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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

WARDHA DISTRICT, MAHARASHTRA

AAP 2019-20

मध्य क्षेत्र, नागपुर / Central Region, Nagpur

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AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, WARDHA DISTRICT, MAHARASHTRA

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WARDHA DISTRICT AT A GLANCE

1. GENERAL INFORMATION		
Geographical Area	:	6,310 sq Km
Administrative Divisions (2011)	:	Blocks-08: Arvi, Ashti, Deoli, Hinganghat, Karanja, Samudrapur, Selu and Wardha
Villages (Census 2011)	:	1,361
Population (Census 2011)	:	13,00,774
Rainfall 2019	:	900 mm
Normal rainfall (1998-1917)	:	1056.9 mm
Long term rainfall Trend (1998-2019)	:	-2.072 m/year
2. GEOMORPHOLOGY		
Major Physiographic unit	:	Nothern Hills and Southern Plains
Major Drainage	:	Wardha
3. LAND USE (2013-14) (sources: mahasdb.maharashtra.gov.in/district Report)		
Forest Area	:	386.53 Sq. Km. (6.11 %)
Net Area Sown	:	4098.6 Sq. Km. (64.75 %)
Cultivable Area	:	4633.52 Sq. Km. (73.20%)
4. SOIL TYPE	:	Black or Dark Brown soil viz., Kali, Morand, Khardi, Bardi, Fine calcareous deep soil, Loamy clayey extremely shallow soil, Fine loamy clayey shallow soil, Fine calcareous very deep soil and Loamy clayey very shallow soil.
5. PRINCIPAL CROPS		
Oil seeds	:	1353.96 Sq. Km.
Cotton	:	2065.92 Sq. Km.
Pulses	:	856.29 Sq. Km.
Cereals	:	238.67 Sq. Km.
Sugarcane	:	10.53 Sq. Km.
6. IRRIGATION BY DIFFERENT SOURCES (2019-20) - Nos. / Potential Created (ha)		
Dugwells	:	76033/81081
Tubewells/Borewells	:	106/-
Surface Flow Schemes	:	-/5276
Surface Lift Schemes	:	5/-
7. GROUND WATER MONITORING WELLS (March 2019)		
Dugwells	:	57+133=190
Piezometers	:	11
8. GEOLOGY		
Recent to sub-recent	:	Alluvium
Late Cretaceous to Eocene	:	Basalt (Deccan Traps)

	Middle Cretaceous	:	Infra-trappean beds
9. HYDROGEOLOGY			
	Water bearing formation	:	Alluvium- Along Wardha River Basalt- weathered/fractured/jointed vesicular/massive, under phreatic and semi-confined to confined conditions. Sandstone-Gondwana formation
Depth to water level in Shallow Aquifer			
	Premonsoon Depth to Water Level (May-2019)	:	3.12 to 18.9 mbgl
	Postmonsoon Depth to Water Level (Nov.-2019)	:	1.0 to 16.17 mbgl
Depth to water level in Deeper Aquifer			
	Premonsoon Depth to Water Level (May-2019)	:	1.05 to 65 mbgl
	Postmonsoon Depth to Water Level (Nov.-2019)	:	2.65 to 27 mbgl
Water level Trend (2010-19)			
	Premonsoon Water Level Trend (2010-2019)	:	Rise: 0.0096 to 0.53 m/year Fall: 0.003 to 2.58 m/year
	Postmonsoon Water Level Trend (2010-2019)	:	Rise: 0.0012 to 0.437 m/year Fall: 0.0042 to 0.39 m/year
10. GROUND WATER EXPLORATION (As on March 2020)			
	Wells Drilled	:	79(EW:50, OW:14, PZ:15)
	Depth Range	:	30-200
	Discharge	:	0.14-25.05 lps
	Storativity	:	0.000065-0.0135
	Transmissivity	:	0.09-270.18 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 No3 and F.
	Type of Water	:	Basalt- Ca-HCO ₃ Alluvium- Na-HCO ₃ & Na-Cl
12. DYNAMIC GROUND WATER RESOURCES - (2017)			
	Net Annual Ground Water Recharge (ham)	:	83430.63 ham
	Annual Ground Water Extraction (Irrigation + Domestic+ Industrial)	:	43384.70ham

	Projected Demand for (Domestic use up to 2025)	:	3698.32 ham
	Stage of Ground Water Development	:	52 %
	Category		SC: Karanja, rest Blocks are Safe
13. MAJOR GROUND WATER PROBLEMS AND ISSUES			
	The moderate drought area has been observed in the north western parts of the district i.e., in major parts of Ashti, Karanja and Arvi talukas. Ground water quality is adversely affected by nitrate contamination and fluoride contamination in some parts of the district.		
14. Aquifer Management Plan			
	Supply side Management		Proposed AR structures: 177 Percolation Tanks and 503 Check dams. The expected recharge every year from these structures is 219.04 MCM.
	Demand side Management		A total of 31.6 sq km area of cotton crop is proposed to cover under drip and sprinkler irrigation. 8.22 MCM of ground water can be saved.
	Development plan		Proposed 9256 Dugwells and 1543 Borewells in phased manner for 6 years.

**AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN
WARDHA DISTRICT, MAHARASHTRA
(AAP 2019-20)**

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AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN WARDHA 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 Wardha 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

Wardha is one of the 11 districts of Vidarbha. It has a geographical area of 6310 km², which is about 2.0% of the area of the State. It is bounded by north latitudes 20°08' and 21°22' and east longitudes 78°30' and 79°15'. It falls in parts of Survey of India degree sheets 55 K, 55 L and 55 P.

The district headquarters is located at Wardha town. For administrative convenience, the district has been divided into eight talukas, i.e., Arvi, Ashti, Deoli, Hinganghat, Karanja, Samudrapur, Selu and Wardha. There are 1376 villages and 13 towns in the district. The total population of the district as per 2011 census is 13,00,774 and the density of population is 206 persons/sq. km. The district forms part of Godavari

basin. Wardha River is the main river flowing through western boarder of district sharing with Amaravati district.

Wardha district has been taken up under NAQUIM study during the year 2019-20. The total area of the district is 6,310 sq km. The Karanja Block is 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)**.

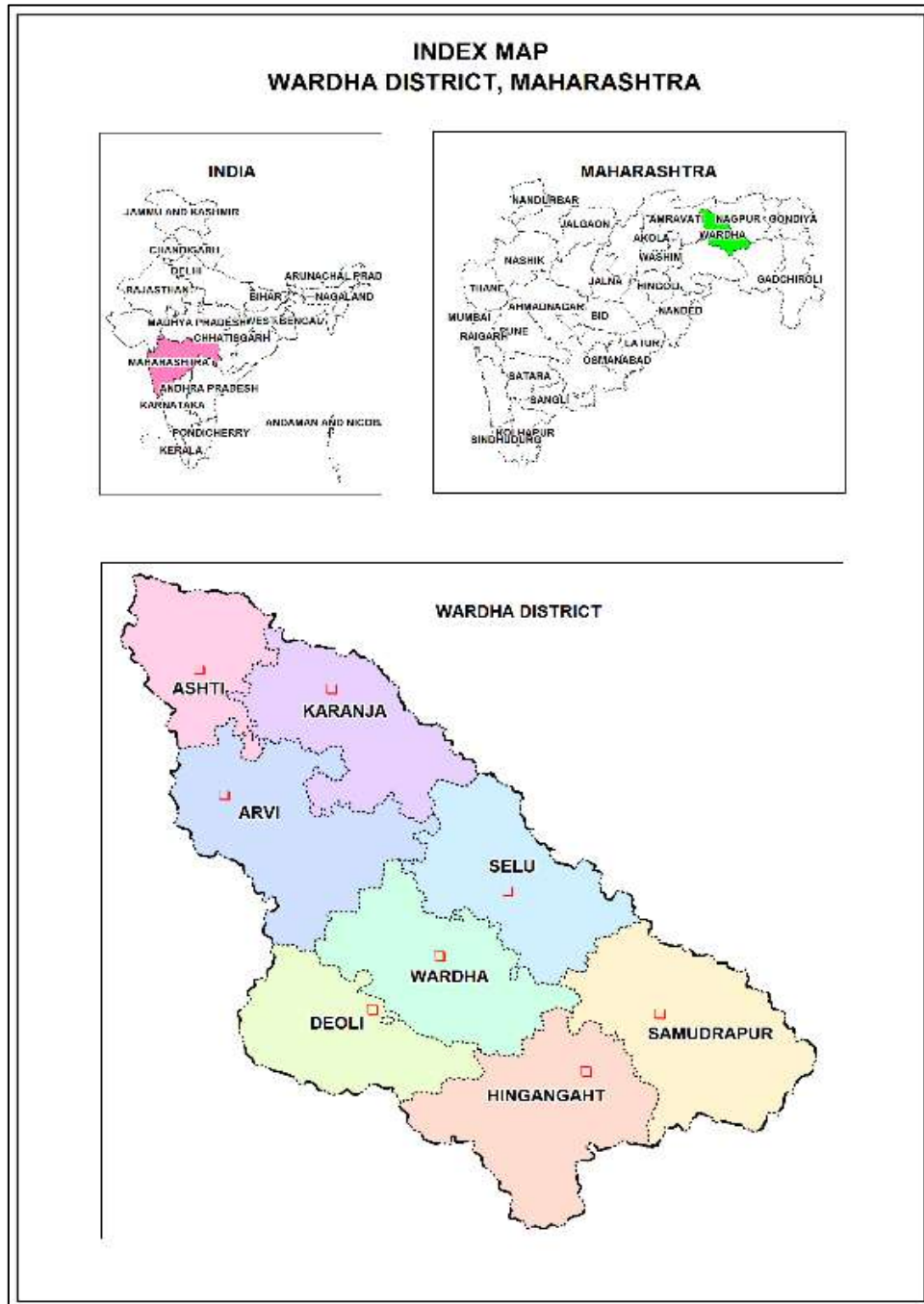


Figure.1.1 (a) Index map, Wardha District

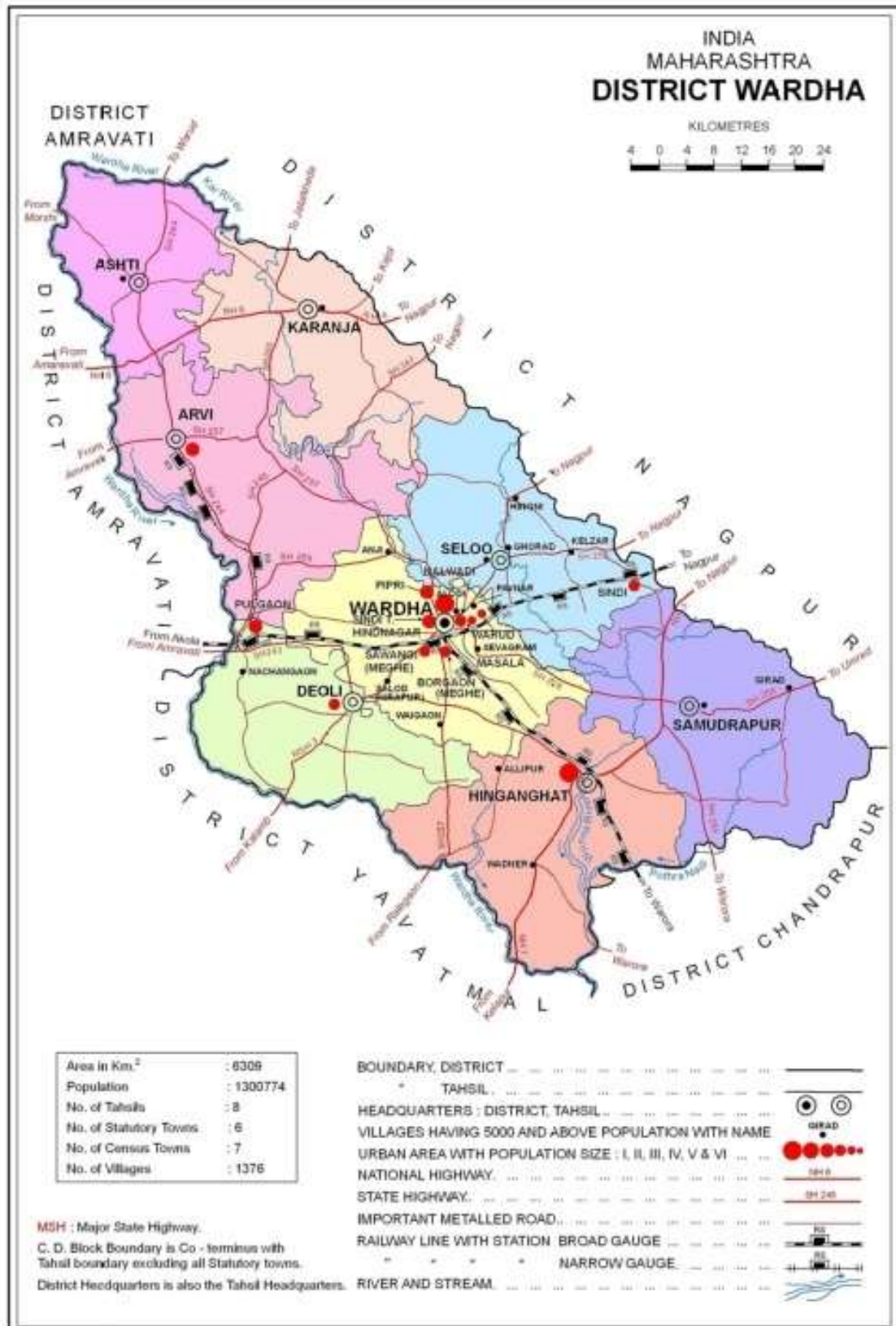


Figure 1.1 (b): Administrative map, Wardha District

Ground water exploration has been taken up in the district in different phases. The first exploration was taken up between 1974 and 1976 when 20 wells were drilled in Yashoda basin. Subsequently later on exploration was also taken up in other parts of the CGWB, CR, Nagpur

district and so far, 79 wells (EW-50, OW-14 and PZ-15) have been drilled. The taluka wise salient features of ground water exploration are given in Annexure-I

A total of 68 existing ground water monitoring stations were being monitored 4 times in a year to assess the ground water scenario of the district. Based on data gap analysis additional 133KOWs were inventoried to acquire micro level hydrogeological data to decipher the water level scenario, sub-surface lithological disposition and hydrogeological setup of shallow aquifer (Aquifer-I). The details of KOWs, GWM and PMP wells are given in Annexure-II and IV. Locations of existing ground water monitoring stations and exploratory wells are shown in **Figure.1.2**.

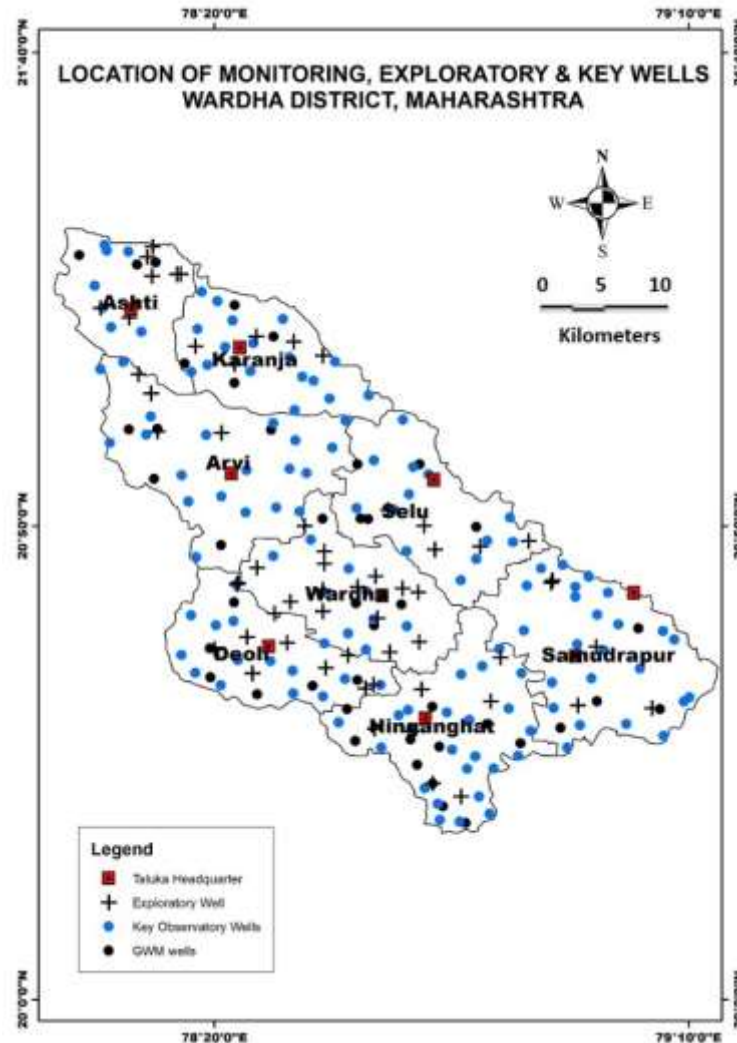
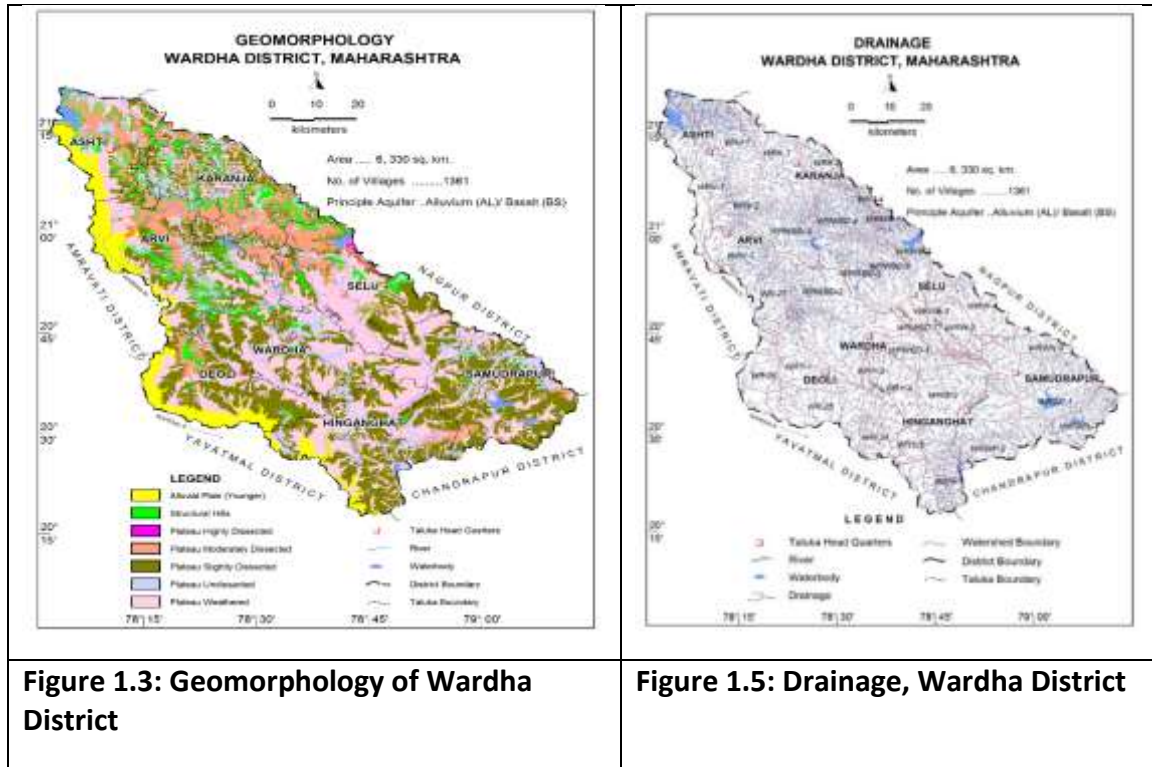


Figure 1.2: Location of Existing Exploratory wells, Key wells, and Ground Water Monitoring Wells

1.2 Geomorphology, Drainage, Land Use and Soil Types

The area is physiographically divided in two parts, the north and north eastern parts forming into a hilly spur projecting south and south eastwards from the Satpuras. While the southern part forms into an undulating plain with average elevation ranging between 300 and 500 metre above mean sea level (m amsl) the general slope is southwards and gentle towards Wardha River but tends to become steeper in the northern uplands. The geomorphological map of Wardha district is shown in **Figure. 1.3**



The entire district is mainly drained by Wardha River and its tributaries viz., Yashoda, Wunna and Bakli. Based on geomorphological setting and drainage pattern, the district is divided into 39 watersheds. The drainage map of Wardha district is shown in **Figure. 1.4**

Land Use (**Figure .1.5**) details have been observed that the major parts of the district are covered by agricultural land with net sown area of 4098.6 Sq.km (65.17%). Forest covers very little area of 386.16 Sq.km (6.14 %) and double cropped area covers 534.97 Sq.km (8.50%). The built-up area is reflected wherever settlement have come up.

The soil of the district is basically derived from Deccan Trap Basalt comprising of clay and loam mixture and almost entire district consists of black or dark brown soil over a sheet of Deccan Trap Basalt. The soil varies in depth from few centimetres to 3 m with average thickness being about 0.75 m. The soils of the district can be grouped as., Kali, Morand, Khardi and Bardi, fine calcareous deep soil, Loamy clayey extremely shallow soil, Fine loamy clayey shallow soil, Fine calcareous very deep soil and Loamy clayey very shallow soil with major part of the district being occupied by Kali soil. The thematic map of soil distribution in the district is shown in **Figure. 1.6**

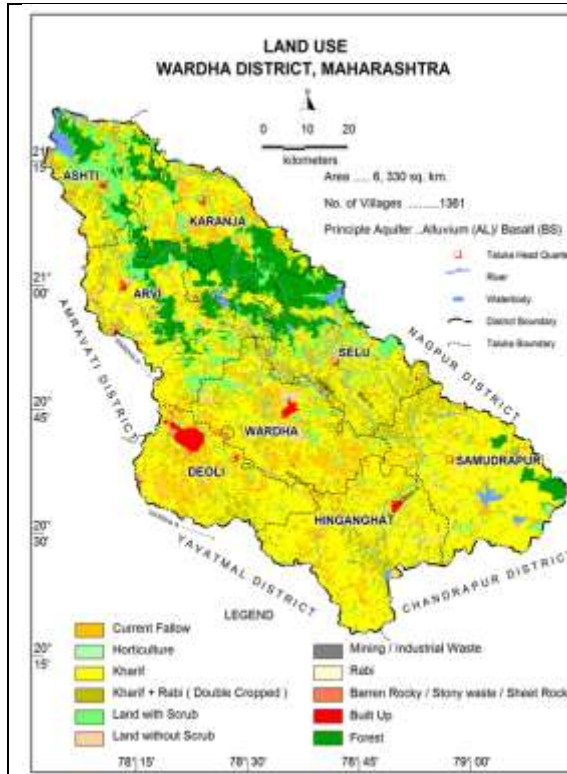


Figure 1.5: Land Use of Wardha District

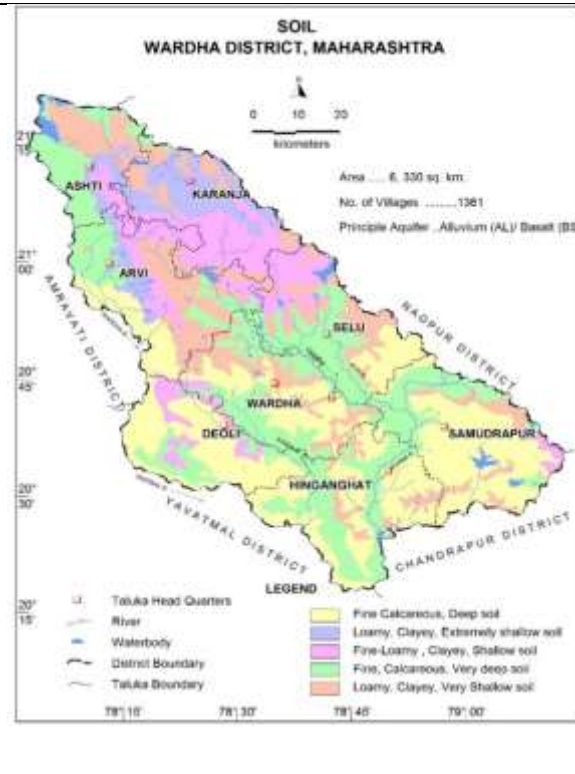


Figure 1.6: Soil, Wardha District

1.3 Climate and Rainfall

The climate of the district is characterized by a hot summer and general dryness throughout the year except during the south-west monsoon season i.e., June to September. The mean minimum temperature is 12.1°C and the mean maximum temperature is 42.8°C.

The Normal rainfall of the district is 1056.9 mm spread over 47 to 50 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)
Wardha	1998-2019	22	1056.9	253.18	26.9	-2.072
No of Years				% of total Years		
Departures						
Positive	6		27			
Negative	16		73			
Drought						
Moderate	4		18			

Severe	0	0
Acute	1	5
Normal & Excess RF		
Normal	16	73
Excess	1	5

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

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average Rainfall (mm)
Warhda	1277	978.3	886.5	1249.6	735.5	987.6	964.9	687.8	769.2	900	943.64

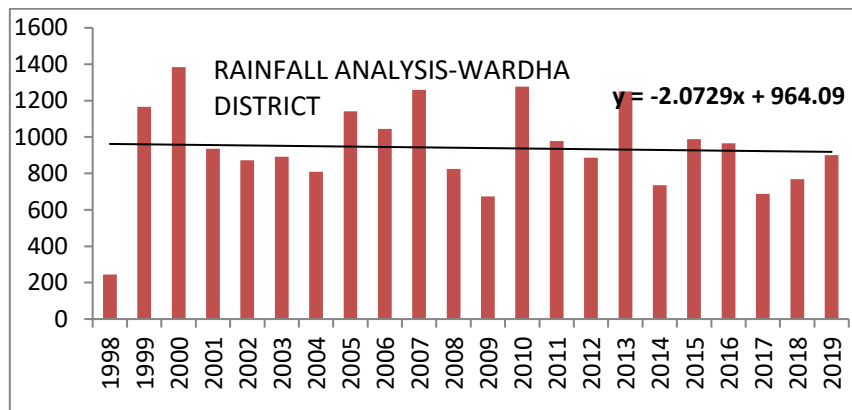


Figure 1.7: Rainfall Analysis (1998-2019), Wadha District

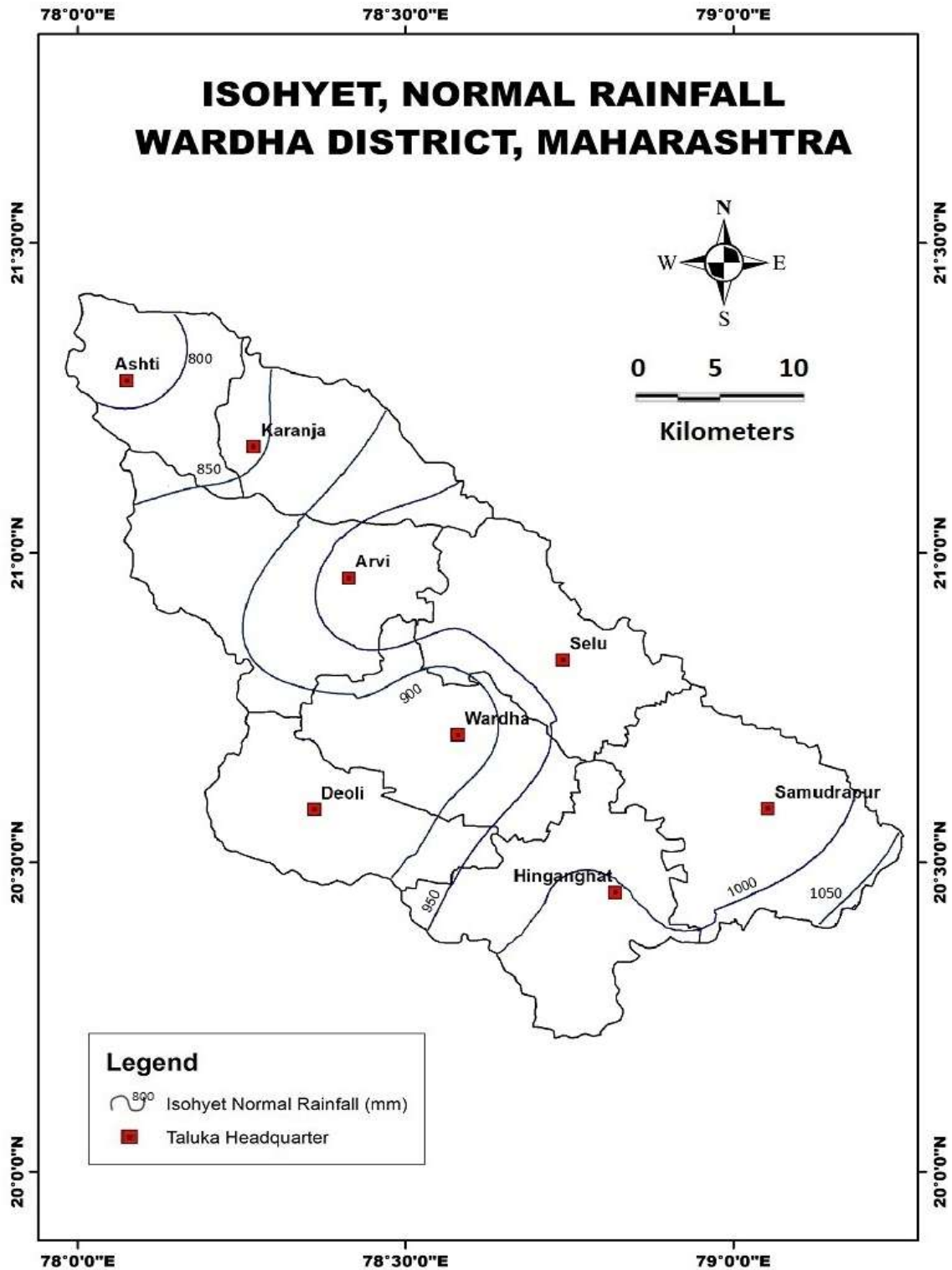


Figure 1.8: Isohyet map of Wardha District

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 Taroda and Mandgaon 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-V** and the plots of soil infiltration tests are presented in **Fig. 1.9**. The duration of the test ranges from 80 to 122 minutes, the depth of water infiltrated varied from 0.80 cm to 1.00 cm and the final infiltration rate in the area are 4.80 cm/hr at Taroda and 6.20 cm/hr at Mandgaon.

Table 1.3: Salient Features of Infiltration Tests

SI No	Village	Date	Duration (min)	Water Level (cm agl)	Final infiltrated Water Depth(cm)	Final Infiltration Rate (cm/hr)
1	Taroda	08/01/2020	80	30	0.80	4.80
2	Mandgaon	07/01/2020	122	30	1.00	6.20

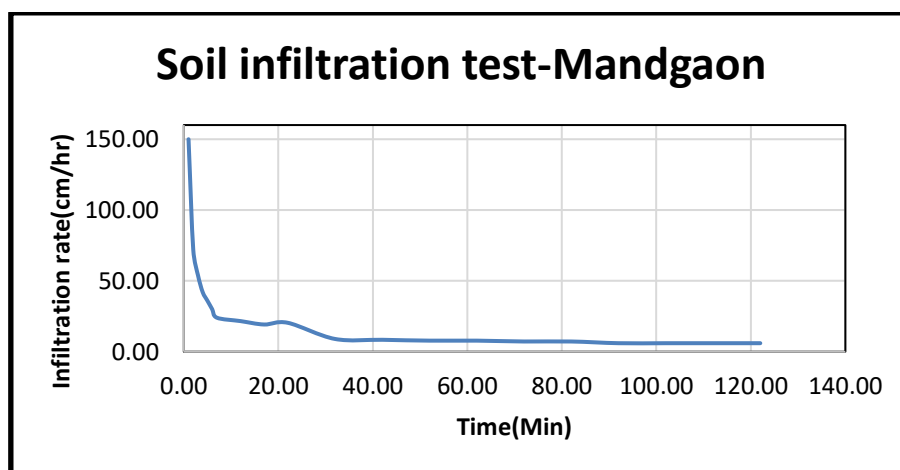
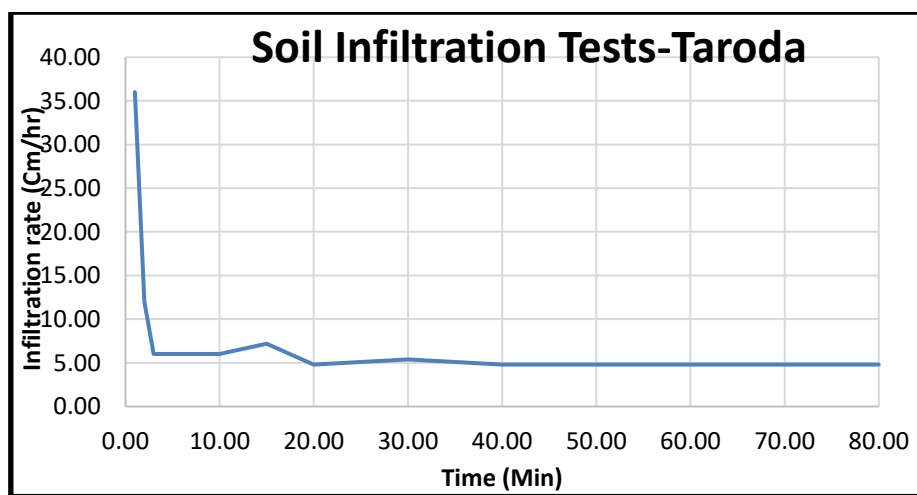


Figure 1.9: Soil Infiltration Tests of Wardha District

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 120 to 150 lpm for pumping duration of 160 to 180 minutes.

The drawdown observed at the end of the pumping ranged from 1.89 to 2.2 m and the residual drawdown for the 1st minute was observed to be ranging from 0.1 to 0.45 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 51.10 to 407.82 m²/day, whereas the specific yield 0.05% to 0.07%, whereas specific capacity values ranged from 54.55 to 79.37 lpm/m.

Table 1.4: Salient Features of Specific Yield Tests.

SI No	Village	Diameter (m)	Depth (mbgl)	SWL (mbgl)	Q (lpm)	Pt (min)	DD (m)	RDD (m)	C (lpm/m)	T (m ² /day)	S _y
1	Taroda	6.55	9.51	4.87	120	180	2.2	0.45	54.55	51.10	0.045
2	Mandgaon	5.83	15.38	7.43	150	160	1.89	0.1	79.37	407.82	0.074

Q=Discharge in LPM Pt=Pumping duration in Minutes

DD=Drawdown in meter RDD=Residual drawdown in meters

C=Specific Capacity in lpm/m

T=Transmissivity in m²/day

S_y=Specific Yield

2. HYDROGEOLOGY

2.1 Major Aquifer Systems

There are 2 types of aquifer systems in the area namely Alluvium and Basalt. The map showing major aquifer systems of Wardha district is shown in **Figure 2.1**.

Alluvium

The Alluvial deposits are restricted along the banks of Wardha River and Yashoda River and have limited areal extent. They comprise of upper layer of silt material underlain by a coarse detrital material like sand and gravel with admixture of clay. Coarse detrital material occurring as lenses form good aquifers, whereas finer silt and clayey material are poorly permeable and act as aquiclude. The maximum thickness of Alluvium is about 30 m, which is situated along the bank of Wardha River elsewhere it is very shallow.

Basalt

Deccan Trap Basalt of late Cretaceous to Eocene age is the major rock formation in the district covering almost entire district, a map depicting hydrogeological features is presented in **Figure 2.2** and water table contour map is shown in **Figure 2.3**.

Deccan Trap Basalt represents a thick pile of nearly horizontal flows, within these thick piles seven flows have been deciphered down to a depth of 120 m. The porosity and permeability have been found to change in an individual flow, from flow to flow and from place to place.

Ground water in the near-surface strata generally occurs under unconfined conditions but at deeper levels it usually occurs under semi- confined state, the confining layers being red boles and dense massive part of Basalt. Deeper confined aquifers are less productive than shallow semi- confined and phreatic aquifers, unless they have interconnected fracture system, which is being recharged. Weathering of Basalt both in massive and vesicular unit have given rise to good phreatic aquifers even down to a depth of 20 m and these shallow aquifers are extensive and homogeneous. The palaeo-weathering which has taken place during the time intervals between two eruptions has given rise to stratified aquifer systems. Ground water is under semi-confined conditions in these aquifers, which get recharged mainly from downward recharge through shallow aquifers and from major surface water bodies. Broadly speaking, three distinct aquifer systems are available in the Basalts in areas underlain by Deccan Traps, Wardha district being one such area.

- ❖ Shallow water table or phreatic aquifer down to 30 m depth.
- ❖ Semi-confined aquifers at slightly deeper levels overlain by massive Basalt and red boles from 30 to 60 m depth.
- ❖ Confined aquifers, which are noticed at still deeper levels in flows not exposed and available from about 60 m to about 170 m.



Figure 2.1: Major Aquifers

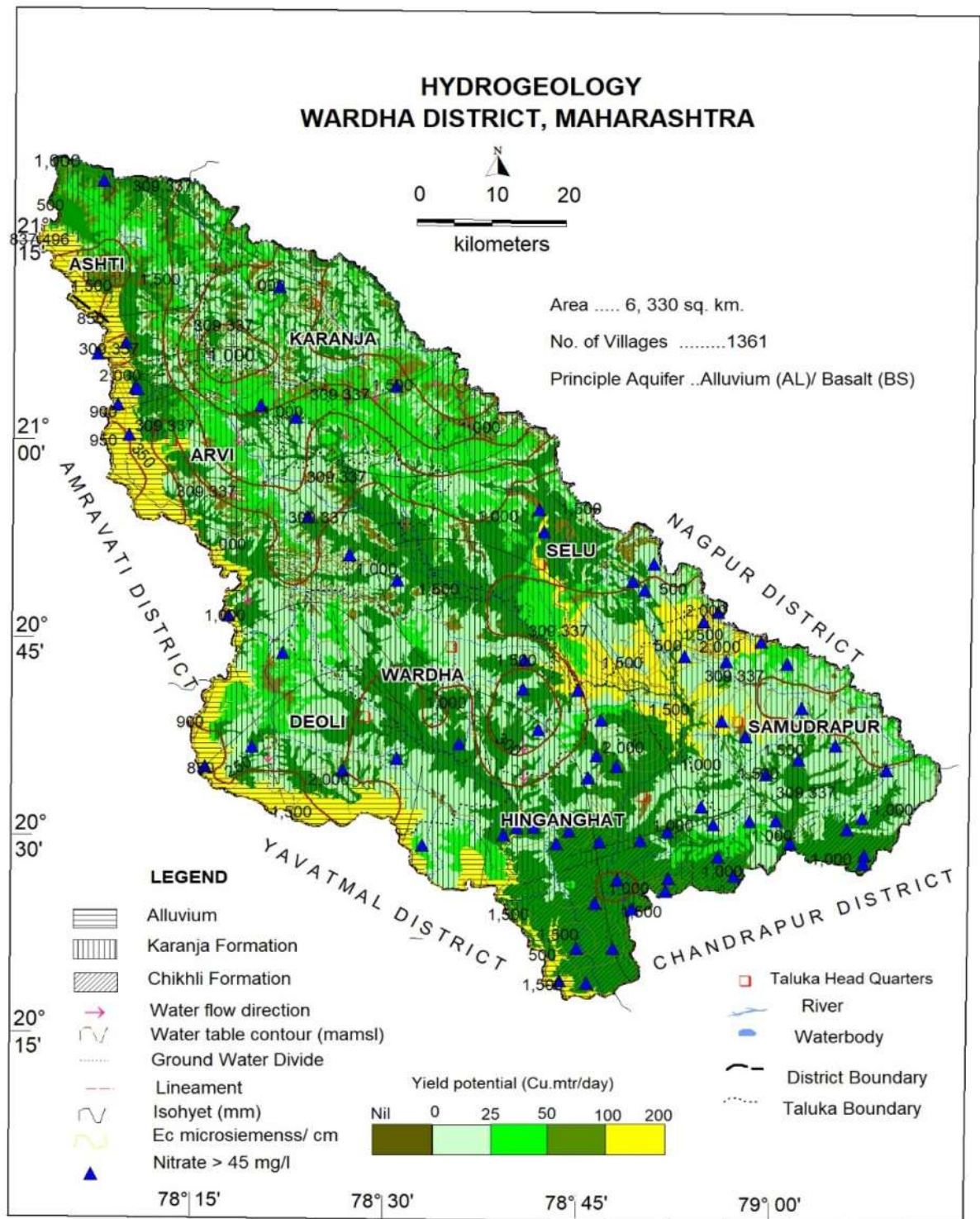
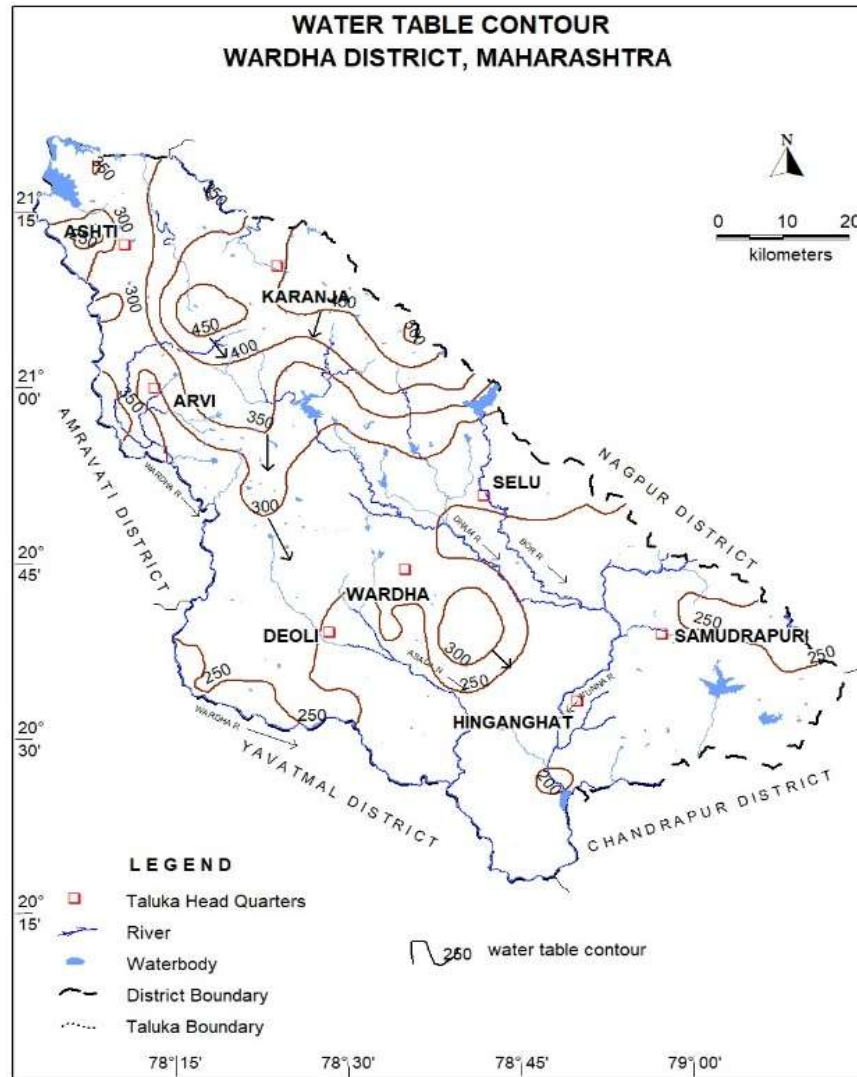


Figure 2.2: Hydrogeology

Water Table Elevation in Wardha district ranges between 200 m amsl and 500 m amsl. The entire district is mainly drained by tributaries of Wardha River, the general slope is southwards and gentle towards Wardha River but tends to become steeper in the northern uplands. GW movement is from NE to SW with elevation from 450 m to 250 m amsl. Dham river has GW movement from N to SE with elevation from 450 m to 250 m

amsl while Wunna river in southern part of the district has GW movement from SE to S with elevation from 250 m to 200 m amsl. Bor river has GW movement from N to SE with elevation from 350 m to 250 m amsl. It has been observed that the ground water flow direction follows the drainage and topography of



the area

Figure 2.3: Water Table contour

Table 2.1: Aquifer Characteristic of Wardha district

Major Aquifers	Basalt (Deccan Traps)		Alluvium
Type of Aquifer	Aquifer-I	Aquifer-II	Aquifer-I (AL02)
Formation	Weathered/Fractured Basalt	Jointed / Fractured Basalt	Alluvium-Sand / silt & Clay
Depth of Occurrence (mbgl)	5 to 30	30 to 170	5 to 30
SWL (mbgl)	3.1 to 18.9	1.05 to 65	3.1 to 20
Granular/Weathered /Fractured rocks thickness (m)	5 to 20	3 to 11	5 to 22

Fractures/granular zone encountered (mbgl)	Upto 28	Upto 170	Upto 30
Yield	10 – 100 m ³ /day	2.5 lps	60-120m ³ /day
Sustainability	1 to 3 hrs	0.5 to 3 hrs	1 to 4 hrs
Transmissivity (m ² /day)	51.10 -407.82	0.27-270	12-250
Specific Yield/ Storativity (Sy/S)	0.045 to 0.074	3.3*10 ⁻⁴ to 1.35*10 ⁻²	0.07
Suitability for drinking/ irrigation	Suitable for both except high Nitrate (>45 mg/l)	Suitable for both, except high EC	Suitable for both

Aquifer Characteristic of Wardha district is shown in **Figure 2.1**. There are two major aquifers such as Deccan Trap Basalt and Alluvium. Weathered/Fractured Basalt and Jointed / Fractured Basalt are the water bearing formations in Deccan Trap Basalt of Wardha District. Yield of Aquifer –I is 10 – 100 m³/day, Aquifer-II is 0-2.5 lps and Aquifer-I Alluvium having yield of 60-120m³/day.

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) and Aquifer –I Alluvium are 5 to 30 m while depth of occurrence of Aquifer-II Basalt (Jointed & Fractured Basalt) is 30 to 170 m.

Yield Potential of Aquifer-I (Basalt & Alluvium) and Aquifer-II (Basalt) is shown in **Figure 2.6 and 2.7**. Aquifer –I Alluvium having yield potential of 60 to 120 m³/day while yield potential of Aquifer-I Basalt is 10 to 100 m³/day. Yield Potential of Aquifer-II Basalt is 0 to 2.5 lps.

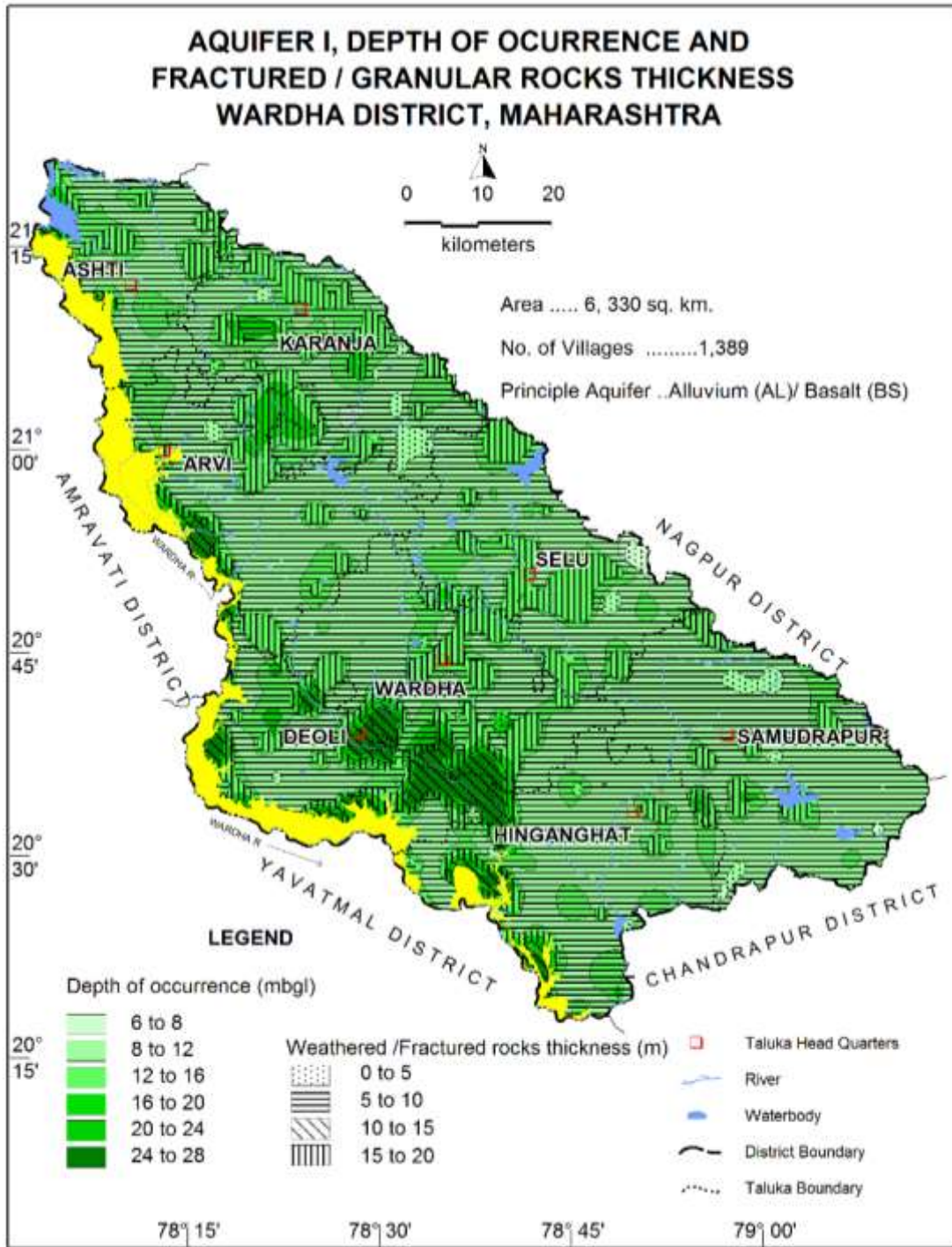


Figure 2.4: Depth of occurrence and fractured/granular rock thickness of Aquifer-I

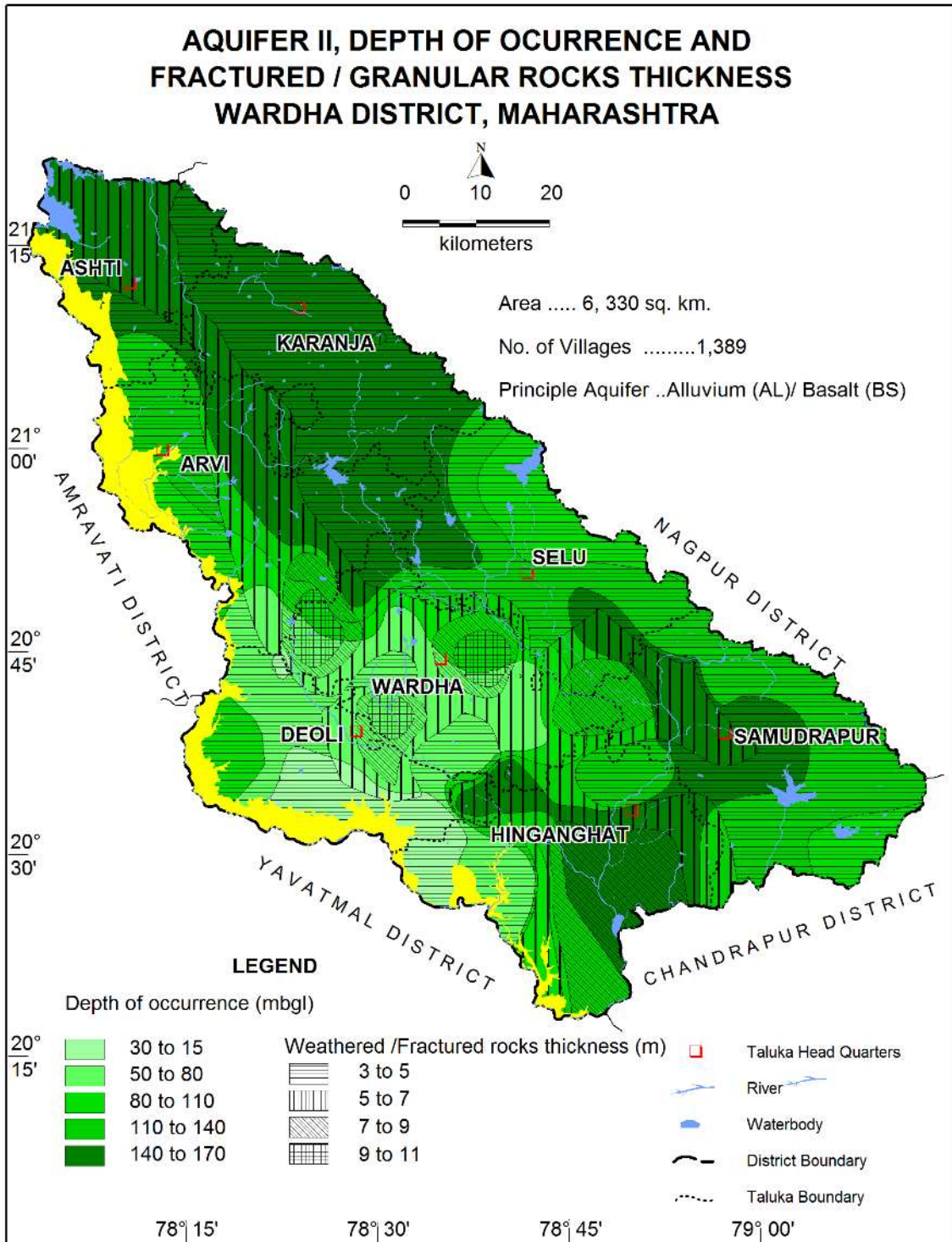


Figure 2.5: Depth of occurrence and fractured/granular rock thickness of Aquifer-II

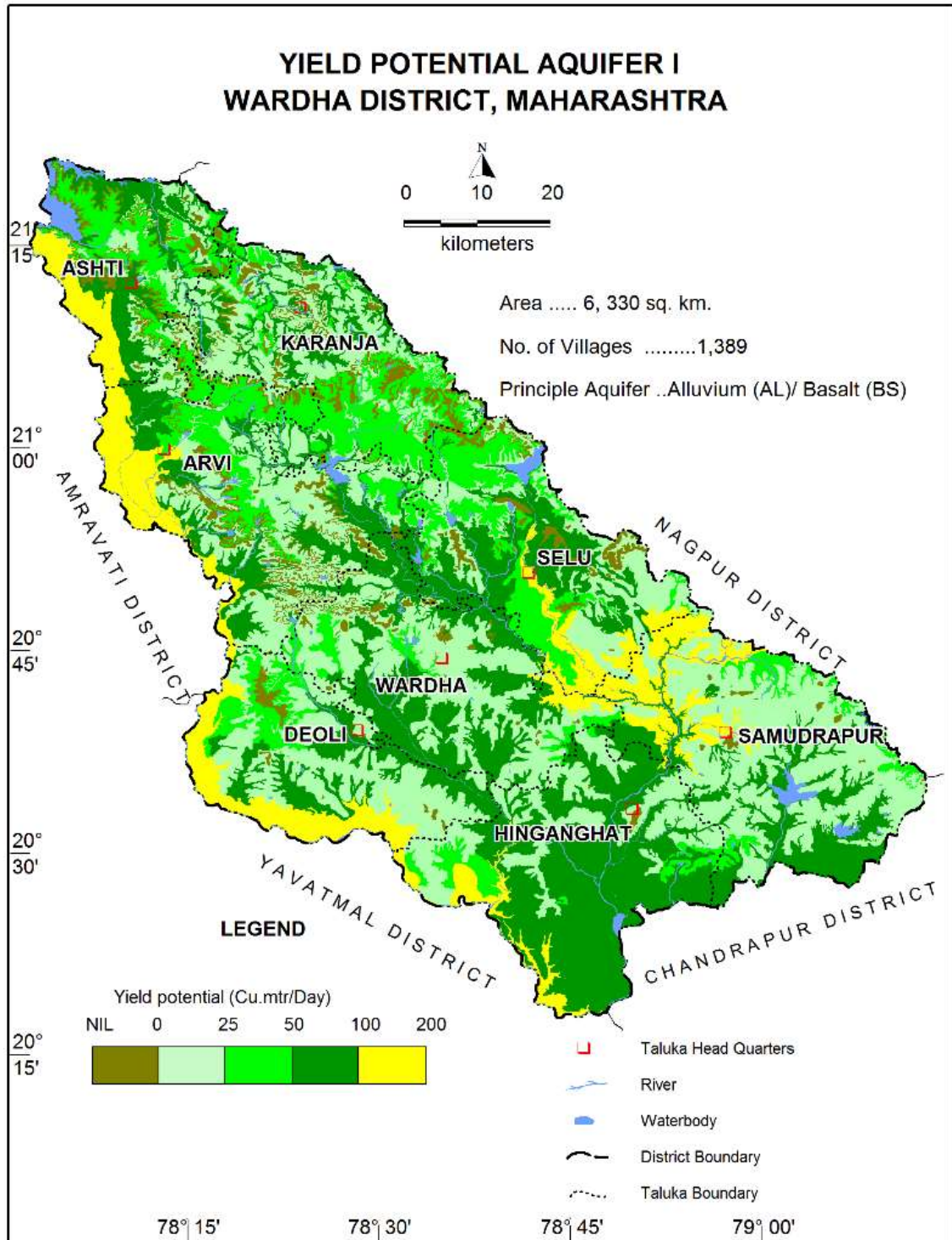


Figure 2.6: Aquifer-I Yield Potential (Basalt & Alluvium)

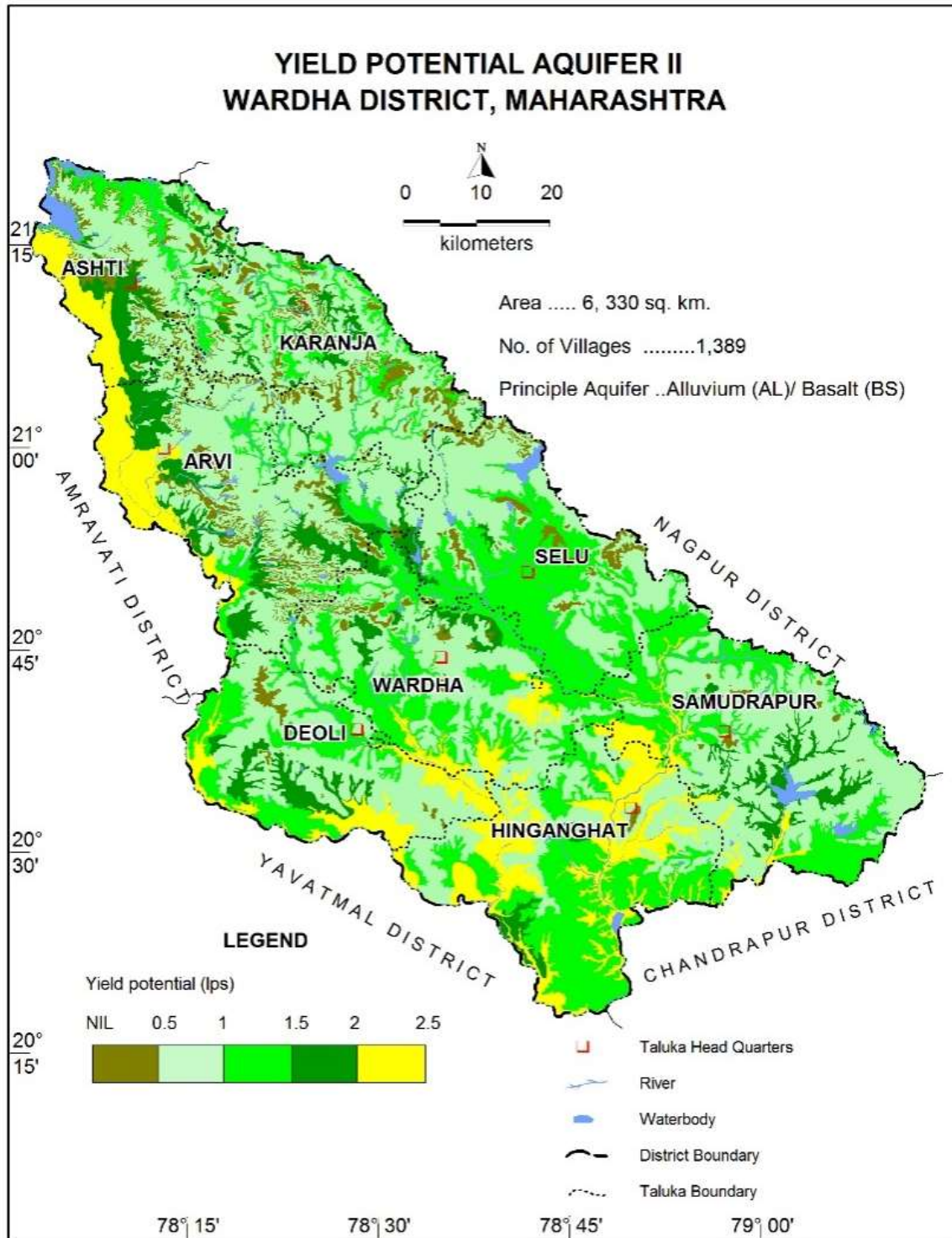


Figure 2.7: Aquifer-II Yield Potential (Basalt)

Yield potential	Aquifer I	Aquifer II
Alluvium	100 to 120 m ³ /day	-
Basalt	10 to 100 m ³ /day	0.0 to 2.5 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 Alluvial terrain. The specific capacity of the wells tapping Deccan Trap Basalt ranges between 0.003 and 18.75 lpm/m-drawdown and the transmissivity ranges from 51 to 407 m²/day. The specific capacity of dugwells tested in Deccan Trap Basalt ranges between 54.55 and 79.37 lpm/m-drawdown. During the pumping tests conducted on the exploratory wells in Basalt, the transmissivity was found to vary from 0.27 to 270m²/day. The storage coefficient varied between 3.3x10⁻⁴ and 135x10⁻².

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 **Figure 2.9, 2.10, 2.11 and 2.12 (a to d)** to understand the subsurface disposition of aquifer system.

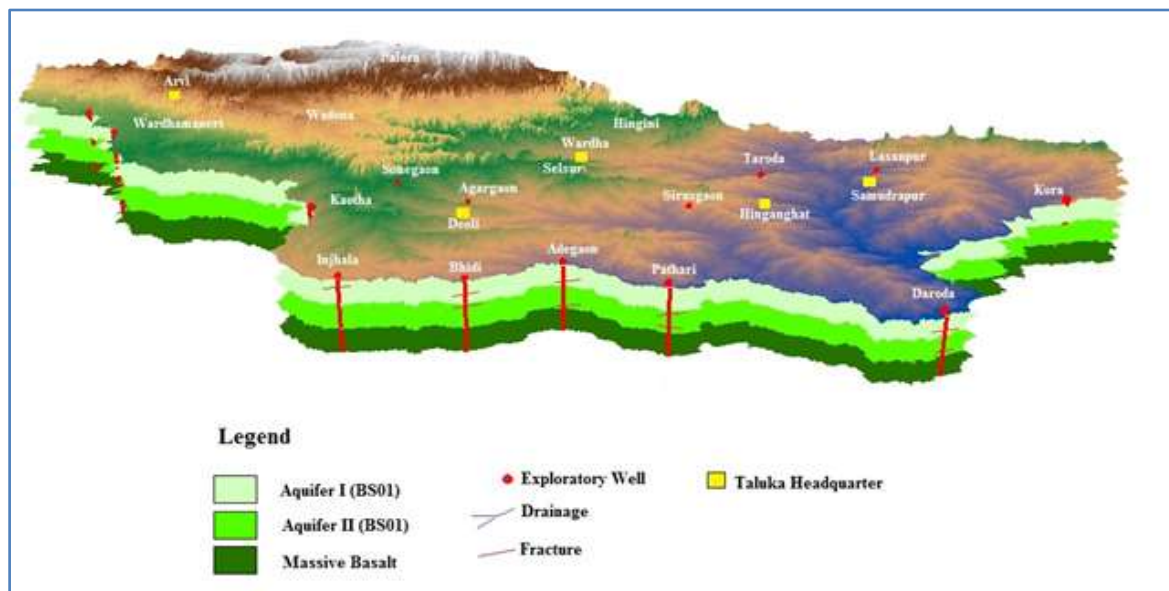


Figure 2.8-3D Aquifer Disposition

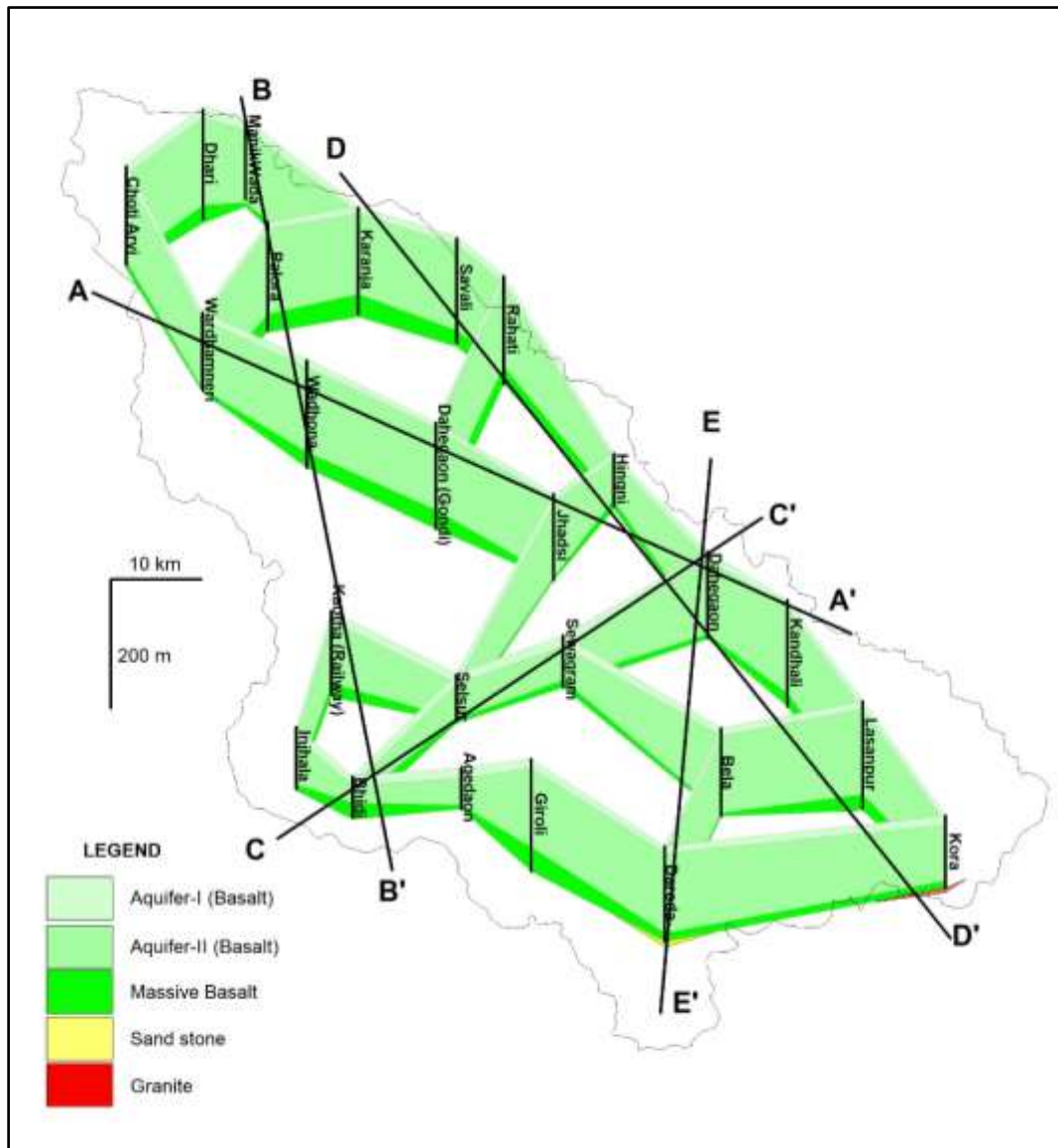


Figure 2.9: Fence Diagram

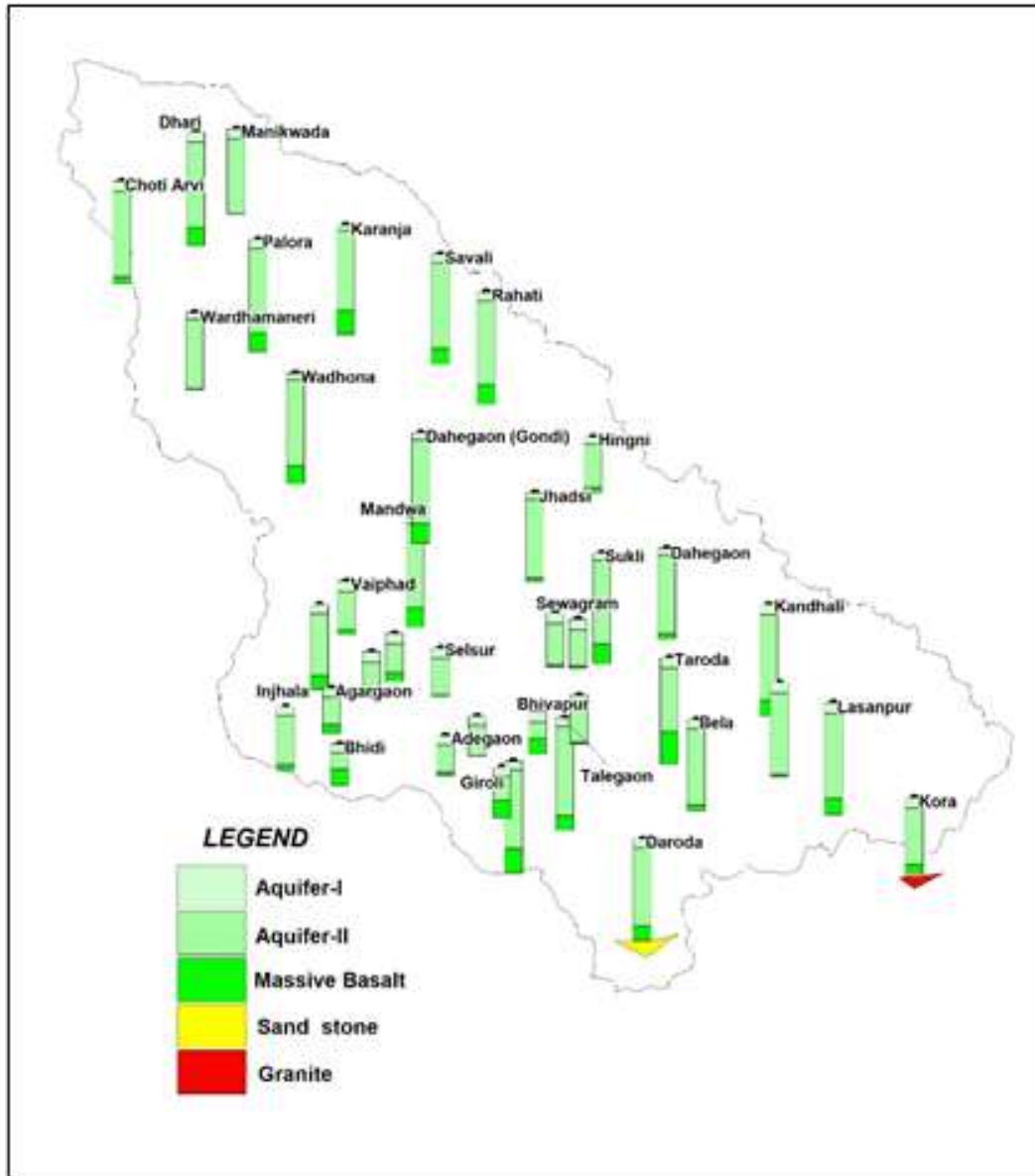


Figure 2.10: Bar Diagram

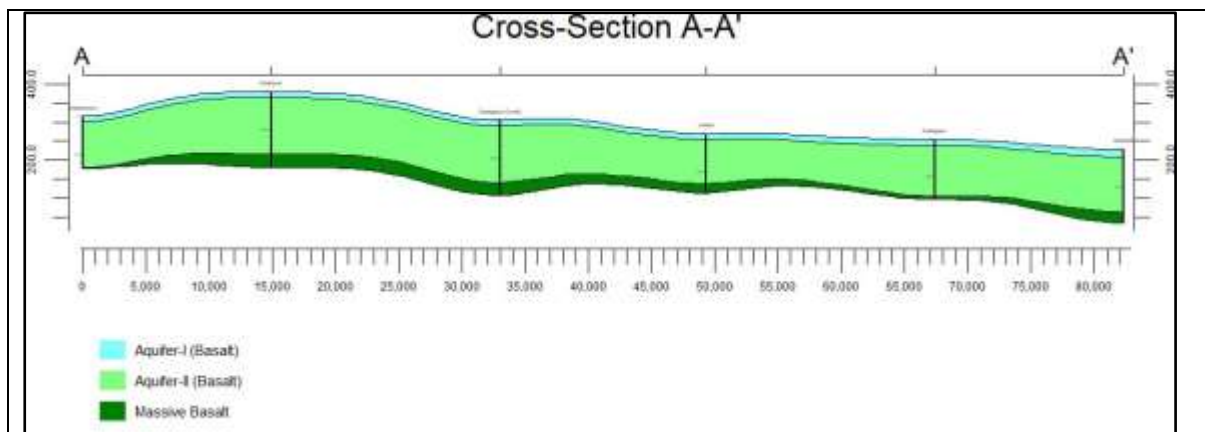


Figure 2.11 (a): Lithological section

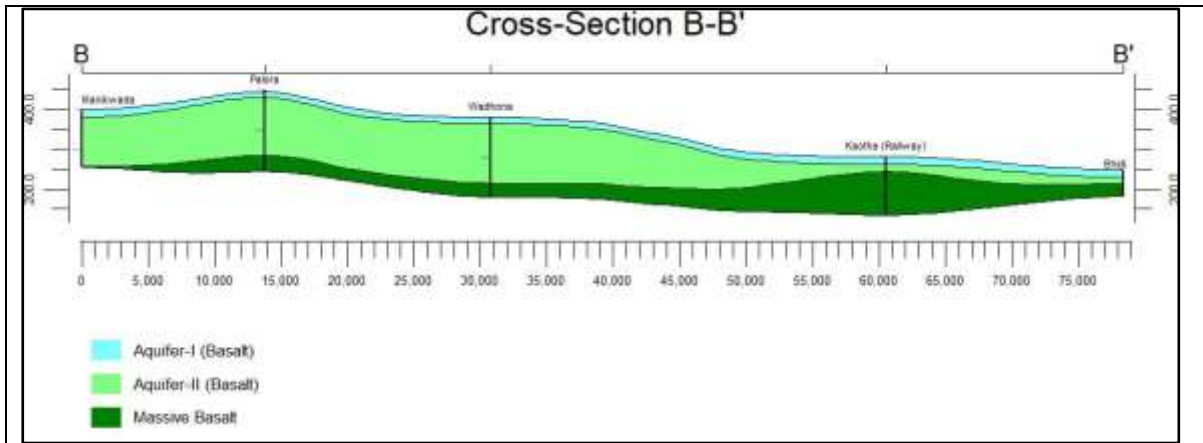


Figure 2.11 (b): Lithological section

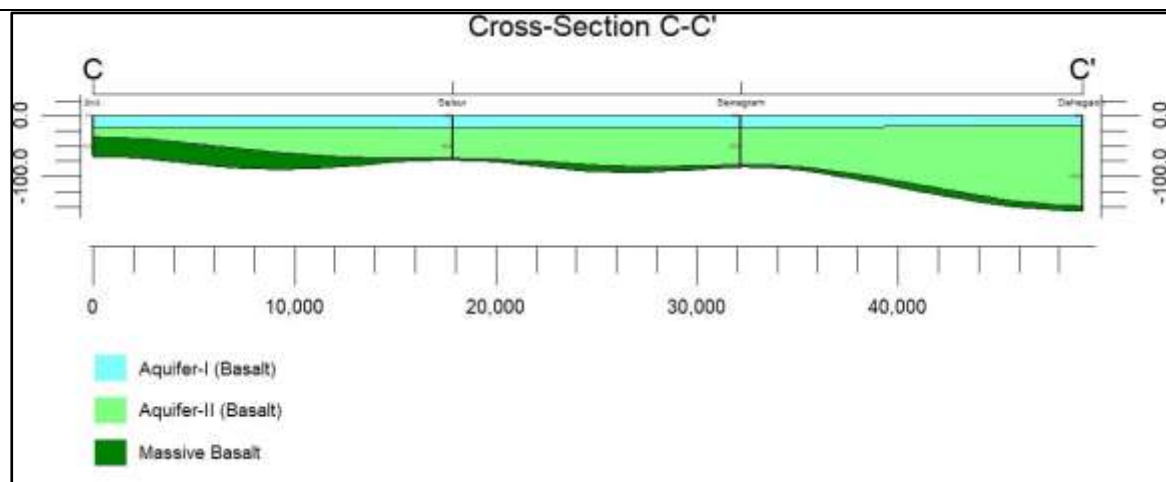


Figure 2.11 (c): Lithological section

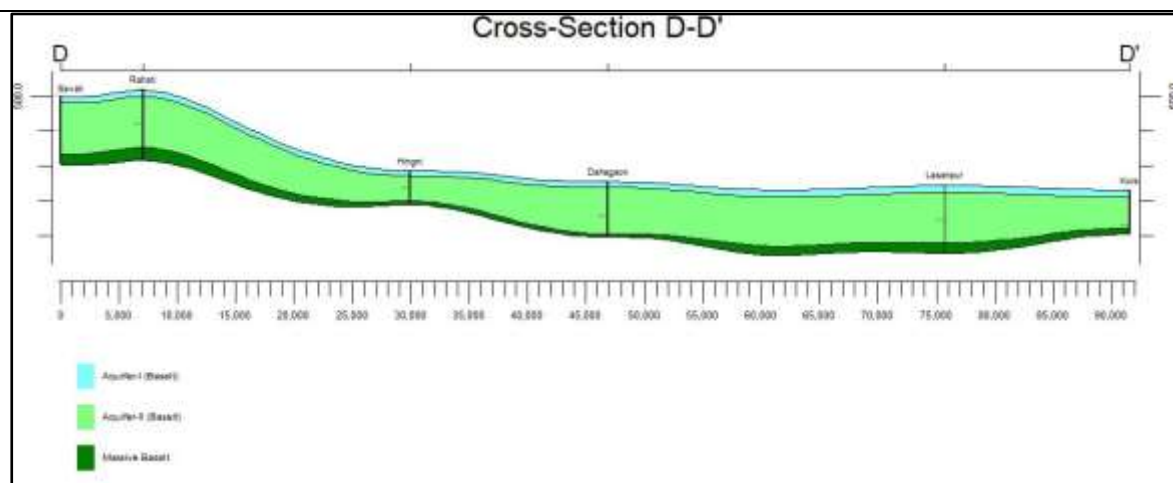


Figure 2.11 (d): Lithological section

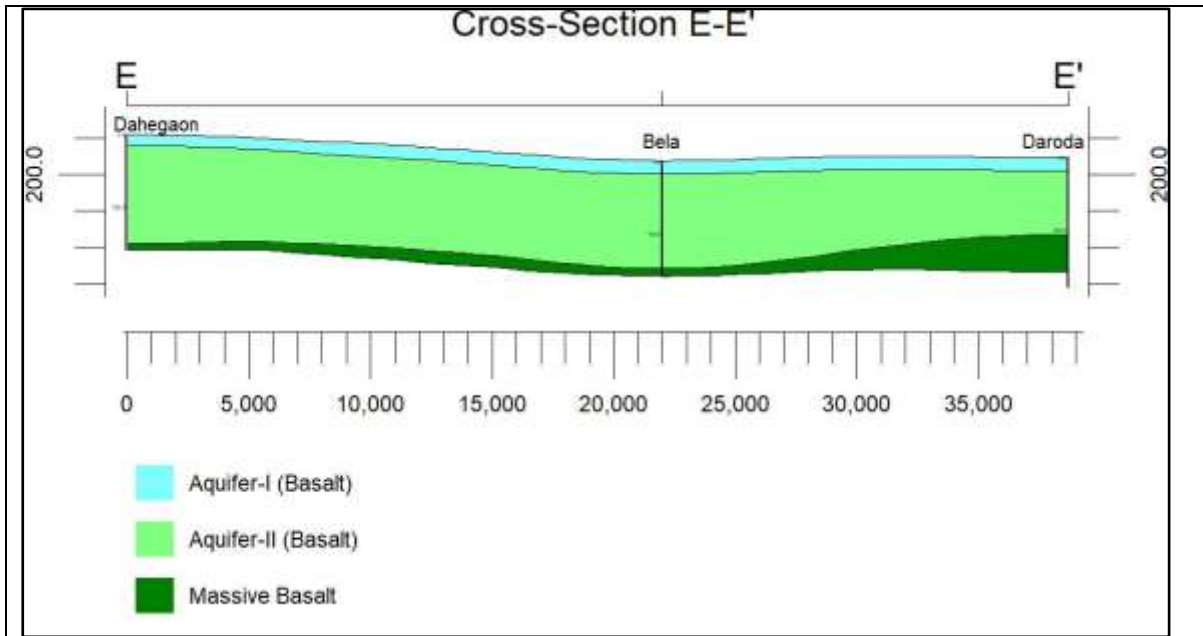


Figure 2.11 (e): Lithological section

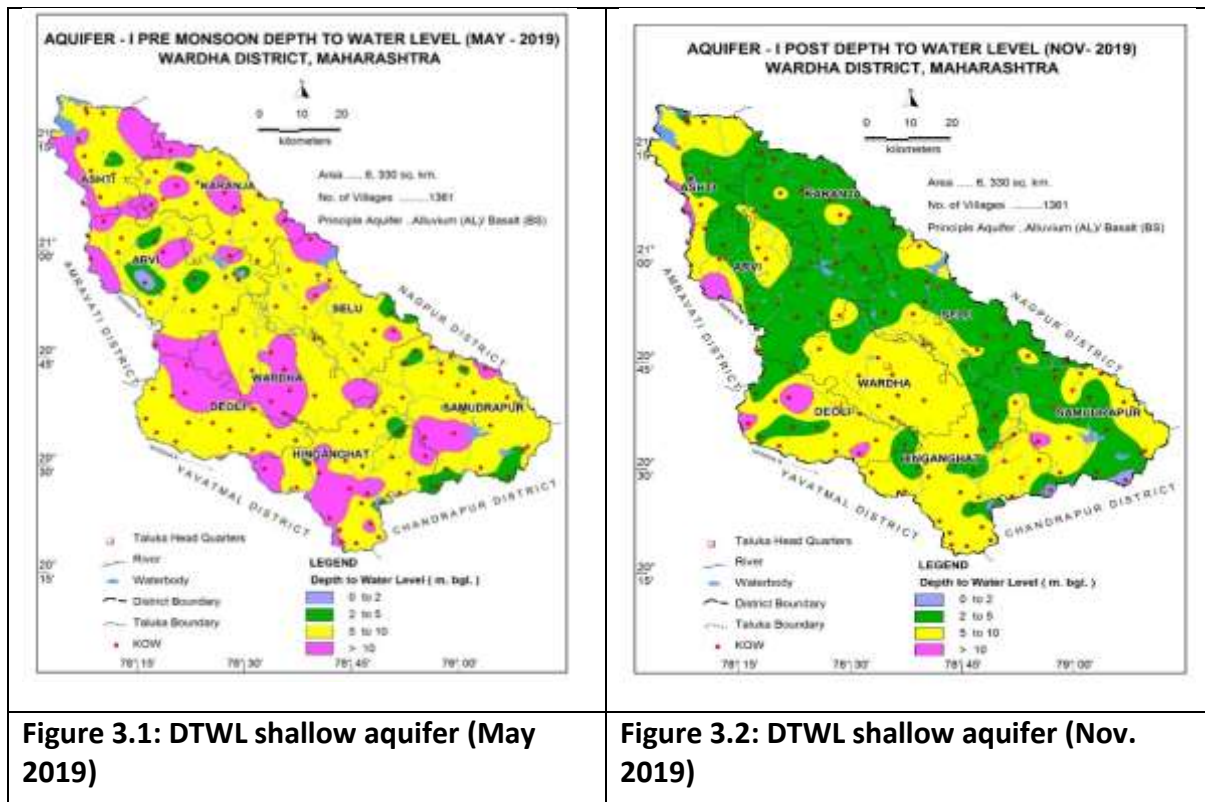
3. WATER LEVEL SCENARIO

3.1 Depth to Water level of (Aquifer-I/Shallow Aquifer)

Central Ground Water Board periodically monitors 68 (GMMW-57, PZ-11) Ground Water monitoring wells in the Wardha district, four times a year i.e. in January, May (Premonsoon), August and November (Postmonsoon). Apart from this under NAQUIM study, 133 KOW were also established and monitored during the year 2019. These data have been used for preparation of depth to water level maps of the district. Pre-monsoon and post monsoon water levels along with fluctuation during 2019 and long-term water level trends (2010-2019) are given in Annexure-VI.

