



URBAN WATER & SANITATION IN GUJARAT

Summary Report 2009-2016

June 2016

Prepared by Urban Management Centre under
Performance Assessment System (PAS) Project



URBAN MANAGEMENT CENTRE

The Urban Management Centre (UMC) is a not-for-profit organization based in Ahmedabad, Gujarat, working towards professionalizing urban management in India and South Asia. UMC provides technical assistance and support to Indian state local government associations and implements programs that work towards improvement in cities by partnering with city governments. UMC builds and enhances the capacity of city governments by providing much-needed expertise and ready access to innovations on good governance implemented in India and abroad. UMC is a legacy organization of International City/County Management Association (ICMA) and hence is also known as ICMA-South Asia.

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PERFORMANCE ASSESSMENT SYSTEM

PAS, a seven-year action research project, has been initiated by CEPT University with funding from the Bill and Melinda Gates Foundation. PAS aims to develop better information on water and sanitation performance at the local level to be used to improve the financial viability, quality and reliability of services. It will use performance indicators and benchmarks on water and sanitation services in all the 400-plus urban areas of Gujarat and Maharashtra. UMC and the All India Institute of Local Self Governance are CEPT's project partners in Gujarat and Maharashtra, respectively. More details at

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List of Acronyms

AMC	Ahmedabad Municipal Corporation
GMFB	Gujarat Municipal Finance Board
GUDC	Gujarat Urban Development Company
GWSSB	Gujarat Water Supply and Sewerage Board
KPIs	Key Performance Indicator
LPCD	Liter Per Capita Per Day
MLD	Million Liter Per Day
MOUD	Ministry of Urban Development
NGSP	Nirmal Gujarat Shauchalaya Yojana
PAS	Performance Assessment System
SJMMSVY	Swarnim Jayanti Mukhya Mantri Shaheri Vikas Yojana
SLB	Service Level Benchmark
SMC	Surat Municipal Corporation
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TPD	Tons Per Day
ULB	Urban Local Body
UMC	Urban Management Center
VMC	Vadodara Municipal Corporation
WTP	Water Treatment Plant

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Foreword

UMC is proud to be associated with the Performance Assessment System (PAS) program. The PAS project was initiated in 2009 and has completed seven years. Data collection under the PAS program has been an extensive exercise. During the last 7 years, UMC team has travelled to all cities in Gujarat to collect information and data on water and sanitation, understand ground realities, validate the data with the urban local body (ULB) officials and engage with them on various performance monitoring and improvement initiatives.

The data collected over the last seven years has been analyzed and presented in the form of key performance indicators (KPI), that comprise a set of indicators for goals and reforms as indicated in Indicator's framework. KPIs in each sector have been analyzed at the state level and according to various classes of cities in Gujarat. We have used weighted averages to arrive at key indicator values at the state level. There is a significant population variation between the least and most populated cities when comparing at the state level or even within classes. Simple averages are a constrained way to calculate the measure of central tendency when several mutually related variables exist. Weighted average gives a better perspective for a given indicator as it takes into consideration the importance of other related variables, which are not taken into account while calculating a simple mean value.

During the last eight years, the urban water and sanitation sector in Gujarat has seen positive improvements at large, however there still exist areas (and regions) that need attention. This summary report highlights these transformations in the state over the last eight years.

Water and Sanitation in Urban Gujarat 2009-2015: A Summary

Urban sanitation has emerged as a focus area in Gujarat in the last decade. The Government of Gujarat (GoG) declared the year 2005 as the 'Urban Year' to bring focus to urban development issues in the state, and foster organized development of infrastructure in cities. This was in alignment with the launch of Government of India's Jawaharlal Nehru Urban Renewal Mission (JNNURM) that provided an impetus to states and cities to undertake large-scale urban improvements. The JNNURM brought central funding to four large cities in the State (Ahmedabad, Surat, Vadodara, and Rajkot). A large proportion of this was utilized for augmenting water supply and sewage infrastructure, and improving habitat conditions in slum communities under the Basic Services for Urban Poor (BSUP) sub mission. The State Government strengthened its institutional capacity to implement the program by forming the Gujarat Urban Development Mission. In addition to implementing the federally funded programs, GoG also launched state level initiatives including the Nirmal Gujrat Shuchalaya Yojana (for improving toilet coverage) and the Swarnim Jayanti Mukhya Mantri Shehri Vikas Yojana (SJMMSVY) for financing and constructing Infrastructure facilities like internal roads, streetlights, city bus services, water supply and sewerage systems.

In 2009, GoG instituted performance assessment system (PAS) for urban water supply and sanitation with support from the CEPT University and the Urban Management Centre (UMC). The key aim of the PAS program is to measure, monitor and improve performance of urban water supply and sanitation in the state. The PAS program is aligned to the service level benchmarking (SLB) initiative of the Ministry of Urban Development, Government of India. Since 2009, all urban local bodies (ULBs) in Gujarat have been annually reporting the service level benchmarks for water and sanitation to the State Government. The database developed under the PAS program is a telling resource that highlights the impact of large-scale investments in the water and sanitation sector in the State.

Based on the analysis of last seven years of data, there are three broad areas where the State has made remarkable progress:

- (i) Increasing access to individual sanitation (especially in slums),
- (ii) Increasing coverage of underground sewage network
- (iii) Increasing production and supply of water (with a move towards more surface sources)

The coverage of toilets (defined as total number of properties with access to individual or community toilets as a % of total number of properties) has increased from 87% in 2008-2009 to 91% in 2015-2016. The coverage of toilets in municipalities in the same year is 87%. The ‘Nirmal Gujarat Shauchalaya Yojana’ (NGSY) launched by the State Government in 2007 has been a key driver for this progress. ULBs across Gujarat have utilized funds from NGSY to foster the construction of individual toilets, especially in slum areas. The coverage of toilets in slums in 2015-2016 stands at 82%, as compared to a mere 44% in 2008-2009.

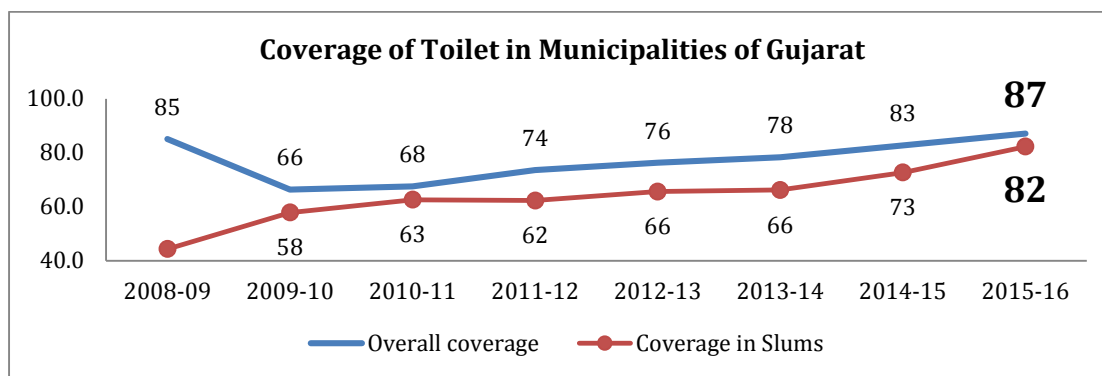


Figure 1: Yearly increase in coverage of toilets in municipalities of Gujarat

Since its launch, the NGSY guidelines have been revised and updated several times. Currently the program is subsumed under the MGSM a State level apex body consolidating all different state programs in water, sanitation and waste management under one authority. The latest guideline for provision of individual toilets adopts a more flexible (and demand based) approach that allows households to make their own decisions regarding toilet size, design and construction. In recent years, GoG’s emphasis on centralized sewage collection and treatment is also evident. Under the SJMMSVY, GoG has embarked upon a state-wide mega project for constructing/augmenting underground drainage and establishing sewage treatment plants (STPs) in all 167 cities in the state. As a result, the coverage of waste-water network services in the state has increased from 44% in 2008-09 to 64% in 2015-16.

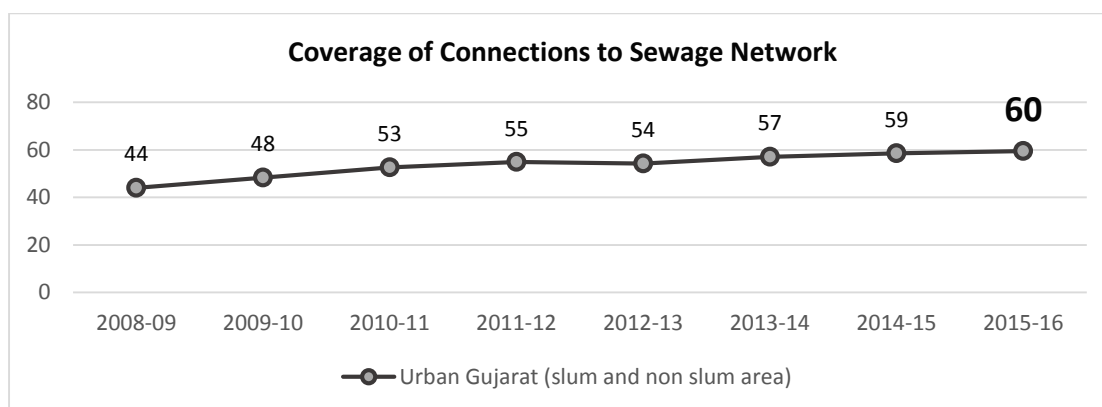


Figure 2: Yearly increase in sewage connections (2009-2016)

Thanks to the Narmada Canal Network laid under the Sardar Sarovar Dam Project, Gujarat has also significantly increased the amount of water that it produces and supplies. The state produced a total of 4519 MLD of water for municipal supply in 2015-2016, a 48% from 2008-2009, when it produced 3049 MLD. 80 % of this total water produced by urban Gujarat is sourced from surface water sources as compared to 77% in 2009.

Government of Gujarat has made large-scale investments towards ensuring that all cities in the state have a centralized sewage system. For cities with sewage network, the MoUD recommends 135 liters of water to be supplied per capita per day. In 2015-2016, Gujarat the reported per capita supply in Gujarat was 130 LPCD, still less than, but closer to the MoUD established benchmark. In 2008-2009, the reported LPCD was under 110 LPCD.

