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भारत सरकार

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जल संसाधन, नदी विकास और गंगा संरक्षण विभाग

CENTRAL GROUND WATER BOARD

Government of India

Ministry of Jal Shakti

Department of Water Resources,

River Development& Ganga Rejuvenation

AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN SATARA DISTRICT, MAHARASHTRA

AAP 2019-20

मध्यक्षेत्र, नागपुर / Central Region, Nagpur

2022

AQUIFER MAPS AND GROUND WATER MANAGEMENTPLAN, SATARA DISTRICT, MAHARASHTRA

(AAP 2019-20)
CONTRIBUTORS

Principal Authors		
Sandeep D. Waghmare Catherine Louise	: :	Scientist-B Scientist-B
Guidance and Supervision		
Sh N. Varadaraj		Regional Director
Dr. P. K. Jain	:	Regional Director (Retd)
Ms Anuradha Bhatia	:	Scientist-D (SHG) (Retd)
Sh Kartik Dongre	:	Scientist-D (SHG)
Dr J Davithuraj	:	Scientist-C & Officer Incharge
Hydrogeology, GIS maps and Management Plan		
Nelofar Khan Sandeep D. Waghmare Catherine Louise	: : :	Scientist-B Scientist-B Scientist-B
Groundwater Exploration		
Sandeep D. Waghmare Catherine Louise	: :	Scientist-B Scientist-B
Chemical Analysis		
Dr.Devsharan Verma	:	Scientist B (Chemist)
Dr. Rajni Kant Sharma	:	Scientist B (Chemist)
Shri. T. Dinesh Kumar	:	Assistant Chemist

SATARA DISTRICT AT A GLANCE

1. GENERAL INFORMATION			
	Geographical Area	:	10480 sq.km
	Administrative Divisions (2011)	:	Taluka – 11; Satara, Wai, Khandala, Phaltan, Mahabaleshwar, Patan, Karad, Jaoli, Koregaon, Man, Khatav.
	Villages (Census 2011)	:	1719
	Population(Census 2011)	:	3,003,741
	Rainfall 2019		1033.4 mm
	Normal rainfall (1998-1917)		457.1 mm to 5972.7 mm
	Long term rainfall Trend (1998-2019)		-10.34 m/year
2. GEOMORPHOLOGY			
	Major Physiographic unit	:	Western Ghat, Foothill zone Central, Plateau and eastern Plains
	Major Drainage	:	Krishna, Nira, Man
3. LAND USE *(sources: mahasdb.maharashtra.gov.in/district Report)*			
	Forest Area	:	386.53 Sq. Km. (6.11 %)
	Net Area Sown	:	6829.07 Sq. Km. (65.16 %)
	Cultivable Area	:	4633.52 Sq. Km. (73.20%)
	Fallow Land	:	353.39 (5.58 %)
4.	**SOIL TYPE**	:	BCS laterite and lateritic soils followed by reddish to yellowish brown soils of mixed origin eastwards on hill slopes
5. PRINCIPAL CROPS			
	Jawar	:	2101 sq km
	Bajra		899 sq. km
	Cereals	:	942 sq km
	Oil Seeds	:	886 sq km
	Sugarcane		470 sq km
6. IRRIGATION BY DIFFERENT SOURCES - Nos. / Potential Created (ha)			
	Dugwells	:	69180/100541
	Tubewells/Borewells	:	11075/-
	Surface Flow Schemes	:	-/71515
	Surface Lift Schemes	:	150/-

7. GROUND WATER MONITORING WELLS			
	Dugwells	:	48
	Piezometers	:	03
8. GEOLOGY			
	Recent	:	Alluvium
	Upper Cretaceous to Eocene	:	Deccan Trap (Basalt)
9. HYDROGEOLOGY			
	Water bearing formation	:	Basalt- Weathered /Fractured / Jointed/ Vesicular/ massive/ under Phreatic and semi-confined Condition
	Depth to water level in Shallow Aquifer		
	Pre-monsoon Depth to Water Level (May 2017)	:	0.90 to 25.00 mbgl
	Post-monsoon Depth to Water Level (NOV 2017)	:	0.10 to 19.00 mbgl
	Depth to water level in Deeper Aquifer		
	Premonsoon Depth to Water Level (May 2017)	:	9.00 to 95.00 mbgl
	Postmonsoon Depth to Water Level (NOV 2017)	:	1.40 to More than 100.00 mbgl
	Water level Trend (2010-19)		
	Premonsoon Water Level Trend (2010-2019)	:	Rise : 0.020 to 0.40 m/year
			Fall : 0.086 to 1.16 m/year
	Postmonsoon Water Level Trend (2010-2019)	:	Rise : 0.0006 to 0.40 m/year
			Fall : 0.004 to 1.20 m/year
10. GROUND WATER EXPLORATION as on March 2020			
	Wells Drilled	:	117(EW:84, OW:29, PZ-4)
	Depth Range	:	25 to 200 mbgl
	Discharge	:	traces to 10 lps
	Storativity	:	0.000012-0.00035
	Transmissivity	:	10-97 m^2/day
11. GROUND WATER QUALITY			
	Water Quality Data	:	The pH of ground water is found to be within permissible limit and suitable for drinking purpose, potability is affected places due to high EC, NO_3 and F.
12. DYNAMIC GROUND WATER RESOURCES - (2017)			

	Net Annual Ground Water Recharge	:	99555.90 ham
	Annual Ground Water Extraction (Irrigation + Domestic+ Industrial)	:	62576.38 ham
	Projected Demand for (Domestic use up to 2025)	:	5505.92 ham
	Stage of Ground Water extraction	:	66.27 %
	Category		5 Blocks, Khatav, Man, Patan, Phaltan, Wai are semi critical and remaining 6 blocks are Safe.
13. MAJOR GROUND WATER PROBLEMS AND ISSUES			
	The stage of ground water Extraction in 6 talukas (Karad, Khatav, Koregaon, Phaltan, Man and Wai) has already crossed 70%. Most of these talukas fall in rain shadow zone of Western Ghats, where rainfall is low. Water logged area occurring in the command area of Nira right bank canal. The western part of the district has prominent hill ranges, isolated hillocks and undulating topography, which gives rise to very higher surface run-off. The underlying basalt formation has poor storage and transmission capability rendering the aquifer to limited potential. The unconfined aquifer gets fully recharged instantaneously and a situation of rejected recharge emerges. Also, the aquifer gets drained off quickly due to sloping and undulating topography. The area around Phaltan, Gokhali, Rajuri & Somanthali, Phaltan taluka, Chitali, Karad taluka, Dhuldeo, Man taluka and Katar Khatav, Khatav taluka having EC more than 2250 µS/cm in Shallow aquifer whereas in deeper aquifer in some isolated pockets having EC more than 2250 µS/cm.		
14.	**Aquifer Management Plan**		
	Supply side Management		Proposed AR structures: 275 Percolation Tanks and 783 Check dams. The expected recharge every year from these structures is 58.71 MCM.
	Demand side Management		A total of 156.48 Sq km area of Sugarcane crop is proposed to cover under drip irrigation. 89.21 MCM of ground water can be saved.
	Development plan		Proposed 9929 Dugwells and 1655 Borewells in phased manner for 6 years.

AQUIFER MAPS AND GROUND WATER MANAGEMENTPLAN,
SATARA DISTRICT, MAHARASHTRA
(AAP 2019-20)

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AQUIFER MAPS AND GROUND WATER MANAGEMENTPLAN, SATARA DISTRICT, MAHARASHTRA

1. INTRODUCTION

National Aquifer Mapping (NAQUIM) has been taken up in XII five-year plans by CGWB to carry out detailed hydrogeological investigation on toposheet scale of 1:50,000. The NAQUIM has been prioritized to study Over-exploited, Critical and Semi-Critical Blocks as well as the other stress areas recommended by the State Govt. Aquifer mapping is a process wherein a combination of geological, geophysical, hydrological and chemical analyses is applied to characterize the quantity, quality and sustainability of ground water in aquifers.

The vagaries of rainfall, inherent heterogeneity & unsustainable nature of basalt aquifers, over exploitation of once copious alluvial aquifers, lack of regulation mechanism has a detrimental effect on ground water scenario of the Country in last decade or so. Thus, prompting the paradigm shift from “traditional groundwater development concept” to “modern groundwater management concept”.

Varied and diverse hydrogeological settings demand precise and comprehensive mapping of aquifers down to the optimum possible depth at appropriate scale to arrive at the robust and implementable ground water management plans. The proposed management plans will provide the “Road Map” for ensuring sustainable management and equitable distribution of ground water resources, thereby primarily improving drinking water security and irrigation coverage. Thus, the crux of NAQUIM is not merely mapping, but reaching the goal-that of ground water management through community participation. The aquifer maps and management plans will be shared with the Administration of Satara district, Maharashtra for its effective implementation.

The activities under NAQUIM are aimed at:

- Identifying the aquifer geometry,
- Aquifer characteristics and their yield potential
- Quality of water occurring at various depths,
- Aquifer wise assessment of ground water resources
- Preparation of aquifer maps and
- Formulate ground water management plan

1.1 About the Area

Satara district is one of the oldest districts and located in western part of Maharashtra State. In 1960 Northern Satara district was named as Satara and Southern Satara district named as Sangli district. It is bounded by Pune district in the north, Solapur district in the east, Sangli district in the south, Ratnagiri district in the west and Raigad district in its north-west. Satara district is located in the western part of Deccan plateau and lies between 17°05’ and 18°11’ north latitudes and 73°33’ and 74°54’ east longitudes. The entire area of the district falls in parts of Survey of India degree sheet numbers 47-G, 47-K, 47-J and 47-F. The district has an area of 10480 sq.km, which constitutes about 3% of the total area of Maharashtra. Prior to 1971, district had 9 talukas but presently there are 11 talukas, namely Satara, Karad, Wai, Mahabaleshwar, Phaltan, Man, Khatav, Koregaon, Patan, Jaoli and Khandala. This district comes under Pune Administrative Division along with Pune, Sangli, Solapur and Kolhapur.

The total population of Satara district as per 2011 census is 3,003,741 out of which rural population is 2,433,363 (81.01%) while urban population is 570,378 (18.99). The male population is 1,510,842 and female population is 1,492,899 whereas the population density is 268 person /sq.km. The increase in population is 6.93% over the period of 10 years from 2001 to 2011.

Satara is one of the famous districts for tourist destination. Mahabaleshwar and Panchghani are the two hill stations which have great tourism attraction and Pratapgarh has quite a historical importance

Satara district has been taken up under NAQUIM study during the year 2016-17,2017—2018 and 2019-20. The total area of the district is 10480 sq km. The Khatav, Man, Patan, Phaltan and Wai Blocks are categorised as Semi-critical and rest of the Blocks are categorized as safe as per Ground Water Resources Estimation as on March 2017. The Administrative and Index map of the study area is presented in **Figure.1.1 (a&b)**.

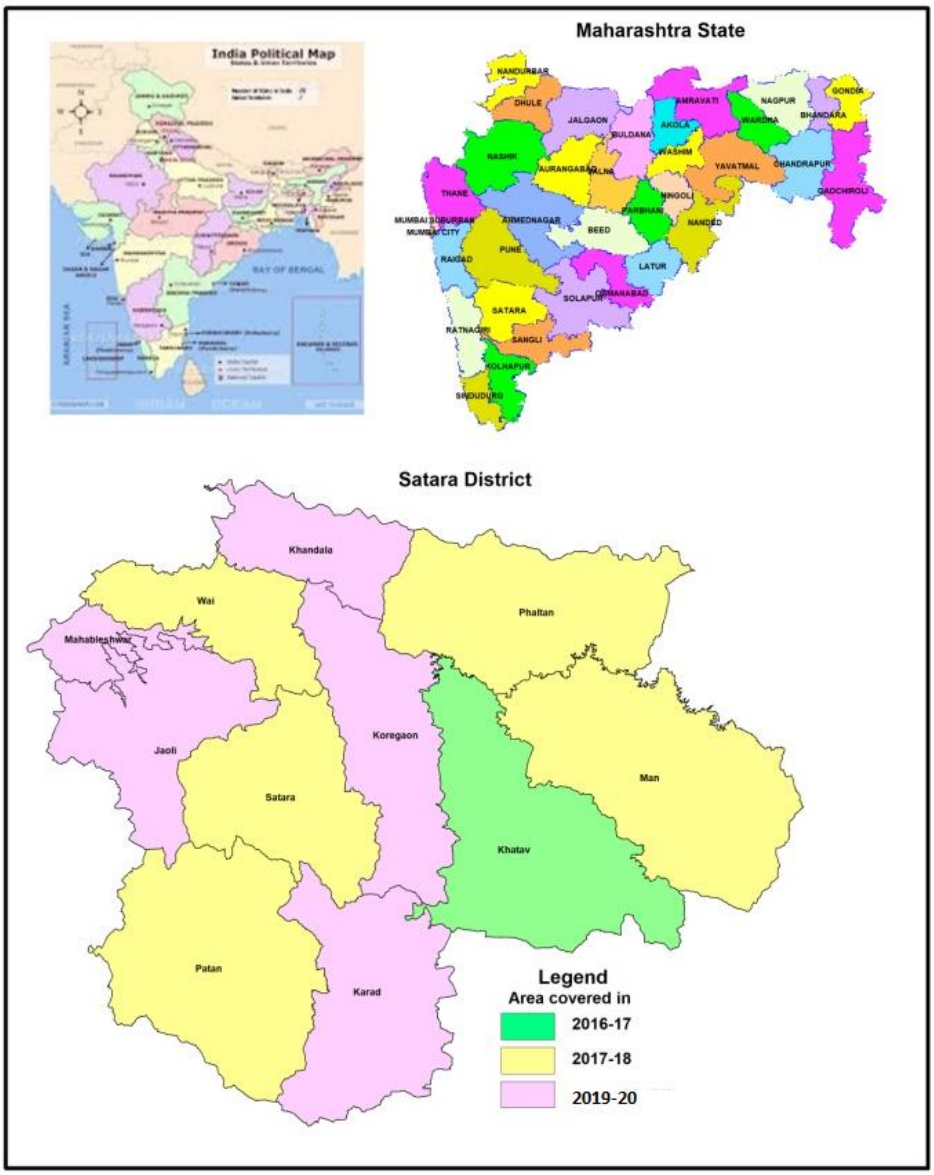


Figure.1.1 (a) Index map, Satara District

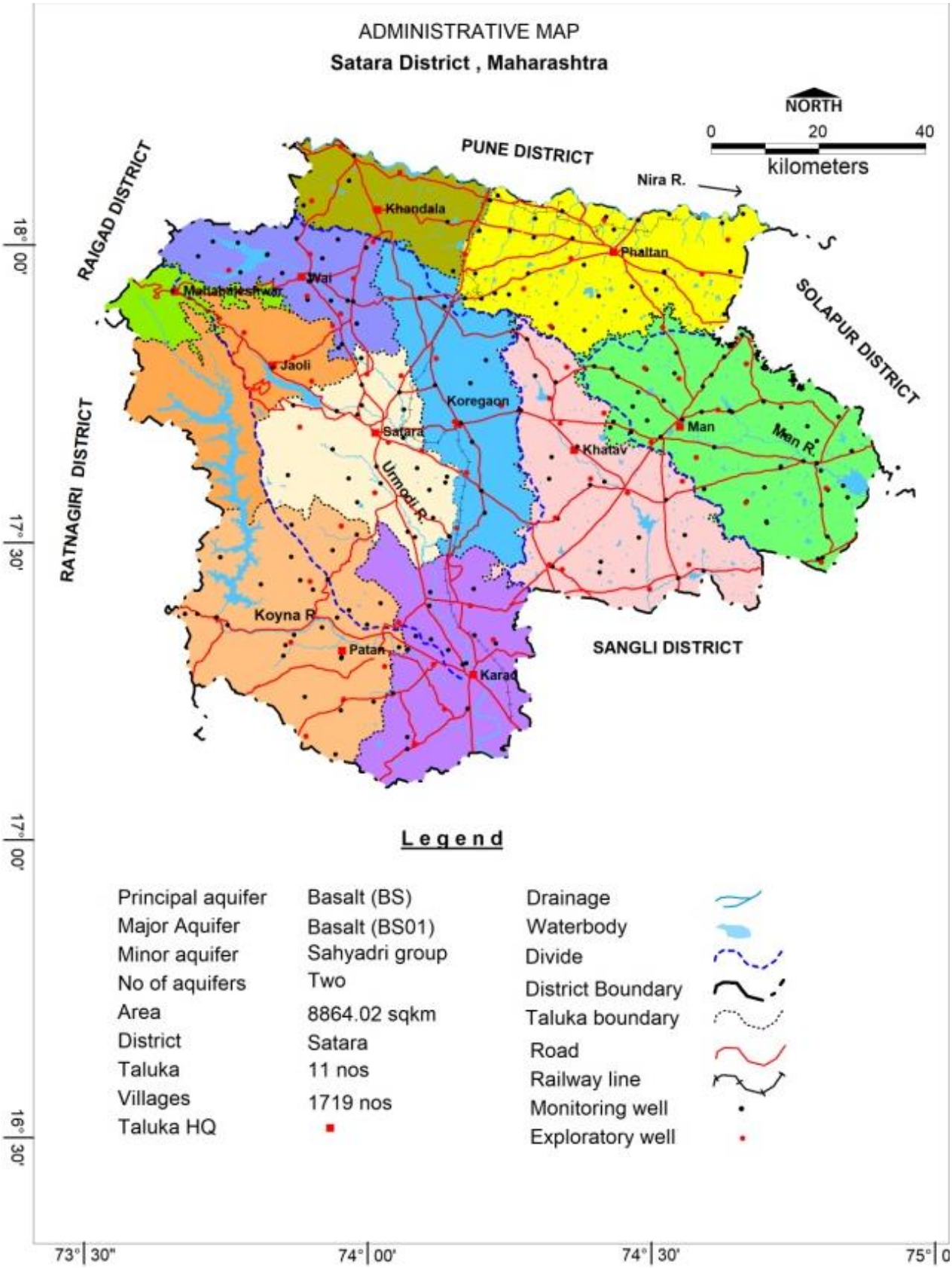


Figure 1.1 (b): Administrative map, Satara District

Ground water exploratory drilling in the district has been taken up in different phases since 1979. The ground water exploration has been done in Alluvial and hard rock areas occupied by Deccan Trap Basalt. To establish the aquifer geometry, disposition and potential of aquifers, ground water exploration down to the depth of 200 m bgl has been taken up where the data gap exists and accordingly 11 exploratory wells and 6 observation wells and 01 Piezometer have been constructed during 2016-17. A total of 84 EW, 29 OW and 4 Piezometers have been constructed till March 2020. Salient Features of Ground Water Exploration are given in **Annexure –I.**

S. No	**Taluka**	**Wells Drilled**	**Drilled Depth (m bgl)**	**Zones (m bgl)**	**Discharge (lps)**	**SWL (m bgl)**
1.	Javali	4EW +1 OW	200.00	16.00 to 181.00	0.14 to 2.16	5.00 to 12.00
2.	Karad	9EW + 2OW	95.00 to 200.00	7.40 to 95.80	1.37 to 5.77	6.25 to 50.00
3.	Khandala	9EW + 4OW + 1Pz	40.00 to 200.00	10.00 to 79.00	0.38 to 10.00	3.20 to 7.95
4.	Khatav	10EW + 3OW	67.40 to 301.00	6.00 to 196.70	0.14 to 5.00	2 to 95
5.	Koregaon	7EW + 3OW	122.25 to 200.00	4.25 to 134.55	0.14 to 12.18	1.40 to 17.50
6.	Man	11EW + 6OW	135.50 to 201.60	16.20 to 150.00	0.71 to 10.00	1.00 to 64.50
7.	Patan	9EW	80.60 to 200.00	22.60 to 186.30	Traces to 3.00	1.47 to 74.50
8.	Phaltan	10EW + 3OW+1PZ	7.70 to 201.00	28.00 to 96.80	0.14 to 0.72	3.17 to 190
9.	Satara	7EW + 4OW	177.10 to 201.5.50	35.00 to 36.00 152.00 to 153.00	2.16 to 5.15	1.40 to 18.20
10.	Wai	8EW + 3OW + 2Pz	5.70 to 200.00	12.00 to 16.00	Traces to 3.00	1.60 to 17.29
Total		**117 Wells (84 EW + 29 OW + 4 PZ)**	**5.70 to 301.00**	**4.25 to 186.30**	**Traces to 10.00**	**1.00 to 190**

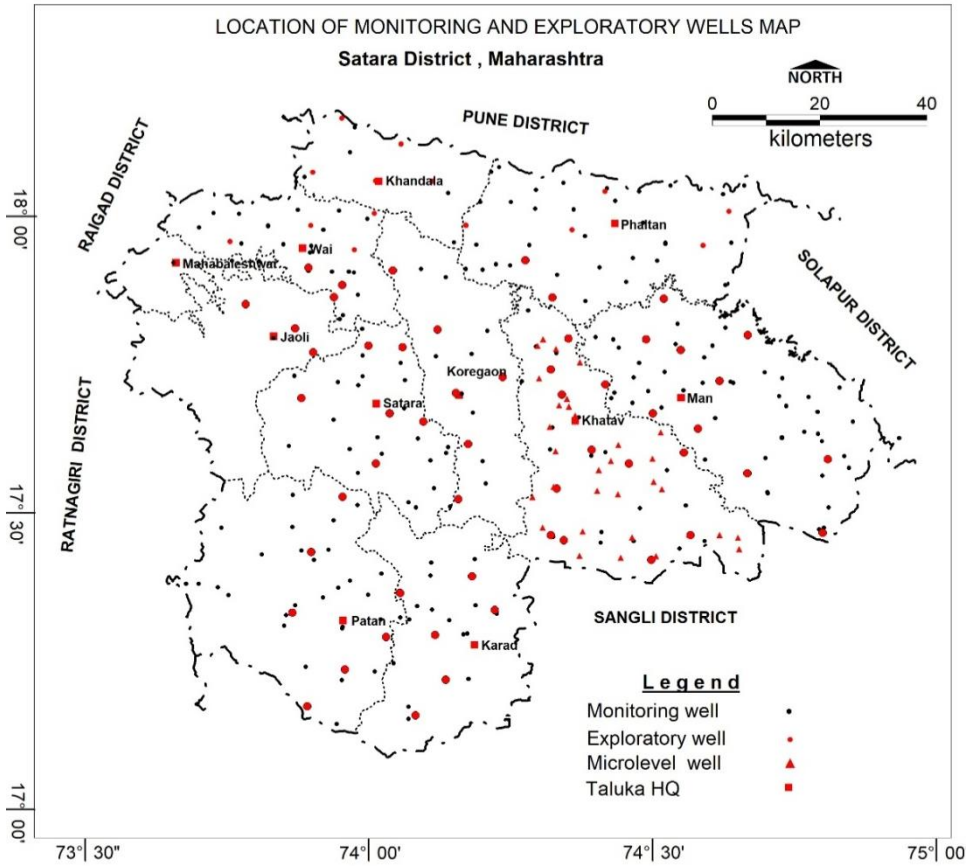
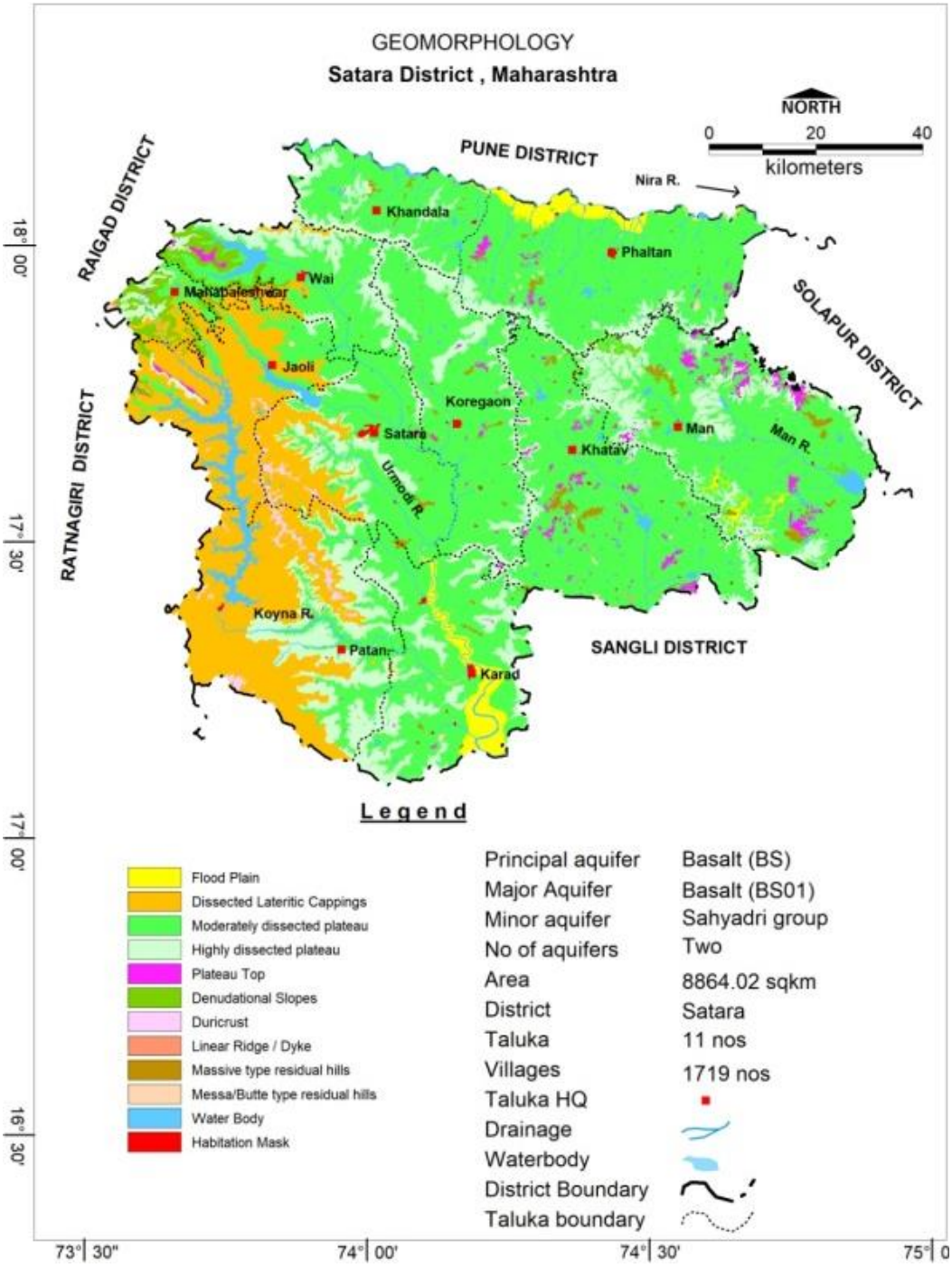


Figure 1.2: Location of Existing Exploratory wells, Key wells, and GroundWater Monitoring Wells

1.2 Geomorphology, Drainage, Land Use and Soil Types

The district forms part of western Maharashtra plateau of the Sahyadri ranges and can be broadly divided in four major units viz., (i) Hills and Ghats, (ii) Foothills zones, (iii) Plateaus and (iv) Plains. The district forms part of Deccan plateau of Sahayadri hill range. The Sahyadri range, the main range of the Western Ghats, runs north and south along the western edge of the district, separating it from Ratnagiri District. The residual hill ranges and the intermediate valley, all well developed on the table land surface form the main geomorphic element of landscape in the district. In the west, the district has the Sahaydri scarp and its major peaks usually flat topped with intervening saddles. The Mahadeo range, which is next major well-developed range in the district, an off-shoot of the Sahayadri in the north western part starts about 10 m. north of Mahabaleshwar and stretches east and south-east across the whole of the district. The Mahadeo hills are bold, presenting bare scarps of Deccan Trap basalt. The

elevation of the district ranges from 483 m.amsl (along Nira River) to 1348 m.amsl (Mahabaleshwar). Geomorphological map of the district is presented in **Fig 1.3**



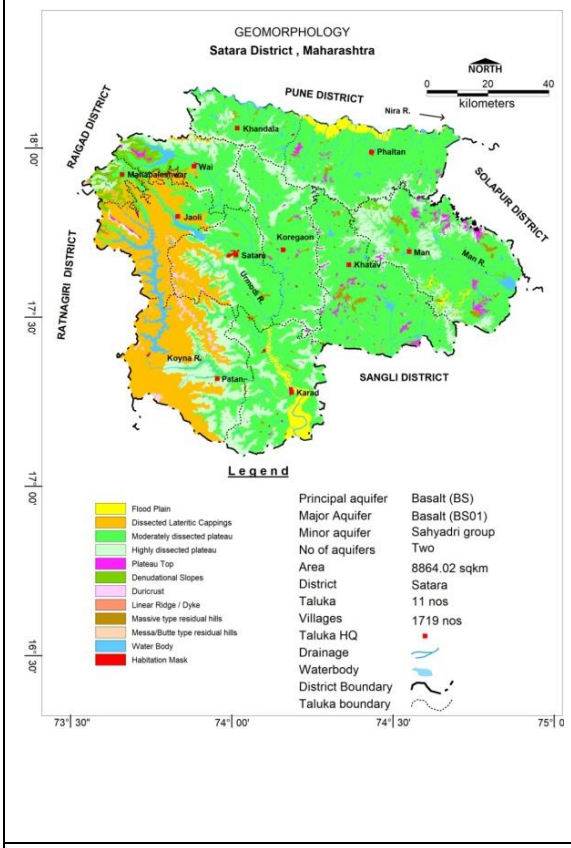


Figure 1.3: Geomorphology of Satara District

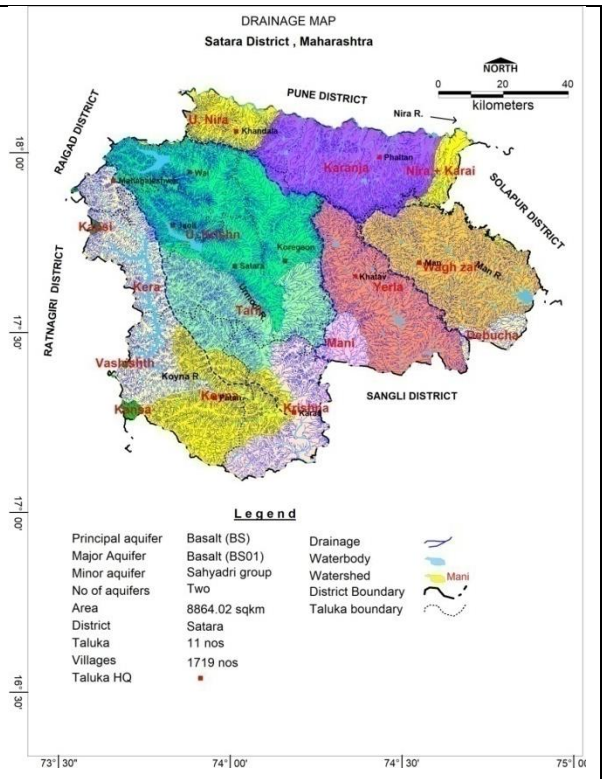


Figure 1.4: Drainage, Satara District

The entire Satara district falls in the drainage of the Krishna river basin and is drained by the Nira River and its tributaries in the entire northern part, the Man River and its tributaries in the south-east and the Krishna River and its tributaries in the south. Krishna River which is one of the major rivers of Southern Peninsula rises on the eastern brow of the Mahabaleshwar plateau in the district and flows for about 176 km. in the district. Kudal, Vena, Urmodi, Tarli, Koyna, Vasna and Verla rivers are the main tributaries of Krishna River. The entire river system has sub-parallel to semi-dendritic drainage pattern and the drainage density is quite high in the district. Satara district is part of two main watersheds, the Nira River and Man River forming the Bhima River watershed north of the Mahadeo hills and the upper Krishna watershed to the south and further divided into 50 minor watersheds. The drainage map of the district is presented in **Fig 1.4**

Land Use (**Figure .1.5**) details have been observed that the major parts are covered by agricultural land with net sown area of 6829.07 Sq. Km (65.16%). Forest covers very little area of 386.53Sq.km (6.11 %) and cultivable area covers 4633.52 Sq.km (73.20%). The built-up area is reflected wherever settlement have come up.

The soils in the district are derived from the Deccan basalt formation. The western fringe of the district is covered by laterite and lateritic soils which are followed by reddish to yellowish brown soils of mixed origin eastwards on hill slopes. Further east, coarse shallow

soils occur on plateau flats, medium black soil occurring in central part are rich in clay content in the intermediate area and deep black soil occur in the valleys in central and southern parts of the district. Along the major river/tributaries silty loam soil (>100 cm) is observed.

The thematic map of soil distribution in the district is shown in **Figure. 1.6**

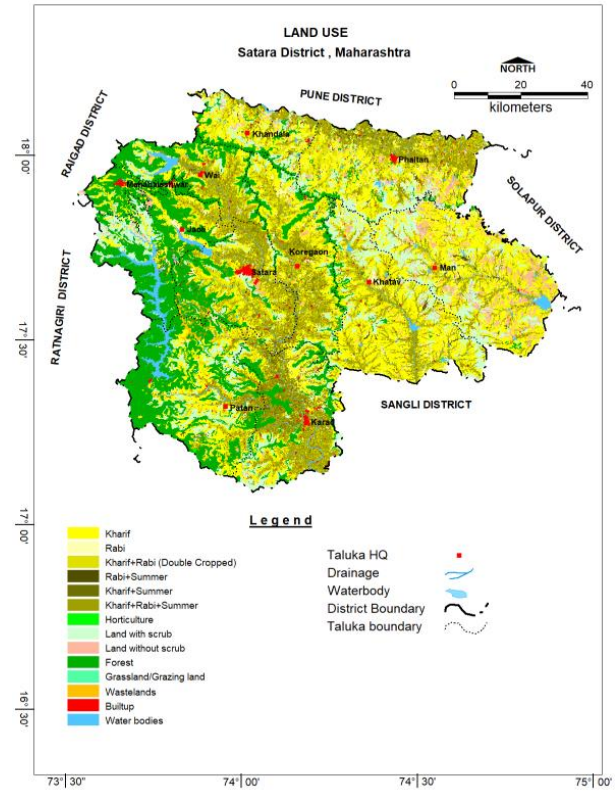


Figure 1.5: Land Use of Satara District

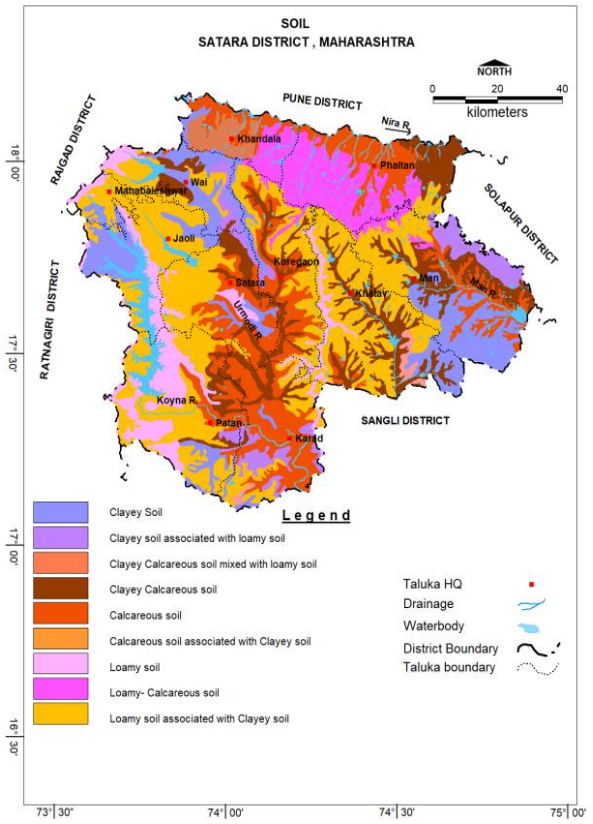


Figure 1.6: Soil, Satara District

1.3 Climate and Rainfall

The climate of the district is tropical climate and, on the whole, is agreeable. The mean minimum temperature is 14.4°C and the mean maximum temperature is 36.8°C.

The Normal rainfall of the district is 1033.4 mm spread over 80 to 90 rainy days in normal condition. Long term rainfall analysis (1998-2019) and annual rainfall data of last ten years is given in **Table 1.1** and **1.2** and **Figure. 1.7**. The spatial distribution of the rainfall is given in **Figure. 1.8**.

Table 1.1: Long-term rainfall analysis

District	Period	No of years	Normal Rainfall (mm)	Std. Deviation (mm)	Coefficient of Variation (%)	Rainfall Trend (mm/year)
Satara	1998-2019	22	1033.4	368.10	29.6	-10.34
	No of Years			% of total Years		

Departures		
Positive	16	73
Negative	6	27
Drought		
Moderate	1	5
Severe	0	0
Acute	0	0
Normal & Excess RF		
Normal	11	50
Excess	10	45

Table 1.2: Annual rainfall data (2010-2019) (in mm)

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average Rainfall (mm)
Satara	1388.9	1315	926.9	1034.6	1094.6	752.9	1042.6	1002.2	959	1614	1113.07

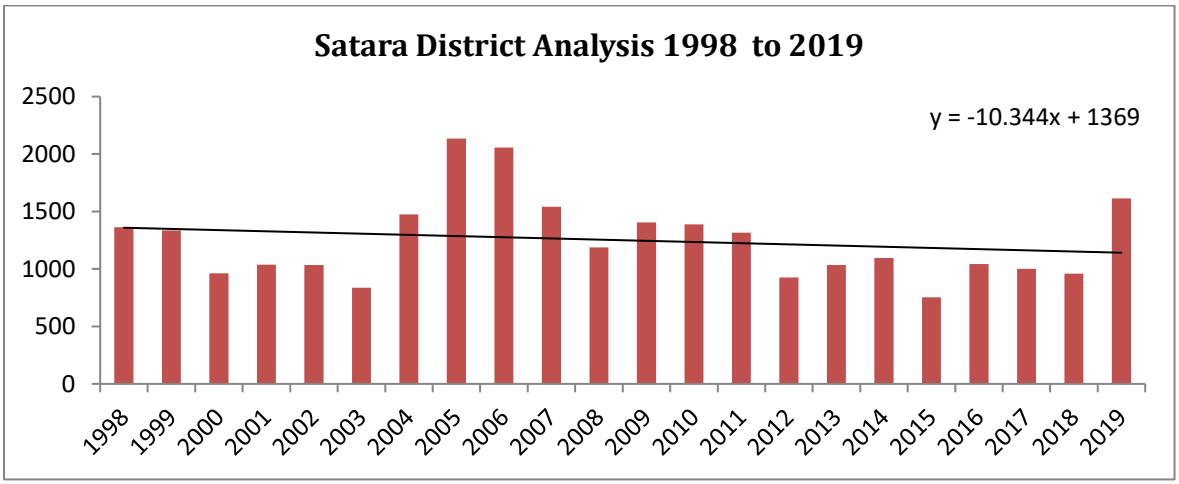


Figure 1.7: Rainfall Analysis (1998-2019), Satara District

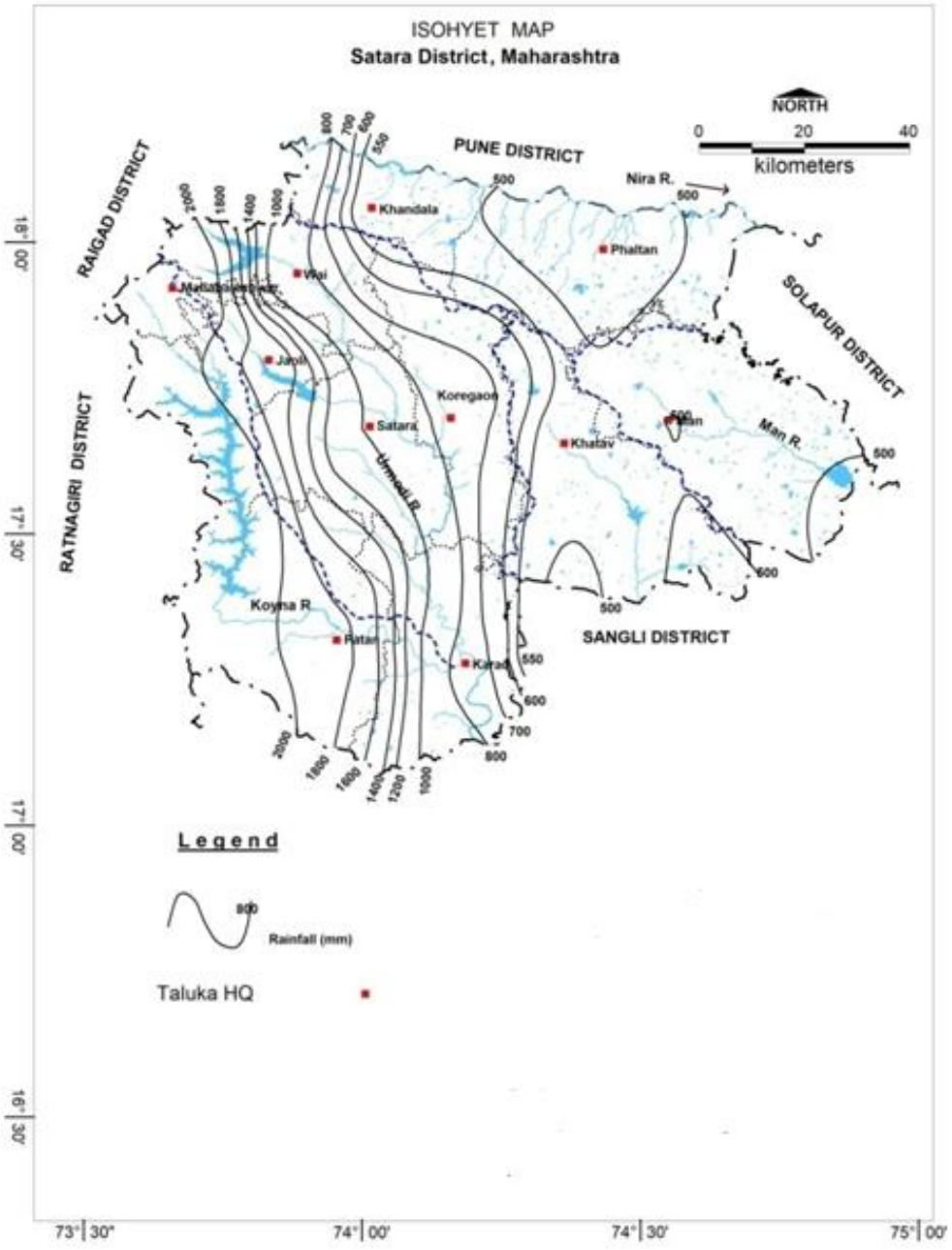


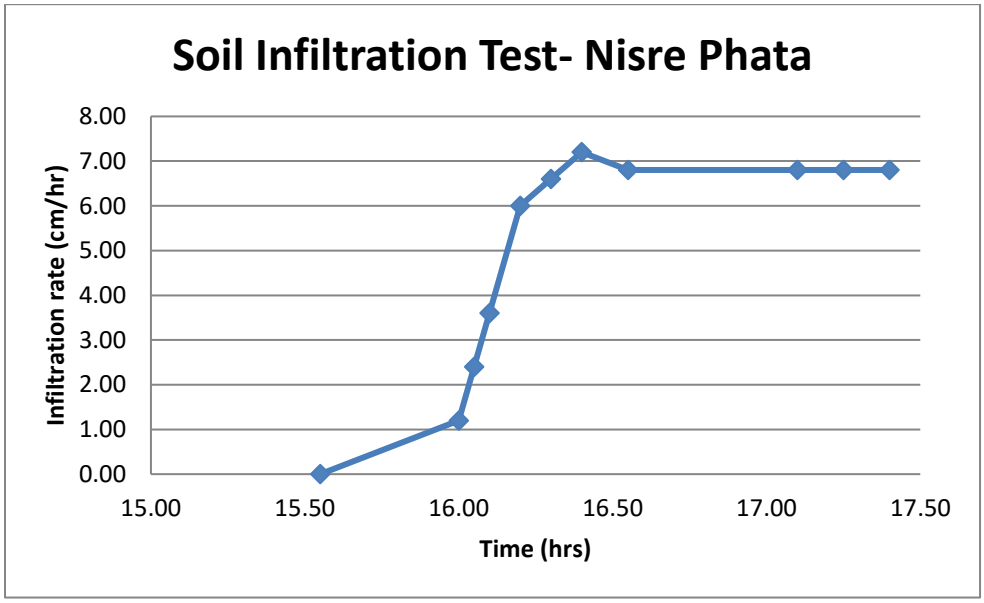
Figure 1.8: Isohyet map of Satara District

1.4 Soil Infiltration Tests

To estimate the actual rate of infiltration of various soil cover and their impact on recharge to ground water, 2 infiltration tests have been conducted at Taswade and Nisre Phata in various soil types. The data has been analyzed and the salient features of the infiltration tests are presented in **Table 1.3**, whereas the data is presented in **Annexure-IV** and the plots of soil infiltration tests are presented in **Fig. 1.9**. The duration of the test ranges from 100 to 105 minutes, the depth of water infiltrated varied from 0.59 cm to 1.70 cm and the final infiltration rate in the area are 2.36 cm/hr at Taswade and 6.80 cm/hr at Nisre Phata.

Table 1.3: Salient Features of Infiltration Tests

S No	Village	Date	Duration (min)	Water Level (cm agl)	Final infiltrated Water Depth(cm)	Final Infiltration Rate (cm/hr)
1	Taswade	19/02/2020	100	14	0.59	2.36
2	Nisre Phata	21/02/2020	105	25	1.70	6.80



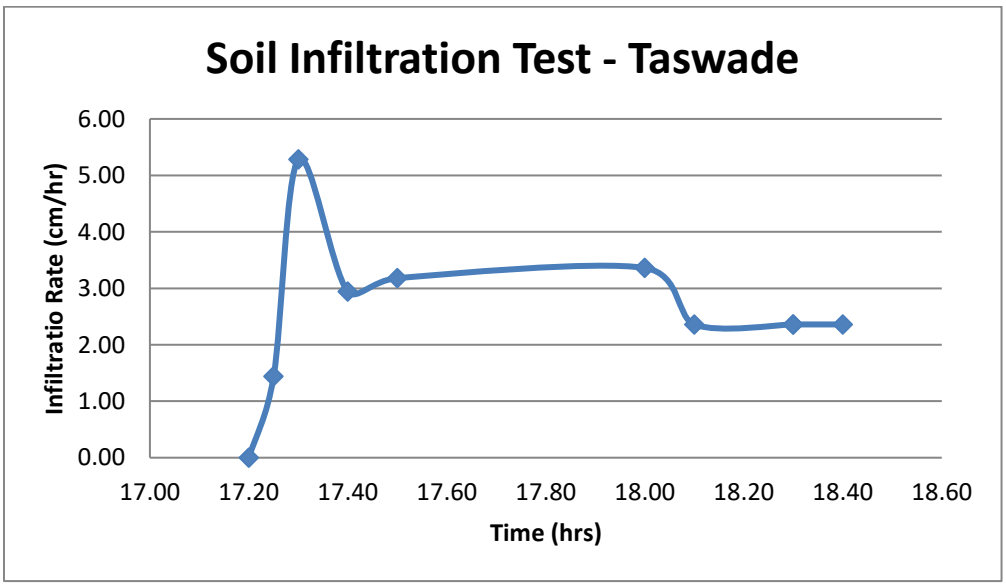


Figure 1.9: Soil Infiltration Tests of Satara District

1.5 Specific Yield Tests

To estimate the aquifer parameters of shallow aquifer (Aquifer-I) in the area, 2 pumping tests on open dug wells have been conducted. The data has been analyzed by Kumarswamy method. The salient features of pumping tests are given in **Table 1.4**. The discharge of the wells ranged from 300 to 400 lpm for pumping duration of 180 to 300 minutes.

