Performance Improvement Plan for Satara

Prepared by:

CEPT University and AIILSG in consultation with Satara Municipal Council

2012

pas performance assessment system

CEPT UNIVERSITY ज्ञानं विज्ञानसहितम्

ALL INDIA INSTITUTE OF LOCAL SELF-GOVERNMENT

Performance Improvement Plan for Satara

Prepared by:

Centre for Environmental Planning and Technology (CEPT) University

and

All India Institute of Local Self Government (AIILSG)

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Abbreviations

AIILSG	All India Institute of Local Self Government
BAU	Business As Usual
BOD	Biochemical Oxygen Demand
BRGF	Backward Region Grants Fund
CAGR	Compounded Annual Growth Rate
CBO	Community Based Organization
CEPT	Centre for Environmental Planning and Technology
CO	Chief Officer
CPHEEO	Central Public Health and Environmental Engineering Organization
DCB	Demand Collection Balance
DMA	Directorate of Municipal Administration
DMA	District Metering Area
DPR	Detailed Project Report
DSR	Schedule of Rates
DU	Dwelling Units
ESR	Elevated Service Reservoir
FGD	Focused Group Discussion
FS	Fecal Sludge
GIS	Geographic Information System
GoM	Government of Maharashtra
GR	Government Resolution
GSR	Ground Service Reservoir
HHs	Households
IEC	Information Communication and Education
IHSDP	Integrated Housing and Slum Development Programme
ILCS	Integrated Low Cost Sanitation
KPI	Key Performance Indicator
LPCD	Liters Per Capita Per Day
MBR	Master Balance Reservoir
MJP	Maharashtra Jeevan Pradhikaran
MIDC	Maharashtra Industrial Development Corporation
MLD	Million Liter Per day
MoUD	Ministry of Urban Development
MSNA	Maharashtra Sujal Nirmal Abhiyan
NGO	Non Governmental Organization
NRCP	National River Conservation Plan
NRW	Non Revenue Water
ODF	Open Defecation Free

O&M	Operation and Maintenance
PAS	Performance Assessment System
PIP	Performance Improvement Plan
PMC	Project Management Consultant
PSPs	Public Stand Posts
PWD	Public Works Department
RAY	Rajiv Awas Yojana
SS	Settled Sewerage
SC/ST	Schedule Castes and Schedule Tribes
SFC	State Finance Commission
SJSRY	Suvarna Jayanti Shahari Rojgar Yojana
SLB	Service-Level Benchmark
STP	Sewage Treatment Plant
SWM	Solid Waste Management
SMC	Satara Municipal Council
UIDSSMT	Urban Infrastructure Development Scheme for Small and Medium Towns
ULB	Urban Local Body
WDS	Water Distribution Station
WS	Water Supply
WSD	Water Supply Department
WSSD	Water Supply and Sanitation Department
WSS	Water Supply and Sanitation
WTP	Water Treatment Plant

Executive Summary

The preparation of this Performance Improvement Plan (PIP) for water supply and sanitation has been led by the Satara Municipal Council (SMC) 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 PIP has been done in response to a request from the Government of Maharashtra. The two focus areas of 'making cities Open Defecation Free' and 'moving towards 24x7 water supply' were suggested by the Chief Secretary, Government of Maharashtra 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 un-served poor (slum dwellers) and improving financial sustainability. This PIP exercise uses the set of indicators given by the Govt. of India's Service Level Benchmark Initiative as a baseline to assess past performance and identify priorities.

City Profile: Satara is an 'A' class Municipal Council located in the Pune Division in the western part of Maharashtra state. Satara city is bounded on the north by the Pune-Satara road, on the west by the Yavteshvar hill, on the south by the Ajinkya fort, and on the east by an offshoot of the fort hill. Krishna and Urmodi are other two major rivers near Satara. The city has a favourable topography with gentle slope running from South-West to North-East.

The municipal jurisdiction of Satara covers an area of 8.15 Sq kms which inhabits population of 1.20 lakhs and 27056 households. The total developed area is 5.98 sq kms.

Water supply: Out of 39 wards in Satara, 26 wards (almost 2/3rd population) are served by SMC water department and 13 wards (almost 1/3rd population) are served by MJP water supply. At present Satara gets water from 3 Sources viz. Kas Dam, Urmodi River at Shahpur and Krishna River at Mahuli. The current total water supply is 19MLD. Kas dam scheme and Urmodi river at Shahpur is owned and operated by SMC. Krishna river source is owned and operated by MJP, from which SMC purchases 1.25 MLD bulk treated water. Satara MC owns 3 WTPs having total treatment capacity of 18.5 MLD. Of this only 11.25 MLD is currently utilized, while MJP owns 1 WTP with a capacity of 28.5 MLD. The city has three water supply zones. Zone 1 is served by Kas dam water supply, Zone 2 is served by Urmodi water works and Zone 3 is catered through Krishna river water works (MJP water supply). There are 11 ESRs/ GSRs having 8.7 MLD storage capacity and actual utilization capacity is 13.25 MLD which is highly inadequate to meet the current supply requirements. This leads to the practice of giving direct connections on transmission network. The distribution system is also insufficient to meet the requirement of the increased population and hence requires overhauling and remodeling of the storage capacity and distribution network.

The coverage of water supply is 94%, about 25,363 HHs are served by individual water connections. The per capita availability of water at consumer end is 116 lpcd and the water supply is one hour a day for all the days in a month. Quality of water supplied is 100%. But the reliability of the data is D. The extent of metering is 27%, but 3% meters are non-functional metering. Metering is present only in MJP served area while there is no metering in SMC served area. The NRW has increased in last three years from 21% to 24%. The maximum water losses are in transmission network i.e. from WTP to WDS and distribution network i.e. from WDS to consumer end.

The cost recovery of SMC in water supply sector has increased to 116% in 2010-11 compared to previous year which was 107%. The collection efficiency of water related charges has also decreased from 62% in 2008-09 to 27% in 2010-11. The major contribution in revenue income of WS is from water connections and water charges at 98%. Remaining 2% is from other charges like water supply connection fees, etc. The revenue expenditure of WS department is dominated by energy expenses at 30% followed by bulk water purchase at 23%. From 2009-10, Satara has started getting major funds for water supply scheme under UIDSSMT. SMC is also initiating steps to move towards 24x7 water supply through various on-going reforms and activities under MSNA & UIDSSMT.

Sanitation: 78% of HHs in Satara has access to individual toilets within their premises while 20% are dependent on shared sanitation. According to census 2011, 2% of households do not have access to any sanitation and thus resort to open defecation. There are 122 community/public toilet blocks with 807 toilet seats in Satara. The on-going sanitation projects in Satara include construction of 1641 individual toilets sanctioned under MSNA, and 16 community toilets blocks sanctioned under MSNA having 4 seats each i.e. 64 toilet seats. In addition to this 1473 slum beneficiaries will be covered under IHSDP and provided with dwelling units including individual toilets and bathrooms.

Satara municipality does not have sewerage network. Majority of toilets are connected to septic tanks and few are connected to soak pits. There are 28918 total properties in Satara; out of which 23644 have toilets and 23452 are connected to septic tanks. The septic tank effluent is let into 200 km network of surface drains which in turn flow into 7 natural nallahs. Services to empty septic tanks in Satara are provided by municipal council through a vacuum emptier.

Services to slums: There are 14 slum settlements in Satara with a total population of 8374 which is 7% of the total city population. None of these slum settlements are notified. The coverage of individual water supply connections in the slums is 59%. The slum dwellers are also served by 7 stand posts in the slums. The coverage of individual toilets in slums is 25%. There is no sewerage network in the slums. The door-to-door coverage of SWM services in slums is 60%.

Municipal Finance of SMC:

The municipal finances have been reviewed for the last seven years, from 2005-06 to 2011-12. The total budgeted revenue income for SMC in 2011-12 was Rs 34.52 Crores. Past trends shows that own revenue sources of income have formed an average of 40% share in revenue income. Property tax has been the main source of tax revenue income at 59% while water benefit tax is at 15% of own tax revenue income sources. External sources of revenue income such as assigned revenues, grants and contributions contributed about 60% of the total revenue income. In revenue expenditure, largest share i.e. 35% goes on water, waste water and MSWM services followed by 31% on general administration and 15% on public health and welfare. The revenue account was in surplus in all the 7 years under consideration. The Operating ratio was minimum at 68% in 2005-06 and maximum at 96% in 2010-11.

Over the study period, the capital income has increased at CAGR of 27% from Rs 1.08 Crores during 2005-06 to Rs. 24.23 Crores in the year 2009-10. However this increase is primarily due to the UIDSSMT Grant made available to SMC for the purpose of the water supply project. The capital expenditure has increased substantially from the level of Rs. 3.65 Crores in 2005-06 to Rs. 31.51 Crores in the year 2009-10. The increase in the capital expenditure is mainly due to the water supply project under UIDSSMT, IHSDP and other development works as mentioned above. The capital account was in deficit in all the 7 years under consideration which has increased from Rs 2.57 Cr in 2005-06 to Rs 10.23 Cr in 2011-12. The average capital utilization was 265% over the period of 7 years with minimum at 103% in 2011-12 and maximum at 869% in 2008-09. From the assessment of Business-as-usual scenario, it was observed that SMC does not have any investible surplus before 2013.

Summary of Performance Improvement Plan for SMC: The proposals suggested are focused on two key areas of 'establishing 24X7 water supply system' and 'moving towards an open defecation free' SMC, 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 Satara, the Performance Improvement Plan (PIP) for SMC has been summarized below. The total PIP cost for SMC will be Rs. 147.25 Crores.

Table 1 Summary of Performance Improvement Plan for SMC (in Crores)

Key actions for improvement	Costs	Current status
Water supply: towards 24X7 system		
GIS digitization and mapping and consumer survey, Water & energy Audit, Hydraulic Modelling, Computerized billing system and Installation of bulk flow meters	**1.8 Cr**	Sanctioned under MSNA
Rehabilitation of Distribution Network, Converting open canal into closed pipeline, Storage reservoirs, Systems improvement and up-gradation of WTPs, Connecting Kas MBR to Urmodi MBR, Pumping works and Water head	**67.83 Cr**	Sanctioned under UIDSSMT

works		
Under KAS Dam Height increase Project	**43 Cr**	Sanctioned under MSNA special provision
Consumer end metering	**6.89 Cr**	Proposed by SMC
Total – Water Supply	**119.52 Cr**	
Sanitation: towards OD free		
Periodic maintenance of drains, Refurbishment of existing unusable community toilets, Construction of sludge treatment facility and Undertake necessary IEC measures.	**2.93 Cr**	
Construction of covered drains in un-served areas, Procurement of 6 suction emptier trucks, Upgrading open drains (125 km) to covered drains	**24.8 Cr**	Preparation of DPR is required
Total – Waste Water	**27.73 Cr**	
Total cost of PIP		**147.25 Cr**

Considering the existing surplus trends, it is extremely critical that SMC undertakes revenue enhancement measures as otherwise it would need to resort to external resources to fund its internal operations as well as for substantial capital expenditure actions. Some of the steps that can be potentially taken to increase revenue are improvement in cost recovery of water supply and sanitation, revision of tariff of municipal services at appropriate intervals etc to account for increased expenditure in service delivery. After implementation of above mentioned revenue enhancement actions, significant improvement in investible surplus can be observed.

The improvements for SMC have been proposed in two phases: Phase I Immediate interventions (from 2013 - 2014), and Phase II Long term interventions (from 2015 – 2018).

Phase I: Immediate interventions (from 2013 – 2014)

SMC can undertake improvement actions related to processes and policy changes followed in the water supply and sanitation operations in Phase I. These actions being no or low cost can be immediately taken up by the Council.

These include regularizing un-authorized connection, periodic; monitoring water quality;; levy telescopic rates for water supply after 100% metering, introduce sewerage charges; improve collection efficiency of sanitation tax; implementation of Septage Management Plan and increase complaint redressal system.

Water Supply: SMC can complete the on-going projects under MSNA (digitization, survey, hydraulic modelling etc) and UIDSSMT project to move towards 24x7 water supply by 2015. Consumer end metering can be completed in 2013-14 and council can start levying telescopic rates for water supply once metering is done from 2014-15. By 2014, Satara can complete distribution network augmentation and creation of pilot DMAs for future 24x7 Water supply in the city.

Sanitation: Satara can move towards achieving Open Defecation Free (ODF) city once the construction and provision of sanctioned toilets under MSNA and IHSDP is in place in Phase I. The remaining population without individual toilets can be served by maintaining existing functional community toilets and refurbishing existing non-functional community toilets. Simultaneously SMC should undertake various measures to curb the problem of open defecation and to achieve complete sanitation. Such measures include regular surveys through zone sanitary inspectors, strengthen O&M of existing community toilets, undertake necessary IEC measures and to improve cost recovery. Campaigns to bring awareness related to cleanliness and hygiene practices, safe sanitation practices and the negative health impacts due to open defecation need to be conducted by the Council. The campaigns should begin by triggering initiation in the slum settlements and undertaking transect walk to the open defecation sites to highlight the above issues. As majority of toilets are connected to septic tanks, SMC should also initiate the preparation of Septage Management Plan and procurement of few suction emptier trucks for the city for regular monitoring and cleaning of the overflowing septic tanks.

Table 2 Phasing of PIP for Satara

Proposed improvement areas	2013	2014	2015	2016	2017	2018
Water Supply	**Phase I**		**Phase II**			
Regularizing un-authorized connection						
Periodic surveys at source, treatment and consumer end						
Proper sampling regimen for monitoring water quality						
GIS digitization and mapping and consumer survey						
Water & Energy Audit						
Undertake hydraulic modeling for the entire water supply network						
Computerized billing system						
Installation of bulk flow meters						
Rehabilitation of Distribution Network- 120 Km to be replaced and improvement in transmission network						
Converting 6 km open canal into closed pipeline						
Storage reservoirs						
Systems improvement and up-gradation of WTPs						
Connecting Kas MBR to Urmodi MBR						
Pumping works						
Water head works						
Kas Source Augmentation (Increasing dam height)						
Consumer metering						
Levy telescopic rates for water supply						
Distribution network augmentation: creation of pilot DMAs						
24x7 Water supply system for the city						
Sanitation (including sewerage)						
Regular surveys through zone sanitary inspectors						
Periodic maintenance of drains						
Strengthen O and M of existing community toilets						
Refurbishment of existing non-functional community						

Proposed improvement areas	2013	2014	2015	2016	2017	2018
Water Supply	**Phase I**		**Phase II**			
toilets						
Towards OD Free through provision of individual & community toilets sanctioned under MSNA and IHSDP						
Undertake necessary IEC measures						
Preparation of Septage Management Plan						
Implementation of Septage Management Plan						
Construction of sludge treatment facility						
Introducing drainage tax, environmental tax in property tax, and collection efficiency of charges						
Improve cost recovery						
Construction of covered drains in un-served areas						
Procurement of suction emptier trucks						
Upgrading open drains (125 km) to covered drains						

Phase II: Long term interventions (from 2015 - 2018)

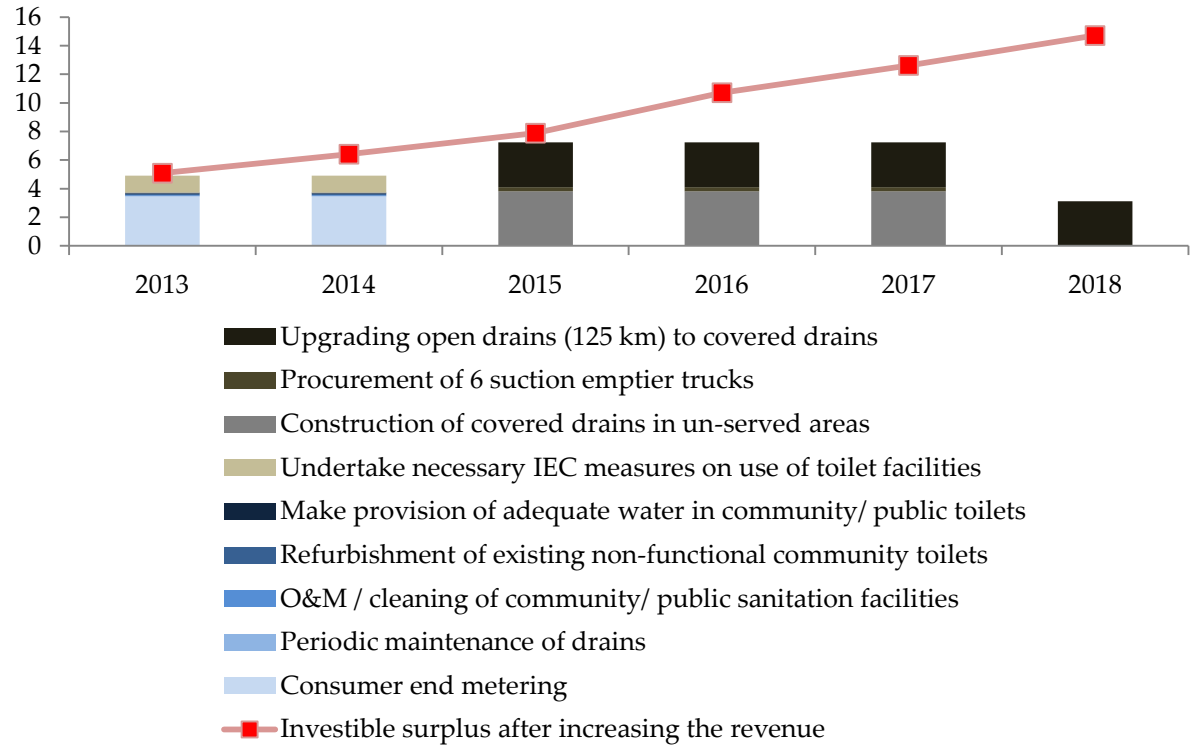
Once the above measures of Phase-I are in place, SMC can begin implementation of 24X7 for the entire city from 2015. Similarly in Sanitation, once the sanctioned toilets under MSNA and IHSDP are constructed, refurbishment of existing community toilets and preparation of Septage Management Plan is done; SMC can start with implementation of Septage Management Plan for the entire city. SMC can also undertake other substantial capital investment projects in this phase. Such capital intensive projects include construction of covered drains in un-served areas, procurement of remaining suction emptier trucks and upgrading open drains (125 km) to covered drains.

As discussed earlier, SMC can generate substantial amount of surplus after taking steps for potential increase in revenue. Table below provides the details of sources of revenue to fund 24x7 water supply and ODF city. As discussed, out of Rs. 119.5 Crores required for 24x7 Water supply in Satara, Rs 112.8 Crores are available through different funding under UIDSSMT and MSNA. Satara needs Rs. 6.9 Crores for remaining 24x7 Water Supply work, Rs 2.93 Crores for minimal capital expenditure for Sanitation and Rs 24.8 Crores for substantial capital expenditure for Sanitation in Satara.

Table 3 Sources of revenue to fund 24X7 water supply and ODF in SMC (in Rs. Crores)

Performance Improvement Actions	2013	2014	2015	2016	2017	2018
Implementation of 24X7 system for SMC	3.45	3.45				
Open Defecation Free Satara City	1.46	1.46	7.225	7.225	7.225	3.125
Investible surplus after increasing the revenue	**5.08**	**6.41**	**7.88**	**10.71**	**12.62**	**14.71**
External funds required	**No external funding required**					

Chart 1 Proposed phasing of water and sanitation projects, after undertaking revenue enhancement measures



After implementation of above mentioned revenue enhancement actions, significant improvement in investible surplus is observed. Eventually, SMC would be in a position to invest in required performance improvement actions from its own investible surplus and will not have to depend on external funding.

In order to realise the targets set for improving water supply and sanitation in SMC, 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 defined policy restricting provision of services, in other instances it is the improper regulation of the existing policies. SMC has to focus its attention on improving policies related to services, financial sustainability, and accountability to the consumers.

Some of the additional measures SMC need to undertake includes augmentation of staff at SMC, mobilization of external support through Project Management Consultants (PMC), NGOs and CBOs, setting up of PIP taskforce and performance monitoring through regular target setting.

1. INTRODUCTION

The preparation of this Performance Improvement Plan (PIP) for water supply and sanitation has been led by the Satara Municipal Council (SMC) with support from the PAS Project through teams from All India Institute of Local Self Government (AIILSG), Mumbai and the CEPT University, Ahmadabad.

The preparation of PIP has been done in response to a request from the Government of Maharashtra. The two focus areas of **'making cities Open Defecation Free'** and **'moving towards 24x7 water supply'** were suggested by the Chief Secretary, Government of Maharashtra in an inception meeting, for starting the Government of India's Service Level Benchmarking (SLB)(MoUD, 2010) process in Maharashtra. In addition to that the inherent themes for PIPs are improving coverage and service levels for un-served poor (slum dwellers) and improving financial sustainability. This PIP exercise uses the set of indicators given by the Govt. of India's Service Level Benchmark initiative as a baseline to assess past performance and identify priorities. During the preparation of PIPs consistent efforts were taken by the PIP team to bring in ownership of SMC through dialogue, periodic consultations and meetings with Satara Chief Officer and officials from respective Departments.