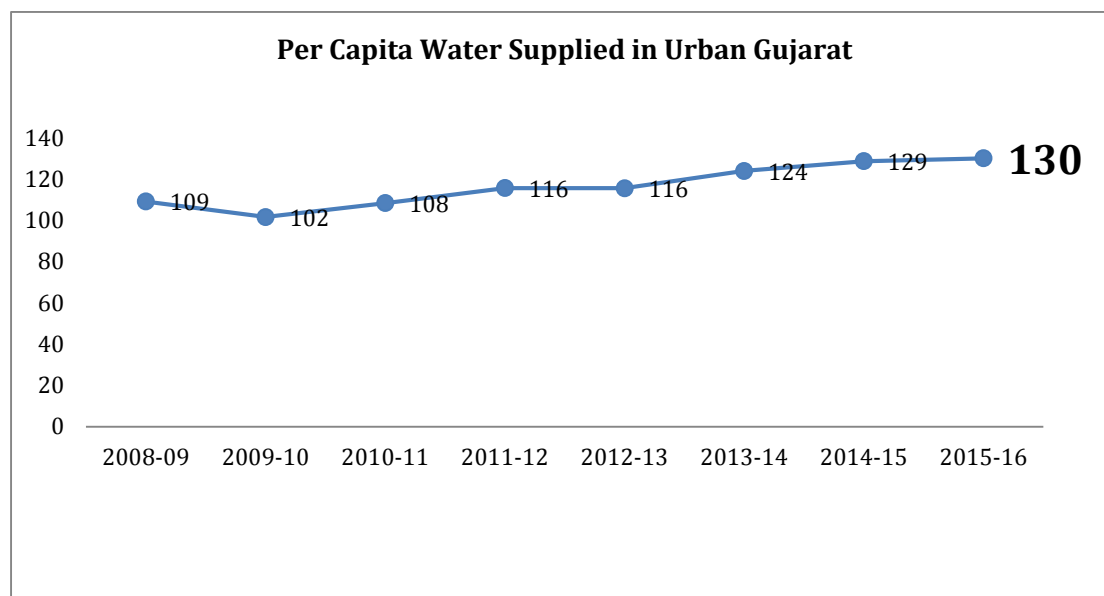








Figure 3: Yearly increase in per capita water supplied

While the State has exhibited decent progress in water and sanitation sectors, the area of solid waste management needs significant improvement. Most cities in the state have ramped up their efforts towards putting in place, and augmenting their door-to-door waste collection system. As a result, coverage of waste collection services has increased to 95% in 2015-16 from 80% in 2008-09. However, the extent of segregation, recovery, and scientific disposal of solid waste is still very low.

The extent of segregation in the state is still less than 10%. Only 18% of all the waste collected in cities of Gujarat gets recovered, and less than 8% gets scientifically disposed. Most waste still finds its way into open dump-sites and is indiscriminately disposed without any prior processing treatment. In the last 8 years, the State Government has also invested in several processing facilities including vermicomposting plants and waste to energy plants. Most of this facility are currently not functional and lying unused.




1. Water Supply

There are 12 key performance indicators for the water supply sector. The following table presents a comparison of the value of KPIs at the state level (calculated as a weighted average of the individual KPIs of all cities in Gujarat that reported data) for the year 2008-2009 and 2015-2016.

Indicator	Unit	2008-09	2015-16	
Coverage of Water Supply Connections	%	77	83	
Coverage of water supply connections in 'slum settlements'*	%			
Per capita supply of water at consumer end	lpcd	109	130	
Continuity of water supply	hrs	1.8	1.6	
Quality of water supplied	%	97	98	
Cost recovery (O&M) in water supply services	%	60	70	
Extent of functional metering of water connections	%			
Extent of Non Revenue Water (NRW)	%	30	19	
Efficiency in redressal of customer complaints	%	96	95	
Efficiency in collection of water supply related charges	%	62	71	

* The average figure for coverage of toilet in slums, does not include municipal corporations

Table 1: Comparison of KPIs in water supply sector (2008-09 and 2015-16)

	Significant progress (More than 25%)		Sufficient progress (10- 25%)		Marginal progress (Less than 10%)
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1.1. Gujarat State Scenario

1.1.1. Water production

Gujarat has traditionally been a water stressed state. Till about five years back, several cities, especially in north and central Gujarat regions were primarily dependent on ground water for domestic water supply and were faced with acute water shortages. With the laying of the Narmada canal network under the Sardar Sarovar Dam Project, the state has significantly augmented its water production from 3049 MLD in 2008-2009 to 4519 in 2015-2016.

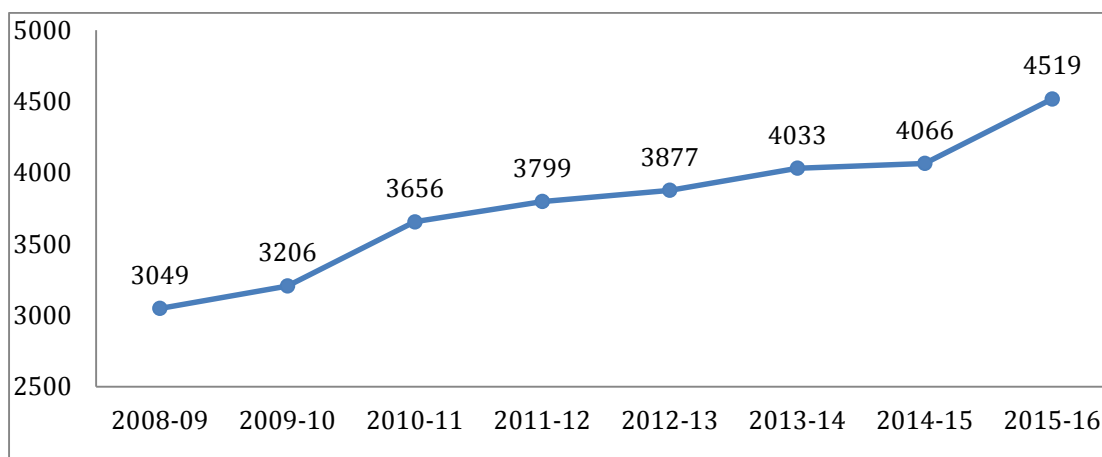


Figure 4: Yearly increase in water production in Urban Gujarat

98 cities, primarily in the North, Central and Saurashtra Regions of the state now receive water for domestic supply from the Narmada Canal network, which also feeds the state capital Gandhinagar. Only 20% of the water produced for domestic supply in the State is now sourced through ground water sources. 49 cities in the State have completely stopped the use of groundwater for municipal water supply. Only 32 cities in the state are now 100 % dependent on ground water as compared to 68 cities in 2008-09.

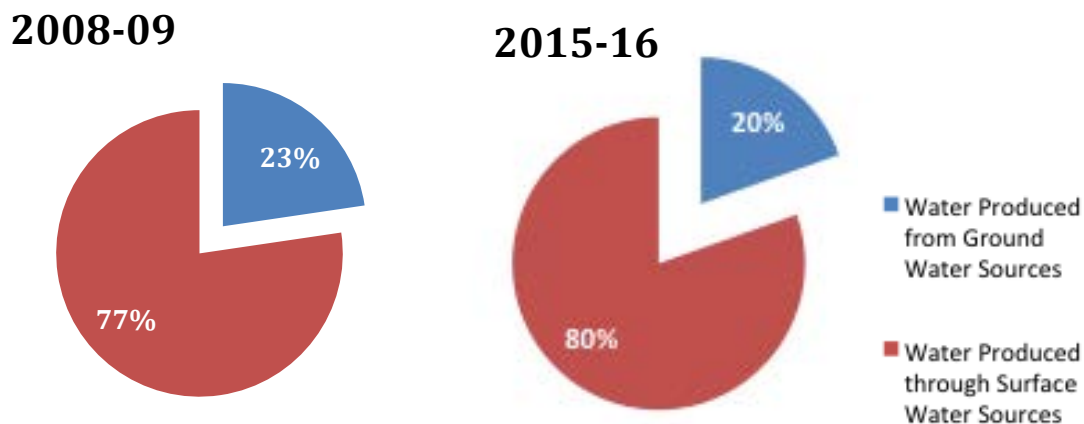


Figure 5: Dependency on ground and surface water sources (2008-09 and 2015-16)

1.1.2. Coverage and Level of Service

The Government of Gujarat has also initiated several projects under the Swarnim Jayanti Mukhya Mantri Saheri Vikas Yojana (SJMMSVY)/UIDSSMT for improving the water network across different cities of the state. There are various initiatives being undertaken by GMFB, GUDC and GWSSB and ULBs. With all these investments, the State has also done well in terms of extending the network of water supply in cities and improving access to individual water connections for all households. The coverage of water supply (defined as the percentage of households) with access to individual municipal water connection has increased from 77% in 2008-09 to 83.4% in 2015-16. The coverage of water supply in slums is significantly less as compared to the State average, however an upward trend is visible, indicating that cities in Gujarat are continuing to make concerted efforts to provide basic services in slums. In 2015-2016, 62.6% slum households had an individual water connection.

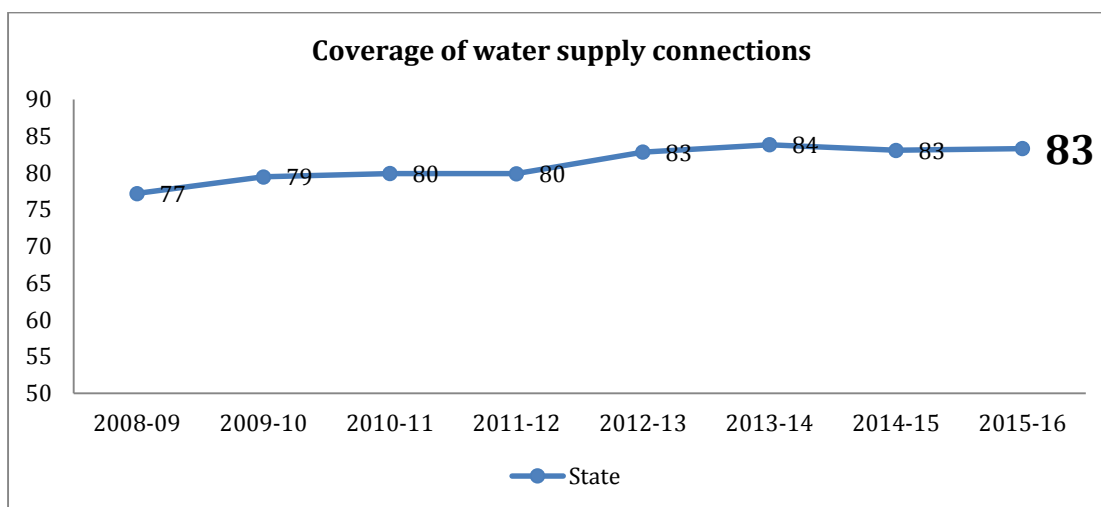


Figure 6: Increase in coverage of water supply in Gujarat

Key highlights:

- 34 ULBs have more than 95% coverage and another 12 ULBs in the State have more than 90% households connected to the municipal water supply network.
- In 2009-2010, 99 cities had a water supply coverage of less than 75%. This has reduced to 62 in 2015-2016.
- Water supply coverage in municipalities of Umargam, Vapi, and Chhaya has continued to remain low (Less than 35%). These cities have shown little progress in the last eight years.
- The per capita water supplied in the state has significantly increased. Urban households with a water supply connection now receive on an average 130 litres of water, per capita, per day as compared to 109 litres in 2009-10.

1.2. Class Wise Thematic Assessment

1.2.1. Access and Coverage

Providing safe drinking water is one of the key responsibilities of ULBs in Gujarat. ULBs in all classes have made consistent progress to increase water supply coverage in their cities. Municipal corporations in the State have achieved maximum coverage of piped water supply (88%). The average water supply coverage in municipalities is 75%. Size of the municipality has little bearing on providing piped water supply. Class A municipalities with a population between 1,00,000 to 3,00,000 have the least coverage of piped water supply (69%), while municipalities of Classes B, C and D exhibit an average in the range of 71-75%.

