Performance Improvement Plan for Chandrapur

Prepared by:
CEPT University and AIILSG in consultation with Chandrapur Municipal Council
November 2011

pas performance assessment system

CEPT UNIVERSITY ज्ञानं विज्ञानसहितम्

ALL INDIA INSTITUTE OF LOCAL SELF-GOVERNMENT

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CEPT University

All India Institute of Local Self-Government

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ABBREVIATIONS

AIILSG	All India Institute of Local Self Government
BAU	Business As Usual
BRGF	Backward Region Grants Fund
CAGR	Compounded Annual Growth Rate
CBO	Community-based Organisation
CEPT	Centre for Environmental Planning and Technology
CMC	Chandrapur Municipal Council
CPHEEO	Central Public Health and Environmental Engineering Organisation
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
IHSDP	Integrated Housing and Slum Development Programme
ILCS	Integrated Low Cost Sanitation
KPI	Key Performance Indicator
lpcd	Litres per capita per day
MGA	M/s Gurukrupa Associates
MJP	Maharashtra Jeevan Pradhikaran
ML(D)	Million Litres (per Day)
MoUD	Ministry of Urban Development
MSJNMA	Maharashtra Swarna Jayanti Nagarothan Maha Abhiyan
MSNA	Maharashtra Sujal Nirmal Abhiyan
NGO	Non-governmental Organisation
O&M	Operation and Maintenance
ODF	Open Defecation Free
PAS	Performance Assessment System
PIP	Performance Improvement Plan
PMC	Project Management Consultant
PWD	Public Works Department
RAY	Rajiv Awaz Yojana
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
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 has been led by the Chandrapur Municipal Council (CMC) with support from the PAS Project through teams from All India Institute of Local Self Government (AIILSG), Mumbai, and the 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 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 SLB Initiative as a baseline to assess past performance and identify priorities.

City profile: Chandrapur, a Class A municipality in Maharashtra with a population of approximately 3.2 lakh (Census 2011), is situated in the district of Chandrapur. It is part of the Vidharba region known for its rich mineral resources. The municipal limit is bordered by collieries to the north-east and south, and the direction of growth is seen along the south-west of the city. Chandrapur is an old settlement that grew along the banks of the tributaries of Wardha River: the north-south flowing river Erai on its western part, and east flowing river Zhorpat.

An estimated 33 per cent of the city's population lives in slum settlements. Of the total 80 slums in Chandrapur, 55 are notified settlements. These settlements are located in the core area of the city and along the major road networks. The non-notified settlements are located on the outskirts of the city, or have developed as offshoots of the notified settlements.

Water supply: Chandrapur presents an interesting case of private sector participation in water supply services. Operation and maintenance (O&M), including providing new connections and collecting user charges for water supply, is outsourced. Under the past contract from 2004 to 2012, the private contractor paid an annual fee of Rs 10 lakh each year. Chandrapur Municipal Council's (CMC) responsibility is limited to taking up projects involving major capital investment in water supply. The city relies on surface sources for its water supply production. In 2009, the total inhabited area was reported to be covered only by 57 per cent of the distribution network. As the ground water table is quite high in Chandrapur, private bore wells are the major source of water supply in non-networked areas. Though M/s Gurukrupa Agency (MGA), the private contractor, has the authority to provide water connections, the distribution network in the city is quite old and needs to be augmented. The city reports very low coverage for household water supply connections at 30 per cent. As there are also concerns about the reliability of this information, the data systems related to coverage of connections need to be improved. While per capita supply is 113 lpcd, water is supplied only for two hours daily. Other areas where improvement is required are: low quality of water supply, extent of NRW, and inefficiency in consumer redressal. As the MGA has the responsibility for billing and collection and retains the revenues collected, it has taken care to maximise cost recovery and

collection efficiency of water supply related charges. Given that the MGA can increase tariffs by 10 per cent every three years, the CMC needs to look into the contracting arrangements carefully to ensure performance improvement and thus fully utilise the services of the MGA. The current contracting arrangement does not have any performance targets with respect to indicators, nor does the monitoring role work effectively. In 2012, the CMC contracted out the operations and maintenance of the water supply to a new agency, Ujjwal Construction, for 10 years.

The CMC has proposed projects under the Maharashtra Sujal Nirmal Abhiyan (MSNA) and Maharashtra Swarna Jayanti Nagarothan Maha Abhiyan (MSJNMA) for specific reforms such as complete metering, establishment of a geographic information system database linked to property tax, and augmentation of the distribution network for the entire city. While these proposals have been submitted for compliance with reforms (MSNA) and improving network coverage, these will need to be implemented with the perspective of moving towards 24x7 water supply systems. In addition, additional projects will be needed to first set up pilot zones for 24x7 supply and later to implement this in the entire city.

Sanitation (including sewerage): Compared with water supply, the CMC reports relatively good coverage of toilets in the city at 79 per cent. However, an estimated 19 per cent of the population still resorts to open defecation due to lack of proper sanitation facilities. The city has acquired sanction to construct individual toilets under the Integrated Low Cost Sanitation Scheme (ILCS) and Integrated Housing and Services Development Programme (IHSDP). The CMC is also nearing completion of Phase 1 of its sewerage network and STP funded under the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT).

Services to slums: The coverage of household level water supply connections in notified slums is 43 per cent, while in non-notified settlements it is 34 per cent. Currently, only two notified slum settlements have group connections. Non-notified settlements also have access to water supply through stand posts, and have achieved 100 per cent coverage including coverage of stand posts. The coverage of individual toilets in slums is only 51 per cent, though it improves to 71 per cent if access to community toilets is included. There is not much variation in access to individual toilet coverage in notified slums as compared to non-notified slums. While the CMC provides individual toilet facilities to non-notified slums as well, it does not provide community or pay-and-use toilets in these settlements.

Municipal finance of the CMC: The CMC had a total approved budget in 2011–12 of Rs 84.2 crore. The municipal finances have been reviewed for the last seven years, from 2005–06 to 2011–12. Property tax accounts for 7.7 per cent of the revenue income in the CMC. Collection efficiency for property tax has improved to 91 per cent from 80 per cent in the last five years. However, coverage of properties was found to be inadequate, with 53,803 residential properties being registered against 57,830 households. In addition, 71.7 per cent of the total revenue income is through assigned and compensatory grants to CMC. Other own sources contribute to about 28.3 per cent of the total income. Cost recovery of water supply system is dependent on the royalty paid by the service contractor, which does not follow a specific trend. Cost recovery of other services has been negligible. These costs are estimated to be met through contribution from the consolidated property tax. However, the exact proportion of the amount allocated for these services is not clear from the budget documents.

Capital income has grown at a compounded annual growth rate (CAGR) of 47.4 per cent over the study period with major contributions from the UIDSSMT, Backward Region Grants Fund (BRGF), IHSDP, Finance Commission grants, Suvarna Jayanti Shahari Rojgar Yojana (SJSRY), etc. The utilisation levels of the available capital have been low at 47 per cent (2009–10). About 26 per cent of the capital expenditure has been towards benefiting urban poor through either housing or provision of basic services. Investible surplus is based on the surplus achieved from annual revenue surplus, committed and routine capital expenditure. From the assessment it was observed that the CMC does not have an investible surplus to consider improvements in the performance of service delivery in the next 10 years in the Business As Usual (BAU) scenario.

Summary of Performance Improvement Plan for the CMC: The proposals suggested are focused on two key areas of establishing 24x7 water supply system and moving towards an open defecation free CMC, 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 Chandrapur, the Performance Improvement Plan for CMC has been summarised in Table 1.

Table 1: Summary of Performance Improvement Plan for CMC

Key actions for improvement	Costs required	Current status
Water supply: Towards 24x7 system		
Technical studies and metering	Rs 4.4 crore	Awaiting sanction of DPR submitted under MSNA
Planning and implementation of pilot 24x7 zones	Rs 0.6 crore	Awaiting sanction of DPR submitted under MSNA
Planning and implementation of 24x7 for entire city	Rs 174 crore	Awaiting sanction of DPR submitted under Nagarothan
Sanitation: Towards OD free		
Construction of individual and community toilets (including IEC costs)	Rs 5.9 crore	Preparation of DPR is required
Preparation of Septage Management Plan		
Total cost for Performance Improvement		**Rs 1,84.9 crore**

The Council has to also undertake improvement actions related to processes in the water supply and sanitation (WSS) operations. These actions have no or low cost, and thus can be immediately taken up by the Council. These include revision of 'new connection' format, periodic surveys at source, treatment and consumer end of water supplied, levying telescopic rates for water supply, drainage tax, and improving collection efficiency of sanitation tax.

Based on the revenue enhancement measures mentioned above, the investible surplus for the CMC is projected to be approximately Rs 7.5 crore in the next 10 years. Thus, the investible surplus of the CMC can be gradually improved. The CMC can, hence, look to financing certain areas of its WSS projects.

Given that the contract with the MGA does not specify any performance targets that would help the CMC monitor the MGA's progress improvements are suggested in the contract with respect to annual targets as well as reporting procedures.

The improvements for the CMC have been proposed in two phases: (a) Immediate interventions (from 2013 to 2018); and (b) Long term interventions (from 2018 to 2023). The interventions mentioned here to augment revenue as well as process improvements are proposed to begin in 2013. The costs shown below are inflated at 7.5 per cent for each year.

Phase 1: Immediate interventions (from 2013 to 2018)

- It is proposed that the CMC will begin with interventions related to process and policy changes that will not require capital investment such as improving reliability of information through better formats, surveys, etc, as well as initiatives such as increasing collection efficiency of charges, introducing drainage tax, etc.

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

Proposed improvement areas	2013	2014	2015	2016	2017	2018
Water supply						
Revision of 'new connection' format						
Periodic surveys at source, treatment and consumer end						
Proper sampling regimen for monitoring water quality						
Regular surveys through zonal sanitary inspectors						
Revision in contractual arrangements with MGA						
Introducing drainage tax, environmental tax in property tax and collection efficiency of charges						
Conduct consumer survey for entire city						
Conduct water audit and leak detection surveys						
Undertake hydraulic modelling for entire water supply network						
Installation of bulk flow meters and meters at consumer end						
Distribution network augmentation: Creation of pilot DMAs						
Levy telescopic rates for water supply						
Sanitation (including sewerage)						
Preparation and implementation of Septage Management Plan						
Preparation of DPR						
Towards OD Free city through provision of individual toilets (including IEC costs)						
Towards OD Free city through provision of community toilets (including IEC costs)						
Improve collection efficiency of sanitation tax						
Levy telescopic rates for drainage tax						

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

- Starting from 2014, the CMC 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 CMC refurbish these toilets before initiating construction of new community toilets. To begin with, therefore, the CMC can go in for construction of individual toilets. Construction of individual toilets will be completed in five years, while that of community toilets will be completed by four years.

- 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 Gad, or MBGs) 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 issues.
- Water supply improvements that will help the CMC move towards 24x7 supply, such as conducting consumer survey, and hydraulic modelling can begin in 2014. As the CMC has augmentation proposals under the MSNA for network refurbishment and augmentation, this can also be initiated in 2014. The CMC's contribution towards this project would be 10 per cent of the total cost, as per MSNA conditions. These projects will be completed in 2014 itself.
- Once interventions such as consumer survey, hydraulic modelling and demarcation of pilot DMA is complete, the CMC can proceed with installation of bulk flow meters and consumer meters. This improvement is proposed to be completed within two years. After this the CMC will begin water audit and leak detection surveys.

Figure 1: Implementation of projects after revenue enhancement measures

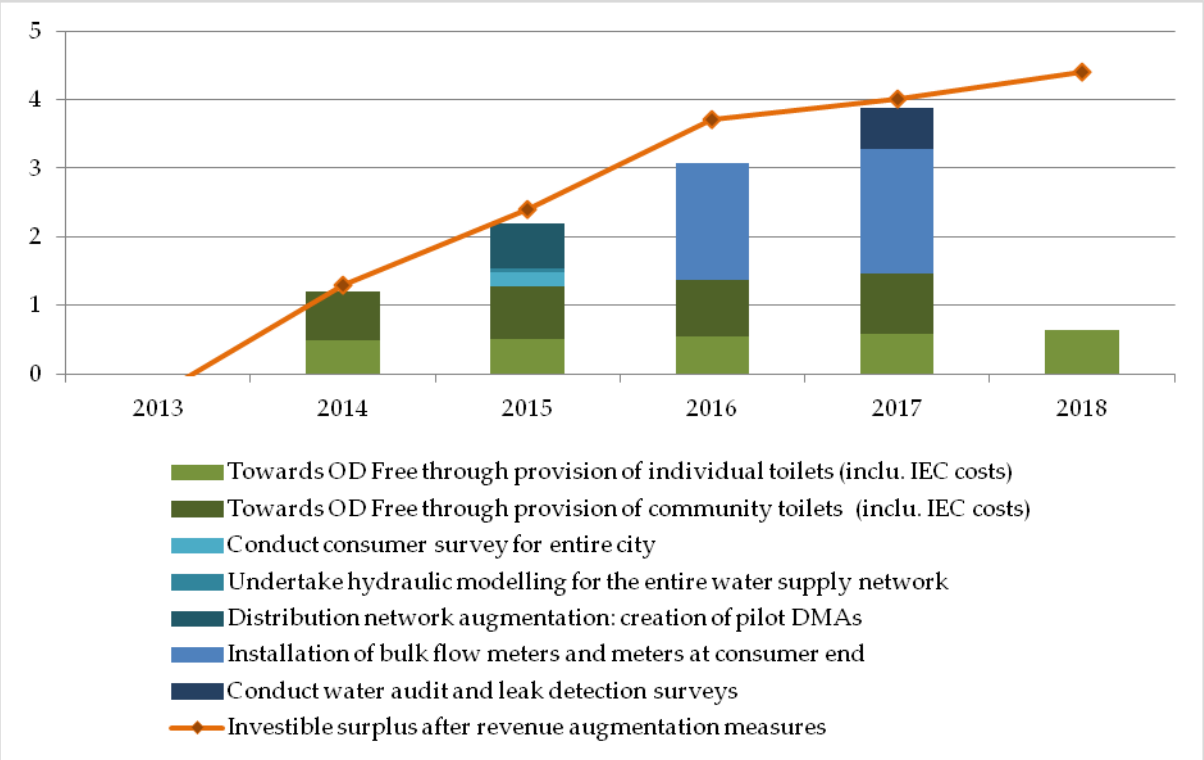


Table 3: Sources of revenue to fund 24x7 water supply system in CMC (in Rs crore)

Implementation of 24x7 system for CMC	2019	2020	2021	2022	2023
Total cost	**28.8**	**30.8**	**33.0**	**35.3**	**37.8**
Investible surplus after implementation of other projects	**4.8**	**5.4**	**5.8**	**7.5**	**8.1**
External funds required	**24.0**	**25.4**	**27.2**	**27.8**	**29.7**

To realise the targets set for improving water supply and sanitation in the CMC, the existing institutional framework must be enhanced to enable better operation and management 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 CMC has to focus its attention on improving policies related to services, financial sustainability and accountability to consumers.

Some of the additional measures the CMC needs to undertake includes augmentation of staff at the CMC and MGA, mobilisation of external support through Project Management Consultants (PMC), Non-Governmental Organisations (NGOs) and CBOs, setting up of PIP taskforce, and performance monitoring through regular target setting.

Photo plate 1: General characteristics of Chandrapur

Discussions with Chandrapur General Body (of the Municipal Council) and municipal staff.

A historical monument in Chandrapur.

Well laid network in a slum settlement.

A historical monument in Chandrapur

Kicking off the PIP exercise in Chandrapur.

A historical monument in Chandrapur.

Reservoir at Erai Dam, Chandrapur.

1. INTRODUCTION

The preparation of this Performance Improvement Plan (PIP) for water supply and sanitation (WSS) has been led by the Chandrapur Municipal Council (CMC) 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 CMC 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) 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 GoI's SLB Initiative as a baseline to assess past performance and identify priorities. During the preparation of PIPs several dialogues, periodic consultations and meetings with Chandrapur's Chief Officer and officials from respective departments were held.

Preparation of the PIP has been done in the following stages:

Initial performance assessment: Based on the data from the CMC, an initial assessment of all SLB indicators for the past three years was done. As a part of the preparatory work, a preliminary profile of the CMC using SLB indicators was prepared. The CMC teams were assisted to generate a city profile based on the CMC's comparative performance assessment for the last three years, based on its data in the PAS benchmarking system. This involved past trends as well as comparison with other Class A Municipal Councils in Maharashtra. The existing service levels are assessed along with their respective reliabilities against service level benchmarks to be achieved.

This was discussed with CMC officials at the first PIP consultative workshop in June 2011 in Chandrapur. The workshop was attended by Chandrapur's Chief Officer, respective heads of the water supply department, sanitation department and tax department. Preliminary priorities were identified at this workshop. Particular focus was also placed on the issues around making the city open defecation free and exploring the possibility of introducing 24x7 water systems. The outcome of the consultation was: initiating diagnostic assessment of PIP in Chandrapur.

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 the purpose of PIP preparation included data templates, survey formats, transect walks, schedules of interviews, focus group discussions (FGD) guidelines, areas for digital documentation, dimensions of stakeholder consultations, etc.