3.1.1 Pre-monsoon DTW (May-2019)

The depth to water levels in Wardha district during May 2019 ranges between 3.12 (Sawangi, Hinganghat block) and 18.90 mbgl (Nababpur, Ashti block). The depth to water levels less than 5 mbgl and more than 10 mbgl are observed in isolated patches. The depth to Water level between 5-10 mbgl covers almost the entire area of the district. Water level range between 2-5 m bgl is observed in small patches of all blocks except Wardha and Deoli blocks. Water level ranges between 0-2 m bgl is observed in Arvi block of the Wardha district. The premonsoon depth to water level map is depicted in **Figure 3.1**.



3.1.2 Seasonal Water Level Fluctuation (May-Nov2019)

It is observed that minimal water level fluctuation was observed at Silli, Samudrapur block (0.15 m) while maximal water level fluctuation was measured at Kharas Khande, Karanja block (11.70 m). Declining water level has been observed in most of the locations of the blocks except for the few locations of Samudrapur, Deoli, Hinganghat and Arvi. The map depicting seasonal fluctuation is shown in Fig. 3.3.

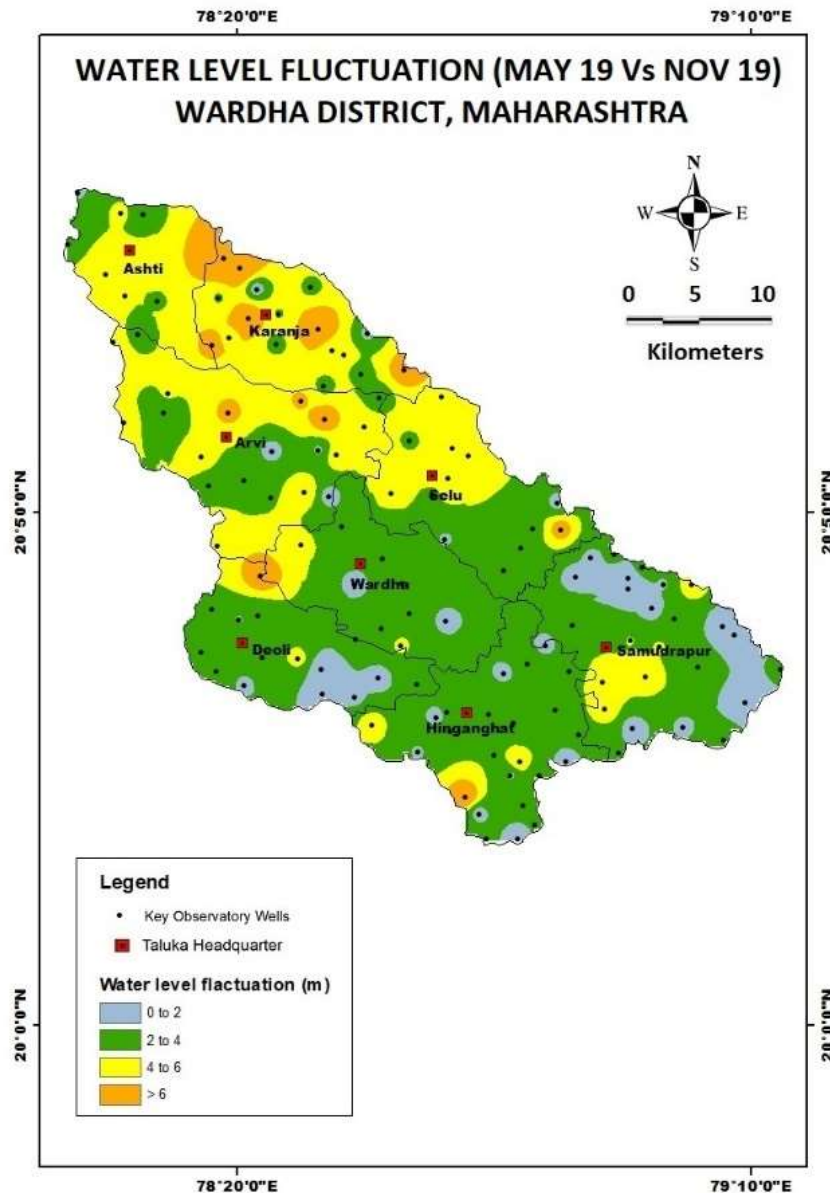


Figure 3.3: Seasonal Fluctuation, shallow aquifer (May-19 vs Nov- 19)

3.2 Depth to water level of (Aquifer-II /Deeper Aquifer)

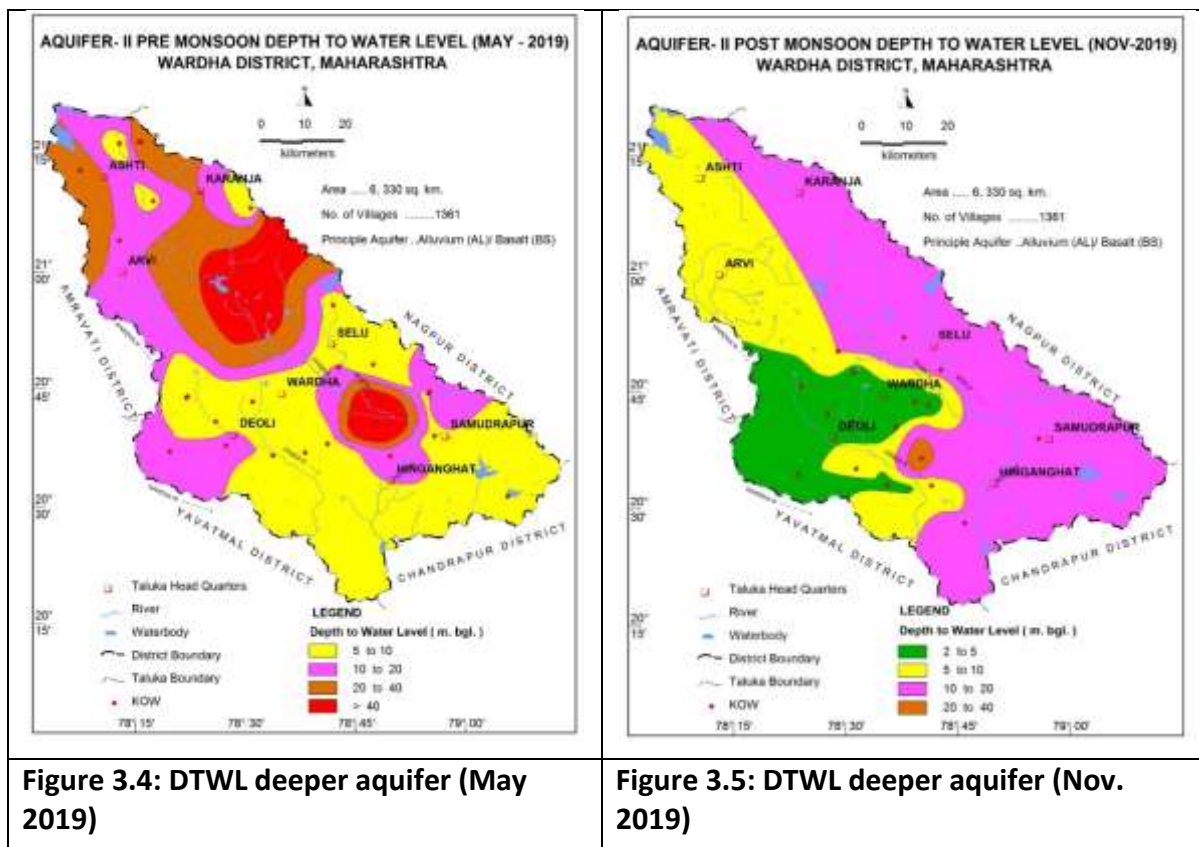
3.2.1 Pre-monsoon Depth to Water Level (May-2019)

The pre-monsoon depth to water level in deeper aquifer of Wardha district, during May 2019 range from 1.05 mbgl (Kaotha, Deoliblock) to 65 mbgl (Rahati, Karanjablock). The depth to water level between 10 and 20 mbgl is observed in the parts of Deoli, Hinganghat, Karanja, Samudrapur and Selu blocks. The deepest water level (>30 mbgl) has been observed

in Arvi, Ashti, Karanja and Wardha Blocks. The pre-monsoon depth to water level map of Aquifer-II is given in **Figure 3.4**.

3.2.2 Post-monsoon Depth to Water Level (Nov-2019)

In Aquifer-II, the post-monsoon depth to water levels in Wardha District during November 2019 range between 2.65 mbgl (Sewagram, Wardha block) and 27 mbgl (Talegaon, Wardha block). Depth to water level less than 10 m bgl has been observed in parts of Deoli, Hinganghat and Wardha block. Depth to water level more than 20 mbgl is observed in only Wardha block. The post-monsoon depth to water level map of Aquifer-II is given in **Figure 3.5**.



3.3 Water Level Trend (2010-2019)

During pre-monsoon, rise in water level trend has been recorded at 61 stations and ranges from 0.0096m/year (Kajalsara, Hinganghat block) to 0.53 m/year (Danapur, Karanja block) while falling trend was observed in 92 stations varying from 0.003 (Dahigaon) to 2.58 m/year (Ashti, Ashti block). Area showing rising trend >0.2 m observed in 123.59 Km². Area showing falling trend >0.2 m observed in 797 Km². (**Figure 3.6**).

During post monsoon, rise in water level trend has been recorded at 69 stations and it ranges between 0.0012 m/year (Sirsoli, Ashti block) to 0.437m/year (Itala, Wardha block) while falling trend was observed in 85 stations varying from 0.0042 (Samudrapur) to 0.39 m/year (Gondapur, Selu block). Area showing rising trend >0.2 m observed in 105.4Km².Area showing falling trend >0.2 m observed in 103.49 Km². (**Figure 3.7**).

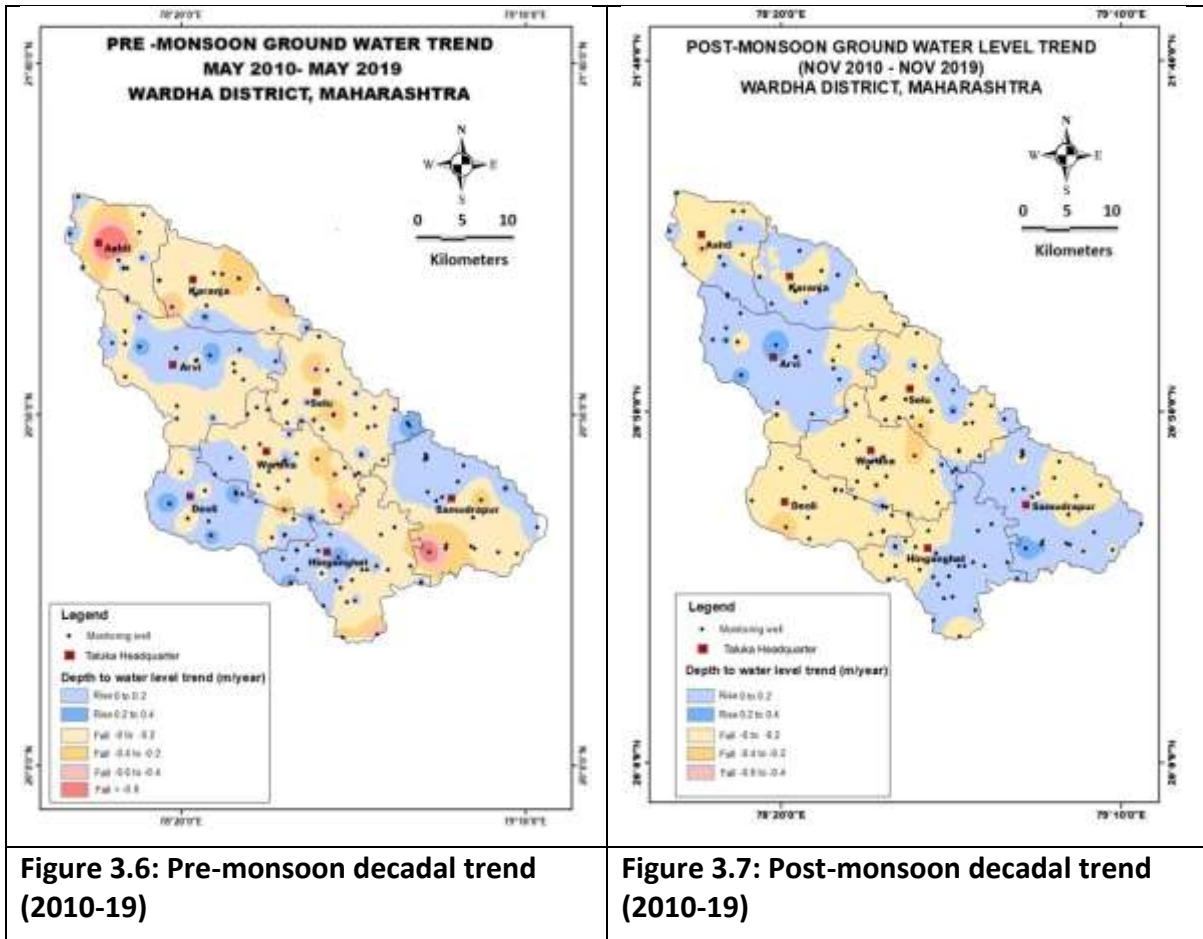


Figure 3.6: Pre-monsoon decadal trend (2010-19)

Figure 3.7: Post-monsoon decadal trend (2010-19)

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 activities, domestic requirements, and industrial needs. The analysis of hydrographs shows that the annual rising limbs in hydrographs indicate the natural recharge of groundwater regime due to monsoon rainfall, as the monsoon rainfall is the sole source of natural recharge to the ground water regime (Figure. 3.8 a to h). However, continuous increase in the groundwater draft is indicated by the recessionary limb.

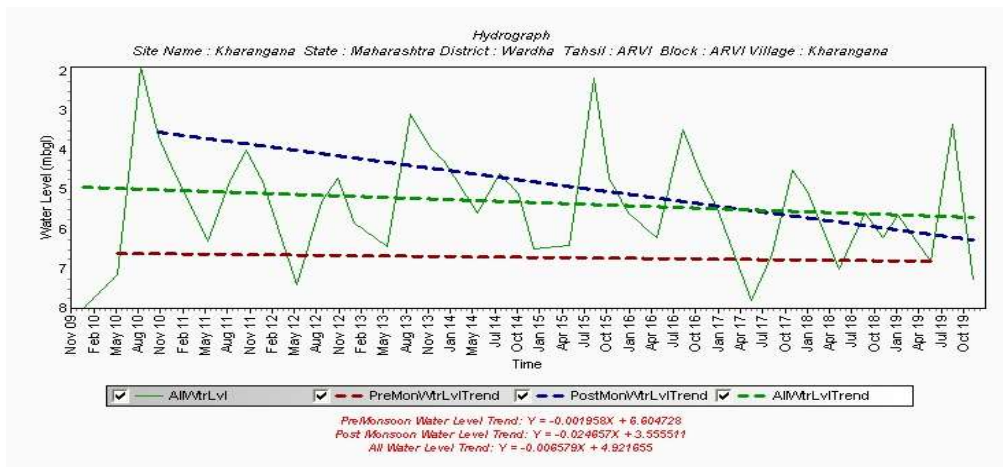


Figure 3.8 a: Hydrograph (2010-19), Kharangana, Arvi Taluka

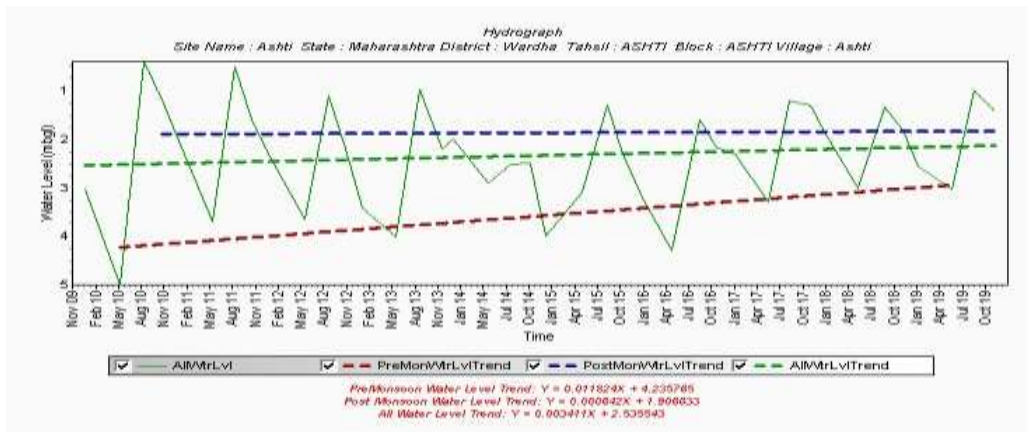


Figure3.8 b: Hydrograph (2010-19), Ashti, Ashti Taluka

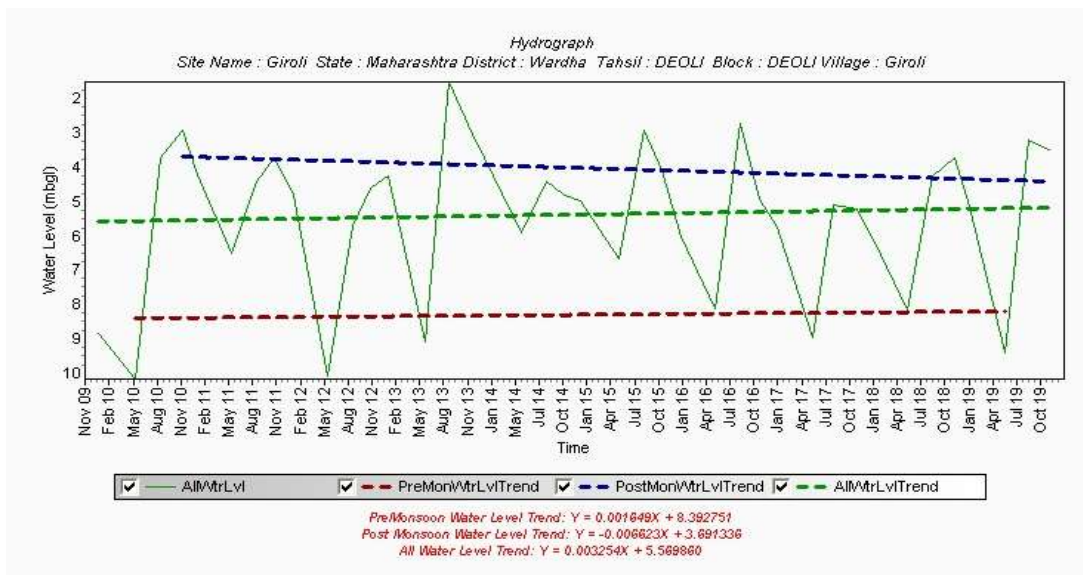


Figure3.8 c: Hydrograph (2010-19), Giroli, Deoli Taluka

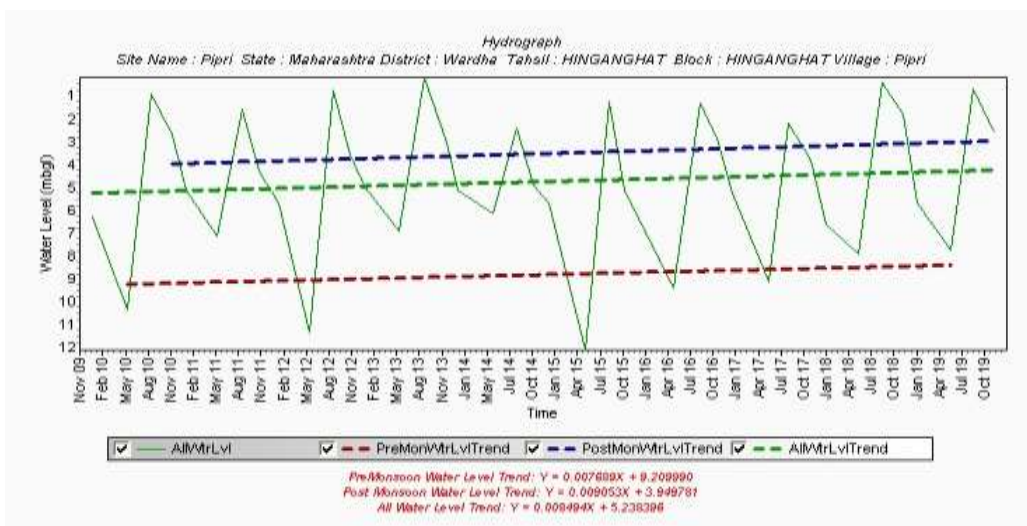


Figure3.8 d: Hydrograph (2010-19), Pipri, Hinganghat Taluka

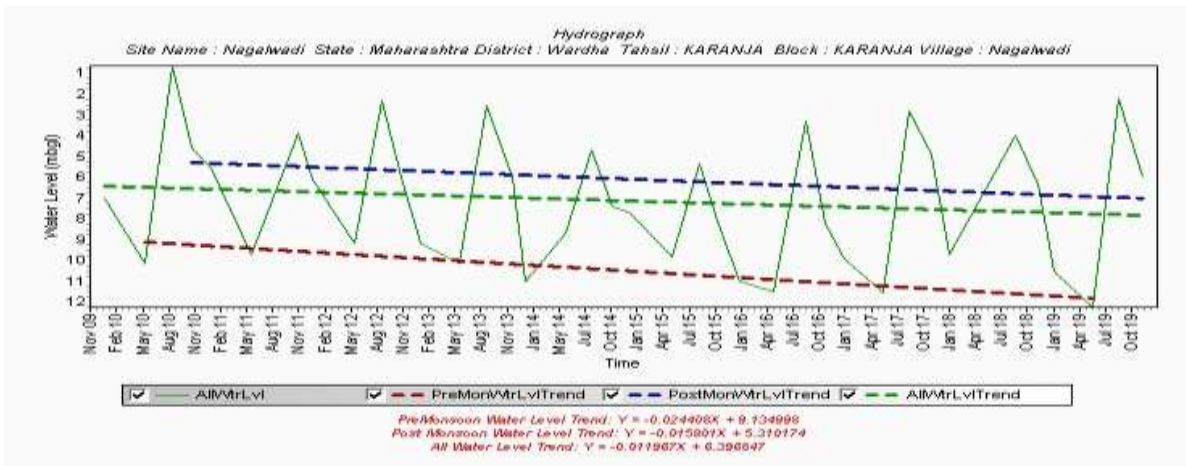


Figure3.8 e: Hydrograph (2010-19), Nagalwadi, Karanja Taluka

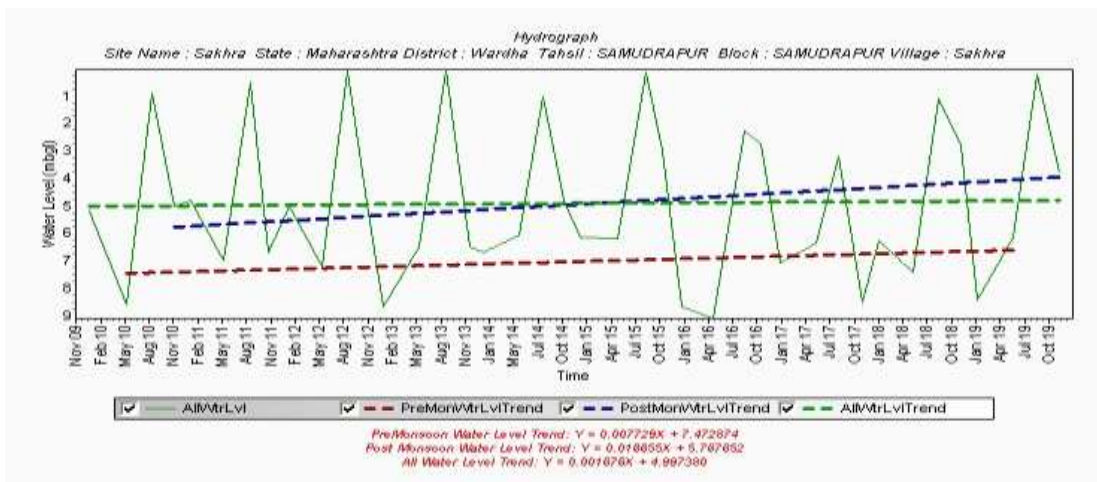


Figure3.8 f: Hydrograph (2010-19), Sakhra, Samudrapur Taluka

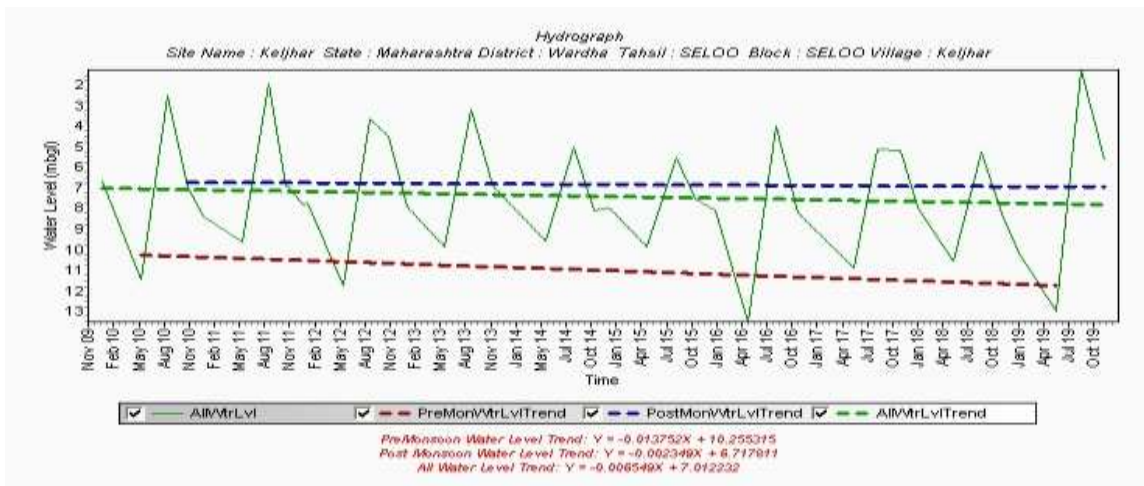


Figure3.8 g: Hydrograph (2010-19), Keljhar, Selu Taluka

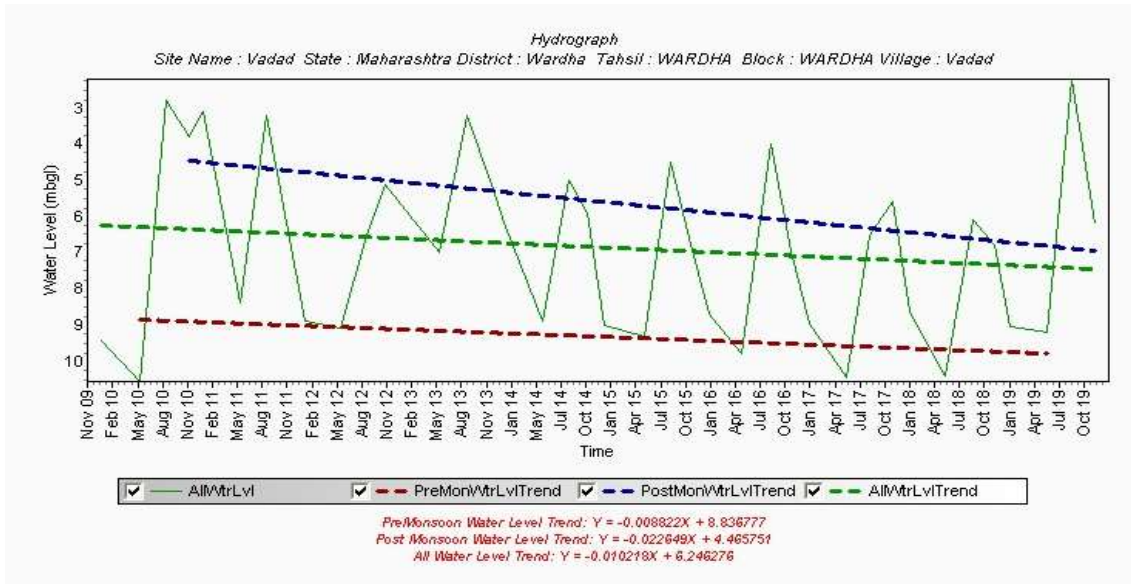


Figure3.8 h: Hydrograph (2010-19), Vadad, Wardha Taluka

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. To decipher the ground water quality scenario, 360 samples from aquifer-I / shallow aquifer and 46 from aquifer – II / deeper aquifers have been utilized including monitoring wells/exploratory wells, tube wells/bore wells of CGWB and GSDA; data from earlier studies. The aquifer wise ranges of different chemical constituents present in ground water are given in **Table 4.1**. The details of chemical analysis are given in **Annexure VII and VIII**.

Table 4.1: Aquifer wise ranges of chemical constituents in Wardha District

Constituents	Shallow aquifer		Deeper aquifer	
	Min	Max	Min	Max
Ph	7.1	8.5	6.8	8.7
EC ($\mu\text{S}/\text{cm}$)	307.6	4456	380	3077
TDS (mg/l)	200	2659	70	1810
TH (mg/l)	5	840	40	1096
Calcium (mg/l)	3	247.5	8	200
Magnesium (mg/l)	0.07	117.7	1	217.48
Potassium (mg/l)	0.38	143	BDL	41
Sodium (mg/l)	8.26	2152.2	12	632.5
Bicarbonate (mg/l)	58.6	1284.66	43	848
Carbonate (mg/l)	0	0	BDL	48
Chloride (mg/l)	10.3	600	BDL	549
Sulphate (mg/l)	3	267	BDL	576
Nitrate (mg/l)	4	98	BDL	56.42
Fluoride (mg/l)	0.01	2.39	BDL	3.06

*BDL- below detection limit

4.1 Electrical Conductivity (EC)

4.1.1 Distribution of Electrical Conductivity in Shallow Aquifer

The concentration of EC in shallow aquifer varies between 307.6 (Panwadi, Arvi) and 4456 $\mu\text{S}/\text{cm}$ (Khandali). Out of 360 samples collected from dug wells, 13 samples are having EC >2250 $\mu\text{S}/\text{cm}$ and 122 samples have shown EC ranges from 250 to 750 $\mu\text{S}/\text{cm}$. Concentration of EC >3000 $\mu\text{S}/\text{cm}$ has been observed in parts of Samudrapur, Arvi and Hinganghat Blocks. The distribution of electrical conductivity in shallow aquifers is shown in **Figure 4.1** and analytical data is presented in **Table 4.2**.

4.1.2 Distribution of Electrical Conductivity in Deeper Aquifer

The concentration of EC in deeper aquifer varies between 380 (Wardhamaneri, Arvi block) and 3077 $\mu\text{S}/\text{cm}$ (Daroda, Hinganghat block). Out of 46 samples collected from bore wells, only one sample having EC >3000 $\mu\text{S}/\text{cm}$ (Daroda, Hinganghat block). The distribution of electrical conductivity in deeper aquifers is shown in **Figure 4.2** and analytical data is presented in **Table 4.2**.

Table 4.2: Aquifer wise Electrical conductivity analytical data

S. No.	EC ($\mu\text{S}/\text{cm}$)	Shallow aquifer		Deeper Aquifer	
		No. of samples	% of samples	No. of samples	% of samples
1	< 250	0	0	0	0
2	>250-750	122	33.89	24	52.17
3	>750-2250	225	62.5	19	41.30
4	>2250-3000	9	2.5	2	4.35
5	>3000	4	1.11	1	2.18
Total samples		360	100	46	100

4.2 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 Wardha district nitrate concentration varies between BDL to 98 mg/l. As per BIS (2012) the desirable limit is 45 mg/l. In shallow aquifer, 360 samples were analysed; out of this, 85 water samples show the nitrate concentrations exceeding 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, 46 wells were analysed, out of this only one water sample show nitrate concentration exceeding the desirable limit of 45 mg/l. Aquifer wise nitrate concentration is given in **Table 4.3**.

4.3 Fluoride

In shallow aquifer, concentration of fluoride ranges from 0.01 to 2.39 mg/l. out of 360 samples was analysed, 14 samples show fluoride concentration more than 1 mg/l. In Deeper Aquifer, concentration of fluoride ranges from BDL to 4.1 mg/l. Out of 46 samples analysed, 4 samples show fluoride concentration more than 1 mg/l. Aquifer wise fluoride concentration is given in **Table 4.3**.

Table 4.3: Aquifer wise Nitrate and Fluoride concentration

Aquifer	No ₃ > 45 mg/l		Fluoride >1 mg/l	
	Total Samples	No of samples	Total Samples	No of samples
Shallow Aquifer	360	85	360	14
	Total Samples	No of samples	Total Samples	No of samples
Deeper Aquifer	46	1	46	4

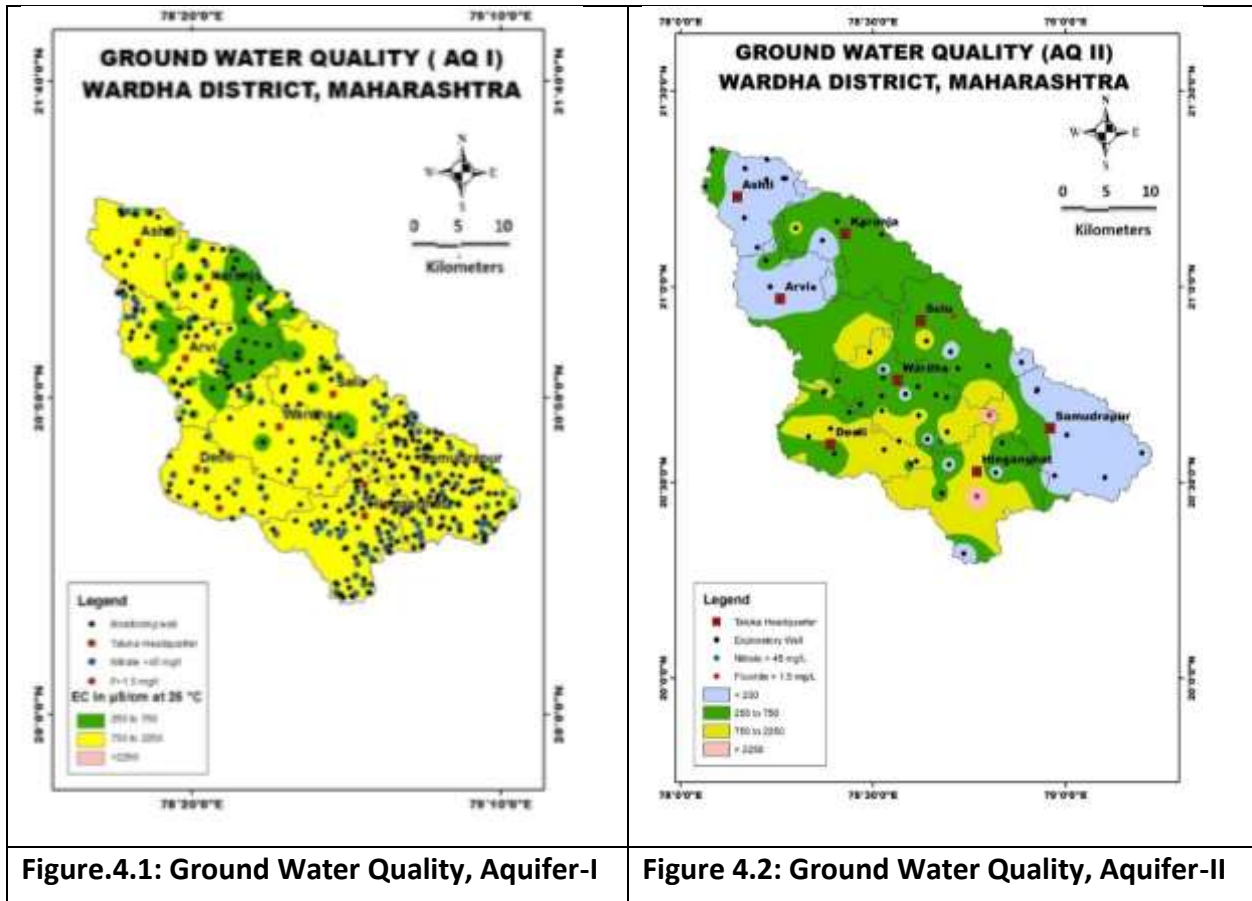


Figure.4.1: Ground Water Quality, Aquifer-I

Figure 4.2: Ground Water Quality, Aquifer-II

4.4 Suitability of Ground Water for Drinking Purpose

In shallow aquifer, 59.16 % of samples have TDS concentration above the Desirable limit (DL) but below the MPL. The water from such area is not fit for drinking purpose if directly consumed without treatment. It is also seen that about 0 to 18.61 % samples are beyond the maximum permissible limit for the parameters like TH, Ca, Mg, F and NO₃ indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in shallow Aquifer is given in **Table 4.4**.

In Deeper aquifer, none of the samples having TDS more than maximum permissible limit (MPL) and 28.26 % of samples have TDS concentration above the Desirable limit (DL) but below the MPL. The water from such area is not fit for drinking purpose if directly consumed without treatment. It is also seen that about 0 to 15.22 % samples are beyond the maximum permissible limit for the parameters like TH, Mg, SO₄, F and NO₃ indicating that the water is not suitable for drinking purpose. 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	360	0	0	355	98.6	5	1.38
TDS	500	2000	360	143	39.72	213	59.16	4	1.11
TH	300	600	360	195	54.16	148	41.11	17	4.72
Ca (mg/L)	75	200	360	330	91.66	27	7.5	3	9.09
Mg (mg/L)	30	100	360	200	55.55	39	10.83	1	0.27
Cl (mg/L)	250	1000	360	337	93.61	23	6.38	0	0
SO ₄ (mg/L)	200	400	360	359	99.72	1	0.27	0	0
NO ₃ (mg/L)	45	No relaxation	360	293	81.38	-	-	67	18.61
F (mg/L)	1	1.5	360	346	96.11	13	3.61	1	0.27

(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	46	0	0	41	89.13	5	10.87
TDS	500	2000	46	33	71.74	13	28.26	0	0
TH	300	600	46	28	60.87	11	23.91	7	15.22
Ca (mg/L)	75	200	46	38	82.61	8	17.39	0	0
Mg (mg/L)	30	100	46	36	78.20	8	17.39	2	4.35
Cl (mg/L)	250	1000	46	39	84.78	7	15.22	0	0
SO ₄ (mg/L)	200	400	46	42	91.30	3	6.52	1	2.17
NO ₃ (mg/L)	45	No relaxation	46	45	97.83	-	-	1	2.17
F (mg/L)	1	1.5	46	41	89.13	0	0	4	8.70

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

4.5 Suitability of Ground Water for Irrigation

The quality of Irrigation water affects the productivity, yield and quality of the 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 assess the water quality and its suitability for irrigation.

Electrical Conductivity (EC)

The amount of dissolved ions in the water is represented by the 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 $\mu\text{S}/\text{cm}$): 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 $\mu\text{S}/\text{cm}$): 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 $\mu\text{S}/\text{cm}$): 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 $\mu\text{S}/\text{cm}$): 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

S. No	Water Quality Type	EC in $\mu\text{S}/\text{cm}$	Shallow aquifer		Deeper Aquifer	
			No. of Samples	% of samples	No. of samples	% of samples
1	Low Salinity Water	< 250	0	0	0	0
2	Medium Salinity Water	>250-750	122	33.89	24	52.17
3	High Salinity Water	>750-2250	225	62.5	19	41.30
4	Very High Salinity Water	> 2250	13	3.6	3	6.53
Total			360	100	46	100

In shallow aquifer, maximum numbers of samples fall under the category of high salinity type of water. In deeper Aquifer, maximum numbers of samples fall under the category of medium salinity type of water. The areas where very high salinity prevails (>2250 $\mu\text{S}/\text{cm}$), ground water can be used for irrigation for very high salt tolerant crops and with proper soil and crop management practices

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 Wardha district based on GEC-2015 methodology. Block wise ground water resources are given in **Table 5.1**, and graphical representations of the resources on the map are shown in **Figure 5.1**.

Ground Water Resources estimation was carried out for 5812.16 sq. km. area out of which 2041.28 sq. km. is under command and 3770.88 sq. km. is under non-command. As per the estimation, the net annual ground water availability comes to be 79068.08 MCM. The gross draft for all uses is estimated at 43384.70 MCM with irrigation sector being the major consumer having a draft of 39911.98 MCM. The domestic and industrial water requirements are worked out at 3472.72 MCM. The net ground water availability for future irrigation is estimated at 35457.78 MCM.

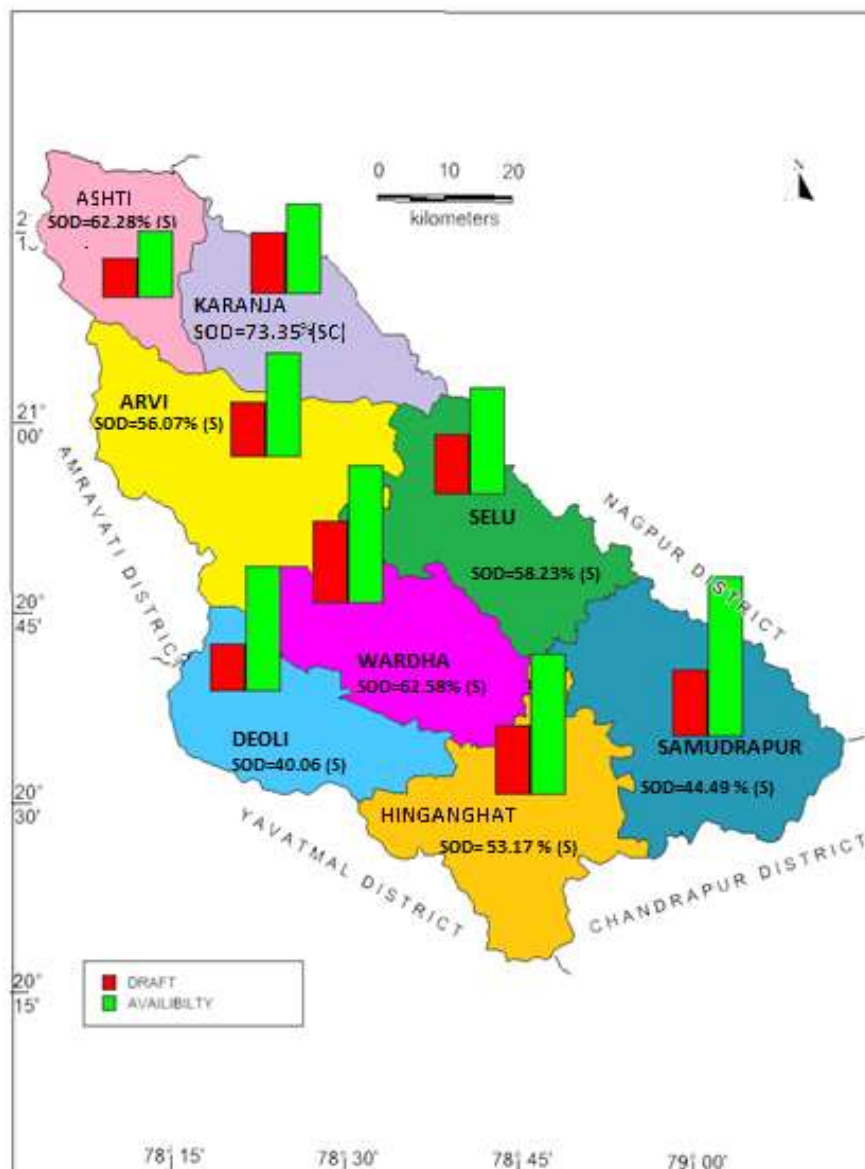


Figure 5.1: Ground Water Resources (2017), Wardha district

5.2 Ground Water Resources – Aquifer-II

Block wise ground water resources of Aquifer-II are given in **Table 5.2**. Total Ground Water Resources of Wardha district is 78.79 MCM, resources out of which 13.62 MCM is under Hinganghat block, 12.39 MCM is under Wardha Block and 12.37 mcm is under Samudrapur block.

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

Administrative Unit	Net Annual Ground Water Availability (MCM)	Existing Gross Ground Water Draft for irrigation (MCM)	Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	Existing Gross Ground Water Draft for All uses (MCM)	Provision for domestic and industrial requirement supply to 2025 (MCM)	Net Ground Water Availability for future irrigation development (10-11-14) (MCM)	Stage of Ground Water Development {13/10 * 100} %	Category
Arvi	89.09	44.64	5.30	49.95	5.67	41.20	56.07	Safe
Ashti	57.58	32.91	2.94	35.86	3.16	20.78	62.28	Safe
Deoli	105.42	38.02	4.20	42.23	4.79	61.68	40.06	Safe
Hinganghat	117.98	57.51	5.2	62.73	5.41	56.03	53.17	Safe
Karanja	77.27	53.29	3.37	56.68	3.54	21.06	73.35	Semi Critical
Samudrapur	135.26	56.12	4.04	60.17	4.23	74.71	44.49	Safe
Seloo	91.52	49.24	4.04	53.30	4.24	38.13	58.23	Safe
Wardha	116.54	67.35	5.57	72.93	5.95	40.99	62.58	Safe
TOTAL	790.65	399.08	34.68	433.84	36.99	354.58	54.87	Safe

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

Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Arvi	4	552.64	42.5	0.0000438	0.002	1.028739	4.42112	5.449859
Arvi	6	337.47	55	0.0000438	0.002	0.812965	4.04964	4.862605
Arvi	8	43.74	60	0.0000438	0.002	0.114949	0.69984	0.814789
Arvi	10	8.37	60	0.0000438	0.002	0.021996	0.1674	0.189396
Arvi								11.31665
Ashti	4	249.54	50	0.000012	0.002	0.149724	1.99632	2.146044
Ashti	6	290.07	49	0.000012	0.002	0.170561	3.48084	3.651401
Ashti								5.797445
Deoli	4	516.61	51.05	0.0000438	0.002	1.155135	4.13288	5.288015
Deoli	6	114.4	61.5	0.0000438	0.002	0.308159	1.3728	1.680959
Deoli	8	29.46	12.5	0.0000438	0.002	0.016129	0.47136	0.487489
Deoli								7.456463
Hinganghat	4	288.18	64	0.0000438	0.002	0.807826	2.30544	3.113266
Hinganghat	6	298.35	60	0.0000438	0.002	0.784064	3.5802	4.364264
Hinganghat	8	320.11	73	0.0000438	0.002	1.02352	5.12176	6.14528
Hinganghat								13.62281
Karanja	4	664.31	42.5	0.0000438	0.002	1.236613	5.31448	6.551093
Karanja	6	72.47	44	0.0000438	0.002	0.139664	0.86964	1.009304
Karanja								7.56037
Samudrapur	4	753.31	58	0.000065	0.002	2.839979	6.02648	8.866459
Samudrapur	6	172.69	56	0.000065	0.002	0.628592	2.07228	2.700872
Samudrapur	8	42.86	42	0.000065	0.002	0.117008	0.68576	0.802768

Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Samudrapur								12.3701
Selu	4	642.8	55	0.000033	0.002	1.166682	5.1424	6.309082
Selu	6	97	60	0.000033	0.002	0.19206	1.164	1.35606
Selu	8	31.97	50	0.000065	0.002	0.103903	0.51152	0.615423
Selu								8.280565
Wardha	4	146.28	55	0.0000438	0.002	0.352389	1.17024	1.522629
Wardha	6	359.78	60	0.0000438	0.002	0.945502	4.31736	5.262862
Wardha	8	160.34	47	0.0000438	0.002	0.330076	2.56544	2.895516
Wardha	10	120.71	55	0.0000438	0.002	0.29079	2.4142	2.70499
Wardha								12.386
District Total								78.79042447

6. GROUND WATER RELATED ISSUES

6.1 Declining Water Levels

Pre monsoon ground water falling trend greater than 0.2/ year covered 797.28 sq km of the area, Post monsoon ground water falling trend 0.2/ year covered 104 sq km of the area in the north western part of the district i.e., in major part of Ashti, Karanja and Arvi talukas. The average annual rainfall during is also minimum in this part. Thus, future water conservation and artificial recharge structures in the district may be prioritized in this part of the district.

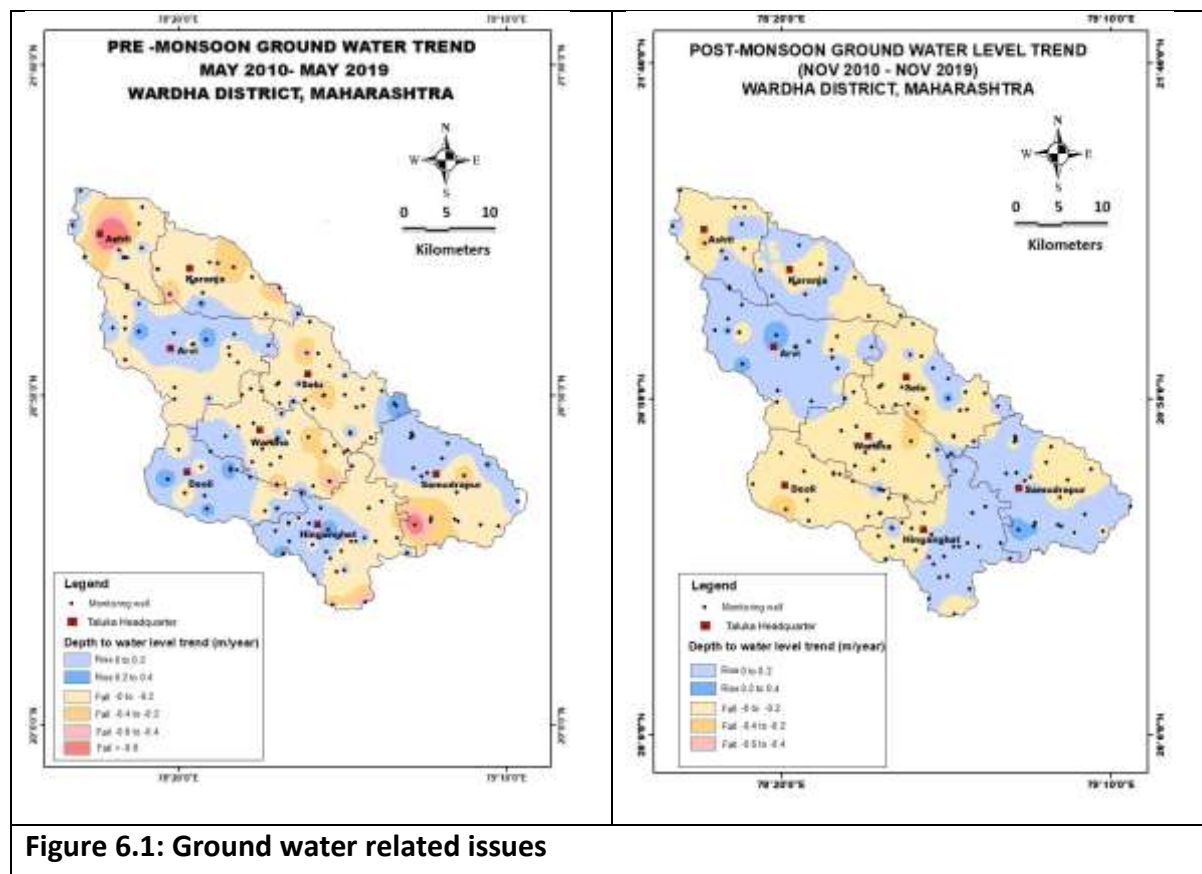


Figure 6.1: Ground water related issues

6.2 Rainfall and Droughts

Based on the long-term rainfall analysis from 1998 to 2019 it is observed that Selu, Arvi, Hinganghat and Wardha Blocks experienced declining rainfall trend. Severe droughts have been observed in Selu Block for 1 time, rest of the blocks never experienced severe drought conditions; however, it has experienced Moderate droughts.

6.3 Over-Exploitation

All the block of the district falls under the safe category in 2004-2011. In 2017 all the block of the district falls under the safe category (Stage of development below 65%) except for the Karanja block, the, in karanja block stage of ground water development increasing 2004 to 2011 but in safe category, whereas 2017 stage of ground water development of which is 73.35 % and which falls under the semi-critical category. In these blocks, declining ground water level trend has been observed both in pre- and post-monsoon season.

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.

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 3 mbgl and the specific yield of the aquifer. The **Table 7.1** gives the block wise volume available for the recharge.

Table 7.1: Area feasible and volume available for Artificial Recharge

Block	Area	Area feasible for recharge (Sq. km.)	Unsaturated Volume (MCM)
Arvi	1110.94	570.36	610.28
Ashti	464.94	25.68	88.85
Deoli	699.32	385.25	616.4
Hinganghat	899.19	58.94	47.74
Karanja	619.11	196.6	365.69
Samudrapur	999.68	76.44	71.09
Selu	715.93	504.46	1932.08
Wardha	820.89	429.70	988.31
Total	6330.00	2247.43	4720.44

The total unsaturated volume available for artificial recharge is 4720.44 MCM and it ranges from 47.74 MCM in Hinganghat block to 1932.08 MCM in Selu 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 50.32 MCM. This surplus can be used to recharge facility through 177 Percolation Tanks and 503 Check dams. The expected recharge every year from these structures is 219.04 MCM. The talukawise details are given **Table 7.2**. Tentative locations of these structures are given in **Figure. 7.1** and details are given in **Annexures IX and X**.

The rainwater harvesting in urban areas can be adopted in 50% of the household with 50 sq.m roof area. A total of 3.52 MCM potential can be generated by taking 80% runoff coefficient with a cost estimate of 146.03 corers. However, it is not economically viable and not recommended.

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)
Arvi	12.77	45	128	9.58
Ashti	0.57	2	6	0.43
Deoli	8.62	30	86	6.47
Hinganghat	1.32	5	13	0.99
Karanja	4.40	15	44	3.30
Samudrapur	1.71	6	17	1.28
Seloo	11.3	40	113	8.48
Wardha	9.62	34	96	7.22
Total	50.31	177	503	219.04

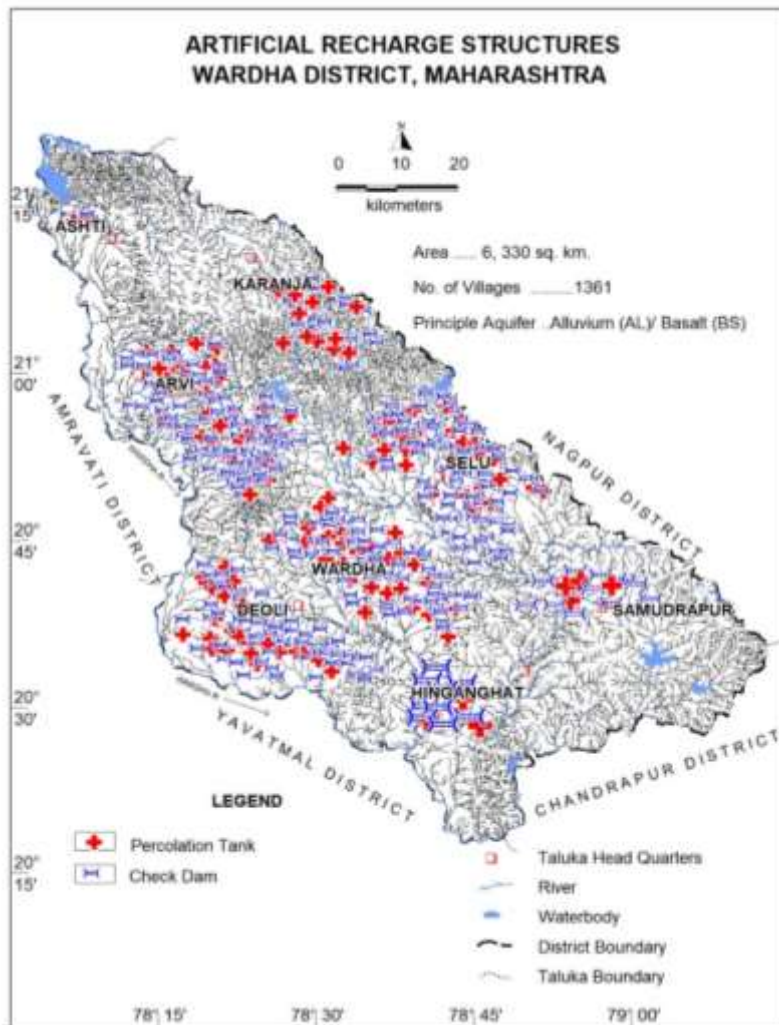


Figure 7.1: Location of Proposed Artificial Recharge structures

7.2 Demand Side Management

The Demand Side Management is proposed in areas where the stage of ground water development is relatively high and adopting micro-irrigation techniques for water intensive crops or change in cropping pattern or both are required to save water.

Table 7.3 Demand side interventions proposed

Taluka	Cotton Area proposed to be covered under drip (sq.km)	Volume of Water expected to be saved with drip irrigation for cotton (MCM)	Total GW Draft after Demand side intervention (MCM)	Stage of GWD after 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.)
Arvi			49.95	50.62	19.12	29.41
Ashti	14.70	3.82	32.04	55.23	8.57	13.18
Deoli			42.23	37.74	36.09	55.52
Hinganghat			62.73	52.73	20.55	31.61
Karanja	16.90	4.39	52.29	64.90	4.11	6.33
Samudrapur			60.17	44.07	35.41	54.48
Seloo			53.29	53.29	16.71	25.70
Wardha			72.93	58.93	13.70	21.07
Total	31.60	8.22	425.62	51.38	154.25	237.31

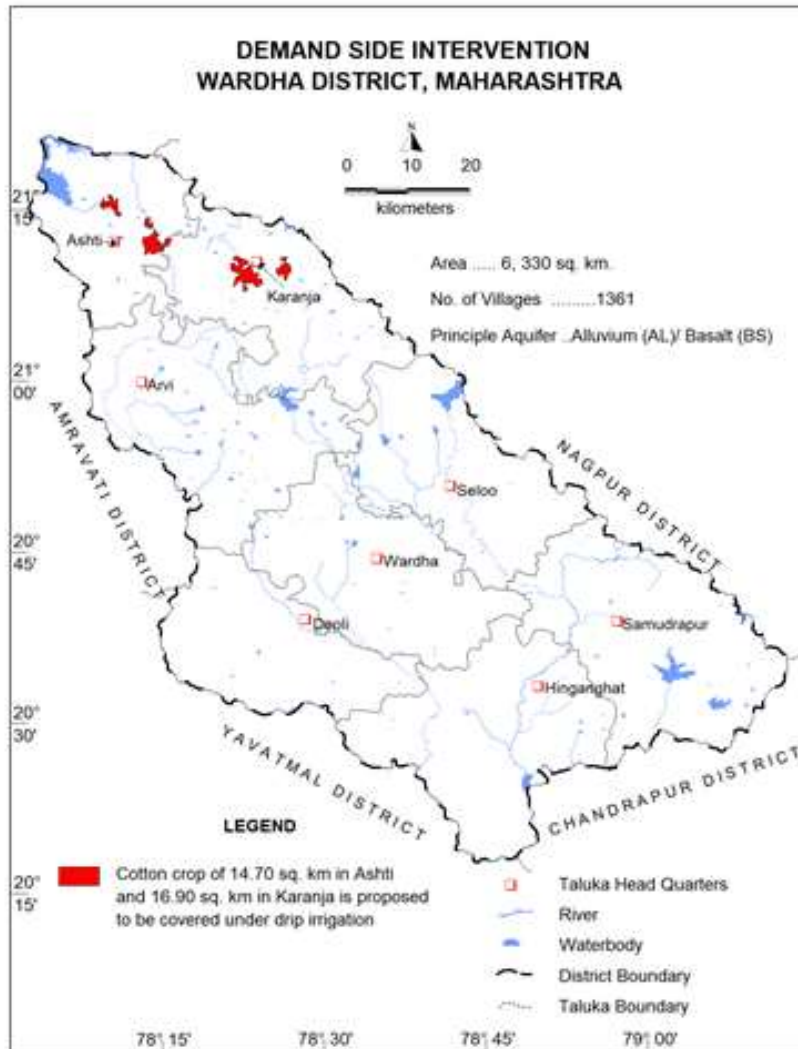


Figure 7.2: Location of Proposed Demand side interventions

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 Blocks 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 (sq.km.) proposed to be brought under assured GW irrigation (sq.km)
Arvi	98.67	49.95	50.62	19.12	29.41
Ashti	58.01	32.04	55.23	8.57	13.18
Deoli	111.89	42.23	37.74	36.09	55.52

Block	Total GW resource available after supply side intervention (MCM)	Total GW Draft after Demand side intervention (MCM)	Stage of GWD after supply side and demand side interventions (%)	GWR available/ required to bring the Stage of GWD to 70% (MCM)	Additional Area (sq.km.) proposed to be brought under assured GW irrigation (sq.km)
Hinganghat	118.97	62.73	52.73	20.55	31.61
Karanja	80.57	52.29	64.90	4.11	6.33
Samudrapur	136.54	60.17	44.07	35.41	54.48
Seloo	100.00	53.29	53.29	16.71	25.70
Wardha	123.76	72.93	58.93	13.70	21.07
Total	828.39	425.62	51.38	154.25	237.31

The total ground water resource available after supply side intervention are 828.39 MCM whereas the total ground water draft after demand side intervention is 425.62 MCM. Thus about 154.25 MCM of ground water is available to bring stage of ground water development to 70%. With this, additional area of 237.31 sq.km can be irrigated. Tentative locations of these areas are shown in Figure 7.3.

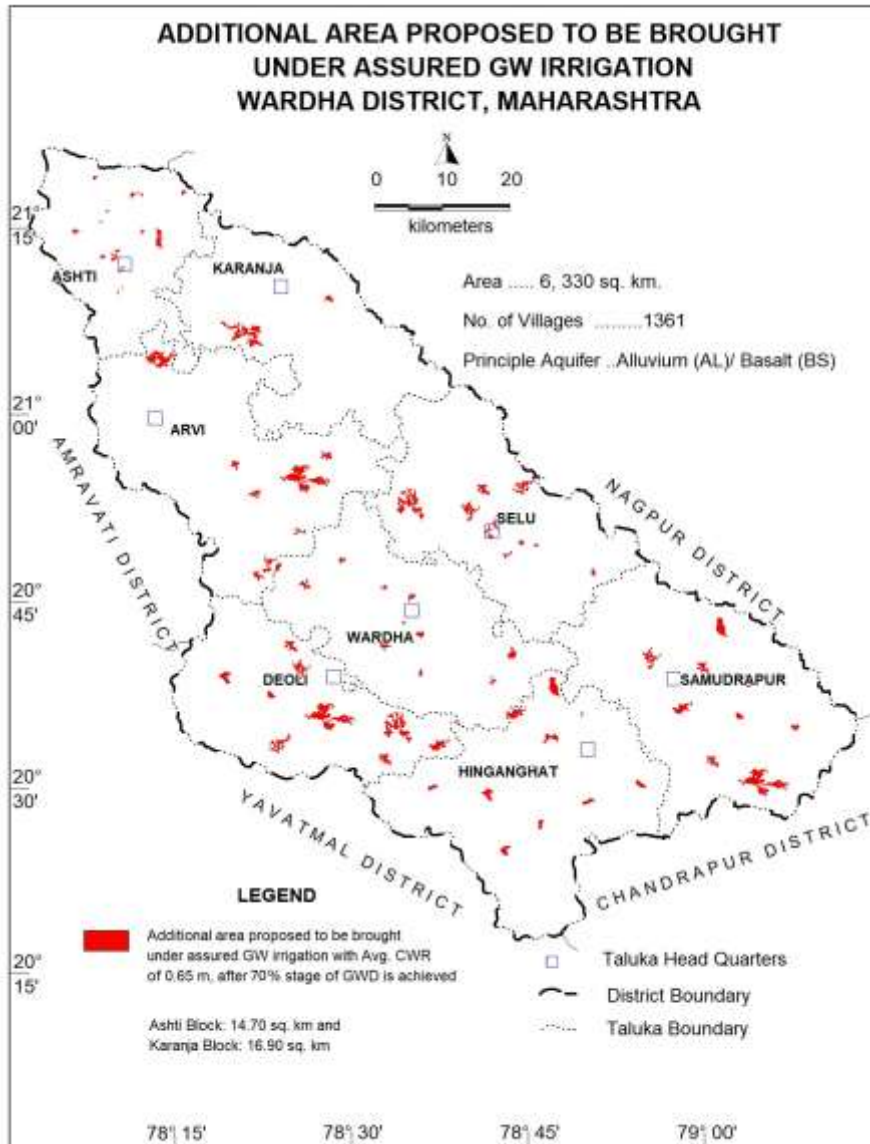


Figure 7.3: Additional area Proposed to be bought under Assured GW irrigation.

7.4 Development Plan

Since additional ground water to the tune of 154.25 MCM is available for irrigating the additional area, a number of wells can be constructed. 90% of this water is proposed for constructing dugwells and remaining 10% for borewells. Thus about 9256 dugwells and 1543 borewells can be constructed. The block wise details are given in **Table 7.5**.

Table 7.5: Block wise additional area wells proposed

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)
Arvi	19.12	1147	191
Ashti	8.57	514	86
Deoli	36.09	2165	361
Hinganghat	20.55	1233	206
Karanja	4.11	247	41
Samudrapur	35.41	2125	354
Selu	16.71	1003	167
Wardha	13.70	822	137
Total	154.26	9256	1543

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 Wardha district.

Geographically, Wardha district covers an area of 6310 sq km, out of this 561.50 sq km area is occupied by forest. Geologically, the area is occupied by Basalt and Alluvium formations. The stage of ground water development is 54.87 %. Karanja block is 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 0.0042 -0.39 m/year has been observed in 85 stations during post monsoon. Declining water level trend of between 0.003-2.58 m/year has been observed in 92 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 4720.44 MCM and it ranges from 47.74 MCM in Hinganghat block to 1932.08 MCM in Selu 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 50.32 MCM. This surplus can be used to recharge facility through 177 Percolation Tanks and 503 Check dams. The expected recharge every year from these structures is 219.04 MCM.

The demand side management can be implemented through the micro-irrigation techniques. It is proposed to be adopted drip irrigation in about 31.6 sq. km cotton areas in the district. With this about area 8.22 MCM of ground water can be saved.

With supply side and demand side interventions, it is expected that about 154.25 MCM of ground water would be available to bring stage of ground water development to 70%. With this, additional area of 237.31 sq.km can be irrigated through additional 9256 dugwells and 1543 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, development 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. IEC activities and capacity building activities needs to be aggressively propagated to establish the institutional framework for participatory ground water management.

Roof top Rainwater harvesting is not recommended as it is economically not viable.

B LOCK WISE AQUIFER MAPS AND MANAGEMENT PLAN

- 1. ARVI BLOCK**
- 2. ASHTI BLOCK**
- 3. DEOLI BLOCK**
- 4. HINGANGHAT BLOCK**
- 5. KARANJA BLOCK**
- 6. SAMUDRAPUR BLOCK**
- 7. SELU BLOCK**
- 8. WARDHA BLOCK**

9. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN

9.1 ARVI BLOCK, WARDHA DISTRICT, MAHARASHTRA

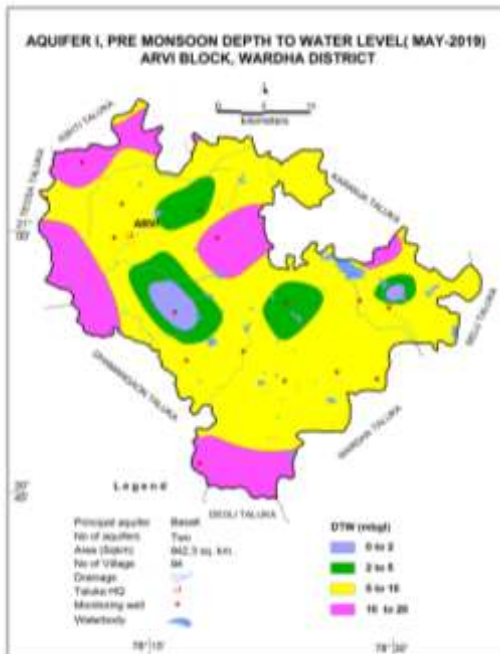
1. SALIENT FEATURE	
1.1 Introduction	
Block Name	Arvi
Geographical Area (Sq. Km.)	1110.94 Sq. Km.
Forest Area (Sq. Km)	48.07 Sq. Km.
Population (2011)	145981
Climate	Monsoon sub-tropical
Net Annual Ground Water Availability (MCM)	89.08
Existing Gross Ground Water Draft for All uses (MCM)	49.95
Stage of Ground Water Development (%)	56.07
Category	SAFE
1.2 Rainfall Analysis	
Normal Rainfall	982.3 mm
Annual Rainfall (2019)	899.7 mm
Decadal Average Annual Rainfall (2010-19)	905.68 mm
Long Term Rainfall Analysis (1998-2019)	Falling Trend 13.71 mm/year. Probability of Normal/Excess Rainfall- 77%/9%. Probability of Drought (Moderate /Acute)-: 9 % Moderate & 5%Acute.
Rainfall Trend Analysis (1998 To 2019)	
<p>RAINFALL ANALYSIS-ARVI TALUKA</p> <p>EQUATION OF TREND LINE: $Y = -13.71x + 1126$</p>	
1.3 Geomorphology, Soil & Geology	
Geomorphic Unit	Moderately dissected plateau and alluvial plain covers major area, followed by Slightly dissected plateau, weathered plateau, structural hills and undissected plateau.
Geology	Alluvium (sand/silt and clay alternating beds)., Age: Recent to Sub-recent Deccan Traps (Basalt). Age: Late Cretaceous to Eocene

Soil	Fine calcareous deep soil and Loamy, clayey very shallow soil found in the major parts of the block followed by fine calcareous very deep soil, fine-Loamy, clayey shallow soil and Loamy, clayey ,extremely shallow soil.	
1.4 Hydrology & Drainage		
Drainage	The main rivers are tributaries of Godavari and sub basins of Wardha district	
Hydrology	Major project	0
	Medium	1 (Madanproject)
	Bigger Minor (250 to 600 and >600 Ha.)	8 PT
	Minor Irrigation Project (100 to 250 Ha)	8 PT, 2 Minor irrigation scheme
	Minor Irrigation Project (0 to 100 Ha.)	49 Diversion dam, 45 KT Weirs & 2 Minor irrigation scheme
1.5 Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area		1110.94 Sq. Km.
Forest Area		48.07 Sq. Km.
Cultivable Area		477.84 Sq. Km.
Net Sown Area		412.02 Sq. Km.
Double Cropped Area		65.82 Sq. Km.
Area under Irrigation	Surface Water	8.84 Sq. Km.
	Ground Water	28.61 Sq. Km.
Principal Crops (<i>Reference year 2018-19</i>)	Crop Type	Area (Sq. Km.)
	Cotton	219.22
	Cerals	15.07
	Pulses	81.21
	Oil Seeds	147.96
Horticultural Crops	Sugarcane	1.06
	Fruits and vegetables	11.13
	Spices	1.16

Water Level Behaviour

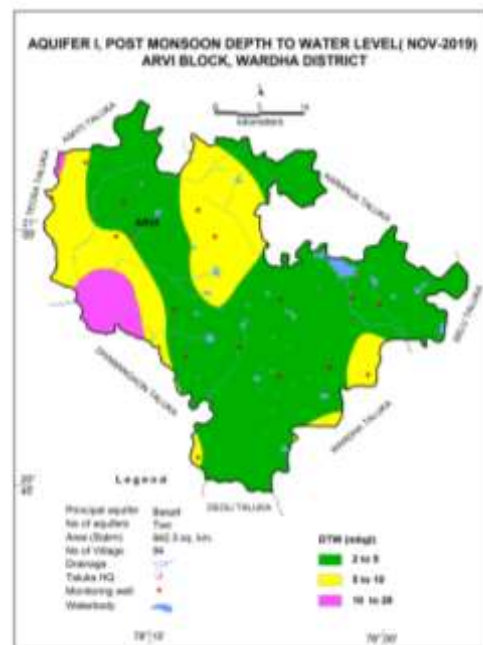
Aquifer-I/Shallow Aquifer

Pre-Monsoon Water Level (May 2019)



Water level between 10 -20 m bgl is observed as small patches. Water level ranges between 5-10 m bgl are covered major part of the Block. Water level ranges between 2-5 m bgl observed in small patches in central and eastern part of the block. Water level ranges between 0-2 m bgl observed in central and eastern parts of the block.

Post-Monsoon Water Level (Nov. 2019)

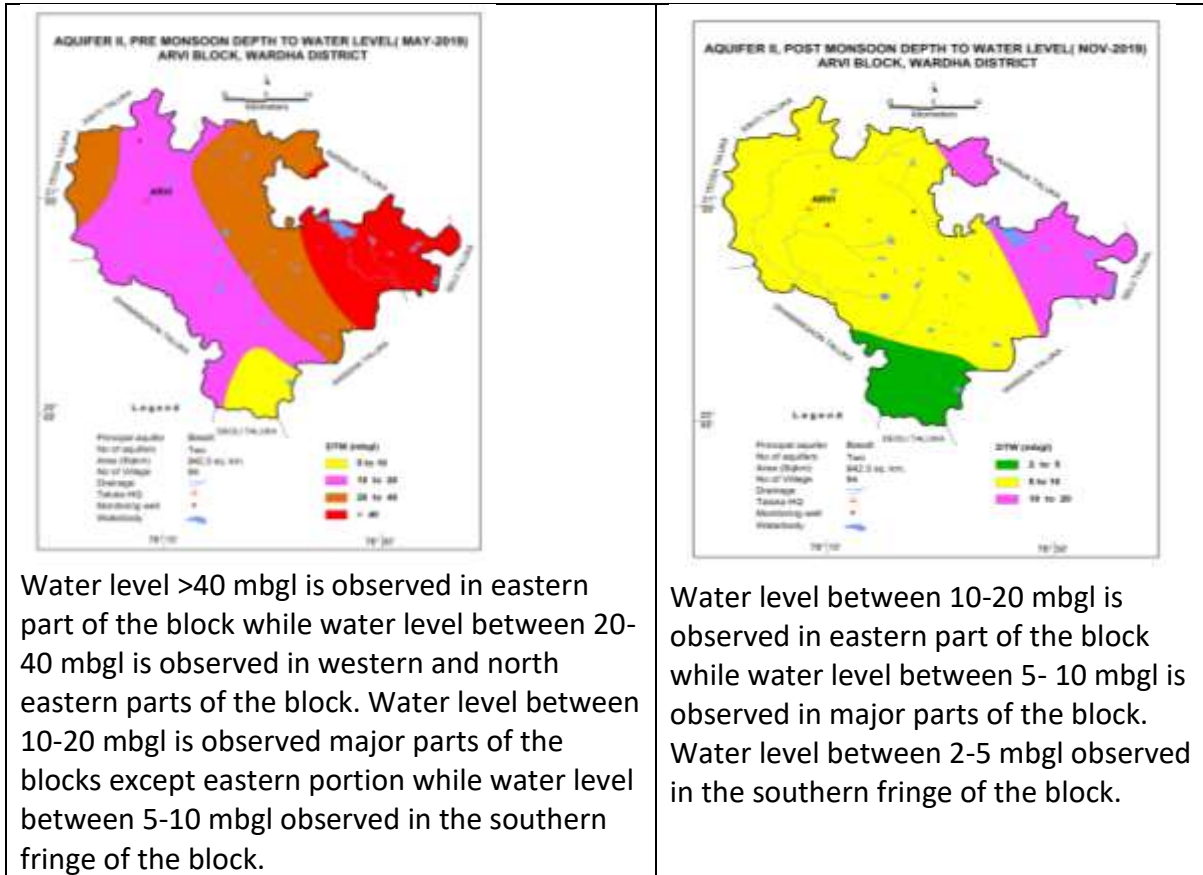


Water level between 10-20 m bgl is observed in the western part of the block as small patches. Water level ranges between 5-10 m bgl are covered north eastern part of the block and small patches observed in the southern and eastern part of the block and small patches observed in the northern blocks. Water level ranges between 2-5 m bgl covering maximum area of the block.

