Develop GIS-linked computerised property tax, connection registers, etc, incorporating ward level details on households served
A	Computerised records; households with toilets maintained for each ward/zone, with periodic updation	Computerise property tax, connection registers, etc, along with household records for each ward/zone
B	Manual records of households with toilet connections maintained for each ward/zone; alternatively, this can be estimated on basis of periodic surveys	Develop a system of manual records of toilet connections at ward/zone level, incorporating households with access to toilets
C	Manual records of properties with access to toilets in their premises. Assumption: 1 property = 1 household	Develop a system of manual records for property tax, connection registers, etc
D	No records; as reported by ULB	–

Equity in Service Delivery	
11. Spatial variations in coverage of sewerage connections (ratio)	
Definition	Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "total households to sewerage network with an individual connection as percentage of total households" (indicator 2 above)
Description	Coefficient of variation = standard deviation of 'a'/mean of 'a', where a: coverage, derived from number of households with individual water connections divided by total population/households in the ward/zone ***The coefficient of variation will be '0', if coverage is the same across all the zones/wards in the city***

Reliability bands	*Ward-wise households with individual sewerage connections*	*Actions needed to achieve reliability*
A+	GIS database of property level details and toilet connections, for each ward/zone	Develop GIS-linked computerised property tax, connection registers, etc, incorporating ward level details on households served
A	Computerised records; households with individual sewerage connections maintained for each ward/zone, with periodic updation	Computerise property tax, connection registers, etc, along with household records for each ward/zone
B	Manual records of households with sewerage connections maintained for each ward/zone	Develop a system of manual records of sewerage connections at ward/zone level, incorporating number of households
C	Manual records of number of sewerage connections for each ward/zone. Assumption: 1 household = 1 connection	Develop a system of manual records for connection registers
D	No records; as reported by ULB	–

Equity in Service Delivery		
12. Coverage of toilets in slum settlements (%)		
Definition	Total households in slum settlements with individual toilets as percentage of total households in all slum settlements in the ULB	
Description	Coverage of toilets = (a/b)*100; where a: is the total number of households with individual toilets in the slums b: is the total number of households in the slums	
Reliability bands	*Number of households in slums and services*	*Actions needed to achieve reliability*
A+	Computerised records; household level connection details maintained	Computerise records of slum households and household level services provided
A	Manual records; household level connection details maintained	Develop manual recording systems of households and toilet connections provided
B	Recent surveys; households and connection details maintained	Conduct periodic surveys to assess the slum household nos. and basic services provided to each household
C	Past surveys; households and connection details maintained	Maintain records of past surveys conducted that give information of households and connections provided
D	No records; as reported by ULB	–

Equity in Service Delivery		
13. Coverage of sewerage connections in slum settlements (%)		
Definition	Total households in slum settlements with sewerage connections as percentage of total households in all slum settlements in the ULB	
Description	Coverage of sewerage connections = (b/a)*100; where a: is the total number of households in the slums b: is the total number of households with sewerage connections in the slums	
Reliability bands	*Number of households in slums and services*	*Actions needed to achieve reliability*
A+	Computerised records; household level connection details maintained	Computerise records of slum households and household level services provided
A	Manual records; household level connection details maintained	Develop manual recording systems of households and sewerage connections provided
B	Recent surveys; households and connection details maintained	Conduct periodic surveys to assess the slum household nos. and basic services provided to each household
C	Past surveys; households and connection details maintained	Maintain records of past surveys conducted that give information of households and connections provided
D	No records; as reported by ULB	–

2.3 Solid Waste Management

Access and Coverage		
1. Coverage of households and establishments for primary collection of MSW (%)		
Definition	Total households and establishments that are covered by daily doorstep collection system, as a percentage of total households and establishments in the city.	
Description	Coverage =(b/a)*100; where a: is the total number of households and establishments in the service area, as projected from Census or as reported by ULB (no.) b: is the total number of households covered by and establishments with daily doorstep collection (no.)	
Reliability bands	***Households and establishments covered by doorstep collection***	***Actions needed to achieve reliability***
A+	GIS database of households and establishments	Develop GIS database of households and establishments, with details on primary collection
A	Computerised records; households and establishments served by primary collection maintained, with periodic updation	Computerise property tax, primary collection records, etc, incorporating households and establishments
B	Manual records; primary collection records maintained	Develop a system of manual records for primary collection, along with households and establishments served
C	Estimation of primary collection of households and establishments based on surveys	Conduct surveys to estimate households and establishments served by primary collection
D	No records; as reported by ULB	–

Service levels and Quality		
2. Efficiency of collection of municipal solid waste (%)		
Definition	Total waste collected by ULB and/or authorised service providers as a percentage of total waste generated within the ULB, excluding recycling or processing at the generation point	
Description	Collection efficiency = (b/a)*100; where a: is the total waste that is generated and which needs to be collected (tons per month) b: is the total waste that is collected by the ULB and/or authorised service providers (tons per month)	
Reliability bands	***Quantum of waste collected, quantum of waste generated***	***Actions needed to achieve reliability***
A+	Automated systems, linked to GIS database; quantum of waste collected measured at weighbridge. Sample surveys conducted to estimate quantum of waste generation	Introduce automated systems linked to GIS database for monitoring waste collection processes. Conduct sample seasonal surveys to estimate waste generation
A	Automated systems; quantum of waste collected measured at weighbridge. Sample surveys conducted to estimate quantum of waste generation	Automated systems for monitoring waste collection from primary points to treatment/disposal points
B	Manual records; quantum of waste collected measured at weighbridge. Spot surveys conducted to estimate quantum of waste generation	Develop a system of manual records for monitoring waste collection at the treatment/disposal site. Conduct spot surveys to estimate waste generation
C	Manual records; quantum of waste collected based on trips to treatment/disposal site. Estimates of waste generation based on size of the city	Develop a system of manual records of transportation of waste to treatment/disposal site
D	No records; as reported by ULB	–

Service levels and Quality		
3. Extent of segregation of municipal solid waste (%)		
Definition	Total quantity of waste that arrives at the treatment/disposal site in a segregated manner as a percentage of total waste received at the treatment/disposal site	
Description	Extent of segregation = (a/b)*100; where a: is the quantity of waste that arrives in a segregated manner at the treatment/disposal site (tons per month) b: is the total quantity of waste received at the treatment/disposal site (tons per month)	
Reliability bands	***Quantum of waste segregated, quantum of waste collected***	***Actions needed to achieve reliability***
A+	Automated systems, linked to GIS database; quantum of waste measured at weighbridge	Introduce automated systems linked to GIS database for monitoring waste collection processes
A	Automated systems; quantum of waste measured at weighbridge	Automated systems for monitoring waste segregation and collection
B	Manual records; quantum of waste measured at weighbridge	Develop a system of manual records for monitoring waste segregation and collection
C	Manual records; quantum of waste based on trips to treatment/disposal site	Develop a system of manual records of transportation of waste to treatment and/or disposal site
D	No records; as reported by ULB	–

4. Extent of municipal solid waste processed and recycled (%)		
Definition	Total quantity of waste that is processed and recycled as a percentage of total waste collected	
Description	Extent of recovery = (a/b)* 100; where a: is the quantity of waste that is processed and recycled (tons per month) b: is the total quantum of waste that is collected by the ULB or authorised service providers (tons per month)	
Reliability bands	***Quantum of waste processed and recycled***	***Actions needed to achieve reliability***
A+	Automated systems, linked to GIS database; quantum of waste measured at weighbridge	Introduce automated systems linked to GIS database for monitoring waste collection processes
A	Automated systems; quantum of waste measured at weighbridge	Automated systems for monitoring waste segregation and collection
B	Manual records; quantum of waste measured at weighbridge	Develop a system of manual records for monitoring waste segregation and collection
C	Manual records; quantum of waste based on trips to treatment/disposal site	Develop a system of manual records of transportation of waste to disposal site
D	No records; as reported by ULB	–

Financial Sustainability		
5. Extent of cost recovery (O&M) in SWM services (%)		
Definition	Percentage of total operating revenues from solid waste management charges to total operating expenses on solid waste management	
Description	Cost recovery = (b/a)*100; where a: is the total annual operating expenses in SWM, excluding loan interest payment and depreciation b: is the total annual operating revenues in SWM from local sources and excluding revenue grants	
Reliability bands	***Accounting systems and segregation of budget heads***	***Actions needed to achieve reliability***
A+	Computerised accounting systems with accrual-based double entry system. Clear segregation of budget heads related to SWM. Regular reporting of financial statements	Develop computerised accrual-based double entry systems, with full migration from cash-based system. Accounting system to enable clear segregation of budget heads.
A	Computerised accounting systems with accrual-based double entry system, but parallel to cash-based system. Clear segregation of budget heads related to SWM. Regular reporting of financial statements	Develop computerised accrual-based double entry system, enabling clear segregation of budget heads.
B	Computerised accounting systems with accrual-based double entry system, with partial segregation of budget heads related to SWM	Develop computerised accrual-based double entry system
C	Manual records. Cash-based accounting system	Develop manual systems of cash-based accounting systems
D	Cash-based accounting system	–

Efficiency in Service Operation	
6. Extent of scientific disposal of municipal solid waste (%)	
Definition	Total quantum of waste that is disposed in 'compliant' landfills as a percentage of total quanta of waste disposed in all landfill sites, including open dump sites
Description	Extent of scientific disposal of MSW = (a/b)*100; where a: is the total quantum of waste disposed in scientific/compliant landfills (tons per month) b: is the total quantum of waste disposed in all landfills, including open dumps (tons per month)

Reliability bands	*Quantum of waste disposed at compliant sites*	*Actions needed to achieve reliability*
A+	Automated systems, linked to GIS database; quantum of waste measured at weighbridge	Introduce automated systems linked to GIS database for monitoring waste collection processes
A	Automated systems; quantum of waste measured at weighbridge	Automated systems for monitoring waste segregation and collection
B	Manual records; quantum of waste measured at weighbridge	Develop a system of manual records for monitoring waste segregation and collection
C	Manual records; quantum of waste based on trips to treatment/disposal site	Develop a system of manual records of transportation of waste to disposal site
D	No records; as reported by ULB	–