The emphasis was on understanding the current data record systems and measures to improve the performance data reliability.

Detailed discussions with CMC engineers and support staff were held to assess the water and sanitation situation. City level reconnaissance surveys and dedicated field visits were undertaken by teams to facilities including water source as well as treatment and distribution/collection systems for

water supply, sanitation and solid waste management (SWM) to validate secondary data and identify performance issues. Wherever applicable, appropriate consultations were also undertaken with Maharashtra Jeevan Pradhikaran (MJP) officials and private service providers to help assess and validate issues from different perspectives.

For detailed qualitative insights, the teams visited all slums and conducted FGDs with slum dwellers. 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. In addition, key person interviews, FGDs and consultations were held with safai karamcharis,[1] contractors and private parties to identify service delivery issues from the consumers' perspectives.

Action planning and preliminary costing: Consultations with sector experts were also held in August 2011 for proposing actions and estimating the required capital cost/investment based on identified improvement areas. At the end of the expert consultations the options for improving water supply, sanitation and SWM scenario were discussed with concerned CMC officials and Chief Officer. The diagnostic study, detailed assessment and preliminary strategies for improvement were shared with CMC officials during the second PIP consultative workshop in September 2011 in Chandrapur. The suggestions given by CMC officials were incorporated in the PIP.

On identification of city priorities, consultations were held with the Chief Officer, opinion leaders, municipal councillors, CMC officers and representatives of water and sanitation committees to discuss priorities for municipal water supply and sanitation (WSS).

While proposing strategies and actions for improvement, the assessment of ongoing projects was done. The actions for improvement were identified, prioritised and streamlined in consultation with CMC officials to achieve both priority/focal areas – 'Open Defecation Free CMC' and '24x7' water supply.

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 CMC officials during the third PIP consultative workshop in November 2011 in Chandrapur.

Preliminary validation of draft Performance Improvement Plan by CMC: The proposed draft PIP was shared with CMC, and finalised by incorporating the revisions suggested. The Chandrapur PIP has been validated by the Chandrapur Chief Officer and CMC 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 and CEPT University. This PIP report will be submitted to the state government for review and guidance. It is anticipated that the CMC will identify low-cost actions that can be taken immediately and provide

[1] Employees (permanent/contractual) of the Municipal Council who pick up waste.

funds for these actions from their budget. For actions that require significant capital expenditure, the CMC will prepare detailed project reports and seek assistance under state and national programmes.

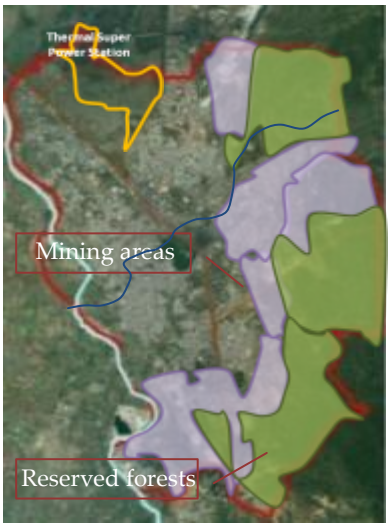
2. CITY PROFILE

This section discusses the general characteristics of Chandrapur related to population, aspects related to slum settlements, and human resources in the CMC. Also, aspects related to municipal finances, specifically with respect to WSS services and extent of private sector participation, are discussed here.

2.1. LOCATION AND DEMOGRAPHY

Chandrapur is part of Nagpur division located in the Vidharbha region, which is the easternmost district in Maharashtra. It is also the headquarters of Chandrapur district. Categorised as a Class A municipality (population greater than 1 lakh), it has a population of approximately 3.2 lakh (based on provisional Census 2011) with an area of 56.28 sq km. Chandrapur is an old settlement that grew along the banks of the tributaries of Wardha river: the north-south flowing river Erai on its western part, and east flowing river Zhorpat. Being a district rich in minerals like iron ore, limestone and coal, the city is surrounded by mining areas on the northern and south eastern parts.

Figure 2: Chandrapur city surrounded by reserved forests and mining areas



The city has had an interesting growth pattern. The core of the city is within the fort walls with some structures around 100+ years old. The outer parts of the city developed as colonies near the Thermal Superstation, Western Coal Limited, etc. The density of Chandrapur is 5,711 persons per sq km. The growth of industries started around the 1980s, bringing migrants from states like Andhra Pradesh, Chhattisgarh, Haryana, etc.

2.2. SERVICES IN SLUMS IN CHANDRAPUR

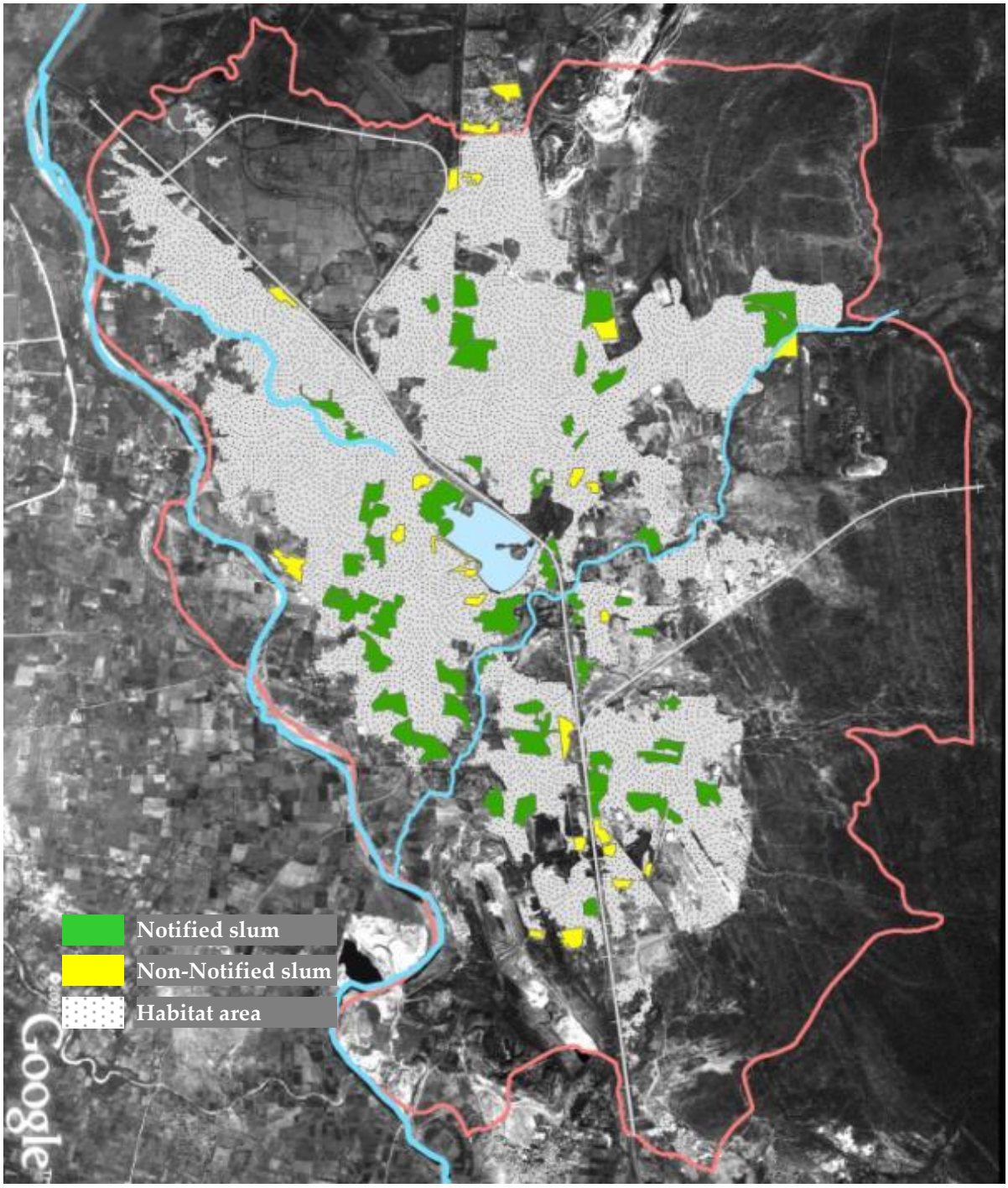
One of the focal areas under the PAS Project's improvement areas is the provision of services to urban poor. While the performance measurement tool captures information at city level on services provided to slums, a more detailed measurement tool was also developed to capture settlement level variations in services. Chandrapur is also one of the cities in Maharashtra that has been selected under Phase 1 of the Rajiv Awaz Yojana (RAY); a central government programme that aims to make cities free of slums by 20 years.

As part of the PIP diagnostic assessment, quick spot visits to some of the slum settlements were also carried out to understand the characteristics of slums in the city. The total population in slums is approximately 1.06 lakh, which is 33 per cent of the total population of Chandrapur.

Most of the slum settlements are located within the core area of the city (67.5 per cent) with average age of the slums being around 40 years. Moreover, 41 per cent of the slums are located along the major road networks which make extending the WSS network to these settlements feasible.

As can be seen in Figure 3, a majority of the non-notified slums are on the outer areas of the city or located at the boundaries of notified slums.

Figure 3: Location of notified and non-notified slums in Chandrapur



Source: CEPT University, 2011.

The Council has earmarked 5 per cent of the budget for servicing the poor. However, a look at the budget over the past four years shows that the Council has spent on an average about 13 per cent of total CAPEX on redevelopment schemes in slums. This was mainly under Nagar Dalit Vasti Sudhar, Nagar Dalit Vasti Water Supply, and Minority Community Slum Development. While the Council

has provisions to supply individual WSS services to slum settlements, it does not provide services to slums on private land. This seems to be a minor issue for slums in Chandrapur as almost 81 per cent of the settlements resides on land owned by the state government. Moreover, nearly 100 per cent of the slum settlements either have fully legal status or quasi-legal status of the land they occupy. A detailed analysis for each sector is discussed in the following chapters.

While 81 per cent of slum settlements are on land owned by the state government, only 19 per cent of the settlements have full tenureship of the land. Eighty-one per cent of the settlements have quasi-legal status, implying that they own a possession certificate or have occupancy rights over the land.

Table 4: Table 4: Land ownership and tenureship of slums

Total number of slum settlements	80
% notified slum settlements	68.75
% non-notified slum settlements	11.25
% notified slum settlements in 1985	29.09
% notified slum settlements in 2006	65.45
LAND OWNERSHIP	
% slum settlements with land under state govt	81.25
% slum settlements with land under central govt, excluding Railways, Defence or Airport	17.5
TENURESHIP	
% slum settlements that are fully legal	18.75
% slum settlements with quasi-legal status	81.25

Source: CEPT University, 2011.

2.3. STAFFING OF CHANDRAPUR COUNCIL

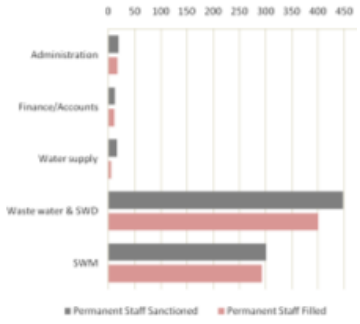
The CMC has a total staff of 725 out of 794 sanctioned posts. The technical staff is negligible compared to non-technical staff (see Table 5), with the non-technical staff forming the chunk of the municipal staff (see Figure 4).

Table 5: Technical and non-technical staff in UWSS

Department	No of technical staff	No of non-technical staff
Water supply	1	4
Waste water	2	398
SWM	2	290

Source: CEPT University, 2009–2011

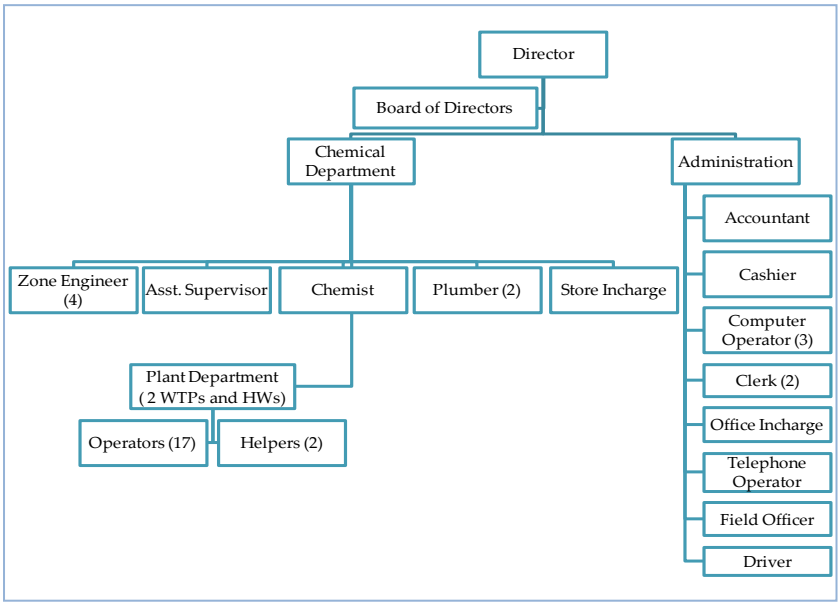
Figure 4. Staffing (sanctioned vs recruited) in Chandrapur



Source: CEPT University, 2009–2011

The water supply department has only 11 per cent of senior level staff that includes management and engineers, while it has 29 per cent technical staff (plumbers, work inspectors, electricians) and over 60 per cent of labour staff. Four posts for senior management lie vacant out of the total of five. Sanitation and SWM staff is accounted within the SWM department. While there are 11 sanctioned posts for sanitary inspectors, only four of them have been filled. None of the 15 sanctioned posts for sanitary supervisors have been filled. A huge number of staff in sanitation is in the non-technical category, namely safai karamcharis or sweepers, at 96 per cent of the total working staff. Though the sanctioned posts are only 298, the actual staff employed is over 600.

Figure 5: Institutional structure of MGA



M/s Gurukrupa Associates (MGA) has 41 staff members dedicated to water supply operations for the CMC. The company has, essentially, two main departments for administration and O&M. The latter (referred to as the chemical department) is headed by four zonal engineers who are supported by one assistant supervisor, chemist, and two plumbers. Separately, at each of the water treatment plants and head works (Babupeth and Erai), there are 29 operators. The administration department manages billing, collection and complaint redressal, among daily operations. Apart from this, the company has also contracted about 20 people for collection of bills from the 61 wards in the city.

2.4. MUNICIPAL FINANCE ASSESSMENT[2]

The municipal finances of CMC 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 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 CMC in 2011–12was Rs 84.2 crore.

[2] This section is based on a detailed analysis of municipal finances as reported in CRISIL 2012.

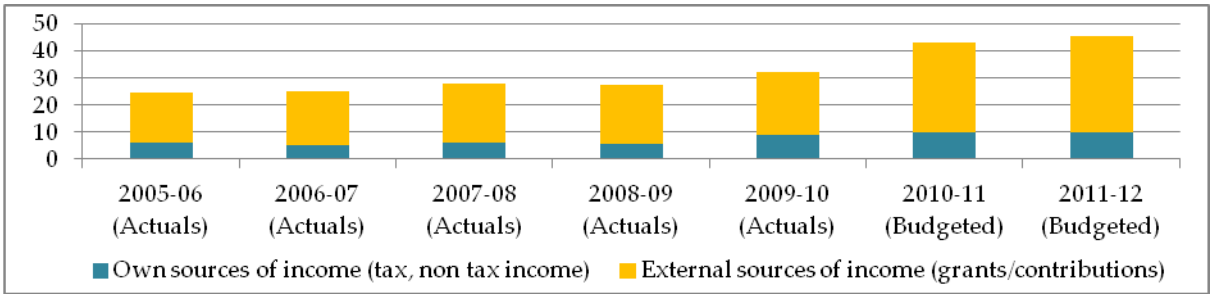
Table 6: Revised financial summary (recast budget figures) of CMC (in Rs crore)

Items	2005–06 (actuals)	2006–07 (actuals)	2007–08 (actuals)	2008–09 (actuals)	2009–10 (actuals)	2010–11 (budgeted)	2011–12 (budgeted)
Opening balance	**5.9**	**8.7**	**17.0**	**13.4**	**10.8**	**16.2**	**4.0**
Revenue account							
Revenue income	24.5	25.3	27.8	27.7	32.4	42.6	44.8
Revenue expenditure	20.6	21.5	23.8	25.6	33.5	40.1	45.7
Surplus/(deficit)	3.9	3.9	4.0	2.1	-1.2	2.5	-0.9
Operating ratio (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Capital account							
Capital income	6.1	11.0	7.7	12.5	42.6	31.0	31.1
Capital expenditure	7.7	7.2	13.2	12.9	20.5	49.7	40.4
Extraordinary receipt	3.7	6.9	4.4	8.4	21.8	34.6	8.3
Extraordinary liabilities	3.3	6.2	6.6	12.7	37.4	14.7	8.0
Overall surplus/(deficit)	**8.7**	**17.0**	**13.4**	**10.8**	**16.2**	**4.0**	**0.9**

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

Revenue account: The total budgeted revenue income for CMC in 2011–12 was Rs 44.8 crore. Main sources of revenue include taxes and duties levied under various acts, service charges, rents, grants and contributions, etc. The revenue income of CMC has grown steadily at a Compound Annual Growth Rate (CAGR) of 5.73 per cent in 2009–10; 71.7 per cent of this is 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.

