



**केन्द्रीय भूमि जल बोर्ड**  
जल संसाधन, नदी विकास और गंगा संरक्षण  
विभाग, जल शक्ति मंत्रालय  
भारत सरकार

**Central Ground Water Board**  
Department of Water Resources, River  
Development and Ganga Rejuvenation,  
Ministry of Jal Shakti  
Government of India

## **AQUIFER MAPPING AND MANAGEMENT OF GROUND WATER RESOURCES**

**GONDIA DISTRICT  
MAHARASHTRA**

मध्यक्षेत्र, नागपुर  
**Central Region, Nagpur**

**AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN,  
GONDIA DISTRICT, MAHARASHTRA**  
(AAP 2021-22)

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## GONDIA DISTRICT AT A GLANCE

1. GENERAL INFORMATION			
	Geographical Area	: 5209.18 sq.km	
	Administrative Divisions (2011)	: 8 (Amgaon, Deori, Gondia, Goregaon, Sadak arjuni, Arjuni moregaon, Saleksa, Tirora)	
	Villages (Census 2011)	: 942	
	Population	: 1322507	
	Rainfall 2021	: 1340.88 mm	
	Normal rainfall (1998-2021)	: 1517.4	
	Long term rainfall Trend (1998-2021)	: $y = -9.622x + 1421.1$	
2. GEOMORPHOLOGY AND DRAINAGE			
	Major Physiographic unit	: The district can be broadly divided into two units viz; the one controlled by structural features i.e the structural origin (hills and ridges) and the other controlled by differential weathering i.e the denudation origin (pediments/pediains)	
	Major Drainage	: Basin: Entire district falls in Godavari Basin Sub Basins: Middle Wainganga Major River: Waingang river and its tributaries namely Bagh, Bavanthadi, Chulbandh, Garhvi and Sur rivers.	
3. LAND USE (2019-20) <i>(sources: mahasdb.maharashtra.gov.in/district Report)</i>			
	Forest Area	: 1508.10sq. km.	
	Net Area Sown	: 3184.51sq. km.	
	Cultivable Area	: 2265.85sq. km.	
4.	<b>SOIL TYPE</b>	: The main types of soils are Sandy clay, Sandy clay loam, Clay loam, gravely clay, Gravely sandy loam etc.	
5. PRINCIPAL CROPS (2020)			
	Rice	: 2010.69 sq. km.	
	Wheat	: 127.54 sq. km.	
	Sugarcane	: 10 sq. km.	
	Total Pulses	: 137.9 sq. km.	
	Vegetables	: 32.30 sq. km	
6. HORTICULTURAL CROPS			
	Mango	: 1.15 sq. km.	
	Grapes	: -	
	Citrus fruit	: 0.2	
	Banana	: -	
	Others	: 0.22 sq. km.	
7. IRRIGATION BY DIFFERENT SOURCES (2020)-			
		Nos.	Potential Created (ha)
	Dug wells	: 16533	20309
	Tube wells/Bore wells	: 308	485
	Surface Flow Schemes	: 2505	67146

	Lift Irrigation Schemes	:	18	1028
<b>8. GROUND WATER MONITORING WELLS (As on March 2022)</b>				
	Dug wells	:	30	
	Piezometers	:	03	
<b>9. GEOLOGY</b>				
	Recent & Pleistocene	:	Laterite, Alluvium	
	Upper Cretaceous-Lower Eocene	:	Dongargarh Super group - Andesite, Rhyolite, Granite, Sandstone etc.	
	Archean	:	Sakoli Group - Amphibolite Schist, Gniess, Quartzite, Phyllites.	
<b>10. HYDROGEOLOGY</b>				
	Pre-cambrian	:	Metamorphic and igneous rocks, fractured and jointed. Under phreatic, semi-confined to confined conditions.	
<b>Depth to water level in Shallow Aquifer</b>				
	Pre-monsoon Depth to Water Level (May-2021)	:	Major Area: 2-5 mbgl (147.4sq km), 5-10 mbgl (3074.2sq km) and 10-20 m bgl (1965.0sqkm)	
	Post-monsoon Depth to Water Level (Nov.-2021)	:	Major Area: 0-2mbgl (3443sq km), 2-5 mbgl (1301), 5-10 m bgl (416sq km) and 10-20 m (24sq km)	
<b>Depth to water level in Deeper Aquifer</b>				
	Pre- monsoon Depth to Water Level (May-2021)	:	Major Area: 5-10 m bgl (3730 sq km), 10-20m bgl (250 sq km) and 2-5 (1206 sq km)	
	Post-monsoon Depth to Water Level (Nov.-2021)	:	Major Area: 2-5 m bgl (899 sq km), 5-10 m bgl (2480 sq km), 10-20mbgl (963 sq km), 20-30mbgl (346 sq km), 30-50mbgl (497 sq km)	
<b>Water level Trend (2012-21)</b>				
	Pre- monsoon Water Level Trend (2012-2021)	:	Rise: 0.0024 to 1.1027m/year Fall: 0.018 to 0.7374 m/year	
	Post-monsoon Water Level Trend (2012-2021)	:	Rise: 0.004 to 0.4464 m/year Fall: 0.0006 to 1.084 m/year	
<b>11. GROUND WATER EXPLORATION (As on March 2022)</b>				
	Wells Drilled	:	EW-21 OW-11 and 03 Pz <b>Total -35</b>	
	Depth Range	:	30.0 to 200 mbgl	
	Discharge	:	0.025 – 1218 lps	
	Drawdown	:	0 to 43.04 m	
	Transmissivity	:	3.4 to 59.54	
	Storativity	:	1.70x10 <sup>-5</sup> to 2.77x10 <sup>-3</sup>	
<b>12. GROUND WATER QUALITY</b>				



	Good and suitable for drinking and irrigation purposes except Nitrate and Fluoride affected villages.	
	Type of Water	:
<b>13. DYNAMIC GROUND WATER RESOURCES- (2020)</b>		
	Annual Extractable Ground Water Resource	: 625.49 MCM
	Ground Water Extraction for Irrigation Use	: 101.53 MCM
	Ground Water Extraction for Industrial Use	: 2.97 MCM
	Ground Water Extraction for Domestic Use	: 59.0949 MCM
	Annual GW Allocation for Domestic Use as on 2025	: 59.0992 MCM
	Net Ground Water Availability for future use	: 461.88 MCM
	Stage of Ground Water Development	: 28.20 %
	Category	<b>Safe</b>
<b>14.</b>	<b>MAJOR GROUND WATER PROBLEMS AND ISSUES</b>	
	<ul style="list-style-type: none"> <li>Declining water level trend of more than 0.2 m/year has been observed in major part of district due to water intensive crops like Paddy (main crop).</li> <li>About 60% area of the district is having low yield potential (&lt;1 lps).</li> <li>Quality of ground water in the district is in general good and potable. It is suitable for domestic and irrigation purposes. However, Electrical Conductivity, Nitrate and Fluoride concentration beyond permissible limit are noticed in some parts of district.</li> </ul>	
<b>15.</b>	<b>Aquifer Management Plan</b>	
	Supply side Management	: Proposed AR structures: 25 Percolation tanks and 72 Check dams
	Demand side Management	: 9.20 sq. km. area proposed for Drip irrigation
	Expected Benefits	: <ul style="list-style-type: none"> <li>Additional GW Resources enhanced by Supply side intervention (AR) = 5.35 MCM</li> <li>Water saving through adopting Micro Irrigation in sugarcane crop area = 5.24MCM</li> <li>Balance GWR available for Development after SOD 70% – 283.23 MCM</li> <li>Even after above, SOD will be 70% (safe category)</li> </ul> Increase in GW Availability & Sustainability

**AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN,  
GONDIA DISTRICT, MAHARASHTRA  
(AAP 2021-22)**

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# **AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, GONDIA DISTRICT**

## **1.0 INTRODUCTION**

National Aquifer Mapping (NAQUIM) has been taken up in XII five-year plan by CGWB to carry out detailed hydrogeological investigation on 1:50,000 scale. 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 geologic, geophysical, hydrologic and chemical analyses is applied to characterize the quantity, quality and sustainability of ground water in aquifers.

The vagaries of rainfall, inherent heterogeneity & poor sustainability of hard rock 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 ground water 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 Gondia 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**

The district comes under Nagpur division (Vidarbha) in Maharashtra State. It is newly formed district and carved out by the division of Bhandara district in May 1999. Gondia district as well as its parent district is unique in Maharashtra and differs from the rest of the State in the following ways: -

- i. The entire area of the district is occupied by crystalline rocks while rest of the State is covered by Deccan Basalt.
- ii. Paddy is the staple food crop of the district while wheat is the main agriculture produce in the rest of the State.

Gondia district is situated on North-Eastern side of Maharashtra state having state borders of Madhya Pradesh and Chattisgarh. It lies between latitudes 20.39 to 21.38 North and longitudes 79.27 to 80.42 East, Elevations ranging from 263 to 315 m ams. The total area of the district is 5209.18sq. km. and falls in parts of survey of India degree sheets 64C/4, 64D/1, 64C/7 and 54P/13. It is bounded by south and west are Chandrapur district and Bhandara district of Maharashtra.

The district headquarters is located at Gondia Town. For administrative convenience, the district is divided into 8 blocks i.e., Amgaon, Deori, Gondia, Goregaon, Sadak arjuni, Arjuni morgaon, Saleksa, Tirora. It has a total population of 1322507 as per 2011 Census. The district has 8 towns/blocks and 942 villages. The district forms part of Godavari Basin and subbasins of Middle Wainganga. Wainganga river and its tributaries namely Bagh, Bavanthadi, Chulbandh, Garhvi and Sur rivers are the main rivers flowing through the district. The overall stage of ground water development for the district is 28.20 % district is categorized as safe as per Ground Water Resources Estimation 2020. The Administrative and Index map of the Gondia district is presented in **Fig. 1.1 and Fig. 1.2**.

Gondia district has been taken up under NAQUIM study during the year 2021-22. The total area of the district is about 5209 sq. km. Central Ground Water Board has taken up several studies in the district since 1986-87 including Systematic Hydrogeological Survey (1987-88), Drought Relief Work, Reappraisal Hydrogeological Studies done in 1991-92 Wainganga Basin, north western parts of gondia district and 1995-96 Wanganga Basin, northern part of Gondia district. The data generated have been shared with the Central, State agencies as well as with the stake holders in the form of reports, maps etc.

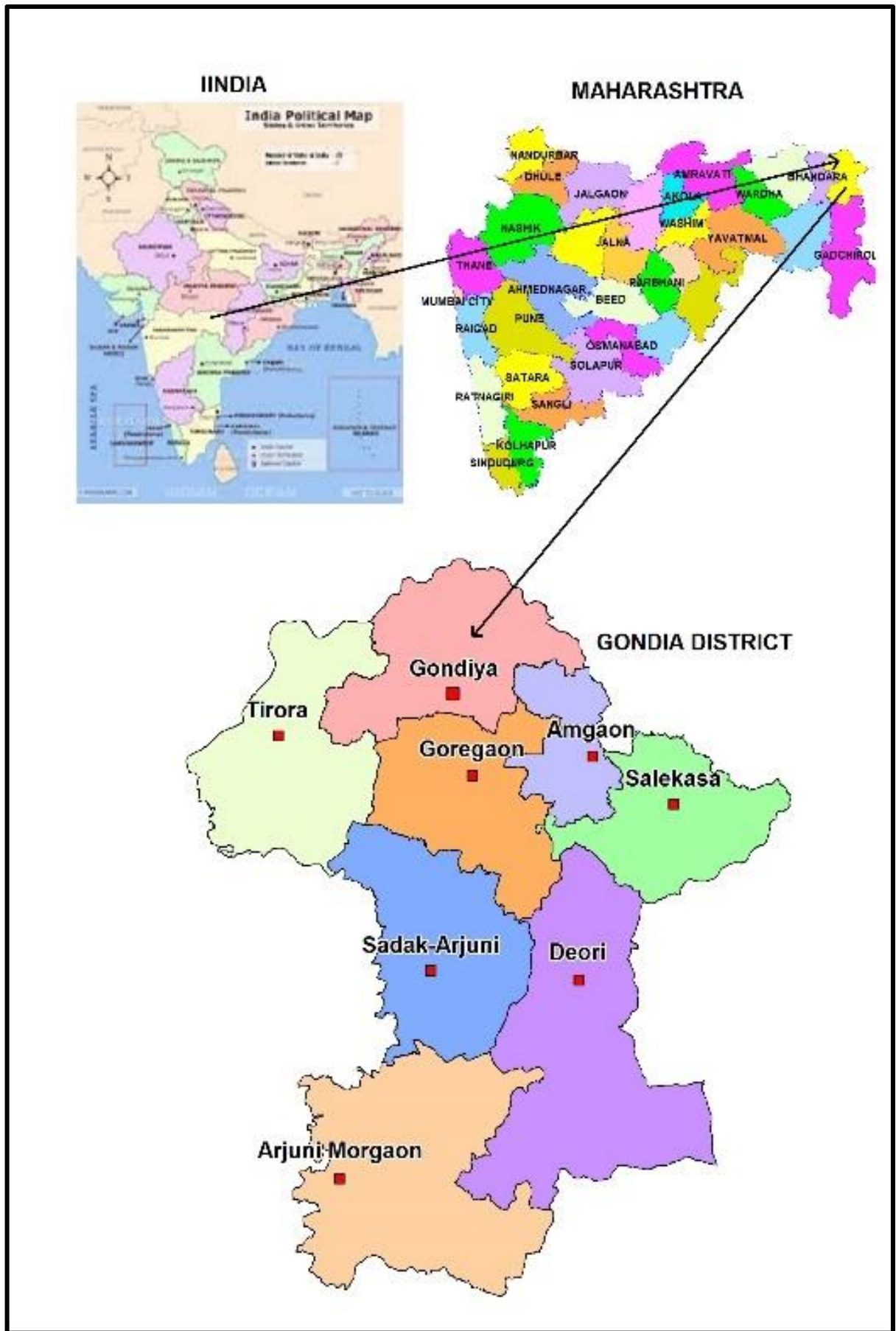
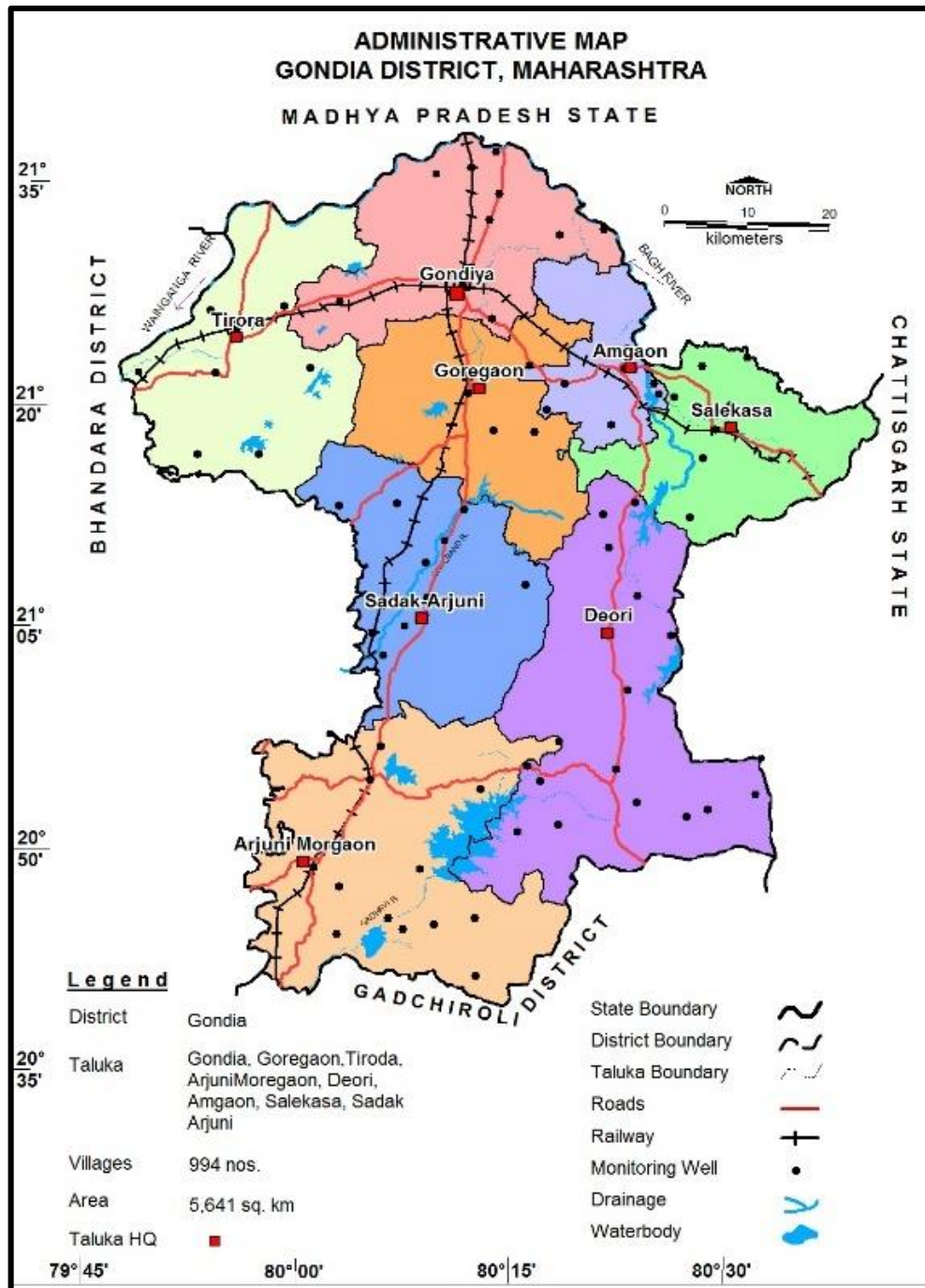


Figure 1. 1:Index map, Gondia District

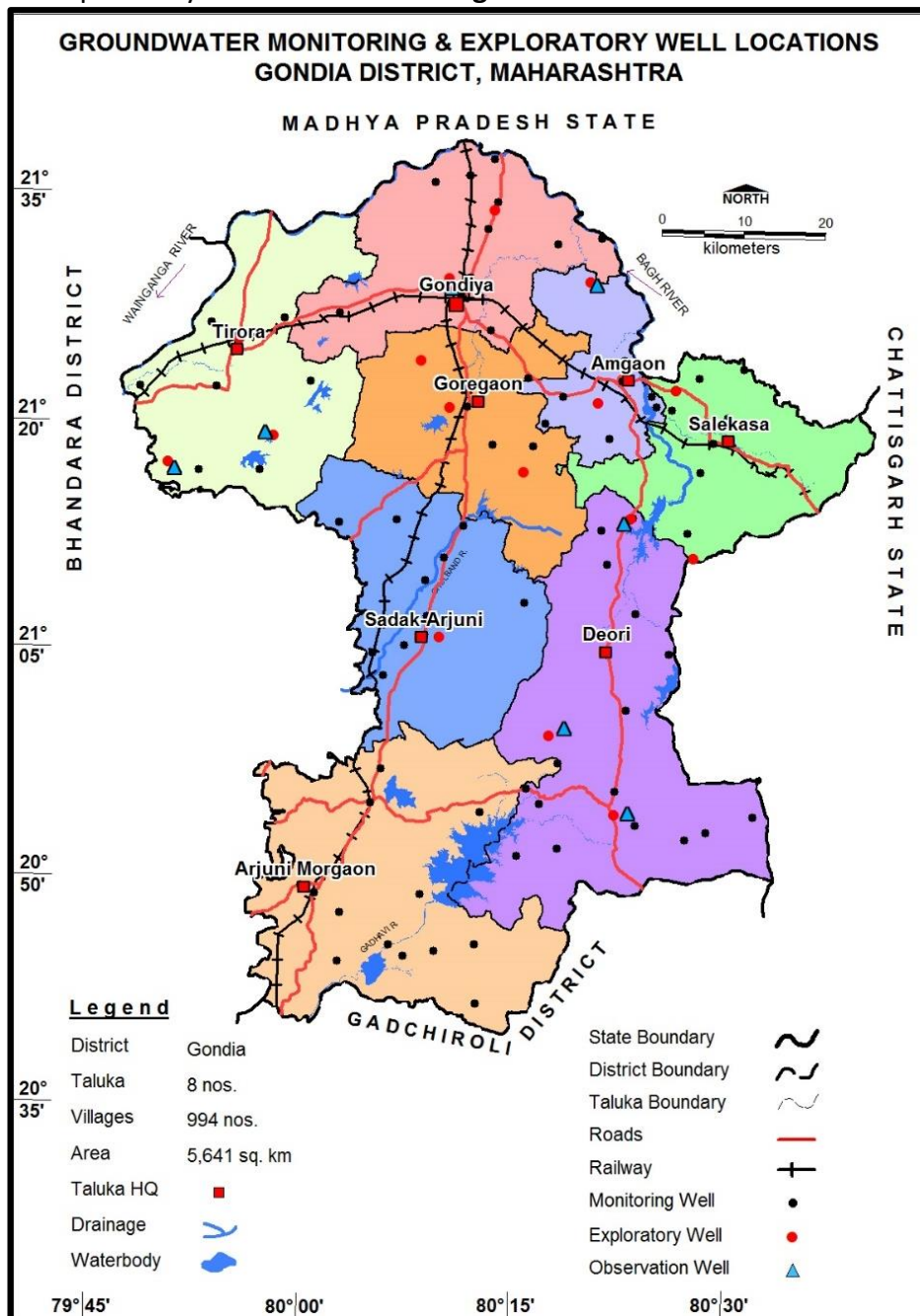


**Figure 1. 2 : Administrative map, Gondia District**

The exploratory drilling programme in Gondia district was started in the year 1992-93 and a total of 21 exploratory wells, 11 observation wells and 3 Piezometers have been drilled till 2022 in the district, tapping weathered granites and gneisses. The drilling was carried out by a DTH and rotary Rig down to depths of 24.50 to 201.50 m bgl. Two to three water-bearing zones were tapped totalling to a thickness varying from 3 to 30 m. The shallowest zone was struck at 10.30 m bgl while the deepest zone at 129.30 m bgl. The static water level ranged from 2.24-17.20 m bgl. Preliminary yield tests have shown yields ranging from 0.38 to 7.76 lps with six wells having yields of more than 3 lps. The transmissivity of these wells ranged from 3.42 to 56.00 m<sup>2</sup> /day while the Storativity ranges from 2.1 x 10<sup>-3</sup> to 1.7 x 10<sup>-5</sup>. The specific capacities of these tubewells ranged from 0.19 to 0.80 lpm/m of drawdown.



To assess the ground water regime, 104 existing ground water monitoring stations were being monitored 4 times in a year. Locations of existing ground water monitoring stations and exploratory wells are shown in Fig. 1.3.



**Figure 1. 3:Locations of Existing Exploratory and Ground Water Monitoring Wells**

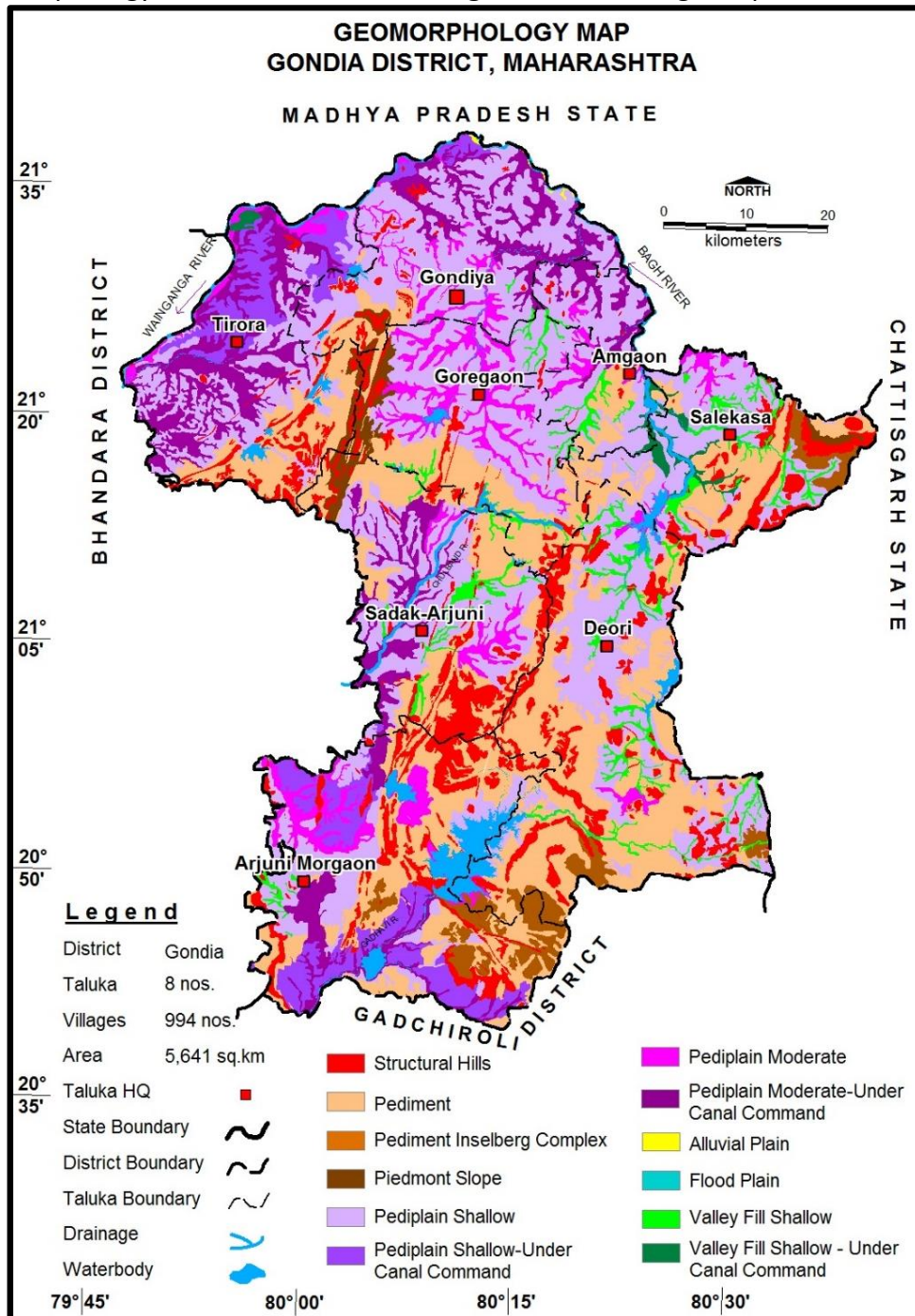
## 1.2 GEOMORPHOLOGY, DRAINAGE AND SOIL TYPES

The district forms part of Wainganga sub-basin and has an undulating terrain with elevations ranging from 263 to 315 m amsl. Physiographically, the district can be broadly divided into two physiographic units viz., the one controlled by structural features i.e., the Structural Origin and the one controlled by differential weathering i.e., the Denudation Origin. The structural hills and ridges are more common in the eastern and south eastern parts of the district, while the denudational features like pediments/pedi plains are seen in

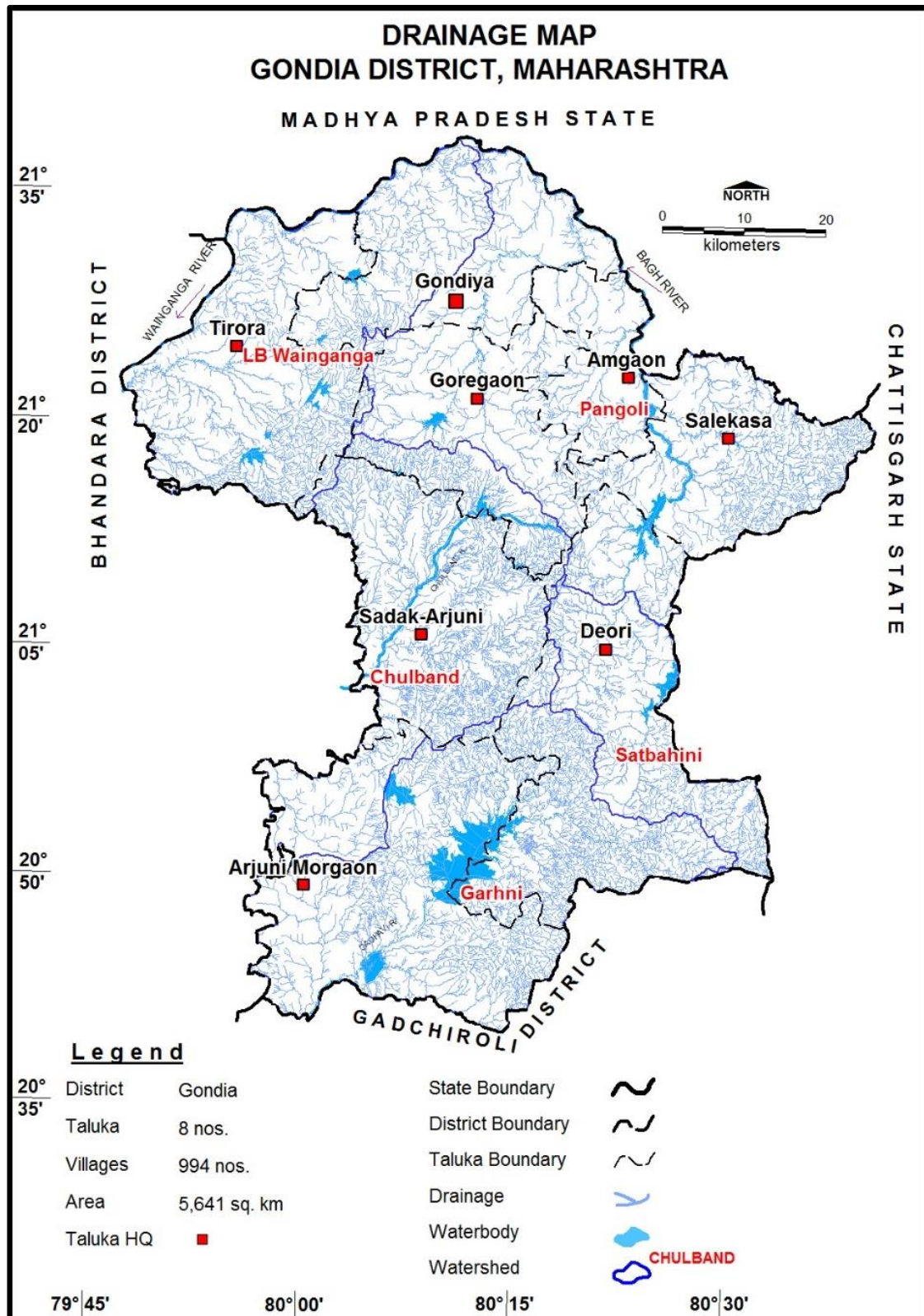
north-central, west central and south-west portions.

The main river flowing in Gondia district is Wainganga & Wagh, Chulbndh and Godhavi are its tributaries. The general slope of area is towards south west direction. Drainage pattern of the area is parallel to sub parallel. Based on geomorphological setting and drainage pattern, the district is divided into 40 watersheds.

The geomorphology of the area is shown in **Fig. 1.4** and Drainage map is shown in **Fig. 1.5**.



**Figure 1. 4: Geomorphology, Gondia District**



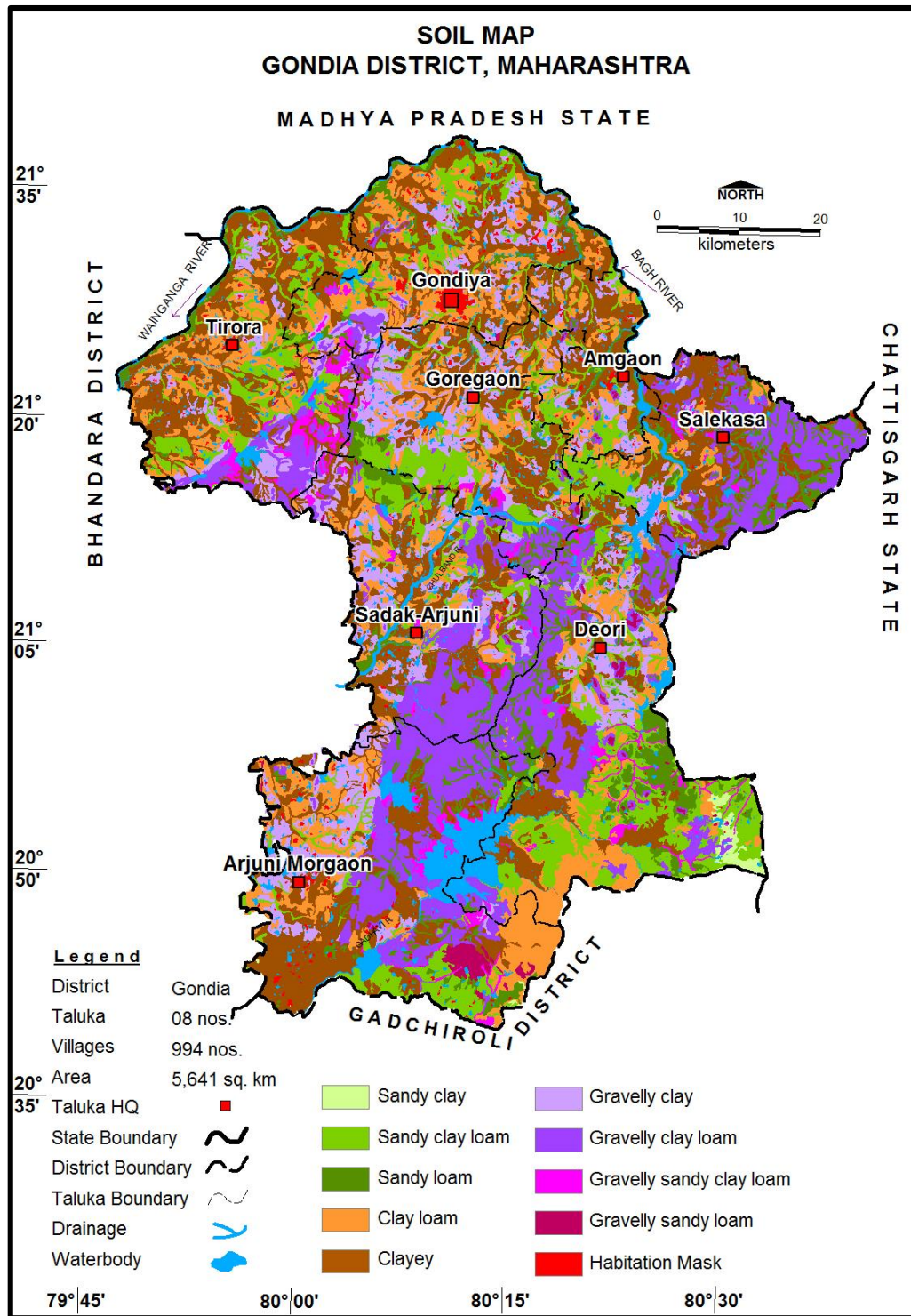
**Figure 1. 5: Drainage, Gondia District**

Soil plays a very important role in the agricultural activities and forest growth of the area. The fertility of the soil from agricultural point of view depends upon the texture and structure which controls the retaining and transmitting capacity of the soil to hold the moisture content and various nutrients such as nitrogen, phosphorous and potassium



present in the parent rock. The process of formation of the soil in the area is influenced by the climate, geology, vegetation and topography.

The characteristics and distribution of soils in the region are influenced essentially by the nature and intensity of weathering and the mode and rapidity of fluvial transport on the plateau. The main types of soils are Sandy clay, Sandy clay loam, Clay loam, gravely clay, Gravely sandy loam etc and locally called as Kali, kanhar, sihar, morand, khardi and bardi are found in this region. The area under kali is not very extensive and it occurs in form of regional pockets in Tiroda taluka. Kanhar denotes a very rich alluvial soil. Sihar is a reddish yellow soil formed mainly of the detritus of the crystalline rock. It cracks very little in hot weather. Morand soil is very sticky and retentive of moisture and bears a double crop. Morand class II and Sihar, cover altogether one third of the total cultivated area in the region Very inferior type of sihar is known as Khardi. Kanhar and first class morand soils are chiefly found in the plains and along the Bagh River. In the valleys of the Bagh River, the soil consists of sandy loam of varying quality which is very suitable for the cultivation of rice. Both Morand class II and Sihar soils are utilized for cultivation of rice; but the sihar is perhaps prominently the rice soil while Morand especially, where it is purest, grows jowar, wheat and linseed. Soils derived from granitic decomposition are generally light and with their low productivity are suitable only for kharif crops like paddy and jowar.



**Figure 1. 6 : Soil, Gondia District**

**Soil Infiltration test:** To estimate the actual rate of infiltration in various soil types and their impact on recharge to ground water in Gondia district, two soil infiltration tests were conducted at Kaneri ram and Anjora villages on various soil types. The data has been analyzed and the salient features of the soil infiltration tests are presented in **Table 1.1**. The duration of the test ranged from 100 to 120 minutes and the infiltration rate in the area ranged from 1.2 to 1.8 cm/hr.

Based on soil infiltration test it is observed that:

- Soils with low Infiltration rate shall be responsible for high runoff and become saturated

during rain events. There will be less recharge to ground water. This in turn decreases soil strength and increases erosion potential.

- Soils that have less Infiltration rates lead to an increase in the overall volume of runoff. The excess run off caused by low Infiltration rate of soils may also contribute to local and regional flooding of streams and rivers or may result in accelerated soil erosion of fields or stream banks.
- Soil infiltration rate varies from 1.2 cm/hr (Sadak Arjuni block) to 1.8 cm/hr (Amgaon block).

**Table 1. 1: Salient Features of Infiltration Tests**

S.No.	District	Block	Location	Latitude	Longitude	Rate of infiltration (cm/hr)
1	Gondia	Sadak Arjuni	Kaneri ram	21.032918	79.762218	1.20
2	Gondia	Amgaon	Anjora	21.299127	80.404729	1.80

### 1.3 CLIMATE AND RAINFALL

Gondia District experiences extreme variations in temperature with very hot Summers and very cold Winters and a general dryness throughout the year except during the south west monsoon season, which is from June to September while October and November constitute the post-monsoon season. The winter season commences towards the end of November when temperatures begin to fall rapidly. December is the coldest month and the mean minimum temperature during winter is 7.4°C. From the beginning of March, the daily temperature increases continuously. May is the hottest month with the mean maximum temperature of 47.5°C recorded in the year 2011. With the onset of the south-west monsoon by the second week of June, the temperature falls appreciably and average relative humidity 62 percent.

Rainfall is the minimum in the north-west, south-east direction and increases in the north-east direction. Tiroda receives the minimum rainfall of 1173 mm while the maximum rainfall of 1359 mm is received at Gondia.