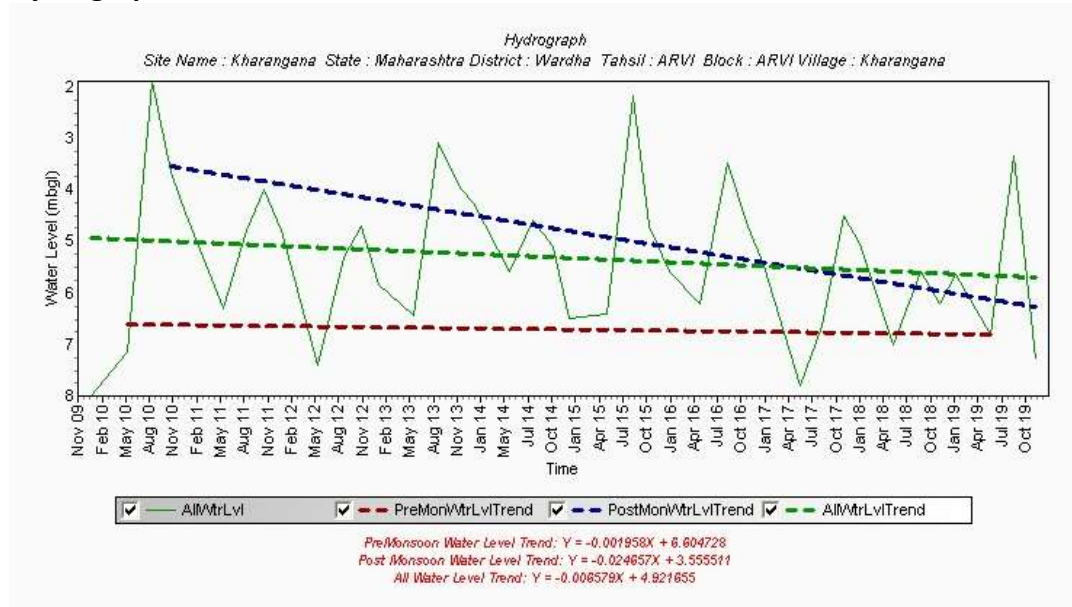
Aquifer-II/Deeper Aquifer

Pre-Monsoon Water Level (May 2019)

Post-Monsoon Water Level (Nov. 2019)



Hydrograph



Hydrograph shows Pre-monsoon falling water level trend @ 0.023 m/year

Hydrograph shows Post- monsoon fallingwater level trend @ 0.296 m/year

Pre-Monsoon trend
Falling 0.01 to 0.16 m/year, Rising 0.01 to 0.42 m/year

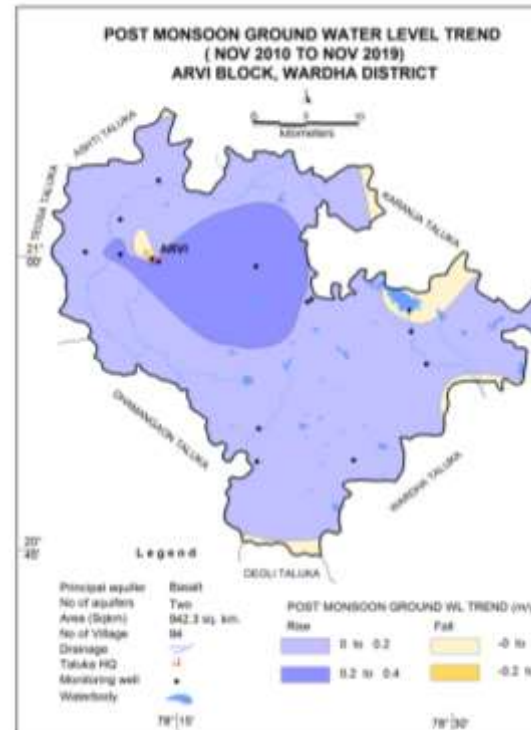
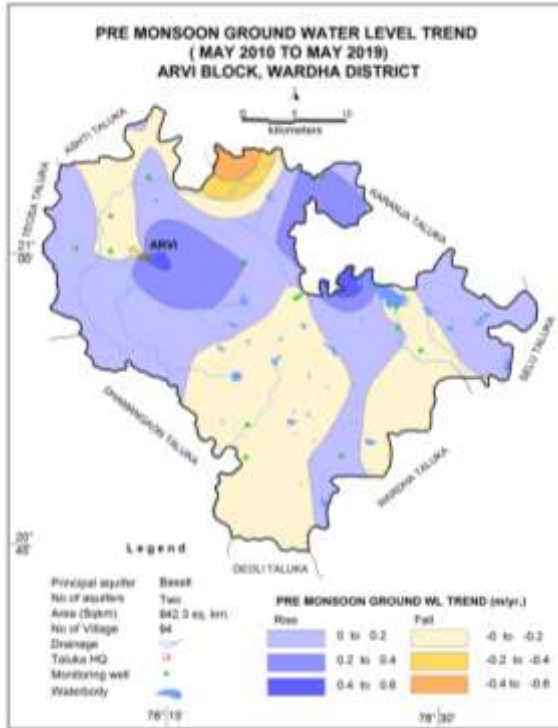
Post-Monsoon trend
Rising 0.03 to 0.37 m/year

Pre-Monsoon Water Level Trend (2010-2019)
Almost entire taluka is showing falling trend.

Post-Monsoon Water Level Trend (2010-2019)
Almost entire taluka is showing

Maximum area of taluka is showing 0-0.2 m rising trend. Area showing rising trend >0.2 m is 13.75 Km². Falling trend >0.2 observed in 12.87 Km². Falling trend between 0.2 -0.4 m and 0.4-0.6 m are observed in isolated patches. Rising trend of >0.4 m is observed in isolated patches.

Rising trend. Area showing rising trend >0.2 m is observed in 62.41 Km² while area showing falling trend >0.2 observed in 0.18 Km². Maximum area of taluka is showing 0- 0.2 m Rising trend. Rising trend between 0.2- 0.4 m is observed in central part of the block. Falling trend of 0-0.2 m is observed in isolated patches.



2. GROUND WATER ISSUES

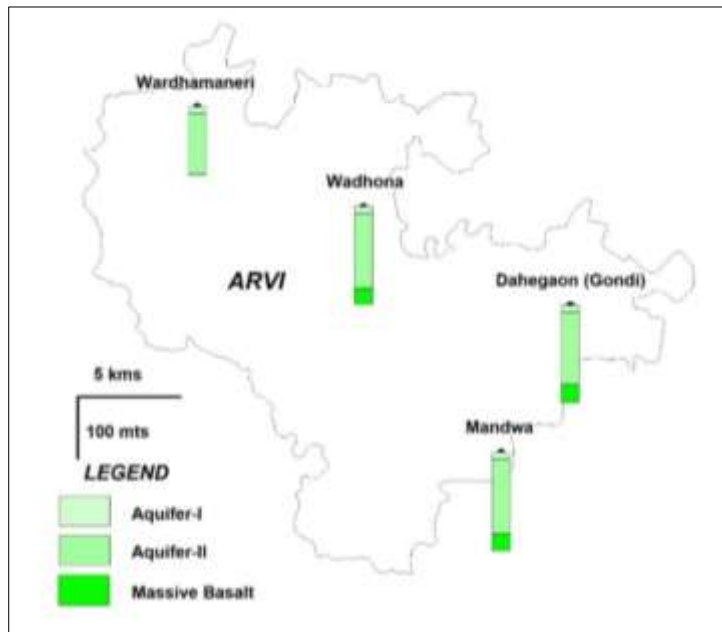
Limited aquifer potential
Water scarcity in lean period

3. AQUIFER DISPOSITION

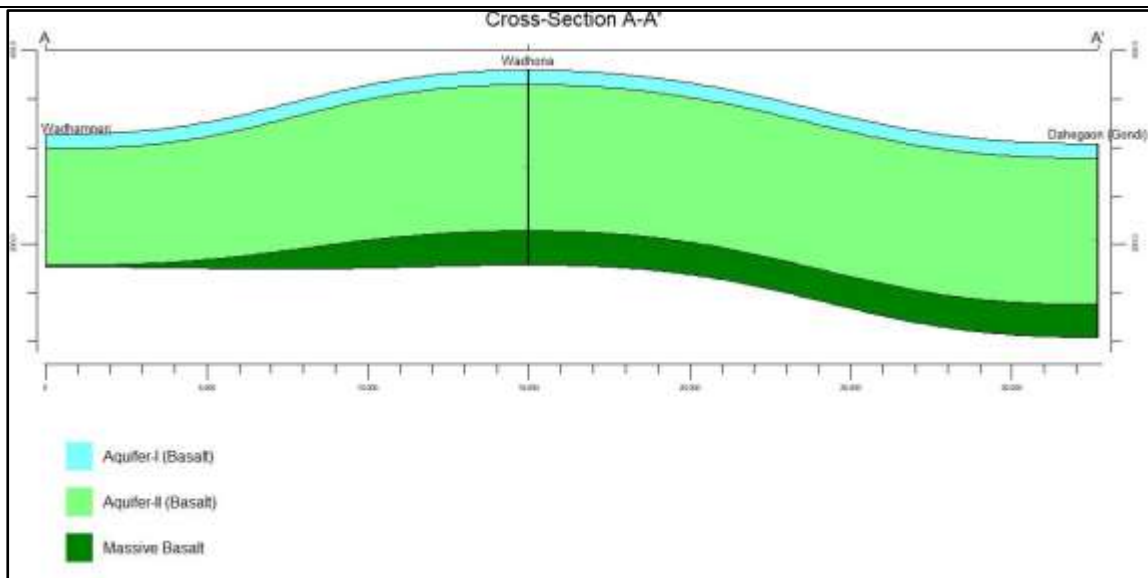
3.1 Number of Aquifers

Basalt – Aquifer-I (weathered & fractured basalt)
Basalt – Aquifer-II (Jointed & fractured basalt)

3.2 Aquifer Disposition



3.3 Cross Sections: Section AA'



3.4 Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)		Alluvium
Type of Aquifer (Phreatic/Semiconfined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined / confined)	Aquifer -I

Depth of Occurrence (mbgl)	9 to 30	40-176	5-30
Granular/weathered/fractured rocks thickness (m)	5 to22	3 to 6	5 to22
Yield	10 – 100m ³ /day	Upto 2.5 Ips	60-100m ³ /day
Specific yield/Storativity (S)	0.019 – 0.028	0.0004 38	0.07
Transmissivity (T)	30-80 m ² /day	38.85m ² /day	12-250 m ² /day

4. GROUND WATER QUALITY

4.1 Aquifer-I/Shallow Aquifer

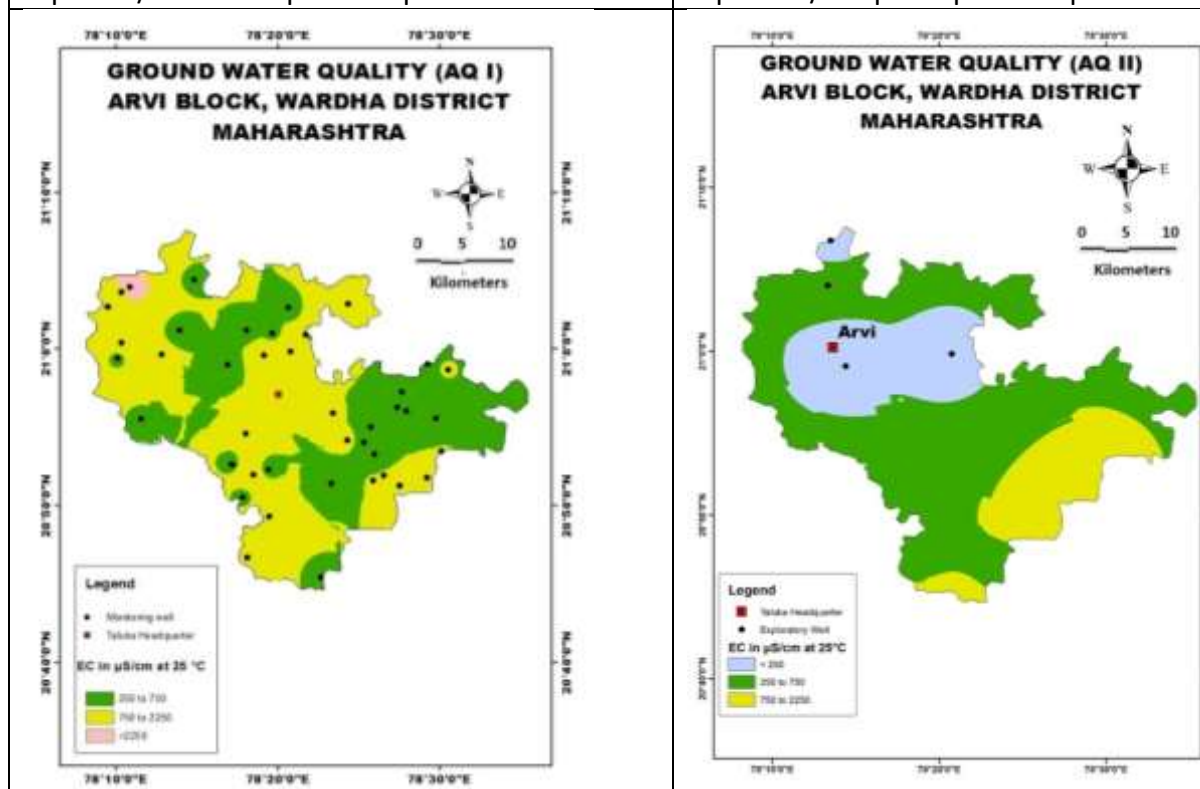
EC between 750- 2250 μ S/cm has been observed in major part of block. Area showing EC >2250 μ S/cm observed in 6.54 Km².

4.2 Aquifer-II/Deeper Aquifer

EC ranging from 250 to 750 μ S/cm has been observed in major parts of the block while EC between 750 -2250 μ S/cm has been observed in southeastern part of the block. EC less than 250 μ S/cm have been observed in northern and central part of the block.The ground water quality of deeper aquifer is suitable for drinking purpose.

Aquifer-I/Shallow Aquifer map

Aquifer-II/Deeper Aquifer map



5. GROUND WATER RESOURCES

5.1 Aquifer-I/Shallow Aquifer

Ground Water Recharge Worthy Area (Sq. Km.)	794.76
Total Annual Ground Water Recharge (MCM)	94.36
Natural Discharge (MCM)	5.27
Net Annual Ground Water Availability (MCM)	89.08
Existing Gross Ground Water Draft for irrigation (MCM)	44.64
Existing Gross Ground Water Draft for domestic and industrial water supply(MCM)	5.30
Existing Gross Ground Water Draft for all uses	49.95
Provision for domestic and industrial requirement supply to 2025(MCM)	5.67
Net Ground Water Availability for future irrigation development (MCM)	41.20
Stage of Ground Water Development (%)	56.07
Category	SAFE

5.2 Aquifer-II/Deeper Aquifer

Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in layer above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Arvi	4	552.64	42.5	0.0000438	0.002	1.028739	4.42112	5.449859
Arvi	6	337.47	55	0.0000438	0.002	0.812965	4.04964	4.862605
Arvi	8	43.74	60	0.0000438	0.002	0.114949	0.69984	0.814789
Arvi	10	8.37	60	0.0000438	0.002	0.021996	0.1674	0.189396
TOTAL								11.31665

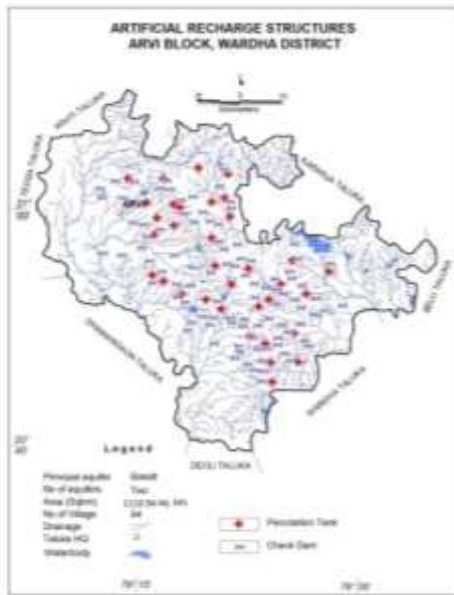
6. GROUND WATER RESOURCE MANAGEMENT

Net Annual Ground Water Availability (MCM)	89.09
Gross Annual Draft (MCM)	49.95
Stage of Ground Water Development (%)	56.07

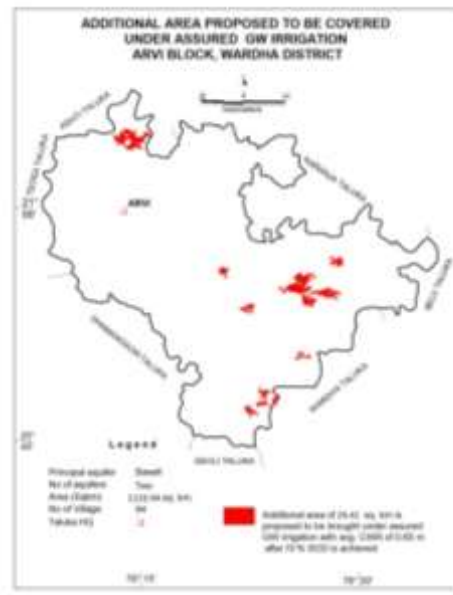
6.1 Supply Side Management

SUPPLY (MCM)	
Agricultural Supply –GW	44.64
Agricultural Supply –SW	8.84
Domestic Supply – GW	5.31
Domestic Supply – SW	1.33
Total Supply	60.12
Area of Block (Sq. Km.)	1110.94
Area suitable for Artificial recharge(Sq. Km)	570.36
Type of Aquifer	Hard Rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	570.36
Volume of Unsaturated Zone (MCM)	610.28
Average Specific Yield	0.02
Recharge Potential (MCM)	12.21
Surplus water Available (MCM)	12.77

Proposed Structures	Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	45	128
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	6.71	2.87
RTRWH Structures – Urban Areas		
Households to be covered (50% with 50 m ² area)		9550
Total RWH potential (MCM)		0.42
Rainwater harvested / recharged @ 80% runoff co-efficient		0.33
RTRWH & AR is economically not viable& hence not recommended.		
6.2 Demand Side Management		
Micro irrigation techniques		
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler		Not proposed
Water Saving by use of Drip and Sprinklers		-
Proposed Cropping Pattern change		Not proposed
Ground water Irrigated area under Water Intensive Crop (sq.km)		NIL
Water Saving by water use efficiency (MCM)		NIL
6.3 Expected Benefits		
Net Ground Water Availability (MCM)		89.09
Existing Ground Water Draft for All Uses (MCM)		49.95
Present stage of Ground Water Development (%)		56.07
Additional GW resources available after Supply side interventions (MCM)		9.58
Ground Water Availability after Supply side intervention (MCM)		98.67
Stage of Ground Water Development after Supply side Interventions (%)		50.62
Total GWR available for GW Development (MCM)		19.12
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)		69.07
Other Interventions Proposed if any		
Alternate Water Sources Available		NIL
6.4 Development Plan		
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)		19.12
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)		1320
Proposed Number of BW (@ 1 ham for 10% of GWR Available)		220
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m		29.41



Location of AR Structure

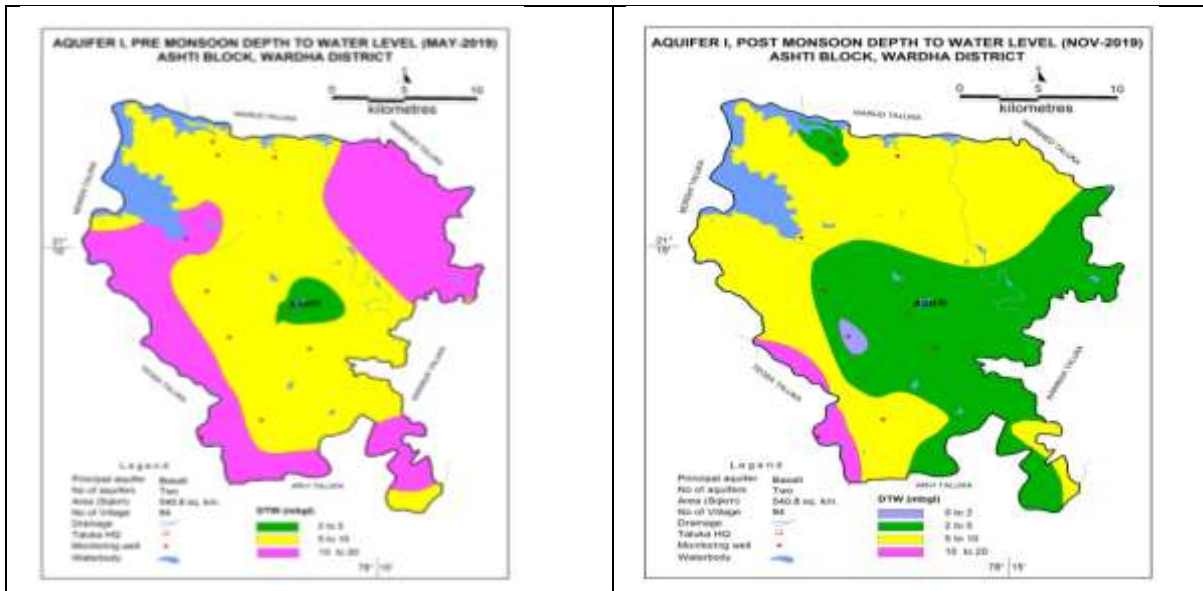


Area proposed under Assured GW irrigation

9.2 ASHTI BLOCK, WARDHADISTRICT, MAHARASHTRA

1. SALIENT FEATURE	
1.1 Introduction	
Block Name	Ashti
Geographical Area (Sq. Km.)	464.94 Sq. Km.
Forest Area (Sq. Km)	56.96 Sq. Km.
Population (2011)	76276
Climate	Monsoon sub-tropical
Net Annual Ground Water Availability (MCM)	57.58
Existing Gross Ground Water Draft for All uses (MCM)	35.86
Stage of Ground Water Development (%)	62.28
Category	SAFE
1.2 Rainfall Analysis	
Normal Rainfall	837.5 mm
Annual Rainfall (2019)	974.4 mm
Decadal Average Annual Rainfall (2010-19)	854.64 mm
Long Term Rainfall Analysis (1998-2019)	Rising Trend 1.51 mm/year. Probability of Normal/Excess Rainfall: 67%/14 %. Probability of Drought (Moderate/Acute)-: 14 % Moderate & 5 % Acute.
Rainfall Trend (1998- 2019)	
<p style="text-align: center;">ASHTI RAINFALL ANALYSIS</p> <p style="text-align: right;">$y = 1.5097x + 820.12$</p>	
EQUATION OF TREND LINE: $Y = 1.509x + 820.1$	
1.3 Geomorphology, Soil & Geology	
Geomorphic Unit	The block is divided into 5 unit's viz alluvial plain, Moderately dissected plateau and plateau weathered covering maximum area while Slightly dissected plateau and structural hills observed in some parts of the block.
Geology	Alluvium (sand/ silt and clay alternating beds), Age: Recent to Sub-recent Deccan Traps (Basalt), Age: Late Cretaceous to Eocene Almost entire block is underlain by basaltic lava flows, alluvium covers area adjacent Wardha river.

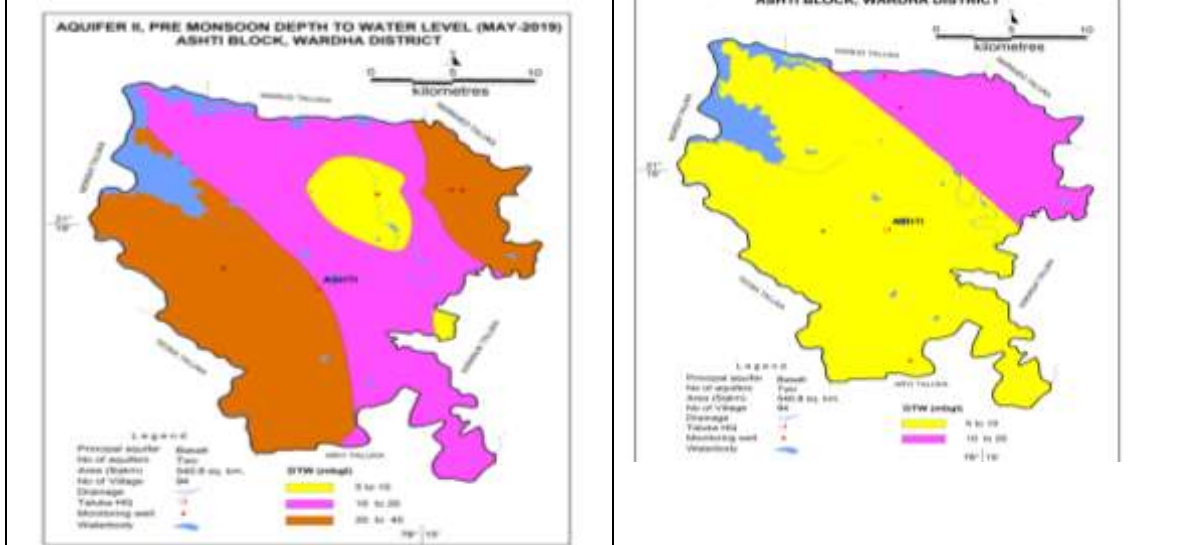
Soil	Fine calcareous very deep soil covers maximum area of block followed by Loamy clayey very shallow soil, Loamy clayey extremely shallow soil and fine loamy clayey shallow soil.	
1.4 Hydrology & Drainage		
Drainage	Wardha river is the main river it enters Ashti at Salora village	
Hydrology	Major project	1 (Kar)
	Medium	0
	Bigger Minor (250 to 600 and >600 Ha.)	1 PT
	Minor Irrigation Project (100 to 250 Ha.)	3 PT
	Minor Irrigation Project (0 to 100 Ha.)	33 Diversion Dam, 12 KT Weirs, 2 PT, 1 Minor Irrigation tank
1.5 Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area		464.94 Sq.km.
Forest Area		56.96 Sq. Km.
Cultivable Area		350.75 Sq. Km.
Net sown area		300.84 sq. km
Double cropped area		49.91 sq. km
Area under Irrigation	Surface Water	5.44
	Ground Water	28.08
Principal Crops (Reference year 2018-19)	Crop Type	Area (Sq. Km.)
	Cotton	147.13
	Cereals	14.37
	Pulses	67.38
	Oil Seeds	104.5
Horticultural Crops	Fruits and vegetables	14.87
	Sugarcane	0.67
	Spices	1.4
1.6 Water Level Behaviour`		
1.6.1 Aquifer-I/Shallow Aquifer		
Pre-Monsoon Water Level (May 2019) Water level ranging from 2 to 5 mbgl is observed in central part of the block as a patch while water level in the range of 5 to 10 mbgl is observed in major parts of the block. Water level ranges from 10-20 mbgl observed in the north eastern and south western parts of the block.		Post-Monsoon Water Level (Nov. 2019) Water Level between 0-2 mbgl observed as a small patch in the central portion of the block while water level between 2-5 mbgl observed in the central and south eastern parts of the block. Water level between 5-10 mbgl is observed in major part of the block while water lever between 10-20 mbgl observed in the south eastern part of the block.



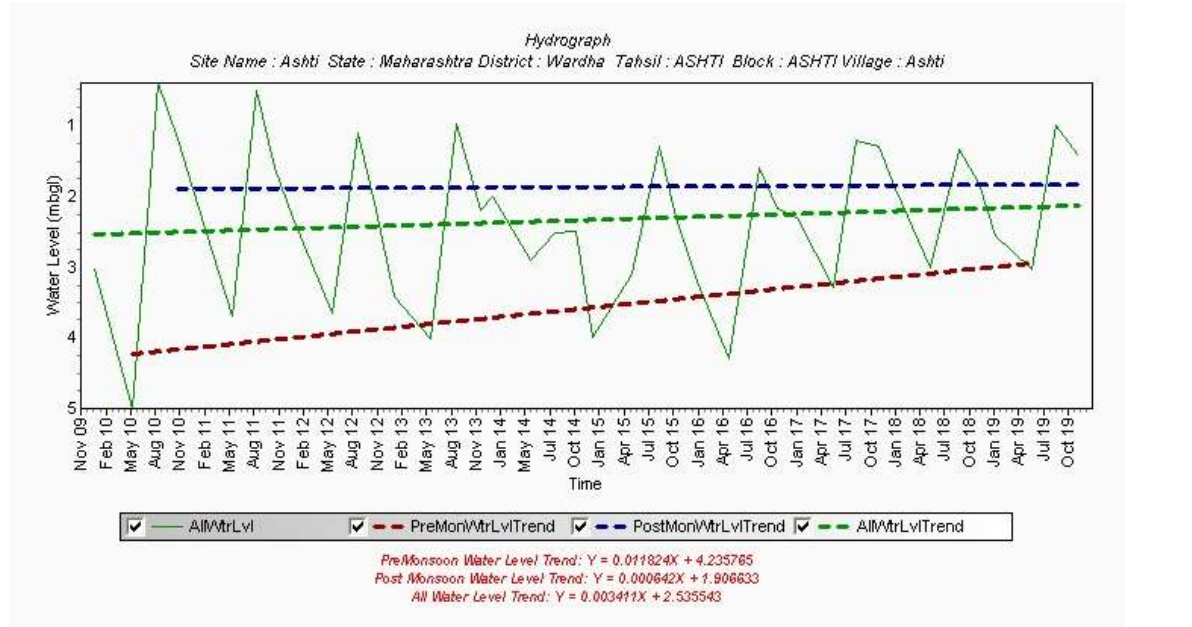
1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon Water Level (May 2019)
 Water level between 5-10 mbgl is observed in central eastern parts of the block while water level between 10-20 mbgl is observed in major part of the block. Water level between 20-40 mbgl observed in the north eastern and south western parts of the block.

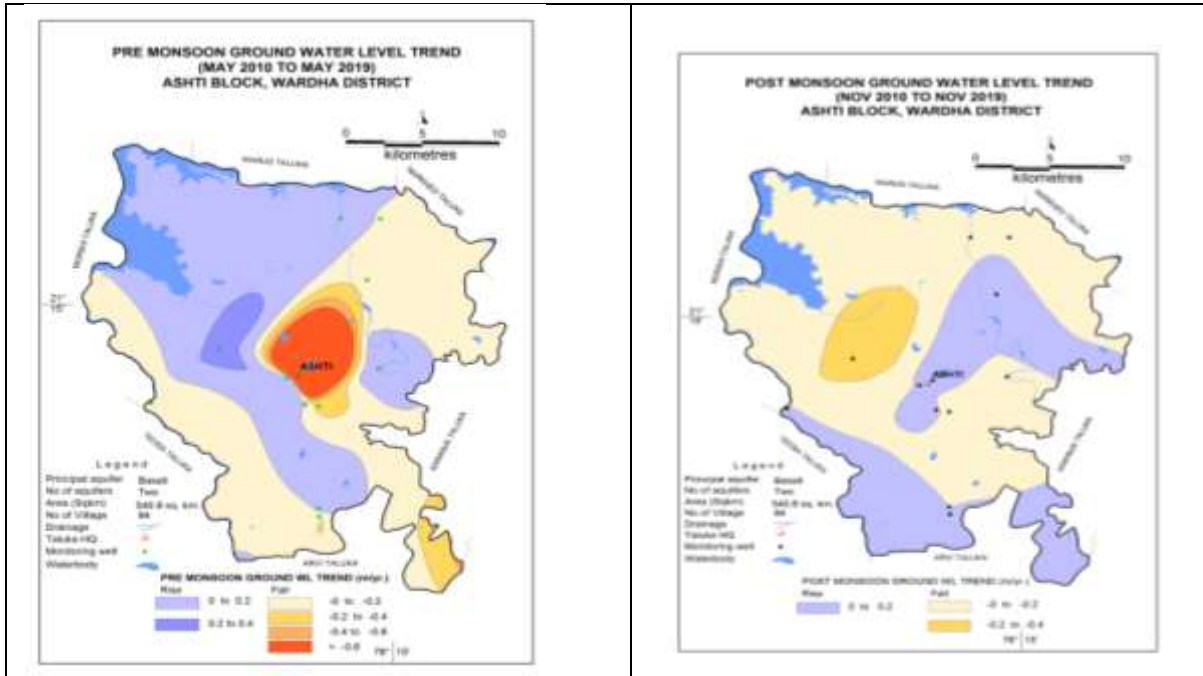
Post-Monsoon Water Level (Nov. 2019)
 Water level 5-10 mbgl is observed in major part of the block while water level between 20-40 mbgl is observed in the north eastern part of the block.



1.7 Hydrograph



Hydrograph shows Pre-monsoon rising water level trend @ 0.142 m/year	Hydrograph shows Post-monsoon rising water level trend @ 0.008 m/year
Pre-Monsoon trend Rising 0.095 to 0.26 m/year Falling 0.006 to 0.207 m/year	Post-Monsoon trend Rising 0.001 to 0.26 m/year Falling 0.019 to 0.32 m/year
Pre-Monsoon Water Level Trend (2010-2019) Almost entire taluka is showing falling trend in the range of 0-0.2 m. Area showing rising trend >0.2 m observed in 1.6 Km ² while falling trend >0.2 m observed in 186 Km ² . Rising trend in the range of 0-0.2 observed in the northern, central and southern part of the block.	Post-Monsoon Water Level Trend (2010-2019) Almost entire taluka is showing falling trend. Maximum area of taluka is showing falling trend in the range of 0 to 0.2 m. Area having falling trend >0.2 m observed in 11.28 Km ²



2. GROUND WATER ISSUES

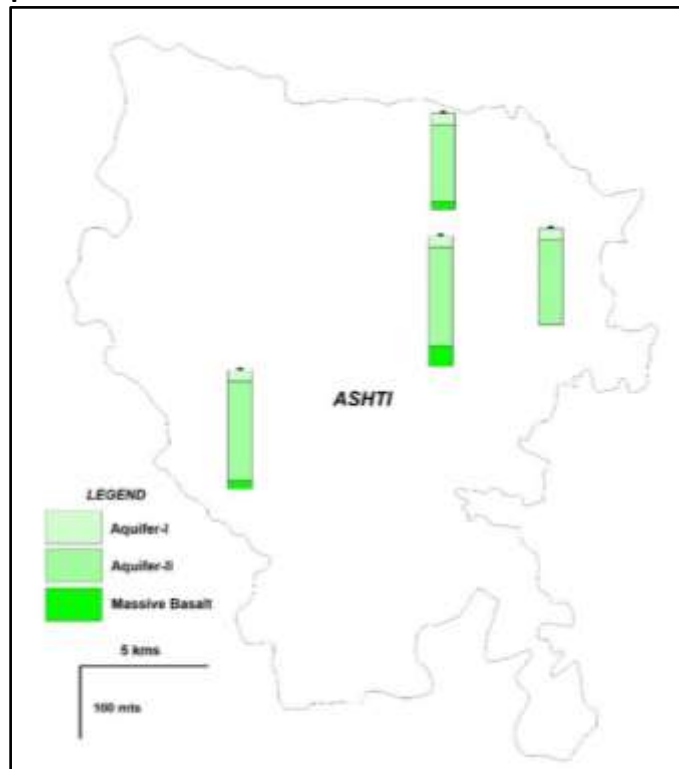
- Limited aquifer potential
- Water scarcity in lean period
- Declining Water Level trend during pre and post monsoon in almost entire block
- Nitrate >45 mg/l observed in Aquifer I

3. AQUIFER DISPOSITION

3.1 Number of Aquifers

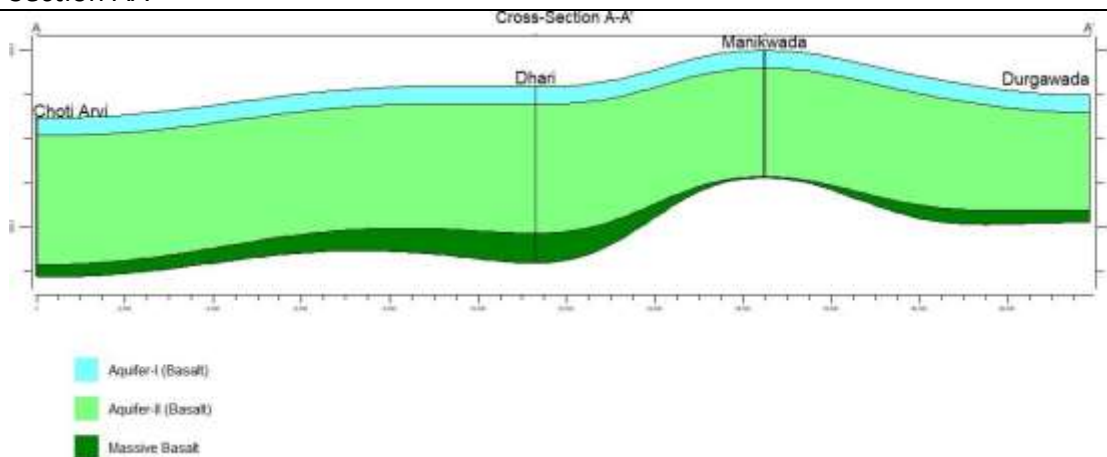
- Basalt – Aquifer-I (weathered & fractured basalt)
- Basalt – Aquifer-II (Jointed & fractured basalt)

3.2 Lithological disposition



3.3 Cross Sections

Section AA'



3.4 Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)		Alluvium
Type of Aquifer (Phreatic/Semi-confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined /confined)	Aquifer-I
Depth of Occurrence (mbgl)	9to 30	40 to 143	5-30
Granular/weathered/fractured rocks thickness (m)	6.2 to 22	1 to 3	5 to22
Yield	10 – 100m ³ /day	Upto 2.5 lps	60- 100m ³ /day
Specific yield/Storativity (S)	0.019 – 0.028	0.000012	0.07
Transmissivity (T)	30-80 m ² /day	8.97 m ² /day	60- 120m ² /day

4. GROUND WATER QUALITY

4.1 Aquifer-I/Shallow Aquifer

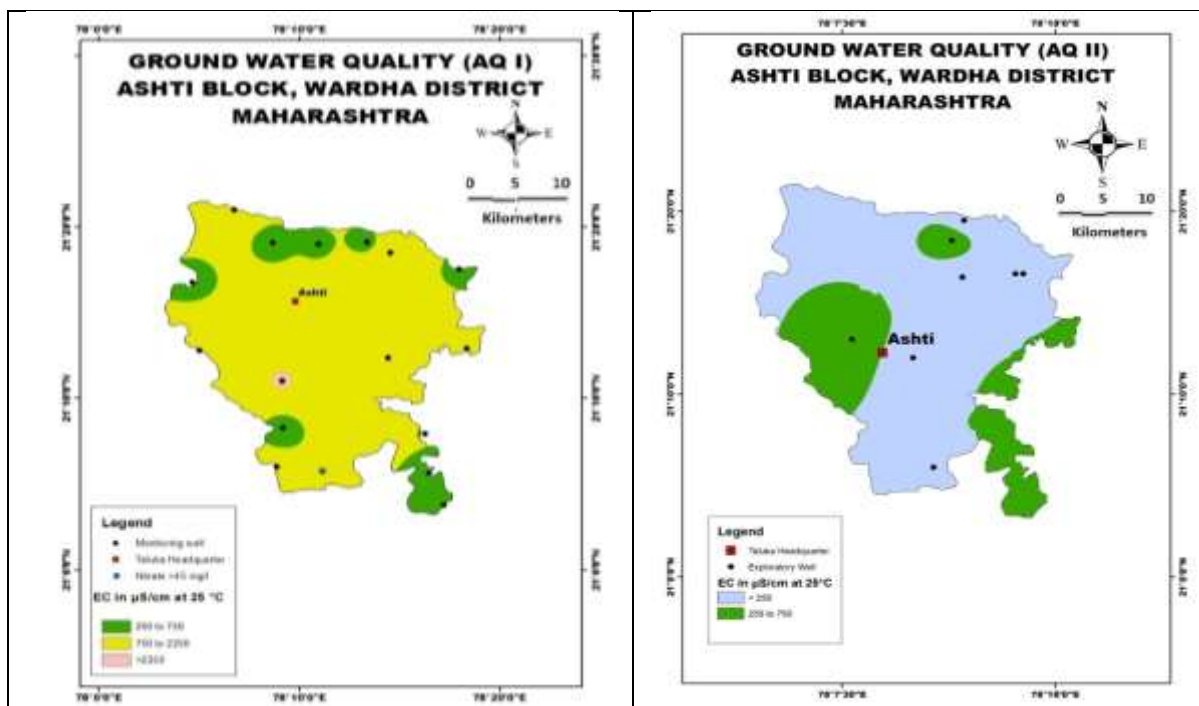
EC more than 2250 μ S/cm has been observed as a very small patch in 3 Km² area of the block. Nitrate >45 mg/l observed in southern part of the block.

4.2 Aquifer-II/Deeper Aquifer

Almost entire block is having EC values less than 250 μ S/cm. The ground water quality of deeper aquifer is suitable for drinking purpose

Aquifer-I/Shallow Aquifer map

Aquifer-II/Deeper Aquifer map



5. GROUND WATER RESOURCES

5.1 Aquifer-I/Shallow Aquifer

Ground Water Recharge Worthy Area (Sq. Km.)	459.35
Command (Sq. Km.)	249.58
Non-command (Sq. Km.)	209.77
Total Annual Ground Water Recharge (MCM)	60.61
Natural Discharge (MCM)	3.03
Net Annual Ground Water Availability (MCM)	57.58
Existing Gross Ground Water Draft for irrigation (MCM)	32.91
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	2.94
Existing Gross Ground Water Draft for All uses(MCM)	35.86
Provision for domestic and industrial requirement supply to 2025(MCM)	3.15
Net Ground Water Availability for future irrigation development (MCM)	20.78
Stage of Ground Water Development (%)	62.28
Category	Safe

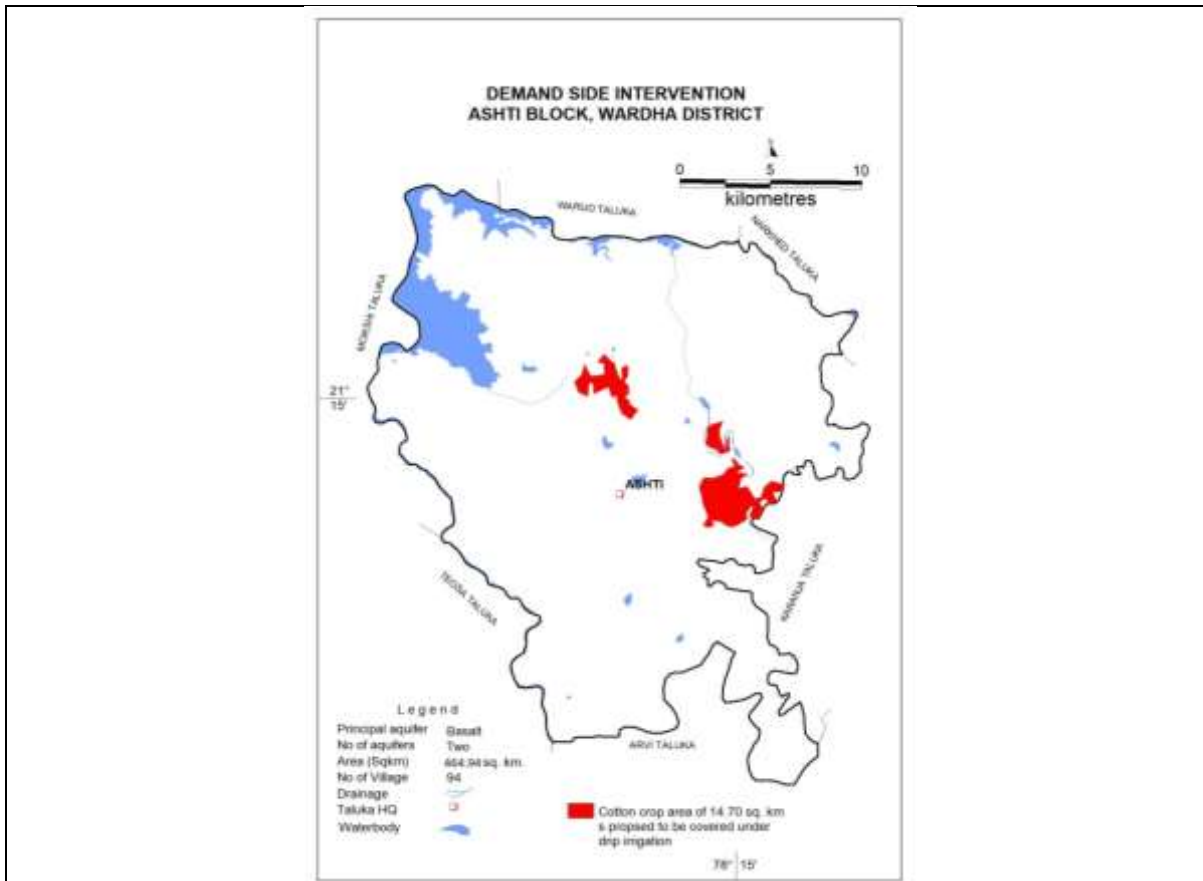
5.2 Aquifer-II/Deeper Aquifer

Taluk	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Ashti	4	249.54	50	0.000012	0.002	0.149724	1.99632	2.146044
Ashti	6	290.07	49	0.000012	0.002	0.170561	3.48084	3.651401
Total								5.797445

6. GROUND WATER RESOURCE MANAGEMENT

Net Annual Ground Water Availability (MCM)	57.58
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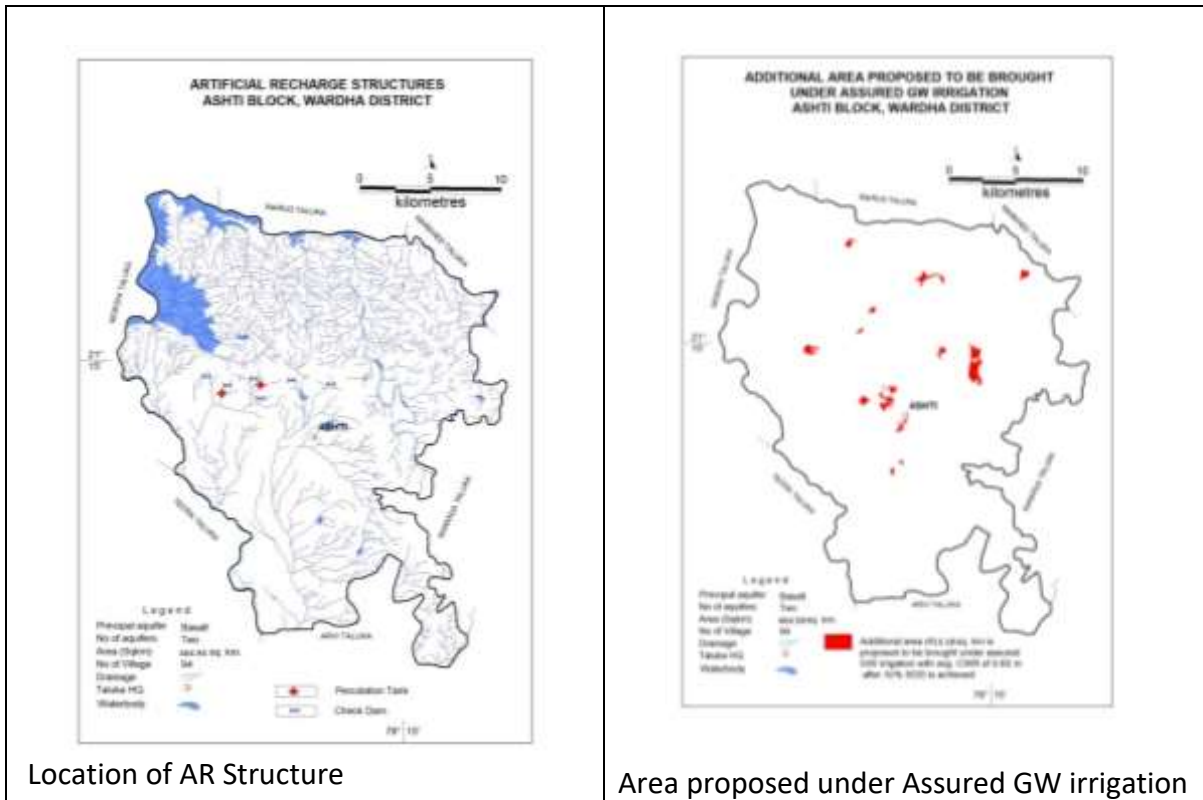
Gross Annual Draft (MCM)		35.86
Stage of Ground Water Development (%)		62.28
6.1 Supply Side Management		
SUPPLY (MCM)		
Agricultural Supply -GW		32.91
Agricultural Supply -SW		5.44
Domestic Supply - GW		2.95
Domestic Supply - SW		0.74
Total Supply		42.04
Area of Block (Sq. Km.)		464.94
Area suitable for Artificial recharge(Sq. Km)		25.68
Type of Aquifer		Hard Rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)		25.68
Volume of Unsaturated Zone (MCM)		88.85
Average Specific Yield		0.02
Recharge Potential (MCM)		1.78
Surplus water Available (MCM)		0.58
Proposed Structures	Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	2	6
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	0.30	0.13
RTRWH Structures – Urban Areas		
Households to be covered (50% with 50 m ² area)		0
Total RWH potential (MCM)		0
Rainwater harvested / recharged @ 80% runoff co-efficient		0
Estimated Expenditure (Rs. In Cr.) @ Rs.30000/-per HH		0
RTRWH & AR is economically not viable & hence, not recommended.		
6.2 Demand Side Management		
Micro irrigation techniques		
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler		14.7
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.815 m. Drip Req. -0.511, WUE- 0.304 m		3.82
Proposed Cropping Pattern change		Not proposed
Ground water Irrigated area under Water Intensive Crop (sq.km)		NIL
Water Saving by water use efficiency (MCM)		NIL



Demand side Interventions

6.3 Expected Benefits

Net Ground Water Availability (MCM)	57.58
Existing Ground Water Draft for All Uses (MCM)	35.86
Present stage of Ground Water Development (%)	62.28
Additional GW resources available after Supply side and demand side interventions (MCM)	0.43
Ground Water Availability after Supply side and Demand side intervention (MCM)	58.01
Stage of Ground Water Development after Supply side Interventions (%)	61.81
Total GWR available for GW Development (MCM)	8.57
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)	44.43
Other Interventions Proposed, if any	Not proposed
Alternate Water Sources Available	NIL
6.4 Development Plan	
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	8.57
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	514
Proposed Number of BW (@ 1 ham for 10% of GWR Available)	86
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	13.18

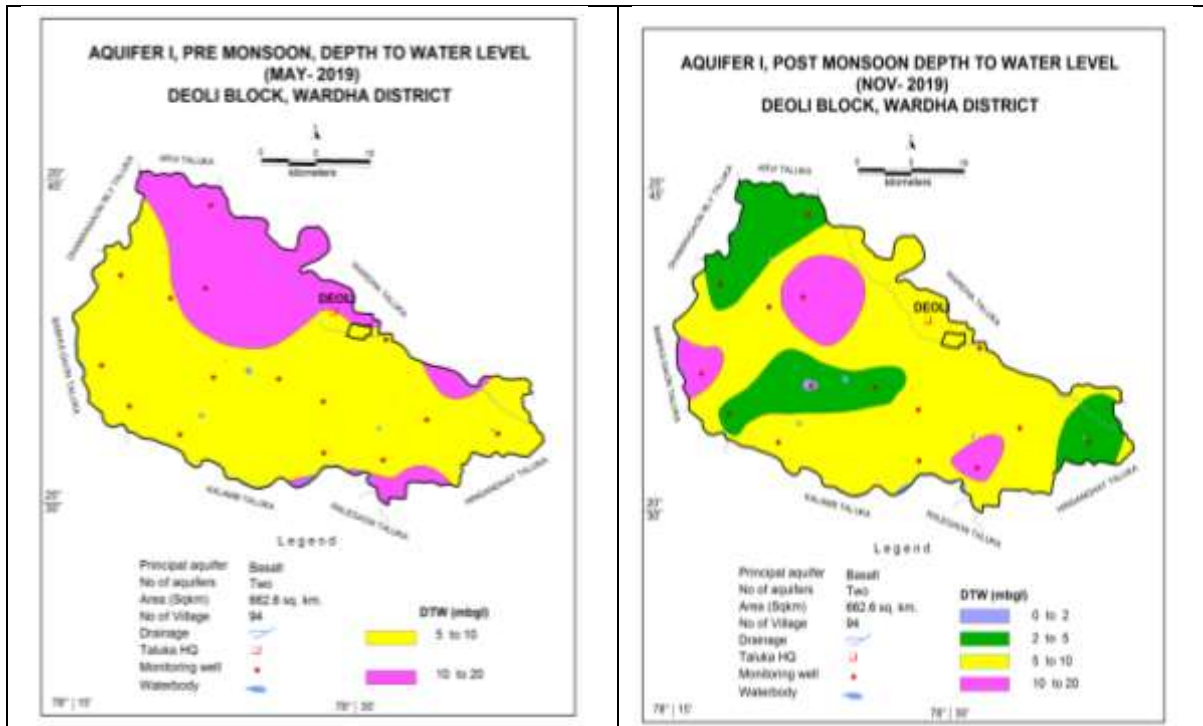


9.3 DEOLI BLOCK, WARDHA DISTRICT, MAHARASHTRA

1.SALIENT FEATURE	
1.1 Introduction	
Block Name	Deoli
Geographical Area (Sq. Km.)	699.32Sq. Km.
Forest Area (Sq. Km)	12.43Sq. Km.
Population (2011)	159877
Climate	Monsoon sub-tropical
Net Annual Ground Water Availability (MCM)	105.42
Existing Gross Ground Water Draft for All uses(MCM)	42.23
Stage of Ground Water Development (%)	40.06
Category	SAFE

1.2 Rainfall Analysis		
Normal Rainfall	883 mm	
Annual Rainfall (2019)	847.3 mm	
Decadal Average Annual Rainfall (2010-19)	935.2 mm	
Long Term Rainfall Analysis (1998-2019)	Rising Trend 3.841 mm/year. Probability of Normal/Excess Rainfall: 72%/14%. Probability of Drought (Moderate/Acute)-: 9 % Moderate & 5% Acute.	
Rainfall Trend(1998-2019)		
<p style="text-align: center;">RAINFALL ANALYSIS DEOLI TALUKA $y = 3.8417x + 846.22$</p>		
EQUATION OF TREND LINE: $Y = 3.841x + 846.2$		
1.3 Geomorphology, Soil & Geology		
Geomorphic Unit	Alluvium plain, slightly dissected plateau, highly dissected plateau and plateau weathered observed major parts of the block while Moderately dissected plateau and structural hills covering smaller portion of the block.	
Geology	Alluvium (sand/ silt and clay alternating beds). Age: Recent to Sub-recent Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
Soil	Major part of the block is covered by fine calcareous deep soil, followed by fine calcareous very deep soil and fine Loamy clayey shallow soil	
1.4 Hydrology & Drainage		
Drainage	The block is drained by Yasodha river	
Hydrology	Major project	Nil
	Medium	Nil
	Bigger Minor (250 to 600 and >600 Ha.)	Nil
	Minor Irrigation Project (100 to 250 Ha)	Nil
	Minor Irrigation Project (0 to 100 Ha.)	5 PT, 9 KT Weirs ,22 Diversion Dam, 2 Minor Irrigation

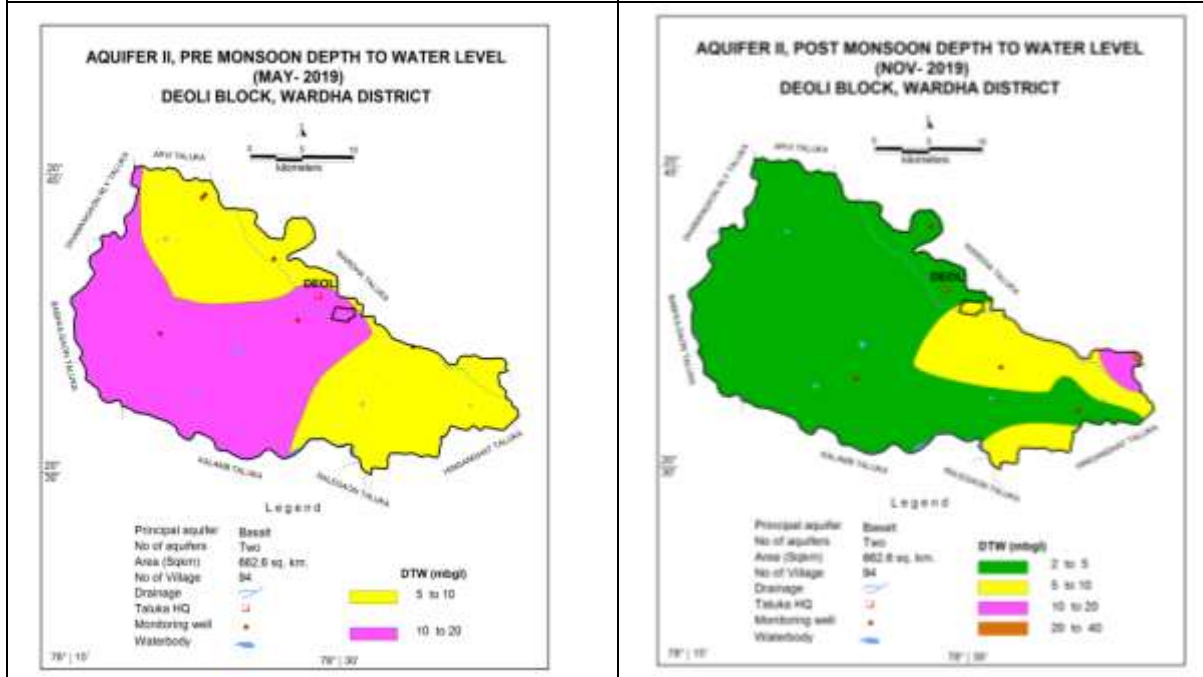
		Scheme,7 Sakhali Cement Nala Band	
1.5 Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		699.32Sq. Km.	
Forest Area		12.43Sq. Km.	
Cultivable Area		545.12 Sq. Km.	
Net Sown Area		511.44Sq. Km.	
Double Cropped Area		33.68Sq. Km.	
Area under Irrigation		Surface Water	0
		Ground Water	12.71
Principal Crops (Reference year 2018-19)		Crop Type	Area (Sq. Km.)
		Cotton	242.34
		Cereals	15.68
		Pulses	81.22
		Oil Seeds	198.61
Horticultural Crops		Fruits and Vegetables	4.11
		Sugarcane	0.63
		Spices	1.19
1.6 Water Level Behaviour			
1.6.1 Aquifer-I/Shallow Aquifer			
Pre-Monsoon Water Level (May 2019) Water level between 5-10 mbgl is observed in almost entire block while water level between 10-20 mbgl observed in the north eastern and southern parts of the block.		Post-Monsoon Water Level (Nov. 2019) Water Level between 0- 2 mbgl is observed in isolated patches in central part of block. Water level between 2 to 5 mbgl observed in the northern, eastern, and central parts of the block as patches. Water level between 5-10 mbgl is observed in almost entire block. Water level between 10-20 mbgl is observed in the central, western and southern parts of the block as small patches.	



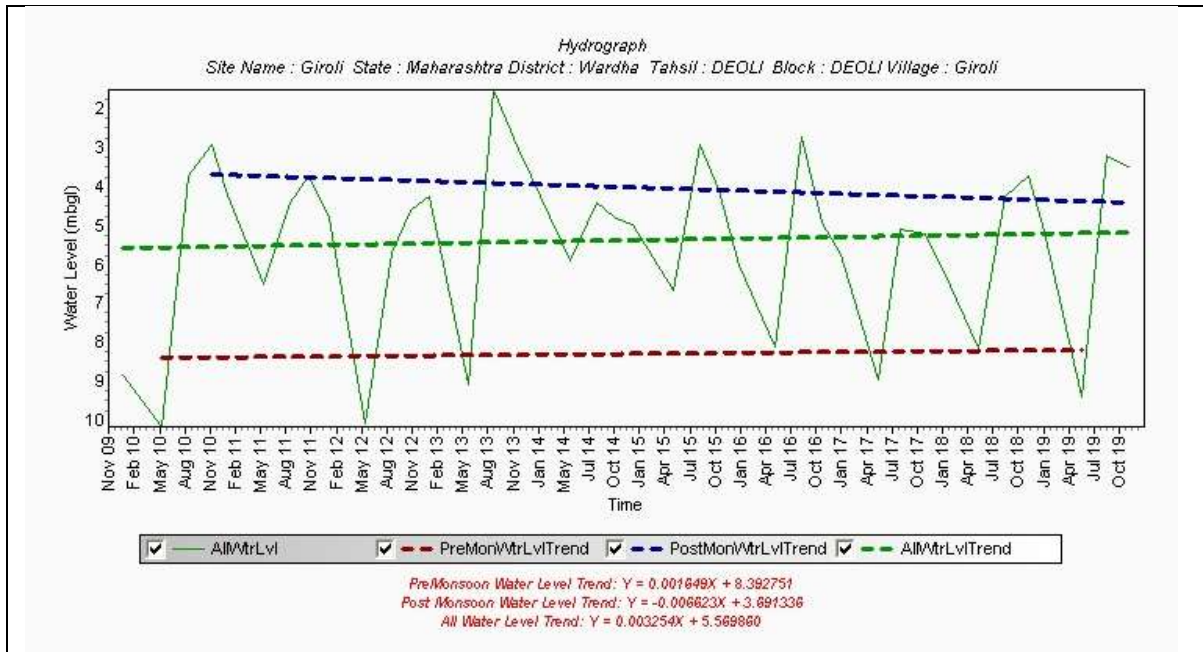
1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon Water Level (May 2019)
 Water level between 5-20 mbgl is observed in north eastern parts of the block while water level between 10-20 mbgl is observed almost entire block.

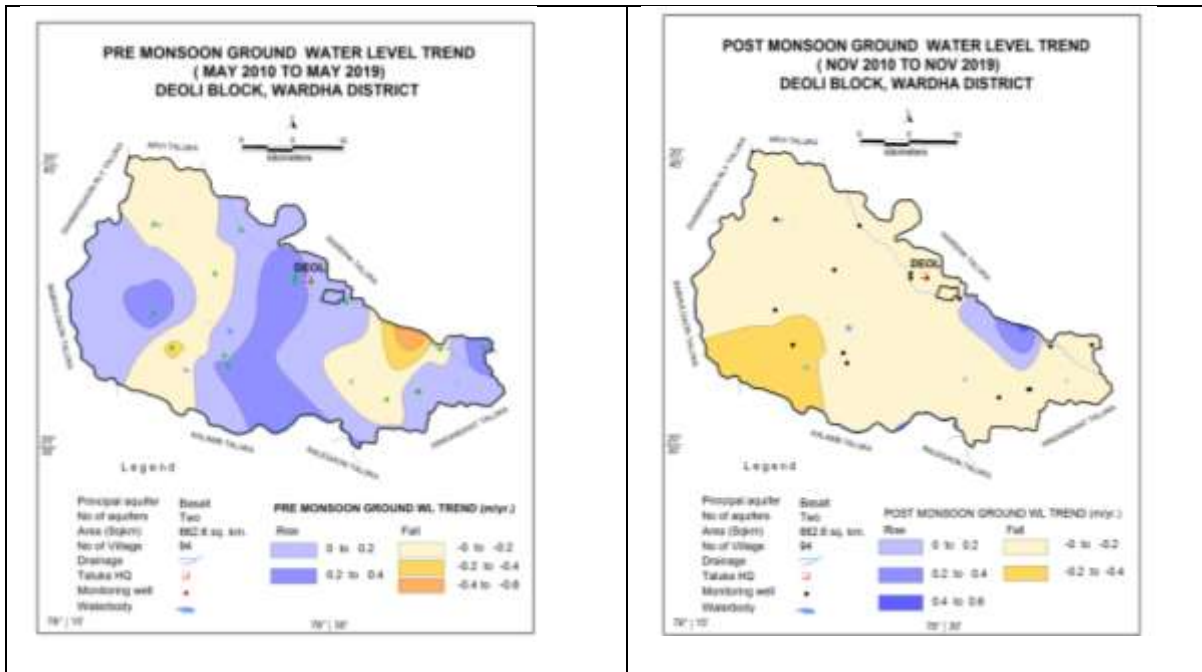
Post-Monsoon Water Level (Nov. 2019)
 Water level between 2-5 mbgl is observed in major part of the block while water level between 5-10 mbgl observed in the eastern part of the block while water level between 10-20 mbgl observed in the eastern tip of the block.



Hydrograph



Hydrograph shows Pre-monsoon rising water level trend @ 0.019 m/year	Hydrograph shows Post- monsoon fallingwater level trend @ 0.079 m/year
Pre-Monsoon trend Rising 0.019 to 0.35 m/year Falling 0.055 to 0.23 m/year	Post-Monsoon trend Falling 0.008 to 0.33m/year
Pre-Monsoon Water Level Trend (2010-2019) Almost entire taluka is showing rising trend, except northern, eastern and southern part of the block. Area showing rising trend >0.2 m is 29.62 km ² .Area showing falling trend >0.2 m observed in 6 Km ² .Falling trend between 0.2-0.4 m and 0.4 -0.6 m are observed in the eastern part of the block.	Post-Monsoon Water Level Trend (2010-2019) Almost entire taluka is showing falling trend. Maximum area of taluka is showing falling trend in the range of 0 to 0.2 m. Rising trend of 0 to 0.2 and 0.2-0.4 m are observed in the eastern part of the block.Falling trend >0.2 m observed in 26.45 Km ² area.



2. GROUND WATER ISSUES

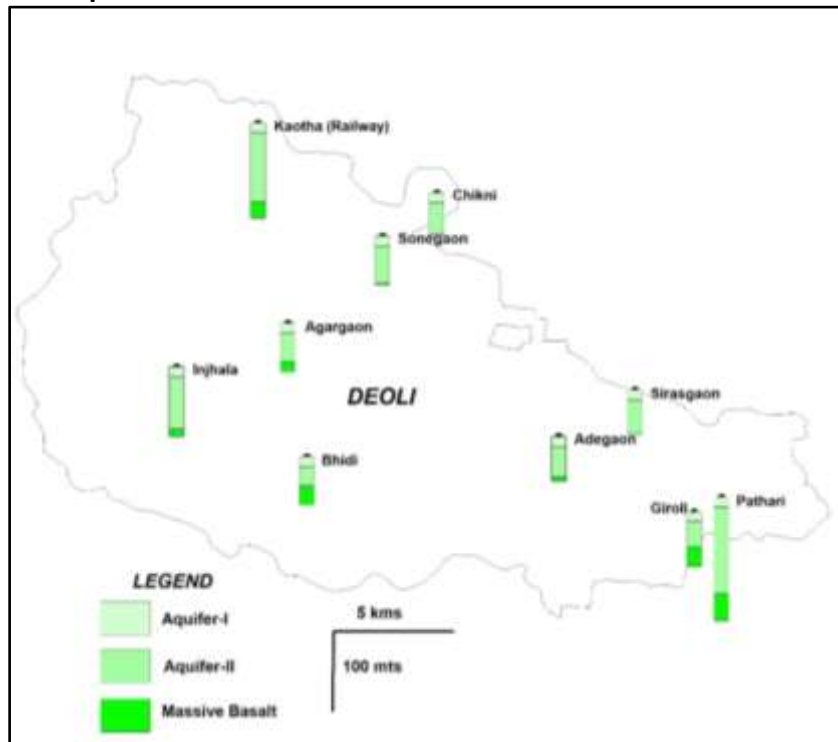
- 1. Water scarcity in lean period
- 2. Fluoride > 1.5 mg/l
- 3. Nitrate > 45 mg/l

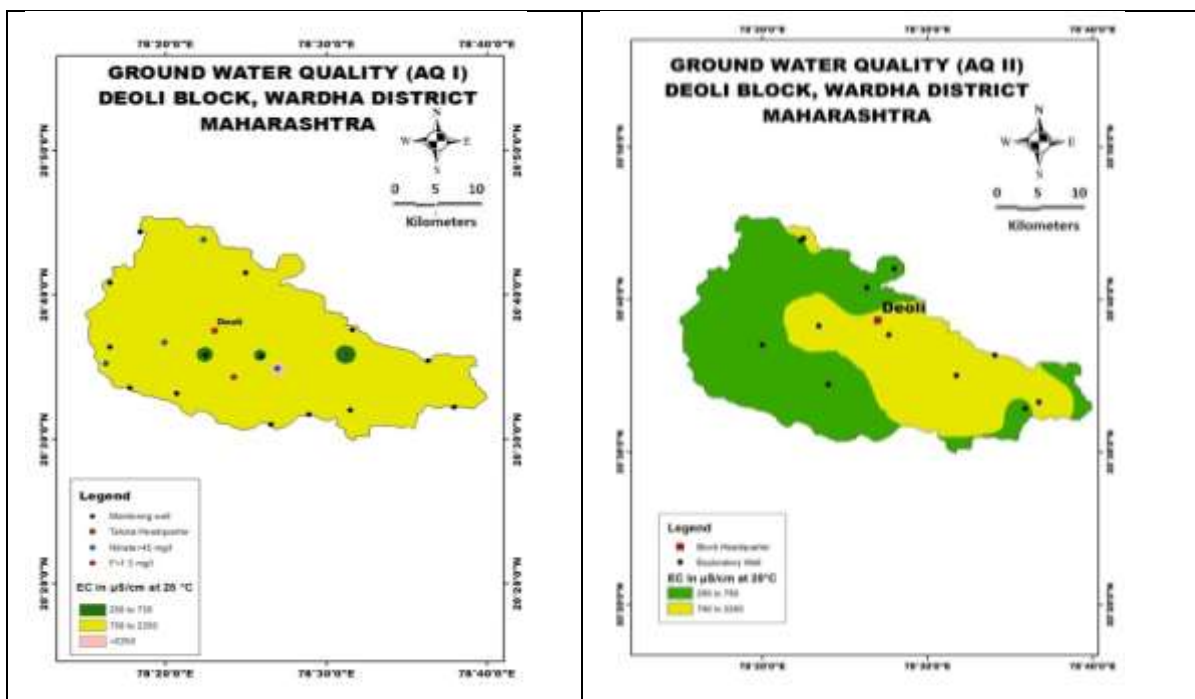
3. AQUIFER DISPOSITION

3.1 Number of Aquifers

Basalt – Aquifer-I (weathered & fractured basalt)
 Basalt – Aquifer-II (Jointed & fractured basalt)

3.2 Lithological disposition





5. GROUND WATER RESOURCES

5.1 Aquifer-I/Shallow Aquifer

Ground Water Recharge Worthy Area (Sq. Km.)	681.78
Total Annual Ground Water Recharge (MCM)	111.07
Natural Discharge (MCM)	5.64
Net Annual Ground Water Availability (MCM)	105.42
Existing Gross Ground Water Draft for irrigation (MCM)	38.01
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	4.20
Existing Gross Ground Water Draft for All uses(MCM)	42.23
Provision for domestic and industrial requirement supply to 2025(MCM)	4.79
Net Ground Water Availability for future irrigation development (MCM)	61.68
Stage of Ground Water Development (%)	40.06
Category	Safe

5.2 Aquifer-II/Deeper Aquifer

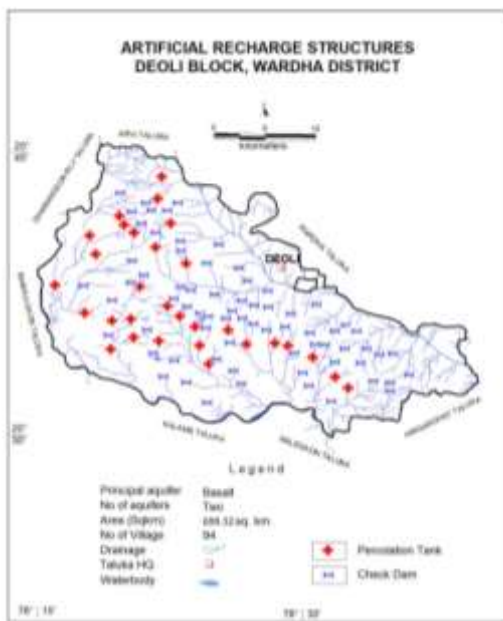
Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Deoli	4	516.61	51.05	0.0000438	0.002	1.155135	4.13288	5.288015
Deoli	6	114.4	61.5	0.0000438	0.002	0.308159	1.3728	1.680959
Deoli	8	29.46	12.5	0.0000438	0.002	0.016129	0.47136	0.487489
Total								7.456463

6. GROUND WATER RESOURCE MANAGEMENT

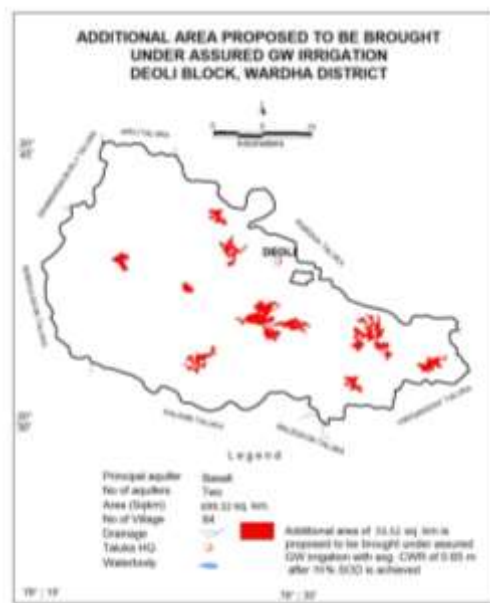
Net Annual Ground Water Availability (MCM)	105.43
Gross Annual Draft (MCM)	42.23
Stage of Ground Water Development (%)	40.06

6.1 Supply Side Management		
SUPPLY (MCM)		
Agricultural Supply -GW		38.02
Agricultural Supply -SW		0.0
Domestic Supply - GW		4.21
Domestic Supply - SW		1.05
Total Supply		43.28
Area of Block (Sq. Km.)		699.32
Area suitable for Artificial recharge(Sq. Km)		385.25
Type of Aquifer		Hard Rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)		385.25
Volume of Unsaturated Zone (MCM)		616.4
Average Specific Yield		0.02
Recharge Potential (MCM)		12.32
Surplus water Available (MCM)		8.62
Proposed Structures	Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	30	86
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	4.53	1.94
RTRWH Structures – Urban Areas		
Households to be covered (50% with 50 m ² area)		12182
Total RWH potential (MCM)		0.55
Rainwater harvested / recharged @ 80% runoff co-efficient		0.44
RTRWH & AR is economically not viable & hence, not recommended.		
6.2 Demand Side Management		
Micro irrigation techniques		
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler		Not proposed
Water Saving by use of Drip and Sprinklers		
Proposed Cropping Pattern change		Not proposed
Ground water Irrigated area under Water Intensive Crop (sq.km)		NIL
Water Saving by water use efficiency (MCM)		NIL
6.3 EXPECTED BENEFITS		
Net Ground Water Availability (MCM)		105.43
Existing Ground Water Draft for All Uses (MCM)		42.23
Present stage of Ground Water Development (%)		40.06
Additional GW resources available after Supply side interventions (MCM)		6.47
Ground Water Availability after Supply side intervention (MCM)		111.9

Stage of Ground Water Development after Supply side Interventions (%)	37.74
Total GWR available for GW Development (MCM)	36.09
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)	78.32
Other Interventions Proposed, if any	Not proposed
Alternate Water Sources Available	NIL
6.4 Development Plan	
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	36.09
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	2165
Proposed Number of BW (@ 1 ham for 10% of GWR Available)	361
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	55.52

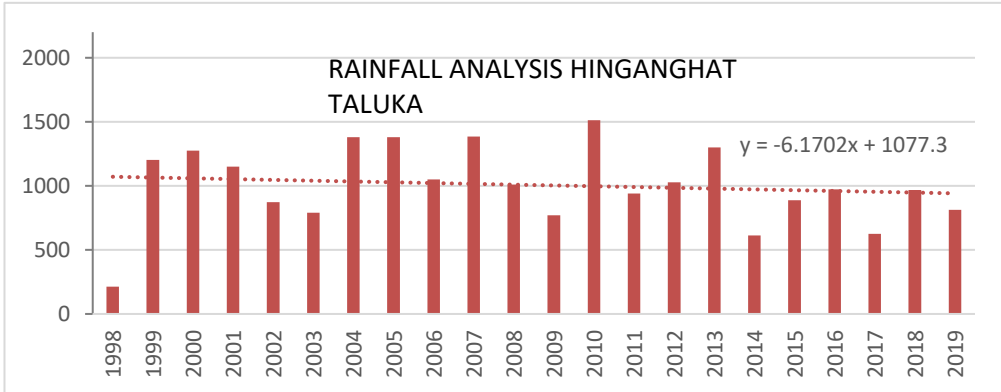


Location of AR Structure

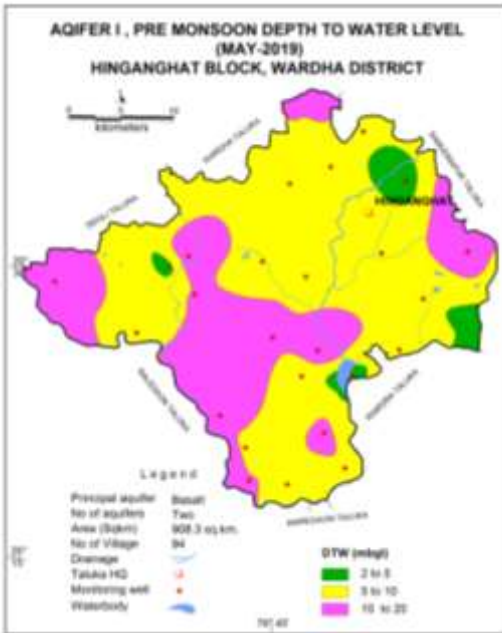


Area proposed under Assured GW irrigation

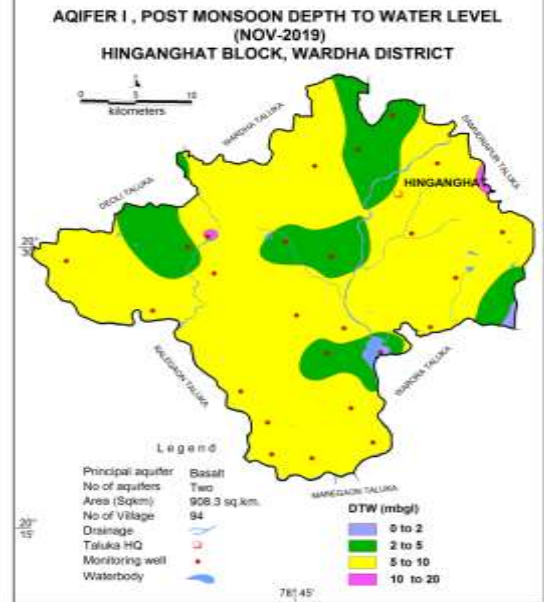
9.4 HINGANGHAT BLOCK, WARDHA DISTRICT, MAHARASHTRA

1. SALIENT FEATURE	
1.1 Introduction	
Block Name	Hinganghat
Geographical Area(Sq. Km.)	899.19Sq. Km.
Forest Area (Sq. Km)	26.49Sq. Km.
Population (2011)	224017
Climate	Monsoon sub-tropical
Net Annual Ground Water Availability (MCM)	117.98
Existing Gross Ground Water Draft for All uses(MCM)	62.73
Stage of Ground Water Development (%)	53.17
Category	SAFE
1.2 Rainfall Analysis	
Normal Rainfall	1006.4 mm
Annual Rainfall (2019)	811.9 mm
Decadal Average Annual Rainfall (2010-19)	966.13 mm
Long Term Rainfall Analysis (1998-2019)	Falling Trend 6.170 mm/year. Probability of Normal/Excess Rainfall: 59%/27%. Probability of Drought (Moderate /Acute)-: 9 % Moderate& 5% Acute.
Rainfall Trend 1998-2019	
 <p style="text-align: center;">RAINFALL ANALYSIS HINGANGHAT TALUKA</p> <p style="text-align: right;">$y = -6.1702x + 1077.3$</p>	
EQUATION OF TREND LINE: $Y = -6.170x + 1077$	
1.3 Geomorphology, Soil & Geology	
Geomorphic Unit	The block is occupied by slightly dissected plateau followed by weathered plateau, alluvial plain in the western part of the block. Plateau undissected observed in the block except southern portion. Structural hills observed as patches and plateau moderately dissected observed as patches in the eastern part of the block.
Geology	Alluvium (sand/ silt and clay alternating beds), Age: Recent to Sub-recent Deccan Traps (Basalt). Age: Late Cretaceous to Eocene
Soil	Fine calcareous, deep soil found in the major parts of the block followed by fine calcareous very deep soil and Loamy, clayey very shallow soil.
1.4 Hydrology & Drainage	

Drainage	The block is drained by tributaries of Godavari and Sub basins of Wardha River. The main rivers flowing through the block are Wunna and Asada river.	
Hydrology	Major project	1(Wana Project)
	Medium	2 (Dham, Pothra)
	Bigger Minor (250 to 600 and >600 Ha.)	1 Small Irrigation Pond
	Minor Irrigation Project (100 to 250 Ha.)	1 PT
	Minor Irrigation Project (0 to 100 Ha.)	34 Diversion Dam, 25 KT Weirs,7 Minor Irrigation Scheme, 1 PT, 14 Sakhali Cement Nala Band
1.5 Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area		899.19Sq. Km.
Forest Area		26.49Sq. Km.
Cultivable Area		828.33Sq. Km.
Net Sown Area		761.31 Sq. Km.
Double Cropped Area		67.02 Sq. Km.
Area under Irrigation	Surface Water	0
	Ground Water	37.58
Principal Crops (Reference year 2018-19)	Crop Type	Area (Sq. Km.)
	Cotton	441.27
	Cereals	21.26
	Pulses	181.54
	Oil Seeds	173.03
Horticultural Crops	Fruits and Vegetables	6.78
	Sugarcane	0.18
	Spices	1.81
1.6 Water Level Behaviour		
1.6.1 Aquifer-I/Shallow Aquifer		
Pre-Monsoon Water Level (May 2019)		Post-Monsoon Water Level (Nov. 2019)



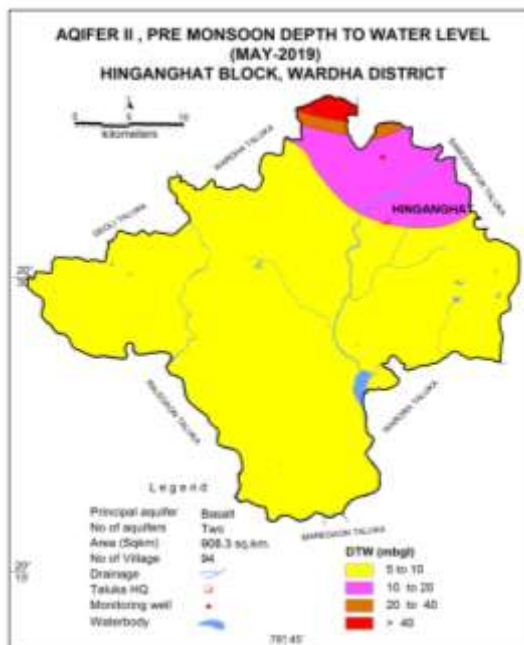
Water level between 2-5 mbgl observed as small patches while water level between 5-10 mbgl observed in almost entire part of the block. Water level between 10-20 mbgl observed in the south western and northeastern parts of the block.