The drawdown observed at the end of the pumping ranged from 5.9 to 6.9 m. The aquifer parameter values estimated by Kumarswamy method are observed to be well within the general range of values for weathered and jointed basalt i.e., the transmissivity value was observed from 4761.39 to 6548.55 m2/day, whereas the specific yield 0.07% to 0.08%, whereas specific capacity values ranged from 50.85 to 57.97 lpm/m.

Table 1.4: Salient Features of Pumping Tests.

Sl No	Village	Diameter (m)	Depth (mbgl)	SWL (mbgl)	Q (lpm)	Pt (min)	DD (m)	RDD (m)	C (lpm/m)	T (m^2/day	Sy
1	Sonaichiwadi	5	14	2.7	300	180	5.9	1.1	50.85	4761.39	0.074
2	Nune	5.5	11	2.4	400	300	6.9	1.9	57.97	6548.55	0.089

Q=Discharge in LPM Pt=Pumping duration in Minutes; DD=Drawdown in meter RDD=Residual drawdown in meters C=Specific Capacity in lpm/mT=Transmissivity in m^2/day S_Y=Specific Yield

2. HYDROGEOLOGY

2.1 Major Aquifer Systems

Laterite and Basalt aquifers are the main aquifers in the district. Two aquifer Systems in Basalt and one aquifer in Laterite are found to be prevailing in the district. **(Figure 2.1).**

Deccan Trap Basalt of upper Cretaceous to lower Eocene age is the major rock formation in the district. Laterite occurs covering almost all the plateaus of the Western Ghats- and also in the north and central portions of the district. A map depicting hydrogeological features is presented in **figure 2.2.** Water table contour in **Figure 2.3**

Laterites:

Laterites, although occurring at high elevations, on top of plateaus, form moderately good aquifers (perched aquifers), suitable for constructing large diameter wells. Shallow Aquifer occurs from 2 to 10 m bgl depth with very shallow water levels.

Deccan basalts:

Deccan basalts are hydrogeologically in-homogeneous rocks. The weathered and jointed /fractured parts of the rock, as also permeable inter-flow beds constitute the zone of ground water storage and flow. The existence of multiple aquifers is characteristic of basalt and exhibits wide variation in the joint/fracture intensity. The yields of well is function of the permeability and transmissivity of aquifer and it depends upon the degree of weathering and topographic setting of the aquifer. Due to wide variation in secondary openings, the potential areas for ground water are generally localized. In general, ground water occurs under phreatic/unconfined to semi-confined conditions in basalts. Two Aquifer system has been delineated: Aquifer I from 9 to 34 m (Weathered /Jointed Basalt); and Aquifer II from 35 to 193 m (Jointed/fractured basalt). Shallow Aquifer generally tapped by the dug wells of 9 to 35 m depth, have water levels ranging from 0.9 to 25.0 m bgl and yield varies from 10 to 200 m3/day. The deeper Aquifer is being tapped by borewells with depth ranging from 35 to 200 m bgl and the water level from 9.0 to 95 m bgl and yields vary from 0 to 3 lps. Based on Ground Water Exploration, Aquifer wise characteristics are given **Table 2.1**. Maps depicting depth of occurrence and fractured/Granular rock thickness and Aquifer wise yield potential maps are shown in **fig 2.4, Fig 2.5, Fig 2.6 and Fig 2.7**.

Figure 2.1: Major Aquifers

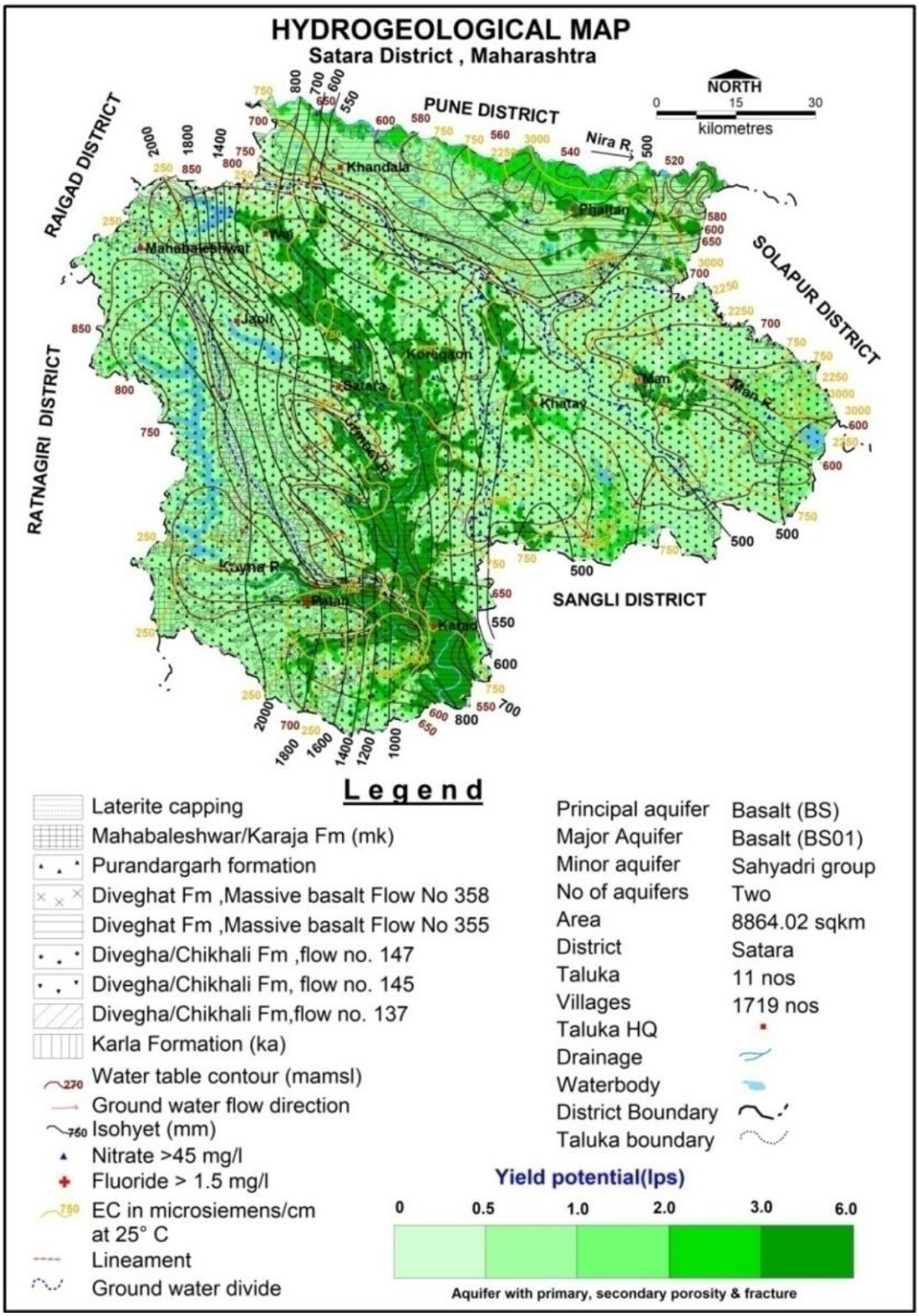


Figure 2.2: Hydrogeology

Water Table Elevation in Satara district ranges between 520 m amsl and 850 m amsl. The entire district is mainly drained by tributaries of Krishna River. Nira River and its

tributaries in the entire northern part, the Man River and its tributaries in the south-east and the Krishna River and its tributaries in the south. It has been observed that the ground water flow direction follows the drainage and topography.

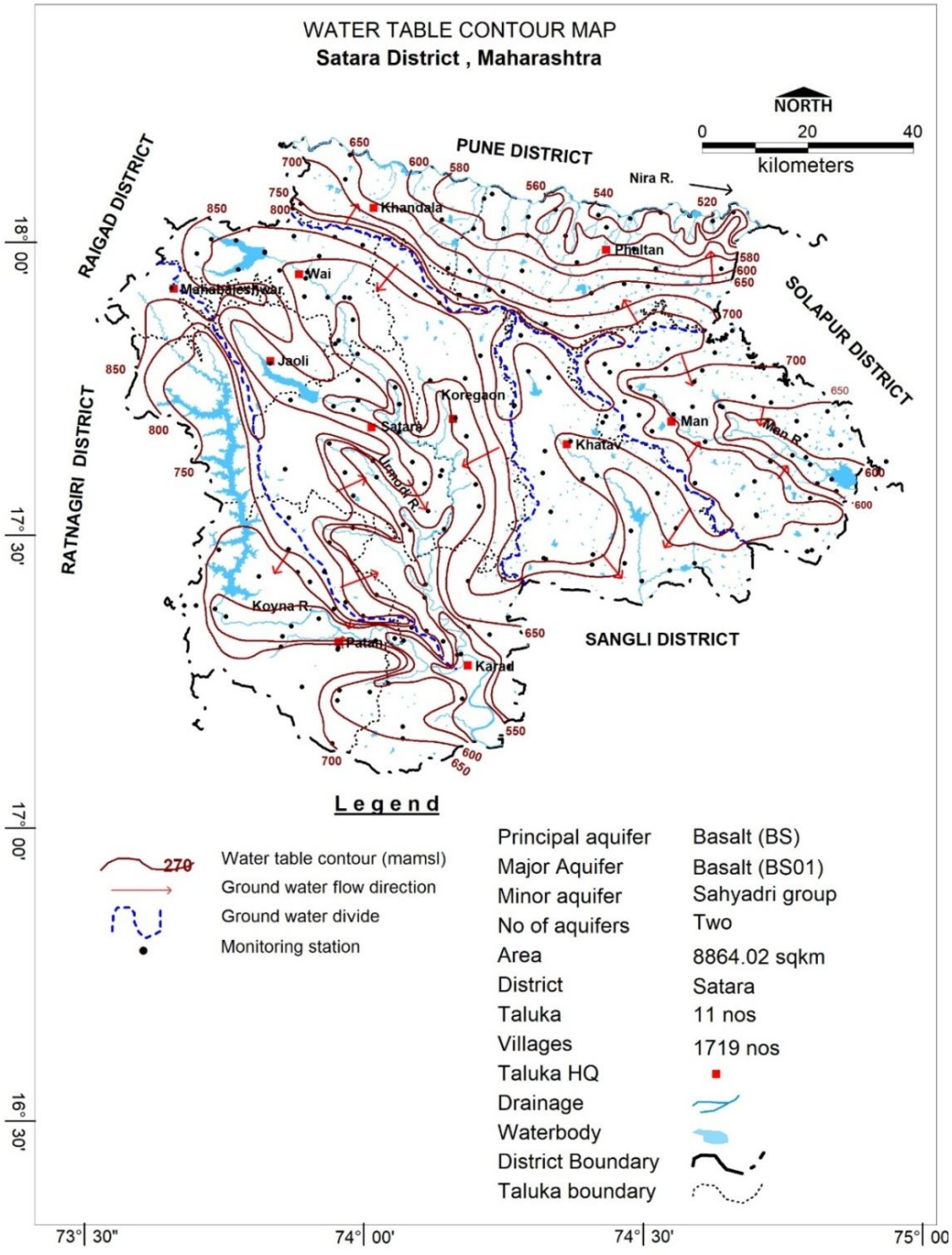


Figure 2.3: Water Table contour

Table 2.1: Aquifer Characteristic of Satara district

Type of Aquifer	Formation	Depth range of the aquifers (mbgl)	SWL (mbgl)	Thickness (m)	Fractures encountered (mbgl)	Yield	Sustainability	Aquifer parameter (Transmissivity m^2/day)	Specific yield/ storotivity	Suitability for drinking/ irrigation
Aquifer-I	**Deccan Trap-** Weathered/ Fractured Basalt	9 to 34	0.9 to 25	1-12	up to 34	10 to 200 m^3/day	1 to 2 hrs	9.25 to 30 m^2/day	0.019 to 0.028	Suitable for both (except NO3 & F affected villages for drinking)
Aquifer-II	Jointed / Fractured Basalt	35 to 193	9 to 95	1-6t	up to 193	0 to 3 lps	0.5 to 3 hrs	10 to 97 m^2/day	1.2 x10^{-4} to 3.57 X x10^{-4}	Suitable for both (except NO3 & F affected villages for drinking)

Aquifer Characteristic of Satara district is shown in **Table 2.1.** There are two major aquifers such as Deccan Trap Basalt and Laterites. Weathered/Fractured Basalt and Jointed / Fractured Basalt are the water bearing formations in Deccan Trap Basalt of Satara District. Yield of Aquifer –I is 10 – 200 m^3/day, Aquifer-II is upto 3 lps.

Depth of occurrence and fractured/granular rock thickness of Aquifer-I and Aquifer-II is shown in **Figure 2.4 and 2.5,** respectively. Depth of occurrence of Aquifer –I Basalt (Weathered /Fractured Basalt) is 9 to 34 m and Laterites are 2 to 10 m while depth of occurrence of Aquifer-II Basalt (Jointed & Fractured Basalt) is 35 to 193 m.

Yield Potential of Aquifer-I (Weathered and fractured Basalts) and Aquifer-II (Jonted/fractured Basalt) is shown in **Figure 2.6 and 2.7** yield potential of Aquifer-I is 10 to 200 m^3/day. Yield Potential of Aquifer-II is upto 3 lps.

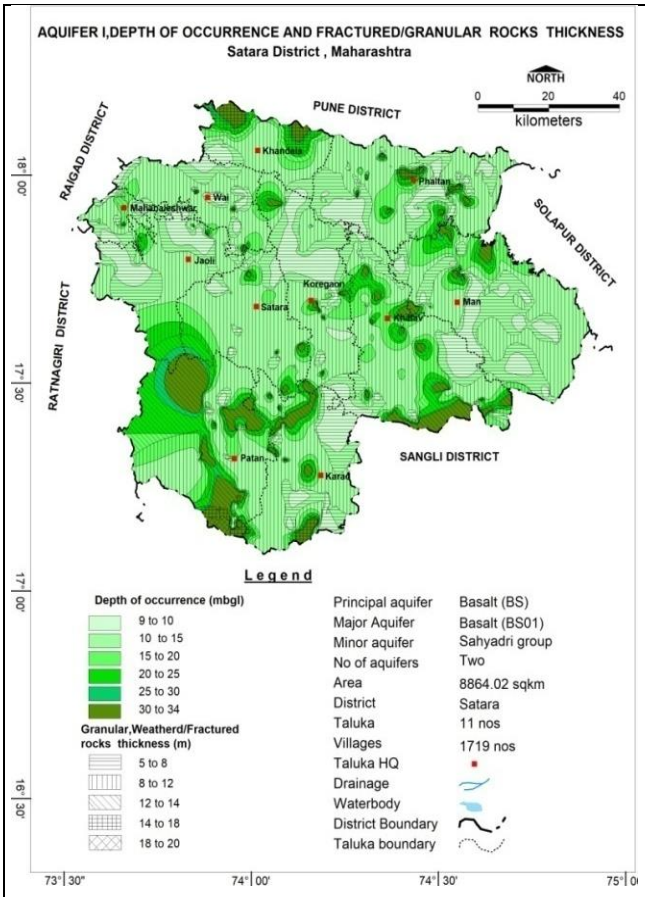


Figure 2.4: Depth of occurrence and fractured/granular rock thickness of Aquifer-I

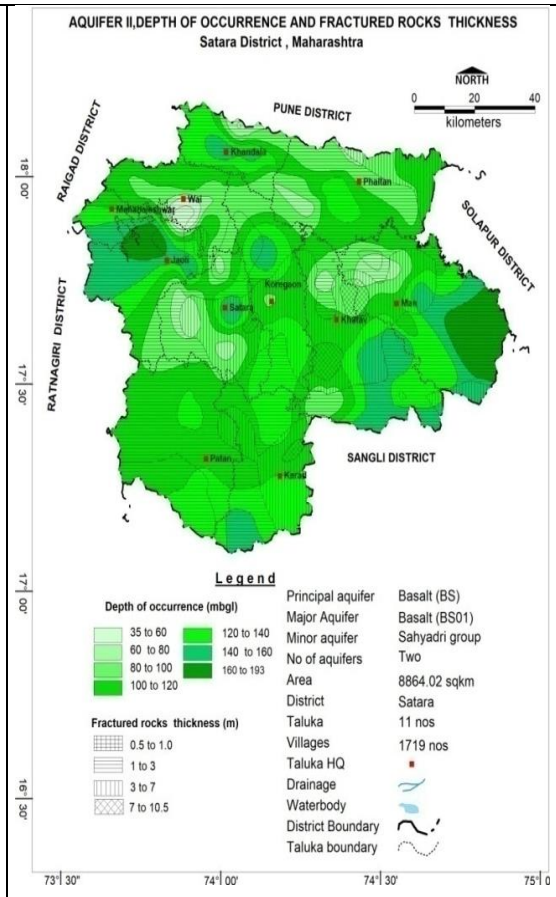


Figure 2.5: Depth of occurrence and fractured/granular rock thickness of Aquifer-II

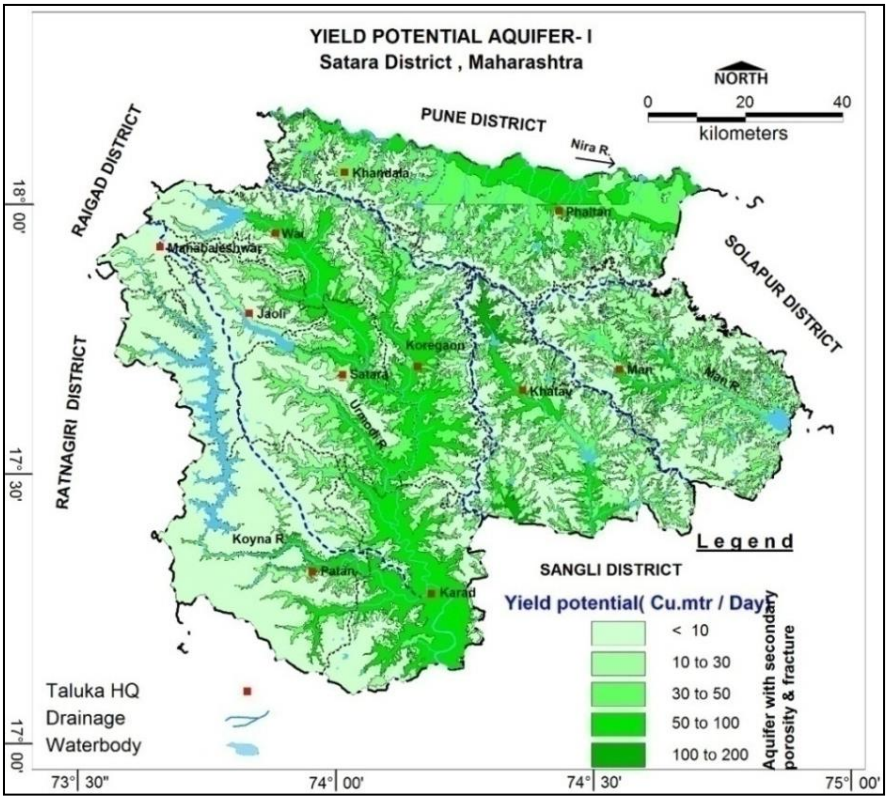


Figure 2.6: Aquifer-I Yield Potential (Basalt & Alluvium)

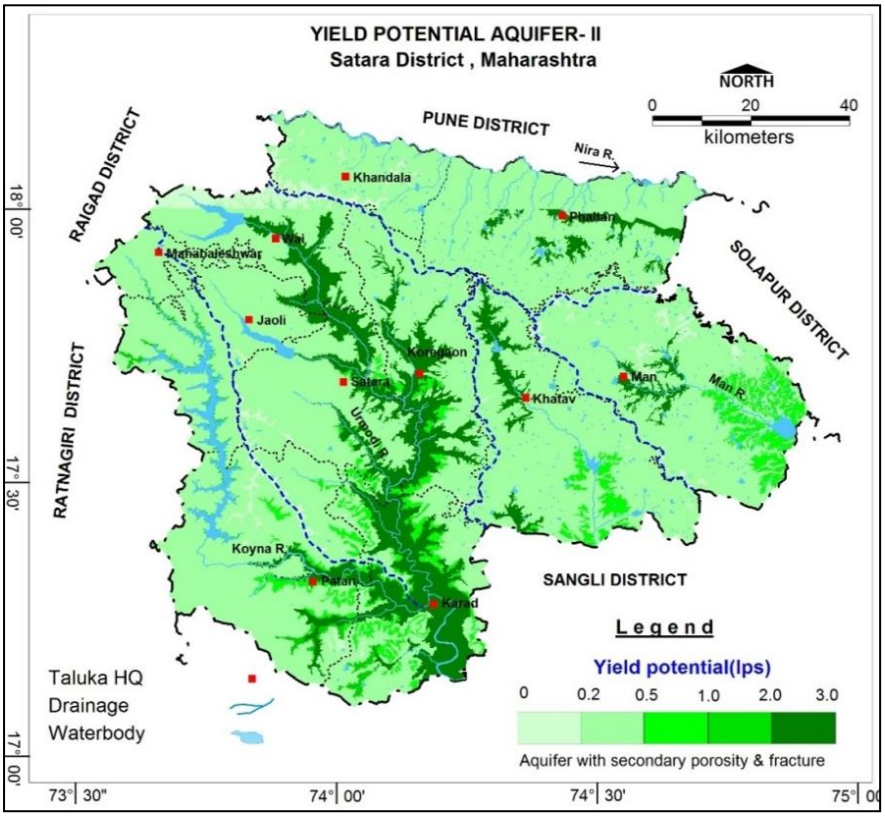


Figure 2.7: Aquifer-II Yield Potential (Basalt)

Yield potential	Aquifer I	Aquifer II
Basalt	10 to 200 m^3/day	Traces to 3 lps

2.2 Aquifer Parameters

Aquifer parameters are available from ground water exploration carried out in the basaltic area of the district as well as from the pumping tests carried out on dugwells in Basaltic and lateritic terrain. The specific capacity of dugwells tested in Deccan Trap Basalt ranges between 50.85 and 57.97 lpm/m-drawdown. During the pumping tests conducted on the exploratory wells in Basalt, the transmissivity was found to vary from 10 to 97 m^2/day. The Storativity of the aquifer varied between $1.2x10^{-4}$ and $3.5x10^{-4}$

2.3 3-D and 2-D Aquifer Disposition

Based on the existing data, 3D aquifer disposition, Fence diagram, Bar diagram and hydrogeological sections along different directions have been prepared and shown in **Figure2.8, 2.9, 2.10 and 2.11 (a to d)** to understand the subsurface disposition of aquifer system.

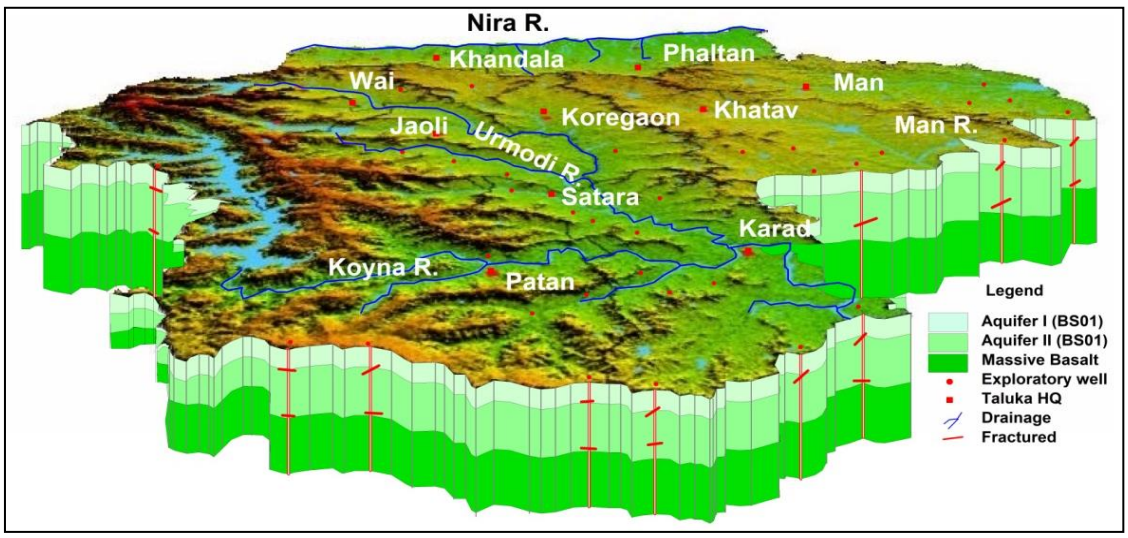


Figure 2.8-3D Aquifer Disposition

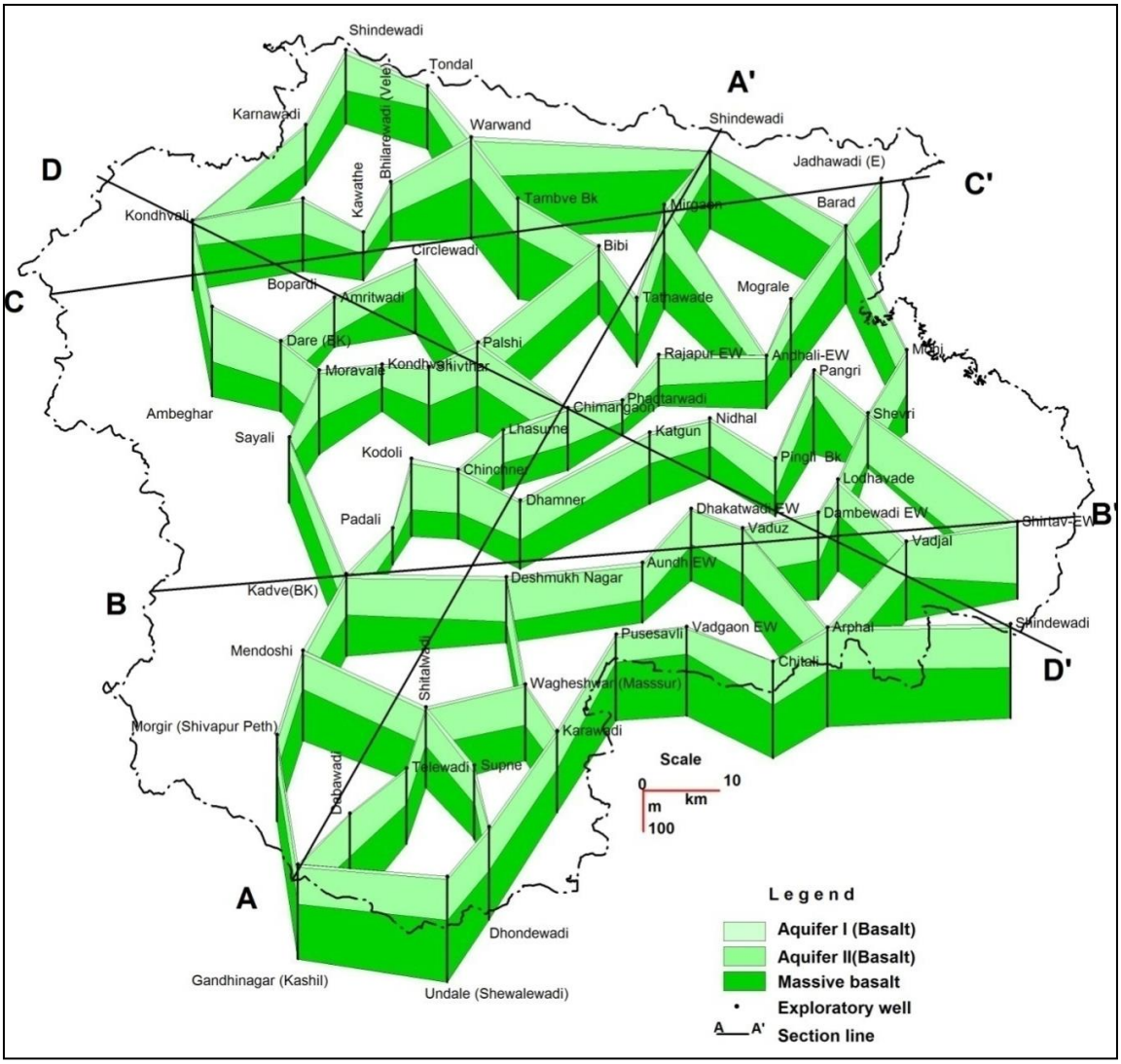


Figure 2.9: Fence Diagram

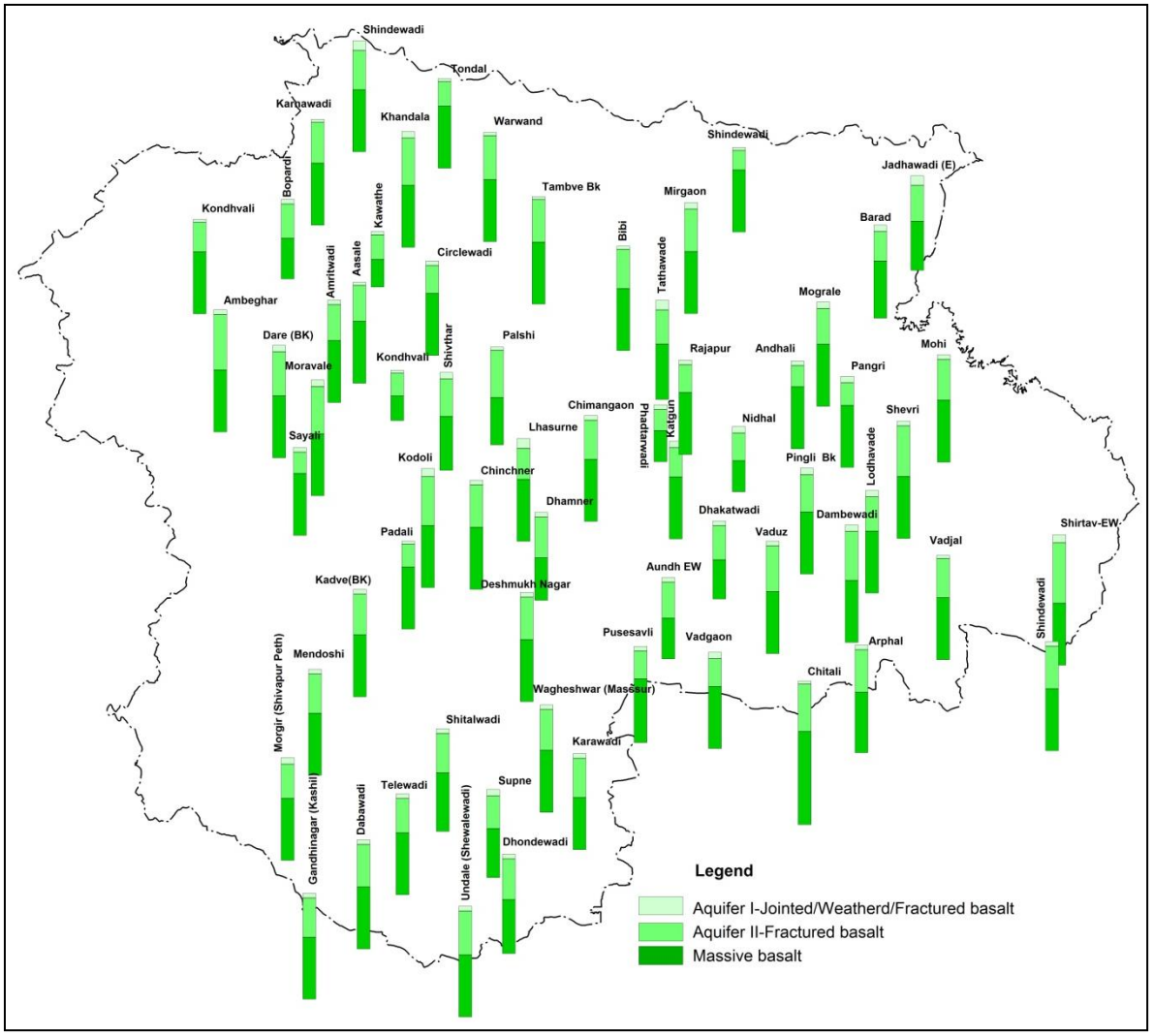


Figure 2.10: Bar Diagram

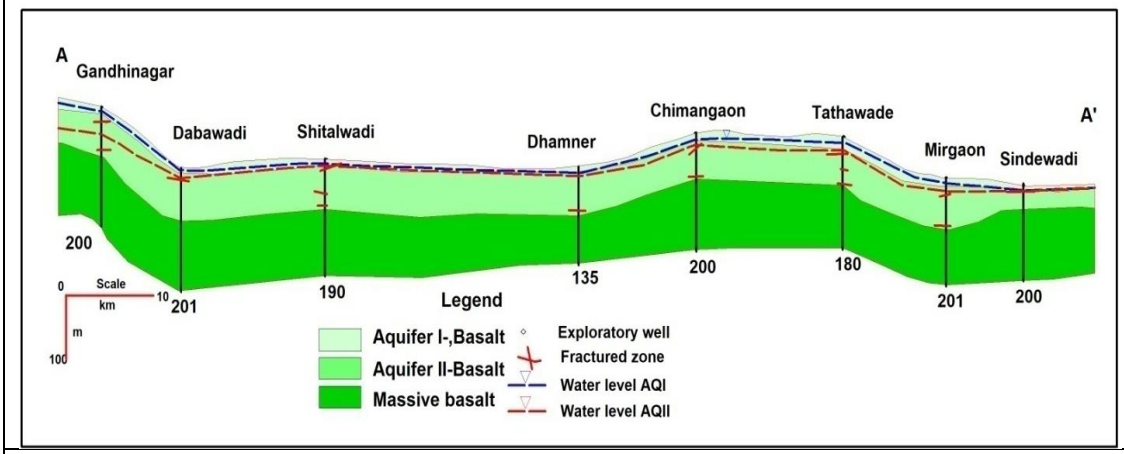


Figure2.11 (a): Lithological section

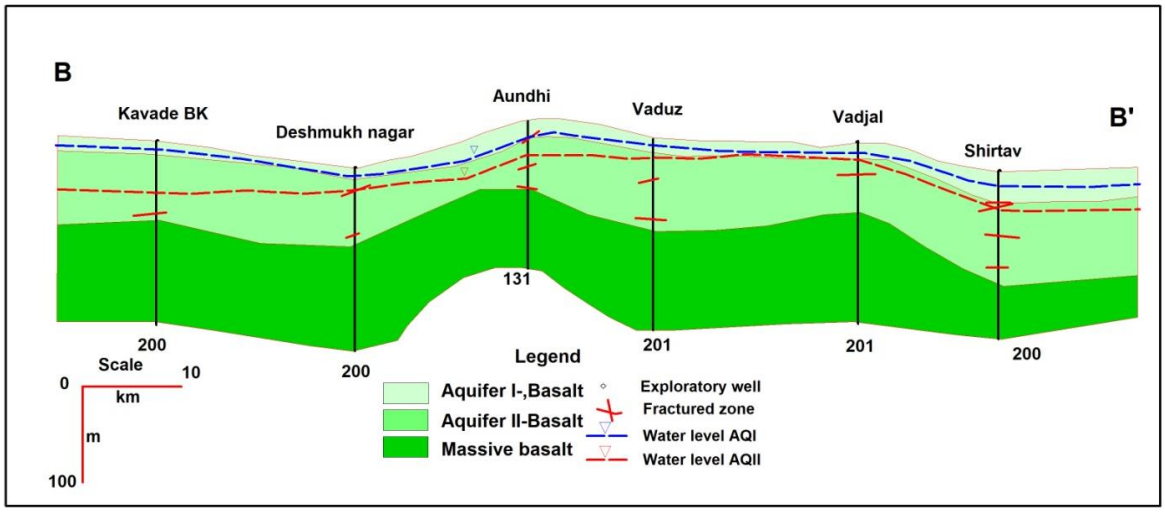


Figure2.11 (b): Lithological section

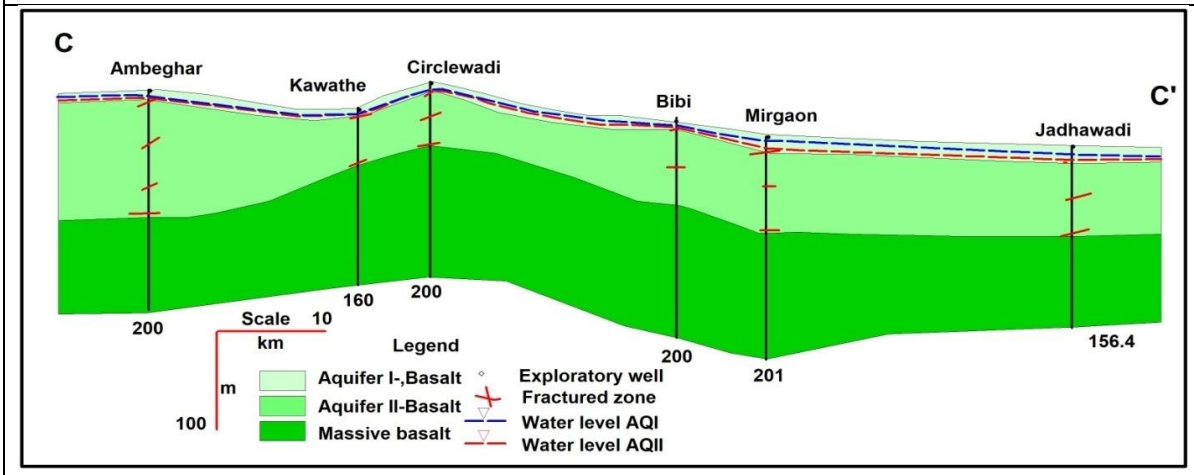


Figure2.11(c): Lithological section

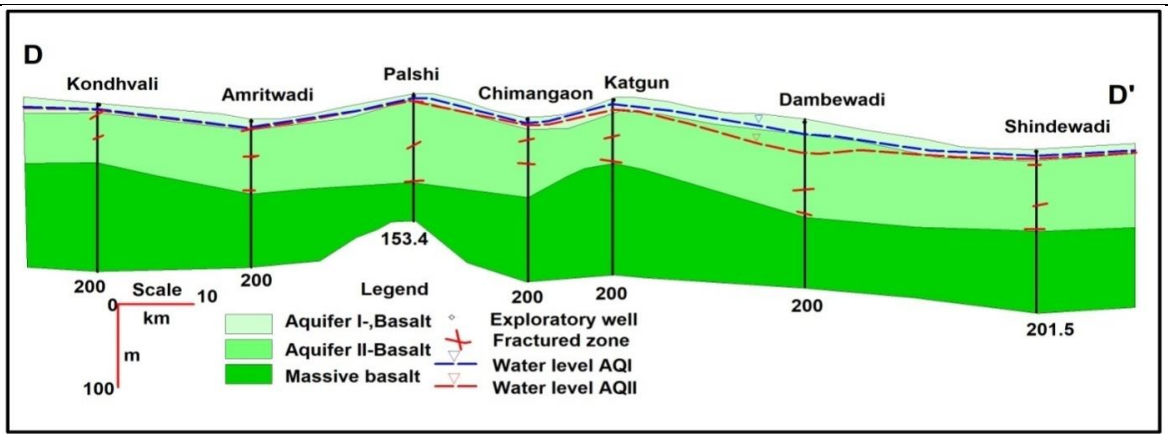


Figure2.11 (d): Lithological section

3. WATER LEVEL SCENARIO

3.1 Depth to water level (Shallow Aquifer-I)

Central Ground Water Board periodically monitors 48 Ground Water monitoring wells in the Satara district, four times a year i.e. in January, May (Premonsoon), August and November (Postmonsoon). Apart from this under NAQUIM study; 17 KOW were also established and monitored during the year 2016 and 101 and 107 KOWs were also established and monitored during the year 2017 and 2019 respectively. These data have been used for preparation of depth to water level maps of the district.

Depth to Water Level – Pre-monsoon (May-2017)

The depth to water levels in Satara district during May 2017 ranges between 0.9 mbgl (Morgiri, Patan taluka) and 25.00 mbgl (Pachgani, Mahabaleshwar taluka). The depth to Water levels varies between 5 and 10 mbgl in major part of the District. The depth to water levels less than 5 mbgl are observed in western part of the district covering Patan taluka and in patches in Karad, Jaoli Satara talukas and in isolated wells in Phaltan, Koregaon, Khandala, Man and Wai talukas. The depth to water level between 10 to 20 mbgl observed in patches in north-western and eatern parts of the district. The Deeper water levels between 20 and 30 mbgl are observed in two isolated patches in Mahabaleshwar and Khatav talukas. The premonsoon depth to water level map is depicted in **Figure-3.1 and** details are given in **Annexure- II**

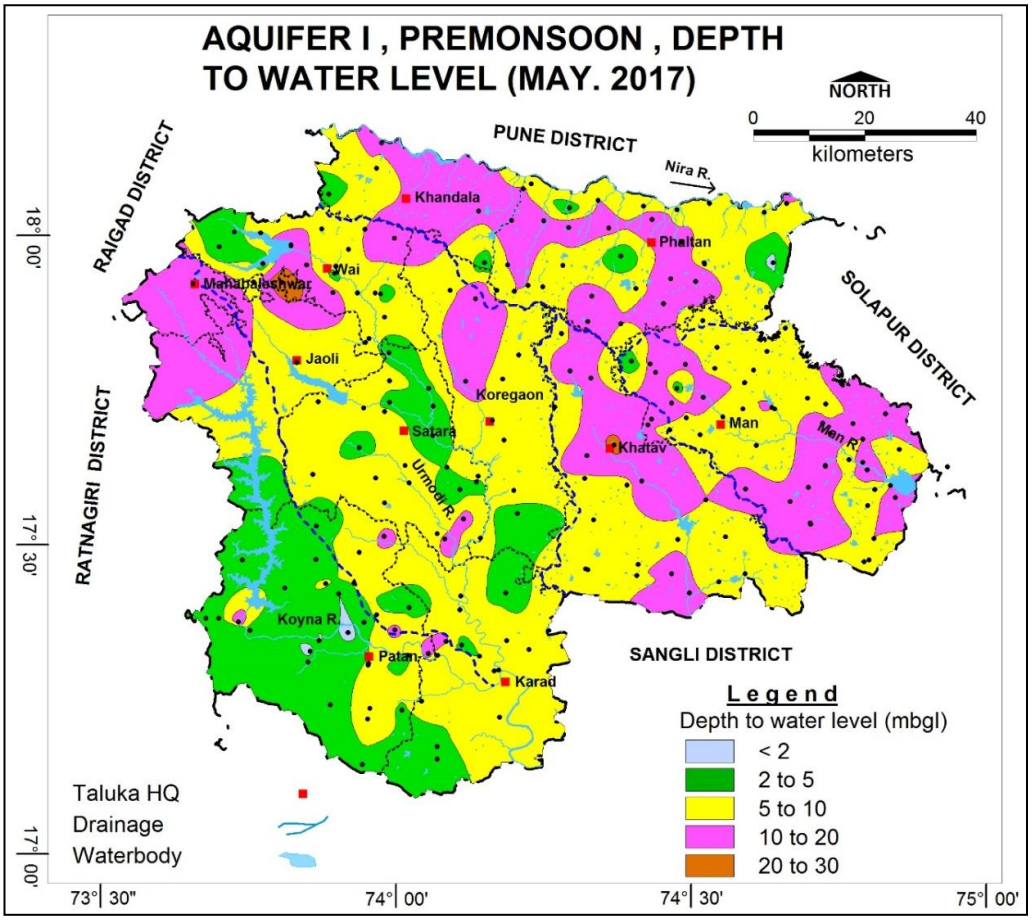


Fig 3.1: DTWL shallow aquifer (May 2017)

Depth to Water Level : Post monsoon (Nov-2017)

The depth to water levels in Satara district during Nov. 2017 ranges between 0.1 mbgl (Dhuldev, Man taluka) and 19.0 mbgl (Khatav, Khatavtaluka). Shallow water levels within 5 m bgl are observed in major part of the district. The depth to water level between 10 to 20 mbgl has been observed in parts of Mahabaleshwar, Khatav and Phaltan talukas and in parts few isolated wells. Spatial variation in post monsoon depth to water levels is shown in **Figure-3.2**

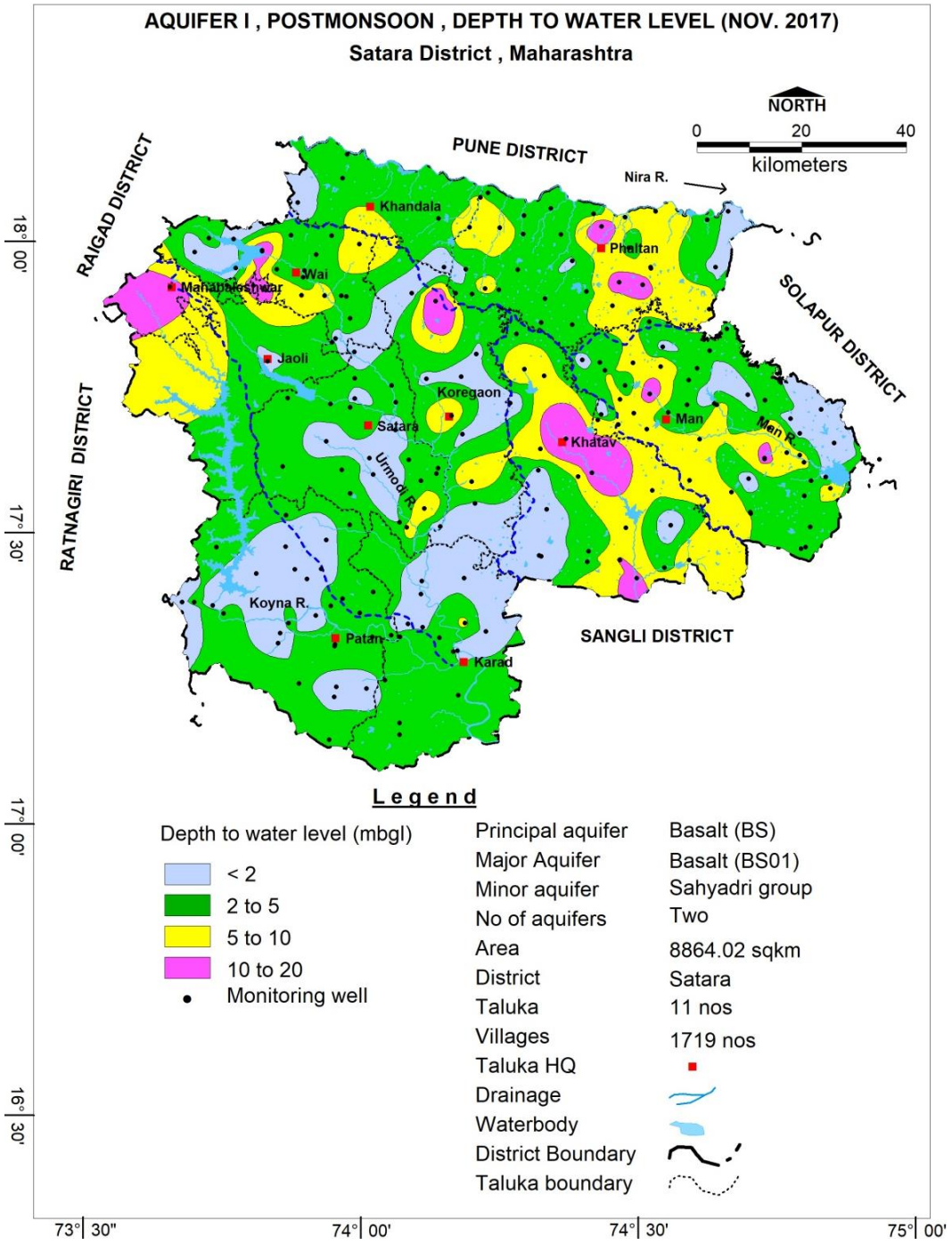


Fig 3.2: DTWL shallow aquifer (Nov. 2017)

Seasonal Water Level Fluctuation (May-Nov. 2017)

It is observed that minimal water level fluctuation was 0.10m at Vaduth, Satara taluka and Rajuri, Phaltan taluka while maximal water level fluctuation was 13.0m at Pachgani, Mahabaleshwar taluka . Rise in water level has been observed in entire district, mainly in the range of 0 to 4 m and >4 m in. Decline in water level was observed in 7 isolated wells in Khatav, Koregaon and Phaltan talukas in the District. Water level fluctuation is presented in **Fig 3.3**

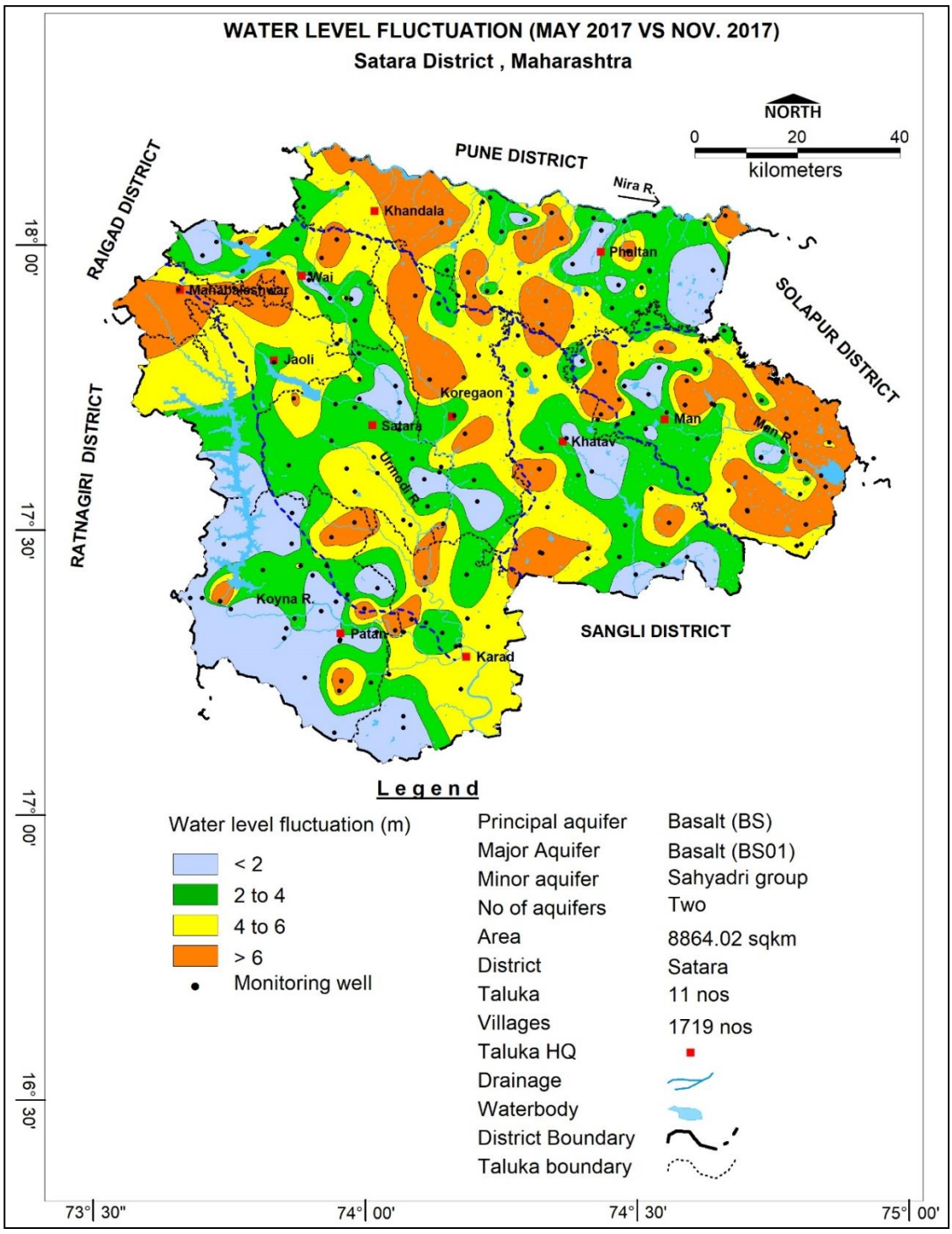


Fig 3.3: Water level fluctuation (May 2017 Vs Nov 2017)

3.2 Depth to water level (Deeper Aquifer-II)

Premonsoon Depth to Water Level (May-2017)

In Deeper Aquifer-II, the pre-monsoon depth to water levels, in Satara District during May 2017, range from 9.00 (Lhasurne, Koregaon taluka) to 95.00 mbgl (Vadgaon, Phaltan taluka). The depth to water level varies between 10 to 30 mbgl in major part of the district. The deep water level (>50 mbgl) has been observed in Phaltan (Vadgaon and Andhali EW), Karad (Wagheshwar EW), Patan (Mendoshi and Morgir EW), Jaoli (Dare BK EW), Satara (Kadve BK EW), Man (Rajale EW, Khatav (Rajapur EW) and Wai (Eksar OW) Talukas. The premonsoon depth to water level for Aquifer –II is given in **Fig. 3.4 (a)** and the details are presented in **Annexure III**.