The normal rainfall of the district is 1352.6 mm spread over 54 rainy days in normal conditions. Annual rainfall data of 1998-2021 is analysed and presented in Fig. 1.7. This indicates that Minimum rainfall occurred in 2017 (776.7 mm) and maximum rainfall in 2013 (1920.8 mm). The rainfall trend analysis shows a falling trend @ 9.6 mm/year. The rainfall analysis show that the departure of annual rainfall from the normal rainfall, expressed in terms of percentage, varied from -42 to 42 percent. The departure percent analysed denotes the rainfall variation pattern occurred during the period. The area experienced 2 times (8%) excess rainfall, 20times (83%) normal rainfall and 2 times (8%) moderate drought conditions as given in Table 1.2. The coefficient of variation of the annual rainfall from the mean rainfall has been observed to be 19.62% The isohyet map of the district is depicted in Figure 1.8.

The block wise annual rainfall data (1998-2021) of Gondia district is shown in Table 1.2. Based on rainfall data analysis it is observed that:

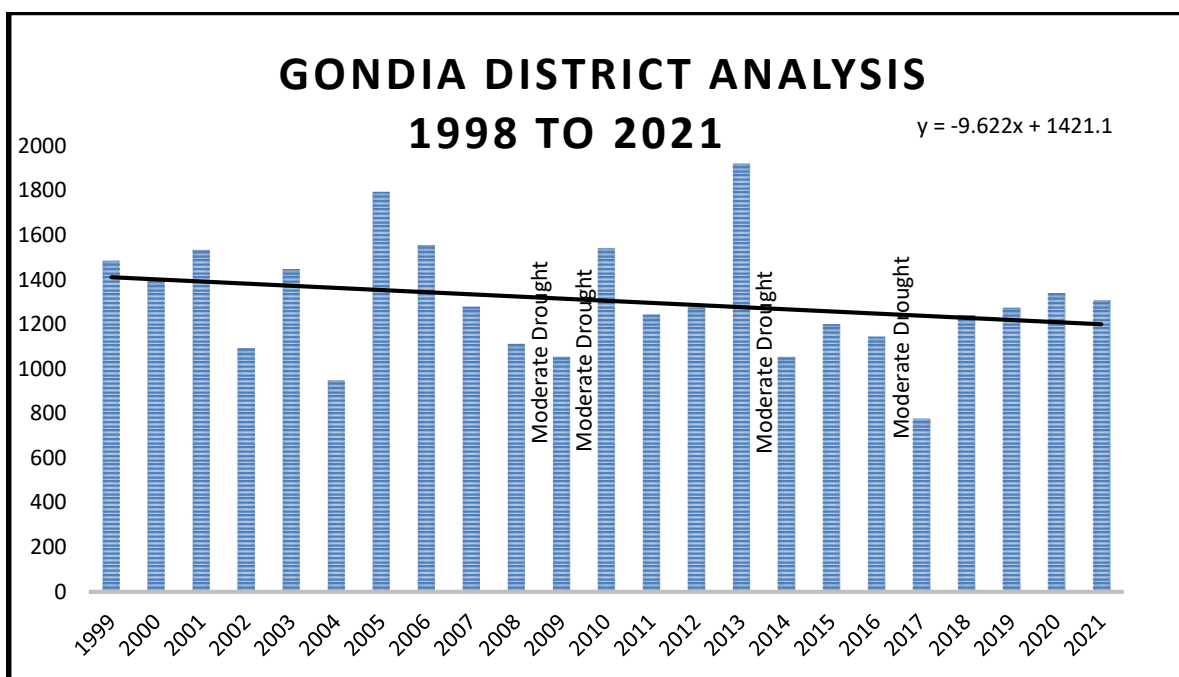
- The Average Annual rainfall in the district varies from 1173.6 (Tiroda block) to 1359.6 mm (Amgaon block).
- The Normal annual rainfall in the district varies between 1133.9 mm in Goregaon block and 1573.1 mm in Gondia block.

**Table 1. 2: Long Term Rainfall Analysis (1998 to 2021) of Gondia District**

PERIOD = 1998 to 2021					
YEAR	ANNUAL	NORMAL	DEPARTURE	No of Rainy days	CATEGORY
1998	1296.5	1352.6	-4.147567647	98	NORMAL
1999	1485.8	1352.6	9.847700725	99	NORMAL
2000	1395.3	1352.6	3.15688304	74	NORMAL
2001	1534.8	1352.6	13.47035339	80	NORMAL
2002	1094.8	1352.6	-19.05958894	53	NORMAL
2003	1448.2	1352.6	7.067869289	89	NORMAL
2004	949.9	1352.6	-29.7722904	60	MODERATE
2005	1794.3	1352.6	32.6556262	78	EXCESS
2006	1555.1	1352.6	14.97116664	71	NORMAL
2007	1280.4	1352.6	-5.33786781	74	NORMAL
2008	1112.8	1352.6	-17.72881857	74	NORMAL
2009	1056	1352.6	-21.9281384	63	NORMAL
2010	1540.6	1352.6	13.89915718	83	NORMAL
2011	1243.7	1352.6	-8.051160727	78	NORMAL
2012	1276.3	1352.6	-5.640987727	76	NORMAL
2013	1920.8	1352.6	42.00798462	85	EXCESS
2014	1055.1	1352.6	-21.99467692	57	NORMAL
2015	1201.2	1352.6	-11.19325743	71	NORMAL
2016	1144.2	1352.6	-15.4073636	74	NORMAL
2017	776.7	1352.6	-42.57725861	61	MODERATE
2018	1241.4	1352.6	-8.243383114	76	NORMAL
2019	1273.65	1352.6	-5.836906698	68	NORMAL
2020	1340.88	1352.6	-0.866479373	72	NORMAL
2021	1308.4	1352.6	-3.267780571	94	NORMAL

<b>Period</b>	1998 to 2021	
<b>No. of years</b>	24	
<b>Normal rainfall</b>	1352.6	<b>Mean:</b> 1305.3
<b>Standard deviation</b>	256.21mm	<b>Median:</b> 1169.6
<b>Coefficient of variation</b>	19.62 %	<b>No of years:</b> 24
<b>Slope</b>	-9.622 mm/year	
<b>Intercept</b>	1421.1	
<b>Equation of trend line</b>	$y = -9.622x + 1421.1$	
<b>CATEGORY</b>	<b>NUMBER OF YEARS</b>	<b>% OF TOTAL YEARS</b>
<b>DEPARTURES</b>		
POSITIVE	16	67
NEGATIVE	8	33
<b>DROUGHTS</b>		
MODERATE	2	8
SEVERE	0	0
ACUTE	0	0
<b>NORMAL &amp; EXCESS R/F</b>		
NORMAL	20	83
EXCESS	2	8

Rainfall departure: EXCESS: > +25; NORMAL: +25 TO -25; MODERATE: -25 TO -50; SEVERE: -50 TO -75; ACUTE: <-75

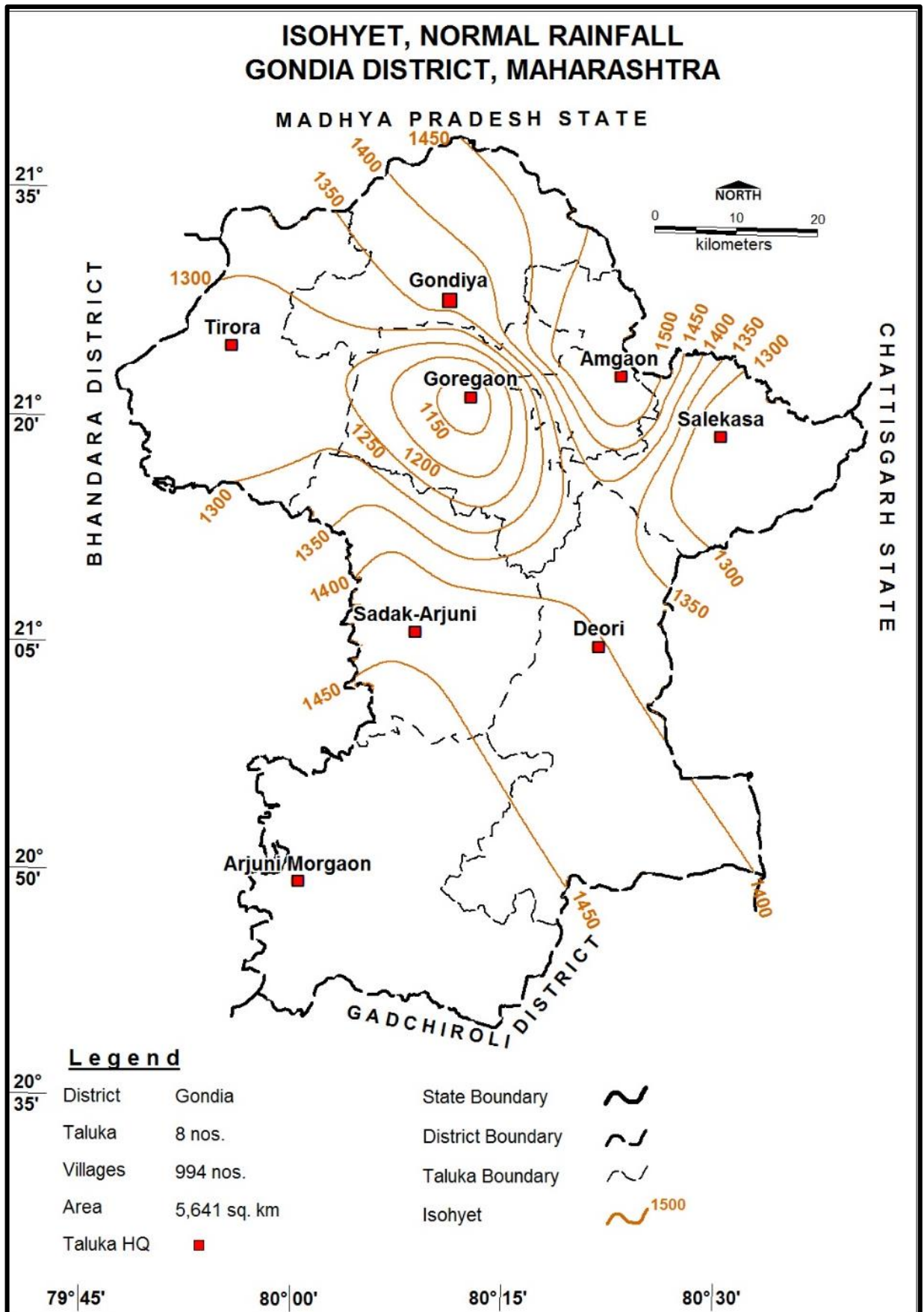


**Figure 1. 7 : Annual Rainfall Pattern (1998-2021)**

**Table 1. 3: Block wise Annual rainfall data (2012-2021) (in mm)**

Block	Normal RF	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average Rainfall (mm)
Gondia	1366.7	1425	1797.2	921.7	1097.1	933.5	690.8	1198	1356.4	1427.8	1230.8	1207.83
Amgaon	1573.1	1205.9	2107.9	1179.2	1240.1	1170.8	858.4	1677.3	1248.5	1510.8	1210.8	1340.97
Tiroda	1289.7	1128.4	1586.3	1000.1	1134.7	1139.7	717.4	1067.3	1245.2	1441.3	1295.4	1175.58
Goregaon	1133.9	1247.3	1703.4	1076.5	1325.3	1124.2	804.2	1321.4	1384.2	1912.3	1407.6	1330.64
Salekasa	1257.2	1320.8	2014.2	1217.4	1253	1465.2	798.1	1061.3	1062.7	1488.6	1341.4	1302.27
Devari	1401.5	1138.5	2161.1	1339.5	1113.9	1294.1	674.1	974.4	1060.2	1670.8	1414.2	1284.08
Arjuni morgaon	1480.7	1346.7	2079.7	838.1	1124	1001.4	970.5	1081.8	1470.5	1270.8	1399.3	1258.28
Sadak arjuni	1443.8	1392.8	2125.9	1173.9	1437.8	1307.9	695.9	1252.7	1361.5	0	1203	1195.14
<b>District Av.</b>	<b>1352.6</b>	<b>1275.6</b>	<b>1946.9</b>	<b>1093.3</b>	<b>1215.7</b>	<b>1179.6</b>	<b>776.17</b>	<b>1204.2</b>	<b>1273.6</b>	<b>1340.88</b>	<b>1312.8</b>	<b>1270.1</b>





**Figure 1. 8: Isohyet map of Gondia District**

## 1.4 GEOLOGY

The oldest rocks are the crystalline complex consisting of granite, granite-gneiss, followed by the mica schists and hornblend-schists, quartzites, crystalline limestones, calc-granulites and calciphyres of Sausar series and are exposed in the northern part of the district. They are usually arranged in parallel bands and are very often continuous for many miles. It is possible to trace a passage along the strike from calc-granulite, through banded calciphyres into marble. It is among the gneisses, schists and quartzites that the manganese ore deposits and the associated manganese silicate rocks are enclosed in the form of elongated lenticular bands conformable in strike and dip to the surrounding rocks. Near Bhamsar hill manganese ores occur in unusual schistose quartzite containing lazurite, rutile, and ilmenite. Another quartzite is of green colour and contains chrome-vanadium-muscovite.

### Hard Rock Areas

**Archeans:** The Archeans are represented by Amgaon Group consisting of Augen gneisses, amphibolites, migmatites and these formations are confined to the N & NW corner of the district around Amgaon and Bahela.

**Dharwars:** The Amgaon group is followed by Dharwars (Lower Precambrian) are represented by Sakoli Group and Dongargarh Group of rocks, the latter forms the major stratigraphic unit in the district. The Sakoli Group consists of quartzites, schists, phyllites, metavolcanics and BIF and is confined to the N and NW part of Nagjhira. The areas surrounding Salekasa, Wadegaon, Murdoli, Deori and Chinchgarh rocks consisting of Rhyolites, Andesites and basic volcanics are present which respectively represents Bijli, Pitepani and Sitagota formations of the Dongargarh Group.

The stratigraphic sequence based on available information on the geology of the area is as follows: —

**Table 1. 4: Generalized Geological sequence Gondia district**

Formation	Lithology	Age
Alluvium	Soil, kankar, laterite	Recent.
Kamthis	Conglomerate, arkose dark brownish, grey sandstone.	Lr. Gondwanas.
Vindhyan	Greyish white to yellowish grey sandstone and shale.	Proterozoic.
Cuddaphs	Sandstones, shales grits and arkose in the upper part. Alternate bands of quartzites and conglomerates in the lower parts.	Proterozoic.
Dongargarh system.	Rhyolites, andesites, granites and sandstones	
Sakoli series	Crushed albitite, microcline quartzites	
	Phyllites and slate	
	Hematite-sericite quartzite	
	Garnetiferrousphyllites and chlorite muscovite schists; jaspilites, epidote-chlorite-schists.	
Sausar series	Amphibolite and garnet amphibolite (Sitapar stage).	

	Crystalline dolomitic-limestone dolomite diopside calciphyre: chlorite-tremolite-actionliteschists (Bichua stage).	} Archeans.
	Microcline-muscovite-quartzite (Chorbaoli stage)	
Older granites	Granite and granite-gneiss	

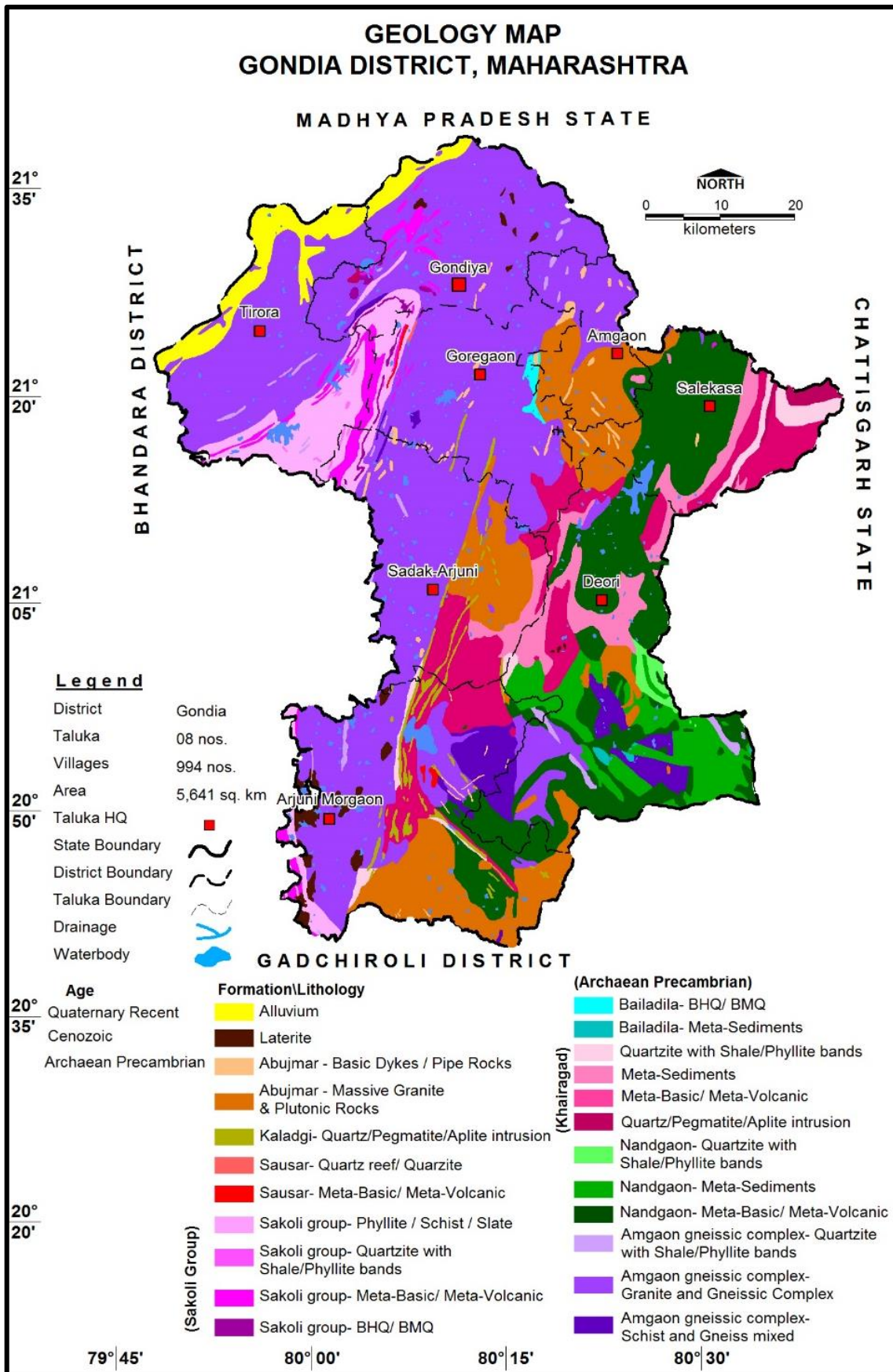


Figure 1.9: Geological Map, Gondia district

## **2.0 HYDROGEOLOGY**

Gondia district is unique in Maharashtra in the sense that the entire area of the district is occupied by metamorphic and igneous rocks. Major part of the district is occupied by the crystalline rocks of Pre-Cambrian formations viz; Archaean, Dharwars. A map depicting the hydrogeological features is shown in Fig.2.1

### **Occurrence of Ground Water**

The Pre-Cambrian crystalline rocks are the major water bearing formations in the district. The weathered portions of crystalline rocks together with joints and fracture zones act as good aquifers. Ground water occurs under water table conditions in the weathered mantle and then the fractured, well-jointed and sheared zones. Dug wells, dug cum bore wells and bore wells are the common ground water abstraction structures. Ground water occurs under water table conditions and semi-confined conditions in these formations. Water table conditions prevail in the weathered mantle and the fractures, jointed and sheared zones. At places where the argillaceous litho-units like phyllites and mica schists act as a confining medium, the ground water is found to occur under semi-confined conditions. A map depicting the hydrogeological features is shown in **2.1**



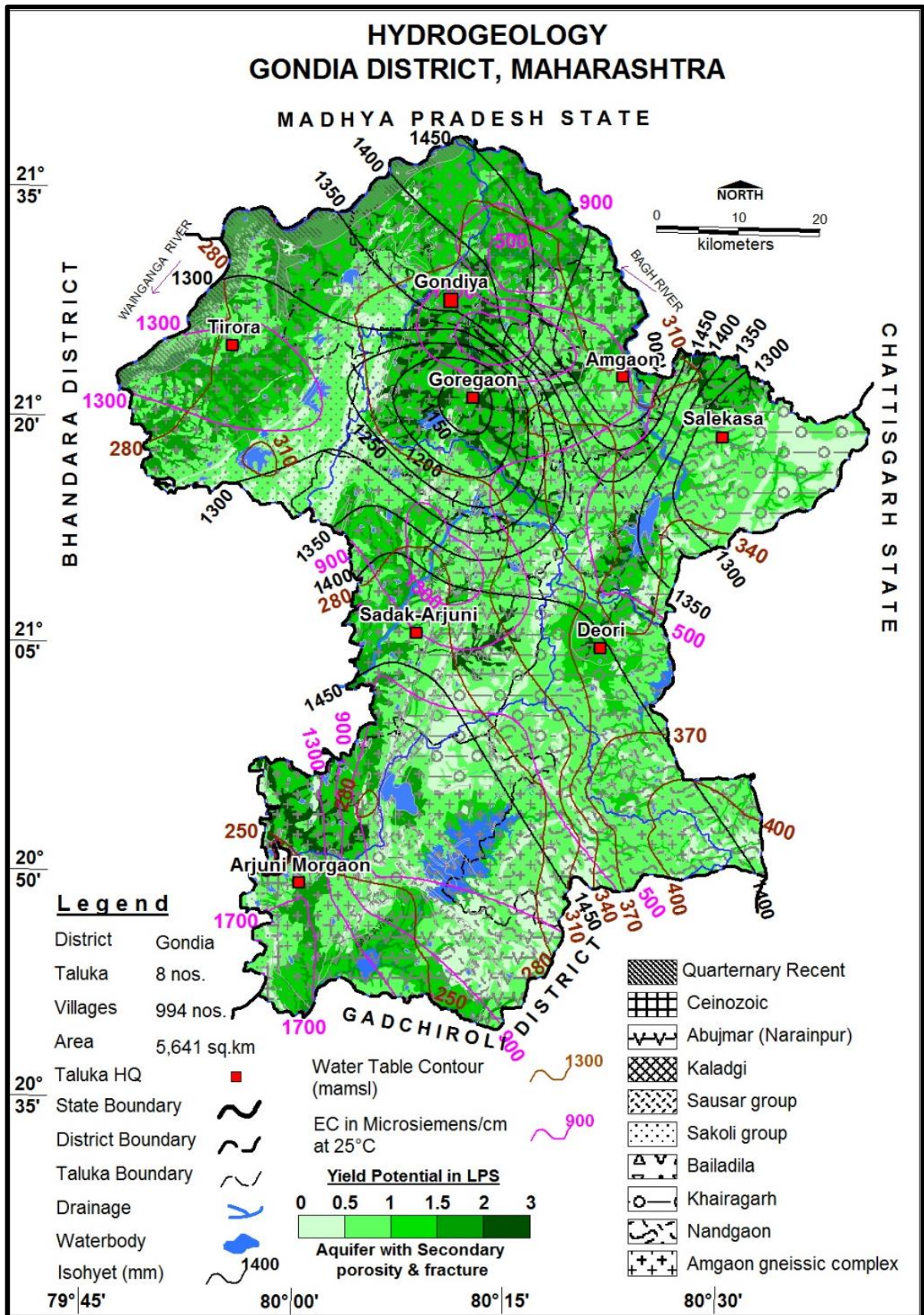
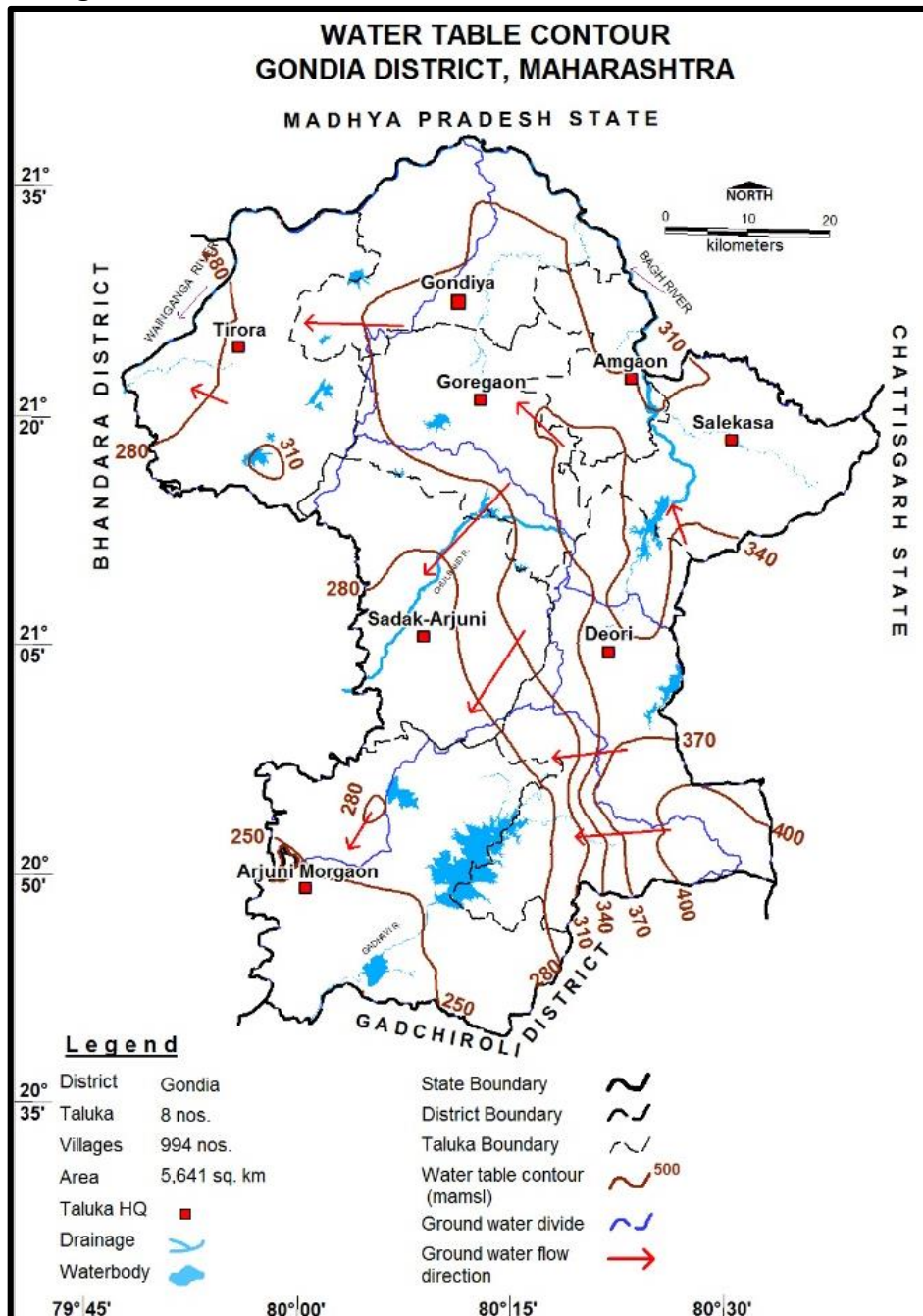


Figure 2. 1: Hydrogeology, Gondia District

**WATER TABLE CONTOUR**

Based on the data, a pre monsoon water table contour map has been prepared and presented in **figure 2.2**.



**Figure 2. 2: Water Table Contour, Gondia district**

The map depicts occurrence and movement of ground water in the district. The ground water flow lines are marked to show the direction of ground water flow. The elevation of water table ranges from 250 to 400 m amsl and generally follows the topography. In general, the ground water movement is towards the Wainganga River. The ground water movement is generally slow in the alluvial areas with high permeable zones and in the areas of convergent ground water flow. Such areas have been demarcated as ground water potential zones. In area of low permeability, the water table contours are closely spaced indicating steep gradient.



## 2.1 MAJOR AQUIFER SYSTEMS

Archean Crystalline and metamorphics formation (Granite Gneissic complex /Quartzite/Phyllite / Schist / Slates) constitutes the principal aquifers in the district (**Fig. 2.3**). Based on the ground water exploration carried out in the district and the data generated so far, aquifer wise characteristics have been delineated and are shown in **Table 2.1**. The aquifer units found in each of the formation are given below:

### Granite Gneisses–

- Aquifer – I: up to 35 m
- Aquifer -II: up to 180 m

**Aquifer-I:** The aquifer-I in Granite Gneisses formation occurs up to 35 m with thickness of weathered/fractured zone varying from 5 to 14 m and yield of the aquifer up to from 100 m<sup>3</sup>/day.

**Aquifer- II:** Aquifer-II in Granite Gneisses formation is observed in the depth range of 35 to 180 mbgl with water levels of 2.2 to 55 mbgl and thickness of fractured zone varying from 0.5 to 12 m. The aquifer-II is exploited mainly by borewells and yield of the aquifer generally varies up to 12.18 lps. Yield map is presented in the **Fig. 2.5** and Depth of occurrence of Aquifer -II is depicted in **Fig. 2.6**

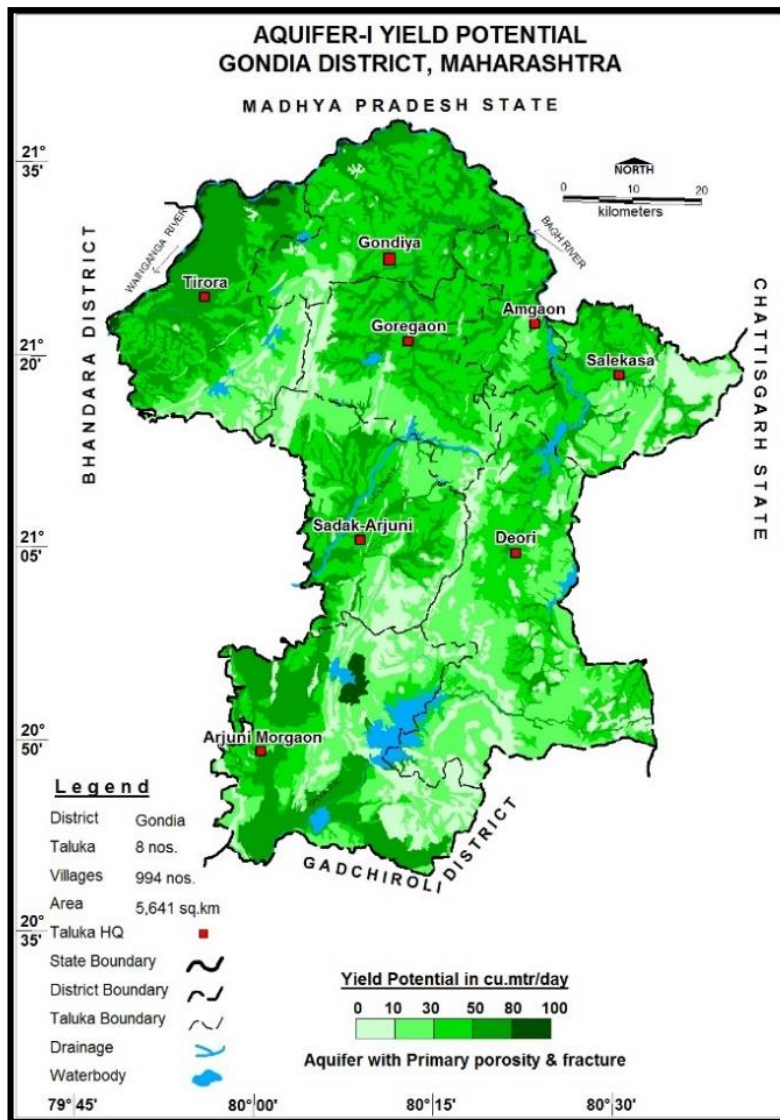
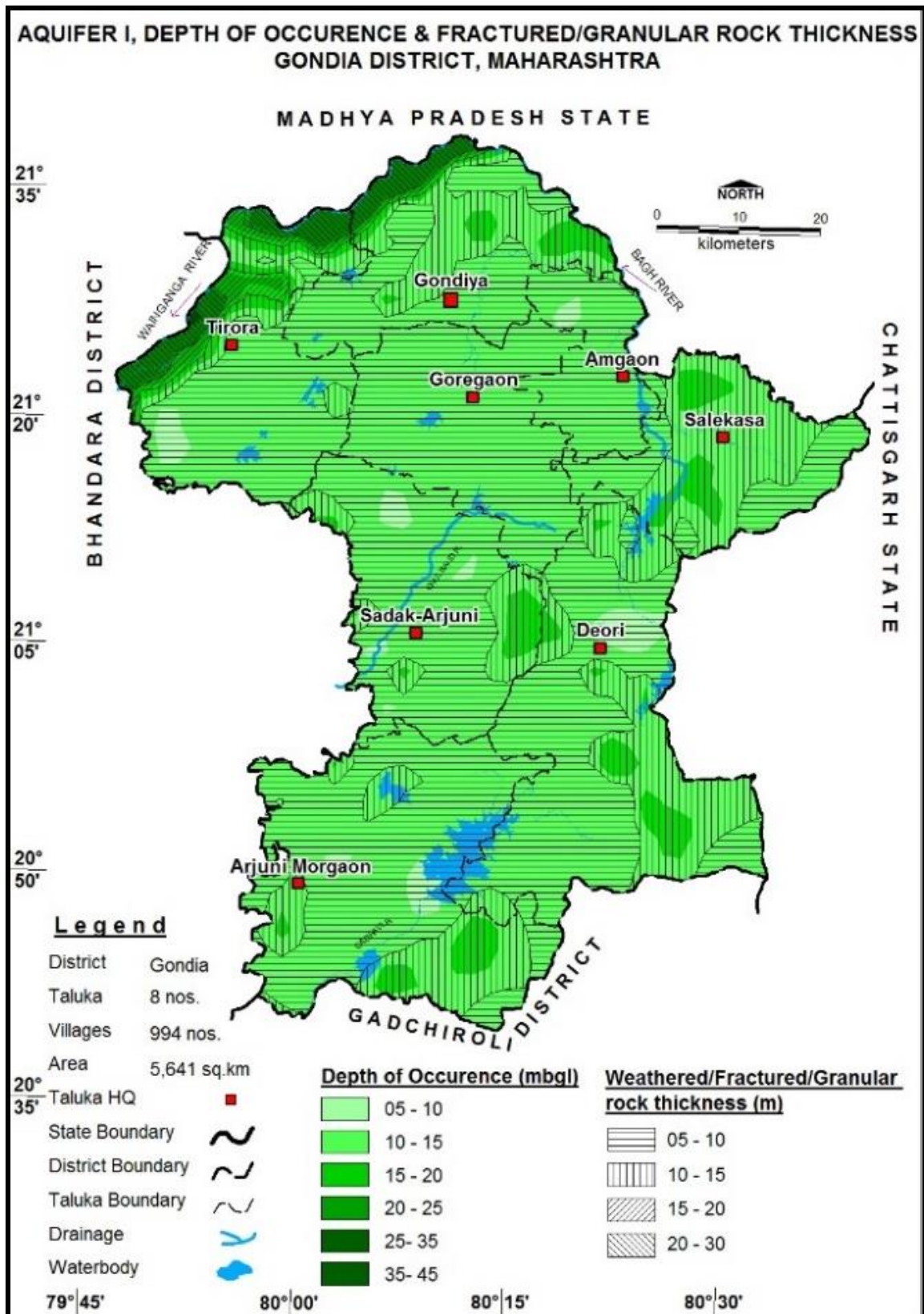