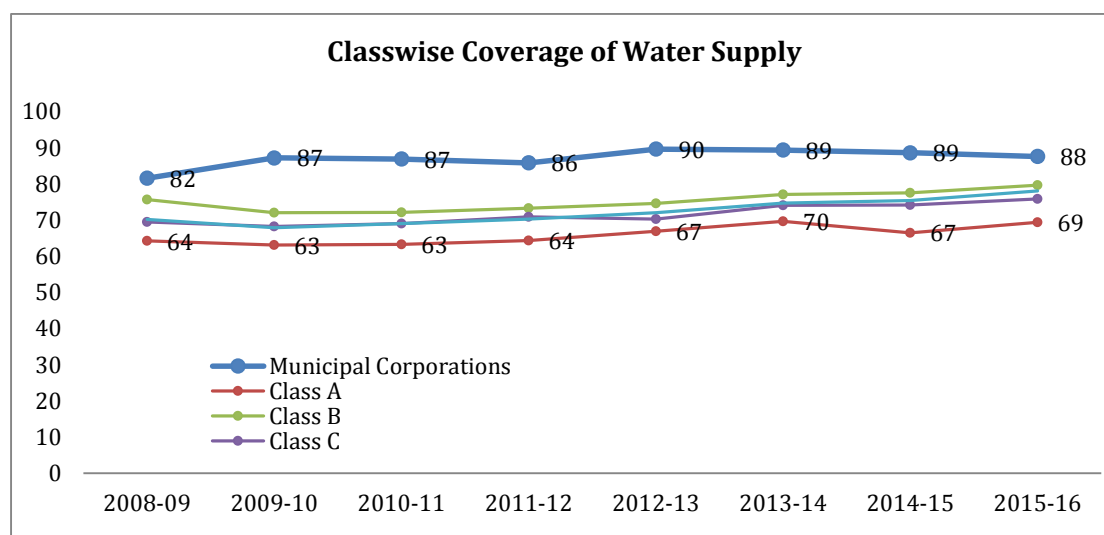


Figure 7: Yearly trends in coverage of water supply by class of cities

Among municipal corporations, Junagadh Municipal Corporation is the only city that has reported a decrease in water supply coverage in the last eight years. The city is not able to augment its network and provide water supply connections to keep pace with the growing population and number of households.

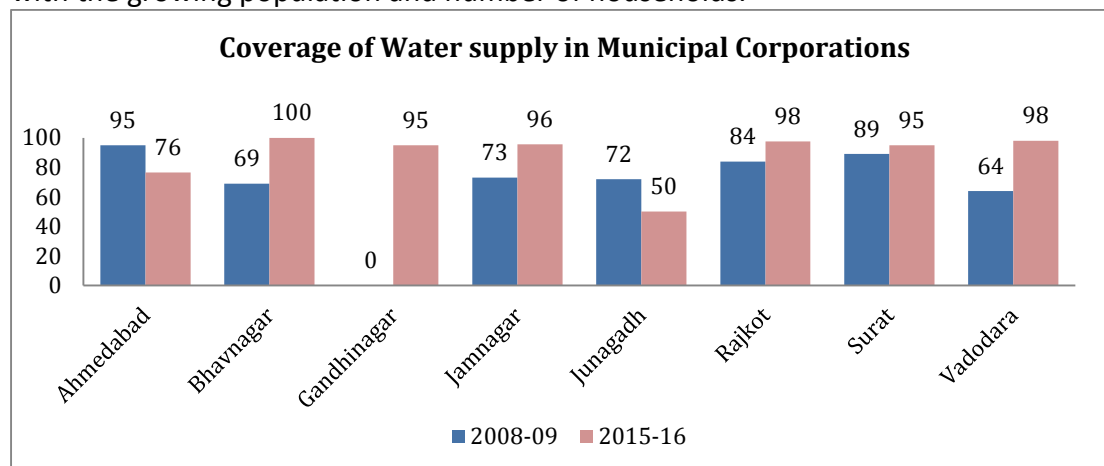


Figure 8: Comparison of coverage of water supply in municipal corporations (2008-09 and 2015-16)

With the overall increase in water supply coverage in cities, the inequity in provision of water supply is also reducing, but is still evident. On an average there is a difference of almost 13 percent points between slum coverage and city-wide coverage in municipalities in the state in the year 2015-2016. Some cities in the State have made significant progress towards extending basic services in slum settlements in the last five years. The coverage of water supply network in slums in Patan Municipality has increased from 57% in 2009 to 94% in 2013.

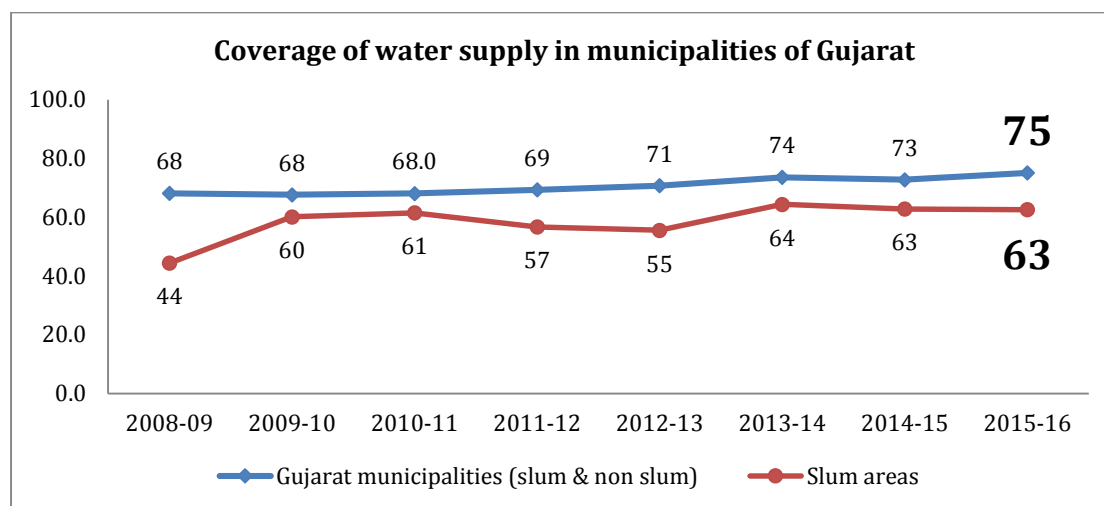


Figure 9: Equity in service provision in municipalities of Gujarat (Water Supply)

1.2.2. Level and Quality of Service

Service levels and quality includes indicators pertaining to per capita supply of water, continuity of the supply, and quality of water supplied.

Per Capita Water Supply

Per capita supply of water at consumer end is defined as the total water supplied to consumers expressed by population served per day. With the increase in water production, cities in all classes in Gujarat also exhibit an increase in per capita supply of water. Municipal corporations in the state supplied 145litres of water per capita per day in 2015-2016, higher than the MoUD established benchmark of 135lpcd. Class A, B, and D municipalities also provide more than 100lpcd, a significant progress from 2008-09, when all classes of municipalities were providing less than 80lpcd. Class D towns in the State have shown a remarkable 34 percentage points increase in per capita supply of water.

	Average	Best Performing City	Worst Performing City
Municipal Corporations	130	Gandhinagar (254lpcd)	Junagadh (52lpcd)
Class A	82	Bharuch (173lpcd)	Porbandar (59lpcd)
Class B	75	Virangam (158lpcd)	Dholka(68lpcd)
Class C	71	Vallabh VidyaNagar (169lpcd)	Wankaner (35lpcd)
Class D	68	Thara (251lpcd)	Vadali (45lpcd)

Table 2: Per capita water supply by class (2016)

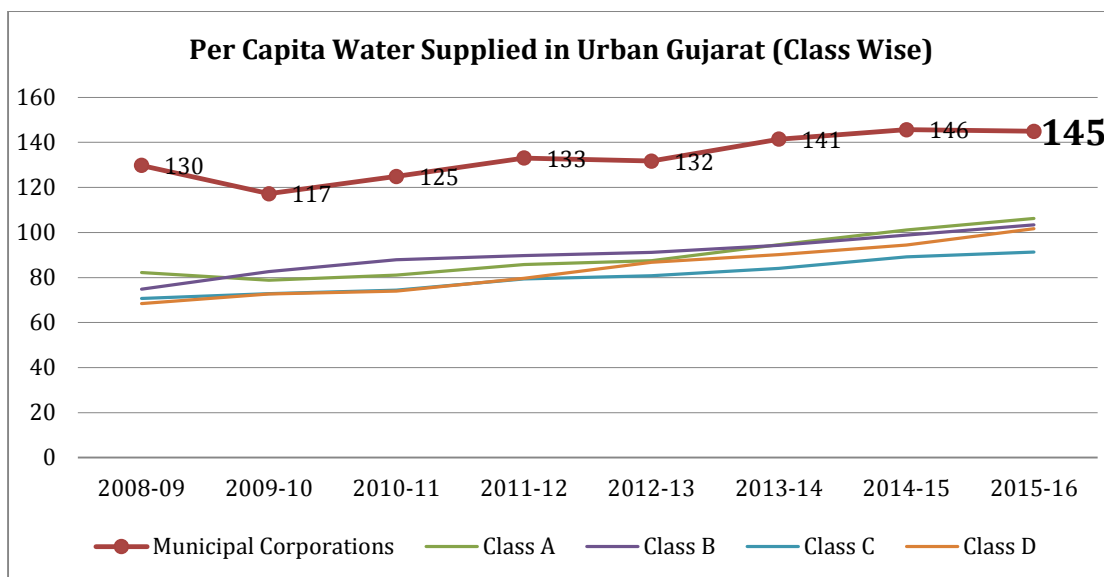
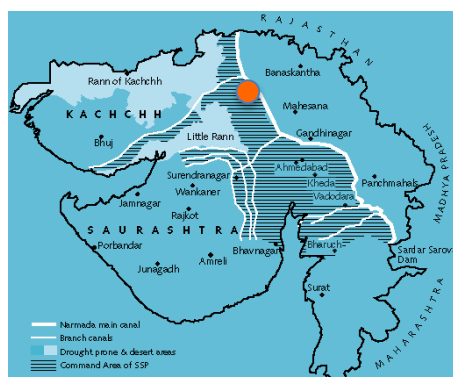


Figure 10: Per Capita Water Supplied in Gujarat by Class of Cities

No more water wars: The turnaround for Thara Municipality

Thara is a class municipality in North Gujarat with a population of 20,678. In 2009, the city was primarily dependent on ground water sources despite being in the over-exploited zone defined by Gujarat Water Resources Development Corporation (GWRDC), which is restricted for ground water extraction. The city was able to produce only 0.7 MLD of water, which was insufficient to cover its population of 20,000. The per capita water supplied per day was very low at 28lpcd. Water wars were a common phenomenon.