Efficiency in Service Operation		
7. Efficiency in redressal of customer complaints (%)		
Definition	Total number of SWM-related complaints redressed as per standards specified in service charter of the ULB, as a percentage of the total number of SWM complaints received daily	
Description	Efficiency in redressal of complaints = (b/a)*100; where a: is the total number of SWM-related complaints received in a year (no.) b: is the total number of SWM complaints redressed as per service standards in that given year (no.)	
Reliability bands	***Complaints received and redressed***	***Actions needed to achieve reliability***
A+	Computerised records linked to GIS database	Introduce computerised systems with links to GIS database to monitor and analyse complaints received
A	Computerised records; complaints segregated and collated from various means	Develop fully automated complaint redressal system, with proper categorisation of complaints and capturing complaints made through various means
B	Manual records; complaints segregated and collated from various means	Develop a system of manual records for complaints received and redressed, with proper categorisation of complaints and capturing complaints made through various means
C	Manual records; no segregation or collation of complaints	Develop a system of manual records for complaints received and redressed
D	No records; as reported by ULB	–

8. Efficiency in collection of SWM-related user charges (%)		
Definition	Percentage of total revenues collected from solid waste-related taxes and charges as a percentage of total billed amounts in the year	
Description	Collection efficiency = (a/b)*100; where a: is the revenues collected in SWM during the given year for current demand b: is the total billed demand in SWM during the given year	
Reliability bands	***Demand Collection Balance tables***	***Actions needed to achieve reliability***
A+	Automated generation of DCB tables, linked to billing and collection systems, with regular updation. Accrual-based double entry system	Develop a computerised system for demand and collection, linked to billing and collection, along with automatic generation of the tables. Computerised accrual-based double entry system
A	Manual records of DCB tables linked to billing and collection systems. Accrual-based double entry system	Develop a system of manual records of demand and collection. Manual records of accrual-based double entry systems

Reliability bands	*Demand Collection Balance tables*	*Actions needed to achieve reliability*
B	Manual records; accrual-based double entry system, practiced in parallel to cash-based system	Develop a system of manual records for demand and collection. Develop manual systems for double entry accounting parallel to cash-based system
C	Manual records; no segregation of current year revenues vs. arrears. Cash-based accounting system	Develop a system of manual records for billing and collection, along with cash-based accounting system
D	No records; as reported by ULB	–

Equity in Service Delivery		
9. Spatial coverage of SWM services (%)		
Definition	Coefficient of variation (defined as standard deviation divided by mean) of zonal values for "Percentage of households covered by daily doorstep collection system to total number of households" (indicator 1 above)	
Description	Coefficient of variation = standard deviation of 'a'/mean of 'a', where a: coverage, derived from number of households with individual water connections divided by total population/households in the ward/zone ***The coefficient of variation will be '0', if coverage is the same across all the zones/wards in the city***	
Reliability bands	***Ward-wise households with doorstep collection of SWM***	***Actions needed to achieve reliability***
A+	GIS database of households and establishments, for each ward/zone	Develop GIS database of households and establishments, with details on primary collection at ward/zone level
A	Computerised records; households and establishments served by primary collection maintained for each ward/zone, with periodic updation	Computerise property tax, primary collection records, etc, incorporating households and establishments at ward/zone level
B	Manual records; primary collection records maintained for each ward/zone	Develop a system of manual records for primary collection at ward/zone level, along with households and establishments served
C	Estimation of primary collection of households and establishments based on surveys	Conduct surveys to estimate households and establishments served by primary collection
D	No records; as reported by ULB	–

Equity in Service Delivery		
10. Household level coverage of SWM services in slum settlements		
Definition	Percentage of households that are covered by daily doorstep collection system to the total number of households in the slum settlements	
Description	SWM coverage = (b/a)*100; where a: is the total number of households in the slum (no.) b: is the total number of households with daily doorstep collection of SWM (no.)	
Reliability bands	***Number of households in slums and services***	***Actions needed to achieve reliability***
A+	Computerised records; household level collection details maintained	Computerise records of slum households and household level services provided
A	Manual records; household level collection details maintained	Develop manual recording systems of households and primary collection details

Reliability bands	*Number of households in slums and services*	*Actions needed to achieve reliability*
B	Recent surveys; households and collection details maintained	Conduct periodic surveys to assess the slum household nos. and basic services provided to each household
C	Past surveys; households and collection details maintained	Maintain records of past surveys conducted that give information of households and primary collections provided
D	No records; as reported by ULB	–

3. Local Action Indicators

3.1 Summary List of Indicators

	Water supply	Wastewater[1]	Solid waste management
Access and coverage			
Coverage of utility network across the city	1. % of inhabited municipal area covered with water supply distribution network	1. % of inhabited municipal area covered with sewerage network	
		2. Spatial coverage of sewerage and sullage system	
		3. Coverage of storm water drainage	
Service levels and quality			
Quantity	2. Percentage of estimated water demand over next three years to available supply from all current sources and immediate plans to augment through ongoing projects		
	3. % of connections that are metered		
	4. % of meters that are functional		
	5. Average consumption per connection (for residential and others) where consumer meters are in place and are functional		
Quality	6. Quality of water supply at WTP (residual chlorine (RC), bacteriological, total dissolved salts (TDS))		
	7. Quality of water at ESR Level (RC, bacteriological, TDS)		
	8. Quality of water at consumer end (RC, bacteriological, TDS, fluoride)		
Financial sustainability			
Overall cost recovery	9. Recovery of O&M costs for water, wastewater and SWM from local taxes and charges		

[1]Wastewater includes storm water drainage.

	Water supply	Wastewater	Solid waste management
Efficiency in service operations			
Non-revenue water and physical losses	10. % Authorised and unbilled consumption to total supply		
	11. % Losses from source to water treatment plant (WTP)		
	12. % Losses from WTP to water distribution station (WDS)		
	13. % Losses from WDS to final consumption (includes both leakage on service connections and unauthorised consumption)		
	14. % of identified illegal connections that are regularised		
	15. Water losses per connection		
	16. Real losses per service connection per month per meter (head) pressure		
	17. Water losses per mains length		
	18. Unavoidable Annual Real Losses (UARL)		
	19. Infrastructure Leakage Index		
	20. Annual cost of losses		
Complaint redressal	21. Total complaints in water supply per 1,000 connections per year	4. Total complaints in wastewater per 1,000 connections per year	1. Total complaints in solid waste per 1,000 households
	22. Complaints for pipe breaks and leakages per 1,000 connections per year	5. Complaints for sewerage blocks per 1,000 sewerage connections per year	2. Complaints related to garbage collection per 1,000 households per year
	23.Complaints for low pressure per 1,000 connections per year	6. Complaints for damaged/overflowing manholes per 1,000 sewerage connections per year	3. Complaints related to street sweeping per 1,000 households per year
	24. Complaints for water quality per 1,000 connections per year	7. Complaints for leakage/overflowing lines per 1,000 sewerage connections per year	4. Complaints related to odour/nuisance
Staffing	25. % of staff recruited to sanctioned for water supply	8. % of staff recruited to sanctioned for wastewater	5. % of staff recruited to sanctioned for SWM

	Water supply	Wastewater	Solid waste management
Efficiency in service operations			
	26. Total staff (regular and contract) per 1,000 water supply connections	9. Total staff (regular and contract) per 1,000 wastewater connections	6. Total staff (regular and contract) per 1,000 households
			7. Total sweepers per km of road length swept
Unit costs and revenues	27. Electricity expenditure as a share of water production	10. Unit cost of treatment of wastewater	8. Unit cost of transportation of solid waste
	28. Unit cost of production of water		
	29. Average revenue per connection	11. Average revenue per connection	9. Average revenue per connection
Collection efficiency	30. Collection period for water supply charges	12. Collection period for wastewater charges	10. Collection period for SWM charges
	31. Billed arrears to total billed demand	13. Billed arrears to total billed demand	11. Billed arrears to total billed demand
Flooding incidents		14. Incidence of water logging/flooding	
Equity in service delivery			
Equity across slum settlements	32. Population per shared/community standpost in slum settlements	15. Population per toilet seat in community toilets in slum settlements	

3.2 Definition and Description of Local Indicators

Water Supply

Water supply	Unit	Description
Access and coverage		
1. % of inhabited municipal area covered with water supply distribution network	%	This indicator captures the geographical area of the water supply network with respect to total area of the city. It is an important indicator in assessing the coverage of water connections in the city.
		Percentage of municipal area covered by water supply network to total area of the city
Service levels and quality		
2. Percentage of estimated water demand over next three years to available supply from all current sources and immediate plans to augment through ongoing projects	%	This indicator captures the percentage of water demand that is estimated over the next three years to the available supply in the ULB.
		Percentage of estimated water demand, over next three years, to available supply from current sources and immediate plans to augment through ongoing projects
3. % of connections that are metered	%	This indicator captures the percentage of connections that are metered to the total connections in the ULB. This indicator coupled with functional metering of connections gives the actual extent of metering of connections in the ULB.
		Percentage of connections metered to total connections in the ULB
4. % of meters that are functional	%	This indicator captures the functional meters of the total number of meters installed.
		Percentage of meters that is functional to total number of meters
5. Average consumption per connection (for residential and others) where consumer meters are in place and are functional	litres/ day	This indicator captures the average consumption per connection, where consumer meters are in place and are functional. This is an important indicator in terms of resource use, across various agro climatic regions of the state.
		Average consumption per connection, in litres per day, where consumer meters are in place and functional
6. Quality of water supply at WTP (RC, bacteriological, TDS)	%	This indicator captures the quality of water produced at WTP, according to physical, chemical and bacteriological tests. These indicators give an important indication of the quality aspects from source to consumer.
		Percentage of samples that have passed as per standards to number of samples conducted, for RC, bacteriological, TDS, and fluoride at WTP
7. Quality of water at ESR level (RC, bacteriological, TDS)	%	This indicator captures the quality of water produced at ESR, according to physical, chemical and bacteriological tests. These indicators give an important indication of the quality aspects from source to consumer.
		Percentage of samples that have passed as per standards to number of samples conducted, for RC, bacteriological, TDS, and fluoride at ESR
8. Quality of water at consumer end (RC, bacteriological, TDS, fluoride)	%	This indicator captures the quality of water produced at consumer end, according to physical, chemical and bacteriological tests. These indicators give an important indication of the quality aspects from source to consumer.
		Percentage of samples that have passed as per standards to number of samples conducted, for RC, bacteriological, TDS and fluoride at consumer end