Preparation of the PIP has been done in three stages:

Initial Performance Assessment: Based on the data from the SMC, 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 SMC using SLB indicators was prepared. The SMC teams were assisted to generate a city profile based on comparative performance assessment of SMC for last three years based on their data in 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 the SMC officials at the first PIP consultative workshop in July, 2011 at Satara. The workshop was attended by Satara Chief Officer, respective heads of 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 Satara.

Detailed Diagnostics and Issues Identification: The diagnostic assessment was prepared by taking into consideration the ground realities, local conditions, and assessment of the present situation. A detailed field guide developed for purpose of PIP preparation included

data templates, survey formats; transect walks, schedules of interviews, FGD guidelines, areas for digital documentation, dimensions of stakeholder consultations etc.

A rapid assessment of demographic /physical characteristics, institutional arrangements, key processes, municipal finances and private sector participation was also undertaken to build appropriate context for city performance. The emphasis has been also given on understanding the current data record systems and measures to improve the performance data reliability.

Detailed discussions with SMC engineers and support staff were held to assess water and sanitation situation on ground. City level reconnaissance surveys and dedicated field visits were undertaken by teams to facilities like source, treatment and distribution systems for water supply, sanitation and solid waste management to validate secondary data and identify performance issues. Wherever applicable, appropriate consultations were also undertaken with 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 focus group discussions (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 to that key person interviews, FGDs and consultations were held with safai karamcharies, contractors and private parties to identify service delivery issues from consumers' perspectives. The team also visited local factory that manufactures prefabricated septic tanks and prefabricated toilets.

Action Planning and Preliminary Costing: Consultations with Sector Expert's were also held and a dedicated on-field PIP exercise was undertaken in August 2011 for proposing actions and estimating the required capital cost/ investment based on improvement areas identified. At the end of the expert consultations the options for improving water supply, sanitation and SWM scenario were discussed with concerned SMC officials and Chief Officer.

The diagnostic study, detailed assessment and preliminary strategies for improvement were shared with SMC officials during second PIP consultative workshop in September 2011 at Satara. The suggestions by SMC officials were taken and incorporated in the PIP.

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

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 SMC officials to achieve both priority/ focal areas - 'Open Defecation Free

SMC' and '24x7 Water Supply'. In this PIP report the identified interventions are classified as minimal capital expenditure with short term in phase I and substantial capital expenditure with long term in Phase II. Process and policy related actions to improve reliability of performance indicators are also identified. Block cost estimates have been developed for the actions identified.

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

Preliminary Validation of Draft Performance Improvement Plan by SMC:

In an attempt to bring full ownership of the PIP by SMC the fourth PIP consultative workshop was held in January 2012 where suggestions were invited from the stakeholders – SMC, MJP officials. The Satara PIP is preliminary validated by Satara CO, SMC officials & MJP officials and their suggestions are incorporated in the PIP report.

This PIP report presents the performance improvement plan of the ULB. It describes improvement actions and the costs that will have to be incurred to implement the identified actions. 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 a review and guidance. Based on the comments and guidance by the state government, the Satara Municipal Council will identify low-cost actions that can be taken immediately and provide funds for these actions from their budget. For actions that require significant capital expenditure, the SMC will prepare detailed project reports and seek assistance under state and national programmes.

Photo Plate 1 Overview of Satara & SMC

Photo Plate 2 Slums in Satara

2. CITY PROFILE

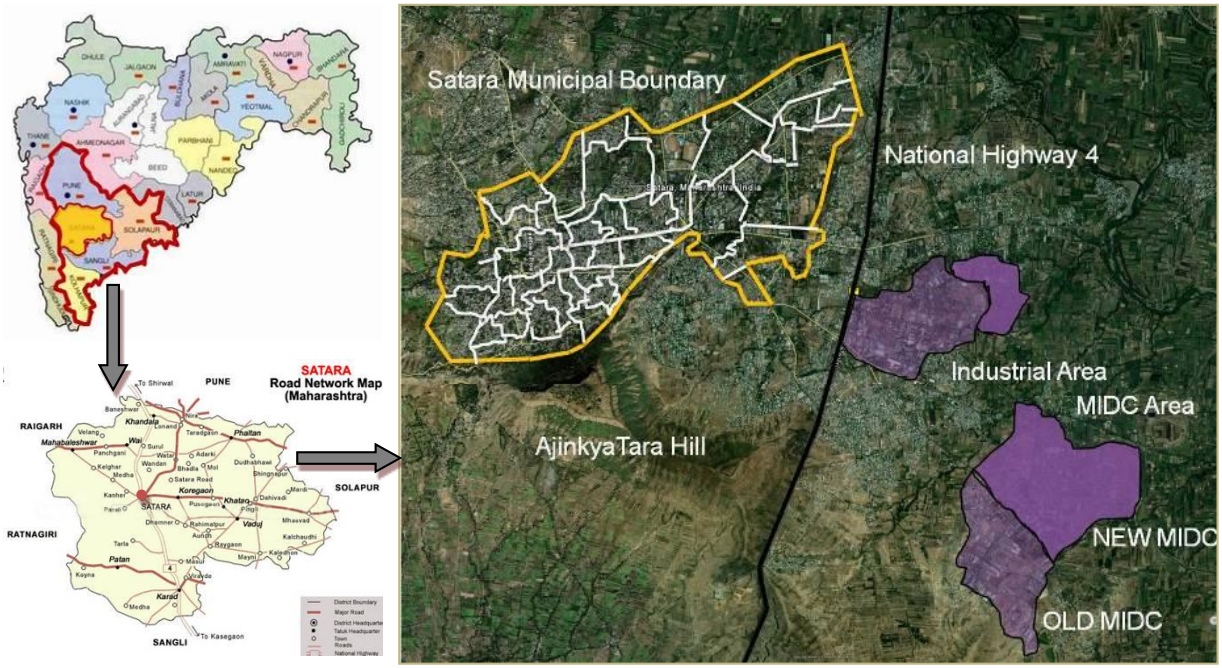
This section discusses general characteristics of Satara related to location, population and area, aspects related to slum settlements and human resources in SMC. Also, aspects related to municipal finances specifically with respect to water supply and sanitation services and extent of private sector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

2.1 Location

Satara is an 'A' class Municipal Council located in the Pune Division in the western part of Maharashtra state. The city of Satara is an administrative center as headquarters of Satara Tehsil and District. The city has a historical significance as once it was the seat of Chhatrapati dynasty of Maharashtra.

With a height of 2320 feet above mean sea level Satara is about 96 kms from the coast, 110 kms south of Pune and 122 kms north of Kolhapur. Satara city is bounded on the north by the Pune-Satara road, on the west by the Yavteshvar hill, on the south by the Ajinkya fort, and on the east by an offshoot of the fort hill.

Figure 1 Satara City Map showing SMC



This unique location of Satara has given it natural slopes for drainage as all storm water discharges to the Venna River on the north through natural nallahs / small streams rising from the hills on its three sides. Krishna and Urmodi are other two major rivers near Satara which are also the source of water for the city and surrounding areas.

Overall, the city has a favourable topography with gentle slope running from South-West to North-East. The soil varies in depth from two to three feet to perhaps fifteen to twenty and consists of soft, spongy, easily friable murum overlying the hard trap-rock.

Table 4 City Profile

Description	2001	2011
Area km²	8.15	8.15
Population	1,08,048	1,20,079
Decadal Growth Rate	13.5%	11.13%
No. of HHs	22,689	27056
HH Size	4.76	4.44
Density (Persons per Hectare)	132.5	147.3
Floating Population	***	12250
No of Properties	22830	28918
Total Election Wards	34	39
Total Property Tax Wards	***	22
Source: (CEPT University, 2009 - 2011)		

The municipal jurisdiction of Satara covers an area of 8.15 Sq kms which inhabits population of 1.20 lakhs and 27056 households. In year 2001 there were 34 census wards while in 2006, 39 wards were created before elections.

The city has observed growth but due to lack of employment and higher education facilities the out-migration is also observed in the city. This is also evident from decreasing decadal growth rate. A moderate to high floating population is observed in the city.

The city has predominantly low rise development with mostly plotted development (individual houses) while the construction of apartment buildings is not so common. The total developed area is 5.98 sq kms (73% of the total area). At the city level, the gross density is moderate (147 pph), however the core areas of the city and some of the older area's (Gaothan) are very densely populated (200-400 pph) than the fringe areas of the city which has a density around 60-80 pph. Outside the municipal limits, the nearby surrounding villages on the agglomeration of the city have been converted into residential colonies. There is proposal for extension of municipal limits which will include 8 surrounding villages.

Trade and commerce is the predominant economic activity in the city of Satara which provides employment to large population. The agriculture produce of the Satara tehsil is collected at the trading center of Satara city. This provides Satara the strong economic base for trade and commerce activities that are flourishing based on agriculture produce in the hinterland. Satara also caters to the surrounding areas as small scale industrial area and a wholesale Market. The Maharashtra Industrial Development Corporation (MIDC) has developed an industrial estate MIDC just outside the limits of Municipal Council on Satara Rahimatpur road and diversion of National Highway. Large proportion of the population is also engaged in the service sector as Satara is an administrative center of Satara Tehsil as well as District headquarters.

2.2 Services in Slums of Satara

There are 14 slum settlements in Satara. The total slum population is 8374 which is 7% of the total population of the city. The last decade has seen multifold increase (43%) in the population residing in the slums. Annex 1 gives the map of Satara with the location of slums and Annex 2 provides the details of the slums in Satara.

Table 5 Slum Profile of Satara

Particular	2001	2011
Total Slum Settlements	***	14
Slum Population	5,836	8,374
Slum HHs	1,153	1,824
Number of Notified slum settlements		0
Source: (CEPT University, 2009 - 2011)		

None of the slums are notified. All slums are either on municipal land or state government land. Of 14 slums, 13 slums are located in the core city area and 1 lies in fringe area.

Services in Slums: In 10 slums SMC provides water supply either through individual connections or Public Stand Posts (PSP) and 4 slums are covered by MJP water supply (individual connections or PSPs). There are no group connections in slums. The majority of the slums HHs are served by PSPs. Though there is no policy provision in Satara for providing individual connections, group water connections and individual toilets in slums. However 9 out of 14 slums are fully connected with distribution network.

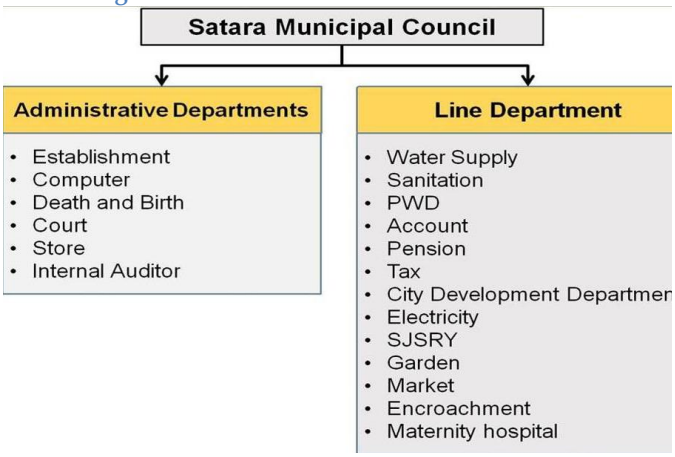
Mostly all slums are connected either by pucca lined open drainage network or kuccha drainage network. At few places closed drainage network is also observed. The existing community toilet seats are catering the population without access to individual toilets but many seats of them are non functional due to non availability of water and poor O&M of community toilets. Many slums are covered by door to door waste collection through ghantagadi except few with very narrow lanes that do not allow ghantagdi to enter. Community bins are also provided near slums for Solid waste collection.

The Satara MC earmarks funds for the poor in their budgetary allocation. Under Durbal Ghatak Yojana (5% of revenue expenditure) and under Mahila va Bal Kalyaan (5% of revenue expenditure) is annually allocated for the same. The central grant assistance under IHSDP and JnNURM was sanctioned in year 2011 for Satara. Under IHSDP 1473 dwelling units of area 269 sq ft will be constructed benefitting 1473 slum HHs. Most of the slums in Satara are on encroached government and municipal land. There is lack of security of tenure that inhabits slum dwellers to invest adequately in housing. Very few community based organizations (CBOs) are working in slum areas.

2.3 Staffing of Satara Municipal Council

The institutional responsibility of providing and maintaining all services in Satara lies with the Satara Municipal Council (SMC). Responsibilities are divided among 6 Administrative Departments and 13 Line Departments. Water supply is handled by Water Supply Department and Sanitation and Solid Waste Management in the city is administered/ managed by 'Health Department'.

Chart 3 Organization structure of SMC



Water Supply Department:

Water Supply in Satara is a joint responsibility of Water Supply Department (WSD) and Maharashtra Jeevan Pradhikaran, Satara (MJP-Satara). Of 39 wards, 26 wards (almost 2/3rd population) are served by SMC and 13 wards (almost 1/3rd population) are served by MJP retail supply. MJP also supplies water in surrounding 8 villages.

Chart 2 Division of Water Supply Services in Satara

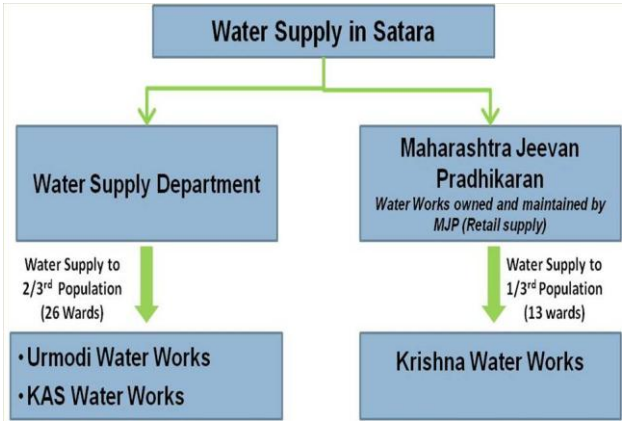


Chart 4 Organogram of Water Supply Department

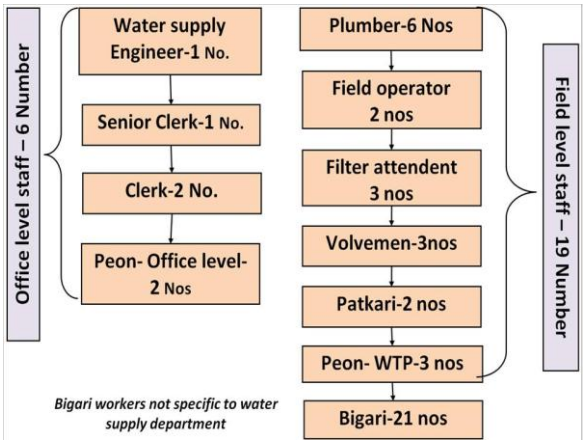
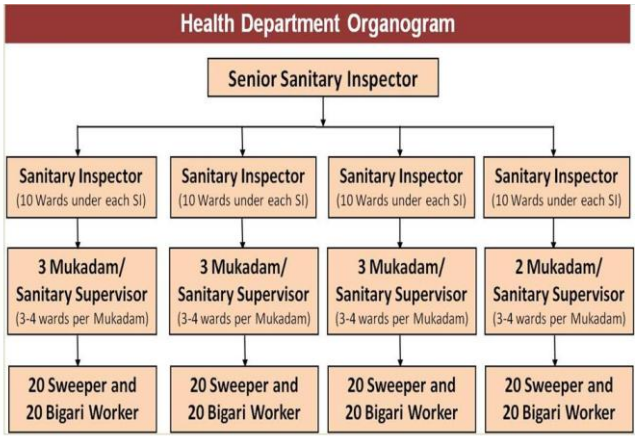


Chart 4 depicts the organogram for WSD, Satara. Of total 40 sanctioned posts 25 posts are filled in water supply department (Akrutiband 2011, DMA). Of total staff members working in the water supply department 6 are office level staff and rest 19 are field level staff. As discussed with WS department officials there is lack of technical staff e.g. water supply engineers to supervise and implement the ongoing water supply projects including UIDSSMT, MSNA and Kas source augmentation. Currently of 2 sanctioned posts only 1 water supply engineer is working and the post of senior management for WS is also vacant. The O&M of Jakatwadi WTP is outsourced to private agency.

Health Department:

Sanitation and Solid Waste Management in the city is administered and managed by 'Health Department' of SMC. There are 279 sanctioned posts of which 278 posts are filled (Akrutiband 2011, DMA). Total 5 sanitary inspectors and 11 sanitary supervisors are working and overseeing work in 39 wards. There is no post for Health Officer designated for the city.

Chart 5 Organogram of Health Department



2.4 Municipal Finance Assessment

SMC maintains a consolidated general budget that includes all the functions of the council. Thus Municipal transport, slums and urban poor, water supply and sewerage etc. have not been budgeted separately but under the same consolidated budget. The municipal finances of SMC have been re-casted and reviewed for the last seven years. (From 2005-06 to 2011-12) For 2005-06 to 2009-10 the information is from 'Actuals', while budget estimates are given for the remaining two years.

Table 6 Municipal Finance summary of SMC (in Rs Crores)

Items	2005-06 (A)	2006-07 (A)	2007-08 (A)	2008-09 (A)	2009-10 (A)	2010-11 (B)	2011-12 (B)
Revenue Account							
Opening Balance	2.24	2.56	4.04	4.81	3.78	5.79	(0.78)
Revenue Income	17.21	17.37	18.99	20.16	22.98	28.31	34.52
Revenue Expenditure	11.74	13.51	15.36	16.15	17.50	27.19	26.31
Revenue surplus / Deficit	5.47	3.86	3.62	4.02	5.48	1.12	8.21
Operating Ratio	68%	78%	81%	80%	76%	96%	76%
Capital Account							
Capital Income	1.08	3.16	2.83	4.67	24.23	5.29	48.61
Capital Expenditure	3.65	5.98	5.73	9.87	31.51	12.98	58.83
Capital Surplus / Deficit	(2.57)	(2.82)	(2.90)	(5.20)	(7.28)	(7.69)	(10.23)
Overall Surplus / Deficit	2.90	1.04	0.72	(1.18)	(1.80)	(6.57)	(2.02)
Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)							

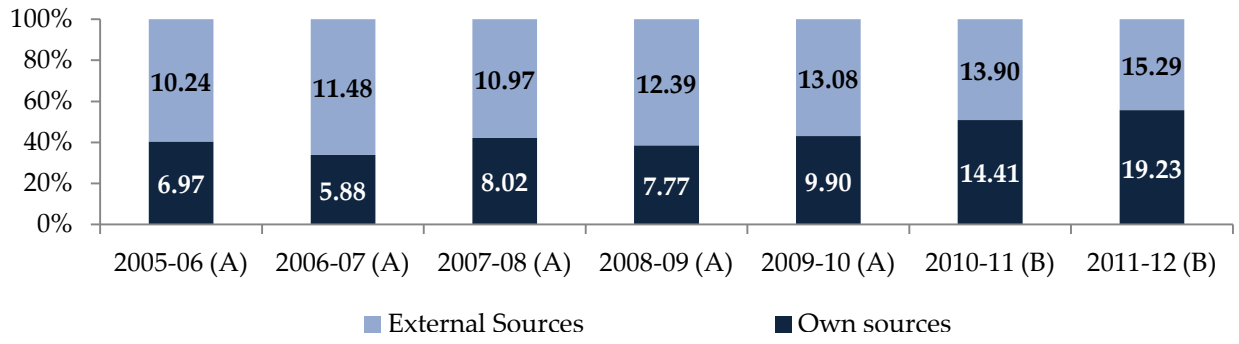
Revenue Account: The revenue account comprises two components - revenue income and revenue expenditure.

Revenue income: Own sources of revenue have displayed a steady trend contributing to about 40% of the total revenue income for last five financial years. In the tax items of own sources, major chunk i.e. 59% is through property tax, 15% is through water charges and

remaining 26% is through other own sources. This accounts to 30% of revenue income which has seen growth of CAGR 7%. The non-tax items of own sources forms 10% of revenue income which registered a CAGR of 19%.

The external sources in revenue income contribute 60% of the total revenue income which has seen growth of CAGR 6%. The major part of the revenue grant if through Octroi compensation grants from the State Government. The chart below provides the trend of own and external sources of revenue income of SMC in the period under consideration.