Figure 2.3: Aquifer-I yield Potential





**Figure 2.4: Aquifer-I Depth of occurrence and fractured rock thicknes**

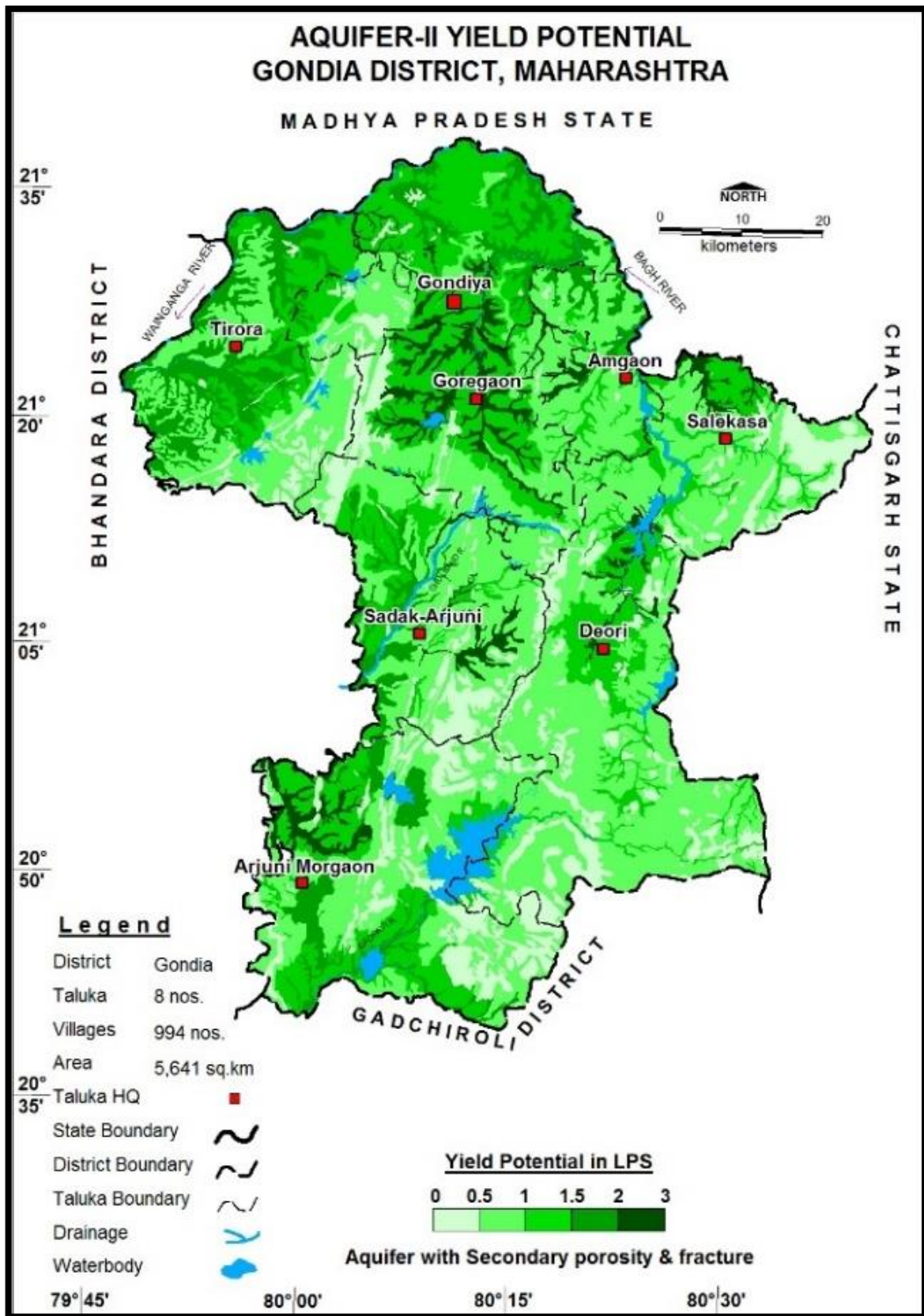
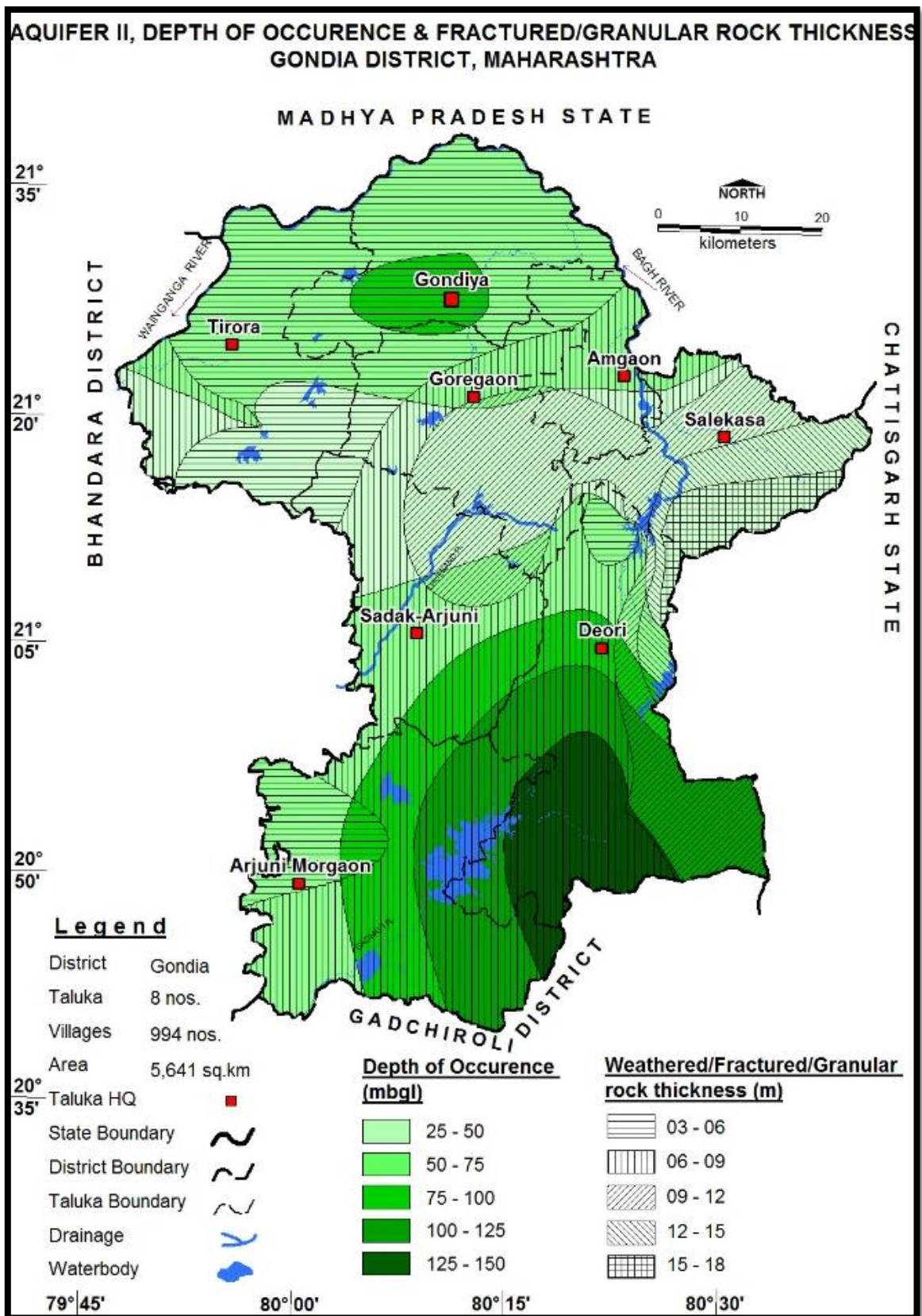


Figure 2.5: Aquifer-II yield Potential





**Figure 2.6: Aquifer-II Depth of occurrence and fractured rock thickness**

**Table 2. 1: Aquifer Characteristic of Major aquifers of Gondia district**

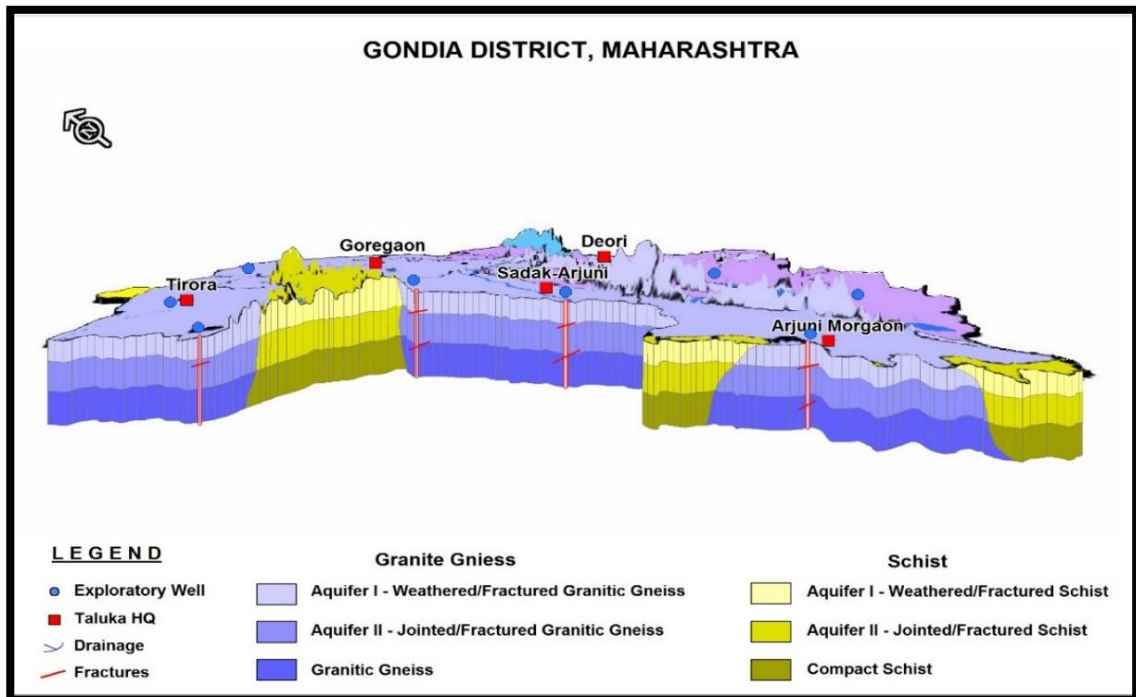
Major Aquifer	Granite gneiss	
	Aquifer-I	Aquifer-II
Type of Aquifer	Weathered/Fractured Granite Gniess	Jointed/Fractured Granite Gniess
Formation	Weathered/Fractured Granite Gniess	Jointed/Fractured Granite Gniess
Depth to bottom of Aquifer (mbgl)	10.3 to 35	35 to 180
Weathered/ Fractures zones encountered (mbgl)	up to 35	up to 180
Weathered/Fractured rocks thickness (m)	5 to 14	0.5 to 12
SWL (mbgl)	0.6 to 28	2.2 to 55
Transmissivity (m <sup>2</sup> /day)	-	3.4 to 59.54
Specific Yield/ Storativity (Sy/S)	0.05	1.70x10 <sup>-5</sup> to 2.77x10 <sup>-3</sup>
Yield	-	up to 12.18lps
Sustainability	1 to 4 hrs	1 to 6 hrs

## 2.2 AQUIFER PARAMETERS

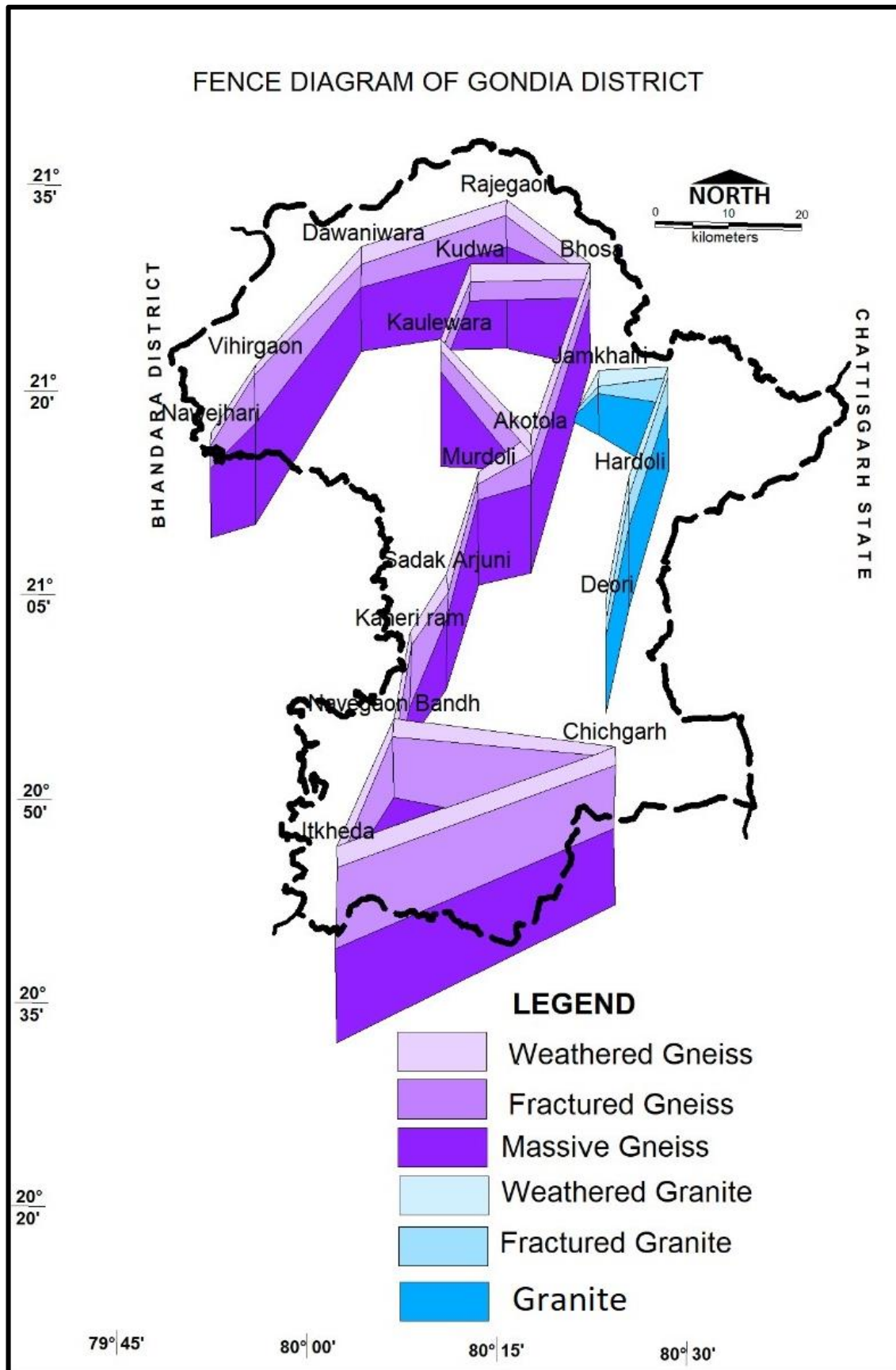
Based on pumping tests, it was observed that in Fractured Gneisses the transmissivity ranges from 3.4 to 59.54 m<sup>2</sup>/day, the storativity ranges from 1.70x10<sup>-5</sup> to 2.77x10<sup>-3</sup> and specific capacity ranges from 6.68 to 32.117 lpm/m.

## 2.3 3-D AND 2-D AQUIFER DISPOSITION

Based on the existing data, aquifer disposition in 3D, Fence diagram, 3D Bar diagram, various hydrogeological sections have been prepared along section lines to understand the subsurface disposition of aquifer systems shown in Fig. 2.7to 2.14.



**Figure 2. 7: 3D Aquifer Disposition**



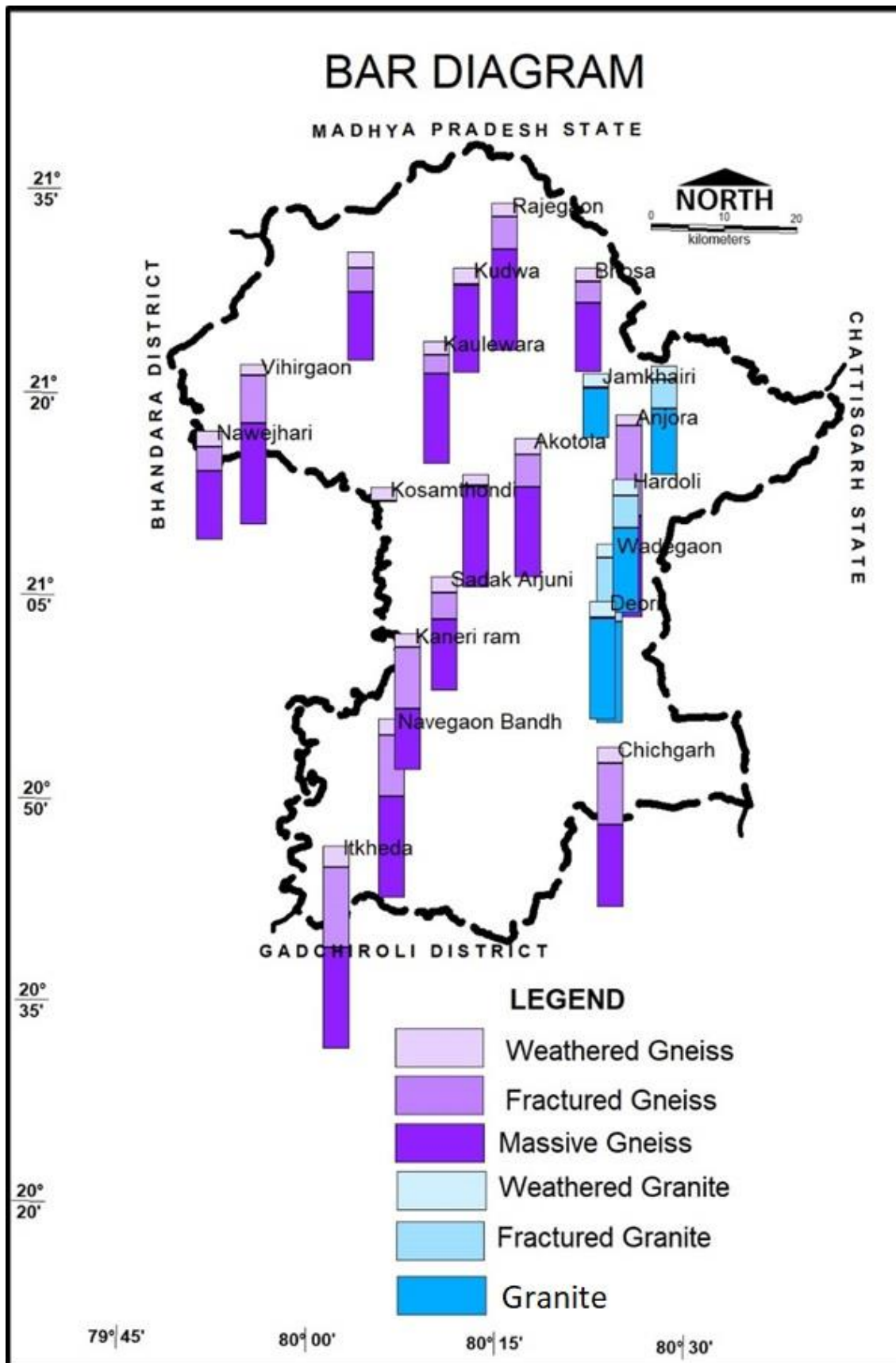
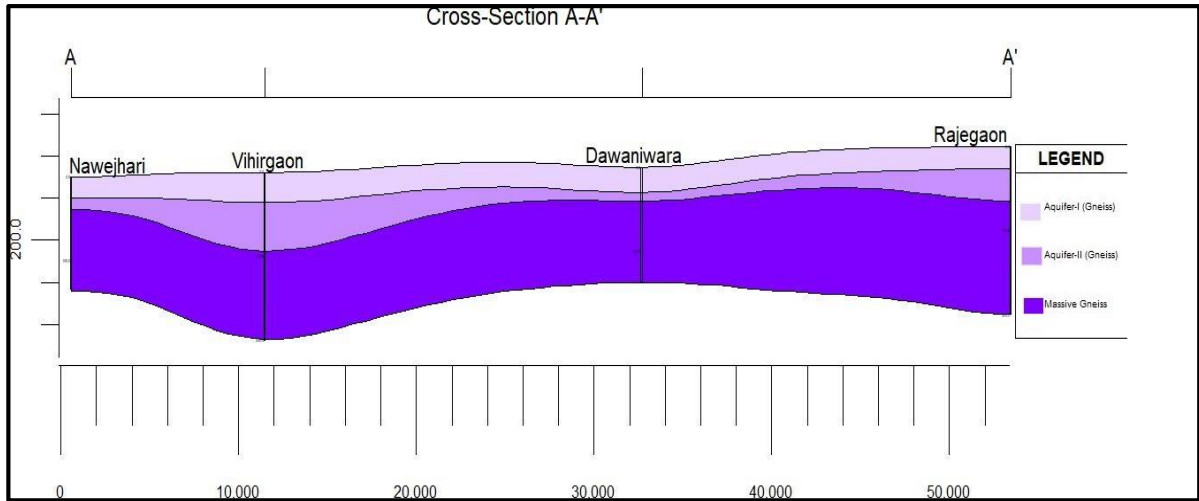
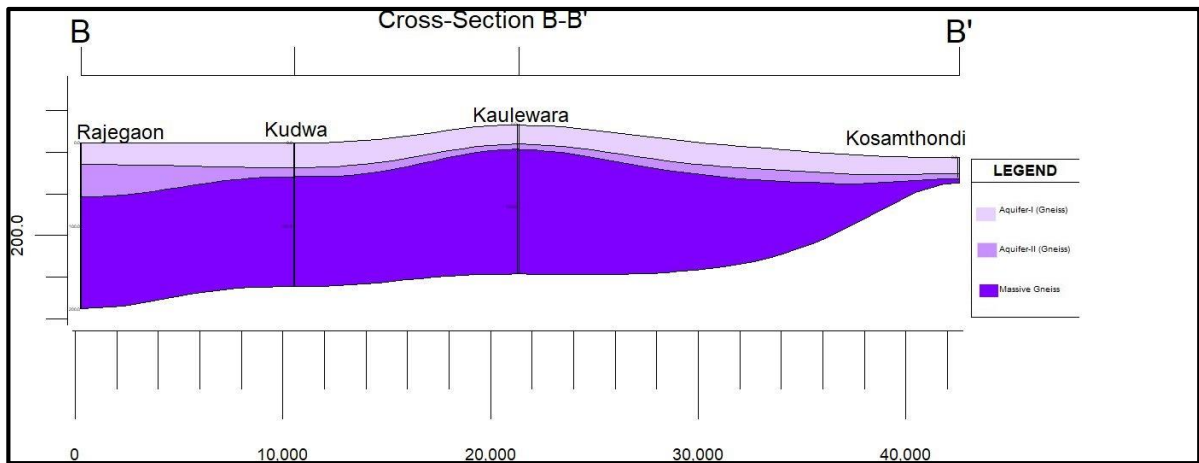


Figure 2. 9: 3D Bar Diagram

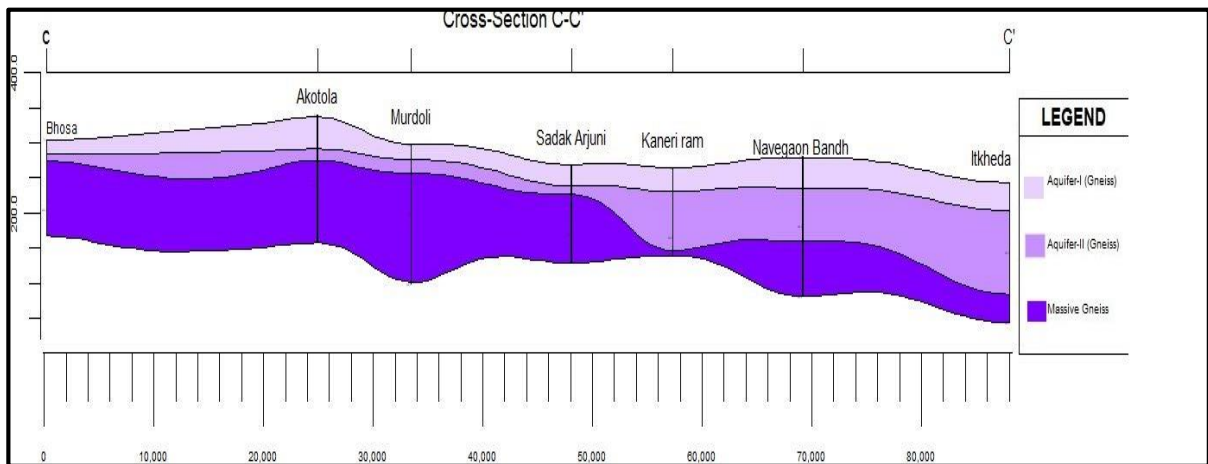




**Figure 2.10: Lithological section (A-A')**



**Figure 2. 11: Lithological section (B-B')**



**Figure 2. 12: Lithological section (C-C')**

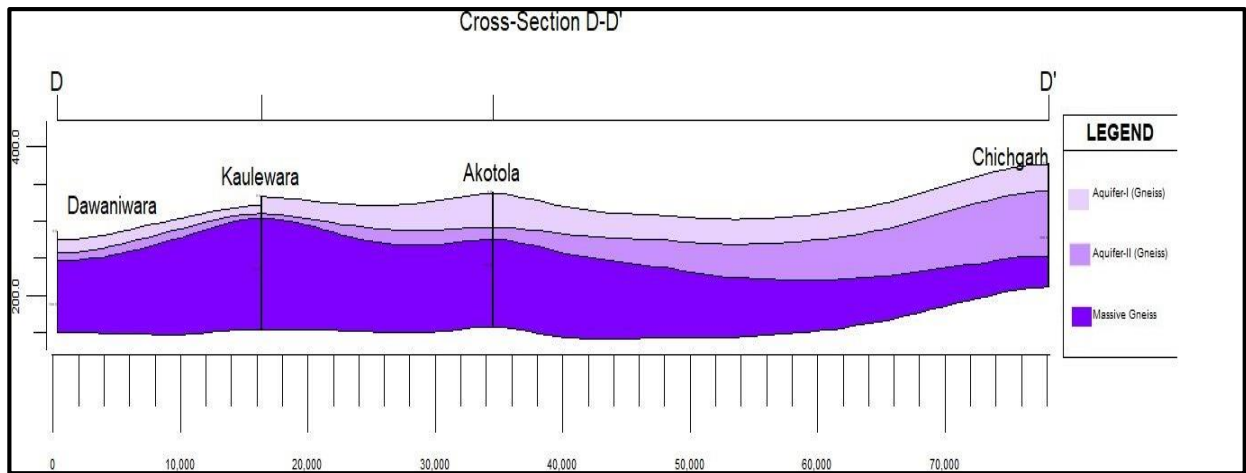


Figure 2. 13: Lithological section (D-D')

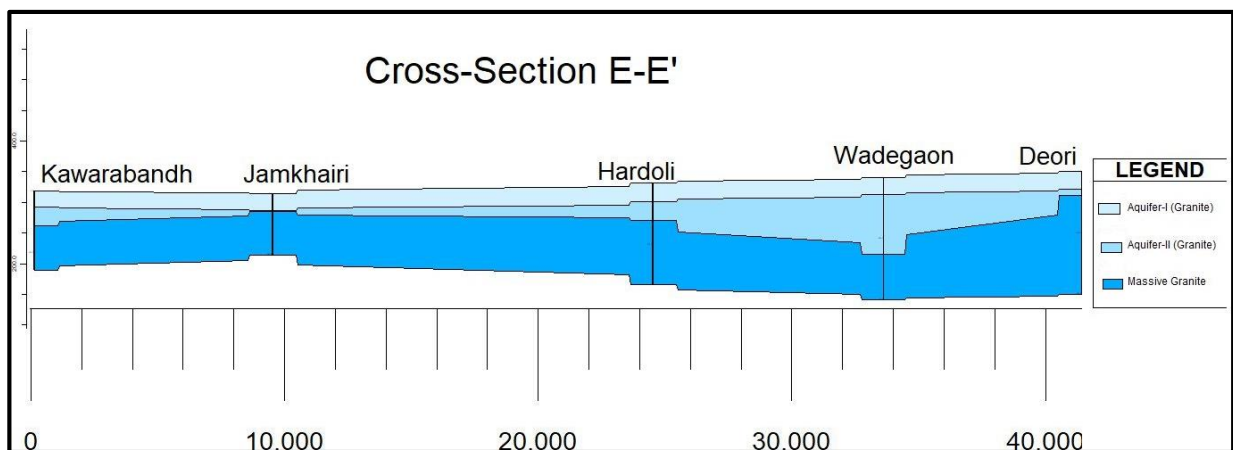


Figure 2. 14: Lithological section (E-E')

### 3.0 WATER LEVEL SCENARIO

#### 3.1 DEPTH TO WATER LEVEL (AQUIER-I/SHALLOW AQUIFER)

Central Ground Water Board periodically monitors 33 Ground Water monitoring wells four times a year i.e., in May (Pre monsoon), August, November (Post monsoon) and January in the district. Apart from this data, the monitoring data obtained from GSDA has also been used for preparation of depth to water level maps of the district. However, during May 2021, CGWB could not carry out the monitoring of these wells (GWMWs) in the state because of restrictions (lockdown) on the movement of men and material across the state due to COVID 19 pandemic; so, Pre-monsoon DTWL map is prepared based on GSDA data only and for post monsoon water level maps both CGWB and GSDA data were used. Premonsoon and post monsoon data are given in **Annexure-II**.

#### Pre-monsoon DTW (May-2021)

The depth to water levels in Gondia district during May 2021 ranges between 3.00 mbgl (Shirpur, Deori block) and 14 mbgl (Dhobotila, Amgaon block). Shallow water levels between 2-5 mbgl are observed in small isolated patch in Tiroda and Amgaon blocks covering 147.4 sq. km. area of the district. Water levels between 5 to 10 mbgl covering about 3074 sq km area are observed in major part of the Deori, Tiroda and Goregaon blocks part of Gondia and Arjuni morgaon blocks. Water levels between 10 to 20 mbgl covering about 1965



sq km observed in major part Sadak arjuni and Gondia blocks, part of Salekasa and Arjuni morgaon blocks. The pre monsoon depth to water level map is depicted in Fig. 3.1.

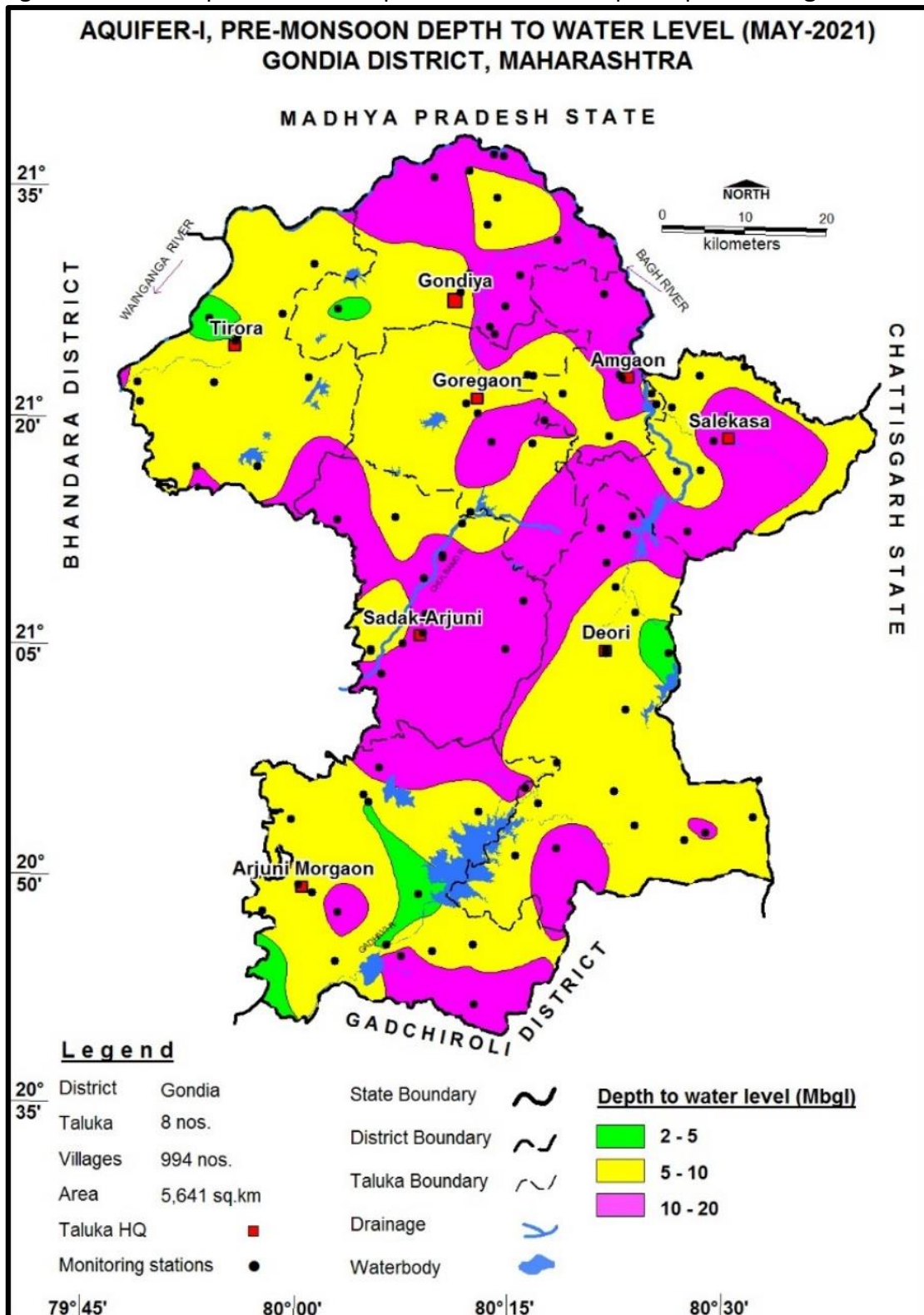
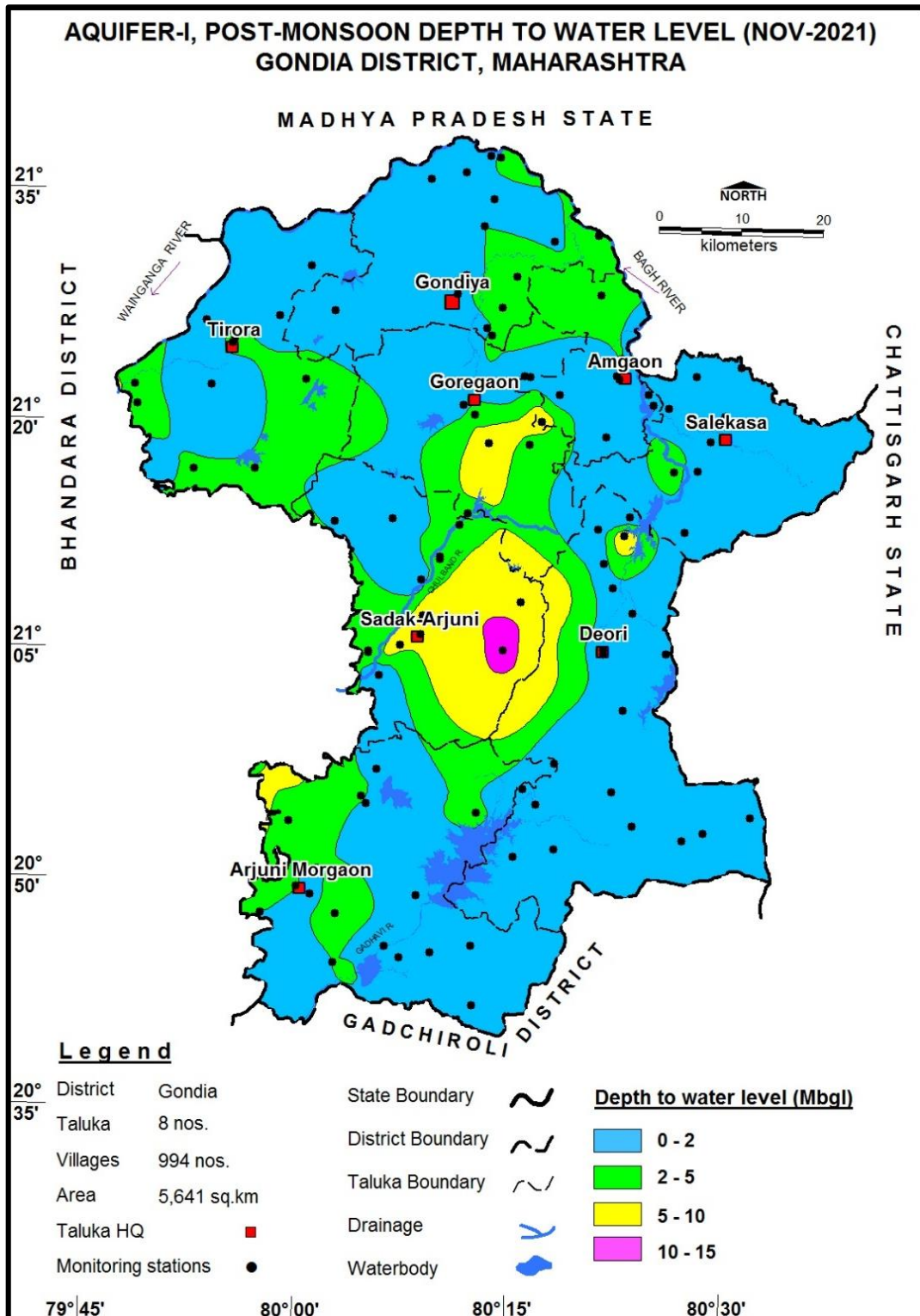


Figure 3. 1 : DTWL, Shallow Aquifer (May 2021)

**Post Monsoon DTW (Nov 2021)**

The depth to water levels in Gondia district during Nov 2021 ranges between 0.2 mbgl (Hardoli, Deori block) and 14 mbgl (Shenda, Sadak-Arjuni block). Shallow water levels

between 0-2 mbgl covering about 3443sq km. area are observed in major parts of the district i.e. in Arjuni morgaon, Sadak arjuni, Salekasa and Gondia blocks. Water levels between 2-5 mbgl covering about 1301sq km area, Water levels between 5 to 10 mbgl covering about 416 sq km area are observed in major part of the Sadak arjuni block, part of Goregaon block. Water levels between 10 to 15 mbgl covering about 24sq km observed in major part Sadak arjuni block. Spatial variation in post monsoon depth to water levels is shown in **Fig. 3.2**.

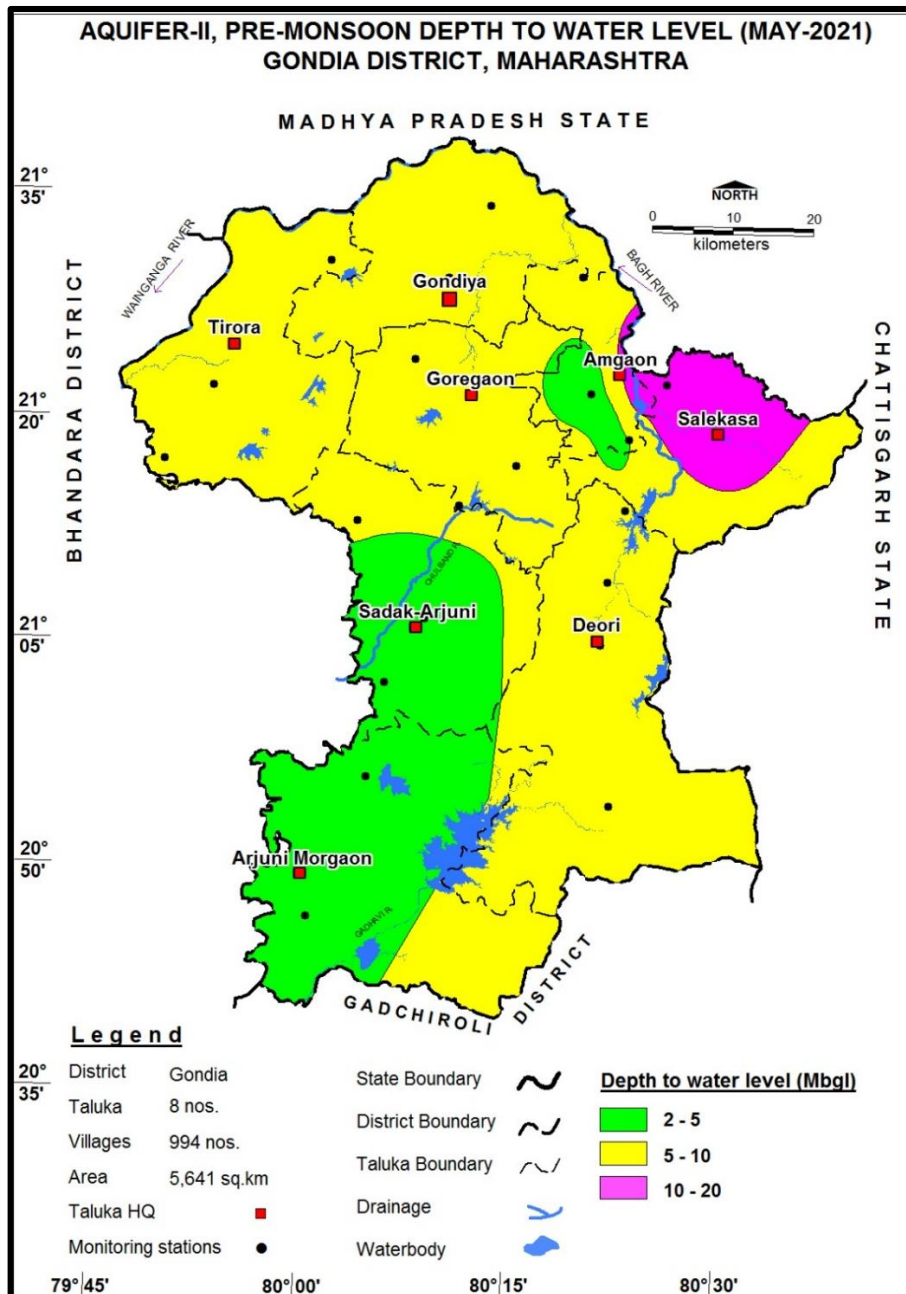


**Figure 3. 2: DTWL, Shallow Aquifer (Nov. 2021)**

### **3.2 DEPTH TO WATER LEVEL (AQUIFER-II/ DEEPER AQUIFER)**

#### **3.2.1 Pre-monsoon Depth to Water Level (May-2021)**

The pre-monsoon depth to water levels in deeper aquifer in Gondia district during May 2021 range between 2.24 mbgl (Sadak arjuni, Sadak arjuni block) and 17.4 mbgl (Kawarabandh, Salekasa block). Shallow water levels between 2-5 mbgl are observed in major part in Arjuni morgaon and Sadak arjuni blocks covering 1206 sq. km. area of the district. Water levels between 5 to 10 mbgl covering about 3730 sq km area are observed in major part of the Deori, Tiroda and Goregaon blocks; part of Gondia and Arjuni morgaon blocks. Water levels between 10 to 20 mbgl covering about 250 sq km observed in major part Salekasa block. The pre-monsoon depth to water level map of Aquifer-II is given in **Figure 3.3**.



