



Tata Institute of
Social Sciences

STATUS OF RURAL WATER SUPPLY IN MAHARASHTRA

Tata Institute of Social Sciences, 2015

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Abbreviations

APL	: Above poverty line
ARWSP	: Accelerated Rural Water Supply Program
BCM	: Billion Cubic Meters
BPL	: Below Poverty Line
BRC	: Block Resource Center
BW	: Bore Wells
CAG	: Controller and Auditor General
CCDU	: Communication & Capacity Development Unit
DFID	: Department for International Development
DISE	: District Information System for Education
DLHS	: District level household survey
DW	: Dug well
DWSM	: District Water and Sanitation Mission
ESR	: Elevated service reservoir
FC	: Fully covered
FGD	: Focus Group Discussion
FTK	: Field Test Kit
GoI	: Government of India
GP	: Grampanchayat
GR	: Government Resolution
GSDA	: Groundwater and Survey Development Agency
GSR	: Ground level service reservoir
HH	: Household
HRD	: Human Resource Department
ICDS	: Integrated Child Development Services
IEC	: Information Education and Communication
IMIS	: Integrated Management Information System
Lpcd	: Litre per capita per day
MDWS	: Ministry of Drinking Water and Sanitation
MIDC	: Maharashtra Industrial Development Corporation
MIS	: Management Information System.
MJP	: Maharashtra Jeevan Pradhikaran
MoU	: Memorandum of Understanding
NC	: Not covered
NGP	: Nirmal Gram Puraskar
NRDWP	: National Rural Drinking Water Programme
O&M	: Operation and maintenance
OBC	: Other Backward castes
OT	: Orthotolidine
PC	: Public Contribution
Ppm	: Parts per milligram
PRI	: Panchayat Raj Institutions
PWSS	: Pipe water supply scheme
RRWSS	: Regional rural water supply schemes
RSPMU	: Reform Support and Project Management Unit
SBM	: Swaccha Bharat Mission
SC	: Schedule Castes
SGBSA	: Gadge Baba Swachhata Abhiyan
ST	: Scheduled Tribes
TCL	: Tropicalised Chloride of Lime
TDS	: Total Dissolved Solids
TSC	: Total Sanitation Campaign
VWSC	: Village Water Supply and Sanitation Committees
WASH	: Water, Sanitation and Hygiene
WSSD	: Water Supply and Sanitation Department
ZP	: Zilla Parishad

Executive Summary

1. About the Report

This report is an outcome of the field study conducted to assess the status of rural water supply schemes in Maharashtra. The Ministry of Drinking Water and Sanitation (MDWS), Government of India assigned the task to conduct a third party evaluation to Tata Institute of Social Sciences. The objectives of the evaluation study are as given below;

- To study status of the water supply systems in selected Gram Panchayats in Maharashtra (including the Anganwadis and schools in the GPs).
- To assess the functionality of water supply systems in the selected Gram Panchayat, Anganwadi and schools in Maharashtra.

2. Methodology of the Study

In order to conduct the evaluation based on the aforesaid objectives, all the 6 divisions in Maharashtra viz Pune, Nagpur, Aurangabad, Konkan, Nashik and Amravati were covered. To get a representative sample from each division, two districts were studied from each division. In each district, four GPs and in aggregate 48 GPs were selected for the study. The selection of districts and the GPs were based on multi-stage sampling to get adequate representativeness of GPs. The stratification criteria are as follows:

- 24 GPs were selected from a pool of villages which had a population size of more than 2000 population and remaining 24 GPs were selected from pull of villages with population size with less than 2000.
- Four GPs were selected from coastal area of Konkan and Sindhudurga.
- 12 GPs were chosen from Tribal area of Yavatmal, Chandrapur and Bhandara districts.

This evaluation study in Maharashtra had been conducted using four methods:

- An infrastructure inspection and evaluation of the physical community water system to assess

the functionality, maintenance & sustainability.

- Village-level survey, which included gathering detail information of process of chlorination, operation and maintenance of piped water supply scheme, institutional structure, financial management etc.
- A household survey through canvassing questionnaire consisting questions related to water and sanitation facilities, practices related to drinking water and sanitation and through observing general hygiene behaviors. In total, 960 households were covered in 27 GPs of the study area, which works out to 10% of the population.
- Focus group discussion with PRI members, VWSC members, including waterman and Gramsevak.

3. Findings and Observations

3.1 Profile of Households Surveyed

Household survey was conducted in 27 GPs of the 48 GPs selected for the study. Data from 960 households were collected from the study area. The caste composition of the study villages as follows: 37.8% belongs to BC, 21.7% belongs to SC, 13.3% belongs to ST, rest 27.2% belongs to Others.

According to our study, among the households surveyed, 59.9% were identified as APL households, 34.1% households were identified as BPL households, and the remaining 6% households were identified as Antyodaya.

The primary occupation of head of household of 45.1% households was farming. Another 41% households' head were engaged in wage work both in agricultural and non-agricultural work. The education profiles of head of the household's show that 28.9% were illiterates, 34.9% had gone to primary schools, 33% had gone to high/higher secondary schools and 3.2% were graduates and above.

3.2 Village Level Institution

In the study, out of the 48 GPs in 12 districts covered, it was found that in 87.5% GPs had formed VWSCs to manage water supply schemes. According to the guideline, 50% representation of women members in the VWSC is mandatory. However, in the study, it was found that only 20.8% GPs had VWSCs with 50% or more women members. While, 58.3% of GPs had women representative in VWSCs in the range of 25-49% and 8.3% GPs had less than 25% women representatives respectively.

It was observed that only 37.5% of GPs had conducted regular VWSC meetings in the last financial year. However, the practice of recording minutes of VWSC meetings was observed to be very poor. It was found that only 18.8% of GPs across the 48 GPs surveyed had recorded the minutes of VWSC meetings held, and over 68.8% of GPs had not recorded the minutes of VWSC meetings at all.

Only 20.8% GPs reported that the VWSC members had received training from BRC/DWSM or from any other agency nominated for this purpose at the moment. Absence of training to VWSC members was cited as one of the reasons for its ineffectiveness of VWSCs.

The general perception amongst the GP members is that the VWSC is formed because there is a statutory requirement of formation of VWSC whenever a new water supply scheme is to be implemented.

It is found that elected representatives were felt threatened to back the functioning of VWSC as provision of water is an important agenda even for them to take up the political mileage. They felt that the formation of VWSC was a threat to their existence and in the process they might get sidelined.

Furthermore, the elected representatives were not very keen to collect water tariff from people due to the fear of backlash in the following elections. The lack of availability of fund adversely affected O&M of the water supply scheme.

3.3 Drinking Water Sources

PWSS : In this study, status of Piped Water Supply Schemes (PWSS) serving one or more habitations in the GPs and Regional Rural Water Supply Schemes (RRWSS) were collected. The data of 38 PWSS and 10 RRWSS schemes collected are presented and analysed in this section.

It was found that 5 schemes were based on bore wells, 30 schemes were based on dug wells, 13 schemes were based on surface water (out of this, 1 scheme was linked to a bulk water supplied by MIDC). Out of these 48 schemes, 28 PWSS schemes were functioning, while 6 were not-functioning and 14 were in partial functioning condition.

In the study area, only one scheme was found to have metered water connections, and rest of the 41 functional schemes had non-metered connections. The lone metered scheme was in Rajewadi GP in Raigad District of Konkan. A water tariff of Rs.8 per 1 KL is collected in Rajewadi. Also, over 25 schemes studied had standby pumps for providing uninterrupted water supply.

Minor repairs of 22 Schemes were reported to be rectified within a day. However, for rest of the 20 schemes, for 10 schemes it was reported to be taking 2-3 days duration, while for the other 10 schemes it took more than 3 days on an average for repairing such faults.

Out of the 42 schemes, rising mains of 6 schemes were reported to be not laid properly. It was found that pipelines were exposed and not buried below the ground, and as a result these pipes which are laid on the roadsides and agricultural fields get damaged frequently. Leakages in rising main of PWSS were reported in 10 schemes. It was reported that leakages from rising main occur due to poor workmanship, use of substandard pipes and improper design.

Due to lack of timely maintenance, quality of constructions of GSR/ESR of 8 schemes was in very poor condition. Also, Major leakages of water from GSR/ESR were reported in 11 schemes.

It is reported that water distribution pipes of 36 schemes were prone to contamination. In addition, 5 schemes were reported to be having major leakages in the distribution pipes. In these GPs, distribution lines and water connections given to houses from it are laid in unsafe manner, often joints of these pipes are exposed inside wastewater drains. The risk of contamination of water increases many fold when these open drains are used for open defecation or for discharging wastewater from septic tanks.

Other Water Sources : Status of hand pumps and dug wells in the GPs covered under the study was collected to understand their functioning and availability of water in summer. In the GPs covered under the study, it was reported that 75.3 % of the 400 hand pumps are functional. However, it is striking that 62.7% hand pumps were reported to have inadequate water in summer. About 91.2% of the 102 dug wells present in the study area are reported to be functional. However, only 48% dug wells are reported to have water in summer months.

Coverage Status : In this analysis, 146 habitations of 48 GPs have been studied. In total, there were 187 habitations in the GPs. As per the IMIS data, there were 89.7% fully covered and 10.3% partially covered habitations in the study and no habitation was reported uncovered. However, in the field study, it was found that 70.5% habitations were fully covered, 23.3% habitations were partially covered and 6.2% habitations were not covered.

Although, the findings of the study reveal a good level of achievement in providing water supply in the State of Maharashtra, recurring droughts and poor ground water availability pose serious challenges for water supply. In summer, taking private wells which are having water in summer months on lease for supplying water is reported to be an alternative arrangement to augment water supply, in addition to use of tankers for supplying water in drought affected GPs.

Improvements in water supply status are quite feasible. The goal of achieving supply of water 24x7 seems to be a distant dream for many GPs as of now. Also, issues like practice of defaulting payment of water tariff among users, reluctance of elected GP members to pursue water tariff

collection, and the practice of manipulation of income and expenditure for showing efficient functioning of schemes by the GPs, calls for new insights and corrective steps as these issues have long term implications on the functioning of water supply schemes.

3.4 Access to Water Sources at Household Level

Type of Water Source (HH) : Across the 960 households surveyed, 63.8% households used water from PWSS (i.e. household tap connections and community standposts), 22.5% households use hand pumps, 1.5% use dug wells and 12.3% use their own source.

Access to Water Sources : It is observed that 43.3% households had individual household tap connections, 39.4% households used public water sources within 500m distance, 5% households use public sources located at a distance of more than 500m and 12.3% households had their own water source at homes.

Frequency of Water Supply : 68.9% households informed that they received water daily, 12.5% households received water every alternate day and 18.6% households received water once in 3 or more days.

Impact of Water Supply : To the question on reduction in the distance travelled because of the current water supply scheme in the habitation, 39.1% households reported that the reduction in distance was less than 200m, 30.2% household reported that the distance was between 200 and 500m, 4.2% households responded that it was more than 500m and 26.5% felt that there was no change in the distance travelled by them.

On improvement of water supply situation due to installation of new water schemes, 66.8% households reported that the new scheme had, indeed, improved the water supply. Among these households, 54.8% of households reported the availability of adequate quantity of water to be the primary reason for their opinion.

The proportion of households who expressed satisfaction over the water scheme includes SC-62.5% (out of 128), ST-52.4% (out of 208), BC-75.5% (out of 274) & General-68.2% (out of 261).

3.5 Water Quality

Awareness of Water Quality Tests Conducted: 60.4% GPs reported that they were aware of regular tests being conducted for the bacteriological parameters, while 56.3% GPs reported that they are aware of the regular tests for the chemical parameters of water sources. However, responses of the GP members with regard to water quality of drinking water sources for bacteriological and chemical parameters revealed that they are mostly ignorant of the results of water quality tests being conducted time to time.

62.5% GPs reported regular use of chlorine and treatment of water sources. About 72.9% of Jalsurakshak in the 48 GPs reported that they were aware of chlorination procedure and protocols of handling. In the study, it was found that only 47.9% GPs had OT test kits and only 16.7% GPs conducted it regularly. It was found that most GPs did not have the chemical required to perform the OT tests.

Household Water Treatment : It was observed that awareness with regard to the quality of water being used for drinking purposes was at a negligent level among the surveyed households. Water quality aspect is given consideration only when there is any physical contamination like presence of mud or dirt by the households.

Point of use water treatment is almost non-existent at the household level. Around 75.3% households never used any kind of water treatment processes at home. Occasional use of chlorine at home for treatment of water especially in monsoon season was reported by 24.3% households. Only 0.2% of households reported the use of boiled water, while the same number of households reported the use of advanced water filters for water treatment at house level.

The IMIS data for water quality tests conducted in drinking water sources of 39 GPs shows that at-least one of the sources is contaminated either bacteriologically or chemically. Presence of chemical parameters such as fluoride, nitrate, iron, hardness & chloride more than the permissible limits were reported. This situation reflects the need for more attention towards addressing water quality related problems.

3.6 Financial Aspects of Water Supply Schemes

Household Water Connections: In all the 42 GPs which had functional PWSS, the number of households with water tap connections was collected to understand the level of service. For the entire study area, 15.3% GPs reported households with 80% and above tap connections, 23.7% GPs reported 50-80% tap connections are 21.3% GPs reported 25-50% tap connections and 39.7% GPs reported less than 25% tap connections.

Water Tariff Collection : Frequency of water tariff collected reveals that 67.8% of GPs collect water tariff once in a year while the rest of 32.2% of GPs reported collection of water tariff on a monthly basis.

The percentage of water tariff collection during the last financial year in 31.8% GPs is 80% and above, in 33.7% GPs it is 50-80%, in 24.9% GPs it is 25-50% and in 9.6% GPs it is less than 25%. Konkan division had the maximum number of GPs (62.5%) collecting water tariff in the range of 80% and above.

Financial Management : Ability to pay electricity bills and salary of Jalsurakshak has always been an issue for the GPs due to inadequate funds. On an average, it was observed that only 32.5% of GPs pay electricity bills and 73.4% GPs paid salary of Jalsurakshaks regularly in the study area.

Based on the water tariff collected and actual expenditure, it was found that only 20.5% schemes in the GPs studied were able to meet the expenditures incurred for management of the water schemes with efficient water tariff collection. Even if the GPs were able to collect 100% of water tariff (demand) based on the current tariff structure, it is observed that only 48.8% schemes in the GPs can meet their current maintenance expenditures of water supply schemes. Therefore, there is a need to revisit the water tariff structure.

Lack of capacities among VWSCs and GPs to motivate users to actively participate in the management of water supply schemes was reported to be one of the reasons for the poor performance of schemes, especially on the financial management front.

In addition to special drives to increase awareness and participation of people on the need for effective management and water tariff collection, field level support and training by the BRCs/DWSMs on O&M and financial management aspects are also need to be undertaken at regular intervals.

3.7 Household Sanitation

Household Toilets : Household toilet coverage in the study area was 44.6% of 960 households surveyed. Only 40.2% of households reported that they have a functional toilet. The usage of toilets by households was not assessed as it is always misleading.

Analysis of 428 households who had built toilets based on their social status was carried out to understand its distribution among different social groups. The households who had toilets according to social status were SC 11.7%, ST 20.8%, BC 38.1% and General 30.4%.

It was observed that 65.9% households had water sources within the house premises were observed to have built toilets while only 35% households which depended on common water sources had built toilets. In other words, this suggested that the chance of building a toilet doubles with the availability water source within the dwelling area of the households.

Of all GPs 42 GPs, 16 GPs received the NGP award before 2012. However, according to the IMIS baseline data for 2012, households in 13 GPs did not have 100% toilet coverage. The 3 GPs which were still maintaining the open defecation free status in the study are from the Konkan division. This status was also confirmed by team during field visits to these GPs as well.

3.8 WASH Facilities in Schools & Anganwadis

Water Supply in Schools : Of the 45 schools covered under the study, 91.1% schools had provision of water sources and only 8.9 % schools lacked any sort of water source within the school premises. About 53.3% schools had tap connection from PWSS, while 20% had handpumps, 15.6% had borewells with motor and 2.2% had dugwells as the water source.

In addition, responses on availability of water round the year in schools show that only 71.1% schools had water in all seasons. This reveals

that over 20% schools had water source drying up in summer in addition to 8.9% schools which did not have any sort of water source in schools.

Hand Washing Facility : In the study, it was found that none of the schools had a dedicated hand washing station. However, facilities such as bucket and mug was available in 4.4% schools, use of outlet taps provided in ground level storage tanks in 26.7% schools and hand pumps in 17.8% schools were being used as hand washing facility.

School Sanitation : It was observed that 97.8% schools surveyed had toilets, only 62.2% of them were functional at the time of survey. Major reasons observed are lack of water and absence of regular maintenance of toilets.

Only 6% schools had some basic provision for assisting children with special needs in the toilets. In the study, it was found that a western type toilet or a commode chair over Indian type toilet seat was provided to assist students with disability. However, provision of ramp with hand rails, wheel chair access inside the toilets and handles which provide support within the toilets were absent.

Anganwadi : 75 Anganwadis were covered in the study. Only 68% of Anganwadis had water sources within their premises. Water sources provided in Anganwadis include; bore wells with motors in 10.7%, hand pumps in 17.3% and tap connection in 40%.

76% Anganwadis were observed to have toilet facilities within the premises. However, out of 75 Anganwadis surveyed only 46.7% Anganwadis had functional toilets. Baby friendly features provided in toilets were observed only in 50.7% Anganwadis surveyed.

4. Conclusion

The status of water supply in Maharashtra can be considered as satisfactory in terms of coverage at the habitations and in terms of service at the households. The State which adopted the reform processes ahead of many other States in the country, has been steadily implementing various steps to improve water and sanitation services in rural areas. However, it can be argued that there is tremendous scope for improvement.

1

INTRODUCTION



1.1 Administration and State Profile

The State of Maharashtra is one of the most industrialized with strong social and economical growth. The State is divided into 6 administrative divisions, namely Konkan, Pune, Nashik, Aurangabad, Nagpur and Amravati. The State has a total of 36 districts and 353 blocks. Out of these, Mumbai and Mumbai Suburban are two urban districts and the remaining 34 are rural districts. A basic summary of the State is as follows :

- Capital – Mumbai
- Administrative Divisions - Six
- Districts – 36 (Rural 34, Urban 2)
- Block Panchayats – 353
- Gram Panchayats – 27,918
- No of Habitations – 86881



Figure 1: Map of Maharashtra

1.2 Demography

As per the Census 2011, the State has total a population of 11.24 crores. It was 9.69 crores in 2001. Between 2001 and 2011, the population growth rate was 15.99%. The population density is 365 persons per sq. km in 2011 as against 315 in 2001 in Maharashtra. The share of urban population increased from 42.4% in 2001 has increased to 45.2% during 2011. This indicates to a pattern of urbanization in the State.

The key socio-demographic characteristics of the State are summarized below :

- Decadal growth rate of Population (2001-2011) – 15.99%
- Sex ratio (Census 2011) - 929
- Population density (Census 2011) – 365 per sq.km.
- Literacy rate (Census 2011) - 82.3%
- Female literacy – 69.9% & Male literacy – 88.4%
- IMR (SRS 2013) - 24
- MMR (SRS 2010-12) – 87

1.3 Geography and Geology

The State is located between the longitudes 72° 30' 00" to 80° 30' 00" and latitudes 15° 40' 00" to 22° 00' 00". The State is spread over a land area of about 30.77 million hectares, and it is the third largest in the country in terms of land area. It has a coastline of 720 km which stretches between Daman in the North and Goa in the South. It's surrounded by Gujarat and the Union Territories of Daman, Dadra and Nagar Haveli in the North-West; Madhya Pradesh in the North; Chhattisgarh in the East; Andhra Pradesh in the South-East and Karnataka and Goa towards the South of Maharashtra. The physiographically Maharashtra can be classified into the Western Coastal tract (the Konkan), hill ranges of the Western Ghats, which run in a North-South direction parallel to the Western Coast and the eastern area called the Deccan Plateau.

The geology of Maharashtra is famous for the Deccan Traps, which occur in all the districts of the State, except Bhandara, Gondia and Gadchiroli. Nearly 81.5% of the geographical area of the state is occupied by the geological formation of the Deccan Plateau. The other formations include Quaternary Alluvium, Gondwana Rock, Proterozoics and Precambrian basement.

1.4 Surface & Ground Water Resources

Rainfall differs widely between various regions of the State. The Western Ghats and coastal districts receive an average annual rainfall of 2000mm, while the large part of the State lying in the rain shadow area receives an average rainfall of 600 to 700mm. The State

receives about 85% of its rainfall from the South-West monsoon during June to September. The 75% of drainage of the State's area chiefly occurs through the eastward flowing rivers Godavari and Krishna to the Bay of Bengal and the rest of the area drains into the westward flowing rivers like the Narmada, Tapi and coastal rivers in Konkan rivers to the Arabian Sea.

The state is divided into 5 major river basins namely, Godavari, Krishna, Tapi, Narmada and west flowing rivers of Konkan coastal strip. Annual average water available yield for entire the State of Maharashtra drained by above river basins is about 163820 Mm³. The four river basins in the Western Ghats namely Krishna, Godavari, Tapi and Narmada contribute 55% of the dependable yield. These four river basins comprise 92% of the cultivable land and more than 60% of the population in rural areas. The rest of 45% of state's surface water flows through the west flowing rivers emanating from the Ghats and drains into the Arabian Sea, which is not utilised due to geological constraints.

Availability of ground water in the State is limited because of the hard rock presence over 92% of its area. Other factors which influence limitations in the availability of ground water are the peculiar physiography of the region and wide variations in the rainfall. The State's estimated rechargeable fresh groundwater resource is about 33.95 BCM and the net available ground water is about 32.15 BCM. The present gross groundwater draft for all purposes is 17.18 BCM. The Stage of groundwater development for the State, as whole, is 53%. This indicates that on an average 53% of yearly replenishable groundwater is being used in the State. Out of 353 Talukas, 325 are categorized as Safe, 16 Semi-Critical, 2 Critical and 10 Over-Exploited (GSDA, 2014).