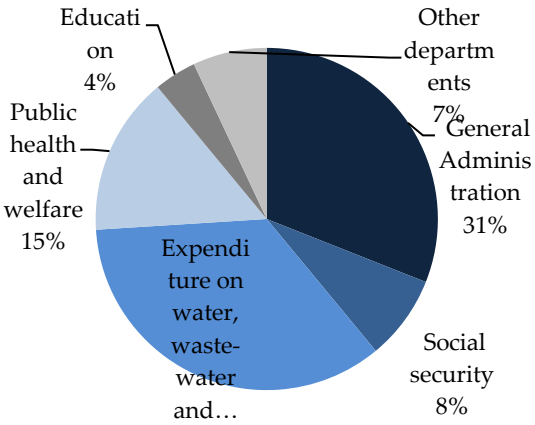
Chart 6 Trend of own and external sources of revenue income of SMC (in Rs Crores)



Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)

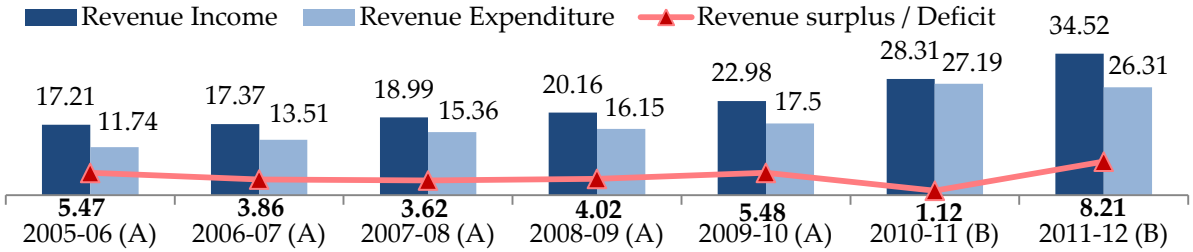
Revenue expenditure: The growth of revenue expenditure in this period was at 10% CAGR. As seen from the chart on composition of revenue expenditure, largest share i.e. 35% goes on water, waste water and MSWM services followed by 31% on general administration and 15% on public health and welfare. The surplus/deficit of the revenue account of SMC is shown in the chart below. The revenue account was in surplus in all the 7 years under consideration. The Operating ratio was minimum at 68% in 2005-06 and maximum at 96% in 2010-11.

Chart 7 Composition of revenue expenditure



Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)

Chart 8 Revenue income vs. expenditure of SMC (in Rs Crores)



Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)

Capital Account:

In general, the capital account of SMC consists of incomes on account of capital grants under various schemes of Government of India (GoI) and Government of Maharashtra (GoM) and expenditure on account of utilization of capital grants under such schemes and for asset creation.

Capital income The capital income has increased from the level of Rs. 1.08 Crores during 2005-06 to Rs. 24.23 Crores in the year 2009-10. However this increase is primarily due to the UIDSSMT Grant made available to SMC for the purpose of the water supply project. SMC received a grant of Rs 21.22 Crores for the UIDSSMT project in the year 2009-10.

Table 7 Sources of capital income for SMC (in Rs. Crores)

Item	2005-06 (A)	2006-07 (A)	2007-08 (A)	2008-09 (A)	2009-10 (A)	2010-11 (B)	2011-12 (B)
Roads	0.33	0.60	0.76	2.43	1.11	1.00	2.00
Water supply schemes	-	-	-	-	-	-	13.50
UIDSSMT water supply	-	-	-	-	21.22	-	21.22
Slum development	0.31	0.81	0.99	0.60	-	0.36	6.65
SWM	-	1.17	0.40	0.34	1.00	0.37	-
Others	0.43	0.58	0.69	1.30	0.90	3.57	5.24
Total	1.08	3.16	2.83	4.67	24.23	5.29	48.61

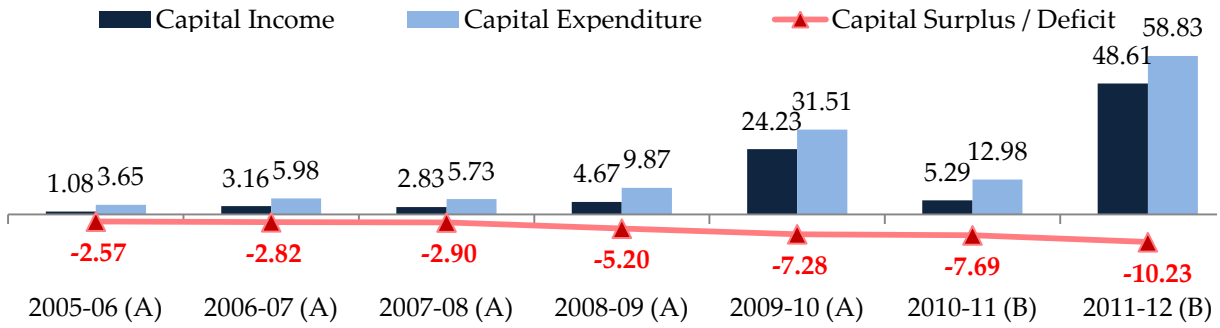
Capital expenditure comprises expenditure incurred pertaining to the acquisition of permanent assets such as purchase of land, building, machinery, vehicles and expenditure incurred pertaining to the improvement or refurbishment of the existing assets. The capital expenditure has increased substantially from the level of Rs. 3.65 Crores in 2005-06 to Rs. 31.51 Crores in the year 2009-10. It has been budgeted at Rs. 12.98 Crores and Rs 58.83 Crores for the year 2010-11 and 2011-12. The increase in the capital expenditure is mainly due to the water supply project under UIDSSMT, IHSDP and other development works as mentioned below.

Table 8 Capital expenditure for SMC (in Rs. Crores)

Items	2005-06 (A)	2006-07 (A)	2007-08 (A)	2008-09 (A)	2009-10 (A)	2010-11 (B)	2011-12 (B)
Roads	2.07	2.52	1.86	2.81	4.01	1.4	2.5
UIDSSMT Water supply scheme	0	0	0	0	21.26	1	22.62
Water, Waste-water and SWM	0.31	0.39	1.27	2.03	1.48	2.03	16.25
Slum development and IHSDP	0.36	0.17	0.71	0.69	0.99	0.63	7.65
Development schemes	0.82	1.87	1.32	1.84	1.94	2.66	2.57
Others	0.09	1.03	0.57	2.51	1.83	5.27	7.24
Total	3.65	5.98	5.73	9.87	31.51	12.98	58.83

The surplus/deficit of the capital account of SMC is shown in the chart above. The capital account was in deficit in all the 7 years under consideration which has increased from Rs 2.57 Crores in 2005-06 to Rs 10.23 Crores in 2011-12.

Chart 9 Capital income vs. expenditure of SMC (in Rs Crores)



Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)

Based on the trend of income and expenditure during the period 2005-06 to 2011-12 it is likely that the financial position of Satara Municipal Council will be in marginal surplus from the situation that it is right now. SMC needs to enhance its revenues by adding new income sources. The external sources of revenues are high as compared to revenues from own sources. Such sources of revenue are not under the control of the ULB and therefore it is advisable to reduce the dependence on such external sources. The income from own sources would provide funds for maintenance of assets being created through grants and help in achieving financial sustainability.

2.5 Private Sector Participation in Satara

The following section puts forth in brief the extent of private sector participation in service delivery in SMC.

O&M of WTP: Jakatwadi Water Treatment Plant (WTP), head water works at Urmodi river source is owned by SMC. The SMC has outsourced Operation and Maintenance (O&M) of the WTP to a private agency at annual payment of Rs. 800000/- . Three persons are

appointed by the agency. Energy bill and expenditure towards repair work is done by the SMC.

Contract for Waste Collection and Transportation: Door to door solid waste collection through ghantagadi in administrative ward number 4 and its transportation to dumping site at Songaon is outsourced to a private contractor. SMC pays Rs. 14000/- per month to the contractor.

O&M of Public Toilets, Urinals, Community Toilets and Municipal School Toilets: For operation and maintenance of public sanitation facilities the annual service contract has been given to the private agency since year 2008. The annual payment towards the same is Rs. 312000/- (26000/- X 12 months). The cleaning material, equipment and water for cleaning through Fire water tanker is provided by the SMC.

Street Sweeping: The SMC has contracted out street sweeping of main roads, market area and public places since July 2008. The municipal area is divided into 3 zones (Rajwada area, Guruwar Paraj area and Sadar Bazaar area) for which 3 annual service contracts are being given for the payment of Rs. 189000/- Rs. 132300/- and Rs. 151200/- respectively.

Cleaning of Gutters and Drains: The SMC is giving annual service contracts since year 2008 to 3 private contractors for cleaning of gutters, nallahs and odhas in the Rajwada area, Guruwar Paraj area and Sadar Bazaar area of the city for the annual payment of Rs. 2,24,640, Rs. 1,68,480 and Rs. 187200 respectively. The total cost for cleaning gutters, nallahs etc for the entire city is Rs 580320.

Table 9 Private Sector Participation in Satara

Sector	Scope of Contract	Value of the Contract
Water Supply	Operation and Maintenance (O&M) of the Jakatwadi Water Treatment Plant (WTP)	Rs. 800000/- per year
Waste Water	O&M of public sanitation facilities	Rs. 312000/- per year
Waste Water	Cleaning of gutters, nallahs and odhas	Rajwada area - Rs. 224640/- per year
		Guruwar Paraj area - Rs. 168480/- per year
		Sadar Bazaar area - Rs. 187200/- per year
SWM	Door to door solid waste collection through ghantagadi and transportation to dumping site at Songaon in administrative ward number 4	Rs. 14000/- per month
SWM	Street sweeping of main roads, market area and public places	Rajwada area - Rs. 189000/- per year
		Guruwar Paraj area - Rs. 132300/- per year
		Sadar Bazaar area - Rs. 151200/- per year

Photo Plate 3 Water supply in Satara

3. ASSESSMENT AND PROPOSALS FOR WATER SUPPLY

This section provides an overview of the water supply system in SMC, performance and issues in water supply and proposals for improvement.

3.1 Assessment of Current Water Supply Systems

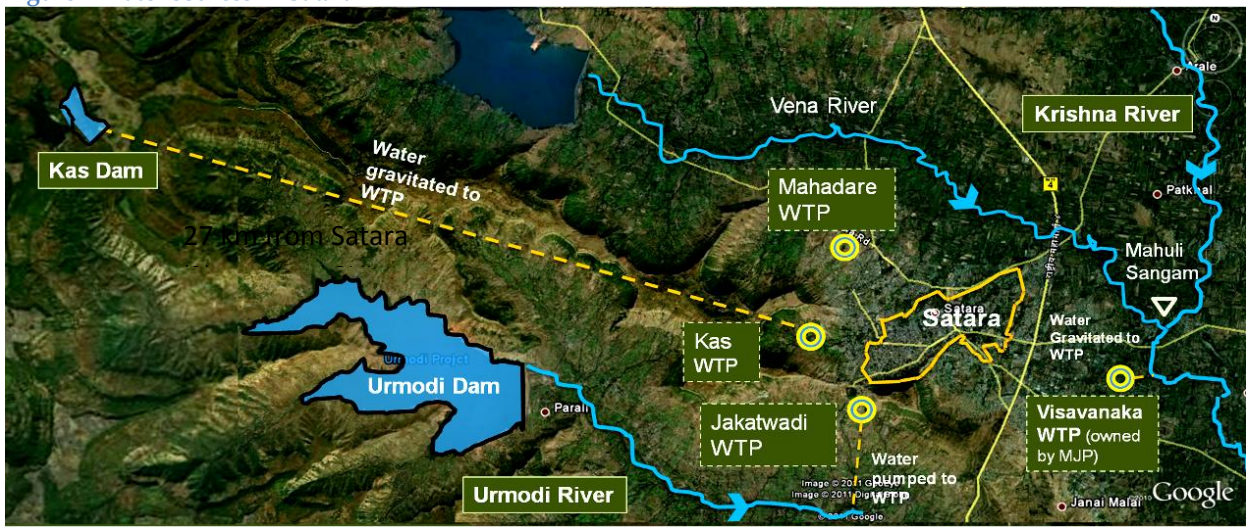
At present Satara gets water from 3 Sources viz. Kas Dam, Urmodi river at Shahpur and Krishna River at Mahuli. The current total water supply is 19MLD.

Annex 3 Schematic Diagram of Water Supply Source in SMC.

Kas dam scheme is owned and operated by SMC. It is located at 23 kms from the city. The water is conveyed from Kas dam to Kasani fall through unlined open canal for 6 kms. This results into heavy losses due to low water discharge capacity. The scheme at **Urmodi River at Shahpur** is owned and operated by SMC. 6 MLD water is allocated for SMC by the Irrigation Department from Urmodi river source. The SMC buys raw water from the Irrigation Department at bulk rate of Rs 8.70 per 10,000 liters. The present system was commissioned in October 2006 and is designed for ultimate stage year 2040. In addition, SMC also purchases 1.25 MLD bulk treated water from MJP (for which expenditure amounts to Rs. 280894/- per month approximately). **Krishna river source** at Mahuli which is located at 5 km from Satara is owned and operated by MJP. The MJP supplies water to 13 wards in Satara and in 8 surrounding villages.

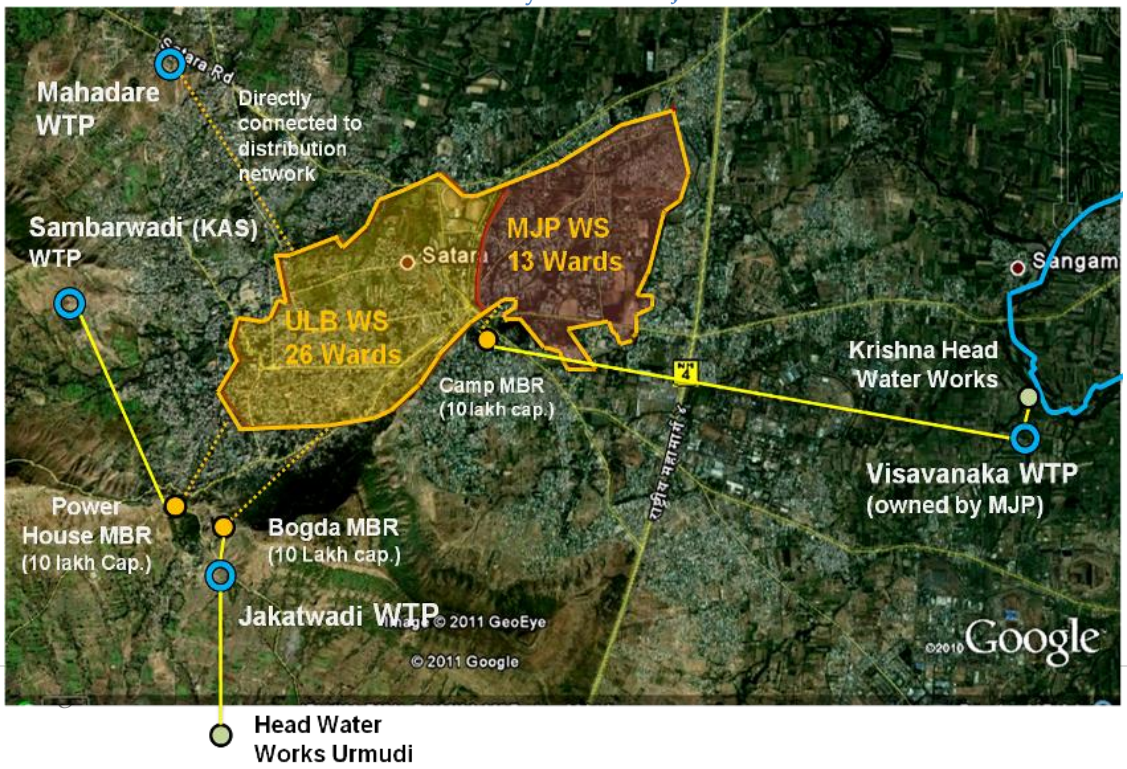
Proposed Improvements: To curb the water losses from 6 km open canal from Kas dam, converting the open canal into the raw water gravity main (closed pipeline) is proposed under UIDSSMT. For Urmodi river source, the headwater works and raw water rising main are found to be sufficient for the wards served in Zone 2 for projected population for 2040. Additional raw water pumping machinery and WTP is proposed to fulfill demand at intermediate stage year 2025 under UIDSSMT. At Krishna River the present head work is very old which was constructed before 1960 and requires heavy maintenance. Thus new head work is proposed under UIDSSMT.

Figure 2 Water sources in Satara



Presently Satara MC owns 3 WTPs (Sambarwadi WTP, Jakatwadi WTP and Mahadare WTP) and MJP owns Visavanaka WTP. The total treatment capacity of SMC's 3 WTPs is 18.5 MLD. Of this only 11.25 MLD is currently utilized.

Figure 3 Water Treatment Plants and Wards served By ULB and MJP



Annex 4 Schematic Diagram of Water Supply Treatment in SMC. Sambarwadi WTP (capacity 9 MLD) is located near Yeweteshwar Hill which was constructed before 1960. It treats 5 MLD water and supplies it to Zone 1. The raw water from Kas dam flows at gravity to Sambharwadi WTP, thus no pumping is required. Jakatwadi WTP has a capacity of 8 MLD and treats 6 MLD water from Urmodi river source which is supplied to Zone 2. The water from Shahpur is pumped and transmitted to Jakatwadi WTP through pumping main. Mahadare WTP has a capacity of 1.25 MLD and treats 0.25 MLD water from Mahadare tank. The treated water is released directly into the distribution network.

MJP owns Visavanaka WTP with a capacity of 28.5 MLD. It treats water from Krishna source. Of total treated water 6 MLD is supplied in Satara Municipal Jurisdiction which covers 13 wards. The treated water reservoir capacity (ESRs/ GSRs) is inadequate for the Zone 3, to compensate that direct connections are given on transmission network by MJP. However at consumer end (water connections) meters are provided that accounts for the payment for the water consumed by the users.

Proposed Improvements: Since demand of Zone 1 is less than the amount of water available to it, hence a connecting main is suggested from Kas pure water MBR to pure water MBR near tunnel for Zone 2 under UIDSSMT project. This will reduce pumping at Urmodi water works resulting in reduction in operating expenditure in fair season when Kas dam overflows for a long period.

The city has three water supply zones for transmission of water. Zone 1 is served by Kas dam water supply, zone 2 is served by Urmodi water works and zone 3 is catered through Krishna river water works (MJP water supply).

Annex 5 Schematic Diagram of Water Supply Transmission in SMC

There are 11 ESRs/ GSRs having 8.7 MLD storage capacity and actual utilization capacity is 13.25 MLD which is highly inadequate to meet the current supply requirements. This leads to the practice of giving direct connections on transmission network. This practice is more prevalent in MJP served area where all water connections are metered. Apart from that treated water from Mahadare WTP is released directly into distribution network. There are many leakages in the transmission network. In total 11 pipe breaks and increasing number of complaints for water leakages are reported in year 2010-11. There are in total 12 pumps operating including raw and treated water regiment. SMC spends high on energy expenditure up to Rs. 75-80 lakhs per month due to low pumping efficiency. Presently energy audit is going under MSNA and one pump is already replaced at Jakatwadi WTP.

The distribution network and storage reservoirs were constructed in 1965 and show problems of ageing of old pipeline both in transmission and distribution network. The distribution system is also found to be insufficient to meet the requirements for the increased population and hence requires overhauling and remodeling of the storage capacity and distribution network.

Annex 6 Schematic Diagram of Water Supply Distribution in SMC.