Water supply	Unit	Description
Financial sustainability		
9. Recovery of O&M costs for water, wastewater and SWM from local taxes and charges	%	This indicator captures the extent of recovery of O&M costs for water, wastewater and SWM. This indicator, when interpreted with the cost recovery for individual sectors, helps to understand how they are performing.
		Percentage of operating revenues for water supply, wastewater and SWM to operating expenses in a year
Efficiency in service operations		
10. Authorised and unbilled consumption to total supply	%	This indicator captures the extent of authorised and unbilled consumption. This indicator is used for policy level decisions.
		Percentage of authorised and unbilled consumption to total water supply
11. Losses from source to water treatment plant (WTP)	%	This indicator captures the losses in transmission of water from source to treatment plant, and is a sub-component of non-revenue water. This is an important indicator as it identifies the stages of quantity loss.
		Percentage of losses in water supplied from source to water treatment plant
12. Losses from WTP to water distribution station (WDS)	%	This indicator captures the losses in transmission of water from treatment plant to water distribution station, and is a sub-component of non-revenue water. This is an important indicator as it identifies the stages of quantity loss.
		Percentage of losses in water supplied from water treatment plant to water distribution station
13. Losses from WDS to final consumption	%	This indicator captures the losses in transmission of water from water distribution station till consumer point, and is a sub-component of non-revenue water. This is an important indicator as it identifies the stages of quantity loss.
		Percentage of losses in water supplied from water distribution station to final consumption point (includes both leakage on service connections and unauthorised consumption)
14. % of identified illegal connections that are regularised	%	This indicator captures the number of illegal connections that have been identified and regularised. This essentially forms the unauthorised consumption within the system.
		Percentage of illegal connections that have been identified and regularised to total number of connections in water supply.
15. Water losses per connection	Litres	This indicator captures the quantity of water loss per connection, and is a conventional performance indicator for NRW.
		NRW losses per total number of connections in water supply per day
16. Real losses per service connection per month per meter (head) pressure	Cu m/ connection /m/day	This indicator captures the quantity of water loss per connection, and it is a useful indicator for comparing different areas of the same water utility, or different utilities with systems operating at different pressure.
		Real losses expressed in terms of daily volume of water lost per connection per average meter of pressure
17. Water losses per mains length	cum/km/ day	This indicator captures the quantity of water loss per length of trunk network. This indicator is more useful to know the condition of the network.
		NRW losses to total length of main network, per day

Water supply	Unit	Description
Efficiency in service operations		
18. Unavoidable Annual Real Losses (UARL)	Index	This indicator captures the losses that are unavoidable per year. This indicator is used to know the lowest technically achievable real loss for a well managed and well maintained system.
		UARL is defined as the minimum losses expressed in terms of length of mains and number of connections
19. Infrastructure Leakage Index (ILI)	Index	This indicator captures the unavoidable real losses that occur in the system. It is an indicator of water supply system expressing the technical condition of the system from point of view of water losses.
		Ratio between the actual real losses and an estimate of the minimum real losses that could be technically achieved for the system operating pressure, average service connection length and service connection density
20. Annual cost of losses	Rs	This indicator captures the yearly production cost occurring due to losses in quantity of water supplied. This indicator gives the annual production cost of real losses.
		Real losses in non-revenue water (losses from source to consumer point) expressed in terms of production cost
21. Total complaints in water supply per 1,000 connections per year	Ratio	This indicator captures the complaints in water supply per 1,000 water connections. This is an important indicator to understand the level of service provided across cities.
		Total complaints received per 1,000 water supply connections in a year
22. Complaints for pipe breaks and leakages per 1,000 connections per year	Ratio	This indicator captures the complaints for pipe breaks and leakages per 1,000 water connections. Along with city level comparison, it is an important factor in non-revenue water.
		Total complaints received for pipe breaks and leakages that are recorded per 1,000 water supply connections in a year
23.Complaints for low pressure per 1,000 connections per year	Ratio	This indicator captures the complaints for low pressure per 1,000 water connections. Along with city level comparison, it is an important factor in intermittent supply of water.
		Total complaints received for low pressure that is recorded per 1,000 water supply connections in a year
24. Complaints for water quality per 1,000 connections per year	Ratio	This indicator captures the complaints for water quality per 1,000 water connections. This is an important indicator to understand the level of service provided across cities.
		Total complaints received for water quality that is recorded per 1,000 water supply connections in a year
25. Percentage of recruited staff to sanctioned staff	%	This indicator captures the number of staff that is recruited as a percentage of the sanctioned staff in water supply.
		Number of recruited staff as a percentage of sanctioned staff for water supply operations
26. Total staff (regular and contract) per 1,000 water supply connections	Ratio	This indicator captures the staffing ratio for each city. This is an important indicator for comparisons across cities.
		Total staff, including regular and contracted, employed in water supply per 1,000 water supply connections
27. Electricity expenditure as a share of water production	Rs/Kl	This indicator captures the expenditure of electricity incurred in daily production of water supply.

Water supply	Unit	Description
Efficiency in service operations		
		Total expenditure on electricity on water supply services per day (total expenditure during the year divided by number of days in the year) divided by average water supplied per day in Kl
28. Unit cost of production of water	Rs/Kl	This indicator captures the O&M cost of water that is produced. This indicator is relevant when coupled with electricity cost per production of water, and also for city level comparisons.
		O&M cost, excluding depreciation and loan interest repayment, in terms of production of water, in Kl
29. Average revenue per connection	Rs	This indicator captures the average revenue charged to the consumer per connection. This indicator is relevant in terms of the affordability aspect of the consumer.
		Average revenue per water connection as charged by ULB
30. Collection period for water supply charges	Days	This indicator captures the number of days required to collect charges levied, and is relevant as it indicates delayed or faulty billings, and inefficiencies in collection of charges.
		Year-end accounts receivable per total annual operating revenues per day
31. Billed arrears to total billed demand	%	This indicator captures the percentage of arrears for billed demand.
		Percentage of billed arrears to total billed demand in water supply
Equity in service delivery		
32. Population per shared/community standpost in slum settlements	Ratio	This indicator captures the slum population with access to shared/community standpost in slum settlements.
		Ratio of population in slum settlements per shared/community standpost

Wastewater

Wastewater	Unit	Description
Access and coverage		
1. % of inhabited municipal area covered with sewerage network	%	This indicator captures the geographical area of the sewerage network with respect to total area of the city. It is an important indicator in assessing the coverage of sewerage connections in the city.
		Percentage of inhabited municipal area covered by sewerage network to total area of the city
2. Spatial coverage of sewerage and sullage network	%	This indicator captures the geographical coverage of the wastewater collection system, both sewerage and sullage. This is important to measure as, in most cities, only sullage systems exist.
		Percentage of inhabited municipal area covered by sewerage and sullage network, to the total area of the city
3. Coverage of storm water drainage network	%	This indicator captures the extent of storm water drainage network in the city.
		Percentage of road length covered by storm water drainage network
Efficiency in service operations		
4. Total complaints in wastewater per 1,000 connections per year	Ratio	This indicator captures the complaints in wastewater per 1,000 sewerage connections. This is an important indicator to understand the level of service provided across cities.
		Total complaints received that is recorded per 1,000 sewerage connections in a year
5. Complaints for sewerage blocks per 1,000 sewerage connections per year	Ratio	This indicator captures the complaints for sewerage blocks per 1,000 sewerage connections. Along with city level comparisons, it is important factor in physical condition of the network.
		Total complaints received for sewerage blocks per 1,000 sewerage connections in a year
6. Complaints for damaged/overflowing manholes per 1,000 sewerage connections per year	Ratio	This indicator captures the complaints for damaged/overflowing manholes per 1,000 sewerage connections. This indicator helps to assess infrastructure conditions across cities.
		Total complaints received for damaged/overflowing manholes per 1,000 sewerage connections in a year
7. Complaints for leakage/overflowing lines per 1,000 sewerage connections per year	Ratio	This indicator captures the complaints for leakage/overflowing lines per 1,000 sewerage connections. Along with city level comparisons, it is important factor in physical condition of the network.
		Total complaints received for leakage/overflowing lines per ,1000 sewerage connections in a year
8. Percentage of recruited staff to sanctioned staff	%	This indicator captures the number of staff that is recruited as a percentage of the sanctioned staff in wastewater.
		Number of recruited staff as a percentage of sanctioned staff for wastewater operations
9. Total staff (regular and contract) per 1,000 wastewater connections	Ratio	This indicator captures the staffing ratio for each city. This is an important indicator for comparisons across cities.
		Total staff, including regular and contracted, employed in wastewater per 1,000 wastewater connections