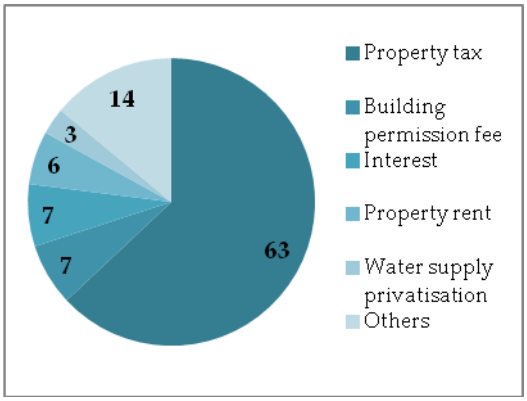
Figure 6: Trend of own and external sources of revenue income of CMC (in Rs crore)



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

The CMC's own source of income in 2009–10 formed only 9.2 per cent of total revenue income. Over the past five years, the share of own sources of income has increased slightly from 25.9–28.3 per cent of total revenue income. Property tax has been the main source of own revenue at 63 per cent and registered a CAGR of 7.7 per cent. The CMC showed good collection efficiency at 91 per cent in 2010–11, improving from 73 per cent in 2006–07. However, coverage of properties assessed under property tax needs to be improved as only 52,303 residential properties were registered against 73,536 households in 2011.

Figure 7: Composition of own sources of revenue income (%)

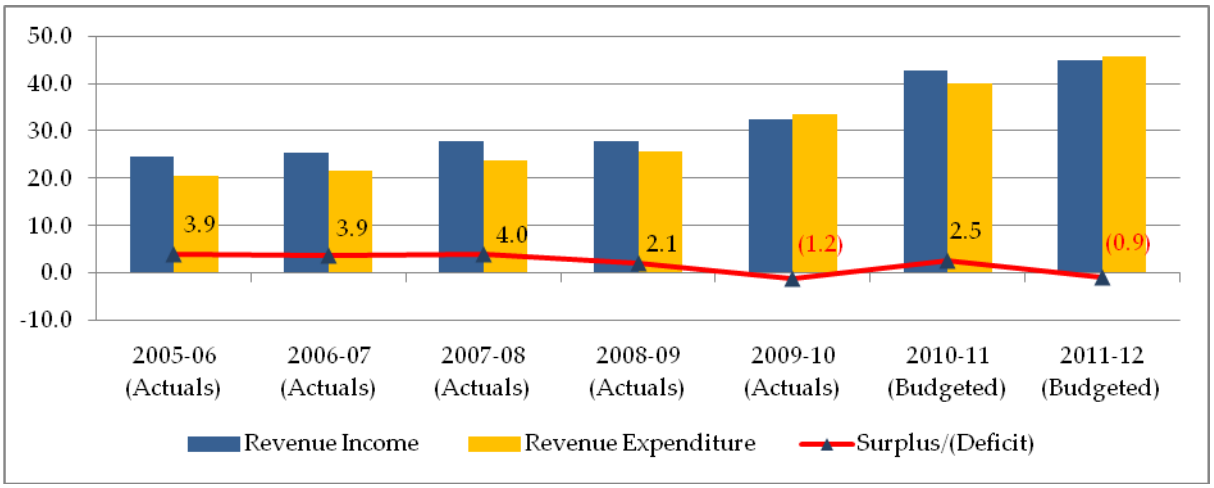


Source: Chandrapur Municipal Council, 2005–06 to 2011–12.

External sources of revenue income such as assigned revenues, grants and contributions contributed about 71.7 per cent of the total revenue income, increasing at a CAGR of 5.14 per cent in 2009–10. 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 CMC has been analysed against main departmental budget heads of general administration and tax collection department, public security, public health and sanitation, etc. The basic services such as water supply, sanitation and sewerage form about 41 per cent of the total revenue expenditure of the Council. The per capita revenue expenditure in the CMC is Rs 1,060 with per capita revenue expenditure on services about Rs 437 (as of 2009–10).The total revenue expenditure of the CMC has grown at a CAGR of 10.25 per cent for the last five financial years faster than the revenue income. This is reflected in the revenue budget deficit forecasted at Rs 0.8 crore by 2011–12 (see Figure 8).

Figure 8: Revenue income vs. expenditure of CMC (in Rs crore)



Source: Chandrapur Municipal Council, 2005–06 to 2011–12.

Capital account: Although capital income has increased over a period of time at a CAGR of 47.4 per cent, the increase does not follow a specific trend. The sudden increase in capital income in 2009–10 is observed as a result of addition of funds under the Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) at Rs 28.8 crore, Backward Region Grants Fund (BRGF),

Integrated Housing and Slum Development Programme (IHSDP), finance commission grants, Suvarna Jayanti Shahari Rojgar Yojana (SJSRY), etc.

Table 7: Sources of capital income for CMC (in Rs crore)

Budget head	2005–2006 *(actuals)*	2006–2007 *(actuals)*	2007–2008 *(actuals)*	2008–2009 *(actuals)*	2009–2010 *(actuals)*	2010–2011 *(budgeted)*	2011–2012 *(budgeted)*
UIDSSMT	0.0	0.0	0.0	0.0	28.8	10.0	5.0
Grants from Mines Development Corp	2.1	1.1	0.5	0.4	3.7	2.0	1.0
12th Finance Commission grant	0.3	2.1	1.9	1.0	3.2	2.8	0.5
SJSRY	0.0	0.0	3.0	1.7	1.8	1.9	2.0
BRGF	0.0	0.0	0.0	0.0	1.6	1.8	4.0
Road grant	1.3	1.2	1.2	3.9	1.2	2.9	5.0
Others	2.5	6.7	1.1	5.4	2.3	9.7	13.6
Total capital Income	**6.1**	**11.0**	**7.7**	**12.5**	**42.6**	**31.0**	**31.1**

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

However, it can be seen that only 48 per cent of the total capital income was utilised by the CMC in 2009–10. Capital expenditure has been projected to double from Rs 20.4 crore in 2009–10 to Rs 49.6 crore in 2010–11.This would put severe strain on the limited staff at the CMC. While the CMC has staff to support implementation of projects (through the additional City Engineer and Project Engineer), it lacks the capacity to formulate projects based on the Council's financials. Ongoing construction of the underground sewerage network has been a major capital expenditure component in 2009–10 and projected to increase. Others include construction of infrastructure in slums, construction of pipeline/hand pumps/tube wells, SWM related expenses, etc.

Table 8: Financial summary: Capital account (in Rs crore)

Items	2005–06 (actuals)	2006–07 (actuals)	2007–08 (actuals)	2008–09 (actuals)	2009–10 (actuals)	2010–11 (budgeted)	2011–12 (budgeted)
Opening balance	5.9	8.7	17.0	13.4	10.8	16.2	4.0
Revenue account surplus/(deficit)	3.9	3.9	4.0	2.1	-1.2	2.5	-0.9
Capital account							
Capital income	6.1	11.0	7.7	12.5	42.6	31.0	31.1
Capital expenditure	7.7	7.2	13.2	12.9	20.5	49.7	40.4
Capital account surplus/(deficit)	**-1.6**	**3.8**	**-5.5**	**-0.4**	**22.2**	**-18.7**	**-9.3**
Surplus after considering revenue account and accrued balance	8.3	16.3	15.5	15.0	31.8	0.1	-6.2
% Utilisation of capital income	**125.7**	**65.6**	**171.5**	**103.6**	**48.0**	**160.1**	**130.0**

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

2.5. PRIVATE SECTOR PARTICIPATION IN CHANDRAPUR

The CMC has utilised services of private agencies in all three sectors of water supply, sanitation and SWM; the major private sector involvement being in the operation and maintenance (O&M) of the water supply system. The initiation of private sector involvement in water supply occurred with the handing over of the water supply system by MJP to the Council. The Council, unable to manage the system due to increasing operational issues and financial costs, went in for private sector participation.

Private sector participation is also engaged for O&M of pay-and-use toilets as well as maintenance of the bore wells. The Council has also contracted drainage cleaning for a period of one year in one of the sub-zones (three wards) of the city on a pilot basis.

Under SWM, transportation of waste from secondary collection bins to disposal sites has been contracted out to a private agency. The tractors used for transportation are owned by the contractor, while one dumper placer is under the Council's ownership. The annual expenditure on these contracts is about Rs 0.6 crore. The CMC estimates that this is far less than expenditure required if the Council employed its own staff and resources. Based on this experience, the CMC is currently also exploring other possible contracts where the entire secondary collection, including procurement of secondary collection bins, transportation, construction and operation of the treatment plant, can be outsourced to a single private agency.

Table 9: Private sector participation in Chandrapur

Sector	Private agency	Scope of contract	Duration	Type	Value of contract	Procurement process
Water supply	M/s Gurukrupa Associates	Complete O&M and billing of existing water supply network	10 years	O&M	Premium to be paid by contractor of Rs 15,91,899.9 to the ULB on yearly basis	Competitive bidding
Sanitation (pay-and-use toilets)	M/s Chandrapur Swachata Samajik Mandal	Maintenance of 25 pay-and-use toilets	1 year	O&M	Rs 12,400 per month Rs 9,400 per month Rs 3,088 per month	Tendering
Drainage cleaning	M/s Dhanashree Berojgaar Sewa Sangh Sahakari Sanstha Ltd	Cleaning of 'open and closed' drains, dumping the waste in containers in 3 wards of city	11 months	Item rate tender	Rs 1,06,210 (per month)	Competitive bidding
SWM	M/s Vilas Maroti Bankar	Transport waste to dumping site using 8 tractors (owned by contractor) and 1 dumper placer (owned by ULB) in 31 wards.	1 year	Item rate tender	Rs 5,15,684 (per month)	Competitive bidding

Photo plate 2: Water supply in Chandrapur


Water Distribution Stations at Chandrapur


Gurukrupa Associates office: WS operator


Water Distribution Stations at Chandrapur


Water supply pipeline across open drains


Direct connections to pipeline through hoses


Direct connections to pipeline through hoses


Zorpat River, Chandrapur


Director, Gurukrupa Associates


Direct connections to pipeline through hoses


Use of common household water source

Photo plate 3: Slums in Chandrapur

3. ASSESSMENT AND PROPOSALS FOR WATER SUPPLY

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

2.6. ASSESSMENT OF CURRENT WATER SUPPLY SYSTEMS

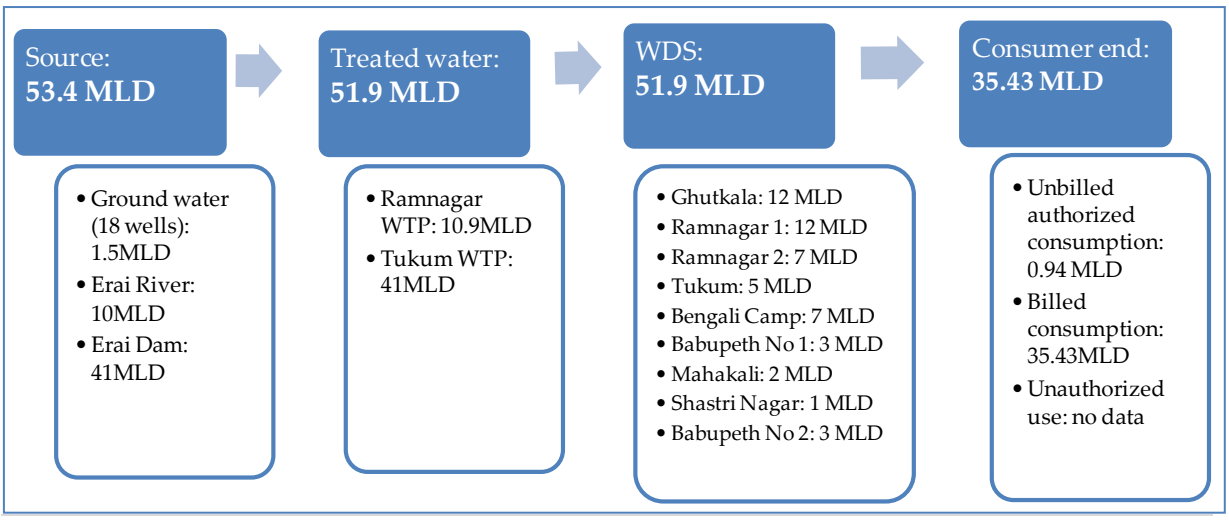
Chandrapur is flanked by two rivers: the Erai River on its west and the Zorpat River on the East: both tributaries of the Wardha River. At present, the Erai Dam constructed on the north of the city at a distance of 22 km is the major source of municipal water supply. Based on an agreement with the Irrigation department, the city is allocated free supply of 41 MLD as the Dam was built within the municipal limits. However, this allocation cannot be increased, and the city has had to look at other water sources to meet its future demand.

The city has another intake structure of 10.5 ML capacity at the Erai River. The water from the Erai Dam and the Erai River Intake is taken to two water treatment plants (WTPs): the Tukum WTP with a capacity of 41 MLD and Ramnagar WTP with a capacity of 10 MLD.

The city also has around 18 tubewells supplying 1.8 MLD. From the WTPs, water is distributed to the nine Elevated Service Reservoirs (ESRs) with a total capacity of 52 MLD. Figure 10 shows the schematic of the system.

Figure 9: Sources of water supply in Chandrapur

Figure 10: Water supply production, treatment and supply in Chandrapur



As mentioned previously, the Council has contracted the MGA to operate and maintain water supply in Chandrapur for 10 years starting from 2004. The lease contract provides the private company, MGA, the legal responsibility for operating the service in exchange of total revenues from consumers. The main tasks are O&M. In this arrangement, the consumers become the direct clients of the MGA. The company, however, is not responsible for undertaking capital investments.

Prior to this contracting arrangement, the city was incurring an annual loss of around Rs 2.1 crore. This was used to make a case for private sector participation. The major clauses, as mentioned in the contract, are discussed in Table 10 under the categories of access and coverage, service level and quality, financial sustainability, efficiency in service operations, and equity in service delivery.

Table 10: Responsibilities of MGA as specified in the contract with CMC

Categories	Description	Issue
Access and coverage	Provide new connections to consumer on obtaining up-to-date property tax paid receipt from the consumer. Efforts to convert standpost into group connections. But MGA cannot close down or disconnect existing standposts. MGA has to disconnect illegal connections and regularise these connections. A maximum fine of Rs 2,000 can be imposed on such connections. It also has the right to cease pump sets directly installed on the supply line.	*The contract does not mention periodic targets to be achieved by MGA for improving coverage.*
Service levels and quality	MGA shall have to lay additional minimum 1 km pipeline of required diameter per year. So laid pipeline will be the property of the CMC. MGA can lay new pipeline for distribution and allot new connections provided sufficient quantity of water supply is available. MGA has to inform daily figures of total water supplied in a day, in prescribed form, to the water works office as well as to the engineer in charge at his residence.	*As in coverage, performance targets to be achieved by MGA are not specified in terms of per capita supply and continuity of water supply. While MGA is to lay 1 km length of network every year, it does not specify the number of connections to be provided every year.*
	MGA should send a sample of treated water to the regional public health laboratory (RPH) on every working day. The charges towards testing such samples should be borne by MGA. It will be the responsibility of MGA to collect and send the sample to RPH lab and to submit the report collected from the lab to the department. Chlorine dosage should be maintained as per quality norms/standards.	
Financial sustainability	Disbursement and collection of water bills shall be carried out by MGA. MGA is at liberty to disburse monthly/quarterly bills with intimation to the CMC. A copy of the bill disbursed shall be submitted to engineer in charge. MGA shall have to manage required staff at Council for collection of bills at its own cost. Arrears of water bills due from various consumers up to date of commencement of the contract shall be recovered by MGA. MGA shall be paid 10 per cent of the recovered amount as an incentive. MGA shall have to maintain daily revenue collection account. This account shall be produced for review to the	*Increase in tariff is not linked to improvement in coverage or service levels.* *External audit of MGA financials is not mentioned in the contract.*

Categories	Description	Issue
	inspecting officer as and when demanded. Rates fixed by the Council shall not be altered by the contractor. In no circumstances can MGA increase the prescribed water charges. After every three years, 10 per cent of the water charges shall be increased.	
Efficiency in service operations	MGA should supply drinking water free of cost to all municipal buildings and gardens. MGA should not allow balancing tank to overflow but sufficient water level should be maintained for continuous pumping. During working condition of filter bed, its drain valve should not be left leaking. Any type of wastage of water should not be allowed. Control room to redressal grievance of consumers shall be opened at municipal headquarter. In addition to this, MGA has liberty to open grievance redressal office in various parts of town. Filter water to be supplied to all consumers or complaints should be rectified in 48 hours. Otherwise Rs 100 per day fine will be recovered from MGA. Leakages in distribution network should be attained within 12 hours, and completed within 48 hours. If leakages are not attained within stipulated time, fine of Rs 100 per day per leakage will be imposed by Council.	*No clause is mentioned in contract requiring MGA to conduct water audits or leakage detection studies. Contract mentions requirement of grievance redressal system. However, it does not mention regarding fine in case of non-compliance.*
Equity in service delivery	There are no clauses mentioned specifically for service provision to slum settlements.	*The contract does not include provisions for subsidising connections for slum households, and the connection procedures, costs and tariffs are same for slum and non-slum households.*
Maintenance related works	Maintenance of raw water pumping station, raw water rising main 1000 mm dia pipeline, Water Treatment Plant, elevated service reservoirs, pure water gravity main 1000 mm to 400 mm PSC and distribution system, tube wells and bore wells within Municipal Council limits. If any machine or equipment which is under repair and remains unaffected for 4 hrs due to contractors negligence, a penalty of Rs 100 per hour will be imposed till repairs work is done.	

