



Executive Summary

Equity in Service Delivery of Urban Water and Sanitation in Maharashtra

Results from Household Survey

Submitted to:
PAS Project
CEPT University

Prepared by:
ORG Centre for Social Research
AC Nielsen ORG MARG Pvt. Ltd.
July 2011

Executive Summary

Equity in Service Delivery of Urban Water and Sanitation

in Maharashtra

Results from Household Survey

July 2011

CONTENT

	Page No.
FOREWORD	
ACKNOWLEDGEMENT	
LIST OF ABBREVIATIONS	
EXECUTIVE SUMMARY	
CHAPTER 1 INTRODUCTION AND METHODOLOGY	
1.1 URBAN WATER SUPPLY AND SANITATION – A BACKGROUND	2
1.2 INTRODUCTION TO THE PAS STUDY	4
1.3 OBJECTIVES OF THE STUDY	4
1.4 METHODOLOGY FOR CONDUCTING THE SURVEY	5
1.5 PRE FIELD WORK ACTIVITIES	10
1.6 FIELD WORK ACTIVITIES	13
1.7 DATA PROCESSING	13
1.8 SAMPLE WEIGHTS	14
1.9 ORGANIZATION OF THE REPORT	14
CHAPTER 2 WATER SUPPLY SERVICES	
2.1 ACCESS TO MUNICIPAL WATER SUPPLY SERVICES	15
2.2 SERVICE LEVEL AND QUALITY OF MUNICIPAL WATER SUPPLY	27
2.3 COPING MECHANISMS AND COSTS RELATED TO MUNICIPAL WATER SUPPLY	60
BENEFICIARIES	
2.4 BILLING FOR WATER CHARGES	62
2.5 HOUSEHOLDS WHO HAVE REGISTERED A COMPLAINT ON WATER SUPPLY SERVICES	66
2.6 SUMMARY OF WATER SUPPLY BASELINE INDICATORS	66
CHAPTER 3 SANITATION SERVICES – EXCRETA DISPOSAL	
3.1 ACCESS AND COVERAGE	69
3.2 COSTS AND AFFORDABILITY	86
CHAPTER 4 MANAGEMENT SERVICES	
4.1 WASTEWATER DISPOSAL	89
4.2 SOLID WASTE DISPOSAL	92
CHAPTER 5 WATER QUALITY AND IMPACT ON HEALTH	
5.1 SUMMARY SHEET	98
5.2 QUALITY OF WATER	98
5.3 INCIDENCE OF DISEASES	101
CHAPTER 6 SUMMARY AND CONCLUSION	
6.1 WATER SUPPLY – CITIZEN FEEDBACK	103
6.2 SANITATION – CITIZEN FEEDBACK	108
6.3 SOLID WASTE AND WASTE WATER DISPOSAL – CITIZEN FEEDBACK	109
6.4 HEALTH OUTCOMES – CITIZEN FEEDBACK	110
6.5 HOUSEHOLDS WITH HIGHER LEVEL OF SERVICES	111
6.6 SUMMARY OF ISSUES BY CITY CATEGORY	112
BIBLIOGRAPHY	116
ANNEXURES	117

LIST OF TABLES

Table No.	Table Name	Page No.
Table 1.1	Proportion of Households Having Access to Piped Water Supply and Improved Individual Household Toilets	1
Table 1.2	Proportion of Households (Urban and Rural) Having Access to Improved Water Supply	2
Table 1.3	Proportion of Households Having Access to Piped Water Supply (Provisional Figures)	2
Table 1.4	Proportion of Households (Urban and Rural) Having Access to Toilet Facility	2
Table 1.5	Proportion of Households Having Access to Toilets (Provisional Figures)	2
Table 1.6	Category and Zone-wise Number of Cities - Maharashtra	5
Table 1.7	Distribution of Neighbourhoods Across Slum and Non-slum Areas - Maharashtra	6
Table 1.8	Distribution of Household Sample Across Slum and Non-slum Areas - Maharashtra	6
Table 1.9	Sample for Water Consumption Measurement Survey - Maharashtra	7
Table 1.10	Water Sample Collection - Maharashtra	8
Table 2.1	Main Source of Water by Purpose of Use (% of Households)	16
Table 2.2	Improved and Unimproved Sources of Water Supply - Maharashtra (% of Households)	18
Table 2.3	Main Source of Drinking Water (% of Households)	19
Table 2.4	Alternative Water Sources for Various Activities - Maharashtra (% of Households)	21
Table 2.5	Per Capita Daily Water Consumption (in Litres)	22
Table 2.6	Per Capita Water Consumption (in LPCD) with Respect to Water Sanitation Infrastructure	23
Table 2.7	Per Capita Water Consumption Activity-wise (in Litres)	24
Table 2.8	Type of Storage Arrangements - Maharashtra	29
Table 2.9	Average Capacity of the Large Storage Arrangements (in Litres) - Maharashtra	30
Table 2.10	Relation between Frequency of Supply and Presence of Storage Facility (% of Households)	32
Table 2.11	Relation between Size of Ferrule and Mean Water Consumption (LPCD)	33
Table 2.12 a	Size of Ferrule and Storage Capacity - % of Slum Households	34
Table 2.12 b	Size of Ferrule and Storage Capacity - % of Non-slum Households	35
Table 2.13	Adequacy of Pressure for Filling up Storage Arrangements - Maharashtra (% of Households)	36
Table 2.14	Households Using Either Handpumps or Booster Pumps to Fill the Storage - Maharashtra (in %)	37
Table 2.15	Place Where Booster Pump is Fixed - Maharashtra (% of Households)	38
Table 2.16	Weekly Supply of Water - Maharashtra (% of Households)	40
Table 2.17	Number of Supplies per Day - Maharashtra (% of Households)	40
Table 2.18	Timings of First Water Supply - Maharashtra (% of Households)	41