1.5 Rural Water Supply Programmes in Maharashtra

The responsibility of provision water and sanitation lies with the State Governments, however Government of India (GoI) provides support in policy development and also meet financial requirements to implement programmes. The Accelerated Rural Water Supply Program (ARWSP), launched in 1972, has resulted in significant improvements in the water

supply. The ARWSP, which was aimed to provide water supply coverage to all habitations by the end of Eighth Plan (1992-97), continues to provide the basis for rural water supply (Cullet, 2009).

With the increasing number of habitations has not been covered, GoI revised the guidelines of ARWSP in 1999 to pilot sector reform process in the water sector. These pilot projects were designed to implement the demand driven approach and replace the old supply driven mode of water supply. The reform process scaled up across the country under the Swajaldhara guideline introduced in 2002. In 2005, the Bharat Nirman Programme was launched by GoI with special thrust on covering over six lakh habitations across the country.

However, to tackle the issues plaguing rural water supply coverage, such as slippages of covered habitations and increasing number of water quality affected habitation; the National Rural Drinking Water Programme (NRDWP) was launched in 2009. The NRDWP guideline aims to bring community driven decentralized approach to tackle these issues (NRDWP, 2010). The programme aims to increase the service levels of rural water supply with households as the primary unit to determine coverage, which is a major shift from the earlier policy of habitation as the coverage unit. In addition, water safety has been accorded importance in the guideline to ensure sustainability of drinking water sources.

In Maharashtra, the water supply programme has evolved over a period of time with several stages of innovation and experimentation. The notable milestone in the State's water sector began in 1990s, wherein large number of habitations was dependent on tankers for water supply in the State. As a consequence, to address the issue, focus on large regional rural water supply schemes (RRWSS) were undertaken with massive financial investments till the late 1990s (Sangameswaran, 2010). In this period, the master plan era as popularly known, large number of RRWSS failed to take-off due to financial and operation and maintenance (O&M) related issues. The chronology of rural water supply and sanitation schemes in Maharashtra is summarized below;

Table 1 : Chronology of drinking water schemes

Description	Period	Highlight
Dug Well Era	1960-70	<ul style="list-style-type: none"> • Providing dug wells • Mainly manual drawing
Bore Well era	1971-85	<ul style="list-style-type: none"> • Borewell digging technology introduced. • Provided hand pumps and power pumps on bore wells. • As on date 2.2 lakh HPs and 14,000 PWSS schemes functioning in the State. • Large scale digging of BWs for irrigation purpose (@ 20 lakhs BW @ 90,00 community DWs.
Rural Piped Water Supply	1985-97	<ul style="list-style-type: none"> • Increase in PWSS in rural areas based on surface water source • First World Bank project with 17 single village, 47 multi village schemes • White paper on drinking water supply was published in 1995 to set direction to the plans and programs to solve the drinking water problems • DIFID project building 3 regional schemes
Master Plan Era	1997-2000	<ul style="list-style-type: none"> • Highest expenditure for regional and single village piped water supply schemes • 1907 schemes commissioned
The Policy Reform Era	2000 & afterwards	<ul style="list-style-type: none"> • First State in India to adopt state wide new reform policy • Demand driven approach to deliver rural water supply and sanitation service delivery • Use of participatory processes • Adoption of 10 % capital cost and 100% O&M sharing by beneficiaries • Beneficiaries to participate in planning, design and implementation • Emphasis on women involvement in VWSCs and decision making for rural water supply and sanitation • 3 pronged strategy adopted – conservation, preservation and utilization • Well designed IEC campaigns • Independent monitoring and evaluation by third parties • Human resource development at village level

(Source: WSSD, 2003)

Later, based on the Sukthankar Committee report in 2000, the focus shifted from RRWSS to single village piped water supply schemes (PWSS) as an alternative. At the same time, based on the experiences of piloting the sector reform projects from 1997, the State adopted the sector reform agenda in water supply in 2000, the first state in India to do so. The notable other demand driven projects ever since

implemented by the states are the German KfW funded – Aaple Pani and World Bank funded- Jalaswarajya. Recently, the Jalaswarajya Phase-II has been initiated in the State. The State has been implementing number of self sponsored and centrally sponsored schemes. A summary of recent schemes implemented by the department is given below.

Table 2: Water supply schemes implemented in Maharashtra

Scheme	Funding agency	Implementation & cost sharing
ARWSP	Centrally Sponsored	GoI & State Govt
Swajaldhara	Centrally Sponsored	GoI & Beneficiaries
Mahajal	State Sponsored	State Govt & Beneficiaries
Shivkalin Pani Sathvan Yojana	Centrally Sponsored	GoI & Beneficiaries
Total Sanitation Campaign/Nirmal Bharat Abhiyan	Centrally Sponsored	GoI & State Govt & Beneficiaries
Jalswarajya	World Bank Aided	State Govt & Beneficiaries
Aaple Pani	German Bank Aided	State Govt & Beneficiaries

The State is currently implementing the NRDWP as part of the MoU signed with the GoI to carry forward the reform process. The programme emphasis on ensuring sustainability of water availability in terms of potability, adequacy, convenience, affordability and equity on a sustainable basis through decentralized approach involving PRIs and community organizations. The NRDWP vouches for the following objectives in the rural areas of the country :

- enable all households to have access to and use safe and adequate drinking water and within reasonable distance;
- enable communities to monitor and keep surveillance on their drinking water sources;
- to ensure potability, reliability, sustainability, convenience, equity and consumers preference to be the guiding principles while planning for a community based water supply system;
- to provide drinking water facility, especially piped water supply, to Gram Panchayats to achieve open defecation free status on priority basis;
- to ensure access to safe drinking water in all govt. schools and Anganwadis;

- to provide enabling support and environment for Panchayat Raj Institutions and local communities to manage their own drinking water sources and systems in their villages;
- to provide access to information through online reporting mechanism with information placed in public domain to bring in transparency and informed decision making;

1.6 Institutional Structure

Water Supply and Sanitation domain in the State is managed by the Department of Water Supply and Sanitation (WSSD) which was created in 1996 under the Ministry of Water Supply and Sanitation. The WSSD is responsible for formulating policies and to coordinate with the Central Government and other key institutions working in the sector. The Ministry is headed by the Minister of Water Supply and Sanitation and supported by the State Minister for Water Supply and Sanitation. The WSSD is headed by the Principal Secretary and supported by Deputy Secretaries.

The rural water supply and sanitation programs are being coordinated through Reform Support and Management Unit (RSMU) and the Water Supply &

Sanitation Organization (WSSO) which was formed by dissolving the earlier Communication & Capacity Development Unit (CCDU). Maharashtra Jeevan Pradhikaran (MJP) and Groundwater and Survey Development Agency (GSDA) are the technical wings functioning under the department.

The State Water and Sanitation Mission, which is registered under societies act, plays important role in developing policies and guidelines and strengthen inter-departmental coordination. Similarly, the implementation and monitoring role of water supply and sanitation programmes at the district level is coordinated by the Zilla Parishads (ZP), and at the Block level by the Panchayat Samitis. The District Water Sanitation Missions and Block Resource Centres support the implementation of programmes as per the directives of the Zilla Parishad and Panchayat Samitis respectively. The Rural Water Supply Department supports the ZP in undertaking implementation of water supply schemes. At the Grampanchayat (GP) level, Village Water Supply and Sanitation Committees (VWSCs) are created to perform the role of implementation and monitoring. The VWSCs, which are standing committees of the GPs, are responsible for planning, design, execution and maintenance of the drinking water and sanitation schemes.

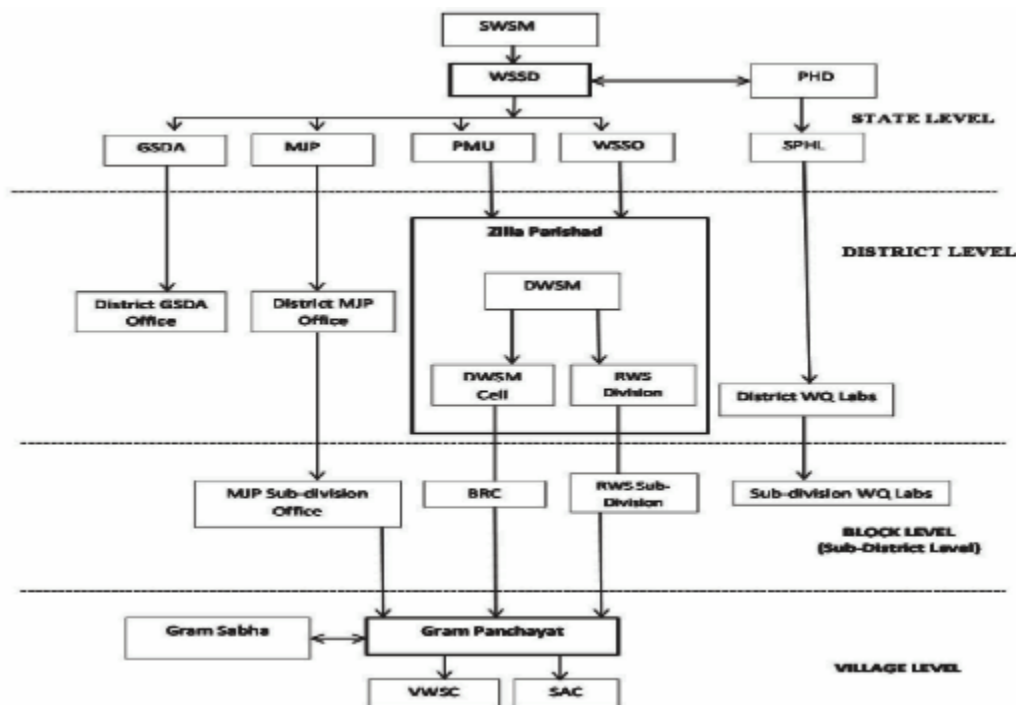


Figure 2 : Institutional structure of water supply and sanitation implementation in the districts surveyed (Source: WSSD, 2003)

1.7 Status, Issues and Challenges in Water Sector in Maharashtra

1.7.1 Village Level Institutions

Maharashtra is the first state in the country to bring in a state wide reform in water supply and sanitation sector. The reform process was scaled-up across all the districts with the aim to further strengthen the GPs which have been given the mandate of implementing developmental activities as part of the decentralisation agenda under the 73rd and 74th constitutional amendments. The VWSCs, which are given the status of standing committee of the GPs, are vested with the power of managing water supply schemes (NRWDP, 2010). VWSCs are constituted by selection of its members in the Gramshaba. The VWSCs should have a representation of 50% women members representing all sections of the people living in the GP.

Formation of VWSC is given very high importance, and it is being considered to be a non-negotiable aspect while implementing new water supply schemes under the sector reform programmes across India. In addition, the existing water supply schemes are also expected to have VWSCs formed to take care of the O&M of the schemes. In this regard, the WSSD issued a gazette notification in order to ensure the convergence and coordination between various schemes being implemented at the village level pertaining to water supply, sanitation, health and nutrition while forming the VWSCs.

The baseline data of the IMIS, which covers over 2,48,815 GPs across the State, indicates that 96% GPs have VWSCs formed and 95% of GPs have functional VWSCs. However, the DLHS – 4 survey reports only 84% of GPs in the State have village level committees formed for promoting water, sanitation and health. The overall figure for all India with respect to formation of VWSCs shows that only 70% of GPs have VWSCs formed and 63.1% of GPs have functional VWSCs.

Although, the VWSCs have been mandated to play an important role in the implementation of reform processes of water supply sector, the

overall experience of its functioning is not very encouraging. It is reported in many states the VWSCs formed under the sector reform process are not functioning effectively (Planning Commission, 2010). The VWSCs are also reported to be losing its relevance with powerful individuals or groups taking up the role of management of water supply schemes (Prasad, 2014). Water supply is considered as an important function in GPs by the elected representatives because of the influence it can have on their political career.

1.7.2 Drinking Water Supply

Recurring droughts and emergence of water quality problems are the major issues of concern in provision of drinking water in the State. Over 85% of drinking water supply schemes in the State are dependent on ground water (GSDA & CGWB, 2014). The availability of water on a sustainable basis for meeting future demand will be critical given the over exploitation of ground water occurring in the State.

The 12th plan, proposed to increase the coverage of piped water supply to households in place of the traditional hand pump based water supply, enhancement of service levels for rural water supply from the norm of 40 lpcd to 55 lpcd, priority for coverage of water quality affected habitations (NRDWP, 2010). However, achieving efficient O&M of drinking water schemes with active user participation and sustainability of water sources are some critical issues which pose serious challenges towards achieving the goal.

As per the IMIS, the current status of water supply in the State, over 87% rural habitations have been provided with 100% water coverage and another 13% habitations are partially covered (MDWS, 2015). The habitations affected by water quality are also reflected in the partially covered category. Although, the aggregated data at the division level of the State shows almost an equal level achievement in terms coverage, 62% of habitations in Buldhana District Amravati Division has the lowest proportion of fully covered habitations. The highest coverage is reported in Nundurbar District in Nashik Division with 97%.

The water supply provision in the state is predominantly covered by piped water supply schemes (PWSS). According to the IMIS data of the state, over 69.4% habitations are covered by PWSS, 25.8% by hand pumps/borewells and 4.53% of habitations are covered with other sources. However, only 40% of the habitations in India are covered with PWSS, while 52.4% is being served by hand pumps/borewells.

Access to water provides an overview of the status of drinking water sources at the household level. The shift from the traditional habitation based coverage to the proposed strategy of household level water security in water supply is an important fundamental change under the NRWDP guideline to be welcomed (NRDWP, 2010). This strategy is expected to provide emphasis on greater inclusion of poor and marginalised sections in water supply schemes. Reducing the distance travelled by households who travel more than 500 m distance is considered as an important priority under the new NRDWP guideline. According to Census 2011, members of 22.21% households in India travel more than 500 m to fetch water.

91.3% of households having improved drinking water supply in the State (DLHS 4, 2013). As per the Census 2011, 67.9% households depend on tap water, while 15.5% on borewells, 14.4% on wells and 2.1% on other sources. The breakup of water sources used in rural households is 50.2% for tap water, 22.9% for borewells, 24.3% for wells and 2.5% on other water sources. Another important parameter is the drudgery of people, especially women in collection of water which is actually measured by the distance travelled by them to collect water. In the rural areas of the State, 19.6% households travel more than 500 m, while 27.5% households travel less than 500 and 42.9% households have water sources within the house premises (Census, 2011).

However, sustainability of water sources is a matter of concern being raised in the state. In the recent audit report on NRWDP programme implementation, it is reported that a large number of rural water supply schemes were non-functional due to poor maintenance/non-

payment of electricity bills (CAG, 2014). The issue of exclusion of habitations in multi-habitation GPs from the PWSS has also been reported (Prasad, 2014). Similarly, in many GPs which are part of RRWSS, it is reported that water supply is not proper either being at the tail end of the scheme or not having influential people who can intervene to solve a problem. Higher O&M costs and inadequate or lack of water supply especially in summer from the RRWSS is also reported to be a major reason for GPs withdrawing from the schemes.

1.7.3 Water Quality

Maharashtra has developed a protocol for water quality testing under the National Rural Drinking Water Quality Monitoring and Surveillance Programme (NRDWQMSP) which is currently merged with the National Rural Drinking Water Programme of the MDWS (GoM GR1, 2011). Accordingly, all three concerned departments of water and health such as Rural Development, Public health and Water Supply & Sanitation are involved in this programme. The protocol specifies objectives and strategies to be adopted at GP, District and State levels. Jalsurakshaks (Village Water Persons) appointed at the GP level are responsible for management of water quality of drinking water sources. A comprehensive State government order was issued in 2011 to provide impetus to water quality aspects such as sanitary surveillance, appointment of Jalsurakshaks and water quality protocol (GoM GR2, 2011).

Water quality testing is carried out by District Public Health Laboratories functioning under the Public Health Department. According to the protocol adopted in the State, a minimum of 4 bacteriological tests and 2 chemical tests are to be conducted annually (GoM GR1, 2011). The State has plans to increase the number of water testing laboratories to address the issue of water quality monitoring effectively. The involvement of various departments in managing different functions related to water quality, the State is supposed to be have one of the best protocols in the country.

In the state, over 949 habitations have been declared as quality affected habitations

(IMIS 2014). The number of habitations affected by various chemical contaminations is Fluoride (307), Iron (114), Salinity (215) and Nitrate (313). In the current financial year, water sources tested from 67,482 (67.2%) habitations in the State, it is reported that water sources of 33,382 (49.5%) habitations are contaminated with either chemical or bacteriological parameters according to the IMIS data.

However, as 85% of drinking water sources in the State are primarily dependent on dug wells, these sources are prone to bacteriological contaminations (WB, 2013). Therefore, a well managed chlorination regime is essential to provide safe water supply. At the GP level, the issues like lack of availability adequate quantities of chlorination and inefficient chlorination procedures followed further compounds the risks of bacteriological contamination. In addition, coordination between the health and rural water supply departments are very critical in monitoring and management of an effective water quality programme. The IMIS data also shows lacuna in reporting of water quality monitoring. The reported results of lab tests and FTK tests conducted over the State have huge variations.

1.7.4 Management of Water Supply Schemes

Managing water supply at local level has been one of the key principles behind the reforms agenda of the water sector, and hence local communities were involved in planning, implementation and O&M of water supply schemes. Formation of VWSCs in every GP to O&M water supply schemes, people's contribution towards initial project cost and water tariff collection for O&M of schemes were made mandatory under the sector reform policy. VWSCs are supposed to operate and manage the water supply schemes under the supervision of GPs. However, with the absence sufficient funds generated for O&M of water supply schemes, the VWSCs are losing their relevance (Prasad, 2014).

Water tariff collection and expenditure of schemes provide a very strong basis to understand the management of water supply

schemes. For rural areas in the State, a minimum water tariff of Rs.360 per family per year is collected, where as Rs. 720 per family per year is collected from households with individual water connection. However, the GPs are flexible to fix water tariff based on the requirement of O&M expenditure of schemes. The overall experience of water tariff collection remains a challenge for GPs with large number of households not willing to pay. This may initially lead to poor O&M of water supply schemes, and eventually they might even become defunct due to poor financial status.

1.7.5 Household Sanitation

The State has been introducing innovative programmes to address the issues and challenges being face in the sanitation sector. Among these, one of the notable initiatives is the Sant Gadge Baba Swachhata Abhiyan (SGBSA), a clean village competition launched to improve sanitation conditions of villages. The central idea of the campaign was to mobilise people around the issue of sanitation. In many villages, the campaign has reported to have influenced the overall village development process.

Based on the success of SGBSA, similar campaigns were launched by various departments in Maharashtra. The Nirmal Gram Puraskar (NGP), a national level clean village award which is modeled on the lines of SGBSA, was launched by Government of India in 2005.

The household level toilet coverage has always been a contentious issue. As per the IMIS, the current coverage of household toilets in the State is reflected to be 57%. An increase of around 6% has been reported in the State after the baseline survey was conducted in 2012. However, the household toilet coverage was only 44% in the state (Census, 2011). The evaluations of both the SGBSA & NGP awarded villages also show that many households in these villages reverting back to open defecation. The State has the highest number of NGP awarded GPs in the country. Maharashtra has around 35% of GPs of the 28,589 GPs who have received the award in India (NGP, 2013).

1.7.6 School and Anganwadi

Special focus on provision of sanitation facilities in schools was first introduced in 1999 under the Total Sanitation Campaign of Government of India (Snel et al., 2002). As a result, consistent efforts were taken up to promote WASH facilities in schools and Anganwadis across the country. WASH components such as provision of drinking water, toilets, hand washing facilities, personal hygiene, menstrual hygiene management, solid and liquid waste management have been introduced as an outcome of these efforts.

In the State, the target of 100% providing toilets in schools has been achieved as per the IMIS baseline data. The State Elementary Education Report Card 2013-14 states that 99.3% schools have toilets for boys and 97.6% schools have toilets for girls (DISE, 2014). It is also reported that 99.3% schools have drinking water facilities as per the survey. The state is reported to have achieved the target of building toilets in 60076 Anganwadis after 2012 as per the IMIS baseline data. There are more than 107913 Anganwadis under operations in the state (ICDS, 2014).

The direction of Supreme Court Bench for ensuring basic right of water and sanitation in educational institutions has had an impact on the issue. As per recent policy change, the overall responsibility of provision of water and sanitation facilities in schools has now been allotted to Ministry of HRD/Education. However, the Ministry of Drinking Water Supply would continue to support awareness and capacity building activities under the Swachh Bharat Mission in schools (SBM, 2014). In Maharashtra, a special incentive based reward and recognition schemes called “Sane Guruji Clean School” and “Savitribai Phule Clean Anganwadi” were also launched (GoM GR, 2009). These programmes have helped to increase awareness amongst the students and teachers on the need for WASH interventions in schools and Anganwadis.

Although, it is reported that most schools have been covered with toilets, there is still scope to improve the standards according to the norms developed by agencies like UNICEF. Also, the

absence of proper management systems for maintenance of WASH facilities in schools is a serious issue of concern, which needs to be addressed. Best practices like hand washing with soap and menstrual hygiene management are some key areas which need to be given focus. The initiatives in schools so far have only aimed merely providing facilities needed in schools rather looking at it as a tool for imparting knowledge to school going children, and through them to their families and peers (UNICEF, IRC).

1.8 The Proposed Evaluation

The Ministry of Drinking Water and Sanitation (MDWS) is in the process of getting third party evaluation of the status of rural water supply in state of Maharashtra. The Tata Institute of Social Sciences was allotted the responsibility of conducting the study in the month of October 2014. Based on the field studies conducted in the month of December 2014 and January 2015, this report has been prepared. The following are the objectives of the proposed evaluation study of water supply schemes in the state of Maharashtra.