With the realization of the Narmada Canal Project in 2012, the water situation in the city was turned around. The city started sourcing 2MLD water from the Narmada canal, which increased to 5MLD in 2013, and 6MLD in 2015, simultaneously reducing its dependency on ground water. Today the city supplies close to 200litres per capita per day.



Case 1: Increasing per capita water supply: the turnaround for Thara Municipality

Continuity of Water Supply

Continuity of water supply is defined as the weighted average of number of hours of pressurized water supply per day for a zone. It has to be viewed in tandem with number of days the water is supplied in the cities. The continuity of water supplied in municipal corporations and Class A cities has reduced marginally, and it has remained the same in Class B, C, and D municipalities. The following table presents the data on continuity of water supply by class of cities for the last eight years.

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
State	1.8	1.8	1.9	1.9	1.9	2.1	2.1	1.6
Municipal Corporations	1.9	2.2	2.1	2.2	2.2	2.4	2.4	1.7
Class A	2.1	1.6	1.6	1.6	1.6	1.6	1.7	1.6
Class B	1.4	1.1	1.3	1.2	1.1	1.2	1.2	1.2
Class C	1.5	1.0	1.0	1.1	1.2	1.0	1.1	1.1
Class D	1.5	1.4	1.4	1.5	1.6	1.5	1.6	1.6

Table 3: Continuity of water supply by class of cities (2008 to 2015)

While the continuity of water has marginally decreased, most cities in Gujarat now supply water more days in a month as compared to 2009-2010. In 2009-2010, 70 cities were providing water for less than 15 days in a month. This has reduced to 64 cities in 2015-2016. SurendraNagar, Amreli, Gondal, Keshod and Modasa municipalities have significantly increased the number of days in a month that they supply water.

1.2.3. Operational Efficiency

Efficiency in redressal of complaints

An efficient complaints redressal system that allows citizens to lodge their complaints and provide feedback regarding municipal services is an important indicator of an efficient, responsive, and transparent ULB. The indicator for calculating efficiency in complaints redressal is based on the total number of water supply- related complaints redressed within 24 hours of receipt of complaint, as a percentage of the total number of water supply related complaints received in the given time period. The efficiency of redressal of complaints has marginally decreased across all classes other than class A municipalities.

	2008-09	2015-16	
	Average	Average	No. of cities showing < 75% efficiency
State	96	95	-
M. Corporations (8)	97	95	5
Class A (18)	92	93	12
Class B (33)	98	96	27
Class C (45)	95	93	32
Class D (63)	99	95	43

Table 4: Efficiency in redressal of water supply related complaints by class (2008-09 and 2015-16)

Efficiency in collection of water supply charges

Collection Efficiency is defined as the revenues collected in the current year expressed as a percentage of the total operating revenues, for the corresponding time period. In the absence of metered connections at the household level, most municipalities in Gujarat impose fixed water charges of Rs. 600 per household. The water charges are collected annually along with the property tax bill.

At the state level, the collection efficiency of water supply related charges has increased from 62.4% in 2008-09 to 71% in 2015-16. In the last eight years, all classes of cities have reported an increase in the collection efficiency of water supply related charges. Class B cities exhibit most progress with 20 percentage points.

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
State	62	60	80	64	70	71	71	71
Municipal Corporations	70	61	88	69	79	80	74	75
Class A	53	63	66	51	51	57	67	70
Class B	49	61	76	66	65	56	67	69
Class C	54	60	63	63	63	51	61	61
Class D	44	49	65	58	58	47	55	53

Table 5: Efficiency in collection of water supply charges by class (2008-2015)

Among class B cities, three cities (Unjha, Upleta, and Gondal) have been able to achieve a collection efficiency of more than 90%. Another 6 cities have a collection efficiency of more than 80%.

The following graph presents a comparison of collection efficiency among class A municipalities for the year 2016. Jetpur has achieved a collection efficiency of more than 95% in 2015-2016, a remarkable progress from a mere 45% in 2008-09.

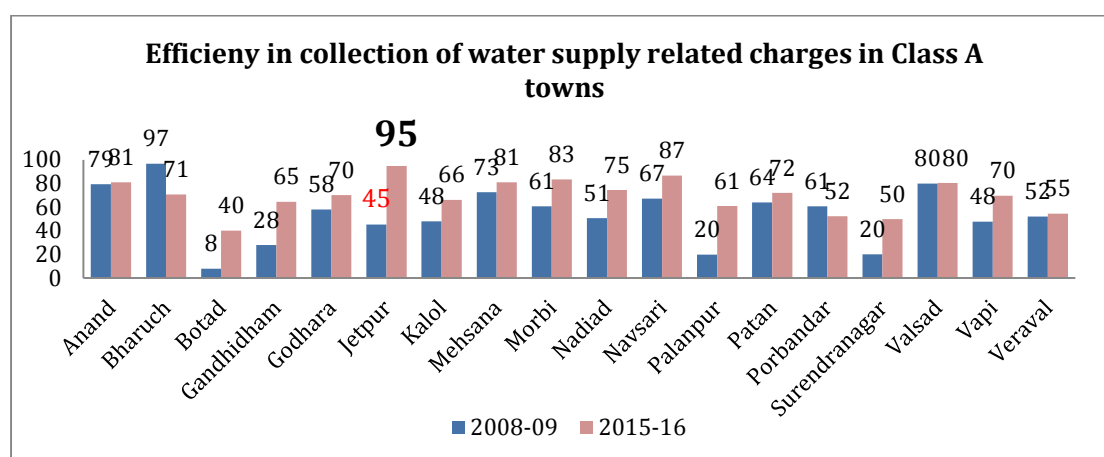


Figure 11: Collection efficiency (water supply) in class A municipalities

Among the 108 municipalities that fall in class C and D, 19 municipalities including Vyara, Mansa, Mandavi (Surat), and Lathi have achieved a collection efficiency of more than 80%.

Improving revenues collected as water supply charges: Lessons from municipalities in Gujarat

Several municipalities in Gujarat are making concerted efforts towards improving the amount of revenue collected as water supply related charges by increasing tariffs/introduce metering, and improving tax collection procedures. Initiatives from three cities are summarized below:

Mansa:

Mansa has undertaken a pilot project for installing water meters in households. Out of the total water received by the municipality through the bulk flow water system, 7.5% share is being distributed to homes. There are 150 properties that have water meters installed, 23 of these are residential properties (3 have been disconnected) and 124 are commercial buildings. In residential areas, the water is distributed at Rs 5 per 1000 ltr, while in commercial areas it is priced at Rs 7/10/15 based on the type of business. The bills are sent at regular intervals and given one month's time to pay off the bill. The city has also installed a bulk flow meter at the water source to accurately measure the amount of water it draws, and pay for it accordingly.

Unjha:

Unjha has consistently maintained a very high collection efficiency (more than 90%) over the last eight years. One of the key strategies that the city employs is the 'defaulters-first' approach. Defaulters (those that haven't paid their dues within the first three months of the new financial year), as well as the defaulters of the previous fiscal year are actively targeted. A notice (along with the pending bill with an additional 15 percent penalty) is sent to all defaulters. Also whenever a citizen approaches the municipality office for a service (seeking a document, registering a complaint etc.), the status of his tax payment is checked. If it is found pending, the person is first asked to first pay the past dues before his service request is processed.












Good administration, improved urban management practices, and full support of the elected wing has enabled Unjha to sustain this initiative over a long period of time, and has also helped retain citizens' faith in the municipality.

Chaya:

Chhaya municipality was once struggling with meeting the operational expenses that it incurred towards domestic water supply. To cover its water supply expenses, the civic body decided to increase residential water charges from Rs. 600 to Rs. 800 per household, which was approved by the elected wing. Involving elected councilors in the decision making process proved to an important aspect for the success of the program. Unfortunately decisions about increase in taxes almost often face opposition by residents. Elected representatives can play a vital role in informing and educating citizens, and building their confidence to view decisions like these as a positive change to wards improved services for citizens.

Case 2: Increased revenue collection (water supply): lessons from municipalities in Gujarat

2. Sanitation

Indicator	Unit	2008-09	2015-16	
Coverage of toilets	%	87	91	
Coverage of toilets in 'slum settlements'*	%	44	82	
Coverage of connections to sewage network	%	42	60	
Coverage of connections to sewage network in slums*	%	7	44	
Collection efficiency of sewerage network	%	46	56	
Sewage treatment capacity	%	60	64	
Cost recovery (O&M) in waste water management	%	56	77	
Quality of sewage treatment	%	46	56	
Extent of reuse and recycling of sewage	%	0.1	3.3	
Efficiency in redressal of customer complaints	%	92	94	
Efficiency in collection of sewerage related charges	%	47	76	

* The average figure for coverage of toilet in slums, does not include municipal corporations



Significant progress
(More than 15%)



Sufficient progress
(5- 15%)



Marginal progress
(Less than 5%)

2.1. Gujarat State Scenario

2.1.1. Emphasizing individual sanitation

With the launch of Swaccha Bharat Mission (SBM), the Government of India has set an ambitious goal of making urban India open-defecation free in the next five years. The SBM has provided an impetus to cities and towns to undertake sanitation improvements. Leveraging this national thrust towards improving sanitation, the Urban Development and Housing Department, Government of Gujarat announced the Mahatma Gandhi Swachhata Mission (MGSM) in January 2015. The MGSM envisions achieving OD-free cities and villages in Gujarat, and fulfilling the objectives of the SBM by consolidating all water and sanitation related programs in the state under one umbrella body. The Government of Gujarat emphasizes facilitating construction of individual toilets in all households to achieve the objectives of the SBM. Even before the launch of MGSM, the Gujarat state government provided financial assistance to ULBs to foster construction of individual toilets in their cities under the NGSY. As a result, access to individual toilets in the state (specifically in slums) has significantly increased. This is reflected in the coverage of toilets, which was reported to be 91% for 2015-2016.

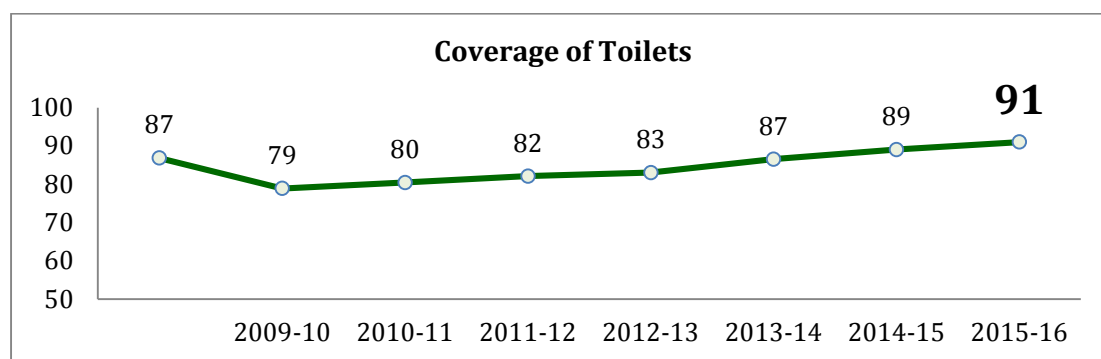


Figure 12: Yearly trends in coverage of toilets in Gujarat

Swaccha Bharat, Swaccha Gujarat: Facilitating individual toilets in the State under Mahatma Gandhi Swachhata Mission and SBM

With the launch of Swaccha Bharat Mission (SBM), the Government of India has set an ambitious goal of making urban India open-defecation free in the next five years. Leveraging this national thrust towards improving sanitation, the Urban Development and Housing Department, GoG announced the MGSM in January 2015. SBM & MGSM have provided an impetus to cities in Gujarat to undertake sanitation improvements. The Government of India provides a financial incentive of Rs.4,000 per household per the guidelines of SBM to individual households to construct toilets. GoG provides an additional incentive of Rs.8,000 under MGSM.