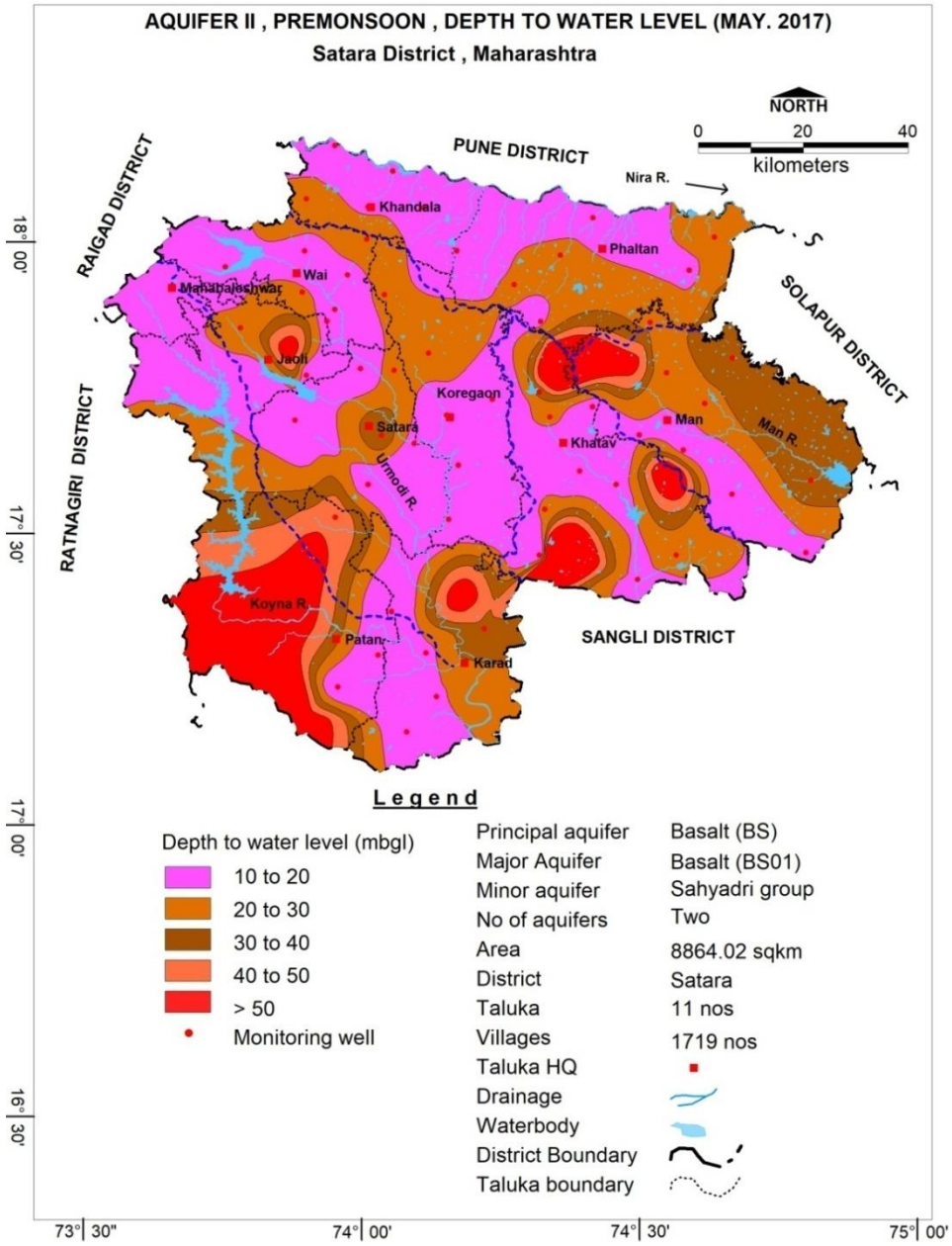


Fig 3.4: DTWL deeper aquifer (May 2017)

Postmonsoon Depth to Water Level (Nov.-2017)

In Aquifer-II, the post monsoon depth to water levels in Satara District during Nov. 2017 range between 1.40 (Lhasurne, Koregaon taluka and Padali, Satara taluka) and >100 mbgl (isolated EW at Surul, Patan taluka). Depth to water level less than 5 m bgl has been observed in patches in Central and western part of the district. The major part of the district shows deeper water levels ranging between 5 and 20 mbgl. The deepest water level of more than 30 mbgl is observed at Wagheshwar EW and Karawadi OW, Karad taluka, Rajapur EW, Khatav taluka, Dare BK EW, Jaoli taluka, Vihe, Mendoshi and Morgir EWs, Patan taluka, Mohi, Man taluka, Andhali-EW, Phaltan taluka and Gandhinagar EW, Phaltan taluka. The post monsoon depth to water level for Aquifer –II is given in **Fig. 3.5**

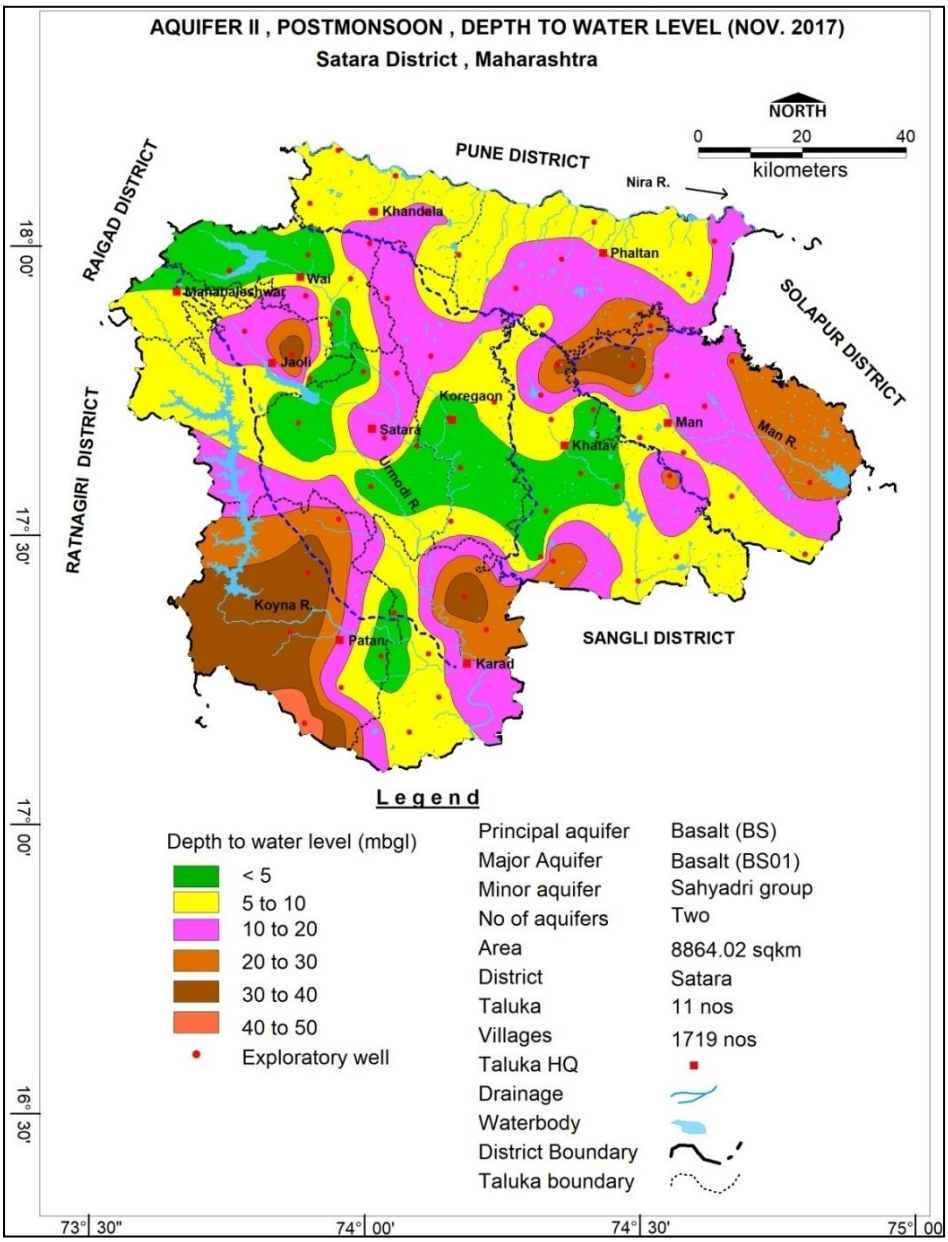


Fig 3.5: DTWL deeper aquifer (Nov. 2017)

3.3 Water Level Trend (2010-2019)

In Satara district, pre-monsoon fall in water levels trend has been recorded at 32 stations and ranges from 0.0010 (Savde, Karad taluka and Dhebewadi, Patan Taluka) to 0.667 m/year (Satara Road (Padali), Koregaon taluka) while rising trend was observed in 50 stations varying from 0.015m/year (Khadakwadi (Tarukh), Karad taluka) to 1.163 (Surur), Wai taluka). During pre-monsoon, declining water level trend has been observed in about 9839 sq km area during 2010-19, i.e., 93 % of the area. Significant decline more than 1.16 m/year has been observed in 4137 sq km, i.e., 40 % area covering major part of Man, Phaltan and Khandala talukas. Rise in water level trend has been observed in western part of the district covering major part of Mahabaleshwar, Satara, Wai and Patan talukas. **(Fig.3.6)**

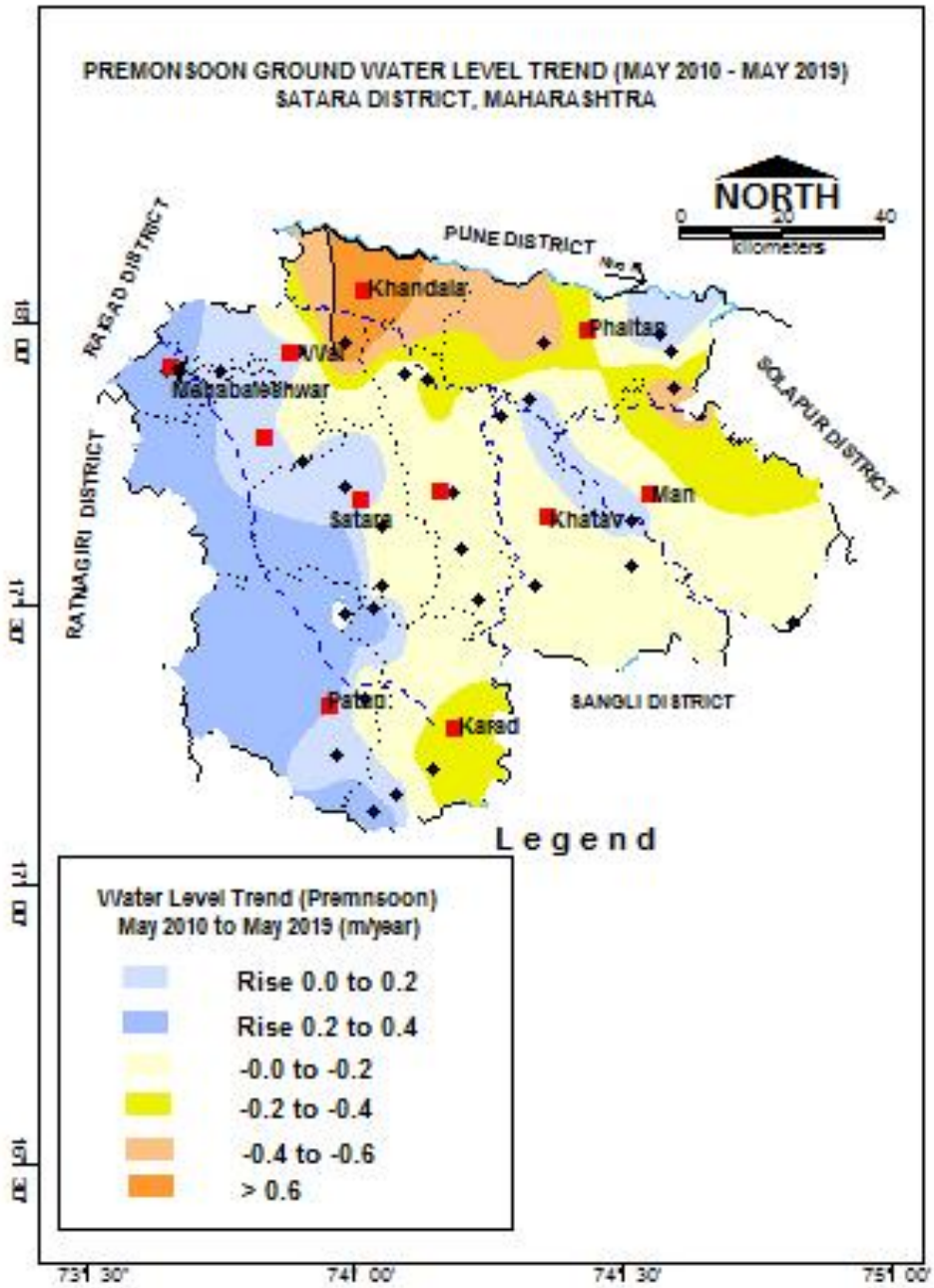


Fig.3.6: Pre-monsoon water level trend (May 2010-May 19)

In Satara district, post monsoon fall in water levels trend has been recorded at 53 stations and it ranges between 0.0006 (Malharpeth, Patan taluka) to 0.414 m/year (Sawantwadi(Jinti), Patan taluka) while raising trend was observed in 33 stations varying from0.0376 m/year (Beldare, Karad taluka) to 0.2287 (Chachali, Koregaon taluka). During post-monsoon, declining water level trend has been observed in about 8444 sq km area during 2010-19, i.e., 80 % of the area. Significant decline more than 1.20 m/year has been observed in 1953 sq km, i.e., 18.6 % area covering extream eastern part of taluka. Rise in water level trend has been observed in northwestern and southeastern part of the district covering major part of Mahabaleshwar, Khanala, Wai , Satara, man khatav and Karad talukas. **(Fig 3.7)**

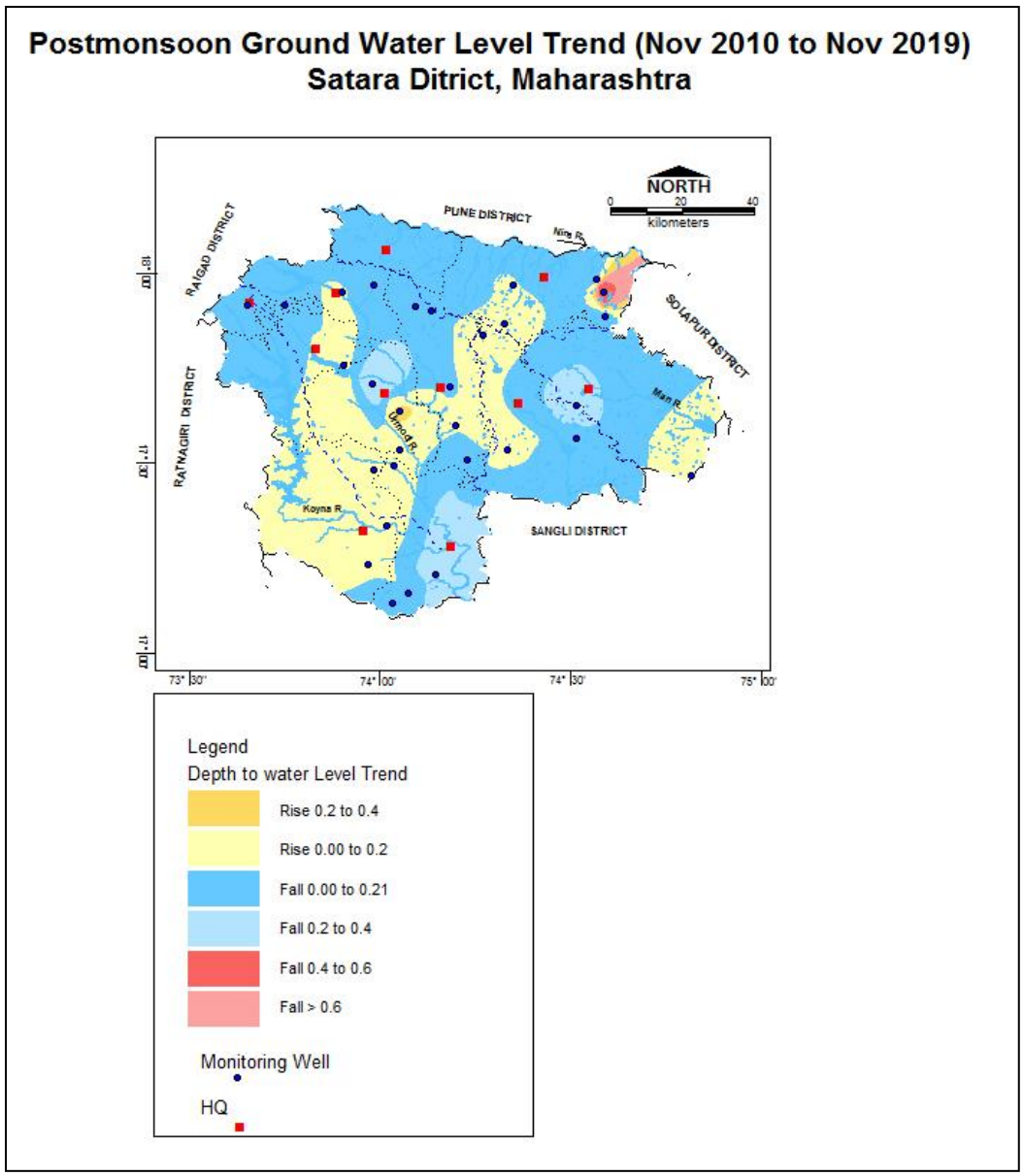


Fig 3.7: Postmonsoon water level trend (Nov 2010-Nov 2019)

3.4 Hydrograph Analysis

The variation in short term and long-term water level trends may be due to variation in natural recharge due to rainfall and withdrawal of groundwater for various agricultural activity, domestic requirements and industrial needs. The analysis of hydrographs shows that the annual rising trend in hydrographs indicates the natural recharge of groundwater regime due to monsoon rainfall, as the monsoon rainfall is the only natural source of water for recharge to the ground water regime**.** However, continuous increase in the groundwater draft is indicated by the falling trend. Which is depicted in hydroghaphs of each hydrogeological unit/taluka in **Fig. 3.8 (a to j).**

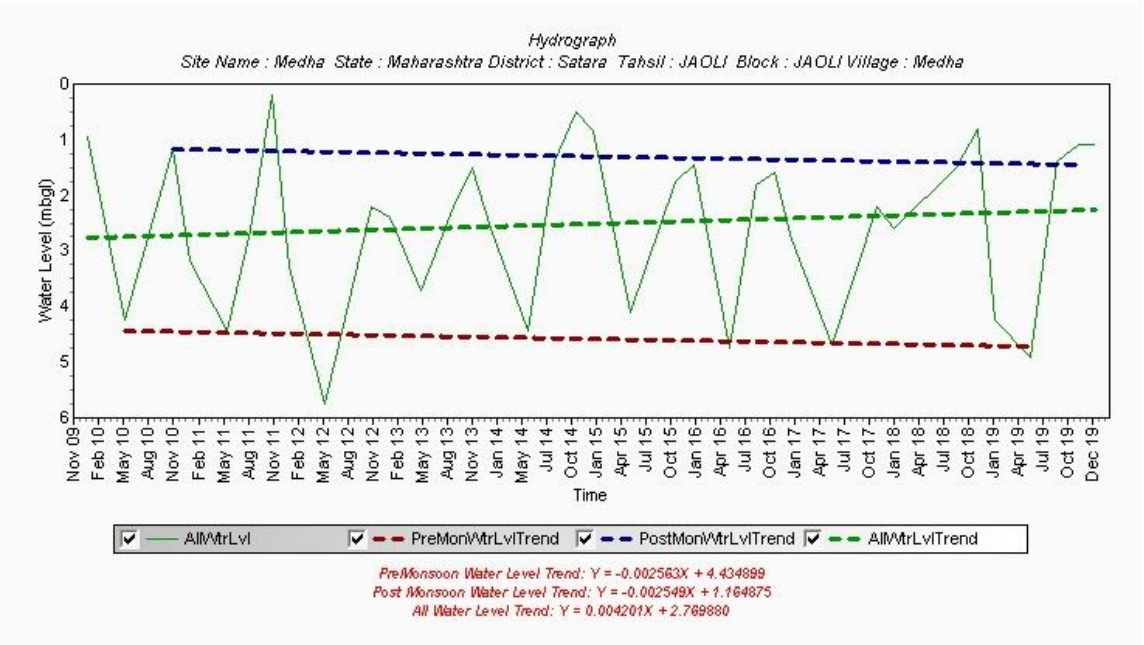


Fig 3.8 a: Hydrograph (2009-19), Medha, Jaoli Taluka

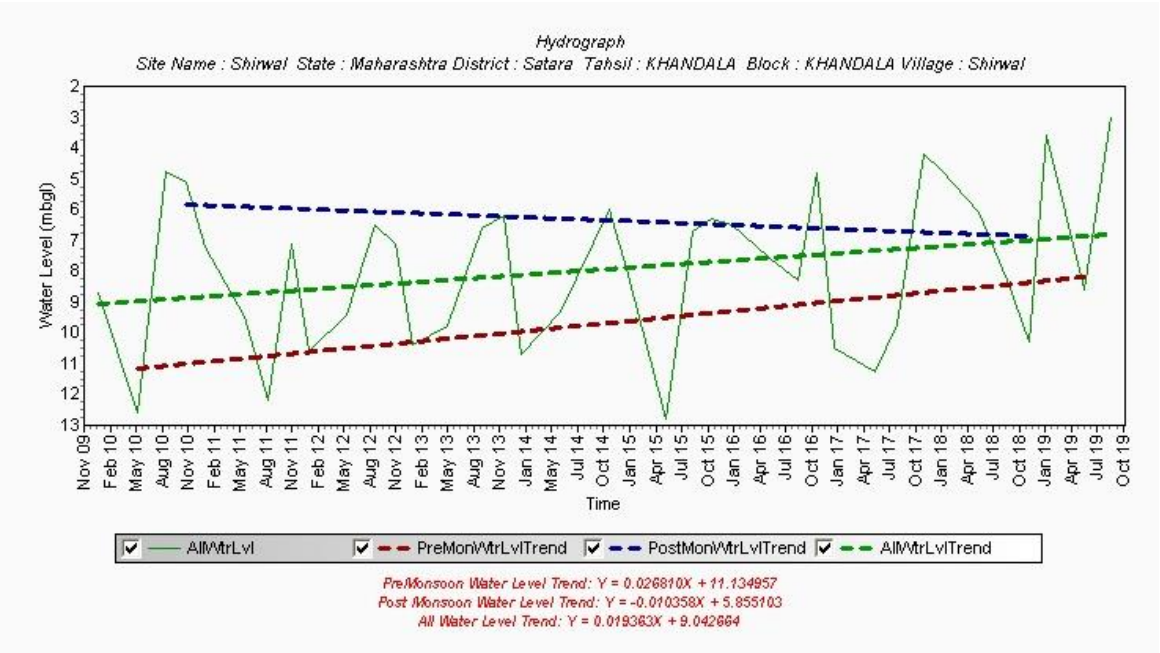


Fig 3.8 b: Hydrograph (2009-19), Shirwal, Khandala Taluka

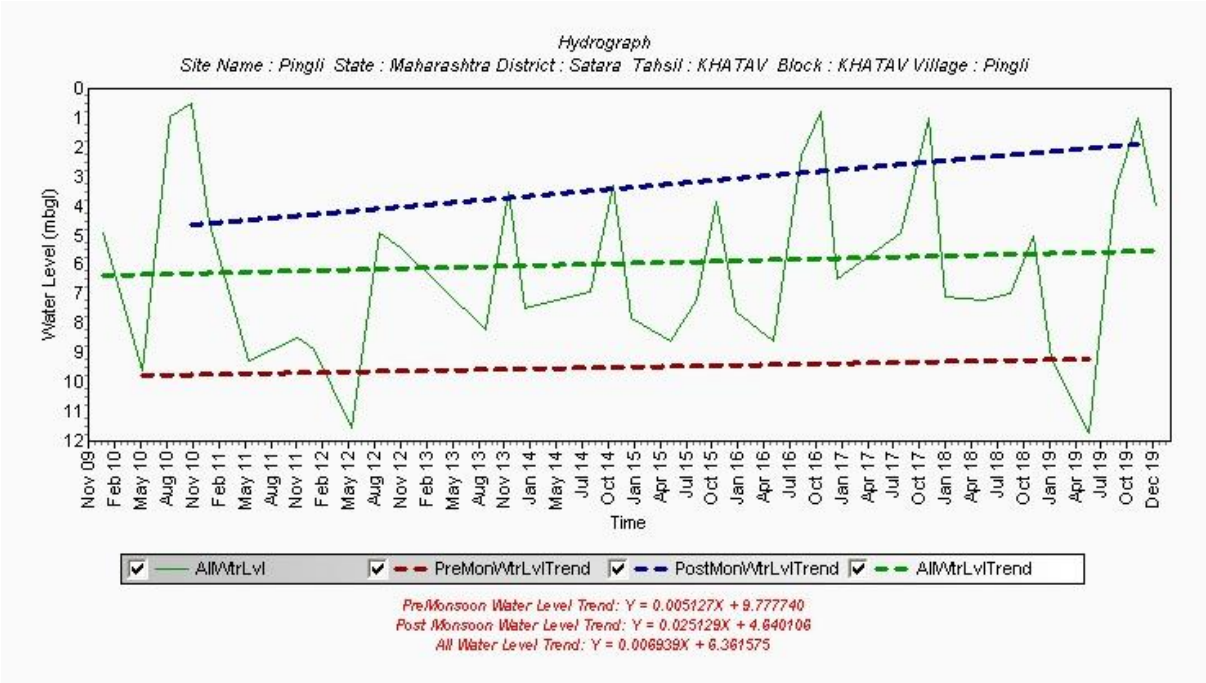


Fig 3.8 c: Hydrograph (2009-19), Pigli, Khatav Taluka

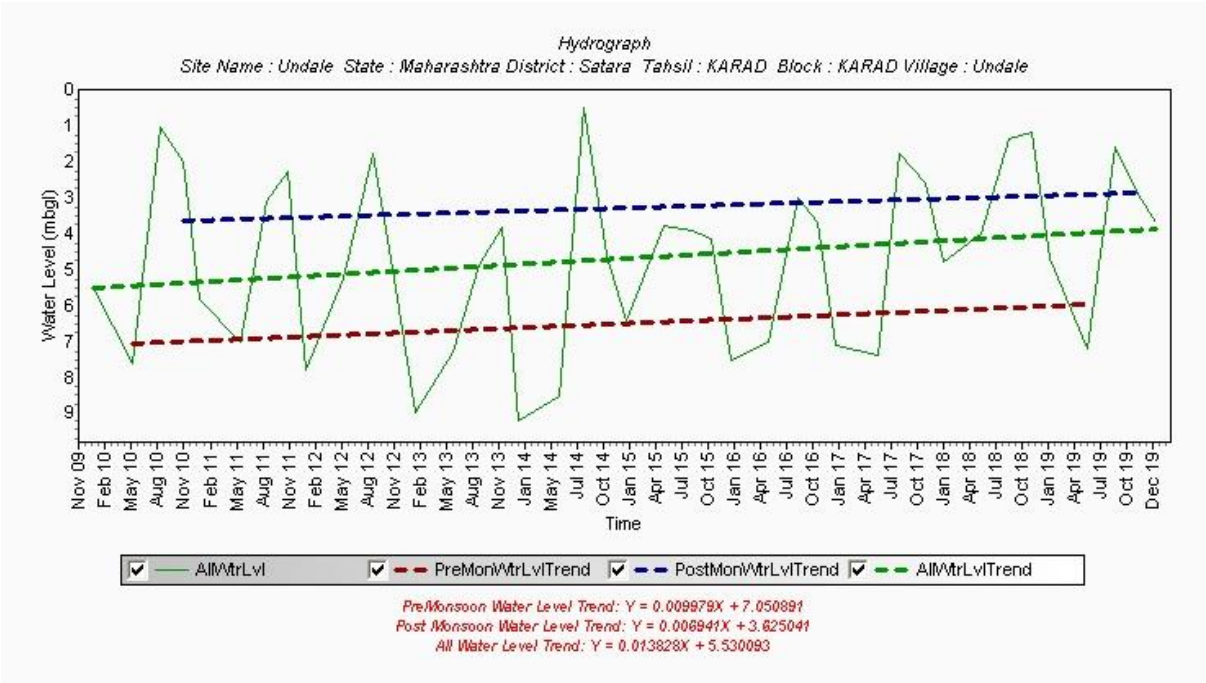


Fig 3.8 d: Hydrograph (2009-19), Undale, Karad Taluka

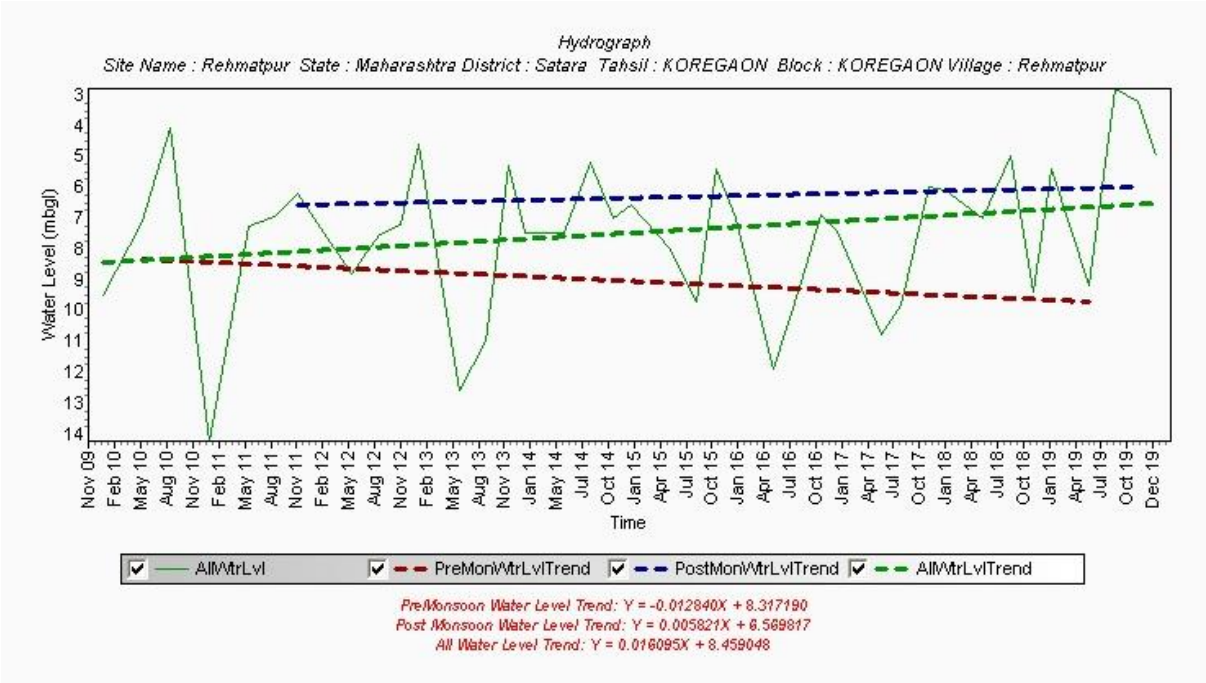


Fig 3.8 e: Hydrograph (2009-19), Rehmatpur, Koregaon Taluka

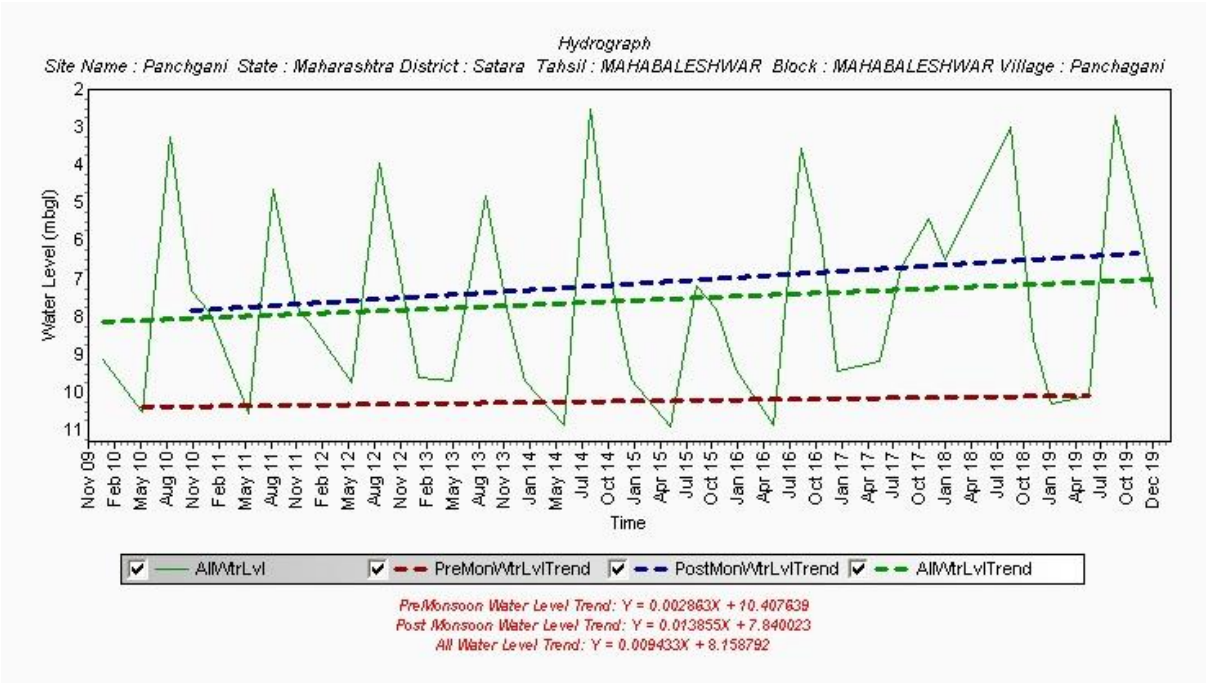


Fig 3.8 f: Hydrograph (2009-19), Pachgani, Mahabaleshwar Taluka

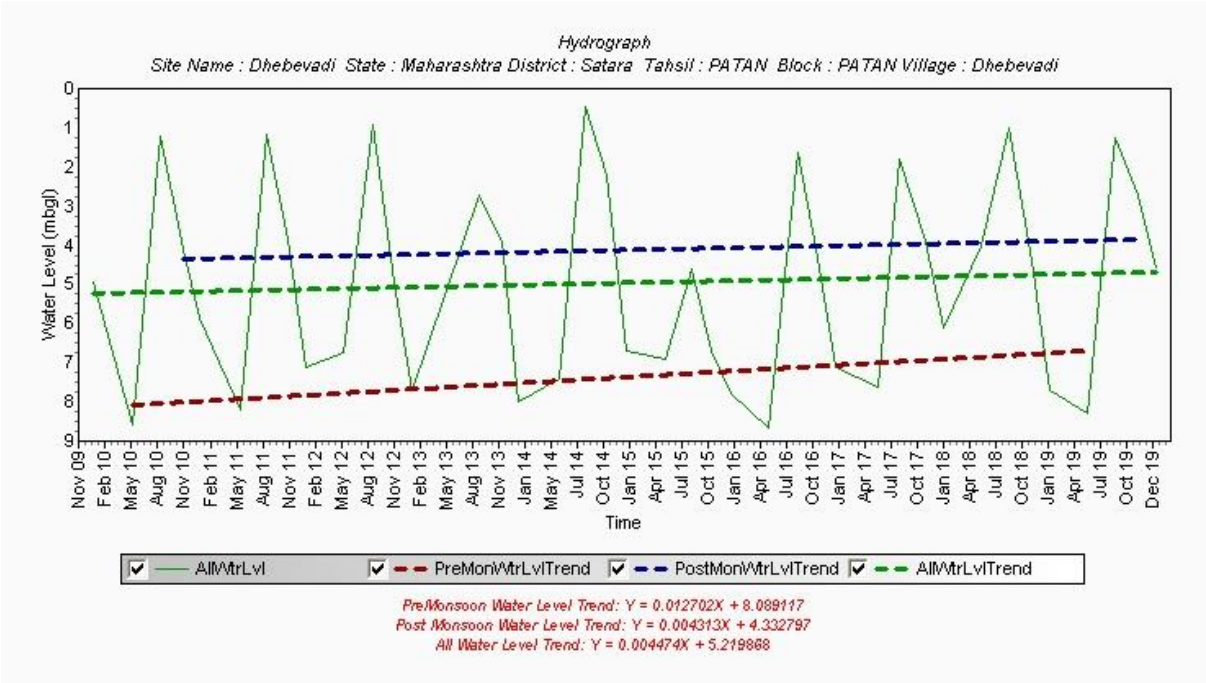


Fig 3.8 g : Hydrograph (2009-19), Dhebewadi, Patan Taluka

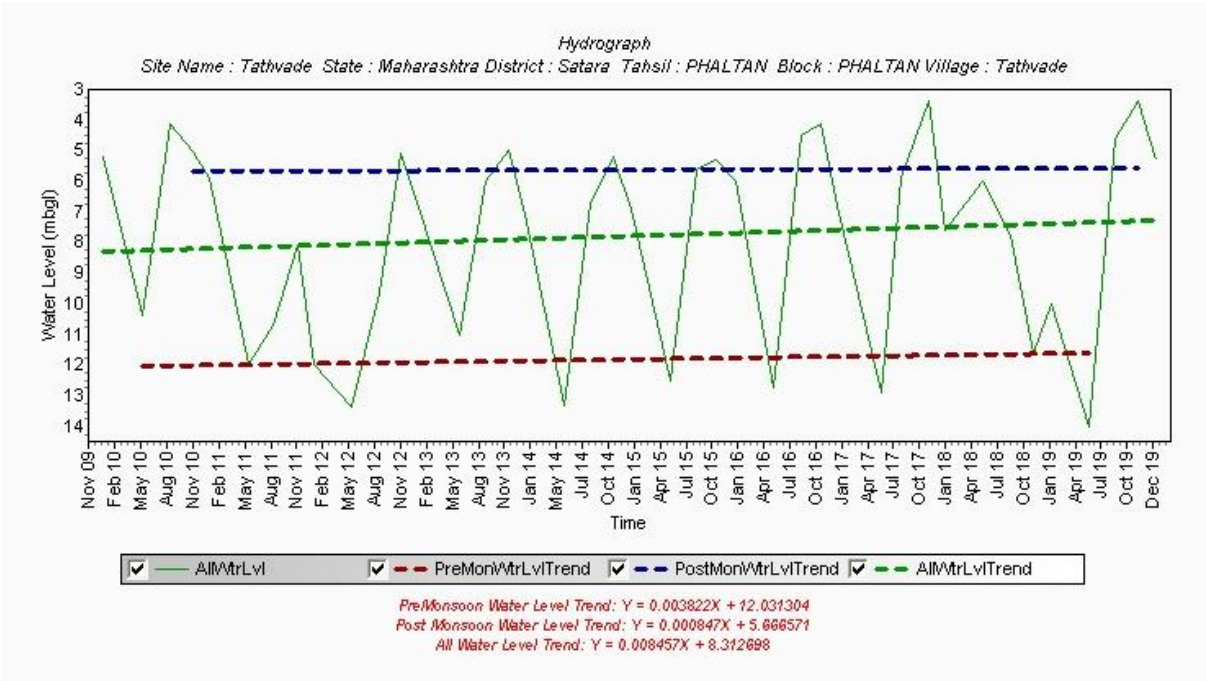


Fig 3.8 h: Hydrograph (2009-19), Tathwade, Phaltan Taluka

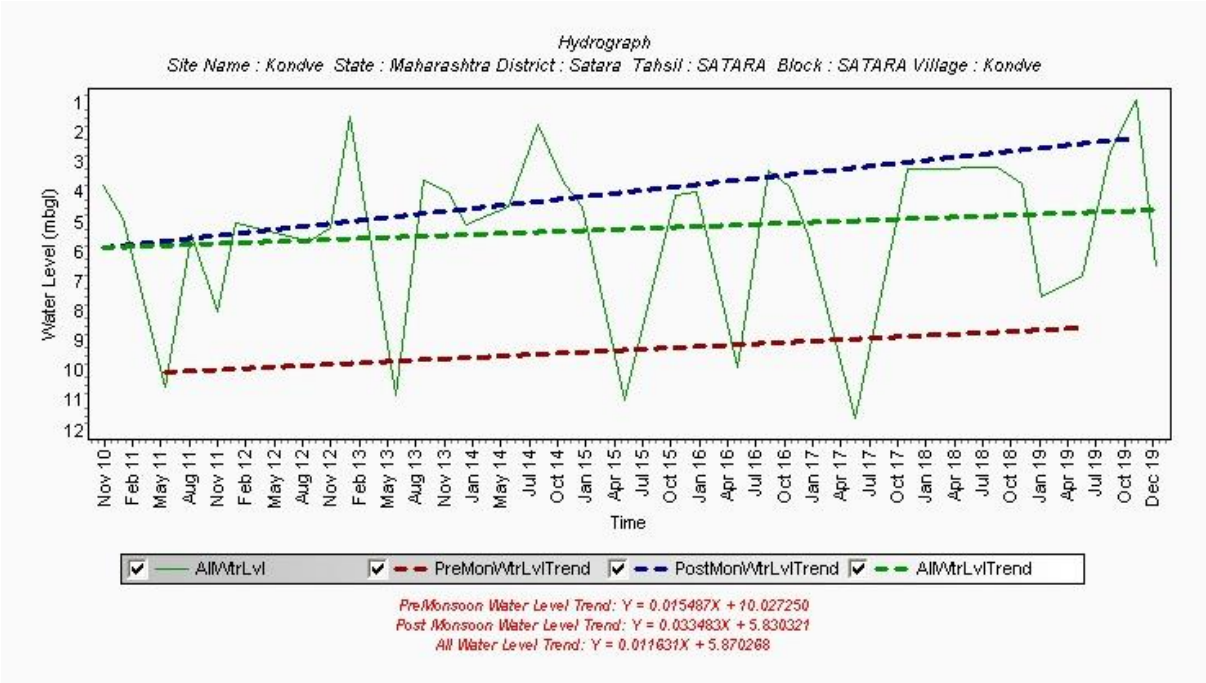


Fig 3.8 i: Hydrograph (2009-19), Kondwe, Satara Taluka

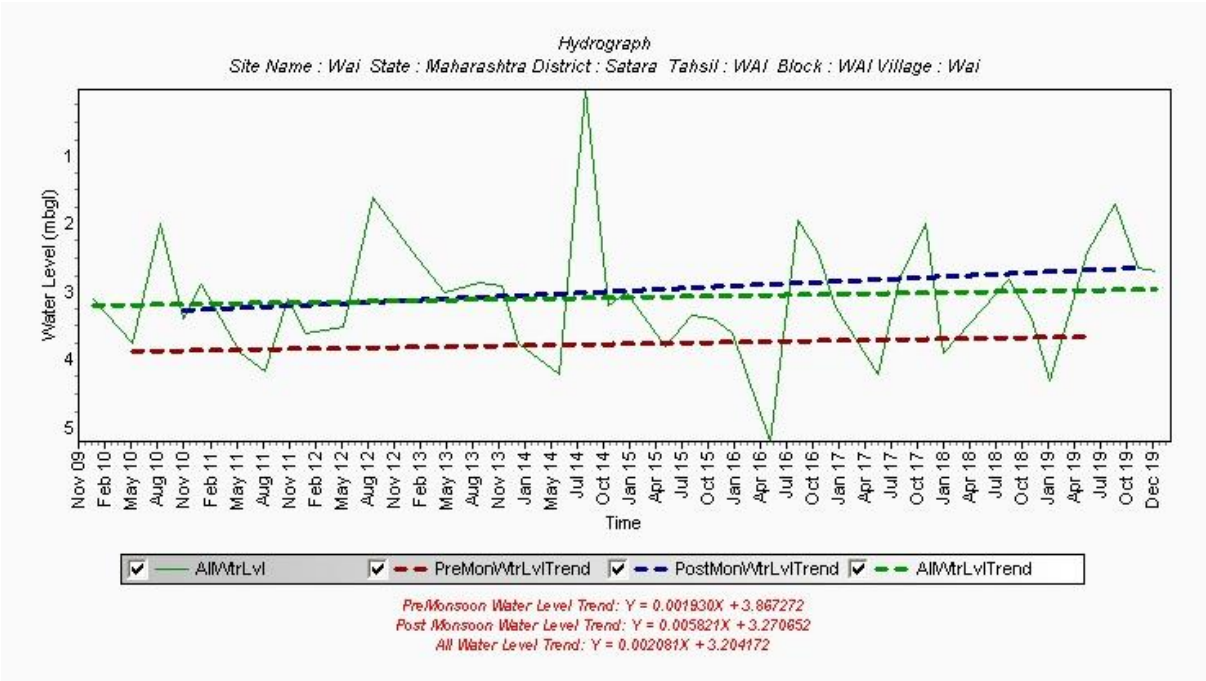


Fig 3.8 j: Hydrograph (2009-19), Wai, Wai Taluka

4. GROUND WATER QUALITY

Water sampling is being done every year from GWM wells during pre-monsoon period (May). The data gap analysis has been carried out to find out the adequacy of information on water quality and identified additional locations, 66 for shallow and 8 for deeper aquifers. Ground water quality data of 178 monitoring wells of CGWB and GSDA representing shallow aquifer have been utilised to decipher the quality scenario of shallow aquifer. 94 exploratory wells tubewells / borewells of CGWB and GSDA representing deeper aquifer have been utilised to decipher the quality scenario of deeper aquifer. The aquifer wise ranges of different chemical constituents present in ground water are given in **Table 4.1**. The details of water quality analysis is given in **Annexure VI**

Table 4.1: Aquifer wise ranges of chemical constituents in Satara district

Constituents	Shallow aquifer		Deeper aquifer	
	Min	Max	Min	Max
pH	7.1	10.1	6.7	9.2
EC	44	11137	75	2000
TDS	99	7128	225	683
TH	24.9	1460	25	840
Calcium	11.2	448	4	330
Magnesium	1.0	107.9	1	76.6
Potassium	0.03	318	0	94
Sodium	1.7	2200	0	365
Bi-carbonate	4.9	585.6	12.2	404
Chloride	7.7	3400	7	270
Sulphate	0.6	1368	0	596.6
Nitrate	0.1	285	0	352
Iron	0.9	27.48	0	145
Fluoride	0	2.5	BDL	2

4.1 Electrical Conductivity (EC)

Distribution of Electrical Conductivity in Shallow Aquifer:

The concentration of EC in shallow aquifer varies between 44 (Matrewadi, Patan taluka) and 11137 µS/cm (Somanthali, Phaltan taluka). Out of 178 samples collected from dug wells, 51 samples are having EC below 500 µS/cm. Western part of the district shows EC less than 750 µS/cm. Major part of rest of the district shows EC in the range of 750-2250 µS/cm. Only 7 samples are having EC more than 2250 µS/cm around Phaltan, Gokhali, Rajuri & Somanthali, Phaltan taluka, Chitali, Karad taluka, Dhuldeo, Man taluka and Katar Khatav, Khatav taluka. The ground water is potable in southern and south-east part of district. The distribution of electrical conductivity in shallow aquifers is shown in **Fig: 4.1** and analytical data is presented in **Table 4.2**.