To study status of the water supply systems of selected Gram Panchayats in Maharashtra (including the Anganwadis and Schools in the GPs).

To assess the functionality of water supply systems in the selected Gram Panchayat, Anganwadi and Schools in Maharashtra.

The status of drinking water facilities in 48 GPs spread over 12 districts of all the 6 divisions of the State were collected and analysed as part of the study. In this study, focus was accorded on piped water supply schemes, household level coverage, maintenance and management of water facilities at the village level, in addition to schools and Anganwadi centers.

2

METHODOLOGY



In order to conduct the evaluation based on the aforesaid objectives, all the 6 divisions in Maharashtra viz Pune, Nagpur, Aurangabad, Konkan, Nashik and Amravati were covered. To get a representative sample from each division, two districts were studied from each division. In each district, four GPs and in aggregate 48 GPs were selected for the study (See Annexure - 2). The selection of districts and the GPs would be based on multi-stage sampling to get adequate representativeness of GPs which consist of different population density. The stratification criteria are as follows :

- 24 GPs were selected from a pool of villages which had a population size of more than 2000 population and remaining 24 GPs were selected from pull of villages with population size with less than 2000.
- Four GPs were selected from coastal area of Konkan and Sindhudurga.
- 12 GPs were chosen from Tribal area of Yavatmal, Chandrapur and Bhandara districts.

The Ministry of Drinking Water proposed to evaluate the status of rural water supply in state of Maharashtra by third party. This evaluation study in Maharashtra had been conducted using four methods :

- An infrastructure inspection and evaluation of the physical community water system to assess the functionality, maintenance and sustainability.
- Village-level survey, which included gathering detail information of process of chlorination, operation and maintenance of piped water supply scheme, institutional structure, financial management, etc.
- A household survey through canvassing questionnaire consisting questions related to water and sanitation facilities, practices related to drinking water and sanitation and through observing general hygiene behaviors. In total, 960 households were covered in 27 GPs of the study area, which works out to 10% of the population (See Annexure - 1).
- Focus group discussion with PRI members, VWSC members, including waterman and Gramsevak.

Table 3: Number of districts surveyed in the study

Name of division	Total number of districts	Total number of surveyed districts	Name of the districts surveyed
Nashik	05	02	Ahmednagar & Dhule
Amravati	05	02	Buldhana & Yavatmal
Nagpur	06	02	Bhandara & Chandrapur
Aurangabad	08	02	Hingoli & Osmanabad
Pune	05	02	Satara & Solapur
Konkan	05	02	Sindhudurga & Raigad
Total	34	12	--

The policies and guidelines of Government of India were utilised to understand and compare effectiveness of the implemented programmes. In addition, aspects like institutional structure, NGP status, ground water situation, chemical contamination of groundwater, operation and maintenance, quality of work, management systems established, recovery of

revenue, impact of the programme, etc., would be assessed. In the study, FGDs were conducted with functionaries and people at the Grampanchayat level. In addition, secondary information was also collected based on desk review conducted from available documents at the state and central level.

Table 4 : Schedule of the survey conducted in each division

Name of Division	Date of Visit
Nashik	22 December to 25 December 2014
Amaravati	26 December to 29 December 2014
Nagpur	30 December 2014 to 2 January 2015
Aurangabad	3 January to 6 January 2015
Pune	7 January to 11 January 2015
Konkan	12 January to 17 January 2015

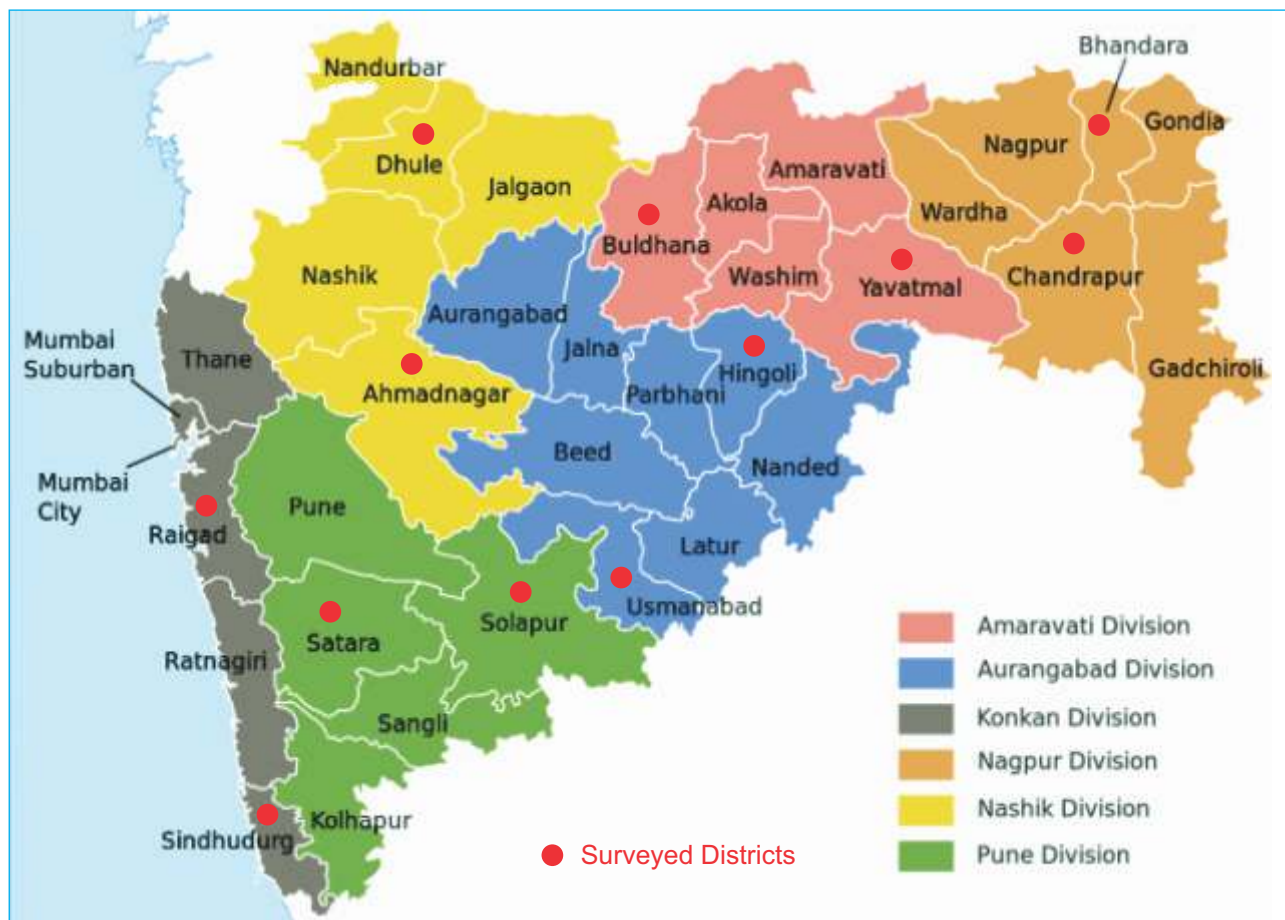


Figure 3 : Location of the districts surveyed



3

FINDINGS AND OBSERVATIONS



3.1 Socio-economic profile of households

The study was conducted in 12 districts spread across 6 divisions of Maharashtra. In each district, 4 GPs were included in the study, covering a total of 48 GPs. However, the household survey was conducted in 27 GPs as mentioned in the methodology section. Data from 960 households were collected, which is approximately 10% of all household in the study area.

In the study, the caste composition of the sampled households is as follows: 37.8% belongs to BC, 21.7% belongs to SC, 13.3% belongs to ST, rest

27.2% belongs to Others. It shows a good representation of all social groups in the sample. However, division wise variation in the caste representation in sample is significant.

According to our study, among the households surveyed, 59.9% were identified as APL households, 34.1% households were identified as BPL households, and the remaining 6% households were identified as Antyodaya.

Table 5 : Socio-Economic status of households covered under the study

Divison covered	Number of households	Social category (%)				Economic category (%)		
		SC	ST	OBC	General	APL	BPL	Antodaya
Amravati	203	20.7	24.1	51.2	3.9	52.7	35.5	11.8
Aurangabad	170	2.9	18.8	25.3	52.9	75.3	17.6	7.1
Konkan	153	2.0	0.0	60.1	37.9	78.4	19.6	2.0
Nagpur	203	24.6	52.2	22.7	0.5	53.2	41.4	5.4
Nashik	86	1.2	18.6	46.5	33.7	41.9	53.5	4.7
Pune	145	18.6	3.4	26.2	51.7	52.4	44.8	2.8
All	960	13.3	21.7	37.8	27.2	59.9	34.1	6.0

Data on occupational pattern and education level of head of the households were collected to understand the sources of income and their educational level. The primary occupation of head of household of 45.1% households was farming. Another 41% households' head were engaged in wage work both in agricultural and non-agricultural work.

In the study villages, main source of income was from

government and private salaried jobs. It is evident that farming and wage work were the major occupations in the study villages.

The education profiles of head of the household's show that 28.9% were illiterates, 34.9% had gone to primary schools, 33% had gone to high/higher secondary schools and 3.2% were graduates and above.

Table 6 : Occupation and educational status of head of households

Divison covered	Occupation (%)						Education (%)			
	Farmer	Labour	Regular employment - govt	Regular employment - private	Housewife	Unemployed	Illiterate	Primary	High school & higher secondary	Graduate & above
Amravati	45.8	49.3	0.5	0.5	3.0	1.0	36.0	27.1	36.0	1.0
Aurangabad	69.4	22.4	4.1	1.8	1.8	0.6	22.9	40.6	32.9	3.5
Konkan	38.6	32.7	6.5	5.2	14.4	2.6	20.3	38.6	37.3	3.9
Nagpur	15.8	67.0	3.0	4.9	7.9	1.5	35.5	32.5	29.1	3.0
Nashik	73.3	18.6	2.3	1.2	4.7	0.0	25.6	27.9	41.9	4.7
Pune	46.9	37.2	4.8	3.4	6.2	1.4	27.6	42.8	24.8	4.8
All	45.1	41.0	3.4	2.9	6.3	1.3	28.9	34.9	33.0	3.2

3.2. Institutional Structure at GP Level

In this survey institutional aspects related to water schemes were also studied. The major aspects which are dealt in this report are dissemination of information pertaining to formation of VWSC, representation of women in VWSC, overall functioning of VWSC and its involvement in O&M of water supply schemes.

VWSC Formation : In the study, out of the 48 GPs in 12 districts covered, it was found that in 87.5% GPs had formed VWSCs to manage water supply schemes. Particularly, in Kokan and Nasik divisions, all GPs have formed VWSC. In Amravati and Aurangabad divisions, 75% GPs could form VWSC.

Representation of women in VWSC is considered to be very crucial to ensure activity planning, execution and management of water supply schemes. According to the guideline, 50% of representation of women members in the VWSC is mandatory. However, in the study, it was found that only 20.8% GPs had VWSCs with 50% or more women members. While, 58.3% of GPs had women representative in VWSCs in the range of 25-49% and 8.3% GPs had less than 25%

women representatives respectively.

According to guideline of central government, the VWSCs must have 6-12 members. In Maharashtra, as per the state guideline, VWSCs must have more than 12 members. However, in the study it was found that only 11 VWSCs have more than 12 members, 29 VWSCs have members in the range of 6-12 and 2 VWSCs have less than 6 members.

In the study, it was also observed that in most of the GPs office-bearers performed the role of VWSCs. As a result separate VWSC were not formed to manage water supply schemes. It is also observed in some GPs where VWSCs are not actively taking part in the day-to-day management of water supply schemes. The data pertaining to functioning of VWSCs and the reasons behind it are discussed in the forth coming sections.

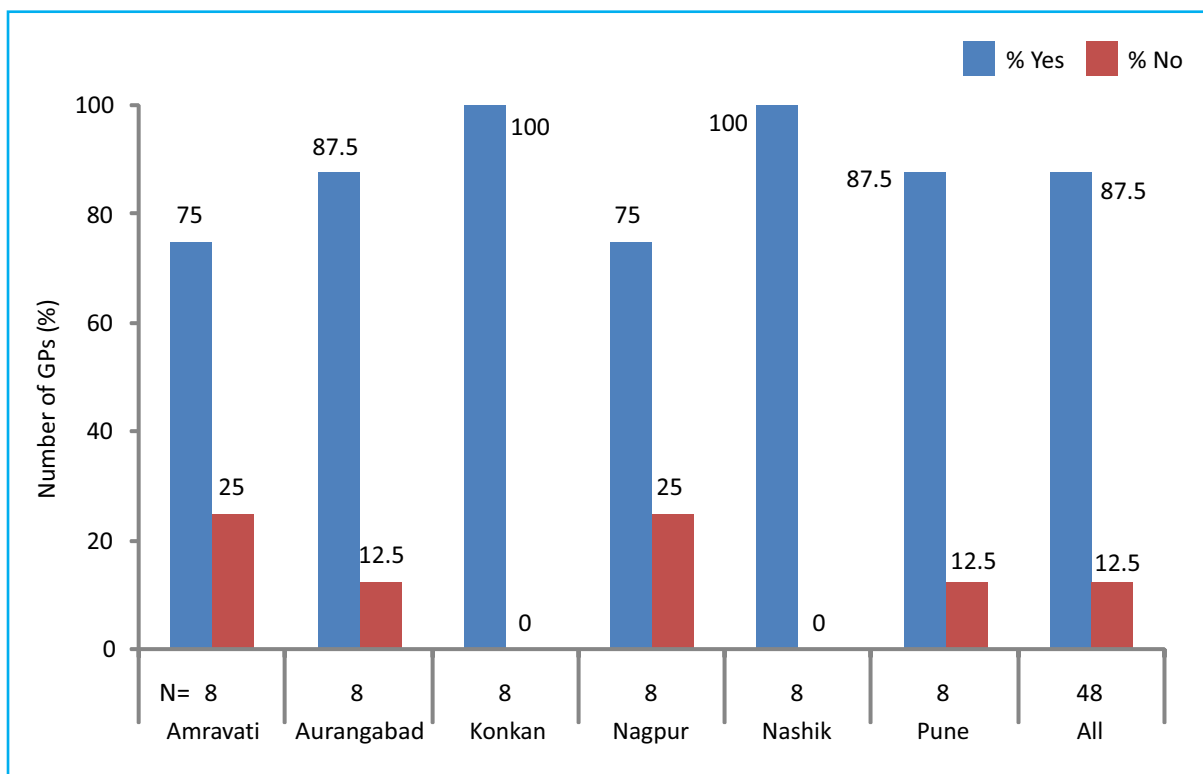


Figure 4 : Status of formation of VWSCs

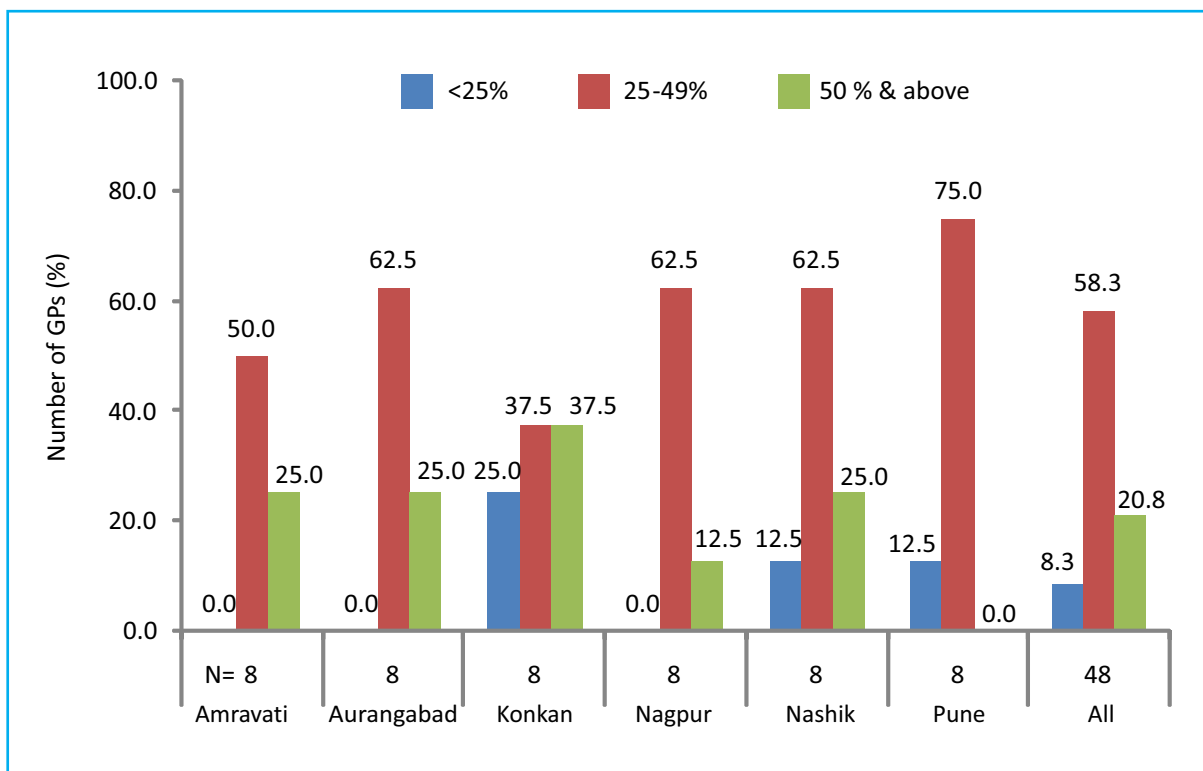


Figure 5 : Representation of women in VWSCs formed

Box. 1 : Role of a Women Sarpanch in Reviving a Defunct Water Supply Scheme

Borda is a Gram Panchyat located in Chandrapur District of Maharashtra. Water sources in the GP are affected by fluoride contamination. In the absence of an alternative option, people were forced to depend on these fluoride affected water sources. In 2005, a water supply scheme was implemented under the Jalswarajya project to address the problem of fluoride contamination of water. Under the scheme, a well was dug at some distance away from the village to obtain fluoride free water. However, due to some technical defects in the scheme, it became non-functional within a span of two years of its commissioning.

As per the guideline of the Jalswarajya project women development committees need to be formed in each GP to increase participation of women for effective implementation of the water supply schemes. Accordingly, the women development committee was formed in this village as well. Under the leadership of Ms. Sangita Meshram the members of committee started monitoring the user to actively participate in the scheme. Later Ms Sangita Meshram given her leadership qualities was elected as Sarpanch of GP.

Upon becoming the Sarpanch, Ms.Meshram initiated steps to revive the defunct water supply schemes implemented under the Jalswarajya project. A new rising main was provided to connect the overhead tank with the water source by the GP using funds received for water scarcity management. As a result of her tireless work, the defunct water supply scheme was repaired and water supply to the village was restored. This success story example of how active participation of women can play important role in sustainability of water supply schemes. Most VWSCs have women members as per the guideline, however responsibilities of managing water supply schemes are usually held by male members of the committees. This success can be replicated by encouraging and making women members of VWSCs responsible for managing water supply schemes.

Functioning of VWSCs : The indicators utilised to understand the effective functioning of VWSCs are number of times VWSC meetings were held in last financial year, availability of meeting minutes with GP and training of VWSC members in O&M of water supply schemes.

First, it was observed that in 50% GPs surveyed, VWSC meetings were not held during the last financial year. Only 37.5% GPs had conducted regular VWSC meetings in the last financial year. In rest of the 12.5% GPs the VWSCs were not formed at all. Out of the 37.5% GPs which had conducted meetings regularly, in 27.4% of GPs meetings of VWSC held less than 5 times and in 10.1% GPs meetings of VWSCs held more than 5 meetings. Konkan division has been exceptional in conducting meetings of VWSCs compared to other divisions. In Konkan division, the highest number of GPs conducted regular VWSC meetings. Of all GPs in this division, around 75% GPs conducted regular VWSC meetings.

Second, the practice of recording minutes of VWSC meetings was observed to be very poor. It was found that only 18.8% GPs across the 48 GPs surveyed had recorded the minutes of VWSC meetings held, and over 68.8% GPs had not recorded the minutes of

VWSC meetings at all. Since VWSCs in the Konkan region were actively engaged in O&M of water supply schemes, in this division over three-fifth of GPs recorded the VWSC minutes of meetings.

Training of VWSC members in O&M of water supply schemes is an important aspect. The training programmes for VWSCs are supposed to be organised by the BRC/DWSMs at regular intervals. However, only 20.8% GPs reported that the VWSC members had received training from BRC/DWSM or from any other agency nominated for this purpose at the moment. Absence of training to VWSC members was cited as one of the reasons for ineffectiveness of VWSCs.

Another key reason cited, for the absence of VWSCs in many GPs, is automatic dissolution of VWSC along with the GP body at the end of the 5 years office term. In such cases, as the old members who have received training automatically leave, and the newly selected VWSC members start functioning without training. The BRCs/DWSMs are expected to undertake capacity building initiatives as per changes in the VWSCs, and also provide inputs on a regular basis to strengthen the O&M process of water supply schemes. The current scenario at the GP level indicates inadequate support from BRCs/DWSM.

Table 7 : Frequency of meetings and availability of records of VWSCs

Division	Number of GPs where VWSC meetings were held last financial year (%)			Number GPs maintaining records of VWSC meetings (%)		No VWSC formed
	< 5 Nos.	5 & Above Nos.	Meetings not conducted	Yes	No	
Amaravathi	25.0	0.0	50.0	0.0	75.0	25.0
Aurangabad	25.0	12.5	50.0	12.5	75.0	12.5
Konkan	37.5	37.5	25.0	62.5	37.5	0.0
Nagpur	12.5	0.0	62.5	0.0	75.0	25.0
Nasik	25.0	12.5	62.5	25.0	75.0	0.0
Pune	37.5	0.0	50.0	12.5	75.0	12.5
All	27.1	10.4	50.0	18.8	68.8	12.5

Various studies indicated that after initiation of new schemes the importance of formation of VWSC's as part of the reform projects is gradually reduced (Prasad et al., 2014). Cullet (2009) reported that new water supply schemes lack people's participation in the planning and execution of the schemes, and rather these schemes are implemented by influential contractors with the help of elected representatives and bureaucracy. A report of Planning Commission observed that across India only 25% of GPs had functional VWSCs and large numbers of villagers are not even aware of the existence of VWSCs (Planning Commission, 2010).

