

# **Performance Improvement Plan for Wardha**

## Prepared by: CEPT University and AIILSG in consultation with Wardha Municipal Council

2012







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## **CEPT University**

All India Institute of Local Self-Government

2012

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## **ABBREVIATIONS**

AIILSG	All India Institute of Local Self Government
BAU	Business-as-usual
CAGR	Compounded Annual Growth Rate
CBO	Community-based Organisation
CEPT	Centre for Environmental Planning and Technology
CPHEEO	Central Public Health and Environmental Engineering Organisation
СО	Chief Officer
Cr	Crore
DCB	Demand Collection Balance
DMA	Directorate of Municipal Administration
DMA	District Metering Area
DPR	Detailed Project Report
ESR	Elevated Service Reservoir
FGD	Focus Group Discussion
GIS	Geographic Information System
GoM	Government of Maharashtra
HH	Household
IHSDP	Integrated Housing and Slum Development Programme
ILCS	Integrated Low Cost Sanitation
KPI	Key Performance Indicator
lpcd	Litres per capita per day
MJP	Maharashtra Jeevan Pradhikaran
MoUD	Ministry of Urban Development
MSNA	Maharashtra Sujal Nirmal Abhiyan
NGO	Non-governmental Organisation
NRW	Non-revenue Water
ODF	Open Defecation Free
PAS	Performance Assessment System
PIP	Performance Improvement Plan
PMC	Project Management Consultant
PWD	Public Works Department
SJSRY	Suvarna Jayanti Shahari Rojgar Yojana
SLB	Service Level Benchmark
STP	Sewage Treatment Plant
SWM	Solid Waste Management
UIDSSMT	Urban Infrastructure Development Scheme for Small and Medium Towns
ULB	Urban Local Body
WMC	Wardha Municipal Council
WSS	Water Supply and Sanitation
WTP	Water Treatment Plant
Note: 1 lakh = 100	,000; 1 crore = 10,000,000.

## **EXECUTIVE SUMMARY**

The preparation of this Performance Improvement Plan (PIP) for water supply and sanitation (WSS) has been led by the Wardha Municipal Council (WMC), with support from the PAS Project through teams from All India Institute of Local Self Government (AIILSG), Mumbai, and the Centre for Environmental Planning and Technology (CEPT) University, Ahmedabad.

The preparation of the PIP has been done in response to a request from the Government of Maharashtra (GoM). The two focus areas of 'making cities open defecation free' and 'moving towards 24x7 water supply' were suggested by the Chief Secretary, GoM, in an inception meeting, for starting the Government of India's Service Level Benchmarking (SLB) process in Maharashtra. In addition to that, the inherent theme for PIPs is improving coverage and service levels for unserved poor (slum dwellers) and improving financial sustainability. This PIP exercise uses the set of indicators given by the Government of India's (GoI) SLB Initiative as a baseline to assess past performance and identify priorities.

**City profile:** Wardha, a Class A municipal council in Maharashtra with a population of approximately 1.06 lakh (Census 2011) is the headquarters of Wardha District and an important railway junction, situated about 80 km from Nagpur and is well connected by railway and state highways. It gets its name from the Wardha River which flows in the north, west and south boundaries of the district. Wardha, the name linked with the 'Father of the Nation' Mahatma Gandhi, is famous for Bapu Kuti in Sewagram 7 km from Wardha, and for the Vinoba Bhave Ashram in Pavnar 9 km from Wardha.

About 18.3 per cent of the total population (19,501 of 1,06,439) in Wardha resides in 17 slum settlements. Out of 17 only 12 are notified, but services are provided in the slums by the WMC irrespective of whether they are notified or non-notified. As a part of the PIP diagnostic assessment, all 17 slum settlements were visited to check the on-the-ground situation of services. During visits, it was found that some slums are in much better condition than even non-slum areas, in terms of not only structures and roads, etc, but also regarding accessibility and availability of water supply and sanitation services. Some are maintained and kept clean by the urban local body (ULB) or by the residents, but some are unclean and need attention to maintain even the minimum hygiene levels.

**Staffing of WMC:** The Chief Officer (CO) is the administrative head of the WMC. There are nine departments under the CO to carry out the day-to-day functions of the Council. The departments are: (i) General Administration; (ii) Accounts; (iii) Tax; (iv) Public Works Department (PWD); (v) Public Health (Sanitation, Solid Waste Management); (vi) Water Supply; (vii) Education; (viii) Fire Services; and (ix) the Suvarna Jayanti Shahari Rojgar Yojana (SJSRY).

There is a major dearth of technical staff in the WMC. Out of 17 sanctioned technical posts across five departments, only five have been filled. In the Water Supply department, only one of two sanctioned posts currently has been filled. The department does not have an engineer and is currently being managed by clerical staff, due to which the O&M of the system from source to Elevated Service Reservoirs (ESRs) is outsourced to the private agency. Out of the five sanctioned posts of sanitary inspectors in the Sanitation department, only one has been filled.

**Water supply:** Wardha is dependent on two sources for its water supply. One of the surface sources is Pavnar at Dham River constructed in 1969, located approximately 9 km north-east of the city. The second source of water for Wardha is at Yelakeli Dam on Dham River constructed in 2001, which is 11 km north

of the city. The Pavnar Scheme is owned and operated by the WMC since it was constructed, whereas the Yelakeli Scheme has been developed by the Maharashtra Jeevan Pradhikaran (MJP) and was handed over to the WMC in 2001. As mentioned previously, due to lack of technical inhouse staff at the WMC, the water supply system of Wardha, from source to ESRs, is operated and maintained by the private agency, Tipanna Bhandari and Co; supplying water from ESRs to the consumers' end and granting them WS connections is under the WMC's purview. Apart from the piped water supply of 16 MLD through individual connections, there are 380 municipal public standposts, 480 municipal handpumps and numerous private open wells through which around 2 ML water is consumed on a daily basis.

As population has decreased in last few years, city level lpcd (115) has increased even with the same quantity of water that is produced from source and supplied from WDS. Metering is completely absent in Wardha and water supply is for average duration of 45 minutes (1.5 hours on alternate days). Low water tariff plus comparatively low coverage of water supply connections has resulted into lower cost recovery and collection efficiency for water supply services.

Major issues that need to be addressed on priority by WMC include ample free water supply, which has a negative impact on key indicators such as coverage of water supply, non-revenue water and cost recovery of water supply services. To rectify physical losses in the old distribution network under Pavnar Scheme, the WMC is seeking technical assistance from the MJP for refurbishment of partial distribution network under Pavnar scheme. The Council has also started conducting household level surveys under Integrated Low Cost Sanitation Scheme (ILCS) which will help identify illegal connections and households dependant on free water, etc.

**Sanitation (including sewerage):** Compared to water supply, the WMC reports relatively good coverage of toilets in the city at 81 per cent. However, an estimated 19 per cent of the population still resorts to open defecation due to lack of proper sanitation facilities. Wardha does not have an underground sewerage network at the city level. By and large, disposal of wastewater is thus carried out through the septic tanks. However, around 150 properties are estimated as having no onsite sanitary disposal. So far, the WMC is not expecting any funds through any scheme for construction of community and/or individual toilets in Wardha. The WMC will submit the proposal on the basis of actions suggested in their PIP. For disposal, as a future plan, the Council has prepared a detailed project report (DPR) for laying sewerage network in the entire WMC limit, which is awaiting sanction from the MJP.

**Services to slums:** All 17 slum settlements are covered with distribution network of water supply. Coverage of water supply connections in slums of Wardha is reported to be 41.6 per cent. Eight out of 17 slums have more than 50 per cent coverage of water supply connections; three slums are highly dependent on handpumps and public standposts. The WMC has conducted household level surveys in slums in 2011 for verifying availability of individual and community toilets in slums. According to this, coverage of individual and community toilets in slums is recorded to be 77 per cent – out of which the coverage of individual toilets is 36 per cent. All 17 slum settlements are covered under property tax collection and assessment, though collection efficiency of taxes and charges is very low in slums. No policies are introduced for provisions of services in slums in Wardha. Also, other than 5 per cent funds that are reserved for EWS, no additional funds are reserved in the budget for provision of services in the slums.

**Municipal finance of the WMC:** The municipal finances of the WMC have been reviewed for the last seven years, from 2005–06 to 2011–12. While for 2005–06 to 2009–10 the information is of 'actuals', budget

estimates are given for the remaining two years. The total approved budget of the WMC in 2011–12 was Rs 25.71 crore.

The main sources of the WMC's revenue include taxes and duties levied under various acts, service charges, rents, grants and contributions, etc. The revenue income of the WMC has grown steadily at a Compounded Annual Growth Rate (CAGR) of 12.74 per cent from 2005–06 onwards. In 2011–12, more than 70 per cent of income was through grants and contributions from external agencies. External sources of revenue income such as assigned revenues, grants and contributions contributed about 62 per cent of the total revenue income, increasing at a CAGR of 11.21 per cent in 2011–12. Out of total revenue expenditure, basic services such as water supply, sanitation and sewerage form about 34 per cent of the total revenue expenditure of the WMC. In 2011–12, the per capita revenue expenditure in the WMC is Rs 2,295; of this, expenditure on water supply and sanitation services is about Rs 780. The total revenue expenditure of the WMC has grown at a CAGR of 14.81 per cent for the last five financial years, faster than the revenue income.

Although capital income has increased over a period of time at a CAGR of 14.71 per cent, the increase does not follow a specific trend. The sudden increase in capital income in 2010–11 is observed as a result of funds under the small savings grant of Rs 2.96 crore. Considering the current scheme of things that is, business-as-usual (BAU) scenario, the Council would be able to manage an investible surplus only by 2021. Hence interventions such as improved collection efficiency of property tax, increased water supply coverage, improved collection efficiency of water tax, improved collection efficiency of sanitation tax and levying of SWM charges through property tax have been recommended so that investible surplus can be achieved by 2017.

**Summary of PIP for the WMC:** The proposals suggested are focused on two key areas of establishing 24x7 water supply system and moving towards an open defecation free WMC, as well as improvements in key processes and operations related to the above areas. Based on the analysis of the water and sanitation sectors in Wardha, the PIP for the WMC has been summarised in Table 1.

Key actions for improvement	Costs required	Current status	
Water supply: Towards 24x7 system	-		
Technical studies and metering	Rs 1.5 cr	Preparation of DPR is required	
Planning and implementation of 24x7 for entire city	Rs 40.0 cr	Preparation of DPR is required	
Sanitation: Towards ODF			
Construction of individual and community toilets	Rs 29.0 cr	Preparation of DPR is required	
(including IEC costs)			
Total cost of PIP		Rs 70.5 cr	

 Table 1: Summary of Performance Improvement Plan for WMC (in Rs crore)

The Council also has to undertake improvement actions related to processes in the WSS operations. These actions have no or low cost, and thus can be immediately taken up by the Council. These include identification and regularisation of illegal connections, conversion of public standposts into group connections, periodic surveys at source, treatment and the consumers' end, proper sampling regimen for monitoring water quality, regular surveys conducted by zonal sanitary inspectors, levy of telescopic rates for water supply, drainage tax, and improve collection efficiency of sanitation tax, and implementation of a Septage Management Plan.

Based on the revenue enhancement measures mentioned above, the investible surplus for the WMC will be approximately Rs 6.61 crore. Improvements for the WMC have been proposed in two phases: (1) Immediate interventions (from 2013–2020); and (2) Long term interventions (from 2020–2030). The interventions mentioned above to augment revenue as well as process improvements are proposed to begin in 2013.

#### Table 2: Phase 1 of PIP for WMC (2013–2018)

Proposed improvement areas	2013	2014	2015	2016	2017	2018	2019	2020
Water supply								
Revision/extension of contractual arrangements								
with private contractor								
Fill technical sanctioned posts for better								
Periodic surveys at source treatment and								
consumer end								
Proper sampling regimen for monitoring water quality								
Regular ward-wise surveys by sanitary inspectors								
Moving towards 24x7								
Conduct physical surveys, consumer survey for entire city and produce maps								
Conduct/revise water audit and leak detection surveys								
Undertake hydraulic modelling for the entire water supply petwork								
Install/repair bulk flow meters								
Install meters at consumers' end								
Augment distribution network: Create pilot								
Levy telescopic rates for water supply								
Sanitation (including sewerage)						1		
Prepare Septage Management Plan								
Prepare DPR								
Implement Septage Plan								
Revise prepared DPR and pursue for approval								
through government grants								
Implement sewerage network								<u> </u>
Levy drainage tax, environmental tax as a part of								
property tax								
Moving towards ODE								
Proving lowards ODF								-
Trepare DTK for ODF								
toilets (including IEC costs)								
Towards ODF through provision of community toilets (including IEC costs)								

Once revenue augmentation measures and process improvements are in place, it is proposed that the WMC can begin its capital intensive projects from 2013.

Starting from 2014, the WMC can begin construction of individual and community toilets. As issues in existing community toilets were observed in terms of operation and maintenance (O&M), it is proposed that the WMC refurbishes existing toilets before initiating the construction of new ones. To begin with, therefore, the WMC can construct individual toilets. Construction of individual toilets will be completed in five years, while community toilets will be completed by four years.

Arrangements with community-based organisations (CBOs) can be looked at with respect to maintenance of community toilets. Campaigns to create awareness related to cleanliness and hygiene practices, safe sanitation practices, and negative health impacts due to open defecation need to be conducted by the Council. Local CBOs need to be roped into this exercise to ensure participation by all communities. The campaigns should begin by triggering initiation in the slum settlements and undertaking transect walks to open defecation sites to highlight the issues mentioned above.



#### Figure 1: Implementation of projects after revenue augmentation

**Institutional imperatives to achieving proposed improvements:** The financial analysis of the WMC showed that overall capital utilisation is poor, with an average capital utilisation of only 58 per cent from 2006–07 to 2011–12. This points to the need for better project conceptualisation and management; if need be, additional staff could be recruited for the purpose.

The Council needs to also augment its staff, as a major percentage of the staff comprises non-technical personnel. Moreover, though water supply operations are/will be outsourced, the technical strength of the private contractor needs to be assessed. Similarly, to efficiently monitor operations of the private contractor, the technical staff at the WMC needs to be increased.

Additionally, the WMC needs to mobilise external support through non-governmental organisations (NGOs) and CBOs in project formulation and implementation, especially related to WSS services in slums. Given that implementation of proposals related to 24x7 water supply requires high technical skills, the WMC needs to also bring external support through project management consultants (PMCs).

Arrangements should be made with PMCs for continued support throughout the implementation of the 24x7 project, both immediate and long term. The Council has to also form a PIP taskforce to ensure proper implementation of the proposed projects and performance monitoring through regular target setting.

## **1** Introduction

The preparation of this Performance Improvement Plan (PIP) for water supply and sanitation (WSS) has been led by the Wardha Municipal Councils (WMC), with support from the Performance Assessment System (PAS) Project through teams from All India Institute of Local Self Government (AIILSG), Mumbai and the Centre for Environmental Planning and Technology (CEPT) University, Ahmedabad.

The preparation of a PIP has been done in response to a request from the Government of Maharashtra (GoM). The two focus areas of 'making cities open defecation free' and 'moving towards 24x7 water supply' were suggested by the Chief Secretary, GoM, in an inception meeting for starting the Government of India's (GoI's) Service Level Benchmarking (SLB) process in Maharashtra. The PIP exercises use the set of indicators given by the SLB Initiative as a baseline to assess past performance and identify priorities.

The preparation of the PIP has been done in three stages:

**Initial performance assessment**: Based on the data received during PAS round II from the WMC, an initial assessment of all SLB indicators for the past three years was done by the PAS team. As a part of the preparatory work, a preliminary profile of urban local bodies (ULBs) using SLB indicators was prepared. The WMC teams were assisted to generate a city profile based on comparative performance assessment of ULBs for the last three years based on PAS data. This involved past trends as well as comparison with other Class A municipal councils in Maharashtra.

The AIILSG/CEPT team visited Wardha from July 24 to 30, 2011, for further exploration of ground realities in UWSS. The preparatory work and the city profile of Wardha were discussed with WMC officials at the first meeting on July 24, 2011. The meeting was attended by the Chief Officer, along with officials from Water Supply and Health Department. Preliminary priorities were identified at this meeting. Particular focus was also placed on the issues around making the city open defecation free and exploring the possibility of introducing 24x7 water supply. ULB officials shared their views on taking their PIPs further and issues that they would have to tackle in this regard.