Figure 4 Proposed 15 water districts to ensure equitable water supply

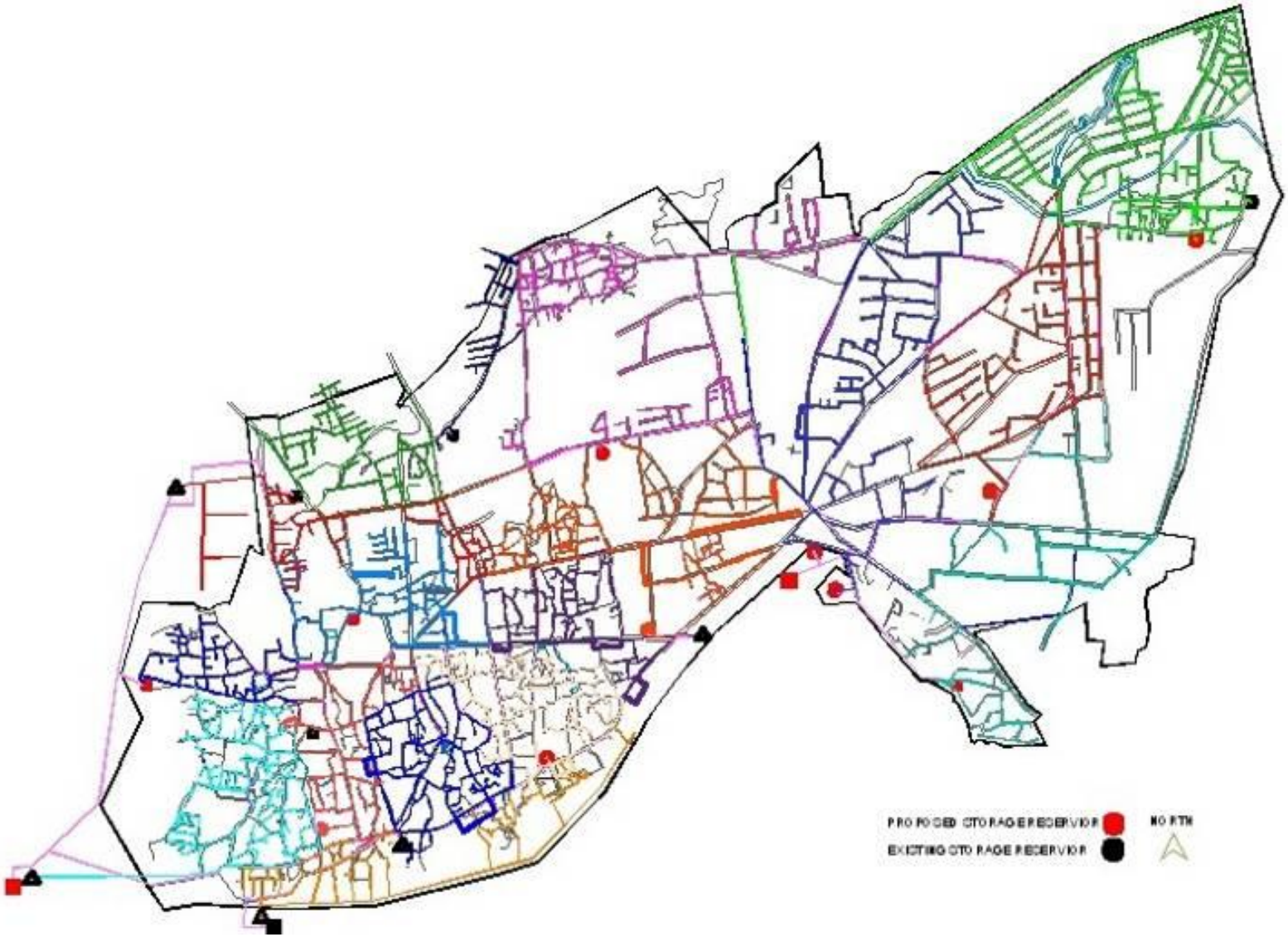
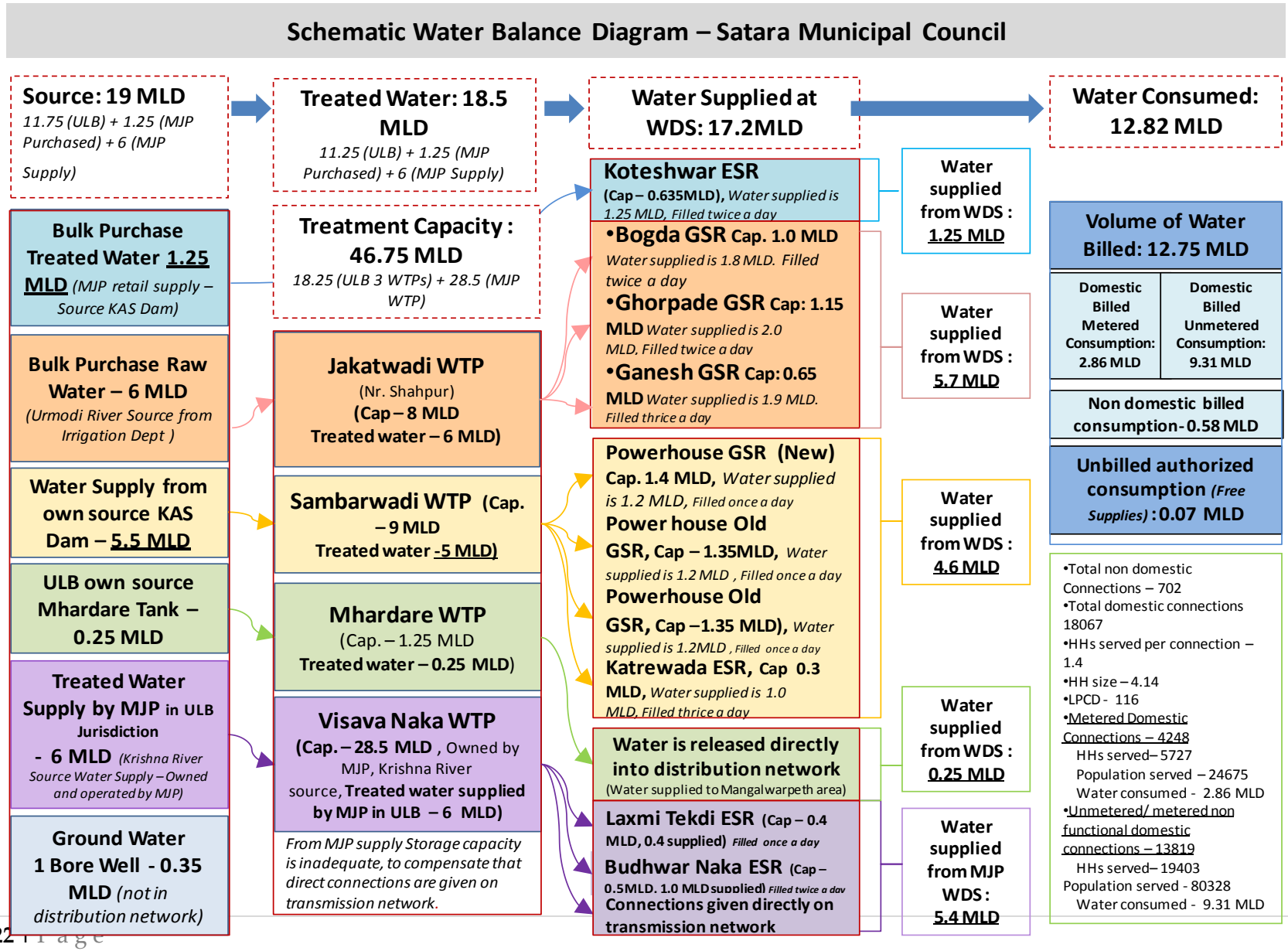


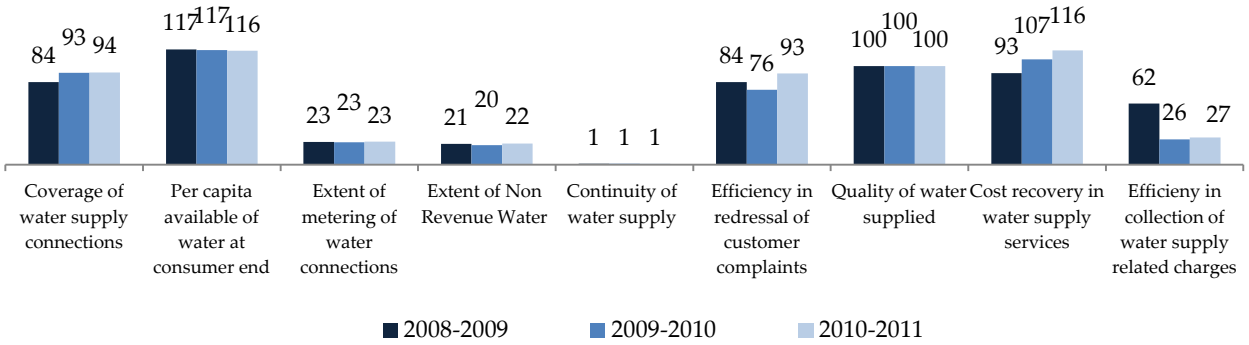
Chart 10 Schematic Water Balance Diagram



3.2 Assessment of Service Delivery

As discussed earlier, water is procured from 3 sources and is supplied by both SMC water department and MJP, Satara. The city has ample of water source to meet the current demand and future demand. The ground water is available in sufficient quantity at 20 m depth. There are very few bore wells/ hand pumps in the city. There is very less or no dependency on ground water sources. The Chart below provides an overview of water supply key performance indicators in Satara for past 3 years.

Chart 11 Areas of poor and good performance in Satara for water supply



Source: (CEPT University, 2009 - 2011)

The poor reliabilities (reliability D) for most of the indicators except efficiency of redressal of consumer complaints (reliability A) indicate need for maintaining and updating records, moving to computerized records, updating the database by conducting HH survey. Also crucial would be use of technology (installing flow meters, SCADA system, automated meter reading etc) for upgraded/ enhanced information.

Access and Coverage

Coverage of Water supply connections: The coverage of water supply is 94% that is about 25,363 HHs are served by individual water connections. 100% area is covered by the water distribution network. In total there are 18769 connections, out of which 18067 are domestic connections, 584 non domestic connections and 118 public stand posts. While giving any new water connection apart from connection fees and

deposit money, the water tax is also levied for the remaining current year. As discussed earlier, Water department of SMC serves 26 wards and MJP serves 13 wards of Satara. Following are the details for domestic connections of SMC and MJP network.

For Domestic Connections in SMC served area, one time Connection Fees of Rs. 500 is levied with one time Deposit of Rs 500. There is no subsidy for poor or slum dwellers for connection charges and water tax. The rebate for early payment is given as 1% on the current amount of consolidated property tax, tree tax and special education tax if the bill amount is paid within 15 days from the date of issue of the bill. SMC also levies penalty for late payment at the rate of 1% per month on all outstanding amount including arrears

For Domestic Connections in MJP served area, one time Connection Fees of Rs. 270 is levied with one time Deposit of Rs 330. Consumers have to buy water meters on their own. Cost of one meter is about Rs. 1000-1500. There is no subsidy for poor or slum dwellers for connection charges and water tax. There is no provision to pay in installments.

Proposals for improvement: SMC should increase the coverage in the city and the slum areas. Policy should be provided to provide individual or group water connections in slums. SMC should make Special GR for regularization of illegal connections and disconnection of illegal connection after repetitive reminders. Updation of new water connection approved should be done in the water tax/ property tax register. SMC should also maintain data regarding zonal distribution of water supply services. Simplification of application procedures for new connections can also help to increase the coverage in water supply system.

Service levels and Quality

Per capita supply of water: The present per capita availability of water at consumer end is 116 lpcd. In absence of water distribution zones and inadequate network capacity (WS scheme since 1965) the city faces problem of inequitable distribution of water and low water pressure at consumer end especially at tail ends. The per capita water supply available at source is 158 lpcd and per capita water availability at consumer end is 116 lpcd indicating high water losses in the transmission and distribution network.

Continuity of water supply: Presently the water supply is one hour a day for all the days in a month.

Quality of water supply: Quality of water supplied is 100%. But the reliability of the data is D. The tests are conducted regularly at the accredited centers. The records are still kept manually and not yet computerized.

Metering: The city has 24% functional metering. Metering is present only in MJP served area while there is no metering in SMC served area. The extent of metering is 27%, but 3% (722 meters at domestic connections and 118 meters at non-domestic connections) are non functional making metering only 24%. Remaining 76% water connections are charged on flat rate basis. Drawing lessons from several cities managed by the Maharashtra Jeevan Pradhikaran (MJP), and as required under the reforms required under the Maharashtra Sujal Nirmal Abhiyan (MSNA), SMC needs to ensure that meters are installed for all consumer connections.

Proposals for improvement: SMC can insure equitable water supply in Satara by hydraulically redesigning the water supply system. To increase per capita water supply, SMC can try to reduce the NRW. By introducing flow meters at the tapping points and ESRs as well as at consumer end in SMC served area can help to reduce NRW and increase extent of metering. Metering can also be increased by refurbishing non-functional meters in MJP served areas. SMC should also appoint technical staff and monitor the proper functioning of the meters regularly. SMC should also increase monitoring in procedures and reporting of quality of water supplied in the city. SMC can also procure mobile water sample testing unit for periodic monitoring of water quality.

Financial Sustainability

Cost recovery (O&M) of water supply: The cost recovery of SMC in water supply sector has increased to 116% in 2010-11 compared to previous year which was 107%. The collection efficiency of water related charges has also decreased from 62% in 2008-09 to 27% in 2010-11. As given in Chart 11. Annex 7 provides the details of the revenue income and revenue expenditure towards provision of water supply services by SMC. The cost recovery (revenue demand) has improved due to increase in water tax from Rs. 800 to Rs.1000 to Rs.1500 in last 3 years. Billed revenue demand is more than revenue expenditure. Collection efficiency is low at 27% and needs attention to improve revenue income. High amount of billed arrears were seen as collection efficiency against arrears is very low.

Chart 12 Revenue Income from Water Supply

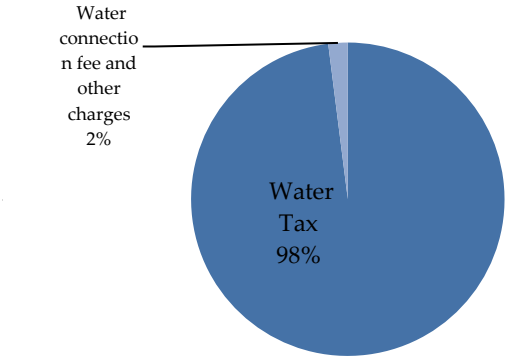
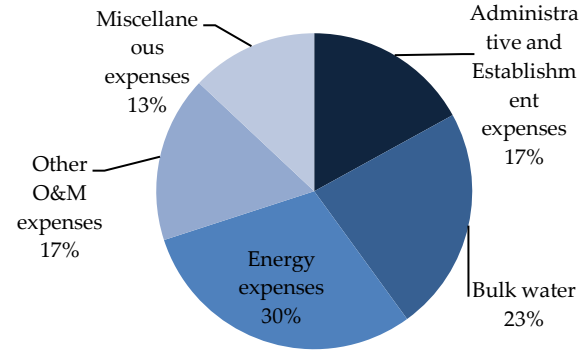


Chart 13 Revenue Expenditure from Water Supply



Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)

The major contribution in revenue income of WS is from water connections and water

charges at 98%. Remaining 2% is from other charges like water supply connection fees, etc. The revenue expenditure of WS department is dominated by energy expenses at 30% followed by bulk water purchase at 23%. The income from water supply service has grown at CAGR of 10% from the year 2005-06 to 2009-10, while the revenue expenditure on water supply has grown at CAGR of 26% during the same assessment period. Though the growth rate of income is much higher than that of expenditure, the water account has remained in revenue deficit condition during the assessment period. The operating ratio has varied from minimum 90% in the year 2005-06 to maximum 216% in the year 2007-08.

Further high energy expenditure can be curbed by replacing inefficient pumps under operation. Another area for improvement is relatively lowers collection efficiency for water supply charges against current demand and abysmally low against arrears. Also no segregated data for revenue demand and collection is available for water supply in area served by MJP within Satara Municipal Jurisdiction.

The per capita expenditure towards water supply by SMC is Rs 193 which is comparatively low when compared against the standard per capita norm of the HPEC and Zakariya Committee. The Per Capita O&M expenditure for water supply estimated by HPEC for class I city (1 Lakh to 1 Mn population) for 2009-10 prices[1] is Rs 491 and Per Capita O&M expenditure for water supply estimated by Zakariya Committee for class I city (1 Lakh to 10 Lakh population) in Rs/ capita (2009-10 prices)[2] is Rs 302.

The tariff structure of water related charges is provided in the table below. The present water tax structure followed by SMC is flat rate tariff as per the ferrule size for domestic and non-domestic connections. The water tax is raised annually and is a part of property tax bill. Apart from water tax the Satara MC also levies one time connection fees and deposit. There is door to door billing in Satara and payment is to be made at SMC office before the due date.

Table 10 Water Tariff Structure by SMC (non metered connections)

Annual Water Tax - Flat Rate Tariff based on Ferrule size			
Connection Size	**½″**	**3/4″**	**1″**

[1] *Source: Report on Indian Urban Infrastructure and Services (The High Powered Expert Committee (HPEC) for Estimating the Investment Requirements for Urban Infrastructure Services), March 2011*

[2] *Source: Zakaria C.ommittee (ZC on Augmentation of Financial Resources of Urban Local Bodies, 1963; Cost of O&M in Rs per capita per annum for water supply & sanitation is derived at 2010-11 price using CPI Index.*

Rates for domestic connections	Rs. 1500/-	Rs. 2330/-	Rs. 5492/-
Rates for non-domestic connections	Rs. 4080/-	Rs. 8135/-	Rs. 18408/-

The MJP, Satara has adopted telescopic water tariff structure where users pay as per the amount of water consumed. All water connections in the area served by MJP are metered. The water charge is raised bimonthly. The MJP have door to door billing system and also facilitates for payment of bills through designated banks. On default of payment before due date the delayed payment charges are levied at the rate of 1% per month on all water charges outstanding including arrears. In case of failure to pay the delayed payment charges the water connection is liable to get discontinued.

Table 11 Water Tariff Structure by MJP (metered connections)

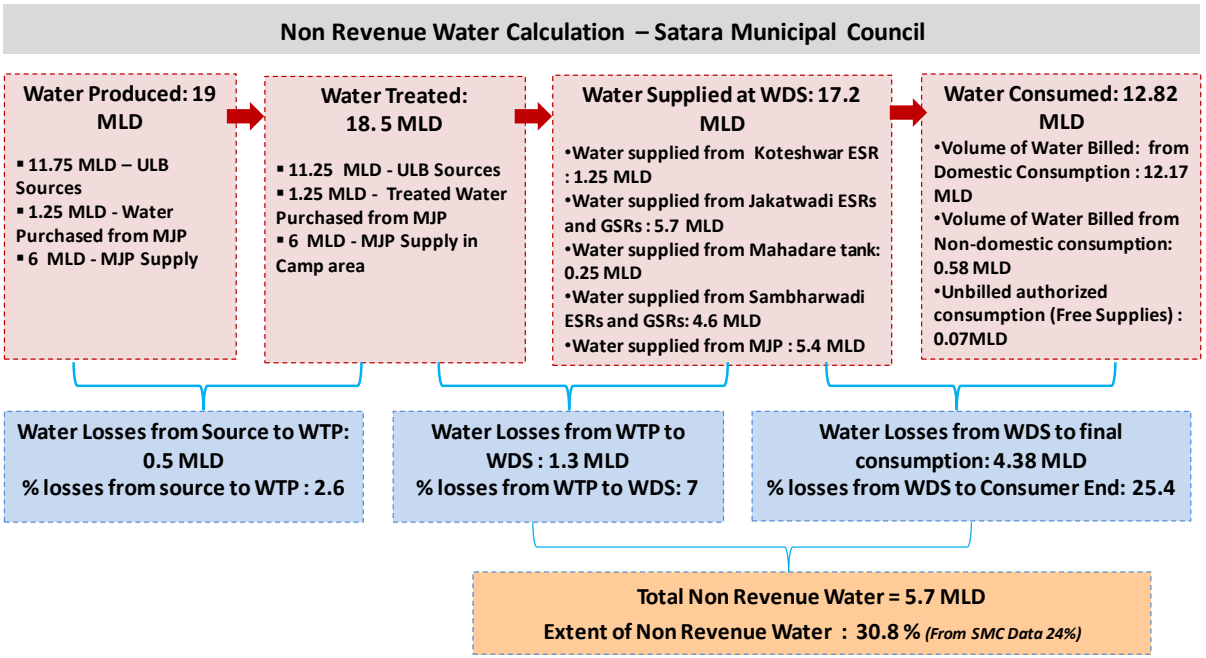
Water Charge - Volumetric Tariff (Bimonthly Water Bill)				
	Up to 15000 liters	**15001 - 20000 liters**	**20001 - 25000 liters**	**> 25000 liters**
Rates for domestic connections	Rs. 11.20	Rs. 12.30	Rs. 16.80	Rs. 22.40
Rates for Institutional connections	Rs. 21.60	Rs. 21.60	Rs. 21.60	Rs. 21.60
Rates for non-domestic connections	Rs. 50.80	Rs. 50.80	Rs. 50.80	Rs. 50.80

Proposals for improvement: Once metering is in place for the entire city especially SMC served area, SMC should incorporate telescopic rates in water supply as MJP does in MJP served areas. SMC should initiate special drive to improve collection efficiency especially against arrears. SMC should also improve billing and collection efficiency by efficient production of bills. SMC can also provide customer friendly collection systems with incentives for early payments/ penalties for arrears.

Efficiency in Service Operations

Extent of NRW: As discussed earlier, the per capita water supply available at source is 158 lpcd and per capita water availability at consumer end is 116 lpcd indicating high water losses in the transmission and distribution network. The NRW has also increased in last three years (Chart 11). The maximum water losses are in transmission network i.e. from WTP to WDS and distribution network i.e. from WDS to consumer end.

Chart 14 Non Revenue Water Calculations



An attempt is made to estimate NRW based on observations made during actual field visit. The water balance diagram (Chart 10) depicts raw water supplied from source, treated water available at WTPs, treated water supplied to WDS and water available to consumers and water consumed. This exercise has been attempted to estimate the water losses at each stage, total unaccounted water or non revenue water. Also note that in absence of flow meters at source, WTPs and Water Distribution Stations (WDS) the water supplied and treated is calculated based on estimations made by WS department officials. Also as there is only part consumer metering (24%) the water consumed is calculated based on water tax bills raised. Based on above calculations the estimated NRW is 30.8%. The maximum water losses are in distribution system. (Chart 14)

The reasons for high NRW are largely attributed to illegal connections, pipe breaks and connections without stop cocks. In current year, 11 pipe breaks were reported and as the distribution system was constructed in 1965, several leakages at pipe joints and at consumer end are reported. SMC has identified 209 illegal connections and regularized them from a single ward. The records are not updated properly as the 1" connections are shown as ½" domestic connections on record. As discussed earlier, water connections are given directly on transmission network from WTP in MJP served area (e.g. Mangalwar pet)

Efficiency in redressal of customer complaints: Though the efficiency of redressal of complaints has increased, SMC has also seen increase in the number of complaints in water supply. SMC has a system to record complaints received and redressed. Though the system allows for monitoring and analyzing complaints on a regular basis, the records system is manually maintained and not yet computerized. The reliability of efficiency in redressal of customer complaints is A. Consumers have multiple mechanisms to register complaints (through telephone, in person, by email).