Distribution of Electrical Conductivity in Deeper Aquifer:

The concentration of EC in deep aquifer varies between 6.7 (Kawthe, Wai taluka) and 2000 µS/cm (Shindewadi, Khandala taluka). All 94 samples collected from tube wells/bore wells are having EC in less than of 2250 µS/cm/ The ground water is potable in major parts of the district. The distribution of electrical conductivity in deeper aquifers is shown in **fig: 4.2** and analytical data is presented in **Table 4.2**.

Table 4.2: Aquifer wise Electrical conductivity data

S.No.	EC (µS/cm)	shallow aquifer		Deeper Aquifer	
		No. of samples	% of samples	No. of samples	% of samples
1	< 250	11	6.18	2	2.13
2	>250-750	100	56.18	59	62.77
3	>750-2250	60	33.71	33	35.11
4	2250-3000	2	1.12	0	0
5	3000-7500	4	2.25	0	0
6	>7500	1	0.56	0	0
Total samples		**178**		**94**	

4.1.1 Nitrate:

Nitrogen in the form of dissolved nitrate nutrient for vegetation, and the element is essential to all life. The major contribution in ground water is from sewage, waste disposal, nitrate fertilizer and decaying of organic matter. In Satara district nitrate concentration varies between 0.1 to 285 mg/l (Mhaswad, Man Taluka). As per BIS (2012) the desirable limit is 45 mg/l. In shallow aquifer, 178 samples were analysed, out of these 49 water samples show the nitrate concentration exceeded the desirable limit of 45 mg/l. The high concentration of Nitrate may be due to domestic waste and sewage in the urban and rural parts of district. In deeper aquifer, nitrate concentration varies between neglegible to 352 mg/l (Shindewadi, Karad Taluka). Out of 86 water samplesanalysed, 29 water samples show that the nitrate concentration exceeded the desirable limit of 45 mg/l. The deeper aquifer are also affected by nitrate contamination, it may be due to percolation of nitrate contaminants from the ground surface as there are no other reasons for nitrate contamination in deeper aquifers. Aquifer wise nitrate concentration is given in **Table 4.3**.

4.1.2 Fluoride:

In shallow aquifer, concentration of fluoride ranges from 0.02 (at Dhawadi, Wai Taluka) to 3.7 mg/l (at Gatewadi (dhakani), Man Taluka). Out of 178 samples analyzed, only 10 samples show fluoride concertation more than 1 mg/l. In shallow aquifer, the highest concentration of fluoride is found in Gatewadi (dhakani) village, Man taluka (3.7 mg/l). In Deeper Aquifer, concentration of fluoride ranges from from below detection limit (BDL) to 2 mg/l (at Kadve, Satara Taluka). Out of 82 samples analysed,

only 6 samples show fluoride concertation more than 1 mg/l. In Deeper aquifer, the highest concentration of fluoride is found in Kadve village, Satara taluka (2.0 mg/l). Fluoride concentration more than permissible limit is observed in ground water samples from deeper aquifer at Kadve, Satara taluka and Andhali, Man taluka and ground water from deeper aquifer may be used with caution for drinking water. This high concentration of fluoride may be due to the lithological reason only. Aquifer wise fluoride concentration is given in **Table 4.3**.

Table 4.3: Aquifer wise nitrate and Fluoride concentration in Satara district

	No_3 > 45 mg/l		**fluoride >1 mg/l**	
Taluka	No of samples Shallow Aquifer	No of samples Deeper Aquifer	No of samples Shallow Aquifer	No of samples Deeper Aquifer
Javli medha	1	0	0	0
Karad	6	3	0	1
Khandala	2	10	0	0
Khatav vaduj	3	3	2	0
Koregaon	4	2	0	2
Mahableshwar	1	0	0	0
Man dahiwadi	8	0	3	1
Patan	2	0	2	0
Phaltan	5	5	3	0
Satara	4	4	0	2
Wai	3	2	0	0
Grand Total	**39**	**29**	**10**	**6**

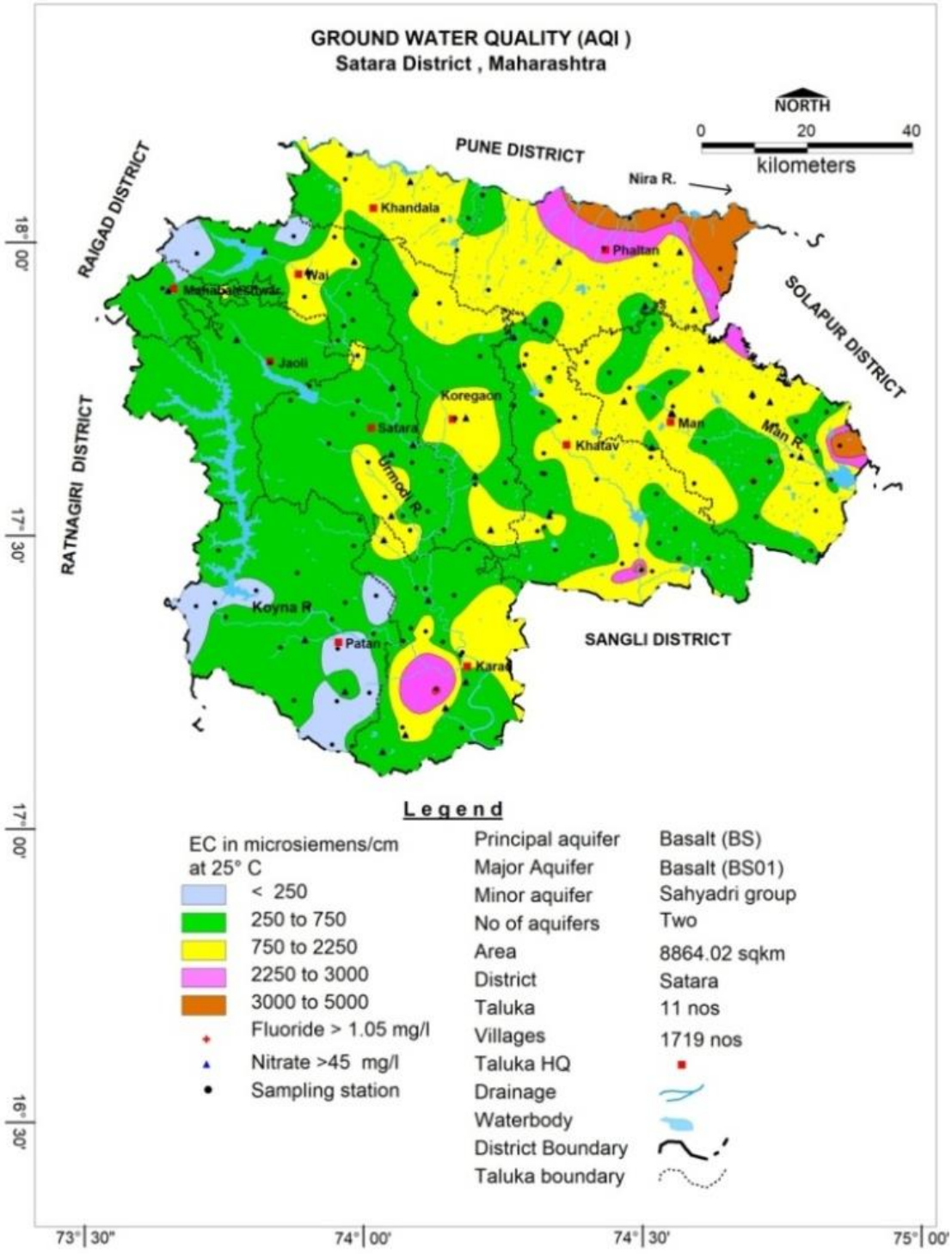


Fig. 4.1: Ground water quality, Aquifer-I

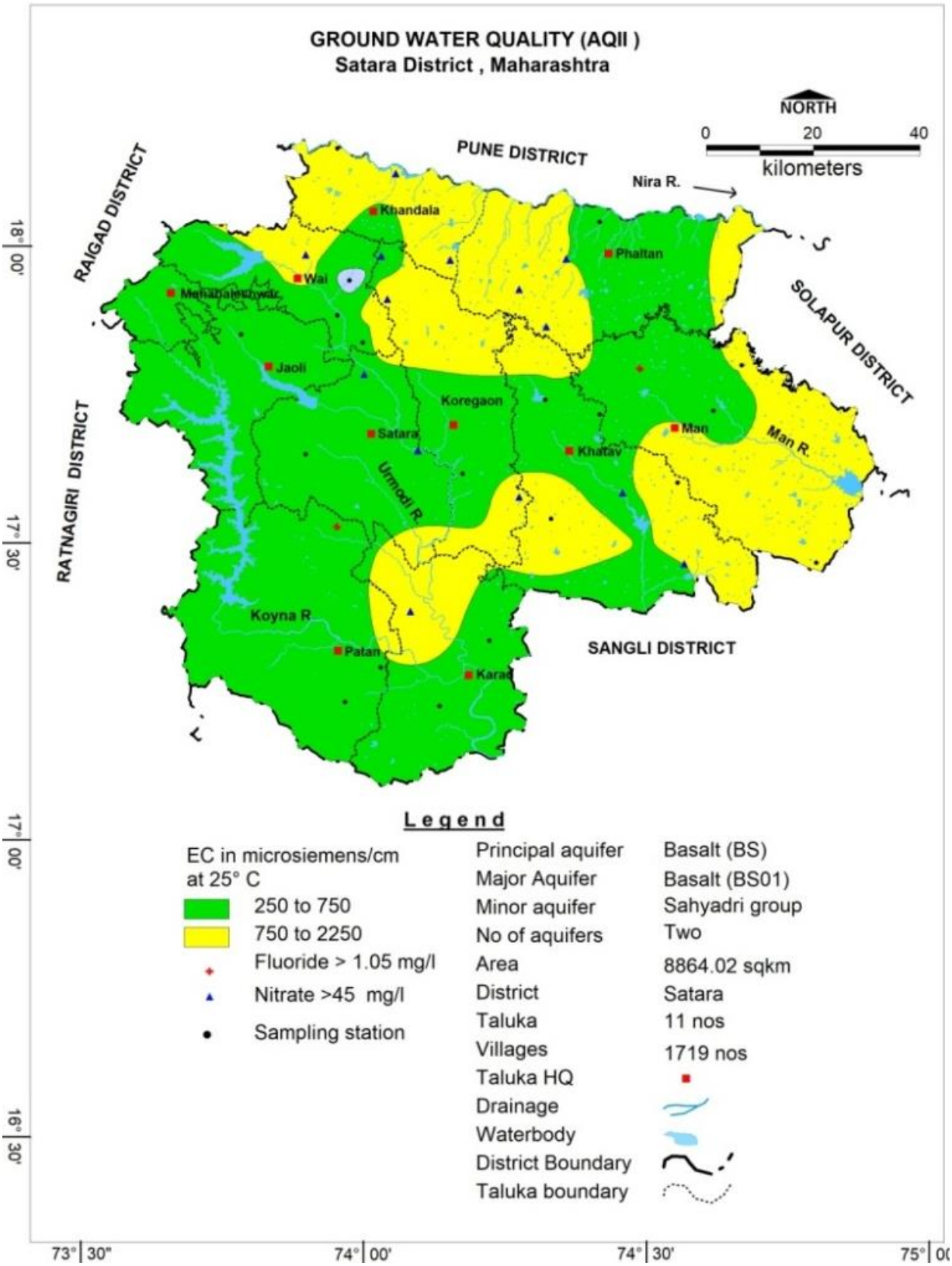


Fig. 4.2: Ground water quality, Aquifer-II

4.2 Suitability of ground water for drinking purpose

In shallow aquifer, only 4.88 % samples are having TDS concentration more than maximum permissible limit (MPL) of 2000 mg/l and 27.64 % of samples have TDS concentration above the Desirable limit (DL) but below the MPL. It is also seen that about very few samples have parameters like TH, Ca, Mg, Cl, SO_4 and NO_3 beyond the maximum permissible limit for drinking, indicating that the water is not suitable for drinking purpose. Samples from shallow aquifer of Mhaswad and Dhuldeo villages, Man Taluka, Rajuri and Somanthali villages, Phaltan Taluka and Katar Khatav, Khatav Taluka have more than one parameter like TH, Ca, Mg, Cl, SO_4, F and NO_3 beyond the maximum permissible limit for drinking, indicating water from such area is not fit for drinking purpose if directly consumed without treatment. Concentration of Chemical constituents in shallow Aquifer is given in **Table 4.4**.

In Deeper aquifer, samples from Chandaydewadi, Sonwadisupe, Rui & Sherechiwadi, Baramati taluka, Ranjangaon, Shirur taluka, Rakh, Purandhar taluka and NhaviSanaas, Haveli taluka have more than one parameter like TH, Ca, Mg, Cl, SO_4 and NO_3 beyond the maximum permissible limit for drinking, indicating water from such area is not fit for drinking purpose if directly consumed without treatment. Concentration of Chemical constituents in Deeper Aquifer is given in **Table 4.5**.

Table 4.4: Concentration of Chemical constituents in shallow Aquifer

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Shallow aquifer					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
	DL	MPL		No	%	No	%	No	%
pH	6.5-8.5	-	133	-	-	129	96.99	4	3.01
TDS (mg/l)	500	2000	123	83	67.48	34	27.64	6	4.88
TH (mg/l)	300	600	178	126	70.79	48	26.97	4	2.25
Ca (mg/L)	75	200	178	94	52.81	78	43.82	6	3.37
Mg (mg/L)	30	100	178	128	71.91	49	27.53	1	0.56
Cl (mg/L)	250	1000	178	160	89.89	16	8.99	2	1.12
SO_4 (mg/L)	200	400	178	166	93.26	9	5.06	3	1.69
NO_3 (mg/L)	45	No relax	178	139	78.09	-	-	39	21.91
Fe (mg/L)	0.3	1	178	147	82.58	29	16.29	2	1.12
F (mg/L)	1	1.5	178	168	94.38	8	4.49	2	1.12

(Here, DL- Desirable Limit, MPL- Maximum Permissible Limit)

Table 4.5: Concentration of Chemical constituents in Deeper Aquifer

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Deeper aquifer					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
	DL	MPL		No	%	No	%	No	%
pH	6.5-8.5	-	94	-	-	84	89.36	10	10.64
TDS (mg/l)	500	2000	43	42	97.67	1	2.33	0	0
TH (mg/l)	300	600	90	71	78.89	16	17.78	3	3.33
Ca (mg/L)	75	200	77	65	84.42	9	11.69	3	3.9
Mg (mg/L)	30	100	72	20	27.78	52	72.22	0	0
Cl (mg/L)	250	1000	71	67	94.37	4	5.63	0	0
SO_4 (mg/L)	200	400	66	64	96.97	0	0	2	3.03
NO_3 (mg/L)	45	No relax	86	57	66.28	-	-	29	33.72
Fe (mg/L)	0.3	1	94	72	76.60	8	8.51	14	14.89
F (mg/L)	1	1.5	82	76	92.68	3	3.66	3	3.66

(Here, DL- Desirable Limit, MPL- Maximum Permissible Limit)

4.3 Suitability of ground water for irrigation

The water used for irrigation is an important factor in productivity of crop, its yield and quality of irrigated crops. The quality of irrigation water depends primarily on the presence of dissolved salts and their concentrations. The Electrical Conductivity (EC), Sodium Absorption Ratio (SAR) and Residual Sodium Carbonate (RSC) are the most important quality criteria, which influence the water quality and its suitability for irrigation.

Electrical Conductivity (EC)

The amount of dissolved ions in the water is best represented by the parameter electrical conductivity. The classification of water for irrigation based on the EC values is given in **Table 4.6** and discussed as follows: -

Low Salinity Water (EC: 100-250 µS/cm): This water can be used for irrigation with most crops on most soils with little likelihood that salinity will develop.

Medium Salinity Water (EC: 250 – 750 µS/cm): This water can be used if moderate amount of leaching occurs. Plants with moderate salt tolerance can be grown in most cases without special practices for salinity control.

High Salinity Water (EC: 750 – 2250 µS/cm): This water cannot be used on soils with restricted drainage. Even with adequate drainage, special management for salinity control may be required and plants with good salt tolerance should be selected.

Very High Salinity Water (EC: >2250 µS/cm): This water is not suitable for irrigation under ordinary condition. The soils must be permeable, drainage must be adequate, irrigation water must be applied in excess to provide considerable leaching and very salt tolerant crops should be selected.

Table 4.6: Classification of Ground water for Irrigation based on EC values

SN	Water Quality Type	EC in µS/cm	shallow aquifer		Deeper Aquifer	
			No. of samples	% of samples	No. of samples	% of samples
1	Low Salinity Water	< 250	11	6.18	2	2.13
2	Medium Salinity Water	250 to 750	100	56.18	59	62.77
3	High Salinity Water	750 to 2250	60	33.71	33	35.11
4	Very High Salinity Water	> 2250	7	3.93	0	0
		Total	**178**		**94**	

In shallow as well as deeper aquifer, maximum numbers of samples fall under the category of medium to high salinity type of water. In general, Plants with moderate salt tolerance can be grown in most cases and special management for salinity control may be required and plants with good salt tolerance should be selected. In shallow aquifer around Phaltan, Gokhali, Rajuri & Somanthali, Phaltan taluka, Chitali, Karad taluka, Dhuldeo, Man taluka and Katar Khatav, Khatav taluka, very high salinity prevails (>2250 µS/cm) and around this area ground water can be used for irrigation for very high salt tolerant crops and with proper soil and crop management practices. No sample from deeper aquifer recorded very high salinity.

Sodium Absorption Ratio (SAR)

Since Calcium and Magnesium will replace Sodium more readily than vice versa, the ratio reflects the Sodium hazard. The SAR indicates the relative activity of the Sodium ions in exchange reactions with the soil. The main problem with high sodium concentration is its effect on soil permeability; hardening of soil & water irrigation system. Sodium also contributes directly to the total salinity of the water and may be toxic to sensitive crops such as fruit trees. The higher value of SAR indicates soil structure damage.

It is observed that Sodium hazard is not present in ground water of the area in shallow as well as deeper aquifer, and as per SAR values, the water is suitable for irrigation. In shallow aquifer, out of 178 samples, 174 (97.75) samples are having SAR less than 10 in **'Good'** and '**Good to Permissible' category**. Only around Gokhali and Somanthali villages in Phaltan Taluka, Sodium hazard is present ground water and around this village the ground water is unsuitable for irrigation.

While in deeper aquifer, 97.1% samples are having SAR value less than 10 in '**Good' category'**. Only around Shindewadi village in Phaltan Taluka, Sodium hazard is likely to be present ground water and around this village the ground water is 'doubtful' to be suitable for irrigation.

The classification of ground water samples based on SAR values for its suitability for irrigation purpose is shown in **Table 4.7.**

Table 4.7: Classification of Ground water for Irrigation based on SAR values

Characteristics	Quality	SAR value							
		< 10		10-18		18-26		> 26	
		Good		Good to Permissible		Doubtful		Bad (Unsuitable)	
	Total No of GW samples	No. of Samples %		No. of Samples %		No. of Samples %		No. of Samples %	
Shallow Aquifer	178	174	97.75	2	1.12	1	0.56	1	0.56
Deeper Aquifer	69	67	97.10	2	2.90	0	0	0	0
Total	**247**	**241**	**97.57**	**4**	**1.62**	**1**	**0.40**	**1**	**0.40**

Residual Sodium Carbonate (RSC):

Residual Sodium Carbonate (RSC) is considered to be superior to SAR as a measure of sodacity particularly at low salinity levels. Calcium reacts with bi-carbonate and precipitate as $CaCO_3$. Magnesium salt is more soluble and so there are fewer tendencies for it to precipitate. When calcium and magnesium are lost from the water, the proportion of sodium is increased resulting in the increase in sodium hazard. This hazard is evaluated in terms of RSC. The classification of ground water samples based on RSC values for its suitability for irrigation purpose is shown in **Table 4.8.**

Table-4.8: Classification of Ground water for Irrigation based on RSC values.

Characteristics	Quality	RSC values (meq/L)					
		< 1.25		1.25-2.50		> 2.50	
		Good		Doubtful		Bad (Unsuitable)	
	Total No of GW samples	No. of Samples %		No. of Samples %		No. of Samples %	
Shallow Aquifer	178	172	96.63	2	1.12	4	2.25
Deeper Aquifer	67	61	91.04	3	4.48	3	4.48
Total	**280**	**233**	83.21	**5**	1.79	**7**	2.5

In shallow aquifer, it is observed that in general, the ground water of the area is suitable for irrigation as 96.63 % samples show RSC values less than 1.25 meq/l. Only 1.12% samples show RSC values between 1.25 meq/l and 2.50 meq/l, at Karad, Karad taluka and Marde, Satara taluka and 2.25% samples show RSC values more than 2.50 meq/l at Valai & Vavarhire, Man taluka and Gokhali & Phaltan, Phaltan taluka - ground water of these areas is not suitable for irrigation.

Ground water of deeper aquifer of the area, in general, is suitable for irrigation as 88.24 % samples show RSC values less than 1.25 meq/l. Only 2.25% samples show RSC values more between 1.25 meq/l and 2.50 meq/l, at Dhamner, Phaltan taluka and 4.5% samples show RSC values more than 2.50 meq/l at Shindewadi, Phaltan taluka - ground water of these areas is not suitable for irrigation.

5. GROUND WATER RESOURCES

5.1 Ground Water Resources – Aquifer-I

Central Ground Water Board and Ground Water Survey and Development Agency (GSDA) have jointly estimated the ground water resources of Satara district based on GEC-2017 methodology. Block wise ground water resources are given in **Table 5.1**, and graphical representations of the resources on the map are shown in **Figure5.1**.

As per the estimation, the net annual ground water availability comes to be 995.55 MCM. The gross draft for all uses is estimated at 768.95 MCM with irrigation sector being the major consumer having a draft of 625.76 MCM. The domestic and industrial water requirements are worked at 48.29 MCM. The net ground water availability for future irrigation is estimated at 311.68 MCM. Stage of ground water development varies from 25.16 % (Jaoli taluka) to 85.24 % (Khatav taluka). The overall stage of ground water development for the district is 66.27 %. Taluka wise assessments indicate that Khatav, Man, Patan, Phaltan and Wai talukas in the district falls under "Semi Critical" category whie all the other talukas fall under "Safe" category.

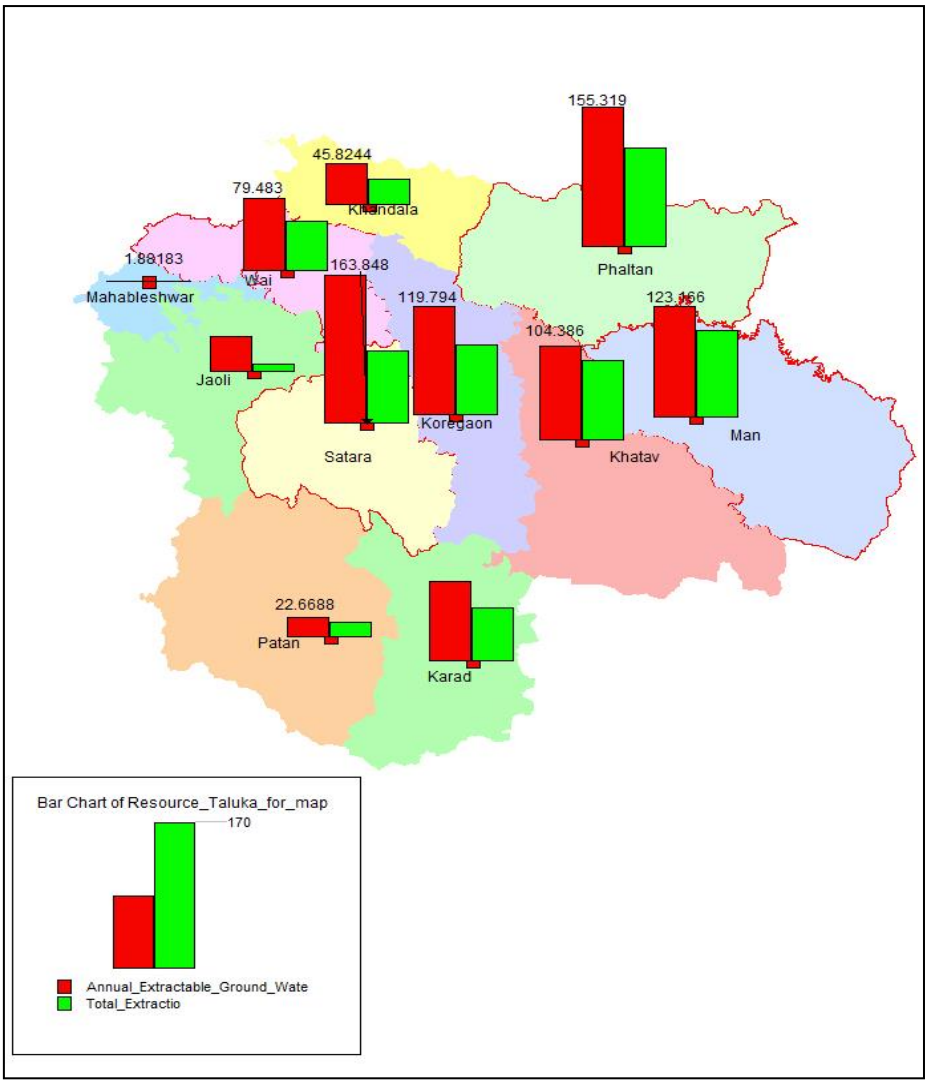


Figure5.1:Ground Water Resources (2017), Satara district

5.2 Ground Water Resources – Aquifer-II

Ground Water Resources – Aquifer-II

The ground water resources of Aquifer-II (Basalt) were also assessed to have the correct quantification of resources so that proper management strategy can be framed. The total resources of aquifer-II have been estimated as 135.56 mcm. Taluka wise summarized Ground Water Resources of Aquifer-II is given in table 5.2.

Table 5.1 Ground water resources, Aquifer-I (Shallow aquifer), Satara district (2017)

Assessment Unit Name	Total Annual Ground Water Recharge (Ham)	Annual Extractable Ground Water Recharge (Ham))	Existing Gross Ground Water Draft for irrigation	Existing Gross Ground Water Draft for domestic and industrial water supply	Existing Gross Ground Water Draft for All uses	Provision for domestic and industrial requirement supply to 2025	Net Ground Water Availability for future irrigation development	Stage of Ground Water Development %	Categorization (OE/Critical/ Semicritical /Safe)
Jaoli	4183.12	3973.96	747.88	252.13	1000.02	339.28	4198.64	25.16	Safe
Karad	9280.63	8810.10	5160.01	830.83	5990.83	947.14	2702.96	68.00	Safe
Khandala	4873.15	4582.44	2764.82	192.21	2957.03	225.77	2020.26	64.53	Safe
Khatav	10988.05	10438.64	8364.87	533.07	8897.94	607.70	1466.08	85.24	Semi Critical
Koregaon	12609.93	11979.43	7305.22	467.76	7772.98	548.26	4288.00	64.89	Safe
Mahabaleshwar	198.09	188.18	94.31	21.78	116.09	29.28	91.46	61.69	Safe
Man	12964.82	12316.58	9087.14	550.88	9638.02	632.57	2736.85	78.25	Semi Critical
Patan	2386.19	2266.88	1273.15	376.18	1649.34	428.85	564.88	72.76	Semi Critical
Phaltan	16458.17	15531.86	10485.66	453.67	10939.33	505.90	3971.90	70.43	Semi Critical
Satara	17247.12	16384.76	7293.41	740.98	8034.40	753.42	6847.11	49.04	Safe
Wai	8366.63	7948.30	5170.11	410.30	5580.40	487.75	2280.53	70.21	Semi Critical
Total (ham)	99555.9	94421.13	57746.58	4829.79	62576.38	5505.92	31168.67	66.27	
Total (MCM)	995.559	944.2113	577.4658	48.2979	625.7638	55.0592	311.6867		Safe

Table 5.2: Ground Water Resources of Aquifer-II (Deeper aquifer)

Taluka	Mean thickness (m)	Area (sqkm)	Piezometric head (m)	Specific Yield	Storativity	Resource above confining layer (MCM)	Resource in confining aquifer (MCM)	Total Resource (MCM)
Jaoli	0.75	1.45313	35	0.005	0.00012	0.0061	0.0054	0.0116
Jaoli	0.75	89.0131	25	0.0025	0.00036	0.7944	0.1669	0.9613
Jaoli	2	443.883	30	0.0025	0.00026	3.4223	2.2194	5.6418
Jaoli	5	0.527005	20	0.005	0.00012	0.0013	0.0132	0.0144
Jaoli	5	17.7127	15	0.0025	0.00016	0.0417	0.2214	0.2631
Karad	0.75	1.72705	25	0.005	0.00016	0.0068	0.0065	0.0133
Karad	2	414	35	0.005	0.00012	1.7388	4.1400	5.8788
Karad	5	433.978	25	0.0025	0.00036	3.8733	5.4247	9.2980
Karad	5	9.13838	30	0.0025	0.00026	0.0705	0.1142	0.1847
Karad	8.75	24.9892	20	0.005	0.00012	0.0600	1.0933	1.1533
Khandala	2	455.51	15	0.0025	0.00016	1.0727	2.2776	3.3503
Koregaon	0.75	93.0232	25	0.005	0.00016	0.3651	0.3488	0.7140
Koregaon	2	306.6	30	0.0025	0.00026	2.3639	1.5330	3.8969
Koregaon	5	374.265	20	0.005	0.00012	0.8982	9.3566	10.2549
Koregaon	8.75	8.98608	15	0.0025	0.00016	0.0212	0.1966	0.2177
Koregaon	8.75	3.86484	25	0.005	0.00016	0.0152	0.1691	0.1843

Taluka	Mean thickness (m)	Area (sqkm)	Piezometric head (m)	Specific Yield	Storativity	Resource above confining layer (MCM)	Resource in confining aquifer (MCM)	Total Resource (MCM)
Mahableshwar	0.75	3.50971	30	0.0025	0.00026	0.0271	0.0066	0.0336
Mahableshwar	2	57.425	30	0.0025	0.00026	0.4427	0.2871	0.7299
Patan	0.75	337.134	15	0.0025	0.00016	0.7940	0.6321	1.4261
Patan	2	542.24	25	0.005	0.00016	2.1283	5.4224	7.5507
Patan	5	48.3679	30	0.0025	0.00026	0.3729	0.6046	0.9775
Patan	5	3.2589	20	0.005	0.00012	0.0078	0.0815	0.0893
Khatav	0.75	0.511264	25	0.005	0.000157	0.0020	0.0019	0.0039
Khatav	2	205	30	0.0025	0.000257	5.6151	3.6414	9.2565
Khatav	5	3.38621	20	0.005	0.00012	0.0081	0.0847	0.0928
Khatav	5	21.941	15	0.0025	0.000157	0.0517	0.2743	0.3259
Khatav	5	3.06048	25	0.005	0.000157	0.0120	0.0765	0.0885
Khatav	5	390.741	30	0.0025	0.000257	3.0126	4.8843	7.8969
Khatav	8.75	80.7868	20	0.005	0.00012	0.1939	3.5344	3.7283
Khatav	8.75	40.5438	15	0.0025	0.000157	0.0955	0.8869	0.9824
Man	0.75	30.21	35	0.005	0.00012	0.1270	0.1130	0.2400
Man	2	950.69	25	0.0025	0.000357	8.4850	4.7530	13.2380

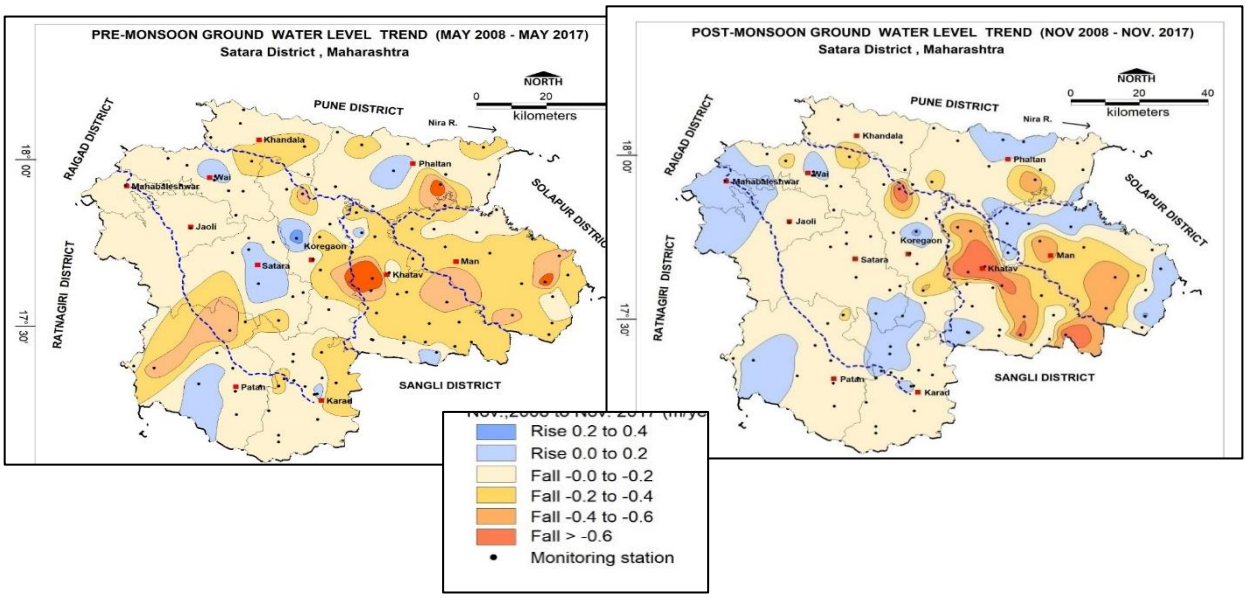
Taluka	Mean thickness (m)	Area (sqkm)	Piezometric head (m)	Specific Yield	Storativity	Resource above confining layer (MCM)	Resource in confining aquifer (MCM)	Total Resource (MCM)
Man	5	46.85	30	0.0025	0.000257	0.3610	0.5860	0.9470
Man	5	9.58	20	0.005	0.00012	0.0230	0.2390	0.2620
Man	5	350.31	15	0.0025	0.000157	0.8250	4.3790	5.2040
Man	8.75	37.99	25	0.005	0.000157	0.1490	1.6620	1.8110
Phaltan	2	856.19	30	0.005	0.00025	6.4210	8.5620	14.9830
Phaltan	5	247.34	25	0.0025	0.000157	0.9710	3.0920	4.0630
Satara	0.75	79.09	25	0.0025	0.000157	0.3100	0.1480	0.4590
Satara	2	396.68	30	0.005	0.00012	1.4280	3.9670	5.3950
Satara	5	0.04	20	0.0025	0.000357	0.0003	0.0010	0.0010
Satara	5	250.25	15	0.005	0.000157	0.5890	6.2560	6.8460
Satara	8.75	17.28	25	0.005	0.00012	0.0520	0.7560	0.8080
Wai	0.75	35.15	30	0.0025	0.000357	0.3760	0.0660	0.4420
Wai	0.75	25.62	20	0.0025	0.000157	0.0800	0.0480	0.1280
Wai	2	451.24	15	0.005	0.00012	0.8120	4.5120	5.3250
Wai	5	12.14	20	0.0025	0.000157	0.0380	0.1520	0.1900
						48.5624	86.9974	135.5625

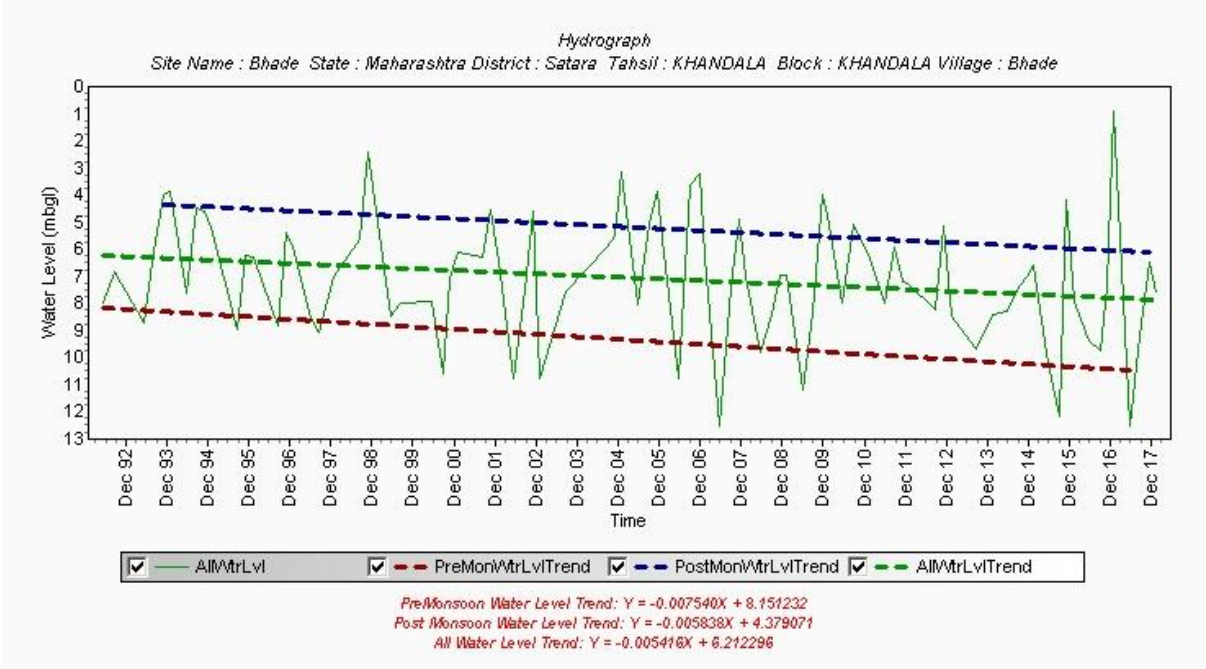
6. GROUND WATER RELATED ISSUES

Declining Water Levels

During pre-monsoon, Entire area of the district except few patches shows long term water level declining trend. Significant decline more than 0.20 m/year has been observed in 4137 sq km, i.e., 40 % area covering major part of Man, Khatav, Phaltan, Patan and Khandala talukas and southern portion of the Karad taluka.

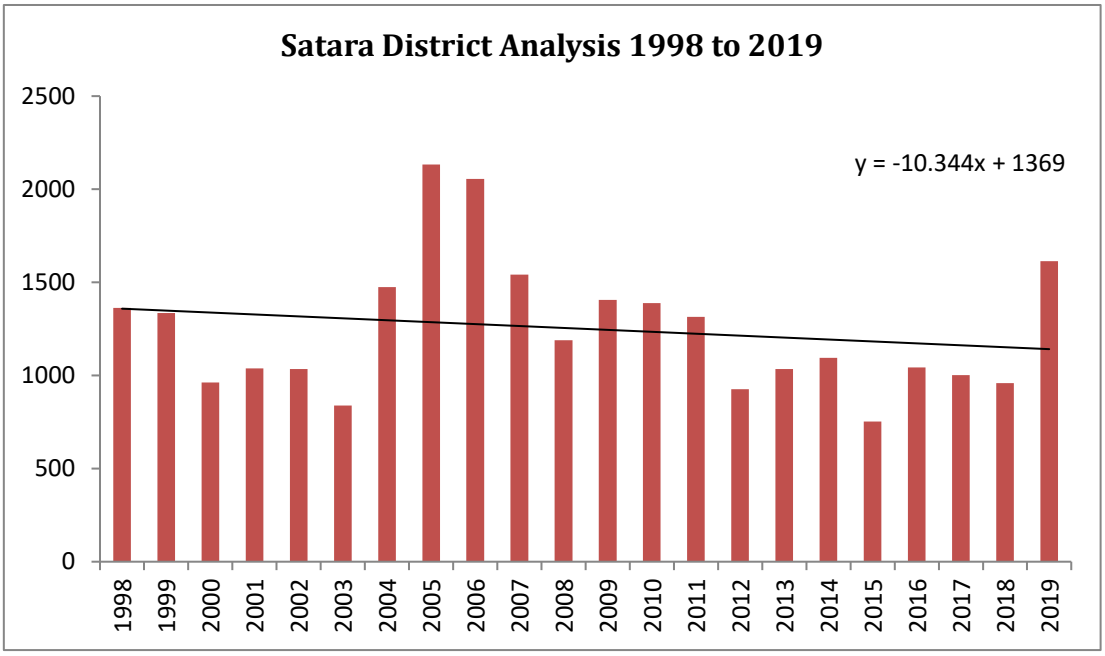
In Satara district, post monsoon Significant decline more than 0.20 m/year has been observed in 1953 sq km, i.e., 18.6 % area covering major part of Man, Khatav, Koregaon and Phaltan talukas and southern portion of the Karad taluka.