**Detailed diagnostics and issues identification**: The diagnostic assessment was prepared by taking into consideration the ground realities, local conditions and assessment of the present situation. A detailed field guide developed for purpose of PIP preparation included data templates, survey formats; transect walks, schedules of interviews, focus group discussion (FGD) guidelines, areas for digital documentation, dimensions of stakeholder consultations, etc.

A rapid assessment of demographic/physical characteristics, institutional arrangements, key processes and municipal finances was also undertaken to build appropriate context for city performance.

Detailed discussions with ULB engineers and support staff were held to assess the water and sanitation situation on the ground. Field visits were undertaken by teams to facilities like source, treatment and distribution systems to validate secondary data and identify performance issues. Wherever applicable, appropriate consultations were also undertaken with private service providers to help assess and validate issues from different perspectives.

For detailed qualitative insights, the team met respective ULB staff at all levels including safai karamcharies,<sup>1</sup> valve operators, etc. The team also met slum dwellers, contractors and private parties to understand issues at different levels and areas of services. Through FGDs and consultations with the citizens of Wardha, service delivery issues were identified from consumers' perspectives. Transect walks in slum settlements and along city roads helped in mapping slum locations, open defection sites, public and community toilets, solid waste dumping sites, etc. On-site situation and issues in services were captured through self-explanatory photographs that expressed the depth of issues for which immediate action needs to be taken.

Action planning and preliminary costing: On identification of city priorities, consultations were held with the Chief Officer, opinion leaders, Municipal Councillors and WMC officers to discuss priorities for municipal water supply and sanitation. This PIP report presents the performance improvement plan of the ULB. It describes improvement actions and the costs that will have to be incurred to implement the identified actions. Efforts that are currently being taken by the WMC to improvise service delivery were also considered while suggesting further actions in the respective sectors. The proposals have been reviewed by technical teams at the AIILSG and at CEPT University.

In the PIP report the identified interventions were classified as minimal capital expenditure, substantial capital expenditure and process and policy related. Actions to improve reliability of performance indicators are also identified. Cost estimates have been developed for all actions identified.

The proposed strategies and actions for improvement and estimated capital cost required to implement actions was discussed with WMC officials during the third PIP consultative workshop in November 2011 in Wardha.

**Preliminary validation of draft PIP by the WMC:** The proposed draft PIP was shared with the WMC and finalised by incorporating the revisions suggested. The Wardha PIP has been prepared in consultation with the WMC CO and other officials.

It describes improvement actions and the costs that will have to be incurred to implement the identified actions. The proposals have been reviewed by technical teams at the AIILSG, Mumbai, and at CEPT University. This PIP report will be submitted to the state government for review and guidance. It is anticipated that the WMC will identify low-cost actions that can be taken immediately and provide funds for these actions from their budget. For actions that require significant capital expenditure, the WMC will prepare detailed project reports and seek assistance under state and national programmes.

<sup>&</sup>lt;sup>1</sup> Employees (permanent/contractual) of the Municipal Council who collect waste, sweep roads and clean toilets and drains.

## 2 City Profile

This section discusses the general characteristics of Wardha related to population, aspects related to slum settlements, and human resources in the WMC. Also, aspects related to municipal finances, specifically with respect to water supply and sanitation services, and extent of private sector participation is discussed here.



#### Figure 2: Location of Wardha in Maharashtra

## 2.1 Location

#### Table 3: General information: Wardha

General details	2001	2011	
Area	7.44 km <sup>2</sup>	7.44 km <sup>2</sup>	
Population	1,11,118	1,06,439	
No of HHs	23, 441	24,144	
No of properties	18,525	23,783	
No of slums	15 (Notified 12)	17 (Notified 12)	
Population in slums		19,501	
% of slum pop to total		18.3	
Courses CEDT University 2011			

The city of Wardha is the headquarters of Wardha District and an important railway junction, situated about 80 km from Nagpur and is well connected by railway and state highways. It gets its name from the Wardha River which flows at the north, west and south

Source: CEPT University, 2011.

boundaries of the district. Wardha, a name linked with the 'Father of the Nation' Mahatma Gandhi, is famous for Bapu Kuti in Sewagram 7 km from Wardha, and for the Vinoba Bhave Ashram in Pavnar 9 km from Wardha.

The topography of the town is almost flat terrain, except a small hillock located in the north-west corner. The climate of Wardha town is characterised by a hot summer and general dryness throughout the year.

The administration of the town is handled by the WMC, from the date of its establishment, that is, 1862. At present, the working of the WMC is regulated by the Maharashtra Municipalities Act, 1965. All services in Wardha are provided and maintained by the WMC.

## 2.2 Services in Slums of Wardha

One of the focal areas under the PAS programme improvement areas is the provision of services to urban poor. While the performance measurement tool captures information at city level on services provided to slums, a more detailed measurement tool was also developed to capture settlement level variations in services. As part of the PIP diagnostic assessment, visits to all 17 slum settlements were also carried out to understand the characteristics of slums in the city. About 18.3 per cent of the total population (19,501 of 1,06,439) of Wardha resides in 17 slum settlements. Though only 12 slums out of 17 are notified, services are provided in slums by the WMC irrespective of whether they are notified or non-notified. During site visits, it was found that some slums are in much better condition than even non-slum areas, in terms of not only structures and roads, etc, but also accessibility and availability of water supply and sanitation services. Some are maintained and cleaned by the ULB or by the residents, but some are unclean and need to maintain even minimum hygiene levels. According to the Annual Budget of the WMC, till 2009–10, 5 per cent funds were reserved as a capital expenditure on Economically Weaker Section (EWS). However, since 2010–11, even that head has been removed from the budget and funds are not being earmarked for the weaker sections. There are no additional provisions of funds for services to poor.

#### Table 4: Slum profile of Wardha

17				
12 (71%)	Plan			
5 (29%)				
15				
12 (80%)	A state			
3 (20%)	30- 10-			
11 (65%)				
Land ownership				
11 (65%)				
1 (6%)				
5 (29%)	LOCAL AND			
11 (65%)				
4 (24%)	and the second second			
2 (12%)				
	17 12 (71%) 5 (29%) 15 12 (80%) 3 (20%) 11 (65%) 11 (65%) 11 (65%) 11 (65%) 5 (29%) 11 (65%) 4 (24%) 2 (12%)			

Source: CEPT University, 2011





Source: Slum surveys, WMC, 2011





Source: CEPT University, 2011

## 2.3 Staffing of Wardha Municipal Council

The Chief Officer (CO) is the administrative head of the WMC. There are nine departments under the CO to carry out the day-to-day functions WMC. of the The departments are: (i) General Administration, (ii) Accounts; (iii) Tax; (iv) PWD; (v) Public Health SWM); (Sanitation, (vi) Water Supply; (vii) Education; (viii) Fire Services; and (ix) SJSRY.

As can be seen from Figure 6, the WMC is facing a severe shortage in the officer and clerical cadres. However, 96 persons are currently

working for the 32 approved positions for Grade 4 staff. The

Figure 5: Organogram of WMC



Source: CEPT University, 2011.

total sanitary workers approved for the WMC are 111 but 248 are currently working there.

There is a major dearth of technical staff in the WMC. Out of the 17 sanctioned technical posts across five departments, only five have been filled. In the Water Supply department only one out of the two sanctioned posts has been filled. The department does not have an engineer and is currently being managed by clerical staff, due to which the O&M of the system from source to ESRs is outsourced to the private agency. In the sanitation department only one out of the five sanctioned posts of sanitary inspectors has been filled.



Figure 6: Details of technical staff, WMC

Source: CEPT University, 2011

## 2.4 Municipal Finance Assessment

The municipal finances of the WMC have been reviewed for the last seven years, from 2005–06 to 2011–12. While for 2005–06 to 2009–10 the information is of 'actuals', budget estimates have been given for the remaining two years. The analysis is based on a 'recast budget'. This was done mainly to reclassify some of the capital grants reported as revenue income to capital income. The total approved budget of the WMC in 2011–12 was Rs 25.72 crore.

Items	2005–06 (actuals)	2006–07 (actuals)	2007–08 (actuals)	2008–09 (actuals)	2009–10 (actuals)	2010–11 (rev est)	2011–12 (budgeted)				
Opening balance	2.00	8.75	15.38	23.28	27.53	30.80	38.21				
	Revenue account										
Revenue income	8.97	11.13	11.8	12.40	13.70	16.60	18.40				
Revenue expenditure	10.66	10.45	14.05	14.38	15.57	18.65	24.42				
Surplus/(Deficit)	-1.70	0.70	-2.20	-2.00	-1.80	-2.00	-6.00				
Operating ratio (%)	1.20	0.90	1.20	1.20	1.10	1.10	1.30				
			Capital ac	count							
Capital income	2.41	3.99	6.72	4.46	4.33	7.62	5.49				
Capital expenditure	3.49	1.92	4.51	3.00	1.57	3.26	5.00				
Extraordinary receipt	0.96	0.38	1.78	0.67	1.00	1.80	1.80				
Extraordinary liabilities	0.97	0.39	0.54	0.36	0.84	6.80	1.80				
Overall surplus/(deficit)	1.58	15.37	23.28	27.53	30.8	38.21	38.15				

#### Table 5: Revised financial summary (recast budget figures) of WMC (in Rs crore)

Source: Wardha Municipal Council, 2005–06 to 2011–12

#### Table 6: Details of staff, WMC

Details	Approved (nos)	Filled positions (nos)		
Total staff	203	368		
Staff under Grade 1 to Grade 3	92	36		
Staff under Grade 4	32	96		
Sanitary workers	111	249		



Source: Wardha Municipal Council, 2005-06 to 2011-12

**Revenue account:** The total budgeted revenue income for the WMC in 2011–12 was Rs 18.43 crore. Main sources of revenue include taxes and duties levied under various acts, service charges, rents, grants and contributions, etc. The revenue income of the WMC has grown steadily at a Compound Annual Growth Rate (CAGR) of 12.74 per cent from 2005–06 onwards. In 2011–12, more than 70 per cent of income was through grants and contributions from external agencies. However, as most of these grants are available as regular transfers, these can be considered as a relatively secure source of income.





Source: Wardha Municipal Council, 2005-06 to 2011-12

The Council's own source of income in 2009–10 formed only 27 per cent of total revenue income. Over the past five years, the share of own sources of income has increased significantly from 27.6 per cent in 2009–10 to 37.3 per cent of total revenue income in 2011–12. Property tax has been the main source of own revenue at 60 per cent and registered a CAGR of 17 per cent. The WMC showed improved property tax collection efficiency at 54 per cent in 2010–11, improving from 49 per cent in 2006–07.

However, coverage of properties assessed under property tax needs to be improved as only 18,710 residential properties were registered, compared with 24,144 households in 2011. External sources of revenue income such as assigned revenues, grants and contributions contributed about 62 per cent of the total revenue income, increasing at a CAGR of 11.21 per cent in 2011–12. Most of this income is from assured revenue grants such as octroi loss compensation, primary education, inflation, mineral development grant, etc.

The revenue expenditure of the WMC has been analysed against main departmental budget heads of general administration and tax collection department, public security, public health and sanitation, etc. Basic services such as water supply, sanitation and sewerage form about 34 per cent of the total revenue expenditure of the Council. In 2011–12, the per capita revenue expenditure in the WMC is Rs 2,295; of this, expenditure on water supply and sanitation services is about Rs 780. The total revenue expenditure of the WMC has grown at a CAGR of 14.81 per cent for the last five financial years, faster than the



#### Figure 9: Revenue income and revenue expenditure, WMC (in Rs cr)

Source: Wardha Municipal Council, 2005-06 to 2011-12

revenue income. This is reflected in the revenue budget deficit forecast at Rs 5.99 crore by 2011–12 (see Figure 9).

**Capital account:** Although capital income has increased over a period of time at a CAGR of 14.71 per cent, the increase does not follow a specific trend. The sudden increase in capital income in 2010–11 is observed as a result of funds under the small savings grant of Rs 2.96 crore.



#### Figure 10: Capital Expenditure, WMC

Source: Wardha Municipal Council, 2005-06 to 2011-12

#### Table 7: Sources of capital income WMC (in Rs crore)

Budget head	2005–06 (actuals)	2006–07 (actuals)	2007–08 (actuals)	2008–09 (actuals)	2009–10 (actuals)	2010–11 (rev est)
Development grant	0.52	1.32	1.32	0.07	0.16	0.50
Dalit Basti	0.60	0.21	1.85	0.40	0.00	0.50
Road construction grant	0.59	0.54	2.00	1.59	0.90	1.00
11th Finance Commission grant	0.34	0.00	0.00	0.00	0.00	0.00
12th Finance Commission grant	0.00	1.2	0.4	0.34	0.69	1.00
Special purpose grant	0.00	0.40	0.50	1.65	0.10	0.50
SJSRY	0.00	0.00	0.00	0.00	0.00	0.56
Thakkar Baba grant	0.00	0.00	0.22	0.00	0.00	0.00
Small savings	0.00	0.00	0.00	0.00	2.15	2.96
Other grants	0.05	0.10	0.04	0.00	0.00	0.00
MP grant	0.30	0.21	0.4	0.41	0.28	0.50
Total income	2.41	3.99	6.72	4.46	4.33	7.62

Source: Wardha Municipal Council, 2005–06 to 2011–12

However, it can be seen that only 36 per cent of the total capital income was utilised by the WMC in 2009– 10. Capital expenditure has been projected to increase 110 per cent from Rs 1.57 crore in 2009–10 to Rs 3.26 crore in 2010–11.This would put a severe strain on the limited staff at the WMC. Proposed construction of underground sewerage network is a major budgeted capital expenditure in the 2011–12 budget. Others include construction of infrastructure in slums under projects such as Dalit Basti Sudhar Yojana, SWMrelated expenses from grants under 12th Finance Commission, etc.

#### Table 8: Capital income financial summary, WMC (in Rs crore)

Items	2005–06 (actuals)	2006–07 (actuals)	2007–08 (actuals)	2008–09 (actuals)	2009–10 (actuals)	2010–11 (rev est)	2011–12 (budgeted)
Opening balance	2.00	8.74	15.37	23.27	27.52	30.79	38.20
Revenue account surplus/(deficit)	-1.70	0.70	-2.20	-2.00	-1.80	-2.00	-6.00
Capital account							
Capital income	2.41	3.99	6.72	4.46	4.33	7.62	5.49
Capital expenditure	3.49	1.92	4.51	3.00	1.57	3.26	5.00
Capital account surplus/(deficit)	-1.08	2.07	2.21	1.46	2.76	4.36	0.49
Surplus after considering revenue account and accrued balance	-0.78	11.51	15.38	22.73	28.48	33.15	32.69
% utilisation of capital income	145.00	48.00	67.00	67.00	36.00	43.00	91

Source: Wardha Municipal Council, 2005–06 to 2011–12

## 2.5 Private Sector Participation in Wardha

Due to lack of inhouse technical staff, the WMC has preferred to utilise services of private agencies, especially in water supply, the major private sector involvement being in the O&M of the partial water supply system. Yelakeli scheme, one of the two water supply schemes in Wardha, was implemented in 2001 by the Maharashtra Jeevan Pradhikaran (MJP). After completion, the MJP had contracted out O&M services under Yelakeli scheme to the local private contractor, SNL Engineering, which was supposed to look after the scheme's O&M, right from water lifting from source at Yelakeli dam to the water supply to ESRs. The value of this contract was Rs 12 lakh/annum, which excluded cost of alum, chlorine and other materials required for water treatment and the electricity bills as it was taken care by the MJP. After six months, when the scheme was handed over by the MJP to the WMC, the latter preferred to continue the O&M contract with SNL Engineering with modified terms and conditions and suitably renewed the agreement. The value of this new contract was Rs 13.8 lakh/annum. The contract was again revised in 2007 to include O&M of Pavnar scheme as well and, as per the revised contract, the cost of materials used at water treatment plants (WTPs) was to be borne by SLN Engineering. The contract with SNL Engineering was terminated in 2011 and a contract was made with Tipanna and Bhandari Co, which is continuing till date. Under water supply, private sector is also engaged in O&M of municipal dug well.