Wastewater	Unit	Description
Efficiency in service operations		
10. Unit cost of conveyance and disposal of wastewater	Rs/Kl	This indicator captures the O&M cost of wastewater collected and disposed.
		O&M cost, excluding depreciation and loan interest repayment, in terms of collection and disposal, in Kl
11. Average revenue per connection	Rs	This indicator captures the average revenue charged to the consumer per connection. This indicator is relevant in terms of the affordability aspect of the consumer.
		Average revenue per wastewater connection as charged by ULB
12. Collection period for wastewater charges	Days	This indicator captures the number of days required to collect charges levied, and is relevant as it indicates delayed or faulty billings, and inefficiencies in collection of charges.
		Total year end accounts receivable per total annual operating revenues per day
13. Billed arrears to total billed demand	%	This indicator captures the percentage of arrears for billed demand.
		Percentage of billed arrears to total billed demand in wastewater
14. Incidence of water logging/flooding	No	This indicator captures the incidence of water logging/flooding in the city.
		Number of times water logging is reported in a year at flood prone points within the city
Equity in service delivery		
15. Population per toilet seat in community toilets in slum settlements	Ratio	This indicator captures the access of toilets to the slum population, in terms of number of toilet seats. In the absence of appropriate individual toilet coverage, it is important to assess whether the city has provided community toilets as per standards.
		Ratio of total number of toilets seats to slum population, in '000's

Solid Waste Management

SWM	Unit	Description
Efficiency in service operations		
1. Total complaints in solid waste per 1,000 household	Ratio	This indicator captures the complaints in SWM per 1,000 households.
		Total complaints received in SWM that is recorded per 1,000 households in a year
2. Complaints related to garbage collection per 1,000 households per year	Ratio	This indicator captures the complaints for garbage collection per 1,000 households. Along with city level comparisons, it is an important factor in quantity of waste that is collected.
		Total complaints received for garbage collection that is recorded per 1,000 households in a year
3. Complaints related to street sweeping per 1,000 households per year	Ratio	This indicator captures the complaints for street sweeping per 1,000 households. Along with city level comparisons, it is an important factor in quantity of waste that is collected.
		Total complaints received for street sweeping per 1,000 households in a year
4. Complaints related to odour/nuisance	Ratio	This indicator captures the complaints for odour or nuisance due to dumpsites, transportation, etc per 1,000 households.
		Total complaints received for odour or nuisance due to dumpsites, transportation, etc, per 1,000 households in a year
5. Percentage of recruited staff to sanctioned staff	%	This indicator captures the number of staff that is recruited as a percentage of the sanctioned staff in SWM.
		Number of recruited staff as a percentage of sanctioned staff for SWM
6. Total staff (regular and contract) per 1,000 households	Ratio	This indicator captures the staffing ratio for each city. This is an important indicator for comparisons across cities.
		Total staff, including regular and contracted, employed in SWM per 1,000 households
7. Total sweepers per km of road length swept	Ratio	This indicator captures the staffing ratio for each city. This is an important indicator for comparisons across cities.
		Number of sweepers per road length swept (in km)
		O&M cost of collection of municipal solid waste, excluding depreciation and loan interest payment
8. Average revenue per connection	Rs	This indicator captures the average revenue charged to the consumer per connection. This indicator is relevant in terms of the affordability aspect of the consumer.
		Average revenue per household as charged by ULB
9. Collection period for SWM charges	Days	This indicator captures the number of days required to collect charges levied, and is relevant as it indicates delayed or faulty billings, and inefficiencies in collection of charges.
		Year end accounts receivable per total annual operating revenues per day
10. Billed arrears to total billed demand	%	This indicator captures the percentage of arrears for billed demand.
		Percentage of billed arrears to total billed demand in SWM

Annexure

Performance Assessment System Questionnaire

The Performance Assessment System (PAS) questionnaire captures basic information from the ULBs for estimating both key performance indicators and local action indicators. It includes both quantitative and qualitative questions related to all three sub-sectors (water supply, wastewater and solid waste management) as well as cross cutting aspects related to finance, staffing, consumer grievance redressal and service levels in slum settlements.

The questionnaire is developed as an excel workbook with in-built validation checks as well as appropriate links to generate key performance and local action indicators. It also generates reliability scores for all key indicators. Detailed guidelines have been developed for the use of this questionnaire at the local level as a part of the Operations Manual.

Performance Assessment System for Urban Water Supply and Sanitation
(PAS for UWSS)

Key Contacts

Department Heads	Name	Designation	Phone No.	E-Mail
General Admin				
Water Supply				
Sewerage				
Solid Waste Management				
Urban Community Development (UCD)				
Accounts				
Tax Superintendent				
Health Officer				

ULB Seal

Signature of ULB Commissioner/ Chief Officer

Name of ULB	
Address	
District	
State	
Class of ULB	
Mayor/ President of ULB	
Commssioner/ Chief Officer of ULB	
Telephone no	
Fax no	
Email ID	
Website	

Data provided as on ***March 2009***

URBAN MANAGEMENT CENTRE
in collaboration with ICMA

CEPT UNIVERSITY
ज्ञानं विज्ञानसहितम्

Performance Assessment System for Urban Water Supply and Sanitation
(PAS for UWSS)

Contents

I. Population & Area

1 Demography of ULB

Year	Population	Number of Households	Area (sq. km)	Source of Information	Methodology used for estimation of current population
1991					
2001					
Current year of latest available population estimate[1]					

[1] *Latest available estimates of population, HH and area, as given by ULB, are to be noted. This should be total population, including the expanded/ merged areas after 2001. Note the methodology for estimation of current population in the last column*

1.1	**Average daily floating population in the ULB[2]**	

[2]*The daily floating population should exclude population due to special events, festivals,fairs, etc*

2 Expansion of ULB limits from 2001 to 2008 - 09 (Insert additional rows/ sheets, if required)

2.1	**Have any areas been added to the ULB after 2001?(Y/N)**			***If No, go to QN 3***
2.2	**How many areas have been added?**			

2.3 Names of areas added to municipal limits[3]	Year added	Census Population of added areas (2001)	Current Admin Ward No
Total		0	
Source of Information:			

[3] *Mark newly added areas on ULB map*

3 Demography by wards (Insert additional rows/ sheets, if required)

3.1	**What is the spatial unit used for records of population/ HHs?(1/2/3/4)***		* *1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify*
3.2	**Total number of wards for population and households in the city**		

3.3 Ward No[4]	Population (2009)	No of households** (2009)
Total	0	0
Source of Information:		

** *Households as defined in census*

[4] *Mark the ward boundaries on the map or collect map*

4 Properties by wards (Insert additional rows/ sheets, if required)

4.1	**What is the spatial unit used for records of properties?(1/2/3/4)***		* *1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify*
4.2	**Total number of wards in the city for recording properties**		

4.3 Ward No[5]	Total no of properties[6] (2009)	No of residential properties*** (2009)
Total	0	0
Source of Information:		

*** *Properties as defined in property tax records*

[5]*Mark the ward boundaries on map or collect map*

[6]*This should include all types of properties, including properties exempted from property tax*

II. Water Production, Storage and Distribution - a

1 Water Sources for Municipal Supply

Sources	Average Daily volume (in MLD)			If B or C, specify method of estimation (1/2/3/4)	Are automated systems used at source?* (Y/N)
	Metered		Not Metered (C)		
	Functional (A)	Non-Functional (B)			
Groundwater					
Surface water (Own source)					
Bulk purchase- Raw water					
Bulk purchase-Treated water					
Other sources[2]					
Total	0.0	0.0	0.0		N
Source of Information:					

** Computerised systems used for monitoring daily production volumes at source.*

[1] *1: Level measurement backed by periodic assessment through portable flow meters, 2: Level measurement, with no calibration, 3: Using pump efficiency and daily record of number of hour; records maintained, 4: No records are maintained*

[2] *Other sources include water procured through tankers from private bore wells, desalination, rainwater harvesting, etc*

1.1. Augmentation of water sources from projects to be commissioned in the next three years (2009-2012)

1.1.1.	**Does the ULB have any projects/ schemes that will be commissioned over the next 3 years to augment present water supply? (Y/N)[3]**	
1.1.2.	**If Yes, capacity addition/ augmentation to present supply (MLD)**	
	Source of Information:	

[3] *e.g. from sources such as irrigation scheme, wells*

2 Ground Water Source (Insert additional rows/sheets, as required)

2.1	**Does the ULB use any ground water sources? (Y/N)**	*If No go to QN 3*
2.2	**Number of wells used for ground water supply**	

2.3

Name of well[4]	Type of well (Tube well/ Open well)	Depth of well (m)	Avg depth of ground water (m)	Average daily quantity of water drawn (MLD)	Method of measurement of quantity of water drawn (1/2/3/4/5/6)[5]
Total		#DIV/0!	#DIV/0!	0	
Source of Information:					

[4] *Mark location of tube wells on map*

[5] *1: Computerised system with flow meters, 2: Manual records with flow meters, 3: Level measurement backed by periodic assessment through portable flow meters, 4: Level measurement, with no calibration, 5: Using pump efficiency and daily record of number of hours; records maintained, 6: as said by ULB, no records*

3 Surface Source (Insert additional rows/sheets, as required)

3.1	**Does the ULB use its own surface water sources? (Y/N)**	*If No go to QN 4*
3.2	**Number of surface sources used for water supply**	

3.3

Name of source	Type of source[6]	Type of transmission line (Closed conduit/ Open channel)	Distance from source to city (km)	Average daily quantity of water drawn (MLD)	Method of measurement of quantity of water drawn (1/2/3/4/5/6)[7]
Total				0	
Source of Information:					

[6] *Type of source can be Dam, River, Lake, etc*

[7] *1: Computerised system with flow meters, 2: Manual records with flow meters, 3: Level measurement backed by periodic assessment through portable flow meters, 4: Level measurement, with no calibration, 5: Using pump efficiency and daily record of number of hours; records maintained, 6: as said by ULB, no records*