Till date, under SBM, GoG has provided subsidies worth Rs. 162 Crore to cities in Gujarat, and facilitated the construction of a total of 4,03,713 individual toilets, the highest in the country. (Source MGSM)

Case 3: Facilitating construction of individual toilets under SBM and MGSM

2.1.2. Wastewater Collection, Conveyance & Treatment

The Government of Gujarat's emphasis on centralized sewage collection and treatment systems is evident. The GWSSB has been undertaking water supply and sewerage projects in rural and urban areas since the early 80s. The capital costs for these projects came from a combination of sources including loans from donor agencies, state government funds and local government funds.

Currently, 60% urban households in the State are connected to an underground sewage network. Out of 167 ULBs, 59 cities now have some extent (more than 15%) of underground drainage network (as compared to 43 in 2008-09). 96 cities, primarily in the South Saurashtra region still don't have a sewage network.



L: STP in construction in Jamnagar, R: laying of UGD lines in Vadodara

While the state has done well in expanding the coverage of underground network, waste water treatment systems need to be significantly improved and augmented. Out of the 59 cities that have some percentage of sewage network, only 16 have a functional sewage treatment facility. Out of these 20 ULBs, only 6 cities (5 municipal corporations and 1 municipality (Valsad)) use high-level sewage treatment technology (ASP, UASB) while the remaining 15 cities use pond based systems. 4 pond based treatment systems are not functional, and the remaining are also not being used efficiently. GoG has plans to replaced them with STPs. In 4 municipalities (Himmatnagar, Kathlal, Patan and Siddhpur), STPs have been constructed and commissioned by GUDC. These are expected to become functional by 2017.

Key highlights

- 8 ULBs out of 167 ULBs in the state have more than 75% coverage of underground sewage network.
- In 2008-2009, 117 cities were entirely dependent on on-site sanitation systems for disposal of wastewater. This has reduced to 96 in 2015-2016.
- The sewage treatment capacity in the state has increased from 2822 in 2009-2010 to 3362 MLD in 2015-16

2.2. Class Wise Thematic Assessment

2.2.1. Coverage of Toilets

As part of MGSM, the State Government has laid a huge thrust on increasing access to toilets for all, and reducing open defecation in cities. Municipal corporations in the State have achieved maximum coverage of toilets (93%). The average toilet coverage in municipalities is 87%. 26 municipalities in the State report a coverage of less than 75% in 2015-16.

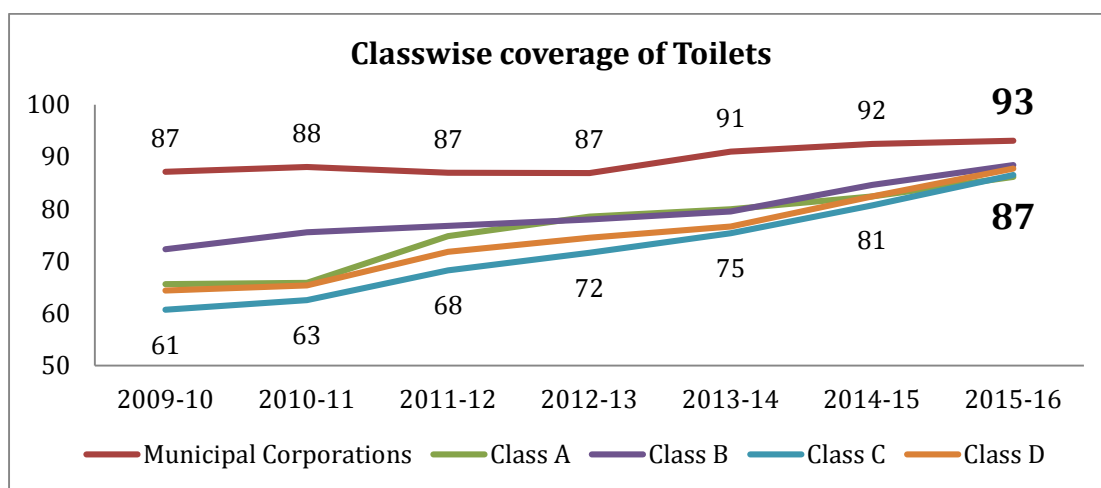


Figure 13: Coverage of toilets by class (2009 to 2015)

The coverage of toilets in slum areas has also significantly improved. On an average, the municipalities exhibit a toilet coverage of 82% in slums. Class C and D municipalities have doubled the coverage of toilets in slums in the last eight years. Five cities in the state (Jaffrabad, Khambaliya, Vyara, Savarkundla, and Amreli) report coverage of less than 50% in slums.

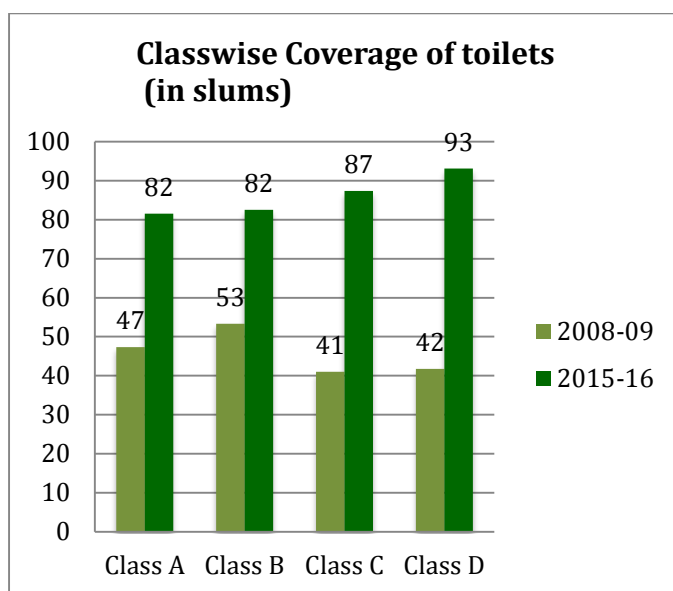


Figure 14: Coverage of toilets in slums by class of municipalities (2008 and 2015)

2.2.2. Access to wastewater disposal systems

Coverage of sewerage network

Even with the state government push towards construction of underground drainage systems in all cities in the last few years, no class of municipality has yet reached and average coverage of 50%. There is a significant difference in coverage of underground sewerage network between municipal corporations and municipalities. Among municipal corporations, Bhavnagar, Jamnagar, Junagadh are still lagging behind with coverage of less than 50%.

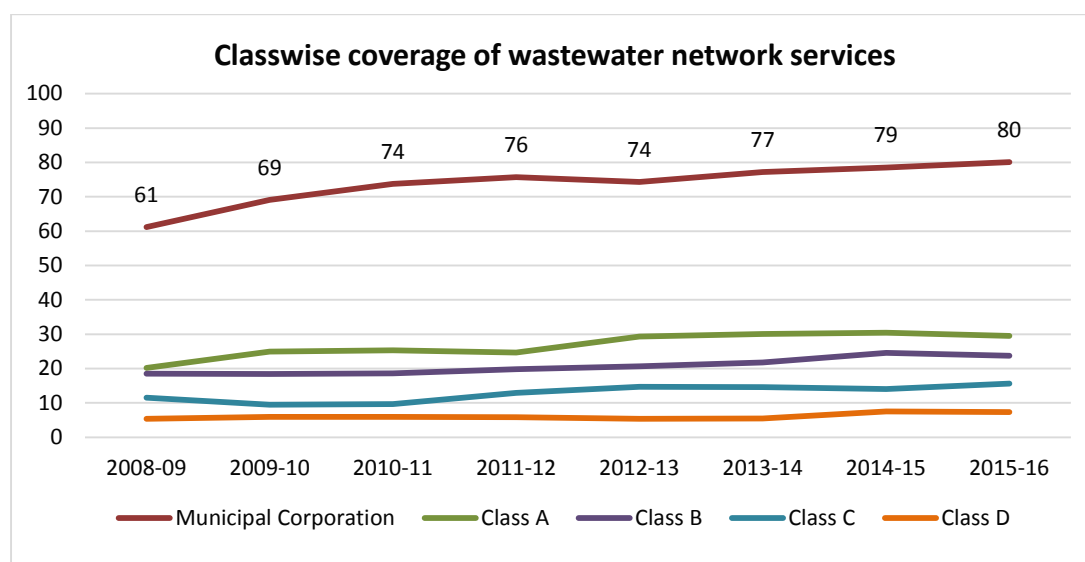


Figure 15: Coverage of sewerage network by class (2008 to 2015)

In 2015-2016, 7 municipalities in the state have achieved a relatively expansive sewerage system (more than 75% coverage). These include Navsari, Nadiad, Kallol (Class A), Vijalpore (Class B), Vallabh Vidhya Nagar, Gariyadhar (Class C), and Kansad (Class D). In the last eight years, 17 other municipalities have shown a significant progress in increasing the coverage of underground drainage network.

		UGD Coverage	
	Municipality	2008-09	2015-16
1	Palanpur (A)	5%	53%
2	Dabhoi (B)	0%	56%
3	Dholka (B)	0%	26%
4	Kadi (B)	0%	54%
5	Visnagar (B)	0%	32%
6	Gariyadhar (C)	20%	83%
7	Karamsad (C)	0%	63%
8	Mansa(C)	0%	44%

		UGD Coverage	
	Municipality	2008-09	2015-16
9	Padra(C)	0%	51%
10	Dakor (D)	0%	38%
11	Gandevi (D)	0%	50%
12	Mandvi_Surat (D)	0%	35%
13	Oad (D)	0%	55%
14	Rapar (D)	0%	30%

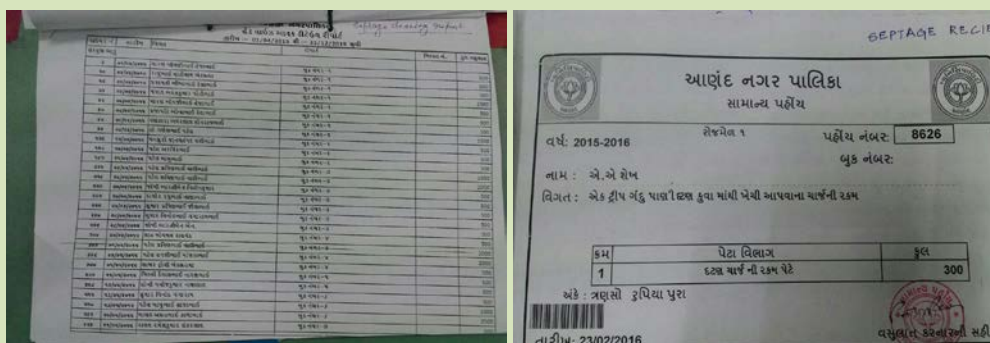
Table 6: Municipalities that have shown significant increase in coverage of sewerage network

Management of On Site Sanitation Systems

Most municipalities in the state are still largely dependent on onsite sanitation solutions such as septic tanks and deep pits for disposal of wastewater from toilets. However, systems for safely cleaning the septic tanks/pits and adequately treating and disposing the faecal sludge are non-existent or inadequate.