Low Rainfall and Droughts

The average annual rainfall for the last ten years when compared with the normal annual rainfall, it is observed that the average annual rainfall for the last ten years of the district is much less than the normal annual rainfall. Thus, the rainfall has definitely decreased in the district over the period of time. The study also reveals that entire north eastern and south-western part of district comprising entire Khandala, Phaltan, Khatav, Man talukas and part of Koregaon and Karad talukaswhich experienced drought for more than 20% of the years can be categorized as "drought area".

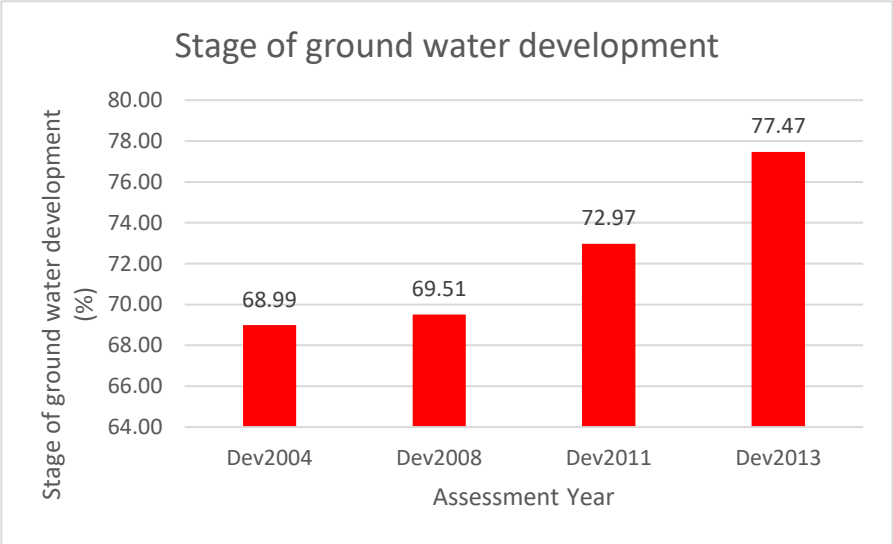


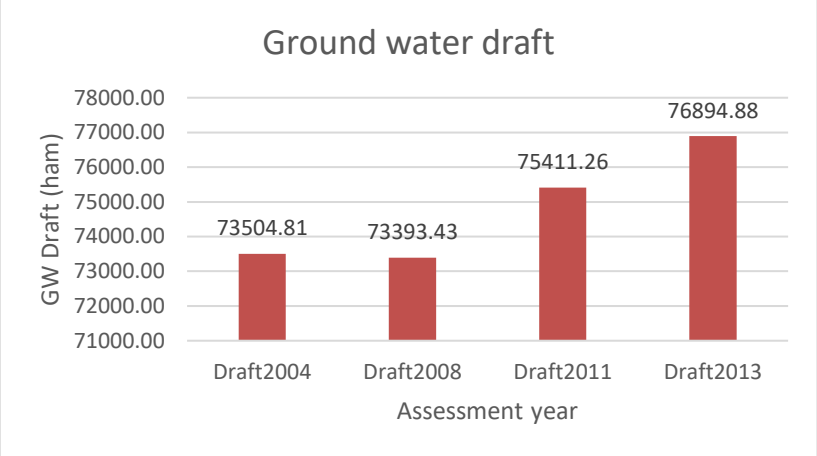
Rainfall Trend (1998-19), Satara Dsitrict

District	Period	No of years	Normal Rainfall (mm)	Std. Deviation (mm)	Coefficient of Variation (%)	Rainfall Trend (mm/year)
Satara	1998-2019	22	1033.4	368.10	29.6	-10.34
	No of Years			% of total Years		
Departures						
Positive	16			73		
Negative	6			27		
Drought						
Moderate	1			5		
Severe	0			0		
Acute	0			0		
Normal & Excess RF						
Normal	11			50		
Excess	10			45		

Continues Increase in Draft, Increase in Stage of GW Development:

The stage of ground water development has increased over the period of time from 2004 to 2013 in all the talukas from 68.99 % to 77.47 %. The main reason for ground water overdraft is intensive irrigation for cash crop. Overall draft for these talukas has increased from 375.04 MCM in 2004 to 768.94 MCM in 2013





Caving and loss of drilling formation:

Red boles, black boles, the intertrappean beds, have collapsible nature when they are saturated. The weathered/highly fractured saturated formation at the contact zones also collapse as a result of which drill rods assembly gets stuck up. This sometimes leads to loss of circulation of fluid there by compounding the problems further. The red bole is usually encountered at the depth of more than 170 m in this area with thickness ranging from 8 to 10 m. The water bearing zones encountered fills up the bore well and that infuses the bole beds in the succession resulting in the collapse of the bole beds. The casing or cement sealing of the red bole is not possible below 100 m bgl, as the present rig is equipped to lower casing down to 100 m bgl depth.

Loss of air in jointed and fractured Basalt was observed during drilling. The problem can be solved by sealing the zones by lowering casing or by cement sealing. This process may often damage the potential aquifer zones if not carried out meticulously with proper equipment.

7. GROUND WATER MANAGEMENT PLAN

The management plan has been proposed to manage the ground water resources and to arrest further decline in water levels. The management plan comprises two components namely supply-side management and demand side management. The supply side management is proposed based on surplus surface water availability and the unsaturated thickness of aquifer whereas the demand side management is proposed by use of micro irrigation techniques and change in cropping pattern.

Talukawise aquifer management plan have been prepared for Aquifer I (Weathered and jointed fractured Basalt) and Aquifer II (jointed and fractured basalt), with the objective of bringing the current stage of ground water development up to 70% by adopting supply side and demand interventions, for all the 11 talukas of Satara District, namely, Khatav, Man, Phaltan, Satara, Wai, Patan, Karad, Mahabaleshwar, Khandala, Jaoli and Koregaon talukas, where aquifer mapping has been completed till 2019-20. The management plan has been proposed to manage the ground water resources and to arrest further decline in water levels. The management plan comprises two components namely supply-side management and demand side management. The supply side Management is proposed based on surplus surface water availability and the unsaturated thickness of aquifer whereas the demand side management is proposed by use of micro irrigation techniques. Change in cropping pattern towards less water-intensive irrigation crops (Demand side intervention) has not been proposed in the area cash crop cultivation drives the economy of the region.

7.1 Supply Side Management

The supply side management of ground water resources can be done through the artificial recharge of surplus runoff available within river sub basins and micro watersheds. Also, it is necessary to understand the unsaturated aquifer volume available for recharge. The unsaturated volume of aquifer was computed based on the area feasible for recharge, unsaturated depth below 5 mbgl and the specific yield of the aquifer. The **Table 7.1** gives the taluka wise volume available for the recharge.

Table 7.1: Area feasible and volume available for Artificial Recharge

Taluka	Geographical Area (sq. km.)	Area feasible for reacharge (Sqkm)	Unsaturated Volume (MCM)
Jaoli	796.24	552.15	59.01
Karad	1062.97	883.23	252.22
Khandala	523.74	455.51	741.02
Khatav	1357.90	1269.05	1657.17
Koregaon	855.16	786.98	1002.47
Mahabaleshwar	224.83	60.12	339.39
Man	1575.49	1425.17	1077.86

Patan	1405.02	931.38	177.25
Phaltan	1167.04	1103.45	1283.63
Satara	888.83	783.36	25.48
Wai	622.78	524.67	315.36
	10480.00	8775.07	6930.86

The total unsaturated volume available for artificial recharge is 6930.86 MCM and it ranges from 25.48 MCM in Satara taluka to 1667.17 MCM in Khatav taluka. The available surplus runoff can be utilized for artificial recharge through construction of percolation tanks and Check dams at suitable sites.

Thus, after taking into consideration all the factors, only 78.26 MCM of surplus water can be utilised for recharge, which is given in **Table 7.2**. This surplus water can be utilized for constructing 783 check dams and 275 percolation tanks at suitable sites. The number of feasible artificial recharge structures was calculated by considering 0.20 MCM per percolation tanks and 0.03 MCM per check dam. This intervention should lead to recharge @ 75% efficiency of about 58.71 MCM/year.Tentative locations of these structures are given in **Fig. 7.1** and details also given in A**nnexures VIII & IX**.

The rainwater harvesting in urban areas can be adopted in 25% of the household with 50 sq. km roof area. A total of 5.0 MCM potential can be generated by taking 80% runoff coefficient.

Table 7.2: Proposed Artificial Recharge Structures

Block	**Availability of Surplus surface runoff (MCM)**	**No. of PT (100 TCM * 2 Fillings = 200 TCM)**	**No. of CD (10 TCM * 3 Fillings = 30 TCM)**	**Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)**
Man	13.2	46	132	9.90
Phaltan	15.72	55	157	11.79
Satara	0.31	1	3	0.23
Wai	3.86	14	39	2.90
Khatav	20.3	71	203	15.23
Khandala	4.54	16	45	3.41
Jaoli	0.72	3	7	0.54
Koregaon	12.28	43	123	9.21
Mahabaleshwar	2.08	7	21	1.56
Patan	2.17	8	22	1.63
Karad	3.08	11	31	2.31
Total	**78.26**	**275**	**783**	**58.71**

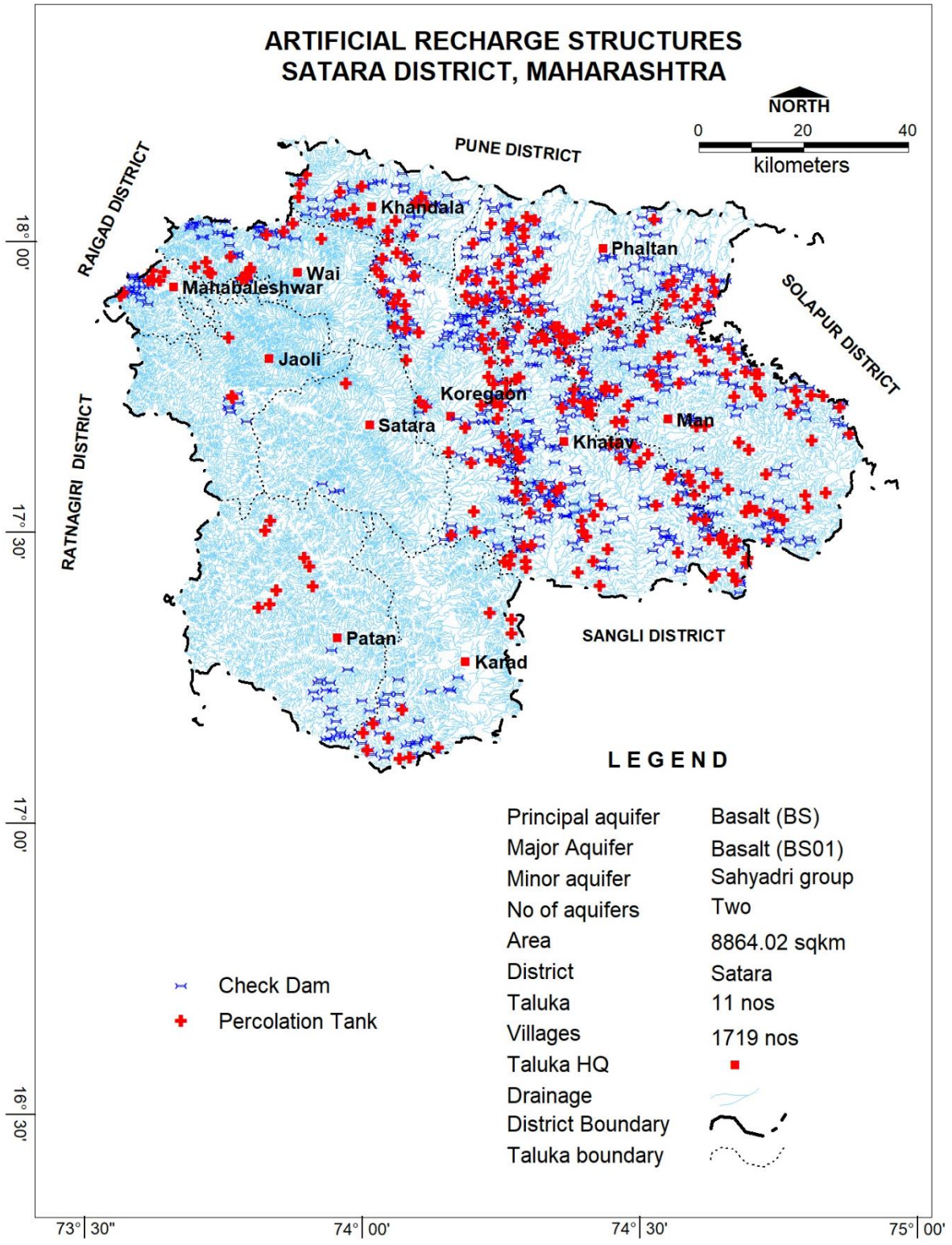


Figure 7.1: Location of Proposed Artificial Recharge structures

7.2 Demand Side Management

Considering the low stage of ground water development in the district, demand side interventions havenot been proposed. However, this is the right time to further enhance the micro irrigation practices in the selected areas to manage the resources perceiving the future demand of resources. Proposed micro irrigation practices in the selected areas to manage the resources perceiving the future demand of resources taluka wise is given in **Table 7.3** and **Fig 7.2**

Table 7.3: Demand side intervention.

Taluka	Sugarcane Area proposed to be covered under drip (sq.km)	Volume of Water expected to be saved with drip irrigation for Sugarcane (MCM)	Total GW Draft after Demand side interventio n (MCM)	Stage of GWD after demand side intervention s (%)	GWR available /require d to bring the stage of GWD to 70% (MCM)	Additional Area proposed to be brought under assured GW irrigation (sq.km.)
Man	6.10	3.48	92.90	69.82	-3.24	0.37
Phaltan	34.00	19.38	90.01	53.87	7.58	41.48
Satara	18.13	10.33	70.01	42.67	34.51	68.98
Wai	17.50	9.98	45.82	55.62	1.87	18.22
Khatav	19.00	10.83	78.14	65.33	-5.24	8.60
Khandala	13.31	7.59	21.98	44.65	4.89	19.20
Jaoli	0.36	0.21	9.79	24.31	18.19	28.31
Koregaon	6.15	3.51	74.21	57.53	12.58	24.75
Mahabale shwar	1.60	0.91	0.25	7.27	1.25	3.32
Patan	0.54	0.31	16.18	66.61	0.51	1.27
Karad	39.79	22.68	37.22	41.17	3.39	40.10
Total	**156.48**	**89.21**	**536.51**	**53.50**	**165.49**	**254.60**

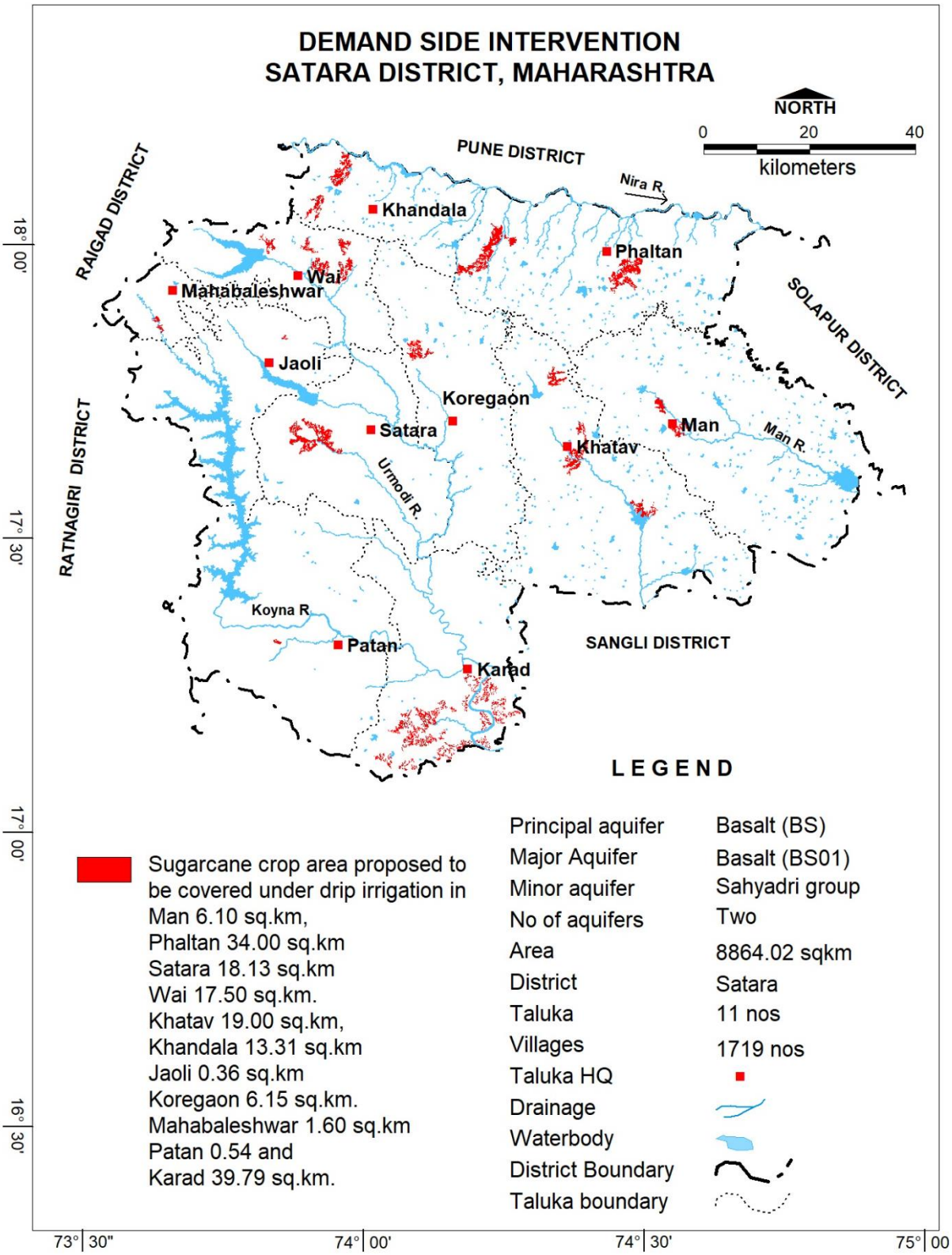


Figure 7.2: Demand side intervention

7.3 Expected Benefits

The impact of groundwater management plans on the groundwater system in the district after its implementation is evaluated and the outcome shows significant improvement in groundwater scenario in all talukas as given in the **Table 7.4.**

Table 7.4: Expected benefits after management options

Block	Total GW resource available after supply side intervention (MCM)	Total GW Draft after Demand side intervention (M CM)	Stage of GWD after supply side and demand side interventions (%)	GWR available/ required to bring the Stage of GWD to 70% (MCM)	Additional Area proposed to be brought under assured GW irrigation (sq.km.)
Man	133.06	92.90	69.82	0.24	0.37
Phaltan	167.10	90.01	53.87	26.96	41.48
Satara	164.07	70.01	42.67	44.84	68.98
Wai	82.38	45.82	55.62	11.85	18.22
Khatav	119.61	78.14	65.33	5.59	8.60
Khandala	49.23	21.98	44.65	12.48	19.20
Jaoli	40.27	9.79	24.31	18.40	28.31
Koregaon	129.00	74.21	57.53	16.09	24.75
Mahabaleshwar	3.44	0.25	7.27	2.16	3.32
Patan	24.29	16.18	66.61	0.82	1.27
Karad	90.41	37.22	41.17	26.07	40.10
Total	**1,002**	**536.51**	**53.50**	**165.49**	**254.60**

7.4 Development Plan

The ground water development plan has been proposed in the view of developing the additional ground water resources available after supply side interventions to bring the stage of ground water development up to 70%. The 89.89 MCM volume of ground water generated can bring 138.3 sq km additional area under assured ground water irrigation with average crop water requirement of 0.65 m. However, No Further development through dugwells and borewells is proposed in hilly part of Khandala and Mahabaleshwar Blocks. Instead the water conservation structures may help in maintaining the spring flow during lean periods and sustainability to exiting abstraction structure.Hydrogeological and scientific intervention is needed for pinpointing the sites for construction of dug wells and Borewells Taluka wise details are given in **Table 7.5**. The area feasible for ground development is shown in **Fig. 7.3** and Gist of Aquifer Management Plan is shown in **Fig. 7.4**.

Table 7.5: Taluka wise additional area under assured GW Irrigation

Block	**GWR available/ required to bring the Stage of GWD to 70% (MCM)**	**Proposed No. of DW @1.5 ham for 90% of GWR Available**	**Proposed No. of BW @1 ham for 10% of GWR Available)**
Man	0.24	15	2
Phaltan	26.96	1618	270
Satara	44.84	2690	448
Wai	11.85	711	118
Khatav	5.59	335	56
Khandala	12.48	749	~~125~~
Jaoli	18.40	1104	184
Koregaon	16.09	965	161
Mahabaleshwar	2.16	129	~~22~~
Patan	0.82	49	8
Karad	26.07	1564	261
Total	**165.49**	**9929**	**1655**

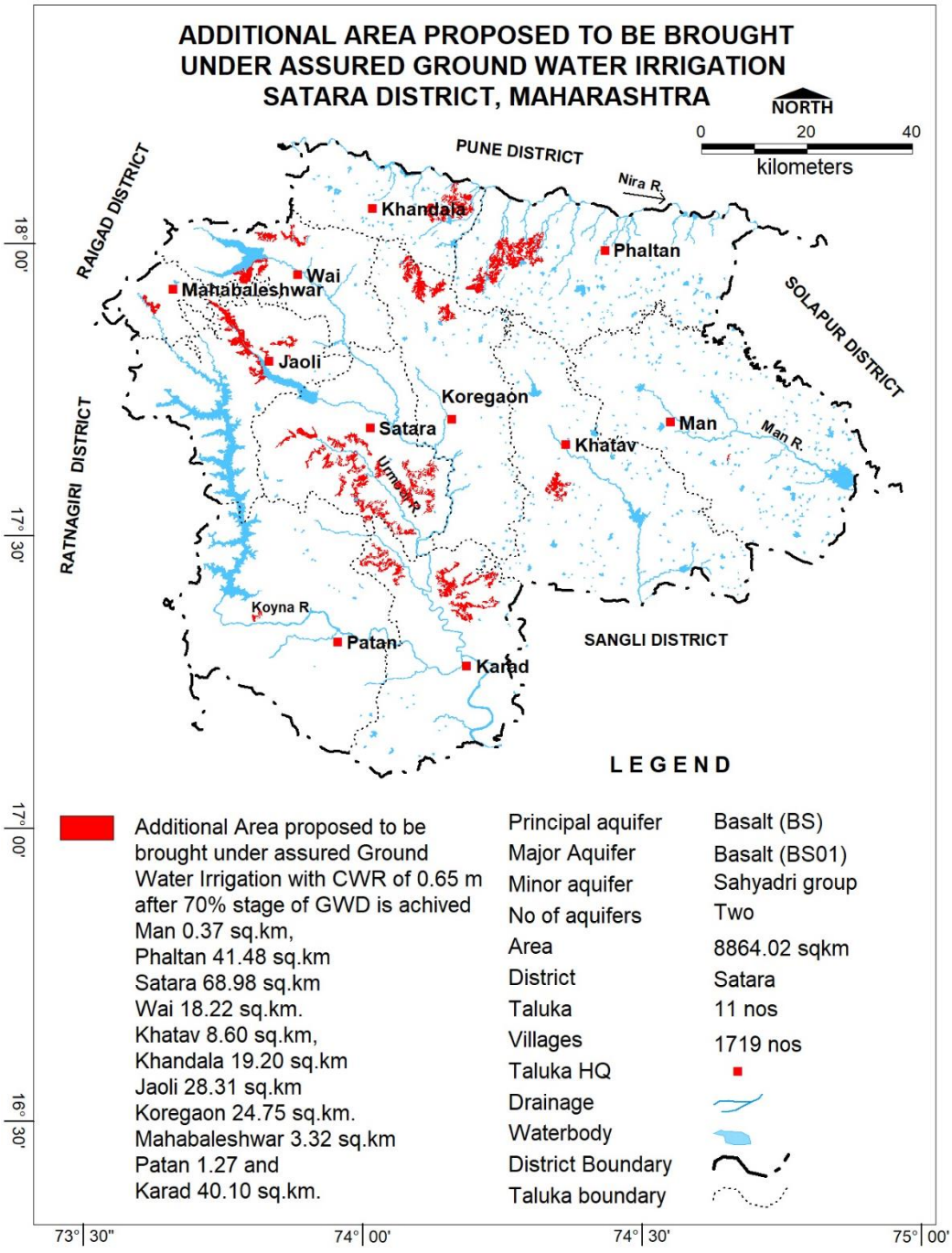


Figure 7.3: Additional area Proposed to be bought under Assured GW irrigation.

Figure 7.4: Gist of Aquifer Management Plan

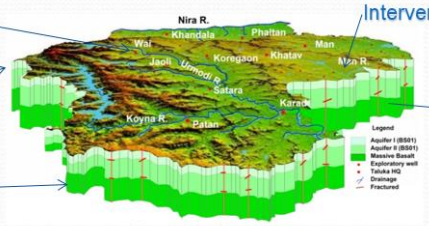
PROPOSED MANAGEMENT PLAN TO IMPROVE SUSTAINABILITY

Augmentation by Supply Side Intervention: 58.71MCM

GW Saving by Demand side Intervention: 89.21 MCM

Aquifer I Resources- 944.21 MCM

Aquifer II Resources- 135.56 MCM



Total Draft= 625.72 MCM

EXPECTED BENEFITS AFTER IMPLEMENTING SUPPLY SIDE AND DEMAND SIDE INTERVENTIONS

- Bringing down to stage of GW development from Semi critical of Man, Khatav, Patan, Phaltan and Wai block to safe category with enhance availability of GWR after supply side & Demand side intervention.
- Beside this, about 254.60 sq. km of additional Area can also be brought under assured GW irrigation from 165.49 MCM of Balance GWR available for GW Development by constructing 9929 Dug wells and 1625 Bore wells.
- The water conservation structures proposed in Khandala and Mahabaleshwar blocks may be useful for maintaining sustainability of exiting wells & spring flow and ground water low to downstream blocks.

8. SUM UP

The highly diversified occurrence and considerable variations in the availability and utilization of groundwater makes its management a challenging task. Scientific development and management strategy for groundwater has become imperative to avert the looming water crisis. In this context, various issues such as, prioritization of areas for development of groundwater resources vis-a-vis its availability, augmentation of groundwater through rainwater harvesting and artificial recharge, pricing and sectoral allocation of resources and participation of the stakeholders must be considered. In view of the above, the present study area a systematic, economically sound and politically feasible framework for groundwater management is required.

A thorough study was carried out based on data gap analysis, data generated in-house; data acquired from State Govt. departments and GIS maps prepared for various themes. All the available data was brought on GIS platform and an integrated approach was adopted for preparation of block wise aquifer maps and aquifer management plans of Satara district.

Geographically, Satara district covers an area of 10480 sq km, out of this 386.53 sq km area is occupied by forest. Geologically, the area is occupied by Basalt and Laerite formations. The stage of ground water extraction is 66.27 %. Khatav, Man, Patan, Phaltan and Wai blocks are categories as semi-critical and rest of the blocks is categorized as safe. The area has witnessed droughts, declining water level and low yield potential of aquifers are the major issues in the district. Declining water level trend between 0.004 -1.20 m/year has been observed in 49 stations during post monsoon. Declining water level trend of between 0.086-1.16 m/year has been observed in 48 stations during pre-monsoon.

The management plan has been proposed to manage the ground water resources and to arrest further decline in water levels. The management plan comprises two components namely supply-side management and demand side management.

The total unsaturated volume available for artificial recharge is 6930.89 MCM and it ranges from 25.48 MCM in Satara block to 1657.17 MCM in Khatav block. The available surplus runoff can be utilized for artificial recharge through construction of percolation tanks and Check dams. The surplus water available for artificial recharge is 78.26 MCM. This surplus can be used to recharge facility through 275 Percolation Tanks and 783 Check dams. The expected recharge every year from these structures is 58.71 MCM.

The demand side management can be implemented through the micro-irrigation techniques. It is proposed to be adopted drip irrigation in about 156.48 sq. km Sugarcane areas in the district. With this about area 89.21 MCM of ground water can be saved.

With supply side and demand side interventions, it is expected that about 165.49 MCM of ground water would be available to bring stage of ground water development to 70%. With this, additional area of 254.60 sq.km can be irrigated through additional 9929 dugwells and 1655 borewells.

Thus, the focus of proposed management plan was to use ground water very effectively with supply and demand side interventions. The perusal of above ground water management plan lays stress on adopting micro-irrigation techniques and artificial recharge measures. Considering the low stage of ground water, extraction in the district demand side interventions have not been proposed. However, this is the right time to further enhance the

micro irrigation practices in the selected areas to manage the resources perceiving the future demand of resources.

These interventions also need to be supported by regulation for deeper aquifer and hence it is recommended to regulate/ban deeper tubewells/borewells of more than 60 m depth in these Blocks, so that the deeper ground water resources are protected for future generation and also serve as ground water sanctuary in times of distress/drought. Capacity building activities needs to be aggressively propagated to establish the institutional framework for participatory ground water management.

Annexures

Annexure-I: Salient Features of Ground Water Exploration

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
1	Jaoli	Ambeghar	EW	200	-	16-17, 180-181	21	12	0.14		17	181	200	1
2	Jaoli	Dare (BK)	EW	200	-	-	55	35	NIL		21	143	200	0.5
3	Karad	Dhondewadi	EW	172.1	5.8	-	19	8.75	1.37		18	132	172.1	3
4	Karad	Karawadi	EW	166	5.8	-	35	25.9	4.77		18	125	166	6
5	Karad	Karawadi	OW	95	5.8	-	42	32.1	5.77		18	90	95	9
6	Karad	Shitalwadi	EW	186.3	5.8	-	13	4.3	3		15	90	186.3	4
7	Karad	Shitalwadi	OW	190.4	4.5	-	12	2.7	1.37		16	125	190.4	3
8	Karad	Supne	EW	160	5.8	-	19	6.25	2.16		19	105	160	3
9	Karad	Undale (Shewalewadi)	EW	200	5.8	-	15	5.9			18	143	200	2
10	Karad	Wagheshwar (Masssur)	EW	200	5.8	-	55	36			16	132	200	2
11	Khandala	Karnawadi	EW	200	5.7	129.4-130.4	23	6.9	0.431	>50	12	130	200	1
12	Khandala	Khandala	EW	200	5.6		19	8	0.43		21	154	200	1

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
13	Khandala	Shindewadi	EW	200	5.7	28-29	15	7.7	0.431	>50	29	125	200	1
14	Khandala	Tambve Bk	EW	200	5.7	11-12 , 33-34	12	5.05	3	37.35	12	135	200	3
15	Khandala	Tambve Bk	OW	40	5.7	10-11 , 30-31	16	5.7	3	33	11	31	40	3
16	Khandala	Tambve Bk	PZ	80	5.7	73-74	17	4.5	0.38	>50	12	74	80	1
17	Khandala	Tondal	EW	200	5.7	10-11 , 78-79	12	3.2	10	5	12	79	200	3
18	Khandala	Tondal	OW	100	5.7	31-32 , 78-79	16	6.75	10	5.5	12	79	100	3
19	Khandala	Tondal	EW	40	5.7	12-13 , 29-30	15	5	10	5	12	30	40	3
20	Khandala	Tondal	OW	40	5.7	12-13 , 29-30	12	5.59	10	3.3	12	30	40	3
21	Khandala	Tondal	OW	100	16.5	12-13 , 30-31 , 78-79	17	7.95	1.37	36.2	30	79	100	3
22	Khatav	Arphal	EW	196	-		25	9	1.73	45.75	15	135	196	3
23	Khatav	Aundh	EW	131	9.5	44.2-47.2, 90-93 , 116-117.4	21	2.72	3.17	30.25 m	17	117.4	131	9
24	Khatav	Chitali	EW	301	-	13 - ,152 -	17	8.28	-	17.26	13	152	301	1
25	Khatav	Dhakarwadi	EW	126.5	9.5	62.5 - 65 , 89.9 -93 , 108.2 - 111.3	12	2	2.16	33.24 m	15	111	126.5	6
26	Khatav	Katgun	EW	200		19.6-20.6 , 96-97	21	9	0.38		21	97	200	2

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
27	Khatav	Nidhal	EW	97.8	-		15	2.15	10.98	30.55	19	90	97.8	12
28	Khatav	Nidhal	OW	79.6	-		17	2.02	5.94	36.28	21	75	79.6	9
29	Khatav	Phadtarwadi	EW	97.9	-	16.5 - ,32.3 -34.8	33	16	15	-	16	70	97.9	2
30	Khatav	Phadtarwadi	OW	67.4	-	17.5 - , 33.8 -37.9	34	17	-	-	17	65	67.4	2
31	Khatav	Pusesavli	EW	203.53	-	6 - ,67.33 -	12	4.35	0.83	28	15	90	203.53	2
32	Khatav	Rajapur	EW	200	14	16 mbgl (Seepage) , 92 mbgl	82.8	31	0.14	-	16	92	200	1
33	Khatav	Vaduz	EW	201.05	-		12	4.8	2.16	-	15	145	201.05	4
34	Khatav	Vaduz	OW	171	-		19	4.09	3.17	-	15	145	171	5
35	Koregaon	Chimangaon	EW	200		14-15 ,100-101 , 124-125	16	8.5	12.18		15	125	200	6
36	Koregaon	Chimangaon	OW	140		14-16 ,92-93	12	5.3	6.81		16	93	140	6
37	Koregaon	Circlewadi	EW	200	5.7	13-14	21	12	0.38	>50	14	90	200	1
38	Koregaon	Deshmukh Nagar	EW	200	5.6		12	7	0.43		15	135	200	1
39	Koregaon	Dhamner	EW	134.55	-	4.25 - ,134.55 -	17	2.45	3.77	38.6	15	134	134.55	3
40	Koregaon	Dhamner	OW	122.25	-	-122.25	12	2.55	1.73	46.5	19	122	122.25	3

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
41	Koregaon	Kodoli	EW	200	5.8		35	18.2	3		25	156	200	4
42	Koregaon	Lhasurne	EW	200		16-17 ,29-30 , 95.6-96.6	9	2	3		30	98	200	5
43	Koregaon	Lhasurne	OW	150		16-17 ,29-30 , 95.6-96.6	16	1.4	0.38		30	98	150	5
44	Malshiras	Palshi	EW	153.4	153.4	145 -150	25	11	-	-	12	150	153.4	1
45	Man	Lodhavade	EW	200	5.6		15.5	7	3	>50.00	21	110	200	4
46	Man	Lodhavade	OW	120	5.6		21	12	0.14		21	110	120	1
47	Man	Mograle	EW	200		74.5-75.5 , 116.3-117.3	28	22.3	0.712		21	117	200	2
48	Man	Mohi	EW	200	5.7	15-16.50 , 80.60-81.60 , 129.4-130.4	64.5	37	3	>50	16	130	200	4
49	Man	Mohi	OW	135.5	5.7	37-38 , 83.60-84.60	14	3.2	1.37	>50	16	98	135.5	2
50	Man	Pangri	EW	200		68.4-69.4 ,74.5-75.5	23	9	3		19	76	200	4
51	Man	Pangri	OW	172.1		07.4-10.4 ,68.4-69.4	18	11.5	1.37		19	76	172.1	4
52	Man	Pingli Bk	EW	200		42-43 ,62.3-63.3	18	6.6	10		19	120	200	4

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
53	Man	Pingli Bk	OW	178.2		42-43 ,62.3-63.3	21	6.6	10		21	120	178.2	4
54	Man	Rajale	EW	200	29.5	12 -13 , 96 -97	>50		meagre		13	97	200	1
55	Man	Shevri	EW	200	5.7	50.1-51.1 159.9-160.9	25	17.8	3	>50	18	161	200	5
56	Man	Shevri	OW	160	5.7	22.6-23.6 , 77.5-78.5 , 132.4-133.4	23	16.3	0.78	>50	24	133	160	2
57	Man	Shindewadi	EW	201.5	-		17	7	5	-	17	135	201.5	6
58	Man	Shindewadi	OW	177.1	-		18	9	-	-	18	154	177.1	1
59	Man	Vadjal	EW	201.6	-		12	8	0.78	46.4	12	125	201.6	1
60	Patan	Dabawadi	EW	201.5	-		12	8.9	0.78	-	17	135	201.5	1
61	Patan	Mendoshi	EW	200	5.8		55	35			16	125	200	2
62	Patan	Morgir (Shivapur Peth)	EW	200	10.1		55	35			19	110	200	1
63	Patan	Surul	EW	200	17.5	10.6 -13.7 , 101 -105	14	>100		Meager	14	105	200	4
64	Patan	Telewadi	EW	200	5.8		16	3.94	0.78		18	110	200	1
65	Patan	Vihe	EW	200	17.5	114 – 117	12	44.66		0.38	15	117	200	3
66	Patoda	Jadhawadi	EW	156.4	156.4	16.2 -29.3 ,36.5 -43.6 ,106.7 -117.3 ,99.5 -102.6	25	10.24	1.6	2.42	29	117	156.4	4

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
67	Phaltan	Andhali	EW	200	29.5	13.7 -16.7	53	36	Dry	Dry	17	70	200	0.5
68	Phaltan	Barad	EW	184.31	11	34.8-37.8 , 50.1-53.1 , 95.8-96.8	18	3.17	10	37	21	97	184.31	6
69	Phaltan	Barad	OW	7.7	-		18	9	-	-	21	97	7.7	1
70	Phaltan	Barad	OW	100	11.7	28.7-29.7	19	5.5	0.431	>50	29	70	100	1
71	Phaltan	Bibi	EW	200	5.7		21	13	0.14		12	125	200	1
72	Phaltan	Bibi	PZ	25	5.7		21	13	0.721		12	25	25	2
73	Phaltan	Gandhinagar (Kashil)	EW	200	5.7	19.60-20.60	60	43	Traces		16	126	200	0.5
74	Phaltan	Mirgaon	EW	201	-		24	17.25	0.58	-	22	135	201	2
75	Phaltan	Shindewadi	EW	200	5.7	37-38 ,61-62	12	9	3	44	11	62	200	3
76	Phaltan	Shindewadi	OW	100	5.7	95-96	18	3.1	0.431	>50	11	96	100	3
77	Phaltan	Shirtav-EW	EW	200	29.5	190.60 – 193.60	35	22	1.4		24	193	200	1.0
78	Phaltan	Tathawade	EW	180	5.7	27.50-28.50 , 55-56	19	8.4	0.14	>50	29	110	180	2
79	Phaltan	Vadgaon	EW	200	29.5	44.20-47.20 (seepage) , 190.60-196.70	95	25	0.1	_	21	90	200	2
80	Phaltan	Warwand	EW	200			16	11			11	143	200	1
81	Satara	Chinchaner	EW	200	-		17	2.95	3.77	28	17	135	200	6

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
82	Satara	Chinchaner	OW	189.3	-		15	4.05	5.94	25.65	12	98	189.3	9
83	Satara	Dambewadi	EW	200	29.5	157-160 ,	61.5	21	0.14	_	19	160	200	1
84	Satara	Kadve(BK)	EW	200	5.8		74.5	35			18	132	200	2
85	Satara	Kadve(BK)	OW	80.6	5.8		19	8			19	76	80.6	2
86	Satara	Moravale	EW	200		19-20 ,153-154	13	3.6	1.05		20	154	200	3
87	Satara	Padali	EW	201.5	-	65 -73	9	1.47	5.15	-	12	73	201.5	6
88	Satara	Padali	OW	177.1	-	65 -73	19	1.4	4.43	-	12	73	177.1	6
89	Satara	Sayali		200	5.8		13	1.8	1.8	2.16	15	70	200	3
90	Satara	Shivthar	EW	175		49-50	24	17.5	<0.14		21	120	175	0.5
91	Wai	Aasale	EW	200	5.7	12-13 ,115-116	15	5.05	3	>50	13	116	200	3
92	Wai	Aasale	OW	120	5.7		16	3			12	110	120	1
93	Wai	Amritwadi	EW	200		114.1-117.2	17	5	2.16		17	117	200	4
94	Wai	Bavdhan	EW	30			21	12			5.7		5.7	1
95	Wai	Bavdhan	PZ	29.8	6.5	16.9-17.9	21	12	Traces		18	29.8	29.8	0.5
96	Wai	Bhilarewadi (Vele)	EW	200	5.7	102-103	25	17.29	0.14	>50	19	103	200	1
97	Wai	Bopardi	EW	129.4	5.7	13.5	18	1.6	3		15	110	129.4	3

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
98	Wai	Eksar	EW	200	17.5	36 -37 , 115 - 118	19.35		2.16		15	118	200	3
99	Wai	Eksar	OW	142	11.5	50.3 -53.3 , 79 - 81, 96 - 99.1	86.1		Meager		15	99	142	6
100	Wai	Kawathe	EW	92	5.7	53.10-54.10	17	6.8	0.14	>50	12	80	92	2
101	Wai	Kondhavali	OW	111.1	5.7	18-19	12.9	4	2.16	>50	19	105	111.1	2
102	Wai	Kondhavali	PZ	80	5.6	75-76	12	4	Traces		12	76	80	0.5
103	Wai	Kondhavali	EW	200	5.75	92-93	22	2.6	3	>50	12	93	200	3
104	Satara	Samarthgaon EW		148	11.5	32.1-35.1, 56-57	8.64		9.84					
105	Satara	Samarthgaon OW		154.1	11.5	32.1-35.1, 53.4-56.5	8.7		9.84					
106	Javli	Mamurdi		166.2	5.5	13.1-19.8 96-114.3, 154-160	5.45		0.38					
107	Javli	Kudal EW		200	21.8	32-38.1, 105.2-108.2	12.8		3.17					
108	Javli	Kudal OW		200	17.5	32-38.1, 74.7-80.8	12.63		3.17					
109	Khandala	Naigaon		200	5.5	56.4-59.4	>100		Traces					
110	Karad	Narayanwadi		200	5.5	1320-135.5	>100		Traces					

S No	**Taluka**	**Village**	**Type EW/ OW**	**Drilling depth**(m)	**Casing**(m)	**AQ Zones**(m.bgl)	**Pre SWL** (m.bgl)	**Post SWL** (m.bgl)	**PYT Discharge (lps)**	**PYT Draw-down**(m.bgl)	**AQI** (m)	**AQII**	**Massive**	**Thickness AQII**
111	Koregaon	Vikhale		200	11.5	120.5-121.5, 163.2 -164.2	66.3		Meager					
112	Khandala	Ahire		200	11.5	3-7.7, 157-160.2	70		0.14					
113	Patan	Tarale		200	11.5	3-7.7 178.5-181.5	>100		0.14					
114	Patan	Sonaichiwadi		200	17.5	130-132.7 177 -178.5	60		0.78					
115	Karad	Talbid		200	29.5	151-152	80		0.14					
116	Karad	Umbraj		200	5.5	47.3-87	>100		traces					
117	Khandala	Lonand		200	5.5	120.5-121.5	>101		traces					

Annexure-II: Aquifer I depth to water level details in Satara district

S/N	Well Name	Taluka	May-19	Nov. 2019	Fluctuation	Premonsoon WL trend (m/year)		Postmonsoon WL trend (m/year)	
			(mbgl)	(mbgl)	(m)	Rise	Fall	Rise	Fall
1.	Yelgaon_Pz	Karad	-	1.2			-0.117	0.16	
2.	Yelgaon-1	Karad	3.5	2	1.5	0.307		0.164	
3.	Muttalvadi	Phaltan	-	1.5			-0.21		-0.159
4.	Undale	Karad	7.2	2.9	4.3	0.12		0.082	
5.	Bhairavnath Nagar	Karad	10	3.4	6.6		-0.42	0.311	
6.	Savantwadi (Jinti)	Patan	5.78	-			-0.054	0.414	
7.	Dhebevadi	Patan	8.3	2.7	5.6	0.152		0.051	
8.	Malkapur	Karad	-	-					-0.005
9.	Morgiri (Shivpurpeth)	Patan	-	-		0.091		0.046	
10.	Malharpeth	Patan	12.7	8.1	4.6		-0.114	0.006	
11.	Varade	Karad	-	3.35			-1.066	0.065	
12.	Manainagar	Karad	2.9	-	2.9			0.038	

13.	Shenwadi	Man	8.32	2	6.32		-0.313	0.049	
14.	Velkhandwadi (Tarli)	Patan	4.8	5.4	-0.6	0.408		0.031	
15.	Pal	Karad	2.7	1.4	1.3	0.263			-0.017
16.	Arvi-1	Koregaon	7.6	6.5	1.1		-0.273	0.189	
17.	Atit	Khandala	3.3	2.7	0.6		-0.134		-0.004
18.	Aundh	Khatav	13.14	6.1	7.04		-0.285	0.021	
19.	Katar Khatav	Khatav	10.24	3.9	6.34		-0.288	0.186	
20.	Rehmatpur	Koregaon	9.2	3.2	6		-0.153	0.069	
21.	Mhaswad	Man	16.52	-			-0.83	0.066	
22.	Shendre	Satara	1.37	1.5	-0.13		-0.125		-0.098
23.	Pingli	Khatav	11.74	1	10.74	0.061		0.301	
24.	Koregaon	Koregaon	8.2	2.3	5.9		-0.231	0.093	
25.	Kondve	Satara	6.8	0.9	5.9	0.187		0.401	
26.	Vaduth	Satara		4.5		0.06		0.016	
27.	Chinchni Kanher	Satara	6.3	1.6	4.7			0.044	
28.	Medha	Jaoli	4.9	1.1	3.8		-0.03		-0.031

29.	Manjarvadi (Mol)	Khatav	7.3	2.2	5.1		-0.086		-0.043
30.	Tathvade	Phaltan	14	3.4	10.6	0.046		0.011	
31.	Javali	Phaltan	13.5	3.55	9.95		-0.707	0.145	
32.	Mogarle	Phaltan	-	1.2			-0.063		-0.008
33.	Wathar (Station)	Koregaon	20	4.6	15.4		-0.463	0.17	
34.	Pimpode (Bk)-1	Koregaon	8.9	0.35	8.55		-0.12	0.144	
35.	Mahabaleswar	Mahabaleswar	12.1	13.8	-1.7	0.355		0.235	
36.	Panchgani	Mahabaleswar	10.1	5.4	4.7	0.035		0.166	
37.	Wai	Wai	2.4	2.65	-0.25	0.024		0.07	
38.	Barad	Phaltan	19	9.2	9.8				-1.204
39.	Surur	Wai	21.5	4.7	16.8		-1.163	0.15	
40.	Mirgaon	Phaltan	10.5	1.4	9.1		-0.703	0.078	
41.	Nimblak	Phaltan	2.6	3.2	-0.6	0.153		0.172	
42.	Nimblak_Pz	Phaltan	-	3			-0.683	0.084	
43.	Bhade	Khandala	-	-			-0.513		-0.052
44.	Shirwal	Khandala	8.85	1.8	7.05	0.307		0.18	