II. Water Production, Storage and Distribution - b

4 Treatment Plant details (Insert additional rows/sheets, as required)

4.1 Does the city have Water Treatment Plant? (Y/N) *If No go to QN 5*

4.2 If Yes, number of water treatment plants used by the ULB

4.3

Water Treatment Plant No (WTP No)	Installed capacity (in MLD)	Is the treatment plant functional? (Y/N)	If yes, no of years of operation	Average daily volume treated (MLD)[8]	Type of treatment (1/2)[9]
Total	0	N		0	
Source of Information:					

[8] *Average of daily quantities of the last month are to be noted here.*

[9] *1: Only Chlorination, 2: Chlorination and Filtration*

4.4 What is the basis of measurement of volume treated at the WTPs? (1/2/3/4)*

**1:Flow meters with automated systems,2: Flow meters with manual records,3: Pump operation/Level measurement details with manual records,4:as said by ULB(no records)*

4.5 Are records of daily quantity of water treated maintained? (Y/N)

4.6 Are records of pump operation details at the treatment plant maintained? (Y/N)

4.7 Are automated systems linked to GIS database? (Y/N)

5 Water Distribution Stations (Insert additional rows/sheets, as required)

5.1 Total number of WDS in the ULB

5.2 Which wards are used to demarcate coverage by WDS? (1/2/3/4)**

*** 1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify*

5.3

Water Distribution Station Name (WDS)[10]	Type of WDS: (Sump+ ESR/ Sump+ ESR+ direct pumping/ Direct pumping/ Sump/ ESR)	WDS Storage Capacity (ML)	Wards (numbers) served by the WDS[11]		Population served by the WDS	Average daily quantity of water supplied (MLD)[12]	Hours of supply from WDS to consumer end[12]	Average no. of days of supply in a month[12]	Average pressure of water supplied (m)
			Wards covered partially	Wards covered fully					
Total		0			0	0	0	0	0
Source of Information:									

[10] *Mark the area served by each WDS on a map*

[11] *Wards mentioned here should be the same as given in Sheet I, as appropriate.*

[12] *Average of daily values of the last month are to be noted here.*

5.4 Does the ULB supply water to bulk and/or large industrial consumers?(Y/N)

If Yes, quantity of water supplied (MLD)

5.5 Basis of estimation of quantity of water supplied from WDS (1/2/3/4/5/6)***

**** 1: Computerised system with flow meters, 2: Manual records with flow meters, 3: Level measurement backed by periodic assessment through portable flow meters, 4: Level measurement, with no calibration, 5: Using pump efficiency and daily record of number of hours, 6: as said by ULB*

5.6 Basis of estimation of population served for each WDS (1/2)***

**** 1: Past trends/ surveys, 2: as reported by the ULB*

5.7 Does the ULB have automated systems(e.g. SCADA)to monitor quantity, hours of supply, pressure to consumers?(Y/N)

If No, are manual records of hours of supply at consumer end maintained? (Y/N)

5.8 Are there any variations in hours/days of water supply over different seasons? (Y/N)

If yes, average quantity of total supply in summer months (MLD)

If yes, average hours of supply in summer months (hrs)

II. Water Production, Storage & Distribution - c			
6	**Sources of Water Supply for Unserved Areas in ULB and/or Outgrowths**		
6.1.	**Does ULB have areas which do not have piped municipal supply? (Y/N)**		*If No go to QN 6.2*
	Mark areas without piped municipal supply on map		
6.1.1.	**If Yes, source of water supplied to these areas within its limits? (1/2/3)[13]**		
	[13] 1: Municipal supply through non-piped means, 2: Private supply by private providers, 3: by households themselves		
6.1.2.	**Quantity of water supplied in non-piped areas (MLD)**		
6.2	**Are there outgrowths[14] with significant population outside ULB boundary? (Y/N)**		*If No go to QN 7*
	Mark outgrowths on map *[14] Outgrowths include contiguous areas outside ULB limits, like railway colonies, revenue villages, etc.*		
6.2.1	**If Yes, does the ULB provide water supply to these outgrowths? (Y/N)**		
6.2.2	**If Yes, quantity of water supplied to outgrowths (MLD)**		
6.2.3	**If municipal supply is not provided, source of supply for outgrowths (1/2)[15]**		
	[15] 1: Supply by private providers, 2:by households themselves		
6.2.4	**Estimated population of the outgrowths**		
7	**Water Supply Network**		
	Total length of trunk main (km)		*Mark the water supply network on map including trunk mains, transmission lines and distribution mains*
	Total length of transmission main (km)		
	Total length of distribution network (km)		
	Total length of road network in city (in km)		
	Total area under water distribution network (sq.km)		
8	**Unauthorised consumption details**		
8.1	**Has any survey been conducted by the Municipality to assess unauthorised connections and/or consumption?(Y/N)**		
	If No, go to QN 8.5		
8.2	**No. of illegal connections based on survey**		
8.3	**% of unauthorised water quantity to total supply based on survey**		
8.4	**No. of illegal connections regularised**		
	Go to QN 9		
8.5	**Number of illegal connections as estimated by ULB staff**		
8.6	**Unauthorized use of water as % to total supply as estimated by ULB staff**		
9	**Audits for water balance and electricity**		
9.1	**Has an energy audit been carried out by the ULB? (Y/N)**		
	If yes, collect a copy of the report		
9.1.1	**If yes, has is it been implemented? (1,2,3)[16]**		*[16] 1: Fully, 2: Partially, 3: Not at all*
9.2	**Has a water audit been carried out by the ULB? (Y/N)**		
	If yes, collect a copy of the report		
9.2.1	**If yes, has is it been implemented?(1,2,3)[16]**		*[16] 1: Fully, 2: Partially, 3: Not at all*
9.3	**Does the ULB do a pre-audit (technical) of water electricity bill regularly?(Y/N)**		
	If yes, collect copy of report		

III. Water Connections - a

1	**Number of connections: ULB level**	
1.1	**Does the ULB maintain and update records of connections for water supply? (Y/N)**	
1.2	**If Yes, how does the ULB maintain records? (1,2,3)***	

** 1: connection registers, 2: as part of property tax registers, 3: Water billing system*

1.3 **Number of connections by type**

Type of connection	Number of connections
Residential	
Industrial	
Public taps/ Stand posts	
Others[1]	
Total	0
Source of Information:	

[1]*Others include commercial, institutional, municipal, government agency connections*

1.4	**Are computerised systems used for data related to water connections? (Y/N)**	
1.5	**If Yes, is GIS database of properties and connections used by ULB? (Y/N)**	
1.6	**Exempted connections/ properties for water charges/ taxes**	
1.6.1	**No. of connections that are exempt from property tax and/or water bill or tax[2]**	

[2]*Exempted connections could be for charitable institutions, gardens, fountains, municipal building, fire fighting department,etc*

1.6.2	**Estimated total consumption per day for exempted connections/ properties (litres per day per connection)**	
2	**Consumption quantities- metered connections**	
2.1	**Does the ULB have metered connections? (Y/N)**	
	If No, go to QN 3	
2.2	**If Yes, are records of metered connections maintained? (Y/N)**	
	If No, go to QN 3	
2.3	**If Yes, are records of metered connections that are functional maintained? (Y/N)**	
2.4	**If Yes, percentage of meters that are functional?**	
2.5	**If Yes, does ULB have automated meter reading system at consumer end? (Y/N)**	
2.6	**If yes, is the process of installation of new water connections, new meters, and generation of water bills interlinked?(Y/N)**	

2.7

Type of connection	% of metered connections	% of functional metered connections	Quantity consumption (ML per yr)
Residential			
Industrial			
Public taps/ Stand posts			
Others[3]			
Total	0	0	0
Source of Information:			

[3]*Others include commercial, institutional, municipal, government agency connections*

3 **Estimated consumption per connection - for unmetered connections and metered connections that are not functional**

3.1

Size of connection	No. of connections	Estimated consumption (litres per day per connection)**	Estimated consumption quantity (ML per year)
1/2"			0
3/4"			0
1"			0
>1"			0
Total	0	0	0
Source of Information:			

*** Estimated consumption quantities are to be filled where information on metered connections is not available.*

3.2	**Basis of estimation of consumption per connection (1/2/3)** [4]	

[4] *1: From regular periodic survey by the ULB, 2:From spot survey, 3: As reported by the ULB without backup surveys*

III. Water Connections - b					
4	**Households served by water connections at ULB level**				
4.1	**Are records on HHs with individual water connections maintained by the ULB? (Y/N)**				
	If No, go to QN 6				
4.2	**If Yes, total number of households with individual water connections**				
4.3	**If Yes, how does the ULB maintain records?(1/2/3)[1]**				
	[1] 1: connection registers, 2: as part of property tax registers, 3: Water bills				
4.4	**If Yes, is this data updated regularly? (Y/N)**				
5	**Ward wise households served by connections**				
5.1	**Is there ward wise information/estimates on number of HHs with individual water connection?(Y/N)**				
	If No, go to QN 6. If Yes, skip QN 6				
5.2	**If Yes, which wards are used for details on households served by water connections as provided in QN 5.4?(1,2,3,4)***				** 1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify.*
5.3	**If Yes, number of wards for which details on households with connections is given in QN 5.4**				

5.4	**Ward No**	**Total no of HHs with individual water connection**	**Total no of HHs**
	Total	0	0
	Source of Information:		

5.5	**Is data regarding HHs with connection regularly (quarterly/annually) updated by ULB?(Y/N)**		
6	**Ward wise number of residential water connections**		
6.1	**Is there ward wise information or estimates on number of residential water connections?(Y/N)**		
	If No, go to QN 7		
6.2	**If Yes, which wards are used for details on residential water connections as given in QN 6.4?(1,2,3,4)***		** 1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify.*
6.3	**Number of wards for which details on residential water connections is given in QN 6.4**		

6.4	**Ward No**	**No. of residential water connections**	**Total no of HHs**
	Total	0	0
	Source of Information:		

7	**Estimated Households served per connection**		
7.1	**Does the ULB have residential connections serving more than 1 HH per connection? (Y/N)[4]**		