FGD with GP members revealed the following reasons for the VWSCs not taking active part in the day-to-day management of schemes;

- VWSC is standing committee of GP and therefore, after the end of 5 year office term of GP it is also dissolved and no efforts were made to form a new VWSC.
- Usually there is no scheduled training program to train the VWSC members on the aspects of

management and O&M of water supply schemes from BRC/DWSM.

- The general perception amongst the GP members is that the VWSCs are formed because there is a statutory requirement whenever a new water supply scheme is to be implemented.
- Elected representatives also feel threatened to back the functioning of VWSC as provision of water is an important agenda even for them to take up the political mileage. They felt that the formation of VWSC is a threat to their existence and in the process they may get sidelined.
- Also, the elected representatives are not very keen on water tariff collection from people due to the fear of backlash in the next elections. This practice eventually leads to poor O&M of the water supply.
- Inadequate funds for management of water supply schemes provide very limited space for the VWSCs to actively engage. Also, the diversion of other funds by the GPs for management of water supply schemes further limits the role of VWSCs.

Table 8 : Involvement in O&M and training received by VWSCs

Division	Number of VWSC's involved in O&M (%)		No VWSC formed	Number of VWSC members attended training (%)
	Yes	No		
Amaravathi	12.5	62.5	25.0	25.0
Aurangabad	25.0	62.5	12.5	0.0
Konkan	75.0	25.0	0.0	25.0
Nagpur	12.5	62.5	25.0	12.5
Nasik	37.5	62.5	0.0	25.0
Pune	50.0	37.5	12.5	37.5
All	35.4	52.1	12.5	20.8

3.3 Drinking Water Sources

In this study, status of Piped Water Supply Schemes (PWSS) serving one or more habitations in the GPs and Regional Rural Water Supply schemes (RRWSS) were collected. Mini-water supply schemes have been included in the PWSS category in the study. The information on drinking water sources was collected by visiting water supply schemes, meetings and FGDs conducted with GP members and households. As the study primarily focuses on the status of PWSS/RRWSS schemes, and therefore only the overall status of other water sources in the GPs such as hand pumps and dug wells were collected based on these discussions. The details pertaining to PWSS/RRWSS schemes are henceforth combined and referred as PWSS schemes for the convenience of representation, and specific details pertaining to RRWSS is used only wherever the independent mention is essential.

Status of PWSS : Data of 48 PWSS/RRWSS schemes had been collected from 48 GPs. However, for GPs with several habitations and having multiple schemes, details pertaining only to major PWSS scheme have been collected and included in this analysis. The data of 38 PWSS and 10 RRWSS schemes collected are presented and analysed in this section. On an average, about 8 PWSS/RRWSS schemes in each division were covered in this study.

The PWSS schemes are categorised into bore well, dug well, surface water (pond/river) sources based on the source of water being tapped for water supply. It was found that 5 schemes were based on bore wells, 30 schemes were based on dug wells, 13 schemes were based on surface water (out of this, 1 scheme is linked to a bulk water supplied by MIDC). Dug wells seemed to be the major source of water tapped for PWSS schemes in all the divisions with Pune and Aurangabad having the highest number (6), followed by Amravati, Konkan and Nagpur (5) and Nashik (3). In Nashik, there are about 5 schemes using surface water sources and whereas in other divisions it is 2 or less in the GPs covered under the study.

28 PWSS schemes were functioning, while 6 were not-functioning and 14 were in partial functioning condition. The 28 functional PWSS schemes were in Amravati (5), Aurangabad (4), Konkan (6), Nagpur (5), Nashik and Pune (4 each).

6 PWSS schemes which were not functioning were located in Amravati (1), Aurangabad (2), Nagpur (2), and Pune (1). The reasons for non-functioning of PWSS quoted are; three dry sources, one scheme suffered due to technical defect, one joint scheme never supplied water, and one source is non-functional because of poor O&M.

There are 14 PWSS schemes which were in a partial functional state at the time of survey. The highest number of partial functional PWSS was four, observed one in Nashik and three in Pune. In Amravati, Aurangabad and Konkan, the number of semi-functional PWSS was two each. One semi-functional PWSS was observed in Nagpur. The reasons for semi-functional status of PWSS quoted are; no water in the source in summer in five schemes of PWSS, technical defect in four of the scheme, and no supply from joint schemes in another five schemes.

The sources of water of functional PWSS schemes were dug wells, bore wells and surface water bodies. About 30 schemes were based on dug wells, 5 schemes were based on hand pumps and 12 were based on surface water sources. It is worthy to mention that of the 30 schemes based dug wells, 22 schemes were affected due to shortage of water in summers. The study found that other PWSS schemes which were based on bore wells and surface water sources were reported to be not affected in summer.

Management of PWSS : Metering of water supply scheme plays an important step towards efficient management of water supply schemes. In the study area, only one scheme was found to have metered water connections, and rest of the 41 functional schemes had non-metered connections. The lone metered scheme was observed in Rajewadi GP in Raigad District of Konkan. A water tariff of Rs.8 per 1 KL is collected in Rajewadi.

The pumping hours of PWSS schemes for supplying water in the study area observed were less than 4 hours in 20 schemes, 4-8 hours in 15 schemes and more than 8 hours in 7 schemes. This shows that most schemes operate for a significantly lower number of hours.

Availability of standby pumps in PWSS is considered to be an indicator of efficient design of the scheme. It was observed that 25 schemes studied had standby

Table 9 : Status of PWSS schemes in the GPs

Division		Amravati	Aurangabad	Konkan	Nagpur	Nashik	Pune	All	
Type of Source & Functionality									
Types of schemes	PWSS	6	7	8	7	3	7	38	
	RRWSS	2	1	0	1	5	1	10	
Different Sources of Water	Bore well	1	0	2	2	0	0	5	
	Dug well	5	6	5	5	3	6	30	
	Surface water	2	2	0	1	5	2	12	
	Others (MIDC supply)	0	0	1	0	0	0	1	
Status of Schemes	Functioning	5	4	6	5	4	4	28	
	Non-Functioning	1	2	0	2	0	1	6	
	Semi-Functioning	2	2	2	1	4	3	14	
Reasons for Not Functioning Schemes	No water in the source (dry)	0	2	0	0	0	1	3	
	Technical defect	1	0	0	0	0	0	1	
	No supply from joint scheme	0	0	0	1	0	0	1	
	Poor O & M	0	0	0	1	0	0	1	
Reasons for Semi Functioning Schemes	No water in the source in summer	0	0	2	1	1	1	5	
	Technical defect	0	1	0	0	1	2	4	
	No supply from joint scheme	2	1	0	0	2	0	5	
Dug well based schemes	Adequate water throughout the year	2	0	1	2	1	1	7	
	Inadequate water in summer	3	5	4	2	4	4	22	
	Safe from external contamination	4	3	3	4	2	4	20	
Bore well based schemes	Adequate water throughout the year	1	0	2	2	0	0	5	
	Inadequate water in summer	0	0	0	0	0	0	0	
Surface water based schemes	Adequate water throughout the year	1	1	1	0	3	2	8	
	Inadequate water in summer	0	0	0	0	0	0	0	
Management of PWSS									
Metering of water supply	Metered	0	0	1	0	0	0	1	
	Non-metered	7	6	7	6	8	7	41	
Scheme pumping hours	< 4 hours	4	0	4	5	4	3	20	
	4-8 hours	2	4	2	1	3	3	15	
	> 8 hours	1	2	2	0	1	1	7	
Availability of standby pump	Available	5	4	5	4	4	3	25	
	Not available	2	2	3	2	4	4	17	
Availability of pump operation record	Available	0	1	0	0	0	0	1	
	Not available	7	5	8	6	8	7	41	
Average time taken for day to day repairs	1 day	2	3	6	4	3	4	22	
	2-3 days	3	2	0	0	2	3	10	
	> 3 days	2	1	2	2	3	0	10	
Pumping & Distribution Systems									
Raising Main	Properly laid	Yes	6	6	7	5	6	6	36
		No	2	1	1	0	1	1	6
	Major leakage from pipes	Yes	6	1	1	1	0	1	10
		No	0	5	6	5	7	6	29
	Free from contamination	Yes	6	5	7	5	6	6	35
		No	1	1	1	1	2	1	7
GSR/ESR	Quality of construction	Good	1	5	4	5	3	5	23
		Normal	4	2	3	3	4	1	17
		Poor/damaged	2	2	1	0	1	2	8
	Leakage from GSR/ESR	Yes	2	2	3	2	0	2	11
		No	5	3	5	7	7	4	31
	Distribution	Free from contamination	Yes	4	4	8	6	6	6
No			3	2	0	0	2	1	8
Major leakage from pipes		Yes	2	1	0	0	0	2	5
		No	5	5	8	6	8	5	37

pumps for providing uninterrupted water supply. The PWSS schemes which have standby pumps were uniformly spread across all the divisions.

Record of pumping daily hours helps in understanding the performance of schemes. The record of daily water pumping hours was maintained in only one PWSS. In Kasti GP of Osmanabad district in Aurangabad division has an electronic device to record the water pumping hours. In other 41 PWSS, the water pumping hour was not maintained.

The average time taken for repair of minor faults that occur on a day-to-day basis was collected. Minor repairs of 22 schemes were reported to be rectified within duration of one day. However, for rest of the 20 schemes, in 10 schemes it is reported to be taking 2-3 days duration while in the other 10 schemes it took, on an average, more than 3 days for repairing any faults.

Water Distribution Systems : In this section, observations pertaining to status of rising mains, storage tanks and water distribution lines of water supply schemes are discussed. Out of the 42 schemes, rising mains of 6 schemes were reported to be not laid properly. It was found that pipelines were exposed and not buried below the ground. As a result these pipes which were laid along the roads and in agricultural fields hence got damaged frequently. Major leakages in rising main of 10 PWSS schemes were also reported. It is reported to be occurring due to poor workmanship, use of substandard pipes and improper design.

Quality of construction of elevated service reservoir (ESR) or ground level service reservoir (GSR) reported shows that 23 schemes were in good condition, 17 schemes were in normal condition and 8 schemes were in poor or damaged condition. Major leakages of water from GSR/ESR were reported in 11 schemes. Absence of timely repairs of minor leakages from the tanks or pipe fittings, negligence of day to day management and cleaning routines, and lack of timely painting of the tanks at periodic intervals were some of the major reasons cited for deterioration of quality of GSRs/ESRs.

It is reported that water distribution pipes of 36 schemes were prone to contamination. In addition, 5 schemes were reported to have major leakages in the distribution pipes. Schemes in Konkan and Nagpur divisions were reported to be free from any

contamination and leakage problem. Improper provision of water distribution pipes was a serious matter of concern, which must be addressed. Constructions of wastewater drains in villages have turned out to be a major problem to ensure safe water supply due to risks of contamination of water flowing in pipelines.

In these GPs, distribution lines and water connections given to houses from it was laid in unsafe manner, often joints of these pipes were exposed inside wastewater drains. The risk of contamination of water increased many fold when these open drains were used for open defecation or for discharging wastewater from septic tanks. In addition, provision of tap connections at households or standposts below ground level increases the chances of contamination of drinking water.

Hand Pumps and Dug Wells : Status of hand pumps and dug wells in the GPs covered under the study was collected to understand their functioning and availability of water in summer. It was collected based on the discussions held with members of GP and communities. However, wherever it was feasible the team visited the location of water sources to observe the status.

In the GPs covered under the study, it was reported that 75.3 % out of the 400 hand pumps were functional. Nasik topped the list of non-functional hand pumps with as high as 37.1% of all hand pumps were non functional followed by Pune at 29.5%. Lowest number of non-functional hand pumps was observed in Nagpur. It is striking that 62.7% of hand pumps were reported to have inadequate water in summer.

About 91.2% of the 102 dug wells reported in the study were reported to be functional. The functional dug wells were reported to be highest in Nashik (100%), followed by Nagpur (92.3%), Amravati (91.3%), Aurangabad (90.9%), Konkan (89.5%) and Pune (50%). In Nashik and Pune divisions, the reported absolute numbers of dug wells were only 8 and 2 respectively. However, only 48% of dug wells were reported to have water in summer months. Amravati has the highest number of wells functioning in summer months with 82.6%. It is reported to be 51.3% in Nagpur, 36.4% in Aurangabad, 25% in Nashik and 21.1% in Konkan.

Table 10 : Status of hand pumps and dug wells in the study area

Division	Hand pumps			Dug wells		
	Total number of hand pumps	Functioning (%)	Not-functioning (%)	Total number of dug wells	Functioning (%)	Not-functioning (%)
Amravati	43	76.7	23.3	23	91.3	8.7
Aurangabad	56	71.4	28.6	11	90.9	9.1
Konkan	22	81.8	18.2	19	89.5	10.5
Nagpur	95	87.4	12.6	39	92.3	7.7
Nashik	35	62.9	37.1	8	100.0	0.0
Pune	149	70.5	29.5	2	50.0	50.0
All	400	75.3	24.8	102	91.2	8.8

Table 11 : Availability of water in summer in hand pumps and dug wells

Division	Hand pumps		Dug wells	
	Total number of hand pumps	Availability of water in summer (%)	Total number of dug wells	Availability of water in summer (%)
Amravati	43	34.9	23	82.6
Aurangabad	56	17.9	11	36.4
Konkan	22	40.9	19	21.1
Nagpur	95	87.4	39	51.3
Nashik	35	14.3	8	25.0
Pune	149	18.1	2	0.0
All	400	37.3	102	48.0

Water Supply Coverage in Habitations : Water supply coverage status of the habitations in the GPs covered was studied. The analysis is based on field observations, discussions with members of the GP and households. For the purpose of comparison, fully covered, partially covered and not covered status

provided in the MIS of MDWS website was used. This is an indicative analysis carried out purely based on opinion of the people interviewed, and it is not based on any technical assessment of per capita availability of water in the habitation.

In this analysis, 146 habitations of 48 GPs have been studied. In total, there were 187 habitations in the GPs. As per the IMIS data, there were 89.7% fully covered and 10.3% partially covered habitations in the study, and no habitation was reported uncovered. However, in the field study, it was found that 70.5% habitations were fully covered, 23.3% habitations were partially covered and 6.2% habitations were not covered.

As per the study, 6 habitations which were shown under the fully covered (FC) status in IMIS, however, it is observed in the field visit that these habitations did not have any water source. So it should come under not covered category. During the discussions, people of these habitations expressed that in the absence of functional public water sources, the primary source of water became private wells to manage their water requirements. Two habitations in Sindhudurg District of Konan Divisions (Khaidawadi in Kolam GP and Guravwadi in Wada GP) were part of a main PWSS of the GP, however as the water sources of PWSS did not have adequate water, it was reported that these habitations were disconnected from the scheme. The four other habitations which are

reported under not covered category (NC) in the study have no functional public water source as the sources mentioned in IMIS presently have no water.

IMIS reported 24 habitations under the FC category; however, this study revealed that these habitations could be, at best, considered as PC. The basis of this conclusion is shortage of water in the habitations. Out of these 24 habitations, 15 habitations which were served by PWSS were reported to be having severe water shortages in summer, in 3 habitations hand pumps have gone dry and people were depending on private wells, and in the rest of the 6 habitations, which had PWSS/RRWSS as a main source of water supply, were affected by inadequate water distribution or non-functioning of the scheme.

Moreover, about 3 habitations, which are included under the category of PC in the IMIS, are shown under the NC category in this study. As per the IMIS data, these habitations are part of a PWSS. However, it was reported that these habitations never had any public water source provided. Therefore, people were only depending on private sources for collection of water all these years.

Box. 2 : Challenges in Water Supply at Nimbari

Nimbari is a Gram Panchayat in Malkapur Block of Buldhana District, Maharashtra. The GP was originally covered by a Regional Rural Water Supply Scheme (RRWSS). Being in the tail end of the RRWSS, the GP was not receiving water supply from the scheme. As an alternative, the GP attempted to have a water supply scheme under the Jalswarajya Project. However the GP was excluded from the Jalswarajya project due to internal conflicts among the people which affected the people's participation criteria required for the scheme.

The household connections and distribution pipes were altered by the people when there was very low supply from the RRWSS initially. The entire network of distribution and household connections also could not be utilized because of these manipulation carried out by the people in the distribution lines. The GSR had also become defunct over the years.

The GP has finally managed to drill a new borewell using the funds of 12th Finance Commission. However, to install a pump and raising main for supply of water, it had to borrow Rs. 1 Lakh from a member of the Zilla Parishad. Even though water is available now, as the GSR and distribution pipes are defunct, water from the borewell is directly supplied through few standposts installed in the GP.

This case is an example of failure of RRWSS schemes to provide water to the tail end GPs. It is also an example of how difficult it is to achieve water supply in a village without people's participation. This example shows that, without collective effort it is impossible to manage water supply schemes efficiently.

Table 12 : Water supply coverage status as per MDWS records and observed during the study

Division	Number of GPs covered	Number of habitations covered	Status as per MDWS records (%)			Status as per this study (%)		
			FC	PC	NC	FC	PC	NC
Amravati	8	14	92.9	7.1	0.0	57.1	42.9	0.0
Aurangabad	8	8	87.5	12.5	0.0	50.0	50.0	0.0
Konkan	8	39	84.6	15.4	0.0	64.1	25.6	10.3
Nagpur	8	23	95.7	4.3	0.0	87.0	13.0	0.0
Nasik	8	13	76.9	23.1	0.0	61.5	38.5	0.0
Pune	8	49	93.9	6.1	0.0	77.6	12.2	10.2
All	48	146	89.7	10.3	0.0	70.5	23.3	6.2

Although, the findings of the study reveal a good level of achievement in providing water supply in the Maharashtra, it is a widely accepted fact that the ground water based sources are affected by severe droughts cycles in most parts of the state. This is further compounded by the rocky terrain which complicates the availability and distribution of ground water. It is reported that over 92% area of the state fall under the rocky formation (GSDA & CGWB, 2014).

Therefore, implementation of source sustainability component prescribed under the NRDWP programme must be given priority for augmentation of ground water. Increasing pressure on surface water sources was also reported by members of the GPs in some locations as competing water extraction for irrigation and water supply to small towns in the neighbouring areas is being taken up from the sources.

In summers, in addition to the use of tankers, GPs reported the practice of leasing private wells which have water as an alternative. In some GPs, practices like creating water sources in private lands in the absence of suitable locations for creating good water holding sources in public lands or use of private sources, particularly owned by GP presidents or

influential members are considered. However, these practices can put the whole scheme in jeopardy in case of any dispute between owners of land and people.

Issues pertaining to the provision of critical water supply scheme components such as rising mains, storage tanks and distribution pipes could be improved to prevent contamination and leakage in many GPs. As discussed in the previous sections, adequate planning and care must be taken to improve the implementation of these components of the schemes for preventing failures and contamination of water supplied. Absence of water metering in almost all the GPs, shows under preparedness of GPs to provide higher service level of water supply to people. The goal of achieving supply of water 24x7 seems to be a distant dream for many GPs as of now.

Issues like practice of defaulting payment of water tariff among users, reluctance of elected GP members to pursue water tariff collection, and the practice of manipulation of income and expenditure for showing efficient functioning of schemes by the GPs, calls for new insights and corrective steps as these issues have long term implications on the functioning of water supply schemes.

3.4 Access to Water Supply at Household Level

Household level survey was conducted among 960 households which was around 10% of the total population of 27 GPs. To understand the household level access to water supply, information on use of different water sources, distance travelled to collect

water, frequency of water supplied and overall impact of water supply on households were collected. Similarly, information on water quality, household water treatment and toilet coverage were also collected.

Type of Water Source (HH) : In the study, use of water sources were categorised into PWSS (tap water), hand pump, dug well and own source (owned hand pump and/or owned dug well). The category of PWSS included all type of piped water supply schemes including the RRWSS/mini-power pumps. The category own source includes hand pumps and dug wells privately owned. However, the categories of hand pumps and dug wells include the only public drinking water sources.

Across the 960 households surveyed, 63.8% households used water from PWSS (i.e. household tap connections and community standposts), 22.5% households used hand pumps, 1.5% use dug wells and 12.3% used their own source. The use of PWSS as primary source of drinking water was highest in Nasik, as 97.7% households reported to use PWSS to

meet water requirement, followed by Konkan, at 85.6%, and Pune 71.7%. The use of PWSS, as primary source of drinking water, was lowest in Aurangabad at 32.9%. The use of hand pumps was highest in Aurangabad division with 52.4% households using this source, followed by Nagpur (31.5%) and Pune (26.2%). It is also observed that less than 10% of all households in all other divisions were depended on hand pumps.

Use of dug wells for directly collecting water was practiced by very few households across the divisions. Interestingly, Amravati division has more number of households who were depended on own source for meeting their water needs with 31.5%, followed by Aurangabad with 11.2% households. Other divisions have very few households using own source for drinking water purposes.

Box. 3 : Status of a Functional Scheme The Actual Situation in Hivarkheda

Hivarkheda, Gram Panchayat located in Khamgaon of Buldhana District, Maharashtra. The GP has one habitation which has a population of 3,194. In 1980, a PWSS was constructed to meet water requirement of the village. The scheme was completed in all respect with an over head tank and it was about to be commissioned. However, during the test pumping conducted just before commissioning the scheme, the distribution pipes got busted at various locations due to the heavy water pressure developed in the pipes.