Source: Based on Chandrapur Municipal Council, 2004.

Monitoring: These are discussed based on whether there are clear and measurable targets for services provided, such as coverage and quality of water supplied, and financial management.

- **Access and coverage (including slums):** The contract does not mention any monitoring procedures for coverage related aspects.

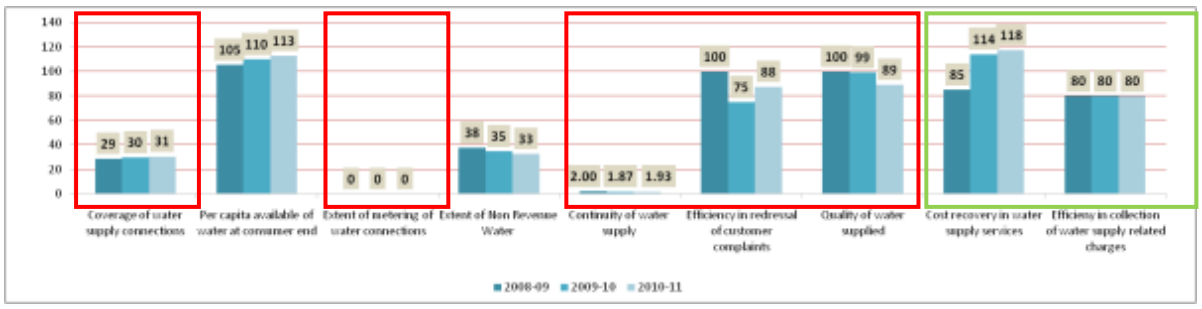
- **Service levels and quality:** The contract sets out parameters to be adhered to, related to water quality. Penal clauses are mentioned where, if water supply of the city gets affected due to negligence or a default on the part of the contractor, penalty shall be imposed.
- **Financial sustainability:** The tariff increase, as authorised by the contract with the MGA, must be done with prior intimation to the Council.
- **External support:** If the Council appoints any consultant to run the scheme smoothly or rectify any problem, the charges of such consultant shall be borne by the contractor.

In 2012, the CMC contracted out the operations and maintenance of the water supply to a new agency, Ujjwal Construction, for 10 years. Overall, the contractual arrangements are similar to the previous contract and include providing connections to consumers, raising and collection of bills in each quarter, regular O&M, etc. However, the annual instalments to the CMC have increased to Rs 18.10 lakh, which over a period of 10 years amounts to almost Rs 2 crore.

2.7. ASSESSMENT OF SERVICE DELIVERY

Provision of water supply services in Chandrapur depends on both O&M undertaken by the MGA, as well as investment in the water supply infrastructure by the CMC. The performance of Chandrapur water supply services is assessed in this context. Figure 11 provides an overview of the key performance indicators across 2009–12 for the CMC. Issues related to water supply services are highlighted in the figure.

Figure 11: Areas of poor and good performance in Chandrapur for water supply



Source: CEPT University, 2009–2011.

Access and Coverage

Coverage of water supply connections: The coverage of household level connections for water supply is relatively low at 31 per cent. This is despite the fact that the distribution network is estimated to cover about 60 per cent of the total inhabited area. This may also, however, be due to a lack of appropriate data recording practices. While discussions with the private operator suggest that estimated household coverage is over 60 per cent, the data provided by the MGA show that coverage is only 31 per cent. This is a critical indicator that impacts service delivery to consumers. The Council has provided 74 per cent of the slum settlements access to municipal supply. While 23 per cent of these are fully covered by the network, about 53 per cent of the settlements are only partially covered. The household level coverage in slums is also reported to be only 35 per cent.

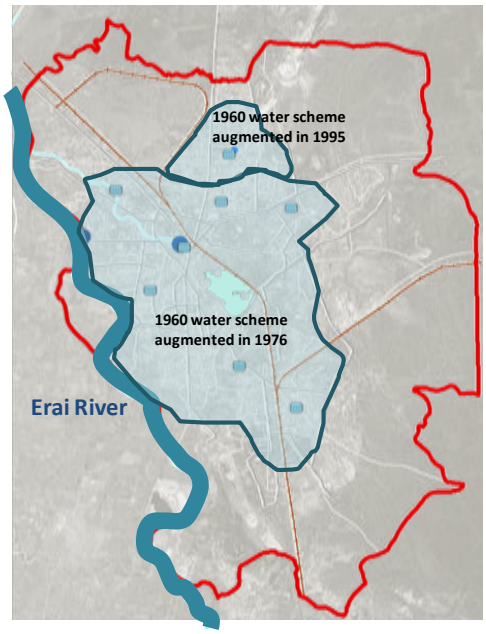
Proposals for improvement: As mentioned previously, it is necessary to accurately assess the coverage of household level connections in the city.

- A simple and no cost improvement action towards achieving this can be to include the number of households served in the output reports generated by the billing and collection software used by the MGA. This would also ensure clearly the number of households that are not connected to the existing network in each ward of the city.
- Subsequently, categories of households as 'general' (for non-slum households) and 'slum' households need to be created within the database. This not only ensures that the coverage is more accurately captured but also will highlight gaps in coverage of slum households.

Service Levels and Quality

Per capita supply of water: Looking at the quantity of water supplied, per capita supply of water (measured ex-treatment) is 164 lpcd while per capita supply at the consumers' end (minus distribution losses, etc) is only 113 lpcd. Considering that the Council is laying a sewerage network, the per capita supply supplied at consumers' end should be a minimum of 135 lpcd as per Central Public Health and Environmental Engineering Organisation (CPHEEO) norms. Tanker supply is also provided by the contractor for areas that are not covered by the distribution network. While the tankers are owned by the Council, the contractor is engaged to provide water supply for Rs 250 per tanker.

Figure 12: Refurbishment of the water supply system in Chandrapur



As can be seen in Figure 12, the water supply network hasn't been augmented since 1976. There are frequent breakdowns in the network due to mining related activities in the nearby areas. Given that a substantial portion of the network requires, and has undergone, frequent repair and maintenance, the Council had submitted proposals for refurbishment and augmentation of network under the Maharashtra Sujal Nirmal Abhiyan (MSNA) and Nagarothan. However, both these proposals are awaiting sanction. As the focus of improvement in water supply is moving towards 24x7, these proposals can be implemented with this perspective as described in Section 3.4.

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

Proposal for improvement: As the MGA has a good network and management of bill collectors, it is possible to train the collectors to conduct periodic surveys at the major bulk production and consumer points. These can be done either through methods like bucket survey or using portable flow meters. This also needs to be factored into the contract to ensure the parameter of minimum wastage of water is met.

Continuity of water supply: The MGA provides water supply for two hours daily. While the Council is keen to augment the supply and duration, lack of adequate quantity and storage capacity has been flagged as an issue by both the MGA and CMC in increasing the duration. There are also issues of low pressure in certain parts of the city.

Proposals for improvement: 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 the duration of water supply to all these zones separately through regular surveys coinciding with the water quantity surveys. Appropriate monitoring mechanisms can also be adopted by the MGA to detect low pressure zones. This will also help to assess areas of major problems in the existing network.

Quality of water supply: Quality has decreased from 100 per cent in 2009 to 89 per cent in 2011. This is of concern and it is necessary to identify the reasons for this decline. As the groundwater table in Chandrapur is quite high, the residents also use their private wells to augment or make up for the lack of municipal supply. As the region is quite prone to industrial activities, this may affect quality of groundwater.

As water quality monitoring is jointly conducted by the Council and the private agency, appropriate quality procedures must be undertaken.

Proposals for improvement: More stringent monitoring of the quality procedures undertaken by the MGA needs to be carried out by the CMC. Additionally, the 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.

Metering: Chandrapur has no metering at source, treatment and consumers' end. Drawing lessons from several cities managed by the MJP, and as required under the reforms required under the MSNA, the Council needs to ensure that metering is introduced for all consumer connections. The CMC has submitted proposals for 100 per cent metering under the MSNA, and is awaiting approval. Proposals related to 100 per cent metering are discussed in detail with the perspective to achieve 24x7 systems.

Financial Sustainability

Cost recovery (O&M) of water supply: The MGA has shown good and consistent performance in financial sustainability, namely cost recovery (O&M), at 118 per cent, and collection efficiency of water supply charges/taxes at 80 per cent. Details on how the MGA achieved this are given in Box 1.

Box 1: Achieving financial sustainability in water supply

The performance in O&M cost recovery and collection efficiency of water supply has been good in the CMC. As per the contract, the MGA retains the revenues collected from consumers. This incentivises it to minimise its O&M costs to the extent possible. For example, when the agency started the services, all oil lubricated pumps (at source, treatment and distribution) were replaced with water lubricating pumps, considerably increasing pump efficiency. Chandrapur spends Rs 0.86 per KL in electricity costs compared with the Class A average of Rs 1.63 per KL. Moreover, leaks at the trunk main and transmission trunk were reduced by regular monitoring of the network by ward level supervisors. The private contractor uses an automated billing and collection system, where the connections are linked to the billing system. Each bill collector is assigned three wards and daily targets that need to be achieved are specified (generally Rs 50,000 per day). The collector is given an incentive of 5–10 per cent of the amount collected on exceeding the daily stipulated target. Fines are imposed if the targets are not met. The process of collection starts in the third quarter of every financial year. There is also provision for payment of bills in instalments.

Table 11: Financials of MGA

Items	2005–06 (actuals)	2006–07 (actuals)	2007–08 (actuals)	2008–09 (actuals)	2009–10 (actuals)	2010–11 (actuals)	CAGR % (2005–2010)
Income	1.15	1.86	2.12	2.45	2.74	3.02	0.17
Expenditure	1.18	1.91	2.12	2.60	2.72	3.12	0.17
Surplus	(.04)	(.05)	(0.04)	(0.15)	.02	(.09)	0.16

Source: CEPT University, 2009–11

The tariff level in Chandrapur is based on flat charges as there is no metering of connections. The details of tariff are given in Table 9. Though the Council does not subsidise the connection costs for slum dwellers, the slum dwellers can pay the same in instalments. With the current level of tariff, MGA is able to sustain operations for water supply.

Table 12: Tariff increase by MGA (from 2007 to 2013)

Year	2004–07	2007–10	2010–13	2004–07	2007–10	2010–13	2004–07	2007–10	2010–13
Size	**Domestic (Rs/yr)**			**Institutional (Rs/yr)**			**Commercial (Rs/yr)**		
1/2″	806.0	886.6	976.0	1612.0	1820.9	1951.0	3580.0	3938.0	4331.0
3/4″	1555.0	1710.5	1881.5	3110.0	3421.0	3774.0	7138.0	7851.8	8637.0
1″	3662.0	4028.2	4431.0	7324.0	8056.4	8862.0	16152.0	17777.8	19556.0
1.5″	-	80520.0	88572.0	-	161040.0	177144.0	-	355369.8	390906.7

Source: Chandrapur Municipal Council, 2011

As mentioned previously, the MGA has the authority to increase water tariffs by 10 per cent every three years. The increase in tariff from 2004 when the MGA took over operations till date is shown in Table 12. While the periodic increase in tariff is needed to ensure operational expenses are met, the same progress is not seen in the service levels provided by MGA (see Figure 11).

Proposals for improvement: Introduction of telescopic rates after installation of meters at all connections – the contractual arrangement with the MGA, however, has to be changed to ensure that this initiative will also benefit the CMC.

Efficiency in Service Operations

Extent of NRW: As mentioned above, the per capita consumption (113 lpcd) is less compared to per capita supply (164 lpcd) due to substantial losses on the distribution network. This may be at least partly due to the old network, as the network from Erai River was laid in 1965 before its augmentation in 1970. However, as metering is not practiced in the city, and there are no periodic surveys undertaken by the MGA, estimates of non-revenue water are not validated.

Proposals for improvement: In the initial phase, it is necessary to undertake improvement measures such as periodic surveys at bulk production and distribution points (as mentioned in 'Per capita supply of water').

Efficiency in redressal of customer complaints: Consumer redressal is another area that has not been properly addressed by the MGA. While there is an automated system to track complaints, it is currently not being used due to lack of trained staff. This needs to be addressed immediately to meet the contractual provisions but, more importantly, to improve consumer relations.

Equity in Service Delivery

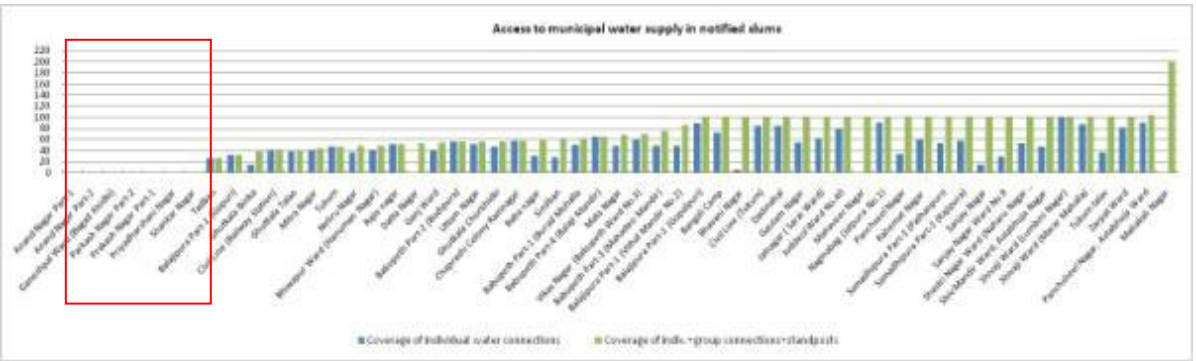
Chandrapur has 80 slum settlements, of which 55 are notified settlements. The non-notified slum settlements in the CMC are mostly located in the peripheral areas of the city or along boundaries of notified slum settlements.

The settlements are provided access to water supply through household connections, public standposts and, in some cases, group connections. The coverage of household connections in notified slum settlements is 43 per cent, while coverage in non-notified slum settlements is only 34 per cent. The variations in coverage in notified and non-notified settlements are discussed below.

Coverage in notified slums: The variation in coverage of household connections within notified slum settlements is quite wide, with coverage ranging from 6 per cent to 100 per cent. Similar figures are seen for coverage including access to standposts, which varies from 27 per cent to 200 per cent. However, even after considering coverage through standposts, only 50 per cent of the settlements show 100 per cent coverage. Group connections[3] are provided in only two notified slum settlements.

[3] Group connections are generally connections shared between five households.

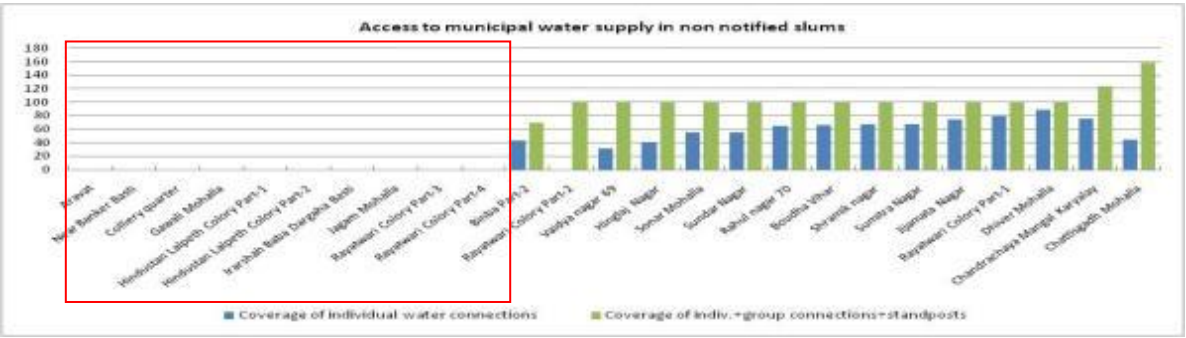
Figure 13: Lack of municipal supply in notified slums



Source: CEPT University, 2011

Coverage in non-notified slums: While the coverage of household connections in non-notified slums is less at 34 per cent, the variation among the settlements in not as high as seen in the case of notified settlements. The coverage in settlement ranges from 32 per cent to 89 per cent. Most of the non-notified slums without access to household connections are located on the outskirts of the city. However, considering coverage including households served by standposts, all the non-notified settlements show 100 per cent coverage, except for one settlement. No group connections are provided in the non-notified settlements.

Figure 14: Lack of municipal supply in non-notified slums



Source: CEPT University, 2011

2.8. PROPOSED ACTIONS/INTERVENTIONS FOR WATER SUPPLY

The following interventions are proposed based on discussions with the Council, and on an analysis of the key indicators and their data reliability. The proposals listed below mainly include the no-cost or low-cost interventions that need to be carried out by the CMC and MGA. 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 Table 13) need to be carried out immediately by the CMC to ensure that basic systems are in place. Detailed interventions which will incur capital investment by the CMC are discussed in the next section.