Table No.	Table Name	Page No.
Table 2.19	Hours of Water Supply in a Day - Maharashtra (% of Households)	42
Table 2.20	Reliability of Municipal Water Supply on Various Parameters - Maharashtra (% of Households)	43
Table 2.21	Households Receiving Municipal Water and Reporting Water 7 Days a Week in Different Seasons (in %)	44
Table 2.22	Households' Perception of Reliability Versus Presence of Storage Arrangement (in %)	45
Table 2.23	Households Reporting Water Quality to be Good on Various Parameters – Maharashtra (in %)	47
Table 2.24	Reasons for Purchase of Water - Maharashtra (% of Households)	48
Table 2.25	Regularity of Water Supply and Perception Regarding Quality - Maharashtra (% of Households)	49
Table 2.26	Water Purification Undertaken by Households – Maharashtra (% of Households)	51
Table 2.27	Type of Water Supply Vis-à-Vis Practice of Water Purification - Maharashtra (% of Households)	52
Table 2.28	Water Quality Perception & Practice of Water Treatment – Maharashtra (% of Households)	52
Table 2.29	Number of Households per Public Standpost - Maharashtra (in %)	54
Table 2.30	Distance (in Meter) of the Public Standpost from the Dwelling – Maharashtra (% of Households)	55
Table 2.31	Responsibility of Collection of Water - Maharashtra (% of Households)	56
Table 2.32	Time Spent in Collecting Water (Minutes/Day) from Public Standpost - Maharashtra (% of Households)	57
Table 2.33	Coping Mechanism in Case of Non-functionality of Water Source - Maharashtra (% of Households)	58
Table 2.34	Additional Monthly Costs Incurred on Purchase of Water Due to Shortage of Water Supply from Municipal Sources - Maharashtra	59
Table 2.35	Average Investment on Private Water Supply Infrastructure - Maharashtra (in Rs.)	60
Table 2.36	Recurring Costs on Water Supply Infrastructure – Maharashtra (in Rs.)	61
Table 2.37	Basis of Calculation of Water Charges – Users' Perception (% of Households)	63
Table 2.38	Annual Water Charges - Maharashtra	64
Table 2.39	Consequences of Non-payment of Water Bills - Maharashtra (% of Households)	64
Table 3.1	Improved and Unimproved Sanitation – Maharashtra (% of Households)	70
Table 3.2	Type of Sanitation Arrangements - Maharashtra (% of Households)	71
Table 3.3	Households with Individual Toilets - Maharashtra (% of Households)	72
Table 3.4	Type of Individual Toilets - Maharashtra (% of Households)	74
Table 3.5	Households That have Undertaken Cleaning of Septic Tanks/Pits - Maharashtra (in %)	75
Table 3.6	Responsibility of Cleaning of On-site facilities - Maharashtra (% of Households)	76
Table 3.7	Awareness Regarding Place of Disposal of Septage (% of Households)	77
Table 3.8	Households Dependant on Shared Facility - Maharashtra (in %)	77
Table 3.9	Type of Shared Toilet Facilities - Maharashtra (% of Households)	78
Table 3.10	Frequency of Cleaning of Septic Tanks of Shared Facility (% of Households)	78