From the time this incident occurred, the PWSS was never repaired. People of this village have been using hand pumps and dug wells. The GP has around 10 hand pumps and 10 dug wells which are functional. However, these sources are affected by high salinity and TDS present in ground water. Use of water from these sources has resulted in formation of kidney stones among many people of the GP. So far, more than 50 cases of kidney stones have been reported.

Even though the scheme is not functional, the IMIS data reflects the habitation as fully covered with a functional PWSS having 210 household connections. As the old scheme is completely defunct, it is reported that a proposal for construction of a new PWSS has been sanctioned under the NRDWP 2014-15 action plan.

Box. 4 : RRWSS or Single Village Scheme? The Story of Wokodi

Wokodi is a Grampanchayat of Kalmunari Block in Hingoli District, Maharashtra. It is a single habitation GP with a population of 6,000. The GP was included as part of a large RRWSS which was designed to supply water for 25 GPs. The scheme was implemented in 2009. People reported that only during pre-commissioning tests conducted some water was received at the GP. Hence, people of this village are forced to depend on hand pumps and dug wells as primary source of drinking water.

However, if one observes locations of the village and large dam “Painganga Isapur Dam” (source of water) carefully, reason for lack of water supply becomes a puzzle. The village is only three km away from the perennial source of water “Painganga Isapur Dam”. Under the RRWSS, water of the Dam is pumped to a distance of 14km to a treatment plant. Then treated water is supplied through pipelines to 25 villages. Interestingly, though the village under consideration is only 3km away from source, but treated water needs to travel 17km to reach the village. This is main reason for lack of water in the study village.

In addition, the GP has adequate ground water potential being located near a large dam, and there is also a perennial water stream flowing at a distance of 100m. The obvious solution to this problem would have been a simple single village level PWSS scheme to supply water to the village in ample quantity. Unfortunately, being a part of RRWSS scheme the village is not entitled to propose a new scheme to resolve serious water problem. Impractical implementation of the scheme and rigid government policy has forced the villages to suffer without proper water supply.

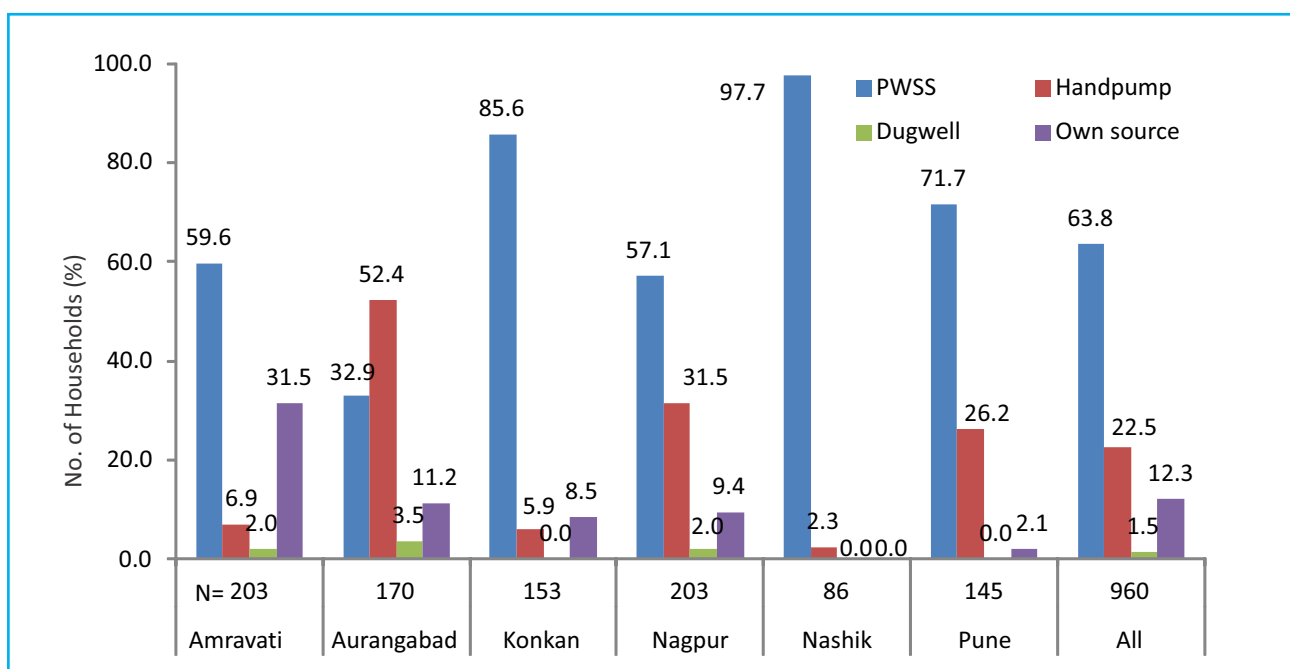


Figure 6 : Different types of water sources being used by households

Access to Water Sources : The responses on access to water sources in habitation were collected to understand the distance people travel to collect water. The variables like use of household tap connection, public source located within 500m distance, public source located at a distance of more than 500m and own source within the premises were collected to understand this aspect. As mentioned before, own source includes either bore well or dug well owned by the households. Similarly, public source can be a stand post of PWSS, hand pump or dug well.

It is observed that 43.3% households have individual household tap connections, 39.4% households use public water sources within 500m distance, 5% households use public sources located at a distance of more than 500m and 12.3% households have their own water source at homes. Thus, only 5% households are actually not covered under the norms suggested for access to drinking water within a distance of 500m. However, the normal access to

water supply of households is affected if water sources become dry during severe drought conditions.

Availability of household tap connection was observed to be highest in Nashik division with 83.7%, followed by Pune (47.6%), Nagpur (44.3%), Konkan (43.8%), Amravati (37.9%) and Aurangabad (24.1%). Availability of public source within 500m distance was observed. 48.3% households in Aurangabad, which had the highest number of households, while the lowest level was in Nashik with 16.3%.

Aurangabad division had the highest proportion of households who travel more than 500 m distance for collection of water (16.5%). It was observed to be 3.9% in Konkan, 3% in Amravati, 2.8% in Pune and 2% in Nagpur. Nashik had no households in this category. This data showed that the access to water had improved with implementation of water supply schemes as fewer households travel more than 500 m distance from their homes to collect water.

Box. 5 : Use of Private Dug Well for Water Supply

Jamb is a Grampanchayat of Yavatmal Block & District, Maharashtra. Total population of the GP is 2,177. Out of the two habitations in the GP, in the year 2000, one of the habitations of Jamb was included in the Kini RRWSS which provides water to 5 villages. This study again showed that how the RRWSS failed to provide water to villages uniformly.

In 2005, a new bore well was drilled in the habitation as an alternative water source. The old distribution network of the RRWSS was utilized for supplying water from the bore well. People were getting water from this arrangement till 2010; afterwards the bore well became dry. The situation of water supply in the GP worsened without a reliable source of water. Hand pumps in the habitation were also affected by water quality problems, whereas the dug wells had very little water to provide relief to people.

At this point of time, the Deputy Sarpanch of the GP agreed to provide water from his own private dug well. The scheme is now connected to this dug well since 5 years. This is a typical case where a private well of an influential member who is elected to the GP is being used to solve the problem of water. This example shows the generosity of an individual who has helped people to avail water in a distress situation. However, making such arrangements on a permanent basis might lead to a situation where people are at the mercy of powerful individuals.

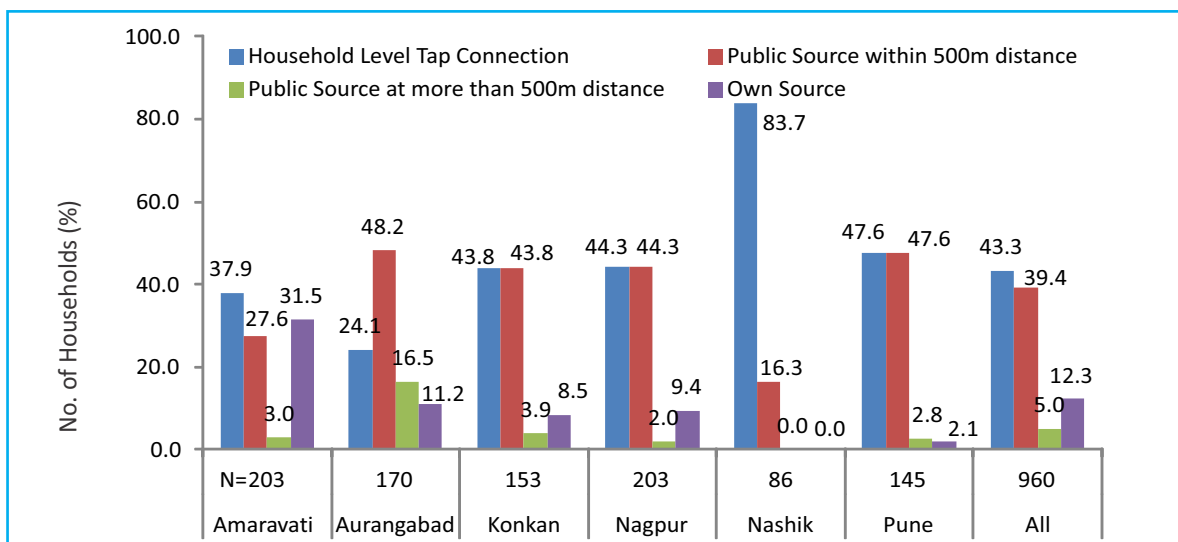


Figure 7 : Distance travelled by households for collection of water from their homes

Frequency of Water Supply : Frequency of water supplied to households had been studied to understand the performance of water supply. Frequency of water supply is categorised as: daily, alternate days, and once in 3 days or more in a normal year. The extreme & unpredictable scenario of drying up of sources or acute drought situation had not been included in this analysis. In this analysis, responses from households who own a water source in their house premises or depend on public hand pumps/dug wells are included under the category “daily”.

68.9% households informed that they received water daily, 12.5% households received water every alternate day & 18.6% households received water once in 3 or more days. The households who received water daily was highest in Pune division (98.6%), followed by Aurangabad (88.2%), Konkan (64.1%) & Amravati (41.4%). Households who reported that they received water only once in 3 days or more were 97.7% in Nashik division & 35% in Amravati. The proportion of household receiving water once in 3 days or more in other divisions were significantly low.

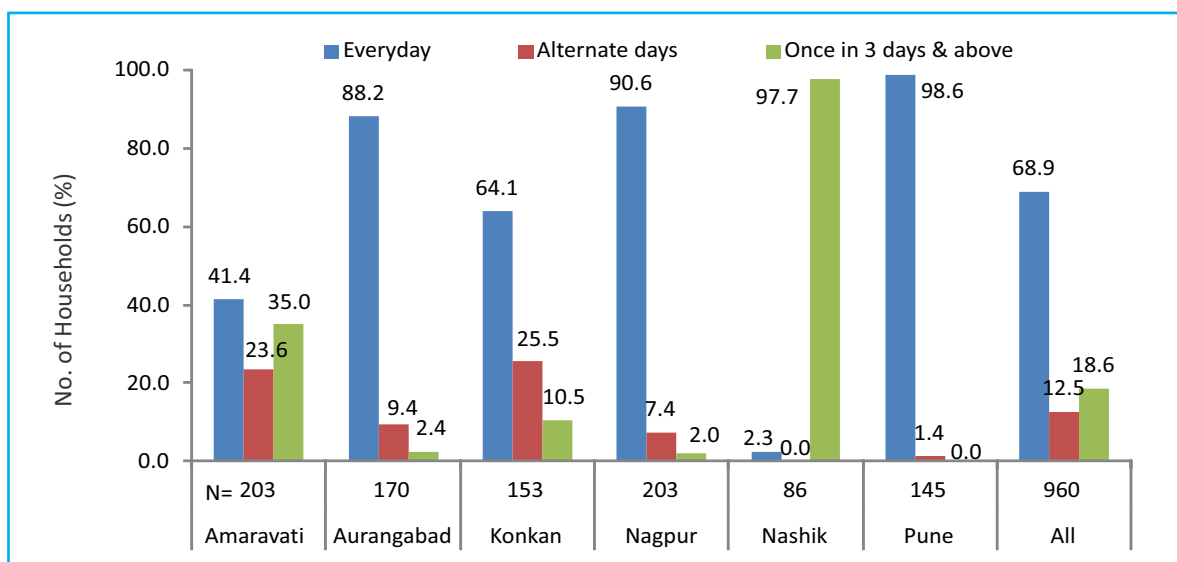


Figure 8 : Frequency of water supplied to households

Impact of Water Supply : The impact of improved water supply on households was observed using parameters such as reduction in travel distance to fetch water and the overall satisfaction received due to improved water supply scheme. The overall satisfaction among households with respect to the water supplies provides a comprehensive understanding than the usual method of eliciting availability of 40 LPCD of water at the households, which is sometime not realistic or accurate.

To the question on reduction in the distance travelled because of the current water supply scheme in the habitation, 39.1% households reported that the reduction in distance was less than 200m, 30.2% household reported that the distance was between 200 and 500m, 4.2% households responded that it was more than 500m and 26.5% felt that there was no change in the distance travelled by them. Among the 26.5% households expressed that there was no change in distance travelled even after the implementation of the new water scheme, 23.2% households had access to water source within 500m distance from their houses. However, the rest of 2.3% households in this category were those who had to travel more than 500m before the new schemes were built, after implementation of new scheme they had to travel that long distance.

4.2% households were the most benefited as their travel distance is reduced more than 500m because of

the new schemes. This also directly relates to the time saved and reduction in hardship faced for collection of water. The numbers of such households were more in Amravati (8.4%) and Konkan (7.2%), as installation of new schemes had resulted in availability of water.

On improvement of water supply situation due to installation of new water schemes, 66.8% households reported that the new scheme had, indeed, improved the water supply. In almost all divisions, the implementation of new schemes had benefitted households immensely. For example, 85.6% households in Konkan (highest) and 56.5% households in Aurangabad (lowest) had reported satisfaction with new water supply scheme.

Of 66.8% households expressed satisfaction on installation of new scheme for two reasons, first, availability of adequate quantity of water (reported by 54.8% households), second, less distance covered to fetch water, improvement in quality of water, reliability of scheme and convenience for water collection (reported by 12% households).

The proportion of households from different caste composition who expressed satisfaction over the water supply scheme includes SC- 62.5% (out of 128), ST-52.4% (out of 208), BC-75.5% (out of 274) and General-68.2% (out of 261). The satisfaction levels over the water supply among different social groups are comparable.

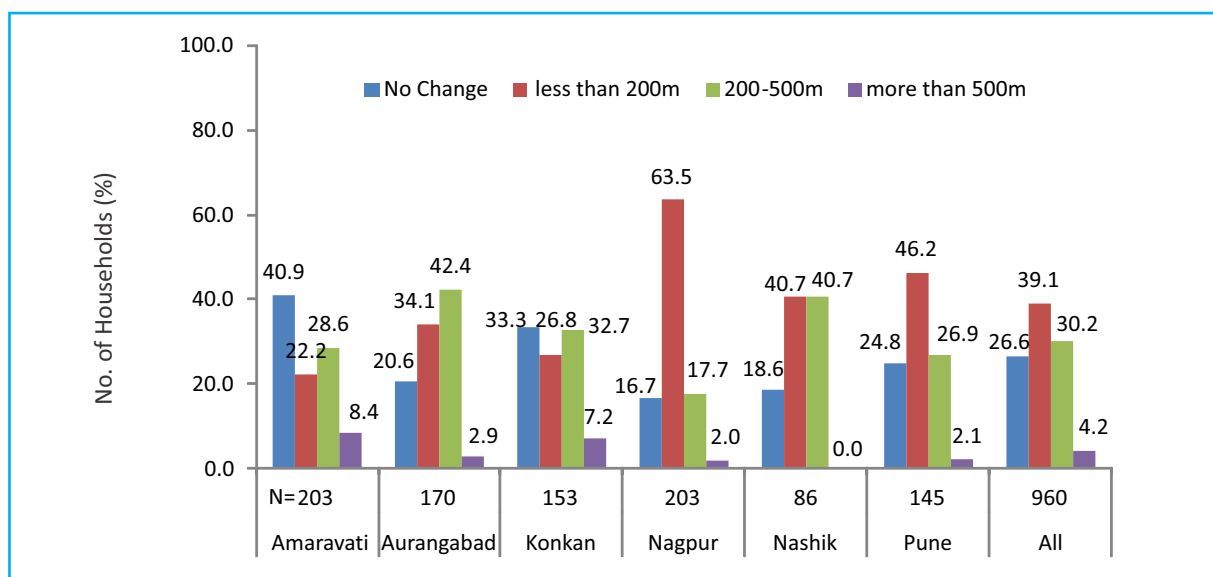


Figure 9 : Change in distance travelled by households as a result of new water sources

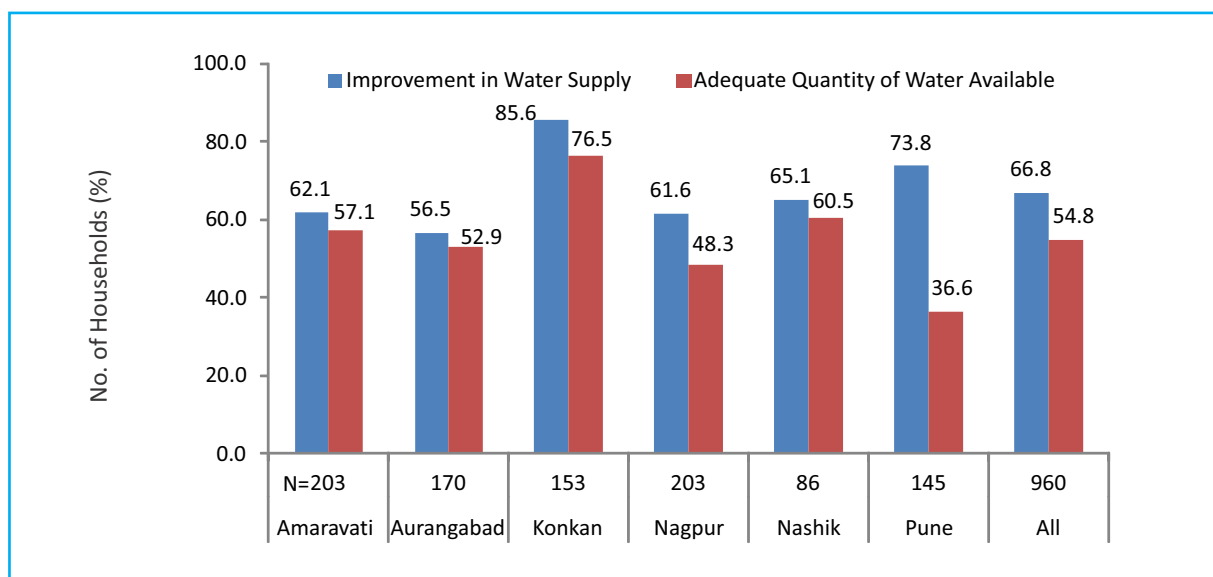


Figure 10 : Response of households on the overall satisfaction over the new water supply schemes

Box. 6 : Efficient Water Management at Tirri

Tirri is a Gram Panchayat in Pauni Block of Bhandara District, Maharashtra. The GP had a water supply scheme implemented by the MJP and later it was renovated under the Jalswarajya Project. This single village scheme has a dug well as its primary source of water. The VWSC, which was formed to manage the water supply, became inactive after a very short period. However, members of the GP were determined to efficiently manage the water supply scheme to ensure uninterrupted supply of water. Due to absolute transparency in the management of the scheme, people started trusting the GP, and were willing to pay for water supply services. As a result, regular water tariffs were paid by the people. This enabled timely and efficient management of the scheme. Presently, the GP has a saving of more than Rs.2 Lakh in the water supply management fund.

Hand pumps, which are used as a back-up for water supply, are also repaired by paying annual maintenance costs regularly to GSDA. In order to save the expenditure in the O&M of the scheme, minor repairs were attended by the members of GP themselves without seeking help of paid mechanics. Also, there is a significant reduction in pumping hours was achieved with careful planning. The pumping hours of 17 hours was brought down to 7 hours after the intervention, which resulted 40% of savings in the electricity bill.

In addition, the GP was also awarded the Nirmal Gram Purashkar in 2007 for eliminating open defecation. Also, a vehicle was purchased for door to door collection of solid waste and its efficient management. Today, people of the GP are satisfied with the efficient water supply and other services being provided by the GP. The story of Tirri is an inspiration for other GPs who want to efficiently manage their water supply schemes.

3.5 Water Quality

In the study efforts were made to understand the engagement and understanding of the GP members on water quality related aspects. Response related to the routine water quality testing of drinking water sources for bacteriological and chemical parameters was collected from the members of the GPs. In addition, it was attempted to understand the awareness among members of GPs and households on the status of quality of water being supplied. Other aspects collected on water quality include, chlorination and testing of residual chlorine and household level water treatment processes adopted.

Awareness on Water Quality Tests Conducted: 60.4% GPs reported that they were aware of regular tests being conducted for bacteriological parameters, while 56.3% GPs reported that they were aware of the regular tests for chemical parameters in water. Only in Konkan division all GPs reported that they were aware of the water testing regime being adopted in the District for both chemical and bacteriological aspects, followed by Pune division in which 75% GPs mentioned that they were aware of water quality testing regime.

Responses of the GP members with regard to water quality of drinking water sources for bacteriological and chemical parameters revealed that they are mostly ignorant of the results of the tests being conducted from time to time. 97.9% GPs reported that the water was potable and it was free from bacteriological contamination. Similarly, 95.8% GPs reported that the water sources of the GPs were free from chemical contamination and it was well within the permissible limits.