The WMC has also contracted sweeping of roads and open spaces, and cleaning of open drains and community toilets in three wards (14, 15, and 16) to the local agency. The details of the area to be swept and toilets to be cleaned by this agency are specified in the contract. The contract mentions collecting the swept waste and waste from open drains; it does not, however, specify anything about where and how this should be disposed of by the agency.

Under SWM, door-to-door collection and transportation of municipal solid waste to the disposal site were outsourced to a private agency till 2010. However, currently these services are undelivered due to some disagreement between the WMC and the contractor. Though the WMC was exploring other better performing contractors to deliver these services, the contract is likely to be continued with the same agency after revision of agreement. Even if the services are outsourced, the vehicles used for transportation of solid waste were municipal assets. Currently, door-to-door collection of waste is almost non-functional, except in a few wards where safai karmacharis collect the waste from individual households and are paid directly by them at the rate of Rs 10 per household per month. The *ghantagadis*<sup>2</sup> used by the safai karmacharis are municipal assets.

Apart from Water Supply, Sanitation and SWM, the WMC has also outsourced assessment of property tax collection for the years 2009–10 to 2012–13 to a private agency, Sthapatya Consultants, Amravati.

Some key details of all existing contracts entered into by the WMC are given in Table 9.

<sup>&</sup>lt;sup>2</sup> Waste collection carts.

## Table 9: Details of private contracts of WMC

Sector/title	Private agency	Scope of contract	Duration	Туре	Value of contract	Procurement process
Water supply from source to ESRs	Tipanna Bhandari and Co, Wardha	O&M of pumping station and WTP in Pavnar, pumping station in Yelakeli and WTP in Hanuman Tekdi. Includes cost of all materials used at WTP, etc, and telephone bills. Excludes cost of electricity bills.	1 year (April 1 of this year to March 31 of next year, since 2010)	O&M (Annual)	Rs 25,75,000 per year (paid by ULB)	Tendering
Dug well maintenance and supply of water to private users	Lalwani Construction s and Co, Wardha	Maintenance of well, selling water to private contactors/tankers. Providing free water to ULB (fire stations/municipal gardens, etc).	1 year (March 11 of this year to March 10 of next year, since 2009)	O&M	Rs 70,000 per year (paid to ULB)	Tendering
Assessment of property tax collection	Sthapatya Consultants, Amravati	All properties to be surveyed and computerised (single line plans). Tax assessment as per rules and regulations under Maharashtra Municipal Council, Industrial Township Act. Providing copyright registered software for the purpose of computerisation of the work. Providing primary tax assessment lists for first publication.	4 years (2009–10 to 2012–13)		Rs 268.5 per property Rs 2,95,000 per unit (software and its maintenance for a year)	Tendering
Sweeping and cleaning of open drains and community toilets	Nitin Thakur, Wardha	Sweeping of roads, lanes, and open grounds and cleaning of open drains and community toilets in Ward Nos 14, 15 and 16. Collect swept waste and waste from open drains. Cost of materials required for cleaning will be borne by the agency. Agency will be bound to monitor services and report to WMC periodically. Redressal of any related complaints will be agency's responsibility.	1 year (April 12, 2011, to April 11, 2012)		Rs 13,86,000 per year	Tendering





Photo plate 2: Interaction with WMC staff, elected representatives and citizens of Wardha















Hume panika koi problem nahi hai..but tax bohot jyada hai.. Hum bhar nahi pate!



Ye toilet bohot kaam ka hai.. Ye nahi hota to sab log idhar reh hi nahi pate..



Toilet me panika tanki to hai... par log uska pani gharpe leke jate hai





## 3 Assessment and Proposals for Water Supply

This section provides an overview of the water supply system in the WMC, its performance and issues, and proposals for improvement. It also discusses the role and responsibilities of the private contractor as well as suggestions to improve the contractual agreement with the private contractor.

## 3.1 Assessment of Current Water Supply System

for its water supply. One of the surface sources is Pavnar at Dham River constructed in 1969, located approximately 9 km north-east from the city. The second source of water for Wardha is at Yelakeli Dam on Dham River constructed in 2001, which is 11 km north of the city. The Pavnar Scheme has been owned and operated by the WMC since it was constructed, and the Yelakeli Scheme has been developed by the MJP and was handed over to the WMC in 2001. As mentioned previously, the water supply system from source to ESRs is operated and maintained by the private agency. Supplying water from

Wardha is dependent on two sources Figure 11: Location of source and WTP in Wardha



Source: Wardha Municipal Council, 2011

ESRs to the consumers' end and granting water supply connections to them is under the WMC's purview. The water supply schematic for Wardha is given in Figure 12.



Source: Wardha Municipal Council, 2011

Water from Pavnar is treated at the Pavnar WTP, which is located at the source itself. Water from Yelakeli Dam is pumped to the WTP in Hanuman Tekdi which is 11 km from the source, due to which there are substantial water losses in the trunk main. Water is distributed further to the consumers' end through six water distribution stations (WDS). Apart from the piped water supply through individual connections, there are 380 municipal public standposts, through which around 1 ML water is consumed on a daily basis. Water consumption through 480 municipal handpumps and open wells is in addition to the piped water supply, which is also around 1 MLD. The parts of the plots, outside city limits, are also served by the WMC for water supply as well as other services.

A Water and Energy audit for Wardha was carried out by a consultant to the WMC in 2006–07, in which are recommended detailed action plans and estimated investments for improved water supply system – these are explained in Annexure 1.

	Table 10: Responsibilities of Ti	panna Bhandari and Co as s	pecified in the contract with WMC
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Categories	Service related	Data records related	Issue
Access and coverage	Granting connections and supplying water at the consumers' end is under WMC's purview.		
Service levels and quality	Tipanna Bhandari and Co (the contractor) needs to appoint and train staff required for O&M of pumps in Pavnar and Yelakeli.	Tipanna Bhandari and Co shall present WMC a Quality Test Report acquired from the Public Health Laboratories or Govt. Bacteriological Technical Dept.	Timeframe for any work (repairing of pipelines/leakages; carrying out water quality tests, etc) has not been specified.
	Contractor is required to use ISI marked materials – alum, bleach or chlorine gas – for water treatment.	Tipanna Bhandari and Co shall present log book maintained at all pumping stations to WMC before 15th day of every month.	Minimum or maximum levels are not specified for any services (for example, water losses should not exceed 15 per cent; min 95 per cent water samples should pass the water quality tests, etc).
	To conduct OT test and maintain right dosage of chlorine will be Tipanna Bhandari and Co's responsibility.		What kind of records should be maintained in the log books is not specified.
	In case of breakdown of pumping machinery, contractor is required to repair and restore the same within 10 days.		Lack of clarity about who should make the effort towards ensuring supply of water: Tipanna Bhandari and Co or the WMC.
	In case during the term of contract the water supply scheme of the WMC is handed over to the MJP, then the present contract will be terminated.		The contract does not include a clause to ensure uninterrupted water supply to the city.
	In case water levels at the jack well become very low, contractor is required to make efforts to supply water to WMC 10 days in advance.		No clause on termination of contract from contractor's side before it expires. There should be a clause to ensure a sufficient notice to be given to the WMC and some form of penalty to be charged.
Financial sustainability	The contractor is required to bear cost of labour and material required for any repair work at WTP and pumping stations and maintenance of all cables, wiring, lights, starter machinery and transformers.		No slab on use of electricity.
	All staff required for operation and maintenance are to be appointed and paid by contractor. In case of any accidents or disasters, the contractor will be entirely responsible and bear all treatment or court cases related expenses.		Contract value is not linked to the minimum performance levels No penal clauses on failure of maintaining minimum performance levels.

Categories		Service related	Data records related	Issue
Efficiency	in	The contractor is required to repair		
service		leakages in the pipelines from:		
operations		Yelakeli to Hanuman Tekdi;		
		Pavnar to Ramnagar ESR; Pavnar		
		to Snehalnagar ESR; and Hanuman		
		Tekdi to Dayalnagar ESR.		
Equity	in	There are no clauses mentioned		
service		specifically for service provision to		
delivery		slum settlements.		

Source: Wardha Municipal Council, contract with Tipanna Bhandari and Co, 2011

At present, the contract is not linked to the performance of the agency. It was also observed that the services provided by the contractor are not monitored on a regular basis. During the site visits at source and WTP, negligence towards maintenance of assets and leakages in the pipelines were also noticed.

## 3.2 Assessment of Service Delivery

The WMC has been taking steps towards improving its service levels and heading towards achieving benchmarks. Figure 13 provides a snapshot of water supply service in Wardha. Wardha fares the same as its peers (Class A ULBs in Maharashtra) with respect to coverage of water supply connections. As population has decreased in the last few years, city level lpcd has increased even with the same quantity of water that is produced from source and supplied from WDS. Metering is completely absent in Wardha and water is supplied for 1.5 hours on alternate days. This makes it as an average duration of 45 minutes daily. Low water tariff plus comparatively low coverage of water supply connections has resulted into lower cost recovery and collection efficiency for water supply services.



#### Figure 13: Water supply KPIs for WMC

Source: CEPT University, 2011

#### 3.2.1 Access and Coverage

Coverage of water supply connections: The distribution network is estimated to cover about 100 per cent of the total inhabited area. However, the coverage of household level connections of water supply is relatively low at 54 per cent. The key reason for this is the lack of consumers' willingness to avail the connections due to perceived high taxes for them. Because of non-affordability of water taxes and ample availability of groundwater as a substitute, almost 40 per cent of citizens are dependent on alternative municipal groundwater sources, that is, 480 municipal handpumps and 100 municipal open wells. In addition to this, around 20 per cent households have private open or bore wells within their premises, which are used as supplementary sources to the municipal water. Another reason for the seemingly low coverage can also be probably attributed to the lack of appropriate data recording practices, due to which coverage of distribution network is estimated to be 100 per cent. The WMC has provided access to municipal supply to all 17 slum settlements irrespective of their

Figure 14: Coverage of water supply in Wardha



Source: CEPT University, 2011

status (notified or non-notified), all being fully covered through the g distribution network. The household level coverage in slums is also reported to be 41.6 per cent, which is comparable to the city level coverage.

As discussed with WMC technical staff, there are several barriers to achieving 100 per cent coverage. The reasons are manifold. There are about 15 per cent illegal connections that are difficult to be regularised in some cases; the existing network can add only 10 per cent more connections considering its capacity and age. Out of the remaining households, around 10 per cent are in slums that cannot afford availing connections in absence of affordable connection fees or provision of payment in instalments. About 11 per cent are not willing to avail connections as they can manage well with groundwater.

**Proposals for improvement:** As mentioned earlier, it is necessary to accurately assess the coverage of household level connections in the city.

**Identify and regularise illegal connections:** Around 1,800 connections that are estimated to be illegal need to be identified through door-to-door surveys and action should be taken to regularise them. The coverage will increase around 15 per cent only by regularisation of illegal connections. The WMC had started a mission for this in 2002, which wasn't 100 per cent successful. However, it has planned to gear it up in 2011, for which it has initiated surveys at household level.

**Convert public standposts to group/individual connections:** Currently, 380 public standposts that are catering to around 19 per cent of the total households are left uncharged. These can be converted by the WMC to group/individual connections and make their entry on the connection register as a household level connection. As a result of this, coverage of household level connections will increase considerably, that is, by around 20 per cent. In last two years, only 20 public standposts were converted to group connections.

**Discontinue use of municipal groundwater:** 480 municipal handpumps that are catering to around 8 per cent of the total households need to be discontinued to make people avail municipal connections and stop using groundwater, which will also help in conserving groundwater sources.

#### 3.2.2 Service Levels and Quality

**Per capita supply of water:** Looking at the quantity of water supplied, per capita supply of water at production level is 150, if measured ex-treatment it is 137 lpcd; while at the consumer end, it is 115 lpcd. Considering that the WMC is planning to lay a sewerage network, the per capita supply at consumer end should be a minimum of 135 lpcd as per Central Public Health and Environmental Engineering Organisation (CPHEEO) norms. As mentioned earlier, apart from piped water supply, the WMC also owns handpumps though which around 1 ML of groundwater is consumed on a daily basis. Considering this augmentation, lpcd at the consumer end is estimated to be 125. The WMC also supplies water through tankers on a demand basis; however, this is used mainly for commercial purposes (Rs 300 per tanker).

# Figure 15: Lpcd and continuity of water supply in Wardha



Source: CEPT University, 2011



#### Figure 16: Location of ESRs and the wards served by each ESR

Source: (CEPT University, 2011)

Currently, the water supply is intermittent, with an average of 45 minutes' supply to some of the wards in the morning and to the remaining wards in the evening. Figure 16 shows locations of all ESRs and the wards served by each ESR in the morning as well as evenings. Due to unplanned designs of the distributions system, water supplied at the tail ends (locations far from ESRs) has very low pressure and duration as compared to others. To avoid this, as per discussions with ULB technical staff, upgradation of part of the distribution network is required, which could be analysed further through hydraulic modelling or likewise technical assessments. Also, there are frequent breakdowns in the old distribution system (CI Pipeline) under Pavnar scheme, due to its age and frequent repair and maintenance. The WMC has taken the MJP's help for estimating costs incurred for refurbishment of distribution system under Pavnar scheme. The Council plans to submit a proposal based on these estimates and avail funds under the Maharashtra Sujal Nirmal Abhiyan (MSNA) for its implementation. As the focus of improvement area in water supply is moving towards 24x7, these proposals can be implemented with this perspective as described.

While the indicator assesses only water quantity supplied at consumers' end, in order to ensure reliability of the indicator, water produced at source, supplied from treatment plant and consumed at the consumers' end needs to be quantified to be accurate. This will also ensure better estimates of the extent of non-revenue water in the city. Currently, quantities are estimated on the basis of pumping capacities and hours of pumping. While metering at all major bulk and consumer connections can be done, it is capital intensive.

**Continuity of water supply:** Post 2009, the WMC has reduced supply days from daily to once on alternate days to avoid losses of water at consumers' end. According to WMC officials, this was done as consumers had a tendency of storing water on one day and replacing that with fresh water on the second day. This had resulted in considerable water losses, due to which it was felt that 45 minutes of water supply once in two days is also sufficient for consumers to fulfil their daily water demand. Though it was an effective action taken against water losses at consumers' end, it was observed to be the reverse step for moving towards 24x7 water supply. It was also observed that, at the tail ends, duration of water supply was not even more than 20 minutes.

Proposals for improvement:

Assessment of actual water demand at consumers' end: Household level surveys need to be carried out to assess actual water demand at the consumers' end. This could be done by engaging trained inhouse staff of the WMC.

**Quantification of water at various levels:** For quantifying water at various levels, periodic surveys at the major bulk production and selected consumer points need to be conducted. These can be done either through methods such as bucket survey or using portable flow meters.

Strengthening contract with the private agency: Performance monitoring clauses need to be factored into the contract with Tipanna Bhandari and Co to ensure minimum wastage of water at source, trunk and transmission mains and WTPs. Present bulk meters need to be repaired and, wherever absent, new bulk meters need to be fixed.

Monitor water supply duration at various locations: To ensure that water supply in all the zones of the city is regulated (fixed timings of supply and at adequate pressure), it is necessary to monitor water supply duration to all these zones separately through regular consumer surveys coinciding with the

water quantity surveys. In addition to this, complaints received need to be recorded properly and updated on a regular basis so that they can be analysed and monitored to identify problem locations. Appropriate monitoring mechanisms can also be adopted by the WMC to detect low pressure zones to assess areas and reasons of pressure related issues in the existing network.

**Technical assessment of existing distribution network:** Further technical assessment of existing distribution network is also required to identify which part of network needs to undergo refurbishment.

**Quality of water supply:** Quality of water is reported to be 96 per cent in the current year as per records maintained with the WMC. As treatment of raw water is outsourced to Tipanna Bhandari and Co, 'quality of water' is mainly affected by of services provided by them. Through site visits, it was observed that cleanliness at WTP and maintenance of the treatment machinery was not up to the mark. At present, there are no clauses in the contract or monitoring system to ensure minimum O&M standards at the WTP.

Apart from the measures that are taken for improving quality of water at the WTPs, it is also important to maintain quality of treated water till the time it reaches the consumers' end. At some locations, it was observed that the water supply distribution line passes through major open drains. At such points, if there are any leakages in the pipeline, it is likely that the pure water will be contaminated.