Annexure-III: Aquifer I depth to water level details in Satara district

S/N	Location	Lat	Long	Block	Depth drilled (m)	Casing Depth (mbgl)	Zones Tapped (mbgl)	Depth to WL (mbgl)	Discharge (lps)	D.D (m)
1.	Samarthgaon EW	17^0 30'55"	74^0 03' 47"	Satara	148	11.50	32.10-35.10 and 56-57	8.64	9.84	34.09
2.	Samarthgaon OW	17^0 30'55"	74^0 03' 47"	Satara	154.10	11.50	32.10-35.10 and 53.40-56.50	8.70	9.84	-
3.	Mamurdi	17^0 48' 58"	73^0 48' 30"	Javli	166.20	5.50	13.70 to 19.80 , 96.00 to 114.30 , and 154.00 to 160.00	5.45	0.38	32.27
4.	Kudal EW	17^0 50'0.1"	73^0 54' 54"	Javli	200	21.80	32.00 to 38.10 m bgl and 105.20-108.20	12.80	3.17	33.25
5.	Kudal OW	17^0 50'0.1"	73^0 54' 54"	Javli	200	17.50	32.00 to 38.10and 74.70-80.80	12.63	3.17	-
6.	Naigaon	18^0 06'43.2"	73^0 58' 4"	Khandala	200	5.50	56.40 to 59.40	>100	Traces	-
7.	Narayanwadi	17^0 13'.23.24"	74^0 10.8' 3"	Karad	200	5.50	132.00-135.50	>100	Traces	-
8.	Vikhale	17.8731	74.1774	Koregaon	200	11.5	Seepage at 120.50,Seepage at 163.20	66.3	Meager	
9.	Ahire	18.06	74.0778	Khandala	200	11.5	Water Zone-I: 3.00 -7.70 mbgl , Seepage at	70	0.14	

							99.20,Water Zone-II: 157.00 - 160.20 mbgl			
10.	Tarale	17.493	73.982	Patan	200	11.5	Water Zone-I: 3.00 -7.70 mbgl , Seepage at 35.10,Seepage at 90.00, Seepage at 144.00, Water Zone-II: 178.50-181.50 mbgl	>100	0.14	
11.	Sonaichiwadi	17.3205	74.0265	Patan	200	17.5	Water Zone-I: 130.00- 132.70 mbgl ,Water Zone-II: 177.00 - 178.50 mbgl	60	0.78	
12.	Talbid	17.3389	74.1119	Karad	200	29.5	Water Zone-I: 151.00-152.00 mbgl	80	0.14	33.75
13.	Umbraj	17.4033	74.1018	Karad	200		Seepage at 47.30, Zone 1 at 83.90-87.00 mbgl	>100	traces	37.45
14.	Lonand	18.0413	74.1926	Khandala	200		Seepage at 120.50,Seepage at 163.20	>101	traces	

Annexure- IV: Soil Infiltration test data

Date	21/2/2020
Unique ID No	SITNQSatara-2
Location	Nisre Phata-20 kms from Karad on Nisre Phata road.
Taluka	Karad
District	Satara
Coordinates	17 20 57, 74 01 28
Elevation / RL (mamsl)	574.82
Initial Water Level	14
Geology	Deccan Basalt
Soil type	Black cotton soil
Final Infiltration Rate (cm/hr)	6.80

Sl.No.	**Clock time**	**Duration(m)**	**Cumulative time (minutes)**	**Water level depth(cm)**	**Infiltrated water Depth(cm)**	**Infiltration rate(cm/hr)**
1	15.55	0	0	14.00	0.00	0.00
2	16.00	5	5	14.10	0.10	1.20
3	16.05	5	10	14.20	0.20	2.40
4	16.10	5	15	14.30	0.30	3.60
5	16.20	10	25	15.00	1.00	6.00
6	16.30	10	16	15.10	1.10	6.60
7	16.40	10	45	15.20	1.20	7.20
8	16.55	15	60	15.70	1.70	6.80
9	17.10	15	75	15.70	1.70	6.80
10	17.25	15	90	15.70	1.70	6.80
11	17.40	15	105	15.70	1.70	6.80

Date	19/2/2020
Unique ID No	SITNQSatara-1
Location	Taswade-In the premises of Accurate Solutions Pvt Ltd.
Taluka	Patan
District	Satara
Coordinates	17 22 07, 74 07 13
Elevation / RL (mamsl)	575.58
Initial Water Level	25
Geology	Deccan Basalt
Soil type	Black cotton soil
Final Infiltration Rate (cm/hr)	6.80

Sl.No.	**Clock time**	**Duration(m)**	**Cumulative time (minutes)**	**Water level depth(cm)**	**Infiltrated water Depth(cm)**	**Infiltration Rate (cm/hr)**
1	17.20	0	0	25.00	0.00	0.00
2	17.25	5	5	24.88	0.12	1.44
3	17.30	5	10	24.56	0.44	5.28
4	17.40	10	20	24.51	0.49	2.94
5	17.50	10	30	24.47	0.53	3.18
6	18.00	10	40	24.44	0.56	3.36
7	18.10	15	55	24.41	0.59	2.36
8	18.30	15	70	24.41	0.59	2.36
9	18.30	15	85	24.41	0.59	2.36
10	18.40	15	100	24.41	0.59	2.36

Annexure-V: Water Level trend (2010-2019)

S. No	**Well Name**	**Taluka**	**May-19**	**Nov. 2019**	**Fluctuation**	**Premonsoon WL trend (m/year)**		**Postmonsoon WL trend (m/year)**	
			(mbgl)	**(mbgl)**	**(m)**	**Rise**	**Fall**	**Rise**	**Fall**
1.	Yelgaon_Pz	Karad	-	1.2			-0.117	0.16	
2.	Yelgaon-1	Karad	3.5	2	1.5	0.307		0.164	
3.	Muttalvadi	Phaltan	-	1.5			-0.21		-0.159
4.	Undale	Karad	7.2	2.9	4.3	0.12		0.082	
5.	Bhairavnath Nagar	Karad	10	3.4	6.6		-0.42	0.311	
6.	Savantwadi (Jinti)	Patan	5.78	-			-0.054	0.414	
7.	Dhebevadi	Patan	8.3	2.7	5.6	0.152		0.051	
8.	Malkapur	Karad	-	-					-0.005
9.	Morgiri (Shivpurpeth)	Patan	-	-		0.091		0.046	
10.	Malharpeth	Patan	12.7	8.1	4.6		-0.114	0.006	
11.	Varade	Karad	-	3.35			-1.066	0.065	
12.	Manainagar	Karad	2.9	-	2.9			0.038	
13.	Shenwadi	Man	8.32	2	6.32		-0.313	0.049	

S. No	**Well Name**	**Taluka**	**May-19**	**Nov. 2019**	**Fluctuation**	**Premonsoon WL trend (m/year)**		**Postmonsoon WL trend (m/year)**	
			(mbgl)	**(mbgl)**	**(m)**	**Rise**	**Fall**	**Rise**	**Fall**
14.	Velkhandwadi (Tarli)	Patan	4.8	5.4	-0.6	0.408		0.031	
15.	Pal	Karad	2.7	1.4	1.3	0.263			-0.017
16.	Arvi-1	Koregaon	7.6	6.5	1.1		-0.273	0.189	
17.	Atit	Khandala	3.3	2.7	0.6		-0.134		-0.004
18.	Aundh	Khatav	13.14	6.1	7.04		-0.285	0.021	
19.	Katar Khatav	Khatav	10.24	3.9	6.34		-0.288	0.186	
20.	Rehmatpur	Koregaon	9.2	3.2	6		-0.153	0.069	
21.	Mhaswad	Man	16.52	-			-0.83	0.066	
22.	Shendre	Satara	1.37	1.5	-0.13		-0.125		-0.098
23.	Pingli	Khatav	11.74	1	10.74	0.061		0.301	
24.	Koregaon	Koregaon	8.2	2.3	5.9		-0.231	0.093	
25.	Kondve	Satara	6.8	0.9	5.9	0.187		0.401	
26.	Vaduth	Satara		4.5		0.06		0.016	
27.	Chinchni Kanher	Satara	6.3	1.6	4.7			0.044	

S. No	**Well Name**	**Taluka**	**May-19**	**Nov. 2019**	**Fluctuation**	**Premonsoon WL trend (m/year)**		**Postmonsoon WL trend (m/year)**	
			(mbgl)	**(mbgl)**	**(m)**	**Rise**	**Fall**	**Rise**	**Fall**
28.	Medha	Jaoli	4.9	1.1	3.8		-0.03		-0.031
29.	Manjarvadi (Mol)	Khatav	7.3	2.2	5.1		-0.086		-0.043
30.	Tathvade	Phaltan	14	3.4	10.6	0.046		0.011	
31.	Javali	Phaltan	13.5	3.55	9.95		-0.707	0.145	
32.	Mogarle	Phaltan	-	1.2			-0.063		-0.008
33.	Wathar (Station)	Koregaon	20	4.6	15.4		-0.463	0.17	
34.	Pimpode (Bk)-1	Koregaon	8.9	0.35	8.55		-0.12	0.144	
35.	Mahabaleswar	Mahabaleswar	12.1	13.8	-1.7	0.355		0.235	
36.	Panchgani	Mahabaleswar	10.1	5.4	4.7	0.035		0.166	
37.	Wai	Wai	2.4	2.65	-0.25	0.024		0.07	
38.	Barad	Phaltan	19	9.2	9.8				-1.204
39.	Surur	Wai	21.5	4.7	16.8		-1.163	0.15	
40.	Mirgaon	Phaltan	10.5	1.4	9.1		-0.703	0.078	
41.	Nimblak	Phaltan	2.6	3.2	-0.6	0.153		0.172	

S. No	**Well Name**	**Taluka**	**May-19**	**Nov. 2019**	**Fluctuation**	**Premonsoon WL trend (m/year)**		**Postmonsoon WL trend (m/year)**	
			(mbgl)	**(mbgl)**	**(m)**	**Rise**	**Fall**	**Rise**	**Fall**
42.	Nimblak_Pz	Phaltan	-	3			-0.683	0.084	
43.	Bhade	Khandala	-	-			-0.513		-0.052
44.	Shirwal	Khandala	8.85	1.8	7.05	0.307		0.18	

Annexure-VI: Chemical analysis of ground water samples, Shallow aquifers

S. No.	Taluka	Location	Agency	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
1	Jaoli	Medha	NHS2016	0	493	262	230	21.2	0.39	62.124	18.2	0.0	128.1	60.265	106	7	0.29	0.0	0.61	-2.53
2	Jaoli	Medha	GSDA	7.8	399	255	188	25.0	0.5	11.2	38.9	1.0	163.0	56	0.9	13	0.1	0.1	0.79	-1.10
3	Karad	Bhairavnath Nagar	NHS2016	0	749	394	355	30.5	5.26	78.156	38.9	0.0	305.0	102.805	61	9	0.24	0.0	0.70	-2.15
4	Karad	Malkapur	NHS2016	0	532	282	230	36.3	1.44	70.14	13.4	0.0	140.3	49.63	134	16	0.32	0.0	1.04	-2.32
5	Karad	Pal	NHS2016	0	931	493	470	38.2	10.58	120.24	41.3	0.0	323.3	99.26	203	14	0.35	0.0	0.77	-4.16
6	Karad	Undale	NHS2016	0	810	430	345	43.7	0.47	82.164	34.0	0.0	256.2	124.075	68	26	0.26	0.0	1.02	-2.74
7	Karad	Varade	NHS2016	0	657	349	270	45.2	0.26	58.116	30.4	0.0	213.5	74.445	97	17	0.21	0.0	1.20	-1.94
8	Karad	Yelegaon-1	NHS2016	0	427	227	220	13.5	0.48	56.112	19.4	0.0	170.8	31.905	48	7	0.2	0.0	0.40	-1.63
9	Karad	Beldare	GSDA	7.6	660	422	200	61.0	6	54.4	15.6	1.0	259.0	56	11	24	0.4	0.1	1.88	0.26
10	Karad	Chitali	GSDA	8.1	3530	2259	600	479.0	0.1	148.8	55.4	0.0	405.0	484	5.1	842	0.7	0.1	8.50	-5.42
11	Karad	Gote	GSDA	7.7	832	532	268	47.0	2.2	56	31.1	0.0	375.8	70	1	14	0.2	0.1	1.25	0.77
12	Karad	Kale	GSDA	7.4	652	417	280	29.0	3	75.2	22.4	0.7	295.3	56	6	20	0.9	0.1	0.75	-0.76
13	Karad	Karad	GSDA	8.3	648	415	180	52.0	7.5	51.2	12.6	5.5	294.4	52	8	6	0.3	0.2	1.69	1.40
14	Karad	Korti	GSDA	8.2	522	334	160	40.0	5	56	4.9	2.8	189.1	54	4	43	0.1	0.3	1.37	-0.01
15	Karad	Masur	GSDA	8.3	456	292	128	20.0	0.1	20.8	18.5	2.4	129.5	22	1.7	13	0.2	0.5	0.77	-0.38
16	Karad	Mhopre	GSDA	8.2	442	283	188	35.0	0.6	60.8	8.7	2.9	197.0	58	3	7	0.1	0.2	1.11	-0.44
17	Karad	Padali Helgaon	GSDA	8.1	568	364	176	21.0	0.1	19.2	31.1	2.6	221.3	28	5.9	13	0.4	0.6	0.69	0.16
18	Karad	Saidapur	GSDA	7.6	1578	1010	388	200.0	14.7	112	26.2	0.0	502.6	210	13	84	0.7	0.1	4.41	0.45
19	Karad	Savade	GSDA	8.6	774	495	192	44.0	64	44.8	19.4	9.1	242.7	100	6	48	0.1	0.7	1.38	0.42
20	Karad	Talbid	GSDA	7.6	953	610	288	80.0	8	80	21.4	0.0	273.3	136	15	7	0.1	0.1	2.05	-1.30
21	Karad	Umbraj	GSDA	8.1	548	351	252	26.0	2	72	17.5	2.6	217.4	62	5.8	6	0.5	0.1	0.71	-1.41
22	Karad	Vanvasmachi	GSDA	7.8	471	301	184	20.0	3	60.8	7.8	1.4	234.6	27	4	18	0.1	0.1	0.64	0.20
23	Khandala	Bhade	NHS2016	0	1851	983	460	190.0	19.25	100.2	51.0	9.0	335.5	315.505	192	7	0.38	0.0	3.85	-3.46
24	Khandala	Shirwal	NHS2016	0	1184	628	460	69.7	0.2	54.108	79.0	0.0	317.2	138.255	168	41	0.38	0.0	1.41	-4.09
25	Khandala	Khed Bk	GSDA	8.3	1230	787	328	120.0	0.7	75.2	34.0	0.0	170.8	340	8	55	0.1	0.6	2.88	-3.80
26	Khandala	Lonand	GSDA	8.3	401	257	128	37.0	1.7	35.2	9.7	3.3	176.6	24	0.4	11	0.3	1.0	1.42	0.44
27	Khandala	Naygaon	GSDA	8.1	778	498	224	42.0	0.4	51.2	23.3	2.7	225.3	50	5.8	22	0.5	0.5	1.22	-0.72
28	Khandala	Shirval	GSDA	8.1	558	357	144	23.0	0.9	20.8	22.4	2.5	213.4	28	1.4	14	0.1	0.7	0.83	0.68
29	Khatav	Aundh	NHS2016	0	1309	690	315	80.1	10.36	80.16	27.9	0.0	317.2	180.795	135	35	0.29	0.0	1.96	-1.14

S. No.	Taluka	Location	Agency	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
30	Khatav	Manjarvadi (Mol)	NHS2016	0	505	268	220	28.6	1.28	68.136	12.2	0.0	225.7	38.995	54	10	0.44	0.0	0.84	-0.72
31	Khatav	Pingli	NHS2016	0	716	379	345	36.2	3.53	100.2	23.1	0.0	268.4	99.26	53	8	0.49	0.0	0.85	-2.53
32	Khatav	Vikhle	NHS2016	0	703	371	215	75.0	0.42	50.1	21.9	0.0	280.6	88.625	37	17	0.38	0.0	2.22	0.27
33	Khatav	Anphal	KOW2016	8.3	653		204.18	60.9	0.63	99.6	25.4	14.4	73.2	89.9544	8	103	0.355	0.0	1.41	-5.42
34	Khatav	Bhosare	KOW2016	8.1	571		89.64	93.5	0.12	49.8	9.7	0.0	151.3	69.3934	29	29	0.98	0.0	3.17	-0.82
35	Khatav	Dhondewadi	KOW2016	8.2	480		164.34	29.0	0.03	109.56	13.3	0.0	156.2	35.9817	8	40	0.368	0.0	0.70	-4.03
36	Khatav	Diskal	KOW2016	7.7	1014		378.48	58.9	2.17	154.38	54.5	0.0	253.8	125.936	32	104	0.359	0.0	1.04	-8.10
37	Khatav	Ganehswadi	KOW2016	8	556		239.04	18.8	1.48	154.38	20.6	0.0	258.6	38.5519	15	5	0.238	0.0	0.38	-5.19
38	Khatav	Jakhangaon	KOW2016	8	801		333.66	36.0	0.14	124.5	50.8	0.0	283.0	79.6739	17	58	0.373	0.0	0.69	-5.82
39	Khatav	Katarkhatav	KOW2016	8.2	698		199.2	69.0	0.41	104.58	23.0	0.0	292.8	71.9635	8	15	0.517	0.0	1.59	-2.35
40	Khatav	Katgun	KOW2016	8	750		244.02	55.2	0.18	154.38	21.8	0.0	253.8	89.9544	8	30	0.462	0.0	1.10	-5.37
41	Khatav	Ladegaon	KOW2016	7.9	483		169.32	25.9	0.36	134.46	8.5	0.0	219.6	28.2714	7	7	0.352	0.0	0.58	-3.83
42	Khatav	Nidhal	KOW2016	8.2	915		338.64	54.0	1.71	124.5	52.0	0.0	292.8	115.656	7	52	0.299	0.0	1.02	-5.76
43	Khatav	Nimsod	KOW2016	8	791		278.88	50.0	0.76	174.3	25.4	0.0	244.0	89.9544	30	47	0.317	0.0	0.94	-6.83
44	Khatav	Pusegaon	KOW2016	8	633		249	38.0	0.42	159.36	21.8	0.0	200.1	79.6739	8	40	0.37	0.0	0.75	-6.50
45	Khatav	Rajapur	KOW2016	7.7	1024		403.38	53.4	1.71	189.24	52.0	0.0	327.0	120.796	34	53	0.483	0.0	0.89	-8.44
46	Khatav	Shindewadi	KOW2016	7.9	845		308.76	42.0	0.09	159.36	36.3	0.0	322.1	51.4025	34	47	0.68	0.0	0.78	-5.71
47	Khatav	Tadavale	KOW2016	8.3	842		333.66	45.0	0.77	184.26	36.3	52.8	278.2	48.8324	18	24	0.497	0.0	0.79	-5.92
48	Khatav	Ambavade	GSDA	7.6	974	623	312	90.0	0.2	104	12.6	0.0	336.7	124	5.8	124	0.4	0.1	2.22	-0.73
49	Khatav	Aundh	GSDA	8.1	571	365	184	19.0	0.2	67.2	3.9	2.3	197.6	44	4.9	17	0.1	0.1	0.61	-0.37
50	Khatav	Bhusangad	GSDA	8.1	462	296	160	38.0	0.7	59.2	2.9	2.7	229.2	44	1	15	0.1	0.1	1.31	0.65
51	Khatav	Budh	GSDA	7.7	733	469	220	47.0	0.4	48	24.3	0.9	183.1	72	19	32	0.6	0.1	1.38	-1.39
52	Khatav	Datewadi	GSDA	8.1	439	281	196	30.0	7.4	56	13.6	2.8	237.1	36	5.8	16	0.5	0.1	0.93	0.05
53	Khatav	Katar Khatav	GSDA	7.4	6800	4352	560	584.0	318	168	34.0	0.0	414.8	486	5.8	990	0.7	0.1	10.73	-4.44
54	Khatav	Kokrale	GSDA	8.1	622	398	200	20.0	0.1	56	14.6	1.9	158.1	62	6.1	32	1.2	0.1	0.61	-1.36
55	Khatav	Lalgun	GSDA	7.7	711	455	200	47.0	0.1	38.4	25.3	0.8	179.1	76	13	24	0.1	0.1	1.44	-1.06
56	Khatav	Mayani	GSDA	8.1	962	616	236	108.0	0.8	88	3.9	0.0	229.4	170	5.6	112	0.1	0.1	3.06	-0.96
57	Khatav	Pusesavali	GSDA	8.2	907	580	212	69.0	13	80	2.9	0.0	258.6	96	11	61	0.1	0.1	2.06	0.00
58	Khatav	S.kuroli	GSDA	7.7	1336	855	522	116.0	1.5	179.2	18.0	0.0	573.4	262	5.8	44	0.5	0.1	2.21	-1.06
59	Khatav	Vankeswar	GSDA	7.9	1336	855	400	108.0	1	123.2	22.4	0.0	322.1	136	5.8	246	1.1	0.1	2.35	-2.74

S. No.	Taluka	Location	Agency	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	mg/l														
60	Khatav	Vardhangad	GSDA	8.7	387	248	164	24.0	0.1	25.6	24.3	10.6	225.1	24	0.2	6	0.4	0.7	0.81	0.74
61	Koregaon	Arvi-1	NHS2016	0	922	494	390	54.5	2.77	84.168	43.7	0.0	244.0	127.62	144	48	0.27	0.0	1.20	-3.85
62	Koregaon	Koregaon	NHS2016	0	1538	816	560	105.7	3.75	140.28	51.0	0.0	128.1	404.13	176	14	0.24	0.0	1.94	-9.17
63	Koregaon	Pimpode (Bk)-1	NHS2016	0	735	386	315	29.5	0.29	84.168	25.5	0.0	158.6	85.08	135	41	0.12	0.0	0.72	-3.74
64	Koregaon	Rehmatpur	NHS2016	0	734	389	305	36.4	0.32	66.132	34.0	0.0	146.4	148.89	60	41	0.35	0.0	0.91	-3.74
65	Koregaon	Eksal	GSDA	7.7	493	316	160	29.0	0.1	36.8	16.5	0.9	183.1	56	4	19	0.7	0.1	1.00	-0.19
66	Koregaon	Jamb Kh	GSDA	8.5	470	301	184	22.0	0.1	30.4	26.2	6.6	223.2	28	1.6	8	0.5	0.6	0.71	0.17
67	Koregaon	Koregaon	GSDA	8.3	1170	749	340	84.0	0.1	96	24.3	0.0	248.9	196	17	50	0.2	0.4	1.98	-2.75
68	Koregaon	Rahimatpur	GSDA	7.8	761	487	292	24.0	0.2	70.4	28.2	1.3	218.7	84	6.4	31	0.7	0.1	0.61	-2.24
69	Koregaon	Surali	GSDA	8.2	574	367	196	28.0	2	56	13.6	3.2	216.7	56	0.2	10	0.3	0.1	0.87	-0.27
70	Koregaon	Wathar Station	GSDA	8.1	1370	877	424	78.0	0.1	150.4	11.7	0.0	219.6	198	5.1	76	0.4	0.5	1.65	-4.89
71	Mahabaleshwar	Mahabaleswar	NHS2016	0	245	130	50	33.1	2.45	16.032	2.4	0.0	30.5	31.905	51	14	0.12	0.0	2.03	-0.50
72	Mahabaleshwar	Panchagani	NHS2016	0	772	409	55	4.0	0.19	16.032	3.6	0.0	30.5	24.815	7	4	0.29	0.0	0.23	-0.61
73	Mahabaleshwer	Mahabaleshwer	GSDA	8.4	311	199	124	21.0	2.1	44.8	2.9	2.8	117.1	46	4.4	9	0.1	0.2	0.82	-0.47
74	Mahabaleshwer	Pachgani	GSDA	7.2	288	184	132	14.0	0.1	35.2	10.7	0.1	51.9	54	6.5	8	0.6	0.9	0.53	-1.80
75	Man	Dahivadi	NHS2016	0	1660	881	445	117.4	1.22	96.192	49.8	0.0	231.8	230.425	196	48	0.29	0.0	2.42	-5.16
76	Man	Mardi	NHS2016	0	1123	596	300	103.6	1.47	64.128	34.0	0.0	274.5	134.71	141	37	0.44	0.0	2.60	-1.54
77	Man	Mhaswad	NHS2016	0	2001	1060	665	179.0	1.93	128.256	83.8	0.0	231.8	425.4	285	32	0.22	0.0	3.02	-9.60
78	Man	Shenwadi	NHS2016	0	740	392	285	57.3	0.36	74.148	24.3	0.0	311.1	67.355	50	37	0.45	0.0	1.47	-0.63
79	Man	Wavarhire-1	NHS2016	0	733	389	185	95.0	1.04	36.072	23.1	0.0	274.5	70.9	77	7	0.41	0.0	3.04	0.77
80	Man	Andhali	KOW2017	7.7	929		438.2	25.0	1.4	259	43.6	0.0	200.1	51.4	33	146	0.4	0.0	0.38	-13.30
81	Man	Bhalavadi	KOW2017	8.1	1887		288.8	195.1	1.5	84.7	49.6	0.0	322.1	287.9	120	95	0.6	0.0	4.16	-3.09
82	Man	Bhandavali	KOW2017	7.8	265		114.5	9.3	2.8	74.7	9.7	0.0	102.5	33.4	4	5	0.1	0.0	0.27	-2.86
83	Man	Bhatki	KOW2017	8	600		273.9	12.1	1.1	159.4	27.8	0.0	170.8	69.4	20	32	0.09	0.0	0.23	-7.49
84	Man	Bijavadi	KOW2017	8.3	1008		259	62.4	1.5	109.6	36.3	43.2	165.9	136.2	5	62	0.4	0.0	1.32	-4.35
85	Man	Dahivadi	KOW2017	7.9	838		209.2	59.2	6.9	69.7	33.9	0.0	73.2	143.9	47	70	0.5	0.0	1.45	-5.11
86	Man	Divad	KOW2017	10.1	329		84.7	31.1	0.6	24.9	14.5	52.8	4.9	43.7	0.4	22	2	0.0	1.22	-0.61
87	Man	Gatewadi (dhakani)	KOW2017	8.3	547		114.5	49.7	0.7	34.9	19.4	33.6	65.9	48.8	36	31	3.7	0.0	1.67	-1.16
88	Man	Gondavale Kh.	KOW2017	8.2	676		234.1	30.2	0.8	149.4	20.6	0.0	248.9	43.7	9	40	0.5	0.0	0.61	-5.11
89	Man	Hingani	KOW2017	8.3	623		169.3	35.3	0.6	134.5	8.5	38.4	109.8	64.3	17	24	0.9	0.0	0.80	-4.35

S. No.	Taluka	Location	Agency	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
90	Man	Kalewadi (naravane)	KOW2017	8	1100		293.8	61.2	1.3	124.5	41.1	0.0	300.1	138.8	30	52	0.4	0.0	1.21	-4.73
91	Man	Kasarwadi	KOW2017	7.7	1001		353.6	24.7	7.3	234.1	29.0	0.0	217.2	136.2	62	41	0.2	0.0	0.40	-10.56
92	Man	Khadaki	KOW2017	7.8	523		234.1	9.8	0.6	154.4	19.4	0.0	214.7	23.1	20	5	0.2	0.0	0.20	-5.82
93	Man	Kulakjai	KOW2017	8.3	1471		403.4	89.0	3.7	109.6	71.4	43.2	346.5	154.2	36	67	0.4	0.0	1.62	-4.31
94	Man	Mardi	KOW2017	8	529		104.6	50.0	1.3	44.8	14.5	0.0	117.1	61.7	7	39	0.5	0.0	1.66	-1.53
95	Man	MHASWAD	KOW2017	8.2	1292		448.2	61.9	1.3	84.7	88.3	0.0	317.2	177.3	28	55	0.3	0.0	1.12	-6.39
96	Man	Bidal	GSDA	7.7	312	200	52	73.0	8	16	2.9	0.4	87.6	66	0.1	37	0.1	0.2	4.40	0.41
97	Man	Dahivadi	GSDA	7.8	1276	817	180	237.0	0.5	70.4	1.0	0.0	214.7	236	11	129	1.2	0.3	7.68	-0.08
98	Man	Dhuldeo	GSDA	7.7	3700	2368	1044	200.0	3.2	240	107.9	0.0	214.7	834	27.5	270	0.5	0.9	2.69	-17.47
99	Man	Divad	GSDA	8.2	502	321	152	33.0	7	35.2	15.6	2.9	193.0	40	0.2	12	0.1	0.2	1.16	0.20
100	Man	Kasarwadi	GSDA	8.5	560	358	184	51.0	0.5	24	30.1	6.6	221.3	36	5	29	0.7	0.2	1.63	0.14
101	Man	Malwadi	GSDA	8.2	2070	1325	524	169.0	2.37	201.6	4.9	0.0	351.4	414	25	132	0.3	0.4	3.21	-4.73
102	Man	Mograle	GSDA	8.2	648	415	200	32.0	0.6	64	9.7	2.9	197.0	70	5.8	30	0.1	0.1	0.98	-0.68
103	Man	Pandharwadi	GSDA	8.5	827	529	212	64.0	8	80	2.9	1.2	258.8	90	10	10	0.1	0.4	1.91	0.04
104	Man	Shenvadi	GSDA	8.5	552	353	168	29.0	0.2	27.2	24.3	5.7	190.2	52	6.23	24	0.7	0.2	0.97	-0.08
105	Man	Sirtav	GSDA	8.5	1286	823	448	50.0	41	131.2	29.2	0.0	307.4	228	2.4	90	0.1	0.3	1.03	-3.95
106	Man	Valai	GSDA	8.8	735	470	172	108.0	0.7	48	12.6	19.9	335.8	58	5.2	36	0.7	0.1	3.58	2.72
107	Man	Vavarhire	GSDA	8.1	802	513	200	110.0	1.2	78.4	1.0	0.0	473.4	66	5.8	29	0.1	0.1	3.38	3.76
108	Patan	Dhebevadi	NHS2016	0	552	292	235	26.1	0.3	66.132	17.0	0.0	97.6	70.9	122	13	0.38	0.0	0.74	-3.12
109	Patan	Malharpeth	NHS2016	0	269	142	135	8.7	0.47	46.092	4.9	0.0	128.1	24.815	16	7	0.24	0.0	0.33	-0.61
110	Patan	Morgiri (Shivpurpeth)	NHS2016	0	432	229	170	33.2	9.15	42.084	15.8	0.0	122.0	74.445	51	24	0.17	0.0	1.11	-1.42
111	Patan	Muttalvadi	NHS2016	0	336	178	150	11.0	1.02	50.1	6.1	0.0	103.7	49.63	26	7	0.26	0.0	0.39	-1.31
112	Patan	Patan	NHS2016	0	483	256	200	24.3	1.7	76.152	2.4	0.0	140.3	70.9	13	7	0.15	0.0	0.75	-1.71
113	Patan	Savanthwadi (Jinti)	NHS2016	0	353	158	150	14.3	0.32	38.076	13.4	0.0	122.0	38.995	33	7	0.2	0.0	0.51	-1.02
114	Patan	Velkhandwadi (Tarli)	NHS2016	0	481	255	235	16.9	0.74	62.124	19.4	0.0	195.2	35.45	44	9	1.17	0.0	0.48	-1.53
115	Patan	Yerphale	NHS2016	0	442	233	215	11.8	0.11	62.124	14.6	0.0	170.8	35.45	28	22	0.35	0.0	0.35	-1.52
116	Patan	Bopoli	KOW2017	7.3	88		44.8	2.1	0.6	34.9	2.4	0.0	34.2	10.3	1	3	0.1	0.0	0.09	-1.38
117	Patan	Chafal	KOW2017	7.4	45		24.9	2.0	0.6	24.9	0.0	0.0	19.5	10.3	1	2	0.07	0.0	0.11	-0.93
118	Patan	Dadholi	KOW2017	8.2	535		219.1	10.3	3.5	169.3	12.1	0.0	229.4	23.1	8	3	0.2	0.0	0.21	-5.71
119	Patan	Dhavade	KOW2017	7.7	598		244	9.0	0.5	179.3	15.7	0.0	197.6	36	34	18	0.1	0.0	0.17	-7.03

S. No.	Taluka	Location	Agency	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
120	Patan	Ghoshatwadi	KOW2017	7.9	355		159.4	9.1	1.4	94.6	15.7	0.0	141.5	23.1	8	5	0.2	0.0	0.23	-3.72
121	Patan	Kalgaon	KOW2017	7.1	47		29.9	1.7	0.7	14.9	3.6	0.0	19.5	12.9	1	1	0.04	0.0	0.10	-0.73
122	Patan	Keral	KOW2017	8.1	663		244	14.8	1.5	174.3	16.9	0.0	251.3	48.8	15	16	0.2	0.0	0.29	-6.00
123	Patan	Manainagar	KOW2017	8.1	461		229.1	12.1	0.7	109.6	29.0	0.0	180.6	28.3	18	12	0.2	0.0	0.27	-4.94
124	Patan	Manewadi(Manegaon)	KOW2017	7.5	129		69.7	3.4	0.5	39.8	7.3	0.0	73.2	7.7	1	0.6	0.1	0.0	0.13	-1.40
125	Patan	Marali	KOW2017	7.2	78		34.9	2.7	1.4	19.9	3.6	0.0	17.1	12.9	11	0.9	0.06	0.0	0.15	-1.01
126	Patan	Matrewadi	KOW2017	7.5	44		24.9	2.9	0.4	14.9	2.4	0.0	22.0	7.7	1	8	0.04	0.0	0.18	-0.58
127	Patan	Helwak	GSDA	7.9	188	120	88	21.0	2	20.8	8.7	0.8	107.2	30	1.1	7	1.2	0.1	0.97	0.01
128	Phaltan	Javali	NHS2016	0	1242	658	380	96.3	28.57	76.152	46.2	0.0	323.3	138.255	188	43	0.44	0.0	2.15	-2.36
129	Phaltan	Mirgaon	NHS2016	0	1380	733	400	102.5	0.66	76.152	51.0	0.0	152.5	255.24	178	33	0.27	0.0	2.23	-5.56
130	Phaltan	Mogarle	NHS2016	0	660	347	295	34.5	1.57	76.152	25.5	0.0	195.2	81.535	123	18	0.32	0.0	0.87	-2.73
131	Phaltan	Nimblak	NHS2016	0	627	332	275	40.6	1.47	58.116	31.6	0.0	128.1	106.35	132	15	0.15	0.0	1.06	-3.44
132	Phaltan	Tathvade	NHS2016	0	566	300	230	39.8	0.44	58.116	20.7	0.0	146.4	56.72	121	31	0.29	0.0	1.14	-2.23
133	Phaltan	Adarki Bk	GSDA	8.3	1946	1245	472	194.0	5.2	164.8	14.6	0.0	585.6	336	11.5	94	0.2	1.5	3.88	0.14
134	Phaltan	Gokhali	GSDA	8.1	3300	2112	248	665.4	0.4	73.6	15.6	0.0	507.5	600	8	230	1.3	0.2	18.37	3.34
135	Phaltan	Nimbalak	GSDA	8.3	1626	1041	256	220.0	0.8	73.6	17.5	0.0	351.4	276	5.2	65	0.8	0.2	5.98	0.62
136	Phaltan	Padegaon	GSDA	8.3	570	365	188	34.0	0.4	25.6	30.1	4.3	231.6	30	4.8	15	0.3	0.5	1.08	0.15
137	Phaltan	Phaltan	GSDA	8.3	2950	1888	220	470.0	0.5	83.2	2.9	0.0	546.6	320	8.6	186	0.9	0.1	13.78	4.56
138	Phaltan	Rajuri	GSDA	7.8	5320	3405	1460	420.0	3.9	448	82.6	0.0	161.0	1220	5.1	196	0.9	0.2	4.78	-26.65
139	Phaltan	Somanthali	GSDA	7.8	11137	7128	1212	2200.0	1	424	36.9	0.0	366.0	3400	5	1368	1.3	0.1	27.48	-18.28
140	Phaltan	Tambve	GSDA	8	1652	1057	400	100.0	55.5	134.4	15.6	0.0	273.3	314	24	100	1.1	2.5	2.17	-3.54
141	Phaltan	Tathavade	GSDA	8.4	567	363	136	59.0	0.6	36.8	10.7	3.5	148.4	56	4.6	18	0.4	0.2	2.20	-0.18
142	Phaltan	Vadale	GSDA	8.3	1322	846	260	180.0	0.3	86.4	10.7	0.0	248.9	240	5	61	0.6	0.2	4.85	-1.13
143	Satara	Atit	NHS2016	0	866	459	325	57.8	1.43	80.16	30.4	0.0	195.2	124.075	127	41	0.32	0.0	1.39	-3.34
144	Satara	Chinchner Vandan	NHS2016	0	734	388	325	51.0	7.13	58.116	43.7	0.0	366.0	60.265	71	22	0.35	0.0	1.23	-0.55
145	Satara	Chinchni Kanheri	NHS2016	0	390	206	195	11.8	0.05	56.112	13.4	0.0	189.1	38.995	16	7	0.14	0.0	0.37	-0.82
146	Satara	Kondve	NHS2016	0	442	239	235	15.8	0.08	52.104	25.5	0.0	280.6	31.905	20	7	0.26	0.0	0.45	-0.13
147	Satara	Shendri	NHS2016	0	577	305	260	29.1	9.29	60.12	26.7	0.0	146.4	60.265	151	7	0.27	0.0	0.78	-2.83
148	Satara	Vaduth	NHS2016	0	355	188	170	15.1	0.19	50.1	10.9	0.0	67.1	38.995	75	7	0.29	0.0	0.50	-2.32
149	Satara	Bhondavade	KOW2017	7.9	393		189.2	9.6	0.4	119.5	16.9	0.0	180.6	20.6	10	2	0.1	0.0	0.22	-4.42

S. No.	Taluka	Location	Agency	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
150	Satara	Borkhal	KOW2017	8.4	316		164.3	8.2	0.8	109.6	13.3	24.0	92.7	18	6	4	0.1	0.0	0.20	-4.27
151	Satara	Fatyapur	KOW2017	7.9	465		194.2	11.2	0.5	129.5	15.7	0.0	183.0	25.7	16	10	0.1	0.0	0.25	-4.78
152	Satara	Jihe	KOW2017	8.3	288		134.5	8.5	0.7	99.6	8.5	24.0	83.0	15.4	1	2	0.1	0.0	0.22	-3.53
153	Satara	Kamathi T.satara	KOW2017	7.7	602		229.1	26.8	1.3	104.6	30.3	0.0	75.6	102.8	34	58	0.1	0.0	0.59	-6.52
154	Satara	Khodad	KOW2017	8.1	866		333.7	31.2	11.9	159.4	42.4	0.0	327.0	59.1	21	43	0.2	0.0	0.57	-6.14
155	Satara	Nigdi	KOW2017	7.9	692		308.8	25.7	0.7	144.4	39.9	0.0	270.8	43.7	23	22	0.2	0.0	0.49	-6.11
156	Satara	Atit	GSDA	8.3	538	344	216	23.0	0.1	43.2	26.2	4.0	211.9	44	3	22	0.2	0.7	0.68	-0.74
157	Satara	Karanje	GSDA	8.3	1027	657	324	65.0	0.2	84.8	27.2	0.0	190.3	192	15	50	0.1	0.3	1.57	-3.39
158	Satara	Kuran	GSDA	8.3	155	99	88	12.0	0.4	25.6	5.8	1.7	90.2	18	4.8	5	0.1	0.6	0.56	-0.23
159	Satara	Marde	GSDA	8.4	792	507	236	79.0	0.5	72	13.6	0.0	429.4	50	10	15	0.2	0.4	2.24	2.31
160	Satara	Nagewadi	GSDA	8.3	618	396	248	23.0	0.5	73.6	15.6	5.5	294.4	30	0.6	12	0.3	0.5	0.64	0.03
161	Satara	Nandgaon	GSDA	8.3	456	292	140	20.0	0.1	40	9.7	2.4	127.5	34	5.8	16	0.1	0.6	0.73	-0.64
162	Satara	Nune	GSDA	8.1	456	292	252	17.0	0.5	73.6	16.5	3.1	260.9	26	1.2	6	0.1	0.8	0.47	-0.68
163	Satara	Shendre	GSDA	7.8	1096	701	436	30.0	0.4	89.68	51.5	0.0	195.2	246	2	44	0.2	0.8	0.62	-5.57
164	Satara	Varne	GSDA	8	565	362	160	21.0	1.4	32	19.4	1.7	178.3	34	3	13	0.3	0.6	0.72	-0.24
165	Satara	Waduth	GSDA	8.5	274	175	116	15.0	0.1	27.2	11.7	3.5	116.4	26	2.5	16	0.1	0.6	0.61	-0.31
166	Wai	Surur	NHS2016	0	803	425	310	58.9	1.16	62.124	37.7	0.0	213.5	102.805	144	22	0.35	0.0	1.45	-2.75
167	Wai	Wai	NHS2016	0	952	504	480	49.4	0.29	72.144	72.9	0.0	146.4	244.605	170	8	0.24	0.0	0.98	-7.28
168	Wai	Bavdhan	KOW2017	8.3	889		353.6	55.4	3.4	134.5	53.2	43.2	263.5	69.4	32	21	0.2	0.0	1.02	-5.40
169	Wai	Bhuinj	KOW2017	7.8	596		194.2	50.5	0.7	114.5	19.4	0.0	246.4	23.1	27	11	0.2	0.0	1.15	-3.30
170	Wai	Chandak	KOW2017	7.9	804		343.6	31.6	0.8	119.5	54.5	0.0	356.2	41.1	17	14	0.3	0.0	0.60	-4.68
171	Wai	Dhawadi	KOW2017	7.5	88		39.8	3.6	0.5	29.9	2.4	0.0	24.4	10.3	4	3	0.02	0.0	0.17	-1.30
172	Wai	Dhom	KOW2017	7.9	668		323.7	18.2	0.4	124.5	48.4	0.0	236.7	38.6	50	11	0.2	0.0	0.35	-6.38
173	Wai	Jor	KOW2017	7.7	130		69.7	4.6	0.5	59.8	2.4	0.0	58.6	12.9	0.7	5	0.06	0.0	0.16	-2.23
174	Wai	Anawadi	GSDA	8.5	334	214	152	19.0	0.5	25.6	21.4	4.8	163.0	20	3.1	8	0.1	0.4	0.67	-0.23
175	Wai	Asare	GSDA	8.2	459	294	220	16.0	2.4	73.6	8.7	3.4	228.5	30	0.7	8	0.4	0.6	0.47	-0.55
176	Wai	Chindhavali	GSDA	8	658	421	208	59.0	0.4	54.4	17.5	2.5	269.4	34	10	13	0.3	0.5	1.78	0.32
177	Wai	Udtare	GSDA	8.3	654	419	272	31.0	0.1	91.2	10.7	5.7	306.2	22	4.1	9	0.3	0.4	0.82	-0.24
178	Wai	Vele	GSDA	8.2	594	380	204	38.0	0.5	67.2	8.7	4.0	267.9	40	6.1	13	0.1	0.3	1.16	0.44

Annexure VII: Chemical analysis of ground water samples, deeper aquifers

S. No.	Taluka	Location	Source	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
1	Jaoli	Ambeghar	EW	9.2	480	NA	175	29.0	0.7	46	15.0	NA	NA	35	20	15	0.12	0.0	0.95	
2	Jaoli	Ambeghar	Exploration	9.2	480	NA	NA	15.0	29	175	46.0	0.7	NA	NA	15	35	0.12	20.0	0.26	
3	Karad	Karawadi	PYT	8.9	680	356	260	34.0	0.4	66	23.0	42.0	262.0	28	24	8	0.09	0.0	0.92	0.48
4	Karad	Karawadi 1st	EW	8.8	600	320	195	40.0	0.9	40	23.0	24.0	189.0	28	35	35	0.14	0.0	1.25	-0.02
5	Karad	Karawadi 1st	OW	8.9	570	300	210	27.0	0.4	42	26.0	30.0	201.0	32	30	12	0.14	0.0	0.81	0.03
6	Karad	Karawadi 1st	EW	8.7	580	304	210	30.0	0.6	40	27.0	30.0	171.0	35	38	18	0.18	0.0	0.90	-0.45
7	Karad	Karawadi 2NA	EW	8.8	650	346	300	12.0	0.5	66	33.0	18.0	189.0	64	44	14	0.2	0.0	0.30	-2.35
8	Karad	Shindewadi	PTEST	7	1100	NA	90	200.0	8	20	9.7	0.0	359.9	57	11	153	0.34	0.0	9.17	4.09
9	Karad	Shitalwadi	Exploration	7.9	600	NA	190	NA	NA	200	NA	NA	NA	NA	NA	NA	BDL	6.0		
10	Karad	Shitalwadi 1st	OW	8.1	440	225	200	11.0	0.1	30	30.0	0.0	214.0	21	13	7	0.38	0.0	0.34	-0.49
11	Karad	Shitalwadi 2NA	OW	8.2	490	255	195	20.0	0.1	36	26.0	0.0	165.0	57	12	15	1.08	0.0	0.62	-1.26
12	Karad	Sinaewadi	PYT	7.1	1680	NA	650	NA	NA	NA	NA	NA	NA	NA	329	NA	0.1	0.0		
13	Karad	Sinaewadi	EW	6.9	1820	NA	680	NA	NA	NA	NA	NA	NA	NA	352	NA	BDL	0.0		
14	Karad	Supne 1st	EW	8	600	310	275	12.0	0.2	38	44.0	0.0	201.0	53	37	27	0.27	0.0	0.31	-2.27
15	Karad	Supne 2NA	EW	8.2	630	325	265	16.0	0.5	50	34.0	0.0	244.0	50	42	10	0.18	0.0	0.43	-1.33
16	Khandala	Shindewadi	EW II ZONE	7.1	2000	NA	270	362.0	17	66	25.5	0.0	85.4	266	10	593.2	0.47	0.0	9.58	-4.03
17	Khandala	Shindewadi	Exploration	7.9	600	NA	190	NA	NA	200	NA	NA	NA	NA	NA	NA	BDL	6.0		
18	Khandala	Tambve	P2-PYT	8.4	1840	NA	420	NA	NA	NA	NA	NA	NA	NA	260	NA	BDL	0.0		
19	Khandala	Tambve	OW-PYT	8.8	1150	NA	380	NA	NA	NA	NA	NA	NA	NA	160	NA	0.62	0.0		
20	Khandala	Tambve	OW-2NA Zone	8.7	1390	NA	840	NA	NA	NA	NA	NA	NA	NA	147	NA	0.6	0.0		
21	Khandala	Tambve	OW-1st Zone	7.8	1320	NA	460	NA	NA	NA	NA	NA	NA	NA	165	NA	0.18	0.0		
22	Khandala	Tambve BK	E.W - PYT	7.9	1160	NA	430	NA	NA	NA	NA	NA	NA	NA	147	NA	BDL	0.0		
23	Khandala	Tambve BK	EW-2NA Zone	7.9	1130	NA	390	NA	NA	NA	NA	NA	NA	NA	145	NA	0.22	0.0		
24	Khandala	Tambve BK	EW-1st Zone	7.8	1250	NA	500	NA	NA	NA	NA	NA	NA	NA	165	NA	BDL	0.0		
25	Khandala	Tonaal	OW-4,PYT	7.9	920	NA	330	NA	NA	NA	NA	NA	NA	NA	143	NA	BDL	0.0		
26	Khandala	Tonaal	OW-4,2NA Zone	7.9	880	NA	330	NA	NA	NA	NA	NA	NA	NA	142	NA	BDL	0.0		
27	Khandala	Tonaal	OW-4,1st Zone	7.9	870	NA	300	NA	NA	NA	NA	NA	NA	NA	145	NA	BDL	0.0		
28	Khandala	Tondal	Exploration	7.9	870	NA	150	NA	NA	300	NA	NA	NA	NA	NA	NA	BDL	145.0		