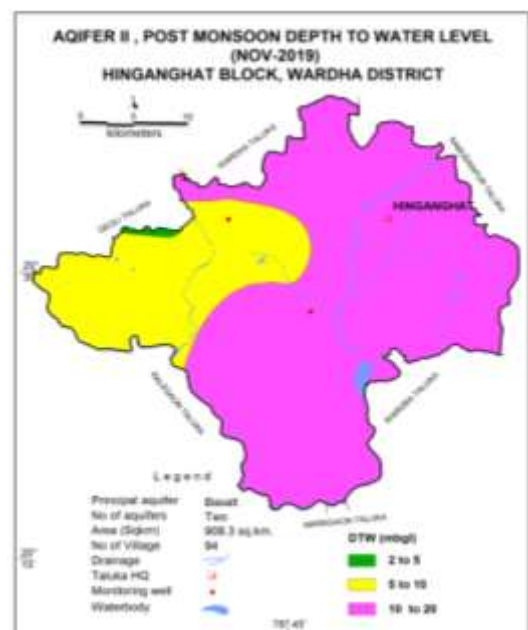
Water level level between 0-2 mbgl observed as very small patches while water level between 2-5 mbgl observed in all parts of the block as patches. Water level between 5-10 mbgl observed in almost entire part of the block while water level between 10-20 mbgl observed in eastern and western part as very small patches.

1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon Water Level (May 2019)

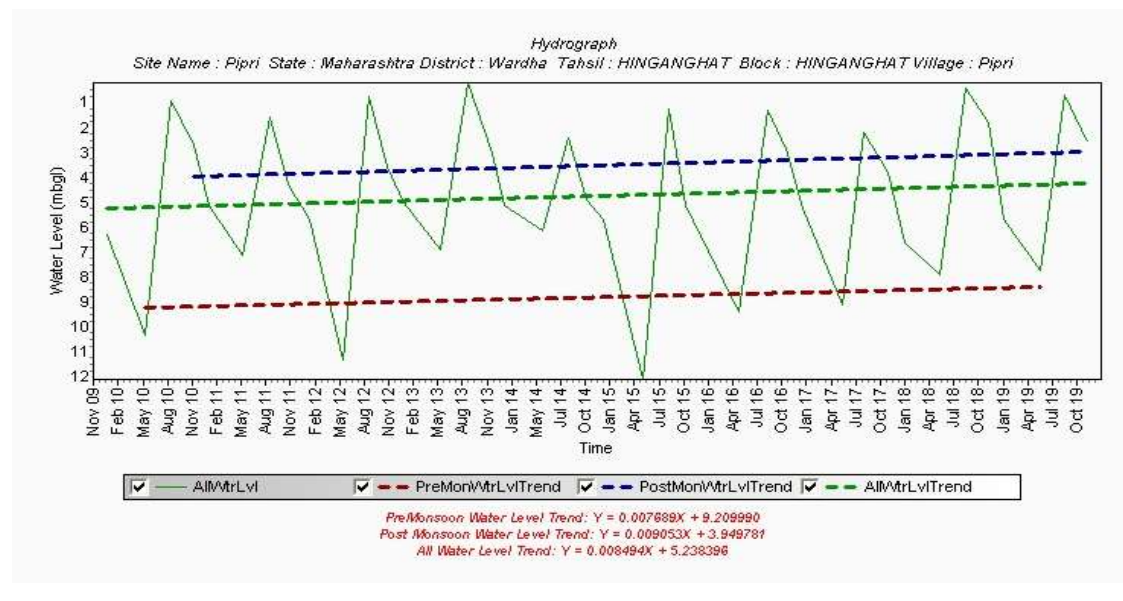


Post-Monsoon Water Level (Nov. 2019)



Water level between 5-10 mbgl is observed in almost entire block, while water level between 10-20, 20-40 and >40 mbgl observed in the northern parts of the block as small patches.	Water level between 2-5 mbgl is observed in western part as small patch while water level between 5-10 mbgl observed in western part. Water level between 10-20 mbgl observed almost entire part of the block.
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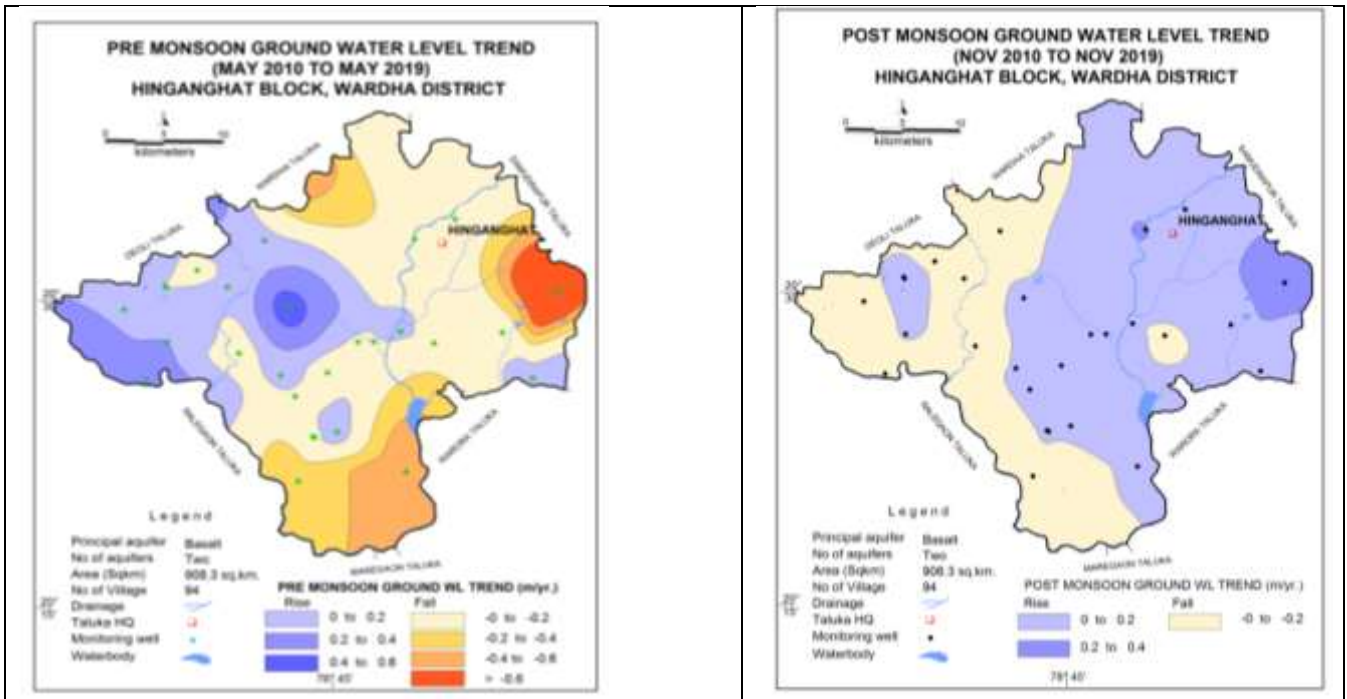
Hydrograph



Hydrograph shows Pre-monsoon rising water level trend @ 0.0076 m/year	Hydrograph shows Post-monsoon rising water level trend @ 0.108 m/year
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Pre-Monsoon Water Level Trend (2010-2019) Rising 0.009 to 0.446 m/year Falling 0.01 to 1.1 m/year	Post-Monsoon Water Level Trend (2010-2019) Rising 0.004 to 0.357 m/year Falling 0.006 to 0.19 m/year
--	--

Almost entire taluka is showing falling trend, except north western and eastern part of the block. Area showing rising trend >0.2 m observed in 27.33Km ² . Falling trend > 0.6 m is observed in eastern part of the block. Area showing falling trend >0.2 m observed in 92.03 Km ² .	Almost entire taluka is showing rising trend. Area showing rising trend >0.2 m observed in 24.15Km ² . Except southern, northwestern and southern part, it shows falling trend th the range of 0 to 0.2 m..
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2. Ground Water Issues

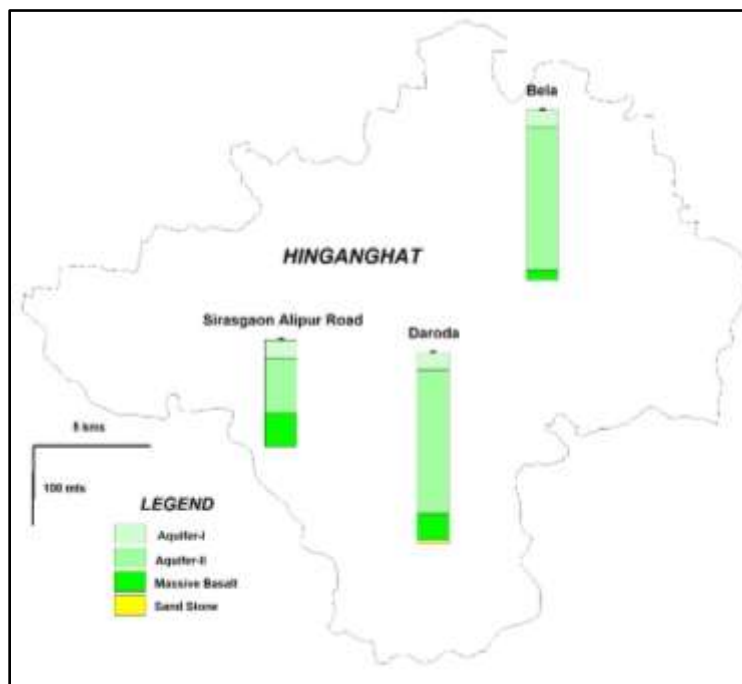
1. Limited aquifer potential
2. Water scarcity in lean period
3. Fluoride >1.5mg/l
4. Nitrate >45 mg/l

3. AQUIFER DISPOSITION

3.1 Number of Aquifers

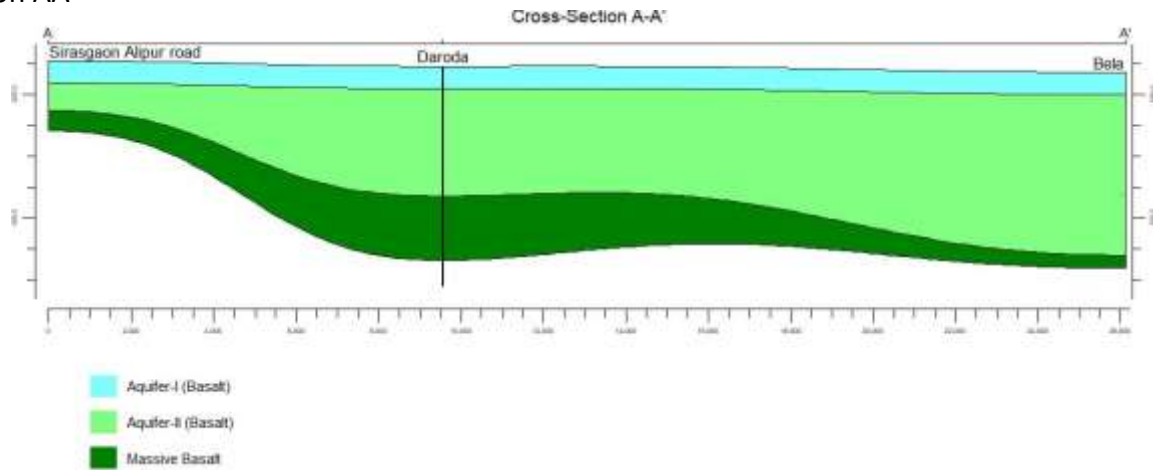
- Basalt – Aquifer-I (weathered & fractured basalt)
- Basalt – Aquifer-II (Jointed & fractured basalt)

3.2 Lithological Disposition



3.3 Cross Sections

Section AA'

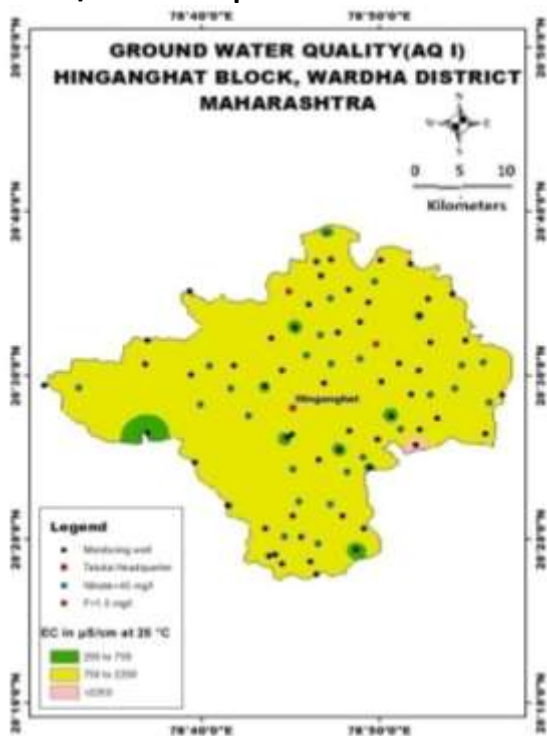


3.4 Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)		Alluvium
Type of Aquifer (Phreatic/Semi-confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined /confined)	Aquifer-I
Depth of Occurrence (mbgl)	9 to 30	40 to 176	5-30
Granular/weathered/fractured rocks thickness (m)	5.4 to 22	3 to 9	5 to 22
Yield	10 – 100m ³ /day	Upto 2.5 lps	60-100m ³ /day
Specific yield/Storativity (S)	0.019 – 0.028	0.000438	0.07
Transmissivity (T)	30-80 m ² /day	149 to 260 m ² /day	60-120 m ² /day

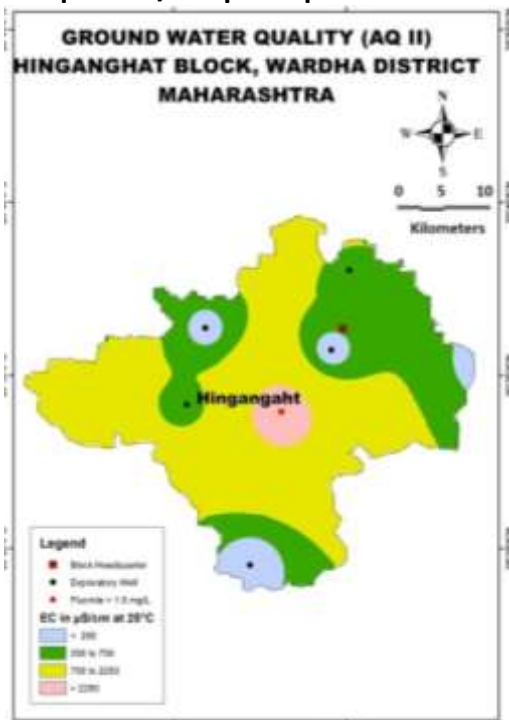
4. GROUND WATER QUALITY

4.1 Aquifer-I/Shallow Aquifer



EC > 2250 $\mu\text{S/cm}$ has been observed in southeastern part of block as a small patch covering 3.27 Km^2 . Whereas most of the area shows EC between 750-2250 $\mu\text{S/cm}$. Areas having EC between 250-750 $\mu\text{S/cm}$ observed as small patches in the block. Fluoride >1.5 mg/l observed in the northern and eastern part of the block and Nitrate >45 mg/l observed in many parts of the block.

4.2 Aquifer-II/Deeper Aquifer



The ground water quality of deeper aquifer is suitable for irrigation purpose. EC between 750-2250 $\mu\text{S/cm}$ observed in major part of the block while EC between 250-750 $\mu\text{S/cm}$ observed in the north western part. Area showing EC >2250 $\mu\text{S/cm}$ is observed in 32.98 Km^2 . Fluoride >1.5 mg/l observed in the central part of the block.

5. GROUND WATER RESOURCES

5.1 Aquifer-I/Shallow Aquifer

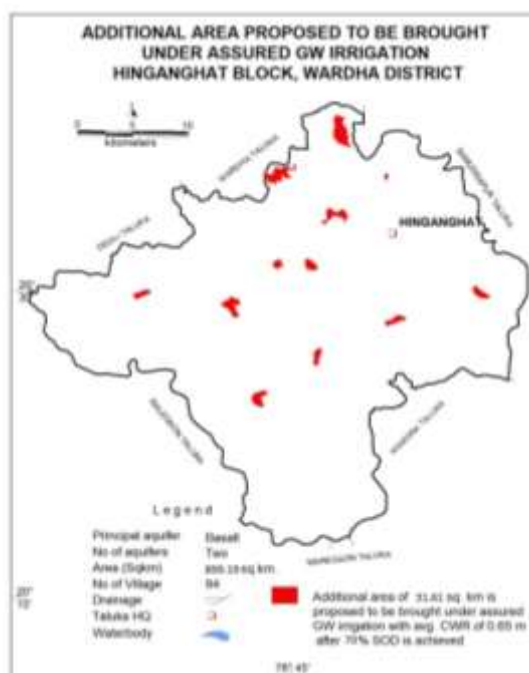
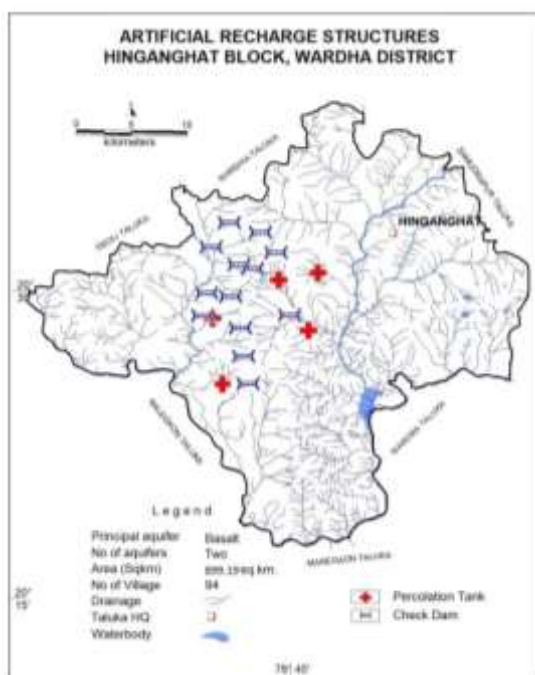
Ground Water Recharge Worthy Area (Sq. Km.)	919.65
Total Annual Ground Water Recharge (MCM)	124.91
Natural Discharge (MCM)	6.93
Net Annual Ground Water Availability (MCM)	117.98
Existing Gross Ground Water Draft for irrigation (MCM)	57.50
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	5.22
Existing Gross Ground Water Draft for All uses (MCM)	62.73
Provision for domestic and industrial requirement supply to 2025 (MCM)	5.40
Net Ground Water Availability for future irrigation development (MCM)	56.02
Stage of Ground Water Development (%)	53.17
Category	Safe

5.2 Aquifer-II/Deeper Aquifer

Taluka	Mean thickn	Area in sqkm	Piezometric head	S	Sy	Resource in above	Resource in confining layer (mcm)	Total resource (mcm)

	ess (m)		meter above bottom of confining layer			confining layer (mcm)		
Hinganghat	4	288.18	64	0.0000438	0.002	0.807826	2.30544	3.113266
Hinganghat	6	298.35	60	0.0000438	0.002	0.784064	3.5802	4.364264
Hinganghat	8	320.11	73	0.0000438	0.002	1.02352	5.12176	6.14528
Hinganghat								13.62281
6. GROUND WATER RESOURCE MANAGEMENT								
Net Annual Ground Water Availability (MCM)								117.98
Gross Annual Draft (MCM)								62.73
Stage of Ground Water Development (%)								53.17
6.1 Supply Side Management								
SUPPLY (MCM)								
Agricultural Supply -GW								57.51
Agricultural Supply -SW								0.0
Domestic Supply - GW								5.22
Domestic Supply - SW								1.31
Total Supply								64.04
Area of Block (Sq. Km.)								920.45
Area suitable for Artificial recharge(Sq. Km)								58.94
Type of Aquifer								Hard Rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)								58.94
Volume of Unsaturated Zone (MCM)								47.74
Average Specific Yield								0.02
Recharge Potential (MCM)								0.95
Surplus water Available (MCM)								1.32
Proposed Structures				Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)			Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	
Number of Structures				5			13	
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)				0.69			0.30	
RTRWH Structures – Urban Areas								
Households to be covered (50% with 50 m ² area)								23409
Total RWH potential (MCM)								1.13
Rainwater harvested / recharged @ 80% runoff co-efficient								0.90
RTRWH & AR is economically not viable & hence, not recommended.								
6.2 Demand Side Management								

Micro irrigation techniques	
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler	Not proposed
Water Saving by use of Drip and Sprinklers	-
Proposed Cropping Pattern change	Not proposed
Ground water Irrigated area under Water Intensive Crop (sq.km)	NIL
Water Saving by water use efficiency (MCM)	NIL
6.3 EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	117.98
Existing Ground Water Draft for All Uses (MCM)	62.73
Present stage of Ground Water Development (%)	53.17
Additional GW resources available after Supply side interventions (MCM)	0.99
Ground Water Availability after Supply side intervention (MCM)	118.97
Stage of Ground Water Development after Supply side Interventions (%)	52.73
Total GWR available for GW Development (MCM)	20.55
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)	83.28
Other Interventions Proposed if any	Not proposed
Alternate Water Sources Available	NIL
6.4 Development Plan	
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	20.55
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	1233
Proposed Number of BW (@ 1 ham for 10% of GWR Available)	206
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	31.61

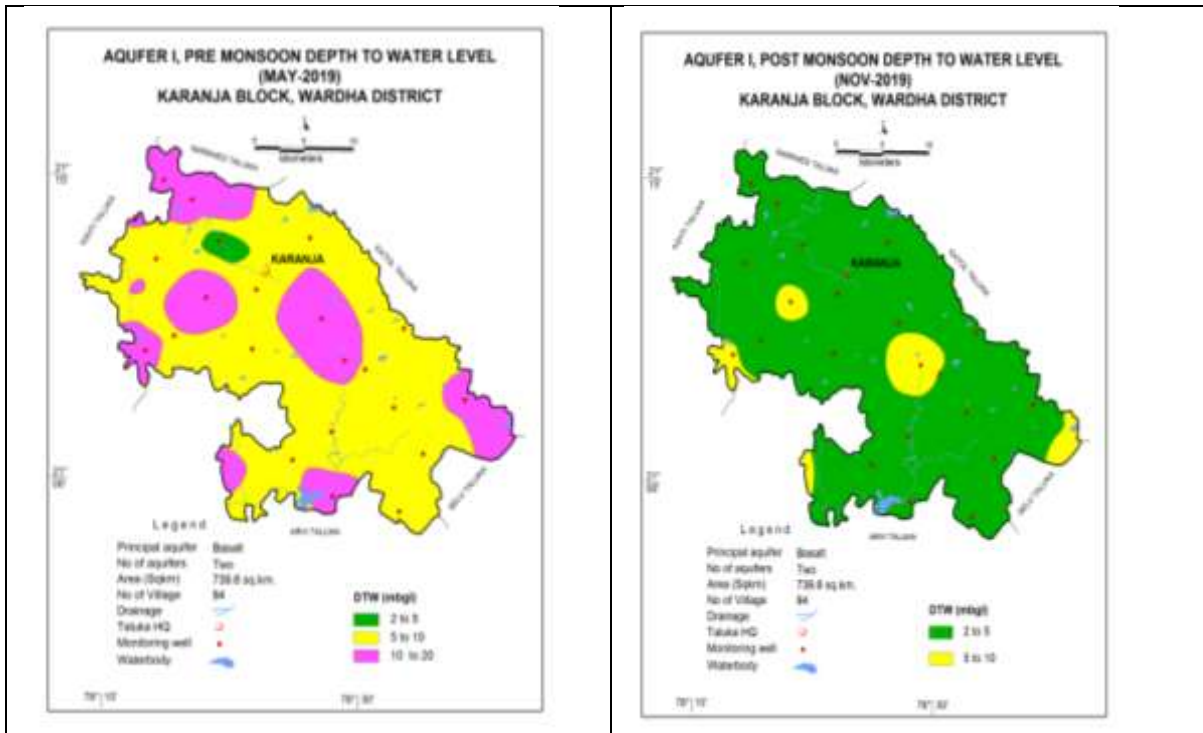


Location of AR Structure	Area proposed under Assured GW irrigation

9.5 KARANJA BLOCK, WARDHA DISTRICT, MAHARASHTRA

1. SALIENT FEATURE																																															
1.1 Introduction																																															
Block Name	Karanja																																														
Geographical Area (Sq. Km.)	619.11 Sq. Km.																																														
Forest Area (Sq. Km)	86.1 Sq. Km.																																														
Population (2011)	90462																																														
Climate	Monsoon sub-tropical																																														
Net Annual Ground Water Availability (MCM)	77.27																																														
Existing Gross Ground Water Draft for All uses(MCM)	56.68																																														
Stage of Ground Water Development (%)	73.35																																														
Category	Semi -Critical																																														
1.2 Rainfall Analysis																																															
Normal Rainfall	875.5 mm																																														
Annual Rainfall (2019)	873 mm																																														
Decadal Average Annual Rainfall (2008-17)	894.13 mm																																														
Long Term Rainfall Analysis (1998-2019)	Rising Trend 0.478 mm/year. Probability of Normal/Excess Rainfall: 85%/5%. Probability of Drought (Moderate/Severe)-: 5 % Moderate & 5% Severe.																																														
<p>Rainfall Trend (1998-2019)</p> <table border="1"> <caption>Annual Rainfall Data (1998-2019)</caption> <thead> <tr> <th>Year</th> <th>Rainfall (mm)</th> </tr> </thead> <tbody> <tr><td>1998</td><td>200</td></tr> <tr><td>1999</td><td>1100</td></tr> <tr><td>2000</td><td>950</td></tr> <tr><td>2001</td><td>1050</td></tr> <tr><td>2002</td><td>750</td></tr> <tr><td>2003</td><td>850</td></tr> <tr><td>2004</td><td>950</td></tr> <tr><td>2005</td><td>950</td></tr> <tr><td>2006</td><td>950</td></tr> <tr><td>2007</td><td>1050</td></tr> <tr><td>2008</td><td>700</td></tr> <tr><td>2009</td><td>700</td></tr> <tr><td>2010</td><td>1250</td></tr> <tr><td>2011</td><td>950</td></tr> <tr><td>2012</td><td>850</td></tr> <tr><td>2013</td><td>1050</td></tr> <tr><td>2014</td><td>850</td></tr> <tr><td>2015</td><td>950</td></tr> <tr><td>2016</td><td>850</td></tr> <tr><td>2017</td><td>750</td></tr> <tr><td>2018</td><td>650</td></tr> <tr><td>2019</td><td>873</td></tr> </tbody> </table>		Year	Rainfall (mm)	1998	200	1999	1100	2000	950	2001	1050	2002	750	2003	850	2004	950	2005	950	2006	950	2007	1050	2008	700	2009	700	2010	1250	2011	950	2012	850	2013	1050	2014	850	2015	950	2016	850	2017	750	2018	650	2019	873
Year	Rainfall (mm)																																														
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2015	950																																														
2016	850																																														
2017	750																																														
2018	650																																														
2019	873																																														
1.3 Geomorphology, Soil & Geology																																															
Geomorphic Unit	The block is covered by structural hills followed by plateau slightly dissected, plateau moderately dissected and plateau weathered																																														
Geology	Deccan Traps (Basalt)Age: Late Cretaceous to Eocene																																														
Soil	Major part of the block covered by fine-loamy, clayey shallow soil followed by loamy,clayey extremely shallow soil, loamy clayey very shallow soil and fine, calcareous very deep soil in the northern part of the block as patches.																																														
1.4 Hydrology & Drainage																																															
Drainage	The block is drained by the tributaries of Godavari and Sub basins of Wardha river																																														
Hydrology	Major project	1 (Kar)																																													
	Medium	0																																													

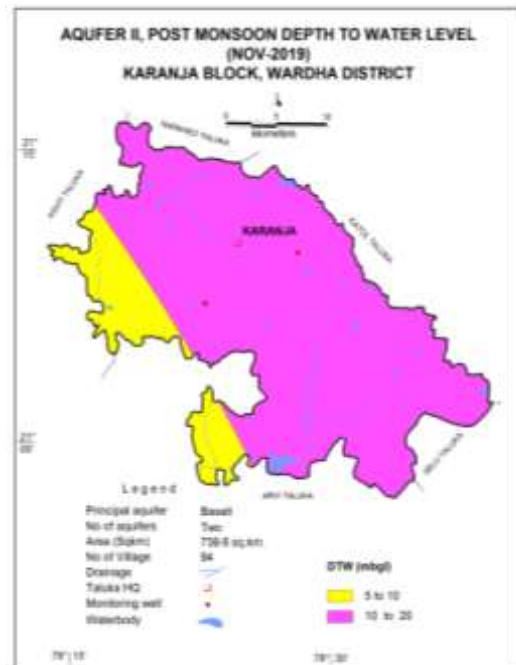
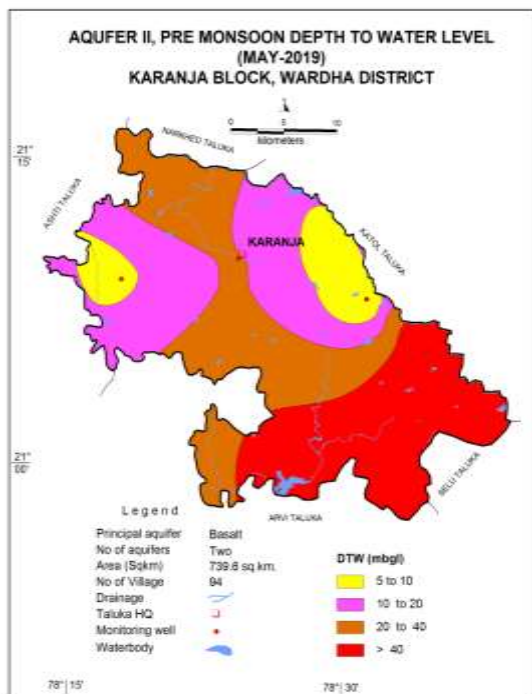
	Bigger Minor (250 to 600 and >600 Ha.)	1 PT
	Minor Irrigation Project (100 to 250 Ha.)	1 PT
	Minor Irrigation Project (0 to 100 Ha.)	25 PT, 43 K T Weirs, 54 Diversion Dam
1.5 Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area		619.11 Sq. Km.
Forest Area		86.1 Sq. Km.
Cultivable Area		452.31 Sq. Km.
Net Sown Area		389.14 Sq. Km.
Double Cropped Area		63.17 Sq. Km.
Area under Irrigation	Surface Water	0.76
	Ground Water	27.41
Principal Crops (Reference year 2013-14)	Crop Type	Area (Sq. Km.)
	Cotton	168.8
	Cereals	42.12
	Pulses	71.24
	Oil Seeds	142.22
Horticultural Crops	Fruits and Vegetables	25.39
	Sugarcane	0.25
	Spices	2.23
1.6 Water Level behaviour		
1.6.1 Aquifer-I/Shallow Aquifer		
Pre-Monsoon Water Level (May 2019) Water level between 2-5 mbgl is observed in isolated patches in the northern part of the block while water level in the range of 5-10 mbgl is observed in almost entire block. Water level between 10-20 observed as isolated patches in the block.		Post-Monsoon Water Level (Nov. 2019) Water Level less between 2-5 mbgl is observed in almost entire area of the block while water level between 5-10mbglobservrd in isolated patches of the block.



1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon Water Level (May 2019)

Post-Monsoon Water Level (Nov. 2019)

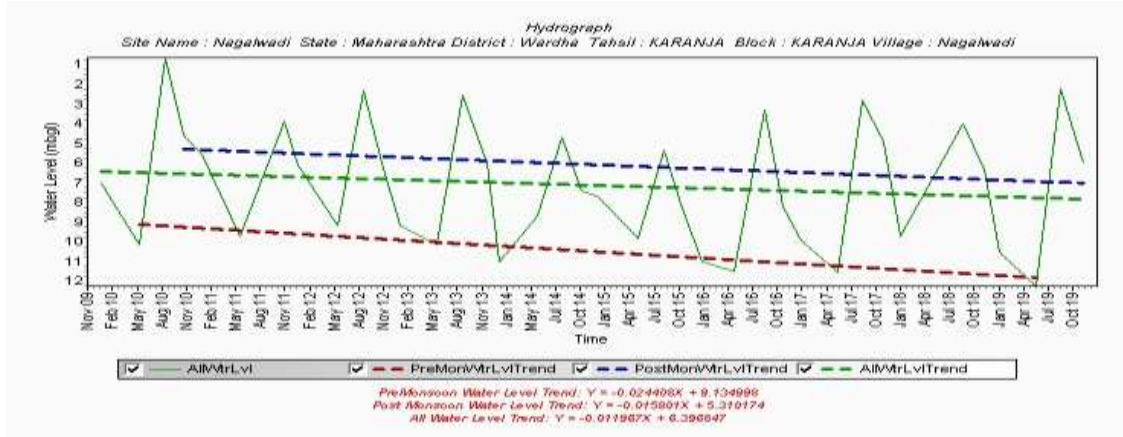


Water level between 5-10 mbgl is observed in isolated patch in eastern and western part of the block. Whereas, water level between 20-30 mbgl is observed in major parts of the block. Water level between 10-20 mbgl observed in the western and eastern parts of the block whereas

Water level between 5-10 mbgl is observed in western and southwestern parts of the block while water level between 10-20 mbgl observed in the major parts of the block.

water level >40 mbgl observed in the southern and eastern part of the block.

1.7 Hydrograph & Water Level Trend (2010-2019)



Hydrograph shows Pre-monsoon falling water level trend @ 0.29 m/year

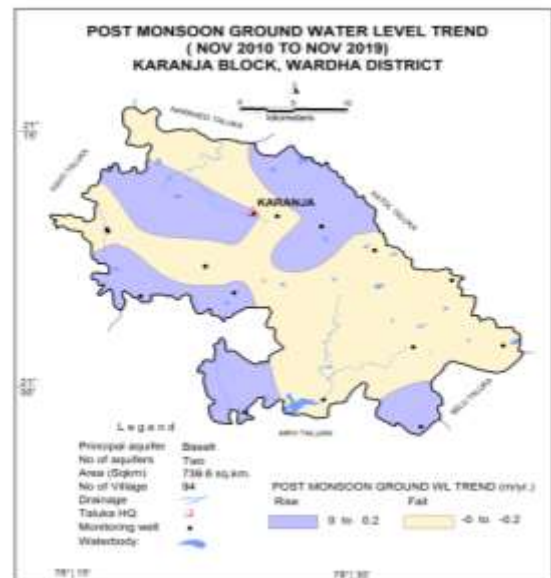
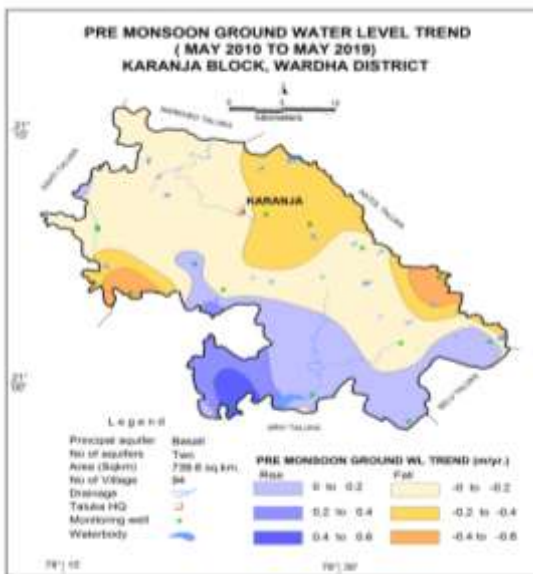
Hydrograph shows Post- monsoon falling water level trend @ 0.189 m/year

Pre-Monsoon Water Level Trend (2010-2019)

Pre-Monsoon trend
Rising 0.06 to 0.53 m/year
Falling 0.03 to 0.58 m/year

Post-Monsoon Water Level Trend (2010-2019)

Post-Monsoon trend
Rising 0.007 to 0.08 m/year
Falling 0.04 to 0.14 m/year



Almost entire block is showing falling trend, except southern and south eastern and north eastern parts of the block. Area showing rising trend >0.2 m is 10.76 Km². Most of the area shows falling trend in the range between 0 to 0.2 m. Area showing falling trend >0.2 m covering 165.91 Km²

Almost entire block is showing falling trend in the range between 0 -0.2 m while rest of the block having rising trend in the range between 0-0.2 m.

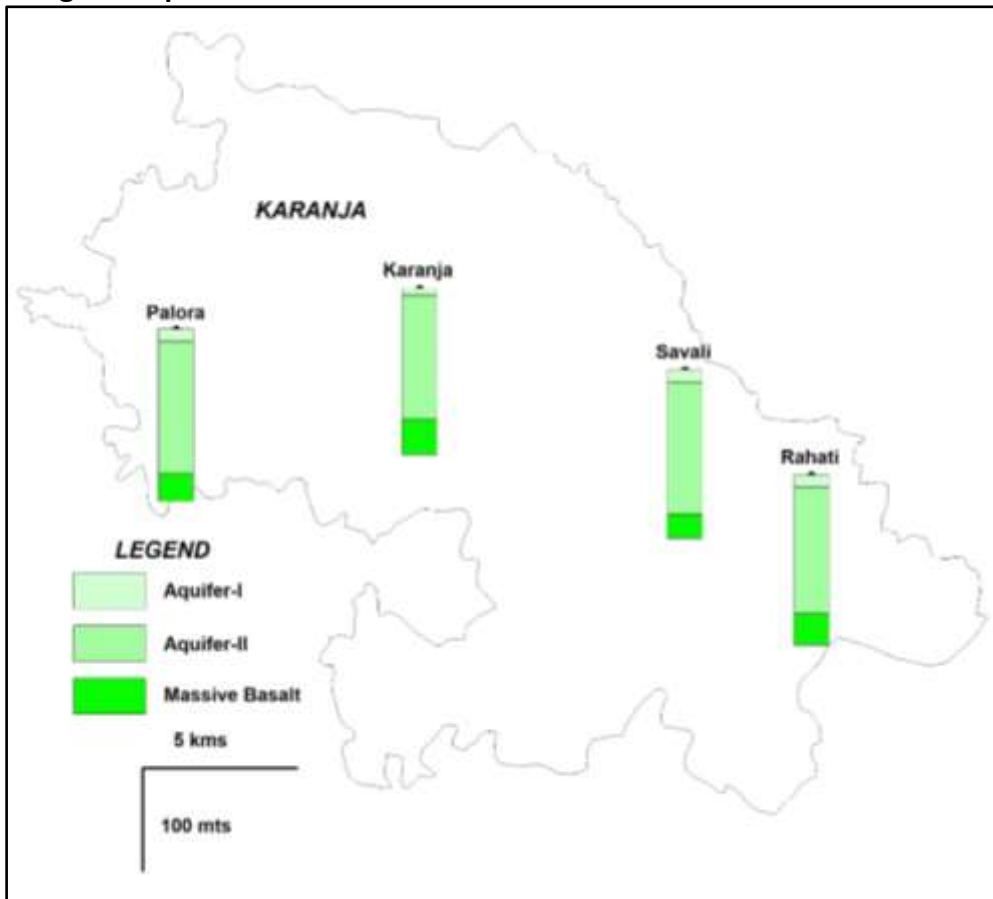
2.0 GROUND WATER ISSUES

1. Over exploitation
2. Water scarcity in lean period
3. Declining Water Level trend is observed in almost entire block.
4. Nitrate > 45mg/l in Aquifer I

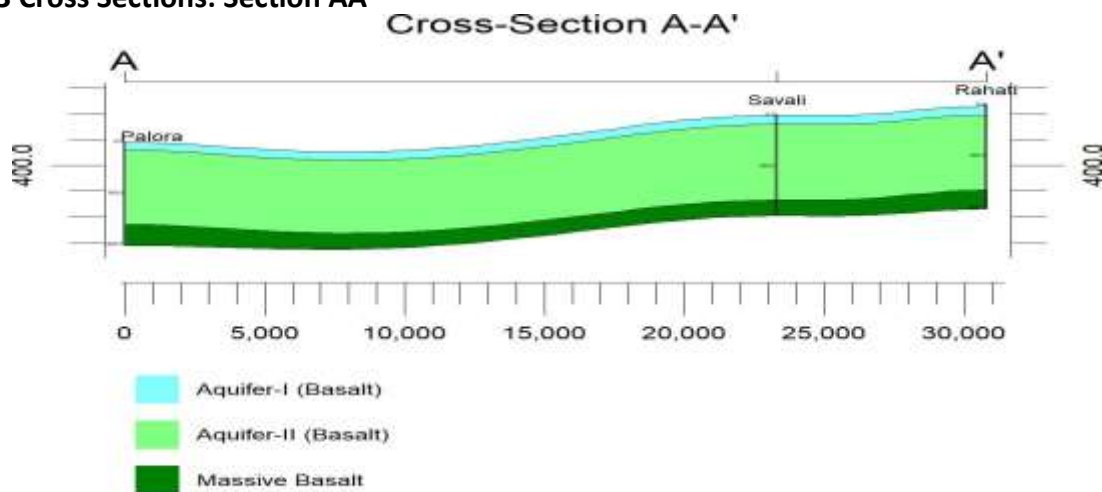
3.0 AQUIFER DISPOSITION

3.1 Number of Aquifers

3.2 Lithological disposition



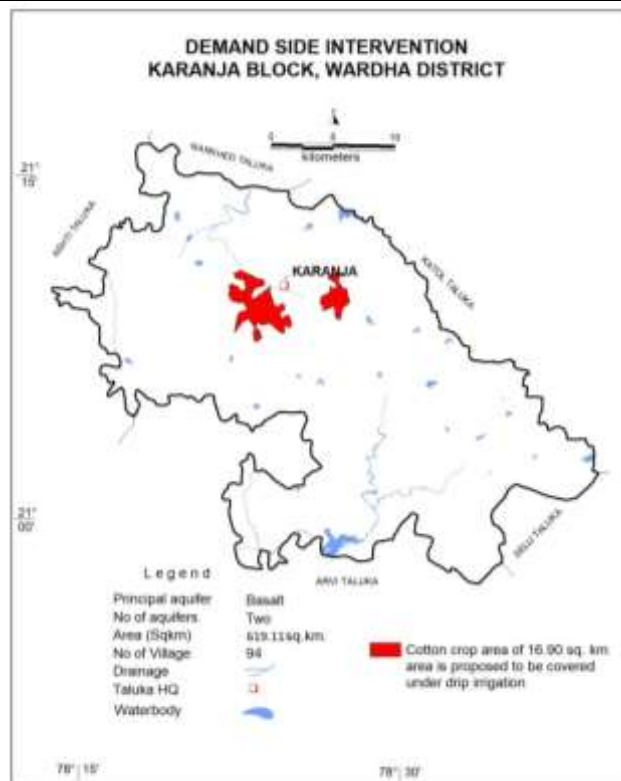
3.3 Cross Sections: Section AA'



3.4 Aquifer Characteristics		
Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi-confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined /confined)
Depth of Occurrence (mbgl)	9 - 18	40 – 163
Granular/weathered/fractured rocks thickness (m)	5.4 – 114	1 to 3
Yield	10 - 100m ³ /day	Upto 2.5lps
Specific yield/Storativity (S)	0.019 – 0.028	0.00002 -0.000057
Transmissivity (T)	30-80 m ² /day	43 m ² /day
4. GROUND WATER QUALITY		
4.1 Aquifer-I/Shallow Aquifer	4.2 Aquifer-II/Deeper Aquifer	
<p>EC between 750- 2250 μS/cm has been observed in major parts of the block as patches. Nitrate >45 mg/l observed in some parts of the block. 4.90 Km² area showing EC >2250 μS/cm.</p>	<p>EC between 250- 750 μS/cm is observed in almost entire part of the block. EC between 750- 2250 μS/cm has been observed in western part of the block as a patch.</p>	
5. GROUND WATER RESOURCES		
5.1 Aquifer-I/Shallow Aquifer		
Ground Water Recharge Worthy Area (Sq. Km.)	603.20	
Total Annual Ground Water Recharge (MCM)	81.47	
Natural Discharge (MCM)	4.19	
Net Annual Ground Water Availability (MCM)	77.27	
Existing Gross Ground Water Draft for irrigation (MCM)	53.29	

Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)								3.37
Existing Gross Ground Water Draft for All uses(MCM)								56.68
Provision for domestic and industrial requirement supply to 2025(MCM)								3.53
Net Ground Water Availability for future irrigation development (MCM)								21.05
Stage of Ground Water Development (%)								73.35
Category								Semi-Critical
5.2 Aquifer-II/Deeper Aquifer								
Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Karanja	4	664.31	42.5	0.0000438	0.002	1.236613	5.31448	6.551093
Karanja	6	72.47	44	0.0000438	0.002	0.139664	0.86964	1.009304
Total								7.56037
6. GROUND WATER RESOURCE MANAGEMENT								
Net Annual Ground Water Availability (MCM)								77.27
Gross Annual Draft (MCM)								56.68
Stage of Ground Water Development (%)								73.35
6.1 Supply Side Management								
SUPPLY (MCM)								
Agricultural Supply -GW								53.3
Agricultural Supply -SW								0.76
Domestic Supply - GW								3.38
Domestic Supply - SW								0.85
Total Supply								58.29
Area of Block (Sq. Km.)								619.11
Area suitable for Artificial recharge (Sq. Km)								196.61
Type of Aquifer								Hard Rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)								196.61
Volume of Unsaturated Zone (MCM)								365.70
Average Specific Yield								0.02
Recharge Potential (MCM)								7.31
Surplus water Available (MCM)								4.40
Proposed Structures				Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)			Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	
Number of Structures				15			44	
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)				2.31			0.99	
RTRWH Structures – Urban Areas								
Households to be covered (50% with 50 m ² area)								0

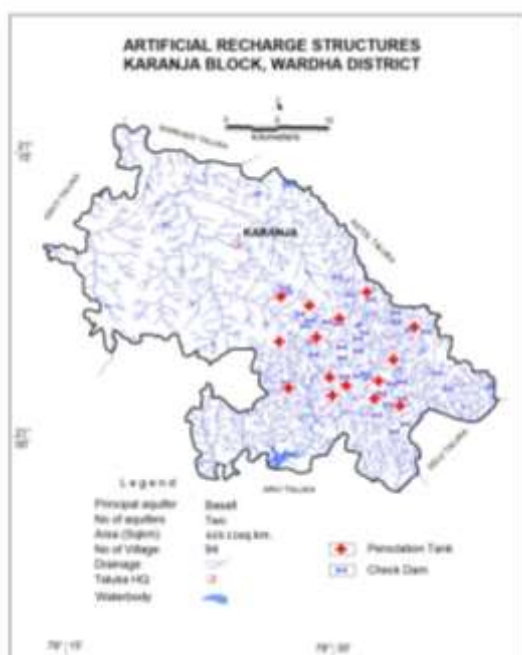
Total RWH potential (MCM)	0
Rainwater harvested / recharged @ 80% runoff co-efficient	0
Estimated Expenditure (Rs. In Cr.) @ Rs.30000/-per HH	0
RTRWH & AR is economically not viable & hence, not recommended.	
6.2 Demand Side Management	
Micro irrigation techniques	
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler	16.9
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.815 m. Drip Req. -0.55, WUE- 0.304 m	4.39
Proposed Cropping Pattern change	Not proposed
Ground water Irrigated area under Water Intensive Crop (sq.km)	NIL
Water Saving by water use efficiency (MCM)	NIL



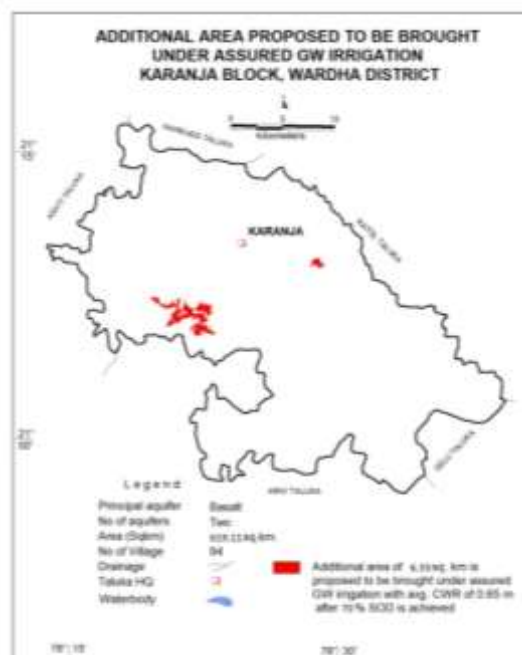
Demand Side Interventions

6.3 EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	77.27
Existing Ground Water Draft for All Uses (MCM)	56.68
Present stage of Ground Water Development (%)	73.35
Additional GW resources available after Supply side and Demand side interventions (MCM)	3.30
Ground Water Availability after Supply side and Demand side intervention (MCM)	80.57
Stage of Ground Water Development after Supply side and Demand side Interventions (%)	70.34

Total GWR available for GW Development (MCM)	4.11
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)	60.79
Other Interventions Proposed, if any	Not proposed
Alternate Water Sources Available	NIL
6.4 Development Plan	
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	4.11
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	247
Proposed Number of BW (@ 1 ham for 10% of GWR Available)	41
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	6.33



Location of AR Structure

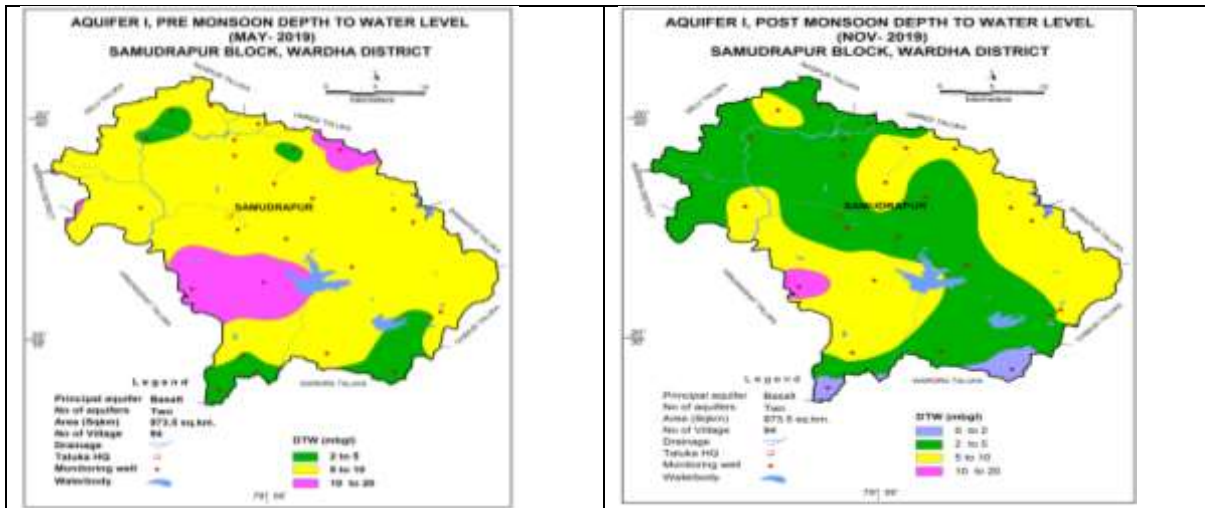


Area proposed under Assured GW irrigation

9.6 SAMUDRAPUR BLOCK, WARDHA DISTRICT, MAHARASHTRA

1.0 SALIENT FEATURE																																															
1.1 Introduction																																															
Block Name	Samudrapur																																														
Geographical Area (Sq. Km.)	996.68																																														
Forest Area (Sq. Km)	43.61																																														
Population (2011)	117038																																														
Climate	Monsoon sub-tropical																																														
Net Annual Ground Water Availability (MCM)	135.26																																														
Existing Gross Ground Water Draft for All uses(MCM)	60.17																																														
Stage of Ground Water Development (%)	44.49																																														
Category	SAFE																																														
1.2 Rainfall Analysis																																															
Normal Rainfall	957.8 mm																																														
Annual Rainfall (2019)	1133.2 mm																																														
Decadal Average Annual Rainfall (2010-19)	991.94 mm																																														
Long Term Rainfall Analysis (1998-2019)	Rising Trend 5.912 mm/year. Probability of Normal/Excess Rainfall: 59%/27%. Probability of Drought (Moderate/Acute)-: 9 % Moderate/ 5% Acute																																														
Rainfall Trend (1998-2019)																																															
<p>RAINFALL ANALYSIS-SAMUDRAPUR BLOCK</p> <p>$y = 5.912x + 889.86$</p> <table border="1"> <caption>Annual Rainfall Data (1998-2019)</caption> <thead> <tr> <th>Year</th> <th>Rainfall (mm)</th> </tr> </thead> <tbody> <tr><td>1998</td><td>100</td></tr> <tr><td>1999</td><td>1000</td></tr> <tr><td>2000</td><td>900</td></tr> <tr><td>2001</td><td>800</td></tr> <tr><td>2002</td><td>850</td></tr> <tr><td>2003</td><td>700</td></tr> <tr><td>2004</td><td>1250</td></tr> <tr><td>2005</td><td>1250</td></tr> <tr><td>2006</td><td>1250</td></tr> <tr><td>2007</td><td>1400</td></tr> <tr><td>2008</td><td>700</td></tr> <tr><td>2009</td><td>750</td></tr> <tr><td>2010</td><td>1450</td></tr> <tr><td>2011</td><td>1100</td></tr> <tr><td>2012</td><td>1050</td></tr> <tr><td>2013</td><td>1350</td></tr> <tr><td>2014</td><td>600</td></tr> <tr><td>2015</td><td>850</td></tr> <tr><td>2016</td><td>850</td></tr> <tr><td>2017</td><td>700</td></tr> <tr><td>2018</td><td>750</td></tr> <tr><td>2019</td><td>1133.2</td></tr> </tbody> </table>		Year	Rainfall (mm)	1998	100	1999	1000	2000	900	2001	800	2002	850	2003	700	2004	1250	2005	1250	2006	1250	2007	1400	2008	700	2009	750	2010	1450	2011	1100	2012	1050	2013	1350	2014	600	2015	850	2016	850	2017	700	2018	750	2019	1133.2
Year	Rainfall (mm)																																														
1998	100																																														
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2015	850																																														
2016	850																																														
2017	700																																														
2018	750																																														
2019	1133.2																																														
1.3 Geomorphology, Soil & Geology																																															
Geomorphic Unit	Major parts of the block are occupied by slightly dissected plateau followed by plateau weathered. Undissected plateau observed in the central and northeastern parts while plateau moderately dissected found in southern and eastern parts of the block.																																														
Geology	Deccan Traps (Basalt), Age: Late Cretaceous to Eocene																																														
Soil	Major parts of the block covered by fine calcareous deep soil followed by fine calcareous very deep soil, loamy clayey very shallow soil and fine loamy clayey shallow soil.																																														

1.4 Hydrology & Drainage		
Drainage	The area is drained by tributaries of Godavari and Sub basins of Wardha River i.e. Vena river	
Hydrology	Major project	2 (Bor, Wana)
	Medium	2 (Dam, Pothra)
	Bigger Minor (250 to 600 and >600 Ha.)	1 Small Irrigation Pond
	Minor Irrigation Project (100 to 250 Ha.)	0
	Minor Irrigation Project (0 to 100 Ha.)	38 Diversion Dam, 17 KT Weirs, 5 Minor Irrigation Scheme, 4 PT, 12 Sakhali Cement Nala Band
1.5 Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area		996.68 Sq. Km.
Forest Area		43.61 Sq. Km.
Cultivable Area		869.87 Sq. Km.
Net Sown Area		733.28 Sq. Km.
Double Cropped Area		136.59 Sq. Km.
Area under Irrigation	Surface Water	35.74
	Ground Water	100.41
Principal Crops (Reference year 2018-19)	Crop Type	Area (Sq. Km.)
	Cotton	367.11
	Cereals	52.89
	Pulses	192.98
	Oil Seeds	248.85
Horticultural Crops	Fruits and Vegetables	5.69
	Sugarcane	0
	Spices	2.35
1.6 Water Level Behavior		
1.6.1 Aquifer-I/Shallow Aquifer		
Pre-Monsoon Water Level (May 2019) Water level between 2-5 mbgl is observed in northern, southern and south eastern parts of the block as small patches, while water level in the range of 5 to 10 mbgl is observed entire parts of the block. Waterlevel ranges from 10-20 mbgl observed in southern and north eastern parts of the block.		Post-Monsoon Water Level (Nov. 2019) Water Level between 0-2 mbgl is observed in isolated patch in southern part of block. Water level between 2 to 5 mbgl is observed in major part of the block. Water level 5 to 10 mbgl is observed in eastern and western parts of the block. Water level between 10-20 mbgl observed in the western part of the block as very small isolate patch.



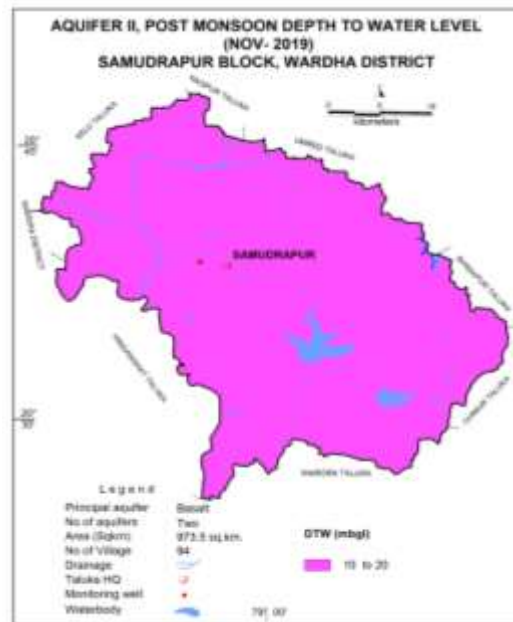
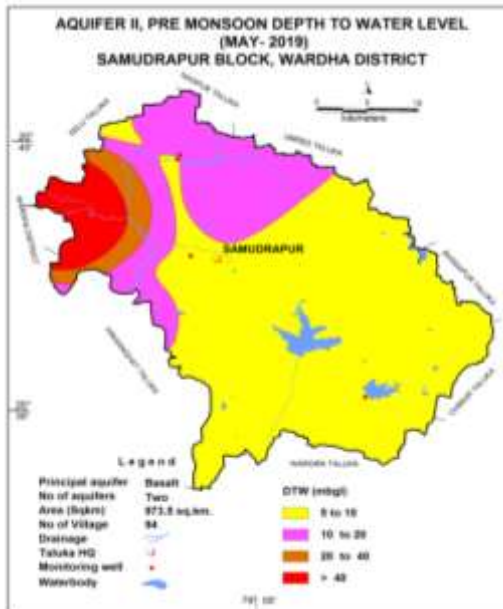
1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon Water Level (May 2019)

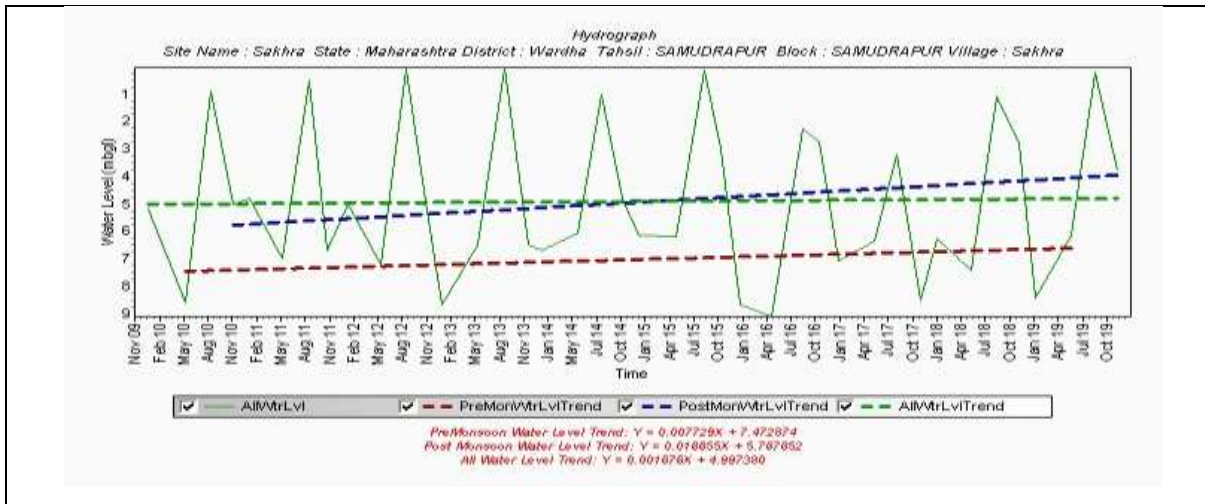
Water level between 5-10 mbgl is observed in almost entire block. Water level between 10-20 mbgl observed in the northern and western parts of the block while water level between 20-40 mbgl observed in the western part of the block. Water level >40 mbgl observed in the western part of the block as an isolated patch.

Post-Monsoon Water Level (Nov. 2019)

Water level between 10-20 mbgl observed in almost entire block



1.7 Hydrograph and Water Level Trend (2010-2019)



Hydrograph shows Pre-monsoon rising water level trend @ 0.09 m/year

Hydrograph shows Post- monsoon rising water level trend @ 0.199 m/year

Pre-Monsoon trend

Post-Monsoon trend

Rising 0.01 to 0.13 m/year

Rising 0.03 to 0.18 m/year

Falling 0.01 to 0.24 m/year

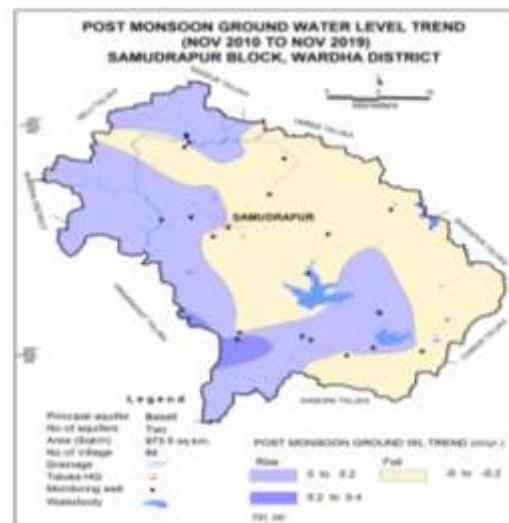
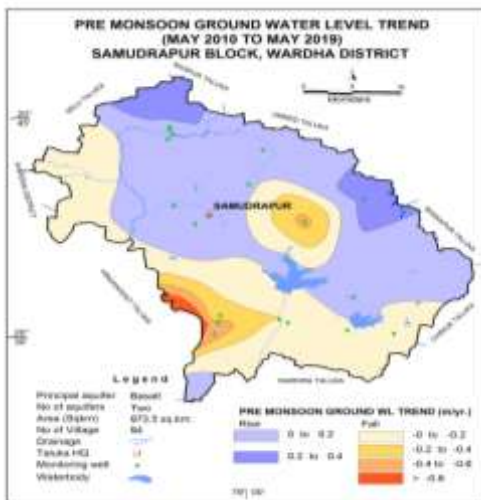
Falling 0.009 to 0.125 m/year

Pre-Monsoon Water Level Trend (2010-2019)

Post-Monsoon Water Level Trend (2010-2019)

Almost entire taluka is showing rising trend, except central and western part of the block. Area showing rising trend >0.2 m is 5.64 Km². Falling trend between 0 -0.2m m is observed in isolated patches in central and western part of the block. Area showing falling trend >0.2 m is 135.58 Km².

Almost entire taluka is showing falling trend in the range of 0 to 0.2 m. Rising trend is observed in western and northern parts of the block. Area showing rising trend >0.2 m is 9.87 Km².



2.0 GROUND WATER ISSUES

1. Water scarcity in lean period

2. Nitrate > 45mg/l in Aquifer I

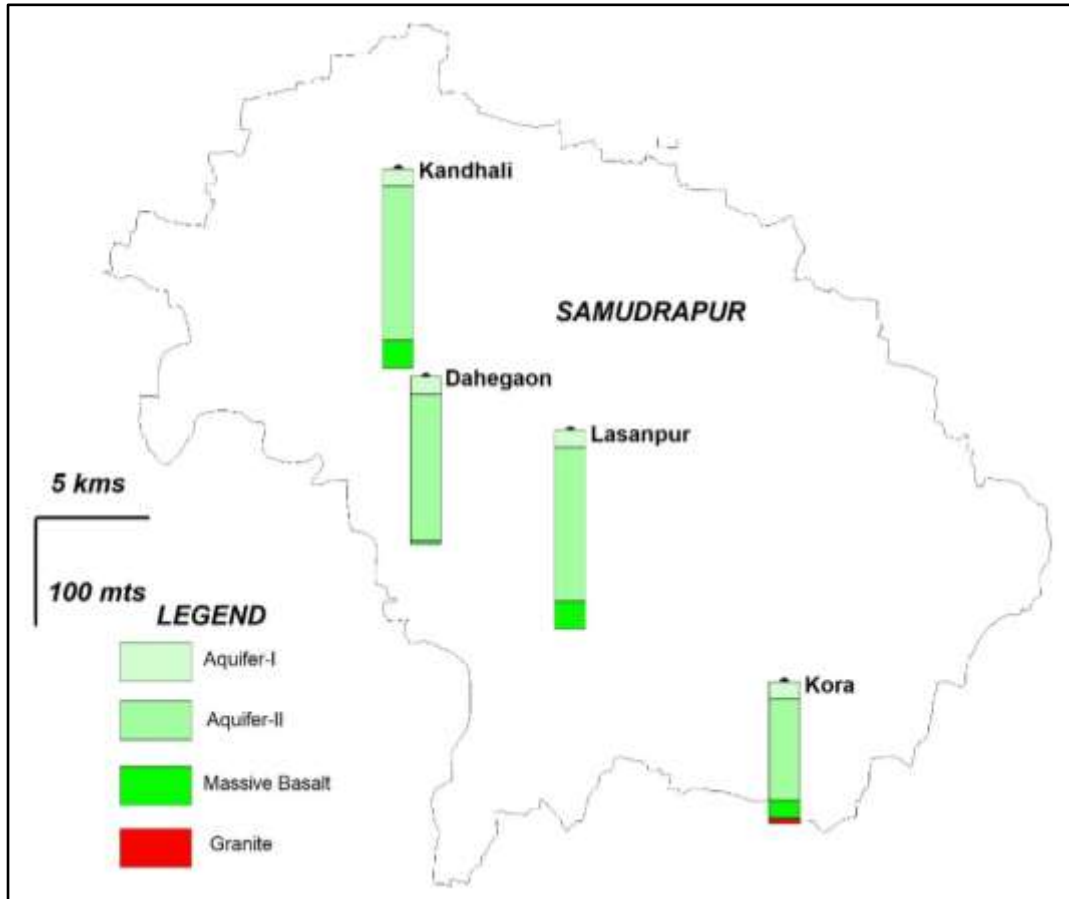
3.0 AQUIFER DISPOSITION

3.1 Number of Aquifers

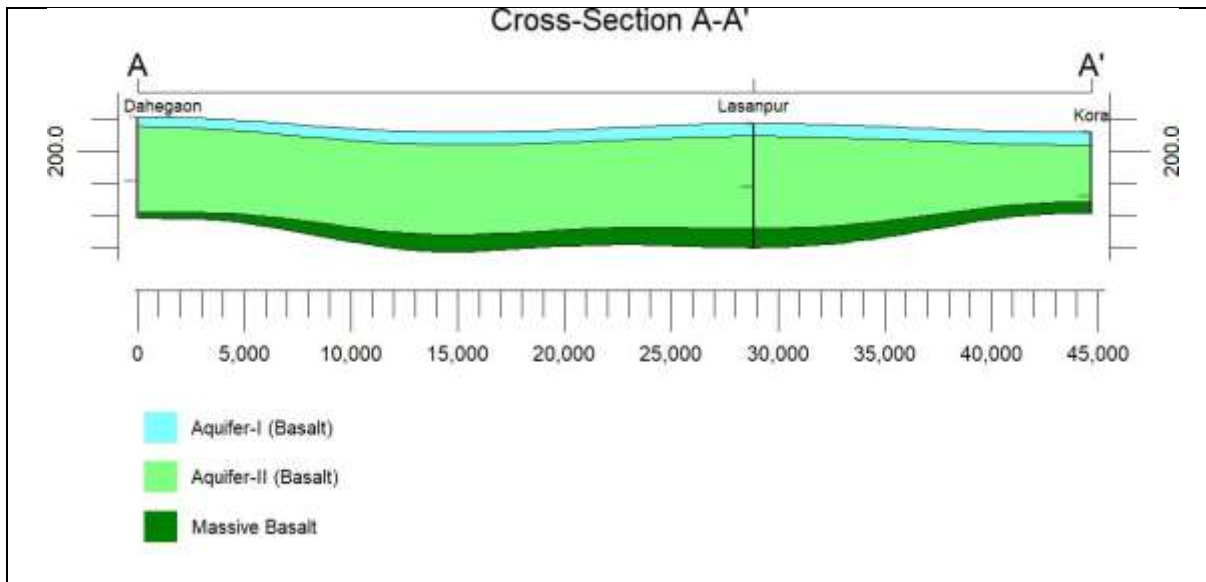
Basalt – Aquifer-I (weathered & fractured basalt)

Basalt – Aquifer-II (Jointed & fractured basalt)

3.2 Lithological disposition



3.3 Cross Sections: Section AA'

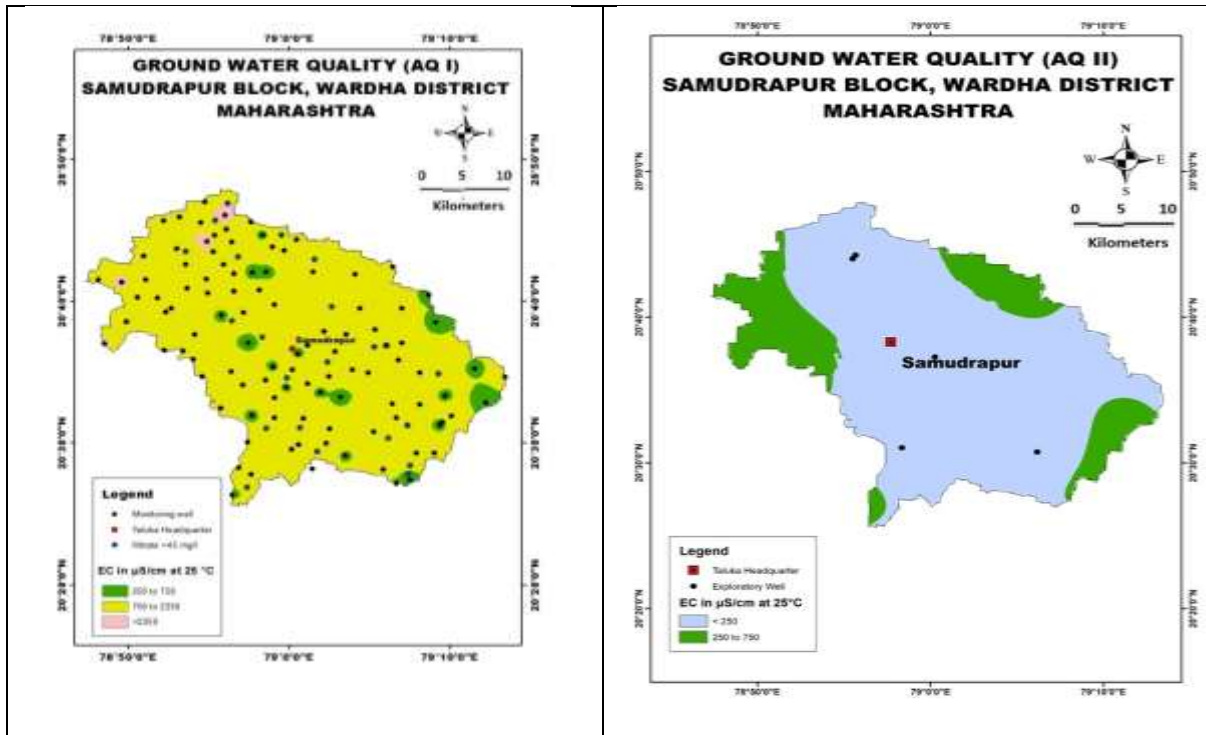


3.4 Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi-confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined /confined)
Depth of Occurrence (mbgl)	9 to 16	40 to 157
Granular/weathered/fractured rocks thickness (m)	5.4 to 12	1 to 6
Yield	10 – 100m ³ /day	Upto 2.5 lps
Specific yield/Storativity (S)	0.074	1.35*10 ⁻²
Transmissivity (T)	407.82	98.6

4.GROUND WATER QUALITY

4.1 Aquifer-I/Shallow Aquifer	4.2 Aquifer-II/Deeper Aquifer
EC between 750-2250 μ S/cm has been observed in almost entire part of the block while >2250 μ S/cm observed northern part covering 11.17 Km ² area. Nitrate >45 mg/l observed in some parts of the block	The ground water quality of deeper aquifer is suitable for drinking purpose. The EC less than 250 μ S/cm is observed in almost entire part of the block.