**Metering of water supply connections:** Wardha has no metering at consumers' end, due to which the WMC is unable to calculate quantity of water consumed at the users' end. When the MJP handed over Yelakeli scheme to the WMC, the bulk meters were fixed at the source in Yelakeli Dam and WTP in Hanuman Tekdi, which are currently observed to be non-functional – the reason being improper maintenance by the contractor.

Drawing lessons from several cities managed by the MJP, and as required under the reforms required under the MSNA, the WMC needs to ensure that metering is introduced at all levels.

#### **Proposals for improvement:**

Monitoring of services provided by the contractor: More stringent monitoring of the quality procedures undertaken by Tipanna Bhandari and Co needs to be carried out by the WMC. Also, the maintenance of meters and other devices at the source and WTP need to be monitored by the WMC and assessed periodically to review their accuracy.

Assessment of water quality related complaints: Possibilities of linking the complaint redressal system with quality monitoring need to be assessed. For instance, if particular areas of the city report frequent complaints of low quality, these can be analysed better for likely causes and solutions.

#### 3.2.3 Financial Sustainability

**Cost recovery (O&M) of water supply:** The cost recovery on O&M of water supply services is only 43 per cent. In 2010–11, the total operating expenditure is 2.86 crore and revenue demand from water tax is 0.63 crore. The main reason for poor cost recovery is the low revenue demand. The reason for this can be attributed to the low coverage of water supply services at 51 per cent. On the expenditure side the major heads of expenditure are electricity charges/fuel costs and outsourced/contract staff costs. To reduce electricity expenditure, all recommendations made in the energy audit must be implemented. Table 11 gives the current water tariff structure at the WMC.

#### Table 11: Water tariff: WMC, 2011

Water tariffs	Туре	2006–2011		
Water connection fees (Rs/connection)	Connection fees (Rs)	23	231	
	Deposit (Rs)	1,000		
	Cost for digging pucca/tar road	200		
	Total	1,4	1,431	
Water tax	Type of connection	Res	Com	
(Rs/year)	<sup>1</sup> / <sub>2</sub> -inch connection	926	3,700	
	<sup>3</sup> / <sub>4</sub> -inch connection	1,675	7,258	
	1-inch connection	3,780	16,272	

Source: Wardha Municipal Council, 2011

**Collection efficiency:** The collection efficiency of water tax of the WMC is 51 per cent at present. The main reason for the low collection efficiency is the peoples' unwillingness to pay as the present tariff structure is perceived to be very high. As a remedy to low cost recovery in water supply, the Council has proposed an increased water tariff from 2011–12, as per the resolution passed by the Standing Committee. This could affect collection efficiency adversely. Thus, keeping in mind the staff crunch faced by the WMC and the likely adverse effect of the increased tariffs, the option of outsourcing tax collection can be explored by the Council.

The two major steps that will help attain financial sustainability in water supply in the WMC are:

- Increasing coverage of water supply in a phased manner so as to achieve 100 per cent coverage by 2020.
- Improving collection efficiency to 95 per cent in a phased manner by 2015.

Table 12 shows a snapshot of how financial sustainability can be attained in water supply with increased tariff rates, by attaining 100 per cent coverage by 2020 and improving collection efficiency to 95 per cent in a phased manner. If the above is done, financial sustainability can be attained by 2013.

Year	No of connections	Increased coverage (%)	Tariff per connection annually	Increased demand (Rs cr)	Increased collection efficiency (%)	Collection with increased efficiency (Rs cr)
2010	12,313.00	51.00	924.00	1.14	51.00	0.53
2011	13,279.00	55.00	924.00	1.23	65.00	0.79
2012	14,486.00	60.00	1,500.00	2.03	70.00	1.42
2013	15,694.00	65.00	1,500.00	2.35	80.00	1.88
2014	16,902.00	70.00	1,500.00	2.54	85.00	2.15
2015	18,109.00	75.00	1,500.00	2.72	95.00	2.58
2016	19,317.00	80.00	1,500.00	2.90	95.00	2.75
2017	20,524.00	85.00	1,500.00	3.08	95.00	2.92
2018	21,731.00	90.00	1,500.00	3.26	95.00	3.09
2019	22,940.00	95.00	1,500.00	3.44	95.00	3.26
2020	24,147.00	100.00	1,500.00	3.62	95.00	3.43

Table 12: Financial sustainability in water supply with increased connections, tariff and collection efficiency

Source: CEPT University, 2011

#### 3.2.4 Efficiency in Service Operations

**Extent of non revenue water (NRW):** All the above indicators have direct or indirect impact on NRW. As mentioned above, the per capita consumption (115 lpcd) is quite low compared to per capita supply (137 lpcd) due to substantial losses in the distribution network. This may be at least partly due to the old network under Pavnar scheme (1969). However, as metering is not practiced in the city, and there are no periodic surveys undertaken by the WMC, estimates of NRW are not validated. Also, the water consumed through public standposts and exempted connections is supplied free of charge, which is an equally major component of NRW.

Initially, when the Yelakeli scheme was implemented, cases of illegal pumping from trunk and transmission mains were observed. These have been stopped recently as the MJP has started implementing dedicated water supply schemes in the nearby villages.

**Proposals for improvement:** Almost all measures suggested above, especially for coverage of water supply connections and per capita supply, are required to be taken for reducing NRW effectively. Collectively, they are highlighted again as follows:

**Quantify water at various levels:** For quantifying water at various levels, periodic surveys at the major bulk production and selected consumer points need to be conducted. These can be done either through methods such as bucket survey or using existing or portable flow meters. Repair and maintenance of existing meters at source and WTP is necessary. Post-repair functioning of these meters also needs to be monitored by the WMC in future.

**Identify and regularise illegal connections:** Around 1,800 connections that are estimated to be illegal need to be identified through door-to-door surveys and actions should be taken to regularise them.

**Convert public standposts to group/individual connections:** Currently, 380 public standposts that are catering to around 19 per cent of the total households are left uncharged and cannot be even counted as a part of household level coverage of connections. These can be converted by the WMC to group/individual connections and made chargeable. Only by doing this can NRW be brought down from 40 per cent to around 26 per cent.

**Strengthen contract with the private agency:** Clauses need to be factored into the contract with Tipanna Bhandari and Co to ensure the parameter of minimum wastage of water is met at source, trunk and transmission mains and WTPs.

**Technical assessment of existing distribution network:** Further technical assessment of existing distribution network such as hydraulic modelling is also required to identify the parts of the network that need to undergo refurbishment to avoid physical losses. DMAs (District Metering Areas) of appropriate sizes can be formed to identify locations of leakages, etc.

Efficiency in redressal of customer complaints: Consumer redressal is another area that has not been properly addressed by the WMC. Not all the complaints that are received are registered. As per records, it looks like only four to five complaints are received per month; whereas the estimated number of complaints received per month varies between 80 to 120. This is because almost 95 per cent complaints that are received in person or telephonically are not even registered or recorded by the WMC. According to the WMC, though the complaints are not recorded, around 75 per cent of the complaints that are

received are redressed within 24 hours. Due to lack of records, it is difficult for the WMC to assess complaints according to their type or location, which could have helped it in identifying areas for improvement.

#### 3.2.5 Equity in Service Delivery

Wardha has 17 slum settlements, of which 12 are notified. As mentioned previously, the WMC provides services in slums irrespective of their notified or non-notified status. Coverage of water supply connections in slums of Wardha is reported to be 41.6 per cent





Source: Slum Surveys, WMC, 2011

All 17 slum settlements are covered with a distribution network. As mentioned previously, the WMC has adopted the policy of providing services to the slums irrespective of whether they are notified or non-notified. Figure 17 shows number of households in different slums with access to various water supply services. It can be seen from the graph that eight out of 17 slums have more than 50 per cent coverage of water supply connections. Sindhi and Ramnagar Sweeper Moholla seem to have highest coverage of water supply connections at household level, that is, above 95 per cent. Wadar is highly dependent on public standposts, whereas, Tarfail and Indirawadi (Lendipura) are highly dependent on handpumps. Pulfail, the biggest slum with a population of 7,402, is one of the oldest slums and shows equal dependency on all sources of water supply.
# Photo plate 3: Water supply: Wardha



### Photo plate 4: Water consumption: Wardha



# 3.3 **Proposed Actions/Interventions for Water Supply**

Based on the above analysis, Table 13 gives indicator-wise priorities that could be derived for the WMC.

Priority	Water supply KPIs				
	Extent of non-revenue water (NRW).				
	Continuity of water supply.				
First/immediate	Cost recovery (O&M) in water supply services.				
	Efficiency in collection of water supply charges.				
	Coverage of water supply connections/in slums.				
	Quality of water supplied.				
Second	Efficiency in redressal of customer complaints.				
	Extent of functional metering of water connections.				
Third	Per capita supply of water at consumers' end.				

Table 13:	Prioritisation	of actions	for improv	ement in w	ater supply,	WMC

Table 14 gives some important interventions that are proposed based on discussions with the WMC and analysis of the key indicators and their data reliability. Capacity building of the staff must also be conducted to ensure proper implementation of these interventions. As the focus of improvement in water supply is to move towards a 24x7 water supply system, the interventions mentioned in the Table need to be carried out by the WMC to ensure that basic systems are in place. Detailed interventions which will incur capital investment by the WMC are discussed in the next section.

Table 14: Summary of interventions required in water supply services, WMC

Categories	Interventions required
Access and coverage	Identify illegal connections through household level surveys and regularise them.
	Convert public standposts to group/individual connections.
	Discontinue handpumps to stop use of municipal groundwater.
	Encourage citizens to avail connections by ensuring better quality water and services,
	simplifying procedures of granting connections and/or by giving some other incentives.
	Create heads of 'general' (for non-slum households) and 'slum' households in the
	connection register and maintain data likewise.
Service levels and	Assess actual water demand at consumers' end.
quality	Quantify water at various levels: repair existing bulk flow meters; train staff to conduct
	periodic surveys at the major bulk production and consumer points, either through
	methods such as bucket survey or using portable flow meters.
	Strengthen contract with the private agency: clauses need to be factored into the contract
	with Tipanna Bhandari and Co to ensure the parameter of minimum wastage of water.
	Increase monitoring of quality procedures and reporting by Tipanna Bhandari and Co as
	well as the WMC.
	Monitor water supply duration at various locations: Monitor water supply duration to all
	supply zones separately through surveys.
	Technical assessment of existing distribution network: Likeliness of refurbishment of part
	of distribution network needs to be verified through hydraulic modelling, etc.
Financial sustainability	Revise/extend contractual agreement.
	Attain 100 per cent coverage by 2020 and improving collection efficiency to 95 per cent in a
	phased manner.
Efficiency in service	Improve data recording system so that it can be used for decision making.
operations	Assess various kinds of complaints to identify areas for improvement.

# 3.4 Moving Towards 24x7 Water Supply in Wardha

The GoM's major focus in performance improvement has been the planning and implementation of 24x7 water supply system in all Class A cities in the state. At present, O&M of water supply system from source to ESRs is outsourced due to lack of technical staff at the WMC. A few issues pertaining to the services provided by the contractor, monitoring by the Council, free use of water and gaps in data records may exist. However, as compared to any other peer class cities, Wardha portrays an above average scenario as far as its water supply services are considered. The key indicator which is thought of on priority while planning for 24x7 water supply is per capita supply, is comparatively closer to the recommended level of 135 lpcd.

The WMC has carried out a comprehensive water audit, leak detection and leak reduction, energy audit and energy conservation for the entire water supply distribution of the WMC in 2006–07 through the consultant. The following issues were highlighted as a result of the water and energy audit:

- Pumping machinery is not performing on the duty parameter leading to unreliable operations.
- Absence of consumer meters also resulted in water theft, illegal usage.
- The availability and cost of energy for UWSS operations in India and in Maharashtra will be an issue of concern.

The cost of energy is likely to increase further with more competing uses. Therefore, the WMC shall implement the action plan on energy efficiency and energy conservation for immediate savings as given below:

- Meter water production and consumption points.
- Invest in pump efficiencies for energy efficient pumping.
- Improve existing electrical efficiency by installation of capacitors for immediate benefit.
- Install Remote Monitoring System for the WMC, for flow and energy monitoring of WMC's water supply to ensure continuous energy efficiency.

The detailed action plan and estimated investment for improved water supply system as per the water and energy audit are given in Annexure 1.

While steps towards achieving 24x7 water supply requires substantial efforts, certain actions related to the upgradation of human resources and improved management information systems are easier to implement. The technical guidelines suggested by MoUD towards 24x7 systems provide an approach based on the technical, commercial and institutional improvements required.

**Technical improvements**: Given that the Council currently operates its water supply in intermittent conditions, technical shortcomings would exist which would constrain the shift towards establishing 24x7 water supply systems. These are discussed here.

- Reliable data on distribution networks and customers do not exist.
- Pipelines comprising the distribution system are totally interlinked.
- There is virtually no metering of bulk water produced, its transmission or distribution at any point.
- Customer meters do not function with any predictable accuracy under intermittent supply conditions.

- Control of leakage on a routine, planned basis is impossible.
- It is unusual for service providers to routinely measure system pressure.

Some of the technical and commercial constraints mentioned by the MoUD guidelines are resolved through the implementation of the GoM's reform programme of MSNA.

### Reliable data on distribution network and customers is achieved through:

- 1. <u>Consumer end survey</u>: 100 per cent consumer survey will help in identification and subsequent regularisation of illegal connections. It will provide data on household consumption which will help in assessment of augmentation of water sources, if required.
- 2. <u>GIS mapping and hydraulic modelling</u>: GIS mapping will provide detailed network maps with results from consumer survey and hydraulic modelling will help to implement equitable distribution zones in the city.

### Interlinked distribution network can be restructured through:

- 3. <u>Water audit and leak detection and energy audit study</u>: Water audits will help in identification of major points of losses (real: physical and apparent) from source to consumer end in the network. Along with leak detection studies, this will help locate critical areas in the network. The network refurbishment and augmentation can then focus on these areas on priority basis.
- Demarcation of District Metering Area (DMA)s and installation of bulk flow meters: The analysis of results generated from GIS mapping and hydraulic modelling will be used for demarcation of DMAs. Once they are demarcated, bulk flow meters will be installed to monitor quantity of flow into these DMAs.

### Metering at bulk production and distribution points including consumer connections:

5. <u>Introduce consumer metering and volumetric tariff</u>: The reforms mentioned above related to regularisation of illegal connections, implementation of suggestions of water audit and energy audit, formation of DMA, etc, will reduce the O&M expenditure. Once these reforms are in place, the city should introduce metering at consumers' end and volumetric tariff to recover full O&M cost.

**Commercial improvements:** Given that the technical improvements need to be financially sustainable, the conversion to 24x7 water systems requires advanced commercial systems and procedures. In Wardha, billing is currently based on flat tariff. With introduction of metering and volumetric tariff system, consumers will be charged based on the water quantities consumed. To ensure that the system progresses smoothly, in the initial phase, the WMC needs to develop public awareness.

**Institutional improvements:** To move towards 24x7 water systems, the Council has to significantly improve and supplement its managerial and technical skills as well as those of the private operator, as hitherto these skills were oriented towards maintaining an intermittent supply. Some of the technical aspects that will require improved skills and automation are:

• Planning and design of water supply infrastructure from source to distribution to customer for 24x7 system, including conceptualising and establishing DMAs.

- Restructuring of existing systems, currently operated under intermittent conditions, to continuous supply at minimal cost and simultaneously maintaining supply throughout the conversion process.
- Appropriate hydraulic models and application to planning, design and operation.
- All aspects of pressure management including specification of pressure valves
- Design and specification of flow and pressure measurement and control devices for management of continuous supply.

Hence, the operational skills required to plan and implement these measures would include operation under continuous supply, pressure management, proactive detection and repair of leaks, proactive detection and regularisation/disconnection of illegal connections, mapping of water service infrastructure on GIS linked to operation, maintenance and customer services tracking. While the WMC can continue to rely on the skills provided by Tipanna Bhandari and Co, more staff for the WMC and private operators need to be appointed in order to ensure smooth functioning of the 24x7 system.