**Figure 3. 3: DTWL, Deeper Aquifer (May 2021)**

### 3.2.2 Post-monsoon Depth to Water Level (Nov-2021)

The post-monsoon depth to water levels in deeper aquifer in Gondia district during Nov 2021 range between 2.10 mbgl (Hardoli, Deori block) and 55.05 mbgl (Murdoli, Goregaon block). Shallow water levels between 2-5 mbgl are observed in major part in Salekasa block, parts of Amgaon and Deori blocks covering 899 sq. km. area of the district. Water levels between 5 to 10 mbgl covering about 2480 sq km area are observed in major part of the Deori, Arjuni morgaon and Gondia blocks; part of Sadak arjuni and Tiroda blocks. Water levels between 10 to 20 mbgl covering about 963 sq km observed in major part Sadak arjuni, Tiroda and Goregaon blocks. Water levels between 20 to 30 mbgl covering about 346 sq km observed in major part Sadak arjuni, Tiroda and Goregaon blocks. Water level More than 30mbgl covering about 497 sq km observed in major part Sadak arjuni and Goregaon blocks. The post-monsoon depth to water level map of Aquifer-II is given in **Figure3.4**.



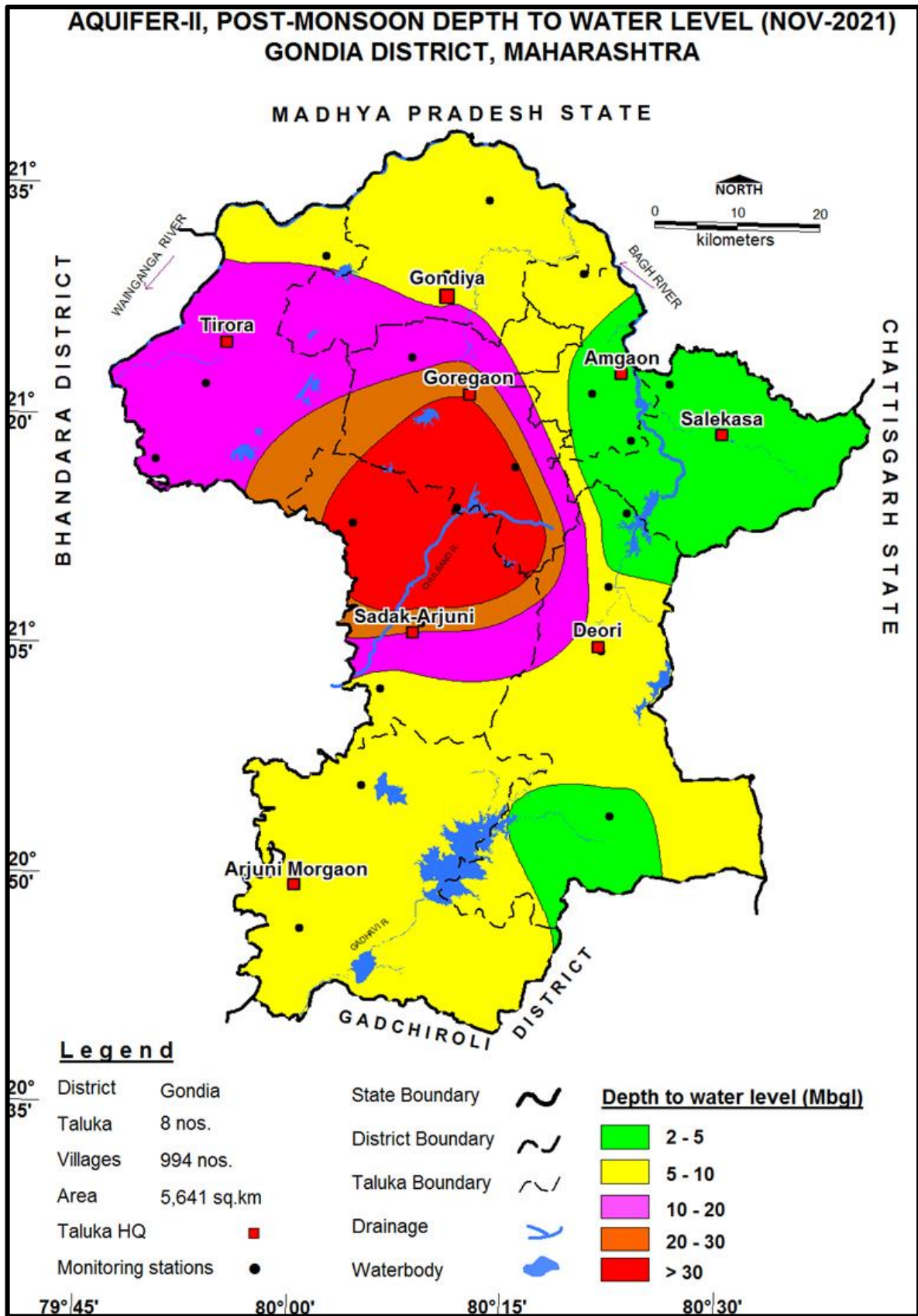


Figure 3.4: DTWL, Deeper Aquifer (Nov. 2021)

### 3.3 WATER LEVEL TREND (2012-2021)

During pre-monsoon period, rising water level trend has been recorded at 38 stations ranging from 0.0024 (Kamtha, Gondia block) to 1.102 m/year (Salekasa block) while falling trend was observed in 60 stations varying from 0.018 (Chorkamara, Tiroda block) to 0.737 m/year (Saleka, Salekasa block).

During pre-monsoon period, declining water level trend has been observed in about 3310 sq. km. area i.e., 65 % of the area. Significant decline of more than 0.20 m/year has been observed in 958 sq. km., i.e., 19 % of the area covering major parts of Gondia, Goregaon, Sadak arjuni and Tirora blocks and in isolated parts of Deori and Salekasa blocks. (Fig.3.5)

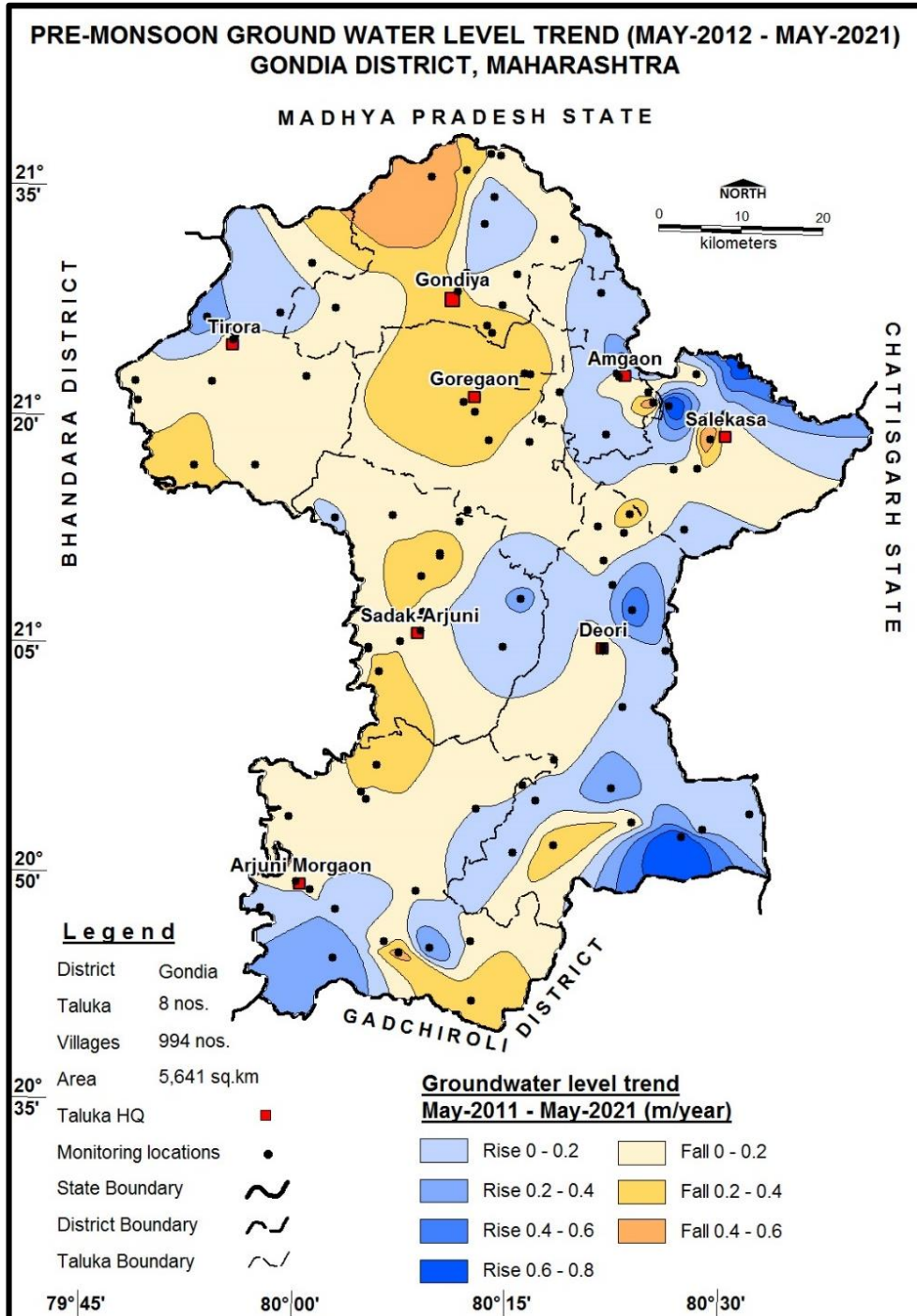


Figure 3.5: Pre-monsoon Decadal Trend (2012-21) Fall @>0.2m/year 958 Sq. km. (about 19% area)

of the district)

During post monsoon period, rise in water level trend has been recorded at 42 stations and it ranges between 0.04 m/year (Gondia , Gondia block) to 0.446 (Savangi ,Amgaon block) while falling trend was observed at 57 stations varying from 0.006 (Dahegaon, Goregaonblock) to 1.08m/year (Dongargaon, Sadak arjuni block).

During post monsoon period, declining water level trend has been observed in about 2387sq. km. area i.e. 46 % of the area. Significant decline of more than 0.20 m/year has been observed in 363sq. km., i.e., 7 % of the area covering major parts of Gondia, Goregaon, Arjuni morgaon and Tirora blocks and in Isolated parts of Deori and Salekasa blocks. (Fig 3.6) These declines may be due to the exploitation of ground water or low and erratic rainfall received in these areas. Water level trend data (2011-21) of (GWM wells) observation wells of CGWB is given in Annexure-IV.

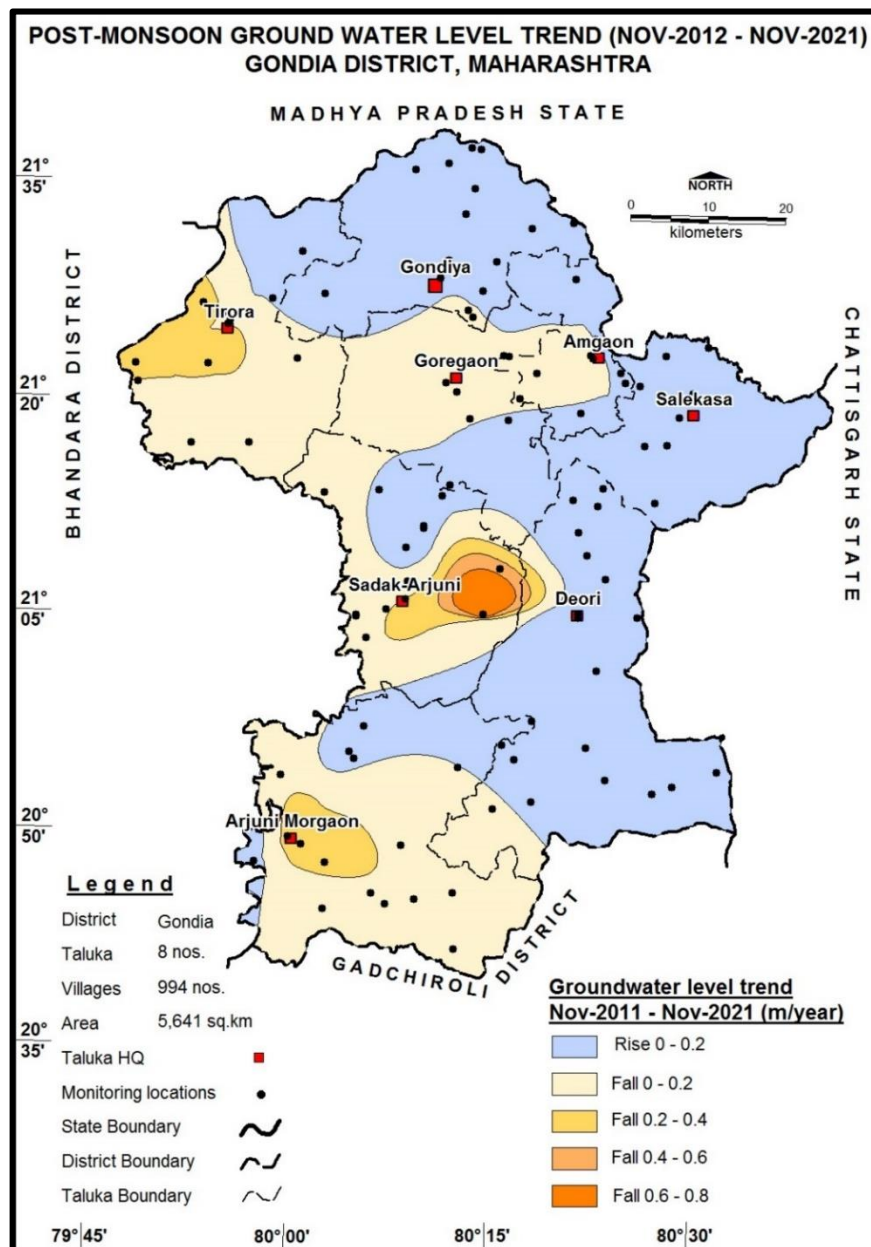
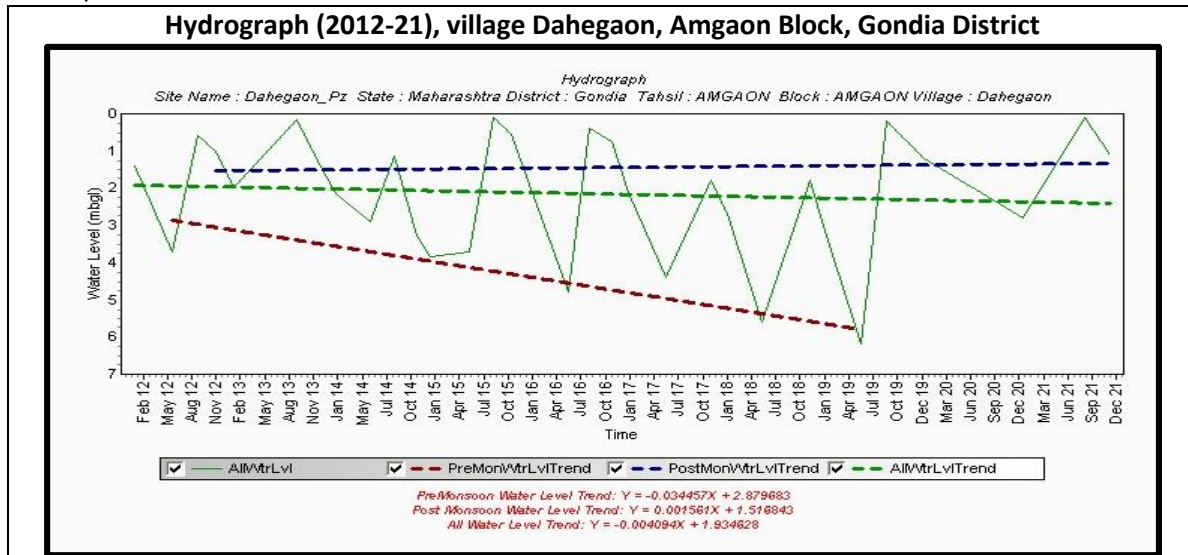


Figure 3. 6: Post monsoon Decadal Trend (2012-21) Fall @>0.2m/year 363 Sq. km. (about 7% of the district)

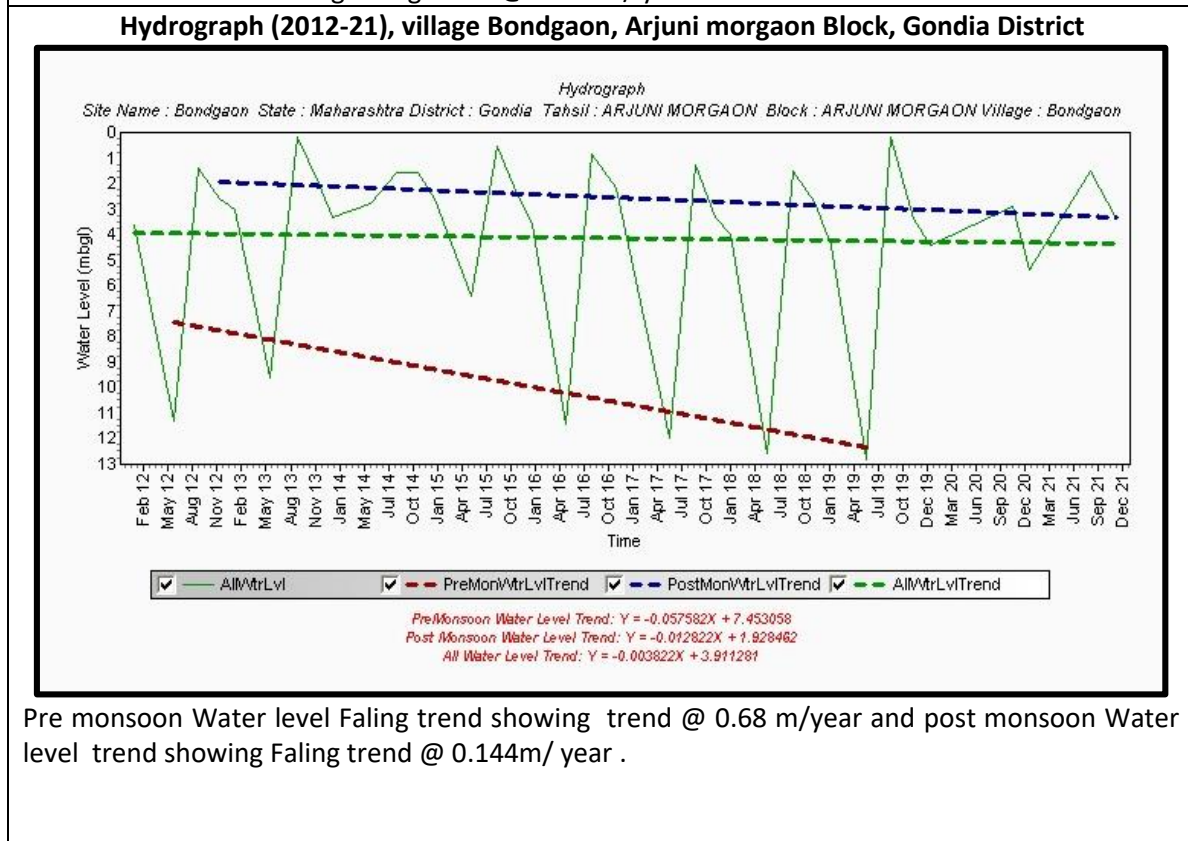


### 3.4 HYDROGRAPH ANALYSIS

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. However, continuous increase in the groundwater draft is indicated by the recessionary limb. The figure 3.7 shows selected hydrographs (time series) of water levels.



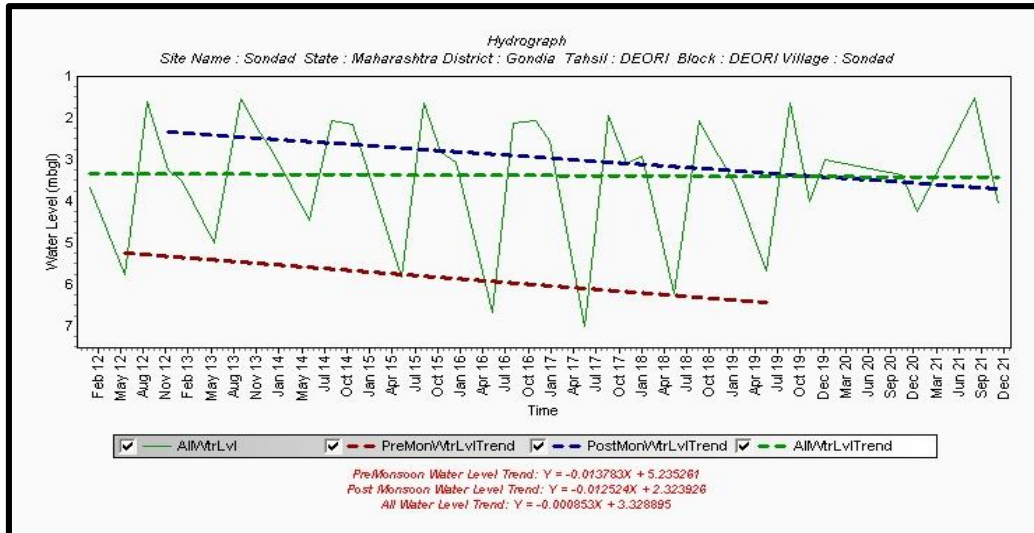
Pre monsoon Water level trend showing declining trend @ 0.408m/year and post monsoon Water level trend showing Rising trend @ 0.018m/ year.



Pre monsoon Water level Faling trend showing trend @ 0.68 m/year and post monsoon Water level trend showing Faling trend @ 0.144m/ year .

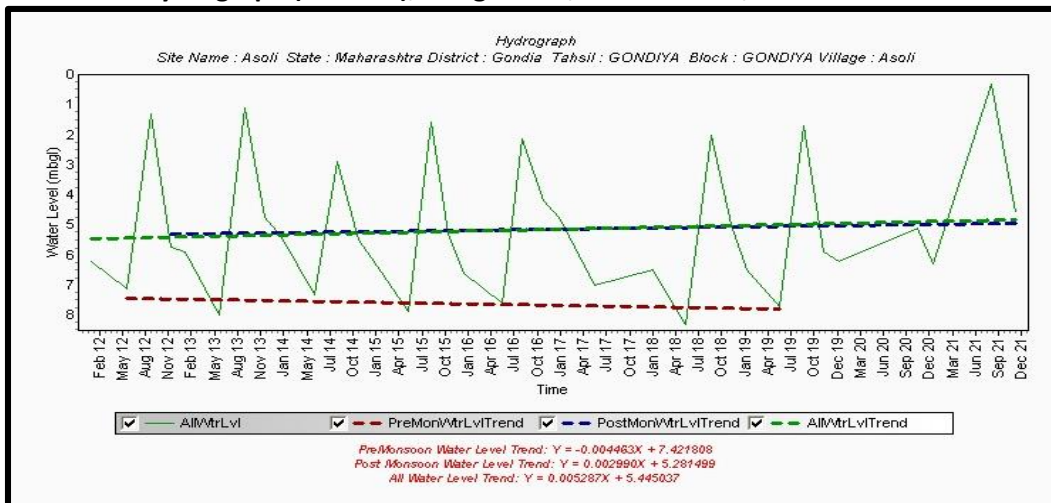


### Hydrograph (2012-21), village Sondad, Deori Block, Gondia District



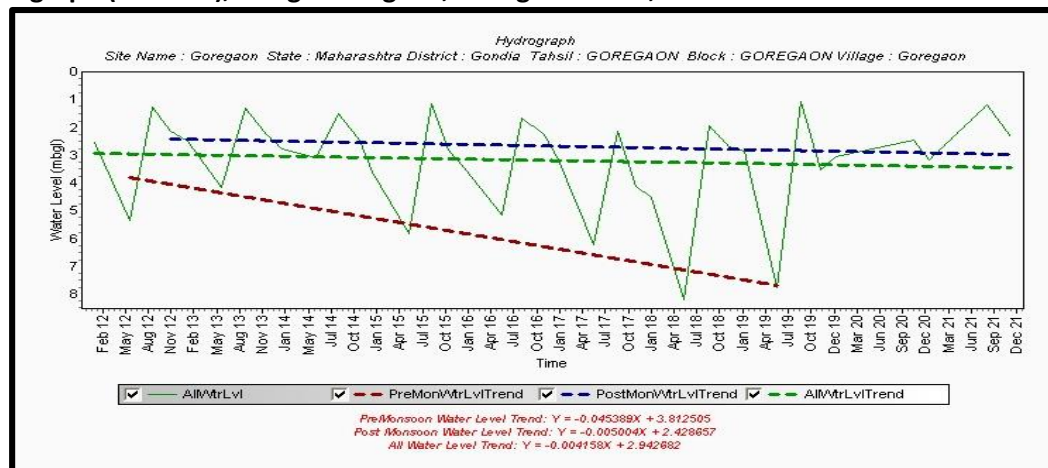
Pre monsoon Water level trend showing Faling trend @ 0.156 m/year and post monsoon Water level trend showing Faling trend @ 0.144 m/ year .

### Hydrograph (2012-21), village Asoli, Gondia Block, Gondia Distric



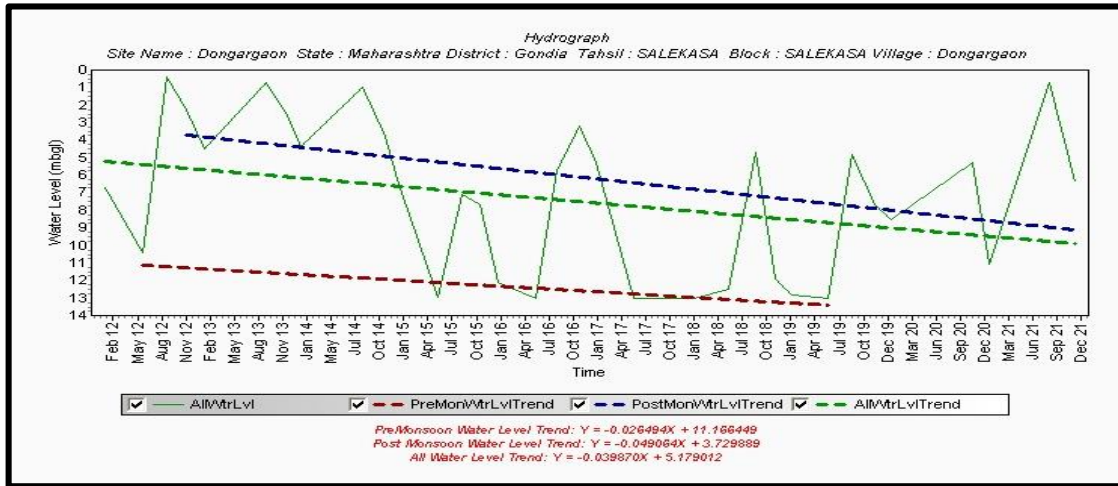
Pre monsoon Water level trend showing Faling trend @ 0.048 m/year and post monsoon Water level Rising trend showing declining trend @ 0.024m/ year.

### Hydrograph (2012-21), village Goregaon, Goregaon Block, Gondia District



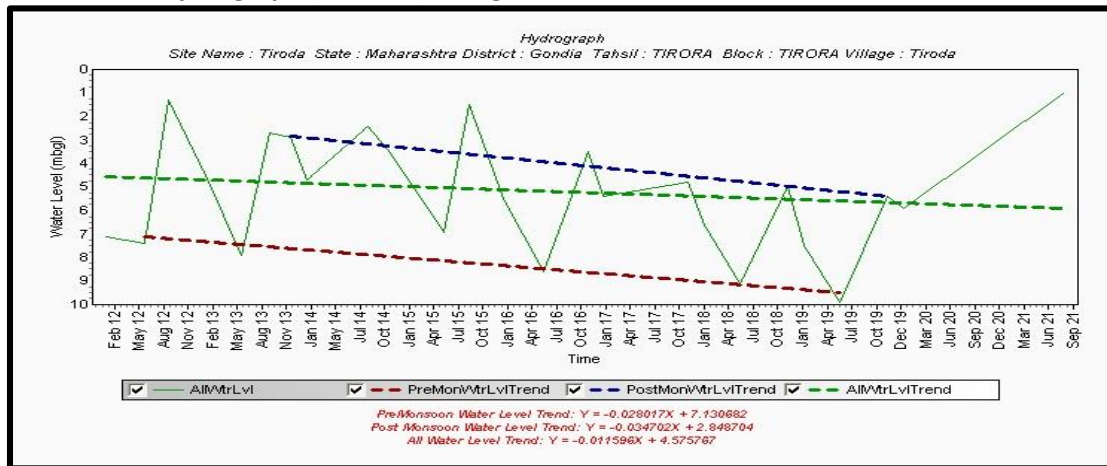
Pre monsoon Water level Faling trend showing Falling trend @ 0.54 m/year and post monsoon Water level trend showing falling trend @ 0.06m/ year

### Hydrograph (2012-21), village Dongargaon, Salekasa Block, Gondia District



Pre monsoon Water level trend showing Falling trend @ 0.312m/year and post monsoon Water level trend showing falling trend @ 0.588 m/ year .

### Hydrograph (2012-21), village Tiroda, Tiroda Block, Gondia District



Pre monsoon Water level trend showing Falling trend @ 0.336m/year and post monsoon Water level trend showing falling trend @ 0.408 m/ year .

Figure 3. 7: Behavior of water level with time

#### 4.GROUND WATER QUALITY

Ground water sampling is being done every year from GWM wells during pre-monsoon period (May). Ground water quality data of 417 monitoring wells of CGWB and GSDA representing shallow aquifer have been utilised to decipher the quality scenario of shallow aquifer. 45EW, OW- tubewells/borewells data of CGWB and GSDA representing deeper aquifer have been utilised to decipher the quality scenario of deeper aquifer. The aquifer wise concentrations of different chemical constituents present in ground water are given in Table 4.1. The details of chemical analysis are given in Annexure V and VI.

**Table 4. 1: Aquifer wise ranges of chemical constituents in Gondia district**

Constituents	Shallow aquifer		Deeper aquifer	
	Min	Max	Min	Max
pH	6.7	8.9	7.2	8.9
EC	135	4469	200	1405
TDS	72	2905	100	913
TH	9	2960	60	410
Calcium	08	123	18	122.4
Magnesium	5	122	2.9	48.6
Potassium	0.09	50.3	0.1	12
Sodium	9	89	7	69
Bi-carbonate	59	535	73	488
Chloride	9	1050	7	260
Sulphate	0.16	80	0.3	19
Nitrate	0	49	1	65
Fluoride	0.1	1.3	0.14	1.6
Iron	-	-		

\*BDL- below detection limit

#### 4.1 ELECTRICAL CONDUCTIVITY (EC)

##### Distribution of Electrical Conductivity in Shallow Aquifer:

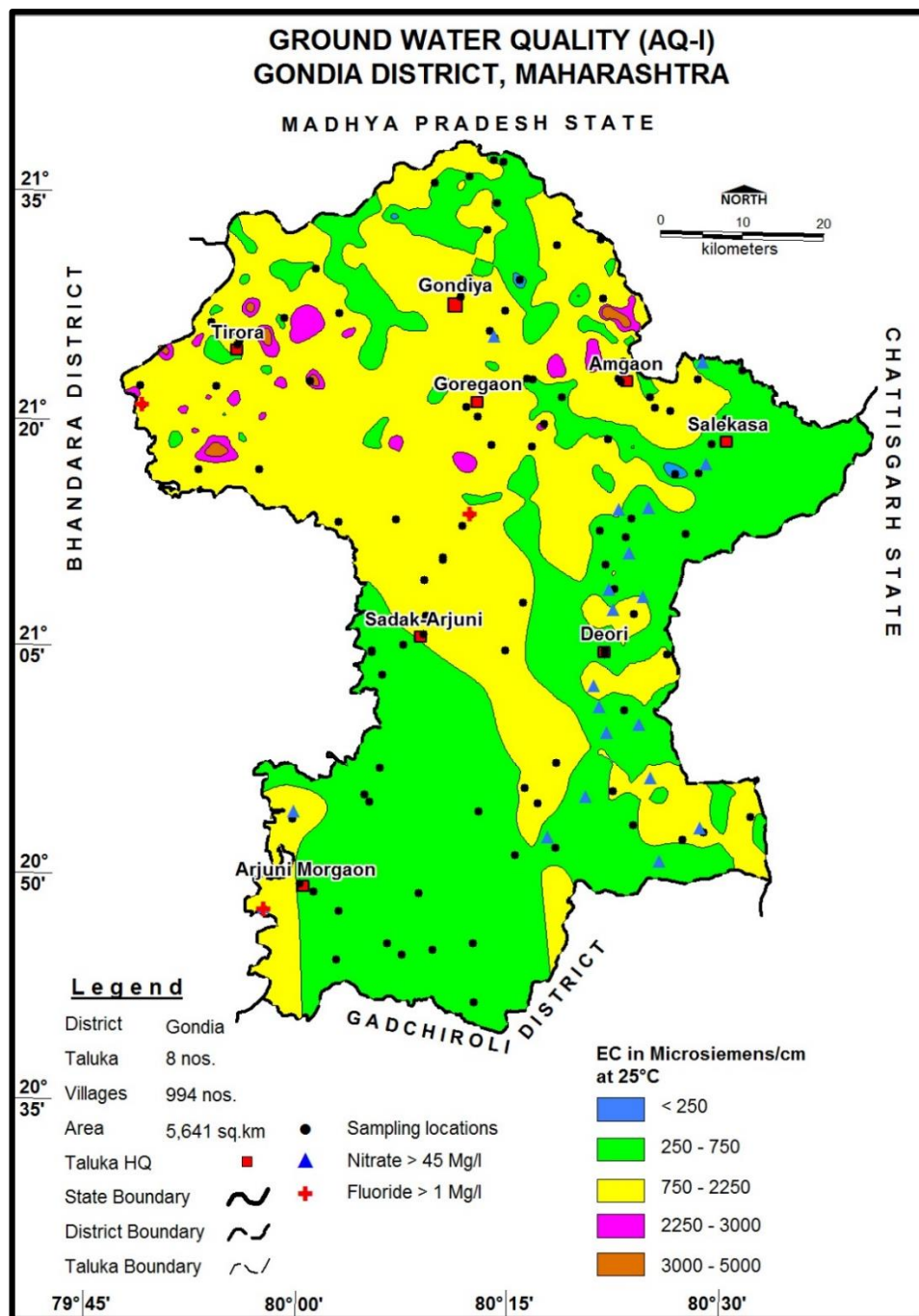
The EC in shallow aquifer varies between 135 (Sategaon-Sakaritola, Salekasa block) and 4469  $\mu\text{S}/\text{cm}$  (Nangpura, Amgaon block). Out of 417 samples collected from dug wells 4 samples having EC <250  $\mu\text{S}/\text{cm}$  has been observed in 6.48 sq. km. 143 samples are having EC 250-750  $\mu\text{S}/\text{cm}$  has been observed in 2433 sq. km. 239 samples are having EC 750-2250  $\mu\text{S}/\text{cm}$  has been observed in 2660 sqkm major part of Arjuni morgan and Salekasa blocks. 24 samples are having EC 2250-3000 $\mu\text{S}/\text{cm}$  has been observed in 73.7sq. km. 7 samples are having EC 3000-5000  $\mu\text{S}/\text{cm}$  has been observed in 13.3 sq. km. The ground water is potable in major part of district. The distribution of electrical conductivity in shallow aquifers is shown in **Fig. 4.1** and analytical data is presented in Table 4.2.

##### Distribution of Electrical Conductivity in Deeper Aquifer:

The EC in deep aquifer varies between 200 (Jamkhairi, Amgaon block) and 1405  $\mu\text{S}/\text{cm}$  (Gotabodi, Deori block). Out of 45 samples collected from dug wells 1 sample is having EC <250  $\mu\text{S}/\text{cm}$  has been observed in 45.5 sqkm. 35 samples are having EC 250-750  $\mu\text{S}/\text{cm}$  has been observed in 4986 sq. km. 09 samples are having EC 750-2250  $\mu\text{S}/\text{cm}$  has been observed in 154 sqkm. The distribution of electrical conductivity in deeper aquifers is shown in **Fig. 4.2** and analytical data is presented in Table 4.2.

**Table 4. 2: Aquifer wise Electrical conductivity 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	4	0.95	1	2.22
2	>250-750	143	34.2	35	77.7
3	>750-2250	239	57.31	09	20
4	>2250-3000	24	5.75		
5	>3000-5000	7	1.67	-	-
6	>5000	-	-	-	-
<b>Total samples</b>		<b>417</b>	<b>100</b>	<b>45</b>	<b>100</b>



**Figure 4. 1: Ground Water Quality, Aquifer-I**

**Nitrate:**

Nitrogen in the form of dissolved nitrate, is a nutrient for vegetation and an essential element to all life. The major contribution in ground water is from sewage, waste disposal, nitrate fertilizer and decaying of organic matter. From shallow aquifer, 417 samples were analyzed; out of these 24 water samples show the nitrate concentrations exceeding the desirable limit of 45 mg/l. In Gondia district nitrate concentration varies between 1 to 49mg/l. As per BIS (2012) the desirable limit is 45 mg/l. The high concentration of Nitrate may be due to domestic waste and sewage effected pollution in the urban and rural parts of district.