132 cities in Gujarat provide septic tank/ pit cleaning as a municipal service. However, the number of septage sucking machines in several cities is inadequate. Most municipalities also do not maintain updated records of the properties with OSS that are serviced through the city's septage management system. The fecal sludge that is collected from the onsite systems is disposed in water bodies or on dumpsites without any treatment. There is no incidence of farmers acquiring/ using this collected septage as manure in their fields.

Towards improved fecal sludge management: data recording and management in Khedbrahma and Anand



Khedbrahma and Anand municipalities in Gujarat maintain detailed receipts of the septic tank emptying services that they provide. Khedbrahma has 1 septage sucking machines that is provided by GUDC. The ULB maintains a daily register of properties that it services (for cleaning and emptying of septic tanks and pits). On an average the city processes, 5 service requests in a week. The charges range from Rs. 500 to Rs. 2000 per service. In the period of 8 months between 1st April 2015 and 31st December 2015, the ULB emptied 155 septic tanks in the city.

Recording and maintaining such data on cleaning and emptying of septic tanks/ pits is the starting point for building an updated database on the properties dependent on on-site-sanitation systems. Unfortunately, currently the ULB does not record the addresses of these properties. Maintaining location data can help cities formulate local/ ward level plans for desludging/ septage management systems, coupled with a strong spatial monitoring system.

Case 4: Improved data recording for septage management

Coverage of sewerage network in slums

The overall coverage of sewerage network in Gujarat in 2015-16 is 74.8%. The coverage in slums however is still limited at 36.6%. Of the 59 ULBs that have a partial sewer system, 45 cities have reported some level of coverage in slums. The following table shows municipalities have reported more than 50% coverage (overall) but less than 25% coverage in slums.

Class	Cities with >50% coverage of UGD, but <25% coverage in slums
Class A	Navsari, Palanpur
Class B	-
Class C	Gariyadhar, Karamsad
Class D	Umargam

Table 7: Cities exhibiting poor coverage of sewerage connections in slums

2.2.3. Level and Quality of Service of Sewerage System**Collection efficiency**

Collection efficiency is defined as the quantum of wastewater collected (at the inlet of treatment facility) as percentage of normative total waste-water generated in the ULB. The following table shows the collection efficiency (for 2015-2016) in cities that have reported a functional sewage treatment facility.

	Class	Name of City	Collection Efficiency
1.	MC	Ahmedabad	100%
2.	MC	Gandhinagar	97%
3.	MC	Rajkot	68%
4.	MC	Surat	99%
5.	MC	Vadodara	84%
6.	A	Morbi	64%
7.	A	Patan	45%
8.	A	Valsad	32%
9.	B	Himmatnagar	25%
10.	B	Petlad	15%
11.	B	Unjha	76%
12.	C	Balasinor	32%
13.	C	Karamsad	86%
14.	C	Mandavi	44%
15.	D	Anklav	30%
16.	D	Mandavi_S	57%

Table 8: Collection efficiency (wastewater) in cities that have a functional sewage treatment facility

Municipal corporations, on an average exhibit higher collection efficiency than municipalities. Among municipalities, Karamdad, Unjha, and Mandvi (Surat) have reported collection efficiency higher than 50% in 2015-2016.

Adequacy of sewage treatment capacity

This indicator reflects the capacity to treat quantum of wastewater to secondary treatment standards (removal of BOD and COD) as a percentage of total estimated wastewater generated in the ULB.

Among municipal corporations, Jamnagar, Bhavnagar, and Junagadh do not have a functional sewage treatment plant. Gandhinagar is the only city that exhibits an increase in the treatment capacity (that is they have augmented their facilities). All other municipal corporations show a decrease in the last eight years.

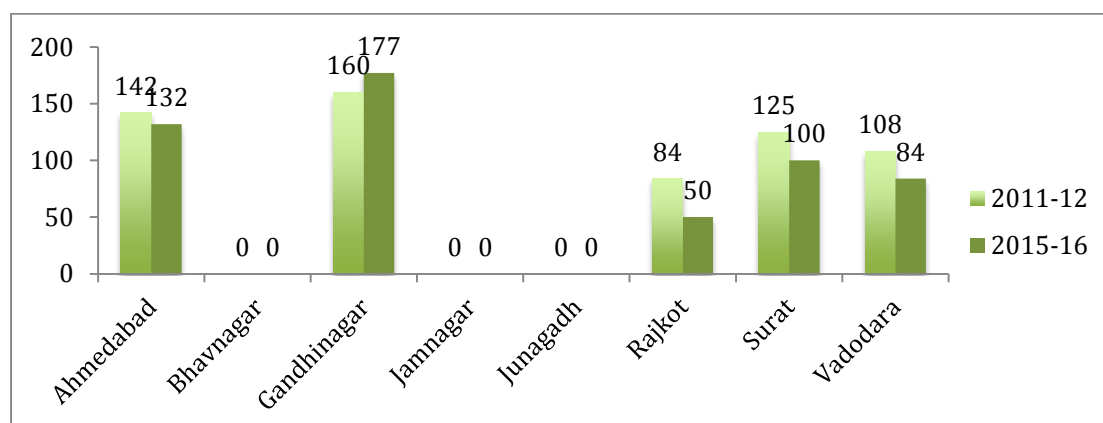


Figure 16: Adequacy of wastewater treatment capacity in municipal corporations (2011 and 2015)

Currently Ahmedabad and Gandhinagar municipal corporations exhibit sewage treatment capacity of more than 100%. This indicates that their sewage treatment facilities have been designed in mind the future demand. In the last eight years, the sewage treatment capacity in Surat has reduced from 125% to 100%. Though, currently Surat is able to treat all the wastewater that the city generates, it will have to augment its treatment capacity to cater to the growing population in the coming years. Rajkot and Vadodara have a treatment capacity of 50% and 84% respectively. Not all wastewater generated in these cities hence is being adequately treated.

Efficiency in redressal of complaints

All class of municipalities have consistently maintained a 90% or above efficiency in redressal of sanitation related complaints. Class B and D municipalities have the highest efficiencies at 98 and 97% respectively. All class of municipalities (other than municipal corporations) have improved efficiency in redressing complaints.

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
State	92	95	95	95	93	93	92	94
MC	95	98	97	98	93	92	92	93
Class A	91	81	81	84	91	93	92	95
Class B	87	92	91	94	96	94	93	98
Class C	90	95	95	95	94	93	95	96
Class D	81	96	97	98	95	96	96	97

Table 9: Efficiency in redressal of sanitation related complaints

Efficiency in collection of sewage related charges

An efficient collection system is critical to the long term financial sustainability any urban service. Collection Efficiency is defined as current year revenues collected from sewerage related taxes and charges, expressed as a percentage of the total operating revenues, for the corresponding time period.

100 ULBs in Gujarat do not levy any sewerage tax. Of the ULBs that levy a sewerage tax, 30 ULBs have a collection efficiency of more than 75%. As the graph indicates, all class of cities in the state have significantly increased their collection efficiency of sewage related charges in the last eight years.

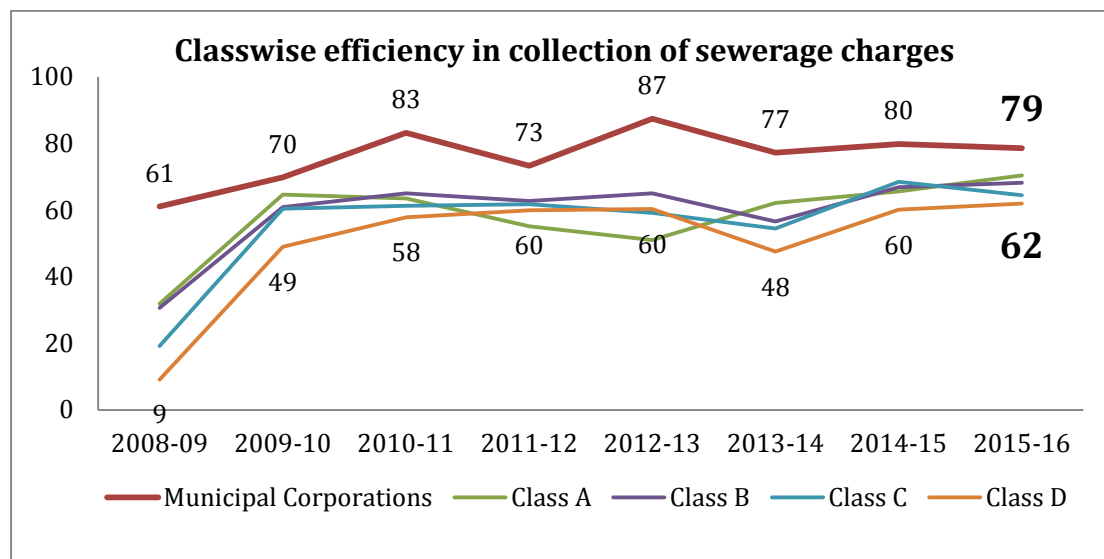







Figure 17: Yearly trends in collection efficiency of sewerage related charges (by class)

Class	Name	Collection efficiency
MC	Rajkot	76
MC	Surat	85
MC	Vadodara	98
A	Anand	88
A	Mehsana	88
A	Nadiad	86
A	Navsari	91
A	Patan	79
A	Valsad	90
B	Bardoli	98
B	Bilimora	94
B	Dabhoi	76
B	Himmatnagar	100
B	Kadi	79
B	Palitana	99

Class	Name	Collection efficiency
B	Petlad	77
B	Siddhpur	77
B	Unjha	94
B	Vijalpore	92
C	Dehgam	90
C	Gadhda	86
C	Halol	75
C	Jafrabad	80
C	Mandavi	90
C	Mansa	91
C	Padra	82
C	V.Vidyanagar	93
D	Dharampur	97
D	Gandevi	92
D	Mandavi_S	87

Table 10: Cities with 75% or higher collection efficiency of sewerage related charges

3. Solid Waste Management

Indicator	Unit	2008-09	2015-16	
Household level coverage of SWM services	%	80	95	
Household level coverage of SWM services in 'slum settlements'*	%	56	50	
Efficiency of collection of municipal solid waste	%	85	97.0	
Extent of segregation of municipal solid waste	%	12	8	
Extent of municipal solid waste processed/recycled	%	21	18	
Extent of cost recovery (O&M) in SWM services	%	42	47	
Extent of scientific disposal of municipal solid waste	%	3	8	
Efficiency in redressal of customer complaints	%	98	96	
Efficiency in collection of SWM related charges	%	55	70	

* The average figure for coverage of toilet in slums, does not include municipal corporations



Significant progress
(More than 25%)



Sufficient progress
(10- 25%)



Marginal progress
(Less than 10%)

3.1. Gujarat State Scenario

Collecting, processing, transporting and disposing this municipal solid waste (MSW) is the responsibility of urban local bodies (ULBs). As per the Municipal Solid Waste (Management & Handling) Rules, 2000, waste should be collected in a segregated manner with categories including organic/ food waste, domestic hazardous waste, recyclable waste and silt and construction and demolition waste. Waste recovery should be maximized through recycling of dry waste and processing of wet waste into compost/ energy and transportation and disposal of waste should be undertaken in a safe and scientific manner.