Table 13: Interventions required to be carried out by CMC

Categories	Interventions required
Access and coverage	• Including 'households' served in the output reports generated by the billing and collection software. • Creating categories: 'general' (for non-slum households) and 'slum' households within the billing and collection software.
Service levels and quality	• Training of bill collectors to conduct periodic surveys at the major bulk production and consumer points, either through methods such as bucket survey or using portable flow meters. • Monitoring water supply duration to all supply zones separately through surveys coinciding with water quantity estimation surveys. • Increasing monitoring of quality procedures and reporting by the MGA as well as CMC.
Financial sustainability	Once metering is in place for the entire city, the Council needs to incorporate telescopic rates. This will require changes in the contractual arrangement.
Efficiency in service operations	The MGA has to appoint staff for operating and managing the complaint redressal software system.

2.9. MOVING TOWARDS 24X7 WATER SUPPLY IN CHANDRAPUR

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. Given that Chandrapur has contracted out its routine water supply O&M to the MGA, planning and implementation of the 24x7 system has to be done in collaboration with the MGA.

While steps towards achieving 24x7 water supply require substantial efforts, certain actions related to upgradation of human resources and improved management information systems are easier to implement. The technical guidelines suggested by the Ministry of Urban Development (MoUD) for 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, and these 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 the bulk water produced, or of 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 a service provider 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 the MSNA. The CMC has submitted proposals under the MSNA that will enable its progress to 24x7 water supply. These are presented below.

Reliable data on distribution network and customers is achieved through:

1. Consumer end survey: 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. GIS mapping and hydraulic modeling: 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.

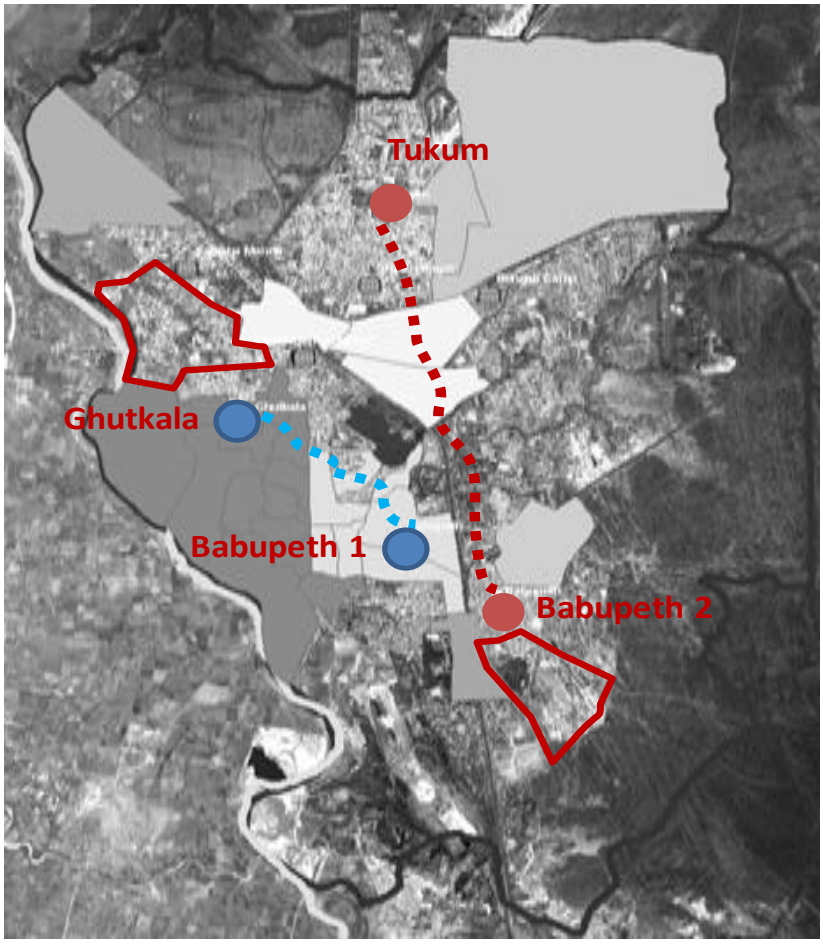
Interlinked distribution network can be restructured through:

3. Water audit, leak detection and energy audit study: 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.
4. Demarcation of District Metering Areas (DMAs) 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.

   Additionally, the CMC has proposed two augmentation projects under the MSNA and Nagarothan, respectively. The proposed distribution network improvements under the MSNA are for two areas in the north and south of the city (Figure 15). The proposal under Nagarothan is for the entire city (Figure 16). Both these augmentation projects can be carried out from the perspective of moving towards 24x7 systems.

Proposal submitted under the MSNA: The CMC has proposed the refurbishment of the network from Tukum in the north to Babupeth 2 in the south, as frequent leakages occur due to heavy truck movements (transporting minerals) on these roads. In addition, the network from Ghutkala to Babupeth 1 is under construction, to ensure increased supply to the unserved areas located in the west and south of the city. As the new network is being proposed, these can be planned so as to locate appropriate DMAs in the newly served areas based on results of hydraulic modelling. Subsequently, proposed metering can be initiated in these DMAs and these can function as pilot zones for 24x7 supply. Pilot DMAs are essential to understand and correct any constraints that would occur with the existing network. While in the Indian context, average size of the DMA can be between 1,500 to 3,000 properties, DMAs of 350–400 properties also work well and are more manageable. Given that Chandrapur operates its water supply through a private operator, a DMA of about 400–600 properties would work to understand both technical and managerial issues. This can be planned and implemented within a period of six to 12 months.

Figure 15: Proposed network for the unserved areas in the city submitted under MSNA

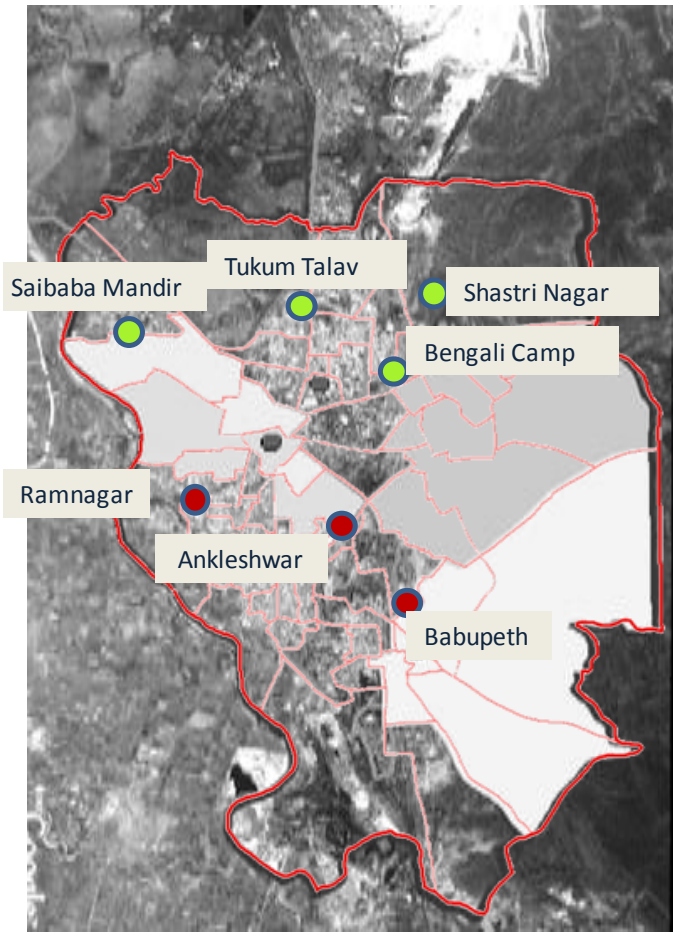


Source: Chandrapur Municipal Council, 2011.

Proposal submitted under Nagarothan for network augmentation of the entire city: The CMC has also proposed substantial augmentation of its water supply network, as the network is quite old and has undergone frequent repairs. The project is designed for a period of 30 years till 2040. Components proposed under this include construction of jack well, raw water rising main, Break Pressure Tank (BPT), WTP of installed capacity of 60 MLD and distribution network of 142 km. The Council has proposed three new water districts, in addition to the existing seven water districts, around the areas of Saibaba Mandir, Bengali Camp and Babupeth. Seven additional ESRs have also been proposed with a total capacity of 24.25 ML to augment the supply. While the proposal was initially floated under the UIDSSMT, the MJP raised concerns regarding the sufficient availability of the source (Erai Dam and River) and hence the project was not approved. Subsequently, the proposal was revised with Wardha River as the new source and submitted under Nagarothan, which is under approval. The Council has indicated that intake from the Erai River will eventually be stopped due to increasing pollution caused by the mining activities carried out nearby.

As boundaries of the DMAs are generally chosen based on their proposed service reservoirs, main or booster pumping stations, pressure zones, etc, these water districts can be planned to operate as DMAs. This would ensure the city's progress towards achieving 24x7 water systems.

Figure 16: Proposed water districts and additional ESRs for CMC



Source: Chandrapur Municipal Council, 2011.

Metering at bulk production and distribution points including consumer connections

5. Introduce consumer metering and volumetric tariff: 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 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 technical improvements need to be financially sustainable, the conversion to 24x7 water systems requires advanced commercial systems and procedures. While the MGA has computerised billing and collection system with updated consumer records, the billing is currently based on flat tariff. With the 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 Council as well as the private operator need 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 operational, maintenance and customer services tracking. While the CMC can continue to rely on the skills provided by the MGA, assisted by the four zonal engineers and operators at each of its bulk production points (intake and treatment plants) (see Figure 5), the staff at the CMC and MGA need to be augmented to ensure smooth functioning of the 24x7 system.

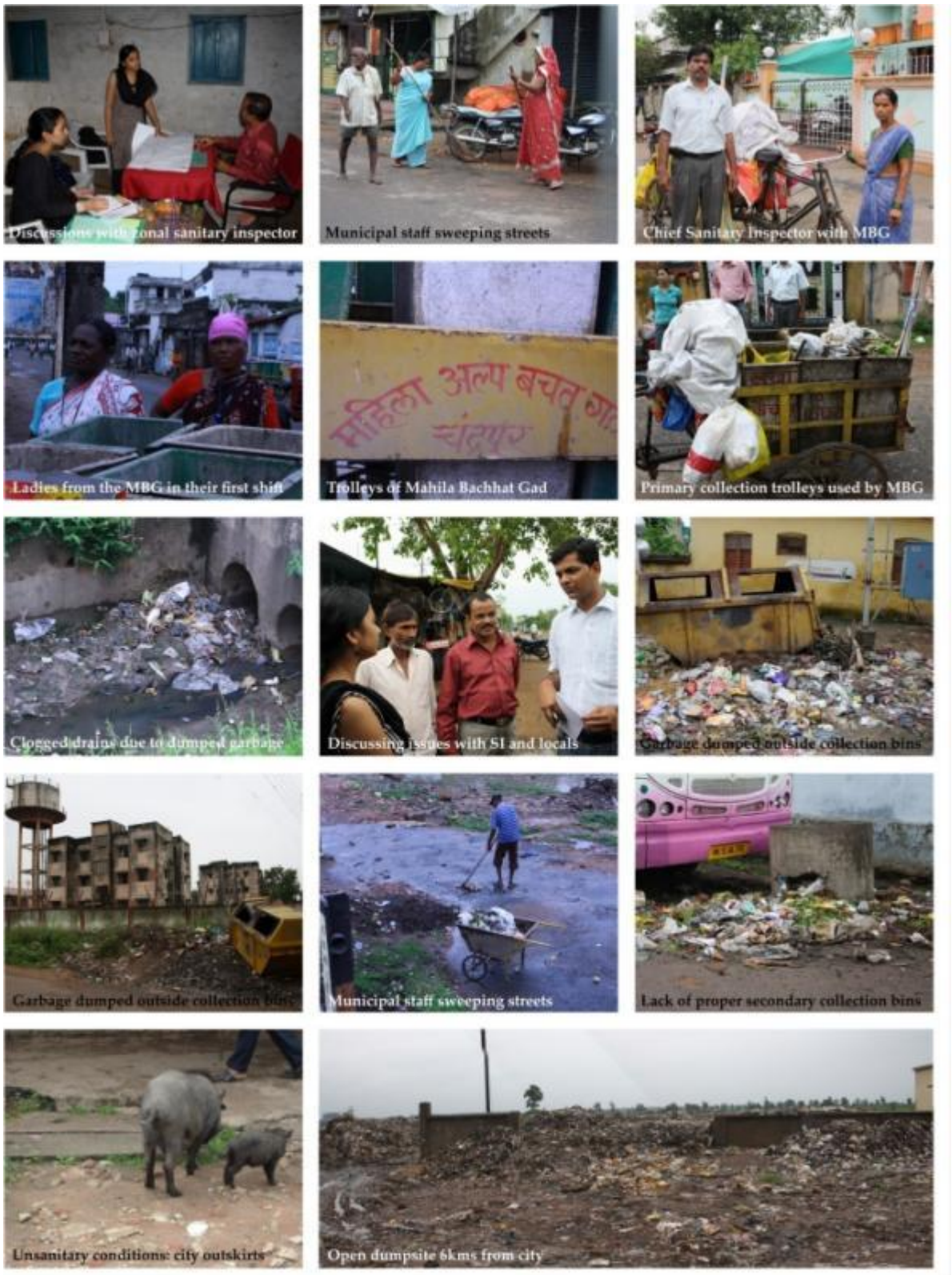
A summary of the actions and cost implications towards achieving 24x7 water systems is given in Table 14.

Table 14: Summary of improvement actions to implement 24x7 systems

Activity	Description	Status
Network and customer database	Detailed network maps in AUTOCAD.	Carried out by MGA.
	GIS mapping and hydraulic modelling for entire city.	Proposed under MSNA.
	100 per cent consumer end survey, including identifying and regularising illegal connections.	
Network restructuring	Creation of DMAs.	Proposed under MSNA.
100 per cent metered network	Metering at all bulk production and distribution points, including at all consumer connections.	Proposed under MSNA.
Leakage control	Conducting water audits and leak detection studies, and repairing existing leakages in the system.	Controlled by MGA on trunk and transmission network.
		Proposed under MSNA for entire network.
Creation of pilot 24x7 zones	Refurbishment and network augmentation in JN and NS areas.	Proposed under MSNA.
Implementation of 24x7 in entire city	Augmentation of entire network in the city.	Proposed under Nagarothan.

Photo plate 4: Sanitation and sewerage in Chandrapur

Photo plate 5: MSWM in Chandrapur



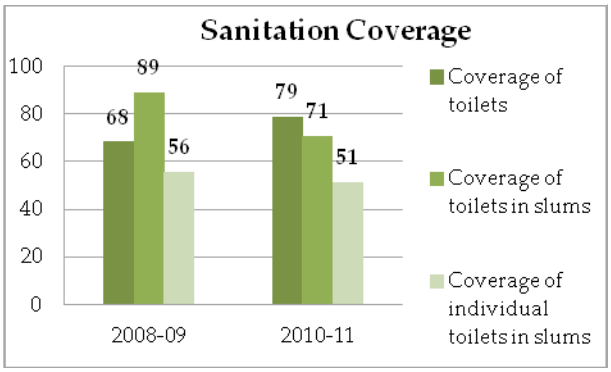
4. ASSESSMENT AND PROPOSALS FOR SANITATION

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

3.1. COVERAGE OF TOILETS

The coverage of toilets in the CMC has increased from 68 per cent in 2008–09 to almost 80 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. However, coverage of households with individual toilets in slums is just above 50 per cent. The growth in slum population from 2009–10 to 2010–11 has been 15.1 per cent; growth in provision of individual toilets has been only 10 per cent.

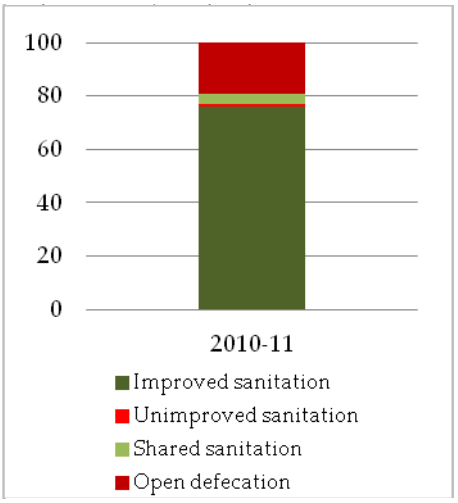
Figure 17: Coverage of toilets in city and slums across the years



Source: CEPT University, 2009–11

According to recent figures from Census 2011, 76 per cent of households have access to safe sanitation, implying latrine facilities within premises and connected to pipe sewer, septic tank and ventilated improved pit latrine. However, 19 per cent of households do not have access to any sanitation (improved/shared/unimproved) and thus resort to open defecation. The Council has also received funding to provide additional toilets for slum settlements under the IHSDP and ILCS programmes.

Figure 18: Access to sanitation in Chandrapur: Improved and



Source: Census, 2011.