Table No.	Table Name	Page No.
Table 3.11	Proportion of Households Incurring Cost for Cleaning Shared Toilets (in %)	79
Table 3.12	Responsibility of Cleaning and Maintenance of Shared Toilets - Maharashtra (% of Households)	80
Table 3.13	Slum Households Using Community Toilets- Maharashtra (in %)	81
Table 3.14	Type of Community Toilets Used Among Slum Households - Maharashtra (% of Households)	81
Table 3.15	Distance (in Meters) of Community Toilets from Home at Slum - Maharashtra (% of Households)	82
Table 3.16	Maintenance of Community Toilets (% of Households)	82
Table 3.17	Perception of Users Regarding Community Toilets - Maharashtra (% of Households)	83
Table 3.18	Type of Facilities in Community Facilities in Maharashtra (% of Households)	83
Table 3.19	Reasons for Not Having Individual Toilets - Maharashtra (% of Households)	84
Table 3.20	Practice of Open Defecation - Maharashtra (% of Households)	84
Table 3.21	Cost Incurred (Annual in Rs.) in Cleaning Individual On-site Facility - Maharashtra (% of Households)	85
Table 3.22	Cost Incurred Annually (in Rs.) for Maintenance of Shared Toilet (% of Households)	86
Table 3.23	Monthly Cost Incurred for Usage of Community Toilet Facility - Maharashtra	86
Table 4.1	Type of Drainage Network - Maharashtra (% of Households)	89
Table 4.2	Frequency of Cleaning up the Drains - Maharashtra (% of Households)	90
Table 4.3	Responsibility of Cleaning of Drains - Maharashtra	90
Table 4.4	Wastewater Stagnation - Maharashtra (% of Households)	91
Table 4.5	Weekly Door-to-Door Collection of Garbage - Maharashtra (% of Households)	93
Table 4.6	Responsibility of Door-to-Door Collection - Maharashtra (% of Households)	93
Table 4.7	Place of Disposal in Absence of Door-to-Door - Maharashtra (% of Households)	95
Table 4.8	Frequency of Cleaning the Secondary Bins - Maharashtra (% of Households)	96
Table 5.1	Parameters Used for Quality Test	98
Table 5.2	Water Test Results for Sample from Treatment Plant - Maharashtra	98
Table 5.3	Water Test Results for Sample from Distribution Network - Maharashtra	99
Table 5.4	Water Test Results from User Households - Maharashtra	99
Table 5.5	Incidence of Water and Sanitation Related Diseases - Maharashtra	101

LIST OF FIGURES

Figure No.	Figure Name	Page No.
Figure 2.1	Usage of Alternative Sources in Addition to Municipal Sources - Maharashtra	20
Figure 2.2	Percentage (%) of Households with Metered Water Connections in Maharashtra	26
Figure 2.3	Opinion Regarding Adequacy of Water in Maharashtra	27
Figure 2.4	Households Having Large Storage Arrangements in Maharashtra (in %)	28
Figure 2.5	Households Having Storage Arrangements within Premises in Maharashtra (in %)	31
Figure 2.6	Sufficiency of Water Pressure in Maharashtra (% of Households)	37
Figure 2.7	Seasonality in Water Supply in Maharashtra (% of Households)	44
Figure 2.8	Percentage of Households That Think Municipal Water Supply Does Not Need Treatment - Maharashtra	50
Figure 2.9	Comparison of Functionality of Community Water Sources Maharashtra (% of Households)	57
Figure 2.10	Comparison of Percentage Households Interested in Private Connections in Maharashtra	58
Figure 4.1	Households Covered under Door-to-Door Collection of Garbage - Maharashtra (in %)	92
Figure 4.2	Segregation of Waste into Organic and Inorganic Waste - Maharashtra (% of Households)	94

LIST OF ANNEXURES

Annexure No.	Annexure Name	Page No.
Annexure 1	Profile of Neighbourhoods in Different City Categories	119
Annexure 2 a	Definition of Indicators	131
Annexure 2 b	Category-wise Indicator Values	137
Annexure 3	Sampling Methodology	141
Annexure 4	Estimation Procedure	146
Annexure 5	Summary of City Categories, Maharashtra	148
Annexure 6	Questionnaires Used for the Survey	164

FOREWORD

The urban areas in India accounts for more than a third of the population of the country and play a significant role in contributing to the GDP of the country. Maintaining the momentum of growth and boosting the productivity would require massive investments in infrastructure as well as increased efficiency in the service delivery system affecting the residents of the urban areas.

With the 74th constitutional amendment, the roles and responsibilities of the urban local bodies (ULBs) have increased considerably. These ULBs are the primary drivers of any service which affect the common citizens. Water Supply and sanitation services are the key among the ULB services and its importance in the lives of citizens needs no emphasis.

The ULBs have the arduous task of providing services throughout the year to a complex and dynamic environment affected by the various socio economic and political factors as well as availability of resources. The task of the ULBs is not limited to fulfilling the various technical norms but in ensuring that the aspirations and expectations of the residents are met in terms of both quantity and quality of services.

In such a scenario, assessment of the service delivery is an important tool for both the policy makers as well as the ULBs to improve upon the existing status and strive towards excellence in service delivery.

The study is an attempt to look at the various facets of the water supply and sanitation services provided by the ULBs to the people. It provides a list of various indicators which can be tracked over time to measure the performance. It is hoped that this document would be useful to all stakeholders working in the field of water supply and sanitation.

Sharmistha Baig

Advisor

Director, Client Solutions

ORG Centre for Social Research, The Nielsen Company

ACKNOWLEDGEMENT

Regular supply of water, proper sanitation facilities are a few of the most important services determining the quality of life of the residents. These are services which affect the lives of residents irrespective of their economic status. The service delivery mechanism and its efficiency levels vary with the category of town which is largely a reflection of the investments, which have gone in the provision of services in different categories. Within the city category, the inequality in service delivery among the poor and non-poor is a well known phenomenon.

This document has delved into the various water supply and sanitation indicators and I hope that it will be useful to not only the PAS team but also to the various stakeholders including the urban local bodies in improving the efficiency of services.

I wish to express my gratitude to the various officials at the municipal corporations and municipalities which provided their full cooperation in the carrying out of the study. I would specially like to thank Prof. Dinesh Mehta and Prof. Meera Mehta for their help, guidance and support extended along with their colleagues at CEPT University.