Availability of bleaching powder or TCL at GP level, and regular treatment of water sources plays an important role in mitigating bacteriological contamination of drinking water. In order to assess

this aspect, observations and discussions were held to understand the protocol related to the chlorination of the drinking water with GP members and Village Water Man (Jal Surakshak). 62.5% GPs reported the regular use of chlorine and treatment of water sources. Regular use of chlorine by GPs reported were highest in Konkan division (87.5%), followed by Nashik (75%), Amravati (62.5%), Pune (62.5%) and Aurangabad (50%). The GPs in Nagpur divisions reported the lowest level of chlorine use with only 37.5% of GPs used regular chlorination.

The awareness of chlorine procedure and protocols of handling them were assessed among the Jalsurakshak. 72.9% of Jalsurakshak in the 48 GPs reported that they were aware of the chlorination procedure and protocols of handling. Lower level of awareness among Jalsurakshak were found in GPs of Nagpur division (37.5%).

The Orthotolodine Test (OT) is an essential test conducted for determining chlorine dose in drinking water supplied. GPs are provided with the OT kits and the Jalsurakshak's are trained to monitor chlorine dose using these kits. In the study, it was found that only 47.9% GPs had OT test kits and only 16.7% GPs conducted it regularly. It was found that most GPs did not have the chemical required to perform the OT tests.

The study results reveal that chlorination is the major water treatment process adopted by the GPs surveyed. In some GPs, which were affected by fluoride, it was observed that connections of hand pumps to fluoride removal plants installed were bypassed to save the time of water collection. This practice shows that the communities were not properly informed about the ill-effects of contaminated water on health.

Table 13 : Frequency of bacteriological and chemical tests conducted and potability of water sources as per GPs

Division	Bacteriological tests (%)		Chemical tests (%)	
	Number of GPs testing regularly	GPs reported potable water sources	Number of GPs testing regularly	GPs Reported chemical parameters below permissible limit
Amaravathi	62.5	100.0	50.0	100.0
Aurangabad	50.0	87.5	37.5	100.0
Konkan	100.0	100.0	100.0	100.0
Nagpur	37.5	100.0	25.0	87.5
Nashik	37.5	100.0	50.0	87.5
Pune	75.0	100.0	75.0	100.0
All	60.4	97.9	56.3	95.8

Table 14 : Chlorination and availability of OT test kits for testing residual chlorine in GPs

Division	Number of GPs reported chlorine availability and regular chlorination (%)	Number of water operators aware of chlorine dosage & handling procedure (%)	Number of GPs having OT test kits (%)	Number of GPs conducting OT tests regularly (%)
Amaravathi	62.5	75.0	50.0	0.0
Aurangabad	50.0	50.0	50.0	25.0
Konkan	87.5	87.5	37.5	12.5
Nagpur	37.5	37.5	37.5	25.0
Nashik	75.0	100.0	62.5	25.0
Pune	62.5	87.5	50.0	12.5
All	62.5	72.9	47.9	16.7

Household Water Treatment : In order to understand the household level awareness of water quality issues, responses on the quality of water being used in monsoon and summer seasons were collected from the 960 households surveyed. It was observed that awareness with regard to the quality of water being used for drinking purposes was at a negligent level among the surveyed households.

On quality of water during Monsoon, 94.1% households responded that the water quality in the monsoon period was good, while only 5.2% and 0.7% households reported water quality was average and poor respectively. However, only 79.6% households reported that quality of water in summer periods was good while 11.0% and 9.4% households reported as average and poor respectively.

These results suggest that the lack of understanding

on the quality of supplied water among people. The poor quality of water reported for summer months could be due to the scarcity of water in the period wherein households were forced to depend on alternative sources which were likely to be bad in quality and had not been tested otherwise.

Point of use water treatment is almost non-existent at the household level. Around 75.3% households never used any kind of water treatment processes at home. Occasional use of liquid chlorine in rainy seasons was the only treatment process on which the households depended on. Occasional use of chlorine for treatment of water especially in monsoon season was reported by 24.3% households. Only 0.2% of households reported the use of boiled water, while the same number of households reported the use of advanced water filters for water treatment at house level.

Table 15 : Perception of households on water quality

Division	Number of households	Water quality in monsoon (%)			Water quality in summer (%)		
		Good	Average	Poor	Good	Average	Poor
Amravati	203	87.2	9.9	3.0	51.7	34.0	14.3
Aurangabad	170	89.4	10.6	0.0	84.7	4.7	10.6
Konkan	153	99.3	0.7	0.0	87.6	5.2	7.2
Nagpur	203	94.6	4.9	0.5	94.1	4.9	1.0
Nasik	86	100.0	0.0	0.0	53.5	11.6	34.9
Pune	145	99.3	0.7	0.0	99.3	0.7	0.0
All	960	94.1	5.2	0.7	79.6	11.0	9.4

Water quality aspect had not been given importance except when there was any physical contamination like presence of mud or dirt by the households. In fluoride affected GPs, it was witnessed that even wells which have been declared not safe were still in use for water collection. In Hivarkhede GP of Buldhana District the source water had high TDS levels (around 1000 ppm) in ground water where many people suffer the problem of kidney stone as a result. However, out of the 79 households surveyed in the GP, only 6 reported that the water quality was poor.

In the FGDs, people of the villages raised some serious issues related to quality of water. The issues

such are: improper collection of water sample by some of the health department staff, lack of coordination between the frontline workers of various departments mainly the health and rural water supply department, lack of sufficient funds for O&M, inefficient chlorination by the Jal Surakshaks.

The IMIS data for water quality tests conducted in drinking water sources of 39 GPs shows that at-least one of the source is contaminated either bacteriologically or chemically. Presence of chemical parameters such as fluoride, nitrate, iron, hardness and chloride more than the permissible limits were reported. This situation reflects the need for more

attention towards addressing water quality related problems. Households must be actively engaged to promote water quality related issues and take

appropriate steps for ensuring contamination free water supply.

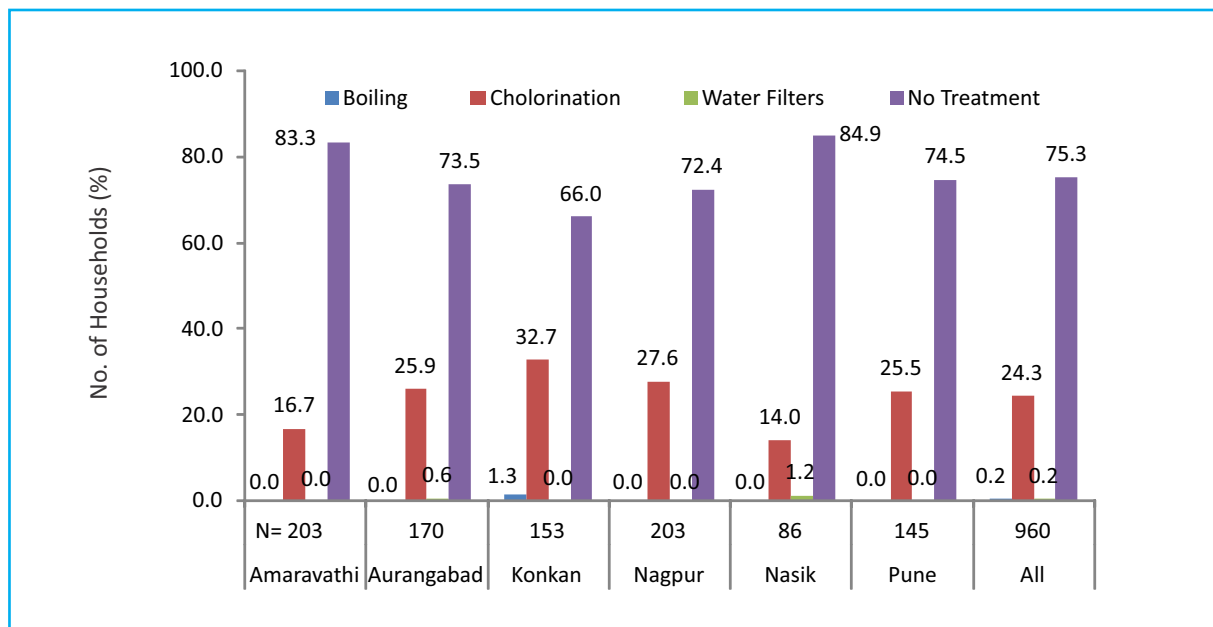


Figure 11 : Household level drinking water treatment practices

3.6 Financial Aspects of Water Supply Schemes

In the study, 42 GPs with functional PWSS were taken for the financial analysis. GPs without PWSS and/or defunct PWSS were not included in this analysis. In this section, proportion of households with water connections, proportion of water tariff collection, frequency of water tariff collection, payment of electricity bills and salary of Jalsurakshaks, ratio of water tariff collected to expenditure and ratio of estimated water tariff to expenditure were assessed.

Household Water Connections : In all the 42 GPs which had functional PWSS, the number of households with water tap connections was collected to understand the level of service. For the entire study area, 15.3% GPs reported households with 80% and above tap connections, 23.7% GPs reported 50-80% tap connections are 21.3% GPs reported 25-50% tap connections and 39.7% GPs reported less than 25% tap connections. Only three divisions, Konkan (37.5%), Nashik (37.5%) and Aurangabad (16.6%) had GPs with 80% and above households having individual tap connections. All other divisions had

GPs with household tap connections only in the range of 50-80% as the highest level of service.

Water Tariff Collection : Frequency of water tariff collected revealed that 67.8% of GPs collect water tariff once in a year while the rest of 32.2% of GPs reported collection of water tariff on a monthly basis. Although, water tariff collection on a monthly basis helps in timely availability of funds for efficient O&M of schemes, for the convenience of households who depend on seasonal income especially agriculture operations and seasonal employment the practice of annual water tariff collection is still followed by many GPs.

The percentage of water tariff collection during the financial year 2013-14 in 31.8% GPs were 80% and above, in 33.7% GPs it is 50-80%, in 24.9% GPs it is 25-50% and in 9.6% GPs it is less than 25%. Konkan division has the maximum number of GPs (62.5%) collecting water tariff in the range of 80% and above.

Financial Management : Ability to pay electricity

bills and salary of Jalsurakshak has always been an issue for the GPs due to inadequate funds. On an average, it was observed that only 32.5% of GPs pay electricity bills and 73.4% GPs paid salary of Jalsurakshaks regularly in the study area. Schemes in GPs of Konkan and Nagpur divisions reported regular payment of both the electricity bills and salary of Jalsurakshaks. However, in Amravati division it was observed that only payments to Jalsurakshaks were done regularly.

Analysis of water tariff collection and the actual expenditure provides an over view of financial management of water supply schemes in GPs. For this purpose, the water tariff collected in the last financial year and the average annual expenditure of water supply scheme in GPs were used. The results shows that only 20.5% schemes in the GPs studied were able to meet the expenditures incurred for management of the water schemes with an efficient water tariff collection system. The ratio of water tariff collected to the expenditure incurred by rest of the schemes falling in the range of 80-100% were 7.7%, 50-80% were

25.6 and 25-50% were 46.2%.

Similarly, analysis of the demand (maximum water tariff collection based on potential tariff) and the actual expenditure was also calculated. This analysis shows that 48.8% schemes in the GPs can meet the maintenance expenditures if water tariff was collected efficiently from all the users. The ratio of water tariff demand to the expenditure incurred by rest of the schemes falling in the range of 80-100% were 15.4%, 50-80% were 17.9% and 25-50% were 17.9%.

It can be concluded that only 48.8% of schemes surveyed can meet the financial requirements of managing the water supply schemes with the current water tariff structure. Therefore, there is a need to revisit the water tariff structure to enable GPs to meet the expenditures for managing the schemes. However, 28.3% (i.e. the difference between estimated ratio (48.8 %) and the actual ratio (20.5%) mentioned above) of GPs can improve their performance by introducing effective water tariff collection mechanisms.

Table 16 : Household water connections and frequency of water tariff collection

Details	Number of functional PWSS schemes	Household water connections (%)				Frequency of water tariff collection (%)	
		<25%	<25-50%	50-80%	80% & above	Monthly	Yearly
Amravati	7	42.9	42.9	14.2	0.0	0.0	100.0
Aurangabad	6	50.0	16.7	16.7	16.6	50.0	50.0
Konkan	8	37.5	0.0	25.0	37.5	75.0	25.0
Nagpur	6	66.7	16.7	16.7	0.0	16.7	83.3
Nasik	8	12.5	37.5	12.5	37.5	37.5	62.5
Pune	7	28.6	14.3	57.1	0.0	14.3	85.7
All	42	39.7	21.3	23.7	15.3	32.2	67.8

Lack of capacities among VWSCs and GPs to motivate users to actively participate in the management of water supply schemes was reported to be one of the reasons for the poor performance of schemes, especially on the financial management front. In addition to special drives to increase awareness and participation of people on the need for effective management and water tariff collection,

field level support and training by the BRCs/DWSMs on O&M and financial management aspects are also need to be undertaken at regular intervals. Increased focus on sanitation aspects was reported to be partly a reason cited for the poor management of water supply schemes.

It is reported that the elected representatives of GPs were not enforcing water tariff collection practices

Table 17 : Water tariff collection and payments to electricity & salary in GPs

Division	Water tax collection in GPs				Number of GPs paying electricity bill regularly	Number of GPs paying salary of waterman regularly
	<25%	<25-50%	50-80%	80% & above		
Amravati	14.3	28.6	28.6	28.6	14.3	100.0
Aurangabad	16.7	33.3	33.3	16.7	0.0	50.0
Konkan	0.0	12.5	25.0	62.5	87.5	100.0
Nagpur	0.0	50.0	33.3	16.7	66.7	83.3
Nasik	12.5	25.0	25.0	37.5	12.5	50.0
Pune	14.3	0.0	57.1	28.6	14.3	57.1
All	9.6	24.9	33.7	31.8	32.5	73.4

from households. The elected representatives usually are known to be lenient on tax collections to appease the voters. In some GPs, the staff reported that they were successful in collecting water tariff and other taxes by force when people come for other official works like taking an endorsement for ration card or caste certificate at the GP.

The proportion of GPs observed to be collecting water tariff successfully in the study is almost equivalent to the figures reported in a study conducted in Maharashtra (WB, 2013). As a result, non-payment of electricity bills and salary of Jalsurakshaks, insufficient stock of chlorine and timely repair of defunct components of the scheme occurs. It was reported that the practice of manipulating the books of

accounts were undertaken to report better performance of water supply schemes by showing higher proportion of water tariff collection, and at the same time show higher amount of expenditure than what was really spent.

Revision of water tariff according to the actual expenditures incurred by individual schemes is necessary for proper management of water supply schemes. This can only be achieved with active participation of the users. However, it is important to consider the ability of poor and marginal households to pay the water tariff fixed. The role of BRCs/DWSMs is very important to support the VWSCs/GPs to dynamically review the functioning of water supply schemes and take corrective steps.

Table 18 : Actual and estimated water tariff collection to expenditure

Division	% of Actual water tariff collection to expenditure				% of estimated water tariff collection to expenditure			
	<25-50%	<50-80%	<80-100%	100% & above	<25-50%	<50-80%	<80-100%	100% & above
Amravati	50.0	33.3	0.0	16.7	16.7	33.3	16.7	33.3
Aurangabad	75.0	0.0	0.0	25.0	25.0	0.0	0.0	75.0
Konkan	12.5	25.0	25.0	37.5	12.5	12.5	12.5	62.5
Nagpur	66.7	16.7	0.0	16.7	0.0	16.7	50.0	33.3
Nasik	50.0	25.0	0.0	25.0	0.0	37.5	12.5	50.0
Pune	42.9	42.9	14.3	0.0	57.1	0.0	0.0	42.9
All	46.2	25.6	7.7	20.5	17.9	17.9	15.4	48.7

Box. 7 : Water Supply in Rajewadi : An Example of Best Practice

Rajewadi is a Grampanchayat of Mahad Block of Raigad District in Maharashtra. The GP has a population of 2,440 and it has three habitations. All the three habitations are covered with a single PWSS for water supply. In 2006, the GP was selected as a pilot for implementation of the demand driven project under the central fund. A VWSC was formed for the planning, implementation and management of the water supply scheme. The active VWSC was successful in mobilizing very high people's participation and their involvement in the scheme.

The GP was successful in fixing water meters to all the 425 household connections provided under the scheme. Every month, water tariff is collected on the basis of volume of water consumed by the households, except poor and wageworker household. Presently, the GP charges a water tariff of Rs.8 for one kilo-litre. The Anganwadi worker has also been roped in for collection of water tariff from households.

It should be noted that the GP has managed to collect 100% water tariff for the last 9 years. Water supply is also timed such that the daily wage workers who have to leave their homes early in the morning can collect water before leaving for work. Other rich households are supplied water later in the day. To avoid stagnation of water in the village, households who have tap connections in their homes are requested to manage waste water generated within their house premises.

The GP has successfully managed to provide water supply without any break for the past 9 years due to efficient planning and execution of O&M carried out. Also, electricity bill and bulk water charges to MIDC for supplying water are being paid by the GP in time. Due to the efficient management principles followed by the GP, a saving of Rs.67, 000/- is available in the account meant for O&M of the scheme.

3.7 Household Sanitation

In the study, data on toilet availability, usage, year of construction were collected. The availability of toilet & water supply in the premises of households were also compared to understand the relation between the two.

Household Toilets : In the study area, household toilet coverage of 44.6% was observed among the 960 households surveyed. Proportion of households with toilets was highest in Konkan (64.1%) followed by Amaravathi (52.7%) while households in other divisions covered reported lower than 50% coverage. However, only 40.2% households reported that they have a functional toilet. The Konkan division has the highest proportion of functional toilets with 63.4%. The usage of toilets by households was not assessed as it is always misleading.

Analysis of 428 households who had built toilets based on their social status was carried out to understand its distribution among different social groups. The households who had toilets according to social status were SC 11.7%, ST 20.8%, BC 38.1% and General 30.4%.

In order to study the use of subsidy for building toilets, households surveyed were asked whether they have received subsidy for building toilets. It was observed that 37.9% of the total households surveyed reported to have received subsidy for building toilets.

The availability of water and toilet coverage has a direct correlation because of the importance of the former in sustaining the toilet usage. For this purpose, comparison between households which had access to water source within the house premises and access to common water sources located away from the households with availability of toilet in the households were studied.

It was observed that 65.9% households had water sources within the house premises were observed to have built toilets while only 35% households which depended on common water sources had built toilets. In other words, this suggested that the chance of building a toilet doubles with the availability water source within the dwelling area of the households.

In order to assess the impetus to household sanitation coverage during various programmes implemented across the state, the year of toilet construction was

taken as a topic. The households had built toilets before the year 2000 was 5.4%, between 2000 and 2011 was 72% and from 2012-till date was 22.7%. This shows that maximum coverage of toilet had been achieved between 2000 and 2011 during the implementation TSC programme. The clean village campaigns, SGBSA and NGP could be attributed for the higher sanitation coverage figures in the State. These programmes irrespective of the short comings in terms of sustaining the open defecation status had helped in providing impetus to the sanitation coverage across the country.

Of all 42 GPs, 16 GPs received the NGP award before 2012. However, according to the IMIS baseline data for 2012, 13 GPs among 16 GPs did not have 100% toilet coverage. The 3 GPs which were still maintaining the open defecation free status are from the Konkan division, the status in these GPs was also observed by the team during the field survey. Wide spread failure of NGP awarded GPs across the country in maintaining the open defecation free status is a matter of serious concern.

The proportion of households having toilet observed in the study corresponds well with the findings of the Census 2011. However, the actual toilet usage among the households who have built toilet is expected to be much lower in the study area. Studies conducted in the past have revealed poor level of toilet usage among households who have built toilets (CMS, 2011). One of the key challenges is to promote awareness among people about the problems associated with open defecation, & the need for having a household toilet for safe disposal of human excreta. Therefore, intensive awareness & motivational drives on the need for using toilets with appropriate supply chain & credit mechanisms are essential to supplement the efforts.

The experience suggests that Nirmal Gram Puraskhar awarded GPs reverting back to the state of open defecation. The same is applicable to the study area, there are 13 GPs which are reported to have reverted back to open defecation after the NGP award was received as per the IMIS baseline data. Under the NGP and SGBA campaigns, the officials and key leaders have only aimed at achieving 100% household toilet coverage without paying attention to the actual

Table 19 : Status of household toilet construction

Division covered	Number of Households covered	Propotion of households (in %)				
		Households with toilet	Households with functional toilets	Households received subsidy	Toilets in households with own water source	Toilets in households with common water source
Amravati	203	52.7	45.3	29.0	69.2	31.8
Aurangabad	170	34.1	30.6	41.4	51.7	48.3
Konkan	153	64.1	63.4	19.4	67.3	33.7
Nagpur	203	41.4	38.9	38.1	60.7	40.5
Nashik	86	32.6	27.9	53.6	92.9	10.7
Pune	145	36.6	29.0	77.4	66.0	34.0
All	960	44.6	40.2	37.9	65.9	35.0

awareness and motivational aspects which are critical for elimination of open defecation.

Water scarcity was also one of the key concerns in the study area. It is observed that 49% households with

reliable water source had toilets in this study. Therefore, improved water supply was very important step for promoting improved sanitation practices.

Table 20 : Year of construction of toilets in households

Division covered	Number of households with toilets	Year of toilet construction (in %)		
		Before 2000	2000-2011	2012 to Present
Amravati	107.0	1.9	73.8	24.3
Aurangabad	58.0	1.7	79.3	19.0
Konkan	98.0	13.3	79.6	7.1
Nagpur	84.0	6.0	76.2	17.9
Nasik	28.0	0.0	46.4	53.6
Pune	53.0	3.8	52.8	43.4
All	428.0	5.4	72.0	22.7

3.8 WASH Facilities in Schools and Anganwadis

In the study, 45 schools and 75 Anganwadis located in 48 GPs were covered. Data pertaining to status of water and sanitation facilities in schools and Anganwadis, hand washing facility in schools and water storage tanks in schools were collected. Status of different water sources in the schools and Anganwadis included information related to sources such as PWSS, bore wells with motor, hand pumps and dug wells. Status of toilet facilities collected for

schools and Anganwadis include availability and functional status of toilets, in addition availability of baby friendly toilets in Anganwadis were also collected. The different types of facilities available for hand washing in schools collected include water bucket & mug, storage tank with tap and hand pumps.