SN	Snapshot of water supply issues	Possible solutions
1	Lack of technical staff.	Recruit more or introduce appropriate outsourcing of services to relieve burden on the WMC. The Council should also explore possibilities of outsourcing O&M of all water supply services from source to consumer end considering lack of internal technical capacities.
2	Lack of technical assessment/monitoring over performance of private contractor.	Revision of contract T&C/contract should be performance linked.
3	High NRW through physical losses and illegal connections.	Identification and regularisation of illegal connections, quantifying water production/supply and consumption by introducing metering and undertaking proper monitoring.
4	High NRW through authorised free connections.	Conversion of standposts to group/individual water supply connections.
5	Inequality in duration of water supply (hours) at different places (head and tail ends), because of current distribution system.	Refurbishment of part of distribution network.
6	Coverage of water supply connections is low as people are dependent on groundwater and not willing to avail the connections.	Regularisation of illegal connections/additional connections by expanding distribution network.
7	Age of distribution network under Pavnar scheme (pipelines, since 1898).	Rehabilitation of Pavnar distribution network.

#### Table 15: Identified issues and probable solutions for water supply services in Wardha

	Interventions with substantial capital expenditure										
		Action	KPIs impacted	Est cost (Rs cr)							
diate priority	1	Improvement in trunk main (reduction in raw water transmission losses).	Lpcd, NRW and cost recovery.								
	2	Reduction in treated water transmission losses.	Lpcd, NRW, quality of water and cost recovery.								
	3	Improvement in distribution system.	Coverage, lpcd, continuity, NRW, quality of water and cost recovery.	0.21							
Imme	4	Improvement in water storage.	Lpcd, NRW and quality of water.								
h y	5	Additional connections by expanding distribution network.	Coverage of water supply connections.	0.15							
Secon priorit	6	Replacement of pumping machinery.	Lpcd and NRW.	0.09							

#### Table 16: Interventions in water supply services requiring substantial/minimal/no capital investment

	Interventions with minimal/no capital expenditure									
		Action	Est cost (Rs cr)							
liate Priority	1	Energy and water audit.	Coverage, lpcd, continuity, coverage in slums, complaint redressal, cost recovery and efficiency in collection of charges.	0.39						
	2	Identification and plugging of leakages.	Lpcd, NRW and cost recovery.	1.30						
	3	Reduction in/of free water.	Coverage of water supply connections, NRW, cost recovery.							
Imme	4	Regularisation of illegal connections.	Coverage of water supply connections, lpcd, NRW and cost recovery.							
d Iy	5	Maintenance of WTP and pumping machinery.	Quality of water.							
Secon Priorit	5	Periodic checking of water losses and its repairing.	Lpcd and NRW.	0.09						

Considering various aspects required for moving towards 24x7 water supply in Wardha, Table 17 attempts to give estimates for the overall costs for various items. It shows that Wardha will require minimum funds of Rs 40 crore to be raised from various sources to implement continuous water supply. In case of absence of funds, the WMC can also choose a pilot DMA and establish continuous water supply scheme. Lessons from the pilot project can feed into a city-wide project with support from appropriate private partners.

A summary of the actions and cost implications towards achieving 24x7 water systems is given below.

# Table 17: Summary of improvement actions to implement 24X7 system

	Cost estimations for 24x7 water supply in Wardl	na Municipal	l Council	
	Head	Block cost	Unit	Rs in crore
		90,000	Up to 64 sq km	
1	Satellite Image	1,350	Beyond 64 sq km, for each sq km	0.01
2	Supply and installation of GIS software	1,95,000	Each	0.02
3	Digitisation of satellite image – creating road network, rivers, water bodies, building, land use, etc. Generation of hard copy plot for consumer survey/field survey work	6,250	Per sq km	0.01
4	Physical surveys – GIS network survey and base map survey, admin zones and wards	3,000	Rs/km	
		500	Rs/sq.km	0.02
5	Consumer surveys	36	Rs/HH	0.09
6	747 - Louis	28,00,000	Rs For towns with population of 1 lakh	
6	water audit	20,000	Rs Additional for 1000 pop. above 1 Lakh	0.29
7	Energy audit		Lump sum	0.10
8	Hydraulic model (750 nodes, with 10 nodes/km)	600	Rs/node	0.05
9	Billing software + 1 year's maintenance		0.10	
10	Bulk flow meters (20)	30,000	Rs/bulk flow meter	0.06
11	Replacement of house service connections (assuming 20 per cent connections to be replaced)	3,000	Rs/connection with mechanical meter	0.74
12	Rehabilitation of distribution network, for (if) 20 per cent distribution network to be replaced/added	26,00,000	Rs/km	7.28
13	Pavnar Water Works: Replacing motor pump, repairing clarifier, civil work, electrification rising main repairing, air valve replacement, compound to site			7.00
14	Yelakeli Water Works: Repairing of existing pump, civil work, valve replacement for rising main		As adopted from water audit and/or	2.00
15	At Hanuman Tekdi filter unit: GSR, sump, wash water treatment plant		provided by MJP	6.00
16	New distribution network: Providing new M.S. pipeline, 2 ESRs for new area for distribution by gravity			9.00
17		TOTAL (for	items 1 to 16) Rs lakh	32.76
18	In	ncluding 20 p	per cent contingencies	39.31
	Estimated cost for 24x7 water supply in Wa	ardha (Rs)		40 cr
19	If 100 per cent distribution network is to be replaced	26,00,000	Rs/km	36.40
20	TOTAL (for item	ns 1 to 11, 13	to 16, and 19) Rs lakh	61.88
21	Ir	ncluding 20 p	er cent contingencies	74.25
	Estimated cost for 24x7 water supply in Wa	ardha (Rs)		75 cr

# 4 Assessment and Proposals for Sanitation

This section captures the sanitation aspects in Wardha related to coverage of toilets in the city as well as services in slums, septage management and a summary of proposed interventions for improving sanitation in the city.

### 4.1 Assessment of Current Sanitation Scenario

Wardha does not have an underground sewerage network at the city level. By and large, disposal of waste water is thus carried out through the septic tanks. However, around 150 properties out of a total 15,135 properties with access to sanitation are estimated as having no onsite sanitary disposal.



#### Figure 18: Wastewater KPIs for Wardha

Source: CEPT University, 2009-11

#### 4.1.1 Access and Coverage

The coverage of toilets in the WMC has increased from 76 per cent in 2008–09 to 81 per cent in 2010–11. This accounts for both individual toilets as well as access to community/pay-and-use toilets for both residential and non-residential properties.

As per the recent figures from Census 2011, 84 per cent of the households have access to safe sanitation implying latrine facilities within premises and connected to pipe sewer, septic tank and ventilated improved pit latrine. However, 4 per cent of households do not have access to any sanitation (improved/shared/unimproved) and thus resort to open defecation. While the figures calculated by considering

# Figure 19: Population with access to sanitation facilities as per Census 2011



Source: Census, 2011

availability of facilities show that the households resorting to open defecation are only 4 per cent, it was observed that some of the facilities were not functional and hence, percentage of open defecation was estimated to be around 19 per cent. The WMC is planning to submit a proposal under the ILCS programme for availing funds for construction of more community toilets as required, for which door-to-door surveys are being conducted by the Council. Currently, the WMC has provided 23 community toilets with 492 seats. Assuming an average of eight households per seat, it is estimated that around 3,936 households can be served by the community toilets. Maintenance of all community toilets is taken care by the WMC except for three wards, where it is contracted to a private agency. During visits, around 77 community toilet seats out of 492 were found non-functional due to lack of water; missing or broken doors, broken water closet pans, misuse of toilet blocks as storage places, etc; in other places, some seats were unclean due to which they were not in use. This has aggravated the extent of open defecation in the city, predominantly along the railway lines and near community toilet blocks. However, as compared to peers, contribution of community toilets to overall sanitation in Wardha is considerable. At city level, coverage of community toilets was found to be 17 per cent.

### 4.1.2 Financial Sustainability

**Cost recovery in sewage management:** The cost recovery on O&M of wastewater management is 58 per cent. In 2010–11, the total operating expenditure is 0.1 crore and revenue demand from sanitation tax is 0.06 crore. A sanitation tax of Rs 40/household with toilet is levied annually. Currently, there are 15,135 households with toilets. On the expenditure side, the major heads of expenditure are repairs/maintenance costs and chemical costs.

**Efficiency in collection of sewage charges:** Present collection efficiency of sanitation tax of the WMC is only 51 per cent. As per the suggested action plan, the WMC can become open defecation free (ODF) by 2018, by constructing 8,397 individual toilets, for the entire population that currently does not have access to toilets (option 1: under 'moving towards open defecation free Wardha').

Year	No of properties with individual toilets	Sanitation tax demand @ Rs. 40/ property	Collection efficiency (%)	Collection (Rs cr)	Sanitation tax demand @ Rs. 50/ property	Improved collection efficiency (%)	Collection with increased efficiency (Rs cr)	Net increased collection sanitation tax
2011	15,135	0.06	51.00	0.03	0.08	55.00	0.04	0.01
2012	15,135	0.06	51.00	0.03	0.08	60.00	0.05	0.02
2013	15,135	0.06	51.00	0.03	0.08	65.00	0.05	0.02
2014	15,135	0.06	51.00	0.03	0.08	70.00	0.06	0.03
2015	16,815	0.07	51.00	0.03	0.08	75.00	0.07	0.04
2016	18,495	0.07	51.00	0.04	0.09	80.00	0.09	0.05
2017	20,175	0.08	51.00	0.04	0.10	85.00	0.10	0.06
2018	21,855	0.09	51.00	0.05	0.11	90.00	0.10	0.06
2019	23,535	0.09	51.00	0.05	0.12	95.00	0.11	0.06
2020	24,147	0.10	51.00	0.05	0.12	95.00	0.12	0.07

Table 18: Financial sustainability in wastewater management with increased sanitation tax and improved collection efficiency

The two major steps that will help attain financial sustainability in wastewater management in the WMC are:

- Increasing sanitation tax to Rs 50 per household from Rs 40 per household.
- Improving collection efficiency to 95 per cent in a phased manner by 2015.

Table 18 shows a snapshot of how financial sustainability can be attained in waste water management by increasing sanitation tax to Rs 50/household with individual toilet, and improving collection efficiency to 95 per cent in a phased manner.

#### 4.1.3 Equity in Service Delivery

As mentioned earlier, the WMC has extended its services to slums irrespective of their notified or non-notified status. The

Council has conducted household level surveys in slums in 2011, according to which the coverage of individual + community toilets in slums is recorded to be 77 per cent –out of which 36 per cent is the coverage of individual toilets. All 17 slum settlements are covered under property tax collection and assessment, though collection efficiency of taxes and charges is very low in slums. No dedicated funds are reserved in the budget for provision of services in the slums.

According to the surveys, the settlement level coverage of individual and community toilets is: Ramnagar and Sindhi are the slums where all households have individual toilets; all households in Wadar slum are resorting to open defecation due to the absence of individual or even community toilets. Nine slums out of 17 report having no households resorting to open



Figure 20: Coverage of toilets at city level and slums in Wardha



defecation; Tarfail and Itwari report having more than 50 per cent open defecation. It was observed that wherever community toilets are available within a 100 m radius, use of community toilets is higher.





Source: Slum surveys, WMC, 2011

Dependency of households on various facilities was studied with respect to availability of facilities which showed that the ratio of households/seat of community toilets varies slum–wise from one household/seat to 13 households/seat.

It can be seen from Figure 22 that almost all community toilets are located near slums. Ramnagar, Sindhi, Gorakshan and Wadar are the four slums with no access to community toilets, out of which Ramnagar



#### Figure 22: Location of community toilets and open defecation spots

Source: CEPT University, 2011

and Sindhi are totally dependent on individual toilets and Gorakshan is partially dependent on individual toilets. However, Wadar has absolutely no access to sanitation. In spite of community toilets being located on the periphery of most of the slums, households from more or less 15 slums defecate in the open, either due to no easy access to toilets, poor facilities or tendency to defecate in the open even if good quality facilities are available within reach. As all community toilets are located near slums, it seems that access to community toilets for non-slums areas is low.

### Table 19: Slum-wise identification of deficit/surplus of toilet seats

Slum-wi	Slum-wise identification of deficit/surplus of toilet seats										
SN	Name of slum	Number of HHs	No of HHs with individual toilets	No of HHs dependant on community toilet	No of community toilet seats available	HHs that could be served with the existing community toilets (Assumption = 10 HH/seat)	Excess HHs	Excess HHs per seat	No of community toilet seats required		
1	Pulfail	1,480	391	1,089	60	600	489	6	1.2		
2	Safai Kamgar Basti Krushna Nagar	46	9	37	30	300	-263	-4	-0.8		
3	Tarfail	94	18	76	6	60	16	8	1.5		
4	Ashoke Nagar/Mangaradipura	306	182	124	24	240	-116	0	0		
5	Sindi Zoparpatti	95	93	2	0	0	2	-	0.4		
6	Stationfail	425	222	203	52	520	-317	-1	-0.2		
7	Sweeper Muhallah (Ramnagar)	26	26	0	20	200	-200	-5	-1		
8	Vinobha Bhave Nagar	81	57	24	6	60	-36	-1	-0.2		
9	Mahadev Pura (Chambhar Nallah)	60	21	39	30	300	-261	-4	-0.7		
10	Wadar Zopadpatti	137	0	137	0	0	137	-	27.4		
11	Gorakshan	32	29	3	0	0	3	-	0.6		
12	Indira Nagar	229	102	127	10	100	27	8	1.5		
13	Indira Wadi	117	22	95	10	100	-5	5	0.9		
14	Matangpura (Mangpura)	76	31	45	7	70	-25	1	0.3		
15	Burad Muhallah	194	73	121	14	140	-19	4	0.7		
16	Itwari	278	42	236	15	150	86	11	2.1		
17	Sweeper Pura	202	89	113	20	200	-87	1	0.1		
		Requirement	of additional to	oilet seats				33	35		

### Photo plate 5: Community Toilets: Wardha



Photo plate 6: Poor maintenance of community toilets, and open defecation





Resident nearby broke the toilet because land value of his adjacent plot decreased.





### Photo plate 7: Services in slums: Wardha



# 4.2 Moving Towards Open Defecation Free Wardha

Given that the GoM's major focus in urban sanitation has been towards **'making cities open defecation free'**, the performance improvement plan in sanitation for the WMC has concentrated on covering the gap in toilet coverage, and related components (like IEC, awareness campaigns, etc).

For making Wardha an open defecation free city, in the given condition of ample water supply, it is essential to first create awareness among the citizens of Wardha – through necessary IEC measures – about using existing toilet facilities properly. The second priority is to provide additional individual, shared and community toilet seats, along with the required infrastructure, to meet the gap in demand and supply.

Based on the above analysis, various options have been worked out based on provision of individual toilets, individual and community toilets where constraints for providing individual toilets exist, and construction of additional toilets with refurbishment of existing ones where required.

**Option 1: Achieving open defecation free status through 100 per cent provision of individual toilets:** To ensure open defecation free status, the Council has to construct about 8,397 individual toilets. Assuming that an average cost of Rs 75,000 per individual toilet, the total cost works out to be Rs 72 crore.

**Option 2:** Achieving open defecation free status through provision of individual and community toilets: In consultation with the WMC, an assumption is made that around 30 per cent of the citizens with no access to toilets would have the affordability (Rs 25,000 = one-third of total cost) and space for individual toilets. With this assumption, 2,520 households can be provided with individual toilets. In addition, 243 new community toilet seats will have to be constructed, considering 492 existing seats are refurbished. The estimated total cost for this option is Rs 29 crore.

**Option 3:** Achieving open defecation free status through provision of only community toilets: Alternatively, the Council can also look at the option of making the city open defecation free through the provision of community toilets. Under this scenario, the Council will incur a total cost of Rs 13 crore for constructing about 60 new community toilet blocks and refurbishing the existing ones.