I hope this document will be useful to all users working in the water supply and sanitation services.

Dr. Akshaya Patro

Team leader

Director, Client Solutions

ORG Centre for Social Research, The Nielsen Company

LIST OF ABBREVIATIONS

AIILSG	All India Institute of Local Self Governments
CBO	Community Based Organisation
CEPT	Centre for Environmental Planning & Technology
CS	Can't Say
DK	Don't Know
DLHS	District Level Household Survey
EWS	Economically Weaker Sections
GLR	Ground Level Reservoir
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
LPCD	Litres per capita per day
MPN	Most Probable Number
NFHS	National Family Health Survey
NGO	Non-governmental Organisation
NTU	Nephelometric Turbidity Unit
OD	Open Defecation
OHT	Overhead Tank
PAS	Performance Assessment System
PDA	Personal Digital Assistant
PPS	Probability Proportionate to Size
PSU	Primary Sampling Unit
SPSS	Statistical Package for the Social Sciences
TA	Total Alkalinity
TDS	Total Dissolved Solids
TH	Total Hardness
UGR	Underground Reservoir
ULB	Urban Local Body
UMC	Urban Management Center
USU	Ultimate Sampling Units

EXECUTIVE SUMMARY

This report provides the analysis and results from a household survey conducted in the state of Maharashtra under the CEPT University's action research project for developing and setting up Performance Assessment System (PAS) for urban water supply and sanitation in Maharashtra.

The user perspective needs to be captured to assess service levels measured through a set of identified indicators. The broad indicators for demand-side assessment were designed around following themes:

- *Access and coverage* – including access to connections to municipal water supply and wastewater networks, toilets and solid waste collection networks in urban areas.
- *Service level and quality* – including the nature of services received by the households such as: quantity, continuity (hours of supply), quality, and time spent on availing these services, with particular focus on quantity of water used from different sources, methods used for wastewater and solid waste disposal.
- *Reliability* – the reliability of the municipal services in the three sub-sectors and the reliability of services in different seasons.
- *Costs and household expenditure* – including the costs of water supply, sanitation and solid waste disposal; including all expenditure on municipal and other services for water supply, sanitation and solid waste.
- *Complaint redressal and customer service* – the nature and frequency of problems faced by the customers and the efficiency in redressal of these complaints for water supply, sanitation and solid waste services.

The household survey for the PAS Project was also designed as consumer feedback from representative cities and representative populations. Representation was defined in terms of city typology (different classes of cities), and as population inhabiting slum and non-slum localities in different classes of cities.

The findings for Maharashtra state have been summarised and organised based on the identified themes and indicators.

METHODOLOGY

The household surveys were done to provide state-level estimates for different city categories (population size and administration) and for variations in services for slum and non-slum households. A total of 7,680 households were surveyed across 40

cities of Maharashtra. Four categories of cities were covered: Large Corporations, Small Corporations, Class A towns and Small Towns.

The housing typologies were classified into slum and non-slum households. The households interviewed in the Large Corporations (with larger variation of housing differences) was 2,440, in Small Corporations 2,200 households, while in Class A and Small Towns 1,840 and 1,200 households, respectively, were interviewed. Within each category, the sample across the selected towns was distributed in proportion to its population. To the extent possible, an equal number of slum and non-slum neighbourhoods were covered in each selected city. The estimations for the slum and non-slum categories, city categories and urban Maharashtra were arrived at after applying weights on the sample data.

Apart from the household interviews, water quality sample tests were carried out for 100 samples taken from different cities and across slum and non-slum neighbourhoods. The water samples were taken from the water source end, the distribution network and from consumer premises, to understand the water quality issues in different stages of water transmission through the piped water network. The tests were conducted by recognised laboratories on various (physical, chemical and bacteriological) parameters and categorised into potable and non-potable water quality.

Additionally, a small sub-sample of 100 households was covered for measurement of the actual water consumption for domestic purposes by the households. This was undertaken to validate (on sample basis) the water consumption data captured through verbal recall methodology in the household survey. The consumption was tracked over three consecutive days to arrive at reliable estimates of water consumption by different members of the households for independent usage, as well as the household's water consumption for common uses such as cooking, washing utensils, cleaning the house, etc, to arrive at a more scientific and objective consumption estimate.

WATER SUPPLY

Type of Connection and Service Level

Looking at the primary sources of water supply, most urban consumers (88.7 per cent) in Maharashtra are provided with municipal water supply, and a higher proportion of slum households (89.9 per cent). Included in this estimate are households which use on-site municipal connections (both legal and illegal), shared municipal connections and community stand posts.

Among non-slum households, 88.4 per cent receive municipal water supply. Most of these households receive water supply through on-site municipal connections. However, a much lower proportion of slum households (77.1 per cent) have on-site municipal connections as compared to non-slum households (87.2 per cent). A

considerable proportion of slum households depend on public standposts for their domestic requirements including drinking water.