There is not much variation in access to individual toilet coverage in notified slums as compared to non-notified slums, with 61 per cent coverage in the latter compared with 58 per cent in the former. As per the CMC, non-notified slums are also eligible to receive household level sanitation services. Property tax and user charges related to water and sanitation are also levied on non-notified slums.

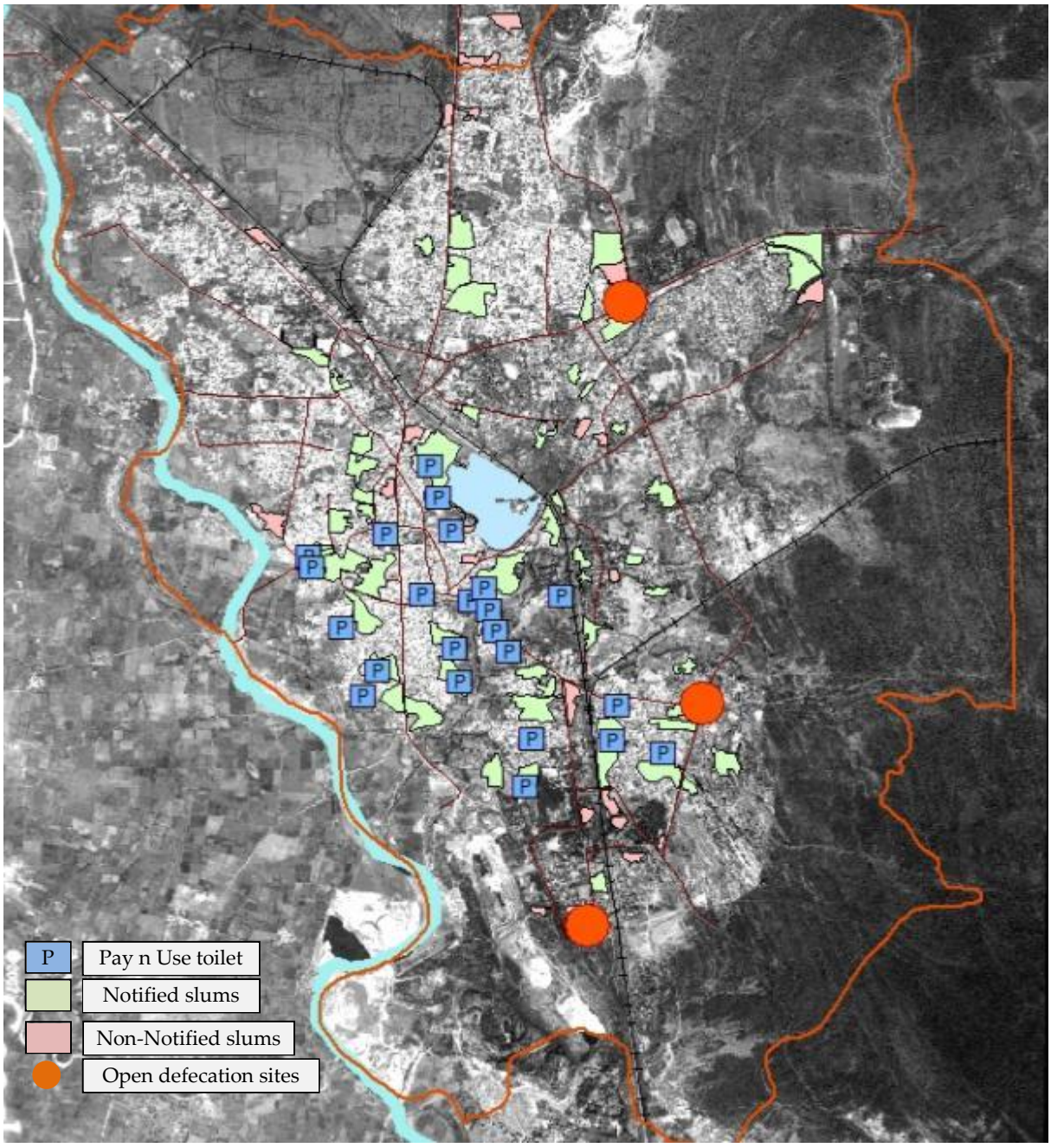
The Council has also provided 20 community and 25 pay-and-use toilets having a total of 700 seats. Assuming an average of 10 HHs persons per seat, it is estimated that around 7,000 HHs are served by 700 seats in shared toilets. The coverage of individual and community/pay-and-use toilets in slums is thus 71 per cent (See Figure 20). The coverage increases marginally to 63 per cent and 67 per cent for

notified and non-notified slums, respectively, by considering access to community and pay-and-use toilets.

The maintenance of all the pay-and-use toilets is through a maintenance contract renewable annually. However, a visit to some of the community and pay-and-use toilets showed that some of these toilets are not used due to lack of water supply in these facilities. The Council also has one mobile toilet unit.

During the visit, a few open defecation sites were also identified in the city. Most of these sites (shown in the map in Figure 19) are near the slum colonies around the mining areas, located northeast and south of the city. Access to sanitation in these areas (either through individual or community) is less than 20 per cent. Moreover, some of the community toilets were not functional due to inadequate water supply.

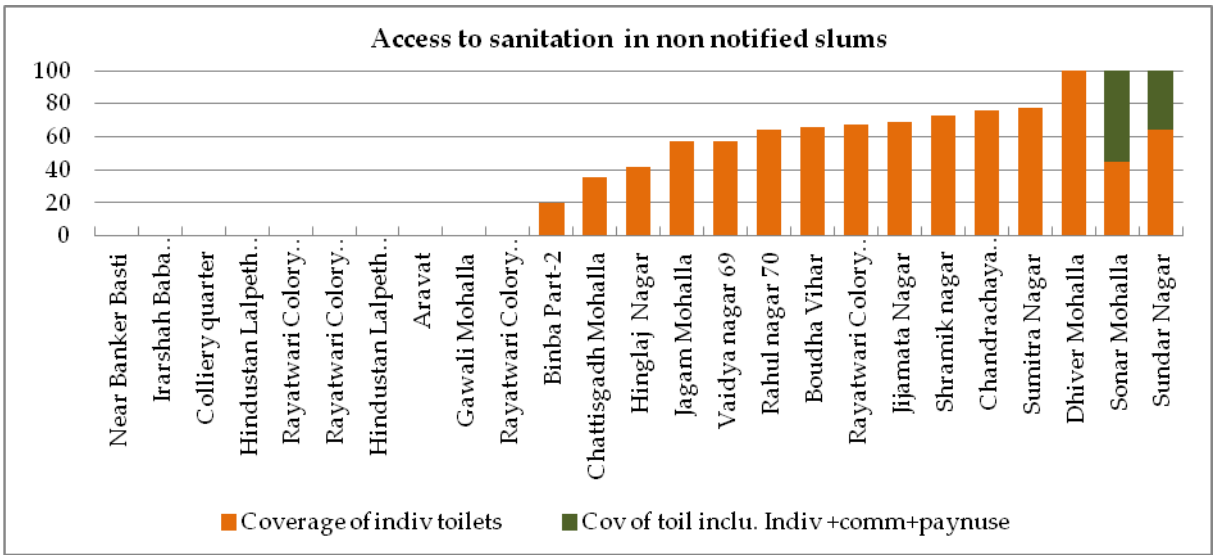
Figure 19: Map showing notified and non-notified slum settlements and sanitation facilities



Source: CEPT University, 2011

As can be seen from Figure 19, pay-and-use toilets are located more in the central areas of the city and near the notified slums. In contrast to this, only two non-notified slums have access to community/pay-and-use toilets. These are concentrated in the southwest and southern portions of the city.

Figure 20: Access to sanitation in non-notified slums



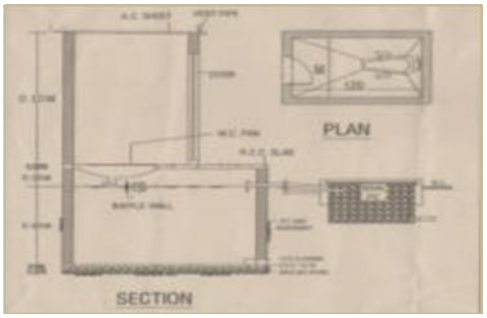
Source: CEPT University, 2011

Highlights

ILCS and IHSDP programmes in Chandrapur

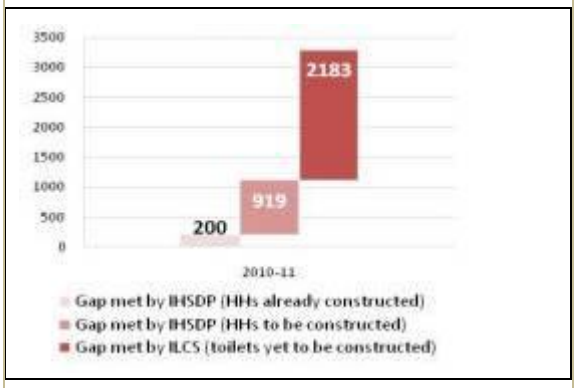
Both Integrated Low Cost Sanitation (ILCS) and Integrated Housing and Slum Development Programme (IHSDP) programmes have been initiated in Chandrapur. Under the IHSDP (a housing development programme), 200 households have already been constructed, providing individual water and toilet to low income beneficiaries. Around 919 households are still to be constructed. Under the ILCS, the Council has identified 2,183 beneficiaries that need to be provided with individual toilets. The cost of one toilet unit is Rs 11,850, with the beneficiary share being Rs 1,000. However, though the Council has invited tenders, contractors are unwilling to construct the toilets at the current cost.

Figure 21: Section of one ILCS unit connected to septic tank-cum-



Under the two programmes, 3,302 households will be provided with individual toilets, bringing down the gap from 21 per cent to 15 per cent.

Figure 22: Households provided with individual toilets (under IHSDP and ILCS)



3.2. MOVING TOWARDS OPEN DEFECATION FREE CHANDRAPUR

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 CMC has concentrated on covering the gaps in toilet coverage, and related components (such as IEC, awareness campaigns, etc).

Based on this 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: Twenty per cent of the population still resorts to open defecation. To ensure open defecation free status, the Council has to construct about 8,100 individual toilets. Assuming that the average cost per individual toilet is Rs 15,000, the total cost works out to Rs 12.7 crore.

Option 2: Achieving open defecation free status through provision of individual and community toilets: The Council would have to construct about 1,600 individual toilets and 65 community toilet blocks with 10 seats per block. Assuming similar costs for individual toilets as in Option 1 and Rs 40,000 per seat (including connection to septic tank), the total cost works out to be Rs 5.3 crore.

Option 3: Achieving open defecation free status through provision of only community toilets: 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 3.4 crore for constructing about 80 community blocks (assuming similar costs as given in option 2).

Table 15: Summary of options to make CMC open defecation free

Strategies for ODF	Option 1	Option 2	Option 3
Number of individual toilets	8,095	1,619	0
Number of seats in community toilets	0	648	810
Cost per individual toilet	15,000	15,000	0
Cost per seat in community toilet (including connection to septic tank)	0	40,000	40,000
IEC activities at 5% of construction cost	0.05	0.05	0.05
Total cost (in Rs crore)	**12.7**	**5.3**	**3.4**

Considering the CMC's current financial position, achieving 100 per cent toilet coverage through Option 1 does not seem to be financially sustainable. 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, the O&M of the community blocks will remain an issue as similar issues can be seen in the existing community and pay-and-use toilets. During site visits, it was observed that toilet blocks were not functioning due to lack of water supply. The CMC 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, the most feasible.

However, the Council must also simultaneously undertake community mobilisation and awareness campaigns to ensure that the community toilet blocks are maintained/managed properly. While the

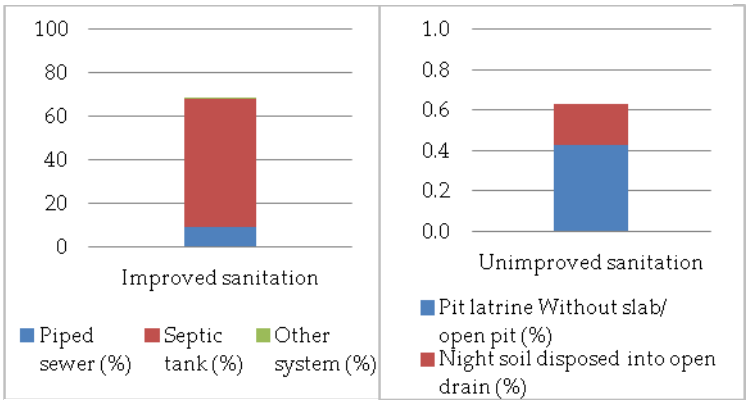
maintenance of all the pay-and-use toilets has been contracted out, similar arrangements with community-based organisations (CBOs) can be looked at with respect to community toilets. Campaigns to create awareness related to cleanliness and hygiene practices, safe sanitation practices, and negative health impacts due to open defecation need to be conducted by the Council. Local CBOs (such as the Mahila Bachhat Gad, or MBGs) 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.

It is proposed that the CMC will move towards achieving open defecation free 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.

3.3. SEPTAGE AND SULLAGE MANAGEMENT

Within the current system, all the toilets are connected to septic tanks, and hence properties with access to safe sanitation number 79 per cent. The Council also provides a subsidy of Rs 5,000 to all citizens, to construct septic tanks and thus avoid connecting toilets to open drains. Grey water is collected through covered and open drains, and finally drained downstream in the Zorpat River.

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



Source: Census, 2011

Collection of septage: The Council has two suction emptiers and, on an average, empties around 350 septic tanks annually (out of a total of 35,000 septic tanks). There are no private septic tank emptiers service providers in the CMC. As per the standards specified by the Government of India (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.

Disposal/treatment of septage: The septic tank waste is transported and dumped near the open disposal site on the outskirts of the town. The Council charges Rs 1,000 per trip for emptying within city limits, and Rs 2,000 per trip outside city limits. Currently the Council does not treat its septage.

Collection of grey water: The city has a good network of open and covered drains and is relatively clean of garbage/debris in most places. Currently, the city has contracted out drainage cleaning in only one zone (16 wards); the rest of the zones are covered by the Council itself. The CMC is looking

at the possibilities of extending the contracts to the other zones, considering the administrative expenses. The Council, at present, has 630 safai karamcharis against the sanctioned 298 posts.

Proposals for improvement: The Government of India's draft of 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 submerging a probe on a long handle 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:

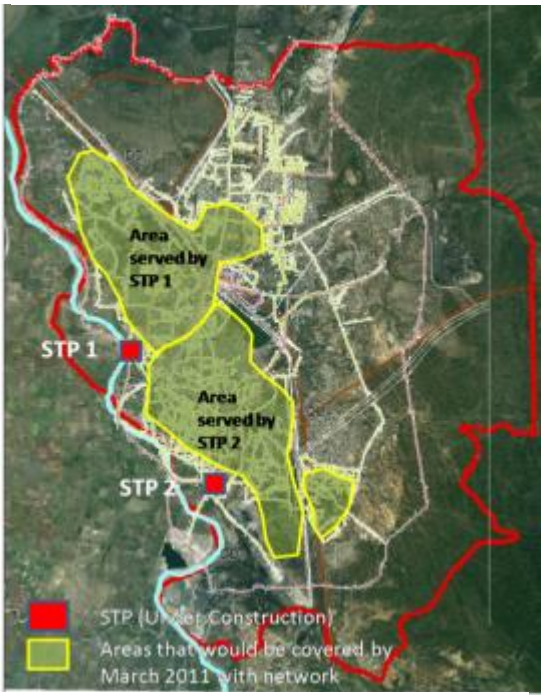
- Manual of Practice, listing operational procedures for specific equipment and documenting day to day procedures.
- Record keeping and manifests: Maintain accurate records related to septic tanks and volume pumped for billing and compliance purposes. These records should specify location or address of the pumped septic tank, septage characteristics (residential/commercial), details of property owner, volume of septage pumped, any other details like 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 or that the private operator undertakes.

Improvement in monitoring: The Council needs to undertake initiatives to ensure implementation 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 like 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.

3.4. ONGOING SEWERAGE PROJECT UNDER UIDSSMT

The Council is currently constructing a sewerage network for the entire city, and is also constructing two Sewage Treatment Plants (STPs). Project implementation began in 2009 and is expected to be completed by early 2012. The project is designed for a horizon period of 2040 and population of 9 lakh generating wastewater of around 108 MLD compared to the existing wastewater generation of about 29 MLD. The total cost of the project is approximately Rs 89 crore. The Council has received Rs 63.79 crore as of May 2011 and has utilised 77.4 per cent. Currently, the work for two sewage pumping stations and one STP is in its final stages. Around 70 per cent of the area to be serviced by STP 1 has been completed.

Figure 24: Areas covered by sewerage network and location of STPs



Source: Chandrapur Municipal Council, 2007

The Council plans to initially operationalise STP 1, following which STP 2 will be commissioned. As areas surrounding STP 2 are largely industrial and slum areas, there are a few minor land acquisition issues in constructing the network. STP 1 has a capacity of 25 MLD and STP 2 has a capacity of 45 MLD – thus bringing the total treatment capacity to 70 MLD. On a pilot basis, the Council is also planning to reuse around 0.27 MLD for flushing and gardening purposes in the municipal offices and institutions.