5. GROUND WATER RESOURCES

5.1 Aquifer-I/Shallow Aquifer

Ground Water Recharge Worthy Area (Sq. Km.)	925.52
Total Annual Ground Water Recharge (MCM)	142.62
Natural Discharge (MCM)	7.35
Net Annual Ground Water Availability (MCM)	135.26
Existing Gross Ground Water Draft for irrigation (MCM)	56.12
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	4.04
Existing Gross Ground Water Draft for All uses(MCM)	60.17
Provision for domestic and industrial requirement supply to 2025(MCM)	4.23
Net Ground Water Availability for future irrigation development (MCM)	74.71
Stage of Ground Water Development (%)	44.49
Category	Safe

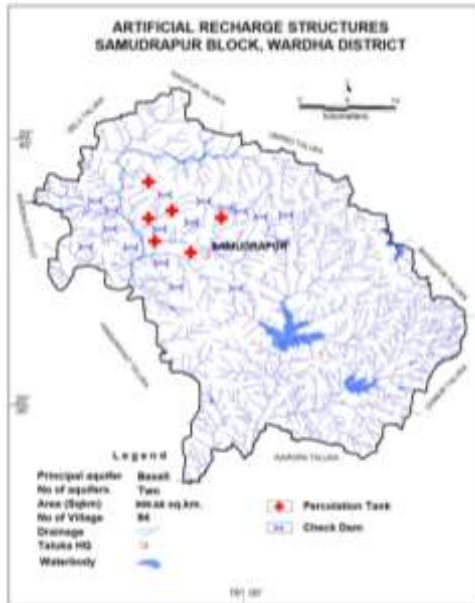
5.2 Aquifer-II/Deeper Aquifer

Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)

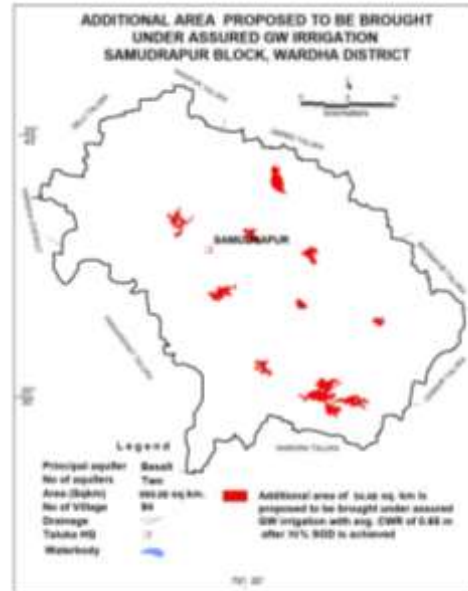
Samudrapur	4	753.31	58	0.000065	0.002	2.839979	6.02648	8.866459
Samudrapur	6	172.69	56	0.000065	0.002	0.628592	2.07228	2.700872
Samudrapur	8	42.86	42	0.000065	0.002	0.117008	0.68576	0.802768
Total								12.3701
6. GROUND WATER RESOURCE MANAGEMENT								
Net Annual Ground Water Availability (MCM)							135.26	
Gross Annual Draft (MCM)							60.17	
Stage of Ground Water Development (%)							44.49	
6.1 Supply Side Management								
SUPPLY (MCM)								
Agricultural Supply -GW							56.13	
Agricultural Supply -SW							35.74	
Domestic Supply - GW							4.04	
Domestic Supply - SW							1.04	
Total Supply							96.92	
Area of Block (Sq. Km.)							999.68	
Area suitable for Artificial recharge(Sq. Km)							76.44	
Type of Aquifer							Hard Rock	
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)							76.44	
Volume of Unsaturated Zone (MCM)							71.09	
Average Specific Yield							0.02	
Recharge Potential (MCM)							1.42	
Surplus water Available (MCM)							1.71	
Proposed Structures				Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)			Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	
Number of Structures				6			17	

Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	0.9	0.39
RTRWH Structures – Urban Areas	No Urban area	
Households to be covered (50% with 50 m ² area)	0	
Total RWH potential (MCM)	0	
Rainwater harvested / recharged @ 80% runoff co-efficient	0	
Estimated Expenditure (Rs. In Cr.) @ Rs.30000/-per HH	0	
RTRWH & AR is economically not viable & hence, not recommended.		
6.2 Demand Side Management		
Micro irrigation techniques		
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler	Not proposed	
Water Saving by use of Drip and Sprinklers	-	
Proposed Cropping Pattern change	Not proposed	
Ground water Irrigated area under Water Intensive Crop (sq.km)	NIL	
Water Saving by water use efficiency (MCM)	NIL	
6.3 EXPECTED BENEFITS		
Net Ground Water Availability (MCM)	135.26	
Existing Ground Water Draft for All Uses (MCM)	60.17	
Present stage of Ground Water Development (%)	44.49	
Additional GW resources available after Supply side interventions (MCM)	1.28	
Ground Water Availability after Supply side intervention (MCM)	136.54	
Stage of Ground Water Development after Supply side Interventions (%)	44.07	
Total GWR available for GW Development (MCM)	35.41	
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)	95.58	
Other Interventions Proposed, if any	Not proposed	
Alternate Water Sources Available	NIL	
6.4 Development Plan		
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	35.41	

Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	2125
Proposed Number of BW (@ 1 ham for 10% of GWR Available)	354
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	54.48



Location of AR Structure



Area proposed under Assured GW irrigation

9.7 SELU BLOCK, WARDHA DISTRICT, MAHARASHTRA

1.0 SALIENT FEATURE																																															
1.1 Introduction																																															
Block Name	Selu																																														
Geographical Area (Sq. Km.)	715.93 Sq. Km.																																														
Forest Area (Sq. Km)	110.58Sq. Km.																																														
Population (2011)	129647																																														
Climate	Monsoon sub-tropical																																														
Net Annual Ground Water Availability (MCM)	91.52																																														
Existing Gross Ground Water Draft for All uses(MCM)	53.29																																														
Stage of Ground Water Development (%)	58.23																																														
Category	SAFE																																														
1.2 Rainfall Analysis																																															
Normal Rainfall	984.4 mm																																														
Annual Rainfall (2019)	869.4mm																																														
Decadal Average Annual Rainfall (2010-19)	923 mm																																														
Long Term Rainfall Analysis (1998-2019)	<p>Falling Trend 4.34 mm/year.</p> <p>Probability of Normal/Excess Rainfall: 54%/32%.</p> <p>Probability of Drought (Moderate/Severe)-: 9 % Moderate & 5% Severe.</p>																																														
Rainfall Trend (1998-2019)																																															
<p>RAINFALL ANALYSIS-SELU BLOCK</p> <p>$y = -4.3432x + 1034.3$</p> <table border="1"> <caption>Annual Rainfall Data (1998-2019)</caption> <thead> <tr> <th>Year</th> <th>Rainfall (mm)</th> </tr> </thead> <tbody> <tr><td>1998</td><td>250</td></tr> <tr><td>1999</td><td>1250</td></tr> <tr><td>2000</td><td>850</td></tr> <tr><td>2001</td><td>750</td></tr> <tr><td>2002</td><td>1250</td></tr> <tr><td>2003</td><td>950</td></tr> <tr><td>2004</td><td>1250</td></tr> <tr><td>2005</td><td>1250</td></tr> <tr><td>2006</td><td>1050</td></tr> <tr><td>2007</td><td>1550</td></tr> <tr><td>2008</td><td>1000</td></tr> <tr><td>2009</td><td>750</td></tr> <tr><td>2010</td><td>1250</td></tr> <tr><td>2011</td><td>1000</td></tr> <tr><td>2012</td><td>500</td></tr> <tr><td>2013</td><td>1450</td></tr> <tr><td>2014</td><td>750</td></tr> <tr><td>2015</td><td>750</td></tr> <tr><td>2016</td><td>950</td></tr> <tr><td>2017</td><td>850</td></tr> <tr><td>2018</td><td>850</td></tr> <tr><td>2019</td><td>869.4</td></tr> </tbody> </table>		Year	Rainfall (mm)	1998	250	1999	1250	2000	850	2001	750	2002	1250	2003	950	2004	1250	2005	1250	2006	1050	2007	1550	2008	1000	2009	750	2010	1250	2011	1000	2012	500	2013	1450	2014	750	2015	750	2016	950	2017	850	2018	850	2019	869.4
Year	Rainfall (mm)																																														
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2015	750																																														
2016	950																																														
2017	850																																														
2018	850																																														
2019	869.4																																														

1.3 Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau weathered occupy almost entire area of block. Moderately dissected plateau observed in the northern part of the block while slightly dissected plateau observed in the southern and northern parts of the block. Highly dissected plateau observed as small patches .	
Geology	Deccan Traps (Basalt), Age: Late Cretaceous to Eocene	
Soil	Major parts of the block covered by fine-loamy clayey shallow soil followed by fine calcareous very deep soil, fine calcareous deep soil and loamy clayey very shallow soil.	
1.4 Hydrology & Drainage		
Drainage	The main river of the block is Bor.	
Hydrology	Major project	2 (Bor, Wana)
	Medium	2 (Panchdhara, Dongargaon)
	Bigger Minor (250 to 600 and >600 Ha.)	2 KT Weirs, 1 PT
	Minor Irrigation Project (100 to 250 Ha.)	1 PT
	Minor Irrigation Project (0 to 100 Ha.)	29 Diversion Dam, 40 KT Weirs, 6 Minor Irrigation Scheme, 2 PT
1.5 Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area		715.93 Sq. Km.
Forest Area		110.58 Sq. Km.
Cultivable Area		485.4 Sq. Km.
Net Sown Area		431.52 Sq. Km.
Double Cropped Area		53.88 Sq. Km.
Area under Irrigation	Surface Water	1.98
	Ground Water	26.14

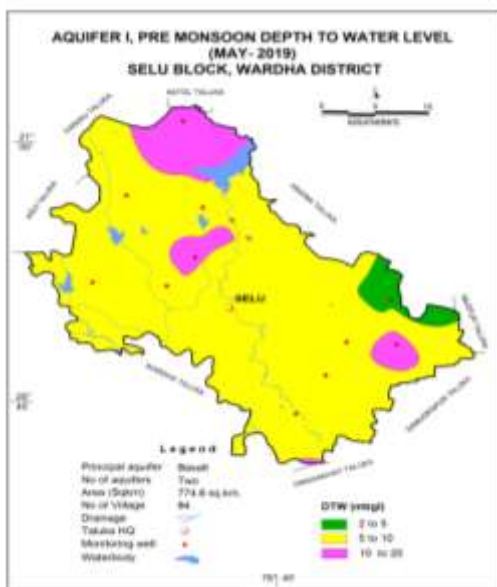
Principal Crops (Reference year 2013-14)	Crop Type	Area (Sq. Km.)
	Cotton	210.4
	Cereals	42.21
	Pulses	70.71
	Oil Seeds	144.93
Horticultural Crops	Fruits and Vegetables	7.27
	Sugarcane	6.19
	Spices	3.08

1.6 Water Level Behavior

1.6.1 Aquifer-I/Shallow Aquifer

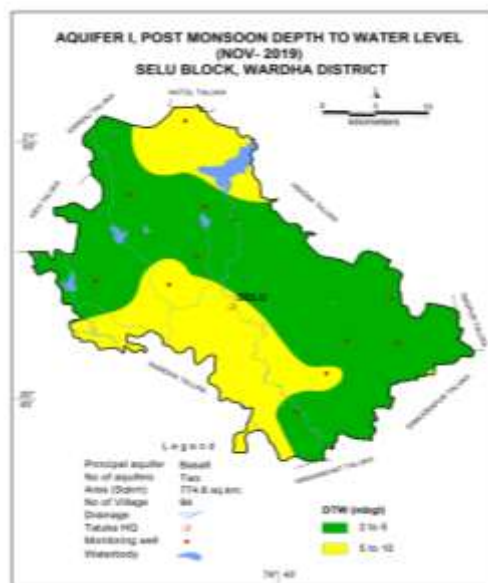
Pre-Monsoon Water Level (May 2019)

Water level between 2-5 mbgl is observed in eastern part of the block while water level in the range of 5 to 10 mbgl is observed in almost entire block. Water level between 10-20 mbgl is observed in northern, central and eastern parts of the block.



Post-Monsoon Water Level (Nov. 2019)

Water Level between 2- 5 mbgl is observed in almost entire part of the block while water level between 5-10 mbgl is observed in northern and south western parts of the block.

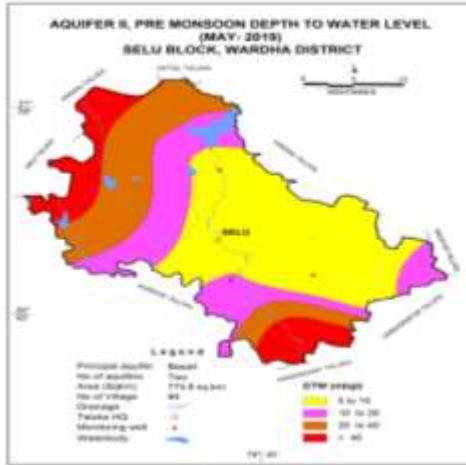


1.6.2 Aquifer-II/Deeper Aquifer

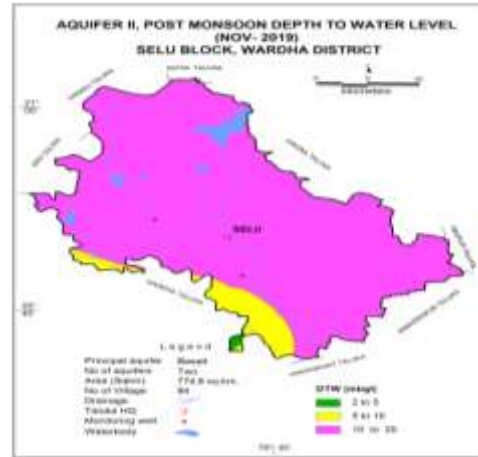
Pre-Monsoon Water Level (May 2019)

Post-Monsoon Water Level (Nov. 2019)

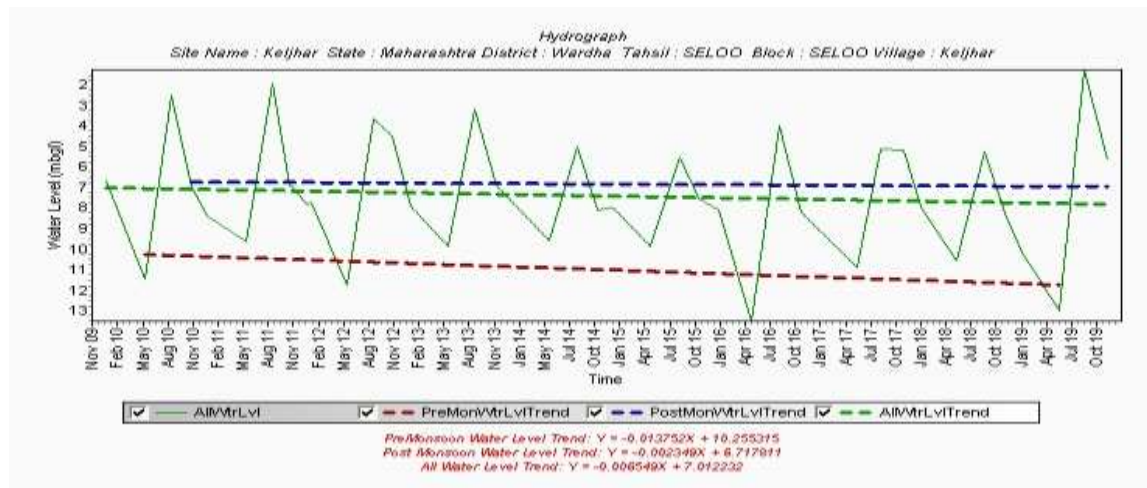
Water level between 5-10 mbgl is observed in major part of the block. Water level between 10-20 mbgl observed in the north western, southern and eastern parts of the block. Water level between 20-40 and >40 mbgl observed in the north western and southern parts of the block.



Water level 2 to 5 mbgl is observed in southern part of the block as an isolated patch. Water level between 5-10 mbgl is observed in the south eastern part of the block. Water level between 10-20 mbgl observed in the major part of the block.



1.7 Hydrograph and Water Level Trend (2010-2019)



Hydrograph shows Pre-monsoon falling water level trend @ 0.165 m/year

Hydrograph shows Post-monsoon falling water level trend @ 0.03 m/year

Pre-Monsoon trend
 Rising 0.024 to 0.235 m/year
 Falling 0.006 to 0.54 m/year

Post-Monsoon trend
 Rising 0.002 to 0.338 m/year
 Falling 0.02 to 0.39 m/year

Pre-Monsoon Water Level Trend (2010-2019)

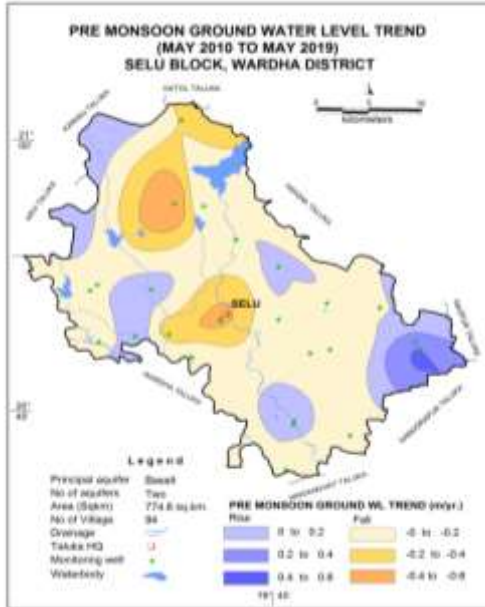
Post-Monsoon Water Level Trend (2010-2019)

Falling trend is observed in almost entire part of the block. Rising trend is observed in eastern,

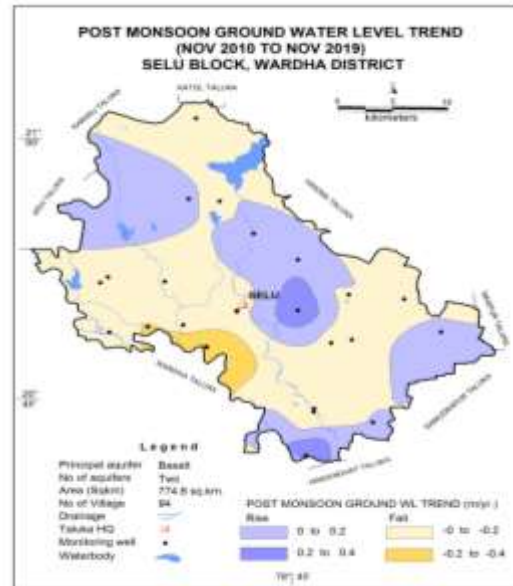
Rising trend is observed in south eastern, central and western part. Area showing rising trend >0.2

southern,western and central parts of the block as isolated patches.Area showing rising trend >0.2 m observed in 32.09 Km²

While falling trend >0.2 m observed in 80.04 Km².



m observed in 6.70 Km². Falling trend is observed in almost entire part of the block. Area showing falling trend >0.2 m observed in 13.93 Km².



2.0 Ground Water Issues

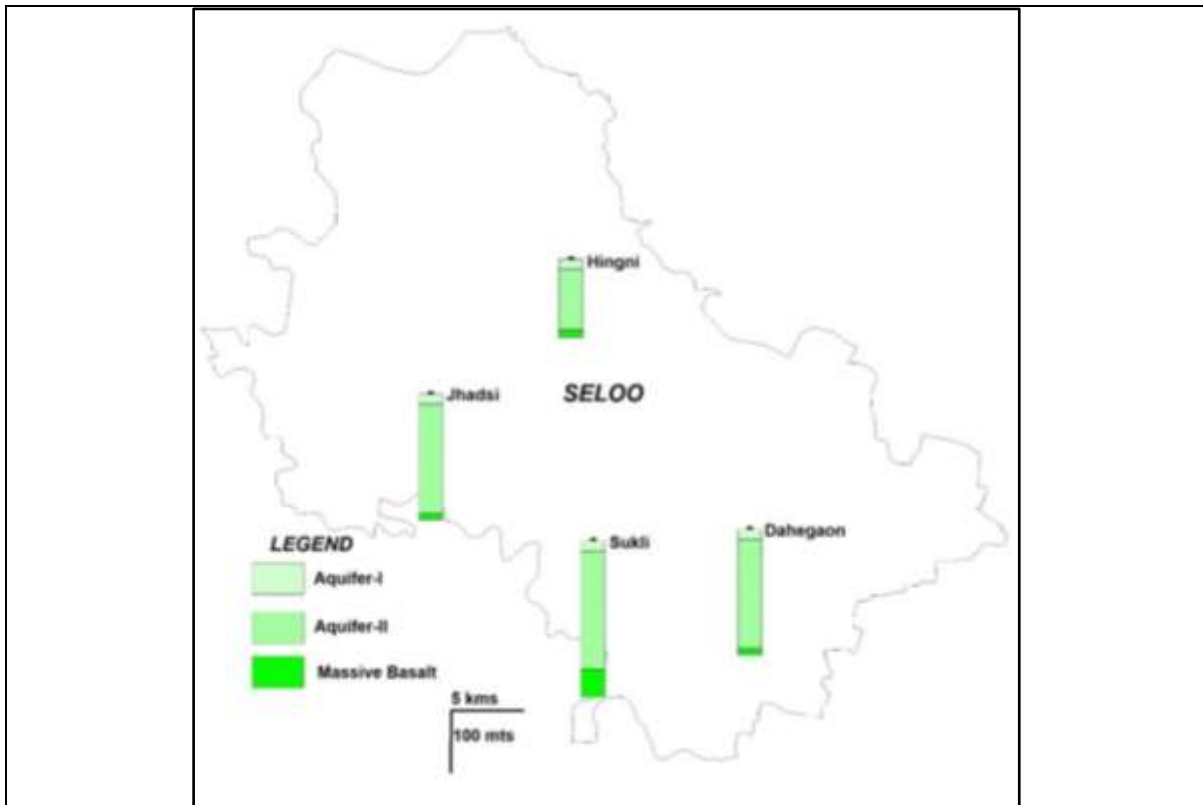
1. Water scarcity in lean period
2. Declining Water Level trend is observed in almost entire block.
3. Nitrate >45mg/l in Aquifer I
4. Fluoride >1.5 mg/l in Aquifer II

3.0 AQUIFER DISPOSITION

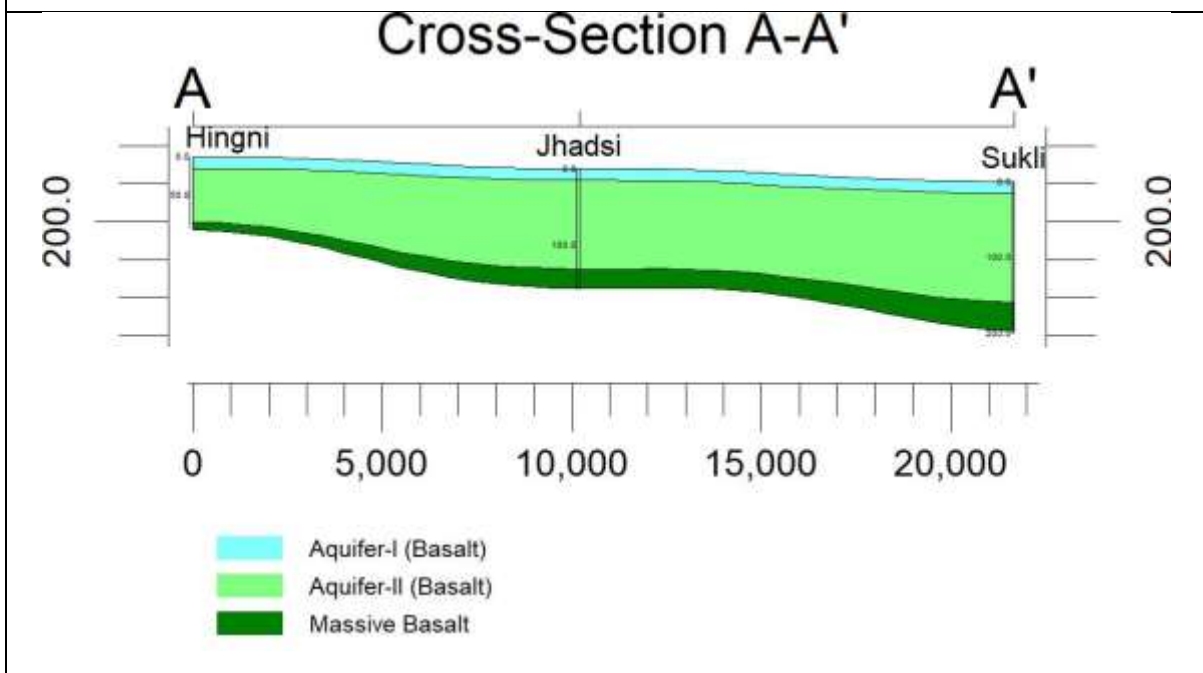
3.1 Number of Aquifers

Basalt – Aquifer-I (weathered & fractured basalt)
 Basalt – Aquifer-II (Jointed & fractured basalt)

3.2 Lithological disposition



3.3 Cross Sections: Section AA'



3.4 Aquifer Characteristics

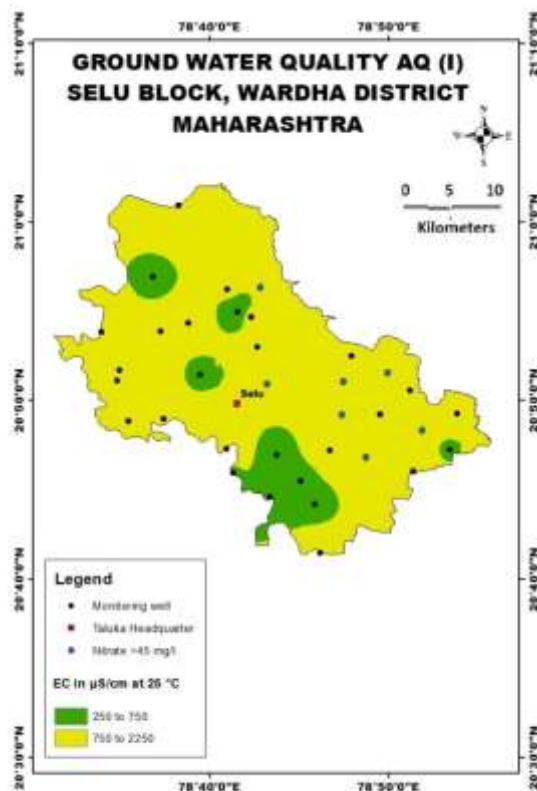
Major Aquifers	Basalt (Deccan Traps)
----------------	-----------------------

Type of Aquifer (Phreatic/Semi-confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined /confined)
Depth of Occurrence (mbgl)	9 to 18	40 to 162
Granular/weathered/fractured rocks thickness (m)	5.4 to 14	1 to 4
Yield	10 – 100m ³ /day	Upto 2.5 lps
Specific yield/Storativity (S)	0.019 – 0.028	0.00033
Transmissivity (T)	30-80 m ² /day	13 to 270 m ² /day

4 GROUND WATER QUALITY

4.1 Aquifer-I/Shallow Aquifer

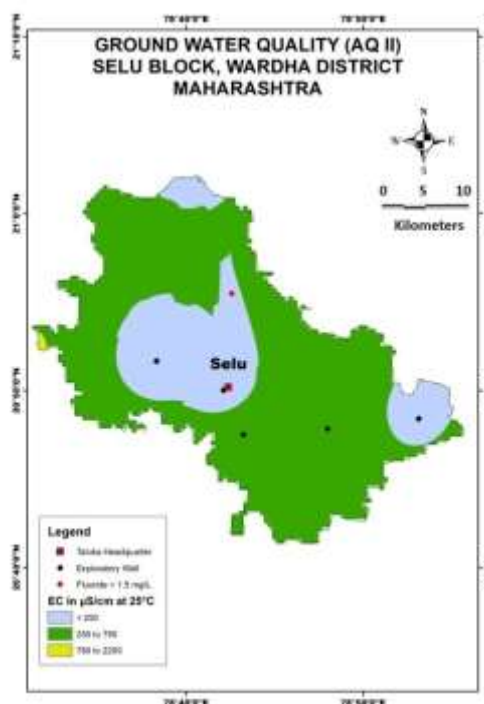
EC between 750-2250 μ S/cm has been observed in major part of the block while EC between 250-750 μ S/cm has been observed in the south eastern, north western and central parts of the block. Nitrate >45 mg/l observed in central and eastern parts of the block.



4.2 Aquifer-II/Deeper Aquifer

EC between 250-750 μ S/cm has been observed in major part of the block while EC between 750 - 2250 μ S/cm has been observed in western parts of the block as a small patch.

Fluoride >1.5 mg/l observed in north eastern part of the block.



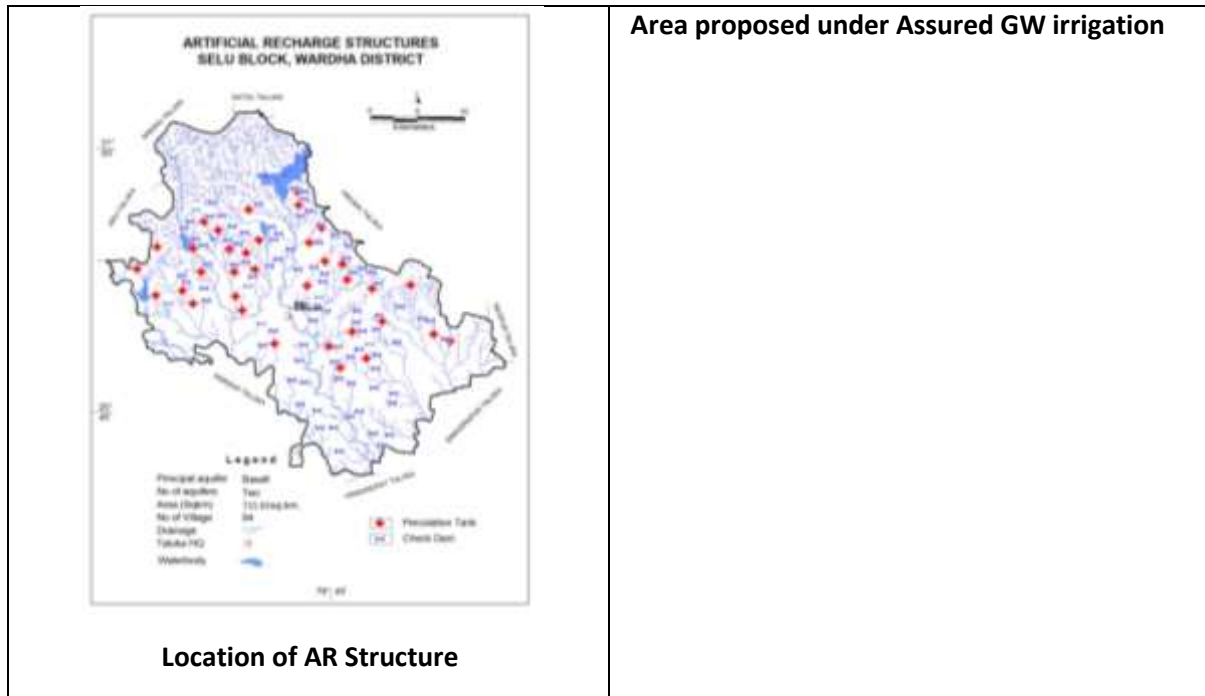
5. GROUND WATER RESOURCES

5.1 Aquifer-I/Shallow Aquifer

Ground Water Recharge Worthy Area (Sq. Km.)	641.40							
Total Annual Ground Water Recharge (MCM)	96.56							
Natural Discharge (MCM)	5.04							
Net Annual Ground Water Availability (MCM)	91.52							
Existing Gross Ground Water Draft for irrigation (MCM)	49.24							
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	4.04							
Existing Gross Ground Water Draft for All uses(MCM)	53.29							
Provision for domestic and industrial requirement supply to 2025(MCM)	4.24							
Net Ground Water Availability for future irrigation development (MCM)	38.13							
Stage of Ground Water Development (%)	58.23							
Category	Safe							
5.2 Aquifer-II/Deeper Aquifer								
Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Selu	4	642.8	55	0.000 033	0.00 2	1.166682	5.1424	6.309082
Selu	6	97	60	0.000 033	0.00 2	0.19206	1.164	1.35606
Selu	8	31.97	50	0.000 065	0.00 2	0.103903	0.51152	0.615423
Total								8.280565
6. GROUND WATER RESOURCE MANAGEMENT								
Net Annual Ground Water Availability (MCM)								91.52
Gross Annual Draft (MCM)								53.29
Stage of Ground Water Development (%)								58.23
6.1 Supply Side Management								
SUPPLY (MCM)								
Agricultural Supply -GW								49.24
Agricultural Supply -SW								1.98

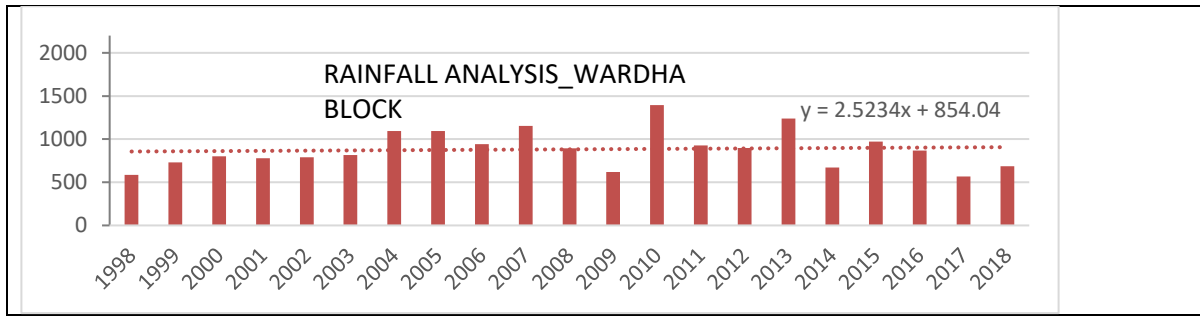
Domestic Supply - GW	4.05	
Domestic Supply - SW	1.01	
Total Supply	56.28	
Area of Block (Sq. Km.)	715.93	
Area suitable for Artificial recharge(Sq. Km)	504.46	
Type of Aquifer	Hard Rock	
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	504.46	
Volume of Unsaturated Zone (MCM)	1932.08	
Average Specific Yield	0.02	
Recharge Potential (MCM)	38.64	
Surplus water Available (MCM)	11.30	
Proposed Structures	Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	40	113
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	5.93	2.54
RTRWH Structures – Urban Areas		
Households to be covered (50% with 50 m ² area)	2938	
Total RWH potential (MCM)	0.13	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.10	
RTRWH & AR is economically not viable & hence, not recommended.		
6.2 Demand Side Management		
Micro irrigation techniques		
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler	Not proposed	
Water Saving by use of Drip and Sprinklers	-	
Proposed Cropping Pattern change	Not proposed	
Ground water Irrigated area under Water Intensive Crop (sq.km)	NIL	

Water Saving by water use efficiency (MCM)	NIL
6.3 EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	91.52
Existing Ground Water Draft for All Uses (MCM)	53.29
Present stage of Ground Water Development (%)	58.23
Additional GW resources available after Supply side interventions (MCM)	8.48
Ground Water Availability after Supply side intervention (MCM)	100
Stage of Ground Water Development after Supply side Interventions (%)	53.29
Total GWR available for GW Development (MCM)	16.71
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)	70
Other Interventions Proposed, if any	Not proposed
Alternate Water Sources Available	NIL
6.4 Development Plan	
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	16.71
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	1003
Proposed Number of BW (@ 1 ham for 10% of GWR Available)	167
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	25.70
	<p>ADDITIONAL AREA PROPOSED TO BE BROUGHT UNDER ASSURED GW IRRIGATION SELU BLOCK, WARDHA DISTRICT</p> <p>Principal canals: [Symbol] Canal No. of aquifers: [Symbol] No. Area (ha): [Symbol] ha No. of villages: [Symbol] No. Drainage: [Symbol] Taluka: [Symbol] Watershed: [Symbol]</p> <p>Legend: [Symbol] No. of aquifers [Symbol] Area (ha) [Symbol] No. of villages [Symbol] Drainage [Symbol] Taluka [Symbol] Watershed</p> <p>[Red shaded area] Additional area of 25.70 sq. km. is proposed to be brought under assured GW irrigation with avg. CWR of 0.65 m after 10% GWD is achieved</p>



9.8 WARDHA BLOCK, WARDHA DISTRICT, MAHARASHTRA

1.0 SALIENT FEATURE	
1.1 Introduction	
Block Name	Wardha
Geographical Area (Sq. Km.)	820.89 Sq. Km.
Forest Area (Sq. Km)	2.29 Sq. Km.
Population (2011)	357476
Climate	Monsoon sub-tropical
Net Annual Ground Water Availability (MCM)	116.54
Existing Gross Ground Water Draft for All uses(MCM)	72.93
Stage of Ground Water Development (%)	62.58
Category	SAFE
1.2 Rainfall Analysis	
Normal Rainfall	894.6 mm
Annual Rainfall (2019)	789.3 mm
Decadal Average Annual Rainfall (2010-19)	901.51 mm
Long Term Rainfall Analysis (1998-2019)	Rising Trend 2.52 mm/year. Probability of Normal/Excess Rainfall: 72%/14%. Probability of Drought (Moderate)-: 14 % Moderate.
Rainfall Trend (1998-2019)	



1.3 Geomorphology, Soil & Geology

Geomorphic Unit	Plateau weathered occupy almost entire area of block followed by slightly dissected plateau, Structural hills observed in the northern part of the block as patches.
Geology	Deccan Traps (Basalt), Age: Late Cretaceous to Eocene
Soil	Major parts of the block covered by fine calcareous deep soil followed by fine calcareous very deep soil, loamy clayey very shallow soil and fine – loamy clayey shallow soil in the western part of the block as patches.

1.4 Hydrology & Drainage

Drainage	The block is drained by Wardha and dam rivers	
Hydrology	Major project	0
	Medium	2 (Dam, Madan)
	Bigger Minor (250 to 600 and >600 Ha.)	1 PT
	Minor Irrigation Project (100 to 250 Ha.)	3 PT
	Minor Irrigation Project (0 to 100 Ha.)	46 Diversion Dam, 29 KT Weirs, 10 Minor Irrigation Scheme, 1 PT, 1 Sakhali Cement Nala Band, 3 Small Irrigation Pond

1.5 Land Use, Agriculture, Irrigation & Cropping Pattern

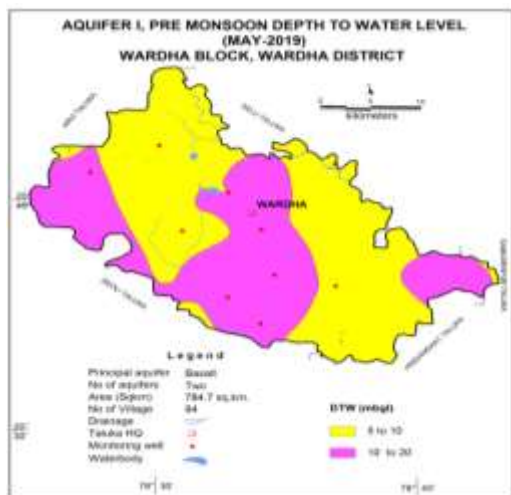
Geographical Area		820.89 Sq. Km.
Forest Area		2.29 Sq. Km.
Cultivable Area		623.95 Sq. Km.
Net Sown Area		559.05 Sq. Km.
Double Cropped Area		64.9 Sq. Km.
Area under Irrigation	Surface Water	0
	Ground Water	549.87
Principal Crops (Reference year 2013-14)	Crop Type	Area (Sq. Km.)
	Cotton	269.65
	Cereals	35.07
	Pulses	110.01
	Oil Seeds	193.86

Horticultural Crops	Fruits and Vegetables	9.6
	Sugarcane	1.55
	Spices	2.93

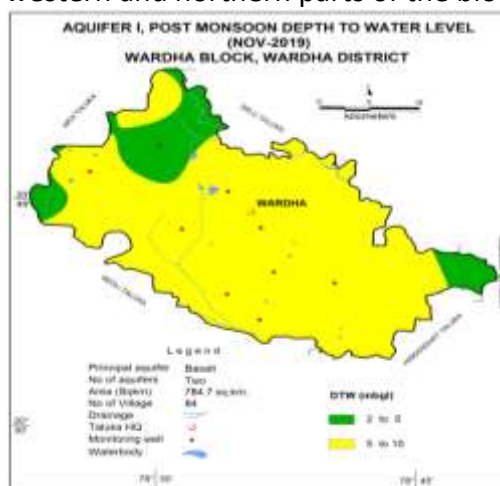
1.6 Water Level Behavior

1.6.1 Aquifer-I/Shallow Aquifer

Pre-Monsoon Water Level (May 2019)
 Water level between 5- 10 mbgl is observed in major part of the block while water level between 10-20 mbgl observed in the eastern , central and south western parts of the block.



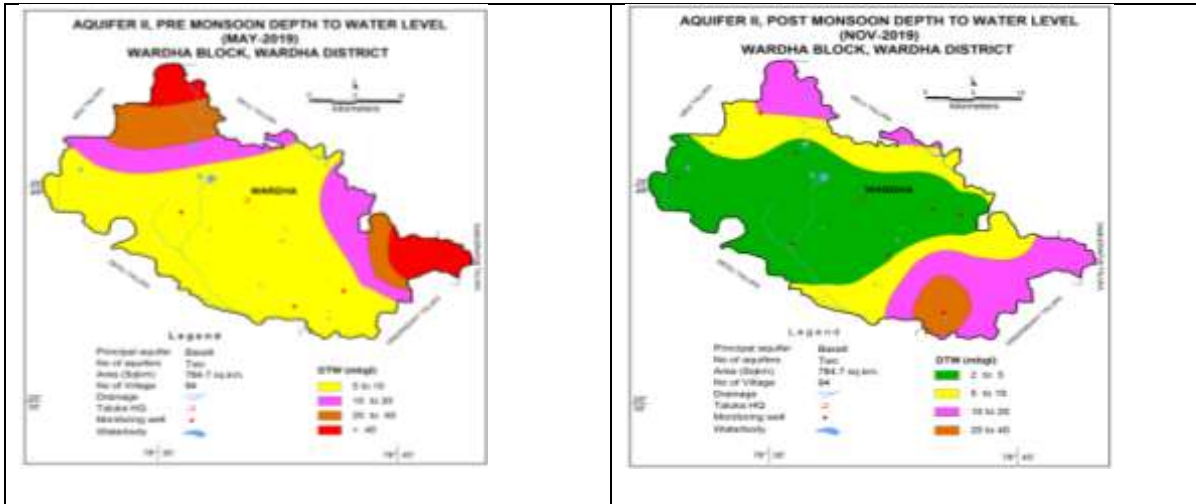
Post-Monsoon Water Level (Nov. 2019)
 Water Level between 5-10 mbgl is observed in almost entire parts of the block while water level between 2-5 mbgl observed in the isolated patch in eastern, western and northern parts of the block.



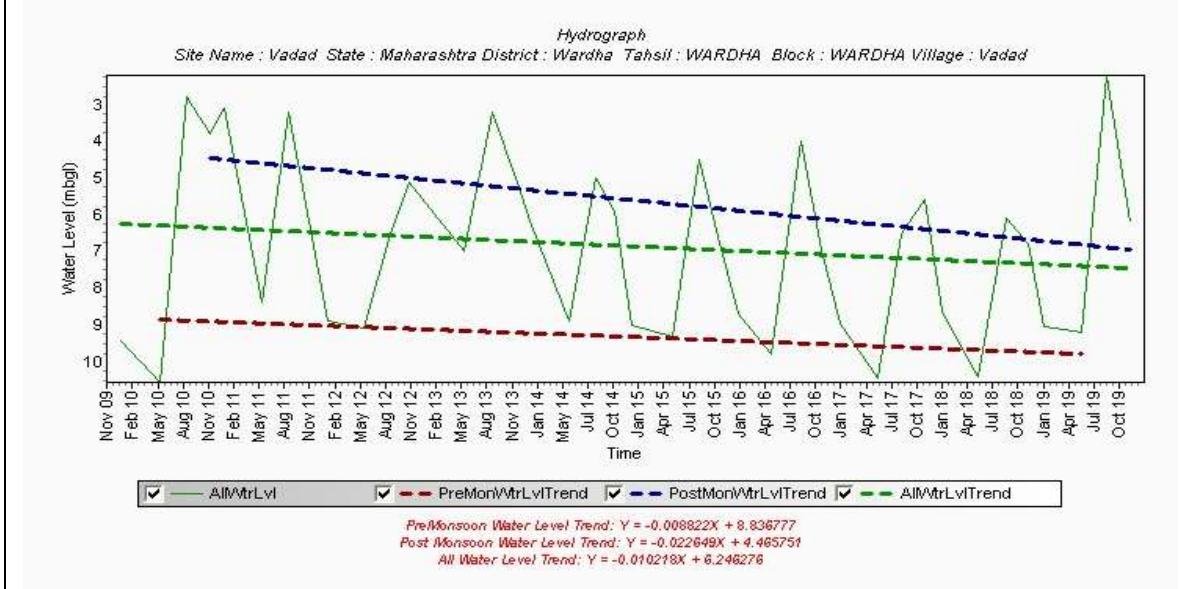
1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon Water Level (May 2019)
 Water level between 5-10 mbgl is observed in major parts of the block while water level between 10-20 mbgl, 20-40 mbgl and >40 mbgl are observed in the northern and eastern parts of the block.

Post-Monsoon Water Level (Nov. 2019)
 Water level 2 to 5 mbgl is observed in major part of the block while water level 5-10 mbgl is observed in north eastern and south eastern part of the block. Water level between 10-20 mbgl observed in the northern and south eastern parts of the block while water level between 20-40 mbgl observed in the southern part of the block.



1.7 Hydrograph and Water Level Trend (2010-2019)



Hydrograph shows Pre-monsoon falling water level trend @ 0.11 m/year

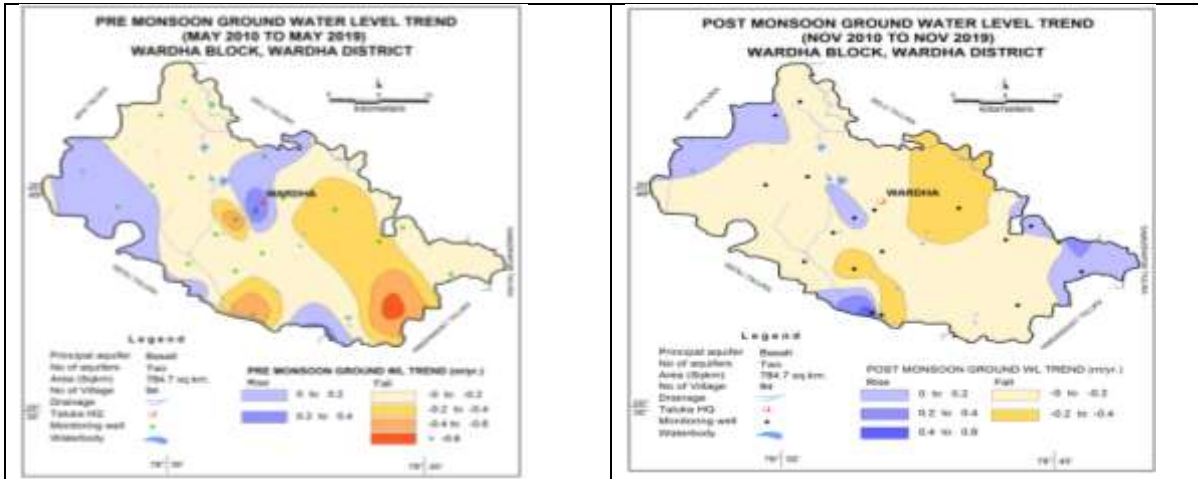
Hydrograph shows Post-monsoon falling water level trend @ 0.27 m/year

Pre-Monsoon trend
Rising 0.045 to 0.107 m/year
Falling 0.012 to 0.545 m/year

Post-Monsoon trend
Rising 0.04 to 0.437 m/year
Falling 0.019 to 0.377 m/year

Pre-Monsoon Water Level Trend (2010-2019)
Major parts of the block showing falling trend. Area showing falling trend >0.2 m observed in 113.54 Km². Rising trend is observed in sothern, western and central part. Area showing rising trend >0.2 m observed in 3.17 Km².

Post-Monsoon Water Level Trend (2010-2019)
Major parts of the block showing falling trend. Area showing falling trend >0.2 m observed in 52.72 Km². Area showing rising trend >0.2 m observed in 2.29 Km². Rising trend is observed in sothern, western, eastern and central part as isolated patches.



2.0 Ground Water Issues

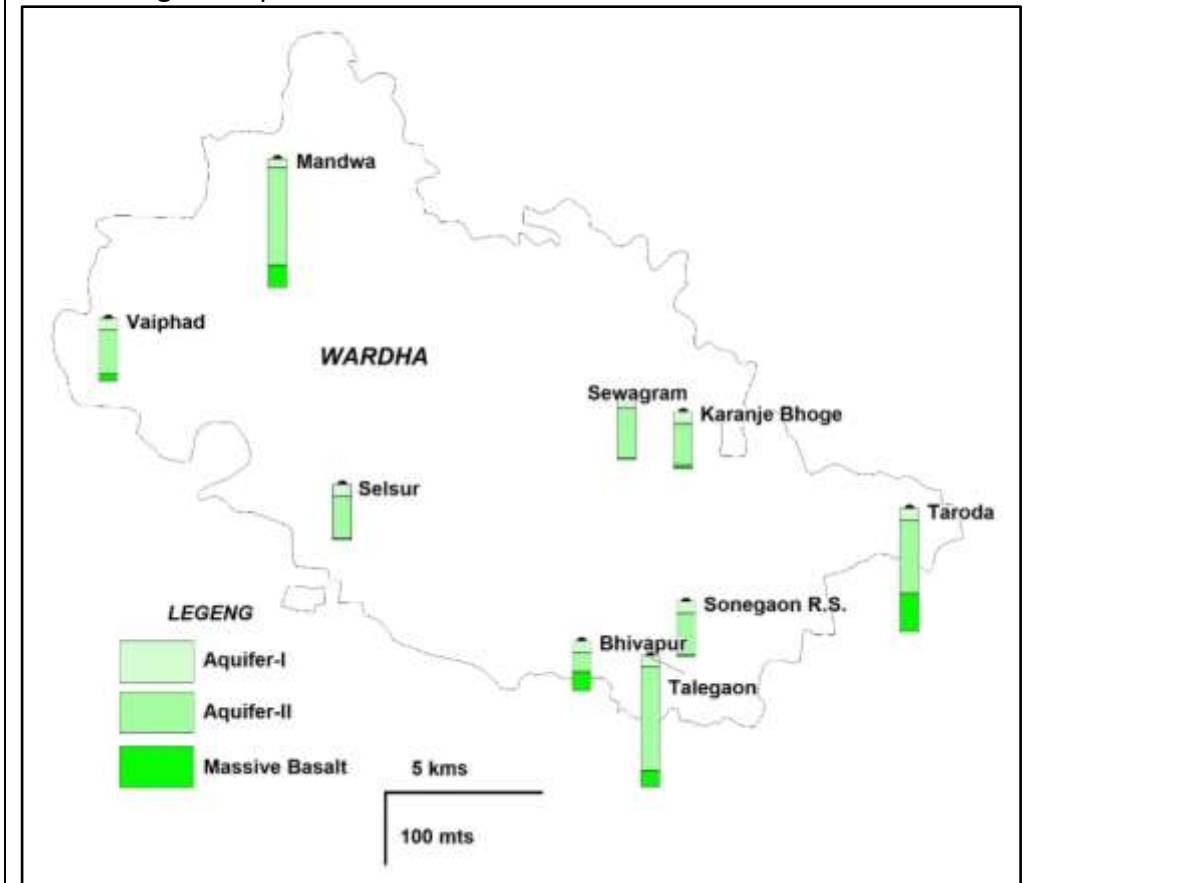
1. Water scarcity in lean period
2. Declining Water Level trend is observed in almost entire block.
3. Nitrate > 45 mg/l in Aquifer I & II
4. F > 1.5 mg/l observed in Aquifer II

3.0 AQUIFER DISPOSITION

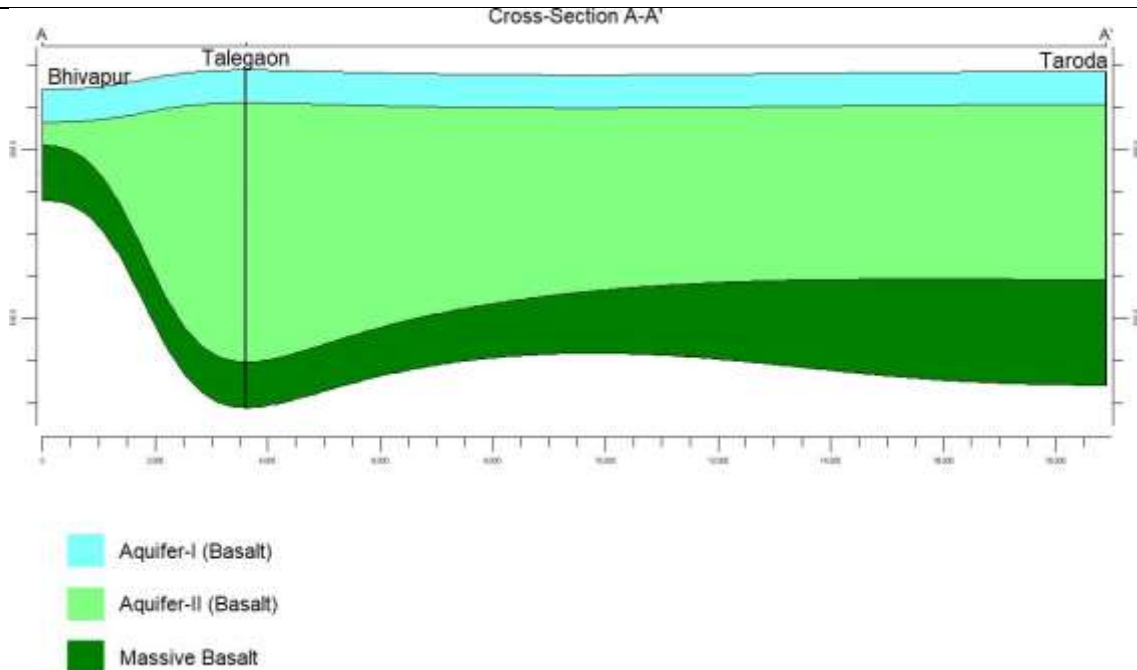
3.1 Number of Aquifers

Basalt – Aquifer-I (weathered & fractured basalt)
 Basalt – Aquifer-II (Jointed & fractured basalt)

3.2 Lithological disposition



3.3 Cross Sections: Section AA'

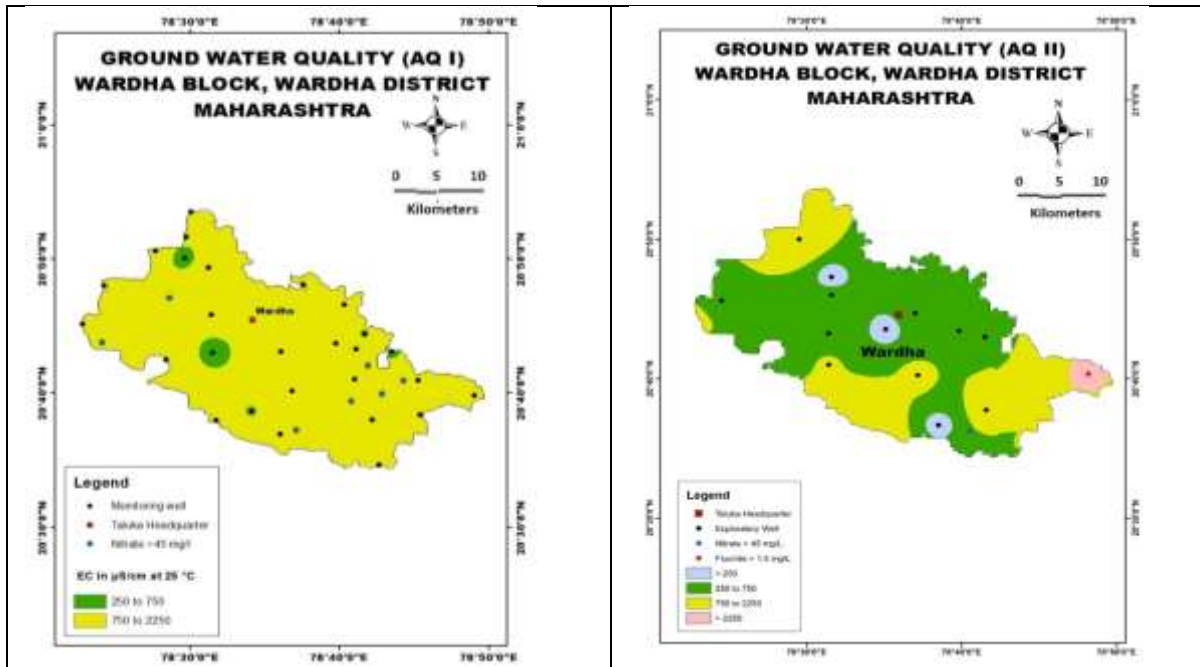


3.4 Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi-confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi-confined /confined)
Depth of Occurrence (mbgl)	9 to 30	40 to 173
Granular/weathered/fractured rocks thickness (m)	6.3 to 22	1 to 11.5
Yield	10 – 100m ³ /day	Upto 2.5 lps
Specific yield/Storativity (S)	0.045	0.00033
Transmissivity (T)	51.10m ² /day	0.27 to 237.7 m ² /day

4 GROUND WATER QUALITY

<p>4.1 Aquifer-I/Shallow Aquifer EC between 750- 2250 μS/cm has been observed in major part of the block while EC between 250-750 μS/cm observed in the central, northern, central and eastern parts of the block. Nitrate >45 mg/l observed in eastern, southern and western parts of the block.</p>	<p>4.2 Aquifer-II/Deeper Aquifer EC between 250-750 μS/cm has been observed in major part of the block while EC between less than 250 μS/cm observed in southern, central and northern parts of the block. Area showing EC >2250 μS/cm observed in 13.67 Sq.Km. Nitrate >45 mg/l observed in southern part of the block and Fluoride >1.5 mg/l observed in eastern part of the block.</p>
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5. GROUND WATER RESOURCES

5.1 Aquifer-I/Shallow Aquifer

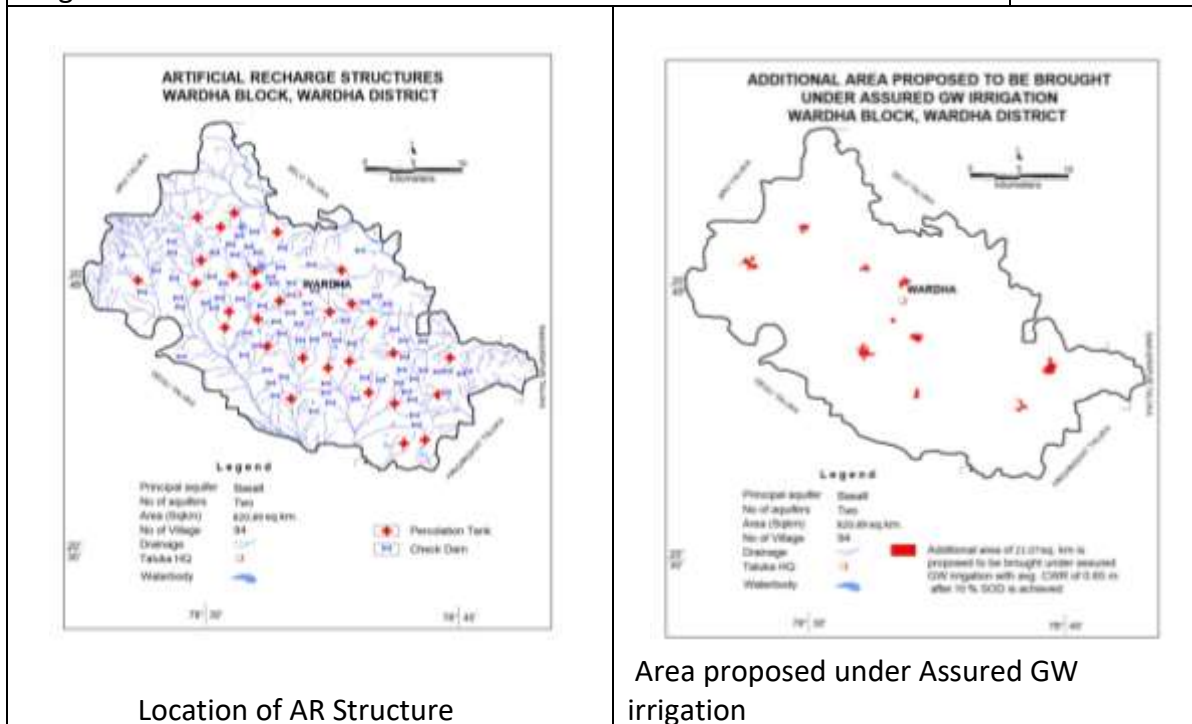
Ground Water Recharge Worthy Area (Sq. Km.)	785.50
Total Annual Ground Water Recharge (MCM)	122.67
Natural Discharge (MCM)	6.13
Net Annual Ground Water Availability (MCM)	116.55
Existing Gross Ground Water Draft for irrigation (MCM)	67.35
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	5.57
Existing Gross Ground Water Draft for All uses(MCM)	72.93
Provision for domestic and industrial requirement supply to 2025(MCM)	5.94
Net Ground Water Availability for future irrigation development (MCM)	40.98
Stage of Ground Water Development (%)	62.58
Category	Safe

5.2 Aquifer-II/Deeper Aquifer

Taluka	Mean thickness (m)	Area in sqkm	Piezometric head meter above bottom of confining layer	S	Sy	Resource in above confining layer (mcm)	Resource in confining layer (mcm)	Total resource (mcm)
Wardha	4	146.28	55	0.000043	0.002	0.35238	1.17024	1.522629
Wardha	6	359.78	60	0.000043	0.002	0.94550	4.31736	5.262862
Wardha	8	160.34	47	0.000043	0.002	0.33007	2.56544	2.895516
Wardha	10	120.71	55	0.000043	0.002	0.29079	2.4142	2.70499

Total	12.386	
6. GROUND WATER RESOURCE MANAGEMENT		
Net Annual Ground Water Availability (MCM)	116.55	
Gross Annual Draft (MCM)	72.93	
Stage of Ground Water Development (%)	62.58	
6.1 Supply Side Management		
SUPPLY (MCM)		
Agricultural Supply -GW	67.36	
Agricultural Supply -SW	0.0	
Domestic Supply - GW	5.57	
Domestic Supply - SW	1.39	
Total Supply	74.32	
Area of Block (Sq. Km.)	820.89	
Area suitable for Artificial recharge (Sq. Km)	429.7	
Type of Aquifer	Hard Rock	
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	429.7	
Volume of Unsaturated Zone (MCM)	988.31	
Average Specific Yield	0.02	
Recharge Potential (MCM)	19.77	
Surplus water Available (MCM)	9.62	
Proposed Structures	Percolation Tank (@ Rs.175.14 lakh, Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam(@ Rs.19.432 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	34	96
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	5.05	2.17
RTRWH Structures – Urban Areas		
Households to be covered (50% with 50 m ² area)	49274	
Total RWH potential (MCM)	2.18	
Rainwater harvested / recharged @ 80% runoff co-efficient	1.74	
Estimated Expenditure (Rs. In Cr.) @ Rs.30000/-per HH	73.91	
RTRWH & AR is economically not viable & hence, not recommended.		
6.2 Demand Side Management		
Micro irrigation techniques		
Irrigation Area (sq. km.) proposed for irrigation through Drip and Sprinkler	Not proposed	
Water Saving by use of Drip and Sprinklers	-	
Proposed Cropping Pattern change	Not proposed	
Ground water Irrigated area under Water Intensive Crop (sq.km)	NIL	

Water Saving by water use efficiency (MCM)	NIL
6.3 EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	116.55
Existing Ground Water Draft for All Uses (MCM)	72.93
Present stage of Ground Water Development (%)	62.58
Additional GW resources available after Supply side interventions (MCM)	7.22
Ground Water Availability after Supply side intervention (MCM)	123.77
Stage of Ground Water Development after Supply side Interventions (%)	58.92
Total GWR available for GW Development (MCM)	13.70
GW draft after Ground Water Development to enhance Stage of Development to 70% (MCM)	86.63
Other Interventions Proposed, if any	Not proposed
Alternate Water Sources Available	NIL
6.4 Development Plan	
Volume of water available for GWD to enhance stage of GWD to 70% (MCM)	13.70
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	822
Proposed Number of BW (@ 1 ham for 10% of GWR Available)	137
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	21.07



PANCHAYAT WISE AQUIFER MAPS AND MANAGEMENT PLAN

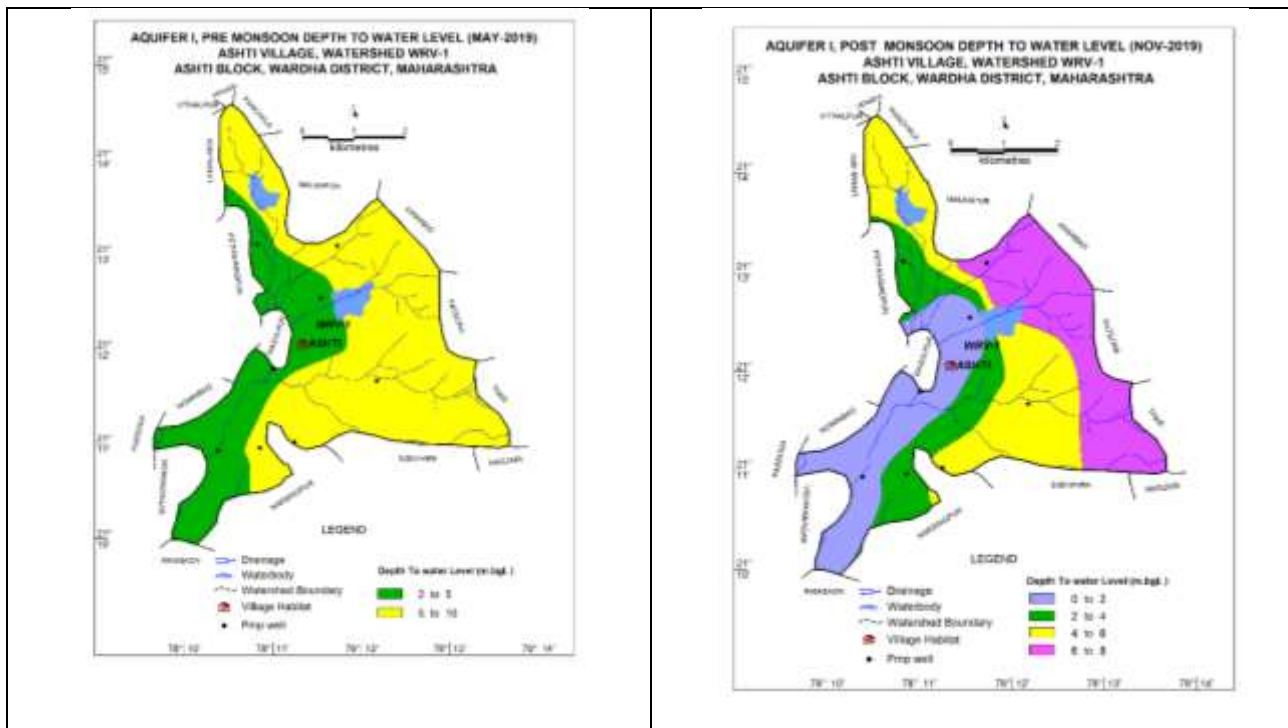
1. ASHTI VILLAGE
2. DAHEGAON (GONDI)
3. HINGNI
4. SARAWADI
5. DEOLI
6. JAMNI
7. UMRI

10. PANCHAYAT LEVEL AQUIFER MANAGEMENT PLAN,

10.1 VILLAGE ASHTI, ASHTI BLOCK, WARDHA DISTRICT

1. SALIENT FEATURES	
1.1 Introduction	
Village Name	Ashti
Geographical Area (Sq. Km.)	21.70
Hilly Area (Sq. Km.)	Nil
Population (Current year -2019)	11716
Climate	Monsoon Sub-Tropical
Normal Rainfall (mm)	974.4
Average Rainfall (mm) 2010-19	854.6
1.2. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau (weathered, moderately dissected, slightly dissected), Butte.
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene
Soil	Soil mostly consisting of loamy mixed, fine loamy mixed, fine calcareous.
1.3. Hydrology & Drainage	
Watershed	WRV-1
Drainage	Godavari basin; dendritic to sub-dendritic drainage pattern. 1 st Order Stream – 18.1673 km 2 nd Order Stream – 11.8065 km 3 rd Order Stream – 5.0396 km
Irrigation Project (Major/Medium/Minor etc.)	Nil
WC structures (PT / KT / CD / FP etc.)	01-CD, PT-02,LBS-01, Vill farm-2.
1.4. Land Use, Agriculture, Irrigation & Cropping Pattern	
Specifics	Area
Forest Area	Nil
Cultivable Area	848.98 ha
Net Sown Area	883.93
Double Cropped Area	4.536 sq.km (As per land use Map), 83 ha(Data collected from Talathi)

Irrigation Dug wells		256
Irrigation Bore wells		25
Area under Drip & Sprinkler Irrigation		-
Area under Irrigation	Surface Water	0.1798
	Ground Water	0.7113
Principal Crops	Soyabean	360 ha
	Jawar	5.0 ha
	Pulses (<i>Tur</i>)	139ha
	Sugar cane	3.0 ha
	Cotton	249.0 ha
	Wheat	59.0 ha
	Gram	48.0 ha
	Orange	79.0 ha
	Vegetables	5.0 ha
	Others	0.0 ha
1.5. Water Level Behaviour: Aquifer-I (Shallow Aquifer)		
In the village, 08 KOW were established to decipher the water level scenario.		
Pre-Monsoon (May-2019) In the western part of village shows the DTWL ranges between 0-5 mbgl, remaining part of the area DTWL ranges 5-10 mbgl is observed.		Post-Monsoon (November-2018) In the western part of village shows the DTWL ranges between 0-4mbgl, remaining part of the area DTWL ranges 4-8mbgl is observed.



2. Ground Water Issues

1. Non-availability of surface water for irrigation.
2. Less ground water potential in basaltic aquifer.
3. Water stress situation during lean period (March to June).

3. AQUIFER DISPOSITION

3.1. Number of Aquifers Basalt –Aquifer-I (Phreatic / Shallow aquifer)

3.2. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)
Type of Aquifer	Basalt –Aquifer-I (Phreatic / Shallow aquifer)
Static Water Level (mbgl)	1.0-7.00
Depth of Occurrence (mbgl)	10.00-35.00
weathered thickness (m)	0- 14.00
Yield	10 – 100 m ³ /day
Specific yield (Sy)	0.02 (norms)

4. GROUND WATER QUALITY: Phreatic Aquifer (Aquifer-I/ Shallow aquifer)

In the village of Ashti, 08 nosKow established Ec is ranges 518 to 1880. Three water sample collected for the chemical analysis.

5.0. GROUND WATER RESOURCE MANAGEMENT

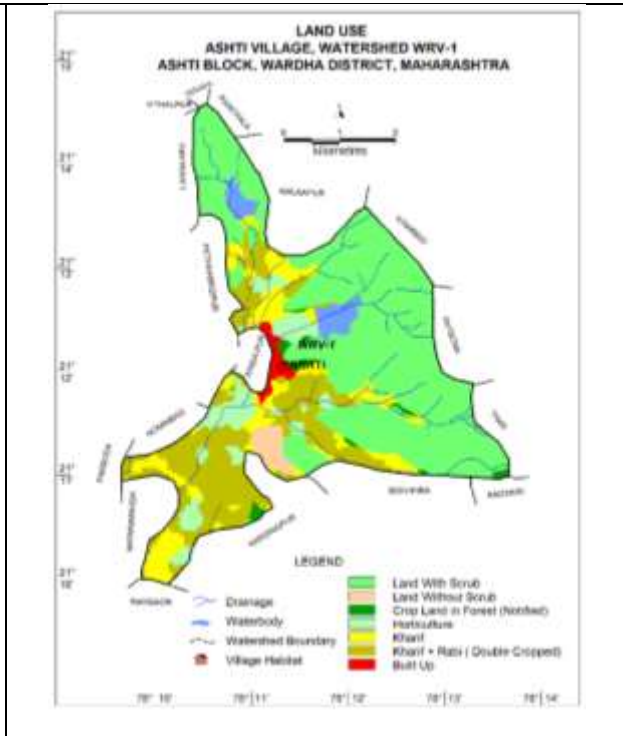
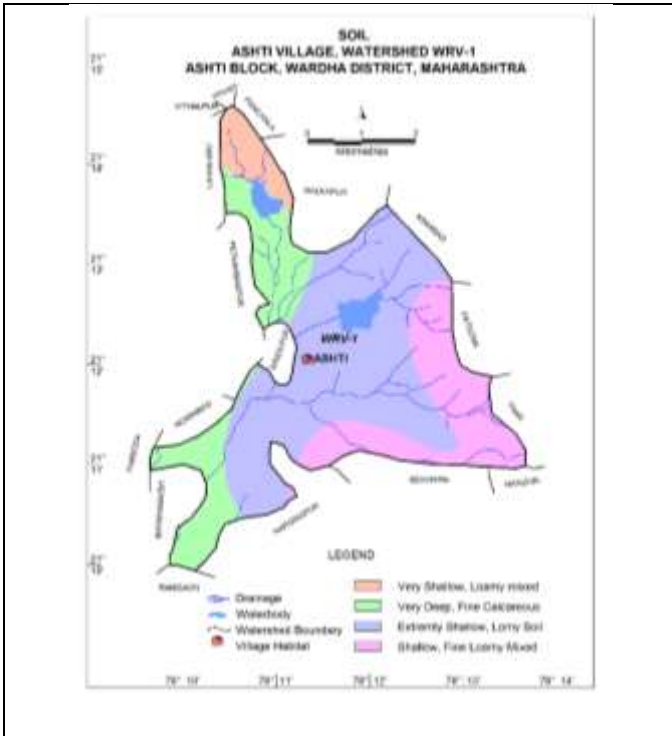
5.1. Supply Side Management

SUPPLY (MCM)

Available Resource (MCM)	8.28
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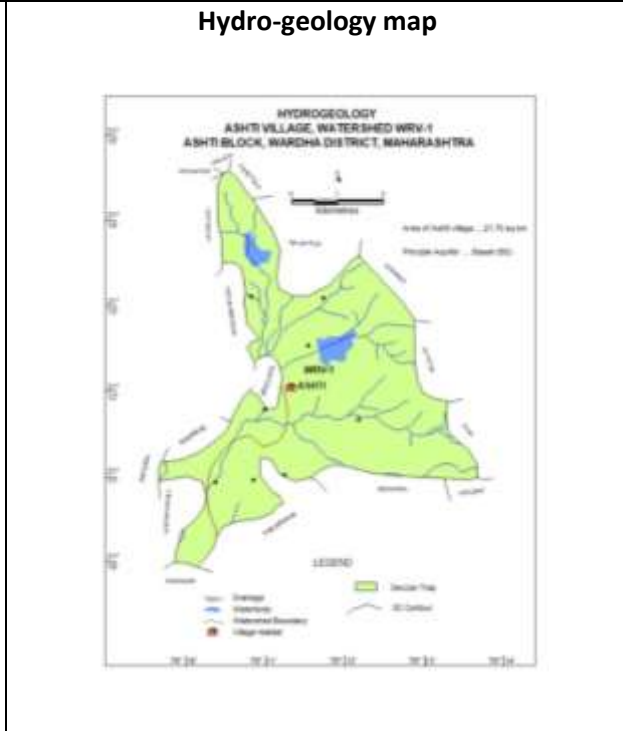
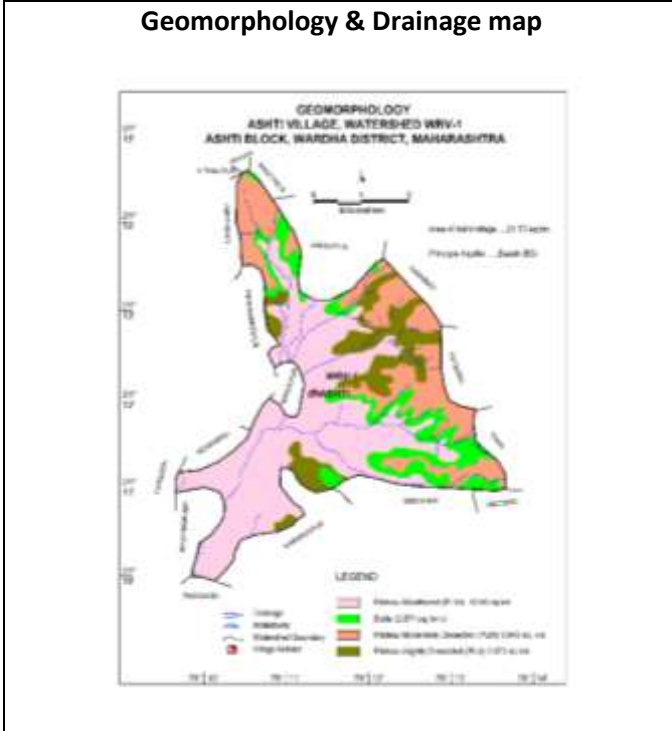
Agricultural Supply –GW	0.71
Agricultural Supply -SW	17.98
Domestic Supply - GW	0.39
Domestic Supply - SW	0.00
Non agriculture use (MCM)	0.18
Total GW availability (MCM)	6.99
Gross Annual Draft (MCM)	0.71
Area of village (Sq. Km.)	21.05
Area suitable for Artificial recharge (sq km)	21.05
Type of Aquifer	Hard rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	12.87
Volume of Unsaturated Zone (MCM)	27.027
Average Specific Yield	0.02
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	0.540540000000
Surplus runoff considered for planning (MCM) @ 100%	0.02
Proposed AR Structures (Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM))	Not proposed
Proposed AR Structures Gabion	Not proposed
Proposed AR Structures Other	Not proposed
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	Total of above
Specific Recommendations - As per State Govt. Resolution, segment wise nala/stream desilting, deepening and widening upto 3 m depth or upto weathered rock considering the local hydrogeological condition without disturbing the ecology/aquifer/environmental flow of nala/stream.	
Considering average nala deepening of 1 m depth, additional storage	0.00
Considering average nala deepening of 1 m depth, additional recharge @ 75%	0.00
RTRWH Structures	
Households to be covered (Pakka House only)	1020
Total RWH potential (MCM) (25% with 50 m2 area)	0.0000499
Rainwater harvested / recharged @ 80% runoff co-efficient (MCM)	0.0000400
However, RTRWH is economically not viable & not Recommended	

6.2. Demand Side Management	
Micro irrigation techniques	
Area is proposed to be covered under Drip	Not proposed
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.36 m. Drip Req. - 0.24, WUE- 0.12 m	
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	
6.3. Expected Benefits	
Net Ground Water Availability (MCM)	8.28
Additional GW resources available after Supply side interventions (MCM)	0.00
Ground Water Availability after Supply side intervention(MCM)	8.28
Existing Ground Water Draft for All Uses (MCM)	1.29
GW draft after Demand Side Interventions (MCM)	0.00
Present stage of Ground Water Development (%)	15.55
Expected Stage of Ground Water Development after interventions (%)	15.55
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD after stage of GWD brought to 25% (MCM)	0.78
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	47
Proposed Number of BW (@ 1.0 ham for 10% of GWR Available)	8
Area (ha) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 60% stage of gwd is achieved	120.39
Soil map	Landuse map



In the village major area consisting mostly of loamy soil in the center part of the village, fine calcareous soil observed in north and south-west parts, fine loamy mixed observed in the south-eastern parts.

In the village major cultivable land is under Kharif cropping pattern



Major part of the village shows weathered plateau in the center, south and south-west part of the village, plateau moderately dissected is observed in north-

Entire village is covered by Deccan trap Basalt.