In deeper aquifer, 45 wells were analyzed, no water samples show nitrate concentration exceeding the desirable limit of 45 mg/l. In deeper Aquifer nitrate concentration ranges from 1 to 4mg/l. The deeper aquifer is also affected by nitrate contamination; it may be due to percolation of nitrate contaminants from the ground surface as there are no other reasons for nitrate contamination in deeper aquifers. Aquifer wise nitrate concentration is given in Table 4.3.

**4.3 Concentration of NO<sub>3</sub> Shallow aquifer and deeper aquifer**

S.No.	NO <sub>3</sub> 45 ppm)	Shallow aquifer		Deeper Aquifer	
		No. of samples	% of samples	No. of samples	% of samples
1	<45	393	94.2	45	100
2	>45	24	5.75	-	-
3	<b>Total</b>	<b>417</b>	<b>100</b>	<b>45</b>	<b>-</b>



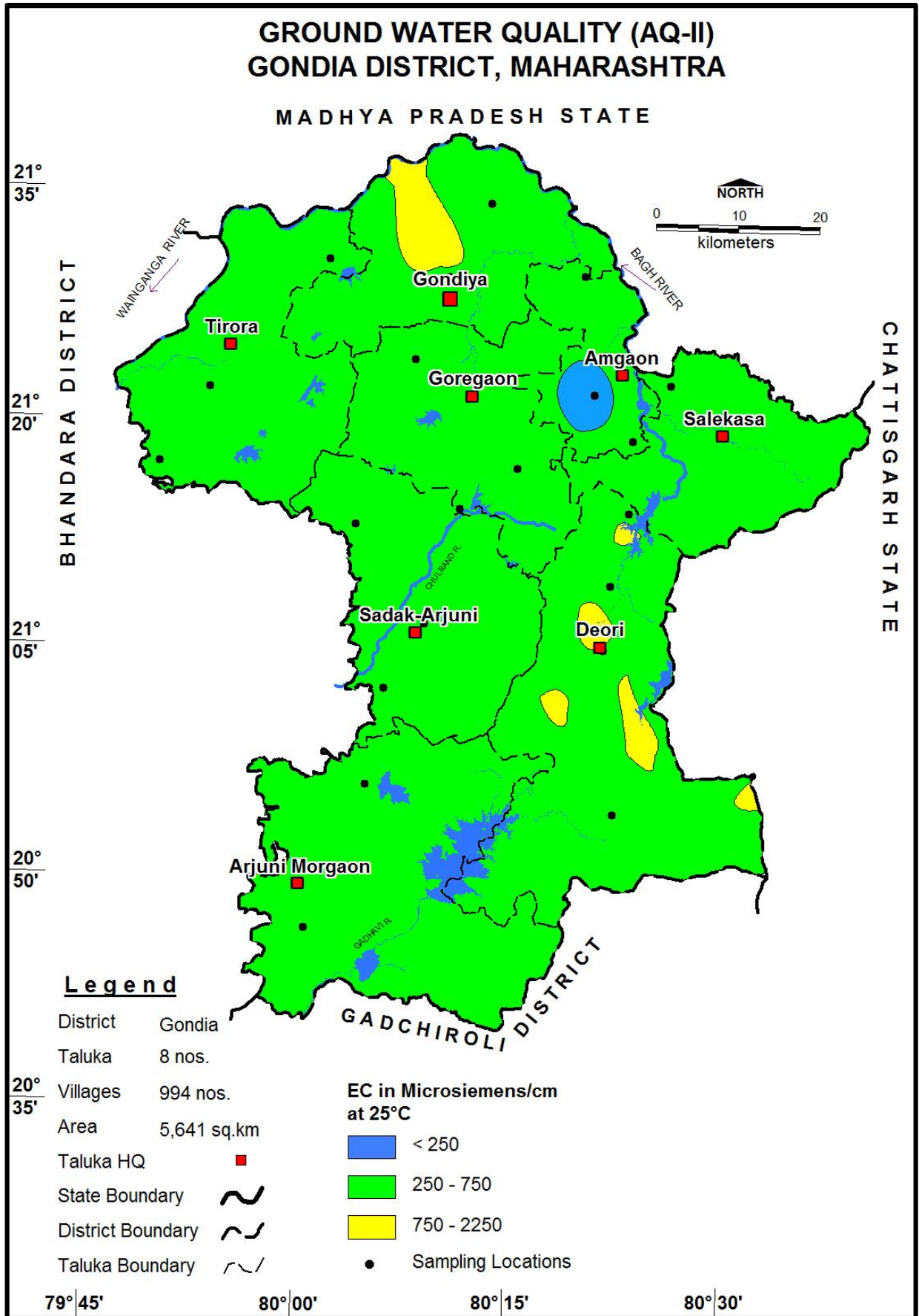


Figure 4. 2: Ground Water Quality, Aquifer-II



## Fluoride:

In shallow aquifer, concentration of fluoride ranges from 0.1 to 1.3mg/l. out of 417 samples analyzed, no samples show fluoride concentration more than 1.5 mg/l. In Deeper Aquifer, Concentration of fluoride ranges from 0.2 to 1.65 mg/l. Out of 45 samples analyzed, 1 sample show fluoride concentration more than 1.5 mg/l. Aquifer wise fluoride concentration is given in Table 4.4.

**Table 4. 4: Aquifer wise Fluoride concentration**

S.No.	F	Shallow aquifer		Deeper Aquifer	
	1.5 ppm)	No. of samples	% of samples	No. of samples	% of samples
1	<1.5	417	100	45	98.2
2	>1.5	0	0	1	1.6
3	Total	417	100	45	100

**Table 4. 5: Aq wise Nitrate and Fluoride concentration**

Block	No <sub>3</sub> > 45 mg/l		fluoride >1.5 mg/l	
	No of samples	No of samples	No of samples	No of samples
	Shallow Aquifer	Deeper Aquifer	Shallow Aquifer	Deeper Aquifer
Amgaon		-	-	-
Arjuni morgaon	3	-		1
Devari	14	-	-	-
Gondia	2	-	-	-
Goregaon	-	-	-	-
Sadak arjuni	-	-	-	-
Salekasa	3	-	-	-
Tiroda	2	-	-	-
<b>Total</b>	<b>24</b>	<b>0</b>	<b>-</b>	<b>01</b>

## 4.2 SUITABILITY OF GROUND WATER FOR DRINKING PURPOSE

In shallow aquifer, 60 % 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 13.66% samples are beyond the maximum permissible limit for the parameters like TH and Mg indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in shallow Aquifer is given in **Table 4.6.** and graphical representation of Percentage distribution of Ground Water Samples in shallow aquifer as per Drinking water Standards (IS-10500-2012) is given in **Figure 4.1**

**Table 4. 6: Concentration of Chemical constituents in shallow Aquifer**

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Shallow aquifer					
	DL	MPL		Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
				No	%	No	%	No	%
pH	6.5	8.5	417	-	-	413	99.01	4	0.9
TDS (mg/L)	500	2000	417	174	38	237	60.3	7	1.53
TH (mg/L)	300	600	417	190	45.5	170	40.7	57	13.66
Ca (mg/L)	75	200	20	14	70	6	30		
Mg (mg/L)	30	100	20	11	55	8	40	1	5
Cl (mg/L)	250	1000	417	294	70.5	121	29.01	2	0.04
SO <sub>4</sub> (mg/L)	200	400	417	417	100				

NO <sub>3</sub> (mg/L)	45	No relaxation	417	393	94.2			24	5.7
F (mg/L)	1	1.5	410	417	98.3	7	1.6		

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

In Deeper aquifer, 8.88% 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 6.66 % samples are beyond the maximum permissible limit for the parameters like pH indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in Deeper Aquifer is given in **Table 4.7.** and graphical representation Percentage Distribution of Ground Water Samples in Deeper aquifer as per Drinking water Standards (IS-10500-2012) is given in **Figure 4.2**

**Table 4. 7: Concentration of Chemical Constituents in Deeper Aquifer**

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Deeper aquifer					
	DL	MPL		Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
				No	%	No	%	No	%
pH	6.5-8.5	-	45			42	93.3	3	6.66
TDS (mg/L)	500	2000	45	41	91.1	4	8.88		
TH (mg/L)	300	600	45	41	91.1	4	8.88		
Ca (mg/L)	75	200	17	17	100				
Mg (mg/L)	30	100	17	16	94.1	1	5.88		
Cl (mg/L)	250	1000	45	44	97.7	1	2.22		
SO <sub>4</sub> (mg/L)	200	400	45	45	100				
NO <sub>3</sub> (mg/L)	45	No relaxation	45	44	97.77	1	2.2		
F (mg/L)	1	1.5	45	44	97.77	1	2.2		

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

### 4.3 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 Adsorption 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 concentration 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 4.8 and details are as follows: -

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

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

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

**Very High Salinity Water (EC: >2250 µS/cm):** This water is not suitable for irrigation under ordinary condition. The soils must be permeable, drainage must be adequate, irrigation

water must be applied in excess to provide considerable leaching and very salt tolerant crops should be selected.

**Table 4. 8 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	4	0.95	1	2.22
2	Medium Salinity Water	>250-750	143	34.2	35	77.7
3	High Salinity Water	>750-2250	239	57.31	09	20
4	Very High Salinity Water	>2250-3000	24	5.75		
		>3000-5000	7	1.67	-	-
<b>Total</b>			<b>417</b>	<b>100</b>	<b>45</b>	<b>100</b>

In shallow aquifer, maximum numbers of samples fall under the category of medium to high salinity type of water. In deeper aquifer also maximum numbers of samples fall under the category of medium to high 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.

### Sodium Adsorption Ratio (SAR)

Excess of sodium in water render it unsuitable for irrigation on soil containing exchangeable Calcium and Magnesium ions. Soil containing exchangeable Calcium and Magnesium takes up sodium of irrigation water in exchange for Calcium and Magnesium, the ratio reflects the Sodium hazard. The SAR indicates the relative activity of the Sodium ions in exchange reactions with the soil. The main problem with high sodium concentration is its effect on soil permeability; hardening of soil & water irrigation system. Sodium also contributes directly to the total salinity of the water and may be toxic to sensitive crops such as fruit trees. The higher value of SAR indicates soil structure damage.

In shallow aquifer, out of 20 samples analyzed and all samples are having SAR value less than 10. In deeper aquifer, out of 17 samples analyzed and all samples are having SAR value less than 10. The classification of ground water samples based on SAR values for its suitability for irrigation purpose is shown in Table 4.9.

**Table 4. 9: Classification of Ground water for Irrigation based on SAR values**

Characteristics	Quality	SAR value							
		< 10		10-18		18-26		> 26	
		Good		Good to Permissible		Doubtful		Bad (Unsuitable)	
	Total Number of GW samples	No	%	No	%	No	%	No	%
Shallow Aquifer	20	20	100	-	-	-	-	-	-
Deeper Aquifer	17	17	100	-	-	-	-	-	-
<b>Total</b>	<b>52</b>	<b>52</b>	<b>100</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

### Residual Sodium Carbonate (RSC)

Residual Sodium Carbonate (RSC) is considered to be superior to SAR as a measure of sodicity particularly at low salinity levels. Calcium reacts with bi-carbonate and precipitate as  $\text{CaCO}_3$ . Magnesium salt is more soluble and so there are fewer tendencies for it to precipitate. When calcium and magnesium are lost from the water, the proportion of sodium is increased resulting in the increase in sodium hazard. This hazard is evaluated in terms of RSC. The classification of ground water samples based on RSC values for its suitability for irrigation purpose is shown in Table 4.10.

**Table 4. 10: Classification of Ground water for Irrigation based on RSC values**

Characteristics	Quality	RSC values (meq/L)					
		< 1.25		1.25-2.50		> 2.50	
		Good		Doubtful		Bad (Unsuitable)	
	Total No of GW samples	No	%	No	%	No	%
Shallow Aquifer	20	20	100			-	-
Deeper Aquifer	17	32	100			-	-
<b>Total</b>	<b>52</b>	<b>52</b>	<b>100</b>			-	-

## 5.0 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-97 methodology. Block wise ground water resources are given in **Table 4.9**, and graphical representations of the resources on the map are shown in **Figure 5.1**.

Ground Water Resources estimation was carried out for 6216.44 sq. km. area out of which 2397.66 sq. km. is under command and 3817.7 sq. km. is under non-command. As per the estimation, the Annual extractable ground water resources is 625.49 MCM. The total Extraction is estimated at 163.60 MCM with irrigation sector having a draft of 101.53 MCM and Domestic use having draft of 59.09 MCM. The industrial water requirements are worked out at 2.97 MCM. The net ground water availability for future use is estimated at 461.88 MCM. Stage of ground water development varies from 14.70 % (Doeri) to 43.14% (Goregaon). The overall stage of ground water development for the district is 28.20%. Block wise assessments indicate that all the blocks in the district fall under "Safe" category.

**Table 5.1: Ground water resources-2020 (MCM), Aquifer-I (Shallow Aquifer)**

Administrative Unit	Annual Extractable Ground Water Recharge	Annual Ground Water Extraction on-irrigation use	Annual Ground Water Extraction on-industrial use	Annual Ground Water Extraction on-domestic use	Total Extraction	Annual GW Allocation for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction	Category
Amgaon	46.91	5.77	0.27	8.06	14.11	8.06	32.80	30.08	safe
Arjuni Morgaon	144.15	16.69	0.24	6.98	23.93	6.98	120.21	16.61	safe
Devari	86.54	8.013	0.11	4.46	12.71	4.46	73.82	14.70	safe
Gondia	80.02	16.11	0.91	10.30	27.33	10.29	52.69	34.16	safe
Goregaon	47.46	12.50	0.74	7.52	20.77	7.52	26.68	43.77	safe
Sadak arjuni	84.81	23.82	0.24	6.1	30.18	6.11	54.63	35.58	safe
Salekasa	62.96	8.84	0.18	5.79	14.82	5.79	48.14	23.54	safe
Tiroda	72.60	9.63	0.24	9.84	19.72	9.84	52.88	27.16	safe
<b>Total</b>	<b>625.49</b>	<b>101.53</b>	<b>2.97</b>	<b>59.09</b>	<b>163.60</b>	<b>59.099</b>	<b>461.885</b>	<b>28.20</b>	<b>safe</b>

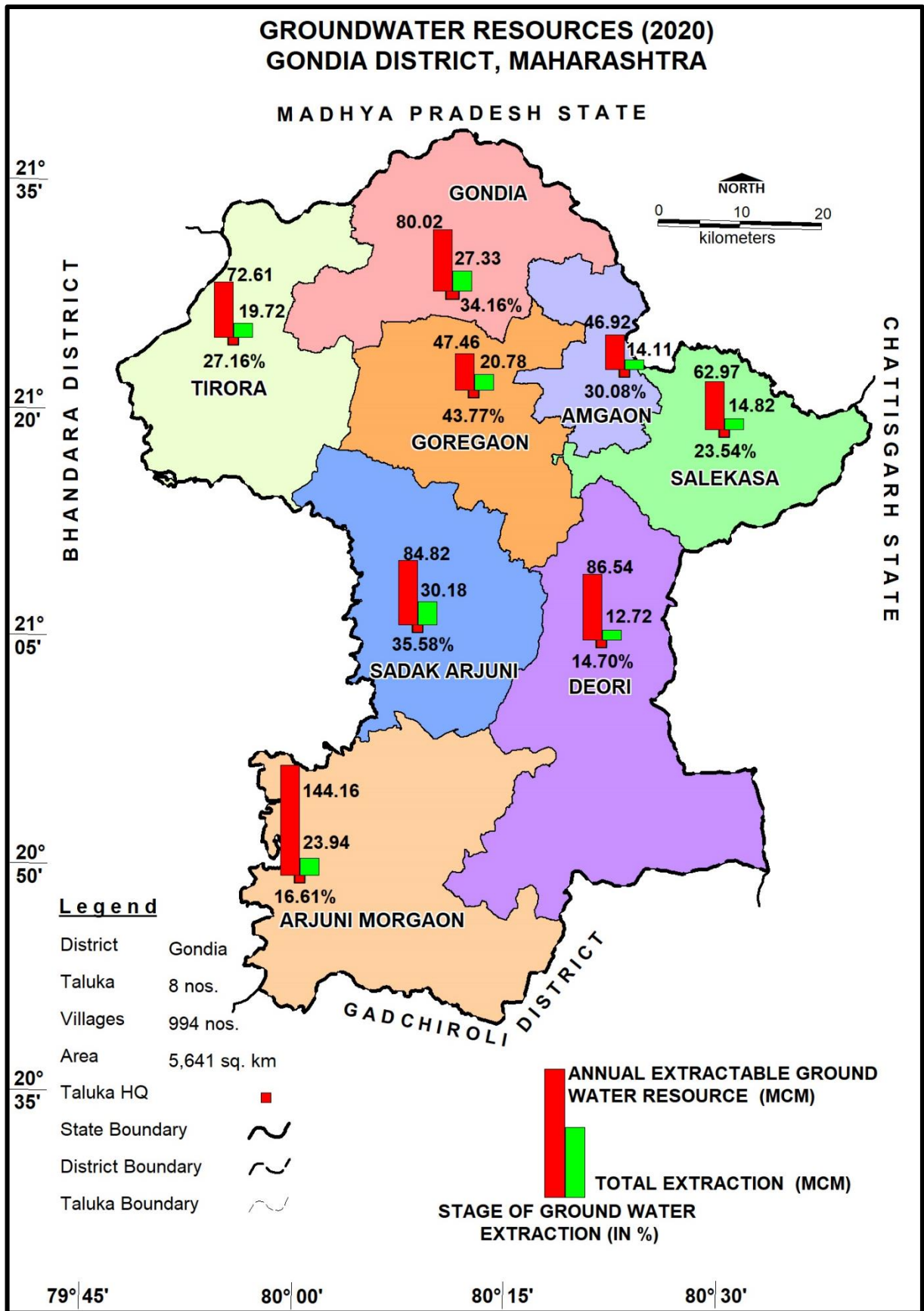


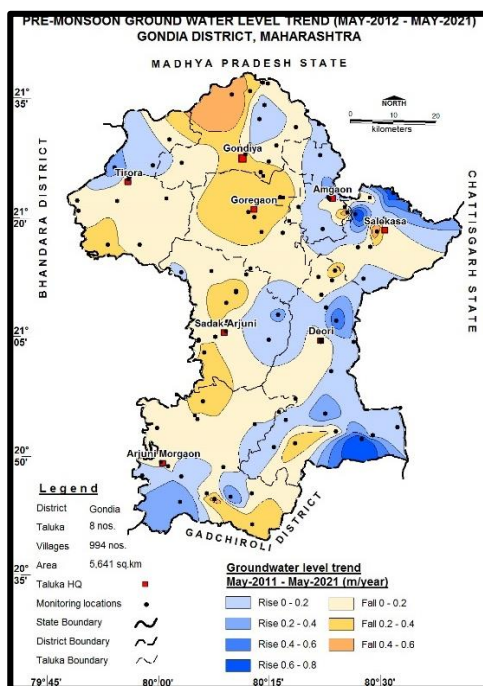
Figure 5. 1: Ground Water Resources (2020), Gondia district

## 6.0 GROUND WATER RELATED ISSUES

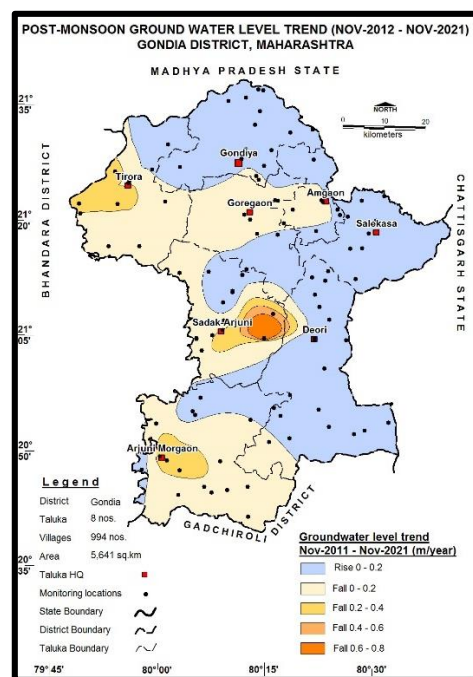
### 6.1 Declining Water Level trend

During pre-monsoon period, declining water level trend has been observed in about 3310 sq. km. area i.e., 65 % of the area. Significant decline of more than 0.20 m/year has been observed in 958 sq. km., i.e., 19 % of the area covering major parts of Gondia, Goregaon, Sadak arjuni and Tirora blocks and in Isolated parts of Deori and Salekasa blocks.

During post monsoon period, declining water level trend has been observed in about 2387sq. km. area i.e. 46 % of the area. Significant decline of more than 0.20 m/year has been observed in 363sq. km., i.e., 7 % of the area covering major parts of Gondia, Goregaon, Arjuni morgaon and Tirora blocks and in Isolated parts of Deori and Salekasa blocks. (Fig 6.1) These declines may be due to the exploitation of ground water or low and erratic rainfall received in these areas. Water level trend data (2012-21) of (GWM wells) observation wells of CGWB is given in Annexure-IV.



Pre-monsoon decline in water level – 3310 sq.km area (65%)  
Decline > 0.2 m/year in 958 sq km (19% of the Area)



Post-monsoon decline in water level – 2387 sq.km area (46%)  
Decline > 0.2 m/year – 363 sq km (7%)

### 6.2 RAINFALL AND DROUGHTS

The short-term rainfall analysis for the period 2012-2021 indicates that average rainfall of Gondia District is 1270.1mm and Normal rainfall of the districts is 1352.6mm. **The rainfall analysis for last ten years is showing deficient rainfall/ Moderate drought condition in the years 2017 and excess rainfall in the year 2013.**



**Table 6.1 The rainfall analysis for last ten years**

District	YEAR	ANNUAL	NORMAL	DEPARTURE	No of Rainy days	CATEGORY
<b>Gondia</b>	2012	1276.3	1352.6	-5.6	76	NORMAL
	2013	1920.8	1352.6	42.0	85	EXCESS
	2014	1055.1	1352.6	-22.0	57	NORMAL
	2015	1201.2	1352.6	-11.2	71	NORMAL
	2016	1144.2	1352.6	-15.4	74	NORMAL
	2017	776.7	1352.6	-42.6	61	MODERATE
	2018	1241.1	1352.6	-8.2	76	NORMAL
	2019	1273.65	1352.6	-5.8	68	NORMAL
	2020	1340.88	1352.6	-0.9	72	NORMAL
	2021	1308.4	1352.6	-3.3	94	NORMAL

### 6.3 GROUND WATER QUALITY HAZARD

#### Fluoride:

High Fluoride concentration is noticed in Vindhyan sediments and Archean granite Gneiss in parts of all the blocks and mohadi blocks is badly affected by flourided contamoination.

In shallow aquifer, concentration of fluoride ranges from 0.01 to 1.3 mg/l. out of 417samples analyzed, 7 samples show fluoride concentration more than 1 mg/l.

In Deeper Aquifer, concentration of fluoride ranges from 0.002 to 1.65 mg/l. Out of 45samples analyzed, only 1 sample show fluoride concentration more than 1 mg/l. In Deeper aquifer, the highest concentration of fluoride is found in Anjora (1.65 mg/L) in Amgaon block; it may be due to the geogenic reasons.

The ground water quality is mainly affected by high concentrations fluoride above Desirable limit of BIS. Continuous intake of high fluoride concentration water causes dental and skeletal fluorosis. Thus, all the wells used for water supply should be first analysed for Fluoride contents and if the fluoride content is found beyond the desirable limit the ground water may be used for other purposes than drinking.

#### Mesures:

- Fluoride free water supply schemes should be framed exclusively for drinking water purpose by tapping surface water and collector wells, wherever feasible.
- Proper well design in construction of tubewells and sealing of fluoride rich zones based on scientific methods.
- Open wells/shallow borewells should be located in the vicinity of surface water bodies.
- De-fluoridation techniques may be adopted with community involvement.
- As high sodium (which comes from domestic sewage besides from lithology) helps in retention and concentration of Fluoride in ground water, local agencies should make proper arrangement of lined drainage system for disposal of domestic waste.

#### Nitrate:

The major contribution in ground water is from sewage, waste disposal, nitrate fertilizer and decaying of organic matter. From shallow aquifer, 417 samples were analyzed and 24 samples showing nitrate concentrations exceeding the desirable limit of 45 mg/l. In Gondia district nitrate concentration varies from 0.12 to 49 mg/l. As per BIS (2012) the desirable limit is 45 mg/l.

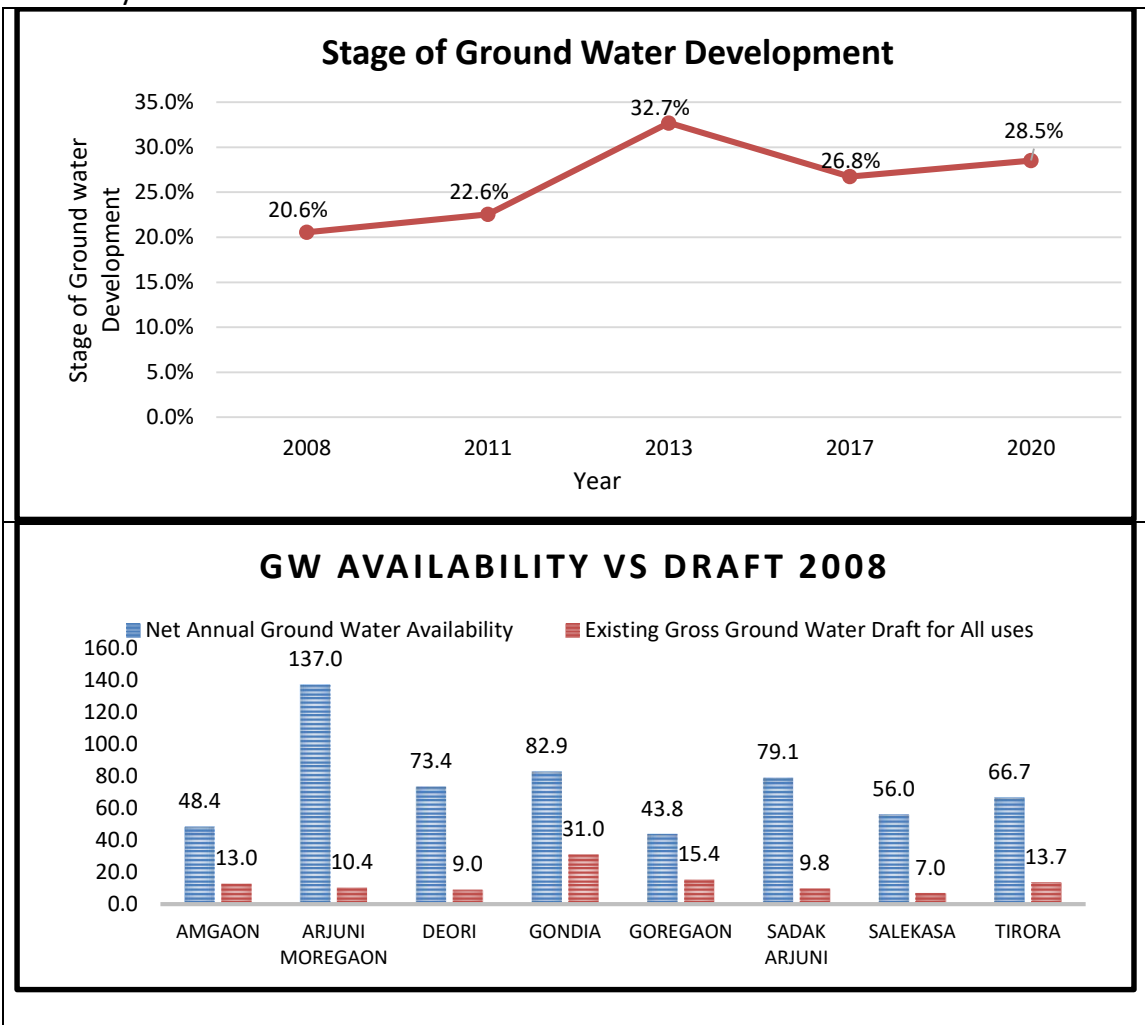
In deeper aquifer, 45 water, samples were analyzed, out of these1 water sample show nitrate concentration exceeding the desirable limit of 45 mg/l. In deeper aquifer nitrate concentration ranges from 6 to 65 mg/l (Kaneriram, Sadak arjuni block). The deeper aquifer is also affected by nitrate contamination; it may be due to percolation of nitrate contaminants from the ground surface as there are no other reasons for nitrate contamination in deeper aquifers.

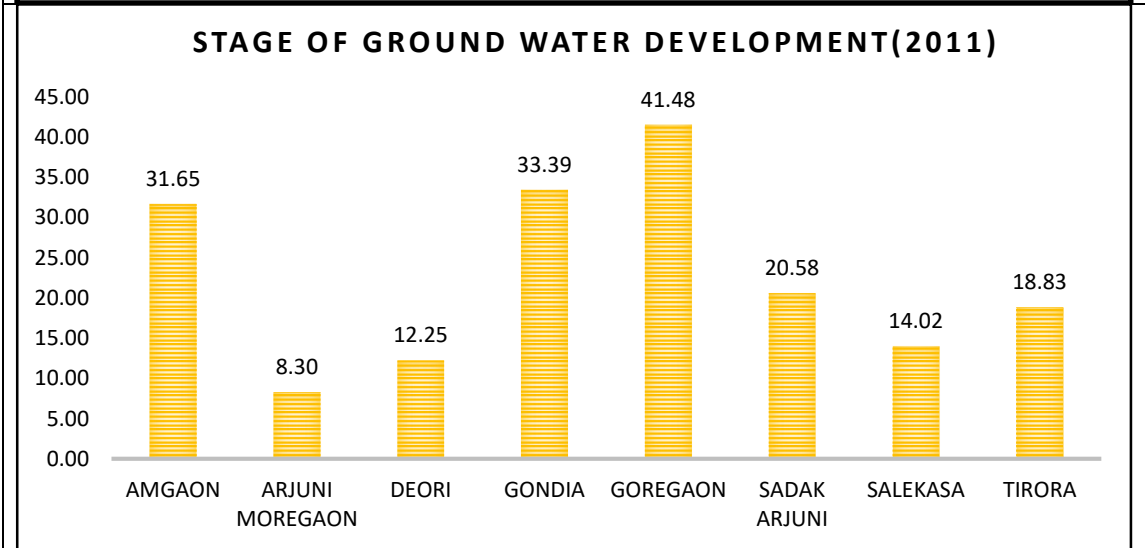
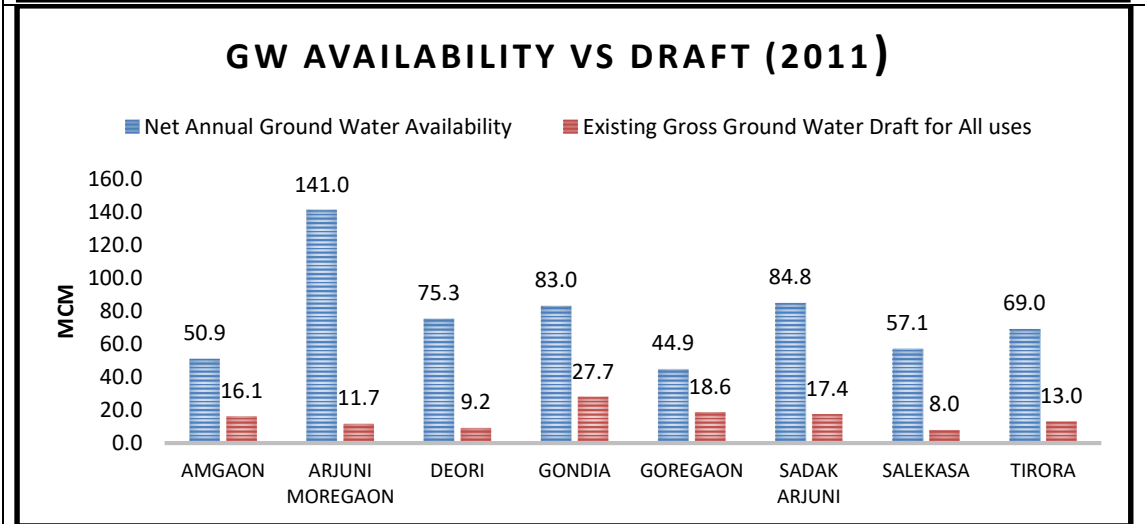
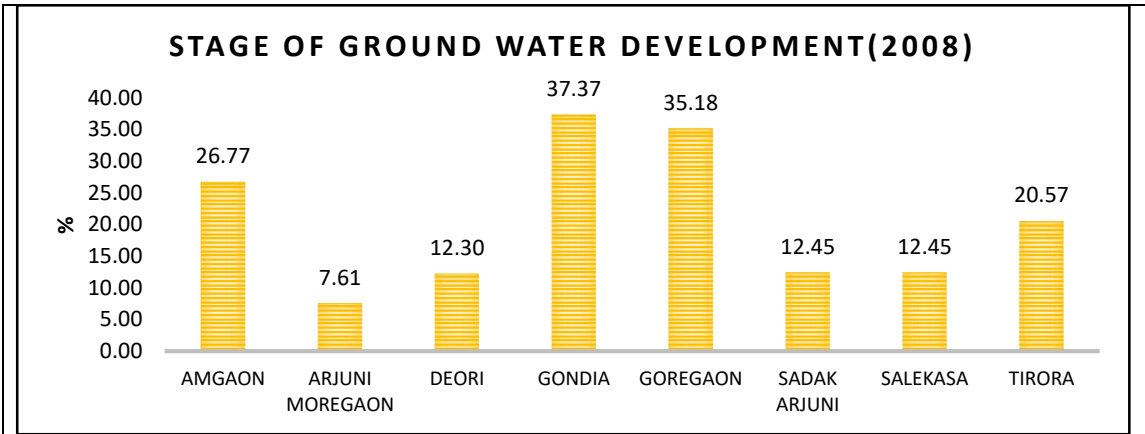
**Mesures:**

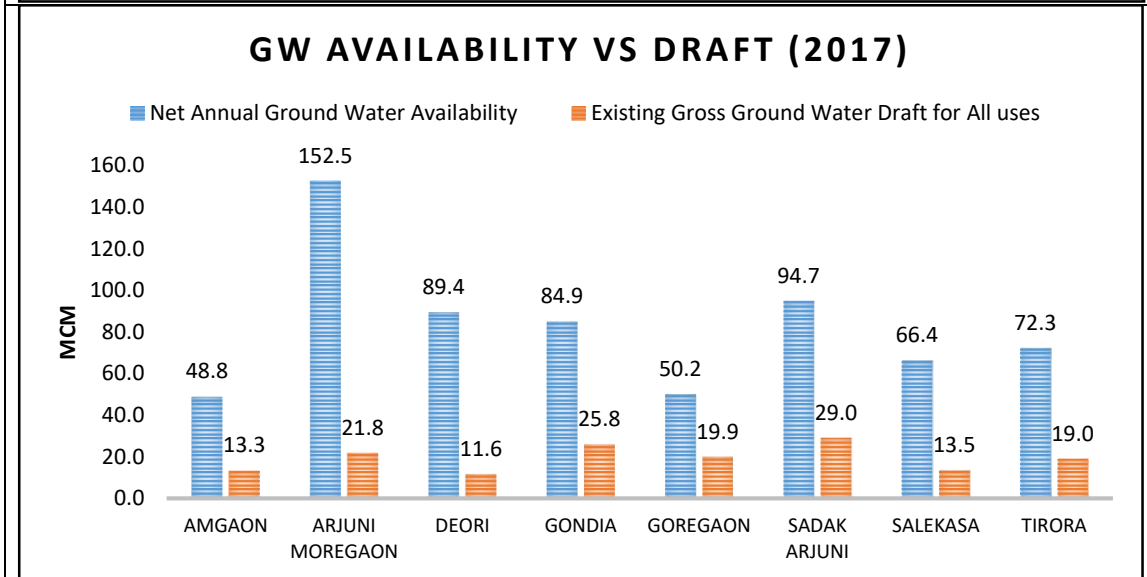
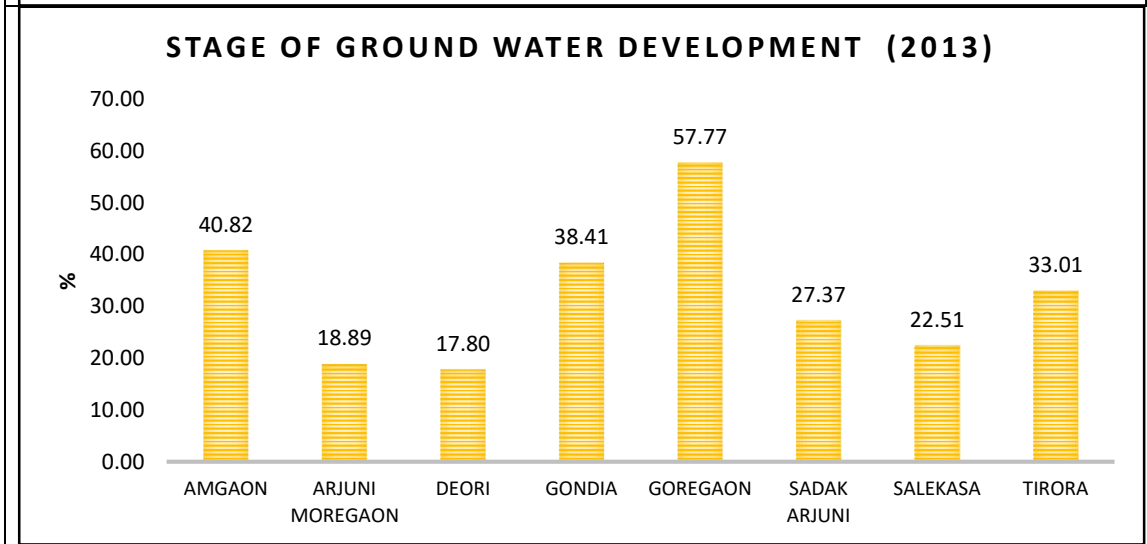
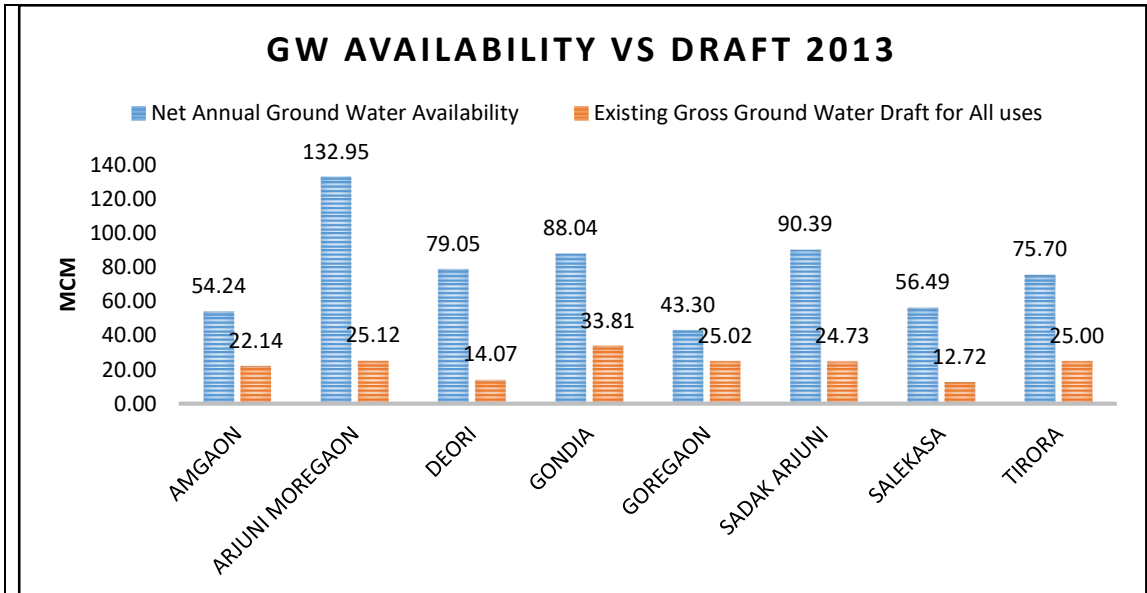
- Propoer arrangement for disposal and treatment of domestic sewage, waste and wastewater in urban as well as rural areas is required.
- Prpoer linig of Nalas carrying domestic sewage, waste, selecting suitable impermeable geological sites for disposal of garbage.
- Prpoer mangmemet of animal excreta.