[4]This may apply to ULBs with multi-storied apartments, where one connection serves many HHs

If No go to Next Worksheet on Water Quality

7.2	**Size of residential connection**	**Estimated no of HH served per connection**	**No. of residential connections**	**Total no. of estimated HHs served per connections**
	1/2"			0
	3/4"			0
	1"			0
	>1"			0
	Total			0
	Source of Information:			

IV. Water Quality

1 For Surface & Ground sources : Residual Chlorine, Bacteriological and TDS tests

Sample location	Residual Chlorine tests		Bacteriological tests		TDS tests	
	No of tests conducted per year	No of tests that met the standards per year	No of tests conducted per year	No of tests that met the standards per year	No of tests conducted per year	No of tests that met the standards per year
At the outlet of WTP/ bore wells						
At intermediate (ESR) points						
At consumer end						
Total	0	0	0	0	0	0
Source of Information:						

2 For Ground Sources: Fluoride testing

Sample location	Fluoride tests	
	No of tests conducted per year	No of tests that met the standards per year
At source		
At consumer end		
Total	0	0
Source of Information:		

2.1	**Average values of TDS at city level (ppm)**	
2.2	**Average value of Fluoride at city level (ppm)**	
2.3	**Are chemical tests conducted by the ULB? (Y/N)**	
2.4	**If Yes, Give details on parameters that were tested and period of tests conducted**	

3 Information recording system for water quality

3.1	**Are records of tests conducted maintained by the ULB? (Y/N)**	
3.2	**If Yes, are records of tests computerised? (Y/N)**	
3.3	**If Yes, are computerised records linked to GIS database? (Y/N)**	
3.4	**Is sampling regimen for tests at consumer end well documented and practiced? (Y/N)**	
3.5	**Are audits for water quality conducted?(1/2/3/4)***	

** 1: Independent and regular audits, 2: Independent but occasional/ Ad-hoc audit, 3: Periodic internal audit, 4: No audits conducted*

V. Sanitation, Waste Water & Storm Water Drainage - b

5 Ward wise households with individual toilets

5.1 Is there ward wise information or estimates on number of HHs with access to individual toilets?(Y/N)

If No, go to QN 5.5

5.2 If Yes, which wards are used for details on households with access to individual toilets as provided in QN 5.4? (1,2,3,4)[9]

5.3 Number of wards for which details on households with access to individual toilets is provided in QN 5.4

[9] *1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify. These should match with ward details on Sheet 1*

5.4 Number of households with access to individual toilets (insert additional rows/sheets if required)

Ward No	Total no of HHs with access to individual toilets	Total no of HHs
Total	0	0
Source of Information:		

5.5 Is there ward wise information or estimates on number of residential properties with access to individual toilets?(Y/N)

If No, go to QN 6

5.6 If Yes, which wards are used for details on residential properties with access to individual toilets as provided in QN 5.7? (1,2,3,4)[10]

[10] *1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify. These should match with ward details on Sheet 1*

5.7 Number of residential properties with access to individual toilets (insert additional rows/sheets if required)

Ward No	Total no of residential properties with access to individual toilets	Total no of residential properties
Total	0	0
Source of Information:		

6 Ward wise households with sewerage connections

6.1 Is there ward wise information or estimates on number of HHs served per connection?(Y/N)

If No, go to QN 7

6.2 If Yes, which wards are used for information on households served by sewerage connections as provided in QN 6.4? (1,2,3,4)[11]

6.3 Number of wards used for details on households by sewerage connections as provided in QN 6.4?

[11] *1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify. These should match with ward details on Sheet 1*

6.4 Ward wise households served by sewerage connections (insert additional rows/sheets if required)

Ward No	Total no of HHs with individual sewerage connection	Total no of HHs
Total	0	0
Source of Information:		

7 Ward wise Residential sewerage connections

7.1 Is there ward wise information or estimates on number of residential sewerage connections?(Y/N)

If No, go to QN 8

7.2 If Yes, which wards are used for information on residential sewerage connections as provided in QN 7.4? (1,2,3,4)[12]

7.3 Number of wards for which details on residential sewerage connections is provided in QN 7.4

[12] *1: Admin ward, 2: Election ward, 3: Property tax ward.4: Others, specify. These should match with ward details on Sheet 1*

7.4 Number of residential sewerage connections by wards (insert additional rows/sheets if required)

Ward No	No of residential sewerage connections	Total no of HHs
Total	0	0
Source of Information:		

V. Sanitation, Waste Water & Storm Water Drainage - c

8 Areas without sewerage network

8.1	Does the ULB have areas without piped sewerage network? (Y/N)	
	If No, go to QN 9	
8.2	Area without sewerage network (in sq. km)[13]	
8.3	Means of disposal of sewage in these areas (1/2/3)[14]	
8.4	If means of disposal is by septic tanks, agency for cleaning septic tanks?(3/4)[15]	
8.5	Location of disposal of septic tank waste (mark on map)	

[13] *Mark areas without sewerage network on map*
[14] *1: Septic tanks, 2:Open drains, 3: Soak pits*
[15] *3: ULB, 4:Private agency*

9 Sewage Treatment Plants (insert additional rows/ sheets if required)

9.1	Does the ULB have pumping stations?(Y/N)	
9.2	If Yes, total number of pumping stations in the ULB	
9.3	Does the ULB have Sewage Treatment Plants?(Y/N)	
	If No, go to QN 11	
9.4	If Yes, total number of STPs in the ULB	

Mark locations of all pumping stations on map

Mark locations of all STPs on map

9.5 Details of STPs

Name of STP	Installed Capacity of STPs (MLD)	No of sewage zones/ wards covered	Location in Ward/ outside city	Is inflow meter present? (Y/N)	Daily avg inflow (MLD)	Type of Treatment: Primary (P), Secondary (S), Tertiary (T)	Is outflow meter present? (Y/N)	Water conveyed for recycling/ reuse after treatment (MLD)
Total	0			N	0	0	N	0
Source of Information								

9.6	Are log records of treatment plant operations maintained?(Y/N)	
9.7	If No, is quantity of waste water collected estimated on the basis of inflow channel dimensions? (Y/N)	
9.8	Are automated systems adopted for monitoring waste water treatment plant operations? (Y/N)	
9.9	Are automated systems linked to GIS database? (Y/N)	

10 Quality of waste water treatment

10.1	Effluent samples tested (number per year)(BOD , COD, Suspended solids, etc)	
10.2	Effluent samples passed (number per year)(BOD , COD, Suspended solids, etc)	
10.3	Are all parameters (BOD , COD, Suspended solids, etc) for waste water treatment tested? (Y/N)	
10.4	Is sampling regimen for waste water samples well documented and practiced? (Y/N)	
10.5	If yes, are the records of sampling regimen computerised? (Y/N)	
10.6	If yes, are the records linked to GIS database? (Y/N)	
10.7	Are audits for waste water quality conducted?(1/2/3/4)*	

** 1: Independent and regular audits, 2: Independent but occasional/ Ad-hoc audit, 3: Periodic internal audit, 4: No audits conducted*

11 Untreated waste water

11.1	Location of Sewage Outfalls for Untreated Waste Water (Admin ward no./ Outside city)[16]	
11.2	Estimated quantity of untreated waste water disposed (MLD)	
11.3	Basis of estimation of quantity of untreated waste water (1/2)[17]	

[16] *Mark location of sewage outfalls on map (marking need not be to scale)*
[17] *1: Based on outfall channel dimensions, 2: as reported by ULB without any back up*

12 Storm water drainage (SWD) network

12.1 Type of network

At ULB level	Total Length of SWD (km)	Discharge point
Under-ground		
Surface: Covered		
Surface: Uncovered		
Total	0	
Source of Information:		

12.2 Flooding incidents in the ULB (insert additional sheets if required)

Name of flooding locations[18]	Frequency (no/yr)	Period of water flooding (hrs)	Reason of flooding (1/2/3)*
Total	0	#DIV/0!	
Source of Information:			

** 1: Choked drains, 2: low lying areas, 3: Others (specify)*

[18] *Mark locations of flooding on map*

12.3	Are records of location of flooding points/ duration of floods maintained by ULB?(Y/N)	

	VI. Municipal Solid Waste Management - a		
1	**Generation of Solid Waste in ULB**		
1.1	**Total waste generated in ULB (TPD)***		* *Tonnes per day*
1.2	**Basis of estimation of waste generated (1/2/3/4)[1]**		
	[1] *1: Sample survey (seasonal variations in quantity also captured), 2: spot surveys to validate norms(MSW 2000), 3: per capita waste generation, 4: as said by ULB*		
1.3	**If estimation is based on per capita norms, what is the rate of generation used?(gms/capita/day)**		
2	**Primary Collection at ULB level**		
2.1	**Total no of residential HHs served by door to door collection of solid waste**		
2.1.1	**Number of HHs provided with two bins system for bio-degradable and recyclable specified**		
2.1.2	**Are bins provided: 1. by HHs at their cost, or 2. by ULB? (1/2)**		
2.2	**Total no of establishments[2] served by door step collection**		
2.3	**Total no of establishments in the city**		
2.4	**What is the source of information of primary collection of solid waste? (1/2/3/4/5)[3]**		
	[2]*Establishments include offices, institutions, hotels, restaurants, and other commercial establishments*		
	[3]*1: GIS database on MSWM, 2: Computerised records, 3: Manual records(property tax/connection registers/ billing records), 4: Surveys, 5: as reported by ULB; no records*		
3	**Primary Collection of Solid Waste: Residential Households at Ward level**		
3.1.	**Is there ward wise information or estimates on number of HHs served? (Y/N)**		
	If No, Go to QN 4		
3.2	**If Yes, which wards/ zones are used for details on households served by primary collection as provided in QN 3.4? (1,2,3,4)[4]**		
	[4] *1: Admin ward, 2: Election ward, 3: Property tax ward, 4: Others, specify. These should match with ward details on Sheet 1*		
3.3	**If Yes, number of wards for which details on HHs served by primary collection is provided in QN 3.4**		
3.4	**Households served by door to door collection (add rows/ sheets if required)**		