Access and coverage: Based on the Council's plan to initially operationalise STP 1, it is estimated that about 1.2 lakh people will be connected to the sewerage network by 2012. Coverage of wastewater network services would thus be around 45 per cent. Once STP 2 in the second phase is initialised, the coverage will be 100 per cent, thereby achieving the benchmark for coverage of sewerage services.

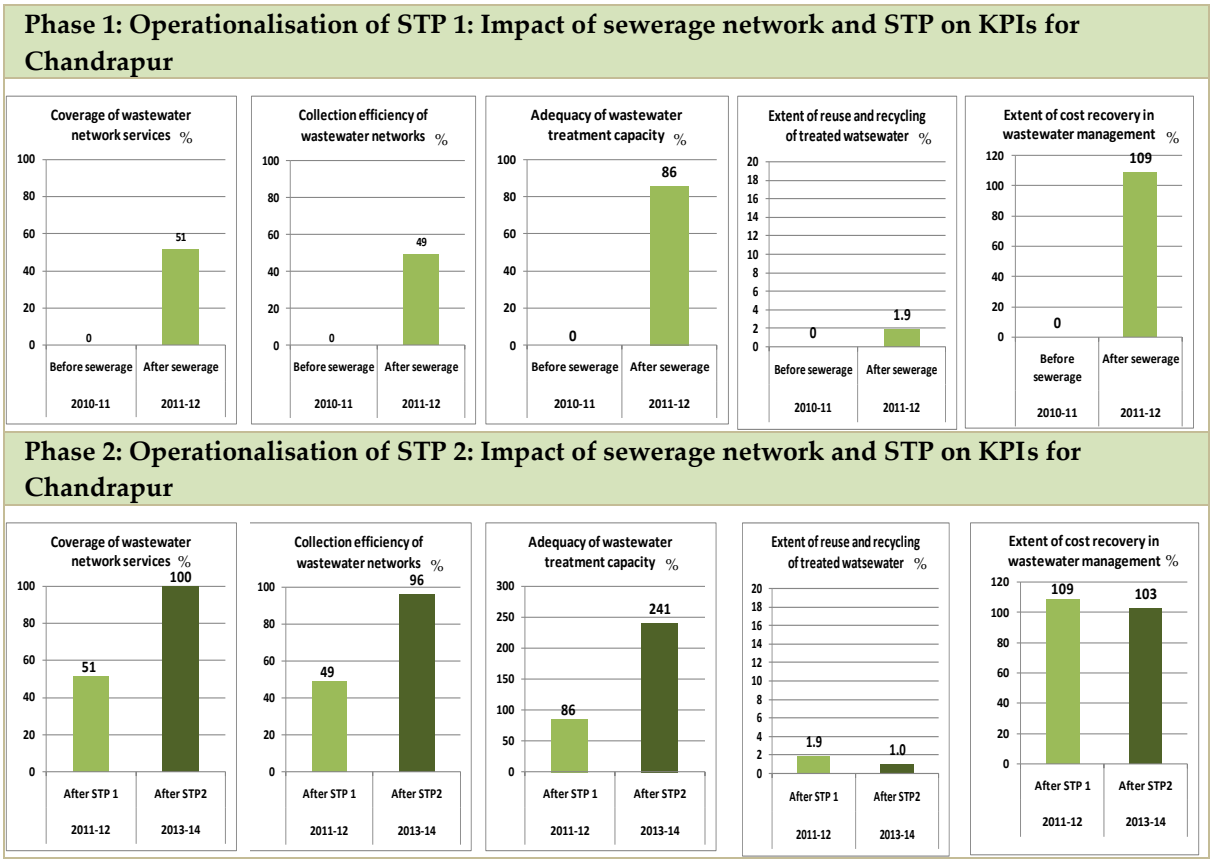
Service levels and quality: This would mean an estimated wastewater generation of approximately 14.35 MLD, bringing the collection efficiency of the system to 49 per cent. This will again be 100 per cent on achieving full coverage of sewerage network and operationalisation of STP 2.

Efficiency in service operations: Given that the Council is initiating a pilot project to reuse 0.27 MLD of treated wastewater, the extent of reuse of treated wastewater in the city would be close to 2 per cent. Based on experience from the pilot project, the Council will 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 around Rs 460 per household. Based on operation and maintenance costs of running the sewerage network in the initial phase, the **cost recovery (O&M)** is derived to be 30 per cent, against 0 per cent

in the previous years. In the second phase, once the network is laid for the entire city and assuming 100 per cent coverage of sewerage connections, the cost recovery of 100 per cent can be achieved.

Figure 25: Impact of construction of sewerage network and STP in Chandrapur



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 proposal listed below to make the CMC open defecation free is based on experiences and constraints faced in current management of toilet options. Extensive awareness campaigns must also be conducted to ensure the achievement of the open defecation free status.

To make the CMC 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. A summary of the improvements required and costs is given below.

The Council also has to prepare a Septage Management Plan to ensure safe and proper disposal of septage, and streamline its own operations.

Table 16: Summary of improvement actions for sanitation in CMC

Activity	Description	Status/next steps
Strategies for ODF	Provision of individual and community toilets.	Preparation of DPR needs to be undertaken.
	Undertake IEC activities.	
Strategies for Septage Management	Comprehensive plan to be implemented.	Preparation of Septage Management Plan and DPR.
	Required fleet capacity and inspection facilities and resources to be improved.	

5. SUMMARY OF PERFORMANCE IMPROVEMENT PLAN FOR CHANDRAPUR

This section provides a summary of all the improvement actions for water supply and sanitation, including 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.

4.1. SUMMARY OF PROPOSALS

The proposals summarised below are focused on two key areas of establishing a 24x7 water supply system and moving towards an open defecation free CMC, as well as improvements in key processes and operations related to these two focal areas. As discussed previously, the water supply operations and maintenance being carried out by the MGA, 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 the MGA and these are also summarised below.

As the city is nearing completion of its first phase of laying its sewerage network, certain process-related improvements in sewerage are also suggested. On coverage of toilets, considering the current experiences and capacity of the CMC, improvements are considered for both individual as well as community toilet provision.

Based on the analysis of the water and sanitation sectors in Chandrapur, the Performance Improvement Plan (PIP) for the CMC has been summarised below. The total PIP cost for the CMC will be Rs 184.9 crore.

Table 17: Summary of Performance Improvement Plan for CMC

Key actions for improvement	Costs required	Current status
Water supply: Towards a 24x7 system		
Technical studies and metering	Rs 4.4 crore	Awaiting sanction of DPR submitted under MSNA.
Planning and implementation of pilot 24x7 zones	Rs 0.6 crore	Awaiting sanction of DPR submitted under MSNA.
Planning and implementation of 24x7 for entire city	Rs 174 crore	Awaiting sanction of DPR submitted under Nagarothan.
Sanitation: Towards ODF		
Construction of individual and community toilets (including IEC costs)	Rs 5.9 crore	Preparation of DPR is required.
Total cost of PIP		**Rs 184.9 crore**

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

- Revision of 'new connection' format.
- 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.

Improvements related to performance contract for water supply

Given that the contract with the MGA does not specify any performance targets that would help the CMC monitor MGA's progress, improvements are suggested in the contract with respect to annual targets as well as reporting procedures.

Under the agreement between the CMC and MGA, the O&M of water supply assets is the responsibility of the MGA. The responsibility of creating any substantial new infrastructure lies with the CMC. Some of the clauses that need to be revised by adding certain performance targets are listed here.

Table 18: Improvements required in contract between MGA and CMC

Categories	Contractual clauses	Improvements/additions suggested
Access and coverage	Provision of new connections to consumers. Provision to convert standposts into group connections.	Include annual target/improvement to be achieved by MGA based on baseline performance. Include provision to assess individual/shared connections in slum settlements.
Service levels and quality	Provision to lay 1 km pipeline every year.	Include target of connections provided based on network added. Also include annual target/improvement to be achieved for per capita supply of water and continuity of supply every year.
Financial sustainability	Provision to increase water tariff every three years.	Link tariff increase every three years based on percentage improvement in coverage and service levels and quality of water supplied.
Efficiency in service operations	Minimisation of water losses occurring through leakages and overflow.	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 MGA in case of non-functioning complaint redressal system.
Equity in service delivery	No provision in contract to subsidise or ease procedures for connections to slum settlements.	Include provisions to simplify procedures and subsidise connections costs and tariffs for slum settlements. Include annual targets/improvement to be achieved for coverage in slum settlements.

4.2. PHASING AND STEPS TO IMPROVEMENT

In order to carry out the improvements suggested above, the CMC has to improve its current financial position. The suggestions for improvement are based on an analysis of the Business As Usual (BAU) 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 CMC would continue in the future. To arrive at the investible surplus in this scenario, calculations are based on: (a) Revenue surplus (difference of total revenue expenditure and WSS related revenue expenditure); (b) Net surplus after capital and revenue receipt and expenditure (revenue surplus + capital receipts other than WSS – capital expenditure other than WSS and debt servicing); and (c) Investible surplus (surplus + revenue related to WSS – revenue expenditure related to WSS). As the CMC has repaid only Rs 0.3 crore of the total Rs 0.8 crore debts incurred (for the UIDSSMT and others), debt servicing has also been factored into the investment capacity of the Council. The key financials of the Council have been projected for 10 years from 2011–12 as shown in Table 19. The financial assessment of the CMC shows that the investment capacity of the Council is limited.

Table 19: Projected investment capacity: Business As Usual scenario (in Rs crore)

Year	Net surplus after capital and revenue accounts (All except WS, WWS, MSW and slums)	Debt service of existing debt	Revenues (WS, WWS, MSW and slums)	Revenue expenses (WS, WWS, MSW and slums)	Balance available for investment in performance improvement actions
2011–12	2.1	0.0	0.3	16.5	**-14.1**
Projected					
2012–13	11.0[4]	1.3	0.3	13.4	**-2.1**
2013–14	11.7	1.2	0.4	14.2	**-2.2**
2014–15	12.3	1.1	0.4	15.1	**-2.4**
2015–16	13.1	1.1	0.4	16.0	**-2.5**
2016–17	13.9	1.0	0.5	17.0	**-2.6**
2017–18	14.7	0.9	0.6	18.0	**-2.7**
2018–19	15.6	0.9	0.6	19.1	**-2.8**
2019–20	16.6	0.8	0.7	19.9	**-2.7**
2020–21	17.6	0.8	0.8	21.1	**-2.7**
2021–22	18.8	0.7	0.9	22.4	**-2.7**
2022–23	20.7	0.1	1.0	23.8	**-2.1**

Hence it is extremely critical that the CMC undertakes revenue enhancement measures; otherwise it would need to resort to external resources to fund its internal operations as well. Some of the steps to increase revenue are:

[4] The sudden increase in net surplus for 2012–13 is due to the increase in capital expenditure in 2011–12 of almost Rs 10 crore.

- Levy of drainage tax (after completion of sewerage system under the UIDSSMT scheme).
- Improvement in the collection efficiency of special sanitation tax.
- Levy of additional environment tax under consolidated property tax for SWM services.

The actions suggested above do not require capital investments for implementation; they need only process changes. To simulate the effect of the above-mentioned changes in the investment capacity, assumptions have been made considering full cost recovery of service provision within five years. The details of assumptions are given in Annexure 3. Along with revenue enhancement measures, the CMC 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 CMC will be approximately Rs 7.5 crore in the next 10 years. Thus, the investible surplus of the CMC can be gradually improved. The Council can, hence, look to financing its water supply and sanitation projects.

Improvements for the CMC have been proposed in two phases: (1) Immediate interventions (from 2013–2018); and (2) Long term interventions (from 2018–2023). The interventions mentioned above to augment revenue as well as process improvements are proposed to begin in 2013.

Phase 1: Immediate interventions (from 2013–2018)

- It is proposed that the CMC will begin with interventions related to process and policy changes that will not require capital investment (such as improving reliability of information through better formats, surveys, etc) and with initiatives such as increasing collection efficiency of charges, introducing drainage tax, etc.

Table 20: Phase 1 of PIP for CMC (2013–2018)

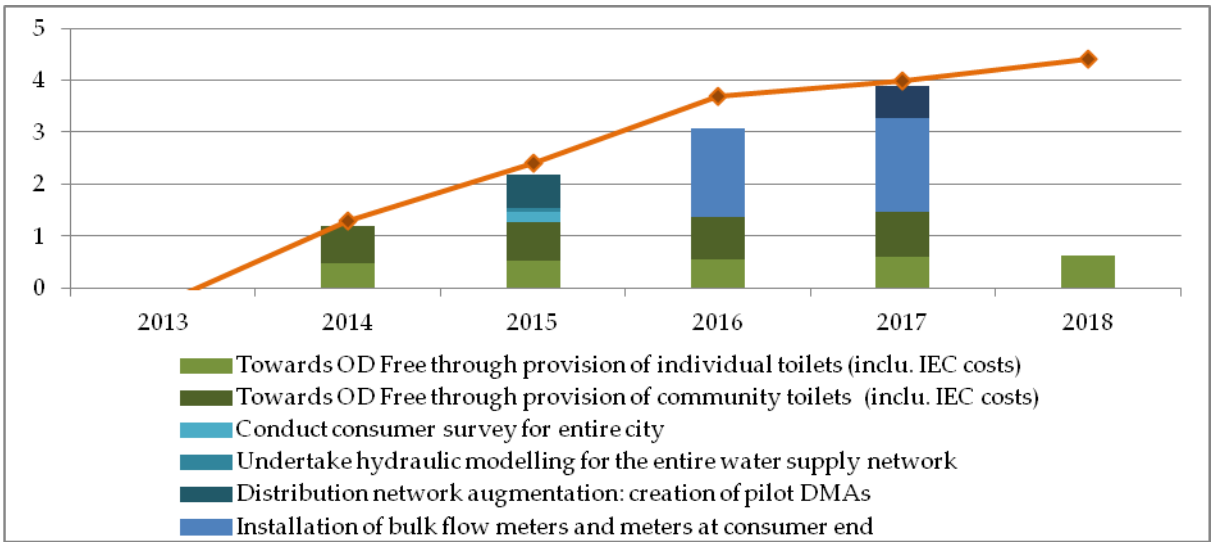
Proposed improvement areas	2013	2014	2015	2016	2017	2018
Water supply						
Revision of 'new connection' format						
Periodic surveys at source, treatment and consumer end						
Proper sampling regimen for monitoring water quality						
Regular surveys through zone sanitary inspectors						
Revision in contractual arrangements with MGA						
Introducing drainage tax, environmental tax in property tax and collection efficiency of charges						
Conduct consumer survey for entire city						
Conduct water audit and leak detection surveys						
Undertake hydraulic modelling for the entire water supply network						
Installation of bulk flow meters and meters at consumer end						
Distribution network augmentation: creation of pilot DMAs						
Levy telescopic rates for water supply						
Sanitation (including sewerage)						
Preparation and Implementation of Septage Management Plan						
Preparation of DPR						

Proposed improvement areas	2013	2014	2015	2016	2017	2018
Towards ODF through provision of individual toilets (including IEC costs)						
Towards ODF through provision of community toilets (including IEC costs)						
Improve collection efficiency of sanitation tax						
Levy telescopic rates for drainage tax						

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

- Starting from 2014, the CMC can begin construction of individual and community toilets. As O&M issues were observed in existing community toilets, it is proposed that the CMC refurbishes these toilets before initiating construction of new community toilets. To begin with, therefore, the CMC can initiate construction of individual toilets. Construction of individual toilets will be completed in five years, while community toilets will be complete by four years.
- While the maintenance of all the pay-and-use toilets has been contracted out, similar arrangements with CBOs can be looked at with respect to community toilets. Campaigns to bring about 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 (like the MBGs) 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.
- Water supply improvements that will help the CMC move towards 24x7 water supply systems – such as conducting consumer surveys and hydraulic modelling — can begin in 2014. As the Council has augmentation proposals under the MSNA for network refurbishment and augmentation, this can also be initiated in 2014. The CMC's contribution towards this project would be 10 per cent of the total cost, as per MSNA conditions. These projects will be completed in 2014 itself.
- Once interventions such as consumer survey, hydraulic modelling and demarcation of pilot DMA is complete, the CMC can proceed with the installation of bulk flow meters and consumer meters. This improvement is proposed to be completed within two years, after which the CMC will begin water audit and leak detection surveys.

Figure 26: Phase 1: Proposed phasing of water and sanitation projects, after undertaking revenue enhancement measures



Phase 2: Long term interventions (from 2018–2023)

- Once the measures outlined above are in place, the CMC can begin implementation of 24x7 water supply for the entire city. The CMC will not be able to fund 24x7 implementation for the entire city from its own revenue sources and will have to look at external funds. One of the funding sources is Nagarothan. Other possible funding sources could also be from National River Conservation Plan. Considering that the project is proposed to begin in 2019, the CMC can target to complete it by 2023. Table 21 shows the extent of external funds required by the CMC.

Table 21: Sources of revenue to fund 24x7 water supply system in CMC (in Rs crore)

Implementation of 24x7 system for CMC	2019	2020	2021	2022	2023
Total cost	28.8	30.8	33.0	35.3	37.8
Investible surplus after implementation of other projects	4.8	5.4	5.8	7.5	8.1
External funds required	24.0	25.4	27.2	27.8	29.7

4.3. INSTITUTIONAL IMPERATIVES TO ACHIEVING PROPOSED IMPROVEMENTS

In order to realise the targets set for improving water supply and sanitation in the CMC, 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 CMC has to focus on improving policies related to services, financial sustainability, and accountability to the consumers.