S. No.	Taluka	Location	Source	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
29	Khandala	Tondal	Exploration	7.9	880	NA	140	NA	NA	330	NA	NA	NA	NA	NA	NA	BDL	142.0		
30	Khandala	Tondal	Exploration	7.9	920	NA	140	NA	NA	330	NA	NA	NA	NA	NA	NA	BDL	143.0		
31	Khatav	Arphal	EW	8	750	420	245	60.0	0.1	76	13.0	0.0	342.0	35	58	3	NA	0.0	1.67	0.72
32	Khatav	Arphal	Exploration	7.99	750	420	245	60.0	0	76	13.0	0.0	342.0	35	58	3	0	0.5	1.67	0.72
33	Khatav	Aundh	Pump Test-2	8	899	476	418	43.0	0.9	114	32.0	0.0	404.0	70	40	34	0.67	0.0	0.92	-1.74
34	Khatav	Aundh	Pump Test-1	8	918	486	408	41.0	0.8	119	27.0	0.0	363.0	65	43	26	0.25	0.0	0.88	-2.25
35	Khatav	Dambewadi	EW	7.4	1290	683	245	137.0	8.1	45	32.0	0.0	107.0	270	1	124	0.39	0.0	3.81	-3.16
36	Khatav	Nidhal	EW	7.8	440	240	135	39.0	2	32	13.0	0.0	214.0	18	23	5	NA	0.0	1.47	0.82
37	Khatav	Nidhal	Exploration	7.8	440	240	135	39.0	2	32	13.0	0.0	214.0	18	23	5	0	0.7	1.47	0.82
38	Khatav	Phadtarwadi	EW	7.9	600	NA	125	NA	NA	24	16.0	0.0	174.0	74	NA	NA	NA	0.0		0.32
39	Khatav	Phadtarwadi	Exploration	7.86	600	384	125	0.0	0	24	16.0	0.0	174.0	74	0	0	0	1.2	0.00	0.32
40	Khatav	Vaduz	OW	7.8	690	430	65	129.0	1	22	2.0	0.0	61.0	131	35	80	NA	0.0	7.05	-0.27
41	Khatav	Vaduz	EW	7.5	600	365	105	90.0	2	30	7.0	0.0	183.0	43	70	30	NA	0.0	3.84	0.92
42	Khatav	Vaduz	Exploration	7.5	600	365	105	90.0	2	30	7.0	0.0	183.0	43	70	30	0	0.6	3.84	0.92
43	Khatav	Vaduz	Exploration	7.75	690	430	65	129.0	1	22	2.0	0.0	61.0	131	35	80	0	0.4	7.05	-0.27
44	Koregaon	Circlewadi	EW-PYT	8.9	1060	NA	460	NA	NA	NA	NA	NA	NA	NA	196	NA	BDL	0.0		
45	Koregaon	Dhamner	OW	7.9	630	NA	175	NA	NA	24	27.0	0.0	285.0	54	NA	NA	NA	0.0		1.22
46	Koregaon	Dhamner	EW	7.8	570	NA	130	NA	NA	42	6.0	0.0	253.0	40	NA	NA	NA	0.0		1.55
47	Koregaon	Dhamner	Exploration	7.83	570	364.8	130	0.0	0	42	6.0	0.0	253.0	40	0	0	0	0.7	0.00	1.55
48	Koregaon	Dhamner	Exploration	7.88	630	403.2	175	0.0	0	24	27.0	0.0	285.0	54	0	0	0	0.1	0.00	1.22
49	Koregaon	Kodoli	EW	7.7	480	290	30	94.0	1.2	10	1.0	0.0	104.0	57	2.8	70	1.03	0.0	7.57	1.12
50	Koregaon	Kodoli	Exploration	7.7	480	290	NA	1.0	94	30	10.0	1.2	Nil	104	70	57	1.03	2.8	0.04	
51	Man	Andhali	EW	8	535	283	148	41.0	0.9	20	23.0	0.0	119.0	55	8	80	1.7	0.0	1.48	-0.97
52	Man	Mohi	E.W	7.4	760	NA	220	NA	NA	NA	NA	NA	NA	NA	26	NA	0.2	0.0		
53	Man	Shindewadi	OW	8.1	570	350	115	78.0	0.5	22	15.0	0.0	61.0	85	29	90	NA	0.0	3.14	-1.35
54	Man	Shindewadi	EW	7.9	600	365	110	87.0	0.1	14	18.0	0.0	43.0	106	18	100	NA	0.0	3.62	-1.50
55	Man	Shindewadi	OW I ZONE	7	670	NA	30	132.0	8	8	2.4	0.0	237.9	60	11	18	0.23	0.0	10.50	3.30
56	Man	Shindewadi	EW I ZONE	7.2	2000	NA	275	365.0	15	66	26.8	0.0	85.4	266	8	596.6	0.46	0.0	9.56	-4.13
57	Man	Shindewadi	Exploration	8.1	570	350	115	78.0	0.5	22	15.0	0.0	61.0	85	29	90	0	1.6	3.14	-1.35
58	Man	Shindewadi	Exploration	7.88	600	365	110	87.0	0	14	18.0	0.0	43.0	106	18	100	0	1.3	3.62	-1.50

S. No.	Taluka	Location	Source	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
59	Man	Sinaewadi	EW-1st Zone	7.9	600	NA	200	NA	NA	NA	NA	NA	NA	NA	6	NA	BDL	0.0		
60	Patan	Dabawadi	EW	7.6	470	250	155	37.0	0.5	12	30.0	0.0	220.0	18	40	NA	NA	0.0	1.30	0.51
61	Patan	Dabawadi	Exploration	7.55	470	250	155	37.0	0.5	12	30.0	0.0	220.0	18	40	0	0	1.4	1.30	0.51
62	Patan	Telewadi	EW	8	720	370	290	33.0	0.2	36	49.0	0.0	268.0	78	7	30	0.38	0.0	0.84	-1.49
63	Phaltan	Bibi	EW	7.3	490	NA	350	NA	NA	NA	NA	NA	NA	NA	19	NA	0.1	0.0		
64	Phaltan	Bibi	EW PYT	7	1610	NA	495	152.0	1	88	66.9	0.0	231.0	252	220	69.1	0.15	0.0	2.97	-6.19
65	Phaltan	Bibi	EW I ZONE	7	1600	NA	500	150.0	2	74	76.6	0.0	256.0	241	223	64.8	0.15	0.0	2.92	-5.89
66	Phaltan	Mirgaon	Exploration	7.3	750	460	125	115.0	2	26	15.0	0.0	92.0	142	62	50	0	22.5	4.44	-1.04
67	Phaltan	Shindewadi	OW PYT	7	990	NA	125	160.0	8	26	14.6	0.0	286.7	67	10	129.3	0.32	0.0	6.22	2.18
68	Phaltan	Shindewadi	OW II ZONE	7	670	NA	25	135.0	8	8	1.2	0.0	231.8	64	11	17.6	0.23	0.0	11.75	3.30
69	Phaltan	Sinaewadi	PYT	8.1	550	NA	310	NA	NA	NA	NA	NA	NA	NA	9	NA	BDL	0.0		
70	Phaltan	Tathwade	EW PYT	7.1	1110	NA	250	144.0	1	30	42.6	0.0	164.7	124	116	140	0.1	0.0	3.96	-2.35
71	Phaltan	Tathwade	EW I ZONE	7.1	1140	NA	245	150.0	4	28	42.6	0.0	164.7	124	130	149	0.12	0.0	4.16	-2.25
72	Satara	Chinchner	EW	8	450	230	175	23.0	0.5	30	24.0	0.0	238.0	7	29	NA	NA	0.0	0.76	0.40
73	Satara	Chinchner	OW	7.9	480	280	170	37.0	0.5	34	21.0	0.0	232.0	7	67	NA	NA	0.0	1.23	0.35
74	Satara	Chinchner	Exploration	8	450	230	175	23.0	0.5	30	24.0	0.0	238.0	7	29	0	0	1.3	0.76	0.40
75	Satara	Chinchner	Exploration	7.85	480	280	170	37.0	0.5	34	21.0	0.0	232.0	7	67	0	0	0.7	1.23	0.35
76	Satara	Kadve	EW	7.8	590	330	125	77.0	1.5	40	6.0	0.0	220.0	50	0.8	43	2	0.0	3.00	1.11
77	Satara	Kadve(BK)	Exploration	7.8	590	330	NA	6.0	77	125	40.0	1.5	Nil	220	43	50	2	0.8	0.12	
78	Satara	Konahawali	OW PYT	7	630	NA	175	60.0	8	32	23.1	0.0	195.0	99	5	4.2	0.12	0.0	1.97	-0.33
79	Satara	Konahawali	OW I ZONE	6.7	1000	NA	250	112.0	14	26	45.0	0.0	214.0	184	71	29.7	0.08	0.0	3.08	-1.54
80	Satara	Konahawali	EW PYT	6.8	590	NA	185	45.0	6	28	28.0	0.0	189.0	85	1	14.1	0.07	0.0	1.44	-0.63
81	Satara	Konahawali	EW I ZONE	6.7	570	NA	175	48.0	5	26	26.8	0.0	183.0	85	1	12.5	0.08	0.0	1.58	-0.53
82	Satara	Sayali	EW	7.9	470	252	180	22.0	1.6	54	11.0	0.0	201.0	35	20	8	0.2	0.0	0.71	-0.32
83	Satara	Sayali	Exploration	7.9	470	252	NA	11.0	22	180	54.0	1.6	Nil	201	8	35	0.2	20.0	0.18	
84	Satara	Velu	EW PYT	7.1	1010	NA	260	103.0	7	30	45.0	0.0	232.0	156	71	30.1	0.24	0.0	2.78	-1.45
85	Satara	Velu	EW PYT IST ZONE	6.9	660	NA	215	51.0	9	40	28.0	0.0	183.0	110	16	20.7	0.22	0.0	1.51	-1.33
86	Wai	Asale	APT	6.8	710	NA	205	65.0	4	22	36.5	0.0	213.0	89	35	28.5	0.05	0.0	1.97	-0.65
87	Wai	Asale	APT	6.9	770	NA	235	62.0	5	28	40.1	0.0	210.0	92	35	42	0.04	0.0	1.76	-1.30
88	Wai	Asale	OW PYT	6.8	790	NA	190	86.0	7	18	35.3	0.0	213.0	92	43	45	0.05	0.0	2.71	-0.35

S. No.	Taluka	Location	Source	pH	EC	Hardness	TDS	Na	K	Ca	Mg	CO_3	HCO_3	Cl	NO_3	SO_4	F	Fe	SAR	RSC
					µS/cm	---------- mg/l ----------														
89	Wai	Asale	OW I ZONE	6.8	380	NA	30	60.0	10	10	1.2	0.0	85.4	50	14	27.3	0.02	0.0	4.77	0.80
90	Wai	Asale	EW	7	740	NA	180	85.0	8	28	26.8	0.0	220.0	92	42	40	0.06	0.0	2.75	-0.03
91	Wai	Bopardi	EW PYT	7	1030	NA	325	78.0	4	52	47.4	0.0	244.0	110	125	36.9	0.05	0.0	1.88	-2.55
92	Wai	Bopardi	EW I ZONE	7	630	NA	180	57.0	5	26	28.0	0.0	201.3	43	95	14.2	0.04	0.0	1.85	-0.33
93	Wai	Jamb Chillianagar	GSDA BW	8.1	620	397	228	28.0	0.3	35.2	34.0	2.3	193.6	42	6.4	29	0.2	0.5	0.81	-1.34
94	Wai	Kawthe	EW PYT	6.7	75	NA	35	15.0	1	4	6.1	0.0	12.2	21	43	0.6	0.01	0.0	1.10	-0.51

Annexure VIII Location of Proposed Percolation Tanks

DISTRICT	TALUKA	VILLAGE	Type	X	Y
Satara	Jaoli	Bhogavali t. medha	Percolation Tank	73.7598	17.83284
Satara	Jaoli	Kasbe bamnoli	Percolation Tank	73.76706	17.72882
Satara	Jaoli	Mhavshi	Percolation Tank	73.76617	17.73304
Satara	Karad	Akaichiwadi	Percolation Tank	74.06746	17.10915
Satara	Karad	Ghogaon	Percolation Tank	74.04744	17.14512
Satara	Karad	Gotewadi	Percolation Tank	74.00918	17.1243
Satara	Karad	Jinti	Percolation Tank	74.08614	17.1116
Satara	Karad	Kamathi	Percolation Tank	74.26964	17.34886
Satara	Karad	Kasarshirambe	Percolation Tank	74.13733	17.12929
Satara	Karad	Mervawadi	Percolation Tank	74.23032	17.36027
Satara	Karad	Shelekewadi	Percolation Tank	74.01972	17.16941
Satara	Karad	Shewalewadi	Percolation Tank	74.00201	17.15333
Satara	Karad	Surli	Percolation Tank	74.26911	17.32511
Satara	Karad	Tulsan	Percolation Tank	74.07259	17.19353
Satara	Khandala	Ajnuj	Percolation Tank	73.98477	18.05473
Satara	Khandala	Asawali	Percolation Tank	73.96679	18.04551
Satara	Khandala	Asawali	Percolation Tank	73.95392	18.04299
Satara	Khandala	Atit	Percolation Tank	73.88835	18.09595
Satara	Khandala	Atit	Percolation Tank	73.89928	18.11372
Satara	Khandala	Bhade	Percolation Tank	74.10763	18.07442
Satara	Khandala	Dhawadwadi	Percolation Tank	74.06075	18.03327
Satara	Khandala	Harali	Percolation Tank	74.04559	18.01701
Satara	Khandala	Karnavadi	Percolation Tank	73.88605	18.07433
Satara	Khandala	Kavathe	Percolation Tank	73.96027	18.08389
Satara	Khandala	Kesurdi	Percolation Tank	73.99905	18.09327
Satara	Khandala	Khandala	Percolation Tank	74.0135	18.03495

Satara	Khandala	Morve	Percolation Tank	74.09618	18.06386
Satara	Khandala	Waghoshi	Percolation Tank	74.11707	18.0595
Satara	Khandala	Wanyachiwadi	Percolation Tank	73.99658	18.03076
Satara	Khandala	Yelewadi (N.V.)	Percolation Tank	74.09142	18.0088
Satara	Khatav	Anphale	Percolation Tank	74.56944	17.46379
Satara	Khatav	Aundh	Percolation Tank	74.33733	17.54475
Satara	Khatav	Bhushangad	Percolation Tank	74.40439	17.49154
Satara	Khatav	Bitalewadi	Percolation Tank	74.27927	17.63752
Satara	Khatav	Chinchani	Percolation Tank	74.25447	17.82342
Satara	Khatav	Chinchani	Percolation Tank	74.25377	17.81561
Satara	Khatav	Chorade	Percolation Tank	74.38868	17.42992
Satara	Khatav	Dambhewadi	Percolation Tank	74.55673	17.59695
Satara	Khatav	Dambhewadi	Percolation Tank	74.55267	17.59081
Satara	Khatav	Diskal	Percolation Tank	74.32392	17.83896
Satara	Khatav	Diskal	Percolation Tank	74.33151	17.82888
Satara	Khatav	Diskal	Percolation Tank	74.31086	17.82619
Satara	Khatav	Enkul	Percolation Tank	74.59891	17.56311
Satara	Khatav	Enkul	Percolation Tank	74.56803	17.55453
Satara	Khatav	Garalewadi	Percolation Tank	74.67427	17.41481
Satara	Khatav	Garudi	Percolation Tank	74.67285	17.48383
Satara	Khatav	Gursale	Percolation Tank	74.41798	17.52808
Satara	Khatav	Gursale	Percolation Tank	74.43086	17.54643
Satara	Khatav	Hingane	Percolation Tank	74.50158	17.61933
Satara	Khatav	Holichagaon	Percolation Tank	74.44198	17.46966
Satara	Khatav	Jaigaon	Percolation Tank	74.32321	17.57514
Satara	Khatav	Jamb	Percolation Tank	74.28289	17.62475
Satara	Khatav	Jamb	Percolation Tank	74.28492	17.62707
Satara	Khatav	Kaledhon	Percolation Tank	74.62979	17.4202

Satara	Khatav	Kaledhon	Percolation Tank	74.63579	17.42457
Satara	Khatav	Kaledhon	Percolation Tank	74.66862	17.42676
Satara	Khatav	Kanharwadi	Percolation Tank	74.6185	17.52019
Satara	Khatav	Kanharwadi	Percolation Tank	74.59873	17.52238
Satara	Khatav	Katalgewadi	Percolation Tank	74.40002	17.72219
Satara	Khatav	Katalgewadi	Percolation Tank	74.3807	17.72538
Satara	Khatav	Katgun	Percolation Tank	74.36014	17.71209
Satara	Khatav	Khabalwadi	Percolation Tank	74.30239	17.53199
Satara	Khatav	Kurle	Percolation Tank	74.26868	17.45854
Satara	Khatav	Kurle	Percolation Tank	74.29418	17.44895
Satara	Khatav	Kurle	Percolation Tank	74.25633	17.44844
Satara	Khatav	Kurle	Percolation Tank	74.26568	17.44373
Satara	Khatav	Kurle	Percolation Tank	74.29595	17.43784
Satara	Khatav	Mandave	Percolation Tank	74.49011	17.64464
Satara	Khatav	Manetupewadi	Percolation Tank	74.52956	17.54493
Satara	Khatav	Mhasurne	Percolation Tank	74.42839	17.4072
Satara	Khatav	Mol	Percolation Tank	74.28148	17.85173
Satara	Khatav	Mulikwadi	Percolation Tank	74.66085	17.46346
Satara	Khatav	Nagnathawadi	Percolation Tank	74.27662	17.76151
Satara	Khatav	Nagnathawadi	Percolation Tank	74.28421	17.76419
Satara	Khatav	Nandoshi	Percolation Tank	74.29198	17.55479
Satara	Khatav	Nidhal	Percolation Tank	74.4122	17.71815
Satara	Khatav	Nidhal	Percolation Tank	74.41344	17.70066
Satara	Khatav	Nidhal	Percolation Tank	74.40532	17.70495
Satara	Khatav	Pachwad	Percolation Tank	74.66932	17.46901
Satara	Khatav	Pachwad	Percolation Tank	74.65185	17.47945
Satara	Khatav	Pachwad	Percolation Tank	74.64762	17.48669
Satara	Khatav	Pachwad	Percolation Tank	74.6485	17.49359

Satara	Khatav	Pedgaon	Percolation Tank	74.46047	17.65078
Satara	Khatav	Pedgaon	Percolation Tank	74.4467	17.6491
Satara	Khatav	Pusesawali	Percolation Tank	74.30574	17.47596
Satara	Khatav	Rajapur	Percolation Tank	74.37289	17.79267
Satara	Khatav	Rajapur	Percolation Tank	74.35365	17.80737
Satara	Khatav	Ranshingwadi	Percolation Tank	74.38202	17.74422
Satara	Khatav	Revalkarwadi	Percolation Tank	74.27883	17.66415
Satara	Khatav	Satewadi	Percolation Tank	74.46488	17.62597
Satara	Khatav	Shenawadi	Percolation Tank	74.41586	17.44861
Satara	Khatav	Shindewadi	Percolation Tank	74.26189	17.79334
Satara	Khatav	Tadavale	Percolation Tank	74.51561	17.63236
Satara	Khatav	Taraswadi	Percolation Tank	74.69191	17.44561
Satara	Khatav	Taraswadi	Percolation Tank	74.69438	17.45487
Satara	Khatav	Thoravewadi (N.V.)	Percolation Tank	74.29048	17.47369
Satara	Khatav	Varud	Percolation Tank	74.35004	17.57
Satara	Khatav	Varud	Percolation Tank	74.35798	17.57539
Satara	Khatav	Vikhale	Percolation Tank	74.62574	17.48686
Satara	Khatav	Wakalwadi	Percolation Tank	74.39733	17.49996
Satara	Khatav	Wakalwadi	Percolation Tank	74.39592	17.51848
Satara	Koregaon	Anbhulwadi	Percolation Tank	74.23118	17.79108
Satara	Koregaon	Anpatwadi	Percolation Tank	74.07701	17.88861
Satara	Koregaon	Apshinge	Percolation Tank	74.23242	17.62222
Satara	Koregaon	Apshinge	Percolation Tank	74.24789	17.61994
Satara	Koregaon	Banawadi	Percolation Tank	74.07869	17.84825
Satara	Koregaon	Belewadi	Percolation Tank	74.27865	17.58365
Satara	Koregaon	Bhadale	Percolation Tank	74.21589	17.83119
Satara	Koregaon	Bhavenagar	Percolation Tank	74.09416	17.93908
Satara	Koregaon	Bodhewadi	Percolation Tank	74.23675	17.83978

Satara	Koregaon	Bodhewadi	Percolation Tank	74.26	17.73784
Satara	Koregaon	Borjaiwadi	Percolation Tank	74.25938	17.75561
Satara	Koregaon	Borjaiwadi	Percolation Tank	74.23746	17.75384
Satara	Koregaon	Chimangaon	Percolation Tank	74.23887	17.72191
Satara	Koregaon	Dudhanwadi	Percolation Tank	74.05827	17.85187
Satara	Koregaon	Hasewadi	Percolation Tank	74.2196	17.85983
Satara	Koregaon	Holewadi	Percolation Tank	74.22199	17.81425
Satara	Koregaon	Jaigaon	Percolation Tank	74.26362	17.64701
Satara	Koregaon	Jamb bk.	Percolation Tank	74.10309	17.7237
Satara	Koregaon	Jamb bk.	Percolation Tank	74.11458	17.71453
Satara	Koregaon	Karanjkhop	Percolation Tank	74.03511	17.93908
Satara	Koregaon	Kathapur	Percolation Tank	74.15595	17.6356
Satara	Koregaon	Khirkhindi	Percolation Tank	74.24444	17.69411
Satara	Koregaon	Nalavadewadi	Percolation Tank	74.16019	17.49315
Satara	Koregaon	Nandwal	Percolation Tank	74.07807	17.96784
Satara	Koregaon	Naygaon	Percolation Tank	74.06233	17.97895
Satara	Koregaon	Nhavi kh.	Percolation Tank	74.22729	17.76539
Satara	Koregaon	Pimpode kh.	Percolation Tank	74.10211	17.84211
Satara	Koregaon	Ramoshiwadi	Percolation Tank	74.24992	17.71517
Satara	Koregaon	Randullabad	Percolation Tank	74.03617	17.96885
Satara	Koregaon	Randullabad	Percolation Tank	74.02485	17.95085
Satara	Koregaon	Rautwadi	Percolation Tank	74.05632	17.89265
Satara	Koregaon	Revdi	Percolation Tank	74.08002	17.79422
Satara	Koregaon	Sarkalwadi	Percolation Tank	74.03847	17.91149
Satara	Koregaon	Sasurve	Percolation Tank	74.19688	17.61767
Satara	Koregaon	Sathewadi	Percolation Tank	74.20404	17.49922
Satara	Koregaon	Shahapur	Percolation Tank	74.07948	17.86776
Satara	Koregaon	Solashi	Percolation Tank	74.04607	17.99896

Satara	Koregaon	Sultanwadi	Percolation Tank	74.18601	17.67801
Satara	Koregaon	Vadachiwadi	Percolation Tank	74.21474	17.71694
Satara	Koregaon	Velu	Percolation Tank	74.27759	17.56848
Satara	Koregaon	Waghajaiwada	Percolation Tank	74.25319	17.66251
Satara	Koregaon	Wagholi	Percolation Tank	74.06658	17.90577
Satara	Koregaon	Wathar kiroli	Percolation Tank	74.20139	17.53427
Satara	Mahabaleshwar	Dare	Percolation Tank	73.64334	17.94624
Satara	Mahabaleshwar	Haroshi	Percolation Tank	73.6351	17.93124
Satara	Mahabaleshwar	Haroshi	Percolation Tank	73.62395	17.93175
Satara	Mahabaleshwar	Haroshi	Percolation Tank	73.61518	17.93116
Satara	Mahabaleshwar	Jaoli	Percolation Tank	73.62218	17.94775
Satara	Mahabaleshwar	Kumthe	Percolation Tank	73.56505	17.90445
Satara	Mahabaleshwar	Kumthe	Percolation Tank	73.56984	17.91001
Satara	Man	Bangarwadi	Percolation Tank	74.80344	17.54188
Satara	Man	Bidal	Percolation Tank	74.5307	17.75058
Satara	Man	Bidal	Percolation Tank	74.524	17.76957
Satara	Man	Bijavadi	Percolation Tank	74.55351	17.80166
Satara	Man	Bothe	Percolation Tank	74.39786	17.77287
Satara	Man	Dhuldev	Percolation Tank	74.87863	17.66825
Satara	Man	Dorgewadi (Naravane)	Percolation Tank	74.59205	17.58586
Satara	Man	Dorgewadi (Naravane)	Percolation Tank	74.5887	17.59561
Satara	Man	Gondavale kh.	Percolation Tank	74.61837	17.68206
Satara	Man	Gondavale kh.	Percolation Tank	74.60299	17.68072
Satara	Man	Jambhulani	Percolation Tank	74.73495	17.53097
Satara	Man	Jambhulani	Percolation Tank	74.75848	17.51956
Satara	Man	Karkhel	Percolation Tank	74.86074	17.7134
Satara	Man	Kasarwadi (Andhali)	Percolation Tank	74.45839	17.74173
Satara	Man	Khadaki	Percolation Tank	74.77082	17.70157

Satara	Man	Khutbav	Percolation Tank	74.70876	17.77029
Satara	Man	Mahimangad	Percolation Tank	74.45627	17.68886
Satara	Man	Mardi	Percolation Tank	74.67086	17.73186
Satara	Man	Mardi	Percolation Tank	74.69096	17.77356
Satara	Man	Mardi	Percolation Tank	74.70903	17.74654
Satara	Man	Mhaswad (M Cl)	Percolation Tank	74.81076	17.65684
Satara	Man	Mhaswad (M Cl)	Percolation Tank	74.72745	17.59827
Satara	Man	Mogarale	Percolation Tank	74.53096	17.8673
Satara	Man	Mohi	Percolation Tank	74.66081	17.81426
Satara	Man	Mohi	Percolation Tank	74.66998	17.79689
Satara	Man	Mohi	Percolation Tank	74.65614	17.77012
Satara	Man	Naravane	Percolation Tank	74.61621	17.57695
Satara	Man	Naravane	Percolation Tank	74.63895	17.59931
Satara	Man	Pachvad	Percolation Tank	74.53273	17.84875
Satara	Man	Palashi	Percolation Tank	74.69642	17.64066
Satara	Man	Palashi	Percolation Tank	74.67915	17.65259
Satara	Man	Palsavade	Percolation Tank	74.83588	17.56605
Satara	Man	Paryanti	Percolation Tank	74.80873	17.73421
Satara	Man	Sambhukhed	Percolation Tank	74.7844	17.72246
Satara	Man	Sambhukhed	Percolation Tank	74.78008	17.74201
Satara	Man	Satrewadi (malavadi)	Percolation Tank	74.4388	17.74914
Satara	Man	Shindi Bk.	Percolation Tank	74.47992	17.71681
Satara	Man	Shirtav	Percolation Tank	74.79833	17.56235
Satara	Man	Tondale	Percolation Tank	74.50549	17.836
Satara	Man	Vadgaon	Percolation Tank	74.57187	17.75419
Satara	Man	Valai	Percolation Tank	74.69819	17.5428
Satara	Man	Valai	Percolation Tank	74.71018	17.53609
Satara	Man	Varugad	Percolation Tank	74.46088	17.84229

Satara	Man	Wadjal	Percolation Tank	74.66011	17.57174
Satara	Man	Wawarhire	Percolation Tank	74.61832	17.79286
Satara	Man	Yelegaon	Percolation Tank	74.53498	17.79729
Satara	Patan	Aral	Percolation Tank	73.82533	17.5015
Satara	Patan	Bibi	Percolation Tank	73.9107	17.40542
Satara	Patan	Dhadamwadi	Percolation Tank	73.89521	17.45528
Satara	Patan	Karvat	Percolation Tank	73.84579	17.39874
Satara	Patan	Marul tarf patan	Percolation Tank	73.81355	17.369
Satara	Patan	Maulinagar	Percolation Tank	73.90539	17.44049
Satara	Patan	Shiral	Percolation Tank	73.8341	17.37525
Satara	Patan	Van	Percolation Tank	73.83543	17.51882
Satara	Phaltan	Adarki Bk.	Percolation Tank	74.22443	17.89794
Satara	Phaltan	Adarki Kh.	Percolation Tank	74.18658	17.90432
Satara	Phaltan	Adarki Kh.	Percolation Tank	74.1984	17.89383
Satara	Phaltan	Adarki Kh.	Percolation Tank	74.20793	17.89946
Satara	Phaltan	Aljapur	Percolation Tank	74.25849	17.89451
Satara	Phaltan	Aljapur	Percolation Tank	74.25028	17.91095
Satara	Phaltan	Andrud	Percolation Tank	74.6245	17.88788
Satara	Phaltan	Aradgaon	Percolation Tank	74.1999	17.995
Satara	Phaltan	Bibi	Percolation Tank	74.27075	17.919
Satara	Phaltan	Bibi	Percolation Tank	74.26943	17.93743
Satara	Phaltan	Bodkewadi	Percolation Tank	74.43108	17.85608
Satara	Phaltan	Bodkewadi	Percolation Tank	74.42191	17.88754
Satara	Phaltan	Girvi	Percolation Tank	74.44652	17.85994
Satara	Phaltan	Girvi	Percolation Tank	74.46505	17.87303
Satara	Phaltan	Girvi	Percolation Tank	74.44679	17.9044
Satara	Phaltan	Jaoli	Percolation Tank	74.60526	17.86288
Satara	Phaltan	Jaoli	Percolation Tank	74.58462	17.88679

Satara	Phaltan	Jaoli	Percolation Tank	74.60041	17.89946
Satara	Phaltan	Kalaj	Percolation Tank	74.29264	18.00591
Satara	Phaltan	Kalaj	Percolation Tank	74.2914	18.01925
Satara	Phaltan	Kapashi	Percolation Tank	74.23731	17.92787
Satara	Phaltan	Khadaki	Percolation Tank	74.32802	17.93575
Satara	Phaltan	Khadaki	Percolation Tank	74.33208	17.95103
Satara	Phaltan	Kharadewadi	Percolation Tank	74.31161	18.03461
Satara	Phaltan	Kurvali Bk.	Percolation Tank	74.63182	17.93159
Satara	Phaltan	Kurvali Bk.	Percolation Tank	74.60341	17.91472
Satara	Phaltan	Kurvali Bk.	Percolation Tank	74.63535	17.91179
Satara	Phaltan	Malvadi	Percolation Tank	74.3109	17.93239
Satara	Phaltan	Malvadi	Percolation Tank	74.31584	17.93844
Satara	Phaltan	Mirdhe	Percolation Tank	74.54791	17.88956
Satara	Phaltan	Mirdhe	Percolation Tank	74.56176	17.90499
Satara	Phaltan	Mulikwadi	Percolation Tank	74.28143	17.96479
Satara	Phaltan	Naik bombawadi	Percolation Tank	74.54985	17.92336
Satara	Phaltan	Nandal	Percolation Tank	74.31708	17.98023
Satara	Phaltan	Salpe	Percolation Tank	74.17961	17.9341
Satara	Phaltan	Saswad	Percolation Tank	74.26961	17.98527
Satara	Phaltan	Sherechiwadi	Percolation Tank	74.18975	17.94752
Satara	Phaltan	Sherechiwadi	Percolation Tank	74.20572	17.93242
Satara	Phaltan	Shereshindewadi	Percolation Tank	74.56115	17.93108
Satara	Phaltan	Songaon	Percolation Tank	74.52594	18.03544
Satara	Phaltan	Tadavale	Percolation Tank	74.29731	18.04065
Satara	Phaltan	Taradgaon	Percolation Tank	74.23246	18.02865
Satara	Phaltan	Taradgaon	Percolation Tank	74.27075	18.02898
Satara	Phaltan	Taradgaon	Percolation Tank	74.2629	18.019
Satara	Phaltan	Tardaf	Percolation Tank	74.35405	17.85164

Satara	Phaltan	Tardaf	Percolation Tank	74.34523	17.85155
Satara	Phaltan	Tathavada	Percolation Tank	74.30067	17.87714
Satara	Phaltan	Tathavada	Percolation Tank	74.32299	17.87982
Satara	Phaltan	Thakubaichiwadi	Percolation Tank	74.24684	17.95976
Satara	Phaltan	Upalave	Percolation Tank	74.38193	17.83159
Satara	Phaltan	Upalave	Percolation Tank	74.40638	17.8482
Satara	Phaltan	Veloshi	Percolation Tank	74.36623	17.82412
Satara	Phaltan	Veloshi	Percolation Tank	74.35714	17.83503
Satara	Phaltan	Veloshi	Percolation Tank	74.36773	17.83738
Satara	Phaltan	Waghoshi	Percolation Tank	74.29052	17.89786
Satara	Satara	Nele	Percolation Tank	73.97119	17.75454
Satara	Wai	Akoshi	Percolation Tank	73.76352	17.97226
Satara	Wai	Balakavadi	Percolation Tank	73.71924	17.96258
Satara	Wai	Chikhali	Percolation Tank	73.78353	17.93401
Satara	Wai	Chikhali	Percolation Tank	73.79221	17.94311
Satara	Wai	Dahyat	Percolation Tank	73.72871	17.9437
Satara	Wai	Dasvadi	Percolation Tank	73.79894	17.9523
Satara	Wai	Gadhavewadi	Percolation Tank	73.82737	18.00975
Satara	Wai	Golewadi	Percolation Tank	73.69851	17.95423
Satara	Wai	Gundewadi	Percolation Tank	73.85838	18.01515
Satara	Wai	Mungasewadi	Percolation Tank	73.9273	18.00268
Satara	Wai	Pirachiwadi	Percolation Tank	73.87583	18.02871
Satara	Wai	Vaigaon	Percolation Tank	73.72367	17.94547
Satara	Wai	Wadkarwadi	Percolation Tank	73.79159	17.93536
Satara	Wai	Wadkarwadi	Percolation Tank	73.79779	17.94648

Annexure IX: Location of proposed check dams in Satara district

DISTRICT	TALUKA	VILLAGE	Type	X	Y
Satara	Jaoli	Andhari	Check Dam	73.77765	17.72183
Satara	Jaoli	Kasbe bamnoli	Check Dam	73.75985	17.72838
Satara	Jaoli	Majare shevandi	Check Dam	73.76056	17.71243
Satara	Jaoli	Majare shevandi	Check Dam	73.75791	17.71478
Satara	Jaoli	Mhavshi	Check Dam	73.77571	17.73694
Satara	Jaoli	Umbarewadi	Check Dam	73.7921	17.6896
Satara	Jaoli	Waghali	Check Dam	73.76302	17.70521
Satara	Karad	Bamanwadi	Check Dam	74.04585	17.22058
Satara	Karad	Chormarwadi	Check Dam	74.04585	17.12328
Satara	Karad	Ganeshwadi	Check Dam	74.018	17.11689
Satara	Karad	Gotewadi	Check Dam	74.01165	17.12514
Satara	Karad	Hanumantwadi	Check Dam	73.99755	17.15628
Satara	Karad	Jakhinwadi	Check Dam	74.15583	17.23068
Satara	Karad	Jakhinwadi	Check Dam	74.17258	17.24953
Satara	Karad	Jinti	Check Dam	74.09256	17.11251
Satara	Karad	Jinti	Check Dam	74.09097	17.11874
Satara	Karad	Kasarshirambe	Check Dam	74.13362	17.12345

Satara	Karad	Kole	Check Dam	74.06506	17.2465
Satara	Karad	Latakewadi	Check Dam	74.05677	17.17883
Satara	Karad	Maharugadewadi	Check Dam	74.07916	17.13187
Satara	Karad	Maharugadewadi	Check Dam	74.08656	17.13759
Satara	Karad	Manu	Check Dam	74.11353	17.14298
Satara	Karad	Manu	Check Dam	74.1167	17.14719
Satara	Karad	Narayanwadi	Check Dam	74.15901	17.22731
Satara	Karad	Ond	Check Dam	74.10243	17.17547
Satara	Karad	Pawarwadi	Check Dam	74.03879	17.21031
Satara	Karad	Salshirambe	Check Dam	74.09608	17.13591
Satara	Karad	Salshirambe	Check Dam	74.09961	17.1381
Satara	Karad	Shelakewadi	Check Dam	74.02293	17.17395
Satara	Karad	Shelekewadi	Check Dam	74.012	17.16856
Satara	Karad	Shelekewadi	Check Dam	74.018	17.17109
Satara	Karad	Shendawadi	Check Dam	74.06629	17.22058
Satara	Karad	Shevalwadi	Check Dam	74.03157	17.15443
Satara	Karad	Shewalewadi	Check Dam	73.99966	17.13641
Satara	Karad	Tulsan	Check Dam	74.06858	17.20307

Satara	Karad	Vanarwadi	Check Dam	74.04038	17.20324
Satara	Karad	Ving	Check Dam	74.1234	17.22512
Satara	Karad	Yenape	Check Dam	74.04038	17.11167
Satara	Khandala	Ahire	Check Dam	74.08603	18.04112
Satara	Khandala	Ambarwadi	Check Dam	73.99402	18.03207
Satara	Khandala	Ambarwadi	Check Dam	73.98292	18.03726
Satara	Khandala	Andori	Check Dam	74.15319	18.07815
Satara	Khandala	Asawali	Check Dam	73.9593	18.03911
Satara	Khandala	Asawali	Check Dam	73.95313	18.03726
Satara	Khandala	Asawali	Check Dam	73.93833	18.0552
Satara	Khandala	Asawali	Check Dam	73.94608	18.05067
Satara	Khandala	Asawali	Check Dam	73.9422	18.06894
Satara	Khandala	Atit	Check Dam	73.8925	18.10631
Satara	Khandala	Atit	Check Dam	73.89338	18.10111
Satara	Khandala	Bhade	Check Dam	74.07616	18.09491
Satara	Khandala	Bhade	Check Dam	74.10842	18.07045
Satara	Khandala	Bhade	Check Dam	74.11441	18.08301
Satara	Khandala	Bholi	Check Dam	74.01852	18.09843

Satara	Khandala	Bori	Check Dam	74.08903	18.01296
Satara	Khandala	Harali	Check Dam	74.04796	18.0138
Satara	Khandala	Kanheri	Check Dam	73.92599	18.04162
Satara	Khandala	Kanheri	Check Dam	73.91294	18.0557
Satara	Khandala	Kavathe	Check Dam	73.96194	18.07514
Satara	Khandala	Kesurdi	Check Dam	73.98451	18.08888
Satara	Khandala	Kesurdi	Check Dam	74.00407	18.09441
Satara	Khandala	Kesurdi	Check Dam	74.00284	18.0919
Satara	Khandala	Kesurdi	Check Dam	73.9831	18.08318
Satara	Khandala	Khandala	Check Dam	74.00865	18.02352
Satara	Khandala	Khed Bk.	Check Dam	74.1479	18.05318
Satara	Khandala	Limachiwadi	Check Dam	73.8999	18.04497
Satara	Khandala	Lohom	Check Dam	73.91065	18.07128
Satara	Khandala	Lonand (CT)	Check Dam	74.18316	18.06575
Satara	Khandala	Morve	Check Dam	74.0744	18.08452
Satara	Khandala	Morve	Check Dam	74.0982	18.06559
Satara	Khandala	Morve	Check Dam	74.09643	18.06911
Satara	Khandala	Naigaon	Check Dam	73.96512	18.09843

Satara	Khandala	Nimbodi	Check Dam	74.12834	18.0071
Satara	Khandala	Shekhmirwadi	Check Dam	74.02857	18.10245
Satara	Khandala	Shekhmirwadi	Check Dam	74.03421	18.10229
Satara	Khandala	Shivajinagar	Check Dam	74.06136	18.09542
Satara	Khandala	Sukhed	Check Dam	74.09661	18.02637
Satara	Khandala	Sukhed	Check Dam	74.10207	18.04112
Satara	Khandala	Tondal	Check Dam	74.07246	18.11519
Satara	Khandala	Waghoshi	Check Dam	74.12834	18.06257
Satara	Khandala	Waghoshi	Check Dam	74.13239	18.06441
Satara	Khandala	Yelewadi (N.V.)	Check Dam	74.08568	18.00559
Satara	Khandala	Yelewadi (N.V.)	Check Dam	74.0848	18.00794
Satara	Khandala	Yelewadi (N.V.)	Check Dam	74.08216	18.01079
Satara	Khatav	Ambavade	Check Dam	74.46988	17.52258
Satara	Khatav	Ambheri	Check Dam	74.284	17.60514
Satara	Khatav	Ambheri	Check Dam	74.30463	17.58484
Satara	Khatav	Anphale	Check Dam	74.56869	17.48004
Satara	Khatav	Aundh	Check Dam	74.35654	17.54523
Satara	Khatav	Aundh	Check Dam	74.34473	17.54918

Satara	Khatav	Aundh	Check Dam	74.34781	17.5532
Satara	Khatav	Aundh	Check Dam	74.3397	17.55421
Satara	Khatav	Aundh	Check Dam	74.33609	17.55278
Satara	Khatav	Aundh	Check Dam	74.33362	17.52912
Satara	Khatav	Bhandewadi	Check Dam	74.33909	17.64626
Satara	Khatav	Bhandewadi	Check Dam	74.34755	17.64702
Satara	Khatav	Bhosare	Check Dam	74.33891	17.58618
Satara	Khatav	Bhushangad	Check Dam	74.38783	17.47039
Satara	Khatav	Bhushangad	Check Dam	74.39761	17.48977
Satara	Khatav	Bhushangad	Check Dam	74.39911	17.48692
Satara	Khatav	Bitalewadi	Check Dam	74.27157	17.633
Satara	Khatav	Bombale	Check Dam	74.54066	17.6137
Satara	Khatav	Bombale	Check Dam	74.53661	17.60993
Satara	Khatav	Budh	Check Dam	74.35777	17.766
Satara	Khatav	Budh	Check Dam	74.34949	17.7613
Satara	Khatav	Chinchani	Check Dam	74.25359	17.8286
Satara	Khatav	Chinchani	Check Dam	74.25509	17.82465
Satara	Khatav	Chinchani	Check Dam	74.26108	17.82205

Satara	Khatav	Dambhewadi	Check Dam	74.57071	17.59617
Satara	Khatav	Dambhewadi	Check Dam	74.56455	17.60128
Satara	Khatav	Dambhewadi	Check Dam	74.55811	17.59071
Satara	Khatav	Datewadi	Check Dam	74.54419	17.50152
Satara	Khatav	Dhokalwadi	Check Dam	74.61602	17.49128
Satara	Khatav	Dhokalwadi	Check Dam	74.60403	17.47026
Satara	Khatav	Dhondewadi	Check Dam	74.54798	17.4917
Satara	Khatav	Dhondewadi	Check Dam	74.54454	17.49245
Satara	Khatav	Dhondewadi	Check Dam	74.55441	17.48708
Satara	Khatav	Dhondewadi	Check Dam	74.55714	17.49229
Satara	Khatav	Dhondewadi	Check Dam	74.53458	17.47727
Satara	Khatav	Diskal	Check Dam	74.32419	17.8406
Satara	Khatav	Diskal	Check Dam	74.33803	17.8322
Satara	Khatav	Diskal	Check Dam	74.33962	17.82642
Satara	Khatav	Diskal	Check Dam	74.30921	17.82935
Satara	Khatav	Diskal	Check Dam	74.30189	17.82365
Satara	Khatav	Diskal	Check Dam	74.28065	17.8067
Satara	Khatav	Diskal	Check Dam	74.3152	17.81081

Satara	Khatav	Enkul	Check Dam	74.57671	17.5689
Satara	Khatav	Enkul	Check Dam	74.58596	17.56428
Satara	Khatav	Enkul	Check Dam	74.59363	17.56562
Satara	Khatav	Fadtarwadi	Check Dam	74.29608	17.74418
Satara	Khatav	Ganeshwadi	Check Dam	74.33027	17.51989
Satara	Khatav	Ganeshwadi	Check Dam	74.32031	17.51788
Satara	Khatav	Garalewadi	Check Dam	74.67974	17.39501
Satara	Khatav	Garalewadi	Check Dam	74.6808	17.40905
Satara	Khatav	Garalewadi	Check Dam	74.67974	17.41343
Satara	Khatav	Garudi	Check Dam	74.67913	17.47295
Satara	Khatav	Gopuj	Check Dam	74.40325	17.53701
Satara	Khatav	Gopuj	Check Dam	74.38289	17.53281
Satara	Khatav	Gosavyachiwadi	Check Dam	74.38175	17.54834
Satara	Khatav	Gursale	Check Dam	74.44997	17.54146
Satara	Khatav	Gursale	Check Dam	74.44521	17.51494
Satara	Khatav	Hingane	Check Dam	74.48804	17.61698
Satara	Khatav	Hingane	Check Dam	74.49077	17.608
Satara	Khatav	Hivarwadi	Check Dam	74.6199	17.5021

Satara	Khatav	Hivarwadi	Check Dam	74.61619	17.50512
Satara	Khatav	Hivarwadi	Check Dam	74.62325	17.511
Satara	Khatav	Husenpur	Check Dam	74.35116	17.64173
Satara	Khatav	Jaigaon	Check Dam	74.31617	17.58173
Satara	Khatav	Jaigaon	Check Dam	74.31732	17.58643
Satara	Khatav	Jaigaon	Check Dam	74.32155	17.55916
Satara	Khatav	Jaigaon	Check Dam	74.32842	17.56327
Satara	Khatav	Jaigaon	Check Dam	74.30956	17.57049
Satara	Khatav	Jakhangaon	Check Dam	74.30745	17.65222
Satara	Khatav	Jamb	Check Dam	74.27624	17.62444
Satara	Khatav	Jamb	Check Dam	74.2818	17.62218
Satara	Khatav	Jamb	Check Dam	74.2929	17.62134
Satara	Khatav	Kalambi	Check Dam	74.28321	17.48146
Satara	Khatav	Kalambi	Check Dam	74.27906	17.48767
Satara	Khatav	Kalambi	Check Dam	74.31837	17.49103
Satara	Khatav	Kaledhon	Check Dam	74.64784	17.43495
Satara	Khatav	Kaledhon	Check Dam	74.67754	17.41889
Satara	Khatav	Kanharwadi	Check Dam	74.60729	17.54037