<p>east and north-west parts, plateau slightly dissected observed in north-west and small patches in south, eastern parts. Butte observed in north and south-east parts.</p>	
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Panchayat Level Aquifer Management Plan

Village – Ashti, Ashti Taluka, Wardha District

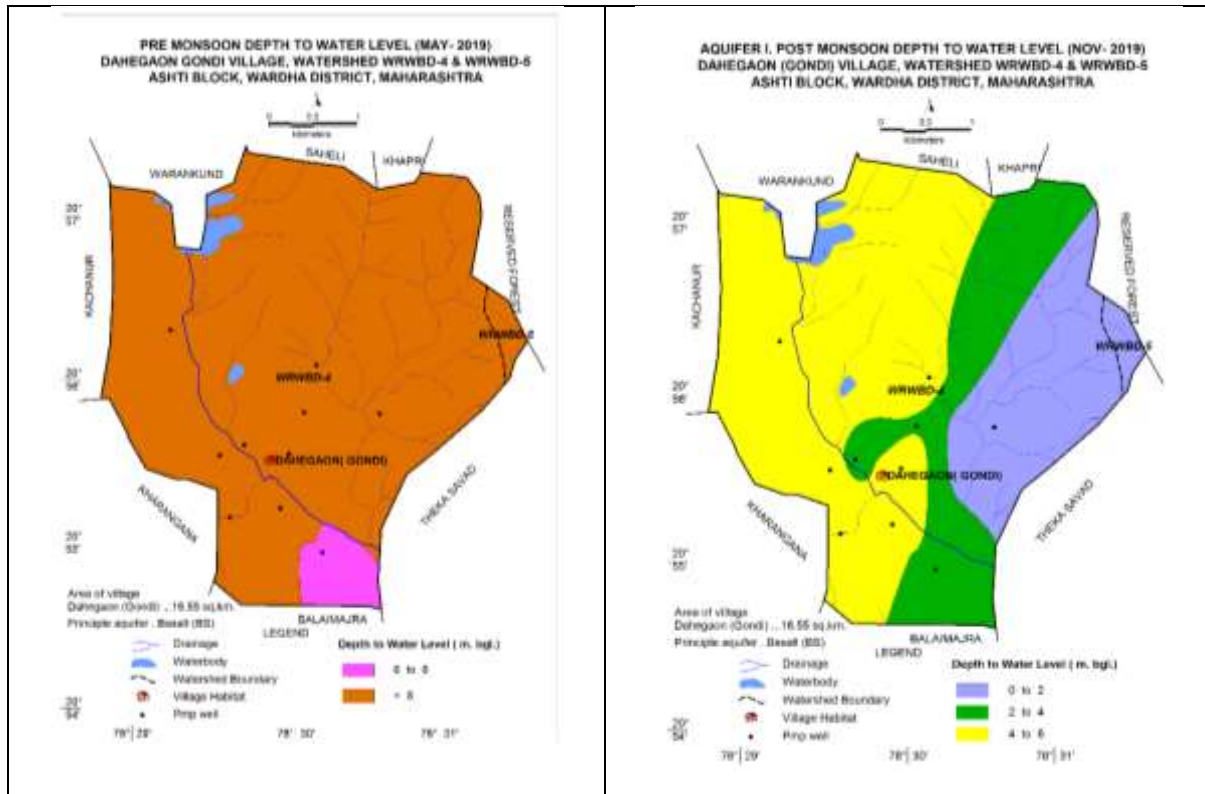
Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
Aquifer I (Basalt - Weathered and fractures)	848.98 ha cultivable land by GW, 01 CD, 02 PT, 01 LBS, 07 DW(d), 256 DW (i), Pre monsoon DTWL~ 2.6-9.5 m bgl. Post monsoon DTWL~ 01-7.2 m bgl.	DT Basalt (Ajantha/ Chikhli/ Karanja formations)	Plateau (weathered, moderately, slightly dissected,), Butte with weathered and thickness.	Good; All parameters are within MPL.	Dug well	Depth Range of Zones: 3– 15 m	3 to 5	1 to 3	< 10 – 100 m ³ / day Or 0.7 ham /year	<ol style="list-style-type: none"> 1. Construction of 47nos dug wells and 08nos bore wells. 2. Desilting of existing water conservation and artificial recharge structures. 3. The GW should be used for irrigation purpose.
Aquifer II (Basalt - Jointed & Fractures)	25 BW(i), 50 BW (d), HP- Nil DTWL~ 15-35 m bgl.	As above	--	-	Bore well	Depth :60 m	3 to 5	1 to 3	0.14 - 2.16 lps	<ol style="list-style-type: none"> 1. The GW should be used for drinking purpose. 4. BW should not be drilled down below the red bole.

Note: DW(d)= Dug well Domestic; DW (i)= Dug Well Irrigation; BW(d)= Bore Well Domestic; BW(i)= Bore Well Irrigation

10.2 VILLAGE DAHEGAON (GONDI), ARVIBLOCK, WARDHA DISTRICT

1. SALIENT FEATURES	
1.1 Introduction	
Village Name	Dahegaon (Gondi)
Geographical Area (Sq. Km.)	16.55
Hilly Area (Sq. Km.)	Nil
Population (Current year -2019)	1742
Climate	Monsoon Sub-Tropical
Normal Rainfall (mm)	899
Average Rainfall (mm) 2010-19	905
1.2. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau (weathered, moderately dissected, slightly dissected, Undissected).
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene
Soil	Soil mostly consisting of fine loamy mixed, loamy, fine calcareous.
1.3. Hydrology & Drainage	
Watershed	WRWBD-4 & WRWBD-5
Drainage	Godavari basin; dendritic to sub-dendritic drainage pattern. 1 st Order Stream – 17.4591 km

	2 nd Order Stream – 8.4485 km 3 rd Order Stream – 3.3494 km	
Irrigation Project (Major/Medium/Minor etc.)	Nil	
WC structures (PT / KT / CD / FP etc.)	06-CD, PT-02, LBS-03, Vill farm-04, other-02	
1.4. Land Use, Agriculture, Irrigation & Cropping Pattern		
Specifics	Area	
Forest Area	7.547 Sq.km	
Cultivable Area	759.8 ha	
Net Sown Area		
Double Cropped Area	5.8 ha(Data collected from Talathi)	
Irrigation Dug wells	185	
Irrigation Bore wells	16	
Area under Drip & Sprinkler Irrigation	-	
Area under Irrigation	Surface Water	0.051816
	Ground Water	0.590903
Principal Crops	Soyabean	66 ha
	Jawar	8.0 ha
	Pulses (<i>Tur</i>)	147.0 ha
	Sugar cane	0.8 ha
	Cotton	587.0 ha
	Wheat	17.0 ha
	Gram	16.0 ha
	Orange	5.0 ha
	Vegetables	0.5 ha
Others	0.0 ha	
1.5. Water Level Behaviour: Aquifer-I (Shallow Aquifer)		
In the village, 09 KOW were established to decipher the water level scenario.		
Pre-Monsoon (May-2019) The entire village shows the DTWL ranges between more than 8 mbgl, small isolated part southern side of the area DTWL ranges 8-6 mbgl is observed.	Post-Monsoon (November-2019) In the most part of village shows the DTWL ranges between 4-6 mbgl in the north-west and south-west, remaining part of the area DTWL ranges 0-4 mbgl is observed in the north-east and south-east.	



2. Ground Water Issues

- 4. Non-availability of surface water for irrigation.
- 5. Less ground water potential in basaltic aquifer.
- 6. Water stress situation during lean period (March to June).

3. AQUIFER DISPOSITION

3.1. Number of Aquifers Basalt –Aquifer-I (Phreatic / Shallow aquifer)

3.2. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)
Type of Aquifer	Basalt –Aquifer-I (Phreatic / Shallow aquifer)
Static Water Level (mbgl)	5.4-9.4
Depth of Occurrence (mbgl)	10.00-35.00
weathered thickness (m)	0- 10.00
Yield	10 – 100 m ³ /day
Specific yield (Sy)	0.02 (norms)

4. GROUND WATER QUALITY: Phreatic Aquifer (Aquifer-I/ Shallow aquifer)

In the village of Dahegaon (Gondi), 09 nosKow established Ec is ranges 570 to 1012. Three water sample collected for the chemical analysis.

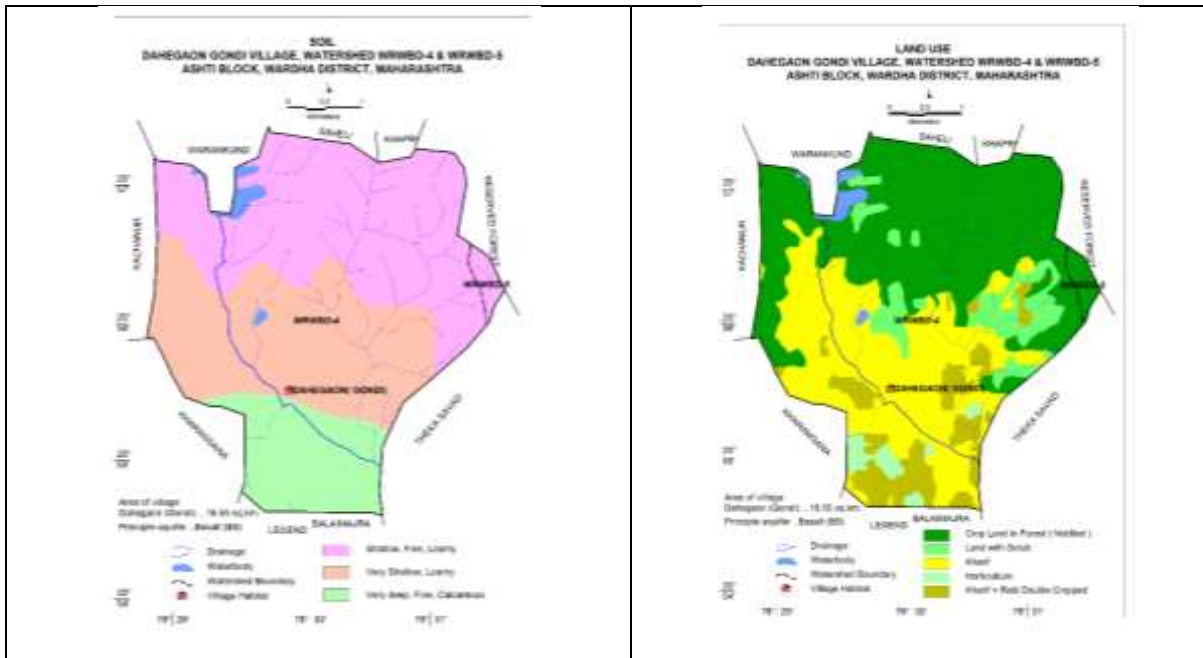
5.0. GROUND WATER RESOURCE MANAGEMENT

5.1. Supply Side Management

SUPPLY (MCM)

Available Resource (MCM)	6.03
Agricultural Supply –GW	0.59
Agricultural Supply -SW	5.18
Domestic Supply - GW	0.05
Domestic Supply - SW	0.00
Non agriculture use (MCM)	0.13
Total GW availability (MCM)	5.25
Gross Annual Draft (MCM)	0.59
Area of village (Sq. Km.)	16.55
Area suitable for Artificial recharge (sq km)	16.55
Type of Aquifer	Hard rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	9.268
Volume of Unsaturated Zone (MCM)	19.4628
Average Specific Yield	0.02
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	0.389256000000
Surplus runoff considered for planning (MCM) @ 100%	0.02
Proposed AR Structures (Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM))	Not proposed
Proposed AR Structures Gabbion	Not proposed
Proposed AR Structures Other	Not proposed
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	Total of above
Specific Recommendations - As per State Govt. Resolution, segment wise nala/stream desilting, deepening and widening upto 3 m depth or upto weathered rock considering the local hydrogeological condition without disturbing the ecology/aquifer/environmental flow of nala/stream.	
Considering average nala deepening of 1 m depth, additional storage	0.00
Considering average nala deepening of 1 m depth, additional recharge @ 75%	0.00
RTRWH Structures	
Households to be covered (Pakka House only)	330
Total RWH potential (MCM) (25% with 50 m2 area)	0.0000499
Rainwater harvested / recharged @ 80% runoff co-efficient (MCM)	0.0000400
However, RTRWH is economically not viable & not Recommended	

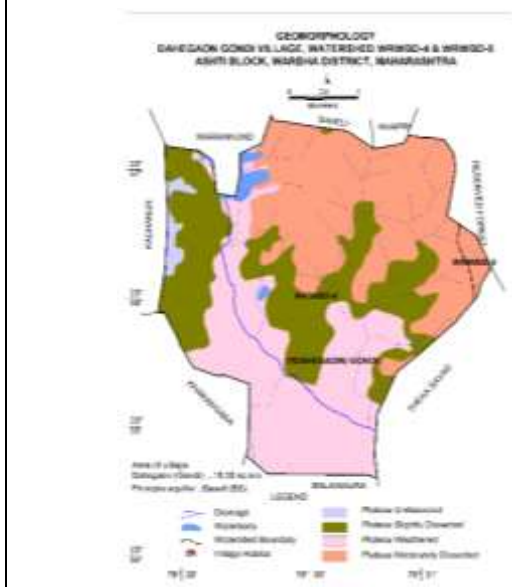
6.2. Demand Side Management	
Micro irrigation techniques	
Area is proposed to be covered under Drip	Not proposed
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.36 m. Drip Req. - 0.24, WUE- 0.12 m	
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	
6.3. Expected Benefits	
Net Ground Water Availability (MCM)	6.03
Additional GW resources available after Supply side interventions (MCM)	0.00
Ground Water Availability after Supply side intervention(MCM)	6.03
Existing Ground Water Draft for All Uses (MCM)	0.78
GW draft after Demand Side Interventions (MCM)	0.00
Present stage of Ground Water Development (%)	12.92
Expected Stage of Ground Water Development after interventions (%)	12.92
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD after stage of GWD brought to 60% (MCM)	0.73
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	44
Proposed Number of BW (@ 1.0 ham for 10% of GWR Available)	7
Area (ha) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 70% stage of gwd is achieved	112.15
Soil map	Landuse map



In the village major area consisting mostly of fine loam soil in north and middle of the village from west to east shows loamy soil. Small portion of south of the village shows fine calcareous soil.

In the village major cultivable land is under Kharif cropping pattern

Geomorphology & Drainage map



Hydro-geology map



Major part of the village shows weathered plateau in the centre, south part of the village, plateau moderately dissected is observed in north-east parts, plateau slightly dissected observed in centre and small patches in west, eastern parts. Plateau un dissected observed in small portion of western parts.

Entire village is covered by Deccan trap Basalt.

Panchayat Level Aquifer Management Plan

Village – Dahegaon (Gondi), Arvi Taluka, Wardha District

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
Aquifer I (Basalt-Weathered and fractures)	759.8 ha cultivable land by GW, 06 CD, 02 PT, 03 LBS, 20 DW(d), 185 DW (i), Pre monsoon DTWL~ 5.4-9.4 m bgl. Post monsoon DTWL~ 02-5.5 m bgl.	DT Basalt (Ajantla/ Chikhli/ Karanja formations)	Plateau (weathered, moderately dissected, slightly dissected, Undissected).with weathered and thickness ranging from 0 to 10 m.	Good; All parameters are within MPL.	Dug well	Depth Range of Zones: 5– 15 m	3 to 5	1 to 3	< 10 – 100 m ³ /day Or 0.7 ham/year	Construction of 44nos dug wells and 07nos bore wells. Desilting of existing water conservation and artificial recharge structures. The GW should be used for irrigation purpose.
Aquifer II (Basalt-Jointed & Fractures)	16 BW(i), 03 BW (d), HP-Nil DTWL~ 15-35 m bgl.	As above	--	-	Bore well	Depth : Up to 170 m	3 to 5	1 to 3	0.14-2.16 lps	1. The GW should be used for drinking purpose. BW should not be drilled down below the red bole.

Note: DW(d)= Dug well Domestic; DW (i)= Dug Well Irrigation; BW(d)= Bore Well Domestic; BW(i)= Bore Well Irrigation

10.3 VILLAGE HINGNI, SELUBLOCK, WARDHA DISTRICT

1. SALIENT FEATURES	
1.1 Introduction	
Village Name	Hingni
Geographical Area (Sq. Km.)	5.006
Hilly Area (Sq. Km.)	Nil
Population (Current year -2020)	5416
Climate	Monsoon Sub-Tropical
Normal Rainfall (mm)	869.4
Average Rainfall (mm) 2010-19	923
1.2. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau (slightly dissected to moderately dissected, weathering (2-5m)).
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene
Soil	Soil mostly consisting of very deep, Fine, calcareous and loamy, clay.
1.3. Hydrology & Drainage	
Watershed	WRWB-2
Drainage	Godavari basin; dendritic to sub-dendritic drainage pattern. 1 st Order Stream – 2.5329 km 2 nd Order Stream – 4.1585km 3 rd Order Stream – 0.07412 km
Irrigation Project (Major/Medium/Minor etc.)	Nil
WC structures (PT / KT / CD / FP etc.)	LBS-03
1.4. Land Use, Agriculture, Irrigation & Cropping Pattern	
Specifics	Area
Forest Area	Nil
Cultivable Area	430.15 ha
Net Sown Area	577.52 ha
Double Cropped Area	55.2 ha(Data collected from Talathi)
Irrigation Dug wells	110
Irrigation Bore wells	85

Area under Drip & Sprinkler Irrigation		-
Area under Irrigation	Surface Water	0.10668 (MCM)
	Ground Water	0.45931185 (MCM)
Principal Crops	Soyabean	35 ha
	Jawar	1.5
	Pulses (<i>Tur</i>)	41
	Groundnut	5.40
	Cotton	292.95 ha
	Wheat	35.0 ha
	Sugarcane	5.20
	Vegetables	2.80
	Orange and Pomegranate, Banana	2.60
	Others	2.0

1.5. Water Level Behavior: Aquifer-I (Shallow Aquifer)

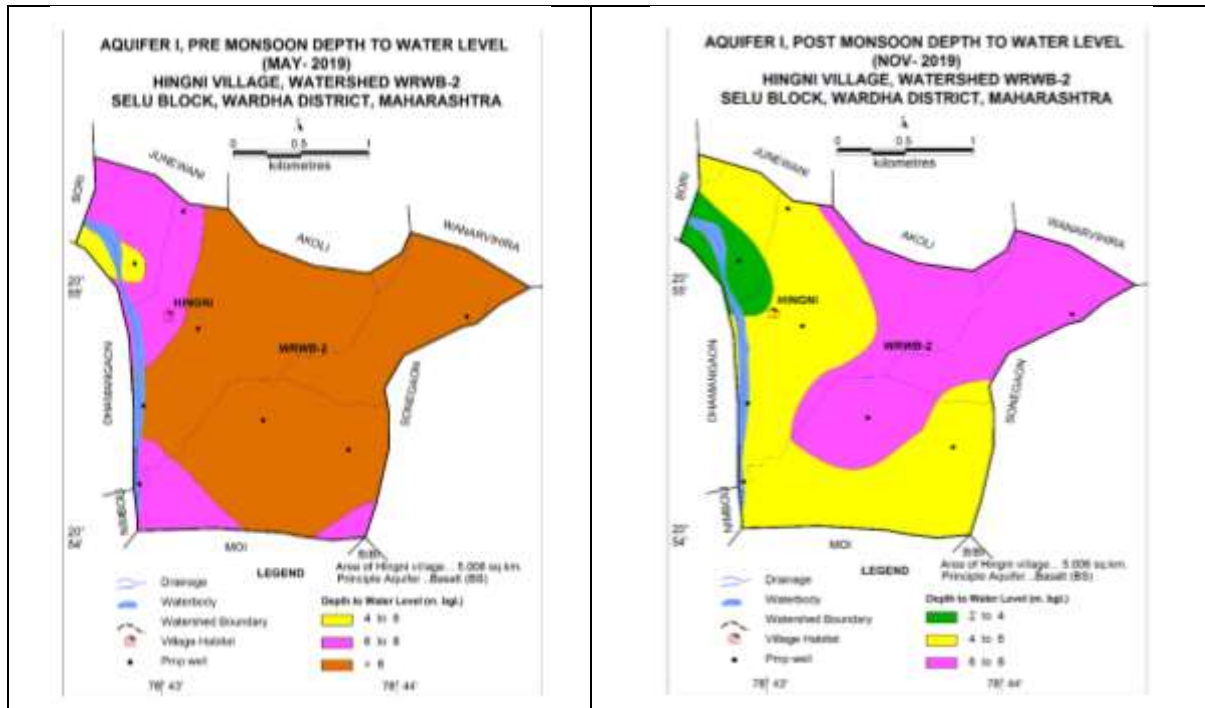
In the village, 13 KOW were established to decipher the water level scenario.

Pre-Monsoon (May-2019)

Entire area of the village shows DTWL in the range of above 8 mbgl except in the north-west, south-west and south-east part a small patch of DTWL ranging 6-8 mbgl is observed. A small isolated patch of the DTWL 4-6 mbgl is observed in the north-west of the village.

Post-Monsoon (November-2019)

In the north-east part the DTWL ranges between 6-8 mbgl whereas in the south, south-west and north-west DTWL ranges between 4-6 mbgl. A small isolated patch of the DTWL 4-6 mbgl is observed in the north-west of the village.



2. Ground Water Issues

- 7. Non-availability of surface water for irrigation.
- 8. Less ground water potential in basaltic aquifer.
- 9. Water stress situation during lean period (March to June).

3. AQUIFER DISPOSITION

3.1. Number of Aquifers Basalt –Aquifer-I (Phreatic / Shallow aquifer)

3.2. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)
Type of Aquifer	Basalt –Aquifer-I (Phreatic / Shallow aquifer)
Static Water Level (mbgl)	3.6-8
Depth of Occurrence (mbgl)	10.00-30.00
weathered thickness (m)	0- 14.00
Yield	10 – 100 m ³ /day
Specific yield (Sy)	0.02 (norms)

4. GROUND WATER QUALITY: Phreatic Aquifer (Aquifer-I/ Shallow aquifer)


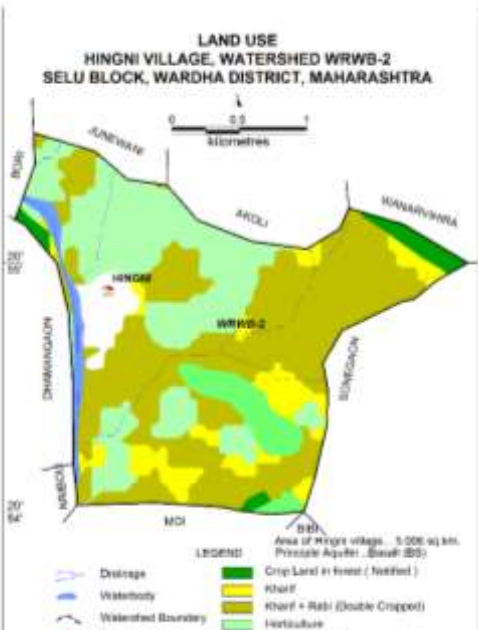
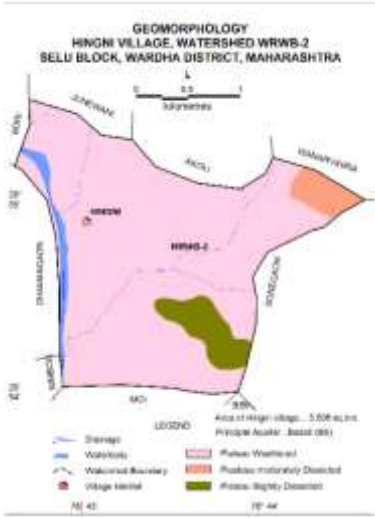

In the village of Hingni, 13 nosKow established Ec is ranges 590 to 1480. Three water sample collected for the chemical analysis. Chemical Result awaited.

5.0. GROUND WATER RESOURCE MANAGEMENT

5.1. Supply Side Management	
SUPPLY (MCM)	
Available Resource (MCM)	2.06
Agricultural Supply –GW	0.46
Agricultural Supply –SW	10.67

Domestic Supply - GW	0.21
Domestic Supply - SW	0.00
Non agriculture use (MCM)	0.05
Total GW availability (MCM)	1.34
Gross Annual Draft (MCM)	0.46
Area of village (Sq. Km.)	5.78
Area suitable for Artificial recharge (sq km)	5.78
Type of Aquifer	Hard rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	12.8
Volume of Unsaturated Zone (MCM)	26.88
Average Specific Yield	0.02
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	0.537600000000
Surplus runoff considered for planning (MCM) @ 100%	0.02
Proposed AR Structures (Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM))	Not proposed
Proposed AR Structures Gabion	Not proposed
Proposed AR Structures Other	Not proposed
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	Total of above
Specific Recommendations - As per State Govt. Resolution, segment wise nala/stream desilting, deepening and widening upto 3 m depth or upto weathered rock considering the local hydrogeological condition without disturbing the ecology/aquifer/environmental flow of nala/stream.	
Considering average nala deepening of 1 m depth, additional storage	0.00
Considering average nala deepening of 1 m depth, additional recharge @ 75%	0.00
RTRWH Structures	
Households to be covered (Pakka House only)	330
Total RWH potential (MCM) (25% with 50 m2 area)	0.0000499
Rainwater harvested / recharged @ 80% runoff co-efficient (MCM)	0.0000400
However, RTRWH is economically not viable & not Recommended	
6.2. Demand Side Management	

Micro irrigation techniques	
Area is proposed to be covered under Drip	Not proposed
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.36 m. Drip Req. - 0.24, WUE- 0.12 m	
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	
6.3. Expected Benefits	
Net Ground Water Availability (MCM)	2.06
Additional GW resources available after Supply side interventions (MCM)	0.00
Ground Water Availability after Supply side intervention(MCM)	2.06
Existing Ground Water Draft for All Uses (MCM)	0.72
GW draft after Demand Side Interventions (MCM)	0.00
Present stage of Ground Water Development (%)	34.81
Expected Stage of Ground Water Development after interventions (%)	34.81
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD after stage of GWD brought to 50% (MCM)	0.31
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	19
Proposed Number of BW (@ 1.0 ham for 10% of GWR Available)	3
Area (ha) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 70% stage of gwd is achieved	48.13

<p style="text-align: center;">Soil map</p> 	<p style="text-align: center;">Landuse map</p> 
<p>In the village major area consisting mostly of very deep, Fine, calcareous and very small patch in end of Eastern side very shallow, loamy, clay.</p>	<p>In the village major cultivable land is under Kharif cropping pattern</p>
<p style="text-align: center;">Geomorphology & Drainage map</p> 	<p style="text-align: center;">Hydro-geology map</p> 
<p>Major part of the village shows Plateau weathered, small patches in north-east and south-east, Plateau moderately and slightly dissected.</p>	<p>Entire village is covered by Deccan trap Basalt.</p>

Panchayat Level Aquifer Management Plan

Village –Hingni, Selu Taluka, Wardha District

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
Aquifer I (Basalt-Weathered and fractures)	430.15 ha cultivable land by GW, 3 lbs, 32 DW(d), 110 DW (i), Pre monsoon DTWL ~ 5.5-13.12 m bgl. Post monsoon DTWL ~ 3.6-7.8 m bgl.	DT Basalt (Ajantaha/ Chikhli/ Karanja formations)	Plateau (moderately, slightly dissected, weathered) with weathered	Good; All parameters are within MPL.	Dug well	Depth Range of Zones: 5– 15 m	3 to 5	1 to 3	< 10 – 100 m ³ /day Or 0.7 ham/year	Construction of 19nos dug wells and 03nos bore wells. Desilting of existing water conservation and artificial recharge structures. The GW should be used for irrigation purpose.
Aquifer II (Basalt-Jointed & Fractures)	85 BW(i), 324 BW (d), HP-Nil DTWL ~ 15-35 m bgl.	As above	--	-	Bore well	Depth :upto 170 m	3 to 5	1 to 3	0.14-2.16 lps	1. The GW should be used for drinking purpose. BW should not be drilled down below the red bole.

Note: DW (d) = Dug well Domestic; DW (i) = Dug Well Irrigation; BW (d) = Bore Well Domestic; BW (i) = Bore Well Irrigation

10.4 VILLAGE SARAWADI, KARANJA BLOCK, WARDHA DISTRICT

1. SALIENT FEATURES		
1.1 Introduction		
Village Name	Sarawadi	
Geographical Area (Sq. Km.)	7.864	
Hilly Area (Sq. Km.)	Nil	
Population (Current year -2020)	2561	
Climate	Monsoon Sub-Tropical	
Normal Rainfall (mm)	873	
Average Rainfall (mm) 2010-19	894.13	
1.2. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (weathered, slightly dissected, Un dissected) and Butte.	
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
Soil	Soil mostly consisting of Extremely and very shallow loamy, clay.	
1.3. Hydrology & Drainage		
Watershed	WRJ-1	
Drainage	Godavari basin; dendritic to sub-dendritic drainage pattern. 1 st Order Stream – 5.1871 km 2 nd Order Stream –2.778 km	
Irrigation Project (Major/Medium/Minor etc.)	Nil	
WC structures (PT / KT / CD / FP etc.)	CD-03, PT-02,	
1.4. Land Use, Agriculture, Irrigation & Cropping Pattern		
Specifics	Area	
Forest Area	Nil	
Cultivable Area	520 ha	
Net Sown Area		
Double Cropped Area	1.316 sq.km (As per land use Map), 100 ha (Data collected from Talathi)	
Irrigation Dug wells	186	
Irrigation Bore wells	13	
Area under Drip & Sprinkler Irrigation	-	
Area under Irrigation	Surface Water	0.24384 (MCM)
	Ground Water	0.519924 (MCM)
Principal Crops	Soyabean (ha)	150 ha
	Jawar (ha)	20
	Pulses (<i>Tur</i>)	31

	Groundnut (ha)	5.4
	Cotton (ha)	200
	Wheat (ha)	80
	Sugarcane (ha)	0
	Vegetables (ha)	5.2
	Orange and Pomegranate, Banana (ha)	100
	Others (ha)	2

1.5. Water Level Behaviour: Aquifer-I (Shallow Aquifer)

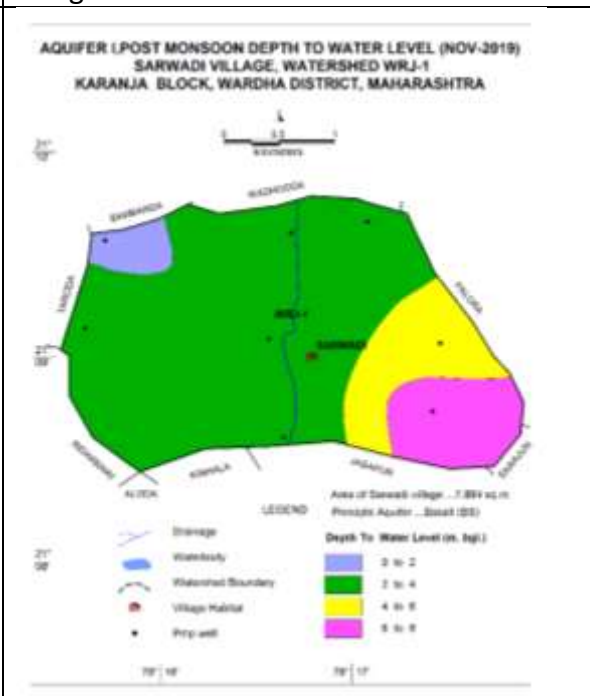
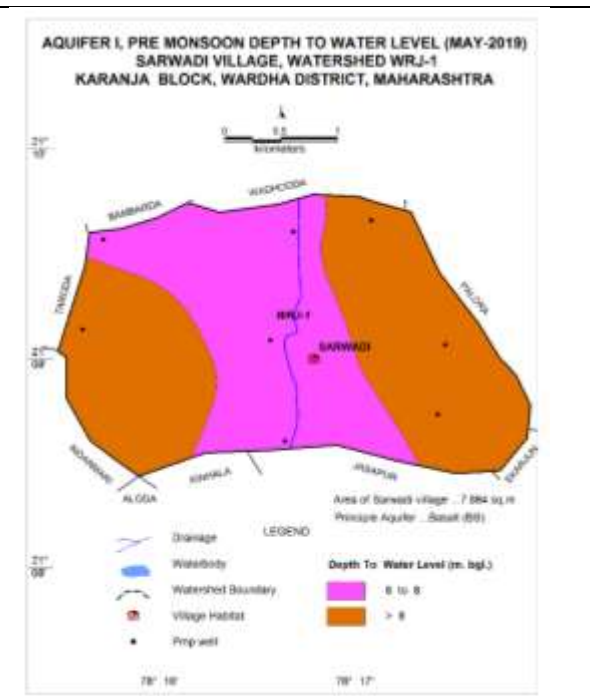
In the village, 08 KOW were established to decipher the water level scenario.

Pre-Monsoon (May-2019)

Major part of the village shows DTWL in the range of above 8 mbgl in the western and eastern part, whereas ranging 6-8 mbgl is observed in the north-south of the village.

Post-Monsoon (November-2019)

Major part of the village shows DTWL ranges between 2 to 4 mbgl in the west, north and south parts, whereas in the south-east DTWL ranges between 4-6 mbgl. A small isolated patch of the DTWL 4-6 mbgl is observed in the north-west of the village.



2. Ground Water Issues

Non-availability of surface water for irrigation.
 Less ground water potential in basaltic aquifer.
 Water stress situation during lean period (March to June).

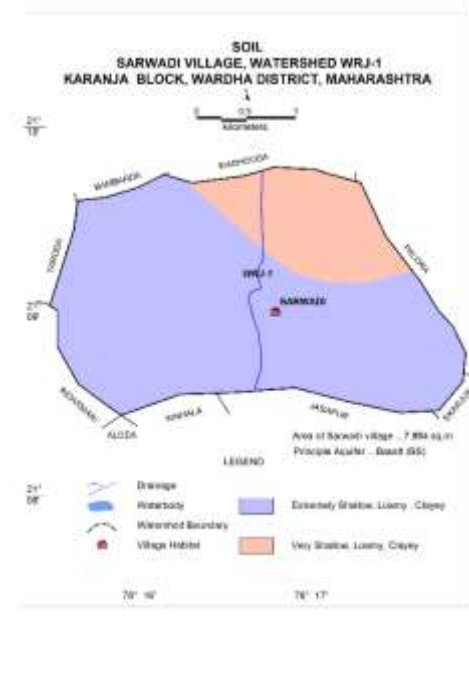
3. AQUIFER DISPOSITION

3.1. Number of Aquifers	Basalt –Aquifer-I (Phreatic / Shallow aquifer)
3.2. Aquifer Characteristics	
Major Aquifers	Basalt (Deccan Traps)

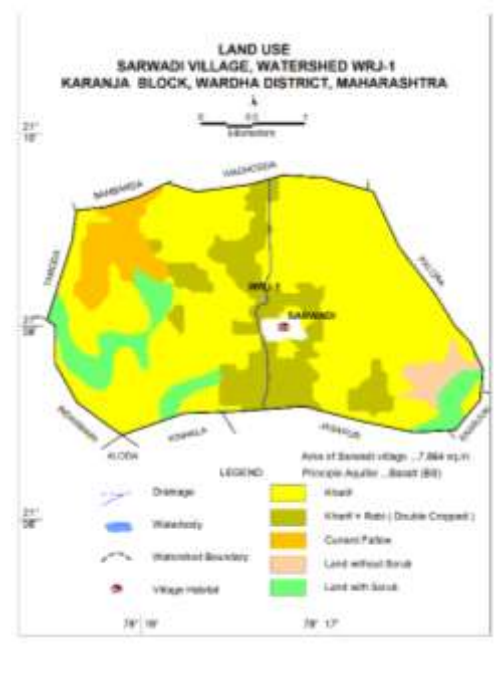
Type of Aquifer	Basalt –Aquifer-I (Phreatic / Shallow aquifer)	
Static Water Level (mbgl)	2.0-8.0	
Depth of Occurrence (mbgl)	10.00-30.00	
weathered thickness (m)	0- 10.00	
Yield	10– 100 m ³ /day	
Specific yield (Sy)	0.02 (norms)	
4. GROUND WATER QUALITY: Phreatic Aquifer (Aquifer-I/ Shallow aquifer)		
In the village of Sarawadi, 8 nosKow established Ec is ranges 890 to 1026. Two water sample collected for the chemical analysis.		
5.0. GROUND WATER RESOURCE MANAGEMENT		
5.1. Supply Side Management		
SUPPLY (MCM)		
Available Resource (MCM)	2.78	
Agricultural Supply –GW	0.52	
Agricultural Supply -SW	24.38	
Domestic Supply - GW	0.07	
Domestic Supply - SW	0.00	
Non agriculture use (MCM)	0.06	
Total GW availability (MCM)	2.12	
Gross Annual Draft (MCM)	0.52	
Area of village (Sq. Km.)	7.86	
Area suitable for Artificial recharge (sq km)	7.86	
Type of Aquifer	Hard rock	
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	1.923	
Volume of Unsaturated Zone (MCM)	4.0383	
Average Specific Yield	0.02	
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	0.080766000000	
Surplus runoff considered for planning (MCM) @ 100%	0.02	
Proposed AR Structures (Check Dam(@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM))	Not proposed	
Proposed AR Structures Gabbion	Not proposed	
Proposed AR Structures Other	Not proposed	
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	Total of above	
Specific Recommendations - As per State Govt. Resolution, segment wise nala/stream desilting, deepening and widening upto 3 m depth or upto weathered rock considering the local hydrogeological condition without disturbing the ecology/aquifer/environmental flow of nala/stream.		

Considering average nala deepening of 1 m depth, additional storage	0.00
Considering average nala deepening of 1 m depth, additional recharge @ 75%	0.00
RTRWH Structures	
Households to be covered (Pakka House only)	330
Total RWH potential (MCM) (25% with 50 m ² area)	0.0000499
Rainwater harvested / recharged @ 80% runoff co-efficient (MCM)	0.0000400
<i>However, RTRWH is economically not viable & not Recommended</i>	
5.2. Demand Side Management	
Micro irrigation techniques	
Area is proposed to be covered under Drip	Not proposed
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.36 m. Drip Req. - 0.24, WUE- 0.12 m	
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	
5.3. Expected Benefits	
Net Ground Water Availability (MCM)	2.78
Additional GW resources available after Supply side interventions (MCM)	0.00
Ground Water Availability after Supply side intervention (MCM)	2.78
Existing Ground Water Draft for All Uses (MCM)	0.66
GW draft after Demand Side Interventions (MCM)	0.00
Present stage of Ground Water Development (%)	23.58
Expected Stage of Ground Water Development after interventions (%)	23.58
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
5.4. Development Plan	
Volume of water available for GWD after stage of GWD brought to 50% (MCM)	0.18
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	11
Proposed Number of BW (@ 1.0 ham for 10% of GWR Available)	2
Area (ha) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 70% stage of gwd is achieved	27.41

Soil map



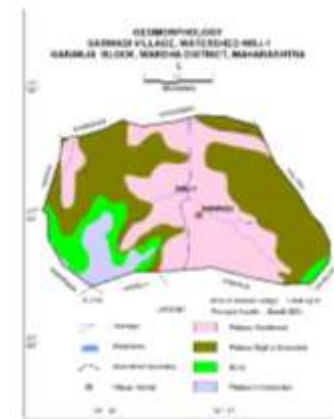
Landuse map



In the village major area consisting mostly of very Extremely Shallow, loamy, clayey observed in south, west and south-east parts. A small area in very shallow, loamy, clayey observed in north-eastern side.

In the village major cultivable land is under Kharif cropping pattern.

Geomorphology & Drainage map



Hydro-geology map



Major part of the village shows Plateau weathered in the centre of the part, Plateau slightly Dissected observed in along west and east, Plateau Un dissected observed in fringe of South-west. Butte observed in the south-west parts and end of south-east part.

Entire village is covered by Deccan trap Basalt.

Panchayat Level Aquifer Management Plan
Village –Sarawadi, Karanja Taluka, Wardha District

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
Aquifer I (Basalt-Weathered and fractures)	520 ha cultivable land by GW, 3 lbs, 04 DW(d), 186 DW (i), Pre monsoon DTWL ~ 6.5-12.2 m bgl. Post monsoon DTWL ~ 3.5-8 m bgl.	DT Basalt (Ajantaha/ Chikhli/ Karanja formations)	Plateau (weathered, slightly dissected, Undissected) and Butte.	Good; All parameters are within MPL.	Dug well	Depth Range of Zones: 5– 15 m	3 to 5	1 to 3	< 10 – 100 m ³ /day Or 0.7 ham/year	Construction of 11 nos dug wells and 02 nos bore wells. Desilting of existing water conservation and artificial recharge structures. The GW should be used for irrigation purpose.
Aquifer II (Basalt-Jointed & Fractures)	13 BW(i), 16 BW (d), HP-Nil DTWL ~ 15-35 m bgl.	As above	--	-	Bore well	Depth :60 m	3 to 5	1 to 3	0.14-2.16 lps	1. The GW should be used for drinking purpose. BW should not be drilled down below the red bole.

Note: DW (d) = Dug well Domestic; DW (i) = Dug Well Irrigation; BW (d) = Bore Well Domestic; BW (i) = Bore Well Irrigation

10.5 VILLAGE DEOLI, DEOLI BLOCK, WARDHA DISTRICT

1. SALIENT FEATURES	
1.1 Introduction	
Village Name	Deoli
Geographical Area (Sq. Km.)	26.30
Hilly Area (Sq. Km.)	Nil
Population (Current year -2020)	19288
Climate	Monsoon Sub-Tropical
Normal Rainfall(mm)	833
Average Rainfall (mm) 2010-19	935.2
1.2. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau weathered covering the major part of the village followed by Plateau slightly dissected
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene
Soil	Major parts of the area having deep fine calcareous soil followed by shallow fine loamy soil and very deep, fine calcareous soil.
1.3. Hydrology & Drainage	
Watershed	WRY-1 & WRY-2
Drainage	Godavari basin; dendritic to sub-dendritic drainage pattern. 1 st Order Stream – 18.24 km 2 nd Order Stream– 4.40 km 3 rd Order Stream–5.95 km
Irrigation Project (Major/Medium/Minor etc.)	Nil
WC structures (PT/KT/CD/FP etc.)	NIL
1.4. Land Use, Agriculture, Irrigation & Cropping Pattern	
Specifics	Area
Forest Area	Nil
Cultivable Area	1632 ha
Net Sown Area	1972.79 ha
Double Cropped Area	95.21 ha (Data collected from Talati)
Irrigation Dug wells	241
Irrigation Bore wells	192
Area under Drip & Sprinkler Irrigation	-

Area under Irrigation	Surface Water	0.17 (MCM)
	Ground Water	1.46 (MCM)
Principal Crops	Soyabean	684.45 ha
	Jawar	0
	Pulses (<i>Tur</i>)	287.21
	Groundnut	0
	Cotton	789.77 ha
	Wheat	55.35 ha
	Gram	60 ha
	Sugarcane	0.8
	Vegetables	95.21
	Orange and Pomegranate, Banana	0
	Others	0

1.5. Water Level Behaviour: Aquifer-I (Shallow Aquifer)

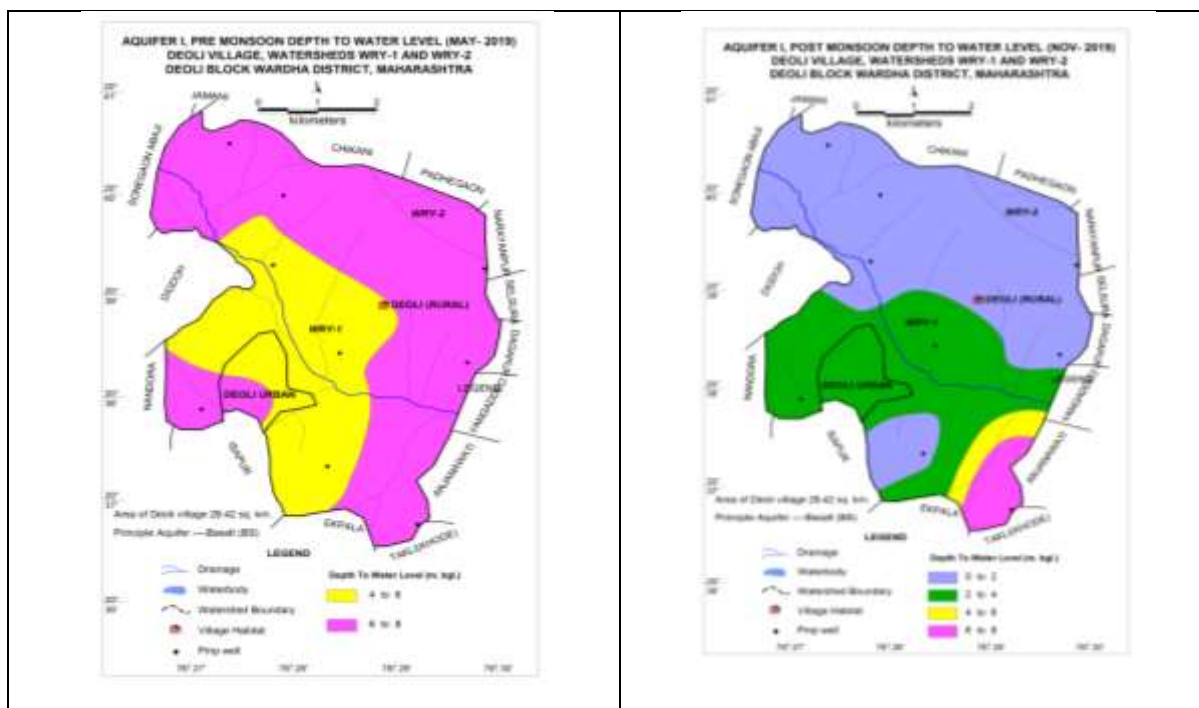
In the village, 9 KOW were established to decipher the water level scenario.

Pre-Monsoon (May-2019)

Water level between 4-6 m bgl is observed in the central and southern part of the village while water level between 6-8 m bgl is covered major part of the village. m bgl observed in central and

Post-Monsoon (November-2019)

Water level between 0-2 m bgl is observed in the northern and southern parts of the village. Water level ranges between 2-4 m bgl are covered south eastern, central and western part of the village while water level between 4-6 m bgl observed in the southern part as a small patch. Water level between 6-8 m bgl observed in the southern tip of the village as an isolated patch.



2. Ground Water Issues

10. Non-availability of surface water for irrigation.
11. Less ground water potential in basaltic aquifer.
12. Water stress situation during lean period (March to June).

3. AQUIFER DISPOSITION

3.1. Number of Aquifers

Basalt –Aquifer-I (Phreatic / Shallow aquifer)

3.2. Aquifer Characteristics

Major Aquifers

Basalt (Deccan Traps)

Type of Aquifer	Basalt –Aquifer-I (Phreatic / Shallow aquifer)
Static Water Level (mbgl)	2.5-12
Depth of Occurrence (mbgl)	10.00-20.00
weathered thickness (m)	0- 11.00
Yield	10 – 100 m ³ /day
Specific yield (Sy)	0.02 (norms)

4. GROUND WATER QUALITY: Phreatic Aquifer (Aquifer-I/ Shallow aquifer)

In the village of Deoli, 9 nosKow established Ec is ranges 550 to 1400. Three water samples collected for the chemical analysis and all chemical parameters are within the permissible limit.

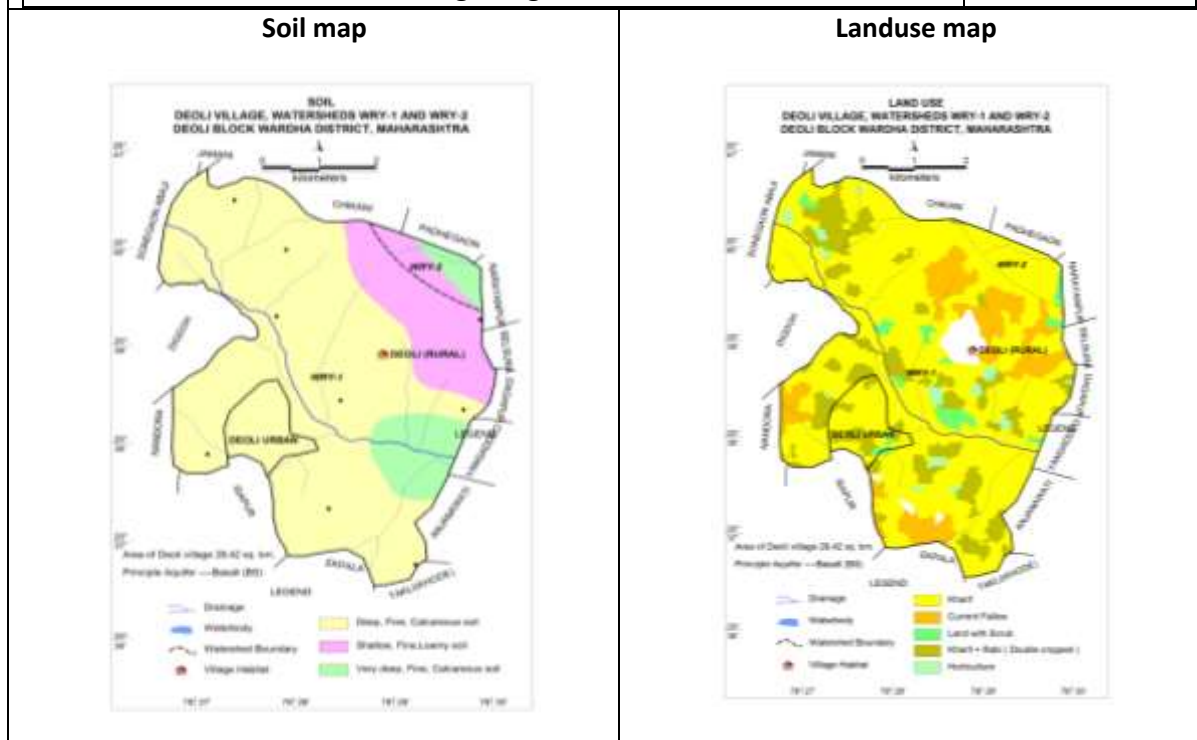
5.0. GROUND WATER RESOURCE MANAGEMENT

5.1. Supply Side Management

SUPPLY (MCM)

Available Resource (MCM)	9.05
Agricultural Supply –GW	1.46
Agricultural Supply -SW	16.87
Domestic Supply - GW	0.43
Domestic Supply - SW	0.00
Non agriculture use (MCM)	0.20
Total GW availability (MCM)	6.96
Gross Annual Draft (MCM)	1.46
Area of village (Sq. Km.)	26.30
Area suitable for Artificial recharge (sq km)	26.30
Type of Aquifer	Hard rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	7.38
Volume of Unsaturated Zone (MCM)	15.498
Average Specific Yield	0.02
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	0.00000030996
Surplus runoff considered for planning (MCM) @ 100%	0.02
Proposed AR Structures (Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM))	Not proposed
Proposed AR Structures Gabbion	Not proposed
Proposed AR Structures Other	Not proposed
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	Total of above
Specific Recommendations - As per State Govt. Resolution, segment wise nala/stream desilting, deepening and widening upto 3 m depth or upto weathered rock considering the local hydrogeological condition without disturbing the ecology/aquifer/environmental flow of nala/stream.	
Considering average nala deepening of 1 m depth, additional storage	0.00
Considering average nala deepening of 1 m depth, additional recharge @ 75%	0.00
RTRWH Structures	
Households to be covered (Pakka House only)	2240
Total RWH potential (MCM) (25% with 50 m2 area)	0.0004718
Rainwater harvested / recharged @ 80% runoff co-efficient (MCM)	0.0003774
However, RTRWH is economically not viable & not Recommended	
6.2. Demand Side Management	
Micro irrigation techniques	

Area is proposed to be covered under Drip	Not proposed
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.36 m. Drip Req. - 0.24, WUE- 0.12 m	
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	
6.3. Expected Benefits	
Net Ground Water Availability (MCM)	9.05
Additional GW resources available after Supply side interventions (MCM)	0.00
Ground Water Availability after Supply side intervention (MCM)	9.05
Existing Ground Water Draft for All Uses (MCM)	2.09
GW draft after Demand Side Interventions (MCM)	0.00
Present stage of Ground Water Development (%)	23.13
Expected Stage of Ground Water Development after interventions (%)	23.13
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD after stage of GWD brought to 35% (MCM)	1.07
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	64
Proposed Number of BW (@ 1.0 ham for 10% of GWR Available)	11
Area (ha) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 70% stage of gwd is achieved	165.33



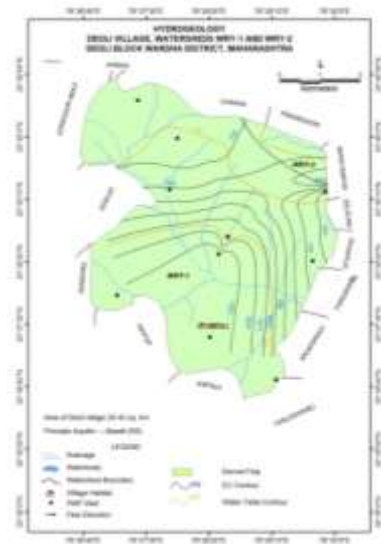
In the village major area consisting mostly of deep, Fine, calcareous soil. Shallow fine, loamy soil found in the north eastern part of the village while very deep, fine, calcareous soil observed in the north eastern and south eastern parts of the block.

In the village major cultivable land is under Kharif cropping pattern

Geomorphology & Drainage map



Hydro-geology map



Major part of the village shows Plateau weathered followed by Plateau slightly dissected observed as small patches in the eastern and southern part of the village and very small patches observed in the northern and western part of the village.

Entire village is covered by Deccan trap Basalt.

Panchayat Level Aquifer Management Plan

Village –Deoli, Deoli Taluka, Wardha District

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
Aquifer I (Basalt-Weathered and fractures)	1632 ha cultivable land by GW, 2 DW(d), 241 DW (i), Pre monsoon DTWL ~ 9.14-13.26 m bgl. Post monsoon DTWL ~ 2.6-11.48 m bgl.	DT Basalt (Ajantaha/ Chikhli/ Karanja formations)	Plateau, weathered, Plateau slightly dissected.	Good; All parameters are within MPL.	Dug well	Depth Range of Zones: 9-17 m	3 to 5	1 to 3	< 10 – 120 m ³ /day Or 0.7 ham/year	Construction of 64 nos dug wells and 11nos bore wells. Desilting of existing water conservation and artificial recharge structures. The GW should be used for irrigation purpose.
Aquifer II (Basalt-Jointed & Fractures)	192 BW(i), 176 BW (d), HP- Nil DTWL ~ 15-35 m bgl.	As above	--	-	Bore well	Depth :upto 150 m	3 to 5	1 to 3	0.14-2.16 lps	1.The GW should be used for drinking purpose. 2. BW should not be drilled down below the red bole.

Note: DW (d) = Dug well Domestic; DW (i) = Dug Well Irrigation; BW (d) = Bore Well Domestic; BW (i) = Bore Well Irrigation

10.6 VILLAGE JAMNI, HINGANGHAT BLOCK, WARDHA DISTRICT

1. SALIENT FEATURES	
1.1 Introduction	
Village Name	Jamni
Geographical Area (Sq. Km.)	4.53
Hilly Area (Sq. Km.)	Nil
Population (Current year -2020)	1065
Climate	Monsoon Sub-Tropical
Normal Rainfall(mm)	1006.4
Average Rainfall (mm) 2010-19	966.13
1.2. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau slightly dissected covering major part of the village followed by plateau weathered.
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene
Soil	Deep fine calcareous soil covering major part of the village followed by very shallow, loamy, clayey soil.
1.3. Hydrology & Drainage	
Watershed	WRW-2
Drainage	Godavari basin;dendritic to sub-dendritic drainage pattern. 1 st Order Stream – 1.62 km 2 nd Order Stream– 1.53 km 3 rd Order Stream–0.36 km
Irrigation Project (Major/Medium/Minor etc.)	Nil
WC structures (PT/KT/CD/FP etc.)	PT-6, CD-7
1.4. Land Use, Agriculture, Irrigation & Cropping Pattern	
Specifics	Area

Forest Area		Nil
Cultivable Area		411.27 ha
Net Sown Area		481.77 ha
Double Cropped Area		8.11 ha (from land use map)
Irrigation Dug wells		52
Irrigation Bore wells		NIL
Area under Drip & Sprinkler Irrigation		-
Area under Irrigation	Surface Water	0.042 (MCM)
	Ground Water	0.36 (MCM)
Principal Crops	Soyabean	58.14 ha
	Jawar	0
	Pulses (<i>Tur</i>)	70.9
	Groundnut	0
	Cotton	282.23 ha
	Wheat	13.90 ha
	Gram	55.6 ha
	Sugarcane	0
	Vegetables	1
	Orange and Pomegranate, Banana	0
	Others	0

1.5. Water Level Behavior: Aquifer-I (Shallow Aquifer)

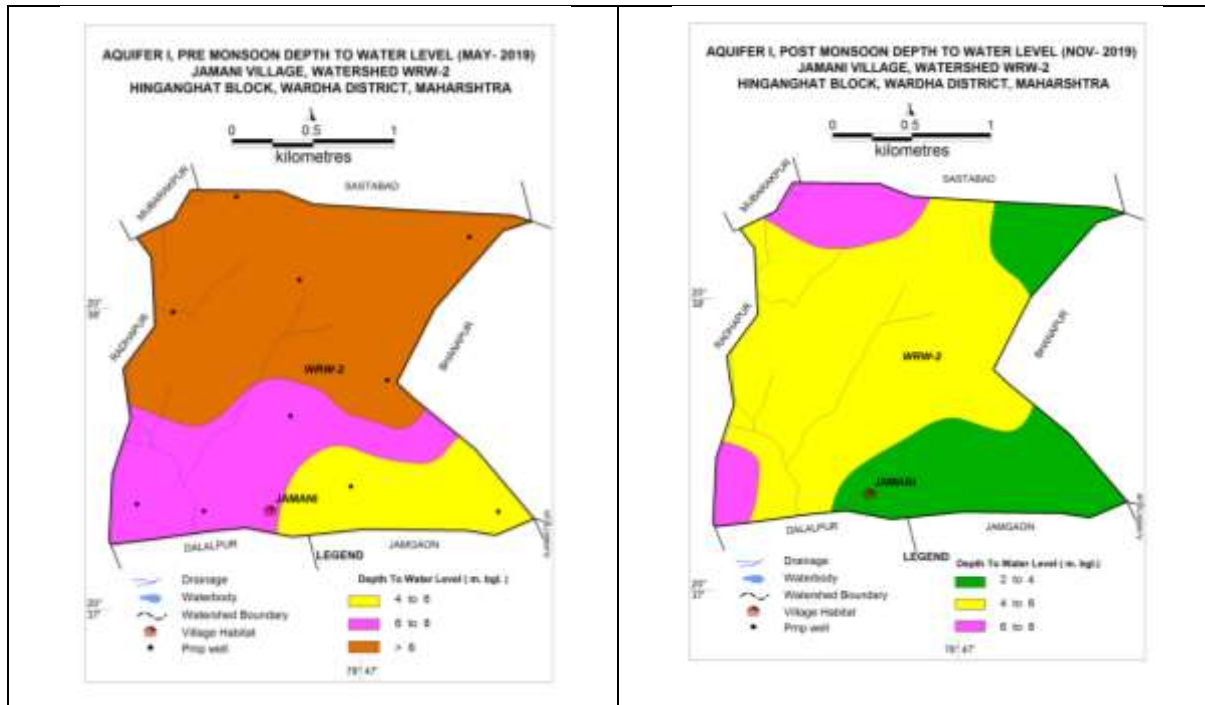
In the village, 10 KOW were established to decipher the water level scenario.

Pre-Monsoon (May-2019)

Water level ranges between 4-6 m bgl observed in the southern and south eastern parts of the village while water level ranges between 6-8 m bgl observed in the southern, south western and south eastern parts of the village. Water level >8 m bgl covering major parts of the village.

Post-Monsoon (November-2019)

Water level ranges between 2-4 m bgl observed in the southern and north eastern parts of the village while water level ranges between 4-6 m bgl observed in the major parts of the village. Water level ranges between 6-8 m bgl observed in the northern and south western parts of the village.



2. Ground Water Issues

- 13. Non-availability of surface water for irrigation.
- 14. Less ground water potential in basaltic aquifer.
- 15. Water stress situation during lean period (March to June).

3. AQUIFER DISPOSITION

3.1. Number of Aquifers

Basalt –Aquifer-I (Phreatic / Shallow aquifer)

3.2. Aquifer Characteristics

Major Aquifers

Basalt (Deccan Traps)

Type of Aquifer	Basalt –Aquifer-I (Phreatic / Shallow aquifer)
Static Water Level (mbgl)	5-13
Depth of Occurrence (mbgl)	7-20
weathered thickness (m)	0- 10
Yield	10 – 100 m ³ /day
Specific yield (Sy)	0.02 (norms)

4. GROUND WATER QUALITY: Phreatic Aquifer (Aquifer-I/ Shallow aquifer)

In the village of Hingni, 10 nos Kow established Ec is ranges 618 to 1526. Three water samples collected for the chemical analysis. Chemical parameters are within the permissible limit.

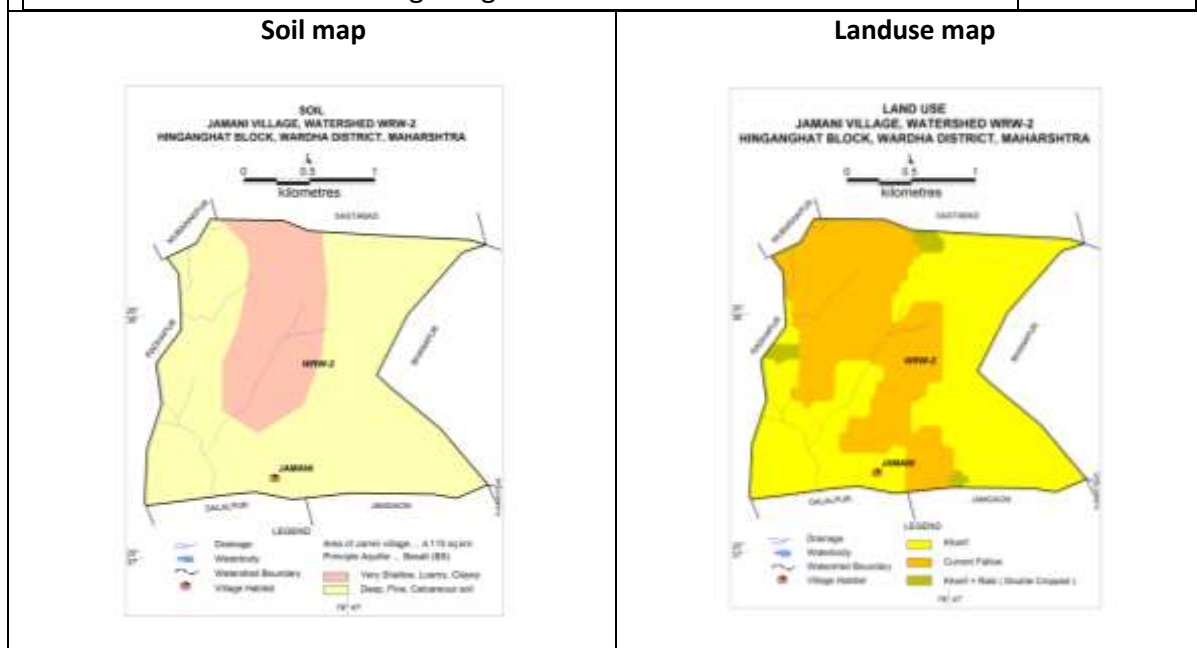
5.0. GROUND WATER RESOURCE MANAGEMENT

5.1. Supply Side Management

SUPPLY (MCM)

Available Resource (MCM)	1.51
Agricultural Supply –GW	0.36
Agricultural Supply -SW	4.24
Domestic Supply - GW	0.03
Domestic Supply - SW	0.00
Non agriculture use (MCM)	0.03
Total GW availability (MCM)	1.08
Gross Annual Draft (MCM)	0.36
Area of village (Sq. Km.)	4.53
Area suitable for Artificial recharge (sq km)	4.53
Type of Aquifer	Hard rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	3.52
Volume of Unsaturated Zone (MCM)	7.392
Average Specific Yield	0.02
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	0.148
Surplus runoff considered for planning (MCM) @ 100%	0.02
Proposed AR Structures (Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM))	Not proposed
Proposed AR Structures Gabbion	Not proposed
Proposed AR Structures Other	Not proposed
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	Total of above
Specific Recommendations - As per State Govt. Resolution, segment wise nala/stream desilting, deepening and widening upto 3 m depth or upto weathered rock considering the local hydrogeological condition without disturbing the ecology/aquifer/environmental flow of nala/stream.	
Considering average nala deepening of 1 m depth, additional storage	0.00
Considering average nala deepening of 1 m depth, additional recharge @ 75%	0.00
RTRWH Structures	
Households to be covered (Pakka House only)	232
Total RWH potential (MCM) (25% with 50 m2 area)	0.0000470
Rainwater harvested / recharged @ 80% runoff co-efficient (MCM)	0.0000376
However, RTRWH is economically not viable & not Recommended	
6.2. Demand Side Management	
Micro irrigation techniques	

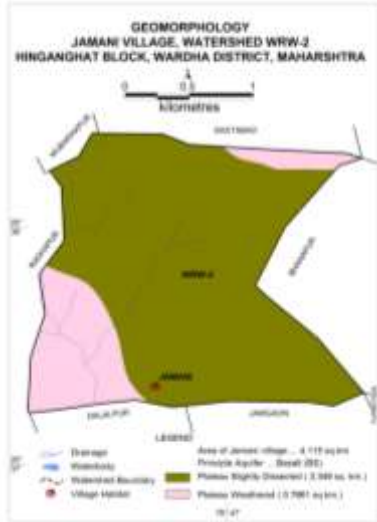
Area is proposed to be covered under Drip	Not proposed
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.36 m. Drip Req. - 0.24, WUE- 0.12 m	
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	
6.3. Expected Benefits	
Net Ground Water Availability (MCM)	1.51
Additional GW resources available after Supply side interventions (MCM)	0.00
Ground Water Availability after Supply side intervention(MCM)	1.51
Existing Ground Water Draft for All Uses (MCM)	0.43
GW draft after Demand Side Interventions (MCM)	0.00
Present stage of Ground Water Development (%)	28.28
Expected Stage of Ground Water Development after interventions (%)	28.28
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD after stage of GWD brought to 35% (MCM)	0.10
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	6
Proposed Number of BW (@ 1.0 ham for 10% of GWR Available)	1
Area (ha) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 70% stage of gwd is achieved	15.61



In the village major area consisting mostly of deep, Fine, calcareous soil followed by very shallow, loamy clayey soil.

In the village major cultivable land is under Kharif cropping pattern

Geomorphology & Drainage map



Hydro-geology map



Major part of the village shows Plateau slightly dissected followed by Plateau weathered which is observed in the northern and south western parts of the village.

Entire village is covered by Deccan trap Basalt.

Panchayat Level Aquifer Management Plan

Village –Jamni, Hinganghat Taluka, Wardha District

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
Aquifer I (Basalt-Weathered and fractures)	411.27 ha cultivable land by GW, 7 CD, 6 PT, 3 DW(d), 52 DW(i), Pre monsoon DTWL ~ 5.0 - 13 m bgl. Post monsoon DTWL ~ 2.27- 7.96 m bgl.	DT Basalt (Ajantaha/ Chikhli/ Karanja formations)	Plateau slightly dissected, Plateau weathered	Good; All parameters are within MPL.	Dug well	Depth Range of Zones: 6– 15 m	3 to 5	1 to 3	< 10 – 120 m ³ /day Or 0.7 ham/year	Construction of 6 nos dug wells and 1 no bore well. Desilting of existing water conservation and artificial recharge structures. The GW should be used for irrigation purpose.
Aquifer II (Basalt-Jointed & Fractures)	BW(i)- Nil 8 BW (d), HP- Nil DTWL ~ 15- 35 m bgl.	As above	--	-	Bore well	Depth : upto 160 m	3 to 5	1 to 3	0.5- 2.5 lps	1. The GW should be used for drinking purpose. 2. BW should not be drilled down below

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
										the red bole.

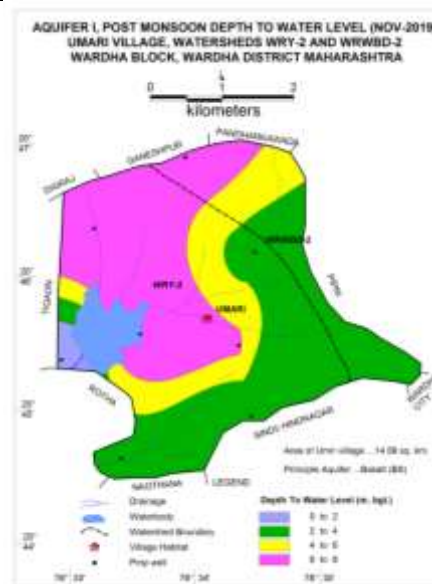
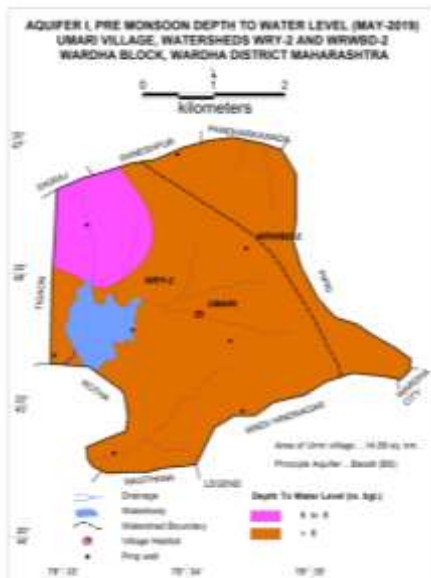
Note: DW (d) = Dug well Domestic; DW (i) = Dug Well Irrigation; BW (d) = Bore Well Domestic; BW (i) = Bore Well Irrigation

10.7 VILLAGE UMRI, WARDHA BLOCK, WARDHA DISTRICT

1. SALIENT FEATURES	
1.1 Introduction	
Village Name	Umri
Geographical Area (Sq. Km.)	14.46
Hilly Area (Sq. Km.)	Nil
Population (Current year -2020)	3469
Climate	Monsoon Sub-Tropical
Normal Rainfall(mm)	894.6
Average Rainfall (mm) 2010-19	901.51
1.2. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau slightly dissected covering major part of the village followed by Plateau Undissected, Plateau weathered and Butte
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene
Soil	Deep fine calcareous soil covering major part of the village followed by very shallow, loamy, clayey soil and very deep, fine calcareous soil which is observed as very small patches in the southern tip of the village.
1.3. Hydrology & Drainage	

Watershed	WRY-2, WRWBD-2	
Drainage	Godavari basin;dendritic to sub-dendritic drainage pattern. 1 st Order Stream – 10.14 km 2 nd Order Stream– 3 km	
Irrigation Project (Major/Medium/Minor etc.)	Nil	
WC structures (PT/KT/CD/FP etc.)	PT-1,CD-6, LBS-8, Village farm-1	
1.4. Land Use, Agriculture, Irrigation & Cropping Pattern		
	Specifics	Area
Forest Area		Nil
Cultivable Area		674 ha
Net Sown Area		811.2 ha
Double Cropped Area		15.80 (Data collected from Talati)
Irrigation Dug wells		54
Irrigation Bore wells		NIL
Area under Drip & Sprinkler Irrigation		-
Area under Irrigation	Surface Water	0.03 (MCM)
	Ground Water	0.60 (MCM)
Principal Crops	Soyabean	115 ha
	Jawar	3
	Pulses (<i>Tur</i>)	117
	Groundnut	0
	Cotton	531 ha
	Wheat	11 ha
	Gram	7
	Sugarcane	0
	Vegetables	15.80
	Orange and Pomegranate, Banana	2.40
	Others	0
1.5. Water Level Behaviour: Aquifer-I (Shallow Aquifer)		
In the village, 8 KOW were established to decipher the water level scenario.		

<p>Pre-Monsoon (May-2019) Water level ranges between 6-8 m bgl observed in the north western part of the village while water level > 8 m bgl observed in the major parts of the village.</p>	<p>Post-Monsoon (November-2019) Water level ranges between 0-2 m bgl observed in the western part of the village while water level ranges between 2-4 m bgl observed in the southern and south eastern parts of the village. Water level ranges between 4-6 m bgl observed in the north eastern, central and western parts of the village .Water level ranges between 6-8 mbgl observed in the major parts of the village.</p>
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2. Ground Water Issues

- 16. Non-availability of surface water for irrigation.
- 17. Less ground water potential in basaltic aquifer.
- 18. Water stress situation during lean period (March to June).

3. AQUIFER DISPOSITION

3.1. Number of Aquifers Basalt –Aquifer-I (Phreatic / Shallow aquifer)

3.2. Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)
Type of Aquifer	Basalt –Aquifer-I (Phreatic / Shallow aquifer)
Static Water Level (mbgl)	6-13
Depth of Occurrence (mbgl)	7-20
weathered thickness (m)	0- 10
Yield	10 – 100 m ³ /day
Specific yield (Sy)	0.02 (norms)

4. GROUND WATER QUALITY: Phreatic Aquifer (Aquifer-I/ Shallow aquifer)

In the village of Hingni, 8 nosKow established Ec is ranges 580 to 1280. Three water samples collected for the chemical analysis. Chemical parameters are within the permissible limit.

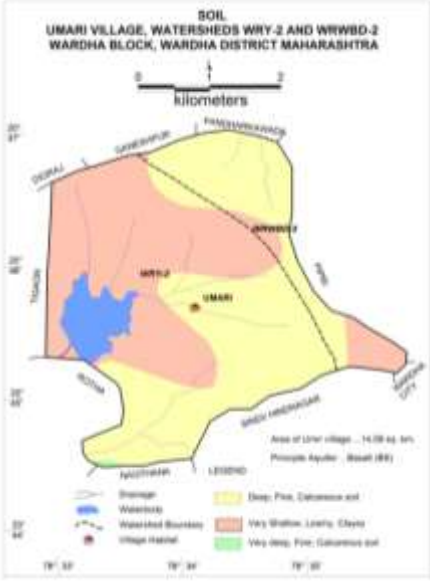
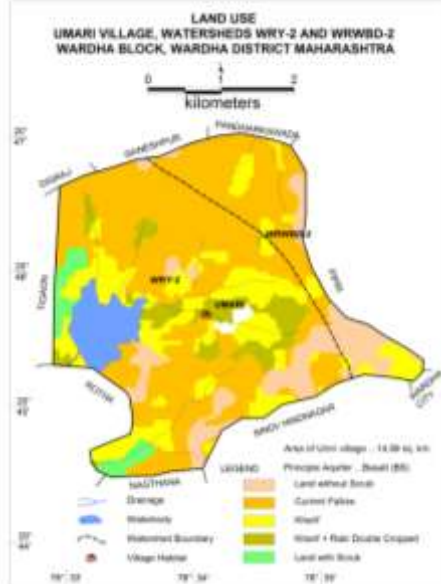
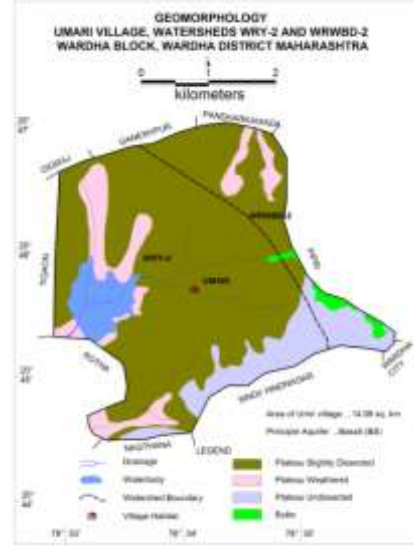
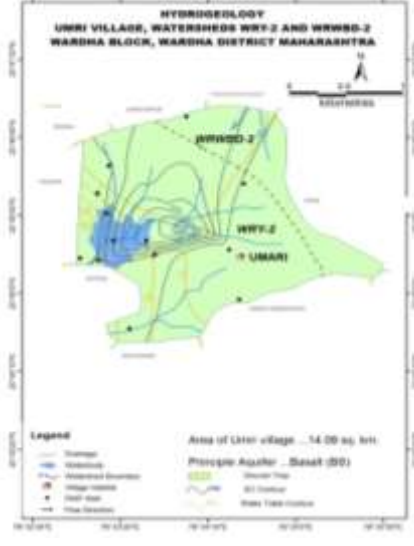
5.0. GROUND WATER RESOURCE MANAGEMENT

5.1. Supply Side Management

SUPPLY (MCM)

Available Resource (MCM)	4.63
Agricultural Supply –GW	0.60
Agricultural Supply -SW	3.35
Domestic Supply - GW	0.09
Domestic Supply - SW	0.00
Non agriculture use (MCM)	0.10
Total GW availability (MCM)	3.84
Gross Annual Draft (MCM)	0.60
Area of village (Sq. Km.)	14.46
Area suitable for Artificial recharge (sq km)	14.46
Type of Aquifer	Hard rock
Area feasible for Artificial Recharge (WL >3mbgl) (Sq. Km.)	10.78
Volume of Unsaturated Zone (MCM)	22.64
Average Specific Yield	0.02
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	0.45
Surplus runoff considered for planning (MCM) @ 100%	0.02
Proposed AR Structures (Check Dam (@ Rs.30 lakh, Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM))	No proposed
Proposed AR Structures Gabbion	No proposed
Proposed AR Structures Other	No proposed
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	Total of above
Specific Recommendations - As per State Govt. Resolution, segment wise nala/stream desilting, deepening and widening upto 3 m depth or upto weathered rock considering the local hydrogeological condition without disturbing the ecology/aquifer/environmental flow of nala/stream.	
Considering average nala deepening of 1 m depth, additional storage	0.00
Considering average nala deepening of 1 m depth, additional recharge @ 75%	0.00

RTRWH Structures		
Households to be covered (Pakka House only)		864
Total RWH potential (MCM) (25% with 50 m ² area)		0.0001706
Rainwater harvested / recharged @ 80% runoff co-efficient (MCM)		0.0001365
However, RTRWH is economically not viable & not Recommended		
6.2. Demand Side Management		
Micro irrigation techniques		
Area is proposed to be covered under Drip		Not proposed
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.36 m. Drip Req. - 0.24, WUE- 0.12 m		
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop(ha)		Not proposed
Water Saving by Change in Cropping Pattern		
6.3. Expected Benefits		
Net Ground Water Availability (MCM)		4.63
Additional GW resources available after Supply side interventions (MCM)		0.00
Ground Water Availability after Supply side intervention(MCM)		4.63
Existing Ground Water Draft for All Uses (MCM)		0.79
GW draft after Demand Side Interventions (MCM)		0.00
Present stage of Ground Water Development (%)		17.12
Expected Stage of Ground Water Development after interventions (%)		17.12
Other Interventions Proposed, if any		
Alternate Water Sources Available		Nil
6.4. Development Plan		
Volume of water available for GWD after stage of GWD brought to 35% (MCM)		0.83
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)		50
Proposed Number of BW (@ 1.0 ham for 10% of GWR Available)		8
Area (ha) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 70% stage of gwd is achieved		127.41

<p style="text-align: center;">Soil map</p> 	<p style="text-align: center;">Land use map</p> 
<p>In the village major area consisting mostly of deep, Fine, calcareous soil followed by very shallow, loamy clayey soil and very deep, fine, calcareous soil observed in the southern tip of the village.</p>	<p>In the village major cultivable land is under current Fallow.</p>
<p style="text-align: center;">Geomorphology & Drainage map</p> 	<p style="text-align: center;">Hydro-geology map</p> 
<p>Plateau slightly dissected covering major part of the village followed by Plateau Undissected, Plateau weathered and Butte</p>	<p>Entire village is covered by Deccan trap Basalt.</p>

Panchayat Level Aquifer Management Plan

Village –Umri, Wardha Taluka, Wardha District

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
Aquifer I (Basalt-Weathered and fractures)	674 ha cultivable land by GW, 8 lbs, 6 CD, 1 PT, 1 DW(d), 54 DW (i), Pre monsoon DTWL ~ 6.32-12.91 m bgl. Post monsoon DTWL ~ 0.5-9.0 m bgl.	DT Basalt (Ajantaha/ Chikhli/ Karanja formations)	Plateau slightly dissected, Plateau undissected, Plateau weathered and Butte	Good; All parameters are within MPL.	Dug well	Depth Range of Zones: 6– 16 m	3 to 5	1 to 3	< 10 – 100 m ³ /day Or 0.7 ham/year	Construction of 50nos dug wells and 8nos bore wells. Desilting of existing water conservation and artificial recharge structures. The GW should be used for irrigation purpose.
Aquifer II (Basalt-Jointed & Fractures)	BW(i)-Nil, 30 BW (d), HP-Nil DTWL ~ 15-35 m bgl.	As above	--	-	Bore well	Depth :upto 150 m	3 to 5	1 to 3	0.14-2.20lps	1.The GW should be used for drinking purpose. 2.BW should not be drilled down

Aquifer (Prominent Lithology)	Current Scenario	Geology / Basalt flow	Geomorphology	GW quality	* Recommendations for Aquifer Development					Aquifer Management Plan
					Type	Zones/Depth to be tapped	HP of pump to be lowered	Pumping Hours	Yield (Cu. m / Day)	
										below the red bole.

Note: DW (d) = Dug well Domestic; DW (i) = Dug Well Irrigation.