Ward no	Number of HHs served by primary collection	Total number of HHs	Agencies involved (1/2/3/4)[5]
Total	0	0	
Source of Information:			

[5]*1: ULB, 2: CBO or Sakhimandal, 3: Private contractors, 4: Resident Welfare Associations*

4	**Street Sweeping Details**		
4.1.	**Total length of streets swept daily by mechanical means (km)**		
4.2.	**Total length of streets swept daily by manual means (km)**		
4.3.	**No. of sweepers deployed (No)**		
	Source of Information:		
5	**Segregation of waste**		
5.1	**Is waste collected in a segregated manner through door to door services? (Y/N)**		***If No, go to QN 5.4***
5.2	**If Yes, is waste collected & transported in separate vehicle trips to treatment/ disposal site?(Y/N)**		
5.2.1	**If Yes, quantity of bio-degradable waste received at treatment/disposal site (TPD)**		
5.2.2	**If Yes, quantity of recyclable waste received at treatment/disposal site (TPD)**		
5.3	**Quantity of waste received at disposal site as non recyclable, non bio-degradable waste and residue & rejects (TPD)**		
5.4	**Quantity of waste taken away by recyclers from intermediate points (TPD)**		
6	**Treatment Plant details**		
6.1	**Does the ULB have treatment plants? (Y/N)**		***If No, go to QN 7;***
6.2	**If Yes, is weigh bridge present near the treatment facility? (Y/N)**		***Skip QN 8***
7	**Mode of disposal for MSWM**		
7.1	**Is mode of disposal of MSW through open dumping? (Y/N)**		
7.2	**Is mode of disposal of MSW through scientific engineered landfills/compliant sites? (Y/N)**		
7.3	**Is mode of disposal of MSW through open dumping and compliant sites? (Y/N)**		

VI. Municipal Solid Waste Management - b

8 Treatment/ Processing facility

8.1	Are log records of daily intake of waste quantity, based on measurement at weighbridge, maintained? (Y/N)	
8.1.1	If Yes, are computerised systems used for monitoring operations at treatment plant? (Y/N)	
8.1.2	If Yes, are monitoring systems linked to GIS database? (Y/N)	
8.2	If No, is quantity of waste intake estimated based on vehicle trips to treatment plant? (Y/N)	

8.3

Type of treatment	Installed capacity (TPD)	Quantity of waste input (TPD)	Quantity of recovered end products (TPD)
Composting			
Vermi-composting			
Community level composting			
RDF			
Waste to energy			
Others, specify			
Total	0	0	0
Source of Information:			

8.4	Quantity of waste rejected after treatment (e.g., inert matter) (TPD)	
8.5	Are there any formal recycling facilities in the ULB? (Y/N)	
8.6	If yes, capacity of the facility(TPD)	

9 Existing system of disposal of MSW

9.1 Open dumps: General details

9.1.1

Name of open dumps*	Distance from the city (km)	Area (Ha)	Remaining age of landfill (yrs)	Does ULB pay tipping fee for disposing waste rejects?[6] (Y/N)	If yes, to whom is it paid	Tipping fee (Rs/ton)
Source of Information:						

** Mark location of open dumps on map* *[6] This is applicable in the case where the disposal site is operated by a private operator*

9.1.2 Open dumps: Details on waste disposed

Name of open dumps	Capacity (Tonnes)	Quantity of waste received (TPD)	Is weighbridge present? (Y/N)	Are log records maintained? (Y/N)	If No, Basis of estimation[7]
Total	0	0	N	N	
Source of Information:					

[7] 1: based on vehicle trips, 2: as said by ULB

9.1.3	Are computerised systems used for monitoring operations at disposal site? (Y/N)	
9.1.4	If yes, are monitoring systems linked to GIS database? (Y/N)	

9.2 Compliant/ Scientific engineered landfills

9.2.1

Name of compliant/ scientific engineered landfill[8]	Area (Ha)	Remaining age of landfill (yrs)	Capacity (Tonnes)	Quantity of waste received (TPD)	Is weighbridge present? (Y/N)	Are log records maintained?(Y/N)	If No, Basis of estimation
Total			0	0	N	N	
Source of Information:							

[8] As per MSW Rules 2000, Mark location of landfills on map

9.2.2	Are computerised systems used for monitoring operations at landfill site? (Y/N)	
9.2.3	If yes, are monitoring systems linked to GIS database? (Y/N)	

10 Transportation of Solid Waste (Insert additional rows/sheets if required)

10.1	Are records of daily trips to treatment/ disposal site maintained? (Y/N)	

10.2 Details on trips of waste transportation vehicles

Type of vehicle	Number	Capacity (T)	Trips/ Day	Tons/ Month
Lorries/ Trucks				0
Tractor trailers				0
Compactors				0
Tipper trucks				0
Dumper placers				0
3-wheeler auto tippers				0
Others (Cycle Rickshaws/Bullock carts, etc)				0
Source of Information:				

VII. Information of Slums

1	**General Information**		
1.1	**Total number of slum settlements in the ULB[1]**		[1] *Mark settlements on map*
	Of total slums, Number of notified slums in the ULB		
1.2	**Number of slum settlements on public land**		
1.3	**Total no of HHs in slum settlements**		
1.4	**Total population in slum settlements**		
1.5	**Total no. of BPL families in the ULB**		

2	**Services in slums**	
2.1	**Number of individual water connections**	
2.2	**Number of group connections**	
2.3	**Number of stand posts**	
2.4	**Number of individual toilets**	
2.5	**Number of seats in pay-n-use toilets (functional toilets)**	
2.6	**Number of seats in community toilets (functional toilets)**	
2.7	**Number of sewerage connections**	
2.8	**Number of slum HHs served by primary collection**	
	Source of Information:	

3	**Information systems for slums**		
3.1	**What is the source of information for QN 1? (1/2/3/4)[2]**		
3.2	**What is the source of information for QN 2? (1/2/3/4)[2]**		
	[2] *1: Records, 2: Survey of all slums, 3: past surveys (more than 5 years), 4: as told by ULB; no records.*		
3.3	**If records are maintained for slum information, how frequently are they updated? (1/2/3)[3]**		
	[3] *1: Annually, 2: Occasionally (once in 3-5 yrs), 3: No updation*		
3.4	**Do records provide settlement level details? (Y/N)**		*If Yes, attach formats*
3.5	**Do records provide household level details? (Y/N)**		*If Yes, attach formats*
3.6	**Is the slum information computerised? (Y/N)**		
3.7	**If Yes, collect data on slum separately from ULB**		

4 **Ongoing/ Completed Projects or schemes related to UWSS for slums in the ULB (Insert additional rows/ sheets as required)**

Name of program/ scheme for slum related activities[1]	Year of inception of program	Duration of program (no. of years)	Brief Description of program (in terms of infrastructure and services provided)
Source of Information:			

[1] *Nirmal Gujarat, IHSDP, BSUP, MSNA, Other programs*

5	**List the major NGOs and/ or CBOs working in slums in the ULB**

VIII. Consumer Grievance Redressal

1 Citizens' Charter

1.1.	**Does the ULB have a citizen charter ? (Y/N)**	
1.1.2	**If yes, is it displayed/ disseminated to the citizen? (Y/N)[1]**	

[1] Collect copy of the citizen charter of the ULB

2 Means of making complaints

Means	Y/N	Number of complaints (2009)
In person		
Letter		
Telephone		
SMS		
E-mail		
Total		0
Source of Information:		

2.1	**Are complaints received through above means recorded? (Y/N)**	

3 Service wise complaints

Service	Average number of complaints received monthly	Number of complaints redressed monthly*
Water supply		
Waste water		
SWM		
SWD		

** Complaints redressed as per standards mentioned in the citizen charter*

3.1	**Does the ULB maintain records on complaints received and redressed? (Y/N)**	
3.2	**If Yes, is the complaint systems computerised? (Y/N)**	
3.3	**If Yes, are the complaint redressal systems linked to GIS database? (Y/N)**	
3.4	**What are the major complaint areas?**	

3.4.1

Service	Type of complaint[2]	Number of complaints received monthly	Number of complaints redressed monthly*
Water supply	Non- availability of water		
	Low water pressure		
	Contaminated water		
	Pipe breakage/leakage		
	Others (specify)		
	Total	0	0
Waste water	Sewer blocks		
	Overflowing manholes		
	Sewer pipe breakage		
	Others (specify)		
	Total	0	0
SWM	Door to door collection		
	Overflowing bins		
	Infrequent street sweeping		
	Odor/nuisance of dumpsites/ transportation vehicles		
	Others (specify)		
	Total	0	0
SWD	Water logging		
	Cleaning of storm drains		
	Disinfection of post-flooded areas		
	Others (specify)		
	Total	0	0
Source of Information:			

** Complaints redressed as per standards mentioned in the citizen charter*

[2]Collect all types of complaints as received and segregated by ULB for each service

IX. Staff and Management

1 Details of Municipal Staff

1.1	**Does the ULB maintain manual systems for staff records? (Y/N)**	
1.2	**If Yes, does the ULB have computerised systems for staff records? (Y/N)**	
1.3	**Does ULB maintain records for recruited staff? (Y/N)**	

1.4

Department	Permanent Staff		No of temporary/ contract staff	No of daily wage staff	Total staff
	Sanctioned	Filled			
Total municipal staff					0
Administration					0
Finance/Accounts					0
Water supply					0
Waste water & SWD					0
SWM					0
Source of Information:					

1.5

Technical and Non-technical staff for WSS

Department	No of technical staff	No of non-technical staff
Water Supply		
Waste water		
SWM		
Total	0	0
Source of Information:		