Proposals for improvement: SMC should try to reduce apparent losses through unauthorized consumption by regularizing them. Simultaneously SMC can form a leak detection cell for each administrative ward with provision of leak detection instruments i.e. pipe locator, electronic leak locator, metal detector, sounding rods etc. For improving efficiency in customer complaints redressal, SMC can improve processes for handling, resolving complaints & reporting back to consumer as per citizen charters. SMC should also initiate process for periodic analysis & feedback from complaints database for quality, leakage, etc.

Equity in Service Delivery

Coverage in Slums: The coverage of water supply connections in slums of Satara was 59% in 2010-11. There are 1069 individual water supply connections in slums. There are no group connections in the slums. Most of the slum households depend on 7 functional stand posts in the slums.

Most of the proposals for improvement in water supply for Satara are being addressed under two ongoing projects viz. UIDSSMT under JnNURM and MSNA, GoM for 24x7 water supply in the city. The projects funded under UIDSSMT commissioned in year 2009-10 for Satara MC. The total cost of project sanctioned is 49.10 Cr and the revised escalated cost is 68 Cr as per new District Schedule of Rates (DSR). The project is being implemented by MJP Satara in coordination with Satara MC. The project is designed for the year 2040 for the projected population of 207917. The detailed breakup of project cost is given in

Items	2005-06 (A)	2006-07 (A)	2007-08 (A)	2008-09 (A)	2009-10 (A)	2010-11 (B)	2011-12 (B)
Revenue Income – Water Supply							

Water Tax	0.99	0.95	1.02	1.25	1.44	2.55	2.5
Water connection fee and other charges	0.02	0.02	0.02	0.02	0.03	0.02	0.02
Total	1.01	0.97	1.04	1.27	1.47	2.57	2.52
Revenue Expenditure – Water Supply							
Administrative and Establishment expenses	0.28	0.27	0.26	0.37	0.29	0.46	0.48
Bulk water	-	0.27	0.62	0.64	0.49	0.42	0.57
Energy expenses	-	0.14	0.85	0.75	0.81	1	1
Other O&M expenses	0.05	0.16	0.42	0.36	0.46	0.62	0.31
Miscellaneous expenses	0.59	0.1	0.09	0.09	0.24	0.12	0.13
Total	0.92	0.94	2.24	2.21	2.29	2.62	2.49
Operating Ratio for water supply	90%	97%	216%	175%	156%	102%	98%
Per Capita expenditure on water supply in Rs/ capita	81	82	193	188	193	218	204
Source:							

Annex 8. The project components under UIDSSMT are converting open canals into closed canals, replacement of distribution network, upgrading capacity of WTPs and ESRs. The projects funded under MSNA got commissioned in year 2009 and is being implemented since July 2009 by MJP Kolhapur for Satara MC. The total cost of project sanctioned is 1.80 Cr. (

Annex 9) The project components under MSNA are installation of Bulk Flow Meters, water and energy audit, Source Augmentation at Kas Dam, Computerized billing system, Consumer survey and GIS mapping and hydraulic modeling.

3.3 Proposed actions/ interventions for water supply

The following interventions are proposed based on discussions with the Council, 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 SMC. 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 "24X7 water supply" system, the interventions mentioned below needs to be carried out immediately by SMC to ensure the basic systems are in place. Detailed interventions which will incur capital investment by SMC are discussed in the next section. (**Error! Reference source not found.**)

Categories	Interventions required
Access and Coverage	• Policy provision to provide individual or group water connections in slums. • Absence of data regarding zonal distribution needs attention • Updation of any new water connection approved in the water tax/ property tax register. • Special GR for regularization of illegal connections and disconnection of illegal connection after repetitive reminders.
Service levels and quality	• Hydraulically redesign the water supply system for equitable water supply system. • Introduce flow meters at tapping points and ESRs as well as consumer end metering in SMC served area. Refurbish non-functional meters in MJP served areas. • GR to take action against consumers to repair/ replace faulty/ non functional meters. • Monitoring of proper functioning of meters • Appoint technical staffs • Increased monitoring of quality procedures and reporting • Procurement of mobile water sample testing unit to for periodic monitoring of water quality. Improved process for maintaining water quality protocol. • Simplification of application procedures for new connections.
Financial sustainability	• Once metering is in place for the entire city especially SMC served area, SMC should incorporate telescopic rates in water supply. • Improved billing and collection efficiency by efficient production of bills, customer friendly collection systems, incentives for early payments/ penalties for arrears by SMC • SMC should initiate special drive to improve collection efficiency especially against arrears.
Efficiency in service operations	• Reduce apparent losses through unauthorized consumption by regularizing them

Categories	Interventions required
	• Formation of leak detection cell for each administrative ward. Provision for leak detection instruments i.e. pipe locator, electronic leak locator, metal detector, sounding rods etc. • Improved processes for handling, resolving complaints & reporting back to consumer as per citizen charters • Process for periodic analysis & feedback from complaints database for quality, leakage, etc.

3.4 Moving towards 24 X 7 water supply in Satara

Govt. of Maharashtra'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. The possibility of 24x7 water supply in Satara is studied taking into account existing water supply system viz. source availability, treatment capacity, network adequacy and implementation of reforms. General Body Satara passed a resolution (Tharav No. - 1306) on 12th September 2011 to assign preparation of DPR to MJP, Satara to achieve 24x7 water supply in the town. In next annual budget provision will be made for the payment of fees to MJP Satara for their services in preparing DPR

While steps towards achieving 24X7 water supply require substantial efforts and investment, certain actions related to up gradation of human resources and improved management information systems are easier to implement. The guidelines suggested by MoUD towards 24X7 WS systems provide an approach based on the technical, commercial and institutional improvements that are required which are discussed below. (MoUD, 2008)

Technical improvements: To achieve 24x7 water supply certain reforms need to be undertaken which ensures adequate, equitable, improved quality of water supply. The crucial factor for implementing 24x7 water supply is presence of adequate/ ample source of water which is available with Satara MC. The technical inadequacies in Satara water supply system which may obstruct the shift towards 24x7 water supply are discussed here. Some of the technical and commercial constraints mentioned by MoUD guidelines can be resolved through the implementation of GoM's reform program of MSNA. The following table represents the pre-requisite for 24x7 water supply in Satara and the possible actions that can be taken with the status of such actions under ongoing MSNA, UIDSSMT and SMC.

Table 12 Summary of improvement actions to implement 24x7 water supply

Activity	Description	Status
Network and Customer database	Detailed network maps in GIS mapping	Ongoing under **MSNA**
	Hydraulic modeling for entire city	
	100% Consumer end survey, including identifying and regularizing illegal connections	
Water supply coverage	Policy level interventions to provide individual water connections or group connections in slums.	Under consideration by **SMC**
Per Capita Water Supply	Source augmentation at Kas dam	Ongoing under special provision - MSNA
Leakage control	Water Audit - Leak detection and plugging of leakage joints	Ongoing under **MSNA**
100% metering	Installation of flow meters at supply	Ongoing under **MSNA**
	Consumer end Metering	Under consideration by **SMC**
Reduce NRW	Regularize illegal connections	Under consideration by **SMC**
	Replacing old pipelines	Ongoing under **UIDSSMT**
Cost recovery and collection efficiency	Computerized billing, door to door billing, facilitate bill payment	Ongoing under **MSNA** e-governance
	Telescopic tariff structure Volumetric billing	Under consideration by **SMC**
	Reduce high energy bills, Energy Audit, Replace inefficient pumps	Ongoing under **MSNA**
Capacity building	Capacity building and training of existing staff , fill vacant posts and Appoint technical staff	Under consideration by **SMC**
Quality of water	Introduce water quality monitoring system	Under consideration by **SMC**

Currently all the pre-requisites and reforms in the WS sector are being implemented under ongoing projects in Satara. The assessment of water supply scenario suggests that 24x7 WS is possible in Satara. The capital investment required in improving the technical aspects for moving towards 24x7 water supply are provided in the table below.

Table 13 Proposed Cost for 24 x 7 Water Supply in Satara Municipal Council

	Description	Rs. Lakhs	Rs Crores
1	GIS digitization and mapping and consumer survey	**180.32**	**1.8 (Under MSNA project)**
2	Water Audit		
3	Energy Audit		
4	Hydraulic Modeling		
5	Computerized billing system		
6	Installation of bulk flow meters (10 Number)		
7	Rehabilitation of Distribution Network- 120 Km to be replaced and improvement in transmission network	**4712**	**67.83 (Under UIDSSMT project)**
8	Converting 6 km open canal into closed pipeline	**832**	
9	Storage reservoirs	**588**	
10	Systems improvement and up-gradation of WTPs	**253**	
11	Connecting Kas MBR to Urmodi MBR	**48**	
12	Pumping works	**270**	
13	Water head works	**80**	
14	Kas Source Augmentation (Increasing dam height)	**4300**	**43 (Under KAS Dam Height increase Project)**

15	Consumer metering, replacement of house service connection (Total 18769 connections of these 4970 metered connections, 13799	Block Cost - Rs. 5000/- per connection with electromagnetic meter	**689.95**	**6.89 (As per block cost estimates)**
		TOTAL	**11953.27**	**119.5**
Total estimated cost for 24 x 7 water supply in Satara (Rs.)				**119.5 Cr**
In addition to this 10% increase in cost to be considered for Satara as per MJP DSR Pune Region 2010-11as Satara falls under Hilly				

The total estimated cost for 24x7 WS arrives at Rs. 120 Crores. Of total funds required, 1.8 Crore are sanctioned under MSNA, 67.83 Crores are sanctioned under UIDSSMT, and 43 Crores are sanctioned as per special provision under MSNA for source augmentation. SMC will need additional ***6.9 Crores*** to achieve 100% consumer metering. A part of this can be met by consumer partly or fully paying for the water meters.

Commercial improvements: Given that the technical improvements need to be financially sustainable, the conversion to 24X7 water systems requires advanced commercial systems and procedures. Along with computerized billing and collection system with updated consumer records, SMC also needs to shift from flat tariff towards volumetric tariff. With introduction of metering and volumetric tariff system, consumers will be charged based on the water quantity they consume. SMC needs to explore telescopic approach for billing.

The cost recovery of water supply department is high at 116% but the collection efficiency of the water supply charges is low at 27%. Actions for imposing new user charges and improving the cost recovery should be given high priority by SMC.

After implementation of 100% consumer metering, the volumetric tariff structure as proposed by MJP-Satara to cover the future O&M costs of WS can be explored which is given below.

Table 14 Proposed tariff structure by MJP

Domestic Connections (Telescopic Rate)		Non domestic Connections
Up to 15000 liter/month	Rs. 11.20/1000 liter	Rs. 50.20/1000 liter
15000 to 20000 liter/month	Rs. 12.30/1000 liter	
20000 to 25000 liter/month	Rs. 16.40/1000 liter	
More than 25000 liter/month	Rs. 21.20/1000 liter	

According to the state government recommendations, the tariff structure was worked out considering the expenditure incurred by SMC towards servicing the part of the water demand. This revenue loss was factored in the calculations for arriving at the revised tariff. The tariff as calculated using the state government guidelines is given in the table below.

Table 15 Proposed tariff structure for SMC water supply

Consumer Group	Connections	Tariff Calculated on the basis of Maharashtra State Government Recommendations (Rs. / KL)[3]
Residential	11504	6.60
Commercial	794	19.79
Industrial	10	32.98

Institutional improvements: SMC has to significantly improve its managerial and technical skills to shift towards 24X7 water systems. Some of the technical aspects that will require improved skills and automation are

- Planning and design of water supply infrastructure from source to distribution/ customer for 24X7 system, including concept and establishment of DMAs.
- Restructuring of existing systems, presently 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 regularization/ disconnection of illegal connections, mapping of water service infrastructure on GIS linked to operational, maintenance and customer services tracking. The staff at SMC needs to be augmented in order to ensure smooth functioning of the 24X7 system.

[3] *The underlying assumptions are 100% collection efficiency, categorization of the existing connections into the categories recommended by the state government and 100% extent of metering in Satara to levy volumetric tariff*

Photo Plate 4 Sanitation and sewerage in Satara

Photo Plate 5 Drainage in Satara

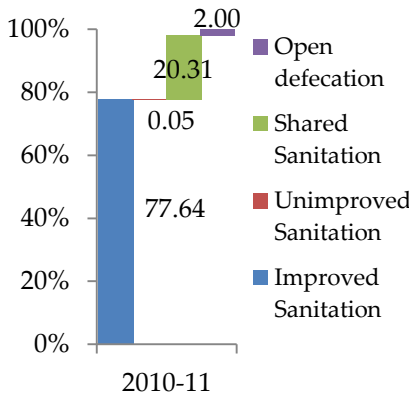
4. ASSESSMENT AND PROPOSALS FOR SANITATION

This section captures the sanitation aspects in Satara related to coverage of toilets in the city, drainage network, Septage management, disposal system as well as services in the slums. It further discusses the impact of the ongoing projects and a summary of proposed interventions for improving sanitation and moving towards Open Defecation Free city.

4.1 Coverage of toilets

As per the recent figures from census 2011, 78% of the households in Satara have access to latrine facilities within premises and are connected to either pipe sewer or septic tank or ventilated improved pit latrine. Around 20% of the Households depend on shared sanitation which are community toilets and public toilets. However, 2% of households do not have access to any sanitation (improved/shared/unimproved) and thus resort to open defecation. (CENSUS, 2011)

Chart 15 Access to sanitation in Satara (CENSUS, 2011)



Source: (CENSUS, 2011)

Hence the coverage of toilets as per census is 98 %. (78% improved sanitation and 20% shared sanitation). However, the coverage of households with individual toilets in slums is only 25% in 2011. There are around 453 individual toilets in the slums. The remaining slum population in SMC is dependent on community toilets and pay-&-use toilets. There are 122 community/public toilet blocks with 807 toilet seats in Satara. In Satara there is no classification between community toilets and public toilets. Thus no segregated data/ information on community toilets and public toilet are available. Around 686 seats out of 807 seats are functional. The possible reasons for non functional seats are inadequate number of seats in community toilets, poor O&M of existing toilets, No water availability near toilets, choked and overflowing septic tanks, no proper approach road, no electricity connection, etc. The estimated open defecation calculation as given in the table below shows 4.28% population resorting to open defecation in Satara.

Table 16 Estimated population resorting to open Defecation

Description	Number
Total population	120079
Total number of properties	28918
Total properties with toilets	23644
Total community toilet seats	807
Total functional community toilet seats	686
Total Households dependent on functional community toilet (6 HHs/seat)	4116
Remaining HHs having no access to individual/community toilets	1158
Remaining Population having no access to individual/community toilets	5143
Percent of HHs resorting to Open Defecation	**4.28%**

Following are the details of the on-going projects in the sanitation sector which includes DPR for sewerage system, MSNA and IHSDP:

Satara Municipal Council (SMC) has prepared the Detail Project Report (DPR) for conventional sewerage network and STP for town of Satara at an estimated cost of approx. 60 Crores (including STP). The DPR is submitted to Central Government under 'National River Conservation Programme' and to State Government under 'Nagorotthan' for grants.

Under Maharashtra Sujal va Nirmal Abhiyaan for year 2011-12 the individual water supply connections and toilets are sanctioned for SC & Navboudh population in Satara Municipal Council as per Government Resolution dated 25-10-11. For this purpose a survey has been conducted to assess the availability of sanitation facilities. Total sanctioned project cost is Rs. 3.12 Crores. The amount of grant released is Rs 1.28 Crores. The cost per individual toilet is Rs 14000 while community toilet block of 4 seats each is Rs 338270. Individual toilets sanctioned are 1641 individual toilets to benefit 1641 HHs. Community toilets sanctioned are 16 community toilets blocks of 4 seats each i.e. 64 seats. Total beneficiaries are 2025 HHs.

Under sanctioned IHSDP project for slum redevelopment/ improvement 1473 slum beneficiary HHs are covered. The Dwelling Units to be provided will be having individual toilet facility.

4.2 Moving towards Open Defecation Free Satara

Given that Govt. of Maharashtra's major focus in urban sanitation has been towards **'making cities Open Defecation Free',** the performance improvement plan in sanitation for SMC has concentrated on the covering the gap in toilet coverage, and related components (like IEC, awareness campaigns, etc)

Table 17 Toilet coverage after MSNA & IHSDP

Description	Number
Total community toilet seats	807
Total functional community toilet seats	686
Total Households dependent on functional community toilet	4116
Total individual toilets sanctioned under MSNA	1641
Individual toilet seats sanctioned under IHSDP	1473
Total HHs catered under sanctioned seats	3114
HHs without individual toilets after MSNA & IHSDP	1002
Community toilet seats sanctioned under MSNA	64
Total community toilet seats (existing functional, non functional and sanctioned)	871

As discussed in the table above, there are 807 community toilet seats out of which 686 seats are functional, which can cater 4116 HHs as per norm of 6 HHs/seat. As mentioned in the above table, 1641 individual toilet seat are sanctioned under MSNA and 1473 individual toilets under IHSDP. After completion of the sanctioned toilets the number of HHs dependent on community toilets will reduce to ~1002 HHs. An additional 16 blocks having 4 seats each i.e. 64 community toilet seats are also sanctioned under MSNA.

To achieve open defecation free Satara, SMC can refurbish its 121 non functional community toilet seats and maintain existing 686 functional seats along with additional new 64 community toilet seat. Hence, SMC will have in all 871 community toilet seats which can easily cater the HHs without individual toilet and can also serve the future population dependent on community toilet seats.

Awareness Campaigns: The Council must also simultaneously undertake community mobilization and awareness campaigns in order to ensure that the community toilet blocks are maintained / managed properly. The campaigns should also target on changing the mindset and behavioral pattern of people defecating in open and encourage them to use community/ group/ individual toilets.

4.3 Septage and sullage management

Sewage network: Satara does not have sewerage network and no waste water treatment facility. There are 28918 total properties in Satara; out of this 23644 properties have toilets which are connected to 23452 septic tanks. Some of the households (flats and chawls) share the septic tanks. Reportedly, some houses even have soak pits into which septic tank effluent

is diverted. The septic tank overflow, in most cases, is let into surface drains (covered or open) leading to insanitary conditions and health risk. Problem is compounded by disposal of garbage and littering into drains. The septic tank effluent flows into 200 km network of surface drains which in turn flows into 7 natural Nallahs. Ground water table is at more than 20 meters depth, so there is no risk of groundwater contamination by leaky septic tanks, soak pits or surface drains carrying effluents. The coverage of drainage network i.e. open and closed drains is 84%. There is no recycling and reuse of this wastewater.

Collection of septage: Emptying of septic tanks in Satara is done by the vacuum emptier available with the municipal council. The service charges per trip within municipal limits are Rs.350 and outside municipal limits Rs.1050. Private Services for emptying septic tank are available but seem to be costlier at Rs. 4000-5000 per trip. As only a single vacuum suction emptier is available with municipal council, it takes relatively longer duration about 2-3 days for the complaint redressal. There is scope for municipality to deploy additional vacuum emptier since the existing emptier services only 700 septic tanks per annum. Additional emptier with municipal council will also put pressure on private service providers to reduce their high charges.

Treatment/Disposal: Transport of fecal sludge in emptier is safe since there is no human contact with fecal sludge at any stage, but the ULB doesn't have facility to treat septage/ fecal sludge. The fecal sludge is dumped by municipal council at solid waste dump site while the Private Service providers dump it randomly on the outskirts of the town.