BW (d) = Bore Well Domestic; BW (i) = Bore Well Irrigation

11. ANNEXURES

ANNEXURES

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Annexure-I: Salient Features of Ground Water Exploration

Sl. No.	Taluka	Village	X Longitude	Y Latitude	Altitude (m AMSL)	Year	Type	Aquifer	Drilling Depth (m)	Constr Depth (m)	Casing (m)	AQ_Zones (m)	SWL (m)	PYT Disch (lps).	PYT DD (m)	Aquifer I	Aquifer II	Aquifer Thickness	APT_SWL	APT Discharge	APT_DD (m)	T
1	Karanja	Savali	78.5236	21.1333	499.1	1992	EW	FB	195.2	-	6.5	-	4.9	1.05	-		165	5	-	-	-	-
2	Ashti	Dhari	78.2239	21.2733	358.3	2012	EW	JMB	200	-	11.7	-	4.4	Traces			166	6	-	-	-	-
3	Ashti	Durgawada	78.225	21.325	349	1992	EW	-	143.3	24.3	-	-	-	-				-	-	-	-	
4	Ashti	Sahur	78.215	21.3067	354	1995	PZ	FB	30	-	13.4	7.35 -19.55	8.44	4.43	-			-	-	-	-	
5	Ashti	Sahur	78.215	21.3067	354		EW	-	-	-	-	-	-	-				-	-	-	-	
6	Ashti	Ashti	78.1833	21.2	330	2011	Pz	-	40	5	-	-	6.6	2.16				-	-	-	-	
7	Ashti	Talegaon	78.2	21.1	319	2011	Pz	-	40	11.8	-	-	8.7	Traces				-	-	-	-	
8	Ashti	Choti Arvi	78.1333	21.2167	322.9	1992	EW	FB	180	-	13.5	-	25.5	1.73	-		166	5	-	-	-	-
9	Arvi	Wardhamaneri	78.2222	21.0667	313.5	1992	EW	FB	136.7	-	12.5	25-27.40, 54-57, 73.20-76.20, 89-91.50	30.2	16.88	10.37		135	5	26.05	7.12	10.37	38.85
10	Arvi	Wardhamaneri	78.2222	21.0667	313.5	1992	OW	FB	99	-	15.5		9.1	2.16	10.55		93	3	-	-	-	-
11	Ashti	Manikwada	78.2736	21.2764	399.4	2013	OW	FB	143.8	-	5	140-143	31.83	4.43			143	3	-	-	-	8.97
12	Ashti	Manikwada	78.2672	21.2764	401.7	2013	EW	FB	143.8	-	2.5	140-143	29.6	4.43	21.25		143	3	-	-	-	-
13	Karanja	Karanja	78.4069	21.1667	439.7	1992	EW	FB	201.3	-	3	16.3 - ,48.1 -	24.09	9.84	33.43			16	5.4	34	43	
14	Karanja	Karanja	78.4069	21.1667	439.7	1992	OW	FB	201.3	-	6	30 - ,153 -	16.5	7.76	1.2		156	3	-	-	-	-
15	Karanja	Junapani	78.3689	21.1181	456.5	2011	Pz		40	2.4			21.9	0.14	-			-	-	-	-	
16	Karanja	Palora	78.3	21.15	447	1992	EW	FB	201.3	-	3.5		8.8	-	-		165	5	-	-	-	-
17	Karanja	Thanegaon	78.4725	21.1575	476	1995	PZ		30	-	10.8		4.75	-	-			-	-	-	-	
18	Arvi	Arvi	78.2333	20.9997	305.1	2011	Pz	-	40	5.4			9.2	Traces				-	-	-	-	

Sl. No.	Taluka	Village	X Longitude	Y Latitude	Altitude (m AMSL)	Year	Type	Aquifer	Drilling Depth (m)	Constr Depth (m)	Casing (m)	AQ_Zones (m)	SWL (m)	PYT Disch (lps).	PYT DD (m)	Aquifer I	Aquifer II	Aquifer Thickness	APT_SWL	APT Discharge	APT_DD (m)	T
19	Deoli	Adegaon	78.5292	20.5833	262.8	1978	EW	VB	60.55	60.55	4.3	1.25 -6.85 ,9.93 -13 ,45.95 -52.8 ,20.09 - 23.59	6.83	0.6	5.88		45	7	6.83	0.6	5.88	8.26
20	Hinganghat	Alipur	78.6972	20.5458	236	1975	EW	WB	49.2	49.2	-	5.15 -15.31 ,23.57 -26	5.59	4.76	16.78				5.59	4.76	16.78	149.3
21	Hinganghat	Alipur	78.6972	20.5458	236	1975	OW	WB	48.1	48.1	48.1	5.2 -17.58 ,24.32 - 27.07	-	-	-				-	-	-	-
22	Wardha	Bhivapur	78.6417	20.6111	235.6	1979	EW	VB	65.57	65.57	65.57	7.83 -12.98 ,30.09 -33.5	2.87	1.25	4.31		60	3	2.87	1.25	4.31	53.1
23	Wardha	Dhotra	78.5236	20.7208	259.6	1979	EW	JB	65.95	65.95	5.15	29.5 -35	2.6	8.16	5.4		60	3	-	-	-	-
24	Deoli	Giroli	78.5986	20.5472	253.3	1975	EW	VB	78.87	78.87	4.5	20.59 - 29.05 ,42.51 - 45.05	4.14	-	-		42	3	-	-	-	-
25	Wardha	Karanje Bhoge	78.6917	20.7167	244.8	1978	EW	VB	75.42	75.42	75.42	9.75 -18.5 ,34.8 -37 ,67.71 - 70.71,50 - 52	2.66	5.01	10.09		65	5	2.66	5.01	10.09	50.23
26	Deoli	Pathari	78.6125	20.5542	241	1996	EW	-	200.15	-	26.55	74 -77 ,149 -152.75	-	-	-				-	-	-	-
27	Wardha	Selsur	78.5236	20.6833	244.7	1978	EW	VB	71.52	71.52	-	11.6 -15 ,27.6 -31 ,65 -69.9 ,46.5 -52.45	2.96	0.57	8.82		46	11	2.96	0.57	8.82	5.27
28	Wardha	Selu Khurd	78.6194	20.6708	258.4	1975	EW	VB	86.23	86.23	86.23	2.75 -8 ,38.5 -41.5 ,78.7 -80 ,61.6 -63.11	4.77	-	12.95		78	5	-	-	-	-

Sl. No.	Taluka	Village	X Longitude	Y Latitude	Altitude (m AMSL)	Year	Type	Aquifer	Drilling Depth (m)	Constr Depth (m)	Casing (m)	AQ_Zones (m)	SWL (m)	PYT Disch (lps).	PYT DD (m)	Aquifer I	Aquifer II	Aquifer Thickness	APT_SWL	APT Discharge	APT_DD (m)	T
29	Wardha	Sewagram	78.6639	20.7236	249.3	1978	EW	VB	83.25	83.25	-	5.68 -9.5,41.15 -45.4,78.5 -80.5,63.5 -68.38	2.65	6.29	9.22		78	11	2.65	6.2	9.22	237.6
30	Deoli	Sirasgaon	78.5681	20.6056	239.3	1975	EW	VB	60.2	60.2	7.62	7.63 -16.8,30.4 -32.55,58.35 -59.85,45.8 -47.8	8.44	-	3		46	3.5	-	-	-	-
31	Wardha	Sawangi (meghe)	78.585	20.7258	278.1	2011	Pz		40	5.4			4.9	traces					-	-	-	-
32	Wardha	Sonegaon R.S.	78.6931	20.6292	252.6	1979	EW	VB	73.29	73.29	73.29	18 -23.8,35 -36.25,62.1 -63.3,51.4 -53.4,67.75 -69.8	6.51	0.56	22.3		51	5.5	6.51	0.56	22.3	0.62
33	Wardha	Wardha	78.6167	20.745	285.9	1995	PZ	FB	30	-	7.85	-	-	-	-				-	-	-	-
34	Ralegaon	Adgaon	78.7164	20.2819	215.7	2011	Pz	-	40	5.4	-	-	17.8	Traces					-	-	-	-
35	Hinganghat	Sirasgaon Alipurroad	78.6792	20.4722	227.3	1979	EW	VB	56.47	56.47	10.3	8.26 -12.62,20.19 -25.54	1.29	12	5.7			1.29	12	5.7	260.38	
36	Kelapur	Sarul	78.6211	20.1356	298.1	2011	Pz	-	40	14	-	-	37	Traces	-				-	-	-	-
37	Kelapur	Sirasgaon	78.5464	20.0242	249.9	2011	Pz	-	40	11.8	-	-	6.9	0.78	-				-	-	-	-
38	Seloo	Dahegaon	78.8	20.7972	254.6	1991	EW	FB	158.6	-	10	-	1.87	1.73	-		145	5	-	-	-	-
39	Seloo	Sindi (Rly)	78.8856	20.8067	247.7	2011	Pz	-	40	5.9		-	8	Traces	-				-	-	-	-
40	Hinganghat	Bela	78.8361	20.6014	218.2	1991	EW	MB	158.5	-	6.5	-	11.5	1.37	2.19				-	-	-	-
41	Hinganghat	Bela	78.8361	20.6014	218.2	1991	OW	MB	110	-	6	-	11.5	1.37	2.19				-	-	-	-

Sl. No.	Taluka	Village	X Longitude	Y Latitude	Altitude (m AMSL)	Year	Type	Aquifer	Drilling Depth (m)	Constr Depth (m)	Casing (m)	AQ_Zones (m)	SWL (m)	PYT Disch (lps).	PYT DD (m)	Aquifer I	Aquifer II	Aquifer Thickness	APT_SWL	APT Discharge	APT_DD (m)	T
42	Samudrapur	Kandhali	78.925	20.7333	228.1	1991	EW	FB	195.2	-	18.5	-	8	-	8		159	5	-	-	-	-
43	Hinganghat	Nandgaon (Borgaon)	78.8189	20.5247	219.8	2011	Pz	-	40	5.4		-	5.1	0.38	-				-	-	-	-
44	Samudrapur	Nandori	78.9725	20.5172	244.4	2011	Pz	-	40	5.4		-	39	Traces	-				-	-	-	-
45	Samudrapur	Pipri	78.9278	20.7375	225.7	1991	EW	F Limestone	103.7	-	2.5	-	13.4	13.5	21.95		99	3	15.1	13.42	21.95	47.2
46	Samudrapur	Pipri	78.9278	20.7375	225.7	1991	OW	F Limestone	130.7	-	2	-	10.07	10.98	0.73		120	3	-	-	-	-
47	Arvi	Mandwa	78.4917	20.8333	276	1991	EW		201.3	-	12.5	-	10	1.37	-		158	5	-	-	-	-
48	Wardha	Vaiphad	78.4083	20.7597	294.6	1979	EW	VB	84.34	84.34	84.34	40.5 -45 ,65 -72	2.72	-	22.78		65	11.5	2.72	0.3	22.78	0.27
49	Arvi	Wadhona	78.3458	20.9972	380.1	1991	EW	-	201.3	-	6.5	-	-	-	-				-	-	-	-
50	Deoli	Agargaon	78.3903	20.6375	266.6	1979	EW	F Basalt	69.3	69.3	6.55	10.03 - 27.07 ,37.03 - 51.47	5.34	2.8	6.76				5.34	2.8	6.76	95.37
51	Deoli	Bhidi	78.4	20.5736	248.3	1978	EW	VB	66	66	66	4.5 -11 ,29 - 33.82	4.18	3.7	12.1		30	3	4.18	3.7	12.1	247.93
52	Wardha	Chikni	78.4667	20.7	259	1978	EW	VB	74.41	74.41	74.41	6.45 -13 ,49.68 -55	3.33	3.2	8.38		49	5	3.33	3.2	8.38	168.9
53	Deoli	Injhala	78.3333	20.6167	258	1996	EW	-	104.95	-	6.5	7.35 -10.35	10.84	-	-		90	3	-	-	-	-
54	Deoli	Injhapur	78.4611	20.6278	255.3	1975	EW	VB	58	58	58	8 -11.6 ,24 - 26	13.55	3.46	10.96				13.55	3.46	10.96	0

Sl. No.	Taluka	Village	X Longitude	Y Latitude	Altitude (m AMSL)	Year	Type	Aquifer	Drilling Depth (m)	Constr Depth (m)	Casing (m)	AQ_Zones (m)	SWL (m)	PYT Disch (lps).	PYT DD (m)	Aquifer I	Aquifer II	Aquifer Thickness	APT_SWL	APT Discharge	APT_DD (m)	T	
55	Deoli	Kaotha (Railway)	78.375	20.7333	282	1996	EW	-	147.65	-	2.5	6-6.5,34-36	1.05	1.05	-	34	3	-	-	-	-	-	
56	Deoli	Kavtha	78.3722	20.7306	284.7	1979	EW	JB	51.02	51.02	51.02	7.97-14.45,44.5-50.29	5.2	7.3	8.1		44	5	5.2	7.3	8.1	56.5	
57	Wardha	Sonegaon	78.4389	20.6792	258.4	1975	EW	VB	67.91	67.91	67.91	6.75-9.5,14.1-18.6,36.45-38.5,28.55-30.15,47-49,65-67.91	4.02	4.55	12.07		47	5	4.02	4.55	12.07	24	
58	Seloo	Jhadsa	78.6389	20.8611	268.8	1991	EW	FB	140.3	-	35.5	-	16	-	-		130	3	-	-	-	-	
59	Seloo	Jhadsa	78.6389	20.8611	268.8	1991	OW	FB	158.6	-	18.5	-	-	0.78	-				-	-	-	-	
60	Seloo	Selu	78.7019	20.8336	265.8	2011	Pz	-	40	7.4	-	-	11.7	traces	-				-	-	-	-	
61	Seloo	Sukli	78.7208	20.7917	252.2	1991	EW	FB	201.3	-	19	-	10.65	4.43	11.25		157	6	10.24	5.3	16.9	13	
62	Seloo	Sukli	78.7208	20.7917	252.2	1991	OW	FB	97.6	-	24.5	-	10.4	1.37	-								
63	Wardha	Tigaon (EW)	78.5264	20.7667	288	1978	EW	VB	78.87	78.87	78.87	7.6-10.63,35.2-39.28,73.89-77.89,64.43-67.91	-	-	-				3.9	4.97	13.2	8.72	
64	Wardha	Tigaon (OW)	78.5264	20.7883	294.9	1975	OW	VB	70	70	70	21-25,33.5-37.2,65.8-68,52.7-56	3.9	4.97	13.2								
65	Samudrapur	Kora	79.1028	20.5125	230.7	1991	EW	F Granite	112.8	-	17.5	-	5.92	8.6	14.73		105	3	5.92	8.6	14.73	98.6	

Sl. No.	Taluka	Village	X Longitude	Y Latitude	Altitude (m AMSL)	Year	Type	Aquifer	Drilling Depth (m)	Constr Depth (m)	Casing (m)	AQ_Zones (m)	SWL (m)	PYT Disch (lps).	PYT DD (m)	Aquifer I	Aquifer II	Aquifer Thickness	APT_SWL	APT Discharge	APT_DD (m)	T	
66	Samudrapur	Kora	79.1028	20.5125	230.7	1991	OW	F Granite	128.1	-	15		6.23	-	1.74								
67	Samudrapur	Lasanpur	79.0042	20.6208	245.1	1991	EW		195.2	-	1.5		-	-	-								
68	Selu	Hingni	78.709833	20.92464	285	2019	EW	FB	93	-	18	41-43,81-83	6.76				81	4					
69	Selu	Hingni	78.70975	20.92472	285	2019	OW	FB	86.9	-	18	41-44,83.80-86.90	7.42										
70	Arvi	Dahegaon (Gondi)	78.499444	20.929	304	2019	EW	FB	200		18	TRACES	55				155	3					
71	Karanja	Rahati	78.579167	21.09006	519	2019	EW	FB	200		18	TRACES	65				160	3					
72	Wardha	Taroda	78.803194	20.67225	246	2019	EW	FAB	185.5		18	71.70-74.70, 105.70-108.20, 120.40-123.50	49.6				120	9					270.18
73	Wardha	Taroda	78.803139	20.67258	248	2019	OW	DRY	129.6		18	DRY	DRY										183.92
74	Samudrapur	Dahegaon	78.937861	20.64375	240	2019	EW	SST	160.1		20	126.50-129.60, 157-160.10	9.29					6					
75	Samudrapur	Dahegaon	78.937917	20.64361	241	2019	OW	SST	160.1		20.2	105.20-108.20, 157-160.10	15.1										
76	Hinganghat	Daroda	78.770472	20.46506	223	2019	EW	FMB/SST	178.4		18	7-10, 65-68, 102-105, 173-176	7.6				173	9					
77	Hinganghat	Daroda	78.7707	20.46508	223	2019	OW	FMB	154		17.5	102-105	14.55										

Sl. No.	Taluka	Village	X Longitude	Y Latitude	Altitude (m AMSL)	Year	Type	Aquifer	Drilling Depth (m)	Constr Depth (m)	Casing (m)	AQ_Zones (m)	SWL (m)	PYT Disch (lps).	PYT DD (m)	Aquifer I	Aquifer II	Aquifer Thickness	APT_SWL	APT Discharge	APT_DD (m)	T
78	Arvi	Kachnur	78.46375	20.94494	310	2019	EW		32		18											16.32
79	Wardha	Talegaon	78.67547	20.60419	247	2019	EW	FMB	200		19.5	10-13, 86-89, 169-173	27				169	7				0.09

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

Sl. No	Taluka	Village	Y Lat	X Long	Elevation (m)	Depth (m)	Pre-monsoon WL (m)	Post-monsoon WL (m)	Fluctuation (m)	RL Pre-monsoon (m AMSL)
1	Samudrapur	Marda	20.75889	78.90772	232	9.63	4.8	6.5	-1.7	227.2
2	Samudrapur	Barbadi	20.76492	78.94550	240	13.7	5.5	3.22	2.28	234.5
3	Samudrapur	Umri	20.74425	78.99142	238	10	7.35	4.47	2.88	230.65
4	Samudrapur	Kawadapur	20.71511	79.07089	250	14.1	11.35	5.22	6.13	238.65
5	Samudrapur	Waigaon (gond)	20.71600	79.02564	247	7.3	4.3	6.17	-1.87	242.7
6	Samudrapur	Harankhuri	20.70844	78.96831	246	8.6	5.7	4.2	1.5	240.3
7	Samudrapur	Rampur	20.72622	78.96800	243	9	5.2	4.9	0.3	237.8
8	Wardha	Umri	20.75822	78.56956	290	13.72	12.9	9.73	3.17	277.1
9	Wardha	Pavnar	20.78919	78.67136	251	11.29	9.2	7.37	1.83	241.8
10	Wardha	Borgaon	20.71806	78.60097	260	10.5	10.1	6.46	3.64	249.9
11	Wardha	Belgaon	20.80922	78.50314	284	7.22	5.7	3	2.7	278.3
12	Wardha	Lonsawali	20.78036	78.43703	283	11.9	10.35	6	4.35	272.65
13	Deoli	Kavtha	20.73067	78.37214	285	16.5	12.35	3.26	9.09	272.65
14	Deoli	Pipri	20.66625	78.36722	294	18.7	18.3	16.17	2.13	275.7
15	Deoli	Ekamba	20.65864	78.33642	277	13	9.5	7.6	1.9	267.5
16	Wardha	Dhotra	20.71667	78.52514	258	8.13	7.9	6.72	1.18	250.1
17	Deoli	Dahegaon dhande	20.67622	78.29256	265	8.62	6.64	3.32	3.32	258.36
18	Deoli	Bopapur (dighi)	20.62631	78.52686	246	14.77	8.97	6.57	2.4	237.03
19	Deoli	Sendari	20.60647	78.27556	256	12.73	9.23	11.64	-2.41	246.77
20	Deoli	Tambha	20.57481	78.30019	259	10.75	7.97	3.97	4	251.03
21	Deoli	Malatpur	20.55303	78.34472	249	11	9.8	8.23	1.57	239.2
22	Deoli	Talni(khandera)	20.59708	78.37450	261	10.7	5.4	1.86	3.54	255.6
23	Deoli	Ratnapur	20.59583	78.43222	262	10.19	9.27	4.41	4.86	252.73
24	Deoli	Wakheda	20.57847	78.47125	250	9.2	5.6	5.85	-0.25	244.4
25	Deoli	Andori	20.53850	78.47181	277	12.7	9.65	8.81	0.84	267.35
26	Deoli	Anji	20.53314	78.52431		11.83	9.1	10.69	-1.59	-9.1
27	Wardha	Selukate	20.66903	78.61347	261	12.85	12.67	9	3.67	248.33
28	Wardha	Sirasgaon	20.64436	78.56864	265	19.75	12.31	8.79	3.52	252.69
29	Wardha	Dewangan	20.61606	78.59994	240	16.05	13.8	9.37	4.43	226.2
30	Deoli	Nibhsada	20.55350	78.62569	244	7.12	5.13	2.69	2.44	238.87
31	Deoli	Chinchala	20.56417	78.56297	251	10.48	8.5	9.75	-1.25	242.5
32	Hinganghat	Khangaon	20.48775	78.55189	245	12.5	12.3	6.69	5.61	232.7
33	Hinganghat	Katri	20.44353	78.62675	229	10.3	8.25	6.42	1.83	220.75
34	Hinganghat	Sirasgaon	20.47658	78.67986	228	11.11	10.2	6.12	4.08	217.8

Sl. No	Taluka	Village	Y Lat	X Long	Elevation (m)	Depth (m)	Pre-monsoon WL (m)	Post-monsoon WL (m)	Fluctuation (m)	RL Pre-monsoon (m AMSL)
35	Hinganghat	Chanki	20.50044	78.65722	231	8.37	4.75	3.41	1.34	226.25
36	Hinganghat	Arvi	20.50503	78.74192	237	9.12	7.4	4.12	3.28	229.6
37	Wardha	Ashta	20.65694	78.67206	355	19.55	9.64	8.2	1.44	345.36
38	Wardha	Talegaon	20.50953	78.67419	247	17.9	12.45	10.2	2.25	234.55
39	Hinganghat	Wela	20.57211	78.76711	230	13.8	7.7	9.37	-1.67	222.3
40	Hinganghat	Wagholi	20.58681	78.80433	219	10	6.2	3.17	3.03	212.8
41	Hinganghat	Kingaon	20.61719	78.83422	229	10.49	5.52	4.13	1.39	223.48
42	Hinganghat	Ajanti	20.57461	78.87328	227	4.72	3.82	6.97	-3.15	223.18
43	Samudrapur	Kinhala	20.55783	78.92692	255	19.7	16.6	11.17	5.43	238.4
44	Hinganghat	Sawli (wagh)	20.51333	78.92953	243	12.9	12.22	6.17	6.05	230.78
45	Hinganghat	Kumbhi	20.51222	78.85100	218	12.43	8.25	5.89	2.36	209.75
46	Hinganghat	Ghatsavli	20.49181	78.78153	233	7.77	7.28	4.3	2.98	225.72
47	Hinganghat	Wadner	20.43950	78.75136	236	14.24	11.95	8	3.95	224.05
48	Hinganghat	Bhopapur	20.37186	78.70308	226	18.05	17.45	7.8	9.65	208.55
49	Hinganghat	Pohana	20.34411	78.72619	219	10.45	6.8	8	-1.2	212.2
50	Hinganghat	Yearla	20.31589	78.72978	212	10.6	10.5	8.4	2.1	201.5
51	Hinganghat	Dhochi	20.31256	78.76464	219	11.45	8.25	7.35	0.9	210.75
52	Hinganghat	Khekdi	20.32639	78.81742	218	17.75	9.65	7.47	2.18	208.35
53	Hinganghat	Selu	20.35692	78.79847	1100	16.64	10.65	8.47	2.18	1089.35
54	Hinganghat	Tembha	20.42786	78.79225	203	13.5	13.63	7.42	6.21	189.37
55	Hinganghat	Bambarda	20.40581	78.77769	221	9.22	5.42	3.69	1.73	215.58
56	Hinganghat	Sawangi	20.40647	78.82414	212	8.25	3.12	1.1	2.02	208.88
57	Hinganghat	Ladki	20.42881	78.86717	213	13.3	9.6	8.45	1.15	203.4
58	Hinganghat	Dhamangaon	20.47283	78.88922	228	10.52	5.35	7.78	-2.43	222.65
59	Samudrapur	Pothara	20.44306	78.95367	220	5.6	3.45	1.45	2	216.55
60	Samudrapur	Govindpur	20.48289	78.97614	214	8.12	4.95	5.81	-0.86	209.05
61	Samudrapur	Karur	20.48503	79.05772	229	11	6	4.27	1.73	223
62	Samudrapur	Khapri	20.46386	79.12325	249	4.53	4.12	1	3.12	244.88
63	Samudrapur	Silli	20.52433	79.15875	248	5.62	4.15	4	0.15	243.85
64	Samudrapur	Dasoda	20.53186	79.16814	243	11.35	7.6	5.26	2.34	235.4
65	Samudrapur	Pimpalgaon	20.58256	79.08181	244	9	8.65	4.82	3.83	235.35
66	Samudrapur	Lonhar	20.56536	78.99644	248	15.55	13.4	8.22	5.18	234.6
67	Samudrapur	Arvi	20.63333	79.14156	268	8.43	6.2	5.95	0.25	261.8
68	Samudrapur	Girad	20.64817	79.12219	266	6.92	5.48	5.83	-0.35	260.52
69	Samudrapur	Bodkha	20.61439	79.01836	245	7.8	7.13	3	4.13	237.87
70	Samudrapur	Muradpur	20.62494	78.97133	247	10.25	7.2	3.14	4.06	239.8

Sl. No	Taluka	Village	Y Lat	X Long	Elevation (m)	Depth (m)	Pre-monsoon WL (m)	Post-monsoon WL (m)	Fluctuation (m)	RL Pre-monsoon (m AMSL)
71	Samudrapur	Chakur	20.72836	78.88269	237	10	4.9	3.66	1.24	232.1
72	Samudrapur	Mandgaon	20.64950	78.87753	225	10.4	9.3	5.36	3.94	215.7
73	Samudrapur	Hiwara	20.66011	79.04397	264	9	6.5	2.86	3.64	257.5
74	Samudrapur	Dhumankheda	20.67703	79.00669	266	10	8.2	7.73	0.47	257.8
75	Arvi	Sukli (uber)	20.85889	78.48336	285	11.9	8.2	7.3	0.9	276.8
76	Arvi	Ajangaon	20.86575	78.44206	296	12.7	9.5	3.4	6.1	286.5
77	Arvi	Saldara	20.85711	78.38844	324	9.3	6.3	2.3	4	317.7
78	Arvi	Wadala	20.77825	78.30142	275	13.6	10.6	5.1	5.5	264.4
79	Arvi	Dhanodi	20.87642	78.28781	285	11	7	3.4	3.6	278
80	Arvi	Pipari	20.92256	78.27578	298	13.5	Dry	4.5	4.5	-
81	Arvi	Deurwada	20.97953	78.14949	382	14.3	12.5	7.8	4.7	369.5
82	Arvi	Vathoda(wallipur)	20.99397	78.21383	299	10.6	7.8	5.7	2.1	291.2
83	Arvi	Jamb	21.02614	78.22186	308	11.3	6.4	2.2	4.2	301.6
84	Arvi	Dahigaon (gond)	20.92675	78.49553	300	9.3	8.7	3.5	5.2	291.3
85	Arvi	Kachnur	20.93381	78.46544	306	9.1	5.7	4.1	1.6	300.3
86	Arvi	Bothali heti	20.93189	78.38994	354	8	4.2	3.1	1.1	349.8
87	Arvi	Panjara bothali	20.88533	78.34597	295	9.8	7.3	4.9	2.4	287.7
88	Arvi	Bedhona	20.99375	78.31925	397	14.5	13.5	6.8	6.7	383.5
89	Arvi	Chincholi	20.01967	78.30114	401	9	3.5	2.8	0.7	397.5
90	Arvi	Takarkhed	20.03167	78.14419	296	11.8	8.8	4.4	4.4	287.2
91	Arvi	Jalgaon	20.06611	78.18064	307	14.8	12	12.2	-0.2	295
92	Ashti	Nababpur	21.10950	78.13308	317	20.7	18.9	13	5.9	298.1
93	Ashti	Anandwadi	21.12217	78.17297	306	11	8.2	5.4	2.8	297.8
94	Ashti	Parsoda	21.18356	78.15183	328	10	5.6	1.6	4	322.4
95	Ashti	Lahan arvi	21.21752	78.13680	233	11.2	8	2.6	5.4	225
96	Ashti	Pilapur	21.25642	78.12297	355	12.3	10.5	7.2	3.3	344.5
97	Ashti	Borgaon	21.31653	78.18203	352	11.3	9.2	6.15	3.05	342.8
98	Ashti	Wadala	21.32800	78.14072	351	8.5	6.7	4.9	1.8	344.3
99	Ashti	Satarpur	21.31811	78.14414	361	10.3	9	4.8	4.2	352
100	Ashti	Sindivihira	21.17511	78.20500	352	13	8.3	4.6	3.7	343.7
101	Karanja	Masod	20.98386	78.47558	341	13	12.1	3.5	8.6	328.9
102	Karanja	Dhaga	21.03742	78.47461	400	6	5.5	2.3	3.2	394.5
103	Karanja	Ambhora	21.05739	78.53572	448	7	5.7	2.6	3.1	442.3
104	Karanja	Maragsur	21.01883	78.56414	442	7.9	5	2.7	2.3	437
105	Karanja	Susund	20.97136	78.54092	364	9.8	8.5	3.15	5.35	355.5
106	Karanja	Brahmanwada	21.01422	78.43667	352	9.9	9.4	3	6.4	342.6

Sl. No	Taluka	Village	Y Lat	X Long	Elevation (m)	Depth (m)	Pre-monsoon WL (m)	Post-monsoon WL (m)	Fluctuation (m)	RL Pre-monsoon (m AMSL)
107	Karanja	Jaurwada (heti)(kann	21.08881	78.50753	439	9.7	9.3	4.9	4.4	429.7
108	Karanja	Ajandoh	21.09589	78.48783	451	15.4	12.3	7.7	4.6	438.7
109	Karanja	Kharas khande	21.13072	78.46494	500	17.5	16.3	4.6	11.7	483.7
110	Karanja	Selgaonlawane	21.19750	78.45378	465	11.8	7.9	4.45	3.45	457.1
111	Karanja	Susundra	21.24550	78.31128	391	16.3	14.7	4.6	10.1	376.3
112	Karanja	Belgaon	21.22906	78.33878	409	14	13.2	2.4	10.8	395.8
113	Karanja	Ajandevi	21.19483	78.36525	418	10	3.5	2.8	0.7	414.5
114	Karanja	Pardi	21.18017	78.30364	445	7.3	6.7	3	3.7	438.3
115	Karanja	Malegaon(kali)	21.10456	78.29281	482	13.2	12	5.1	6.9	470
116	Karanja	Sonegaon	21.11656	78.32108	475	9.8	9.5	4.1	5.4	465.5
117	Karanja	Rajani	21.14828	78.35264	434	16.2	15	5.5	9.5	419
118	Karanja	Karanja	21.15486	78.40150	453	10.4	7.2	3.4	3.8	445.8
119	Karanja	Agargaon	21.12264	78.54539	499	7.6	5.3	3.9	1.4	493.7
120	Karanja	Yengaon	21.10589	78.39719	454	7.3	6.5	3.4	3.1	447.5
121	Karanja	Dhanoli	21.06344	78.60492	512	11.5	11	2.5	8.5	501
122	Seloo	Garamsur	21.02042	78.66497	433	15.1	13.6	7.6	6	419.4
123	Selu	Amgaon	20.94869	78.61378	355	10	8	4.3	3.7	347
124	Selu	Salai pevath	20.93694	78.68292	301	9.2	8	3.1	4.9	293
125	Selu	Juvedi	20.88914	78.67567	286	11.8	10.5	4.7	5.8	275.5
126	Selu	Antargaon	20.86128	78.65000	271	11.8	9.5	5.8	3.7	261.5
127	Selu	Akoli	20.86483	78.58317	284	9.2	8.4	3.8	4.6	275.6
128	Selu	Seldoh	20.84806	78.85286	270	6	4.5	3.1	1.4	265.5
129	Selu	Helodi	20.80506	78.85806	245	12.7	11.6	3.7	7.9	233.4
130	Selu	Khapri (dhone)	20.80722	78.81278	257	8.5	7.1	3.9	3.2	249.9
131	Selu	Junona	20.77525	78.79367	255	10	8	5.15	2.85	247
132	Selu	Chopra	20.73806	78.76675	240	9	8	4.8	3.2	232
133	Selu	Hingni	20.92456	78.70942	292	12.0	8.7	4.1	4.6	283.3
134	Hinganghat	Pipri	20.38889	78.73528	232.7	12.6	7.73	2.6	5.13	225
135	Hinganghat	Kapsi	20.43500	78.59778	234.48	14.3	7.48	8.45	-0.97	227
136	Hinganghat	Daroda	20.46667	78.78333	219.46	6.55	5.2	2.45	2.75	214.26
137	Hinganghat	Kangaon	20.51083	78.61417	230	10.7	6	1.95	4.05	224
138	Samudrapur	Wasi	20.51667	79.04167	237.06	10.15	7.92	1.2	6.72	229.14
139	Samudrapur	Nandori_pz	20.51722	78.97250	255.4	40	11.1	2.7	8.4	244.3
140	Samudrapur	Sakhra	20.54611	79.10639	247.24	10	6.17	3.8	2.37	241.07
141	Deoli	Giroli	20.54889	78.58500	268.4	10.2	9.4	3.5	5.9	259
142	Hinganghat	Alipur	20.54889	78.69417	241	12.4	9.85	3.2	6.65	231.2

Sl. No	Taluka	Village	Y Lat	X Long	Elevation (m)	Depth (m)	Pre-monsoon WL (m)	Post-monsoon WL (m)	Fluctuation (m)	RL Pre-monsoon (m AMSL)
143	Hinganghat	Hinganghat	20.55000	78.81667	228.5	5.95	4.58	0.8	3.78	223.89
144	Deoli	Bhidi	20.57167	78.40361	255.05	10.5	6.1	2.5	3.6	248.95
145	Deoli	Sarul_pz	20.58639	78.60528	242.8	40	8.9	6.7	2.2	233.9
146	Wardha	Sonegaon	20.61667	78.71667	269.31	16.5	8	3.14	-3.14	261.31
147	Samudrapur	Dhondgaon	20.63167	79.05778	249.38	10.5	9	5.05	3.95	241.73
148	Samudrapur	Samudrapur	20.63889	78.96389	248.68	9.65	7.65	2	5.65	241.03
149	Deoli	Deoli	20.65000	78.46667	263.32	13.5	8	1.37	6.63	255.32
150	Samudrapur	Ajda	20.65000	78.92917	234.1	7.8	4.6	2.45	2.15	229.5
151	Wardha	Madni	20.65500	78.77500	249.22	10.8	10.18	4.45	5.73	239.04
152	Wardha	Vadad	20.65833	78.56667	249.15	12	9.2	6.2	3	239.95
153	Samudrapur	Girad	20.65833	79.11667	304.85	12	6	3	3	298.85
154	Deoli	Muradgaon (balsare)1	20.69167	78.41611	301.05	9	7.05	2.19	4.86	294
155	Wardha	Karanji kaji	20.70722	78.72861	251.83	14.8	10.43	4.2	6.23	241.4
156	Wardha	Sawangi	20.71667	78.56667	273.69	10	5.5	2.7	-2.7	268.19
157	Wardha	Sawangi meghe_pz	20.72583	78.58500	283.1	40	5.1	0.5	4.6	278
158	Wardha	Sewagram	20.72806	78.66250	267.75	11.6	10.75	6.55	4.2	257
159	Samudrapur	Kandhli (juna)	20.73750	78.92556	233.21	10.2	6.22	2.45	3.77	226.99
160	Wardha	Dahigaon	20.75444	78.48528	286.42	7.5	6.87	3.65	3.22	279.55
161	Wardha	Tigaon	20.76389	78.52361	289.55	8.4	7.25	2.4	4.85	282.3
162	Selu	Sindi rly_pz	20.80667	78.88556	253.75	40	6.05	4.6	1.45	247.7
163	Selu	Yelakeli	20.81389	78.59028	275.65	13	12.9	9.5	3.4	262.75
164	Selu	Selu_pz	20.83361	78.70194	285.8	40	20	5.8	-5.8	265.8
165	Wardha	Mandwa	20.83417	78.49417	280	6.5	5.03	0.5	4.53	275
166	Wardha	Anji	20.85000	78.51667	280.9	10.5	9	6.7	2.3	271.9
167	Selu	Keljhar	20.85000	78.80000	297.8	15	13	5.63	7.37	284.8
168	Selu	Jamni	20.86139	78.58222	290.8	13.1	8.7	2.1	6.6	282.1
169	Selu	Hingni	20.90833	78.71667	300.99	11	9.42	6.06	3.36	291.57
170	Arvi	Kharangana	20.91667	78.48333	296.36	8	6.8	7.3	-0.5	289.56
171	Arvi	Mahakali	20.95417	78.46083	312.35	9	3.35	4.3	-0.95	309
172	Arvi	Pimpalkhuta	20.96139	78.36833	216.66	8	6.66	2	4.66	210
173	Arvi	Arvi_pz	20.99833	78.22750	324.8	40	11.8	5.6	6.2	313
174	Ashti	Talegaon_pz	21.10556	78.20333	323.1	40	10.1	6.4	3.7	313
175	Karanja	Junapani	21.11806	78.36889	461.52	8	5.1	2.45	2.65	456.42
176	Karanja	Sarwadi	21.15194	78.28139	461.84	11	8.44	2.9	5.54	453.4
177	Karanja	Thanegaon-1	21.15694	78.47306	488.8	14.45	13	2.85	10.15	475.8
178	Karanja	Nagalwadi	21.16667	78.43333	481.55	12	12.25	6	6.25	469.3

Sl. No	Taluka	Village	Y Lat	X Long	Elevation (m)	Depth (m)	Pre-monsoon WL (m)	Post-monsoon WL (m)	Fluctuation (m)	RL Pre-monsoon (m AMSL)
179	Ashti	Ashti	21.20000	78.18333	335.06	7.3	3.03	1.42	1.61	332.03
180	Ashti	Ashti_pz	21.20361	78.19222	406.78	40	25.68	4.1	21.58	381.1
181	Ashti	Thar	21.20611	78.24028	401	10	9.3	4.6	4.7	410.3
182	Ashti	Dhadi	21.26667	78.23333	368.44	14	12.85	6	6.85	355.59
183	Ashti	Sahur	21.30833	78.24167	359.7	10.25	8.9	5	3.9	350.87

Annexure-III A: Aquifer II depth to water level details in Wardha district

Sl. No.	Taluka	Village	Topo sheet	X Longitude	Y Latitude	Altitude (m)	Year	Type	Aquifer	Drilling depth (m)	Const_d epth (m)	Casing (m)	AQ_ Zone (m)	Pre SWL (m)
1	Hinganghat	Bela	55L/14	78.8361	20.6014	218.2	1991	EW	MB	158.5		6.5		11.5
2	Wardha	Bhivapur		78.6417	20.6111		1979	EW	VB	65.57	65.57	65.57	7.83 -12.98 ,30.09 -33.5	2.87
3	Ashti	Choti Arvi	55K/4	78.1333	21.2167	322.9	1992	EW	F Basalt	180		13.5		25.5
4	Seloo	Dahegaon	55L/13	78.8	20.7972		1991	EW	F Basalt	158.6		10		1.87
5	Samudrapur	Dahegaon	55L/13	78.93786	20.64375	240	2019	EW	SSt	160.1		20	126.50-129.60, 157-160.10	9.29
6	Arvi	Dahegaon (Gondi)	55L/5	78.49944	20.929	304	2019	EW	FB	200		18	Traces	55
7	Ashti	Dhari	55K/3	78.2239	21.2733	358.3	2012	EW	JMB	200		11.7		4.4
8	Wardha	Dhotra	55L/10	78.5236	20.7208	259.6	1979	EW	J Basalt	65.95	65.95	5.15	-19 ,29.5 -35	2.6
9	SELU	Hingni	55L/9	78.70983	20.92464	285	2019	EW	FB	93		18	41-43,81-83	6.76
10	SELU	Hingni	55L/9	78.70975	20.92472	285	2019	OW	FB	86.9		18	41-44,83.80-86.90	7.42
11	Deoli	Injhala	55L/6	78.3333	20.6167	258	1996	EW		104.95		6.5	7.35 -10.35	10.84
12	Deoli	Injhapur	55L/6	78.4611	20.6278		1975	EW	VB	58	58	58	8 -11.6 ,24 -26	13.55
13	Arvi	Kachnur	55L/5	78.46375	20.94494	310	2019	EW		32		18	Dry	0
14	Samudrapur	Kandhali	55L/14	78.925	20.7333		1991	EW	F Basalt	195.2		18.5		8

Sl. No.	Taluka	Village	Topo sheet	X Longitude	Y Latitude	Altitude (m)	Year	Type	Aquifer	Drilling depth (m)	Const_d epth (m)	Casing (m)	AQ_ Zone (m)	Pre SWL (m)
15	Deoli	Kaotha (Railway)	55L/6	78.375	20.7333		1996	EW		147.65		2.5	6 -6.5 ,34 -36	1.05
16	Karanja	Karanja	55K/8	78.4069	21.1667	439.7	1992	EW	F Basalt	201.3		3	16.3 - ,48.1 -	24.09
17	Karanja	Karanja	55K/8	78.4069	21.1667	439.7		OW	F Basalt	201.3		6	30 - ,153 -	16.5
18	Deoli	Kavtha	55L/6	78.3722	20.7306	284.7		EW	J Basalt	51.02	51.02	51.02	7.97 -14.45 ,44.5 -50.29	5.2
19	Samudrapur	Kora	55P/2	79.1028	20.5125	230.7	1991	EW	F Granite	112.8		17.5		5.92
20	Samudrapur	Kora	55P/2	79.1028	20.5125	230.7	1991	OW	F Granite	128.1		15		6.23
21	Ashti	Manikwada	55K/7	78.2736	21.2764	399.4	2013	OW	FB	143.8		5	140-143	31.83
22	Ashti	Manikwada	55K/7	78.2672	21.2764	401.7	2013	EW	FB	143.8		2.5	140-143	29.6
23	Karanja	Palora	55K/8	78.3	21.15	447		EW	F Basalt	201.3		3.5		8.8
24	Samudrapur	Pipri	55L/14	78.9278	20.7375	225.7	1991	EW	F Limestone	103.7		2.5		13.4
25	Samudrapur	Pipri	55L/14	78.9278	20.7375	225.7	1991	OW	F Limestone	130.7		2		10.07
26	Karanja	Rahati	55K/12	78.57917	21.09006	519	2019	EW	FB	200		18	Traces	65

Sl. No.	Taluka	Village	Topo sheet	X Longitude	Y Latitude	Altitude (m)	Year	Type	Aquifer	Drilling depth (m)	Const_d epth (m)	Casing (m)	AQ_Zone (m)	Pre SWL (m)
27	Karanja	Savali	55K/12	78.5236	21.1333	499.1	1992	EW	F Basalt	195.2		6.5		4.9
28	Deoli	Sirasgaon	55L/10	78.5681	20.6056		1975	EW	VB	60.2	60.2	7.62	7.63 -16.8 ,30.4 - 32.55 ,58.35 - 59.85 ,45.8 -47.8	8.44
29	Wardha	Sonegaon	55L/6	78.4389	20.6792	258.4	1991	EW	VB	67.91	67.91	67.91	6.75 -9.5 ,14.1 - 18.6 ,36.45 -38.5 ,28.55 -30.15 ,47 -49 ,65 -67.91	4.02
30	Wardha	Sonegaon R.S.	55L/10	78.6931	20.6292	252.6	1979	EW	VB	73.29	73.29	73.29	18 -23.8 ,35 - 36.25 ,62.1 -63.3 ,51.4 -53.4 ,67.75 -69.8	6.51
31	Seloo	Sukli	55L/9	78.7208	20.7917	252.2		OW	F Basalt	97.6		19		10.4
32	Wardha	Taroda	55L/14	78.80314	20.67258	248	2019	OW		129.6		18	Dry	129.6
33	Wardha	Taroda	55L/14	78.80319	20.67225	246		EW	FAB	185.5		18	71.70-74.70, 105.70- 108.20,120.40- 123.50	49.6
34	Arvi	Wardhaman	55K/4	78.2222	21.0667	313.5	1992	EW	F Basalt	136.7	-	12.5	25-27.40, 54-57, 73.20-76.20, 89-	30.2

Sl. No.	Taluka	Village	Topo sheet	X Longitude	Y Latitude	Altitude (m)	Year	Type	Aquifer	Drilling depth (m)	Const_d epth (m)	Casing (m)	AQ_Zone (m)	Pre SWL (m)
		eri											91.50	
35	Arvi	Wardhaman eri	55K/4	78.2222	21.0667	313.5	1992	OW	F Basalt	99	-	15.5		9.1

Annexure-III B: Aquifer II depth to water level details in Wardha district

Sl. No.	Taluka	Village	Topo sheet	X Longitude	Y Latitude	Altitude	Year	Type	Aquifer	Drilling_ depth	Const_ depth	Casing	AQ_ Zones	Post SWL
1	Deoli	Adegaon	55L/10	78.5292	20.5833		1978	EW	VB	60.55	60.55	4.3	1.25 -6.85 ,9.93 -13 ,45.95 -52.8 ,20.09 -23.59	6.83
2	Deoli	Giroli	55L/10	78.5986	20.5472		1975	EW	VB	78.87	78.87	4.5	20.59 -29.05 ,42.51 -45.05	4.14
3	Deoli	Bhidi	55L/6	78.4	20.5736		1978	EW	VB	66	66	66	4.5 -11 ,29 - 33.82	4.18
4	Hinganghat	Daroda	55L/15	78.77049	20.46507	223	2019	EW	FMB	178.4		18	7-10, 65- 68,102-105,173- 176	7.6
5	Hinganghat	Daroda		78.7707	20.46508			OW		154.1		17.5		14.55
6	Hinganghat	Alipur	55L/10	78.6972	20.5458		1975	EW	W Basalt	49.2	49.2	-	5.15 -15.31 ,23.57 -26	5.59
7	Seloo	Jhadsi	55L/9	78.6389	20.8611	268.8	1991	EW	F Basalt	140.3		35.5		16
8	Seloo	Sukli	55L/9	78.7208	20.7917		1991	EW	F Basalt	201.3		24.5		10.65
9	Wardha	Karanje Bhoge	55L/10	78.6917	20.7167	244.8	1978	EW	VB	75.42	75.42	75.42	9.75 -18.5 ,34.8 -37 ,67.71 - 70.71 ,50 -52	2.66
10	Wardha	Selsur	55L/10	78.5236	20.6833		1978	EW	VB	71.52	71.52		11.6 -15 ,27.6 - 31 ,65 -69.9 ,46.5 -52.45	2.96
11	Wardha	Selu Khurd	55L/10	78.6194	20.6708	258.4		EW	VB	86.23	86.23	86.23	2.75 -8 ,38.5 - 41.5 ,78.7 -80 ,61.6 -63.11	4.77
12	Wardha	Sewagram	55L/10	78.6639	20.7236	249.3	1978	EW	VB	83.25	83.25		5.68 -9.5 ,41.15 -45.4 ,78.5 -80.5 ,63.5 -68.38	2.65
13	Wardha	Talegaon	55K/4	78.67547	20.60419	319	2019	EW	FMB	200	11.8	19.5	10-13,86- 89,169-173	27
14	Wardha	Chikni	55L/6	78.4667	20.7			EW	VB	74.41	74.41	74.41	6.45 -13 ,49.68 - 55	3.33
15	Wardha	Vaiphad	55L/5	78.4083	20.7597		1979	EW	VB	84.34	84.34	84.34	40.5 -45 ,65 -72	2.72

Sl. No.	Taluka	Village	Topo sheet	X Longitude	Y Latitude	Altitude	Year	Type	Aquifer	Drilling_ depth	Const_ depth	Casing	AQ_ Zones	Post SWL
16	Wardha	Tigaon (OW)	55L/9	78.5264	20.7883		1975	OW	VB	70	70	70	21 -25 ,33.5 - 37.2 ,65.8 -68 ,52.7 -56	3.9
17	Arvi	Mandwa	55L/5	78.4917	20.8333		1991	EW		201.3		12.5		10
18	Samudrapur	Dahegaon	55L/14	78.93792	20.64361		2006	OW	sandstone	160.1		10	105.20-108.20, 157-160.10	15.1

Annexure-IV: Details of PMP wells, Wardha district

Sl. No	Taluka	Village	Type of well	Toposheet no.	Latitude	Longitude	Altitude (m amsl)	Depth (mbgl)	Aquifer	Q (lps)	Fractured thickness(m)
1	Deoli	Deoli	DW	55L/6	20.65436	78.49789	261	17.02	Basalt	3	6.49
2	Deoli	Deoli	DW	55L/6	20.65312	78.50668	262	16.29	Basalt	3	3.03
3	Deoli	Deoli	DW	55L/6	20.65929	78.54504	249	15.32	Basalt	3	3.04
4	Deoli	Deoli	DW	55L/6	20.66633	78.46521	261	15.24	Basalt	3	3.54
5	Deoli	Deoli	DW	55L/6	20.67478	78.45651	265	16.4	Basalt	3	4.13
6	Deoli	Deoli	DW	55L/6	20.64061	78.47438	253	11.55	Basalt	3	1.65
7	Deoli	Deoli	DW	55L/6	20.64211	78.47517	254	11.29	Basalt	3	2.15
8	Deoli	Deoli	DW	55L/6	20.65634	78.49836	267	15.71	Basalt	3	4.2
9	Deoli	Deoli	DW	55L/6	20.66221	78.50958	257	15.59	Basalt	3	5.95
10	Hinganghat	Jamni	DW	55L/11	20.61758	78.77667	228	9.29	Basalt	3	0.8
11	Hinganghat	Jamni	DW	55L/11	20.61707	78.77794	234	13.6	Basalt	3	4.28
12	Hinganghat	Jamni	DW	55L/11	20.61354	78.77679	233	10.35	Basalt	3	0.35
13	Hinganghat	Jamni	DW	55L/11	20.62215	78.77405	233	9.15	Basalt	3	1.78
14	Hinganghat	Jamni	DW	55L/11	20.62255	78.77008	237	9.35	Basalt	3	3.05
15	Hinganghat	Jamni	DW	55L/11	20.62007	78.76343	239	8.7	Basalt	3	0.65
16	Hinganghat	Jamni	DW	55L/11	20.62742	78.77918	245	10	Basalt	3	2.9
17	Hinganghat	Jamni	DW	55L/11	20.63496	78.7797	252	14.72	Basalt	3	1.6
18	Hinganghat	Jamni	DW	55L/11	20.62353	78.78274	241	8.56	Basalt	3	3.54

Sl. No	Taluka	Village	Type of well	Toposheet no.	Latitude	Longitude	Altitude (m amsl)	Depth (mbgl)	Aquifer	Q (lps)	Fractured thickness(m)
19	Hinganghat	Jamni	DW	55L/11	20.62251	78.77858	243	7.72	Basalt	0.5	2.06
20	Wardha	Umri	DW	55L/9	20.76102	78.56874	285	9.82	Basalt	1	1.6
21	Wardha	Umri	DW	55L/9	20.75781	78.57283	287	14.72	Basalt	3	1.81
22	Wardha	Umri	DW	55L/9	20.75453	78.55201	274	13.08	Basalt	3	2.32
23	Wardha	Umri	DW	55L/9	20.75626	78.54921	268	16.42	Basalt	5	4.64
24	Wardha	Umri	DW	55L/9	20.76126	78.5657	283	9.65	Basalt	3	1.73
25	Wardha	Umri	DW	55L/9	20.75935	78.55973	282	11.82	Basalt	3	2.38
26	Wardha	Umri	DW	55L/9	20.77259	78.55833	290	10.85	Basalt	3	1.39
27	Wardha	Umri	DW	55L/9	20.77269	78.55373	285	11.34	Basalt	3	5.82
28	Selu	Hingni	DW	55L/9-3C	20.91389	78.71922	280	10.07	Basalt	1	1.84
29	Selu	Hingni	DW	55L/9-3C	20.90781	78.72383	291	13.6	Basalt	3	3.3
30	Selu	Hingni	DW	55L/9-3C	20.91936	78.72397	299	9.7	Basalt	3	2.1
31	Selu	Hingni	DW	55L/9-3C	20.92194	78.71119	285	8.97	Basalt	3	3.42
32	Selu	Hingni	DW	55L/9-3C	20.91264	78.71006	288	15.12	Basalt	3	6.07
33	Selu	Hingni	DW	55L/9-3C	20.90633	78.70628	286	15.7	Basalt	5	2.58
34	Selu	Hingni	DW	55L/9-3C	20.90875	78.71533	283	9.26	Basalt	3	0.96
35	Selu	Hingni	DW	55L/9-3C	20.90356	78.71506	279	9.78	Basalt	3	2.28
36	Selu	Hingni	DW	55L/9-3C	20.92456	78.70942	292	12.0	Basalt	3	3.3
37	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.92033	78.49947	298	9.6	Basalt	3	0.2
38	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.92586	78.50039	297	10.16	Basalt	3	2.06
39	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.928	78.167	304	7.5	Basalt	1	0.35
40	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.93489	78.50336	311	5.85 (Dry)	Basalt	1	0.50

Sl. No	Taluka	Village	Type of well	Toposheet no.	Latitude	Longitude	Altitude (m amsl)	Depth (mbgl)	Aquifer	Q (lps)	Fractured thickness(m)
41	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.93008	78.50203	300	10.48	Basalt	3	1.15
42	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.92786	78.49661	302	9.23	Basalt	3	0.93
43	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.92569	78.49286	300	9.5	Basalt	3	1
44	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.92392	78.49703	297	8.25	Basalt	3	0.25
45	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.92517	78.49836	303	8	Basalt	3	2.6
46	Arvi	Dahegaon (Gond)	DW	55L/5-1C	20.92675	78.49553	300	9.3	Basalt	0.5	0.6
47	Karanja	Sarwadi	DW	55K/8-2A	21.14944	78.27736	540	9.45	Basalt	3	2.4
48	Karanja	Sarwadi	DW	55K/8-2A	21.15006	78.27969	437	9.5	Basalt	3	0.5
49	Karanja	Sarwadi	DW	55K/8-2A	21.15025	78.279	444	9.7	Basalt	3	0.9
50	Karanja	Sarwadi	DW	55K/8-2A	21.14792	78.27897	439	9.55	Basalt	0.75	2.5
51	Karanja	Sarwadi	DW	55K/8-2A	21.14922	78.27967	448	9.7	Basalt	1	0.9
52	Karanja	Sarwadi	DW	55K/8-2A	21.14914	78.27433	439	11.88	Basalt	0.75	1.35
53	Karanja	Sarwadi	DW	55K/8-2A	21.15144	78.27611	435	14.67	Basalt	0.5	7.71
54	Karanja	Sarwadi	DW	55K/8-2A	21.15256	78.28022	441	13.33	Basalt	0.75	1.13
55	Ashti	Ashti	DW	54K/4-1C	21.21403	78.18714	352	7.32	Basalt	0.5	1.9
56	Ashti	Ashti	DW	54K/4-1C	21.21219	78.18461	346	10.3	Basalt	3	2.95
57	Ashti	Ashti	BW	54K/4-1C	21.20906	78.19233	353	8	Basalt	2	5.38
58	Ashti	Ashti	BW	54K/4-1C	21.20583	78.18219	339	8.1		3	0.28
59	Ashti	Ashti	DW	54K/4-1C	21.20647	78.18628	348	5	Basalt	0.5	0.95
60	Ashti	Ashti	DW	54K/4-1C	21.20432	78.18303	346	6	Basalt	0.5	1.35
61	Ashti	Ashti	DW	54K/4-1C	21.19978	78.17906	338	11.9	Basalt	3	2.8

Sl. No	Taluka	Village	Type of well	Toposheet no.	Latitude	Longitude	Altitude (m amsl)	Depth (mbgl)	Aquifer	Q (lps)	Fractured thickness(m)
62	Ashti	Ashti	DW	54K/4-1C	21.19656	78.18331	329	7	Basalt	0.75	2.5
63	Ashti	Ashti	DW	54K/4-1C	21.18275	78.18083	333	10.05	Basalt	3	4.05
64	Ashti	Ashti	DW	54K/4-1C	21.18375	78.18733	337	10	Basalt	3	1.7

Annexure-V: Soil Infiltration test data

Date	08.01.2020
Unique ID No	SITENOWR-01
Village	Taroda
Location	In the field of Eswar somnathe
Taluka	Wardha
District	Wardha
Coordinates	20°40'51.60", 78°46'25.40"
Elevation / RL (mamsl)	240
Initial Water Level (cm)	30
Geology	Deccan Basalt
Soil type	Black cotton soil
Final Infiltration Rate (cm/hr)	4.80

Sl.No	Clock time	Duration(m)	Cumulative time (minutes)	Water level depth(cm)	Infiltrated water Depth (cm)	Infiltration rate(cm/hr)	Remarks
1	13.01	1.00	1.00	29.40	0.60	36.00	
2	13.02	1.00	2.00	29.80	0.20	12.00	
3	13.03	1.00	3.00	29.90	0.10	6.00	
4	13.04	1.00	4.00	29.90	0.10	6.00	
5	13.05	1.00	5.00	29.90	0.10	6.00	
6	13.10	5.00	10.00	29.50	0.50	6.00	
7	13.15	5.00	15.00	29.40	0.60	7.20	
8	13.20	5.00	20.00	29.60	0.40	4.80	
9	13.30	10.00	30.00	29.10	0.90	5.40	
10	13.40	10.00	40.00	29.20	0.80	4.80	
11	13.50	10.00	50.00	29.20	0.80	4.80	
12	14.00	10.00	60.00	29.20	0.80	4.80	
13	14.10	10.00	70.00	29.20	0.80	4.80	
14	14.20	10.00	80.00	29.20	0.80	4.80	

Date	07.01.2020
Unique ID No	SITENOWR-02
Village	MANDGAON
Location	In the field of Ganesh Tathoke
Taluka	Samudrapur
District	Wardha
Coordinates	20°39 '28.13", 78°50' 41.89"
Elevation / RL (mamsl)	231
Initial Water Level (cm)	30
Geology	Deccan Basalt
Soil type	Black cotton soil
Final Infiltration Rate (cm/hr)	6.00

Sl.No	Clock time	Duration(m)	Cumulative time (minutes)	Water level depth(cm)	Infiltrated water Depth (cm)	Infiltration rate(cm/hr)	Remarks
1	12.31	1.00	1.00	27.50	2.50	150.00	
2	12.32	1.00	2.00	28.80	1.20	72.00	
3	12.33	1.00	3.00	29.10	0.90	54.00	
4	12.34	1.00	4.00	29.30	0.70	42.00	
5	12.35	1.00	5.00	29.40	0.60	36.00	
6	12.36	1.00	6.00	29.50	0.50	30.00	
7	12.37	1.00	7.00	29.60	0.40	24.00	
8	12.42	5.00	12.00	28.20	1.80	21.60	
9	12.47	5.00	17.00	28.40	1.60	19.20	
10	12.52	5.00	22.00	28.30	1.70	20.40	
11	13.02	10.00	32.00	28.50	1.50	9.00	
12	13.12	10.00	42.00	28.60	1.40	8.40	
13	13.22	10.00	52.00	28.70	1.30	7.80	
14	13.32	10.00	62.00	28.70	1.30	7.80	
15	13.42	10.00	72.00	28.80	1.20	7.20	
16	13.52	10.00	82.00	28.80	1.20	7.20	
17	14.02	10.00	92.00	29.00	1.00	6.00	
18	14.12	10.00	102.00	29.00	1.00	6.00	
19	14.22	10.00	112.00	29.00	1.00	6.00	
20	14.32	10.00	122.00	29.00	1.00	6.00	

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

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
1	Hinganghat	Pipri	20.38889	78.73528		2019	7.73	2.6	0.09		0.11	
2	Hinganghat	Kapsi	20.435	78.59778		2019	7.48	8.45	0.31			-0.18
3	Hinganghat	Daroda	20.46667	78.78333		2019	5.2	2.45		-0.01	0.04	
4	Hinganghat	Kangaon	20.51083	78.61417		2019	6	1.95		-0.09	0.13	
5	Samudrapur	Wasi	20.51667	79.04167		2019	7.92	1.2		-0.16	0.1	
6	Samudrapur	Nandori_Pz	20.51722	78.9725		2019	11.1	2.7		-0.48	0.35	
7	Samudrapur	Sakhra	20.54611	79.10639		2019	6.17	3.8	0.09		0.2	
8	Deoli	Giroli	20.54889	78.585		2019	9.4	3.5	0.02			-0.08
9	Hinganghat	Alipur	20.54889	78.69417		2019	9.85	3.2	0.03			-0.08
10	Hinganghat	Hinganghat	20.55	78.81667		2019	4.58	0.8		-0.18	0.2	
11	Deoli	Bhidi	20.57167	78.40361		2019	6.1	2.5	0.26			-0.08
12	Deoli	Sarul_Pz	20.58639	78.60528		2019	8.9	6.7		-0.06		-0.08
13	Wardha	Sonegaon	20.61667	78.71667		2019	6.1	3.14		-0.64		-0.17
14	Samudrapur	Dhondgaon	20.63167	79.05778		2019	9	5.05		-0.42		-0.06
15	Samudrapur	Samudrapur	20.63889	78.96389		2019	7.65	2	0.04		0	
16	Deoli	Deoli	20.65	78.46667		2019	8	1.37	0.26			-0.07
17	Samudrapur	Ajda	20.65	78.92917		2019	4.6	2.45	0.04		0.07	
18	Wardha	Madni (New)	20.655	78.775		2019	10.18	4.45	0		0.18	

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
19	Wardha	Vadad	20.65833	78.56667		2019	9.2	6.2		-0.1		-0.27
20	Samudrapur	Girad	20.65833	79.11667		2019	6	3	0.22			-0.08
21	Deoli	Muradgaon (Balsare)1	20.69167	78.41611		2019	7.05	2.19	0.02			-0.18
22	Wardha	Karanji Kaji	20.70722	78.72861		2019	10.43	4.2		-0.08	0.13	
23	Wardha	Sawangi	20.71667	78.56667		2019	5.5	2.7		-0.61	0.09	
24	Wardha	Sawangi Meghe_Pz	20.72583	78.585		2019	5.1	0.5	0.42			-0.06
25	Wardha	Sewagram	20.72806	78.6625		2019	10.75	6.55		-0.4		-0.3
26	Samudrapur	Kandhli (Juna)	20.7375	78.92556		2019	6.22	2.45	0.22		0.22	
27	Wardha	Dahigaon	20.75444	78.48528		2019	6.87	3.65	0			-0.13
28	Wardha	Tigaon	20.76389	78.52361		2019	7.25	2.4		-0.07		-0.01
29	Selu	Yelakeli	20.81389	78.59028		2019	12.9	9.5		-0.14		-0.12
30	Selu	Selu_Pz	20.83361	78.70194		2019		5.8		-1.04		-0.21
31	Wardha	Mandwa	20.83417	78.49417		2019	5.03	0.5		-0.2	0.04	
32	Wardha	Anji	20.85	78.51667		2019	9	6.7		-0.01		-0.14
33	Selu	Keljhar	20.85	78.8		2019	13	5.63		-0.16		-0.03
34	Selu	Jamni	20.86139	78.58222		2019	8.7	2.1		-0.02		-0.06
35	Selu	Hingni	20.90833	78.71667		2019	9.42	6.06		-0.07	0.06	
36	Arvi	Mahakali	20.95417	78.46083		2019	3.35	4.3		-0.18		-0.12
37	Arvi	Pimpalkhuta	20.96139	78.36833		2019	6.66	2		-0.05	0.19	
38	Arvi	Arvi_Pz	20.99833	78.2275		2019	11.8	5.6		-0.21		-0.26
39	Ashti	Talegaon_Pz	21.10556	78.20333		2019	10.1	6.4		-0.21	0.14	

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
40	Karanja	Junapani	21.11806	78.36889		2019	5.1	2.45	0.02			-0.04
41	Karanja	Sarwadi	21.15194	78.28139		2019	8.44	2.9		-0.17	0.04	
42	Karanja	Thanegaon-1	21.15694	78.47306		2019	13	2.85		-0.65	0.43	
43	Karanja	Nagalwadi	21.16667	78.43333		2019	12.25	6		-0.29		-0.19
44	Ashti	Ashti	21.2	78.18333		2019	3.03	1.42	0.14		0.01	
45	Ashti	Ashti_Pz	21.20361	78.19222		2019	25.68	4.1		-2.58	0.07	
46	Ashti	Thar	21.20611	78.24028		2019	9.3	4.6	0.15			-0.06
47	Ashti	Dhadi	21.26667	78.23333		2019	12.85	6		-0.16	0.18	
48	Ashti	Sahur	21.30833	78.24167		2019	8.9	5		-0.01		-0.08
49	Hinganghat	Pohana	20.35306	78.72194		2019	16	5.9		-0.28		-0.2
50	Hinganghat	Dhanora	20.36083	78.80972		2019	12.6	1.4		-0.55	0.03	
51	Hinganghat	Pipri	20.38944	78.73361		2019	10.2	1.1		-0.13	0.04	
52	Hinganghat	Khapri	20.39306	78.75361		2019	7.7	1	0.04		0.04	
53	Hinganghat	Parsoda	20.42222	78.71944		2019	9	1.7		-0.03	0.06	
54	Hinganghat	Kajalsara	20.43694	78.91333		2019	8.9	2.5	0.01		0.04	
55	Hinganghat	Veni	20.43694	78.91333		2019	9.1	1	0.06		0.01	
56	Hinganghat	Mankapur	20.43917	78.7075		2019	7.9	1.5	0.08		0	
57	Hinganghat	Wadner	20.44139	78.74583		2019	9	2.1		-0.06	0.03	
58	Hinganghat	Nidha	20.45694	78.67361		2019	8.9	5.3		-0.07		-0.05

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
59	Hinganghat	Burkoni	20.46528	78.83278		2019	11.8	1.5		-0.16		-0.01
60	Hinganghat	Daroda	20.46639	78.77056		2019	6	1.1		-0.01	0	
61	Hinganghat	Kosurla Kh	20.46667	78.615		2019	6.3	2.9	0.2			-0.04
62	Hinganghat	Inzala	20.47389	78.88833		2019	8.7	1.5		-0.06	0.05	
63	Hinganghat	Chincholi	20.475	78.80556		2019	8.4	1	0.08		0.01	
64	Hinganghat	Bhayyapur	20.49278	78.57972		2019	6.8	1.8	0.12			-0.11
65	Hinganghat	Kanchangaon	20.49528	78.71417		2019	5.6	0.5	0.45		0.02	
66	Samudrapur	Khek	20.50472	79.14583		2019	9.9	1		-0.03		-0.01
67	Hinganghat	Sawali wagh	20.5075	78.93333		2019	10.5	0.8		-1.1	0.36	
68	Samudrapur	Kora	20.50833	79.1		2019	8.2	0.7		-0.05	0.07	
69	Hinganghat	Gadegaon	20.51083	78.66417		2019	8.6	2	0.02			-0.09
70	Hinganghat	Kangaon	20.51222	78.61333		2019	6.6	0.6	0.09		0.08	
71	Samudrapur	Savangi (Zade)	20.52083	79.03333		2019	8.5	0.9		-0.2	0.03	
72	Hinganghat	Rohankheda	20.52472	78.63944		2019	9	1.9		-0.02		-0.06
73	Samudrapur	Nandori	20.525	78.975		2019	13.9	2		-0.24		-0.01
74	Deoli	Andori	20.54167	78.55417		2019	9.1	2.2		-0.16		-0.18
75	Deoli	Giroli	20.54861	78.58333		2019	5.6	1	0.33			-0.08
76	Hinganghat	Shahalangdi	20.56611	78.85		2019	7	0.5		-0.04	0	
77	Deoli	Bhidi	20.58056	78.4		2019	7.6	1.5	0.09			-0.1
78	Deoli	Rohani	20.5875	78.35		2019	12.6	4		-0.23		-0.33
79	Deoli	Bhojankheda	20.5875	78.64583		2019	7.2	1.2	0.31			-0.02

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
80	Samudrapur	Burfa	20.58889	79.03889		2019	8.3	0.9	0.01			-0.12
81	Wardha	Itala	20.60833	78.58333		2019	12.6	1.8		-0.55		-0.14
82	Deoli	Inzala	20.61806	78.33278		2019	7.7	1.9	0.32			0.01
83	Deoli	Dighi	20.62778	78.51528		2019	7.8	1.1	0.12			-0.01
84	Samudrapur	Renkapur	20.62917	78.95		2019	4.8	0.5	0.09			-0.02
85	Deoli	Kolhapur	20.64583	78.46667		2019	4.6	1.6	0.35			-0.05
86	Deoli	Deoli	20.64583	78.48278		2019	9.7	1.7	0.11			-0.09
87	Deoli	Agargaon	20.65306	78.39111		2019	7.8	0.6		-0.06		-0.03
88	Wardha	Selsura	20.66667	78.52083		2019	7.8	1.7		-0.1		-0.05
89	Samudrapur	Dhumankheda	20.675	79.00278		2019	10.7	1.9	0.02			-0.17
90	Wardha	Jamtha	20.67833	78.59222		2019	13.6	1.2		-0.1		-0.03
91	Wardha	Madani	20.68889	78.75417		2019	10.8	1.5		-0.01		-0.14
92	Wardha	Waigaon (Nipani)	20.69167	78.70556		2019	13.6	2		-0.26	0.34	
93	Selu	Dindola	20.69583	78.7625		2019	10.5	1.4		-0.13		-0.14
94	Deoli	Nachangaon	20.69722	78.33333		2019	7.2	1.5		-0.06		-0.06
95	Wardha	Salod (Hirapur)	20.7	78.54722		2019	12	1.9		-0.02		-0.15
96	Samudrapur	Waigaon(Gond)	20.71389	79.01667		2019	8.6	0.6	0.12			-0.01
97	Samudrapur	Kori	20.72639	78.92306		2019	4.7	1.3	0.13			-0.09
98	Selu	Hamdapur	20.7275	78.82111		2019	8	1.6		-0.11	0	
99	Samudrapur	Kankati	20.73083	78.9275		2019	5.9	1		-0.01	0.03	
100	Selu	Kopra	20.73778	78.76917		2019	8.8	5.6	0.02			-0.2

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
101	Samudrapur	Kandhali	20.73972	78.92472		2019	8	1.9	0.13			-0.11
102	Selu	Chanki	20.74083	78.76972		2019	9.2	6.1	0.07			-0.18
103	Selu	Gondapur	20.79944	78.67583		2019	17.9	7.8		-0.18		-0.39
104	Selu	Yankapur (Ramna)	20.8	78.675		2019	12.9	6.7	0.05			-0.24
105	Selu	Anjangaon	20.80361	78.78472		2019	5	1.7		-0.09		-0.08
106	Selu	Dahegaon (Gosai)	20.80667	78.80278		2019	4.4	0.4		-0.19		-0.02
107	Selu	Sindi Kh(Railway)	20.81417	78.88083		2019	5.8	0.7	0.24		0.03	
108	Selu	Babapur	20.81917	78.62389		2019	7.5	2.3	0.1			-0.2
109	Selu	Surgaon	20.82083	78.655		2019	15.1	7		-0.28		-0.14
110	Arvi	Marda	20.825	78.32278		2019	10	0.9		-0.04		-0.13
111	Arvi	Pachod (Virul)	20.82639	78.41028		2019	5.4	1.3	0.01		0.15	
112	Selu	Selu	20.83472	78.70222		2019	15	10.4	0.18		0.11	
113	Selu	Janglapur	20.83472	78.75556		2019	7.2	0.2		-0.02	0.31	
114	Selu	Seldoh	20.84556	78.84861		2019	8.4	2.1		-0.02		-0.09
115	Arvi	Rohana	20.85333	78.32417		2019	11.1	1.7		-0.16	0.14	
116	Selu	Zadsi	20.8625	78.63889		2019	8	4.1	0.06			-0.06
117	Selu	Akoli	20.86667	78.58889		2019	8.3	0.9		-0.02		-0.05
118	Selu	Khapari Shivangaon	20.88333	78.75556		2019	8.6	4.1	0.04		0.17	
119	Arvi	Kachnur	20.93611	78.4625		2019	6.2	1.4	0.01		0.06	

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
120	Selu	Salai (Pevath)	20.93944	78.68694		2019	6.7	1.9		-0.01		-0.05
121	Selu	Sondi	20.94167	78.65972		2019	11.6	0.9		-0.54	0.02	
122	Karanja	Borgaon (Gondi)	20.96111	78.5625		2019	4.3	1.9	0.1		0.08	
123	Arvi	Pimpalkhuta	20.96389	78.37222		2019	6.7	1.1		-0.06	0.19	
124	Karanja	Danapur	20.975	78.40417		2019		0.8	0.53		0.06	
125	Karanja	Ladgad	20.9875	78.475		2019	9.8	2	0.06			-0.06
126	Arvi	Bedhona	20.99194	78.32167		2019	12	2.1	0.2		0.38	
127	Arvi	Arvi	20.99583	78.23333		2019	8	2	0.42		0.24	
128	Ashti	Salora	21.00194	78.19861		2019	9.9	1.4		-0.18	0.26	
129	Arvi	Nandpur	21.00417	78.16667		2019	5	1.5	0.14		0.14	
130	Selu	Garamsur	21.01889	78.66611		2019	11.3	2.3		-0.21		-0.09
131	Arvi	Khadki Kh	21.03194	78.19861		2019	8.8	1.8		-0.1	0.14	
132	Karanja	Sindi Vihiri	21.03889	78.55556		2019	14.4	2.3		-0.04		-0.06
133	Karanja	Met Hiraji	21.04028	78.63611		2019	11	6.8	0.1			-0.14
134	Arvi	Mandla	21.06528	78.23333		2019	5.1	1.9	0.06		0.06	
135	Karanja	Narsingpur	21.08889	78.31056		2019	11.6	0.3		-0.55	0.03	
136	Karanja	Pipari	21.09194	78.39444		2019	8.9	1.5		-0.12	0.01	
137	Karanja	Kajali	21.10417	78.59028		2019	9.8	0.9		-0.59		-0.1
138	Ashti	Talegaon	21.11111	78.20278		2019	8	2	0.11			-0.02
139	Karanja	Sawali Kh	21.13333	78.52083		2019	5.6	2.5		-0.05		-0.14
140	Karanja	Sarwadi	21.15417	78.28056		2019	9.9	2.4		-0.08		-0.04

Sl.No	Taluka	Village	Y Lat	X Long	Depth	Year	Pre-monsoon water level (m bgl)	Post-monsoon water level (m bgl)	Pre trend (m/year)		Post trend (m/year)	
									Rise (m)	Fall (m)	Rise (m)	Fall (m)
141	Karanja	Thanegaon	21.15667	78.47306		2019	10.5	2.5		-0.04		-0.06
142	Karanja	Karanja	21.16944	78.4125		2019	5	0.3		-0.08	0.04	
143	Ashti	Sindivihira	21.18056	78.20278		2019	10	6.5		-0.27		-0.16
144	Ashti	Antora	21.18194	78.19444		2019	10	3.1		-0.06	0.01	
145	Ashti	Drugwada	21.18194	78.19444		2019	8.1	1	0.26		0.04	
146	Ashti	Sirsoli	21.18278	78.0975		2019	22.1	17.8		-0.15	0	
147	Ashti	Lahan	21.21944	78.14028		2019	10.5	4.4	0.25			-0.32
148	Ashti	Sahur	21.30833	78.21667		2019	10	2.1	0.1			-0.09