Water Supply in Schools : Of the 45 schools covered under the study, 91.1% schools had provision

of water sources and only 8.9 % schools lacked any sort of water source within the school premises. The disaggregated data on the type of sources provided in schools revealed tap connection from PWSS scheme to be the most common type of water source in schools.

About 53.3% schools had tap connection from PWSS, while 20% had hand pumps, 15.6% had bore wells with motor and 2.2% had dug wells as the water source. However, 25% schools in Konkan, 20% in Aurangabad and 9.1% in Nagpur had no water sources. Nasik division had the highest number of tap water connections from PWSS (88.9%) followed by Konkan (75%), Pune (66.7%), Aurangabad (50%),

Amaravathi (40%) and Nagpur (18.2%).

Provision of water storage tanks of at least 500 litres have been encouraged to be built in schools in schools of Maharashtra as a measure to ensure water for children in schools throughout the day. In the study, it was observed that only 62.2% schools had water storage tank built within the premises.

In addition, responses on availability of water round the year in schools show that only 71.1% schools had water in all seasons. This reveals that over 20% schools had water source drying up in summer in addition to 8.9% schools which did not have any sort of water source in schools.

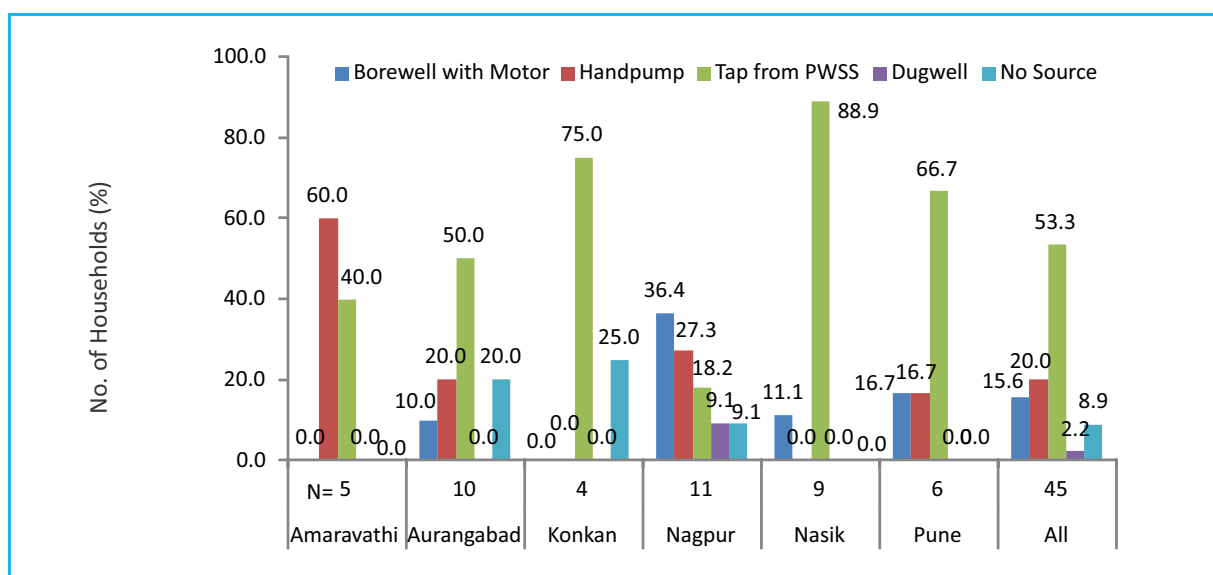


Figure 12 : Drinking water sources in schools

Table 21 : Schools having water storage facilities and round the year water availability

Details	Number of schools covered	Number of schools having water storage tanks (%)	Number of schools having round the year water facility (%)
Amravati	5	20.0	60.0
Aurangabad	10	60.0	30.0
Konkan	4	75.0	75.0
Nagpur	11	54.5	81.8
Nasik	9	88.9	100.0
Pune	6	66.7	83.3
All	45	62.2	71.1

Hand Washing Facility : Hand washing facilities in schools play an important role in inculcating the practice of hand washing among school going children. In the absence of specific guideline which directs the school authorities, this aspect is not considered to be an important intervention. The schools must be directed to provide hand washing facilities like the water and toilet facilities in schools which have been made mandatory.

In the study, it was found that none of the schools had a dedicated hand washing station. Hand washing stations consists of taps with running water/bucket & mug and a trough for collection and disposal of waste water. This arrangement enables students to wash

their hands with ease after using toilet and before eating mid-day-meal.

However, facilities such as bucket and mug in 4.4% schools, use of outlet taps provided in ground level storage tanks in 26.7% schools and handpumps in 17.8% schools were being used as hand washing facility.

Inculcation of hand washing practice among students remains unsatisfactory in schools. Even if the students want to practice hand washing, it is reported that they avoided use of the facility due to overcrowding during the relatively short class intervals. Adopting different schedule of timing for the breaks between the classes in schools is a solution followed in many schools.

Table 22 : Availability and type of hand washing facilities in schools

Division	Availability of handwashing facility (%)	Type of handwashing facility (%)			No handwashing facility available (%)
		Bucket & mug	Storage tank with taps	Handpump	
Amravati	100.0	20.0	40.0	40.0	0.0
Aurangabad	20.0	0.0	0.0	20.0	80.0
Konkan	75.0	25.0	50.0	0.0	25.0
Nagpur	63.6	0.0	36.4	27.3	36.4
Nasik	33.3	0.0	33.3	0.0	66.7
Pune	33.3	0.0	16.7	16.7	66.7
All	48.9	4.4	26.7	17.8	51.1

School Sanitation : Provision of toilets in schools has been considered to be an important component in water, sanitation and hygiene programmes. It not only helps in ensuring reduction of drop-out rates of adolescent girls, but also promotes safe learning environment and inculcate the practice of toilet use among the school going children.

Around 97.8 % schools of the 45 schools surveyed had school toilets built in their premises. Only Nagpur division had 9.1% schools without toilet facility within the school premises. It was observed that 97.8% schools surveyed had toilets, only 62.2% of

them are functional at present. Major reasons observed are lack of water and absence of regular maintenance of toilets.

Only 6% schools had some basic provision for assisting children with special needs in the toilets. In the study, it was found that a western type toilet or a commode chair over Indian type toilet seat was provided to assist students with disability. However, provision of ramp with hand rails, wheel chair access inside the toilets and handles which provide support within the toilets were absent.

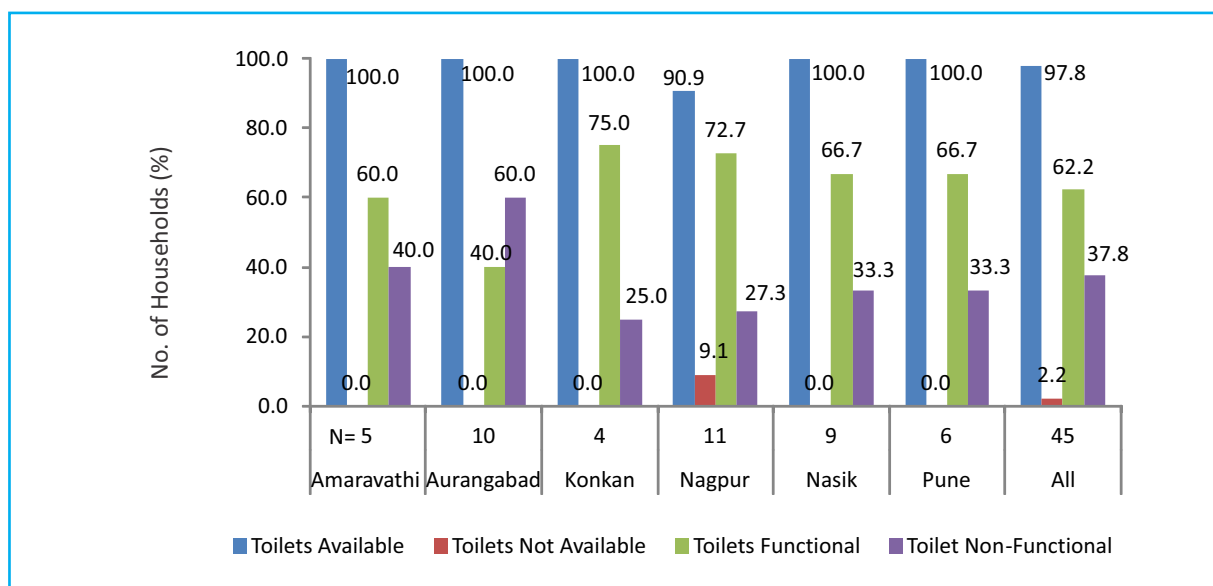


Figure 13 : Status of toilets in schools

Anganwadi : 75 Anganwadis were covered in the study. Only 68% of Anganwadis had water sources within their premises. Water sources provided in Anganwadis include; bore wells with motors in 10.7%, hand pumps in 17.3% and tap connection in 40%. Anganwadis in Konkan division had 100% water source coverage within the premises. It is followed by Pune (76.9%), Nasik (72.7%), Nagpur (69.3%), Aurangabad (64.3%) and Amaravathi (47.1%).

Stored water availability in Anganwadis for drinking purposes was also checked. During the study, it was found that only 68% Anganwadis had water stored in the storage containers meant for drinking.

76% Anganwadis were observed to have toilet facilities within the premises. However, out of 75 Anganwadis surveyed only 46.7% Anganwadis had functional toilets. Baby friendly features provided in toilets were observed only in 50.7% Anganwadis surveyed. In Konkan region, it was found that all toilets built had features of baby friendly toilets incorporated in the design. Features such as baby toilets pans, better ventilated toilets, doors latches which can be operated from both sides of the toilets and pictures on wall to appeal the young users were provided. Baby friendly toilets enable children in Anganwadis to use them without fear and make them feel secured.

Table 23 : Water source and availability of storage tank in Anganwadis

Division	Number of anganwadis covered	Type of water source (%)			No water source (%)	Availability of storage tank with water (%)
		Borewell	Handpump	Tap connection from PWSS		
Amravati	17	0.0	17.6	29.4	52.9	64.7
Aurangabad	14	28.6	21.4	14.3	35.7	21.4
Konkan	7	0.0	0.0	100.0	0.0	100.0
Nagpur	13	15.4	30.8	23.1	30.8	69.2
Nasik	11	9.1	0.0	63.6	27.3	90.9
Pune	13	7.7	23.1	46.2	23.1	84.6
All	75	10.7	17.3	40.0	32.0	68.0

Table 24 : Availability and functioning of toilets in Anganwadis

Division	Number of Anganwadis covered	Availability of toilet (%)	Anganwadis with functioning toilets (%)	Anganwadis having baby friendly toilets (%)
Amravati	17	58.8	35.3	35.3
Aurangabad	14	64.3	14.3	14.3
Konkan	7	100.0	100.0	100.0
Nagpur	13	84.6	53.8	69.2
Nasik	11	81.8	72.7	63.6
Pune	13	84.6	38.5	53.8
All	75	76.0	46.7	50.7

Promoting toilets and urinals based on student strength in schools is essential to ensure adequate facilities as per the norms suggested (Snel et al., 2002). Most schools have adopted the toilet designs having only one toilet and two or three urinals attached to it separately for boys and girls. Similarly, provision of toilets for children with special needs in schools and baby friendly toilets in Anganwadis needs special attention.

Land around the school campus is often used for open defecation in the absence of boundary wall around the school campus. It is also reported in that school toilets were misused and vandalised by local people.

Lack of inter departmental coordination has been sighted as one of the reasons reported for poor state of school water and sanitation status. This situation is expected to change with the new policy of handing over the task to education department.

Promoting hand washing stations in schools is very important to provide safe place for hand washing to students before eating mid-day meal or after toilet use. In the study it was found that absence of a clear guideline, schools does not have adequate facilities built. Dedicated hand washing stations with multiple tap arrangements are necessary to avoid rush during short intervals the students get in schools. Availability of soap for hand washing is another key area of concern.

It is also important to establish systems in schools for promoting regular hygiene education, maintenance and cleaning of toilets, availability of soap and water, and more importantly an effective process of regular review of the overall water and sanitation facilities in schools and Anganwadis.

4

CONCLUSION



The status of water supply in Maharashtra can be considered as satisfactory in terms of coverage at the habitations and in terms of service at the households. Maharashtra adopted the reform processes ahead of many other states in the country and it has been steadily implementing various steps to improve water and sanitation services in rural areas. However, it can be argued that there is tremendous scope for improvement. Major observations and findings of this evaluation study conducted in the State are summarised in the following sections.

According to the guidelines of NRDWP, the role of VWSCs is critical for ensuring effective O&M of water supply schemes. However, the active engagement of only 50% VWSCs in the study area highlights the need for ensuring greater community led processes. Issues with respect to the functioning of VWSCs such as inadequate representation of women members, irregular meetings, lack of capacities to manage water supply schemes efficiently, poor water tariff collection and the direct involvement of GPs role in O&M, calls for proactive steps to increase their effectiveness.

Piped water supply schemes are being managed by the GPs to a greater extent. However, out of the 42 PWSS schemes surveyed, 28 PWSS schemes were functioning, 14 were in partial functioning condition and 6 were not-functioning. The reasons for semi-functional status of PWSS quoted are; no water in the source in summer in five schemes of PWSS, technical defect in four of the scheme, and no supply from joint schemes in another five schemes.

The issue of regional water supply schemes failing to supply water to some habitations, especially in the tail-end, calls for greater attention. Also, the prevailing water scarcity in the region must be given due consideration for ensuring long-term sustainability of schemes. It is very critical as most water sources were reported to have scarcity of water in summer.

Only a lone metered scheme was observed in Rajewadi GP in Raigad District of Konkan. A water tariff of Rs.8/-per 1 KL is collected in Rajewadi. However, good practices like low pumping hours, availability of standby pumps and swift repair of faults were observed in majority of the schemes. However, improvements in the water supply

infrastructure, especially storage tanks and distribution networks, have to be considered. The greater attention needs to be given to contamination of distribution pipes due to the wastewater drains constructed in many GPs.

Out of the 148 habitations covered in the study GPs, as per the IMIS data, there were 89.7% fully covered and 10.3% partially covered habitations in the study and no habitation was reported uncovered. However, in the field study, it was found that 70.5% habitations were fully covered, 23.3% habitations were partially covered and 6.2% habitations were not covered. The reported reasons include dry water source, exclusion of habitation from PWSS and incorrect data reported in the IMIS.

The household level access to different water sources show considerable improvements (63.8%) in the piped water supply in the state which is also reflected in the Census 2011. Also, household survey found that availability of adequate quantity of water to be the primary reason for their satisfaction derived from water supply schemes. However, the coverage is much lower in divisions like Amravati, Aurangabad and Nagpur compared to other divisions.

The general awareness among members of GPs and household survey shows low priority being according to water quality aspects. In view of this, there is a need for better coordination between health and water supply departments at the GP level. In addition, absence of proper chlorination regime in some of the GPs calls for increased attention. Absence of adequate funds for O&M is reported as one of the reasons for procurement of chlorination agents required in some GPs. Household level water treatment is almost nonexistent. Few households reported the use occasional chlorination during rainy seasons.

Water tariff collection is always a challenging factor in piped water supply schemes. In the study area, reported water tariff collection for the last financial year is 80% and above of potential tariff in 31.8% GPs, 50-80% in 33.7% GPs, 25-50% in 24.9% GPs and it is less than 25% in 9.6% GPs. As a result, only 20.5% schemes in the GPs studied were able to meet the expenditures incurred for management of the water schemes. However, even if the 100% water tariff is collected, with the current tariff rates being adopted, only 48.8% of schemes surveyed can meet

the financial requirements of managing the water supply schemes.

There is scope of adopting substantial improvements in the overall management of schemes. However, it is important to note that lack of willingness among elected representatives to enforce stricter water tariff collection mechanisms which results in inadequate funds for O&M, and at the same time the inability of poor and marginal families to pay higher water tariff of water supply. These issues require greater deliberations to find appropriate solutions for effective management of piped water supply schemes.

Household toilet coverage (44.6%) found in the study is comparable to the Census 2011 data (44%) for the State. Availability water source within the dwelling area of the households has an impact on the toilet construction. In the study, 65.9% households with a water source in dwelling area have built toilets, whereas only 35% households using a public water source have built toilets. However, the matter of concern is a large number of NGP awarded GPs reverting back to the practice of open defecation. In the study area, about 13 (81.3%) GPs out of the 16 NGP awarded GPs 81.2% were found to revert back to the practice of open defecation.

In schools and Anganwadis, the availability of water seems to be far better than the availability of toilet facilities for children. Over 91.1% schools had provision of water sources and only 8.9 % schools lacked any sort of water source within the school premises. Out of the 75 Anganwadis covered in the study, only 68% had water sources within their premises. It was observed that 97.8% schools surveyed had toilets, however only 62.2% of them are functional at present. Whereas, out of 75 Anganwadis surveyed, 76% have toilets and only 46.7% had functional toilets. Baby friendly features provided in toilets were observed only in 50.7% Anganwadis surveyed. Major reasons observed are lack of water and absence of regular maintenance of toilets.

However, none of the schools and Anganwadis surveyed had dedicated hand washing facilities available. In the absence of hand washing facilities, children wash their hands with water kept in bucket/mug, hand pumps or taps of drinking water storage tanks. Also, issues such as lack of round the year water supply, absence of design features for differently-abled students/baby friendly, defunct toilets and poor maintenance require attention. However, there is scope for improvements in the facilities provided in schools and Anganwadis.



5

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ANNEXURE

Annexure 1 : List of GPs where household survey was conducted

Division	District	Block	Grampanchayat	Surveyd HH
Nashik	Ahemadnagar	Kopargaon	Chanekasare	36
	Dhule	Dhule	Dondwad	22
		Sakari	Nandwan	28
	Sub Total			
Amaravati	Buldhana	Malakapur	Nimbari	27
		Khamgaon	Hivarkheda	58
	Yavatmal	Yavatmal	Kharad (Bu)	18
			Jamb	37
		Kalamb	Nanja	63
	Sub total			
Nagpur	Bhandara	Bhandara	Rawanwadi	26
			Sarpewda	48
		Pauni	Tirri	40
	Chandrapur	Chandrapur	Borda	44
			Lohara	45
	Sub total			
Aurangabad	Hingoli	Kalmunari	Wakodi	80
		Vasmat	Dagadgaon	14
	Osmanabad	Lohara	Batagali	54
		Kalamb	Baratewadi	22
	Total			
Pune	Solapur	Mohol	Warawade Sayyad	71
		Akkalkot	Nimgaon	9
	Satara	Man	Pingali, (Kh)	27
		Patan	Yerphale	38
	Sub total			
Konkan	Sindhudurga	Malwan	kolamb	52
			Rewandi	19
		Devgad	phanse	19
	Raigad	Mahad	Karanjkhohol	42
		Panvel	Girawale	21
	Sub total			
Total				960

Annexure 2 : List of Grampanchayats covered under the study

Division	District	Block	Name of GP
Nashik	Ahemadnagar	Rahuri	Umbare
			Tamanar Akhada
		Kopargaon	Chandekasare
	Dhule	Dhule	Shirud
			Dondwad
		Sakari	Bhadane
Amravati	Buldhana	Malakapur	Nimbari
			Datala
		Khamgaon	Hivarkheda
	Yavatmal	Yavatmal	Kharad (Bu)
			Jamb
		Kalamb	Ganeshwadi
Nagpur	Bhandara	Bhandara	Rawanwadi
			Sarpewda
		Pauni	Tirri
	Chandrapur	Chandrapur	Betala
			Borda
		Rajura	Lohara
Aurangabad	Hingoli	Kalmunari	Sondo
			Bhurkunda
		Vasmat	Wakodi
	Osmanabad	Lohara	Malewadi
			Akoli
		Kalamb	Dagadgaon
Pune	Solapur	Mohol	Batagali
			Phophali
		Akkalkot	Nimgaon
	Satara	Man	Dahitane
			Dahiwadi
		Patan	Pingali (KH)
Konkan	Sindhudurga	Malwan	Mhawashi
			Rewandi
		Devgad	Yerphale
	Raigad	Mahad	Kolamb
			Phanase
		Panve'	Wada
		Rajewadi	
		Karanjkhoh	
		Somtane	
		Girawale	