Satara	Khatav	Kanharwadi	Check Dam	74.61523	17.53256
Satara	Khatav	Kanharwadi	Check Dam	74.61928	17.52493
Satara	Khatav	Kanharwadi	Check Dam	74.62316	17.52065
Satara	Khatav	Kanharwadi	Check Dam	74.59557	17.52065
Satara	Khatav	Kanharwadi	Check Dam	74.59751	17.52803
Satara	Khatav	Katalgewadi	Check Dam	74.3806	17.72757
Satara	Khatav	Katalgewadi	Check Dam	74.38289	17.72564
Satara	Khatav	Katalgewadi	Check Dam	74.39215	17.72757
Satara	Khatav	Katalgewadi	Check Dam	74.39003	17.73453
Satara	Khatav	Katalgewadi	Check Dam	74.40211	17.73655
Satara	Khatav	Katarkhatav	Check Dam	74.53308	17.54783
Satara	Khatav	Katarkhatav	Check Dam	74.52189	17.54574
Satara	Khatav	Katgun	Check Dam	74.36994	17.69954
Satara	Khatav	Katgun	Check Dam	74.35848	17.6909
Satara	Khatav	Katgun	Check Dam	74.36324	17.68041
Satara	Khatav	Katgun	Check Dam	74.35971	17.67227
Satara	Khatav	Khabalwadi	Check Dam	74.31221	17.53718
Satara	Khatav	Khabalwadi	Check Dam	74.31273	17.52577

Satara	Khatav	Kharashinge	Check Dam	74.36368	17.52736
Satara	Khatav	Kharashinge	Check Dam	74.36826	17.52761
Satara	Khatav	Kharashinge	Check Dam	74.3687	17.52635
Satara	Khatav	Khatgun	Check Dam	74.31406	17.67252
Satara	Khatav	Khatgun	Check Dam	74.31115	17.66447
Satara	Khatav	Khatgun	Check Dam	74.31899	17.65927
Satara	Khatav	Khatval	Check Dam	74.5775	17.54616
Satara	Khatav	Khatval	Check Dam	74.59654	17.54431
Satara	Khatav	Khatval	Check Dam	74.60632	17.54121
Satara	Khatav	Kuroli	Check Dam	74.38554	17.60221
Satara	Khatav	Kuroli	Check Dam	74.38236	17.60951
Satara	Khatav	Kuroli	Check Dam	74.39241	17.584
Satara	Khatav	Lalgun	Check Dam	74.30269	17.78765
Satara	Khatav	Lalgun	Check Dam	74.30771	17.78731
Satara	Khatav	Laxminagar (N.V.)	Check Dam	74.31952	17.47567
Satara	Khatav	Loni	Check Dam	74.34693	17.61865
Satara	Khatav	Mandave	Check Dam	74.48672	17.65608
Satara	Khatav	Mandave	Check Dam	74.48601	17.63938

Satara	Khatav	Mandave	Check Dam	74.495	17.64836
Satara	Khatav	Manjarwadi	Check Dam	74.27457	17.86669
Satara	Khatav	Mayani	Check Dam	74.52418	17.46762
Satara	Khatav	Mayani	Check Dam	74.53934	17.44706
Satara	Khatav	Mayani	Check Dam	74.57239	17.43251
Satara	Khatav	Mayani	Check Dam	74.57486	17.43814
Satara	Khatav	Mhasurne	Check Dam	74.43604	17.43791
Satara	Khatav	Mhasurne	Check Dam	74.43057	17.439
Satara	Khatav	Mol	Check Dam	74.26875	17.84773
Satara	Khatav	Mol	Check Dam	74.26858	17.83581
Satara	Khatav	Mol	Check Dam	74.27862	17.85662
Satara	Khatav	Mol	Check Dam	74.31035	17.8416
Satara	Khatav	Nagnathawadi	Check Dam	74.27651	17.75954
Satara	Khatav	Nandoshi	Check Dam	74.29634	17.5621
Satara	Khatav	Nandoshi	Check Dam	74.29211	17.56546
Satara	Khatav	Nandoshi	Check Dam	74.29995	17.54792
Satara	Khatav	Nidhal	Check Dam	74.39074	17.70013
Satara	Khatav	Nidhal	Check Dam	74.39638	17.71112

Satara	Khatav	Nidhal	Check Dam	74.41797	17.73185
Satara	Khatav	Nidhal	Check Dam	74.41224	17.72774
Satara	Khatav	Nidhal	Check Dam	74.42273	17.72774
Satara	Khatav	Nimsod	Check Dam	74.45182	17.438
Satara	Khatav	Nimsod	Check Dam	74.43119	17.45033
Satara	Khatav	Pachwad	Check Dam	74.66987	17.47169
Satara	Khatav	Pandharwadi	Check Dam	74.26629	17.82692
Satara	Khatav	Pangarkhel	Check Dam	74.32499	17.80552
Satara	Khatav	Pangarkhel	Check Dam	74.31432	17.78605
Satara	Khatav	Pawarwadi	Check Dam	74.27633	17.74209
Satara	Khatav	Pedgaon	Check Dam	74.43683	17.64181
Satara	Khatav	Pedgaon	Check Dam	74.46442	17.63871
Satara	Khatav	Pimpari	Check Dam	74.52894	17.50655
Satara	Khatav	Rajapur	Check Dam	74.35813	17.81249
Satara	Khatav	Rajapur	Check Dam	74.35522	17.8145
Satara	Khatav	Rajapur	Check Dam	74.34869	17.80963
Satara	Khatav	Rajapur	Check Dam	74.36456	17.80594
Satara	Khatav	Rajapur	Check Dam	74.37117	17.79621

Satara	Khatav	Rajapur	Check Dam	74.35768	17.79294
Satara	Khatav	Ramoshiwadi	Check Dam	74.29872	17.64064
Satara	Khatav	Ramoshiwadi	Check Dam	74.29731	17.64274
Satara	Khatav	Ramoshiwadi	Check Dam	74.29176	17.64668
Satara	Khatav	Ramoshiwadi	Check Dam	74.29502	17.64836
Satara	Khatav	Ramoshiwadi	Check Dam	74.29669	17.64844
Satara	Khatav	Ranshingwadi	Check Dam	74.37408	17.73772
Satara	Khatav	Ranshingwadi	Check Dam	74.38298	17.74032
Satara	Khatav	Ranshingwadi	Check Dam	74.38104	17.74083
Satara	Khatav	Ranshingwadi	Check Dam	74.38554	17.74284
Satara	Khatav	Revalkarwadi	Check Dam	74.27219	17.66749
Satara	Khatav	Revalkarwadi	Check Dam	74.28321	17.66296
Satara	Khatav	Revalkarwadi	Check Dam	74.27475	17.65692
Satara	Khatav	Revalkarwadi	Check Dam	74.28065	17.65692
Satara	Khatav	Shindewadi	Check Dam	74.26038	17.79126
Satara	Khatav	Shirsawadi	Check Dam	74.43948	17.50017
Satara	Khatav	Taraswadi	Check Dam	74.69182	17.44134
Satara	Khatav	Thoravewadi (N.V.)	Check Dam	74.28656	17.46862

Satara	Khatav	Thoravewadi (N.V.)	Check Dam	74.28594	17.47164
Satara	Khatav	Thoravewadi (N.V.)	Check Dam	74.30207	17.4693
Satara	Khatav	Thoravewadi (N.V.)	Check Dam	74.29475	17.46888
Satara	Khatav	Umbarde	Check Dam	74.41876	17.56319
Satara	Khatav	Umbarde	Check Dam	74.4185	17.55438
Satara	Khatav	Umbarmale	Check Dam	74.36526	17.72245
Satara	Khatav	Umbarmale	Check Dam	74.35601	17.72186
Satara	Khatav	Umbarmale	Check Dam	74.3613	17.71658
Satara	Khatav	Umbarmale	Check Dam	74.37205	17.72463
Satara	Khatav	Umbarmale	Check Dam	74.37655	17.7133
Satara	Khatav	Vadi	Check Dam	74.28321	17.5058
Satara	Khatav	Vaduj	Check Dam	74.46521	17.62721
Satara	Khatav	Vaduj	Check Dam	74.4705	17.62856
Satara	Khatav	Vaduj	Check Dam	74.47412	17.61865
Satara	Khatav	Vanzoli	Check Dam	74.37981	17.48096
Satara	Khatav	Vardhangad	Check Dam	74.27898	17.70902
Satara	Khatav	Varud	Check Dam	74.37258	17.58148
Satara	Khatav	Varud	Check Dam	74.34649	17.56881

Satara	Khatav	Varud	Check Dam	74.34385	17.57015
Satara	Khatav	Varud	Check Dam	74.34852	17.57552
Satara	Khatav	Varud	Check Dam	74.35125	17.57704
Satara	Khatav	Varud	Check Dam	74.35592	17.55992
Satara	Khatav	Varud	Check Dam	74.35248	17.56453
Satara	Khatav	Varud	Check Dam	74.34385	17.56109
Satara	Khatav	Vetane	Check Dam	74.34799	17.73202
Satara	Khatav	Vikhale	Check Dam	74.63603	17.49682
Satara	Khatav	Vikhale	Check Dam	74.63083	17.49438
Satara	Khatav	Vikhale	Check Dam	74.63391	17.49405
Satara	Khatav	Vikhale	Check Dam	74.59636	17.46034
Satara	Khatav	Visapur	Check Dam	74.29722	17.68939
Satara	Khatav	Visapur	Check Dam	74.29987	17.69015
Satara	Khatav	Wakalwadi	Check Dam	74.3925	17.50999
Satara	Khatav	Yaralwadi	Check Dam	74.50778	17.54288
Satara	Khatav	Yaralwadi	Check Dam	74.5084	17.5569
Satara	Khatav	Yelmarwadi	Check Dam	74.57089	17.58459
Satara	Koregaon	Ambawade s.wagholi	Check Dam	74.07546	17.81663

Satara	Koregaon	Ambheri	Check Dam	74.26144	17.61387
Satara	Koregaon	Ambheri	Check Dam	74.27237	17.60884
Satara	Koregaon	Ambheri	Check Dam	74.26866	17.61219
Satara	Koregaon	Ambheri	Check Dam	74.26338	17.60263
Satara	Koregaon	Anpatwadi	Check Dam	74.07247	17.87734
Satara	Koregaon	Apshinge	Check Dam	74.25033	17.62947
Satara	Koregaon	Arabwadi	Check Dam	74.06947	17.8339
Satara	Koregaon	Arvi	Check Dam	74.21543	17.49932
Satara	Koregaon	Arvi	Check Dam	74.23059	17.50284
Satara	Koregaon	Asangaon	Check Dam	74.09151	17.85537
Satara	Koregaon	Asangaon	Check Dam	74.08428	17.86225
Satara	Koregaon	Banawadi	Check Dam	74.06683	17.83625
Satara	Koregaon	Banawadi	Check Dam	74.07776	17.84162
Satara	Koregaon	Belewadi	Check Dam	74.2706	17.58955
Satara	Koregaon	Bhadale	Check Dam	74.2327	17.87902
Satara	Koregaon	Bhadale	Check Dam	74.21402	17.86258
Satara	Koregaon	Bhadale	Check Dam	74.21931	17.83877
Satara	Koregaon	Bhadale	Check Dam	74.22371	17.83122

Satara	Koregaon	Bhadale	Check Dam	74.21843	17.83055
Satara	Koregaon	Bhandarmachi	Check Dam	74.24522	17.73328
Satara	Koregaon	Bhatamwadi	Check Dam	74.24152	17.72103
Satara	Koregaon	Bhatamwadi	Check Dam	74.22548	17.70862
Satara	Koregaon	Bhavenagar	Check Dam	74.09644	17.95902
Satara	Koregaon	Bhavenagar	Check Dam	74.0945	17.93419
Satara	Koregaon	Bichukale	Check Dam	74.14791	17.83088
Satara	Koregaon	Bichukale	Check Dam	74.15267	17.83608
Satara	Koregaon	Bichukale	Check Dam	74.15497	17.84296
Satara	Koregaon	Bichukale	Check Dam	74.16325	17.84195
Satara	Koregaon	Borjaiwadi	Check Dam	74.24469	17.7581
Satara	Koregaon	Borjaiwadi	Check Dam	74.24998	17.75659
Satara	Koregaon	Borjaiwadi	Check Dam	74.25809	17.75709
Satara	Koregaon	Chilewadi	Check Dam	74.23799	17.88707
Satara	Koregaon	Chilewadi	Check Dam	74.25333	17.88019
Satara	Koregaon	Chimangaon	Check Dam	74.2327	17.73227
Satara	Koregaon	Chimangaon	Check Dam	74.23182	17.71751
Satara	Koregaon	Deur	Check Dam	74.09168	17.84665

Satara	Koregaon	Dudhanwadi	Check Dam	74.05607	17.85973
Satara	Koregaon	Dudhanwadi	Check Dam	74.05431	17.85738
Satara	Koregaon	Dudhanwadi	Check Dam	74.05449	17.85202
Satara	Koregaon	Dudhi	Check Dam	74.17788	17.63215
Satara	Koregaon	Ekambe	Check Dam	74.21984	17.68833
Satara	Koregaon	Ekambe	Check Dam	74.22812	17.689
Satara	Koregaon	Ekambe	Check Dam	74.23024	17.6895
Satara	Koregaon	Ekambe	Check Dam	74.24152	17.6719
Satara	Koregaon	Fadtarwadi	Check Dam	74.18828	17.87097
Satara	Koregaon	Golewadi	Check Dam	74.20045	17.68883
Satara	Koregaon	Gujarwadi	Check Dam	74.13699	17.81948
Satara	Koregaon	Hasewadi	Check Dam	74.229	17.87717
Satara	Koregaon	Hasewadi	Check Dam	74.22618	17.8713
Satara	Koregaon	Hivare	Check Dam	74.18194	17.82971
Satara	Koregaon	Hivare	Check Dam	74.19075	17.83189
Satara	Koregaon	Hivare	Check Dam	74.1941	17.83726
Satara	Koregaon	Hivare	Check Dam	74.20503	17.82032
Satara	Koregaon	Holewadi	Check Dam	74.22671	17.81529

Satara	Koregaon	Jaigaon	Check Dam	74.24575	17.6407
Satara	Koregaon	Jaigaon	Check Dam	74.26091	17.63986
Satara	Koregaon	Jaigaon	Check Dam	74.26267	17.65043
Satara	Koregaon	Jaigaon	Check Dam	74.25879	17.65345
Satara	Koregaon	Jamb bk.	Check Dam	74.10966	17.72321
Satara	Koregaon	Jamb bk.	Check Dam	74.11671	17.71634
Satara	Koregaon	Jamb bk.	Check Dam	74.10244	17.70493
Satara	Koregaon	Jamb kh.	Check Dam	74.19216	17.81478
Satara	Koregaon	Jamb kh.	Check Dam	74.21543	17.8121
Satara	Koregaon	Kanherkhed	Check Dam	74.23129	17.635
Satara	Koregaon	Karanjkhop	Check Dam	74.04814	17.93101
Satara	Koregaon	Karanjkhop	Check Dam	74.04091	17.93352
Satara	Koregaon	Kawadewadi	Check Dam	74.20044	17.8448
Satara	Koregaon	Koregaon (CT)	Check Dam	74.1703	17.69454
Satara	Koregaon	Madanapurwadi	Check Dam	74.17559	17.81831
Satara	Koregaon	Moreband	Check Dam	74.04391	17.96589
Satara	Koregaon	Nagzari	Check Dam	74.24416	17.47802
Satara	Koregaon	Nagzari	Check Dam	74.24716	17.47098

Satara	Koregaon	Nalavadewadi	Check Dam	74.18846	17.85554
Satara	Koregaon	Nalavadewadi	Check Dam	74.18423	17.8542
Satara	Koregaon	Nalavadewadi	Check Dam	74.14791	17.48691
Satara	Koregaon	Nalavadewadi	Check Dam	74.16255	17.49077
Satara	Koregaon	Nandwal	Check Dam	74.08216	17.97545
Satara	Koregaon	Naygaon	Check Dam	74.06965	17.98115
Satara	Koregaon	Nhavi bk	Check Dam	74.25456	17.55819
Satara	Koregaon	Nhavi bk	Check Dam	74.25791	17.55483
Satara	Koregaon	Nhavi bk	Check Dam	74.26355	17.55249
Satara	Koregaon	Nhavi bk	Check Dam	74.27201	17.55047
Satara	Koregaon	Nhavi bk	Check Dam	74.26126	17.52716
Satara	Koregaon	Nigadi	Check Dam	74.20855	17.6412
Satara	Koregaon	Pimpode bk.	Check Dam	74.08992	17.9565
Satara	Koregaon	Pimpode bk.	Check Dam	74.09574	17.94409
Satara	Koregaon	Pimpode bk.	Check Dam	74.10226	17.91206
Satara	Koregaon	Pimpode kh.	Check Dam	74.0938	17.84262
Satara	Koregaon	Ramoshiwadi	Check Dam	74.25615	17.7212
Satara	Koregaon	Randullabad	Check Dam	74.03527	17.97092

Satara	Koregaon	Randullabad	Check Dam	74.03157	17.96992
Satara	Koregaon	Randullabad	Check Dam	74.02752	17.9622
Satara	Koregaon	Randullabad	Check Dam	74.0217	17.95315
Satara	Koregaon	Rautwadi	Check Dam	74.05131	17.89193
Satara	Koregaon	Rautwadi	Check Dam	74.05396	17.89411
Satara	Koregaon	Rautwadi	Check Dam	74.0529	17.88573
Satara	Koregaon	Rautwadi	Check Dam	74.05396	17.88338
Satara	Koregaon	Rautwadi	Check Dam	74.06506	17.8807
Satara	Koregaon	Sap	Check Dam	74.25315	17.59139
Satara	Koregaon	Sarkalwadi	Check Dam	74.03633	17.91508
Satara	Koregaon	Sarkalwadi	Check Dam	74.03439	17.91222
Satara	Koregaon	Sarkalwadi	Check Dam	74.03756	17.90786
Satara	Koregaon	Sarkalwadi	Check Dam	74.04109	17.90602
Satara	Koregaon	Sarkalwadi	Check Dam	74.06207	17.90686
Satara	Koregaon	Sarkalwadi	Check Dam	74.05837	17.90199
Satara	Koregaon	Sasurve	Check Dam	74.20115	17.62225
Satara	Koregaon	Sasurve	Check Dam	74.1867	17.62494
Satara	Koregaon	Sathewadi	Check Dam	74.19762	17.5062

Satara	Koregaon	Solashi	Check Dam	74.04144	17.99658
Satara	Koregaon	Sonake	Check Dam	74.08146	17.93772
Satara	Koregaon	Sultanwadi	Check Dam	74.18529	17.68129
Satara	Koregaon	Talaye	Check Dam	74.15743	17.85906
Satara	Koregaon	Targaon.	Check Dam	74.16131	17.49899
Satara	Koregaon	Targaon.	Check Dam	74.16096	17.51089
Satara	Koregaon	Vadachiwadi	Check Dam	74.21437	17.70259
Satara	Koregaon	Vikhale	Check Dam	74.20397	17.88271
Satara	Koregaon	Vikhale	Check Dam	74.19762	17.8713
Satara	Koregaon	Vikhale	Check Dam	74.17982	17.8713
Satara	Koregaon	Vikhale	Check Dam	74.17964	17.86627
Satara	Koregaon	Vikhale	Check Dam	74.17347	17.86342
Satara	Koregaon	Vikhale	Check Dam	74.16642	17.87181
Satara	Koregaon	Waghajaiwada	Check Dam	74.24416	17.66703
Satara	Mahabaleshwar	Birmani	Check Dam	73.60186	17.89815
Satara	Mahabaleshwar	Dudhoshi	Check Dam	73.61693	17.92128
Satara	Mahabaleshwar	Dudhoshi	Check Dam	73.6068	17.92095
Satara	Mahabaleshwar	Haroshi	Check Dam	73.62786	17.93293

Satara	Mahabaleshwar	Haroshi	Check Dam	73.62292	17.93302
Satara	Mahabaleshwar	Kasrud	Check Dam	73.61438	17.89069
Satara	Mahabaleshwar	Kumbharoshi	Check Dam	73.58697	17.9419
Satara	Mahabaleshwar	Kumbharoshi	Check Dam	73.58803	17.93913
Satara	Mahabaleshwar	Kumbharoshi	Check Dam	73.58935	17.9357
Satara	Mahabaleshwar	Kumbharoshi	Check Dam	73.59975	17.93553
Satara	Mahabaleshwar	Kumbharoshi	Check Dam	73.59693	17.93092
Satara	Mahabaleshwar	Kumbharoshi	Check Dam	73.60645	17.93142
Satara	Mahabaleshwar	Kumthe	Check Dam	73.58098	17.91416
Satara	Mahabaleshwar	Kumthe	Check Dam	73.56926	17.90561
Satara	Mahabaleshwar	Kumthe	Check Dam	73.56398	17.90686
Satara	Mahabaleshwar	Parpar	Check Dam	73.58019	17.91969
Satara	Mahabaleshwar	Parpar	Check Dam	73.58962	17.92086
Satara	Mahabaleshwar	Parpar	Check Dam	73.589	17.91307
Satara	Mahabaleshwar	Parpar	Check Dam	73.59261	17.90946
Satara	Mahabaleshwar	Parpar	Check Dam	73.60063	17.90678
Satara	Mahabaleshwar	Parsond	Check Dam	73.56944	17.91173
Satara	Man	Andhali	Check Dam	74.48863	17.78079

Satara	Man	Andhali	Check Dam	74.50009	17.76954
Satara	Man	Andhali	Check Dam	74.50555	17.78348
Satara	Man	Bhatki	Check Dam	74.79979	17.69383
Satara	Man	Bidal	Check Dam	74.52423	17.72136
Satara	Man	Bidal	Check Dam	74.51947	17.77173
Satara	Man	Bidal	Check Dam	74.54485	17.74352
Satara	Man	Bidal	Check Dam	74.53251	17.75662
Satara	Man	Bidal	Check Dam	74.52405	17.77508
Satara	Man	Bijavadi	Check Dam	74.55419	17.80531
Satara	Man	Bothe	Check Dam	74.4051	17.77425
Satara	Man	Bothe	Check Dam	74.39823	17.77861
Satara	Man	Dhuldev	Check Dam	74.8743	17.66394
Satara	Man	Dhuldev	Check Dam	74.85845	17.6851
Satara	Man	Dhuldev	Check Dam	74.86638	17.68291
Satara	Man	Dorgewadi (Naravane)	Check Dam	74.58821	17.58134
Satara	Man	Dorgewadi (Naravane)	Check Dam	74.58398	17.5847
Satara	Man	Gadewadi	Check Dam	74.40598	17.81269
Satara	Man	Gherewadi	Check Dam	74.59578	17.83485

Satara	Man	Gherewadi	Check Dam	74.59895	17.82915
Satara	Man	Gondavale Bk.	Check Dam	74.59543	17.6898
Satara	Man	Gondavale Bk.	Check Dam	74.5889	17.69836
Satara	Man	Gondavale kh.	Check Dam	74.60124	17.69265
Satara	Man	Gondavale kh.	Check Dam	74.60618	17.64279
Satara	Man	Injabav	Check Dam	74.78182	17.76451
Satara	Man	Injabav	Check Dam	74.77125	17.74772
Satara	Man	Injabav	Check Dam	74.75381	17.74386
Satara	Man	Jambhulani	Check Dam	74.73231	17.53567
Satara	Man	Jambhulani	Check Dam	74.74535	17.52526
Satara	Man	Jambhulani	Check Dam	74.7494	17.5528
Satara	Man	Jambhulani	Check Dam	74.75275	17.5256
Satara	Man	Jambhulani	Check Dam	74.77248	17.54138
Satara	Man	Jashi	Check Dam	74.66467	17.71649
Satara	Man	Jashi	Check Dam	74.67261	17.69937
Satara	Man	Kalchondi	Check Dam	74.74764	17.49974
Satara	Man	Kalchondi	Check Dam	74.75204	17.5031
Satara	Man	Kalchondi	Check Dam	74.76209	17.48295

Satara	Man	Kalchondi	Check Dam	74.76808	17.48782
Satara	Man	Karkhel	Check Dam	74.8669	17.72102
Satara	Man	Karkhel	Check Dam	74.85686	17.71464
Satara	Man	Karkhel	Check Dam	74.85193	17.69332
Satara	Man	Kasarwadi (Andhali)	Check Dam	74.44546	17.73093
Satara	Man	Khadaki	Check Dam	74.77565	17.70793
Satara	Man	Khandyachiwadi(varugad)	Check Dam	74.45251	17.82747
Satara	Man	Khutbav	Check Dam	74.70395	17.77693
Satara	Man	Kiraksal	Check Dam	74.57535	17.62247
Satara	Man	Kukudwad	Check Dam	74.63155	17.53181
Satara	Man	Kukudwad	Check Dam	74.64018	17.5298
Satara	Man	Kukudwad	Check Dam	74.63119	17.55683
Satara	Man	Kukudwad	Check Dam	74.63701	17.56069
Satara	Man	Kulakjai	Check Dam	74.38607	17.79708
Satara	Man	Kulakjai	Check Dam	74.40246	17.8001
Satara	Man	Kulakjai	Check Dam	74.39911	17.78768
Satara	Man	Malavadi	Check Dam	74.45673	17.75376
Satara	Man	Mardi	Check Dam	74.67754	17.71213

Satara	Man	Mardi	Check Dam	74.68001	17.74873
Satara	Man	Mardi	Check Dam	74.6682	17.75343
Satara	Man	Mhaswad (M Cl)	Check Dam	74.76473	17.61408
Satara	Man	Mhaswad (M Cl)	Check Dam	74.7605	17.59561
Satara	Man	Mhaswad (M Cl)	Check Dam	74.74588	17.60686
Satara	Man	Mogarale	Check Dam	74.5237	17.86172
Satara	Man	Mohi	Check Dam	74.69232	17.78432
Satara	Man	Mohi	Check Dam	74.66431	17.77441
Satara	Man	Mohi	Check Dam	74.67525	17.80799
Satara	Man	Mohi	Check Dam	74.67561	17.80044
Satara	Man	Naravane	Check Dam	74.63983	17.58671
Satara	Man	Naravane	Check Dam	74.62732	17.60115
Satara	Man	Naravane	Check Dam	74.61005	17.6087
Satara	Man	Pachvad	Check Dam	74.52758	17.84929
Satara	Man	Pachvad	Check Dam	74.54097	17.86172
Satara	Man	Palashi	Check Dam	74.70184	17.71616
Satara	Man	Panavan	Check Dam	74.71523	17.55985
Satara	Man	Pangari	Check Dam	74.52617	17.78449

Satara	Man	Pangari	Check Dam	74.55912	17.78281
Satara	Man	Pangari	Check Dam	74.54714	17.76568
Satara	Man	Pangari	Check Dam	74.54502	17.78331
Satara	Man	Parkhandi	Check Dam	74.474	17.78818
Satara	Man	Parkhandi	Check Dam	74.4629	17.81633
Satara	Man	Paryanti	Check Dam	74.79661	17.70927
Satara	Man	Paryanti	Check Dam	74.79186	17.71884
Satara	Man	Paryanti	Check Dam	74.80525	17.74789
Satara	Man	Pingali Bk	Check Dam	74.50594	17.69366
Satara	Man	Rajavadi	Check Dam	74.57392	17.80463
Satara	Man	Sambhukhed	Check Dam	74.79168	17.74957
Satara	Man	Satrewadi (malavadi)	Check Dam	74.42871	17.74369
Satara	Man	Satrewadi (malavadi)	Check Dam	74.43312	17.73681
Satara	Man	Shenwadi	Check Dam	74.78869	17.47792
Satara	Man	Shenwadi	Check Dam	74.80736	17.48463
Satara	Man	Shindi Bk.	Check Dam	74.49251	17.72774
Satara	Man	Shindi Bk.	Check Dam	74.49727	17.72942
Satara	Man	Shindi Bk.	Check Dam	74.47242	17.70826

Satara	Man	Shindi kh	Check Dam	74.44193	17.81471
Satara	Man	Shindi kh	Check Dam	74.44916	17.81471
Satara	Man	Shinganapur	Check Dam	74.67402	17.82444
Satara	Man	Shinganapur	Check Dam	74.65887	17.83032
Satara	Man	Shiravali	Check Dam	74.39929	17.74822
Satara	Man	Shiravali	Check Dam	74.4021	17.75964
Satara	Man	Shiravali	Check Dam	74.40545	17.763
Satara	Man	Sokasan	Check Dam	74.63014	17.77324
Satara	Man	Sokasan	Check Dam	74.65182	17.75645
Satara	Man	Sokasan	Check Dam	74.65093	17.76703
Satara	Man	Swarupkhanwadi (mahimangad)	Check Dam	74.46965	17.67569
Satara	Man	Thadale	Check Dam	74.65005	17.81219
Satara	Man	Thadale	Check Dam	74.63966	17.8179
Satara	Man	Thadale	Check Dam	74.62133	17.81773
Satara	Man	Thadale	Check Dam	74.61234	17.81974
Satara	Man	Tondale	Check Dam	74.48352	17.82209
Satara	Man	Tondale	Check Dam	74.50132	17.82042
Satara	Man	Tondale	Check Dam	74.51401	17.84627

Satara	Man	Tondale	Check Dam	74.49938	17.85405
Satara	Man	Ukirde	Check Dam	74.46842	17.69265
Satara	Man	Vadgaon	Check Dam	74.59137	17.75578
Satara	Man	Vadgaon	Check Dam	74.58344	17.76266
Satara	Man	Vadgaon	Check Dam	74.55084	17.75225
Satara	Man	Valai	Check Dam	74.69056	17.56791
Satara	Man	Varkute malavadi	Check Dam	74.80331	17.48967
Satara	Man	Varugad	Check Dam	74.45656	17.84459
Satara	Man	Varugad	Check Dam	74.45832	17.83855
Satara	Man	Varugad	Check Dam	74.46713	17.8362
Satara	Man	Varugad	Check Dam	74.43858	17.85925
Satara	Man	Virali	Check Dam	74.72738	17.51569
Satara	Man	Virali	Check Dam	74.73372	17.51301
Satara	Man	Virali	Check Dam	74.73866	17.50277
Satara	Man	Virali	Check Dam	74.71417	17.50998
Satara	Man	Virali	Check Dam	74.72861	17.48279
Satara	Man	Virali	Check Dam	74.72844	17.4848
Satara	Man	Virobanagar	Check Dam	74.5452	17.77173

Satara	Man	Warkute mhaswad	Check Dam	74.75574	17.71565
Satara	Man	Wawarhire	Check Dam	74.60565	17.77257
Satara	Man	Wawarhire	Check Dam	74.6171	17.77206
Satara	Man	Wawarhire	Check Dam	74.6245	17.79322
Satara	Man	Yelegaon	Check Dam	74.54256	17.80631
Satara	Patan	Acharewadi	Check Dam	73.96741	17.14785
Satara	Patan	Adadev	Check Dam	73.89254	17.32808
Satara	Patan	Ambavade kh.	Check Dam	73.92052	17.24061
Satara	Patan	Ambavade kh.	Check Dam	73.92546	17.24616
Satara	Patan	Bhosgaon	Check Dam	73.93551	17.22798
Satara	Patan	Bhosgaon	Check Dam	73.94767	17.22681
Satara	Patan	Chalkewadi	Check Dam	74.01341	17.1923
Satara	Patan	Dakewadi (wazoli)	Check Dam	73.93956	17.18741
Satara	Patan	Kalgaon	Check Dam	73.95296	17.14886
Satara	Patan	Kalgaon	Check Dam	73.96159	17.15526
Satara	Patan	Kolekarwadi	Check Dam	73.91206	17.22495
Satara	Patan	Letamewadi	Check Dam	73.94273	17.14516
Satara	Patan	Letamewadi	Check Dam	73.93515	17.14398

Satara	Patan	Mandrulkole	Check Dam	73.94238	17.24044
Satara	Patan	Manyachiwadi	Check Dam	73.99931	17.20947
Satara	Patan	Marali	Check Dam	73.94502	17.2965
Satara	Patan	Maskarwadi	Check Dam	73.94449	17.16065
Satara	Patan	Muttalwadi	Check Dam	73.97746	17.14836
Satara	Patan	Sutarwadi	Check Dam	73.97446	17.2635
Satara	Patan	Umarkanchan	Check Dam	73.91947	17.21351
Satara	Patan	Wazoli	Check Dam	73.94573	17.19667
Satara	Patan	Yelavewadi	Check Dam	73.9526	17.17479
Satara	Phaltan	Adarki Bk.	Check Dam	74.22077	17.88707
Satara	Phaltan	Adarki Bk.	Check Dam	74.22623	17.89562
Satara	Phaltan	Adarki Bk.	Check Dam	74.2213	17.90484
Satara	Phaltan	Adarki Bk.	Check Dam	74.23099	17.91054
Satara	Phaltan	Adarki Kh.	Check Dam	74.19839	17.91088
Satara	Phaltan	Adarki Kh.	Check Dam	74.19839	17.8921
Satara	Phaltan	Aljapur	Check Dam	74.23821	17.91038
Satara	Phaltan	Aljapur	Check Dam	74.24262	17.89881
Satara	Phaltan	Aljapur	Check Dam	74.24579	17.89931

Satara	Phaltan	Aljapur	Check Dam	74.25249	17.90166
Satara	Phaltan	Andrud	Check Dam	74.6275	17.87383
Satara	Phaltan	Andrud	Check Dam	74.6201	17.87618
Satara	Phaltan	Andrud	Check Dam	74.62027	17.8921
Satara	Phaltan	Aradgaon	Check Dam	74.21654	18.00124
Satara	Phaltan	Aradgaon	Check Dam	74.222	18.00291
Satara	Phaltan	Barad	Check Dam	74.60265	17.94826
Satara	Phaltan	Barad	Check Dam	74.59578	17.95078
Satara	Phaltan	Barad	Check Dam	74.58961	17.94206
Satara	Phaltan	Barad	Check Dam	74.58679	17.93569
Satara	Phaltan	Barad	Check Dam	74.57569	17.92127
Satara	Phaltan	Barad	Check Dam	74.58203	17.92831
Satara	Phaltan	Barad	Check Dam	74.57798	17.95715
Satara	Phaltan	Bhadali Kh.	Check Dam	74.48017	17.92714
Satara	Phaltan	Bhadali Kh.	Check Dam	74.47682	17.93938
Satara	Phaltan	Bibi	Check Dam	74.26306	17.903
Satara	Phaltan	Bibi	Check Dam	74.28456	17.92127
Satara	Phaltan	Bibi	Check Dam	74.25989	17.931

Satara	Phaltan	Bodkewadi	Check Dam	74.41426	17.86914
Satara	Phaltan	Bodkewadi	Check Dam	74.4273	17.8688
Satara	Phaltan	Bodkewadi	Check Dam	74.42396	17.88121
Satara	Phaltan	Bodkewadi	Check Dam	74.43418	17.85522
Satara	Phaltan	Chavhanwadi	Check Dam	74.22112	18.01398
Satara	Phaltan	Dhaval	Check Dam	74.31364	17.89026
Satara	Phaltan	Dhaval	Check Dam	74.33479	17.89277
Satara	Phaltan	Dhavalewadi	Check Dam	74.34589	18.0061
Satara	Phaltan	Dudhebavi	Check Dam	74.49603	17.89495
Satara	Phaltan	Dudhebavi	Check Dam	74.49462	17.8963
Satara	Phaltan	Dudhebavi	Check Dam	74.4955	17.90401
Satara	Phaltan	Dudhebavi	Check Dam	74.50925	17.90887
Satara	Phaltan	Dudhebavi	Check Dam	74.49868	17.91792
Satara	Phaltan	Dudhebavi	Check Dam	74.51225	17.91323
Satara	Phaltan	Ghadgewadi	Check Dam	74.27381	17.95916
Satara	Phaltan	Ghadgewadi	Check Dam	74.28773	17.94759
Satara	Phaltan	Ghadgewadi	Check Dam	74.27857	17.95815
Satara	Phaltan	Girvi	Check Dam	74.43788	17.88506

Satara	Phaltan	Girvi	Check Dam	74.46643	17.87232
Satara	Phaltan	Girvi	Check Dam	74.46167	17.88573
Satara	Phaltan	Girvi	Check Dam	74.44422	17.88238
Satara	Phaltan	Girvi	Check Dam	74.46837	17.90049
Satara	Phaltan	Gunware	Check Dam	74.60917	17.99956
Satara	Phaltan	Hingangaon	Check Dam	74.21566	17.95162
Satara	Phaltan	Hingangaon	Check Dam	74.21689	17.94323
Satara	Phaltan	Jadhavwadi	Check Dam	74.43471	17.96586
Satara	Phaltan	Jadhavwadi	Check Dam	74.43823	17.97391
Satara	Phaltan	Jaoli	Check Dam	74.60776	17.86361
Satara	Phaltan	Jaoli	Check Dam	74.59595	17.8683
Satara	Phaltan	Jaoli	Check Dam	74.58538	17.86763
Satara	Phaltan	Jaoli	Check Dam	74.60846	17.875
Satara	Phaltan	Kalaj	Check Dam	74.28721	17.99487
Satara	Phaltan	Kalaj	Check Dam	74.27487	18.02269
Satara	Phaltan	Kalaj	Check Dam	74.28262	18.02554
Satara	Phaltan	Kalaj	Check Dam	74.28562	18.00459
Satara	Phaltan	Kalaj	Check Dam	74.29316	18.00014

Satara	Phaltan	Kapadgaon	Check Dam	74.19663	18.01951
Satara	Phaltan	Kapashi	Check Dam	74.24103	17.95229
Satara	Phaltan	Kapashi	Check Dam	74.24456	17.94726
Satara	Phaltan	Kharadewadi	Check Dam	74.30976	18.02789
Satara	Phaltan	Kharadewadi	Check Dam	74.31258	18.03761
Satara	Phaltan	Kolki (CT)	Check Dam	74.44951	17.9724
Satara	Phaltan	Kolki (CT)	Check Dam	74.44598	17.9724
Satara	Phaltan	Korhale	Check Dam	74.27381	17.89428
Satara	Phaltan	Kurvali Bk.	Check Dam	74.65446	17.93083
Satara	Phaltan	Kurvali Bk.	Check Dam	74.62626	17.94038
Satara	Phaltan	Kurvali Bk.	Check Dam	74.64353	17.93066
Satara	Phaltan	Kurvali Bk.	Check Dam	74.61287	17.91608
Satara	Phaltan	Kurvali Bk.	Check Dam	74.63278	17.90417
Satara	Phaltan	Kurvali Bk.	Check Dam	74.63772	17.9087
Satara	Phaltan	Kurvali Bk.	Check Dam	74.63455	17.9201
Satara	Phaltan	Malewadi	Check Dam	74.23821	18.05102
Satara	Phaltan	Malvadi	Check Dam	74.29954	17.93083
Satara	Phaltan	Malvadi	Check Dam	74.29848	17.92312

Satara	Phaltan	Malvadi	Check Dam	74.31241	17.92379
Satara	Phaltan	Malvadi	Check Dam	74.31382	17.93971
Satara	Phaltan	Manewadi	Check Dam	74.33232	17.85271
Satara	Phaltan	Manewadi	Check Dam	74.33338	17.84919
Satara	Phaltan	Manewadi	Check Dam	74.34307	17.85254
Satara	Phaltan	Manewadi	Check Dam	74.34131	17.8564
Satara	Phaltan	Mirdhe	Check Dam	74.55824	17.91608
Satara	Phaltan	Mirdhe	Check Dam	74.563	17.88892
Satara	Phaltan	Mirdhe	Check Dam	74.56899	17.89831
Satara	Phaltan	Naik bombawadi	Check Dam	74.53886	17.9196
Satara	Phaltan	Naik bombawadi	Check Dam	74.54361	17.91658
Satara	Phaltan	Naik bombawadi	Check Dam	74.55013	17.91909
Satara	Phaltan	Naik bombawadi	Check Dam	74.54837	17.9434
Satara	Phaltan	Naik bombawadi	Check Dam	74.54502	17.92932
Satara	Phaltan	Nandal	Check Dam	74.30571	17.96737
Satara	Phaltan	Nandal	Check Dam	74.31681	17.97291
Satara	Phaltan	Nandal	Check Dam	74.33161	17.98749
Satara	Phaltan	Nandal	Check Dam	74.33179	18.00643

Satara	Phaltan	Nandal	Check Dam	74.29143	17.98749
Satara	Phaltan	Padegaon	Check Dam	74.22253	18.06946
Satara	Phaltan	Padegaon	Check Dam	74.23434	18.05807
Satara	Phaltan	Pirachiwadi	Check Dam	74.31047	17.89244
Satara	Phaltan	Pirachiwadi	Check Dam	74.3117	17.90686
Satara	Phaltan	Rajale	Check Dam	74.52863	18.01079
Satara	Phaltan	Rajuri	Check Dam	74.62203	17.94625
Satara	Phaltan	Ravadi Kh.	Check Dam	74.25971	18.06075
Satara	Phaltan	Ravadi Kh.	Check Dam	74.25619	18.06142
Satara	Phaltan	Salpe	Check Dam	74.18112	17.93519
Satara	Phaltan	Sangavi	Check Dam	74.49973	18.0237
Satara	Phaltan	Sangavi	Check Dam	74.50414	18.04046
Satara	Phaltan	Sangavi	Check Dam	74.52176	18.05136
Satara	Phaltan	Saswad	Check Dam	74.26412	17.97458
Satara	Phaltan	Saswad	Check Dam	74.27064	17.97827
Satara	Phaltan	Saswad	Check Dam	74.24174	17.97274
Satara	Phaltan	Saswad	Check Dam	74.25883	18.00492
Satara	Phaltan	Sherechiwadi	Check Dam	74.18799	17.97307

Satara	Phaltan	Sherechiwadi	Check Dam	74.19909	17.9724
Satara	Phaltan	Sherechiwadi	Check Dam	74.19751	17.9481
Satara	Phaltan	Sherechiwadi	Check Dam	74.20244	17.94089
Satara	Phaltan	Sherechiwadi	Check Dam	74.19645	17.92563
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Satara	Phaltan	Shereshindewadi	Check Dam	74.56406	17.9548
Satara	Phaltan	Shereshindewadi	Check Dam	74.56467	17.94929
Satara	Phaltan	Songaon	Check Dam	74.52828	18.03342
Satara	Phaltan	Songaon	Check Dam	74.53093	18.0361
Satara	Phaltan	Sonwadi Bk.	Check Dam	74.47154	17.95145
Satara	Phaltan	Sonwadi Kh.	Check Dam	74.49092	17.95933
Satara	Phaltan	Survadi	Check Dam	74.33602	18.01213
Satara	Phaltan	Tambave	Check Dam	74.18781	17.98816
Satara	Phaltan	Taradgaon	Check Dam	74.26835	18.02756
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Satara	Phaltan	Tardaf	Check Dam	74.34747	17.84667
Satara	Phaltan	Tardaf	Check Dam	74.35329	17.84433
Satara	Phaltan	Tardaf	Check Dam	74.35399	17.8393

Satara	Phaltan	Tathavada	Check Dam	74.31487	17.88171
Satara	Phaltan	Tathavada	Check Dam	74.32051	17.87232
Satara	Phaltan	Tathavada	Check Dam	74.30271	17.87785
Satara	Phaltan	Tathavada	Check Dam	74.3332	17.85925
Satara	Phaltan	Upalave	Check Dam	74.3836	17.83259
Satara	Phaltan	Upalave	Check Dam	74.38959	17.84215
Satara	Phaltan	Upalave	Check Dam	74.39611	17.84265
Satara	Phaltan	Upalave	Check Dam	74.40739	17.84667
Satara	Phaltan	Upalave	Check Dam	74.41356	17.8569
Satara	Phaltan	Vadale	Check Dam	74.53621	17.94374
Satara	Phaltan	Vadale	Check Dam	74.50713	17.95162
Satara	Phaltan	Vadale	Check Dam	74.51524	17.96838
Satara	Phaltan	Vadale	Check Dam	74.50696	17.97089
Satara	Phaltan	Veloshi	Check Dam	74.36633	17.83125
Satara	Phaltan	Veloshi	Check Dam	74.37585	17.82639
Satara	Phaltan	Vidani	Check Dam	74.50907	18.00995
Satara	Phaltan	Vinchurni	Check Dam	74.43488	17.90753
Satara	Phaltan	Vitthalwadi	Check Dam	74.26747	18.01481

Satara	Phaltan	Waghoshi	Check Dam	74.28298	17.8906
Satara	Phaltan	Waghoshi	Check Dam	74.29337	17.88875
Satara	Phaltan	Waghoshi	Check Dam	74.29267	17.88255
Satara	Phaltan	Zadakbaichiwadi	Check Dam	74.34325	17.88255
Satara	Satara	Kusavade	Check Dam	73.94912	17.56894
Satara	Satara	Kusavade	Check Dam	73.95951	17.57129
Satara	Satara	Pilani	Check Dam	73.92753	17.58237
Satara	Wai	Abhepuri	Check Dam	73.8247	18.01329
Satara	Wai	Akoshi	Check Dam	73.77615	17.97257
Satara	Wai	Akoshi	Check Dam	73.77686	17.97886
Satara	Wai	Akoshi	Check Dam	73.76514	17.97324
Satara	Wai	Akoshi	Check Dam	73.76954	17.97584
Satara	Wai	Bhivadi	Check Dam	73.76091	17.99302
Satara	Wai	Chikhali	Check Dam	73.79289	17.93185
Satara	Wai	Chikhali	Check Dam	73.79042	17.9321
Satara	Wai	Chikhali	Check Dam	73.78725	17.93705
Satara	Wai	Chikhali	Check Dam	73.7817	17.93361
Satara	Wai	Dhavadi	Check Dam	73.88056	18.00458

Satara	Wai	Gadhavewadi	Check Dam	73.8277	18.01229
Satara	Wai	Gadhavewadi	Check Dam	73.83651	18.01706
Satara	Wai	Gadhavewadi	Check Dam	73.83898	18.00919
Satara	Wai	Gadhavewadi	Check Dam	73.84532	18.01413
Satara	Wai	Gundewadi	Check Dam	73.85633	18.01648
Satara	Wai	Gundewadi	Check Dam	73.861	18.00676
Satara	Wai	Jambhali	Check Dam	73.72134	18.0277
Satara	Wai	Jambhali	Check Dam	73.70073	18.03189
Satara	Wai	Jambhali	Check Dam	73.69209	18.02569
Satara	Wai	Jambhali	Check Dam	73.69482	18.02569
Satara	Wai	Jambhali	Check Dam	73.69632	18.02988
Satara	Wai	Jambhali	Check Dam	73.69033	18.02167
Satara	Wai	Khavali	Check Dam	73.74011	18.01455
Satara	Wai	Khavali	Check Dam	73.74831	18.01472
Satara	Wai	Oholi	Check Dam	73.75171	18.0318
Satara	Wai	Oholi	Check Dam	73.74364	18.03508
Satara	Wai	Pachputewadi (N.V.)	Check Dam	73.81325	18.00684
Satara	Wai	Pirachiwadi	Check Dam	73.87167	18.02921

Satara	Wai	Pirachiwadi	Check Dam	73.87651	18.03072
Satara	Wai	Renawale	Check Dam	73.76003	18.0091
Satara	Wai	Renawale	Check Dam	73.75738	18.01011
Satara	Wai	Varkhadwadi	Check Dam	73.84127	17.98925
Satara	Wai	Wadachiwadi (N.V.)	Check Dam	73.81307	18.0246
Satara	Wai	Wadachiwadi (N.V.)	Check Dam	73.81518	18.02385
Satara	Wai	Wadachiwadi (N.V.)	Check Dam	73.81695	18.01757
Satara	Wai	Wadachiwadi (N.V.)	Check Dam	73.82126	18.0179
Satara	Wai	Washivali	Check Dam	73.7143	18.00684
Satara	Wai	Washivali	Check Dam	73.71042	18.00592