Annexure-VII: Aquifer-I Chemical analysis

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S}/\text{cm}$ at 25 C)	(mg/L)												
1	NHS 2018	Deoli	Pulgaon-1	7.6	1198	632	59.54	46	0.68	459	83.81	BDL	529.33	95.54	24	4	0.77	-
2	NHS 2018	Arvi	Mahakali	7.8	398	210	20.66	8	0.14	193.8	42.93	BDL	202.22	11.17	13	5	0.61	-
3	NHS 2018	Arvi	Paragothan-1	7.3	475	252	23.09	9	0.46	204	42.93	BDL	261.69	11.17	0	5	0.57	-
4	NHS 2018	Karanja	Thanegaon-1	7.7	564	298	24.3	7	0.16	260.1	63.37	BDL	255.74	21.09	17	6	0.76	-
5	NHS 2018	Wardha	Mandwa	7.8	520	276	4.86	12	0.19	249.9	91.98	BDL	255.74	11.17	23	13	0.89	-
6	NHS 2018	Karanja	Sarwadi	7.7	450	239	9.72	9	0.12	198.9	63.37	BDL	190.32	21.09	5	13	0.81	-
7	NHS 2018	Wardha	Wardha-1	7.7	667	354	29.16	17	0.07	280.5	63.37	BDL	315.22	28.54	22	18	0.66	-
8	NHS 2018	Ashti	Thar	7.5	1673	881	87.49	55	47.82	566.1	79.72	BDL	523.38	187.35	24	23	0.51	-
9	NHS 2018	Samudrapur	Ajda	7.8	591	312	20.66	25	0.17	244.8	63.37	BDL	255.74	38.46	14	24	0.84	-
10	NHS 2018	Hinganghat	PIPRI	7.8	996.9231	648	480	-	-	-	-	-	-	100	24	26	0.4	-
11	NHS 2018	Hinganghat	PIPRI	8.3	836.92	544	360	-	-	-	-	-	-	90	52	28	1.06	-
12	NHS 2018	Arvi	ARVI	7.64	484.61	315	220	-	-	-	-	-	-	76	94	28	0.47	-
13	NHS 2018	Samudrapur	Girad	7.8	785	414	49.82	8	0.1	351.9	57.23	BDL	315.22	45.91	20	33	0.67	-
14	NHS 2018	Arvi	Pimpalkhuta	7.9	699	371	57.11	6	0.17	367.2	51.1	BDL	344.96	45.91	34	33	0.63	-
15	NHS 2018	Arvi	ARVI	8.37	741.53	482	210	-	-	-	-	-	-	90	40	35	0.77	-
16	NHS 2018	Hinganghat	Daroda	7.7	854	452	43.75	5	0.51	402.9	87.9	BDL	350.9	65.76	32	36	0.35	-
17	NHS 2018	Hinganghat	Pipri	7.8	1552	824	98.43	12	0.43	693.6	112.42	BDL	469.85	219.61	46	36	0.62	-
18	NHS 2018	Deoli	Muradgaon (Balsare)1	7.9	1485	788	111.8	16	0.16	673.2	81.76	BDL	553.12	169.98	47	36	0.64	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
19	NHS 2018	Arvi	Rohna	7.9	1229	653	93.57	33	75.95	520.2	51.1	BDL	612.59	55.83	16	36	0.73	-
20	NHS 2018	Ashti	Ashti	7.5	840	445	43.75	4	0.36	397.8	85.85	BDL	362.8	43.43	29	37	0.78	-
21	NHS 2018	Wardha	Sewagram	8	1165	618	85.06	17	0.37	535.5	71.54	BDL	493.64	93.06	23	37	0.74	-
22	NHS 2018	Arvi	Wadhona-1	7.1	1471	779	88.71	30	0.4	673.2	120.6	BDL	582.86	105.46	12	37	0.59	-
23	NHS 2018	Hinganghat	Hinganghat	7.7	926	490	52.25	7	0.12	453.9	94.03	BDL	368.75	88.09	49	38	0.52	-
24	NHS 2018	Arvi	Kharangana	7.7	945	498	71.7	3	0.91	453.9	61.32	BDL	410.38	63.28	39	38	0.7	-
25	NHS 2018	Karanja	Nagalwadi	7.7	541	287	6.08	15	0.16	229.5	81.76	BDL	255.74	16.13	11	38	0.85	-
26	NHS 2018	Wardha	Tigaon	8	787	416	53.47	3	0.36	357	53.15	BDL	315.22	35.98	38	38	0.61	-
27	NHS 2018	Wardha	Vadad	7.6	1137	602	59.54	22	1.71	520.2	108.34	BDL	446.06	73.2	28	38	1.19	-
28	NHS 2018	Hinganghat	Kangaon	7.7	1067	535	65.62	13	1.12	504.9	91.98	BDL	475.8	75.69	41	38	0.78	-
29	NHS 2018		Sirpur NHS	7.6	1608	854	148.25	8	0.37	785.4	65.41	BDL	553.12	162.54	25	39	0.69	-
30	NHS 2018	Selu	Keljhar	7.5	902	478	53.47	13	0.11	438.6	85.85	BDL	374.69	58.32	32	39	0.54	-
31	NHS 2018	Ashti	Sahur	7.7	1937	1027	173.77	8	0.57	938.4	83.81	BDL	749.39	169.98	39	39	0.74	-
32	NHS 2018	Wardha	Anji	7.5	1663	882	156.76	5	1.16	785.4	51.1	BDL	672.07	107.95	34	39	1.1	-
33	NHS 2018	Wardha	Dahegaon	7.6	694	368	17.01	17	0.16	316.2	98.12	BDL	344.96	23.57	19	39	0.63	-
34	NHS 2018	Wardha	Madni (New)	7.9	907	480	41.32	21	2.16	402.9	91.98	BDL	368.75	68.24	34	39	0.5	-
35	NHS 2018	Wardha	Dahigaon	7.8	777	411	48.61	7	0.12	387.6	73.59	BDL	410.38	26.06	16	39	1.1	-
36	NHS 2018	Hinganghat	Alipur	7.7	1253	665	87.49	21	0.45	520.2	61.32	BDL	553.12	70.72	22	39	0.42	-
37	NHS 2018	Deoli	Giroli	7.7	1947	1028	149.47	10	0.8	943.5	126.73	BDL	731.54	145.17	67	39	1.12	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
38	NHS 2018	Samudrapur	Sakhra	7.8	928	492	43.75	9	6.8	443.7	104.25	BDL	434.17	70.72	29	39	0.94	-
39	NHS 2018	Selu	Hingni	7.9	1148	609	74.13	11	0.5	515.1	81.76	BDL	469.85	65.76	46	39	0.78	-
40	NHS 2018	Deoli	Bhidi	7.9	1250	665	47.39	6	9.28	515.1	126.73	BDL	469.85	93.06	28	39	1.16	-
41	NHS 2018	Selu	Yelakeli	7.9	1526	806	121.52	4	0.55	739.5	91.98	BDL	731.54	100.5	37	39	0.6	-
42	NHS 2018	Ashti	Dhadi	7.9	1081	573	57.11	12	0.38	504.9	106.29	BDL	463.91	80.65	22	39	0.68	-
43	NHS 2018	Samudrapur	Wasi	7.9	1578	835	110.58	29	1.12	708.9	98.12	BDL	648.28	169.98	33	39	0.7	-
44	NHS 2018	Wardha	Karanji Kaji	7.9	1183	626	66.84	19	0.27	510	91.98	BDL	463.91	105.46	35	39	0.66	-
45	NHS 2018	Selu	Jamni	7.8	1330	705	102.08	8	0.18	606.9	71.54	BDL	570.96	95.54	50	39	0.64	-
46	NHS 2018	Samudrapur	Khandali	7.9	4456	2363	427.75	6	5.15	2152.2	143.09	BDL	1284.66	596.8	180	40	0.72	-
47	NHS 2018	Samudrapur	Girad	8.04	800	520	280	-	-	-	-	-	-	266	15	40	0.65	-
48	NHS 2018	Wardha	Dahegaon	7.8	1144.615	744	520	-	-	-	-	-	-	220	35	45	0.35	-
49	KOW 2019-20	Samudrapur	Marda Kow-5/01 (Wardha)	7.7	1526	992	154.4	57.9	23.4	105.33	23.4	BDL	170.8	107.9	92	15	0.15	-
50	KOW 2019	Samudrapur	Umri Sd/ 003	7.6	1973	1282	179.3	63.9	28	89.23	10.51	BDL	83	131.1	82	78	0.08	-
51	KOW 2019	Samudrapur	Barbadi W/002	7.9	1339	870	463.1	179.6	68.9	25.2	3.2	BDL	458.7	107.9	24	36	0.06	-
52	KOW 2019	Wardha	Borgaon Kow/003	7.5	745	484	129.5	49.9	19.3	15.02	5.4	BDL	58.6	74.5	13	4	0.23	-
53	KOW 2019	Wardha	Lansawadi Kow-W/005	7.5	832	541	159.4	57.9	24.7	29.05	8.7	BDL	107.4	74.5	25	24	0.14	-
54	KOW 2019	Deoli	Kawtha Kow-001	7.4	817	531	214.1	81.8	32.2	21.25	9.66	BDL	200.1	59.1	24	48	0.1	-
55	KOW 2019	Wardha	Dotra W/006	7.8	593	385	84.7	29.9	13.3	32.44	5.74	BDL	122	25.7	22	12	0.07	-
56	KOW 2019	Deoli	Bopapur Kow-D/005	7.7	782	508	159.4	59.9	24.2	41.57	16.6	BDL	292.8	25.7	15	18	0.1	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
57	KOW 2019	Deoli	Sendari Kow-D/006	7.7	816	530	189.2	63.9	30.5	41.24	14.8	BDL	327	25.7	10	21	0.07	-
58	KOW 2019	Deoli	Tambha Kow-D/007	7.5	950	618	254	97.8	38	22.02	9.5	BDL	175.7	92.5	32	8	0.08	-
59	KOW 2019	Deoli	Maltpur-D/008	8.1	1147	746	224.1	83.8	34.1	78.69	24.5	BDL	346.5	107.9	31	11	0.04	-
60	KOW 2019	Deoli	Talni Khander Kow-D/009	7.5	678	441	224.1	79.8	35.1	30.47	3.58	BDL	209.8	54	14	18	0.23	-
61	KOW 2019	Deoli	Ratnpur Kow-D/010	7.5	585	380	144.4	49.9	23	18.87	8.5	BDL	165.9	33.4	17	25	0.1	-
62	KOW 2019	Deoli	Andori Kow-D/012	7.8	1136	738	179.3	67.9	27.1	45.45	3.8	BDL	112.2	115.7	12	21	0.07	-
63	KOW 2019	Deoli	Aanji Kow-D/013	8	1144	744	179.3	67.9	27.1	41.03	4.2	BDL	78.1	131.1	18	35	0.32	-
64	KOW 2019	Wardha	Selukate Kow-W/007	7.7	1695	1102	438.2	157.7	68.2	44.56	33.5	BDL	297.7	128.5	44	43	0.35	-
65	KOW 2019	Wardha	Sirsagaon Kow-W/008	7.9	731	475	179.3	63.9	28	28.67	11.6	BDL	214.7	38.6	16	40	0.3	-
66	KOW 2019	Wardha	Dewangaon Kow-W/009	7.9	828	538	189.2	69.9	29	35.4	11.46	BDL	258.6	38.6	13	52	0.4	-
67	KOW 2019	Deoli	Nibhsada Kow-D/014	8	795	517	134.5	39.9	23	78.36	0.58	BDL	278.2	41.1	22	20	0.15	-
68	KOW 2019	Hinganghat	Khangaon Kow-Hi/001	7.6	1327	863	303.8	115.8	45.7	53.2	22.2	BDL	214.7	143.9	52	76	0.07	-
69	KOW 2019	Hinganghat	Chanki Kow-Hi/004	7.9	775	504	154.4	51.9	24.9	44.16	9.2	BDL	248.9	25.7	17	49	0.05	-
70	KOW 2019	Hinganghat	Arvi Kow-Hi/005	7.5	1737	1129	358.6	131.7	55.1	63.61	24.6	BDL	239.1	187.6	43	90	0.1	-
71	KOW 2019	Wardha	Talegaon Kow-W/011	7.6	1725	1121	353.6	135.7	52.9	94.4	34.6	BDL	239.1	267.3	46	79	0.04	-
72	KOW 2019	Hinganghat	Wela Kow-Hi/006	7.5	749	487	224.1	79.8	35.1	16.45	15.3	BDL	185.4	43.7	19	59	0.22	-
73	KOW 2019	Hinganghat	Wegholi Kow-Hi/007	7.9	1598	1039	438.2	159.7	67.7	115.85	33.04	BDL	263.5	182.5	104	74	0.1	-
74	KOW 2019	Hinganghat	Kingaon Kow-Hi/008	7.8	2364	1537	488	159.7	79.8	84.5	1.07	BDL	170.8	362.4	83	40	0.07	-
75	KOW 2019	Hinganghat	Sawali (Wagh) Kow Hi/010	7.6	1111	722	453.2	175.6	67.4	49.49	1.01	BDL	185.4	133.6	104	67	0.04	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
76	KOW 2019	Hinganghat	Kumbhi Kow-Hi/011	8.1	1169	760	263.9	99.8	39.9	70.7	19.4	BDL	248.9	128.5	34	35	0.3	-
77	KOW 2019	Hinganghat	Ghatsewali Kow-Hi/012	7.7	898	584	219.1	79.8	33.8	39.84	19.6	BDL	263.5	59.1	27	48	0.4	-
78	KOW 2019	Hinganghat	Wadner Kow-Hi/013	8.1	864	562	149.4	49.9	24.2	66.9	23.6	BDL	214.7	15.4	79	11	0.15	-
79	KOW 2019	Hinganghat	Pohana Kow-Hi/015	7.9	785	510	109.6	39.9	16.9	75.91	1.47	BDL	258.6	25.7	18	42	0.07	-
80	KOW 2019	Hinganghat	Yearla Kow-Hi/016	7.6	1596	1037	572.7	219.6	85.8	70.9	31.85	BDL	361.1	200.5	83	81	0.04	-
81	KOW 2019	Hinganghat	Dhochi Kow-Hi/017	7.8	732	476	184.3	69.9	27.8	33.12	12	BDL	165.9	38.6	18	70	0.07	-
82	KOW 2019	Hinganghat	Selu Kow-Hi/019	7.5	1275	829	229.1	67.9	39.2	37.31	18.8	BDL	151.3	105.4	25	89	0.22	-
83	KOW 2019	Hinganghat	Sawanghi Kw-Hi/022	7.8	688	447	169.3	59.9	26.6	32.5	18.5	BDL	170.8	36	22	66	0.1	-
84	KOW 2019	Hinganghat	Ladki Kow-Hi/023	7.7	3290	2139	577.7	219.6	87	372.9	16.89	BDL	361.1	426.6	267	91	0.22	-
85	KOW 2019	Samudrapur	Waigaon Kow-Sd/005	7.8	755	491	109.6	39.9	16.9	68.46	1.38	BDL	234.2	33.4	16	46	0.31	-
86	KOW 2019	Samudrapur	Haran Khuri Kow-Sd/006	7.8	680	442	159.4	59.9	24.2	34.38	6.9	BDL	209.8	28.3	19	44	0.02	-
87	KOW 2019	Samudrapur	Pothara Kow-Sd/008	7.6	654	425	169.3	61.9	26.1	28.33	13.1	BDL	239.1	23.1	18	25	0.05	-
88	KOW 2019	Samudrapur	Karur Kow-Sd/010	7.7	601	391	94.6	31.9	15.2	49.6	15.6	BDL	229.4	23.1	13	23	0.1	-
89	KOW 2019	Samudrapur	Khapri Kow-Sd/011	7.6	710	462	184.3	63.9	29.3	25.48	14.7	BDL	244	20.6	22	45	0.04	-
90	KOW 2019	Samudrapur	Silli Kow-Sd/012	7.8	703	457	149.4	53.9	23.2	68.1	2.17	BDL	248.9	43.7	21	14	0.22	-
91	KOW 2019	Samudrapur	Dasod Kow-Sd/013	7.6	1274	828	244	81.8	39.4	67	10.12	BDL	248.9	102.8	86	10	0.1	-
92	KOW 2019	Samudrapur	Pimpalgaon Kow-Sd/014	7.7	970	631	219.1	79.8	33.8	51.4	46.88	BDL	302.6	69.4	31	16	0.22	-
93	KOW 2019	Samudrapur	Lonhar Kow-Sd/015	7.7	609	396	114.5	39.9	18.1	53.68	1.84	BDL	190.3	28.3	17	33	0.31	-
94	KOW 2019	Samudrapur	Girad Kow-Sd/-017	7.6	614	399	144.4	41.9	24.9	28.12	14.3	BDL	200.1	36	19	26	0.02	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
95	KOW 2019	Samudrapur	Bodkha Kow-Sd/018	7.8	741	482	169.3	61.9	26.1	36.84	14.4	BDL	214.7	46.3	21	44	0.07	-
96	KOW 2019	Samudrapur	Muradpur-Sd/019	7.6	617	401	144.4	47.9	23.5	20.92	6.8	BDL	180.6	18	15	46	0.19	-
97	KOW 2019	Samudrapur	Andgaon-Sd/020	8	1711	1112	338.6	125.7	51.7	84.5	30.76	BDL	453.8	125.9	73	20	0.22	-
98	KOW 2019	Samudrapur	Chakur -Sd/021	7.9	727	473	124.5	43.9	19.6	46.9	4.57	BDL	126.9	48.8	22	12	0.07	-
99	KOW 2019	Samudrapur	Hiwara-Sd/022	7.7	1676	1089	323.7	121.8	49.1	74.4	47.3	BDL	302.6	177.3	48	80	0.05	-
100	KOW 2019	Wardha	Dhanora-Kow-W-012	7.8	1156	751	239	83.8	37.7	74.44	16.2	BDL	248.9	131.1	42	57	0.01	-
101	KOW 2019	Arvi	Agangaon Ar-02 (Wardha)	7.8	761	495	174.3	55.9	28.8	29.87	2.88	BDL	229.4	28.3	19	32	0.62	-
102	KOW 2019	Arvi	Saldara Ar-03	7.8	503	327	144.4	41.9	24.9	14.51	4.91	BDL	185.4	15.4	21	12	0.06	-
103	KOW 2019	Arvi	Wadala Ar-04	8.1	1680	1092	263.9	83.8	43.8	191	0.38	BDL	414.8	120.8	141	41	0.16	-
104	KOW 2019	Arvi	Dhanodi-05	7.8	780	507	159.4	55.9	25.1	45.25	1.47	BDL	253.8	20.6	10	37	0.07	-
105	KOW 2019	Arvi	Deurwad Ar-07	8	1507	980	219.1	71.9	35.8	98.09	2.4	BDL	258.6	102.8	85	67	0.48	-
106	KOW 2019	Arvi	Vathoda (Wallipur) Ar-08	7.9	886	576	199.2	61.9	33.4	33.6	2.23	BDL	205	36	28	11	0.24	-
107	KOW 2019	Arvi	Dhahigaon Arvi Ar-010	7.6	608	395	139.4	41.9	23.7	27.29	3.7	BDL	185.4	18	18	42	0.17	-
108	KOW 2019	Arvi	Kaohnur Ar-11	7.7	527	343	134.5	39.9	23	22.23	1.43	BDL	185.4	18	18	20	0.62	-
109	KOW 2019	Arvi	Bothli Heti Ar-012	7.7	848	551	194.2	59.9	32.6	28.64	58.01	BDL	229.4	64.3	41	21	0.19	-
110	KOW 2019	Arvi	Ar-14 Bedhona	7.8	1167	759	239	81.8	38.2	60.6	2.45	BDL	219.6	84.8	67	21	0.09	-
111	KOW 2019	Arvi	Chincholi Ar-15	7.8	544	354	129.5	41.9	21.3	22.58	0.94	BDL	190.3	15.4	14	16	0.08	-
112	KOW 2019	Arvi	Jalgaon Ar-17	7.8	4090	2659	732.1	247.5	117.7	304.55	2.42	BDL	346.5	516.6	190	98	0.1	-
113	KOW 2019	Ashti	Nababpur As-01	8.1	1885	1225	328.7	111.8	52.7	163.15	10.5	BDL	507.5	133.6	94	58	0.16	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
114	KOW 2019	Ashti	Anandwadi As-02	8.2	835	543	164.3	61.9	24.9	67.63	11.4	BDL	214.7	28.3	69	11	0.06	BDL
115	KOW 2019	Ashti	Parsodi As-03	8.2	2370	1541	219.1	75.8	34.8	130.66	28.2	BDL	312.3	131.1	112	17	0.14	BDL
116	KOW 2019	Ashti	Lahan Arvi	7.7	603	392	154.4	47.9	25.9	16.75	2.8	BDL	161	33.4	26	21	0.13	-
117	KOW 2019	Ashti	Borgaon	7.6	683	444	169.3	59.9	26.6	39.38	0.49	BDL	209.8	25.7	43	31	0.85	-
118	KOW 2019	Ashti	Wadla As-07	7.5	1031	670	224.1	81.8	34.6	36.82	19.7	BDL	156.2	79.7	76	73	0.09	-
119	KOW 2019	Ashti	Satarpur As-08	7.6	636	413	124.5	43.9	19.6	34.66	6.2	BDL	209.8	20.6	14	22	0.15	-
120	KOW 2019	Karanja	Masad K-01	7.7	590	384	139.4	53.9	20.8	27.45	9.27	BDL	234.2	12.9	10	23	0.11	-
121	KOW 2019	Karanja	Dhaga K-02	7.7	349	227	94.6	31.9	15.2	8.26	7.36	BDL	122	12.9	6	14	0.1	-
122	KOW 2019	Karanja	Ambori K-3	7.9	647	421	159.4	53.9	25.6	19.8	3.18	BDL	248.9	15.4	5	5	0.2	-
123	KOW 2019	Karanja	Susund K-5	7.6	569	370	129.5	41.9	21.3	27.95	1.71	BDL	209.8	10.3	12	21	0.09	-
124	KOW 2019	Karanja	Brahmanwadi K-6	7.8	905	588	179.3	69.9	26.6	37.7	3.4	BDL	122	61.7	48	40	0.11	-
125	KOW 2019	Karanja	Asandoh K-8	7.7	535	348	119.5	41.9	18.9	16.94	1.49	BDL	151.3	15.4	7	24	0.09	-
126	KOW 2019	Karanja	Selgaon Lawane K-10	7.4	563	366	169.3	59.9	26.6	22.61	9	BDL	165.9	23.1	67	21	0.09	-
127	KOW 2019	Karanja	Belgaon K-11	7.7	600	390	139.4	41.9	23.7	27.06	0.42	BDL	200.1	10.3	23	15	0.08	-
128	KOW 2019	Karanja	Anjandev K-12	7.5	1049	682	199.2	73.9	30.5	33.6	37.74	BDL	190.3	69.4	41	21	0.54	-
129	KOW 2019	Karanja	Pardi K-13	7.6	721	469	119.5	43.9	18.4	52.11	3.5	BDL	107.4	92.5	24	18	0.09	-
130	KOW 2019	Karanja	Malegaon K-14 Kali	7.8	678	441	164.3	51.9	27.3	22.49	8.05	BDL	141.5	33.4	38	43	0.08	-
131	KOW 2019	Karanja	Rajani	7.7	535	348	124.5	39.9	20.6	22.69	5.71	BDL	107.4	23.1	50	44	0.08	-
132	KOW 2019	Karanja	Karanja	7.6	738	480	144.4	41.9	24.9	36.41	17.5	BDL	185.4	38.6	35	43	0.12	-

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					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
133	KOW 2019	Karanja	Agargaon K-18	7.9	652	424	159.4	61.9	23.7	30.62	7.65	BDL	165.9	43.7	47	15	0.08	-
134	KOW 2019	Karanja	Dhandli K-20	7.7	639	415	149.4	49.9	24.2	20.02	6.4	BDL	175.7	25.7	25	27	0.24	-
135	KOW 2019	Selu	Amgaon Selu Sh-2	7.8	581	378	139.4	41.9	23.7	22.84	1.34	BDL	131.8	30.8	35	34	0.15	-
136	KOW 2019	Selu	Salaipeth Shelu Sh-3	7.8	800	520	189.2	63.9	30.5	39.8	13.4	BDL	287.9	23.1	27	44	0.27	-
137	KOW 2019	Selu	Juvedi	7.8	707	460	139.4	45.9	22.7	40.94	10.9	BDL	170.8	28.3	47	52	0.15	-
138	KOW 2019	Selu	Anthargaon Sh-5	7.8	755	491	119.5	41.9	18.9	90.73	8.2	BDL	248.9	23.1	103	30	0.3	-
139	KOW 2019	Selu	Akoli Sh-6	7.9	862	560	189.2	63.9	30.5	35.42	16.3	BDL	180.6	79.7	50	22	0.25	-
140	KOW 2019	Selu	Seldoh Sh-7	8	1778	1156	303.8	113.8	46.2	112.02	9.9	BDL	229.4	174.8	22	82	0.56	-
141	KOW 2019-20	Selu	Garamsur Sh-11	7.9	1419	922	283.9	103.8	43.8	64.33	8.73	BDL	327	123.4	20	9	0.12	-
142	GSDA	Karanja	Parsodi	7.7	763	496	410	-	-	-	-	-	-	112	32	42	0.82	-
143	GSDA	Karanja	Kakada	7.8	772.3	502	400	-	-	-	-	-	-	126	40	44	0.86	-
144	GSDA	Ashti	Peth ahmadpur	7.7	861.5	560	310	-	-	-	-	-	-	80	22	32	0.26	-
145	GSDA	Karanja	Palora	7.8	452.3	294	200	-	-	-	-	-	-	78	26	12	0.66	-
146	GSDA	Arvi	Nandora	7.7	640	416	298	-	-	-	-	-	-	114	26	32	0.8	-
147	GSDA	Ashti	Anandwadi	7.7	1538	1000	372	-	-	-	-	-	-	82	32	48	0.6	-
148	GSDA	Karanja	Nara	7.8	1446	940	340	-	-	-	-	-	-	108	92	78	0.36	-
149	GSDA	Arvi	Lahadevi	7.7	523	340	200	-	-	-	-	-	-	100	38	32	0.3	-
150	GSDA	Karanja	Chopan	7.7	600	390	300	-	-	-	-	-	-	80	22	9	0.24	-
151	GSDA	Karanja	Panjara gondi	7.8	1446	940	390	-	-	-	-	-	-	100	72	49	0.81	-
152	GSDA	Arvi	Panwadi	7.6	307.6	200	160	-	-	-	-	-	-	78	20	9	0.07	-
153	GSDA	Arvi	Morangana	7.7	652.3	424	230	-	-	-	-	-	-	120	28	19	0.11	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SOR	No ₃	F	Fe
					(in $\mu\text{S/cm}$ at 25°C)	(mg/L)												
154	GSDA	Ashti	Bhishnur	7.6	476.9	310	200	-	-	-	-	-	-	80	22	11	0.41	-
155	GSDA	Arvi	Ajangaon	7.6	553.8	360	196	-	-	-	-	-	-	72	12	6	0.18	-
156	GSDA	Arvi	Sukli	7.6	372.3	242	168	-	-	-	-	-	-	78	16	9	0.09	-
157	GSDA	Arvi	Kachnur	7.7	600	390	306	-	-	-	-	-	-	92	16	18	0.32	-
158	GSDA	Ashti	Khadaka	7.6	433.8	282	188	-	-	-	-	-	-	80	19	9	0.22	-
159	GSDA	Arvi	Dhanodi	7.7	630.7	410	320	-	-	-	-	-	-	80	20	16	0.19	-
160	GSDA	Karanja	Chandewani	7.7	664.6	432	290	-	-	-	-	-	-	90	29	38	0.32	-
161	GSDA	Karanja	Madani	7.7	1084	705	304	-	-	-	-	-	-	104	32	48	0.19	-
162	GSDA	Ashti	Talegaon	7.7	753.8	490	310	-	-	-	-	-	-	92	40	9	0.18	-
163	GSDA	Arvi	Jamkhuta	7.7	618.4	402	296	-	-	-	-	-	-	86	24	24	0.62	-
164	GSDA	Ashti	Manikwada	7.6	600	390	224	-	-	-	-	-	-	88	38	17	0.42	-
165	GSDA	Ashti	Drugwada	7.7	486.1	316	296	-	-	-	-	-	-	110	30	22	0.017	-
166	GSDA	Arvi	Pargothan	7.7	800	520	390	-	-	-	-	-	-	110	18	19	0.16	-
167	GSDA	Arvi	Khanwadi	7.7	504.6	328	236	-	-	-	-	-	-	82	17	19	0.28	-
168	GSDA	Ashti	Bharaswada	7.6	495.3	322	212	-	-	-	-	-	-	82	20	18	0.11	-
169	GSDA	Arvi	Jalgaon	7.7	1538	1000	500	-	-	-	-	-	-	140	29	68	0.98	-
170	GSDA	Arvi	Kasarkheda	7.7	753.8	490	390	-	-	-	-	-	-	122	32	24	0.86	-
171	GSDA	Arvi	Dighi	7.7	627.6	408	260	-	-	-	-	-	-	98	20	19	0.36	-
172	GSDA	Karanja	Kajali	7.7	809.2	526	310	-	-	-	-	-	-	100	36	40	0.8	-
173	GSDA	Arvi	Kopara	7.7	600	390	214	-	-	-	-	-	-	88	24	20	0.5	-
174	GSDA	Karanja	Garpit	7.7	701.5	456	246	-	-	-	-	-	-	96	24	36	0.16	-
175	GSDA	Arvi	Saheli	7.7	787.6	572	312	-	-	-	-	-	-	112	38	37	0.82	-
176	GSDA	Karanja	Kundi	7.6	643	418	300	-	-	-	-	-	-	90	22	18	0.32	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 $^{\circ}\text{C}$)	(mg/L)												
177	GSDA	Arvi	Talegaon	7.7	640	416	298	-	-	-	-	-	-	84	38	32	0.28	-
178	GSDA	Arvi	Bodad	7.6	581.5	378	218	-	-	-	-	-	-	80	25	30	0.24	-
179	GSDA	Arvi	Taroda	7.7	766.1	498	328	-	-	-	-	-	-	98	30	17	0.16	-
180	GSDA	Arvi	Karmabad	7.8	504.6	328	290	-	-	-	-	-	-	98	26	16	0.2	-
181	GSDA	Karanja	Ambhora	7.6	646.1	420	316	-	-	-	-	-	-	104	27	11	0.62	-
182	GSDA	Samudrapur	Babapur	7.95	852	554	440	-	-	-	-	-	-	80	43	36	0.65	-
183	GSDA	Hinganghat	Dhamangaon	7.12	1146	745	440	-	-	-	-	-	-	80	42	42	0.48	-
184	GSDA	Hinganghat	Waldhur	8.2	957	622	320	-	-	-	-	-	-	280	7	68	0.45	-
185	GSDA	Hinganghat	Manora	8.4	1097	713	160	-	-	-	-	-	-	120	95	44	0.2	-
186	GSDA	Hinganghat	Murpad	7.35	817	531	120	-	-	-	-	-	-	140	40	35	0.25	-
187	GSDA	Samudrapur	Belghat	7.89	654	425	240	-	-	-	-	-	-	60	22	44	0.23	-
188	GSDA	Samudrapur	Dhanoli	7.45	2785	1810	600	-	-	-	-	-	-	440	26	38	0.65	-
189	GSDA	Samudrapur	Nandra	7.82	894	581	80	-	-	-	-	-	-	560	22	21	0.25	-
190	GSDA	Samudrapur	Parda	7.62	1277	830	448	-	-	-	-	-	-	150	74	15	0.24	-
191	GSDA	Samudrapur	Silli	7.65	655	426	200	-	-	-	-	-	-	40	79	26	0.16	-
192	GSDA	Karanja	Dhanoli	7.7	769.2	500	302	-	-	-	-	-	-	110	26	38	0.9	-
193	GSDA	Arvi	Jamb	7.6	323	210	196	-	-	-	-	-	-	80	15	7	0.09	-
194	GSDA	Hinganghat	Daigavhan	8.25	620	403	360	-	-	-	-	-	-	80	68	44	0.12	-
195	GSDA	Hinganghat	Gangapur	8	1340	871	280	-	-	-	-	-	-	60	65	45	0.96	-
196	GSDA	Hinganghat	Burkoni	7.6	531	345	120	-	-	-	-	-	-	60	24	40	0.47	-
197	GSDA	Hinganghat	Yenora	7.9	1020	663	280	-	-	-	-	-	-	100	44	49	0.56	-
198	GSDA	Hinganghat	Selu	8.2	834	542	387	-	-	-	-	-	-	50	35	78	0.96	-
199	GSDA	Hinganghat	Kajalsara	8.4	2523	1640	230	-	-	-	-	-	-	120	35	45	0.16	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SOR	No ₃	F	Fe
					(in $\mu\text{S/cm}$ at 25 $^{\circ}\text{C}$)	(mg/L)												
200	GSDA	Hinganghat	Narsala	7.59	831	540	365	-	-	-	-	-	-	140	24	33	0.15	-
201	GSDA	Hinganghat	Chincholi	7.12	1332	866	650	-	-	-	-	-	-	40	40	43	0.65	-
202	GSDA	Samudrapur	Lahori	7.95	1072	697	440	-	-	-	-	-	-	80	55	40	0.24	-
203	GSDA	Samudrapur	Harankhuri	7.8	554	360	280	-	-	-	-	-	-	80	34	42	0.95	-
204	GSDA	Samudrapur	Nirgudi	7.4	888	577	520	-	-	-	-	-	-	100	126	55	0.52	-
205	GSDA	Samudrapur	Dhamangaon	8	1600	1040	320	-	-	-	-	-	-	140	95	45	0.66	-
206	GSDA	Hinganghat	Daigavhan	8.1	723	470	320	-	-	-	-	-	-	260	110	89	2.39	-
207	GSDA	Samudrapur	Dahegaon	7.8	1145	744	520	-	-	-	-	-	-	220	35	45	0.35	-
208	GSDA	Samudrapur	Chikhali	8.1	672	437	280	-	-	-	-	-	-	210	98	75	0.48	-
209	GSDA	Samudrapur	Jira	8.2	849	552	320	-	-	-	-	-	-	60	35	24	0.45	-
210	GSDA	Samudrapur	Kurla	7.6	1474	958	720	-	-	-	-	-	-	80	59	22	0.27	-
211	GSDA	Samudrapur	Parsodi	7.9	905	588	340	-	-	-	-	-	-	200	101	35	0.56	-
212	GSDA	Samudrapur	Washi	8.4	2277	1480	560	-	-	-	-	-	-	480	19	33	0.16	-
213	GSDA	Samudrapur	Asola	7.1	938	610	280	-	-	-	-	-	-	100	28	45	0.55	-
214	GSDA	Samudrapur	Karur	7.9	1162	755	520	-	-	-	-	-	-	40	27	44	0.64	-
215	GSDA	Samudrapur	Mendula	7.3	715	465	120	-	-	-	-	-	-	40	110	38	0.45	-
216	GSDA	Samudrapur	Derda	8	1000	650	440	-	-	-	-	-	-	80	26	40	0.65	-
217	GSDA	Samudrapur	Govindpur	7.6	972	632	360	-	-	-	-	-	-	120	10	35	0.28	-
218	GSDA	Samudrapur	Pothara	7.8	1331	865	340	-	-	-	-	-	-	260	34	62	0.01	-
219	GSDA	Samudrapur	Ganeshpur	8.3	2292	1490	220	-	-	-	-	-	-	40	22	45	0.65	-
220	GSDA	Samudrapur	Narayanpur	8.2	452	294	220	-	-	-	-	-	-	40	26	27	0.6	-
221	GSDA	Samudrapur	Bothuda	7.6	1095	712	320	-	-	-	-	-	-	160	26	22	0.4	-
222	GSDA	Samudrapur	Nandori	8.1	805	523	360	-	-	-	-	-	-	120	58	45	0.5	-

Sl. No	Agency	Taluka	Village	pH	EC (in $\mu\text{S}/\text{cm}$ at 25 C)	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
						(mg/L)												
223	GSDA	Samudrapur	Runka	8.4	649	422	120	-	-	-	-	-	-	60	147	25	0.6	-
224	GSDA	Samudrapur	Zunka	7.6	495	322	320	-	-	-	-	-	-	100	16	20	0.8	-
225	GSDA	Samudrapur	Kinhala	7.8	742	482	200	-	-	-	-	-	-	60	48	40	0.4	-
226	GSDA	Samudrapur	Mahagaon	8.4	546	355	320	-	-	-	-	-	-	120	43	22	1.02	-
227	GSDA	Samudrapur	Chincholi	8.4	2954	1920	440	-	-	-	-	-	-	420	72	12	0.2	-
228	GSDA	Samudrapur	Mangaon	8	1215	790	400	-	-	-	-	-	-	100	19	16	0.2	-
229	GSDA	Samudrapur	Kandhali	7.8	1846	1200	400	-	-	-	-	-	-	140	10	15	0.4	-
230	GSDA	Samudrapur	Mandgaon	7.8	766	498	420	-	-	-	-	-	-	160	25	40	1.07	-
231	GSDA	Samudrapur	Lonhar	7.8	1923	1250	520	-	-	-	-	-	-	300	96	68	0.5	-
232	GSDA	Samudrapur	Wagheda	8.2	635	413	400	-	-	-	-	-	-	160	55	26	0.2	-
233	GSDA	Samudrapur	Dhagadban	8.1	1154	750	480	-	-	-	-	-	-	200	95	36	0.8	-
234	GSDA	Samudrapur	Tas	7.2	569	370	200	-	-	-	-	-	-	60	102	42	0.4	-
235	GSDA	Samudrapur	Bhosa	7.5	1028	668	400	-	-	-	-	-	-	120	35	35	0.5	-
236	GSDA	Samudrapur	Marda	8.4	1140	741	360	-	-	-	-	-	-	160	45	38	0.5	-
237	GSDA	Samudrapur	Salapur	8.4	1155	751	360	-	-	-	-	-	-	140	35	26	0.4	-
238	GSDA	Samudrapur	Vikhani	7.4	3585	2330	840	73.6	48.6	73.8	0.3	BDL	281.8	600	19	64	0.9	0.2
239	GSDA	Samudrapur	Khandala	8.1	1497	973	520	51.2	55.4	39.5	5.3	BDL	359.9	280	82	40	0.9	BDL
240	GSDA	Samudrapur	Pipri	8.3	837	544	360	76.8	29.2	40.9	10.2	BDL	279.4	90	52	28	1.06	0.1
241	GSDA	Samudrapur	Gaul	7.6	1538	1000	440	89.6	36.9	43.3	1.8	BDL	381.9	300	88	35	0.8	0.1
242	GSDA	Samudrapur	Kalamana	8.4	975	634	440	64	8.3	33.2	132	BDL	323.3	400	35	66	1.02	0.1
243	GSDA	Samudrapur	Kinhi	8.1	822	534	360	48	36	38.8	1.1	BDL	263.3	280	22	74	0.4	0.8
244	GSDA	Samudrapur	Khapri	8.5	555	361	360	70.4	29.2	49.7	0.4	BDL	286.7	100	98	16	0.5	0.1
245	GSDA	Samudrapur	Pimpalgaon	8	977	635	400	57.6	32.1	23.8	2.2	BDL	303.8	100	47	12	1.02	0.1

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
246	GSDA	Samudrapur	Ganeshpur	8.4	722	469	240	52.8	43.7	34.9	0.7	BDL	294.8	180	65	62	0.6	BDL
247	GSDA	Samudrapur	Nandpur	7.4	1938	1260	320	63.2	27.2	47.8	0.5	BDL	259.2	200	110	78	0.2	0.1
248	GSDA	Samudrapur	Pardi	8.3	1157	752	460	35.2	40.8	41.6	0.9	BDL	267.7	160	22	39	0.4	BDL
249	GSDA	Samudrapur	Rajjapur	7.6	2338	1520	440	49.6	41.8	20.1	2.2	BDL	315.9	200	35	26	0.8	0.1
250	GSDA	Samudrapur	Haladgaon	7.8	1700	1105	240	40	53.5	13.4	0.8	BDL	361.5	60	98	16	0.02	BDL
251	GSDA	Samudrapur	Shivani	8.2	1323	860	520	43.2	34	19.7	0.3	BDL	219.3	320	48	22	0.8	BDL
252	GSDA	Hinganghat	Chikmoh	7.5	900	585	260	59.2	7.3	16.2	0.5	BDL	191.4	320	28	45	0.12	BDL
253	GSDA	Hinganghat	Segaon	8.3	862	560	460	36.8	15.6	8.6	0.5	BDL	119.5	210	24	98	0.15	BDL
254	GSDA	Hinganghat	Khapri	7.9	508	330	240	-	-	-	-	-	-	140	85	36	0.15	-
255	GSDA	Hinganghat	Pohana	7.3	720	468	280	-	-	-	-	-	-	140	25	16	0.25	-
256	GSDA	Hinganghat	Veni	7.4	1985	1290	640	-	-	-	-	-	-	190	84	92	0.5	-
257	GSDA	Hinganghat	Ladki	7.2	1520	988	320	-	-	-	-	-	-	240	25	46	0.9	-
258	GSDA	Hinganghat	Satefal	7.6	762	495	160	-	-	-	-	-	-	190	33	28	0.6	-
259	GSDA	Hinganghat	Kadajana	8.2	871	566	560	-	-	-	-	-	-	200	62	44	0.7	-
260	GSDA	Hinganghat	Kukabardi	8.2	1415	920	600	-	-	-	-	-	-	120	45	16	0.5	-
261	GSDA	Hinganghat	Kund	7.9	825	536	320	-	-	-	-	-	-	210	92	94	0.4	-
262	GSDA	Hinganghat	Wani	7.6	2308	1500	600	-	-	-	-	-	-	420	59	36	0.5	-
263	GSDA	Hinganghat	Kawadghat	7.8	951	618	490	-	-	-	-	-	-	145	78	29	0.8	-
264	GSDA	Hinganghat	Bopapur	8.4	1908	1240	400	-	-	-	-	-	-	200	65	25	0.6	-
265	GSDA	Hinganghat	Pardi	7.4	1018	662	360	-	-	-	-	-	-	240	87	40	0.1	-
266	GSDA	Hinganghat	Borgaon	7.8	1303	847	600	-	-	-	-	-	-	80	3	86	0.5	-
267	GSDA	Hinganghat	Nandgaon	7.4	920	598	400	-	-	-	-	-	-	140	67	54	0.5	-
268	GSDA	Hinganghat	Kumbhi	7.6	740	481	400	-	-	-	-	-	-	140	20	37	0.2	-

Sl. No	Agency	Taluka	Village	pH	EC (in $\mu\text{S/cm}$ at 25 C)	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
						(mg/L)												
269	GSDA	Hinganghat	Pimpalgaon	7.6	1200	780	320	-	-	-	-	-	-	120	22	45	0.6	-
270	GSDA	Hinganghat	Pipri	7.8	997	648	480	-	-	-	-	-	-	100	24	26	0.4	-
271	GSDA	Hinganghat	Dhanora	8.2	892	580	240	-	-	-	-	-	-	120	45	35	0.9	-
272	GSDA	Hinganghat	Hivara	8.4	1300	845	520	-	-	-	-	-	-	120	24	25	0.36	-
273	GSDA	Hinganghat	Khekdi	7.5	622	404	400	-	-	-	-	-	-	110	45	36	0.12	-
274	GSDA	Hinganghat	Kolhi	7.4	877	570	320	-	-	-	-	-	-	115	26	22	0.35	-
275	GSDA	Hinganghat	Sasti	8.5	1008	655	384	-	-	-	-	-	-	44	46.3	30.5	0.79	-
276	GSDA	Hinganghat	Dhochi	7.68	1052	684	480	-	-	-	-	-	-	68	66.8	40.5	0.62	-
277	GSDA	Hinganghat	Sawangi	7.76	738	480	400	-	-	-	-	-	-	62	60.4	38.2	0.73	-
278	GSDA	Hinganghat	Dorla	7.84	1662	1080	480	-	-	-	-	-	-	36	54	30.6	0.92	-
279	GSDA	Hinganghat	Yerla	7.68	962	625	400	-	-	-	-	-	-	121	58	30.6	0.74	-
280	GSDA	Hinganghat	Kutki	7.58	683	444	280	-	-	-	-	-	-	140	78	36.8	0.22	-
281	GSDA	Hinganghat	Sonegaon	7.24	760	494	490	-	-	-	-	-	-	120	62	70.5	0.12	-
282	GSDA	Hinganghat	Ajanti	7.88	858	558	320	-	-	-	-	-	-	110	10	11	0.28	-
283	GSDA	Hinganghat	Kolhi	8.34	785	510	490	-	-	-	-	-	-	60	3	35.2	0.989	-
284	GSDA	Hinganghat	Rimdoh	7.94	705	458	380	-	-	-	-	-	-	140	85	44	1.202	-
285	GSDA	Hinganghat	Inzala	7.52	820	533	360	-	-	-	-	-	-	90	27	82	0.472	-
286	GSDA	Hinganghat	Pawani	7.96	1615	1050	497	-	-	-	-	-	-	170	35	65	0.472	-
287	GSDA	Hinganghat	Allipur	7.96	658	428	210	-	-	-	-	-	-	40	29	19	0.162	-
288	GSDA	Hinganghat	Sastabad	8.46	662	430	290	-	-	-	-	-	-	70	15	59	0.52	-
289	GSDA	Hinganghat	Govindpur	8.49	877	570	360	-	-	-	-	-	-	80	35	24.9	0.56	-
290	GSDA	Hinganghat	Bambarda	8.07	1022	664	580	-	-	-	-	-	-	120	26	45	0.16	-
291	GSDA	Hinganghat	Bhiwapur	8.14	1277	830	560	-	-	-	-	-	-	80	94	45	0.0273	-

Sl. No	Agency	Taluka	Village	pH	EC	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
					(in $\mu\text{S/cm}$ at 25 C)	(mg/L)												
292	GSDA	Hinganghat	Gangapur	8.21	915	595	340	-	-	-	-	-	-	80	81	10	0.752	-
293	GSDA	Hinganghat	Jamani	8.14	908	590	390	-	-	-	-	-	-	220	25	16	0.896	-
294	GSDA	Hinganghat	Dalalpur	8.24	760	494	280	-	-	-	-	-	-	110	11	16	0.42	-
295	GSDA	Hinganghat	Jamgaon	8.46	1585	1030	580	-	-	-	-	-	-	120	52	22	0.485	-
296	GSDA	Hinganghat	Kanchangaon	7.43	649	422	240	-	-	-	-	-	-	80	82	56	0.689	-
297	GSDA	Hinganghat	Arvi	8.37	742	482	210	-	-	-	-	-	-	90	40	35	0.767	-
298	GSDA	Hinganghat	Wadner	7.69	654	425	220	-	-	-	-	-	-	140	33	15	1.102	-
299	GSDA	Hinganghat	Ajangaon	7.97	775	504	320	-	-	-	-	-	-	220	37	12	0.849	-
300	GSDA	Hinganghat	Gaul	7.95	671	436	320	-	-	-	-	-	-	160	26	29	0.888	-
301	GSDA	Hinganghat	Tembha	7.75	654	425	260	-	-	-	-	-	-	80	18	25	0.12	-
302	GSDA	Hinganghat	Borkhedi	8.34	957	622	270	-	-	-	-	-	-	210	14	34	1.009	-
303	GSDA	Hinganghat	Dabha	8.44	862	560	360	-	-	-	-	-	-	57	39	26	0.318	-
304	GSDA	Hinganghat	Ganeshpur	8.2	1245	809	600	-	-	-	-	-	-	304	17	68	0.298	-
305	GSDA	Hinganghat	Pimpalgaon	8.12	1349	877	400	-	-	-	-	-	-	190	31	42	0.737	-
306	GSDA	Hinganghat	Sirud	8.01	594	386	320	-	-	-	-	-	-	76	63	44.2	0.876	-
307	GSDA	Hinganghat	Yerandwadi	8.16	1340	871	240	-	-	-	-	-	-	133	61	32	0.776	-
308	GSDA	Hinganghat	Wagholi	8.17	1160	754	560	-	-	-	-	-	-	95	198	42	0.16	-
309	GSDA	Samudrapur	Dongargaon	8.17	543	353	260	-	-	-	-	-	-	76	65	25	0.45	-
310	GSDA	Samudrapur	Arvi	7.64	485	315	220	-	-	-	-	-	-	76	94	28	0.47	-
311	GSDA	Samudrapur	Faridpur	7.75	600	390	150	-	-	-	-	-	-	114	117	42	0.84	-
312	GSDA	Samudrapur	Sujatpur	8.21	817	531	340	-	-	-	-	-	-	74	26	36	0.71	-
313	GSDA	Samudrapur	Gangapur	8.5	815	530	320	-	-	-	-	-	-	140	110	55	0.4	-
314	GSDA	Samudrapur	Yekodi	7.55	511	332	280	-	-	-	-	-	-	60	135	88	0.65	-

Sl. No	Agency	Taluka	Village	pH	EC (in $\mu\text{S}/\text{cm}$ at 25 C)	TDS	TH Ca	Ca	Mg	Na	K	CO3	HCO3	Cl	SOR	No3	F	Fe
						(mg/L)												
315	GSDA	Samudrapur	Khek	8.02	1046	680	490	-	-	-	-	-	-	114	61	39	0.86	-
316	GSDA	Samudrapur	Bothali	8.14	785	510	210	-	-	-	-	-	-	152	85	12	0.91	-
317	GSDA	Samudrapur	Hiwara	8.1	600	390	190	-	-	-	-	-	-	57	76	45	0.96	-
318	GSDA	Samudrapur	Sukali	7.91	775	504	330	-	-	-	-	-	-	95	72	40	0.65	-
319	GSDA	Samudrapur	Antargaon	7.85	626	407	220	-	-	-	-	-	-	90	109	44	0.94	-
320	GSDA	Samudrapur	Ghorpad	8.16	1200	780	490	-	-	-	-	-	-	75	133	67	0.84	-
321	GSDA	Samudrapur	Savangi (mirzapur)	8.21	1538	1000	620	-	-	-	-	-	-	117	70	89	0.69	-
322	GSDA	Samudrapur	Mangrul	7.9	666	433	310	-	-	-	-	-	-	76	82	35	0.83	-
323	GSDA	Samudrapur	Tadgaon	8.05	500	325	190	-	-	-	-	-	-	76	4	20	0.61	-
324	GSDA	Samudrapur	Girad	8.04	800	520	280	-	-	-	-	-	-	266	15	40	0.65	-
325	GSDA	Samudrapur	Peth	7.33	1538	1000	720	-	-	-	-	-	-	140	78	81	0.79	-
326	GSDA	Samudrapur	Yedalabad	7.74	1677	1090	600	-	-	-	-	-	-	160	65	45	0.6	-
327	GSDA	Samudrapur	Bothuda	8.4	737	479	120	-	-	-	-	-	-	40	26	10	0.15	-
328	GSDA	Hinganghat	Umari	7.23	1046	680	380	-	-	-	-	-	-	95	35	45	0.55	-
329	GSDA	Samudrapur	Usegaon	8.21	908	590	380	-	-	-	-	-	-	160	3	67	0.64	-
330	GSDA	Samudrapur	Davalatpur	7.13	1309	851	580	-	-	-	-	-	-	100	35	64	0.57	-
331	GSDA	Samudrapur	Dhamangaon	8.27	840	546	430	-	-	-	-	-	-	114	125	43.6	0.91	-
332	GSDA	Samudrapur	Khursapur	8.21	969	630	490	-	-	-	-	-	-	110	57	33	0.86	-
333	GSDA	Samudrapur	Arambha	7.84	1238	805	600	-	-	-	-	-	-	76	155	10	0.78	-
334	GSDA	Samudrapur	Mangali	7.12	1175	764	520	-	-	-	-	-	-	76	25	35	0.46	-
335	GSDA	Samudrapur	Nimbha	7.81	800	520	260	-	-	-	-	-	-	75	117	42	0.91	-
336	GSDA	Samudrapur	Sirpur	7.97	1738	1130	550	-	-	-	-	-	-	113	45	45	0.81	-
337	GSDA	Samudrapur	Bhawanpur	7.89	1191	774	480	-	-	-	-	-	-	120	25	21	0.91	-

Sl. No	Agency	Taluka	Village	pH	EC (in $\mu\text{S/cm}$ at 25 $^{\circ}$ C)	TDS	TH Ca	Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SOR	No ₃	F	Fe
						(mg/L)												
338	GSDA	Samudrapur	Dhondgaon	7.92	923	600	470	-	-	-	-	-	-	117	55	23	0.71	-
339	GSDA	Samudrapur	Husenpur	7.89	582	378	220	-	-	-	-	-	-	92	11	38	0.28	-
340	GSDA	Samudrapur	Kora	7.65	920	598	290	-	-	-	-	-	-	116	56	45	0.62	-
341	GSDA	Samudrapur	Bodkha	7.62	1631	1060	640	-	-	-	-	-	-	200	26	22.6	0.25	-
342	GSDA	Samudrapur	Lokhandi	8.25	1211	787	520	-	-	-	-	-	-	111	26	33	0.25	-
343	GSDA	Samudrapur	Paikmari	8.36	1600	1040	680	-	-	-	-	-	-	105	25	22	0.2	-
344	GSDA	Samudrapur	Wadgaon	8.24	1600	1040	590	-	-	-	-	-	-	111	15	36	0.6	-
345	GSDA	Samudrapur	Shivanfal	8	1200	780	580	-	-	-	-	-	-	80	92	19	0.45	-
346	GSDA	Samudrapur	Undirgaon	8.5	669	435	280	-	-	-	-	-	-	140	36	32	0.05	-
347	GSDA	Samudrapur	Jogingumpa	8.02	1172	762	460	-	-	-	-	-	-	160	55	37	0.87	-
348	GSDA	Samudrapur	Mandgaon	8.5	908	590	280	-	-	-	-	-	-	65	25	39	0.84	-
349	GSDA	Samudrapur	Khairgaon	7.4	1285	835	520	-	-	-	-	-	-	80	35	12.62	0.45	-
350	GSDA	Samudrapur	Ralegaon	8.25	977	635	200	-	-	-	-	-	-	130	62	10.62	0.16	-
351	GSDA	Samudrapur	Wanarchuwa	7.4	708	460	260	-	-	-	-	-	-	75	10	78.26	0.85	-
352	GSDA	Samudrapur	Chakur	8.16	828	538	320	-	-	-	-	-	-	75	23	45	0.58	-
353	GSDA	Samudrapur	Kankati	7.6	923	600	440	-	-	-	-	-	-	140	125	26	0.29	-
354	GSDA	Samudrapur	Tambhari	8.01	920	598	387	-	-	-	-	-	-	80	16	9.1	0.55	-
355	GSDA	Samudrapur	Rasa	8.32	1362	885	520	-	-	-	-	-	-	80	110	40	0.92	-
356	GSDA	Samudrapur	Barfa	8.02	1146	745	410	-	-	-	-	-	-	95	46	65	0.22	-
357	GSDA	Samudrapur	Sukali	7.56	1118	727	420	-	-	-	-	-	-	110	58	28	0.82	-
358	GSDA	Samudrapur	Usegaon	7.74	908	590	460	-	-	-	-	-	-	114	9	76	0.73	-
359	GSDA	Samudrapur	Chapapur	7.66	1206	784	510	-	-	-	-	-	-	98	76	59	0.25	-
360	GSDA	Samudrapur	Girgaon	8.12	1065	692	390	-	-	-	-	-	-	109	29	44	0.48	-

Annexure VIII: Aquifer II Chemical analysis

Sl.No	Agency	District	Taluka	Village	pH	EC (in $\mu\text{S}/\text{cm}$ at 25 C)	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
							(in mg/L)											
1	GWE	Wardha	Wardha	Karanje Bhoge	8.3	576	245	245	64	21	12	1	BDL	384	14	BDL	BDL	BDL
2	GWE	Wardha	Karanja	Karanja	8.65	410	240	40	12	2	76	2	18	43	50	67	BDL	BDL
3	GWE	Wardha	Hinganghat	Daroda OW	7.9	2404	1414	50	18	1.2152	529	5.083	BDL	781.056	304.87	72	38.44	3.06
4	GWE	Wardha	Arvi	Wardhamaneri	8.43	380	200	60	22	1	60	2	12	55	71	24	BDL	BDL
5	GWE	Wardha	Seloo	Sukli	8.56	670	350	75	12	11	117	3	30	171	67	48	BDL	BDL
6	GWE	Wardha	Ashti	Choti Arvi	8.4	560	410	80	16	10	90	2	6	79	99	60	BDL	BDL
7	GWE	Wardha	Arvi	Wardhamaneri	8.7	560	330	80	24	5	115	2	12	79	117	24	BDL	BDL
8	GWE	Wardha	Deoli	Pathari	7.9	1400	880	95	36	1.2	276	5	BDL	43	284	250	9	BDL
9	GWE	Wardha	Seloo	Jhadsi	7.38	890	524	95	30	5	NA	NA	BDL	109	167	BDL	BDL	BDL
10	GWE	Wardha	Selu	Hingni EW	7.6	914	485	102	35	4	116	1.8	BDL	119	135	71	5	1.94
11	GWE	Wardha	Karanja	Karanja	8.6	1450	870	110	22	13	281	BDL	12	104	262	230	BDL	BDL
12	GWE	Wardha	Karanja	Savali	8.3	410	230	115	50	1	32	2	BDL	104	57	35	BDL	BDL
13	GWE	Wardha	Seloo	Sukli	8.6	850	450	120	8	24	138	2	48	275	14	96	BDL	BDL
14	GWE	Wardha	Hinganghat	Daroda EW	7.8	3077	1810	140	44	7.2912	632.5	3.91	BDL	848.178	496.3	110.4	17.36	2.26
15	GWE	Wardha	Selu	Hingni OW	6.8	790	430	153	39	13	114	2.2	BDL	131	133	100	3	1.94
16	GWE	Wardha	Karanja	Palora	7.6	880	500	165	56	6	122	6	BDL	195	142	77	BDL	BDL
17	GWE	Wardha	Karanja	Thanegaon	8.35	740	460	185	32	26	83	4	3	104	113	80	18	BDL
18	GWE	Wardha	Hinganghat	Bela	7.96	650	382	185	36	23	NA	NA	BDL	212	21	BDL	BDL	BDL
19	GWE	Wardha	Ashti	Sahur	8	500	260	190	44	19	28	0.5	BDL	256	18	5	17	BDL

Sl.No	Agency	District	Taluka	Village	pH	EC (in $\mu\text{S/cm}$ at 25 C)	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
							(in mg/L)											
20	GWE	Wardha	Wardha	Talegaon EW	7.5	1023	602	200	22	35.2408	156.4	4.692	BDL	286.794	177.25	29.76	56.42	0.35
21	GWE	Wardha	Wardha	Wardha	8.4	600	430	215	42	27	37	0.5	9	232	21	50	14	BDL
22	GWE	Wardha	Hinganghat	Bela	7.9	470	276	220	52	22	NA	NA	BDL	244	21	BDL	BDL	BDL
23	GWE	Wardha	Karanja	Rahati	8.15	830	488	225	54	22	87	2	BDL	256	89	62	20	0.63
24	GWE	Wardha	Deoli	Kaotha (Railway)	7.8	1110	640	240	52	27	145	2	BDL	195	209	100	5	BDL
25	GWE	Wardha	Wardha	Tigaon (EW)	7.9	405	70	260	16	7	82	BDL	BDL	268	18	BDL	BDL	BDL
26	GWE	Wardha	Deoli	Injhala	8.1	750	395	270	64	27	48	1	BDL	243	64	30	16	BDL
27	GWE	Wardha	Deoli	Kavtha	8.2	470	150	272	40	12	43	BDL	BDL	244	32	BDL	BDL	BDL
28	GWE	Wardha	Deoli	Giroli	8.3	457	199	294	25	21	40	12	12	232	48	BDL	BDL	BDL
29	GWE	Wardha	Wardha	Sonegaon	7.9	530	211	316	45	24	27	BDL	BDL	305	24	BDL	BDL	BDL
30	GWE	Wardha	Deoli	Bhidi	7.5	495	280	318	80	19	70	1	BDL	329	18	BDL	BDL	BDL
31	GWE	Wardha	Samudrapur	Pipri	8.05	1650	971	320	68	36	NA	NA	BDL	122	392	BDL	BDL	BDL
32	GWE	Wardha	Wardha	Chikni	7.8	531	270	345	60	29	23	1	BDL	345	18	45	BDL	BDL
33	GWE	Wardha	Wardha	Vaiphad	7.8	562	224	348	55	21	25	1	BDL	280	24	10	BDL	BDL
34	GWE	Wardha	Hinganghat	Sirasgaon Alipurroad	8	592	162	360	30	21	66	BDL	BDL	330	16	10	BDL	BDL
35	GWE	Wardha	Wardha	Dhotra	8.1	592	162	370	30	21	16	1	BDL	476	181	56	BDL	BDL
36	GWE	Wardha	Wardha	Sewagram	7.8	576	265	370	40	40	33	1	BDL	360	25	4.5	BDL	BDL
37	GWE	Wardha	Seloo	Dahegaon	7.83	750	441	375	80	42	NA	NA	BDL	201	77	BDL	BDL	BDL
38	GWE	Wardha	Wardha	Selsur	8.1	801	90	530	22	9	192	1	BDL	580	14	BDL	BDL	BDL
39	GWE	Wardha	Deoli	Agargaon	7.9	888	236	565	30	39	94	1	BDL	402	64	20	BDL	BDL

Sl.No	Agency	District	Taluka	Village	pH	EC (in $\mu\text{S/cm}$ at 25 C)	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
							(in mg/L)											
40	GWE	Wardha	Arvi	Mandwa	7.4	1800	1059	625	174	46	NA	NA	BDL	164	386	BDL	BDL	BDL
41	GWE	Wardha	Deoli	Injhapur	8.2	1021	199	630	75	3	149	BDL	BDL	256	BDL	132	BDL	BDL
42	GWE	Wardha	Wardha	Sonegaon R.S.	7.6	1036	436	658	134	24	27	1	BDL	378	96	40	BDL	BDL
43	GWE	Wardha	Wardha	Taroda EW	7.85	2830	1665	660	200	39	345	13	BDL	43	549	576	14	4.1
44	GWE	Wardha	Wardha	Selu Khurd	8.2	886	160	680	15	30	180	1	BDL	208	152	BDL	BDL	BDL
45	GWE	Wardha	Deoli	Adegaon	7.3	1557	505	1050	180	123	70	41	BDL	476	181	56	BDL	BDL
46	GWE	Wardha	Deoli	Sirasgaon	7.3	1666	570	1096	80	217.48	110	10	BDL	354	208	310	BDL	BDL

Annexure-IX: Location of proposed Percolation tanks in Wardha District

SN	Village	Taluka
1	Sarangpuri	Arvi
2	Chincholi	Arvi
3	Titona	Arvi
4	Bedhona	Arvi
5	Adegaon	Arvi
6	Lahadevi	Arvi
7	Sarangpuri	Arvi
8	Sarangpuri	Arvi
9	Chincholi	Arvi
10	Chincholi	Arvi
11	Panjara	Arvi
12	Lahadevi	Arvi
13	Mirapur	Arvi
14	Borgaon	Arvi
15	Chincholi	Arvi
16	Ashta	Arvi
17	Chandani	Arvi
18	Revti	Arvi
19	Panjara	Arvi
20	Pipari	Arvi
21	Sawangi	Arvi
22	Pargothan	Arvi
23	Dahegaon Mustafa	Arvi
24	Sawangi	Arvi
25	Kawadi	Arvi
26	Pacheगाon	Arvi
27	Pipari	Arvi
28	Wallipur	Arvi
29	Pargothan	Arvi
30	Sawangi	Arvi
31	Hashimpur	Arvi
32	Hardoli	Arvi
33	Titona	Arvi
34	Hiwara	Arvi
35	Krishnapur	Arvi
36	Pachod	Arvi
37	Saldara	Arvi
38	Kakaddara	Arvi
39	Bhadod	Arvi
40	Bothali Heti	Arvi
41	Talegaon	Arvi
42	Umari	Arvi

SN	Village	Taluka
43	Sukli	Arvi
44	Chandani	Arvi
45	Talegaon	Arvi
46	Sujatpur	Ashti
47	Lingapur	Ashti
48	Nachangaon	Deoli
49	Haralpur	Deoli
50	Bachchharajpur	Deoli
51	Khadki	Deoli
52	Pipri	Deoli
53	Bhidi	Deoli
54	Bhidi	Deoli
55	Wabgaon	Deoli
56	Ratnapur	Deoli
57	Kajalsara	Deoli
58	Agargaon	Deoli
59	Wakheda	Deoli
60	Kolona (Chore)	Deoli
61	Adegaon	Deoli
62	Dapori	Deoli
63	Bhidi	Deoli
64	Bhidi	Deoli
65	Ratnapur	Deoli
66	Kajalsara	Deoli
67	Babhulgaon	Deoli
68	Kajalsara	Deoli
69	Wakheda	Deoli
70	Muradgaon (Khose)	Deoli
71	Palasgaon	Deoli
72	Bhidi	Deoli
73	Durgada	Deoli
74	Fattepur	Deoli
75	Belgaon	Deoli
76	Digdoh.	Deoli
77	Inzala	Deoli
78	Gaul	Hinganghat
79	Pawani	Hinganghat
80	Kanchangaon	Hinganghat
81	Gadegaon	Hinganghat
82	Sirasgaon	Hinganghat
83	Budhalagad	Karanja
84	Budhalagad	Karanja

SN	Village	Taluka
85	Maraksur	Karanja
86	Maraksur	Karanja
87	Eni Dodka	Karanja
88	Rahati	Karanja
89	Ajandoh	Karanja
90	Tulana	Karanja
91	Bhiwapur	Karanja
92	Kannamwar Gram	Karanja
93	Sindi Vihiri	Karanja
94	Kannamwar Gram	Karanja
95	Sawali Kh	Karanja
96	Sawali Kh	Karanja
97	Agargaon	Karanja
98	Mandgaon	Samudrapur
99	Shedgaon	Samudrapur
100	Khandala	Samudrapur
101	Shivani	Samudrapur
102	Mandgaon	Samudrapur
103	Shedgaon	Samudrapur
104	Belgaon	Selu
105	Wanarvihira	Selu
106	Bori	Selu
107	Bori	Selu
108	Hingni	Selu
109	Shiwangaon	Selu
110	Gaimukh	Selu
111	Mohgaon	Selu
112	Kelzar	Selu
113	Anjangaon	Selu
114	Itala	Selu
115	Wadgaon (Jangli)	Selu
116	Kelzar	Selu
117	Seldoh	Selu
118	Dorli	Selu
119	Kinhala	Selu
120	Borkhedi	Selu
121	Juwadi	Selu
122	Dhanoli (Gawande)	Selu
123	Borkhedi (Kala)	Selu
124	Khairi Menkhat	Selu
125	Salai (Kala)	Selu
126	Salai (Pevath)	Selu
127	Nanbardi	Selu
128	Khairi Menkhat	Selu

SN	Village	Taluka
129	Salai (Kala)	Selu
130	Borkhedi	Selu
131	Khairi Menkhat	Selu
132	Sondi	Selu
133	Salai (Kala)	Selu
134	Ringani	Selu
135	Kotamba	Selu
136	Belgaon	Selu
137	Ghorad	Selu
138	Dhanoli (Meghe)	Selu
139	Kotamba	Selu
140	Chichghat	Selu
141	Chichghat	Selu
142	Bori	Selu
143	Hingni	Selu
144	Dattapur	Wardha
145	Raipalli	Wardha
146	Balapur	Wardha
147	Pipri	Wardha
148	Digraj	Wardha
149	Pipri	Wardha
150	Pandharkawda	Wardha
151	Rotha	Wardha
152	Ashrafpur	Wardha
153	Borgaon (Meghe)	Wardha
154	Paloti	Wardha
155	Banpur	Wardha
156	Inzapur	Wardha
157	Sawangi (Meghe)	Wardha
158	Salod (Hirapur)	Wardha
159	Nagthana	Wardha
160	Fattepur	Wardha
161	Inzapur	Wardha
162	Barbadi	Wardha
163	Mandavgad	Wardha
164	Yesamba	Wardha
165	Goji	Wardha
166	Goji	Wardha
167	Yesamba	Wardha
168	Yerandgaon	Wardha
169	Itlapur	Wardha
170	Abdullapur	Wardha
171	Ashta	Wardha
172	Yesamba	Wardha

SN	Village	Taluka
173	Bondapur	Wardha
174	Bhankheda	Wardha
175	Gondapur	Wardha
176	Taroda	Wardha
177	Chichala	Wardha

Annexure-X: Location of proposed check dam in Wardha district

SN	Village	Taluka
1	Belhara	Arvi
2	Chopan	Arvi
3	Fefarwada	Arvi
4	Wadhona	Arvi
5	Bedhona	Arvi
6	Belhara	Arvi
7	Belhara	Arvi
8	Chopan	Arvi
9	Fefarwada	Arvi
10	Wadhona	Arvi
11	Bedhona	Arvi
12	Borkhedi	Arvi
13	Jamkhuta	Arvi
14	Wadhona	Arvi
15	Nagazari	Arvi
16	PanjaraBothali	Arvi
17	PanjaraBothali	Arvi
18	PanjaraBothali	Arvi
19	PanjaraBothali	Arvi
20	Gaurkheda	Arvi
21	PanjaraBothali	Arvi
22	PanjaraBothali	Arvi
23	Sirpur	Arvi
24	Chor Amba	Arvi
25	Bodad	Arvi
26	Bodad	Arvi
27	Sawangi	Arvi
28	Taroda	Arvi
29	Kinhala	Arvi
30	Tuljapur	Arvi
31	Taroda	Arvi
32	Bothali Heti	Arvi
33	Bothali Heti	Arvi
34	Kinhala	Arvi
35	Taroda	Arvi
36	Pimpalkhuta	Arvi
37	Gundmund	Arvi
38	Pimpalkhuta	Arvi
39	Khairi	Arvi
40	Ratnapur	Arvi
41	Pachod	Arvi

SN	Village	Taluka
42	Saldara	Arvi
43	Ajangaon	Arvi
44	Saldara	Arvi
45	Ajangaon	Arvi
46	Saldara	Arvi
47	Wai	Arvi
48	Pachod	Arvi
49	Pachod	Arvi
50	Krishnapur	Arvi
51	Pachod	Arvi
52	Saldara	Arvi
53	Kakaddara	Arvi
54	Bhadod	Arvi
55	Bothali Heti	Arvi
56	Talegaon	Arvi
57	Umari	Arvi
58	Sukli	Arvi
59	Chandani	Arvi
60	Talegaon	Arvi
61	Nanhi	Arvi
62	Umari	Arvi
63	Talegaon	Arvi
64	Bothali Heti	Arvi
65	Talegaon	Arvi
66	Kakaddara	Arvi
67	Bothali Heti	Arvi
68	Sukli	Arvi
69	Ajangaon	Arvi
70	Umari	Arvi
71	Pachod	Arvi
72	Panwadi	Arvi
73	Ajangaon	Arvi
74	Ajangaon	Arvi
75	Pimpalgaon	Arvi
76	Pimpalgaon	Arvi
77	Tembhari	Arvi
78	Tembhari	Arvi
79	Dighi	Arvi
80	Ajangaon	Arvi
81	Morangana	Arvi
82	Dahegaon(Gondi)	Arvi

SN	Village	Taluka
83	Kachnur	Arvi
84	Morangana	Arvi
85	Bothali	Arvi
86	Bothali	Arvi
87	Patan	Arvi
88	Kachnur	Arvi
89	Dahegaon(Gondi)	Arvi
90	Kachnur	Arvi
91	Morangana	Arvi
92	Balaimajara	Arvi
93	Kachnur	Arvi
94	Kachnur	Arvi
95	Kasarkheda	Arvi
96	Mahakali	Arvi
97	Sarangpuri	Arvi
98	Chincholi	Arvi
99	Titona	Arvi
100	Bedhona	Arvi
101	Adegaon	Arvi
102	Lahadevi	Arvi
103	Sarangpuri	Arvi
104	Sarangpuri	Arvi
105	Chincholi	Arvi
106	Chincholi	Arvi
107	Panjara	Arvi
108	Lahadevi	Arvi
109	Mirapur	Arvi
110	Borgaon	Arvi
111	Chincholi	Arvi
112	Ashta	Arvi
113	Chandani	Arvi
114	Revti	Arvi
115	Panjara	Arvi
116	Pipari	Arvi
117	Sawangi	Arvi
118	Pargothan	Arvi
119	Dahegaon Mustafa	Arvi
120	Sawangi	Arvi
121	Kakaddara	Arvi
122	Bhadod	Arvi
123	Bothali Heti	Arvi
124	Talegaon	Arvi
125	Umari	Arvi

SN	Village	Taluka
126	Sukli	Arvi
127	Chandani	Arvi
128	Talegaon	Arvi
129	Nababpur	Ashti
130	Anandwadi	Ashti
131	Parsoda	Ashti
132	Lahan Arvi	Ashti
133	Pilapur	Ashti
134	Borgaon	Ashti
135	Ratnapur	Deoli
136	Kajalsara	Deoli
137	Babhulgaon	Deoli
138	Kajalsara	Deoli
139	Wakheda	Deoli
140	Muradgaon (Khose)	Deoli
141	Palasgaon	Deoli
142	Bhidi	Deoli
143	Durgada	Deoli
144	Fattepur	Deoli
145	Belgaon	Deoli
146	Digdoh.	Deoli
147	Deoli (Rural)	Deoli
148	Deoli (Rural)	Deoli
149	Muradgaon (Khose)	Deoli
150	Wai	Deoli
151	Isapur	Deoli
152	Ekpala	Deoli
153	Takli (Khode)	Deoli
154	Dighi	Deoli
155	Takli (Khode)	Deoli
156	Chikhali	Deoli
157	Kolona (Chore)	Deoli
158	Barhanpur	Deoli
159	Adegaon	Deoli
160	Adegaon	Deoli
161	Chikhali	Deoli
162	Krishnapur	Deoli
163	Giroli	Deoli
164	Sonegaon	Deoli
165	Krishnapur	Deoli
166	Chichala	Deoli
167	Chichala	Deoli

SN	Village	Taluka
168	Takali (Chanaji)	Deoli
169	Sarul	Deoli
170	Pathari	Deoli
171	Giroli	Deoli
172	Giroli	Deoli
173	Ekpala	Deoli
174	Nachangaon	Deoli
175	Bachchharajpur	Deoli
176	Khadki	Deoli
177	Pipri	Deoli
178	Bhidi	Deoli
179	Bhidi	Deoli
180	Wabgaon	Deoli
181	Ratnapur	Deoli
182	Kajalsara	Deoli
183	Agargaon	Deoli
184	Wakheda	Deoli
185	Kolona (Chore)	Deoli
186	Adegaon	Deoli
187	Dapori	Deoli
188	Bhidi	Deoli
189	Bhidi	Deoli
190	Ratnapur	Deoli
191	Kajalsara	Deoli
192	Babhulgaon	Deoli
193	Kajalsara	Deoli
194	Wakheda	Deoli
195	Muradgaon (Khose)	Deoli
196	Palasgaon	Deoli
197	Bhidi	Deoli
198	Durgada	Deoli
199	Fattepur	Deoli
200	Chichala	Deoli
201	Chichala	Deoli
202	Takali (Chanaji)	Deoli
203	Sarul	Deoli
204	Pathari	Deoli
205	Giroli	Deoli
206	Giroli	Deoli
207	Ekpala	Deoli
208	Nachangaon	Deoli
209	Bachchharajpur	Deoli

SN	Village	Taluka
210	Khadki	Deoli
211	Pipri	Deoli
212	Bhidi	Deoli
213	Bhidi	Deoli
214	Wabgaon	Deoli
215	Ratnapur	Deoli
216	Kajalsara	Deoli
217	Agargaon	Deoli
218	Wakheda	Deoli
219	Ratnapur	Deoli
220	Kajalsara	Deoli
221	Allipur	Hinganghat
222	Arvi	Hinganghat
223	Pimpalgaon	Hinganghat
224	Gaul	Hinganghat
225	Pawani	Hinganghat
226	Kanchangaon	Hinganghat
227	Gadegaon	Hinganghat
228	Sirasgaon	Hinganghat
229	Daroda	Hinganghat
230	Tivsadi	Hinganghat
231	Katri	Hinganghat
232	Sirasgaon	Hinganghat
233	Wela	Hinganghat
234	Dhaga	Karanja
235	Bangadapur	Karanja
236	Ambhora	Karanja
237	Ajandoh	Karanja
238	Nandora	Karanja
239	Jaurkheda	Karanja
240	Ambhora	Karanja
241	Ambhora	Karanja
242	Sindi Vihiri	Karanja
243	Budhalagad	Karanja
244	Budhalagad	Karanja
245	Maraksur	Karanja
246	Maraksur	Karanja
247	Eni Dodka	Karanja
248	Rahati	Karanja
249	Ajandoh	Karanja
250	Tulana	Karanja
251	Bhiwapur	Karanja

SN	Village	Taluka
252	Kannamwar Gram	Karanja
253	Sindi Vihiri	Karanja
254	Kannamwar Gram	Karanja
255	Sawali Kh	Karanja
256	Sawali Kh	Karanja
257	Agargaon	Karanja
258	Dongargaon	Karanja
259	Joga	Karanja
260	Joga	Karanja
261	Dhanoli	Karanja
262	Umar Vihiri	Karanja
263	Ajandoh	Karanja
264	Kundi	Karanja
265	Kharas Khanda	Karanja
266	Kharas Khanda	Karanja
267	Ambhora	Karanja
268	Ambhora	Karanja
269	Sindi Vihiri	Karanja
270	Budhalagad	Karanja
271	Budhalagad	Karanja
272	Maraksur	Karanja
273	Maraksur	Karanja
274	Eni Dodka	Karanja
275	Rahati	Karanja
276	Ajandoh	Karanja
277	Tulana	Karanja
278	Tekadi	Samudrapur
279	Bothali	Samudrapur
280	Ralegaon	Samudrapur
281	Dhumankheda.	Samudrapur
282	Govindpur	Samudrapur
283	Shivani	Samudrapur
284	Mandgaon	Samudrapur
285	Shedgaon	Samudrapur
286	Khandala	Samudrapur
287	Harankhuri	Samudrapur
288	Hiwara	Samudrapur
289	Dahegaon	Samudrapur
290	Lahori	Samudrapur
291	Dhumankheda.	Samudrapur
292	Haladgaon	Samudrapur
293	Khandala	Samudrapur
294	Ajda	Samudrapur

SN	Village	Taluka
295	Dongargaon	Selu
296	Mungapur	Selu
297	Mohgaon	Selu
298	Jungad	Selu
300	Bibi	Selu
301	Kelzar	Selu
302	Kelzar	Selu
303	Kinhala	Selu
304	Itala	Selu
305	Kinhala	Selu
306	Kolgaon	Selu
307	Kelzar	Selu
308	Kolhi	Selu
309	Kelzar	Selu
310	Itala	Selu
311	Hamdapur	Selu
312	Bondsula	Selu
313	Anjangaon	Selu
314	Charmandal	Selu
315	Chanki	Selu
316	Chanki	Selu
317	Dahegaon (Gosai)	Selu
318	Hamdapur	Selu
319	Junona	Selu
320	Deulgaon	Selu
321	Hamdapur	Selu
322	Wadgaon (Jangli)	Selu
323	Kelzar	Selu
324	Seldoh	Selu
325	Dorli	Selu
326	Khapri (Dhone)	Selu
327	Ganeshpur	Selu
328	Wadgaon (Jangli)	Selu
329	Khadki	Selu
330	Khadki	Selu
331	Dahegaon (Gosai)	Selu
332	Tuljapur	Selu
333	Pahelanpur	Selu
334	Dodaki	Selu
335	Dodaki	Selu
336	Dodaki	Selu
337	Bothali	Selu
338	Takali	Selu

SN	Village	Taluka
339	Khairi	Selu
340	Borkhedi	Selu
341	Juwadi	Selu
342	Dhanoli (Gawande)	Selu
343	Borkhedi (Kala)	Selu
344	Khairi Menkhat	Selu
345	Salai (Kala)	Selu
346	Salai (Pevath)	Selu
347	Nanbardi	Selu
348	Khairi Menkhat	Selu
349	Salai (Kala)	Selu
350	Borkhedi	Selu
351	Khairi Menkhat	Selu
352	Sondi	Selu
353	Salai (Kala)	Selu
354	Ringani	Selu
355	Kotamba	Selu
356	Belgaon	Selu
357	Ghorad	Selu
358	Dhanoli (Meghe)	Selu
359	Kotamba	Selu
360	Chichghat	Selu
361	Chichghat	Selu
362	Jogapur	Selu
363	Manoli	Selu
364	Junewani	Selu
365	Bori	Selu
366	Bori	Selu
367	Junewani	Selu
368	Wanarvihira	Selu
369	Gohda (Kh)	Selu
370	Bori	Selu
371	Hingni	Selu
372	Shiwangaon	Selu
373	Bibi	Selu
374	Jungad	Selu
375	Mohgaon	Selu
376	Mungapur	Selu
377	Nimboli	Selu
378	Gohda (Kh)	Selu
379	Sonegaon	Selu
380	Bramhani	Selu
381	Mohgaon	Selu

SN	Village	Taluka
382	Kelzar	Selu
383	Anjangaon	Selu
384	Itala	Selu
385	Wadgaon (Jangli)	Selu
386	Kelzar	Selu
387	Seldoh	Selu
388	Raipur (Jangli)	Selu
389	Tamaswada	Selu
390	Takali	Selu
391	Borkhedi	Selu
392	Pimpal Shenda	Selu
393	Khairi Menkhat	Selu
394	Juwadi	Selu
395	Khairi Menkhat	Selu
396	Khairi Menkhat	Selu
397	Salai (Kala)	Selu
398	Salai (Kala)	Selu
399	Nanbardi	Selu
400	Salai (Pevath)	Selu
401	Dorli	Selu
402	Belgaon	Selu
403	Wanarvihira	Selu
404	Bori	Selu
405	Bori	Selu
406	Hingni	Selu
407	Shiwangaon	Selu
408	Dhotra	Wardha
409	Rotha	Wardha
410	Dhotra	Wardha
411	Dahegaon Miskin	Wardha
412	Amboda	Wardha
413	Tigaon	Wardha
414	Degaon	Wardha
415	Dahegaon Miskin	Wardha
416	Amboda	Wardha
417	Dhamangaon	Wardha
418	Wathoda	Wardha
419	Tigaon	Wardha
420	Umari	Wardha
421		Wardha
422	Umari	Wardha
423	Umari	Wardha
424	Tigaon	Wardha

SN	Village	Taluka
425	Digraj	Wardha
426	Pipri	Wardha
427	Digraj	Wardha
428	Pipri	Wardha
429	Pandharkawda	Wardha
430	Rotha	Wardha
431	Ashrafpur	Wardha
432	Borgaon (Meghe)	Wardha
433	Paloti	Wardha
434	Banpur	Wardha
435	Inzapur	Wardha
436	Sawangi (Meghe)	Wardha
437	Salod (Hirapur)	Wardha
438	Nagthana	Wardha
439	Fattepur	Wardha
440	Inzapur	Wardha
441	Barbadi	Wardha
442		Wardha
443	Satoda	Wardha
444	Warud	Wardha
445	Masala	Wardha
446	Selukate	Wardha
447	Inzapur	Wardha
448	Chichala	Wardha
449	Chitoda	Wardha
450		Wardha
451	Barbadi	Wardha
452	Ashta	Wardha
453	Aminpur	Wardha
454	Walhapur	Wardha
455	Neri	Wardha
456	Shivapur	Wardha
457	Kutki	Wardha
458	Karanji (Bhoge)	Wardha
459	Nandora	Wardha
460	Kharangana (Gode)	Wardha
461	Sondlapur	Wardha
462	Mandavgad	Wardha
463	Yesamba	Wardha
464	Goji	Wardha

SN	Village	Taluka
465	Goji	Wardha
466	Yesamba	Wardha
467	Yerandgaon	Wardha
468	Itlapur	Wardha
469	Abdullapur	Wardha
470	Ashta	Wardha
471	Yesamba	Wardha
472	Bondapur	Wardha
473	Bhankheda	Wardha
474	Gondapur	Wardha
475	Taroda	Wardha
476	Sakhara	Wardha
477	Waigaon	Wardha
478	Pujai	Wardha
479	Bhankheda	Wardha
480	Dahegaon Misikin	Wardha
481	Waifad	Wardha
482	Tigaon	Wardha
483	Umari	Wardha
484	Rotha	Wardha
485	Umari	Wardha
486	Digraj	Wardha
487	Borgaon (Nandora)	Wardha
488		Wardha
489	Padhegaon (Mokashi)	Wardha
490	Jamtha	Wardha
491	Selukate	Wardha
492	Sawangi (Meghe)	Wardha
493	Barbadi	Wardha
494	Warud	Wardha
495	Bhuigaon	Wardha
496	Bhuigaon	Wardha
497	Ashta	Wardha
498	Waigaon	Wardha
499	Sevagram	Wardha
500	Nagapur	Wardha
501	Sonegaon	Wardha
502	Dattapur	Wardha
503	Raipalli	Wardha