**6.4 GROUND WATER RESOURCES-Low Ground Water Development**

Eventhough the district continoue to be safe category; the Stage of ground water development has increased over the period of time from 2008 to 2020 from 20.6% (2008) to 28.5 % (2020) but no singnificant changes in SOD has been observed over the time. In Gondia district, Ground water draft for domestic, industrial and irrigation purposes has continously increased from 109.34 mcm to 163.60 mcm from 2008 to 2020







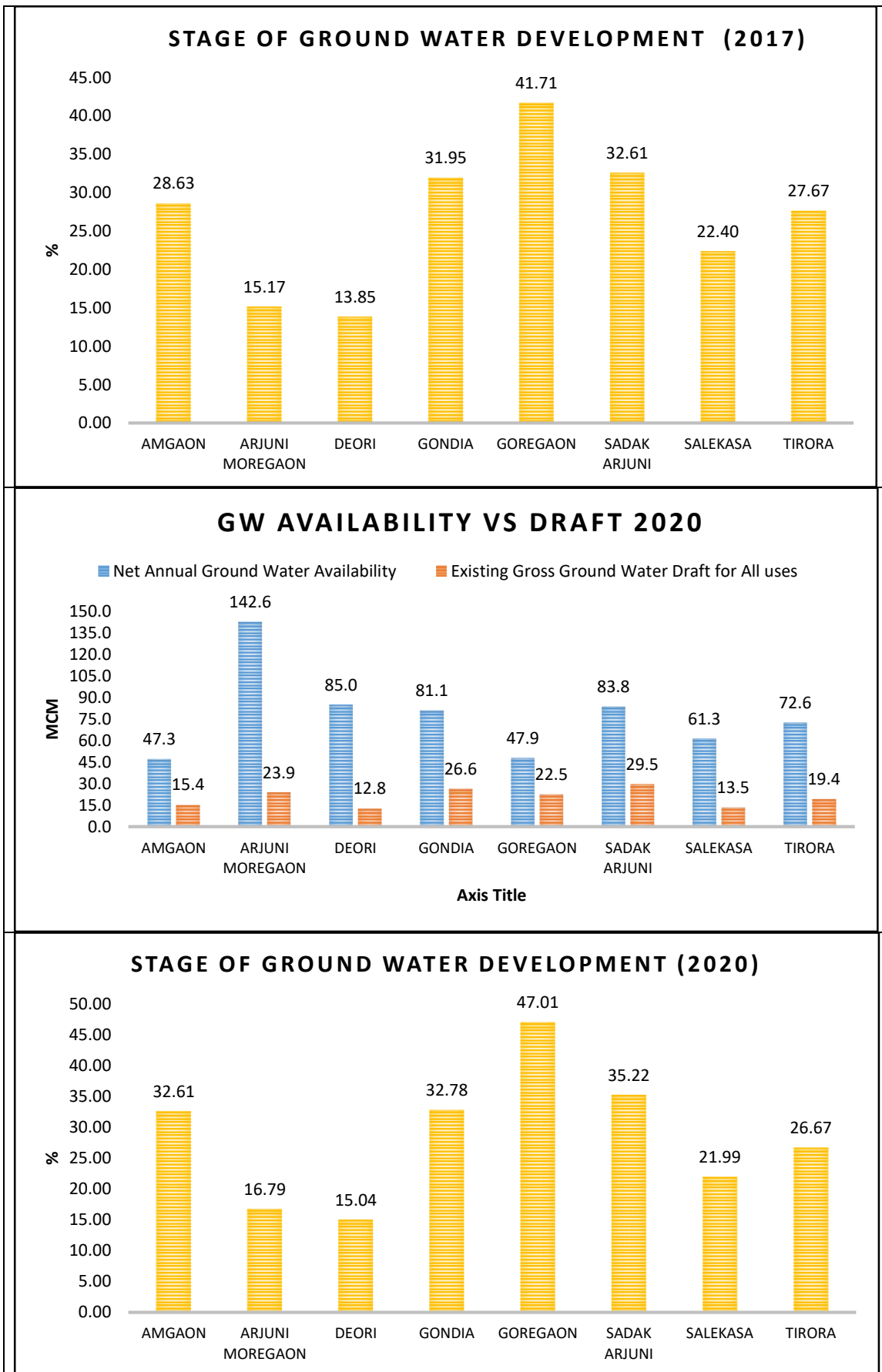


Figure 6. 1: Draft Vs Availability and (2008-2020) & Stage of ground water development (2008-2020)



## 7.0 GROUND WATER MANAGEMENT PLAN

The management plan has been proposed to manage the ground water resources 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 by utilization 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	Geographical Area (sq. km.)	Area feasible for recharge (sq. km.)	Unsaturated Volume (MCM)
Amgaon	416	30.58	15.29
Arjun morgaon	926.33	-	-
Deori	1009	-	-
Gondia	670	111.53	97.59
Goregaon	481	213.75	243.68
Sadak arjuni	639.85	-	-
Salekasa	505	-	-
Tiroda	562	-	-
<b>Grand Total</b>	<b>5209.18</b>	<b>355.86</b>	<b>356.56</b>

The total unsaturated volume available for artificial recharge is 355.86 MCM ranging from 30.58 MCM in Amgaon block to 213.75 MCM in Goregaon block. The available surplus runoff can be utilized for artificial recharge through construction of percolation tanks and Check dams at suitable sites.

Thus, after taking into consideration all the factors, only 7.13 MCM of surplus water can be utilised for recharge, which is given in table 7.2. This surplus water can be utilized for constructing 25percolation tanks and 72check dams at suitable sites. The number of feasible artificial recharge structures was calculated by considering 0.20 MCM per percolation tanks and 0.03 MCM per check dam. This intervention should lead to recharge @ 75% efficiency of about 5.35 MCM/year. Tentative locations of these structures are given in **Fig. 7.1** and details also given in **Annexures VIII and IXFIG.**

The rainwater harvesting in urban areas can be adopted in 25% of the household with 12132 m<sup>2</sup> roof area. A total of 0.711 MCM potential can be generated by taking 80% runoff coefficient.

**Table 7.2: Proposed Artificial Recharge Structures**

Block	Geo graphical Area (sq. km.)	Area feasible for recharge (sq. km.)	Unsaturated Volume (MCM)	Surplus water available for AR (MCM)	Surplus water used for AR (MCM)	Proposed number of structures		Total recharged @ 75 % efficiency (MCM)
						PT	CD	
Amgaon	416	30.58	15.29	31.26	0.31	1	3	0.23
Arjuni Morgaon	926.33	-	-	-	-	-	-	-
Devari	1009	-	-	-	-	-	-	-
Gondia	670	111.53	97.59	225.5	1.95	7	20	1.46
Goregaon	481	213.75	243.68	646.02	4.87	17	49	3.66
Sadakarjuni	639.85	-	-	-	-	-	-	-
Salekasa	505	-	-	-	-	-	-	-
Tiroda	562	-	-	-	-	-	-	-
<b>Grand Total</b>	<b>5209.18</b>	<b>355.86</b>	<b>356.56</b>	<b>902.85</b>	<b>7.13</b>	<b>25</b>	<b>72</b>	<b>5.35</b>

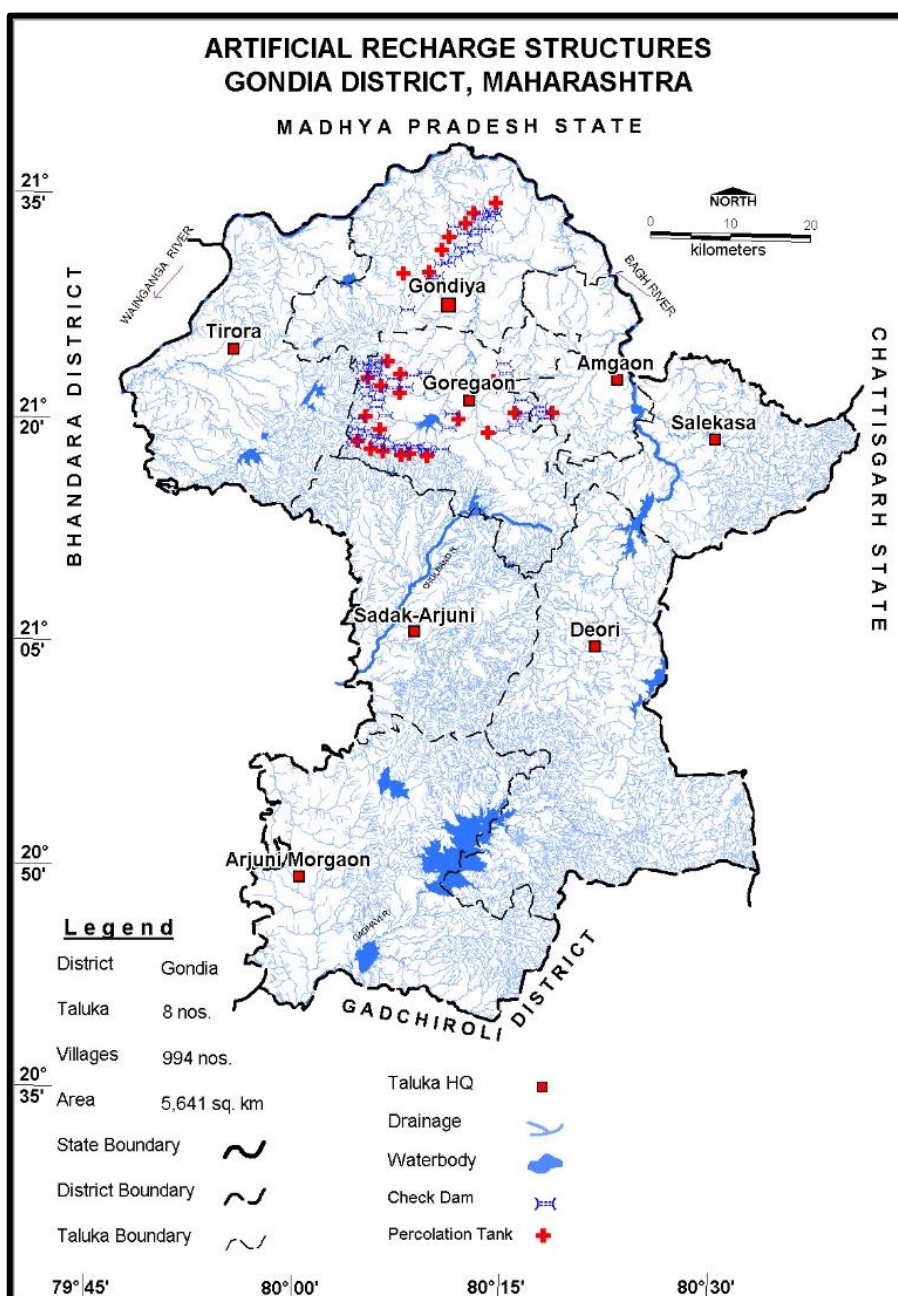
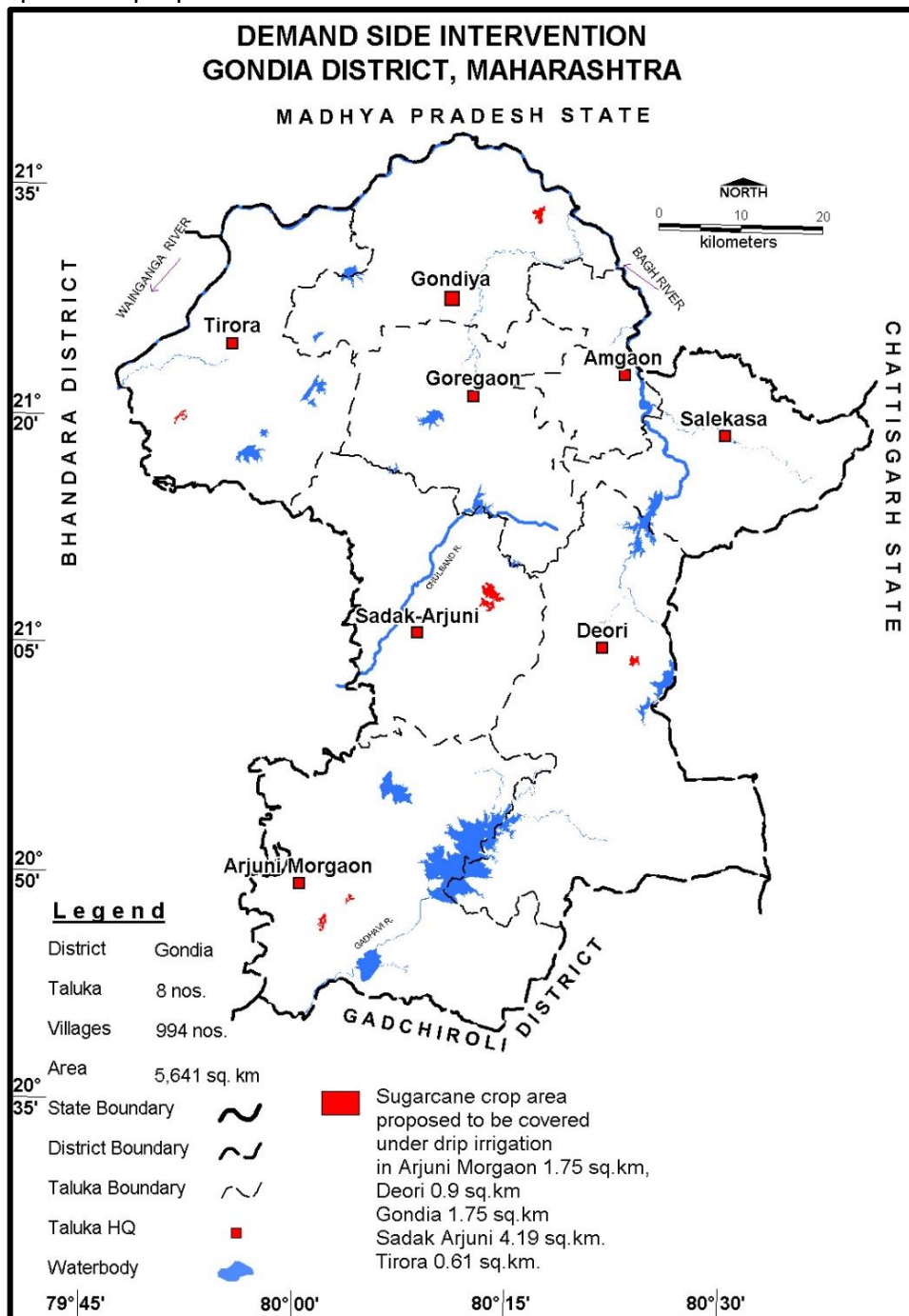


Figure 7. 1: Location of Proposed Artificial Recharge structures

## 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 (Sugarcane/Citrus/Banana) or change in cropping pattern or both are required to save water.

In the district, micro-irrigation techniques, like drip irrigation techniques are proposed to be adopted in 9.20 Sq. km. area in all blocks and that would save a total of 5.24 MCM water (Table.7.3). Change in cropping patterns is not proposed in any of the blocks. Fig 7.2 depicts the proposed demand side interventions.



**Figure 7. 2: Demand Side Intervention**

**Table 7.3: Area proposed for Micro irrigation Techniques and water saving through Demand side interventions**

Block	MICROIRRIGATION TECHNIQUES		
	Sugarcane Area proposed (Sq. Km.)	Double crop Area proposed (Sq. Km.)	Volume of Water saved (MCM)
Amgaon			
Arjuni morgaon	1.75		1
Devari	0.9		0.51
Gondia	1.75		1
Goregaon			
Sadak arjuni	4.19		2.39
Salekasa			
Tiroda	0.61		0.35
<b>Grand Total</b>	<b>9.20</b>		<b>5.24</b>

### 7.3 EXPECTED BENEFITS

The impact of implementation of groundwater management plans on the groundwater system in the district is evaluated and the outcome shows significant improvement in groundwater scenario in all blocks (Table 7.3). The Stage of ground water development gets reduced and comes below 70%.

**Table 7. 3: Expected benefits after management options**

Block	Water Recharged by Supply side intervention (MCM)/year	Water saving by demand side interventions (MCM)/year	Annual Extractable Ground Water Recharge (As per GWRE, 2020) (MCM)/year	Total ground water draft (As per GWRE, 2020) (MCM)/year	Ground water resources after supply side management (MCM)/year	Ground water Draft after demand side management (MCM)/year	Expected stage of Development %
Amgaon	0.23		46.91	14.11	47.13	15.43	29.93
Arjuni morgaon	-	1	144.15	23.93	144.15	22.95	15.93
Devari	-	0.51	86.54	12.71	86.54	12.26	14.09
Gondia	1.46	1	80.02	27.33	81.48	25.586	32.32
Goregaon	3.66		47.46	20.77	51.11	22.505	40.63
Sadak arjuni	-	2.39	84.81	30.18	84.81	27.13	32.77
Salekasa	-		62.96	14.82	62.96	13.47	23.54
Tiroda	-	0.35	72.60	19.72	72.6	19.01	26.68
<b>Total</b>	<b>5.35</b>	<b>5.24</b>	<b>625.491</b>	<b>163.60</b>	<b>630.7984</b>	<b>158.3619</b>	<b>25.10</b>

### 7.4 DEVELOPMENT PLAN

The ground water development plan has been proposed with the view of developing the additional ground water resources available after supply side interventions to bring the stage of ground water development up to 70%. The 283.23 MCM volume of ground water generated can bring additional 435.74sq. km. Kharif Crop area under assured ground water

irrigation with average crop water requirement of 0.65 m by constructing 16994 Dug wells and 2833 Bore wells. Block wise details are given in Table 7.4. The area feasible for ground development is shown in Fig. 7.3.

**Table 7. 4: Block wise additional area under assured GW Irrigation**

Block	Annual Extractable Ground Water Recharge (As per GWRE, 2020) (MCM)/year	Ground water resources after supply side management (MCM)/year	Ground water Draft after demand side management (MCM)/year	Expected stage of Development %	Balance GWR available for GW Development after STAGE OF GWD is brought 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)	Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m after 70% stage of GWD is achieved (Sq. Km)
Amgaon	46.91	47.13	15.432	29.93	18.88	1133	189	29.05
Arjuni morgaon	144.15	144.15	22.95	15.93	77.97	4678	780	119.95
Devari	86.54	86.54	12.26	14.09	48.38	2903	484	74.43
Gondia	80.02	81.48	25.58	32.32	30.70	1842	307	47.24
Goregaon	47.46	51.11	22.50	40.63	15.01	901	150	23.09
Sadak arjuni	84.81	84.81	27.13	32.77	31.57	1895	316	48.57
Salekasa	62.96	62.96	13.47	23.54	29.25	1755	293	45.00
Tiroda	72.60	72.6	19.01	26.68	31.44	1887	314	48.38
<b>Grand Total</b>	<b>625.491</b>	<b>630.79</b>	<b>158.3619</b>	<b>26.10</b>	<b>283.2329</b>	<b>16994</b>	<b>2833</b>	<b>435.742</b>



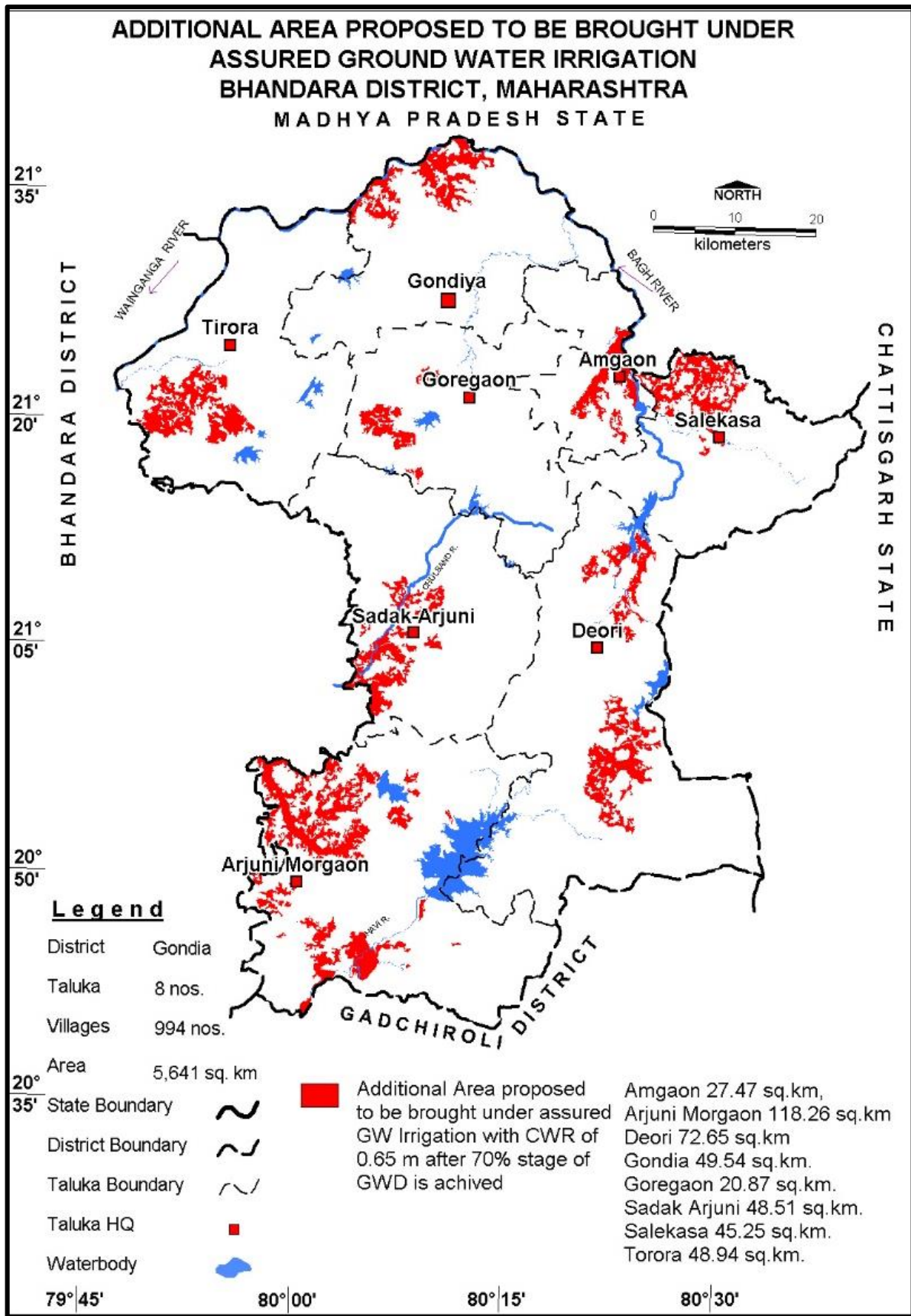


Figure 7. 3: Additional area Proposed to be bought under Assured GW irrigation

## 8.0 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 inhouse; 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 Gondia.

Gondia district covering an area of about 5209.1sq. km. with 612.1sq. km. being hilly area. The stage of ground water development of the district is 28.20%. The area has witnessed relatively high exploitation of ground water resource, declining water level, low rainfall and drought and low yield potential of aquifers. Declining water level trend of more than 0.20 m/year has been observed in 958 sq. km. (19% area of the total area) during pre-monsoon (2012-21). Declining water level trend of more than 0.20 m/year has been observed in 363 sq.km (7% area of the total area) during post monsoon (2012-21). These declines may be due to less rainfall or exploitation of ground water resources more than the annual recharge in these areas.

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.

As a part of Supply side Management, a total 25 Percolation tanks and 72 Check dams are proposed, which will augment ground water resources to the tune of 5.35 MCM/year

As a part of Demand side Management, micro-irrigation techniques are to be adopted in 9.20Sq. km. area thereby saving a total of 5.24MCM/year. Change in cropping patterns is not proposed in any of the blocks.

The ground water development plan has been proposed in view of the developing additional ground water resources available after supply side interventions to bring the stage of ground water development up to 70%. The **283.23**MCM/year volume of ground water generated can bring **435.74**sq. km. additional area under assured ground water irrigation with average crop water requirement of 0.65 m by constructing 16828 Dug wells and 2805 Bore wells.

### Recommendations

#### Ground Water resource:

The interventions discussed above needs to be implemented to bring down the Stage of Ground Water extraction and put a halt to further decline of ground water levels and improve the sustainability of groundwater resources.

#### Ground Water Dependent Irrigation:

Although the district is mainly irrigated by canals and tanks, ground water through dug wells and bore wells contributes the remaining part for irrigation. Increase in agricultural activity, excessive ground water withdrawal, depletion of ground water levels, reduction in yield and ground water quality related issues etc., suggests the need for scientific ground water management, enhancement of storage capacity of the aquifers and protection of ground water quality.

**Advanced irrigation practices:**

The water intensive crops like Paddy grown in major area of district, using the more ground water resource available in the district. Farmers are facing inadequacy of groundwater for agriculture in non-command area. Hence, water economy irrigation practices (WUE) are recommended. Methods like drip irrigation, mulching etc., will help to save water. This needs active support from the Government. Adopting such measures will contribute to ground water resource enhancement in the long run.

**Drinking water Supply:**

In view of ground water contamination with higher concentration of Nitrate, identification of contamination free ground water source is essential. Alternatively, drinking water supply from surface water source needs to be explored.

**Participatory management:**

Awareness programmes and practice of participatory approach needs to be strengthened with the involvement of all the stake holders for sustainable management

# ANNEXURES

### Annexure-I: Salient Features of Ground Water Exploration

Sl. No	Block	Village	Type of Well	Longitude	Latitude	year	Depth Drill ed (m)	Depth of casing (mbgl)	Aquifer zones encountered (mbgl)	Aquifer	SWL (mbgl)	Discharge (lps)	DD(m)	Transmissivity (m <sup>2</sup> /day)	Storativity
	Taluka														
1	Amgaon	Bhosa	EW	80.35	21.48	1992-93	134.85	25.05	50 -56.1 ;103.9 -111	Gneiss	5.85	8.19	15.3	55	0.0021
2	Amgaon	Bhosa	OW	80.35	21.35	1992-93	129.3	28.6	40.8 -46.9 ;59.1 -62.2	Gneiss	5.7	6.94	6.16		
3	Amgaon	Jamkhairi	EW	80.36	20.89	1992-93	101	28.7	33 -36 ;117.1 -123.2	Granite	3.91	1.37	33.18		
4	Deori	Chichgarh	EW	80.38	21.07	1993-94	165	129.3	28.65 -31.75 ;34.75 -37.85 ;62.25 -65.25 ;40.85 -43.85	Gneiss	4.7	4.98	24.75	3.42	0.0021
5	Deori	Chichgarh	OW	80.38	21.22	1993-94	142	129.3	24.9 -28.7	Gneiss	4.6	7.76	6.76		
6	Deori	Deori	EW	80.37	21.48	1993-94	201.5		20.6 -30.7	Granite		0.005			
7	Deori	Hardoli	EW	80.4	21.56	1993-94	165.95	65.25	19.5 -25.6 ;50 -56.1	Granite	2.1	6.1	27.08	10.43	0.000181
8	Deori	Hardoli	OW	80.4	21.27	1993-94	75	62.2	19.4 -25.5 ;62.1 -65.1	Granite	2.58	5.15	20.98		
9	Gondiya	Kudwa	EW	80.19	21.39	1992-93	172.4		17.6 -19.5 ;25.6 -28.6	Gneiss	8.42	4.41	11.72	55	5.30E-05
10	Gondiya	Kudwa	OW	80.19	21.21	1992-93	123.4		15.9 -22.5 ;25.6 -28.6	Gneiss	8.12	1.5	4.05		
11	Gondiya	Rajegaon	EW	80.24	21.1	1992-93	200	25.05	13.4 -19.5 ;22.5 -28.6	Gneiss	7.71	0.38			



Sl. No	Block	Village	Type of Well	Longitude	Latitude	year	Depth Drill (m)	Depth of casing (mbgl)	Aquifer zones encountered (mbgl)	Aquifer	SWL (mbgl)	Discharge (lps)	DD(m)	Transmissivity (m <sup>2</sup> /day)	Storativity
	Taluka														
12	Goregaon	Akotola	EW	80.27	21.36	1992-93	180.1	62.2	13.4 -19.5 ;22.5 -24.5	Gneiss	7.5	1.73	33.4		
13	Goregaon	Kaulewara	EW	80.15	21.5	1992-93	181.1	28.6	12.85 -18.95 ;21.95 -25.05	Gneiss	8	1.37	17.42		
14	Sadak Arjuni	Kosamthondi	EW	80.08	21.28	1992-93	24.5	24.5	10.3 -16.4 ;22.5 -23.6	Gneiss	5.48	2.64	10	17	
15	Sadak Arjuni	Kosamthondi	OW	80.08	21.2259		200.5	28.66		Gneiss	4.5	0.78			
16	Sadak Arjuni	Sadak Arjuni	EW	80.16	20.9247	1992-93	141.5	30.7		Gneiss	2.24	0.78			
17	Salekasa	Kawarabandh	EW	80.45	20.7685	1992-93	129.3	74.4		Granite	17.2	2.16	12.2		
18	Tirora	Dawaniwara	EW	80.05	21.0296	1992-93	136			Gneiss	7.1	2.89	25.93	7.25	1.70E-05
19	Tirora	Dawaniwara	OW	80.05	21.1403	1992-93	140			Gneiss	7.09	4.43	12.83		
20	Tirora	Nawejhari	EW	79.85	21.2991	1991-92	134.5			Gneiss	7.76	7.15	32	59.54	0.00015
21	Tirora	Nawejhari	OW	79.85	21.3616	1991-92	79.55			Gneiss	7.6	3.17	8.35		
22	Gondiya	Kudwa	Pz	80.18	21.48	2011-12	40			Gneiss	17.1	0.14			
23	Goregaon	Dahegaon	Pz	80.18	21.35	2011-12	40			Gneiss	2.6	0.14			
24	Tirora	Tiroda	Pz	79.94	20.89	2011-12	32.2			Gneiss	5	0.14			
25	Goregaon	Murdoli	EW	80.2021389	21.07	2021-22	200	11.5	20-21	Gneiss	55	0.0025			

Sl. No	Block	Village	Type of Well	Longitude	Latitude	Year	Depth Drill ed (m)	Depth of casing (mbgl)	Aquifer zones encountered (mbgl)	Aquifer	SWL (mbgl)	Discharge (lps)	DD(m)	Transmissivity (m <sup>2</sup> /day)	Storativity
	Taluka														
26	Arjuni Morgaon	Navegaon Bandh	EW	80.0903889	21.22	2021-22	200	33.2	42-44, 118-120	Gneiss	5.7	0.14			
27	Arjuni Morgaon	Itkheda	EW	80.0174167	21.48	2021-22	200	47	86.7-89.7, 156.80-159.90	Gneiss	7.24	4.43	40.66	15.223	0.00277
28	Arjuni Morgaon	Itkheda	OW	80.0173333	21.56	2021-22	200	42	86.70-89.70	Gneiss	7.5	0.14	3.94		
29	Sadak Arjuni	Kaneri ram	EW	80.1120278	21.27	2021-22	123.3	23	31-34, 122-123	Gneiss	8.52	12.18	14.02	30.96	0.000264
30	Sadak Arjuni	Kaneri ram	OW	80.1122222	21.39	2021-22	123.3	24	36-37.90, 116-117	Gneiss	8.55	12.18	3.02		
31	Deori	Wadegaon	EW	80.3785	21.21	2021-22	200	28.3	124-125	Granite	9.2	0.14			
32	Amgaon	Anjora	EW	80.4047222	21.1	2021-22	200	11.5	42-44, 105-108, 179-180	Gneiss	4.98	12.18	12.2		
33	Amgaon	Anjora	OW	80.4047222	21.36	2021-22	200	11.5	82-83,124-125,185-186	Gneiss	4.96	12.18	11.42		
34	Tirora	Vihirgaon	EW	79.9086944	21.5	2021-22	200	17.5	35-36, 85-86, 92-95	Gneiss	8.79	3.17	43.04	3.85	
35	Tirora	Vihirgaon	OW	79.9086944	21.28	2021-22	200	17.5	85-86	Gneiss	7.62	3.17			

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

Sl.No	District	Taluka	Village	Y Lat	X Long	Agency name	Pre-monsoon WL	Post-monsoon WL
1	Gondia	Deori	Ghonari	20.9000000	80.3000000	CGWB	-	0.95
2	Gondia	Amgaon	Amgaon	21.3750000	80.3833333	CGWB	-	2.5
3	Gondia	Goregaon	Murdoli	21.2250000	80.2083333	CGWB	-	2.65
4	Gondia	Sakoli	Salebardi	20.9097222	79.9402778	CGWB	-	2
5	Gondia	Sadak-Arjuni	Dongargaon	21.0666667	80.2500000	CGWB	-	3.4
6	Gondia	Goregaon	Goregaon	21.3333333	80.2166667	CGWB	-	2.1
7	Gondia	Sadak-Arjuni	Kohemara	21.0666667	80.1500000	CGWB	-	6.4
8	Gondia	Tirora	Tiroda	21.4000000	79.9333333	CGWB	-	1.5
9	Gondia	Arjuni Morgaon	Navegaon	20.9166667	80.0833333	CGWB	-	2.5
10	Gondia	Deori	Sindbiri	20.9500000	80.3833333	CGWB	-	2.5
11	Gondia	Arjuni Morgaon	Karandli	20.7666667	80.1333333	CGWB	-	4.6
12	Gondia	Gondia	Rajegaon	21.6138889	80.2472222	CGWB	-	5
13	Gondia	Tirora	Nagjhira	21.2500000	80.0000000	CGWB	-	1.1
14	Gondia	Gondia	Asoli	21.4833333	80.2666667	CGWB	-	2.35
15	Gondia	Tirora	Sejgaon	21.4958333	80.0266667	CGWB	-	4.15
16	Gondia	Arjuni Morgaon	Bonde	20.9250000	80.2555556	CGWB	-	10.4
17	Gondia	Sakoli	Sangadi	20.9500000	79.9833333	CGWB	-	4.05
18	Gondia	Sadak-Arjuni	Sondad	21.0750000	80.0916667	CGWB	-	6.7

Sl.No	District	Taluka	Village	Y Lat	X Long	Agency name	Pre-monsoon WL	Post-monsoon WL
19	Gondia	Arjuni Morgaon	Arjuni	20.8222222	80.0222222	CGWB	-	2.6
20	Gondia	Tirora	Navegaon II (KHURD)	21.3463889	79.8216667	CGWB	-	3.25
21	Gondia	Gondia	Datora_Pz	21.4500000	80.2500000	CGWB	-	2.9
22	Gondia	Deori	Chichgarh1	20.8958333	80.3791667	CGWB	-	1.25
23	Gondia	Arjuni Morgaon	Bondgaon	20.8902778	79.9986111	CGWB		0.8
24	Gondia	Salekasa	Salekassa	21.2986111	80.5033333	CGWB		0.3
25	Gondia	Amgaon	Kalimati	21.4633333	80.3652778	CGWB		0.9
26	Gondia	Goregaon	Dahegaon_Pz	21.3738889	80.2819444	CGWB		0.5
27	Gondia	Tirora	Tiroda_Pz	21.4172222	79.9363889	CGWB		0.7
28	Gondia	Sadak-Arjuni	Dawwa	21.1755556	80.1761111	CGWB		1.7
29	Gondia	Deori	Deori-1	21.0758333	80.3666667	CGWB		1.8
30	Gondia	Deori	Wadegaon	21.1433333	80.3788889	CGWB		1.8
31	Gondia	Salekasa	Sategaon-Sakaritola	21.2700000	80.4500000	CGWB		1.8
32	Gondia	Gondia	Khamari	21.4188889	80.2369444	CGWB		1.6
33	Gondia	Arjuni Morgaon	Dhabetekdi	20.7900000	79.9647222	CGWB		1
34	Gondia	Deori	Ambhora	20.9208	80.3764	GSDA	5.7	0.5
35	Gondia	Salekasa	Binzali	21.3389	80.4444	GSDA	5.9	0.8
36	Gondia	Salekasa	Tirkhedi	21.2708	80.4778	GSDA	6	0.6
37	Gondia	Gondia	Rajegaon	21.5681	80.24	GSDA	6.1	0.8
38	Gondia	Arjuni Morgaon	Mhaisuli	20.9514	80.31	GSDA	6.15	0.35
39	Gondia	Sadak-Arjuni	Saundal	21.0736	80.0917	GSDA	6.2	2.3
40	Gondia	Deori	Ghonadi	20.9069	80.2875	GSDA	6.3	0.4
41	Gondia	Gondia	Gondiya	21.4644	80.1975	GSDA	6.7	1.6
42	Gondia	Tirora	Kachewani	21.4417	79.9889	GSDA	6.7	0.7
43	Gondia	Deori	Deori	21.0708	80.3667	GSDA	6.75	0.9