	For making Wardha open detecation free											
Wardha: Exist	ing condition											
Total no of properties	Total HHs	HHs with access to individual toilets	HHs/properti es without access to individual toilets	Existing seats of communit y toilets	Functional seats	Seats actually refurbishn	that need nent					
25,505	05 23,532 15,135		8,397	492	415	77						
Strategies for	ODF		Option 1	Optio	on 2	Option 3						
Number of in	dividual toilets		8,397	2,519 (30% HHs)		0						
Number of se	ats in community toile	ets	0	243 (70% HHs)		558						
Cost per indiv	vidual toilet		75,000	75,000		0						
Cost per seat	t in community toile septic tank) (Rs)	0	1,25,0	000	1,25,000							

63

22

#### Table 20: Summary of options to make WMC open defecation free

Total cost of construction (Rs cr)

7

Strategies for ODF	Option 1	Option 2	Option 3
IEC activities at 5% of construction cost (Rs cr)	3	1	0
Cost of refurbishment of existing CTs (Rs cr)	6	6	6
Total cost for making Wardha ODF (Rs cr)	72	29	13

Note: Block costs have been assumed in consultation with WMC staff

Considering the WMC's current financial position, achieving 100 per cent toilet coverage through option 1 does not seem to be financially feasible. Issues of space constraints for constructing individual toilets have also been observed in some of the settlements. On the other hand, while option 3 is the least costly of all options, O&M of the community blocks will remain an issue as similar issues can be seen in the existing community toilets. During the site visits, it was observed that toilet blocks were not functioning due to lack of water availability, dilapidated infrastructure, no electricity, etc. The WMC needs to also look at refurbishment of such toilet blocks before constructing new blocks. Option 2, which requires construction of individual toilets where possible and community toilet blocks in the remaining areas is, therefore, most feasible. Estimations for option 2 were attempted in detail at the slum level as surveys have been conducted in slums and settlement level data is available (see Table 21).

In Wardha, it was found that the reason behind people defecating in the open is not mainly the unavailability of community toilet seats but their poor repair and maintenance. Currently, the WMC has outsourced cleaning of community toilets in only three wards, while community toilets in the rest of the wards are maintained by the WMC. It was observed that the community toilets maintained by the contractor are comparatively cleaner and functional. Hence, outsourcing repair and maintenance of all community toilets could be explored by the Council. In that case, the WMC needs to ensure that the contract is performance linked and services provided by the contractor are monitored well by the WMC.

In addition to provision and refurbishment of infrastructure, the WMC must also simultaneously undertake community mobilisation and awareness campaigns to ensure that community toilet blocks are maintained or managed properly. While the maintenance of all the pay-and-use toilets has been contracted out, similar arrangements with community-based organisations (CBOs) can be looked at with respect to community toilets. Campaigns to create awareness related to cleanliness and hygiene practices, safe sanitation practices, and negative health impacts due to open defecation need to be conducted by the Council. Local CBOs (such as the Mahila Bachhat Gats) need to be roped into this exercise to ensure participation by all communities. The campaigns should begin by triggering initiation in the slum settlements and undertaking transect walks to the open defecation sites to highlight the above issues.

The WMC should also refer to the best practices adopted by other cities in Maharashtra to make their cities open defecation free. A few cities that have prioritised safe access to sanitation have managed to provide the required infrastructure through ULB funds, maintained on a regular basis by ULB staff, and create awareness through IECs or even through punishments or penalties, whenever required.

It is proposed that the WMC will move towards achieving ODF status within the next five years. The detailed phasing and implementation plans are discussed in the next chapter. Simultaneously, the Council will have to undertake revenue augmentation measures such as increased collection efficiency of sanitation taxes, levy charges for maintenance of community toilets, etc.

#### Table 21: Slum-wise sanitation options to make slums open defecation free

SN	Name of slum	No of HHs	No of HHs with individual toilets	No of HHs dependant on comminity toilets	No of community toilet seats available	HHs that could be served with the existing community toilets	Excess HHs	Excess HHs per seat	No of community toilet seats reqd	Option 1: Community toilet seats that need to be constructed	Estimated cost of construction for all community toilets	(As Lake) Option 2: Mixed Individual + group + community toilet seats	Estimated cost of construction for mixed option (Rs lakh)
1	Pulfail	1,480.0	391.0	1,089.0	60.0	600.0	489.0	6.0	1.2	48.9	61.0	49 community toilet seats	61.3
2	Safai Kamgar Basti Krushna Nagar	46.0	9.0	37.0	30.0	300.0	-263.0	-4.0	-0.8	0.0	0.0	0.0	0.0
3	Tarfail	94.0	18.0	76.0	6.0	60.0	16.0	8.0	1.5	1.6	2.0	2 group toilets	1.5
4	Ashoke Nagar/Mangaradipura	306.0	182.0	124.0	24.0	240.0	-116.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Sindi Zoparpatti	95.0	93.0	2.0	0.0	0.0	2.0	-	0.4	0.2	0.0	2 individual toilets	1.5
6	Stationfail	425.0	222.0	203.0	52.0	520.0	-317.0	-1.0	-0.2	0.0	0.0	0.0	0.0
7	Sweeper Muhallah (Ramnagar)	26.0	26.0	0.0	20.0	200.0	-200.0	-5.0	-1.0	0.0	0.0	0.0	0.0
8	Vinobha Bhave Nagar	81.0	57.0	24.0	6.0	60.0	-36.0	-1.0	-0.2	0.0	0.0	0.0	0.0
9	Mahadev Pura (Chambhar Nallah)	60.0	21.0	39.0	30.0	300.0	-261.0	-4.0	-0.7	0.0	0.0	0.0	0.0
10	Wadar Zopadpatti	137.0	0.0	137.0	0.0	0.0	137.0	-	27.4	13.7	17	28 group toilets	21.0
11	Gorakshan	32.0	29.0	3.0	0.0	0.0	3.0	-	0.6	0.3	0.0	3 individual toilets	2.3
12	Indira Nagar	229.0	102.0	127.0	10.0	100.0	27.0	8.0	1.5	2.7	3	6 group toilets	4.5
13	Indira Wadi	117.0	22.0	95.0	10.0	100.0	-5.0	5.0	0.9	0.0	0.0	0.0	0.0
14	Matangpura (Mangpura)	76.0	31.0	45.0	7.0	70.0	-25.0	1.0	0.3	0.0	0.0	0.0	0.0
15	Burad Muhallah	194.0	73.0	121.0	14.0	140.0	-19.0	4.0	0.7	0.0	0.0	0.0	0.0
16	Itwari	278.0	42.0	236.0	15.0	150.0	86.0	11.0	2.1	8.6	11	18 group toilets	13.5
17	Sweeper Pura	202.0	89.0	113.0	20.0	200.0	-87.0	1.0	0.1	0.0	0.0	0.0	0.0
						Requireme	ent of Add	litional To	ilet Seats	76		122	
				Funds	required for	r provision of 1	required t	oilet seats	(Rs lakh)		95		106

Note: Community toilet: 10 HHs/seat; group toilet: 1 seat for 5 HHs; individual toilets: 1 HH/seat

Source: CEPT University, 2011

Table 21 provides slum-wise availability and requirement of toilet seats. Two options have been worked out for making slums in Wardha ODF. It is seen from the table that 10 slums out of 17 are well served either with individual or community toilets (CT). The estimated cost of construction to make slums in Wardha ODF by constructing only CTs in the remaining seven slums is Rs 95 lakh, whereas the estimated cost of construction for individual + group + CT seats, as applicable, is Rs 106 lakh. The difference in estimated costs for both the options being very less, it is recommended that the WMC should adopt the second option of combination of individual, group and community toilets.

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### 4.3 Septage, Sullage and Solid Waste Management

Overall, the city looks comparatively cleaner because of regular cleaning of roads and drains.

As mentioned earlier, Wardha doesn't have a sewerage system in place; hence on-site sanitary disposal is mainly carried out through septic tanks. Wastewater management is taken care of by the network of open drains. All small open drains are connected to the major ones and are finally allowed to meet the water bodies outside the city. Around 200



Figure 23: Break-up of improved and unimproved sanitation in WMC



properties were estimated as having no safe disposal system. Wastewater from all these properties is currently allowed to flow directly into the open drains.

It is not clear if the toilets and septic tanks were built as per approved standards and specifications. While travelling in the city, it was clearly visible that a large number of septic tanks are not connected to the mandated soak pits for filtering wastewater coming out of the septic tanks. They are instead directly draining the wastewater into open drains. Discussions with WMC engineers and staff point to a high possibility of inappropriate septic tank constructions.

**Collection of septage:** All the desludging and transportation is through 'vacuum suction tanks' attached to a tractor. The WMC has two vacuum suction tanks with a capacity of 3,000 litres and 2,000 litres, out of which only the unit with 3,000 litres capacity is operational – the second one is defunct. There are no private operators in the WMC area providing desludging services.

The desludging operations are managed by the WMC staff in the Health Department (two cleaning staff and one driver). The cleaning service is provided on demand at a charge of Rs 600 per one trip. The WMC cleaned about 200 septic tanks (Rs 1.25 lakh income) in 2010–11 and 243 tanks (Rs 1.46 lakh income) in 2011–12. The staff in WMC is not aware of the recommendations and need for desludging septic tanks regularly.

As per the standards specified by the GoI (IS:2470 Part 1 and 2), "half yearly or yearly desludging of septic tank is desirable. Small domestic tanks, for economic reasons, may be cleaned at least once in two years provided that the tank is not overloaded due to use by more than the number for which it is designed. It must also be noted that frequent desludging inhibits the anaerobic action in the tank." The inspection activity will also help to identify the tanks that require pumping, and those that may be cleaned in the next cycle.

# Photo plate 8: Open drains: Wardha



Photo plate 9: Clean Wardha



**Disposal/treatment of septage:** The WMC has a 35-acre site situated about 4 km from the city limits for dumping and treating solid waste and night soil. Some facilities – such as place for segregation of solid waste, decomposting pits, etc - were built for SWM. In the same site, pits were dug to empty the night soil carried by the vacuum tankers. However, over the last three or four years this facility has become dilapidated and is now a dump yard. Sometimes the vacuum cleaning tank cannot reach the site (due to bad approach roads) and hence the night soil from the vacuum tanks is dumped in unspecified open spaces around the city. There is no record of where the tanks were emptied.

Collection of grey water: The city has a good network of open Figure 24: Network of closed and open drains serving almost 80 per cent of households and is relatively clean of garbage/debris in most places. Around 16 per cent households are covered with closed drains. Currently, the city has contracted out cleaning of drains in only three wards; the rest of the wards are covered by the WMC itself. The Council is looking at the possibility of extending contracts to the other wards, considering the administrative expenses. The WMC currently has 248 safai karamcharis against the sanctioned 111 posts.

At a few places, open drains were marked unsafe, one along which the slaughter houses are located and the waste from these slaughter houses is allowed to flow directly in the drain. A part of the water distribution pipeline passes beneath this drain, which may result into contamination of treated water through leakages in the pipeline.







Proposals for improvement: The Gol's Draft Advisory on Septage Management in Indian cities further states that pumping programmes that focus on routine inspection and pumping when required, rather than mandated periodic pumping, are most efficient. This is because households generate varying volumes of sludge at different rates. It also mentions that prior to sending the trucks for desludging, the service provider (local government/private operator) can consider sending an inspection crew to inform the residents of such activity, locate manholes and access points, and probe tanks to determine level of accumulated sludge. One simple means of gauging sludge depths is by using a probe on a long handle which is submerged into the tank. The policy states that the standard practice in India is to desludge every two years or so. Community-run programmes such as distribution of flyers about proper care and maintenance of septic tanks would also help build awareness among people. Some of the aspects that the Septage Management Plan should undertake include:

- Manual of Practice: List operational procedures for specific equipment and documenting day-today procedures.
- Record keeping and manifests: Maintain accurate records related to septic tanks and volume pumped for billing and compliance purposes. These records should specify location or address of the pumped septic tank, septage characteristics (residential/commercial), details of property owner, volume of septage pumped, any other details such as deficiencies in piping/manholes, etc.

Record keeping is an important part of the monitoring aspect as it allows the local government to keep track of the service it provides/that the private operator undertakes.

**Improvement in monitoring:** The Council needs to undertake initiatives to ensure implementatio of a proper septage management plan for the city. Amongst other things, this will include estimation of septage generated in the city, increased provision of public services to cater to safe disposal of septage, encourage private operators and CBOs to provide services such as emptying of septic tanks, monitor emptying and tracking operator activities, and provide health and safety guidelines for the operators (MoUD, 2011). The Council will need to regularly monitor the effluent and dried septage quality. Additionally, the state government, on its part, needs to ensure that the current policies are amended to support and require local governments to improve sanitation and reorganise and clarify institutional roles and responsibilities.

# 4.4 Proposed Sewerage Project

Wardha currently does not have a sewerage network in place. The WMC has prepared a detailed project report (DPR) for it and is exploring options for funding under the Maharashtra Swarna Jayanti Nagarothan Maha Abhiyan. The proposed sewerage project consists of a sewerage network covering the entire area of Wardha that will collect sewage generated in seven sewer zones and a 24 MLD treatment plant. Five pumping stations with sump and pump houses will store the raw sewage and pump it through the pumping main to the sewage treatment plant (STP). The treated sewage will be let out in the *nullah*<sup>3</sup> in the downstream after the construction of the sewerage network and STP. Approximate length of sewer line planned is 130 km. The proposed sewerage system is designed for a projected population of 1,80,700 for the year 2041. The per capita sewage flow consideration is 108 lpcd (80 per cent of 135 lpcd). For conveyance, seven sewer zones and five pumping stations have been proposed along with one STP of 21 MLD installed capacity. The total project cost is Rs 76.27 crore with 7.5 per cent escalation per annum.

The phasing out of the sewerage network is based on the availability of investible surplus in the city from 2017 onwards. If the DPR for the proposed sewerage network is approved, then its implementation can be phased into two phases: (1) Short term (2013–20); and (2) Long term (2020–30).

If construction starts in 2016, sewer connections to properties can be given from 2018 onwards. Connections to the sewerage network will be increased gradually to achieve 100 per cent sewerage connections by 2024.

Year	Projected properties	Properties connected to sewerage network (%)	No of sewer connections at the end of each year
2012	18,023	-	-
2013	18,525	-	-
2014	18,710	-	-
2015	19,053	-	-
2016	19,396	-	-
2017	19,739	-	-
2018	20,082	5	1,004
2019	20,425	10	2,043
2020	20,768	15	3,115

#### Table 22: Phasing out of proposed sewerage network project (short term actions)

<sup>&</sup>lt;sup>3</sup> Drain.

#### Table 23: Phasing out of proposed sewerage network project (long term actions)

Year	Projected properties	Properties connected to sewerage network (%)	No of sewer connections at the end of each year
2021	21,111	20	4,222
2022	21,454	25	5,364
2023	21,797	30	6,539
2024	22,140	40	8,856
2025	22,483	50	11,242
2026	22,826	60	13,696
2027	23,169	70	16,218
2028	23,512	80	18,810
2029	23,855	90	21,470
2030	24,198	100	24,198

Source: CEPT University, 2011.

The impact of the sewerage network on wastewater KPIs is as follows:

#### Figure 25: Impact on KPIs after implementation of underground sewerage system



Source: CEPT University, 2011

Access and coverage: Based on the DPR, a roadmap has been chalked out by the WMC to phase out the construction of underground sewerage in the city. If the proposed project starts in 2018, it can be phased out in such a way that coverage of wastewater network services would be 100 per cent by 2030. Tables 22 and 23 show the number of connections that will need to be added each year to achieve 100 per cent coverage in 2030.

**Service levels and quality:** If as per DPR, STP of 24 MLD is constructed by 2024, it would be able to suffice for sewage flow up to 2040.

**Efficiency in service operations:** The DPR does not include a proposal for reuse of treated wastewater. The treated wastewater will be let out in the *nullah* in the downstream of the city. However, a pilot project

can be initiated to reuse partial quantities of treated wastewater for supplying to municipal gardens, etc. Based on the experience from the pilot project, the WMC can initiate efforts to expand reuse of treated wastewater.

**Financial sustainability:** Once the network and treatment plants are commissioned, the Council will levy sewerage charges on its citizens. An initial charge that would be levied on all citizens would be Rs 360 per household. Once the network is laid for the entire city and assuming 100 per cent coverage of sewerage connections, the Council will try to achieve 100 per cent cost recovery of O&M through increased tariffs and improved collection efficiency. This is illustrated in Table 24.