2 Private Sector Participation in WSS (Insert additional rows/sheets, as required)

Title of contract	Sector (1/2/3/4)[1]	Type of contract [2]	Tenure (yrs)	Value (Rs)
Source of Information:				

[1] *1: Water, 2: Waste water, 3: SWM, 4: SWD*

[2] *Service contract, Management contract, Lease contract, BOOT/BOT, others (specify)*

3 Computer Proficiency of Staff

3.1	**Does ULB staff use computers in daily operations? (Y/N)**	
3.2	**If Yes, list departments where computerised systems are used[3]**	

[3] *Admin/Accts/Water/Sanitation/SWM/SWD*

3.3	**Software's used in the computers[4]**	
3.4	**Is Internet facility present for the ULB? (Y/N)**	
3.5	**If Yes, type of facility (1/2/3)[5]**	

[4] *MS-Office (Word, Excel),AutoCAD, Others: specify*

[5] *1: Broadband, 2: Dial-up, 3: Others*

X. Finance and Tariffs - a

1	**Accounting systems**	
1.1	**Is accrual based double entry accounting system followed? (Y/N)**	
1.2	**If Yes, is accrual based double entry system followed in parallel to cash based system?(Y/N)**	
1.3	**If Yes, is accrual based double entry accounting systems followed on a regular basis? (Y/N)**	
1.4	**Does the ULB have computerised accrual based double entry accounting systems? (Y/N)**	

2	**ULB Budgets**	
2.1	**Is the information as reported in QN 3, 4, 6 & 7 for 2007-08 based on 'actuals' or 'revised estimates'? (AC/RE)[1]**	
2.2	**Is the information as reported in QN 3, 4, 6 & 7 for 2008-09 based on 'actuals' or 'revised estimates'? (AC/RE)[1]**	

[1] For Financial statement, collect Actual Budget for 2007-08 & 2008-09; However, if actual budget is not available, collect Revised Budget Estimates (RE) for 2008-09

3 Capital Account - for the ULB

3.1 Sources of Funds for Capital Account (In Rs.)

	2007-08	2008-09
Sources	0	0
Grants		
Borrowing		
Internal ULB funds		
Others		
Total	0	0
Source of Information:		

3.2 Capital Expenditure (In Rs.)

	2007-08	2008-09
	0	0
Projects, schemes, etc		
Principal repayment on loans		
Others		
Total	0	0
Source of Information:		

4 Capital expenditure for Municipal Services in Water, Sanitation, SWM and SWD(in Rs)

	Water supply		Waste water		Solid waste		Storm water drainage	
	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
	0	0	0	0	0	0	0	0
On Projects, schemes								
Principal Repayment on loans								
Others								
Total								
If loan repayment is not available sector wise, estimated share of total ULB loan repayments for these sub-sectors								
% share of ULB principal repayments on loans								
Source of Information:								

5 Ongoing/ Recently Completed Capital Investment Projects for Water, Sanitation, SWM and Slums

Sector	Brief Description	Sources of funds (1/2/3/4)[2]	Start Date (Year)	End Date[3] (Year)	Total estimated project cost
Water Supply					
Waste water/ Sewerage					
SWM					
Slums: Housing					
Slums: Basic services					
Total					0
Source of Information:					

[2] Sources of funds: 1: JNNURM/MSNA, 2:Other grants, 3: Only own funds and donations, 4: Others, specify

[3] For ongoing projects, give estimated date of project completion

X. Finance and Tariffs - b

6 Total Revenue Income & Expenditure of the ULB (in Rs)[4]

Income Heads	2007-08	2008-09
	0	0
Tax income		
Non-tax income		
Revenue grants		
Other income		
Misc. Income		
Total	0	0
Source of Information:		

Expenditure Heads	2007-08	2008-09
	0	0
Establishment		
Administrative		
O & M		
Loan interest payment		
Depreciation		
Others (Program Sp. Exp + misc)		
Total	0	0
Source of Information:		

[4] *For Gujarat, the data for the above tables are to be taken from segment reports of the GMARP Annual Accounts statements*

7 Revenue Income & Expenditure by municipal services (in Rs)

7.1 Revenue Income

	Water supply		Waste water		Solid waste		Storm water drainage	
	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
Heads	0	0	0	0	0	0	0	0
Tax income								
Non-tax income								
Revenue grants								
Other income								
Misc. Income								
Total	0	0	0	0	0	0	0	0
Source of Information:								

7.2 Revenue Expenditure

	Water supply		Waste water		Solid waste		Storm water drainage	
	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
Heads	0	0	0	0	0	0	0	0
Establishment								
Administrative								
Energy consumption								
Other expenses in O&M								
Loan interest payment								
Depreciation								
Bulk water			Not applicable					
Others (Program Sp. Exp + misc)								
Total	0	0	0	0	0	0	0	0
Source of Information:								

X. Finance and Tariffs - c

8	**Service taxes and Charges**	
8.1	**Does the ULB levy service taxes for water/sanitation linked to property taxes? (Y/N)**	
	If Yes, collect copy of tax rates	
8.2	**Does the ULB levy charges (fixed/volumetric) for water? (Y/N)**	
	If Yes, collect copy of charges	
8.3	**Does the ULB levy any other charges[7] for water/ sanitation/sewerage/ SWM? (Y/N)**	
.	**If Yes, collect copy of types of other charges**	

[7] *Water charges includes development charges, regularisation fees, user charges, penalties & fees, and other fees*

9 Demand and Collection: 2008-09[5]

9.1 Heads	Billed demand (in Rs)			Collected amount (in Rs)			Arrears yet to be collected		
	Arrears as on 1.4.2008 (a)	Current Billed Demand 2008-09 (b)	Total Billed Demand (a + b)	Collection from Arrears (c)	Collection from Current Billed Demand (d)	Total collected amount during the year 2008-09 (c + d)	Arrears of past demand (e)	Arrears of current demand (f)	Total amount in arrears at the end of the year 2008-09 (e + f)
Water supply									
Water Tax[6]			0			0	0	0	0
User charges (Fixed/ Volumetric)			0			0	0	0	0
Other charges[7]			0			0	0	0	0
Total	0	0	0	0	0	0	0	0	0
Waste water									
Sewerage tax			0			0	0	0	0
Sewerage charge			0			0	0	0	0
Others			0			0	0	0	0
Total	0	0	0	0	0	0	0	0	0
SWM									
SWM charge			0			0	0	0	0
Others			0			0	0	0	0
Total	0	0	0	0	0	0	0	0	0
Source of Information:									

[5] *Billed demand, collection and arrears to be taken from the Demand Collection Balance statement as provided by ULB.*

[6] *Water tax includes water tax, special water tax, water benefit tax, etc*

[7] *Water charges includes development charges, regularisation fees, user charges, penalties & fees, and other fees*

9.2	**Are DCB tables properly maintained and updated by the ULB?(Y/N)**	
9.3	**Is DCB analysis linked to billing and collection systems? (Y/N)**	
9.4	**Is the billing and collection systems computerised and DCB tables automatically generated?(Y/N)**	

List of Reports/ Formats to be collected	
No	**Description**
1	Sample copies of
	a) Property tax bills
	b) Water bills
	c) Waste water bills
	d) Solid Waste bills
2	Application forms
	a) Water connections
	b) Sewerage connections
3	Copy of format used in the following registers or log books:
	a) Water Connection Register
	b) Complaint register formats for Water, Waste water, and Solid Waste
	c) Log books for pumping, storage, treatment, new connections, staff for water, waste water, and solid waste
	d) Log books for details of ESR/ sump
	e) Log books for operations at water treatment plant
	f) Asset register for water, sewerage and sanitation related assets
4	Detailed Project Reports (DPR's) related to water, waste water and solid waste
5	Wherever possible, collect other City Reports- e.g. a) City Development Plan (CDP), Environment Status Report (ESR), Annual maintenance plan for WSS, etc
6	Energy Audit Reports and Water Audit Reports
7	Budgets -Documents that provide details of Budget estimates for current year (2008-09) and Actual amounts for previous year (2007-08)
8	Collect copies of formats as sent to DoM for Gujarat, Inspection Reports for Maharashtra, MOA and progress reports for UIDSSMT and JnNURM, etc
9	Collect copies of formats of slum related information as maintained by ULB
10	Collect copies of Government Resolutions (GR) related to staff recruitments

Information on Maps*

No	Theme	Name of Map	Source (ULB/ Other agency, specify)	Type of map (jpeg, acad, etc)
1	**ULB level Maps**	Development Plans (if available)/Survey Maps. Administrative Wards Census wards Location of newly added areas to ULB		
2	**Water Supply**	Trunk, Transmission and Distribution Network, within and outside ULB Water Distribution Stations/ Zones within and outside the ULB Location of WTP, ESR/Sump, Tube wells		
3	**Sewerage**	Location of sewerage zones within ULB Underground sewerage system On ground piped drainage Combined storm and sewer drainage Unserved areas within ULB limits Location of Sewage Treatment Plant Location of final outfall of sewage, after treatment Location of land used for sewage farming Location of sewage outfalls for untreated waste water		
4	**Storm Water Drainage**	Flooding locations within the ULB		
5	**SWM**	Primary collection zones for SWM (door step collection) Location of Solid Waste Treatment plant Location of dump site Location of Sanitary Engineered Landfill		
6	**Slums**	Location of Slums (Mark on Base Maps)		

* Collect Hard and Soft copy formats of the maps

The Performance Assessment System (PAS) Project

The PAS Project aims to develop appropriate methods and tools to measure, monitor and improve delivery of water and sanitation in cities and towns in India. The PAS Project includes three major components of performance measurement, performance monitoring and performance improvement. It covers all the 400+ urban local governments in Gujarat and Maharashtra.

CEPT University has received a grant from the Bill and Melinda Gates Foundation for the PAS Project. It is being implemented by CEPT University with support of Urban Management Centre (UMC) in Gujarat and All India Institute of Local Self-Government (AIILSG) in Maharashtra.

PAS Project

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