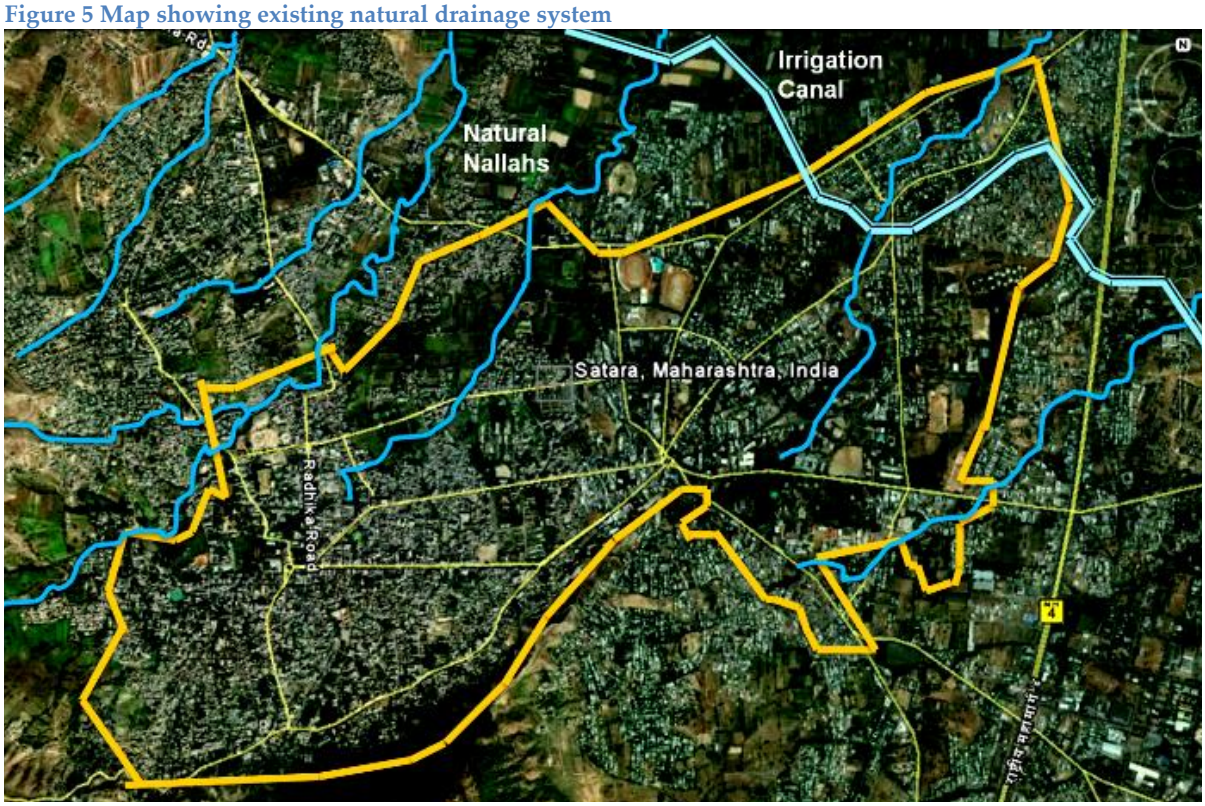
Table 18 Summary of drainage network in Satara

Description	
Total Area of the city (Sq. km)	8.15
Area covered by wastewater network (Sq. km)	6.85 (84%)
Area covered by underground sewerage network (sq. km)	0
Area covered by open drainage network (sq. km)	4.45 (54.6%)
Area covered by covered drainage network (sq. km)	2.40 (29.4%)
Length of open drainage network (Km)	125.0
Length of covered drainage network (Km)	75.0
Source: (CEPT University, 2009 - 2011)	

Strom water drainage network: Estimated volume of wastewater generated and collected is approx. 12.6 MLD which is conveyed through 200 km surface drain network. Of 200 km drainage network, 75 km is within the core city area which is covered while 125 km is in the outer areas which are open drains. Majorly well lined pucca drains were found in the core area of the city. For newly developed areas, SMC extends closed drainage network. Kuccha and overflowing drains are found mostly in slum areas. The frequency of drainage overflows is high, 150 drainage overflows were reported in the city in year 2010-11. This is more prevalent in areas where there are open drains with solid waste is dumped into it.

All drains carrying effluent from septic tanks and sullage discharge into Krishna River at a distance of 5 -10 km from northern edge of town. There are 7 drainage outfalls outside the town. Satara city topography can be characterized as rolling terrain. The ground slopes from southwest to northeast, which slopes gently from 750m above sea level (at the southern foothills of Sahyadri hills) to 620m above sea level (at Rahimatpur Road Bridge on Krishna

Figure 5 Map showing existing natural drainage system



River), which is an average slope of 1 in 150. The city is well drained as there were no incidences of flooding reported during the monsoons. The figure above shows existing natural drainage (nallahs/ streams) in Satara which ultimately connects to Venna River in North and Krishna River in East.

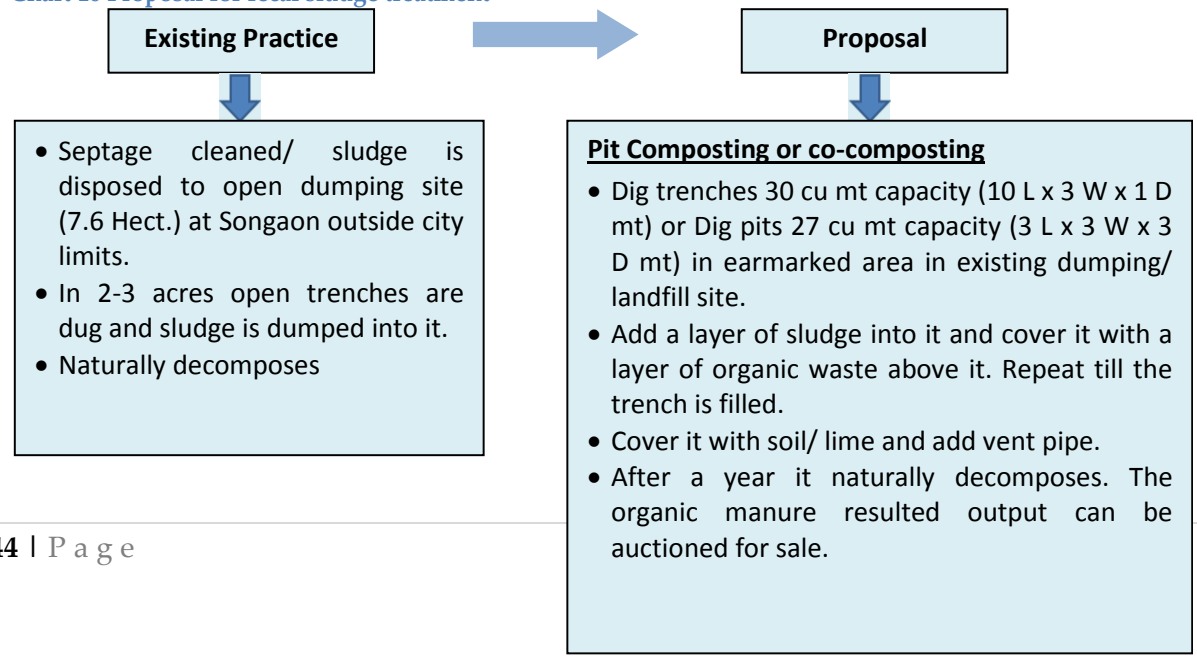
Strengthening Septage Management:

Table 19 Number of septic tank emptiers needed in Satara

Description	Number
Number of septic tanks in Satara	23500
Number of Septic tanks emptied and fecal sludge delivered to treatment site /emptier	700
Assuming emptying cycle of 5 years, number of septic tanks to be emptied every year (23500/5 = 4700)	4700
Number of Septic tanks emptiers required (4700/700 = 6.7)	6.7
Number of emptiers available at present (1 suction emptier of 5000 liters capacity)	1
Number of additional emptiers to be procured	6

As shown in the table above, 7 numbers of suction emptiers are required for efficient septage management. SMC currently has only 1 suction emptier of 5000 liters capacity which cleans 700 septic tanks annually. SMC has to procure 6 more vacuum suction emptiers of 5000 liters capacity to meet current demand. SMC can also outsource the septage services to private agencies or take suction emptier on lease from private agencies to address this issue.

Chart 16 Proposal for fecal sludge treatment



SMC should also regulate fecal sludge disposal by ULB or private service provider initially directing them to dump on dump sites till sanitary landfills or fecal sludge composting units are constructed and operational. The fecal sludge can be treated as discussed in the chart below. The treated fecal sludge can then be sold to the farmers as compost and the pits can be reused.

SMC needs to undertake initiatives to ensure implementation of a proper Septage management plan for areas having septic

tanks. Govt. of India's Draft of Advisory on Septage Management in Indian cities (MoUD, 2011) states that pumping programs 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 de-sludging, the service provider (local government/private operator) can consider sending an inspection crew to inform the residents of such activity, locate manholes and access points, and probe tanks to determine level of accumulated sludge. One simple means of gauging sludge depths is by using a probe on a long handle and submerge into the tank. The policy states that the standard practice in India is to de-sludge every two years or so. Community run programs 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 operation 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.

Improvement in Monitoring: The Septage management plan will include estimation of Septage generated in the city, increased provision of public services to cater safe disposal of Septage, encourage private operators and community based organizations 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, reorganize and clarify institutional roles and responsibilities.

Cost recovery: In Satara, separate revenue budget heads for Sanitation and SWM are maintained. SMC doesn't levy separate sanitation tax or charge for sanitation services to cover O&M costs it incurs in this sector. But there are charges levied for septage management services on per trip basis which leads to some revenue generation. The charges levied are Rs. 350/- per trip- within municipal jurisdiction and Rs. 1050/- outside municipal jurisdiction. But the service is highly subsidized because the expenditure towards septage services is more than income through those services. There is a need to rationalize and increase septage service charges levied based on expenditure incurred. Also

immediate attention is required for introducing sanitation related tax or charge based on the cost of service operations. These charges can be collected with property tax. This would be a crucial step in achieving 100% O&M cost recovery in future as mandated under JnNURM reforms. The per capita O&M expenditure incurred by SMC on for waste water services is Rs 130.

4.4 Summary of proposed actions

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 SMC 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 achievement of being open defecation free.

To make SMC open defecation free city, the coverage of HHs with individual toilets can be increased after the completion of individual toilets under MSNA and IHSDP schemes. The remaining population and future population can be catered by maintaining existing functional community toilets, refurbishing non-functional community toilet seats and constructing the sanctioned community toilet seats under MSNA. SMC should also explore the option of appointing private agency/ NGO at city level for O&M of community toilets.

SMC should strengthen and improve existing waste water network. Open drains should be converted into covered drains. SMC should also increase coverage of drainage network in slums. SMC also has to prepare a Septage Management Plan to ensure safe and proper disposal of Septage and streamline its operations.

Annex 10 puts forth the actions with minimal and substantial capital expenditure to improve the sanitation condition in Satara.

The interventions in minimal expenditure include periodic maintenance of open and closed drains, O&M of community toilets, refurbishment of existing non-functional community toilets and provision of adequate water supply to community toilet block. The total cost for actions under minimal capital expenditure is Rs 2.93 Crores. Further, SMC can undertake substantial capital investment linked interventions which include construction of covered drains in un-served areas, upgrading open drains to covered drains and procurement of 6 suction emptier trucks. The total cost for this is Rs 24.8 Crores.

Other proposed low cost and policy intervention actions for the Satara are:

- Policy provision to provide individual or shared toilets in slums where adequate land is available.
- Introduce sewerage charges or sanitation tax as per GR of WSSD, GoM.
- Rationalize septage charges and sanitation/ wastewater related tariff to cover O&M costs.
- Improved processes for handling, resolving complaints & reporting back to consumer as per citizen charters
- Process for periodic analysis & feedback from complaints database for quality, leakage, etc.

The summary of proposed actions with their status and details for ODF and sanitation is summarized below.

Table 20 Summary of improvement actions for Sanitation in SMC

Activity	Status/ Next steps	Description
Strategies for ODF	Construct individual & community toilets	• Provision of sanctioned individual and community toilets under MSNA and IHSDP
	IEC Campaigns	• Undertake IEC activities • Undertake transect walk to the open defecation site • Targeting for the change in the mindset and behavioural pattern of the people.
Strengthen waste water network		• Upgrading open drains to covered drains. (Intermediate solution) • Strengthen O and M / cleaning of open drain on regular basis. • Construction of settled sewerage network and STP.
Strategies for Septage Management	Preparation of Septage Management Plan and DPR	• Preparation of Septage Management Plan for the city • Systematic implementation of comprehensive Septage management plan. • Construct sludge treatment facility (Composting)
	Human & material resource improvement and procurement	• Need to improve the fleet capacity for inspection facilities and efficient working of the Septage management. • Filling of the vacant sanctioned seats in the department • Procurement of machinery and resources as per the requirement of the Septage management plan.
Cost recovery	Introduce sanitation tax	• Introduce sanitation tax/ service charges to recover O & M cost. • The service charges can be collected with property tax. • Maintain separate revenue budget heads for Sanitation.

5. SUMMARY OF PERFORMANCE IMPROVEMENT PLAN FOR SATARA

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

5.1 Summary of proposals

The proposals summarized below are focused on two key areas of establishing 24X7 water supply system and moving towards open defecation free SMC, as well as improvements in key processes and operations related to these two focal areas. Based on the analysis of the water and sanitation sectors in Satara, the Performance Improvement Plan for SMC has been summarized below. The total PIP cost for SMC will be Rs. 147.25 Crores.

Table 21 Summary of Performance Improvement Plan for SMC

Key actions for improvement	Costs	Current status
Water supply: towards 24X7 system		
GIS digitization and mapping and consumer survey, Water & energy Audit, Hydraulic Modelling, Computerized billing system and Installation of bulk flow meters	**1.8 Cr**	Sanctioned under MSNA
Rehabilitation of Distribution Network, Converting open canal into closed pipeline, Storage reservoirs, Systems improvement and up-gradation of WTPs, Connecting Kas MBR to Urmodi MBR, Pumping works and Water head works	**67.83 Cr**	Sanctioned under UIDSSMT
Under KAS Dam Height increase Project	**43 Cr**	Sanctioned under MSNA special provision
Consumer end metering	**6.89 Cr**	Proposed by SMC
Total – Water Supply	**119.52 Cr**	
Sanitation: towards OD free		
Periodic maintenance of drains, Refurbishment of existing unusable community toilets, Construction of sludge treatment facility and Undertake necessary IEC measures.	**2.93 Cr**	
Construction of covered drains in un-served areas, Procurement of 6 suction emptier trucks, Upgrading open drains (125 km) to covered drains	**24.8 Cr**	Preparation of DPR is required
Total – Waste Water	**27.73 Cr**	
Total cost of PIP		**147.25 Cr**

SMC also needs to implement improvement actions related to processes followed in the water supply and sanitation operations. These actions being no or low cost can be

immediately taken up by the Council. These include regularizing un-authorized connection, IEC campaigns, periodic surveys at source, treatment and consumer end, proper sampling regimen for monitoring water quality, levy telescopic rates for water supply after 100% metering, regular surveys through zonal sanitary inspectors, introduce sewerage charges or sanitation tax as per GR of WSSD, GoM, improve collection efficiency of sanitation tax, rationalize septage charges for emptying septic tanks to recover O&M costs, maintain separate revenue budget head for wastewater and sanitation, increase complaint redressal system with systematic computerized record keeping of complaints received and redressed, etc

5.2 Phasing and steps to improvement

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

Investment capacity in BAU scenario: The business as usual scenario is based on the hypothesis that the past trends in key financials of Satara Municipal Council would continue in the future. Based on such assumption the key financials of Satara Municipal council have been projected and the investible surplus has been determined. Below table details the investible surplus for Satara Municipal Council in business as usual scenario.

Table 22 Projected investment capacity - Business As Usual (BAU) scenario (Rs. In Crores)

Year	Revenue surplus (other than WS, WW and SWM)	Revenue surplus for WS, WW and SWM	Debt servicing	Surplus after capital receipt and expenditure	Investible surplus
Budgeted					
2010-11	6.72	(5.59)	-	(7.69)	(6.57)
2011-12	13.95	(5.74)	-	(10.21)	(2.02)
Estimated					
2012-13	14.75	(6.07)	-	(5.38)	3.30
2013-14	15.60	(6.42)	-	(5.70)	3.48
2014-15	16.50	(6.80)	-	(6.04)	3.66
2015-16	17.45	(7.20)	-	(6.41)	3.84
2016-17	18.45	(7.64)	-	(6.79)	4.02
2017-18	19.51	(8.10)	-	(7.20)	4.21
2018-19	20.63	(8.60)	-	(7.63)	4.39
2019-20	21.80	(9.13)	-	(8.09)	4.58
2020-21	23.04	(9.70)	-	(8.57)	4.77
2021-22	24.35	(10.31)	-	(9.09)	4.95
Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)					

From the above table, the investible surplus in BAU scenario of Satara starts from 2012-13. SMC can start funding its minimal expenditure improvement actions in Phase I from its own surplus from 2013 itself.

Investment capacity after revenue enhancement measures: It is extremely critical that SMC undertakes revenue enhancement measures to recover O&M costs, continue further improvement in its surplus, and increase possibility to fund its internal operations and substantial expenditure improvement actions in Phase II. Some of the steps that can be potentially taken to increase revenue are as follows:

1) Improve cost recovery of water supply department
2) Improvement in cost recovery of sanitation
3) Revision of tariff of municipal services on an yearly basis

The above actions do not require capital investments for implementation and need only process changes. To simulate the effect of the above changes in the investment capacity the following assumptions have been made. These assumptions have been made considering full cost recovery of service provision within five years.

Sr. No.	Item	Assumption
1	Improvement in property tax	Current collection efficiency – 67% Annual increment in collection efficiency – 4% Max. Collection efficiency – 95% in 7 years
2	Improvement in collection efficiency of water tax / charges	Current collection efficiency – 67% Annual increment in collection efficiency – 4% Max. Collection efficiency – 95% in 7 years
3	Revision of Rates	% Increase over base rate: 5% once in every three years for property tax 5% once in every three years for water supply tax

The Annex 11 presents the incremental revenues due to revenue enhancement measures. Thus, it can be seen that after improving the cost recovery of water supply and sanitation departments, the deficit has reduced while SMC needs to undertake additional steps to reduce the deficit further. Also SMC needs to exercise expenditure controls to contribute towards improving the investible surplus.

The improvements for SMC have been proposed in two phases: Phase I Immediate interventions (from 2013 - 2015), and Phase II Long term interventions (from 2016 – 2018).

Phase I: Immediate interventions (from 2013 – 2014)

The interventions related to increase in revenue, process and policy changes which will not require capital investment is proposed to begin in early stage of this phase. SMC can start with regularizing illegal connections, increasing collection efficiency of the charges, introducing drainage tax, etc in Phase I.

The various ongoing projects for water supply improvement under MSNA and UIDSSMT as mentioned in earlier section can be completed in this phase. Satara can complete consumer

end metering in 2013-14 and can levy telescopic rates for water supply once metering is done from 2014-15. By 2014, distribution network augmentation and creation of pilot DMAs for future 24x7 Water supply in the city can be completed.

For sanitation, Satara can move towards achieving Open Defecation Free city once the construction and provision of sanctioned toilets under MSNA and IHSDP is in place in Phase I. The remaining population without individual toilets can be served by maintaining existing functional community toilets and refurbishing existing non-functional community toilets. Simultaneously SMC should undertake various measures to curb the problem of open defecation and to achieve complete sanitation. Such measures include regular surveys through zone sanitary inspectors, strengthen O&M of existing community toilets, undertake necessary IEC measures and to improve cost recovery. Campaigns to bring awareness related to cleanliness and hygiene practices, safe sanitation practices and the negative health impacts due to open defecation needs to be conducted by the Council. The campaigns should begin by triggering initiation in the slum settlements and undertaking transect walk to the open defecation sites to highlight the above issues. As majority of toilets are connected to septic tanks, SMC should also initiate the preparation of Septage Management Plan and procurement of few additional suction emptier trucks for the city for regular monitoring and cleaning of the overflowing septic tanks.

Table 23 Phasing of PIP for Satara

Proposed improvement areas	2013	2014	2015	2016	2017	2018
Water Supply	**Phase I**		**Phase II**			
Regularizing un-authorized connection						
Periodic surveys at source, treatment and consumer end						
Proper sampling regimen for monitoring water quality						
GIS digitization and mapping and consumer survey						
Water & Energy Audit						
Undertake hydraulic modeling for the entire water supply network						
Computerized billing system						
Installation of bulk flow meters						
Rehabilitation of Distribution Network- 120 Km to be replaced and improvement in transmission network						
Converting 6 km open canal into closed pipeline						
Storage reservoirs						
Systems improvement and up-gradation of WTPs						
Connecting Kas MBR to Urmodi MBR						
Pumping works						
Water head works						
Kas Source Augmentation (Increasing dam height)						
Consumer metering						
Levy telescopic rates for water supply						
Distribution network augmentation: creation of pilot DMAs						
24x7 Water supply system for the city						

Proposed improvement areas	2013	2014	2015	2016	2017	2018
Water Supply	Phase I		Phase II			
Sanitation (including sewerage)						
Regular surveys through zone sanitary inspectors						
Periodic maintenance of drains						
Strengthen O and M of existing community toilets						
Refurbishment of existing non-functional community toilets						
Towards OD Free through provision of individual & community toilets sanctioned under MSNA and IHSDP						
Undertake necessary IEC measures						
Preparation of Septage Management Plan						
Implementation of Septage Management Plan						
Construction of sludge treatment facility						
Introducing drainage tax, environmental tax in property tax, and collection efficiency of charges						
Improve cost recovery						
Construction of covered drains in un-served areas						
Procurement of suction emptier trucks						
Upgrading open drains (125 km) to covered drains						

Phase II: Long term interventions (from 2015 - 2018)

Once the above measures of Phase-I are in place, SMC can begin implementation of 24X7 for the entire city from 2015. Similarly in Sanitation, once the sanctioned toilets under MSNA and IHSDP are constructed, refurbishment of existing community toilets and preparation of Septage Management Plan is done; SMC can start with implementation of Septage Management Plan. SMC can undertake other substantial capital investment projects in this phase. Such capital intensive projects include construction of covered drains in un-served areas, procurement of remaining additional suction emptier trucks and upgrading open drains (125 km) to covered drains.