In slums, a little over 45 per cent of the households use either shared or community connections (36.9 per cent shared connection users and 14.6 per cent community standpost users) for drinking water. While it is to be acknowledged that the municipalities have provided water supply as well as household connections to slum households – it is perhaps factors of affordability and space constraints which force some part of the population to go for the lower service level.

In Maharashtra, shared connections are also used by non-slum households (38.9 per cent), and this is primarily because these are plot-level connections, and shared by all apartment holders residing on the plot.

Despite providing a bulk of consumers with on-site connections, the municipal authorities have not undertaken metering of connections in a comprehensive way. Today, slightly less than one-fourth per cent of the households report having metered connections. Households reporting metered connections are more in slum areas (26.2 per cent) than the non-slum areas (22.6 per cent)

Level of Dependence on Municipal Water Supply for Drinking Water Requirements

There seems to be a lot of faith in the quality of water supply, as 88.7 per cent of the households have reported using municipal water supply as their main source of drinking water (89.9 per cent in slum and 88.4 per cent in non-slum). Most households use only municipal water supply, and manage their requirement from the quantity received from this source. Only 17 per cent of households (11.7 per cent in slum and 19.9 per cent in non-slum households) have reported augmenting their water requirement from other sources.

The variations across the city categories show the relatively higher access to municipal water supply in the Corporations as compared to the Class A and Smaller Towns. The need for supplementation of water supply despite having municipal connections was felt by smaller order towns more than the Corporations.

Per Capita Water Consumption

The water consumption information from households has been generated through a verbal recall of the quantity of water used for different domestic purposes. As per this, 55 litres per person per day (lpcd) was the average water consumption (51.4 litres in slum and 56.9 litres in non-slum). However, there is always a level of error during a verbal recall, so for a small sample of representative households, actual measurements, using standard buckets and 1 litre bottle, have been used to measure the water consumption for different domestic activities. This was used to arrive at an estimate after using correction factors on the verbal recall. Based on this the estimated per capita water consumption on an average was 64.2 lpcd, but the water

consumption for slum households (62.1 lpcd) was lower than non-slum households (66.3 lpcd).

Table 1: Water Supply Coverage and Consumption – Slums Versus Non-slum Areas

Indicator	Slum	Non-slum	Urban
% of households with access to water supply as per JMP definition	97.1	98.6	98.2
% of households with access to municipal water supply used for any domestic purpose	89.9	86.3	88.1
% of households with on-site water connections	78.0	88.3	85.5
% of households dependent on shared municipal water connections	36.9	38.9	38.4
% of slum households dependent on community standpost for drinking water	12.8		12.8
Number of slum households per community standpost	61		61
% of households with on-site supply with metered connections in urban Maharashtra	26.2	22.6	23.4
% of households with municipal sources but supplementing with additional sources	11.7	19.9	17.4
Daily consumption of municipal water (in lpcd) (as per verbal recall)	51.4	56.9	55.4
Per capita water consumption (estimated by measurement)	62.1	66.3	64.2
% households reporting adequate municipal water supply	78.7	80.6	81.0

Table 2: Water Supply Coverage and Consumption – By City Categories

Indicator	Large Corporations	Small Corporations	Class A cities	Small Towns
% of households with access to water supply as per JMP definition	99.4	98.3	95.9	95.0
% of households with access to municipal water supply	97.4	92.6	77.3	75.3
% of households with on-site water connections	95.3	83.1	66.4	66.3
% of households dependent on shared municipal water connections	55.2	22.2	25.6	11.7
% of slum households dependent on community standpost for drinking water	9.8	17.1	14.5	20.3
Number of slum households per community standpost	63	66	62	47
% of households with on-site supply with metered connections in urban Maharashtra	22.2	20.0	22.3	32.2
% of households with municipal sources but supplementing with	13.8	22.4	31.7	33.3

Indicator	Large Corporations	Small Corporations	Class A cities	Small Towns
additional sources				
Daily consumption of municipal water (in lpcd) (as per verbal recall)	55.5	53.7	52.4	57.9
Per capita water consumption (estimated by measurement)				
% households reporting adequate municipal water supply	84.0	77.6	74.2	70.1

Status of Services

Most households in Maharashtra receive daily water supply (71.8 per cent), including the small proportion of households (7.6 per cent) which report 24-hour water supply. The service is discontinuous with an average duration of 2 hours per day. Most households receive water supply for 2 hours (55.3 per cent). There is, however, a considerable difference in the proportion of households receiving 2-hour supply among slum (43.8 per cent) and non-slum households (59.6 per cent). The water pressure was reportedly moderate (50.9 per cent households), and only around 41 per cent households have said the supply was with good pressure (34.7 per cent in slum and 42.6 per cent in non-slum areas).

There was a stark variation among the city categories with more than 80 per cent of households in Large Corporations reporting daily supply, while a much lower proportion of the households in the smaller order towns reported having daily supplies (in Small Corporations 51.9 per cent, in Class A towns 58.9 per cent and in Small Towns 59.9 per cent of households reported receiving daily supplies).