The financial analysis of the CMC showed that overall capital utilisation is poor, with only 47 per cent of capital income utilised in 2009–10. This points to the need for better project conceptualisation and management. If needed, additional staff could also be recruited.

Augment staff at the CMC as well as MGA: The CMC needs to also augment its staff as a major percentage of the staff comprises non-technical personnel. Moreover, though water supply operations

are outsourced, provisions to increase technical strength of the MGA need to be put in place. Similarly, to efficiently monitor operations of the MGA, technical staff in the CMC needs to be increased.

Mobilisation of external support: Additionally, the CMC 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 supply requires high technical skills, the CMC 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 the CMC needs to undertake are presented here.

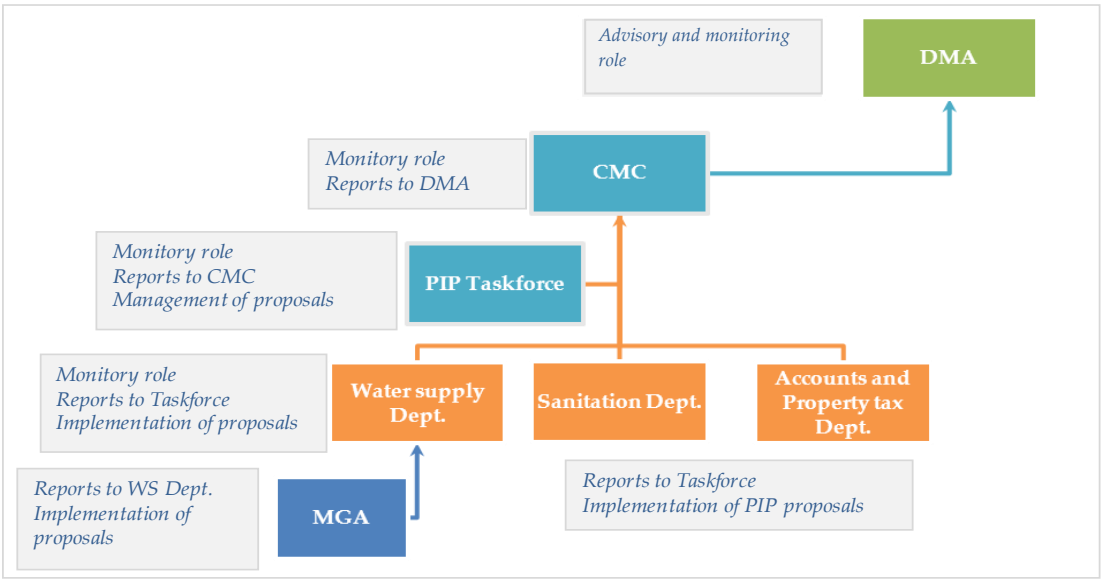
Table 22: Institutional improvements proposed for CMC

Area of improvement	Suggested improvements
Across all sectors	
Human resource management	The CMC (and the MGA for water supply) needs to augment its technical staff in view of proposed projects like 24x7 water supply system and open defecation free CMC. To ensure adequate utilisation of funds for capital projects, the CMC also needs to employ additional resources, either internal or external.
Equity in service delivery	Introduce policy provisions to improve water supply and sanitation services to slum settlements and to unserved areas of the city. Reform institutional arrangements (with the MGA) 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 MGA needs to be revised to include performance-based incentives/penalties.
Consumer redressal system	While it is mandatory for the MGA to have a consumer redressal system in place, it is not maintained by the MGA and there is no monitoring by the CMC. The contract needs to be revised to include penalisation of the MGA in case the consumer redressal system does not function.
Sector specific	
Water supply	There is a need to increase monitoring of the MGA's operations and performance in water supply. These can be done, as suggested, by incorporating appropriate annual targets/improvements to be achieved by the company. In case the MGA 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 out based on targets/improvements achieved.
Sanitation (including sewerage)	Policy provisions to bring about involvement of private sector in areas of septage management, and sanitation services to slum settlements, needs to be implemented.

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

Constitution of the PIP taskforce: The first step towards implementation of the proposed projects should be to constitute a PIP taskforce, comprising key technical staff for water supply and sanitation, including representation from the MGA. The taskforce should comprise managerial and technical staff from water supply and sanitation departments. This can also include resource persons with experience in implementing continuous water supply systems as this involves advanced technical skills. 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. A broad schematic of the institutional structure is shown in Figure 27.

Figure 27: Institutional structure for PIP implementation



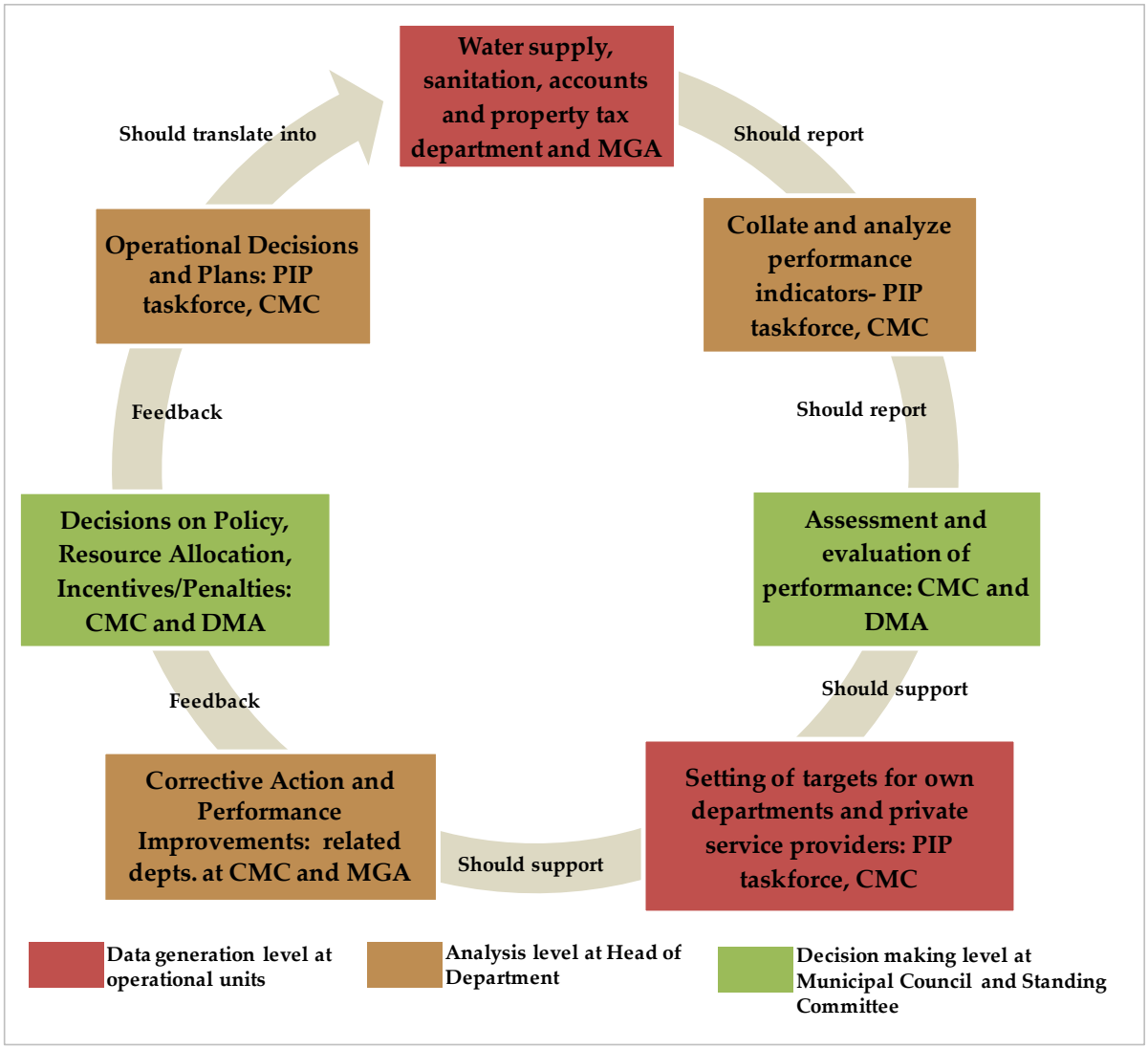
Performance monitoring through regular setting of targets and use of performance indicators: To ensure that the CMC is able to achieve the performance improvement proposals outlined above, it is necessary that it has a well structured monitoring framework in place. The monitoring aspects will include:

- 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.

As the performance improvement proposals are phased from 2013 till 2023, it is necessary for the CMC to ensure that through the above process, the targets set for each year are achieved and corrective measures need to be incorporated, if required. This will be possible only if the information

related to performance indicators is updated and analysed regularly. Similarly, policies to provide performance-based incentives/penalties to internal and external staff need to be implemented. Given that the CMC should look to external agencies for support in PIP, the monitoring process should also include review of these agencies. A possible performance monitoring framework is suggested in Figure 28.

Figure 28: Performance monitoring framework proposed for CMC



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

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ANNEXURES

ANNEXURE 1. LIST OF NOTIFIED AND NON-NOTIFIED SLUM SETTLEMENTS IN CHANDRAPUR

Name of slum settlement	No of households
Notified slum settlements	
Bhavani	891
Jalnagar	816
Sanjay Nagar	760
Babupeth 1–10	405
Sanjay Nagar	398
Baba Nagar	392
Goutam	391
Tadban	378
Ganeshpal Ward (Bagad Kidki)	376
Prakash Nagar I–44	375
Samadhi 2–6	375
Priyadarshini Nagar	365
Bengali Camp	352
Dadmahal	330
Zarpat Ward	311
Shivaji Ward	310
Tukum Talav	302
Mata Nagar	290
G. Talav	280
Vikas	256
Balaji 1–7	243
Nehru Nagar	232
Babupeth 3–12	198
Chorkidki	198
Datta Nagar	196
Samadhi 1–5	194
Joddeol	192
Panshil Nagar	182
Civil Ward	178
Babupeth 4–13	176
Chaprasi	152
Mahakali	152
Babupeth 2–11	150
Mahavir Nagar	148
Anand Nagar I–46	145
Anand Nagar II–47	139
Panshil Ast. 45	138
Prakash Nagar I–42	138
Rajiv Nagar	138
Shastri Nagar	138
Shankar Nagar	128
Rahamat Nagar	126
Bhiwapur	124
Shiv Mandir	112

Name of slum settlement	No of households
Binba	108
Shivaji Marar	105
Sindban	98
Mitra	90
Ganjward	86
Nagina Bagh	82
Civil Line	78
Balaji 3–9	77
Uttam	75
Tukum	73
Balaji 2–8	23
Non–notified slum settlements	
Hindustan Lalpeth II–61	264
Hindustan Lalpeth I–59	246
Ray Colliery IV–74	235
Gawali Mohalla	192
Sundar Nagar	192
Ray Colliery III–67	177
Hinglaj Nagar	130
Boudh Vihar	119
Chattisgadh Moh 68	112
Inarsha Baba	97
Binba Part II–66	84
Aravat	83
Colliery Quarter	80
Jangam Mohalla	79
Vaidya Nagar 69	79
Ray Colliery I–56	70
Shramik Nagar	66
Rahul Nagar 70	62
Sumitra Nagar	62
Bankar Basti	55
Jijamata Nagar	54
Ray Colliery II–57	53
Dhivar Mohalla	45
Sonar Mohalla	45
Chandra Mangal Karya	42

ANNEXURE 2. PROPOSALS SUBMITTED UNDER MSNA AND NAGAROTHAN

Short term interventions: Technical studies and metering (submitted under MSNA)	
• **Conduct consumer survey for entire city:** o Socio-economic surveys, details of consumer connections, consumption of water. o Validate consumer survey data with billing database and identify illegal properties.	**Rs 0.2 crore**
• **Conduct water audit and leak detection surveys:** o Carry out water audit for 12 months and map all components related to water supply network. o Identify system boundaries for DMA, measurement of supply at entry point of all DMAs from bulk meters installed during study. o Compile authorised billed consumption, authorised unbilled consumption, unauthorised consumption, real losses in the IWA standard water table. o Prepare pre-feasibility studies and DPRs.	**Rs 0.6 crore**
• **Install flow meters, bulk and consumer end:** o Design, provide, install and commission various electromagnetic flow meters for raw/pure water with accessories. o Provide, install and satisfactorily field test domestic water meters for all consumer connections. o Maintenance of meters for a period of one year.	**Rs 3.4 crore**
• **Undertake hydraulic modelling for the entire water supply network:** o Supply and install hydraulic modelling software. o Supplied installation to include training to staff of minimum 5–10 persons.	**Rs 0.07 crore**
Sub-total	**Rs 4.27 crore**
Mid-term interventions: Planning and implementation of pilot 24x7 zones (submitted under MSNA)	
For areas of Jagannath Baba Nagar (west) and Normal School Ward (south) • Replacement of existing PSC feeder main by 500 mm and 400 mm dia DI K–7 pipes.	**Rs 1.7 crore**
• Construction of additional RCC sump of 1 ML in addition to existing sump of 0.2 ML capacity. The increased additional capacity is proposed keeping in mind the current load shedding problems.	**Rs 0.39 crore**
• Pumping machinery to be installed on sump to feed ESR of 2 ML, 0.5 ML and 0.4 ML.	**Rs 0.28 crore**
• Lay pure water rising main of 400 mm dia of DI K–7 pipe.	**Rs 0.1 crore**
• RCC ESR of 0.2 ML to distribute water to Normal School Ward.	**Rs 0.8 crore**
• Distribution network of HDPE pipe in Normal School Ward and J. Baba Nagar.	**Rs 1.8 crore**
• Other miscellaneous costs (working survey, project management, etc).	**Rs 1.3 crore**
Sub-total	**Rs 6.37 crore**
Popular contribution from CMC (10 per cent of total cost as scheme is floated	**Rs 0.64 crore**

under MSNA)	
Long-term interventions: Planning and implementation of 24x7 for entire city (submitted under Nagarothan)	
• Lay raw water transmission mains.	**Rs 54.8 crore**
• Construct WTP of capacity 60 MLD, including pure water sump of 2.8 ML and pumping machinery.	**Rs 7.2 crore**
• Lay treated water transmission mains.	**Rs 17.4 crore**
• Storage capacity including MBR of 2.6 ML and 7 additional ESRs of 24.6 ML.	**Rs 12.8 crore**
• Lay distribution network of 142 km.	**Rs 51.5 crore**
Sub-total	**Rs 143.7 crore**
Total cost (including technical studies and metering, planning and implementation of pilot 24x7 zones, and for entire city	**Rs 148.61 crore**

ANNEXURE 3. ASSUMPTIONS USED FOR PROJECTING REVENUES OF CMC

Sr no	Item	Assumption
1	Levy of drainage tax (after UIDSSSMT scheme implementation)	The total per capita requirement of collection for recovery of sewerage system expenses is Rs 270, which can be recovered through two sources: drainage tax and special sanitation tax (which has already been levied). Assuming[5] 50 per cent recovery through each source, an annual charge of Rs 135 would have to be levied. Assuming phased increase in collection efficiency to reach 90 per cent level in 4 years.
2	Improvement in collection efficiency of special sanitation tax	The total per capita requirement of collection for recovery of sewerage system expenses is Rs 270, which can be recovered through two sources: drainage tax and special sanitation tax (which has already been levied). Assuming 50 per cent recovery through each source, an annual charge of Rs 135 per person would have to be levied in the form of special sanitation tax and drainage tax (after completion of UIDSSMT scheme). Assuming phased increase in collection efficiency to reach 90 per cent level in 4 years.
3	Increasing the environment tax for SWM	The total per capita collection for recovery of SWM system expenses is Rs 160. Assuming phased increase in collection efficiency to reach 90 per cent level in 4 years.

[5] Due to insufficient information on basis and rates of special sanitation tax.

ANNEXURE 4. INVESTIBLE SURPLUS AFTER IMPLEMENTATION OF REVENUE ENHANCEMENT MEASURES (IN RS CRORE)

Year	Investible surplus	Drainage tax	Improvement in collection efficiency of special sanitation tax	Increasing the environment tax under consolidated property tax	Investible surplus after revenue augmentation measures
2011–12	-14.1				
Projected					
2012–13	-2.1	0.0	0.8	1.1	**-0.3**
2013–14	-2.2	0.5	1.2	1.8	**1.3**
2014–15	-2.4	0.8	1.4	2.6	**2.4**
2015–16	-2.5	1.2	1.6	3.3	**3.7**
2016–17	-2.6	1.4	1.7	3.5	**4.0**
2017–18	-2.7	1.6	1.8	3.7	**4.4**
2018–19	-2.8	1.7	1.9	3.9	**4.8**
2019–20	-2.7	1.8	2.1	4.2	**5.4**
2020–21	-2.7	1.9	2.2	4.4	**5.8**
2021–22	-2.7	2.2	2.4	5.0	**7.5**

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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pas performance assessment system

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