Sl.No	District	Taluka	Village	Y Lat	X Long	Agency name	Pre-monsoon WL	Post-monsoon WL
44	Gondia	Deori	Kadikasa	20.8667	80.4583	GSDA	7.05	1.4
45	Gondia	Arjuni Morgaon	Mahagaon	20.7347	80.05	GSDA	7.1	2
46	Gondia	Arjuni Morgaon	Kelwad	20.7458	80.1639	GSDA	7.2	0.5
47	Gondia	Arjuni Morgaon	Tadgaon	20.8186	80.0069	GSDA	7.3	2.1
48	Gondia	Amgaon	Thana	21.3542	80.3167	GSDA	7.45	0.6
49	Gondia	Salekasa	Latora	21.3736	80.4764	GSDA	7.45	0.6
50	Gondia	Deori	Palandur	20.85	80.2611	GSDA	7.55	1.1
51	Gondia	Sadak-Arjuni	Patekurra	21.2125	80.1986	GSDA	7.6	2.6
52	Gondia	Goregaon	Goregaon	21.3433	80.2036	GSDA	7.8	1.8
53	Gondia	Arjuni Morgaon	Arjuni Morgaon	20.8097	80.0236	GSDA	7.9	1.4
54	Gondia	Deori	Chichgad	20.8833	80.4	GSDA	7.9	1.1
55	Gondia	Arjuni Morgaon	Umarpayali	20.7528	80.2111	GSDA	8	1.9
56	Gondia	Sadak-Arjuni	Malijunga	21.2194	80.1208	GSDA	8.1	1.6
57	Gondia	Salekasa	Khedapar	21.3833	80.5292	GSDA	8.1	1.2
58	Gondia	Goregaon	Dahegaon	21.375	80.275	GSDA	8.2	0.55
59	Gondia	Tirora	Chorkhamara	21.275	79.9597	GSDA	8.45	2.1
60	Gondia	Tirora	Vhirgaon	21.3667	79.9083	GSDA	8.8	0.4
61	Gondia	Tirora	Ghogara	21.3681	79.8194	GSDA	8.8	2.5
62	Gondia	Arjuni Morgaon	Zashinagar (Tambora)	20.8978	80.2181	GSDA	8.9	2.1
63	Gondia	Deori	Borgaon	21.0097	80.3903	GSDA	9.2	1.7
64	Gondia	Goregaon	Gidhadi	21.3	80.2808	GSDA	9.2	4.1
65	Gondia	Tirora	Rustampur	21.3722	80.0194	GSDA	9.3	2.5
66	Gondia	Gondia	Rawanwadi	21.5383	80.2289	GSDA	9.4	2
67	Gondia	Amgaon	Sawangi	21.3542	80.4208	GSDA	9.6	1.1
68	Gondia	Gondia	Kati	21.5978	80.2072	GSDA	9.8	1.9



Sl.No	District	Taluka	Village	Y Lat	X Long	Agency name	Pre-monsoon WL	Post-monsoon WL
69	Gondia	Amgaon	Waghdongari	21.3083	80.3708	GSDA	9.9	1
70	Gondia	Sadak-Arjuni	Sawangi	21.0819	80.1292	GSDA	10	7
71	Gondia	Tirora	Lonara	21.275	79.8875	GSDA	10	2.1
72	Gondia	Gondia	Kamtha	21.5214	80.3111	GSDA	10.05	1.8
73	Gondia	Gondia	Katangi Kala	21.4853	80.2072	GSDA	10.1	1.2
74	Gondia	Gondia	Katangi Kala	21.4853	80.2072	GSDA	10.1	1.2
75	Gondia	Amgaon	Chichtola	21.3431	80.4264	GSDA	10.2	2.1
76	Gondia	Sadak-Arjuni	Hattimartola	21.1139	80.1556	GSDA	10.5	7.5
77	Gondia	Sadak-Arjuni	Mhaswani	21.1528	80.1544	GSDA	10.6	0.9
78	Gondia	Deori	Charbhata	21.1694	80.3681	GSDA	10.8	1.5
79	Gondia	Deori	Dhawalkhedi	20.875	80.4833	GSDA	10.9	0.8
80	Gondia	Deori	Bonde	20.9236	80.2722	GSDA	10.9	1.05
81	Gondia	Amgaon	Amgaon	21.3708	80.3861	GSDA	11	2
82	Gondia	Amgaon	Malni	21.3931	80.3889	GSDA	11.05	2
83	Gondia	Deori	Sukali	20.8583	80.3083	GSDA	11.7	0.9
84	Gondia	Amgaon	Dhobitola	21.325	80.2958	GSDA	12	6.1
85	Gondia	Arjuni Morgaon	Pandharwani (Mal)	20.9458	80.1014	GSDA	12	1.5
86	Gondia	Gondia	Ghattemani	21.5278	80.3625	GSDA	12	3.9
87	Gondia	Gondia	Jirutola	21.6153	80.2361	GSDA	12.1	0.8
88	Gondia	Arjuni Morgaon	Keshori	20.7403	80.1278	GSDA	12.4	1.1
89	Gondia	Salekasa	Bijepar	21.2042	80.4625	GSDA	12.4	1.1
90	Gondia	Salekasa	Kahali	21.3306	80.5097	GSDA	12.8	2
91	Gondia	Arjuni Morgaon	Tumdimendha	20.7889	80.0528	GSDA	13	3.3
92	Gondia	Gondia	Tedhava	21.5903	80.1664	GSDA	13	1.4

Sl.No	District	Taluka	Village	Y Lat	X Long	Agency name	Pre-monsoon WL	Post-monsoon WL
93	Gondia	Sadak-Arjuni	Shenda	21.1278	80.2708	GSDA	13.25	9.2
94	Gondia	Sadak-Arjuni	Dawwa	21.1778	80.1764	GSDA	13.3	0.8
95	Gondia	Deori	Owara	21.2069	80.3611	GSDA	13.4	0.8
96	Gondia	Gondia	Khamari	21.4275	80.2311	GSDA	13.8	1.5
97	Gondia	Sadak-Arjuni	Thadezari	21.2167	80.0528	GSDA	13.9	1.8
98	Gondia	Arjuni Morgaon	Saigaon	20.6875	80.2125	GSDA	14	1.5
99	Gondia	Goregaon	Kamargaon	21.3014	80.2333	GSDA	14.55	8.35
100	Gondia	Deori	Hardoli	21.2208	80.3986	GSDA	14.85	0.2
101	Gondia	Goregaon	Kamargaon	21.3014	80.2333	GSDA	15.8	8.35
102	Gondia	Salekasa	Salekasa	21.3028	80.4931	GSDA	15.85	1.3
103	Gondia	Sadak-Arjuni	Raka	21.0486	80.1042	GSDA	16	1
104	Gondia	Sadak-Arjuni	Sadak Arjuni	21.0931	80.1528	GSDA	17.4	6

**Annexure-III: Aquifer II depth to water level details in Gondia district.**

S.no	District	Taluka	Village	TopoSheetNo	xLong	yLat	WellType	Year	Depth_Dril	Depth_Cons	Casing_depth	Pre SWL	Post Swl
1	Gondiya	Amgaon	Bhosa	74C7	80.3500	21.4800	EW	1992-93	134.85	134.85	25.05	5.85	
2	Gondiya	Amgaon	Jamkhairi	74C7	80.3600	21.3500	EW	1992-93	101	101	28.7	3.91	
3	Gondiya	Deori	Chichgarh	74D5	80.3800	20.8900	EW	1993-94	165	165	129.3		4.70
4	Gondiya	Deori	Deori	74C8	80.3700	21.0700	EW	1993-94	201.5	201.5			9.00
5	Gondiya	Deori	Hardoli	74C8	80.4000	21.2200	EW	1993-94	165.95	165.95	65.25		2.10
6	Gondiya	Gondiya	Kudwa	74C3	80.1900	21.4800	EW	1992-93	172.4	172.4			8.42
7	Gondiya	Gondiya	Rajegaon	74C2	80.2400	21.5600	EW	1992-93	200	200	25.05		7.71
8	Gondiya	Goregaon	Akotola	74C7	80.2700	21.2700	EW	1992-93	180.1	180.1	62.2	7.50	
9	Gondiya	Goregaon	Kaulewara	74C3	80.1500	21.3900	EW	1992-93	181.1	181.1	28.6	8.00	
10	Gondiya	Sadak Arjuni	Kosamthondi	74C4	80.0800	21.2100	EW	1992-93	24.5	24.5	24.5	5.48	
11	Gondiya	Sadak Arjuni	Sadak Arjuni	74C4	80.1600	21.1000	EW	1992-93	141.5	141.5	30.7	2.24	

S.no	District	Taluka	Village	TopoSheetNo	xLong	yLat	WellType	Year	Depth_Dril	Depth_Cons	Casing_depth	Pre SWL	Post Swl
12	Gondiya	Salekasa	Kawarabandh	74C7	80.4500	21.3600	EW	1992-93	129.3	129.3	74.4	17.20	
13	Gondiya	Tirora	Dawaniwara	74C2	80.0500	21.5000	EW	1992-93	136	136		7.10	
14	Gondiya	Tirora	Nawejhari	55O15	79.8500	21.2800	EW	1991-92	134.5	134.5		7.76	
15	Gondiya	Goregaon	Murdoli	64 C/04	80.2021	21.2259	EW	2021-22	200	200	11.5		55.00
16	Gondiya	Arjuni Morgaon	Navegaon Bandh	64 C/04	80.0904	20.9247	EW	2021-22	200	200	33.2		5.70
17	Gondiya	Arjuni Morgaon	Itkheda	64 D/01	80.0174	20.7685	EW	2021-22	200	200	47		7.24
18	Gondiya	Sadak Arjuni	Kaneri ram	64 C/04	80.1120	21.0296	EW	2021-22	123.3	123.3	23		8.52
19	Gondiya	Deori	Wadegaon	64	80.3785	21.1403	EW	2021-22	200	200	28.3	9.20	
20	Gondiya	Amgaon	Anjora	64C/07	80.4047	21.2991	EW	2021-22	200	200	11.5	4.98	
21	Gondiya	Tirora	Vhirgaon	55O/15	79.9087	21.3616	EW	2021-22	200	200	17.5	8.79	

**Annexure IV: long term ground Water trend (2012-2021)**

S.No	District	taluka	Site name	latt	long	Agency	pre trend (2012-2021)		post trend (2012-2021)	
							Rise	Fall	Rise	Fall
1	GONDIA	Amgaon	Amgaon	21.3708	80.3861	GSDA		-0.1533		-0.0603
2	GONDIA	Amgaon	Amgaon	21.375	80.3833	CGWB	0.2552			-0.0312
3	GONDIA	Amgaon	Chichtola	21.3431	80.4264	GSDA		-0.5685		-0.0291
4	GONDIA	Amgaon	Dhobitola	21.325	80.2958	GSDA		-0.1552		-0.5179
5	GONDIA	Amgaon	Kalimati	21.4633	80.3653	CGWB		-0.2603	0.0369	
6	GONDIA	Amgaon	Malni	21.3931	80.3889	GSDA	0.1700		0.0652	
7	GONDIA	Amgaon	Sawangi	21.3542	80.4208	GSDA		-0.0815	0.4464	
8	GONDIA	Amgaon	Thana	21.3542	80.3167	GSDA	0.0072		0.0588	
9	GONDIA	Amgaon	Waghdongari	21.3083	80.3708	GSDA	0.2382		0.0294	
10	GONDIA	Arjuni Morgaon	Arjuni	20.8222	80.0222	CGWB	0.0116			-0.3860
11	GONDIA	Arjuni Morgaon	Arjuni Morgaon	20.8097	80.0236	GSDA	0.0252			-0.0100
12	GONDIA	Arjuni Morgaon	Bondgaon	20.8903	79.9986	CGWB		-0.3136		-0.1539
13	GONDIA	Arjuni Morgaon	Chicholi	20.7528	80.1097	GSDA		-0.0524		-0.0209
14	GONDIA	Arjuni Morgaon	Gothangaon	20.8083	80.1472	GSDA	0.0194		0.0076	
15	GONDIA	Arjuni Morgaon	Kelwad	20.7458	80.1639	GSDA	0.4552		0.1058	
16	GONDIA	Arjuni Morgaon	Keshori	20.7403	80.1278	GSDA		-0.4912		-0.0330
17	GONDIA	Arjuni Morgaon	Mahagaon	20.7347	80.05	GSDA	0.4648			-0.0082
18	GONDIA	Arjuni Morgaon	Mhaisuli	20.9514	80.31	GSDA		-0.0367	0.0179	
19	GONDIA	Arjuni Morgaon	Navegaon	20.9167	80.0833	CGWB	0.0481		0.1100	
20	GONDIA	Arjuni Morgaon	Nawegaon Bandh	20.9092	80.0894	GSDA		-0.1315		-0.0433
21	GONDIA	Arjuni Morgaon	Pandharwani (Mal)	20.9458	80.1014	GSDA		-0.0252		-0.0661
22	GONDIA	Arjuni Morgaon	Saigaon	20.6875	80.2125	GSDA		-0.2982		-0.0212
23	GONDIA	Arjuni Morgaon	Tadgaon	20.8186	80.0069	GSDA		-0.1058	0.0788	
24	GONDIA	Arjuni Morgaon	Tumdimendha	20.7889	80.0528	GSDA	0.1106			-0.1430



S.No	District	taluka	Site name	latt	long	Agency	pre trend (2012-2021)		post trend (2012-2021)	
							Rise	Fall	Rise	Fall
25	GONDIA	Arjuni Morgaon	Umarpayali	20.7528	80.2111	GSDA		-0.0330		-0.0624
26	GONDIA	Arjuni Morgaon	Zashinagar (Tambora)	20.8978	80.2181	GSDA	0.0185			-0.1130
27	GONDIA	Deori	Ambhora	20.9208	80.3764	GSDA	0.2721		0.0352	
28	GONDIA	Deori	Bonde	20.9236	80.2722	GSDA		-0.1061	0.1400	
29	GONDIA	Deori	Borgaon	21.0097	80.3903	GSDA	0.1600			-0.0212
30	GONDIA	Deori	Charbhata	21.1694	80.3681	GSDA		-0.0406	0.0824	
31	GONDIA	Deori	Chichgad	20.8833	80.4	GSDA		-0.0536		-0.0721
32	GONDIA	Deori	Deori	21.0708	80.3667	GSDA		-0.0400	0.0867	
33	GONDIA	Deori	Deori-1	21.0758	80.3667	CGWB	0.1482		0.0817	
34	GONDIA	Deori	Dhawalkhedhi	20.875	80.4833	GSDA	0.0418			-0.0233
35	GONDIA	Deori	Dongargaon	21.2	80.3917	CGWB		-0.2635		-0.5921
36	GONDIA	Deori	Ghonadi	20.9069	80.2875	GSDA	0.4015		0.1067	
37	GONDIA	Deori	Hardoli	21.2208	80.3986	GSDA		-0.3118	0.0564	
38	GONDIA	Deori	Kadikasa	20.8667	80.4583	GSDA	0.7703		0.0982	
39	GONDIA	Deori	Kokodi New	20.8917	80.5389	GSDA	0.2495		0.0485	
40	GONDIA	Deori	Owara	21.2069	80.3611	GSDA		-0.3339	0.0542	
41	GONDIA	Deori	Sailapur	21.1153	80.4014	GSDA	0.5955		0.0730	
42	GONDIA	Deori	Sirpur	21.0706	80.4403	GSDA	0.3638		0.0427	
43	GONDIA	Deori	Sukali	20.8583	80.3083	GSDA		-0.2564		-0.0052
44	GONDIA	Deori	Wadegaon	21.1433	80.3789	CGWB			0.1018	
45	GONDIA	Gondia	Asoli	21.4833	80.2667	CGWB		-0.1542	0.0357	
46	GONDIA	Gondia	Datora_Pz	21.45	80.25	CGWB		-0.6528	0.2342	
47	GONDIA	Gondia	Gangazari	21.4472	80.0542	GSDA		-0.0209	0.0388	
48	GONDIA	Gondia	Ghattemani	21.5278	80.3625	GSDA	0.0806		0.0894	
49	GONDIA	Gondia	Gondiya	21.4644	80.1975	GSDA		-0.2288	0.0044	
50	GONDIA	Gondia	Jirutola	21.6153	80.2361	GSDA		-0.2067		-0.0121
51	GONDIA	Gondia	Kamtha	21.5214	80.3111	GSDA	0.0024			-0.0203

S.No	District	taluka	Site name	latt	long	Agency	pre trend (2012-2021)		post trend (2012-2021)	
							Rise	Fall	Rise	Fall
52	GONDIA	Gondia	Katangi Kala	21.4853	80.2072	GSDA		-0.0311	0.0187	
53	GONDIA	Gondia	Kati	21.5978	80.2072	GSDA		-0.2761		-0.0430
54	GONDIA	Gondia	Khamari	21.4189	80.2369	CGWB		-0.2554		-0.0733
55	GONDIA	Gondia	Rajegaon	21.6139	80.2472	CGWB		-0.0458	0.0424	
56	GONDIA	Gondia	Tedhava	21.5903	80.1664	GSDA		-0.7091	0.0494	
57	GONDIA	Goregaon	Dahegaon	21.375	80.275	GSDA		-0.4212		-0.0006
58	GONDIA	Goregaon	Gidhadi	21.3	80.2808	GSDA		-0.1097		-0.3655
59	GONDIA	Goregaon	Goregaon	21.3333	80.2167	CGWB		-0.1946		-0.0606
60	GONDIA	Goregaon	Goregaon	21.3433	80.2036	GSDA		-0.3485		-0.0285
61	GONDIA	Goregaon	Kamargaon	21.3014	80.2333	GSDA		-0.3972		-0.5813
62	GONDIA	Goregaon	Murdoli	21.225	80.2083	CGWB	0.2203			-0.0182
63	GONDIA	Sadak-Arjuni	Dawwa	21.1756	80.1761	CGWB		-0.1768	0.0767	
64	GONDIA	Sadak-Arjuni	Dongargaon	21.0667	80.25	CGWB		-0.6663		-1.0843
65	GONDIA	Sadak-Arjuni	Dongargaon_Pz	21.0758	80.25	CGWB	0.2163			-0.8567
66	GONDIA	Sadak-Arjuni	Hattimartola	21.1139	80.1556	GSDA		-0.0970		-0.3195
67	GONDIA	Sadak-Arjuni	Kohemara	21.0667	80.15	CGWB		-0.3403		-0.2083
68	GONDIA	Sadak-Arjuni	Malijunga	21.2194	80.1208	GSDA		-0.0570		-0.0109
69	GONDIA	Sadak-Arjuni	Mhaswani	21.1528	80.1544	GSDA		-0.2073	0.0867	
70	GONDIA	Sadak-Arjuni	Patekurra	21.2125	80.1986	GSDA		-0.1288		-0.0803
71	GONDIA	Sadak-Arjuni	Raka	21.0486	80.1042	GSDA		-0.3527		-0.0421
72	GONDIA	Sadak-Arjuni	Sadak Arjuni	21.0931	80.1528	GSDA	0.0552			-0.4279
73	GONDIA	Sadak-Arjuni	Saundal	21.0736	80.0917	GSDA		-0.1961		-0.0358
74	GONDIA	Sadak-Arjuni	Sawangi	21.0819	80.1292	GSDA		-0.0370		-0.3724
75	GONDIA	Sadak-Arjuni	Shenda	21.1278	80.2708	GSDA	0.2053			-0.3752
76	GONDIA	Sadak-Arjuni	Sondad	21.075	80.0917	CGWB		-0.0708		-0.1503
77	GONDIA	Sadak-Arjuni	Thadezari	21.2167	80.0528	GSDA	0.0382			-0.0936
78	GONDIA	Salekasa	Bijepar	21.2042	80.4625	GSDA	0.0679		0.0303	

S.No	District	taluka	Site name	latt	long	Agency	pre trend (2012-2021)		post trend (2012-2021)	
							Rise	Fall	Rise	Fall
79	GONDIA	Salekasa	Binzali	21.3389	80.4444	GSDA	0.8000		0.0464	
80	GONDIA	Salekasa	Kahali	21.3306	80.5097	GSDA	0.3397			-0.1542
81	GONDIA	Salekasa	Khedapar	21.3833	80.5292	GSDA	1.1027			-0.0324
82	GONDIA	Salekasa	Latora	21.3736	80.4764	GSDA	0.0173		0.0688	
83	GONDIA	Salekasa	Salekasa	21.3028	80.4931	GSDA		-0.7370		-0.0679
84	GONDIA	Salekasa	Satagaon-Sakaritola	21.27	80.45	CGWB		-0.4350	0.0115	
85	GONDIA	Salekasa	Tirkhedi	21.2708	80.4778	GSDA	0.0660		0.0639	
86	GONDIA	Tirora	Chirekhani	21.4264	79.9306	GSDA	0.1733			-0.0142
87	GONDIA	Tirora	Chorkhamara	21.275	79.9597	GSDA		-0.0182	0.0524	
88	GONDIA	Tirora	Ghogara	21.3681	79.8194	GSDA		-0.1273		-0.0379
89	GONDIA	Tirora	Kachewani	21.4417	79.9889	GSDA	0.1513		0.0652	
90	GONDIA	Tirora	Kawalewada	21.4375	79.9028	GSDA	0.2758			-0.0085
91	GONDIA	Tirora	Lonara	21.275	79.8875	GSDA		-0.2609	0.0245	
92	GONDIA	Tirora	Navegaon II (KHURD)	21.3464	79.8217	CGWB	0.2354			-0.0845
93	GONDIA	Tirora	Rustampur	21.3722	80.0194	GSDA		-0.1267		-0.0733
94	GONDIA	Tirora	Sarra	21.2917	79.9333	CGWB		-0.1488		-0.0825
95	GONDIA	Tirora	Sejgaon	21.4958	80.0267	CGWB		-0.1105	0.1097	
96	GONDIA	Tirora	Tiroda	21.4	79.9333	CGWB		-0.3352		-0.4143
97	GONDIA	Tirora	Tiroda_Pz	21.4172	79.9364	CGWB		-0.1731		-0.0958
98	GONDIA	Tirora	Tirora	21.4125	79.9333	GSDA		-0.0773		-0.0255
99	GONDIA	Tirora	Vihirgaon	21.3667	79.9083	GSDA		-0.1876		-0.0064

**Annexure V: Chemical analysis of ground water samples, Shallow aquifers.**

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
1	Gondia	AMGAON	Amgaon	CGWB	80.3833333	21.375	7.5	1249	661	367	47	60	71	5.08	0	375	145	46	4	0.4
2	Gondia	AMGAON	Kalimati	CGWB	80.36528	21.4633333	7.8	687	364	184	25	29	64	1.56	0	208	63	25	10	0.5
3	Gondia	ARJUNIMORG AON	Bondgaon	CGWB	79.99861	20.8902778	7.3	446	236	163	39	16	30	9.52	0	131	58	11	45	0.1
4	Gondia	ARJUNIMORG AON	Dawwa	CGWB	80.17611	21.1755556	7.6	1487	788	515	86	72	65	3.58	0	488	148	67	44	0.2
5	Gondia	Arjuni Morgaon	Dhabetekdi	CGWB	79.96472	20.79	7.4	1735	920	632	86	100	76	12.46	0	434	210	80	47	1.3
6	Gondia	ARJUNIMORG AON	Navegaon	CGWB	80.08333	20.9166667	8.1	454	240	148	39	12	16	1.04	0	172	14	10	4	0.3
7	Gondia	ARJUNIMORG AON	Salebardi	CGWB	79.94028	20.9097222	7.1	1480	784	617	123	74	50	8	0	446	168	79	46	0.6
8	Gondia	ARJUNIMORG AON	Sangadi	CGWB	79.98333	20.95	7.6	320	160	128	31	12	13	6.91	0	131	26	6	27	0.1
9	Gondia	DEORI	Deori-1	CGWB	80.36667	21.0758333	6.9	595	315	163	39	16	53	10.34	0	167	66	38	44	0.1

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
10	Gondia	DEORI	Sondad	CGWB	80.09167	21.075	7.7	522	277	214	45	24	24	1.91	0	214	26	64	3	0.9
11	Gondia	DEORI	Wadegaon	CGWB	80.3788889	21.1433333	7.8	485	256	148	31	17	19	20.7	0	155	43	23	2	0.2
12	Gondia	GONDIA	Asoli	CGWB	80.26667	21.4833333	7.3	161	85	46	10	5	16	9.53	0	59	14	13	20	0.6
13	Gondia	GONDIA	Khamari	CGWB	80.23694	21.4188889	7.4	2082	1103	791	112	122	77	31.37	0	535	259	79	47	0.2
14	Gondia	GONDIA	Rajegaon	CGWB	80.24722	21.6138889	7.5	1197	635	332	63	41	84	50.3	0	375	140	56	45	0.3
15	Gondia	GOREGAON	Goregaon	CGWB	80.2166667	21.3333333	7.2	957	507	265	45	36	89	8.93	0	375	96	20	2	0.9
16	Gondia	GOREGAON	Murdoli	CGWB	80.20833	21.225	7.5	956	506	214	41	27	86	0.99	0	351	41	38	29	1.1
17	Gondia	SALEKASA	Sategaon-Sakaritola	CGWB	80.45	21.27	7.6	135	72	46	8	6	9	5.38	0	59	9	6	5	0.2
18	Gondia	TIRORA	Navegaon II (KHURD)	CGWB	79.82167	21.3463889	7.6	1294	685	393	65	55	75	5.33	0	416	128	13	45	1.1
19	Gondia	TIRORA	Sejgaon	CGWB	80.02667	21.4958333	7.2	925	490	311	84	24	37	5.54	0	250	93	46	40	0.7
20	Gondia	Tirora	Tiroda	CGWB	79.93333	21.4	7.1	1426	754	617	123	74	71	5.34	0	464	195	49	45	0.2

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
21	GONDIA	AMGAON	ANJORA	GSDA	80.400222	21.30044	8.2	760	494	210							130	9	10	0.5
22	GONDIA	AMGAON	ASOLI	GSDA	80.333721	21.322965	7.8	648	421	200							140	9	15	0.4
23	GONDIA	AMGAON	BAGHEDA	GSDA	80.341817	21.259	8	954	620	400							210	13	35	0.4
24	GONDIA	AMGAON	BAMHANI	GSDA	80.40568	21.333098	8.1	1791	1164	590							320	22	15	0.5
25	GONDIA	AMGAON	BANIYATOLA	GSDA	80.334247	21.539911	8	1225	796	530							280	15	23	0.4
26	GONDIA	AMGAON	BANJARITOLA	GSDA	80.376967	21.4589	8.4	1231	800	540							270	17	17	0.2
27	GONDIA	AMGAON	BHAJIYAPAR	GSDA	80.336071	21.414415	8.3	1354	880	450							250	17	13	0.1
28	GONDIA	AMGAON	BHALITOLA	GSDA	80.417345	21.295883	8.1	457	297	140							100	5	10	0.1
29	GONDIA	AMGAON	BHOSA	GSDA	80.343462	21.486405	7.8	854	555	320							200	12	9	0.3
30	GONDIA	AMGAON	BORKANHAR	GSDA	80.396918	21.318081	8.3	383	249	180							100	5	35	0.2
31	GONDIA	AMGAON	BOTHALI	GSDA	80.331152	21.369635	7.2	582	378	200							130	7	15	0.4



S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
32	GONDIA	AMGA ON	CHICHTOL A	GSDA	80.42 6443	21.34 5781	8.1	2018	1312	750							450	28	27	0.2
33	GONDIA	AMGA ON	CHIMANT OLA	GSDA	80.31 0008	21.27 5536	8.3	1408	915	550							310	20	12	0.2
34	GONDIA	AMGA ON	CHIRCHAL BANDH	GSDA	80.31 1613	21.40 3539	8.2	2225	1446	850							510	30	13	0.3
35	GONDIA	AMGA ON	DHAMAN GAON	GSDA	80.37 5182	21.41 8359	8.3	591	384	200							130	7	18	0.5
36	GONDIA	AMGA ON	DHOBITO LA	GSDA	80.29 4456	21.32 3761	8.2	2589	1683	1030							550	35	24	0.2
37	GONDIA	AMGA ON	DONGAR GAON	GSDA	80.34 4438	21.43 1513	8.1	543	353	180							120	6	10	0.2
38	GONDIA	AMGA ON	FUKKIMET A	GSDA	80.35 3585	21.32 3303	7.7	454	295	170							100	5	16	0.3
39	GONDIA	AMGA ON	GHATTEM ANI	GSDA	80.35 4103	21.52 438	8.1	1255	816	530							300	17	28	0.1
40	GONDIA	AMGA ON	GIROLA	GSDA	80.37 0957	21.49 3753	7.9	689	448	210							150	9	23	0.3
41	GONDIA	AMGA ON	GORTHA	GSDA	80.34 3008	21.35 81	8.4	1329	864	530							300	16	28	0.4
42	GONDIA	AMGA ON	GOSAITOL A	GSDA	80.37 2579	21.43 6617	7.6	1486	966	530							320	19	34	0.3

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
43	GONDIA	AMGAON	JAMBHUR TOLA	GSDA	80.347045	21.312721	8.1	760	494	220							170	9	35	0.4
44	GONDIA	AMGAON	JAMKHAR I	GSDA	80.354297	21.342812	7.9	1071	696	420							230	13	12	0.2
45	GONDIA	AMGAON	JAWARI	GSDA	80.335219	21.384542	7.5	1437	934	550							310	20	13	0.1
46	GONDIA	AMGAON	KALIMATI	GSDA	80.366589	21.461392	8.2	1602	1041	570							440	24	23	0.4
47	GONDIA	AMGAON	KARANJI	GSDA	80.324132	21.483416	7.1	1614	1049	570							350	22	31	0.2
48	GONDIA	AMGAON	KATANGTOLA	GSDA	80.371836	21.277748	8.3	1483	964	520							320	20	25	0.2
49	GONDIA	AMGAON	KATTIPAR	GSDA	80.363644	21.430499	8.1	311	202	120							70	5	26	0.3
50	GONDIA	AMGAON	KATURLI	GSDA	80.319916	21.460572	7.6	869	565	320							200	12	23	0.3
51	GONDIA	AMGAON	KAWADI	GSDA	80.391627	21.268179	8.1	845	549	300							180	12	18	0.1
52	GONDIA	AMGAON	KHURSIPARTOLA	GSDA	80.311045	21.382267	7.3	2905	1888	1180							630	38	28	0.3
53	GONDIA	AMGAON	KOPITOLA	GSDA	80.328258	21.287044	7.6	1368	889	550							300	16	23	0.2

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
54	GONDIA	AMGA ON	KOSAMTO LA	GSDA	80.32 4854	21.32 5143	7.8	518	337	180							120	7	14	0.2
55	GONDIA	AMGA ON	MAHARIT OLA	GSDA	80.39 8639	21.41 7392	7.9	434	282	140							100	5	30	0.2
56	GONDIA	AMGA ON	MAKKITO LA	GSDA	80.31 1926	21.32 9904	8.2	572	372	190							140	6	18	0.2
57	GONDIA	AMGA ON	MANEGA ON	GSDA	80.28 5172	21.36 6808	8.2	432	281	150							100	5	17	0.4
58	GONDIA	AMGA ON	MARARTO LA	GSDA	80.40 4237	21.43 1527	7.4	2754	1790	1120							600	35	22	0.2
59	GONDIA	AMGA ON	MOHGAO N	GSDA	80.33 6106	21.46 499	7.9	235	153	90							60	2	33	0.1
60	GONDIA	AMGA ON	MUNDIPA R	GSDA	80.40 0189	21.45 917	7.2	2338	1520	1030							530	32	29	0.4
61	GONDIA	AMGA ON	NANGPUR A	GSDA	80.37 2644	21.44 6962	7.4	4469	2905	1700							1050	60	17	0.3
62	GONDIA	AMGA ON	NANSARI	GSDA	80.41 0853	21.44 5741	8.2	1260	819	540							300	17	31	0.2
63	GONDIA	AMGA ON	NAVEGAO N	GSDA	80.35 2354	21.41 1256	8	2757	1792	1060							620	35	18	0.3
64	GONDIA	AMGA ON	PANGAON	GSDA	80.41 2823	21.27 6604	8.2	858	558	320							190	12	35	0.2

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
65	GONDIA	AMGA ON	PAULDAW ANA	GSDA	80.37 4834	21.32 395	8.3	726	472	220							160	9	35	0.4
66	GONDIA	AMGA ON	PIPARTOL A	GSDA	80.42 3648	21.33 5554	7.2	2166	1408	920							500	30	15	0.5
67	GONDIA	AMGA ON	RAMATOL A	GSDA	80.39 09	21.29 1296	8.2	698	454	220							160	9	21	0.2
68	GONDIA	AMGA ON	SAMBHUT OLA	GSDA	80.38 8407	21.40 6934	7.6	1102	716	360							240	15	21	0.4
69	GONDIA	AMGA ON	SARKART OLA	GSDA	80.39 2646	21.43 3693	8.3	3131	2035	1260							700	42	31	0.1
70	GONDIA	AMGA ON	SAWANGI	GSDA	80.41 9207	21.35 7041	8	615	400	200							130	8	18	0.3
71	GONDIA	AMGA ON	SHIONI	GSDA	80.35 019	21.39 2415	7.4	2578	1676	1080							550	33	26	0.2
72	GONDIA	AMGA ON	SITEPAR	GSDA	80.32 0576	21.43 6511	8.1	1048	681	410							230	13	13	0.3
73	GONDIA	AMGA ON	SONEKHA RI	GSDA	80.36 5137	21.29 1599	7.9	925	601	400							200	13	26	0.2
74	GONDIA	AMGA ON	SUPLIPAR	GSDA	80.34 5164	21.45 2976	8.1	838	545	310							180	9	13	0.4
75	GONDIA	AMGA ON	TAKARI	GSDA	80.36 0856	21.48 5456	8.1	1988	1292	750							460	25	24	0.1

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
76	GONDIA	AMGAON	TEKARI	GSDA	80.358851	21.473269	8.3	937	609	400							210	13	32	0.1
77	GONDIA	AMGAON	THANA	GSDA	80.309784	21.350254	8.6	492	320	160							120	6	12	0.1
78	GONDIA	AMGAON	THANATOLA	GSDA	80.313141	21.36592	7.8	326	212	100							70	4	32	0.8
79	GONDIA	AMGAON	TIGAON	GSDA	80.339647	21.295204	7.6	851	553	310							190	12	26	0.3
80	GONDIA	AMGAON	WALAD	GSDA	80.38172	21.273403	8.2	886	576	320							200	12	11	0.2
81	GONDIA	AMGAON	YERMADA	GSDA	80.362944	21.269527	8	646	420	210							150	9	35	0.3
82	GONDIA	DEORI	ALEWADA	GSDA	80.386498	20.938073	7.7	1094	711	330							220	1	37	0.3
83	GONDIA	DEORI	BALAPUR	GSDA	80.280995	20.839566	7.7	602	391	170							100	0.69	12	0.7
84	GONDIA	DEORI	BELGAON	GSDA	80.42154	20.932725	8.2	1717	1116	510							40	10	49	0.7
85	GONDIA	DEORI	BHAGI	GSDA	80.388283	21.085982	8	755	491	2360							130	5	41	0.7
86	GONDIA	DEORI	BODALDAND	GSDA	80.437588	20.962676	7.9	620	403	180							100	3	19	0.1

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
87	GONDIA	DEORI	BONDE	GSDA	80.274076	20.917125	8	1082	703	330							220	0.29	7	0.2
88	GONDIA	DEORI	BORGAWN	GSDA	80.398065	21.007841	7.3	620	403	170							100	0.69	23	0.3
89	GONDIA	Deori	BORGAWN/B	GSDA	80.377552	21.117942	8	757	492	260							130	0.89	49	0.2
90	GONDIA	Deori	CHARBHATA	GSDA	80.362817	21.173619	7.9	605	393	160							90	0.29	16	0.3
91	GONDIA	DEORI	CHICHEWADA	GSDA	80.329067	21.048451	7.9	558	363	170							90	0.23	29	0.3
92	GONDIA	DEORI	CHILHATI	GSDA	80.523067	20.89528	7.9	1402	911	400							240	19	12	0.6
93	GONDIA	DEORI	CHIPOTA	GSDA	80.508537	20.867712	7.7	788	512	270							160	3	29	0.2
94	GONDIA	DEORI	DHANORI	GSDA	80.430412	20.918626	7.9	466	303	160							90	0.66	39	0.3
95	GONDIA	DEORI	DHAWALKHEDI	GSDA	80.479632	20.877449	7.9	1335	868	430							290	0.16	49	0.1
96	GONDIA	DEORI	DHIWARI NTOLA	GSDA	80.412607	21.132085	8	754	490	260							160	1	49	0.2
97	GONDIA	DEORI	DHOBISARAD	GSDA	80.347024	21.081275	8.2	634	412	190							90	0.69	23	0.3



S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
98	GONDIA	DEORI	DHODHARA	GSDA	80.29 9778	20.86 8166	8.4	580	377	170							90	1	49	0.4
99	GONDIA	DEORI	DONGARGAON	GSDA	80.36 8685	21.19 4762	8.2	555	361	190							110	0.29	11	0.3
100	GONDIA	DEORI	FUKKIMETA	GSDA	80.43 2538	21.11 4182	8.3	635	413	190							100	5	29	0.3
101	GONDIA	DEORI	FUTANA	GSDA	80.40 8384	20.99 1447	7.9	632	411	190							110	0.49	47	0.2
102	GONDIA	DEORI	GADEGAON	GSDA	80.41 9301	20.94 5798	8	765	497	260							140	3	16	0.6
103	GONDIA	DEORI	ISTARI	GSDA	80.46 7305	20.85 3664	8.2	582	378	90							90	0.66	44	0.3
104	GONDIA	DEORI	JAMANAPUR	GSDA	80.32 9984	21.12 3587	7.8	637	414	200							100	0.29	19	0.6
105	GONDIA	DEORI	KAWALEWADA	GSDA	80.37 9377	20.94 9064	8	755	491	260							130	1	34	0.7
106	GONDIA	DEORI	KESHORI	GSDA	80.40 9662	20.91 2043	8.2	755	491	260							150	3	33	0.1
107	GONDIA	DEORI	KHAMBKHURA	GSDA	80.41 5343	20.92 3553	7.8	2015	1310	560							570	19	29	0.7
108	GONDIA	DEORI	KOSBI(BK.)	GSDA	80.45 363	20.93 2612	7.2	1252	814	400							190	13	16	0.6

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
109	GONDIA	DEORI	KOTJAMBORA	GSDA	80.345017	20.912397	7.8	632	411	190							100	9	49	0.2
110	GONDIA	DEORI	KUNABITOLA	GSDA	80.547815	20.888537	8.2	726	472	230							140	3	40	0.2
111	GONDIA	DEORI	LENDIJOB	GSDA	80.36108	21.011134	8	482	313	160							100	0.33	46	0.1
112	GONDIA	DEORI	LOHARA	GSDA	80.396898	21.180287	7.5	645	419	200							110	1	49	0.2
113	GONDIA	DEORI	MAGARDOH	GSDA	80.303954	20.820023	8.4	943	613	300							180	1	16	0.4
114	GONDIA	DEORI	MAKARDHOKADA	GSDA	80.414206	21.091356	8.2	635	413	200							130	0.66	21	0.2
115	GONDIA	DEORI	MASURBHOWDA	GSDA	80.369629	20.982682	7.5	414	269	140							70	1	49	0.1
116	GONDIA	DEORI	MHAISULI	GSDA	80.288437	20.965889	7.8	1252	814	380							220	11	44	0.2
117	GONDIA	DEORI	MISPIRI	GSDA	80.491767	20.849169	8.2	580	377	180							90	0.29	21	0.2
118	GONDIA	DEORI	MOHGAON	GSDA	80.399392	20.939874	7.3	600	390	180							90	0.34	23	0.2
119	GONDIA	DEORI	MULLA	GSDA	80.377176	21.159256	8.2	755	491	270							150	1	43	0.7