Year	No of sewer connections at the end of each year	Properties connected to sewer network (%)	Sewage tariff per connection (Rs)	Revenue demand (Rs cr)
2018	1,004	5.00	360.00	0.04
2019	2,043	10.00	360.00	0.07
2020	3,115	15.00	360.00	0.11
2021	4,222	20.00	360.00	0.15
2022	5,364	25.00	360.00	0.19
2023	6,539	30.00	360.00	0.24
2024	8,856	40.00	360.00	0.32
2025	11,242	50.00	360.00	0.41
2026	13,696	60.00	360.00	0.49
2027	16,218	70.00	360.00	0.58
2028	18,810	80.00	360.00	0.68
2029	21,470	90.00	360.00	0.77
2030	24,198	100.00	360.00	0.87

### Table 24: Revenue income from proposed sewerage network (in Rs cr)

Source: CEPT University, 2011

# 4.5 Summary of Proposed Actions/Interventions

The following interventions are proposed based on discussions with the Council, and analysis of the key indicators and their data reliability. The proposals listed below to make the WMC open defecation free are based on experiences and constraints faced in current management of toilet options. Extensive awareness campaigns must also be conducted to ensure achievement of being open defecation free.

To make WMC open defecation free, it is proposed that provision of both individual and community toilets is undertaken. In instances where space and affordability is not an issue, individual toilets can be constructed. However, where space is a major constraint, construction of community toilets can be opted for. The WMC should prioritise its actions with respect to the following KPIs.

### Table 25: Snapshot of identified issues and probable solutions

SN	Snapshot of sanitation issues	Probable solutions		
1	Gap in availability and demand of toilets.	Construction of individual, group and community toilets with necessary IEC measures on use of toilet facilities.		
2	Non-functionality of existing toilets.	Refurbishment of existing toilets, strategy for maintenance of toilets.		
3	Lack of safe disposal of wastewater.	Construction of underground sewerage network and STP.		
4	Lack of septic tanks for a few properties.	Construction of septic tanks.		
5	Open defecation.	Assured access to water, access to functional individual/community toilets, public awareness.		

	Interventions with substantial capital expenditure					
		Action	Action Improvement of KPIs			
Immediate priority 1	1	Construction of individual and community toilets.	Coverage of toilets, coverage of toilets in slums, complaint redressal.	(City level: Option 2) 29, (slums) 1.06		
d priority	2	Construction of underground sewerage network and STP.	Coverage of wastewater network services/in slums, collection efficiency of wastewater networks, adequacy of wastewater treatment capacity, extent of reuse and recycling of treated wastewater, quality of wastewater treatment, efficiency in redressal of customer complaints.	76.27		
Secon	3	Refurbishment/upgradation of open drains.	Extent of reuse and recycling of treated wastewater, efficiency in redressal of customer complaints.	121.78		

	Interventions with Minimal Capital Expenditure				
		Action	Improvement of KPIs	Est. Cost (Rs cr)	
ority 1	1	Refurbishment of existing community toilets	Coverage of toilets, Coverage of toilets in slums, Complaint redressal.	6	
diate Pric	2	Construction of septic tanks to the existing toilets with no STs.	Complaint redressal.	0.15	
Imme	3	Periodic maintenance of Open Drains	Collection efficiency of wastewater networks, efficiency in redressal of customer complaints.		

Along with all these actions, the WMC also must prepare a Septage Management Plan to ensure safe and proper disposal of septage, and streamline its operations.

### Table 26: Summary of improvement actions for sanitation in WMC

Activity	Description	Status/next steps	
	Provision of individual and community toilets.	Preparation of DPR needs to be	
Stratagias for ODE	Undertake IEC activities.	undertaken.	
Strategies for ODr	Design policies (punishments, penalties, incentives,	Set bye-laws for sanitation.	
	etc).		
Strategies for septage	Comprehensive plan to be implemented	Preparation of Septage	
management	comprenensive plan to be implemented.	Management Plan and DPR.	
Underground sewerage	Sewerage connections to 100 per cent properties	Revision of prepared DPR and	
network as long term	and 100 per cent efficiency in collection and	persuasion for approval under	
plan	treatment of waste water.	Nagarothan.	

# 5 Summary of Performance Improvement Plan for Wardha

This section provides a summary of all the improvement actions for water supply and sanitation, including the costs of implementing these actions. The section also gives an insight into the policy as well as institutional implications along with the phasing of the improvements that have been proposed.

### 5.1 Summary of Proposals

The proposals summarised below are focused on two key areas of establishing 24x7 water supply system and moving towards an open defecation free WMC, as well as improvements in key processes and operations related to these two focal areas. As discussed earlier, the water supply operations and maintenance partially being carried out by Tipanna Bhandari and Co, and its role and responsibilities, must be clearly specified in the improvement actions undertaken. Over and above this, improvements are also required in the contractual agreement with Tipanna Bhandari and Co and these are also summarised below.

On the coverage of toilets, considering the current experiences and capacity of the WMC, improvements are considered for both individual as well as community toilet provision.

Based on the analysis of the water and sanitation sectors in Wardha, the Performance Improvement Plan (PIP) for the WMC has been summarised below. The total PIP cost for WMC will be Rs 70.5 crore.

### Table 27: Summary of Performance Improvement Plan for WMC

Key actions for improvement	Costs required (Rs cr)	Current status
Water supply: Towards 24x7 system		
Technical studies and metering	Rs 1.5 cr	Preparation of DPR is required
Planning and implementation of 24x7 for entire city	Rs 40 cr	Preparation of DPR is required
Sanitation: Towards ODF		
Construction of individual toilets (including IEC costs)	Rs 29 cr	Preparation of DPR is required
Total cost of PIP	Rs 70.5 cr	

Source: CEPT University, 2011.

The WMC has to also undertake improvement actions related to processes followed in the water supply and sanitation operations. These actions, being no or low cost, can be immediately taken up by the Council. These include:

- Periodic surveys at source, treatment and consumers' end.
- Proper sampling regimen for monitoring water quality.
- Regular surveys through zonal sanitary inspectors.
- Levy telescopic rates for water supply, drainage tax, and improve collection efficiency of sanitation tax.
- Implementation of Septage Management Plan.
- Identification and regularisation of illegal connections.
- Conversion of public standposts into group connections.

### Improvements related to performance contract for water supply

Given that the contract with Tipanna Bhandari and Co does not specify any performance targets that would help the WMC monitor performance of the company, improvements are suggested in the contract with respect to annual targets as well as reporting procedures.

Under the agreement between the WMC and Tipanna Bhandari and Co, the O&M of water supply assets at source and WTP is the responsibility of the latter. The responsibility of creating any substantial new infrastructure is with the WMC. Some of the clauses that need to be revised by adding certain performance targets are listed below:

An overview of the performance indicators of water supply services of the WMC shows that the cost recovery and collection efficiency of water supply related charges are the indicators where the WMC is currently lacking. These areas need to be prioritised to improve financial sustainability in water supply. To ensure this, and also considering lack of internal technical capacities, the WMC should explore the options of outsourcing the entire water supply service from source up to the consumers' end, including granting connections to the consumers and billing and collection of taxes, as financial sustainability will be a high priority for the private contractor. Assuming that the WMC outsources the entire water supply service, certain clauses need to be included in their O&M contractual agreement (see Table 28).

Categories	Current contractual clauses	Areas of improvements/inclusions suggested
Access and coverage	Currently no clauses.	Contractor shall grant connections to increase at least 5 per cent of coverage of connections annually to achieve 100 per cent coverage by 2020 by: Regularising illegal connections; and
Service levels and quality	Tipanna Bhandari and Co shall use ISI marked materials – alum, bleach or chlorine gas – for water treatment. To conduct OT test and to maintain right dosage of chlorine will be Tipanna Bhandari and Co's responsibility. In case of breakdown of pumping machinery, it should be repaired and restored within 10 days. In case water levels at the jack well become very low, efforts to supply water to the WMC should be taken 10 days in advance.	Converting public standposts to group connections. Assuming that the required capital investment is done by the WMC, clauses should be included for annual target/improvement to be achieved for per capita supply of water, continuity of supply and quality of water every year by: Periodically checking of water losses and their repairing; Regular maintenance of pumping machinery, WTP, ESRs and distribution network; and Plugging of leakages.
Financial sustainability	Cost of labour and materials required for any repair work at WTP and pumping stations and maintenance of all cables, wiring, lights, starter machinery and transformers will be borne by Tipanna Bhandari and Co. In case of any accidents or disasters, Tipanna Bhandari and Co will be entirely	Link tariff increase every three years based on percentage improvement in coverage, service levels and quality and financial sustainability of water supply by: Reducing O&M expenditure; Increasing coverage (as mentioned in access and coverage above);

Table 28: Identification of clauses/inclusions in contractual agreement for water supply

Categories		Current contractual clauses	Areas of improvements/inclusions suggested
		responsible and bear all treatment or court cases related expenses.	Delinking water tax bills from property tax bills; and Appointing dedicated staff for collection of water taxes.
Efficiency service operations	in	Leakages in the trunk and transmission mains found, if any, shall be repaired by Tipanna Bhandari and Co.	Include annual target/improvement to be achieved for reducing physical losses in the network, as well as unauthorised unbilled consumption. Include provisions to make water audits mandatory and implement recommendations. Include provisions to penalise private contractor in case of non-functioning complaint redressal system.
Equity service delivery	in	Currently no clauses.	Include provisions to simplify procedures and subsidise connection costs and tariffs for slum settlements. Provide options to pay water tax in instalments. Include annual targets/improvement to be achieved for coverage in slum settlements.

# 5.2 Phasing and Steps to Improvement

The WMC has to improve its current financial position in order to carry out the improvements suggested so far. The suggestions for improvement are based on an analysis of the business-as-usual (BAU) scenario and interventions required to improve the BAU scenario.

**Investment capacity in BAU scenario:** The BAU scenario is based on the hypothesis that the past trends in key financials of the the PMC would continue in the future. To arrive at the investible surplus in the this scenario, calculations are based on:

- Revenue surplus/deficit other than WSS.
- Net surplus after capital receipt and expenditure.
- Investible surplus (net surplus + revenue related to WSS revenue expenditure related to WSS).

Table 29 provides the investment capacity of the WMC in the BAU scenario projected till 2021. From the assessment it was observed that currently the WMC does not have an investible surplus to consider improvements in the performance of service delivery. Considering the current scheme of things, that is, the BAU scenario, the Council would be able manage an investible surplus only by 2021.

Year	Revenue surplus/(defic it) other than WS, WWS and MSW	Capital receipts	Capital expenditure	Surplus after capital receipt and expenditure	Revenues (WS, WWS, MSW and slums)	Revenue expenditure	Balance available for investment in performance improvement actions
2010	-4.16	7.62	3.26	0.13	2.12	6.58	-14.26
2011	-10.08	5.49	4.75	-9.41	2.64	7.49	-15.56
Project	Projected						
2012	-11.49	6.40	5.11	-10.26	2.88	8.17	-803
2013	-4.87	7.18	4.58	-2.33	3.22	8.92	-8.32
2014	-5.67	8.48	4.94	-2.18	3.61	9.75	-8.51
2015	-6.58	10.06	5.33	-1.89	4.04	10.67	-8.55
2016	-7.61	12.00	5.75	-1.40	4.53	11.68	-8.36
2017	-8.77	14.37	6.20	-0.64	5.07	12.79	-7.87
2018	-10.09	17.30	6.69	0.47	5.68	14.02	-5.77
2019	-11.59	20.90	7.22	2.05	6.36	14.19	-4.24
2020	-13.28	25.35	7.79	4.25	7.13	15.62	-1.95
2021	-15.18	30.87	8.41	7.27	7.98	17.21	1.27
Source:	Source: CRISIL Advisory Services						

#### Table 29: Projected investment capacity of WMC – Business-as-usual scenario (in Rs cr)

Considering the decreasing revenue surplus, the WMC should undertake revenue enhancement measures on a priority basis to be able to invest in service performance improvement. Otherwise it would need to resort to external resources to fund its internal operations as well. Some of the steps that can be potentially taken to increase revenue are:

- Improve collection efficiency of property tax.
- Increment due to water tax revision and increased collection efficiency.

- Increase sanitation tax.
- Levy solid waste management tax through property tax.
- 1) The above actions do not require capital investments for implementations and need only process changes. To simulate the effect of the above changes in the investment capacity the following assumptions have been made.

S. N.	Item	Assumption
1	Improve collection efficiency of property tax.	Currently, the collection efficiency of property tax is only 54 per cent. Assuming the present level of demand and phased increase in collection efficiency of these charges to reach 95 per cent in five years (Annexure 4).
2	Increment due to water tax revision and increased collection efficiency.	At present 52 per cent of the total revenue expenditure is recovered through taxes with collection efficiency close to 51 per cent. Present coverage of connections is 51 per cent; it is important to increase coverage to improve cost recovery. Assuming phase- wise increase in coverage to attain 100 per cent coverage till 2020. Tariffs have been increased to Rs 1,500 per annum from Rs 924 per annum in 2011–12. Assuming this tariff till 2020 and phase- wise improvement in collection efficiency to 95 per cent by 2015 (Annexure 5).
3	Increase sanitation tax.	Present sanitation tax is Rs 40 per seat. And collection efficiency is 58 per cent. Increasing sanitation tax to Rs 50 per seat and improving collection efficiency to 90 per cent in a phased manner (Annexure 6).
4	Levy solid waste management tax through property tax.	Currently, there is no user charge imposed to recover expenditure by SWM department. Levying an annual SWM tax of Rs 120 per property (2013 onwards), with phased improvement in collection efficiency (Annexure 7).
Source: (	CRISIL Advisory Services	

Table 30: Assumptions for simulation of revenue enhancement

Performance improvement can be taken up immediately only through assistance in the form of grants amounting to 100 per cent of the total expenditure envisaged. But on implementation of the abovementioned improvements, significant improvement in investible surplus is observed. Eventually, the WMC would be in a position to invest in the required improvements by 2017. 

 Table 31: Investible surplus after revenue improvement measures (in Rs cr)

Year	Balance available for investment in performance improvement actions	Net increased property tax collection	Net increased water tax collection	Net increased sanitation tax collection	SWM Tax collection	Net increase in investible surplus	Net available surplus
2011	-8.03	0.65	0.1	0.02	0.00	0.77	-7.26
2012	-8.32	0.95	0.36	0.02	0.00	1.33	-6.99
2013	-8.51	1.54	0.59	0.03	0.21	2.37	-6.14
2014	-8.55	1.84	0.83	0.04	0.23	2.94	-5.61
2015	-8.36	2.44	1.1	0.05	0.25	3.84	-4.52
2016	-7.87	2.44	1.38	0.06	0.27	4.15	-3.72
2017	-5.77	2.44	1.68	0.06	0.29	4.47	-1.30
2018	-4.24	2.44	1.99	0.06	0.31	4.80	0.56
2019	-1.95	2.44	2.33	0.07	0.32	5.16	3.21
2020	1.27	2.44	2.5	0.07	0.33	5.34	6.61

The PIP improvements for the WMC have been proposed in two phases:

The above actions do not require capital investments for implementation and need only process changes. To simulate the effect of the above changes in the investment capacity, assumptions have been made considering maximum cost recovery and increased collection efficiency in service delivery. Along with the revenue enhancement measures, the WMC needs to enforce serious expenditure controls to contribute towards improving the investible surplus.

Based on the revenue enhancement measures mentioned above, the investible surplus for the WMC will be approximately Rs 6.61 crore by 2020. The improvements for the Council have been proposed in two phases: (1) Immediate interventions (from 2013–2020); and (2) Long term interventions (from 2020–2030). The interventions mentioned above to augment revenue as well as process improvements are proposed to begin in 2013.