Amongst the households residing up to the 2nd floor, almost two-thirds of the households in non-slums (82.5 per cent) have mentioned that the water supply reaches the overhead tank without the help of any additional pumping. However, 36.5 per cent households have booster pumps to augment the water pressure (12 per cent in slum and 39.9 per cent in non-slum households), and out of them close to 27 per cent households have attached the booster pump to the main water supply line.

In the Large Corporations, the usage of booster pumps was relatively less than the smaller order towns. However, this may point towards not only the adequacy of water pressure but also to better vigilance on the part of the municipal authorities.

The ideal situation for a consumer is when the tap is opened at any time of the day and there is good quality water with good pressure. This requires water supply to be continuous and with adequate pressure. Since these factors are not guaranteed, consumers tend to have large water storages as a coping mechanism. Thus, 48 per cent households (22 per cent in slum and 58 per cent in non-slum) have large water storage arrangements. This enables households, particularly non-slum households, to have continuous (24x7) water supply at adequate pressure in their homes. In Maharashtra, the reason that the majority of households own large water storage is

because they cannot rely on the fact that the water service will be the same across seasons, or that the water pressure will be equal on all days. Since the quantity of water received by the households is dependent on both these factors, it is necessary to store water to cope with different eventualities.

A considerably high proportion of the households have reported that the municipal water supply was reliable in terms of timing of supply (67 per cent), frequency of supply per week (61 per cent), and quantity of water supply (55 per cent). The reliability is slightly less for parameters of water quality – especially across different seasons (53 per cent) and water pressure (47.9 per cent). On these parameters the situation was slightly better in non-slum areas as compared to slum areas.

Perceptions on Water Quality

A majority of the households (72.4 per cent overall; 73.0 per cent in slum and 72.1 per cent in non-slum households) reported that the municipal water supply was of good quality and was acceptable on the parameters of taste, colour, odour and health impact. About 38.3 per cent households reported purifying municipal water before drinking. This figure is 14.1 per cent in slum households and 47.2 per cent in non-slum households.

Users of Community Standposts

For the 12.8 per cent households in slums which need to share a community standpost, the situation is not good. On an average, 61 households in slums depend on a single standpost. The average distance that a slum household has to travel to reach the community standpost is close to 76 metres. There is also a waiting or a queue time to compound the time spent on walking to the community standpost, and the average time spent in water collection each day is 58 minutes for a slum household.

Water Test Results

Water quality testing was undertaken in 10 cities in Maharashtra. The samples have been taken from the treatment plant, representative points in the distribution pipeline as well as from the users' end. The tests were conducted by accredited laboratories in Maharashtra on the 14 chemical and microbiological parameters specified under BIS. The water quality survey was conducted in 10 cities: three Small Towns, three Class A cities, two Large Corporations and two Small Corporations.

Altogether, 20 samples were taken from source – 10 from the inlet of the water treatment plant, out of which only four samples were found to be potable. Ten samples were taken from the outlet of the selected water treatment plant and all were found to be potable.

Thirty-six samples were tested from the distribution end. For Small Towns, Class A and Small Corporations, one sample each was taken from near the source, middle of

the main distribution network and the tail end. For the Large Corporations, considering the larger network as well as multiple numbers of water treatment plants, two samples were taken from two different networks. None of the samples in Small Towns reported water quality problems at the distribution end. For Large Corporations, the samples near the treatment plant and the middle of the network had four samples each, of which one was found to be contaminated and the other had no quality problem. At the tail end, one out of four samples was found to be contaminated, which shows that there are issues in some cities/parts of the tail end of the distribution network. All the samples of the distribution network from Class A cities and Small Towns have clearly demonstrated water quality problems – and these are also towns which have low and irregular water supplies and low water pressure.

Samples of water was taken from the household premises for users of municipal on-site water supply connection and public standposts to understand the quality of water actually used by the households. Out of the 42 samples which were selected from slum households, 20 were found to be potable, while among the non-slum households 28 out of the 44 samples were found to be potable. The water quality at the household level shows a much higher proportion of contamination – more so in case of slum households.

Table 3: Status and Reliability of Water Supply Services – Slums Versus Non-slum Areas

Indicator	Slum	Non-slum	Urban
% of households with daily water supply	82	78.4	79.4
Hours of water supply (mode value)	2.0	1.0	2.0
% of households that find water pressure adequate for filling underground storage tank	91.4	82.6	82.9
% of households using booster pumps to augment water pressure	12.0	39.9	36.5
% of households that find service reliable for:			
a. Timing of water	66.9	67.3	66.9
b. Frequency of supply per week	58.1	62.5	61.3
c. Quantity of water supply	52.4	56.5	55.4
d. Quality of water (across seasons)	48.7	54.5	52.9
e. Water pressure	43.5	49.6	47.9
% of households with large water storage arrangements	21.6	57.7	47.9
% of households with favourable perception of water quality (daily water supply)	80.8	81.7	81.5
% of households with favourable perception of water quality (less than daily water supply)	87.6	89.8	89.2
% of households that think that municipal water does not need any treatment	87.2	86.1	86.4
% of households reporting seasonal variations in water supply	46.5	37.5	40.1