In Gujarat, the estimated solid waste generation in 2015-2016 was 3.55 million MT or about 12000 MT per day. Close to 75% of this municipal waste is generated in Ahmedabad and Surat Municipal Corporations. Most urban local bodies in Gujarat have been able to achieve good coverage of door-to-door services (95.1%) but the extent of waste segregation and recovery is still low, at 7.9% and 18.1% respectively.

3.1.1. Coverage of Door-to-Door Waste Collection

All cities in the State have established a robust waste collection system. 155 cities in the state have now achieved more than 90% coverage of waste collection as compared to 61 cities in 2008-2009.

Municipalities in the state have also shown a remarkable progress in increasing the coverage of waste collection in slum areas, where the coverage 41% in 2008-09 to 87% in 2015-2016. Out of the 120 ULBs with 100% coverage of door-to-door collection, 94 have achieved a 100% coverage in slums as well. In 2015-2016, all cities in the state have coverage higher than 50%. In 2008-2009, 20 cities had less than 50% coverage of door-to-door collection services.

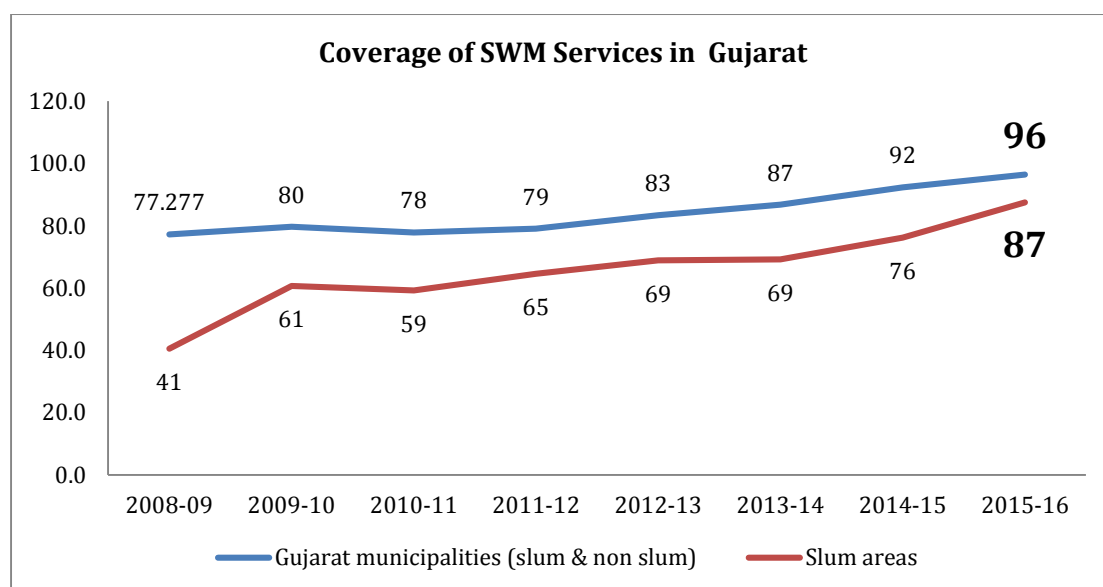


Figure 18: Increase in coverage of waste collection (overall and slums) in municipalities of Gujarat



L: Waste collection in Ramapir no tekro slum in Ahemdabad, R: Waste collection vehicles in Nadiad

3.1.2. Waste processing and recovery

The Government of Gujarat has undertaken several initiatives (include preparation of a state-wide Zero Waste Policy and initiating solid and liquid waste management projects in ULBs in the State) under the MGSM to ensure that cities in Gujarat move towards more sustainable solid waste management practices. However, the state's performance in terms of waste processing and recovery has remained dismal.

Enforcing segregation of wet and dry waste at source is critical to ensuring an efficient and sustainable system of waste recovery and processing. However most cities in Gujarat do not practice segregated waste collection, and the mixed waste is directly transported to processing sites (very often located at the open dump site). Cities like Ahemdabad, Dharampur, Navsari had started waste segregation initiatives but most of these have dwindled and were not able to sustain beyond a few months.

The extent of waste recovery in Gujarat has declined to 18%. 81 cities in Gujarat have waste processing plants, which were constructed by Gujarat Urban Development Misison (GUDM) and contracted out to without little consultation from ULBs. 70 of the 81 plants are vermi- composting plants. Over the years, local bodies found it difficult to operate and maintain these plants and hence most of them fell into disrepair and not in use. 75 waste processing plants in the state are currently not functional. As a result, only 25 cities in the state show a waste recovery of more than 25%.

Only 8% of all waste generated in the state is scientifically disposed in landfills. The extent of scientific disposal has almost doubled for municipalities in the last eight years (5% to 12%). No municipality in the state has a scientific landfill. All cities dispose the solid waste in open dump sites.

3.2. Class Wise Thematic Assessment

3.2.1. Access and Coverage

Over the past 8 years, all classes of cities have increased the coverage of solid waste collection. In 2015-2016, class D municipalities exhibited the highest (99%), and class B municipalities exhibited the lowest (93%) coverage among all class of cities. 121 cities have achieved 100% coverage of door-to-door waste collection. Out of this 6 are municipal corporations, 14 are class A, 21 are class B, 33 class C, and 47 are class D municipalities.

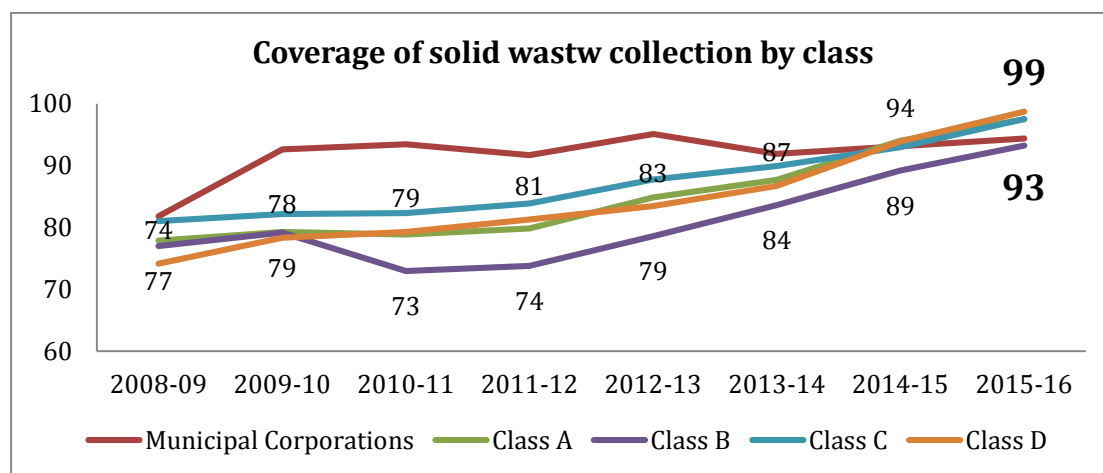


Figure 19: Class wise coverage of solid waste collection (2008-2015)



Deployment of smaller vehicles (*chota hathis*) for door-to-door collection

It is observed that larger vehicles are not efficient for door-to-door collection, especially in smaller cities where the urban fabric comprises of densely built communities with narrow lanes. To help cities service these households better, in 2013, the GUDC provided all municipalities with smaller collection vehicles (*chota hathis*), each with a capacity of 0.5T. Each city received between 3 to 5 vehicles based on its population. This has greatly helped the ULBs increase the coverage of solid waste collection service and reach areas, which were earlier left un-served.

Case 5: Smaller vehicles for more effecient door-to-door collection

Urban Management Centre (UMC)

Coverage of solid waste management services in slums

Municipalities in Gujarat have also achieved a comparable coverage of solid waste collection even in slum areas. Other than class A municipalities, all classes have achieved an average of more than 85%. 95 ULBs in the state have achieved 100% coverage of door-to-door waste collection in slums.

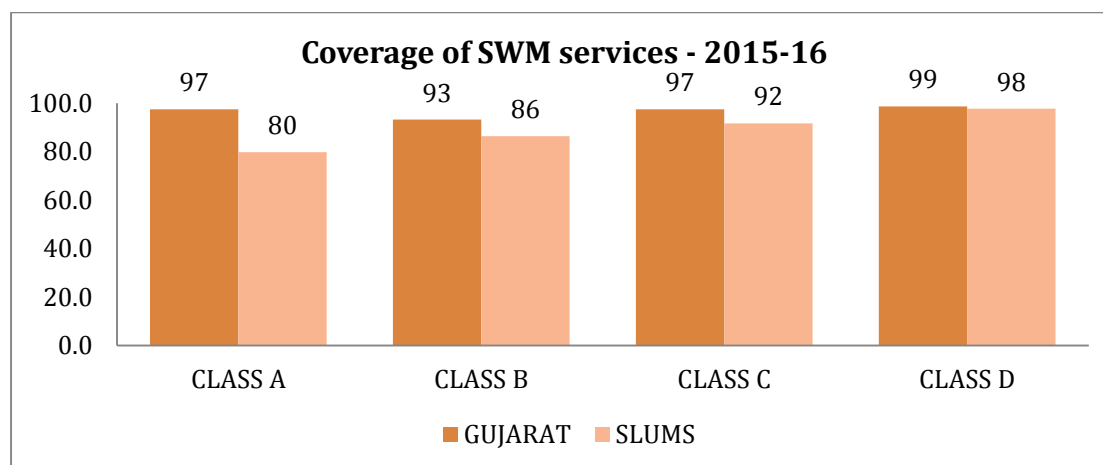


Figure 20: Comparison of coverage of waste collection in slum & non slum areas by class (2015-2016)

3.2.2. Level of Service and Operational Efficiency

Collection efficiency

Efficiency of collection of MSW is defined as the percentage of total waste collected by ULB and/or authorized service providers out of the total waste generated within the ULB limits. The average collection efficiency in the state has increased by 12 percent points in the last eight years.