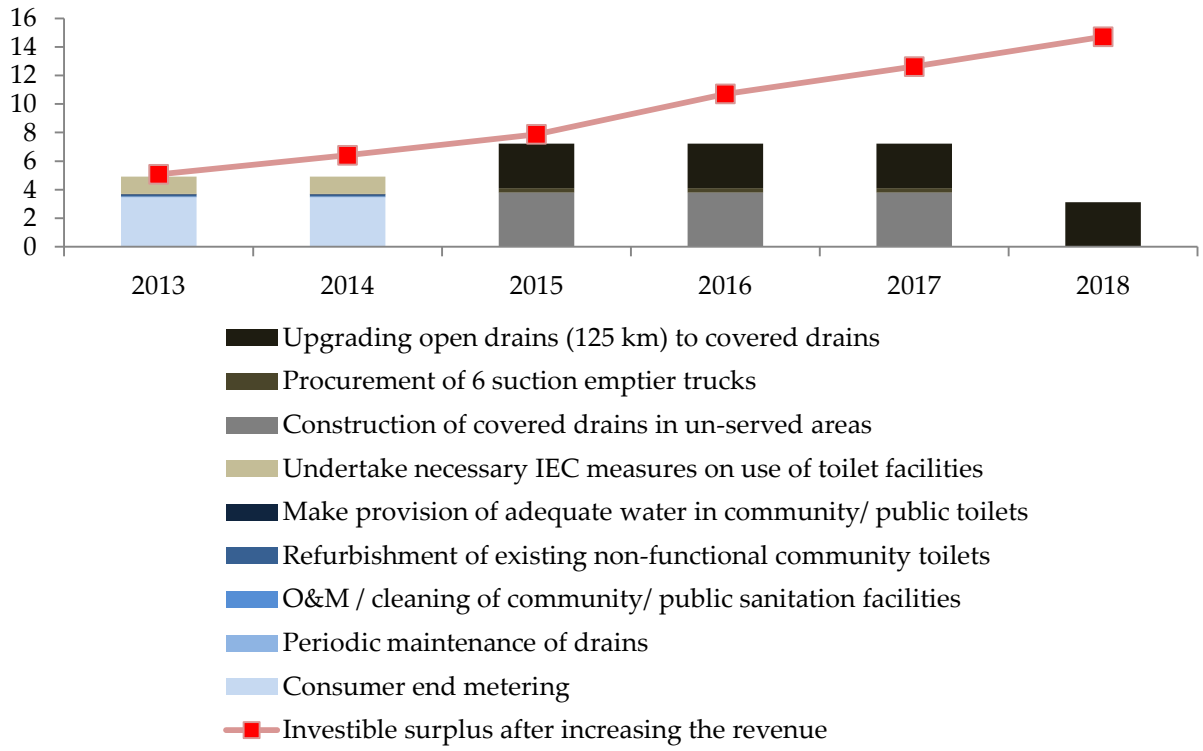
As discussed earlier, SMC can generate substantial amount of surplus after taking steps for potential increase in revenue. Table below provides the details of sources of revenue to fund 24x7 water supply and ODF city. As discussed in **Error! Reference source not found.**, out of Rs. 119.5 Crores required for 24x7 Water supply in Satara, Rs 112.8 Crores are available through different funding under UIDSSMT and MSNA. Satara needs Rs. 6.9 Crores for remaining 24x7 Water Supply work, Rs 2.93 Crores for minimal capital expenditure for Sanitation and Rs 24.8 Crores for substantial capital expenditure for Sanitation in Satara.

After implementation of above mentioned revenue enhancement actions, significant improvement in investible surplus is observed. Eventually, SMC would be in a position to invest in required performance improvement actions from its own investible surplus and will not have to depend on external funding.

Table 24 Sources of revenue to fund 24X7 water supply and ODF in SMC (in Rs. Crores)

Performance Improvement Actions	2013	2014	2015	2016	2017	2018
Implementation of 24X7 system for SMC	3.45	3.45				
Open Defecation Free Satara City	1.46	1.46	7.225	7.225	7.225	3.125
Investible surplus after increasing the revenue	**5.08**	**6.41**	**7.88**	**10.71**	**12.62**	**14.71**
External funds required	No external funding required					
Reference from **Error! Reference source not found.**, *Table 13,* **Error! Reference source not found.** *and* **Error! Reference source not found.**						

Chart 17 Proposed phasing of water and sanitation projects, after undertaking revenue enhancement measures



5.3 Institutional imperatives to achieving proposed improvements

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

Augment staff at SMC: SMC needs to augment its staff as major percentage of the staff comprises non-technical personnel. Across all sectors, SMC require senior management staff for efficient working of these services.

Mobilisation of external support: Additionally, SMC 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 the implementation of proposals related to 24X7 WS requires high technical skills, SMC needs to also bring external support through Project Management Consultants. Arrangements should be made with Project Management Consultants for continued support throughout implementation of the 24X7 project, both immediate and long term.

A summary of the institutional reforms that SMC needs to undertake are given below.

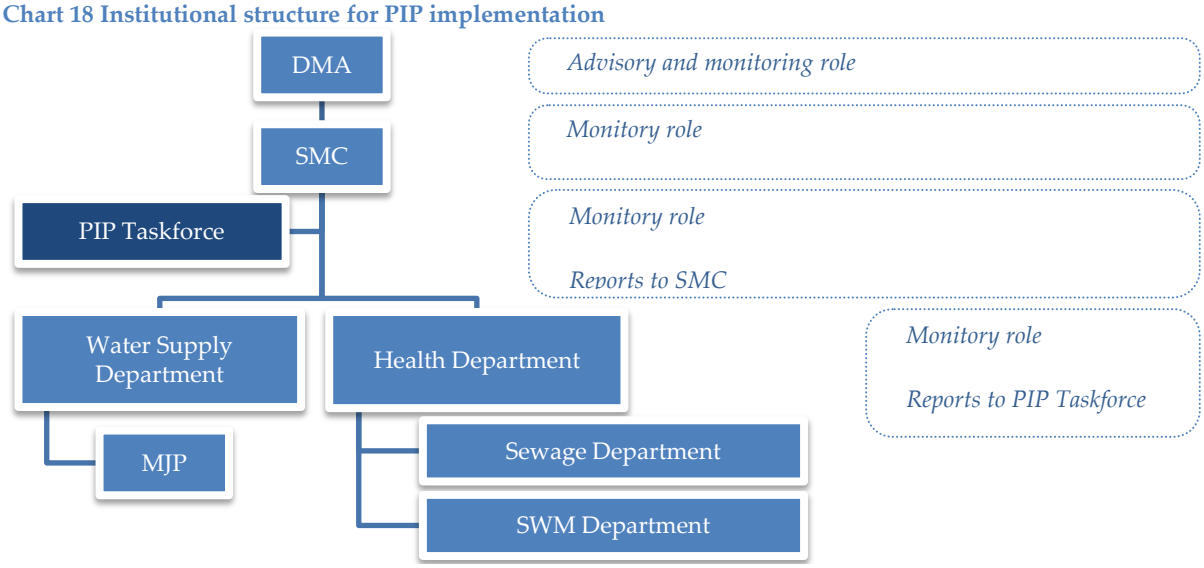
Table 25 Institutional improvements proposed for SMC

Area of improvement	Suggested improvements
Across all sectors	
Human resource management	SMC needs to augment its technical staff in view of proposed projects like 24X7 water supply system and open defecation free SMC.
Equity in service delivery	Introduce policy to improve water supply and sanitation services to slum settlements, as well as un-served areas of the city. Reform institutional arrangements to target and monitor improvement of services in slum settlements.
Financial sustainability	Increase in water supply tariffs, provisions to introduce tariff for SWM, sanitation/drainage tax and Septage management as per Septage management plan.
Consumer redressal system	SMC to maintain records of customer complaints and redressal for all the services and gradually shift to computerised system.

The Council has to also form a PIP taskforce in order 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 is to constitute a PIP taskforce. The taskforce should comprise managerial and technical staff from water supply and sanitation department. 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 Chief Officer and General Body, and annual progress reports to the Urban Development Department (UDD). A broad schematic chart of the institutional

Chart 18 Institutional structure for PIP implementation

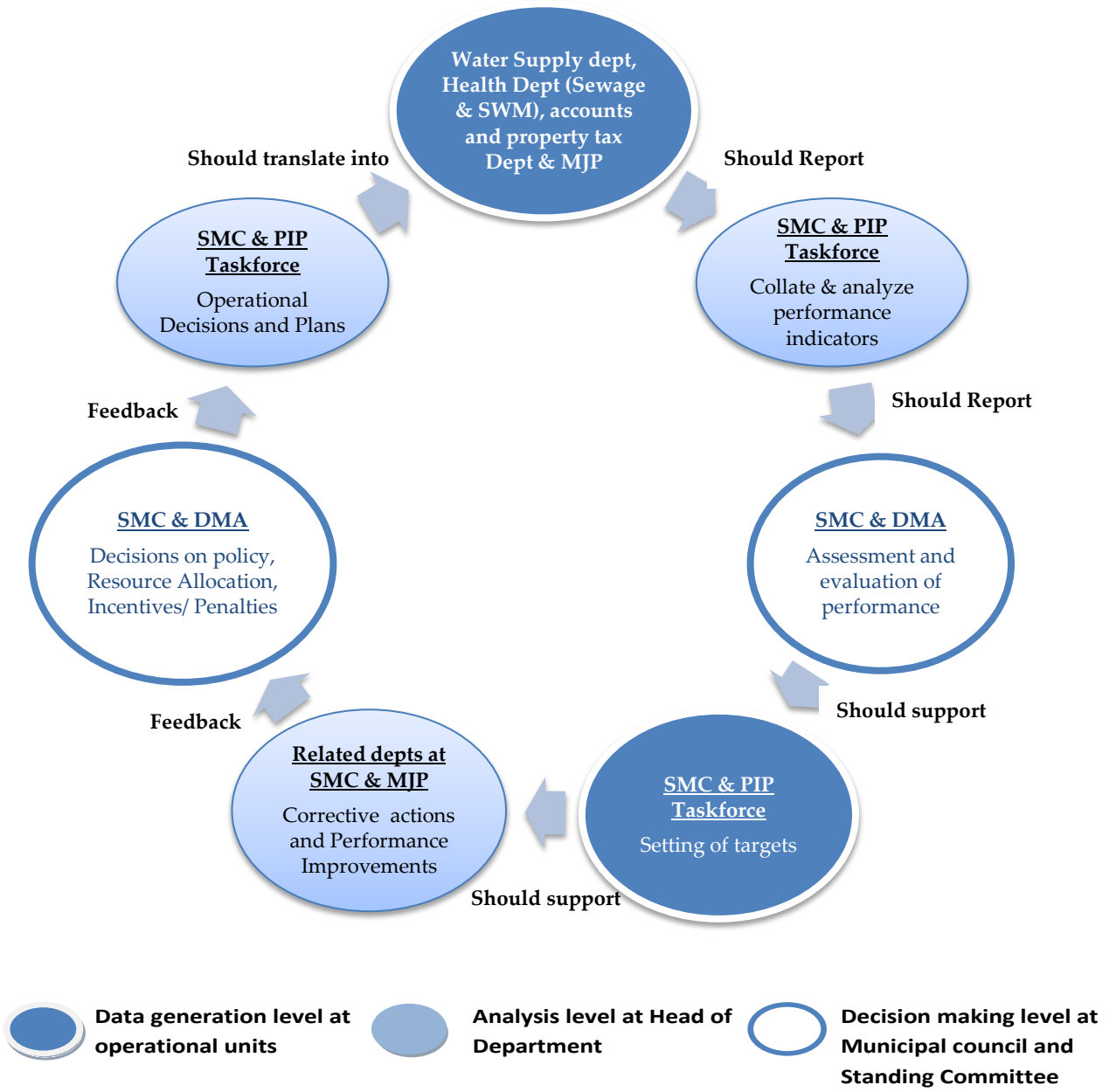


Performance monitoring through regular setting of targets and use of performance indicators: In order to ensure that SMC is able to achieve the performance improvement proposals outlined above, it is necessary that it has a well structured monitoring framework in place. The monitoring aspects will include

- Timely data capture and analysis of performance indicators
- Assessment and evaluation of the progress
- Setting of targets 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 2018, it is necessary for SMC to ensure that through the above process, the targets set for each year is achieved and if required corrective measures need to be incorporated. This will be possible only if the information related to performance indicators are updated and analysed regularly. Similarly, policies to provide incentives and penalties based on their performance needs to be implemented. A possible performance monitoring framework is suggested below.

Chart 19 Performance monitoring framework proposed for SMC. ***Adapted from MoUD***



website: http://www.urbanindia.nic.in/programme/uwss/slb/slb.htm

References

Advisory on Septage Management in Indian Cities: National Urban Sanitation Policy MoUD /Ministry of Urban Development, Govt. of India. - 2011. - June 2012. - http://www.urbanindia.nic.in/programme/uwss/slb/SeptageMgmtAdvMay20.pdf.

City Level Checklist. Performance Assessment Systems for Urban Water Supply and Sanitation for Maharashtra / CEPT University. - 2009 - 2011.

Guidance Notes for Continuous Water Supply (24-7 supply). A Guide to Project Preparation, Implementation and Appraisal MoUD. 2008.

Provision Population Totals of 2011/ Census of India. 2011.. - 2011. - 2012. - http://www.censusindia.gov.in/2011-prov-results/PPT_2.html.

Satara: Assessment of Municipal Finances. Draft Report for PAS Project. CEPT University CRISIL Advisory Services.

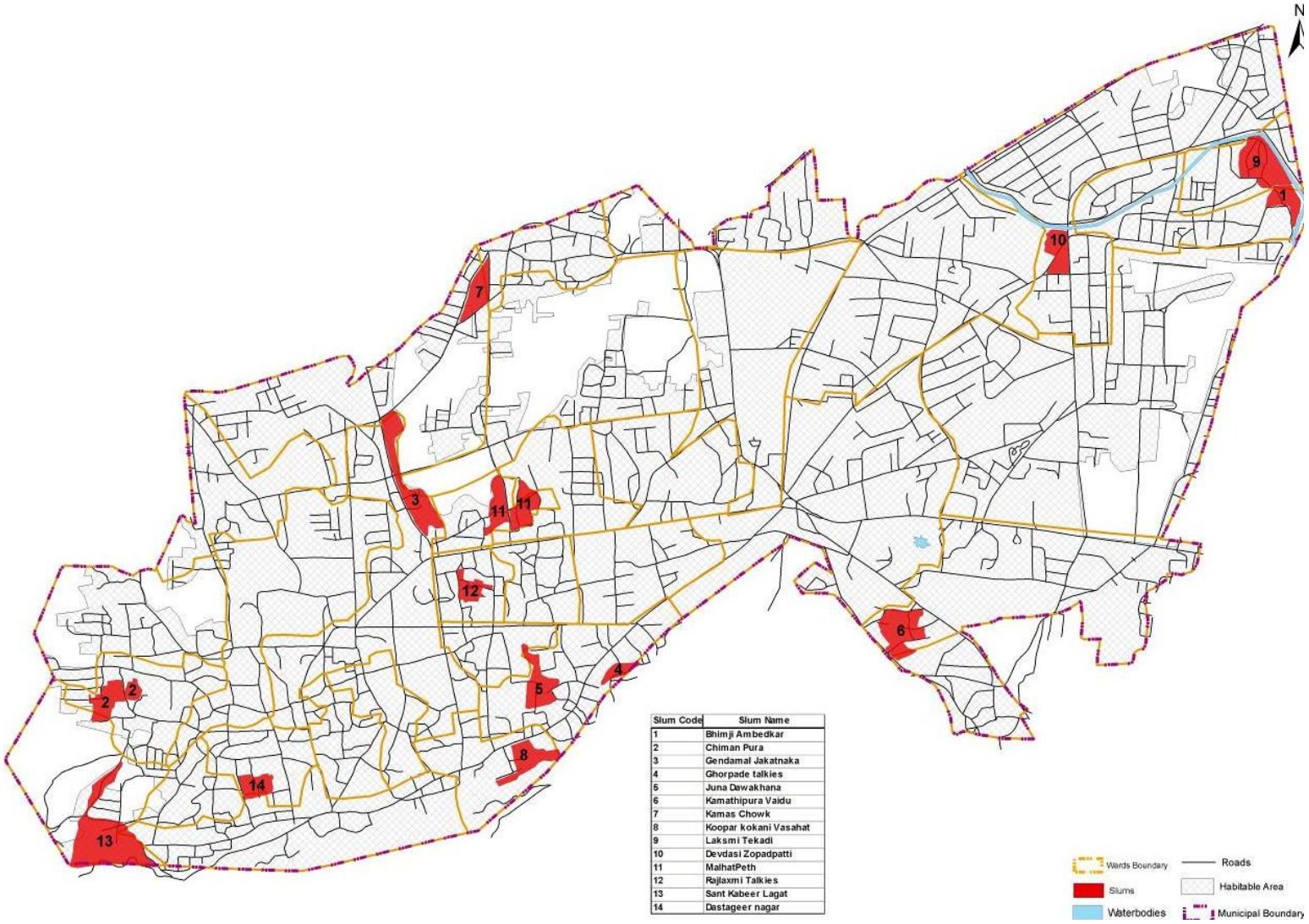
Service Level Benchmarks/ Ministry of Urban Development. Government of India. Web site. - 2010. - June 2012. - http://www.urbanindia.nic.in/programme/uwss/slb/slb.htm.

Settlement Level Checklist. Performance Assessment Systems for Urban Water Supply and Sanitation for Maharashtra / CEPT University. - 2011.

SMC Budget Satara Municipal council Budgets. - 2005-06 to 2011-12.