Table 4: Status and Reliability of Water Supply Services – By City Categories

Indicator	Large Corporations	Small Corporations	Class A cities	Small Towns
% of households with daily water supply	95.6	51.9	58.9	59.9
Average hours of water supply	2.0	2.0	1.0	1.0
% of households that find water pressure adequate for filling underground storage tank	84.3	77.4	84.3	77.0
% of households using booster pumps to augment water pressure	29.3	34.8	51.0	48.2
% of households that find service reliable for:				
a. Timing of water	69.1	64.3	62.0	65.5
b. Frequency of supply per week	62.2	62.8	56.8	59.1
c. Quantity of water supply	55.9	55.4	55.6	59.1
d. Quality of water (across seasons)	54.1	54.8	48.4	47.3
e. Water pressure	48.9	47.8	42.2	43.3
% of households with large water storage arrangements	39.4	46.7	41.9	54.2
% of households with favourable perception of water quality (daily water supply)	79.6	85.8	87.3	85.7
% of households with favourable perception of water quality (less than daily water supply)	95.2	89.7	77.7	90.5
% of households that think that municipal water does not need any treatment	86.4	88.7	77.8	86.2
% of households reporting seasonal variations in water supply	33.7	44.1	48.5	55.7

SANITATION

More than two-third households of urban Maharashtra have an on-site sanitation facility (68.6 per cent) – but this is primarily with non-slum households (85.1 per cent) as compared with slum households (24.3 per cent). There is no major difference in the proportion of households with on-site toilets across city categories.

As per the UNICEF/WHO Joint Monitoring Programme (JMP) definition, around 68 per cent urban households have access to safe sanitation. Again, however, non-slum households are more likely to have access to safe facilities (84.4 per cent) as compared with slum households (23.1 per cent).

In Maharashtra, 43 per cent of the households (57.9 per cent of Large Corporations, 41.6 per cent of Small Corporations, 9.2 per cent in Class A cities and 11.3 per cent of the Small Towns surveyed) reported access to a sewerage network.

As a result, unlike the coverage of water supply, the access to sewerage is available only to 49.2 per cent of the households. Slum households have a lower access (42.7 per cent) to sewerage network as compared non-slum households (50 per cent). There are other households with on-site toilet facility, which are dependent on on-site excreta disposal through septic tanks and soak pits.

There is a large difference in access to the municipal sewerage network across city categories. Households with sewerage connections are mostly in Large Corporations (93.1 per cent) and Small Corporations (58.1 per cent). A very low proportion (13.7 per cent) of the households of Small Towns report this, and it is even lower (12.3 per cent) in Class A cities.

A very small proportion of households (8.1 per cent) use shared¹ toilets. Among the slum households, close to 51.9 of the households also report depending on the community² toilet facilities. For slum households, the average distance of a community toilet from the home of the user is 71.5 metres.

Open defecation is still prevalent in urban Maharashtra; 5.8 per cent households report this. Open defecation is, however, a serious issue with slum households (16.1 per cent in slum and 2 per cent in non-slum).

Table 5: Sanitation Services – By Slums Versus Non-slum Areas

Indicator	Slum	Non-slum	Urban
% of households with access to safe sanitation (as per JMP definition)	23.1	84.4	67.9
% of households with on-site toilet facility	24.3	85.1	68.6
% of households with on-site toilet connected to sewerage network	42.7	50.0	49.2
% of households with on-site toilet connected to septic tanks	41.9	45.9	45.5
% of households using shared toilet facility	9.1	7.7	8.1
% of slum households using community toilet facility	51.9	5.4	18.0
% of households connected to sewerage network	12.0	54.1	42.7
% of households practising open defecation	16.1	2.0	5.8
% of households without access to underground/covered/open drains	9.1	7.9	8.2
% of households reporting wastewater stagnation in rainy season	31.2	16.1	20.2
% of households reporting wastewater stagnation in the year	17.1	10.5	12.3

¹ Shared toilets: An informal arrangement between neighbours where two or more households share the toilet facility and are also responsible for its cleanliness and upkeep.

² Community toilets: A facility created by either the municipality or some NGO which is used by the residents of the area usually on payment of some usage charges. The upkeep and maintenance is usually of the municipality or the NGO which has constructed the facility.

Table 6: Sanitation Services – By City Categories

Indicator	Large Corporations	Small Corporations	Class A cities	Small Towns
% of households with access to safe sanitation (as per JMP definition)	61.5	69.4	74.3	82.2
% of households with on-site toilet facility	62.2	71.6	74.7	82.2
% of households with on-site toilet connected to sewerage network	93.1	58.1	12.3	13.7
% of households with on-site toilet connected to septic tanks	3.5	35.8	82.2	79.6
% of households using shared toilet facility	11.9	5.2	3.4	2.0
% of slum households using community toilet facility	66.4	36.3	12.9	29.0
% of households connected to sewerage network	57.9	41.6	9.2	11.3
% of households practising open defecation	1.2	9.2	16.1	12.0
% of households without access to underground/covered/open drains	3.2	5.2	17.1	23.0
% of households reporting wastewater stagnation in rainy season	21.8	16.8	21.1	18.9
% of households reporting wastewater stagnation in the year	11.5	15.4	8.7	12.5

SOLID WASTE MANAGEMENT

Overall, only 64.2 per cent households have reported door-to-door garbage collection. There is a considerable gap between the service being instituted in the non-slum (72.2 per cent) and slum (42.2 per cent) neighbourhoods. Not surprisingly, the Large Corporations have the highest proportion (69.8 per cent) of households reporting door-to-door collection.