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
State	85	94	95	93	94	97	96	97
Municipal Corporations	83	96	97	92	94	97	96	97
Class A	88	92	91	95	94	97	97	98
Class B	90	92	93	95	95	95	96	96
Class C	87	91	90	95	93	92	94	96
Class D	86	92	92	95	94	95	95	97

Table 11: Collection efficiency of solid waste management (2009-2016)

ULBs with 100% collection efficiency in solid waste management	
MC	Rajkot
A	Navsari, Patan, Surendranagar, Vapi
B	Keshod, Okha, Palitana
C	Bavla, Dhandhuka, Mehamdabad, Radhanpur, Ranavav, VV Nagar
D	Chalal, Chotila, Dhanera, Kathlal, Mahudha, Santrampur, Sutrapad, Tharad, Vijapur

Table 12: Cities with 100% collection efficiency in SWM in 2015-2016

Extent of waste segregation and recovery

Extent of segregation of MSW is defined as percentage of waste from households and establishments that is segregated. Minimum level of segregation is separation of wet and dry waste at the source i.e. at household or establishment level.

In 2015-16, 25 cities in the state have achieved a waste recovery of 25% or higher. 7 out of these 25 cities have achieved a waste recovery of more than 50%. Mansa and Vadnagar municipalities' have shown a significant increase in waste recovery since 2008-2009. Mansa has been processing its wet-waste at a vermin compost plant.

Class	Name	Extent of waste recovery in 2015-16	Extent of waste recovery in 2008-09
MC	Bhavnagar	64	NA
C	Dhandhuka	70	NA
C	Karjan	64	63
C	Mansa	77	41
C	Mehmadabad	78	NA
C	Vadnagar	83	50
D	Vanthali	55	50

Table 13: Cities with more than 50% waste recovery in 2015-2016



Vermicomposting plant at Mansa

Extent of Scientific Disposal

Only four ULBs (Vadodara, Rajkot, Surat and Ahmedabad) dispose solid waste in scientific landfills. In 2015-2016, 11.8% of the whole waste generated from these four cities was scientifically disposed.

3.2.3. Financial Management

Cost Recovery

Extent of cost recovery denotes the extent to which the ULB is able to recover all operating expenses related to SWM services from operating revenues of source related to exclusively to SWM, which is defined as the total annual operating revenues from SWM as a percentage of the total annual operating expenses on solid waste management.

All municipal corporations in the state collect the solid waste management tax as part of the annual property tax collection. The SWM tax is 15% of the property tax. This allows the municipal corporations to recover significant portion of the operating costs. The average cost recovery for municipal corporations has increased from 50% in 2008-2009 to 62% in 2015-2016, which is a positive trend.

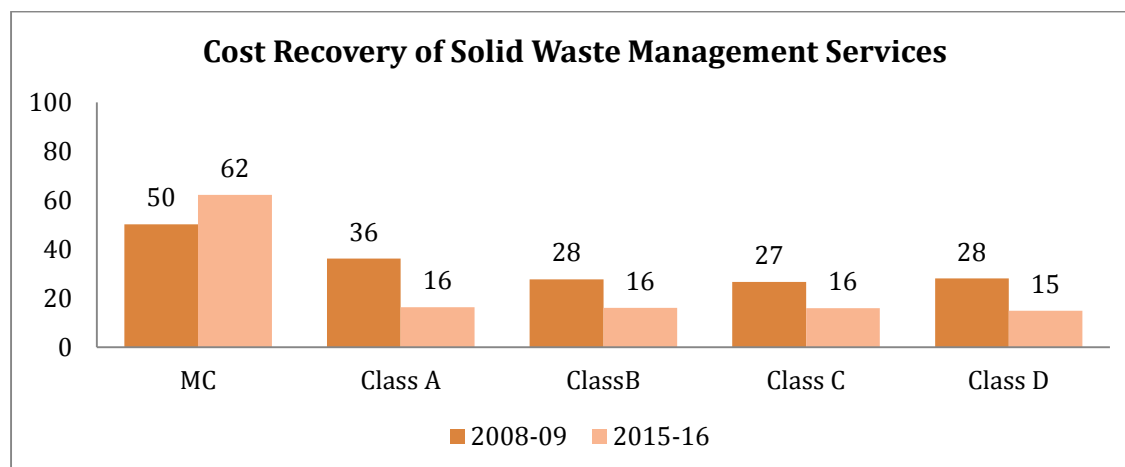


Figure 21: Cost recovery of solid waste management (2009 and 2016)

The extent of cost recovery for municipalities in the state is generally poor. Most municipalities impose an annual SWM tax based at flat rate, which is set very low (between Rs. 5 to Rs. 100). In the last eight years, with increasing door-to-door coverage, municipalities have incurred increasing operating expenses (in terms of staff and equipment costs). However, in comparison, the amount of tax collected has been miniscule. All class of municipalities therefore exhibit a decreasing trend in cost recovery in the solid waste management sector.

SWM charges (in Rs.)	Number of Cities	
	2009-10	2015-16
5 to 50	27	28
50 to 250	92	103
250 to 500	5	3
500 to 1000	2	0
> 1000	0	1

Table 14: SWM charges levied in municipalities of Gujarat

Efficient Solid Waste Management: Lessons from Surat Municipal Corporation

Surat Municipal Corporation has undertaken excellent initiatives in efficient solid waste management. These include

- Ensuring 100% primary collection
- Night sweeping in areas which are extremely crowded during the day
- Efficient transportation by constructing transfer stations
- Levying user charges that has ensured almost 100% cost recovery
- Establishing a robust monitoring system and imposing administrative charges on offenders.

Surat Municipal Corporation conducted a detailed micro-planning exercise to design routes and develop collection schedules. This exercise was conducted by sanitary Inspectors at the ward level. The exercise involved identifying waste generators and bulk waste generators, and then estimating the quantity of waste generated on each street. Based on this information, the SMC staff developed route designs identifying the locations vis a vis the time of collection.

This micro planning exercise also brought to light the need for night sweeping. There were many roads in the city which were difficult to sweep during the day due to heavy traffic. These routes were identified and a night cleaning schedule (10:00 pm to 2:00 am) was prepared for them.

Surat has also invested in transfer stations across the city. Surat currently has six transfer stations and three more are proposed. Depending on their locations and sizes, these transfer stations receive 150-450 metric tons of waste per day.

SMC is also the only municipal corporation that levies user charges for solid waste management in compliance with the GoI reforms. Prior to 2009, the ULB charged conservancy tax, which was levied as a percentage of the property tax. The SWM user charge is levied as a flat rate based on the building use such as residential or commercial or industrial use. SMC charges a user charge of Rs. 50 per residential property. This charge is part of the consolidated property tax bill levied by SMC annually. Surat corporation has a very efficient system of property tax collection; this ensures an efficient recovery of SWM user charges as well.



Case 6: Efficient Solid Waste Management System: Lessons from Surat Municipal Corporation

Urban Management Centre (UMC)

4. Storm Water Management

Indicator	Unit	2008-09	2015-16
Coverage of storm water drainage network	%	36	70
Incidence of water logging/ flooding	%	-	-

The average coverage of storm water drainage network in the state is low at 32%. However, all classes of cities show an improving trend in the last eight years. Among various classes of cities, municipal corporations have achieved the highest coverage in 2015-2016 at 39% followed by class A municipalities at 30%. All other classes of municipalities have an average coverage below 20%.

	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
State	14	21	21	30	29	32	32
Municipal Corporation	15	28	27	37	36	40	39
Class A Cities	22	22	17	27	23	30	30
Class B Cities	7	10	9	12	13	16	17
Class C Cities	4	4	6	8	9	10	10
Class D Cities	8	8	10	12	10	11	11

Table 15: Coverage of storm water network in cities of Gujarat

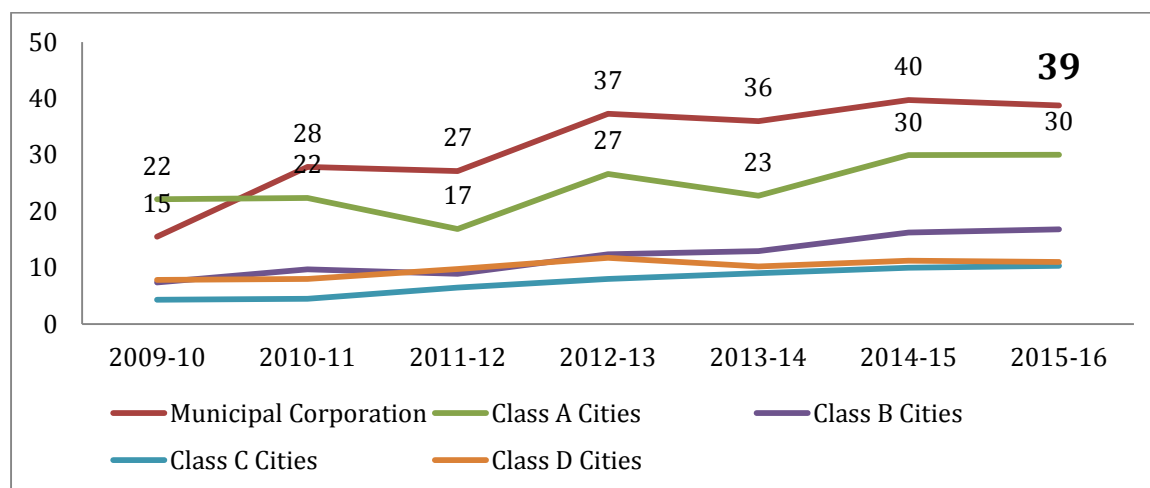


Figure 22: Yearly trends in storm water coverage by class

9 cities in the state have achieved a storm water coverage of more than 50%. 5 out of these have achieved a coverage of more than 75%. These include Porbandar, Vapi, Upleta, Vadhwani, and Valabh Vidhya Nagar.

5.A Note on Data Reliability

The performance measurement is only as reliable for meaningful management decisions as the systems that generate the data to compute the performance. The handbook of service level benchmarking developed by MoUD specifies four levels of reliability of data systems: 'A', 'B', 'C', and 'D,' with 'A' being of highest reliability and 'D' being lowest. This section analyses how the reliability of data collected under the PAS program has improved (if at all) in the last eight years.

Cities in Gujarat have a fairly robust property tax collection system. All indicators that are derived from this database (specifically coverage of water supply, sewerage, and solid waste management, and collection efficiency of user charges/ taxes in each of these sectors), thus can assumed to be fairly reliable.

The cities however fare low on reliability (bands C and D) for other indicators that are derived based on regular surveys and more accurate measurement. For instance, in the water supply sector, most cities still fare in reliability band D for the indicator per capita water supply, as no cities have installed bulk flow meters to measure the quantity of water at the outlet of treatment plants.

The reliability of indicators for redressal of customer complaints can be improved by computerizing the public grievance redressal system. Most cities in Gujarat are currently recording and managing grievances and complaints manually.

In the last eight years, the reliability of key performance indicators has not improved much. Most cities still fall in reliability band C and D for almost all indicators. As part of the performance improvement processes, UMC had worked with Vadodara Municipal Corporation to prepare an Information system improvement plan that would help the city collect more accurate data and establish systems for better monitoring and management. If implemented, the plan would enable VMC to achieve reliability A for all urban water and sanitation indicators.

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