Annexure 3. Institutional structure at the GP level

S.No.	Division	District	Block	Grampanchayat	No. of Households	Population	No. of Members in GP			Status of VWSC							
							Total members	No. of Male Members	No. of Female Members	VWSC Formation	No. of Male Members	No. of Female Members	Total Members	Meetings held Regularly	No. of Meetings held	Meeting Minutes Available	Involved in O & M
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1-8	Nashik	Ahemadnagar	Rahuri	Umbare	728	3638	15	10	5	Yes	6	3	9	No	0	No	No
				Tamanar Akhada	188	1450	7	3	4	Yes	8	3	11	No	0	No	Yes
		Kopargaon	Chandekasare	676	4830	13	6	7	Yes	4	7	11	Yes	4	No	Yes	
			Ghari	295	1603	9	6	3	Yes	4	7	11	No	0	No	Yes	
	Dhule	Dhule	Shirud	1250	8500	15	10	5	Yes	9	6	15	Yes	4	No	No	
			Dondwad	225	1450	7	3	4	Yes	14	4	18	No	0	Yes	No	
		Sakari	Bhadane	1235	5498	13	6	7	Yes	7	3	11	Yes	5	Yes	No	
			Nandwan	272	1429	7	5	2	Yes	7	4	11	No	0	No	No	
9-16	Amarawati	Buldhana	Malakapur	Nimbari	250	2200	7	4	3	No	N/A	N/A	N/A	NA	N/A	NA	NA
				Datala	1694	7256	15	8	7	Yes	7	4	11	No	0	No	No
			Khamgaon	Hivarkheda	628	3194	9	6	3	No	N/A	N/A	N/A	NA	N/A	NA	NA
				Konti	210	1109	7	3	4	Yes	12	9	21	Yes	3	No	No
		Yavatmal	Yavatmal	Kharad (Bu)	156	583	7	3	4	Yes	3	3	6	No	0	No	No
				Jamb	526	2177	9	6	3	Yes	8	3	11	No	0	No	No
			Kalamb	Ganeshwadi	197	715	6	4	2	Yes	6	6	12	No	0	No	No
				Nanja	681	2553	9	6	3	Yes	8	3	11	Yes	3	No	Yes
17-24	Nagpur	Bhandara	Bhandara	Rawanwadi	220	938	7	4	3	Yes	7	4	11	No	0	No	No
				Sarpewda	484	1811	9	6	3	Yes	5	10	15	Yes	4	No	Yes
			Pauni	Tirri	440	1707	9	6	3	Yes	5	2	7	No	0	No	No
				Betala	445	1778	9	4	5	No	N/A	N/A	N/A	NA	N/A	NA	NA
		Chandrapur	Chandrapur	Borda	579	2570	9	6	3	Yes	5	4	9	No	0	No	No
				Lohara	434	1511	7	4	3	No	N/A	N/A	N/A	NA	N/A	NA	NA
			Rajura	Sondo	425	1756	9	4	5	Yes	5	4	9	No	0	No	No
				Bhurkunda	262	1117	7	3	4	Yes	6	5	11	No	0	No	No
25-32	Aurangabad	Hingoli	Kalmunari	Wakodi	1050	6000	11	6	5	Yes	8	4	12	No	0	No	No
				Malewadi	285	1260	7	4	3	Yes	11	7	4	No	0	No	No
			Vasmat	Akoli	400	3600	9	5	4	Yes	6	5	11	No	0	No	No
				Dagadgaon	164	871	7	1	6	No	N/A	N/A	N/A	NA	N/A	NA	NA
		Osmanabad	Lohara	Batagali	511	3134	11	7	4	Yes	7	4	11	Yes	12	Yes	Yes
				Kasti (Bu)	364	2237	6	5	1	Yes	6	7	13	No	0	No	No
			Kalamb	Baratewadi	192	733	7	4	3	Yes	5	6	11	Yes	3	No	Yes
				Massa K	995	4361	11	5	6	Yes	6	5	11	No	2	No	No

S.No.	Division	District	Block	Grampanchayat	No. of Households	Population	No. of Members in GP			Status of VWSC								
							Total members	No. of Male Members	No. of Female Members	VWSC Formation	No. of Male Members	No. of Female Members	Total Members	Meetings held Regularly	No. of Meetings held	Meeting Minutes Available	Involved in O & M	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
33	Pune	Solapur	Mohol	Warawade Sayyad	616	3280	9	6	3	Yes	10	2	12	No	0	No	Yes	
34				Phophali	230	1646	7	4	3	Yes	8	4	12	No	0	No	Yes	
35			Akkalkot	Nimgaon	155	694	7	4	3	Yes	6	4	10	Yes	3	Yes	Yes	
36				Dahitane	535	4136	11	5	6	Yes	5	4	9	Yes	4	No	Yes	
37		Satara	Man	Dahiwadi	3370	16408	17	12	5	Yes	6	5	11	No	0	No	No	
38				Pingali, (Kh)	304	1450	7	4	3	Yes	8	4	12	No	0	No	No	
39			Patan	Mhawashi	765	3698	11	5	6	Yes	9	4	13	Yes	4	No	No	
40				Yerphale	385	1822	9	4	5	No	N A	N A	N A	NA	N A	NA	NA	
41		Kokan	Sindhudurga	Malwan	kolamb	476	2174	9	4	5	Yes	10	3	13	Yes	6	Yes	Yes
42					Rewandi	200	731	7	3	4	Yes	9	7	16	Yes	12	Yes	Yes
43	Devgad			phanse	155	783	6	0	6	Yes	2	2	4	Yes	12	Yes	Yes	
44				Wada	499	2021	9	5	4	Yes	7	7	14	Yes	2	Yes	Yes	
45	Raigad		Mahad	Rajewadi	478	2003	7	3	4	Yes	5	6	11	Yes	3	Yes	Yes	
46				Karanjkhohol	437	2305	7	3	4	Yes	7	4	11	No	0	No	Yes	
47			Panvel	Somtane	587	2200	9	4	5	Yes	6	2	8	No	0	No	No	
48				Girawale	198	600	7	3	4	Yes	8	6	14	Yes	4	No	No	

Annexure 4. Details of other water sources in the Grampanchayats

S. N.	Division	District	Block	Other Water Sources										
				Grampanchayat	Hand Pump					Dug well				
					Total No	Functional	Non Functional	Potable	when it is used	Total No.	Functional	Non Functional	Potable	when it is used
1	Nashik	Ahemadnagar	Rahuri	Umbare	5	5	0	No	Not at all	1	1	0	Yes	In Summer
2				Tamnal Akhada	0	0	0	NA	NA	0	0	0	NA	NA
3			Kopergaon	Chandekasare	2	2	0	Yes	Not at all	0	0	0	NA	NA
4				Ghari	2	2	0	No	Not at all	0	0	0	NA	NA
5		Dhule	Dhule	Shirud	14	7	7	No	Always	6	6	0	No	Not at all
6				Dhondwat	4	3	1	No	Not at all	1	1	0	Yes	Always
7			Sakari	Bhadane	5	0	5	NA	Not at all	0	0	0	NA	NA
8				Nandwan	3	3	0	No	Not at all	0	0	0	NA	NA
9	Amarawati	Buldhana	Malakapur	Nimbari	6	3	3	Yes	Always	0	0	0	NA	NA
10				Datala	6	2	4	Yes	In Summer	2	2	0	No	Not at all
11			Khamgaon	Hivarkheda	10	10	0	Yes	Always	10	10	0	Yes	Always
12				Konti	3	3	0	No	Always	0	0	0	NA	NA
13		Yavatmal	Yavatmal	Kharad	1	1	0	Yes	In Summer	0	0	0	NA	NA
14				Jamb	4	3	1	Yes	Always	4	2	2	Yes	Always
15			Kalamb	Ganeshwadi	6	6	0	Yes	Always	4	4	0	Yes	Always
16				Nanja	7	5	2	Yes	Always	3	3	0	Yes	Always
17	Nagpur	Bhandara	Bhandara	Rawanwadi	7	7	0	Yes	Always	3	3	0	Yes	Always
18				Sarpewada	21	21	0	Yes	Always	6	4	2	Yes	Always
19			Pauni	Tirri	7	7	0	No	Not at all	7	7	0	No	In Summer
20				Betala	12	12	0	Yes	Always	10	10	0	Yes	Always
21		Chandrapur	Chandrapur	Borda	23	23	0	Yes	Always	2	2	0	No	Always
22				Lohara	11	1	10	Yes	Always	3	2	0	Yes	Always
23			Rajura	Sondo	5	5	0	Yes	Always	7	7	0	No	Not at all
24				Bhurkunda	9	7	2	Yes	Always	1	1	0	Yes	Always
25	Aurangabad	Hingoli	Kalmunari	Wakodi	17	15	2	Yes	Always	0	0	0	NA	NA
26				Malegaon	8	7	1	No	Not at all	2	2	0	No	Not at all
27			Vasmat	Akoli	7	6	1	Yes	Always	4	3	1	Yes	Always
28				Dagadgaon	6	4	2	Yes	Always	0	0	0	NA	NA
29		Osmanabad	Lohara	Bhatagali	9	3	6	Yes	Always	0	0	0	NA	NA
30				Kasti Bu	4	4	0	No	Not at all	0	0	0	NA	NA
31			Kalamb	Baratewadi	2	1	1	Yes	In Summer	4	4	0	Yes	Not at all
32				Massa	3	0	3	No	Not at all	1	1	0	Yes	Always
33	Pune	Solapur	Mohol	Sayyed Warwade	17	11	6	Yes	Always	0	0	0	NA	NA
34				Pophali	12	10	2	Yes	Always	0	0	0	NA	NA
35			Akkalkot	Nimgaon	2	0	2	No	Not at all	0	0	0	NA	NA
36				Dahitane	1	1	0	Yes	Always	0	0	0	NA	NA
37		Satara	Man	Dahiwadi	105	75	30	Yes	Always	0	0	0	NA	NA
38				Pingali	10	6	4	Yes	Always	0	0	0	NA	NA
39			Patan	Mhawashi	2	2	0	1y,1no	Always	1	0	1	No	Not at all
40				Yerphale	0	0	0	NA	NA	1	1	0	No	Not at all
41	Konkan	Sindhudurg	Malwan	Kolamb	11	9	2	Yes	Always	2	2	0	Yes	Always
42				Rewandi	3	2	1	Yes	Always	1	1	0	Yes	Always
43			Devgad	Phanse	1	1	0	No	Not at all	0	0	0	NA	NA
44				Wada	3	3	0	No	Not at all	1	1	0	Yes	Always
45		Raigad	Mahad	Rajewadi	0	0	0	NA	NA	2	0	2	No	Not at all
46				Karanjkhol	4	3	1	Yes	Always	4	4	0	No	Not at all
47			Panvel	Somtane	0	0	0	NA	NA	9	9	0	No	Not at all
48				Girwale	0	0	0	NA	NA	0	0	0	NA	NA

Annexure 5. Status of water supply coverage in the study habitations

S.No	Division	District	Block	Grampanchayat	Total No. of Habitations	No of Habitations Evaluated	Name of Habitations	Drinking Water Source as per IMIS	Coverage Status as per IMIS	Drinking Water Source as per the Study	Coverage Status as per IMIS			
1	Nashik	Ahemadnagar	Kopargaon	Umbare	5	1	Umbare	RRWSS	PC	PWSS	PC			
2				Tamnar Akhada	1	1	Tamnar Akhada	RRWSS	FC	PWSS	FC			
3			Rahuri	Chandekasare	5	1	Chandekasare	RRWSS	FC	PWSS	FC			
4				Ghari	4	1	Ghari	PWSS	FC	PWSS	FC			
5		Dhule	Sakhri	Shirud	1	1	Shirud	PWSS	FC	PWSS	FC			
6				Dondwad	1	1	Dondwad	RRWSS	FC	PWSS	PC			
7			Dhule	Dhule	Bhadane	3	3	Bhadane	PWSS	PC	PWSS	PC		
8								Gondas	PWSS	FC	PWSS	PC		
9								Karkhana	OpenWell	FC	Openwell	FC		
10								Nandwan	PWSS	PC	PWSS	PC		
11				Nandwan	4	4	Nagpur	Handpump	FC	Handpump	FC			
12							Shivpada	Handpump	FC	Handpump	FC			
13							Trishulmal	PWSS	FC	PWSS	FC			
14	Amaravati						Buldhana	Malakapur	2	2	Nimbari	RRWSS	FC	PWSS
15		Rastapur	OpenWell	FC	Openwell	FC								
16		Datala	RRWSS	FC	PWSS	FC								
17		Khamgaon	Hivarkheda	1	1	Hivarkheda		PWSS	FC	Handpump	PC			
18						Konti		4	2	Konti	PWSS	FC	PWSS	PC
19										Geru	OpenWell	FC	No Scheme	PC
20		Yavatmal	Yavatmal	Kharad (Bu)	1	1	Kharad (Bu)	Handpump	FC	PWSS	PC			
21							Jamb	2	2	Jamb	PWSS	PC	No Source	PC
22										Kolampod	Handpump	FC	Handpump	FC
23			Kalamb	Ganeshwadi	4	4	Ganeshwadi	PWSS	FC	PWSS	FC			
24							Gawaripod	Dugwell	FC	Dugwell	FC			
25							Gharodyapod	Handpump	FC	Handpump	FC			
26							GosawaiPod	Handpump	FC	Dugwell	FC			
27	Nanja	1	1	Nanja	PWSS	FC	PWSS	FC						

S.No	Division	District	Block	Grampanchayat	Total No. of Habitations	No of Habitations Evaluated	Name of Habitations	Drinking Water Source as per IMIS	Coverage Status as per IMIS	Drinking Water Source as per the Study	Coverage Status as per IMIS		
28	Nagpur	Bhandara	Bhandara	Rawanwadi	2	2	Rawanwadi	Handpump	FC	Handpump	FC		
29							Khapa	Handpump	FC	Handpump	FC		
30				Sarpewada	4	4	Sarpewada	Handpump	FC	PWSS	FC		
31							Chandrapur	Handpump	FC	Mini PWSS	FC		
32							Dudhara	Handpump	FC	Mini PWSS	FC		
33							Injewada	PWSS	FC	PWSS	FC		
34			Pauni	5	5	Tirri	2	1	Tirri	PWSS	FC	PWSS	FC
35						Betala	5	5	Betala	PWSS	FC	Mini PWSS	FC
36									Rohana	Handpump	FC	Mini PWSS	FC
37									Singori	PWSS	FC	Mini PWSS	FC
38									Welwa	Handpump	FC	Dugwell	FC
39			Kachekhani	Handpump	FC	Handpump	FC						
40			Chandrapur	Chandrapur	4	4	Borda	PWSS	FC	PWSS	FC		
41							Chakborda	Dugwell	FC	Dugwell	FC		
42							Ghanta Chauki	PWSS	FC	PWSS	FC		
43		Walni					Handpump	PC	Handpump	PC			
44		Lohara		1	1	Lohara	Handpump	FC	Handpump	FC			
45		Rjura		4	4	Sondo	PWSS	FC	PWSS	FC			
46						Kakadghat	PWSS	FC	Dugwell	PC			
47						Umarzara	PWSS	FC	Mini PWSS	FC			
48						Dewapur	PWSS	FC	Mini PWSS	FC			
49		Bhurkunda		4	2	Bhurkunda	PWSS	FC	PWSS	FC			
50			Sukkadpalli			PWSS	FC	PWSS	PC				
51		Aurangabad	Hingoli	Kalmunari	Wakodi	1	1	Wakodi	PWSS	FC	PWSS	PC	
52					Malegaon	2	1	Malegaon	PWSS	PC	PWSS	PC	
53			Vasmat	Akoli	2	1	Akoli	PWSS	FC	Mini PWSS	PC		
54				Dagadgaon	2	1	Dagadgaon	PWSS	FC	PWSS	FC		
55			Osmanabad	Lohara	Bhatagali	1	1	Bhatagali	PWSS	FC	PWSS	PC	
56					Kasti Bu	1	1	Kasti Bu	PWSS	FC	PWSS	FC	
57			Kalamn	Baratewadi	Baratewadi	1	1	Baratewadi	PWSS	FC	PWSS	FC	
58	Massa k				1	1	Massa K	PWSS	FC	PWSS	FC		

S.No	Division	District	Block	Grampanchayat	Total No. of Habitations	No of Habitations Evaluated	Name of Habitations	Drinking Water Source as per IMIS	Coverage Status as per IMIS	Drinking Water Source as per the Study	Coverage Status as per IMIS	
59	Pune	Solapur	Mohol	Sayyed Warwade	17	13	Sayyed Warwade	PWSS	FC	PWSS	PC	
60							Ambikanagar	Handpump	FC	Handpump	FC	
61							Bunner Wasti	Handpump	FC	No Source	PC	
62							Choudhari Wasti	Handpump	FC	No Source	NC	
63							Nele wasti	Handpump	FC	Handpump	FC	
64							Hanuman Nagar	Handpump	FC	Bore well	FC	
65							Mahat Wasti	Handpump	FC	No Source	PC	
66							Nele wasti Zopadpatti	Handpump	FC	Handpump	FC	
67							Nele- Karande Wasti	PWSS	FC	Handpump	FC	
68							Paradhi Wasti	Handpump	FC	Handpump	FC	
69							Shinde Wasti	Handpump	FC	Handpump	FC	
70							Ukhale wasti	Handpump	FC	Handpump	FC	
71							Virape wasti	Handpump	FC	No Source	PC	
72							Pophali	15	1	Phophali	PWSS	FC
73		Akkalkot	Nimgaon	1	1	Nimgaon	PWSS	FC	PWSS	FC		
74		Dahitane	2	1	Dahitane	PWSS	FC	PWSS	FC			
75		Man			Dahiwadi	26	24	Dahiwadi	PWSS	FC	PWSS	FC
76								Bhatakimala	PWSS	PC	No Source	NC
77								Bhavan Wadi	PWSS	FC	Mini PWSS	FC
78								Dabarmala	PWSS	FC	Mini PWSS	FC
79								Gosawi Wasti	PWSS	FC	Mini PWSS	FC
80								Hingalkar Wasti	Handpump	FC	Handpump	FC
81								Jagdale wasti	PWSS	FC	Mini PWSS	FC
82								Katphale Wasti	DugWell	FC	Handpump	FC
83								Khalcharalmala	Handpump	FC	Handpump	FC
84								KharatWasti	PWSS	FC	PWSS	FC
85								Khatal wasti	PWSS	FC	PWSS	FC
86								Kokare Wasti	DugWell	FC	No Source	NC
87								Landgemere Wasti	Handpump	FC	Handpump	FC
88	Mane Wasti							Handpump	FC	Handpump	FC	
89	More Mala							PWSS	FC	Mini PWSS	FC	

S.No	Division	District	Block	Grampanchayat	Total No. of Habitations	No of Habitations Evaluated	Name of Habitations	Drinking Water Source as per IMIS	Coverage Status as per IMIS	Drinking Water Source as per the Study	Coverage Status as per IMIS		
90	Pune	Satara					Mulik Wasti	PWSS	FC	Mini PWSS	FC		
91							New gavthan	PWSS	FC	PWSS	FC		
92							Pol Wasti	Handpump	FC	Handpump	FC		
93							Ramoshi Wasti	DugWell	FC	Handpump	FC		
94							Sapkal Wasti	DugWell	FC	Dugwell	FC		
95							Shandemala 2	Handpump	FC	Handpump	FC		
96							Shandiwasti	Handpump	FC	Handpump	FC		
97							Stand Campus	PWSS	FC	PWSS	FC		
98							Tupe Wadi	PWSS	PC	PWSS	PC		
99							Pingali Kh.	5	5	Pingali Kh.	PWSS	FC	PWSS
100			Kamble Wasti	Handpump	FC	Handpump				FC			
101			Shelar Wasti	PWSS	FC	Mini PWSS				FC			
102			Thorase Wasti	Handpump	FC	Handpump				NC			
103			Thorat Wasti	DugWell	FC	Handpump				NC			
104			Patan	Mhawashi	3	3	Mhawashi	PWSS	FC	PWSS	FC		
105							Gujar Wadi	PWSS	FC	PWSS	FC		
106							Mogarmal	PWSS	PC	PWSS	PC		
107				Yerphale	1	1	Yerphale	PWSS	FC	PWSS	FC		
108			Sindhudurga		Malvan	Kolamb	8	7	kolamb	PWSS	FC	PWSS	PC
109									BhatWadi	Handpump	FC	PWSS	FC
110	Khalchi Wadi	PWSS							FC	PWSS	PC		
111	Madhali wadi	PWSS							FC	PWSS	PC		
112	Kathwad wadi	PWSS							PC	No Source	NC		
113	Khaida Wadi	PWSS							FC	No Source	NC		
114	Nivhe Wadi	PWSS							PC	No Source	NC		
115	Rewandi	8				8	Khalchi Rewandi	DugWell	FC	PWSS	FC		
116							Koniwadi	PWSS	PC	PWSS	PC		
117							Madhali wadi	PWSS	FC	PWSS	FC		
118							Bhere Wadi	PWSS	FC	PWSS	FC		
119							Harijan Wadi	PWSS	FC	PWSS	FC		
120			Tandelwadi	PWSS	FC		PWSS	FC					

S.No	Division	District	Block	Grampanchayat	Total No. of Habitations	No of Habitations Evaluated	Name of Habitations	Drinking Water Source as per IMIS	Coverage Status as per IMIS	Drinking Water Source as per the Study	Coverage Status as per IMIS			
121	Konkan	Sindhudurga					Kambli wadi	PWSS	FC	PWSS	FC			
122							Kupe Wadi	PWSS	FC	PWSS	FC			
123							Phanse	3	3	Phanse	PWSS	FC	PWSS	PC
124										Bramhan Wadi	PWSS	FC	PWSS	PC
125										Phanse Wadi	PWSS	FC	PWSS	PC
126							Devgad	Wada	13	13	Wada	PWSS	FC	PWSS
127			Boudh Wadi	PWSS	FC	PWSS					FC			
128			Parabwadi	PWSS	FC	PWSS					FC			
129			Sade Wadi	PWSS	FC	PWSS					FC			
130			Gaothan Wadi	PWSS	FC	PWSS					FC			
131			Mulbandh Wadi	PWSS	FC	PWSS					PC			
132			Bramhan Wadi	PWSS	FC	PWSS					FC			
133			Wani Wadi	PWSS	FC	PWSS					FC			
134			Milind Wadi	PWSS	FC	PWSS					FC			
135			Gurav Wadi	PWSS	FC	No Source					NC			
136			Kasabe wadi	PWSS	FC	PWSS					FC			
137			Wadatar	PWSS	FC	PWSS					PC			
138			Sadeteli Wadi	PWSS	FC	PWSS					FC			
139			Raigad	Mahad	Rajewadi	3					3	Rajewadi	PWSS	FC
140							Mohalla	PWSS	FC	PWSS		FC		
141							Boudh Wadi	PWSS	FC	PWSS		FC		
142				Karanjkhol	1	1	Karanjkhol	PWSS	PC	PWSS	FC			
143				Panvel	Somtane	3	3	Dahivali	PWSS	FC	PWSS	FC		
144								Narpoli	Handpump	FC	PWSS	FC		
145								Somtane	PWSS	PC	PWSS	FC		
146								Girwale	1	1	Girwale	PWSS	PC	PWSS