Only 37.5 per cent of the households report that the garbage is collected on a daily basis (23.3 per cent slum and 42.8 per cent non-slum households). Nearly 15 per cent households segregate their garbage into organic and inorganic waste at the time of disposal. Overall, 33.8 per cent households reported collection of waste from secondary bin on daily basis. Again, daily garbage collection is reported by the highest proportion of households (48.9 per cent) in the Large Corporations; in other city categories this proportion is relatively much lower.

For those households which are not covered with garbage collection services, some (15.6 per cent) practise relatively safe methods of garbage disposal, which include disposing in common disposal pits near the house, in secondary bins or waste dumps.

Table 7: Solid Waste Management Services – By Slums Versus Non-slum Areas

Indicator	Slum	Non-slum	Urban
% of households covered by door-to-door solid waste management services	42.7	72.2	64.2
% households not covered by door-to-door solid waste disposal service, but reporting other safe method of solid waste disposal	13.8	16.9	15.6
% of households reporting daily garbage collection (<i>Base: All households</i>)	23.3	42.8	37.5
% of households segregating waste into organic and inorganic waste	14.6	15.0	14.9
% households reporting daily removal of waste from the secondary bin	35.4	36.4	36.1

Table 8: Solid Waste Management Services – By City Categories

Indicator	Large Corporations	Small Corporations	Class A cities	Small Towns
% of households covered by door-to-door solid waste management services	69.8	58.9	49.4	59.1
% households not covered by door-to-door solid waste disposal service, but reporting other safe method of solid waste disposal	34.9	12.1	10.8	1.7
% of households reporting daily garbage collection (<i>Base: All households</i>)	48.9	25.2	27.2	21.5
% of households segregating waste into organic and inorganic waste	17.3	14.0	10.8	8.9
% households reporting daily removal of waste from the secondary bin (<i>Base: All households which are aware</i>)	38.1	17.8	18.6	33.3

ACCESS TO HIGHER LEVEL OF MUNICIPAL SERVICES

If one looks at the municipal services as a whole and categorises households with higher level services for water supply, sanitation and solid waste management services, the overall situation points to nearly 39 per cent of the households enjoying a higher level of services. The inequity is evident with around 10 per cent of the households in slums and 50 per cent of households in non-slums reporting higher level services across all sub-sectors.

It is interesting to note that a high proportion of households in Large Corporations (41 per cent) followed by Small Towns (40 per cent) have access to high level

services. The lowest proportion of households with a higher level of services is in Class A towns (29 per cent).

Table 9: High Level of Services across All Sub-sectors

Indicator	Maharashtra slums	Maharashtra non-slums	Maharashtra urban	
% of households having higher level services (on-site water supply, on-site toilet facility and daily door-to-door garbage collection)	9.6	50.3	39.2	
Indicator	Large Corporations	Small Corporations	Class A cities	Small Towns
% of households having higher level services (on-site water supply, on-site toilet facility and daily door-to-door garbage collection)	41.0	37.3	28.9	40.0

Disclaimer

This publication has been prepared for the Performance Assessment System (PAS) Project, CEPT University. All rights reserved. All copyright in this publication and related works is owned by ORG Centre for Social Research (ORGCSR), AC Nielsen ORG MARG Pvt. Ltd, New Delhi. The same may not be reproduced, wholly or in part in any material form (including photocopying or storing it in any medium by electronic means and whether or not transiently or incidentally to some other use of this publication), modified or in any manner communicated to any third party except with the written approval of ORGCSR.

This publication is for information purposes only. While due care has been taken during the compilation of this publication to ensure that the information is accurate to the best of ORGCSR's knowledge and belief, the content is not to be construed in any manner whatsoever as a substitute for professional advice.

ORGCSR neither recommends nor endorses any specific products or services that may have been mentioned in this publication and nor does it assume any liability or responsibility for the outcome of decisions taken as a result of any reliance placed on this publication.

ORGCSR shall in no way, be liable for any direct or indirect damages that may arise due to any act or omission on the part of the user due to any reliance placed or guidance taken from any portion of this publication.

The Performance Assessment System (PAS) Project

The 'Performance Assessment System – PAS' is a five-year action research project, initiated by the CEPT University, Ahmedabad with funding from the Bill and Melinda Gates Foundation. It supports development of appropriate tools and methods to measure, monitor and improve delivery of urban water and sanitation services in the states of Gujarat and Maharashtra. The PAS Project comprises three components of performance measurement, monitoring and improvement. It covers all the 400+ urban local governments in Gujarat and Maharashtra.

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

CEPT University
Kasturbhai Lalbhai Campus, University Road, Navrangpura, Ahmedabad 380 009 Gujarat,
India

Tel: +91-79-26302470

Fax: +91-79-26302075

www.pas.org.in