### Table 32: Phase 1 of PIP for WMC (2013–2020)

Proposed improvement areas		2014	2015	2016	2017	2018	2019	2020	
Water supply									
Revise/extend contractual arrangements with									
private contractor									
Fill technical sanctioned posts for better									
monitoring of services Periodic surveys and audits at source treatment									
and consumers' end									
Proper sampling regimen for monitoring water									
quality									
Regular ward-wise surveys by sanitary									
Inspectors									
Conduct abusical array of the second									
Conduct physical surveys, consumer survey for entire city and produce maps									
Conduct/revise water audit and leak detection									
surveys									
Undertake hydraulic modelling for the entire									
water supply network									
Install/repair bulk flow meters									
Install meters at consumers' end									
Distribution network augmentation: Creation of									
pilot DMAs/Water Works									
Levy telescopic rates for water supply							<u> </u>		
Pronountion of Contage Management Plan		1							
Preparation of Septage Management Plan									
Preparation of DPR									
Implementation of Septage Plan									
Revision of prepared DPR and persuasion for									
Implementation of sewerage network									
Levy drainage tax environmental tax in property									
tax									
Improve collection efficiency of sanitation tax				ĺ					
Moving towards ODF									
Prepare DPR for ODF									
Towards ODF through provision of individual									
toilets (including IEC costs)									
Towards ODF through provision of community									
toilets (including IEC costs)									

Source: CEPT University, 2011

Once the revenue augmentation measures and process improvements are in place, it is proposed that the WMC can begin its capital intensive projects from 2014.

• Starting from 2014, the WMC can begin construction of individual and community toilets. As issues in existing community toilets were observed in terms of O&M, it is proposed that the WMC refurbishes existing toilets before initiating construction of new community toilets. To begin with, therefore, the WMC can construct individual toilets. Construction of individual toilets will be completed in five years, while community toilets will be completed by four years.

 Arrangements with CBOs can be looked at with respect to maintenance of community toilets. Campaigns to create awareness related to cleanliness and hygiene practices, safe sanitation practices, and negative health impacts due to open defecation need to be conducted by the Council. Local CBOs need to be roped into this exercise to ensure participation by all communities. The campaigns should begin by triggering initiation in the slum settlements and undertaking transect walks to open defecation sites to highlight the above issues.



Figure 26: Implementation of projects after revenue augmentation

# 5.3 Institutional Imperatives to Achieving Proposed Improvements

To realise the targets set for improving water supply and sanitation in the WMC, the existing institutional framework must be enhanced to enable better O&M of these services. While in certain areas it is the lack of a defined policy restricting provision of services, in other instances it is the improper regulation of the existing policies. The WMC has to focus its attention on improving policies related to services, financial sustainability, and accountability to the consumers.

The financial analysis of the WMC showed that overall capital utilisation is poor, with only 42 per cent of capital income utilised in 2009–10. This points to the need for better project conceptualisation and management; if need be, additional staff can be recruited.

**Augment staff at the WMC:** The Council needs to also augment its staff as a major percentage of the staff comprises non-technical personnel. Moreover, though water supply operations are/will be outsourced, the technical strength of the private contractor needs to be assessed. Similarly, the technical staff at the WMC needs to be increased to efficiently monitor operations of the private contractor.

**Mobilisation of external support:** Additionally, the WMC needs to mobilise external support through NGOs and CBOs in project formulation and implementation, especially related to services of water supply and sanitation in slums. Given that implementation of proposals related to 24x7 water supply requires high technical skills, the WMC needs to also bring external support through project management
consultants (PMCs). Arrangements should be made with PMCs for continued support throughout implementation of the 24x7 project, both immediate and long term.

A summary of the institutional reforms that WMC needs to undertake is given in Table 33.

Area of improvement	Suggested improvements
Across all sectors	
Human resource management	The WMC (and Tipanna Bhandari and Co for water supply) need to augment their technical staff in view of proposed projects like 24x7 water supply system and open defecation free WMC. To ensure adequate utilisation of funds for capital projects, the WMC also needs to employ additional resources, either internal or external.
Equity in service delivery	Reform institutional arrangements (with the private contractor) to target and monitor improvement services to slum settlements.
Financial sustainability	As in the case of increase in water supply tariffs, provisions to introduce tariff for sewerage, sanitation and septage management need to be introduced. Contractual arrangement with the private contractor needs to be revised to include performance-based incentives/penalties.
Consumer redressal system	Currently, while it is mandatory for the WMC to have a consumer redressal system in place, it is not maintained by the Council. If all the water supply services are outsourced in the future, complaint redressal will be the private contractor's responsibility. However, as per contract, the WMC should be kept in the complaint redressal system loop, so that areas for monitoring of services could be identified by the WMC.
Sector specific	
Water supply	There is a need to increase monitoring of private contractor's operations and performance in water supply. These can be done, as suggested, by incorporating appropriate annual targets/improvements to be achieved by the private contractor. If the private contractor fails to achieve these targets, a penalty must be levied. While in certain aspects reporting procedures are outlined (for example, quality), a comprehensive reporting mechanism needs to be worked based on targets/improvements achieved.
Sanitation (including sewerage)	Policy provisions to bring about private sector involvement in areas of septage management, and sanitation services to slum settlements needs to be implemented.

The Council has to also form a PIP taskforce in order to ensure proper implementation of the proposed projects. This is discussed below.



The first step towards implementation of the proposed projects should be to constitute a PIP taskforce comprising key managerial and technical staff for water supply and sanitation, including representatives from the private contractor as well. This can also include resource persons with experience in implementing continuous water supply systems as this involves advanced technical skills. The MJP, being the notified agency for technical approvals to the WMC, should also be involved in the appropriate stages during planning and implementation. The Council must legally mandate the PIP taskforce with implementing the proposed projects. Appropriate budget provisions should be made to properly manage the taskforce. The responsibilities of the taskforce will include quarterly progress updates to the Chief Officer and General Body, and annual progress reports to the Urban Development Department (UDD). A broad schematic of the institutional structure is shown Figure 28.

**Performance monitoring through regular setting of targets and use of performance indicators:** To ensure that the WMC is able to achieve the performance improvement proposals outlined above, it is necessary that it has a well structured monitoring framework in place. The monitoring aspects should include:

- Timely data capture and analysis of performance indicators.
- Assessment and evaluation of progress.
- Setting of targets (for own department as well as private service providers) and corrective action, if required.

- Decisions on policy, resource allocation and incentives/penalties.
- Operational decisions and plans.





Source: Adapted from the MoUD website, http://www.urbanindia.nic.in/programme/uwss/slb/slb.htm

As the performance improvement proposals are phased from 2013 till 2020, it is necessary for the WMC to ensure that through the above process, the targets set for each year are achieved and, if required, corrective measures need to be incorporated. This will be possible only if the information related to performance indicators are updated and analysed regularly. Similarly, policies to provide incentives/penalties to internal and external staff based on their performance need to be implemented. Given that the WMC should look to external agencies for support in PIP, the monitoring process should also include a review of these agencies. A possible performance monitoring framework is suggested in Figure 28.

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# ANNEXURES

Annexure 1	<b>l:</b> ]	Recommend	ations	for	24x7	water	supply	, as	per	Water	and	Energy	Audit

S N	Action	Estimated costs (2007)	Escalated costs (rate: 7.5%/annum) (2011)
1	Installation of water meters at appropriate points are recommended in the action plan.		
2	The necessary provision of remote monitoring system at all ESRs and pump houses of Head Works in Yelakeli and Pavnar for pump electrical parameters and pump efficiency	2,00,00,000	2,67,09,383
3	The repairs of leakages in the ESRs and reconditioning is found necessary during study. Hence, condition assessment for ESR structures for life and serviceability	8,46,000	11,29,807
4	It was observed that sufficient water cannot be supplied with adequate pressure to many localities and that accountability of water charges is not related to consumption. Hence, existing old/damaged CI/PVC pipeline of diameter 50 to 100 mm is proposed to be replaced by HDPE/CI pipes of minimum diameter 150 mm without interrupting water supply to provide adequate pressure and minimum maintenance cost. For better accountability of water and water charges provision of bulk water meters and 10,000 consumer water meters.	7,31,56,776	9,76,98,617
5	Water audit reveals that app. 0.2 MLD of water is lost through water treatment plant for back wash and leakage at new and old WTP. It is recommended to re-cycle the wash water to avoid the water losses.	28,30,000	37,79,378
6	The leakages in transmission main and distribution lines have been observed during study. Hence, necessary provision is made for rectification for leakages in transmission main ESRs and distribution lines.	2,68,500	3,58,573
7	Monitoring the system/billing necessary provision for computers, printers, etc.	2,31,000	3,08,493
8	The pump efficiency of raw water pumps in Yelakeli pump house is observed to be only 69 per cent, which can be increased to more than 80 per cent by installing new pumps with existing motors. Hence, provision of new pumps with existing motors is made to reduce the energy and maintenance cost. Three new pumps need to be installed on existing motors (the cost of which is given in the next columns.	10,10,000	13,48,824
9	The pump efficiency of raw water pumps in Pavnar pump house is observed to be only 45 per cent which can be increased to up to 85 per cent by installing new pumps with existing motors. Hence, provision of new pumps with existing motors is made to reduce the energy and maintenance cost. 3 new pumps need to be installed on existing motors, the cost of which is given in the next columns	5,40,000	7,21,153
10	The pump efficiency of pure water pumps in Pavnar WTP is observed to be only 68 per cent which can be increased to up to 85 per cent by installing new pumps with existing motors. Hence, provision of new pumps with existing motors is made to reduce the energy and maintenance cost. 3 new pumps need to be installed on existing motors, the cost of which is given in the next columns	8,20,000	10,95,085
11	Installation of additional capacitors at Pavnar raw/pure water pumping, Yelakeli raw water pumping and Hanuman Tekdi pumping for the improvement of power factor.	2,05,000	2,73,771
	TOTAL	9,99,07,276	13,34,23,084
	Rs (lakh)	999.1	1,334.2

		GENERAL IN	IFORMAT	TION	HOUSING		ACCESS TO SANITATION			ACCESS TO WATER		
SN	Name of slum	Population	No of HHs	HH size	HHs residing in kaccha houses	HHs residing in pucca houses	HHs with individual toilets	HHs dependant on community toilets	HHs resorting to open defecation	HHs with individual WS connection	HHs dependant on public standposts	HHs dependant on handpumps
1	Sweeper Colony	1,044	202	5.2	109	93	89	103	10	74	106	22
2	Tarfail	401	94	4.3	60	34	18	22	54	32	0	62
3	Ashok Nagar	1,872	307	6.1	77	230	182	125	0	201	106	0
4	Station Fail	2,085	425	4.9	251	174	222	203	0	257	161	7
5	Sindhi	502	95	5.3	0	95	93	0	2	91	0	4
6	Itwari	1,341	278	4.8	123	155	42	72	164	72	143	63
7	Burud Moholla	1,023	194	5.3	40	154	73	121	0	81	113	0
8	Matangpura	340	76	4.5	7	69	31	34	11	33	34	9
9	Indirawadi & Lendipura	599	117	5.1	27	90	22	95	0	32	7	78
10	Indiranagar	1,045	229	4.6	134	95	102	127	0	150	79	0
11	Wadar, Aarvi Naka	558	137	4.1	137	0	0	0	137	11	126	0
12	Chambhar Nala	367	60	6.1	28	32	21	39	0	31	29	0
13	Ramnagar Sweeper Moholla	198	26	7.6	20	6	26	0	0	25	0	1
14	Gaurakshan, Ward 38	142	32	4.4	1	31	29	0	3	22	0	10
15	Vinoba Bhave (Hindnagar)	368	81	4.5	25	56	57	24	0	44	8	29
16	Krishnanagar	214	46	4.7	32	14	9	37	0	13	33	0
17	Pulfail	7,402	1,480	5.0	666	814	391	600	489	444	584	452
	TOTAL	19,501	3,879		1,737	2,142	1,407	1,602	870	1,613	1,529	737

Annexure 2: Slum data, as per household level surveys in slums of Wardha, 2011

## Annexure 3: Increased property tax collection

Year	Total demand: Property tax (Rs crore)	Total collection: Property tax (Rs crore)	Present collection efficiency (%)	Improved collection efficiency (%)	Improved collection (Rs crore)	Net increased property tax collection (Rs crore)
2011	5.96	3.22	54.00	65.00	3.87	0.66
2012	5.96	3.22	54.00	70.00	4.17	0.95
2013	5.96	3.22	54.00	80.00	4.77	1.55
2014	5.96	3.22	54.00	85.00	5.07	1.85
2015	5.96	3.22	54.00	95.00	5.66	2.44
2016	5.96	3.22	54.00	95.00	5.66	2.44
2017	5.96	3.22	54.00	95.00	5.66	2.44
2018	5.96	3.22	54.00	95.00	5.66	2.44
2019	5.96	3.22	54.00	95.00	5.66	2.44
2020	5.96	3.22	54.00	95.00	5.66	2.44

Annexure 4: Proposed sewerage network in Wardha, as per detailed project report, 2007



#### Annexure 5: Increased water tax collection (in Rs cr)

Particulars	Present coverage (%)	Number of connections	Tariff per connection annually	Previous demand	Previous collection efficiency (%)	Previous collection	Increased coverage (%)	Total number of new connections	Revenue demand after increased coverage	Improved collection efficiency (%)	Improved collection	Net increased collection water tax
2011	51.00	12,313.00	924.00	1.14	51.00	0.58	55.00	13,279.00	1.23	55.00	0.67	0.10
2012	51.00	12,313.00	1,500.00	1.85	51.00	0.94	60.00	14,486.00	2.17	60.00	1.30	0.36
2013	51.00	12,314.00	1,500.00	1.85	51.00	0.94	65.00	15,694.00	2.35	65.00	1.53	0.59
2014	51.00	12,314.00	1,500.00	1.85	51.00	0.94	70.00	16,902.00	2.54	70.00	1.77	0.83
2015	51.00	12,314.00	1,500.00	1.85	51.00	0.94	75.00	18,109.00	2.72	75.00	2.04	1.10
2016	51.00	12,314.00	1,500.00	1.85	51.00	0.94	80.00	19,317.00	2.90	80.00	2.32	1.38
2017	51.00	12,314.00	1,500.00	1.85	51.00	0.94	85.00	20,524.00	3.08	85.00	2.62	1.68
2018	51.00	12,314.00	1,500.00	1.85	51.00	0.94	90.00	21,731.00	3.26	90.00	2.93	1.99
2019	51.00	12,315.00	1,500.00	1.85	51.00	0.94	95.00	22,940.00	3.44	95.00	3.27	2.33
2020	51.00	12,315.00	1,500.00	1.85	51.00	0.94	100.00	24,147.00	3.62	95.00	3.44	2.50

#### Annexure 6: Increased sanitation tax collection (in Rs cr)

Year	No of Properties with individual toilets	Sanitation tax demand @ 40/property	Present collection efficiency (%)	Collection with present efficiency (Rs cr)	Sanitation tax demand @ 50/ property	Improved collection efficiency (%)	Collection with increased efficiency (Rs cr)	Net increased collection sanitation tax
2011	15,135.00	0.06	51.00	0.03	0.08	55.00	0.04	0.01
2012	15,135.00	0.06	51.00	0.03	0.08	60.00	0.05	0.02
2013	15,135.00	0.06	51.00	0.03	0.08	65.00	0.05	0.02
2014	15,135.00	0.06	51.00	0.03	0.08	70.00	0.06	0.03
2015	16,815.00	0.07	51.00	0.03	0.08	75.00	0.07	0.04
2016	18,495.00	0.07	51.00	0.04	0.09	80.00	0.09	0.05
2017	20,175.00	0.08	51.00	0.04	0.10	85.00	0.10	0.06
2018	21,855.00	0.09	51.00	0.05	0.11	90.00	0.10	0.06
2019	23,535.00	0.09	51.00	0.05	0.12	95.00	0.11	0.06
2020	24,147.00	0.10	51.00	0.05	0.12	95.00	0.12	0.07

#### Annexure 7: Levied solid waste management charges

Year	Number of properties	Annual tax of Rs 120 per property	Collection efficiency (%) (assumed phased improvement)	Collection (Rs cr)
2011	23,783.00	0.29	-	0.00
2012	24,308.00	0.29	-	0.00
2013	24,833.00	0.30	70.00	0.21
2014	25,358.00	0.30	75.00	0.23
2015	25,883.00	0.31	80.00	0.25
2016	26,408.00	0.32	85.00	0.27
2017	26,933.00	0.32	90.00	0.29
2018	27,458.00	0.33	95.00	0.31
2019	27,983.00	0.34	95.00	0.32
2020	28,508.00	0.34	95.00	0.33

## The Performance Assessment System (PAS) Project

The Performance Assessment System (PAS) Project 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 includes three major components of performance measurement, performance monitoring and performance improvement. It covers all the 400+ urban local governments in Gujarat and Maharashtra.

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# **PAS Project**

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