Annexes

Annex 1 Location of slums in Satara

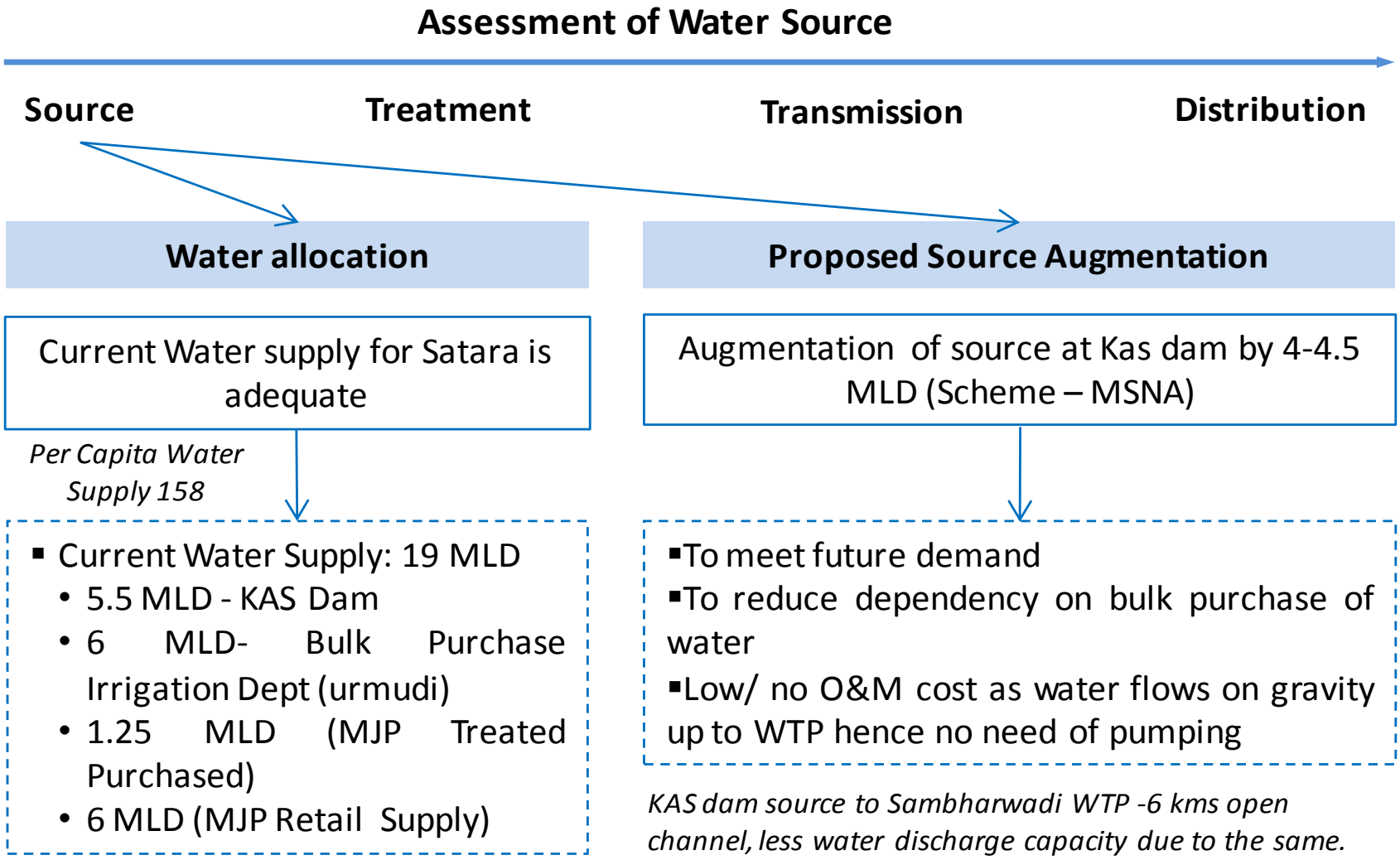


Slum Code	Slum Name
1	Bhimji Ambedkar
2	Chiman Pura
3	Gendamal Jakatnaka
4	Ghorpade talkies
5	Juna Dawakhana
6	Kamathipura Vaidu
7	Kamas Chowk
8	Koopar kokani Vasahat
9	Laksmi Tekadi
10	Devdasi Zopadpatti
11	MalhatPeth
12	Rajlaxmi Talkies
13	Sant Kabeer Lagat
14	Dastageer nagar

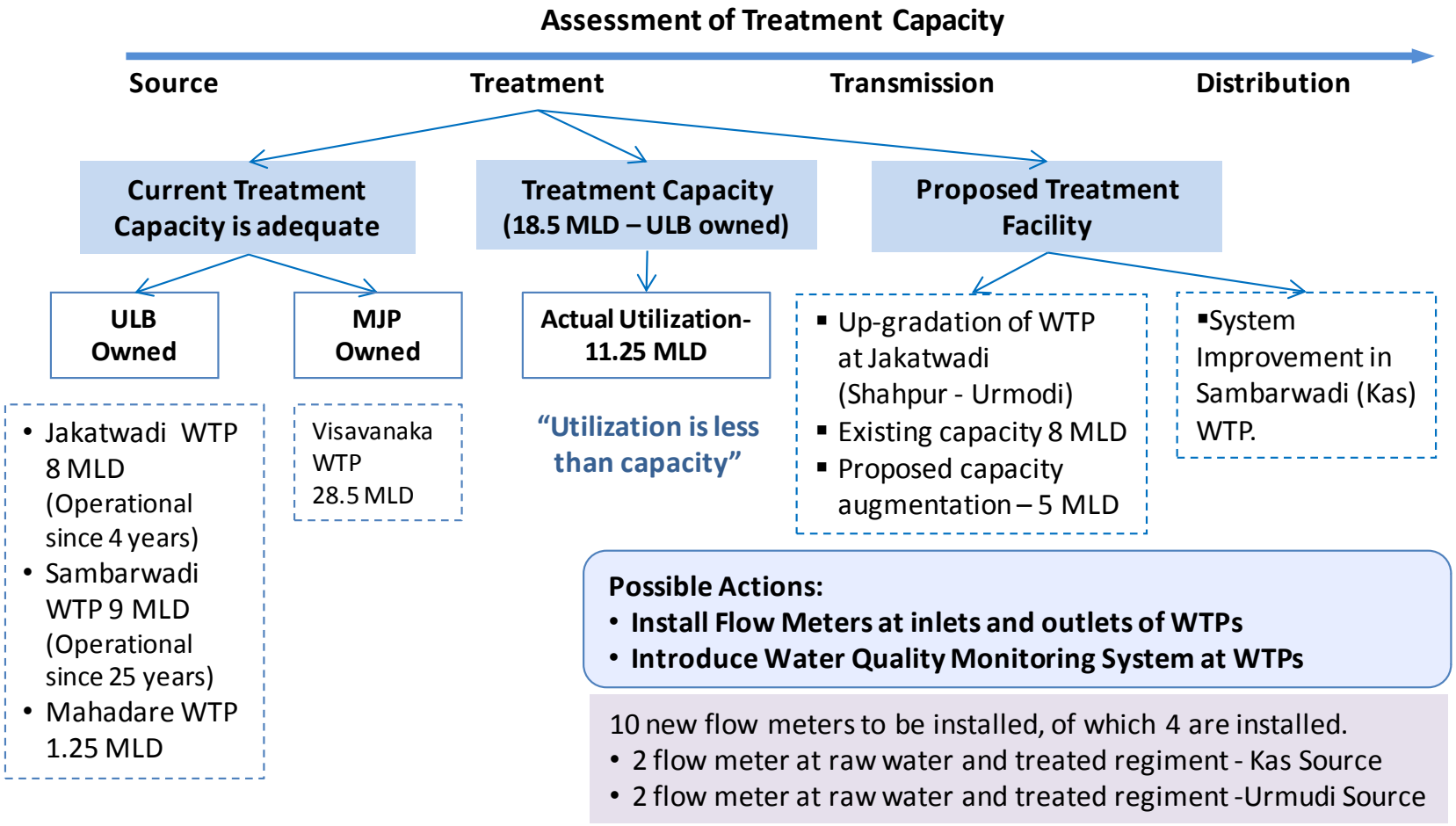
Annex 2 Brief information on slum settlements

Sr. No	Name of Slum	Name of ward in which the slum is located	Total Slum Population	Total Slum HHs	Slum HH size
1	Bhimabai Ambedkar	6	862	174	5.0
2	Chimanpura	20	303	70	4.3
3	Gendamal	15	520	111	4.7
4	Ghorpadetalki Pichadi	28	573	132	4.3
5	Juna Davakhana	31	336	79	4.3
6	Kamathipura	9	438	111	3.9
7	Komati chowk	14	293	60	4.9
8	Koopar Karkhana	32	303	62	4.9
9	Laxmi Tekadi	5	1361	280	4.9
10	Laxmi Tekadi Devdasi Vasti	7	1094	251	4.4
11	Malharpeth	25	687	129	5.3
12	Rajlaxmi Talkies	24	478	97	4.9
13	Santkabeer	38	676	168	4.0
14	Dastageer Nagar	36	450	100	4.5
Total			8374	1824	

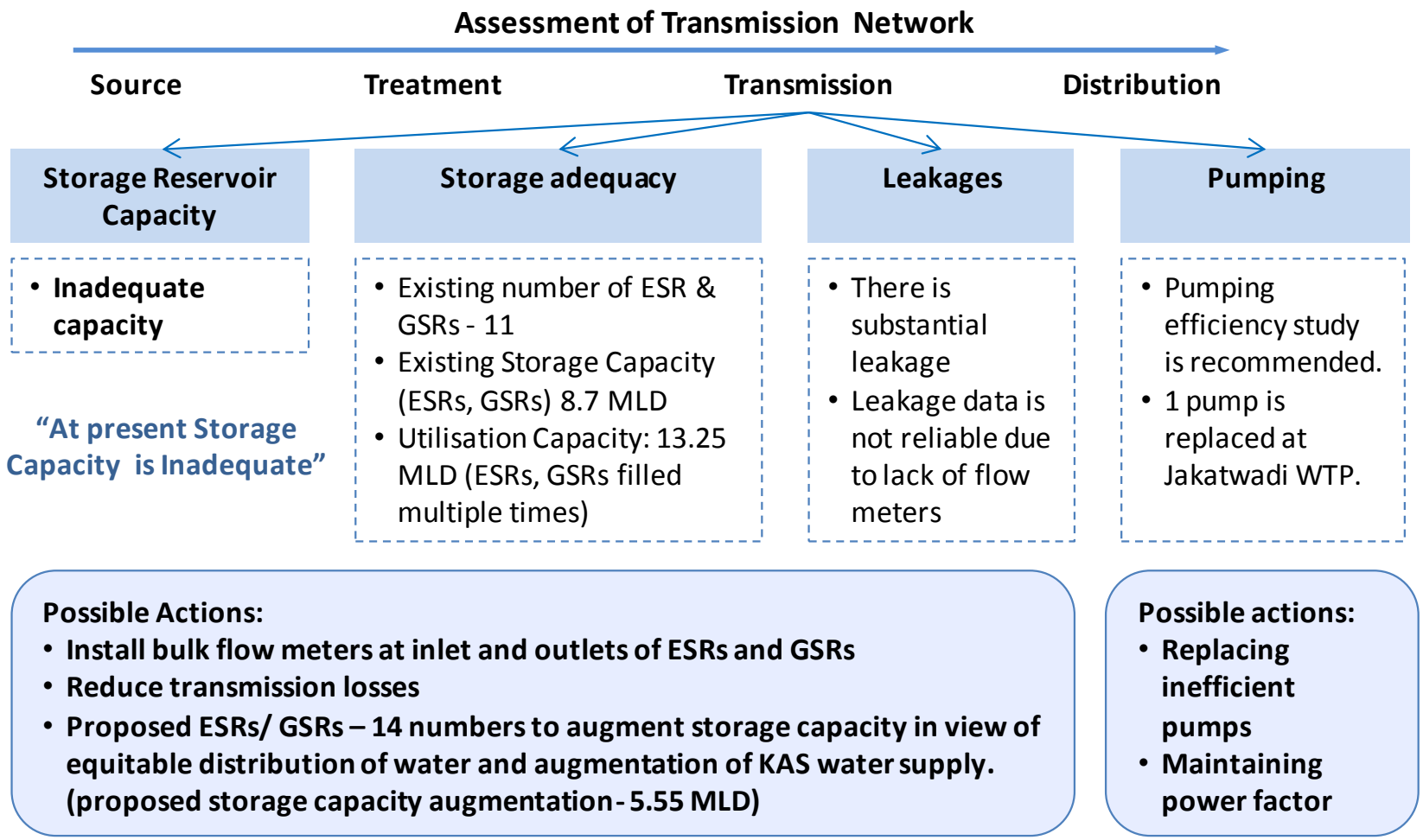
Annex 3 Schematic Diagram of Water Supply Source in SMC



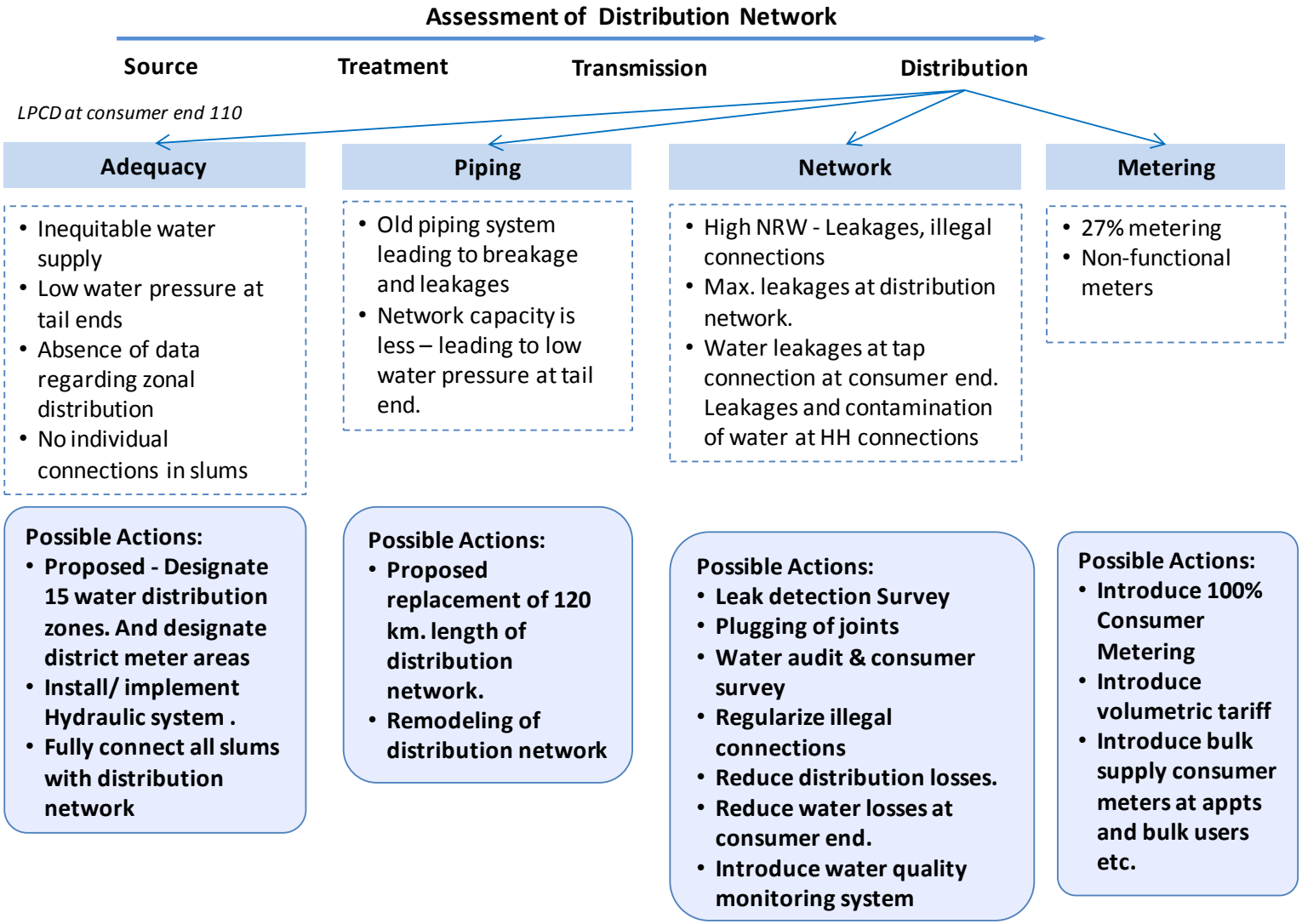
Annex 4 Schematic Diagram of Water Supply Treatment in SMC



Annex 5 Schematic Diagram of Water Supply Transmission in SMC



Annex 6 Schematic Diagram of Water Supply Distribution in SMC



Annex 7 Revenue Income & Expenditure in Water Supply

Items	2005-06 (A)	2006-07 (A)	2007-08 (A)	2008-09 (A)	2009-10 (A)	2010-11 (B)	2011-12 (B)
Revenue Income – Water Supply							
Water Tax	0.99	0.95	1.02	1.25	1.44	2.55	2.5
Water connection fee and other charges	0.02	0.02	0.02	0.02	0.03	0.02	0.02
Total	1.01	0.97	1.04	1.27	1.47	2.57	2.52
Revenue Expenditure – Water Supply							
Administrative and Establishment expenses	0.28	0.27	0.26	0.37	0.29	0.46	0.48
Bulk water	-	0.27	0.62	0.64	0.49	0.42	0.57
Energy expenses	-	0.14	0.85	0.75	0.81	1	1
Other O&M expenses	0.05	0.16	0.42	0.36	0.46	0.62	0.31
Miscellaneous expenses	0.59	0.1	0.09	0.09	0.24	0.12	0.13
Total	0.92	0.94	2.24	2.21	2.29	2.62	2.49
Operating Ratio for water supply	90%	97%	216%	175%	156%	102%	98%
Per Capita expenditure on water supply in Rs/ capita	81	82	193	188	193	218	204
Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)							

Annex 8 Water supply Project under UIDSSMT cost breakup

	Item	Description	Cost in Cr.
Kas Source	Covering of Canal	Converting 6 km open canal into closed pipeline. (currently 6 km open canal and 15 km closed pipeline) *Increase in discharge capacity from 5 MLD to 9 MLD*	8.32
	Water Treatment Plant	Improvement to existing WTP at Sambarwadi	0.59
	Distribution system	Replacement of leading main	1.54
Urmodi Source	Water Treatment Plant	Upgradation to existing WTP at Jakatwadi	1.94
	Pumping works	Raw water Pumping Machinery	0.39
	Connecting Mains	Connecting Main from Kas MBR to Urmodi MBR for equitable distribution of water	0.48
	Distribution system	Replacement of distribution network	0.5
Kas & Urmodi	Storage Reservoirs	Construction of ESRs and GSRs	2.67
	Distribution System	Overhauling distribution network	19.42
		Sub total	**35.85**
Krishna as Source	Water works	Water head works	0.8
	Pumping works	Raw water and pure water pumping machinery	2.31
	Storage reservoirs	Construction of ESRs and GSRs	2.32
	Distribution system	Replacement of distribution network.	18.05
	MBR	Camp area MBR	0.89
		Replacement of leading main	7.61
		Sub total	**31.98**
		Total	**67.86**

Annex 9 Water supply Project under MSNA cost breakup and project status

Project	Details required	Status and Expected completion
Water Audit	Leak detection; identify illegal connections, leaky consumer connections, pipe repairs and replacement. Cost - Rs. 18 lakhs	40% complete (November 2011)
Energy Audit	Survey done by MSNA, at Jakatwadi WTP 3 pumps of 150 HP and 3 pumps Power Factor 75 HP (One pump is replaced) At Mahadare WTP – 2 pumps of 10 HP	100% complete
Flow meter installation	Of 10 electromagnetic flow meters to be installed, 4 flow meter installed, 2 at Raw water and 2 at treated water regiments of Kas source and Urmodi Source	65% complete (December 2011))
Hydraulic Modeling	Continuity of water	30% complete (December 2011)
Computerized billing system		30% complete (December 2011)
Consumer survey & GIS - Digitization & mapping of distribution network		70 % complete (November / December 2011)
Source augmentation - Increasing Kas Dam Height (To achieve 135 lpcd water supply)	Augmenting of water source (project sanctioned March 2011). Increase in Ht- 10.81 m Existing Ht – 17.19 m Proposed Ht – 28 m	
Apart from above mentioned project components (a) consumer end metering, (b) water quality improvement and (c) billing and collection efficiency are also included as a part of UIDSSMT scheme of Satara.		

Annex 10 Interventions with Minimal and Substantial Capital Expenditure (in Crores)

Action	Est. Cost	Remarks
Minimal Capital Cost		
Periodic maintenance of drains (closed as well as open)	0.06	As per existing O&M contract of SMC
Strengthen O&M / cleaning of community/ public sanitation facilities (871 seats) on daily basis #	0.11	As per proposal by SMC for new annual O&M contract of Rs 4.06 lakhs for 300 toilets.
Refurbishment of existing non-functional community toilets (121 seats)	0.24	(Assumption Rs 20,000 - 40,000/ seat for refurbishment)
Make provision of adequate water in community/ public toilets (122 toilet blocks)	0.12	(Assumption Rs 10,000 / toilet block for water supply connection and water tank)
Construction of sludge treatment facility	***	Negligible cost. This can be taken up with solid waste landfill site.
Undertake necessary IEC measures on use of toilet facilities	2.4	(Assumption Rs 100/person for IEC campaign and Rs 100/person for HH survey)
Total	**2.93**	
Substantial Capital Cost		
Construction of covered drains in un-served areas (1.3 sq km) (Intermediate solution)	11.4	(Assumption Rs 30 lakhs/ km for constructing closed drains) (Assumption 30 km drainage network/ sq km area) Thus 38 km covered drainage network to be constructed to cover 1.3 sq km area.
Procurement of suction emptier trucks.# (6 no. with 5000 liters capacity each)	0.9	(Assumption Rs 15,00,000/suction emptier of 5000 liters capacity)
Upgrading open drains (125 km) to covered drains. (Intermediate solution) #.	12.5	(Assumption Rs 10 lakhs/ km for upgrading open drains to closed drains)
Total	**24.8**	
#Action under consideration by Satara Municipal Council **Action proposed under 'National River Conservation Programme', GoI, sanctioning of DPR on conventional sewerage & ASP STP is awaited.*		
In addition to this 10% increase in cost to be considered for Satara as per MJP DSR Pune Region 2010-11 as Satara falls under Hilly areas		

Annex 11 Projected investment capacity – After revenue enhancement measures (Rs. In Crores)

Year	Investible surplus	Increment due to improvement in property tax collection	Increment due to tariff revision and improvement in water charges collection	Investible surplus after revenue augmentation measures
Budgeted				
2010-11	(6.57)	-	-	(6.57)
2011-12	(2.02)	-	-	(2.02)
Estimated				
2012-13	3.30	1.48	0.30	5.08
2013-14	3.48	2.44	0.49	6.41
2014-15	3.66	3.51	0.71	7.88
2015-16	3.84	5.72	1.15	10.71
2016-17	4.02	7.15	1.44	12.62
2017-18	4.21	8.73	1.76	14.71
2018-19	4.39	11.94	2.41	18.74
2019-20	4.58	12.66	2.56	19.79
2020-21	4.77	13.41	2.71	20.89
2021-22	4.95	16.04	3.24	24.23
Source: (Satara Municipal council Budgets, 2005-06 to 2011-12)				

The Performance Assessment System (PAS) Project

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

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

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PAS Project

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

Tel: +91-79-26302470
Fax: 91-79-26302075
www.pas.org.in

pas performance assessment system

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