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
120	GONDIA	DEORI	MURMADI	GSDA	80.537053	20.920795	8	909	591	290							170	3	23	0.3
121	GONDIA	DEORI	NAKATI	GSDA	80.412446	21.019362	8.3	755	491	260							150	3	21	0.1
122	GONDIA	DEORI	NILAJ	GSDA	80.397485	20.920013	7.9	755	491	260							140	3	41	0.3
123	GONDIA	DEORI	OWARA	GSDA	80.351693	21.209032	8	722	469	240							130	7	29	0.2
124	GONDIA	Deori	PADAMPUR	GSDA	80.433925	21.093622	7.9	609	396	180							90	0.69	21	0.7
125	GONDIA	DEORI	PALASGAON	GSDA	80.252724	20.932961	8.4	480	312	160							70	9	1	0.3
126	GONDIA	DEORI	PARSODI(CH)	GSDA	80.365087	20.966083	8	755	491	260							130	0.33	23	0.3
127	GONDIA	DEORI	PAUDAWAN	GSDA	80.383934	21.228521	8	755	491	260							150	7	46	0.8
128	GONDIA	DEORI	PINDAKEPAR/C	GSDA	80.355074	21.122991	7.9	952	619	300							170	14	11	0.7
129	GONDIA	DEORI	PINDAKEPAR/G	GSDA	80.354718	20.942368	7.3	448	291	140							70	0.16	20	0.2
130	GONDIA	DEORI	PIPARKHARI	GSDA	80.382781	20.833236	7.9	482	313	160							70	1	29	0.3

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
131	GONDIA	DEORI	PURADA	GSDA	80.427233	21.154271	8	632	411	190							100	0.29	21	0.4
132	GONDIA	DEORI	REHALI	GSDA	80.416706	20.897479	7.7	1094	711	330							230	11	44	0.2
133	GONDIA	DEORI	ROPA	GSDA	80.279884	20.879469	7.9	952	619	300							190	13	23	0.3
134	GONDIA	DEORI	SALAI	GSDA	80.379852	21.033161	7.8	760	494	260							130	0.21	44	0.4
135	GONDIA	DEORI	SAOLI/D	GSDA	80.387103	21.189904	8.2	678	441	220							120	0.29	13	0.6
136	GONDIA	DEORI	SHEDEPAR	GSDA	80.355043	21.034604	7.5	1355	881	410							260	16	49	0.7
137	GONDIA	DEORI	SILAPUR	GSDA	80.399606	21.116476	8	1525	991	440							310	19	33	0.1
138	GONDIA	DEORI	SINDIBIRRI	GSDA	80.387725	20.985049	7.3	540	351	170							90	1	23	0.1
139	GONDIA	DEORI	SIRPUR	GSDA	80.436377	21.076796	7.2	755	491	260							150	1	41	0.1
140	GONDIA	DEORI	SIRPUR/BANDH	GSDA	80.376348	20.912292	8.2	758	493	260							150	0.33	33	0.2
141	GONDIA	DEORI	SUKALI	GSDA	80.324653	20.847295	8.4	642	417	200							110	0.66	17	0.3

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
142	GONDIA	DEORI	TUMADIKASA	GSDA	80.513416	20.918821	7.5	666	433	220							120	0.9	41	0.1
143	GONDIA	DEORI	WADEGAGON	GSDA	80.372338	21.14008	7.9	575	374	170							90	3	47	0.2
144	GONDIA	DEORI	WADEKASA	GSDA	80.504265	20.891089	7.2	325	211	140							70	0.66	33	0.7
145	GONDIA	DEORI	WANDHARA	GSDA	80.397195	20.902173	7.2	448	291	140							70	0.33	24	0.2
146	GONDIA	DEORI	YEDAMAGONDI	GSDA	80.431733	20.841269	7.5	606	394	180							90	0.69	49	0.1
147	GONDIA	GONDIA	ARJUNI	GSDA	80.242569	21.521633	6.9	628	408	170							100	7	15	0.9
148	GONDIA	GONDIA	BAGHOLI	GSDA	80.206633	21.573985	6.8	426	277	130							50	1	3	0.5
149	GONDIA	GONDIA	BAJARTOLA	GSDA	80.216744	21.590384	8.3	252	164	80							70	2	5	0.8
150	GONDIA	GONDIA	BALAMATOLA	GSDA	80.117488	21.552137	8.3	174	113	50							30	3	3	0.5
151	GONDIA	GONDIA	BANATHAR	GSDA	80.274976	21.59635	7.7	345	224	140							40	2	7	0.7
152	GONDIA	GONDIA	BARBASPURA	GSDA	80.239443	21.49119	8.3	777	505	260							120	2	14	0.7

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
153	GONDIA	GONDIA	BATANA	GSDA	80.255893	21.497292	8.2	312	203	110							40	3	3	0.8
154	GONDIA	GONDIA	BHADYATOLA	GSDA	80.215164	21.616133	7.6	1338	870	500							160	3	12	0.7
155	GONDIA	GONDIA	BIRSI (DASGAON)	GSDA	80.140827	21.549557	8.3	377	245	90							70	2	3	0.8
156	GONDIA	GONDIA	BRAHMA NTOLA	GSDA	80.187492	21.610616	8.3	1042	677	380							240	0.78	4	0.4
157	GONDIA	GONDIA	CHANDANITOLA	GSDA	80.199862	21.504772	7.6	2132	1386	750							330	16	4	0.2
158	GONDIA	GONDIA	CHANGER A	GSDA	80.24547	21.587007	6.9	362	235	130							90	9	21	0.1
159	GONDIA	GONDIA	CHARGAON	GSDA	80.249923	21.545746	7.6	769	500	220							130	3	5	0.8
160	GONDIA	GONDIA	CHICHTOLA (N.V.)	GSDA	80.142464	21.422436	8.1	926	602	430							90	3	1	0.8
161	GONDIA	GONDIA	CHULOD	GSDA	80.242035	21.456006	7.3	1391	904	490							240	3	3	0.7
162	GONDIA	GONDIA	CHUTIYA	GSDA	80.13725	21.438851	7.4	454	295	130							70	2	8	0.8
163	GONDIA	GONDIA	DASGAON BK.	GSDA	80.153717	21.569681	8.4	971	631	380							130	7	2	0.8

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
164	GONDIA	GONDIA	DASGAON KH.	GSDA	80.137392	21.574052	7.6	1295	842	340							200	9	6	0.6
165	GONDIA	GONDIA	DATORA	GSDA	80.270384	21.444182	7.6	763	496	170							60	9	4	0.2
166	GONDIA	GONDIA	DAWANI WADA	GSDA	80.049657	21.511047	7.7	440	286	150							60	0.48	2	0.3
167	GONDIA	GONDIA	DEORI	GSDA	80.089651	21.563637	7.6	526	342	210							60	2	3	0.7
168	GONDIA	GONDIA	DEUTOLA	GSDA	80.069878	21.51404	8.3	1492	970	580							170	4	4	0.8
169	GONDIA	GONDIA	DHAKNI	GSDA	80.150485	21.462858	7.1	1197	778	290							180	9	9	0.1
170	GONDIA	GONDIA	DHAMAN GAON	GSDA	80.256671	21.599556	8.3	500	325	140							80	4	3	0.7
171	GONDIA	GONDIA	DHAPEWADA	GSDA	80.06459	21.543424	8.1	463	301	80							60	6	3	0.7
172	GONDIA	GONDIA	FULCHUR	GSDA	80.205809	21.438435	8.2	980	637	400							110	3	3	0.3
173	GONDIA	GONDIA	FULCHUR TOLA	GSDA	80.19943	21.43966	8.3	1215	790	490							140	1	4	0.8
174	GONDIA	GONDIA	GANGAZARI	GSDA	80.070535	21.427858	7.4	2318	1507	730							460	7	19	0.4



S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
175	GONDIA	GONDIA	GARRA BK.	GSDA	80.20 1342	21.56 3288	7.4	785	510	330							90	2	1	1.0
176	GONDIA	GONDIA	GARRA KH.	GSDA	80.20 4283	21.54 8031	7.4	1006	654	500							90	4	3	0.7
177	GONDIA	GONDIA	GHIWARI	GSDA	80.19 9323	21.53 6572	7.6	523	340	230							50	3	8	0.8
178	GONDIA	GONDIA	GIROLA	GSDA	80.16 8117	21.53 8441	7.9	574	373	200							70	0.28	2	0.3
179	GONDIA	GONDIA	GONDITOLA	GSDA	80.21 7696	21.55 5729	7.9	677	440	260							90	3	3	0.3
180	GONDIA	GONDIA	GUDAMA	GSDA	80.28 6285	21.42 9107	7.9	446	290	140							70	10	4	0.5
181	GONDIA	GONDIA	HALBITOLA	GSDA	80.20 7281	21.51 9369	8	365	237	140							40	2	0	0.8
182	GONDIA	GONDIA	IRRI	GSDA	80.29 3636	21.46 7364	7.4	960	624	340							140	18	34	0.4
183	GONDIA	GONDIA	JAGANTOLA	GSDA	80.26 245	21.58 7547	7.1	445	289	160							60	2	4	0.7
184	GONDIA	GONDIA	JIRUTOLA	GSDA	80.23 4491	21.61 6496	7.3	569	370	250							50	19	19	0.8
185	GONDIA	GONDIA	KALARTOLA	GSDA	80.22 3819	21.57 2557	6.9	1335	868	410							210	3	1	0.8

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
186	GONDIA	GONDI A	KANHART OLA	GSDA	80.19 6247	21.58 6881	6.9	835	543	320							90	3	1	0.7
187	GONDIA	GONDI A	KARANJA	GSDA	80.19 2078	21.41 9818	7.4	1037	674	400							130	0.44	4	0.5
188	GONDIA	GONDI A	KARUTOL A	GSDA	80.04 8595	21.49 0226	7.6	325	211	130							40	2	15	0.3
189	GONDIA	GONDI A	KATANGI KALA	GSDA	80.20 082	21.48 3256	8.3	898	584	380							100	7	2	0.7
190	GONDIA	GONDI A	KATI	GSDA	80.20 475	21.59 8065	7.6	720	468	290							70	4	15	0.8
191	GONDIA	GONDI A	KHALBAN DA	GSDA	80.05 7991	21.47 3778	8.2	848	551	400							70	4	17	0.7
192	GONDIA	GONDI A	KHARRA	GSDA	80.09 7538	21.44 5378	8.3	508	330	170							60	3	7	0.4
193	GONDIA	GONDI A	KHATITOL A	GSDA	80.07 5408	21.49 2304	7.5	712	463	290							90	19	10	0.2
194	GONDIA	GONDI A	KHATIYA	GSDA	80.26 05	21.51 7725	8	511	332	170							80	7	8	0.3
195	GONDIA	GONDI A	KINHI	GSDA	80.11 3379	21.58 0497	8.2	1049	682	260							210	6	4	0.3
196	GONDIA	GONDI A	KOCHEW AHI	GSDA	80.27 6613	21.56 7605	7.8	795	517	240							190	18	17	0.4

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
197	GONDIA	GONDIA	KORANI	GSDA	80.234104	21.604007	7.5	1232	801	290							250	0.66	4	0.5
198	GONDIA	GONDIA	KUDWA	GSDA	80.180936	21.476426	8.2	929	604	360							130	0.48	4	0.1
199	GONDIA	GONDIA	LAHITOLA	GSDA	80.174378	21.530107	8.4	531	345	210							70	3	24	0.8
200	GONDIA	GONDIA	LODHI TOLA	GSDA	80.21474	21.534003	7.6	505	328	160							80	0.96	1	0.8
201	GONDIA	GONDIA	LODHITOLA (DH.)	GSDA	80.05137	21.541931	7.1	360	234	70							40	3	6	0.6
202	GONDIA	GONDIA	LOHARA	GSDA	80.141237	21.530736	6.8	763	496	330							80	3	3	0.4
203	GONDIA	GONDIA	MAJITPUR	GSDA	80.069675	21.452217	7.1	637	414	240							80	3	4	0.2
204	GONDIA	GONDIA	MAKADI	GSDA	80.171731	21.579421	7.4	408	265	230							40	1	15	0.7
205	GONDIA	GONDIA	MARARTOLA	GSDA	80.190832	21.599549	7.8	363	236	90							70	15	7	0.7
206	GONDIA	GONDIA	MORWAHI	GSDA	80.298957	21.446954	8.2	411	267	130							30	0.66	2	0.8
207	GONDIA	GONDIA	MUNDIPAR (KH.)	GSDA	80.278994	21.497729	6.9	745	484	320							80	2	3	1.0

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
208	GONDIA	GONDI A	MURPAR	GSDA	80.23 1377	21.55 2366	7	1055	686	420							120	4	9	0.8
209	GONDIA	GONDI A	NAGARA	GSDA	80.21 6885	21.49 7472	6.9	577	375	220							80	7	10	0.1
210	GONDIA	GONDI A	NANGPUR A MURRI	GSDA	80.17 3313	21.45 5933	7.9	1335	868	410							240	0.66	2	0.7
211	GONDIA	GONDI A	NAVARGA ON KALA	GSDA	80.29 5029	21.48 5586	8.2	728	473	270							110	0.66	4	0.7
212	GONDIA	GONDI A	NAVEGAO N (DHA)	GSDA	80.08 9302	21.53 9417	7.6	1095	712	370							240	4	4	0.6
213	GONDIA	GONDI A	NAWEGA ON (PA)	GSDA	80.18 4978	21.51 6161	7.3	763	496	140							80	7	9	0.4
214	GONDIA	GONDI A	NILAJ	GSDA	80.16 7844	21.55 8639	7.4	557	362	230							60	7	7	0.4
215	GONDIA	GONDI A	PANGADI	GSDA	80.09 1607	21.40 9998	7.5	298	194	130							30	1	2	0.1
216	GONDIA	GONDI A	PANJARA	GSDA	80.33 0153	21.50 7917	7.2	874	568	230							110	8	8	0.3
217	GONDIA	GONDI A	PINDAKEP AR	GSDA	80.18 1529	21.44 1256	8.3	892	580	170							60	2	2	0.5
218	GONDIA	GONDI A	PIPARTOL A	GSDA	80.15 5444	21.54 6179	7.6	886	576	350							110	10	7	0.2

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
219	GONDIA	GONDI A	POLATOL A	GSDA	80.07 4945	21.52 1825	7.6	523	340	180							70	3	2	0.8
220	GONDIA	GONDI A	PUJARITO LA	GSDA	80.17 3437	21.61 2415	8.9	871	566	400							70	4	1	0.8
221	GONDIA	GONDI A	RAIPUR	GSDA	80.12 1851	21.54 0953	7.6	1098	714	340							130	8	3	0.3
222	GONDIA	GONDI A	RAJEGAO N	GSDA	80.24 0456	21.56 8245	7.6	472	307	9							60	9	12	0.4
223	GONDIA	GONDI A	RAPEWAD A	GSDA	80.16 0566	21.42 3163	8.1	778	506	320							90	1	1	0.7
224	GONDIA	GONDI A	RATNARA	GSDA	80.13 923	21.51 3023	8.2	1838	1195	580							300	24	17	0.7
225	GONDIA	GONDI A	RAWANW ADI	GSDA	80.22 812	21.53 7898	7.6	815	530	310							110	2	18	1.0
226	GONDIA	GONDI A	SATONA	GSDA	80.25 4783	21.61 4467	7.4	534	347	160							80	3	9	0.5
227	GONDIA	GONDI A	SAWARI	GSDA	80.22 1905	21.51 9291	8.2	1122	729	510							110	0.48	0	0.5
228	GONDIA	GONDI A	SHIRPUR	GSDA	80.26 5753	21.55 7005	7.6	420	273	200							30	3	15	0.5
229	GONDIA	GONDI A	SHIVANI	GSDA	80.18 5346	21.55 811	8.1	375	244	90							70	26	4	0.6

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
230	GONDIA	GONDI A	SONPURI	GSDA	80.09 067	21.51 8891	7.2	800	520	300							90	5	3	0.8
231	GONDIA	GONDI A	SONVIHA RI	GSDA	80.10 6803	21.55 9459	8.4	777	505	340							80	0.48	1	0.7
232	GONDIA	GONDI A	TANDA	GSDA	80.26 4196	21.38 8975	7.6	1051	683	420							110	4	2	0.6
233	GONDIA	GONDI A	UMARI	GSDA	80.18 5877	21.57 5399	8.3	394	256	130							60	0.6	0	0.7
234	GONDIA	GONDI A	WAZITOL A (N.V.)	GSDA	80.11 248	21.44 1059	8.2	638	415	230							80	3	10	0.2
235	GONDIA	GONDI A	ZADUTOL A	GSDA	80.06 4708	21.48 6248	7	323	210	120							40	2	9	1.0
236	GONDIA	GOREG AON	ALEBEDAR	GSDA	80.06 8058	21.29 7128	7.8	1268	824	500							330	17	10	0.4
237	GONDIA	GOREG AON	AMBETAL AO	GSDA	80.30 6424	21.31 3957	7.9	815	530	310							180	12	26	0.2
238	GONDIA	GOREG AON	ASALPANI	GSDA	80.08 1644	21.32 8253	7.4	1175	764	480							280	15	9	0.7
239	GONDIA	GOREG AON	BABAI	GSDA	80.24 93	21.30 6469	8	765	497	250							170	8	18	0.3
240	GONDIA	GOREG AON	BAGHOLI	GSDA	80.14 7169	21.36 521	8.1	1391	904	540							310	20	12	0.1

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
241	GONDIA	GOREG AON	BAJARTOL A	GSDA	80.27 3467	21.26 201	8.3	394	256	110							60	5	16	0.5
242	GONDIA	GOREG AON	BAMHANI	GSDA	80.27 3817	21.27 8991	8	482	313	160							100	6	9	0.2
243	GONDIA	GOREG AON	BHADANG A	GSDA	80.20 7449	21.31 4522	8.2	1408	915	540							300	20	15	0.2
244	GONDIA	GOREG AON	BODUND A	GSDA	80.09 4112	21.30 5202	7.9	308	200	100							60	4	21	0.4
245	GONDIA	GOREG AON	BORGAO N	GSDA	80.13 524	21.37 2688	7.5	1309	851	520							300	17	22	0.2
246	GONDIA	GOREG AON	CHANDIT OLA (N.V.)	GSDA	80.31 7103	21.28 7487	8.2	1585	1030	580							340	20	30	0.4
247	GONDIA	GOREG AON	CHICHGA ON	GSDA	80.17 0897	21.37 27	8.4	754	490	240							170	9	21	0.3
248	GONDIA	GOREG AON	CHICHGA ONTOLA	GSDA	80.16 0278	21.37 364	8.2	1851	1203	810							410	25	34	0.4
249	GONDIA	GOREG AON	CHILHATI	GSDA	80.27 285	21.31 6488	7.9	1495	972	550							320	20	24	0.2
250	GONDIA	GOREG AON	CHOPA	GSDA	80.26 5744	21.26 6308	8.3	503	327	170							100	6	15	0.6
251	GONDIA	GOREG AON	DAWDIPA R	GSDA	80.25 4034	21.36 5757	8	1231	800	440							220	16	9	0.2



S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
252	GONDIA	GOREGAON	DAWWA	GSDA	80.176564	21.406419	8.4	1605	1043	570							350	22	16	0.1
253	GONDIA	GOREGAON	DEUTOLA	GSDA	80.241252	21.32258	7.9	1826	1187	700							400	24	18	0.3
254	GONDIA	GOREGAON	DHUNDATOLA (N.V.)	GSDA	80.247529	21.378736	8.2	1635	1063	560							250	24	37	0.2
255	GONDIA	GOREGAON	GAHALATOLA	GSDA	80.214061	21.326722	8.3	2265	1472	850							500	30	9	0.4
256	GONDIA	GOREGAON	GANKHAI RA	GSDA	80.192155	21.388996	8.3	768	499	220							170	9	31	0.3
257	GONDIA	GOREGAON	GARADA	GSDA	80.174494	21.276933	7.9	997	648	360							160	12	9	0.2
258	GONDIA	GOREGAON	GAWARITOLA	GSDA	80.294979	21.24589	8.3	937	609	400							210	13	24	0.4
259	GONDIA	GOREGAON	GHOTI	GSDA	80.206803	21.330825	7.9	1932	1256	720							420	25	16	0.3
260	GONDIA	GOREGAON	GHUMAR RA	GSDA	80.237276	21.261009	7.7	1295	842	440							240	16	15	0.5
261	GONDIA	GOREGAON	GIDHADI	GSDA	80.282642	21.298676	8.2	945	614	400							200	12	28	0.3
262	GONDIA	GOREGAON	GONDEKHARI	GSDA	80.150575	21.411088	8	1812	1178	650							400	24	26	0.2

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
263	GONDIA	GOREGAON	HIRAPUR	GSDA	80.118565	21.299551	7.9	2658	1728	1000							620	35	25	0.4
264	GONDIA	GOREGAON	HIRATOLA	GSDA	80.305865	21.293327	7.7	1900	1235	800							420	25	32	0.3
265	GONDIA	GOREGAON	JAMBHULPANI	GSDA	80.156458	21.270784	7.6	775	504	300							170	12	36	0.4
266	GONDIA	GOREGAON	KALIMATI	GSDA	80.316811	21.3032	7.8	551	358	170							120	7	26	0.2
267	GONDIA	GOREGAON	KATANGI	GSDA	80.178615	21.335626	8	1280	832	520							300	17	13	0.4
268	GONDIA	GOREGAON	KAWALEWADA	GSDA	80.155454	21.393977	7.2	1171	761	510							260	15	11	0.1
269	GONDIA	GOREGAON	KHADIPAR	GSDA	80.118387	21.340659	8.2	1871	1216	760							420	25	15	0.1
270	GONDIA	GOREGAON	KURHADI	GSDA	80.134124	21.341896	8.1	1225	796	520							260	15	33	0.3
271	GONDIA	GOREGAON	LENDEZARI	GSDA	80.122226	21.419169	8	1034	672	410							230	12	18	0.2
272	GONDIA	GOREGAON	MALPURI	GSDA	80.124279	21.287955	8.3	1012	658	400							230	12	26	0.3
273	GONDIA	GOREGAON	MEGHATOLA	GSDA	80.153006	21.346816	8	886	576	320							200	10	26	0.2

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
274	GONDIA	GOREG AON	MOHADI	GSDA	80.25 2418	21.28 4541	8.2	1732	1126	590							400	24	35	0.4
275	GONDIA	GOREG AON	MOHAGA ON BK	GSDA	80.23 4592	21.38 9333	7.9	694	451	210							160	9	26	0.2
276	GONDIA	GOREG AON	MOHAGA ON TILLI	GSDA	80.26 5385	21.23 515	7.8	860	559	330							200	12	28	0.4
277	GONDIA	GOREG AON	MUNDIPA R	GSDA	80.19 7847	21.28 2073	7.2	2538	1650	970							550	34	18	0.3
278	GONDIA	GOREG AON	MURDOLI	GSDA	80.20 8577	21.24 1129	8.1	689	448	240							140	8	13	0.4
279	GONDIA	GOREG AON	NAWARG AON	GSDA	80.11 224	21.36 8865	7.3	1085	705	500							230	15	17	0.3
280	GONDIA	GOREG AON	NIMBA	GSDA	80.31 9878	21.21 3944	8.3	1378	896	560							300	17	9	0.3
281	GONDIA	GOREG AON	NIMBA(H ALBITOLA)	GSDA	80.32 1316	21.21 6098	8	2018	1312	840							450	27	17	0.4
282	GONDIA	GOREG AON	NONITOL A	GSDA	80.28 1763	21.33 5193	8.4	323	210	120							70	5	31	0.5
283	GONDIA	GOREG AON	PALKHED A	GSDA	80.25 3304	21.23 4733	7.9	1545	1004	550							340	20	11	0.4
284	GONDIA	GOREG AON	PATHARI	GSDA	80.15 6755	21.33 4107	8.2	1362	885	550							300	17	18	0.2

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
285	GONDIA	GOREG AON	PINDAKEP AR	GSDA	80.16 8618	21.30 3063	8.2	1722	1119	580							440	23	22	0.1
286	GONDIA	GOREG AON	PURGAON	GSDA	80.18 7379	21.36 8963	8.4	2431	1580	970							550	32	26	0.2
287	GONDIA	GOREG AON	RAMATOL A	GSDA	80.13 6851	21.28 7235	8.4	1243	808	510							270	17	26	0.3
288	GONDIA	GOREG AON	SARVATO LA	GSDA	80.23 1239	21.37 2611	8.2	1788	1162	580							400	24	21	0.2
289	GONDIA	GOREG AON	SATWA	GSDA	80.17 0974	21.39 0613	7.4	982	638	410							220	13	22	0.2
290	GONDIA	GOREG AON	SILEGAON	GSDA	80.16 8087	21.35 6804	8.3	478	311	170							110	6	26	0.3
291	GONDIA	GOREG AON	SONDLA G ONDI	GSDA	80.14 6119	21.26 7818	8	1338	870	540							300	16	22	0.1
292	GONDIA	GOREG AON	SONE GAO N	GSDA	80.11 9341	21.38 6824	7.7	1408	915	510							310	20	16	0.3
293	GONDIA	GOREG AON	SONI	GSDA	80.27 4945	21.34 4807	8.2	1877	1220	750							410	25	26	0.2
294	GONDIA	GOREG AON	SUKHA PU R	GSDA	80.13 1194	21.36 1171	8.3	1417	921	530							300	18	23	0.2
295	GONDIA	GOREG AON	TEDHA	GSDA	80.31 2165	21.24 9155	7.9	1063	691	420							240	13	17	0.3

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
296	GONDIA	GOREG AON	TELANKHE DI	GSDA	80.24 1397	21.24 3445	8.3	642	417	210							140	9	18	0.3
297	GONDIA	GOREG AON	TILLI	GSDA	80.27 4018	21.22 6244	8.6	465	302	180							100	7	31	0.2
298	GONDIA	GOREG AON	TIMEZARI	GSDA	80.11 0691	21.33 1057	8	711	462	220							160	9	9	0.2
299	GONDIA	GOREG AON	TUMKHED A BK.	GSDA	80.20 8278	21.39 9344	8	905	588	350							200	11	13	0.4
300	GONDIA	GOREG AON	ZANJIYA	GSDA	80.23 2369	21.35 8775	8.2	1440	936	520							350	20	31	0.3
301	GONDIA	SALEKA SA	ASAITOLA	GSDA	80.47 4765	21.36 4852	8.4	1248	811	400							240	3	3	0.8
302	GONDIA	SALEKA SA	GONDITO LA	GSDA	80.43 5556	21.37 0302	8.2	1094	711	330							200	7	29	0.7
303	GONDIA	SALEKA SA	GORRE	GSDA	80.48 8112	21.26 0608	7.7	448	291	140							70	0.22	11	0.3
304	GONDIA	SALEKA SA	KADHOTIT OLA	GSDA	80.41 9874	21.23 0824	8.4	482	313	170							100	0.29	47	0.3
305	GONDIA	SALEKA SA	KHEDEPA R	GSDA	80.53 175	21.38 077	7.5	725	471	230							140	7	34	0.3
306	GONDIA	SALEKA SA	KULAR BHATTI	GSDA	80.50 6749	21.21 9348	7.9	566	368	160							90	1	17	0.7

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
307	GONDIA	SALEKA SA	LATORI	GSDA	80.47 8331	21.37 4135	7.9	762	495	250							150	0.26	34	0.3
308	GONDIA	SALEKA SA	MAKKATO LA	GSDA	80.44 3309	21.24 8547	7.7	1014	659	320							200	3	39	0.1
309	GONDIA	SALEKA SA	NAVEGAO N	GSDA	80.48 3769	21.39 0924	7.5	722	469	230							130	0.69	49	0.2
310	GONDIA	SALEKA SA	SAKARITO LA	GSDA	80.41 6906	21.37 1592	7.2	632	411	190							100	1	29	0.1
311	GONDIA	SALEKA SA	SONPURI	GSDA	80.50 2183	21.35 6313	7.9	755	491	270							150	3	19	0.2
312	GONDIA	SALEKA SA	TIRKHEDI	GSDA	80.48 7028	21.27 8981	7.9	603	392	190							90	0.69	47	0.3
313	GONDIA	SALEKA SA	ZALIYA	GSDA	80.43 2148	21.36 0862	7.3	755	491	250							130	21	21	0.3
314	GONDIA	TIRORA	ALEZARI	GSDA	79.98 1211	21.33 8774	7.7	1342	872	540							290	15	25	0.2
315	GONDIA	TIRORA	ARJUNI	GSDA	79.95 9894	21.53 7708	8.1	1969	1280	670							390	6	26	0.6
316	GONDIA	TIRORA	ATRI	GSDA	80.02 5034	21.51 7276	8.2	2034	1322	650							260	31	37	0.3
317	GONDIA	TIRORA	BAGHOLI	GSDA	79.95 9426	21.49 9731	8.1	1678	1091	510							380	16	16	0.2

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
318	GONDIA	TIRORA	BAIWADA	GSDA	79.87 2536	21.33 893	8.3	2375	1544	800							480	18	9	0.2
319	GONDIA	TIRORA	BALAPUR	GSDA	80.00 0778	21.33 1845	7.5	1498	974	480							390	8	11	0.1
320	GONDIA	TIRORA	BARBASP URA	GSDA	80.00 2779	21.42 9676	8.2	2911	1892	930							480	26	17	0.3
321	GONDIA	TIRORA	BELATI BK	GSDA	79.89 9351	21.41 2494	7.4	422	274	140							90	35	15	0.2
322	GONDIA	TIRORA	BERDIPAR	GSDA	79.96 4055	21.33 3391	7.5	2371	1541	640							420	11	5	0.3
323	GONDIA	TIRORA	BERDIPAR KH	GSDA	79.98 6096	21.46 0709	7.8	820	533	250							120	6	8	0.6
324	GONDIA	TIRORA	BHAJEPAR	GSDA	79.95 8108	21.30 9351	7.9	1060	689	380							290	11	14	0.9
325	GONDIA	TIRORA	BHAMBO DI	GSDA	79.84 8348	21.38 756	7.9	1114	724	320							210	16	14	0.2
326	GONDIA	TIRORA	BHIWAPU R	GSDA	79.98 937	21.40 1206	7.7	1631	1060	560							370	13	9	0.2
327	GONDIA	TIRORA	BHURATO LA	GSDA	79.94 2383	21.44 3067	7.7	2069	1345	710							490	4	15	0.3
328	GONDIA	TIRORA	BIHIRIYA	GSDA	79.93 8488	21.49 5716	6.8	1140	741	340							210	4	4	0.3

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
329	GONDIA	TIRORA	BIROLI	GSDA	79.84 9289	21.40 6001	8.2	3209	2086	1010							490	6	18	0.1
330	GONDIA	TIRORA	BIRSI	GSDA	79.92 424	21.36 9972	6.8	837	544	310							170	7	12	0.1
331	GONDIA	TIRORA	BODA	GSDA	80.02 2734	21.50 1011	8.1	706	459	210							90	16	14	0.2
332	GONDIA	TIRORA	BODALKA SA	GSDA	80.01 7637	21.35 7859	8.3	780	507	330							110	9	4	0.2
333	GONDIA	TIRORA	BOPE SAR	GSDA	79.91 6852	21.35 0596	8.3	1908	1240	630							450	5	5	0.1
334	GONDIA	TIRORA	BORA	GSDA	79.97 8567	21.49 2912	6.8	329	214	110							80	12	8	0.6
335	GONDIA	TIRORA	BORGAO N	GSDA	79.91 4729	21.32 2352	7.7	1274	828	470							260	14	5	0.2
336	GONDIA	TIRORA	CHANDOR I BK	GSDA	79.83 4388	21.39 0733	7.7	918	597	340							190	6	19	0.3
337	GONDIA	TIRORA	CHANDOR I KH	GSDA	79.93 4266	21.51 3533	8.1	2078	1351	600							430	6	6	0.2
338	GONDIA	TIRORA	CHIKHALI	GSDA	79.96 8134	21.38 4675	6.8	469	305	140							90	24	7	0.6
339	GONDIA	TIRORA	CHIREKHA NI	GSDA	79.93 0594	21.43 0215	8.1	2178	1416	660							390	13	25	0.6



S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
340	GONDIA	TIRORA	CHORKHAMARA	GSDA	79.9559	21.276374	7.5	1698	1104	470							260	21	17	0.5
341	GONDIA	TIRORA	CHURADI	GSDA	79.937234	21.39726	6.9	740	481	160							100	10	15	0.7
342	GONDIA	TIRORA	DABBETOLA	GSDA	79.977419	21.474979	6.9	1775	1154	450							270	6	6	0.3
343	GONDIA	TIRORA	DHADARI	GSDA	79.889997	21.392718	8.1	946	615	330							220	14	19	0.8
344	GONDIA	TIRORA	DONGARGAON	GSDA	79.986053	21.370004	8.3	2629	1709	1150							425	16	14	0.2
345	GONDIA	TIRORA	GANGLA	GSDA	79.890202	21.341851	6.9	2183	1419	750							340	7	8	0.2
346	GONDIA	TIRORA	GARADA	GSDA	79.952145	21.390635	7.7	1172	762	330							240	19	17	0.5
347	GONDIA	TIRORA	GHATKURODA	GSDA	79.810459	21.375615	7.7	1158	753	390							190	7	4	0.2
348	GONDIA	TIRORA	GHOOGARA	GSDA	79.824188	21.367478	7.8	1506	979	430							340	10	9	0.1
349	GONDIA	TIRORA	GHOTI	GSDA	80.041642	21.351485	8.4	743	483	220							90	4	19	0.4
350	GONDIA	TIRORA	GONDMOHADI	GSDA	79.994663	21.512381	8.1	832	541	310							110	16	26	0.3

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
351	GONDIA	TIRORA	GOVINDTOLA	GSDA	80.052864	21.361796	8.3	1371	891	240							280	19	19	0.3
352	GONDIA	TIRORA	GUMADHAWADA	GSDA	79.965005	21.423052	6.9	3800	2470	1210							1000	7	18	0.3
353	GONDIA	TIRORA	INDORABK	GSDA	79.942198	21.483719	8.2	449	292	110							90	8	12	0.8
354	GONDIA	TIRORA	INDORAKH	GSDA	80.016716	21.389959	7.4	1306	849	450							140	8	31	0.6
355	GONDIA	TIRORA	ISAPUR	GSDA	79.884328	21.353535	7.5	1920	1248	540							320	28	14	0.3
356	GONDIA	TIRORA	JAMUNIYA	GSDA	79.970097	21.444929	7.5	851	553	320							180	6	8	0.2
357	GONDIA	TIRORA	KACHEWANI	GSDA	79.988297	21.432878	7.8	643	418	290							190	34	16	0.2
358	GONDIA	TIRORA	KARTIBK	GSDA	79.944663	21.470336	7.9	1509	981	360							210	17	3	0.3
359	GONDIA	TIRORA	KARTIKH	GSDA	79.911631	21.466998	8.3	1275	829	410							240	18	9	0.8
360	GONDIA	TIRORA	KAWALEWADA	GSDA	79.905312	21.438572	6.9	1206	784	340							240	14	6	0.3
361	GONDIA	TIRORA	KESALWADA	GSDA	79.852807	21.328994	7.5	1365	887	450							280	14	14	0.2

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
362	GONDIA	TIRORA	KHADAKI	GSDA	80.003155	21.376229	8.3	743	483	320							170	9	8	0.3
363	GONDIA	TIRORA	KHAIRBODI	GSDA	79.948571	21.41346	8.1	875	569	320							190	19	6	0.2
364	GONDIA	TIRORA	KHAIRLANJI	GSDA	79.947793	21.521462	8.7	317	206	110							50	8	13	0.3
365	GONDIA	TIRORA	KHAMARI	GSDA	79.986933	21.383226	7.2	1737	1129	640							260	24	27	0.5
366	GONDIA	TIRORA	KHODGAGON	GSDA	79.899579	21.354787	8.3	2282	1483	670							540	16	7	0.2
367	GONDIA	TIRORA	KHOPADA	GSDA	79.869186	21.349154	8.2	983	639	310							190	17	14	0.2
368	GONDIA	TIRORA	KHURKHULI	GSDA	79.85969	21.379005	8.2	1098	714	310							190	15	39	0.3
369	GONDIA	TIRORA	KHURSIPAR	GSDA	79.956105	21.327355	6.7	1438	935	330							240	11	18	0.3
370	GONDIA	TIRORA	KODEBARRA	GSDA	80.038861	21.332692	8.3	1940	1261	880							380	7	3	0.2
371	GONDIA	TIRORA	KODELOHARA	GSDA	79.909699	21.297901	8.1	3374	2193	990							430	44	22	0.3
372	GONDIA	TIRORA	KULPA	GSDA	79.857051	21.268507	8.1	889	578	370							140	5	17	0.3

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
373	GONDIA	TIRORA	LAKHEGAON	GSDA	79.930277	21.353512	6.9	2803	1822	780							370	5	7	0.3
374	GONDIA	TIRORA	LEDADA	GSDA	79.875857	21.328009	8.1	1363	886	440							210	19	8	0.2
375	GONDIA	TIRORA	MALHI	GSDA	79.901179	21.316198	8.3	2054	1335	690							470	8	13	0.7
376	GONDIA	TIRORA	MALPURI	GSDA	79.936574	21.378329	8.1	2026	1317	540							390	11	6	0.3
377	GONDIA	TIRORA	MANDAWI	GSDA	79.869175	21.410996	7.7	1105	718	340							220	8	4	1.0
378	GONDIA	TIRORA	MANGEZARI	GSDA	80.053179	21.349461	6.9	1518	987	350							340	17	12	0.3
379	GONDIA	TIRORA	MANORA	GSDA	79.827856	21.327906	7.4	1074	698	260							130	14	30	0.5
380	GONDIA	TIRORA	MARARTOLA	GSDA	79.90748	21.450431	7.7	595	387	160							90	9	16	0.7
381	GONDIA	TIRORA	MAREGAON	GSDA	79.937675	21.309024	8.2	668	434	180							100	11	27	0.7
382	GONDIA	TIRORA	MENDHA	GSDA	79.950442	21.35156	7.7	745	484	270							170	15	6	0.2
383	GONDIA	TIRORA	MENDIPUR	GSDA	79.976183	21.406344	7.7	2817	1831	890							460	14	19	0.7

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
384	GONDIA	TIRORA	MUNDIKOTA	GSDA	79.841219	21.36793	7.4	2694	1751	840							380	16	31	0.2
385	GONDIA	TIRORA	MUNDIPAR	GSDA	79.8862	21.416674	7.3	2831	1840	790							360	9	14	0.1
386	GONDIA	TIRORA	MURPAR	GSDA	79.859626	21.309048	8.3	520	338	140							130	23	7	0.1
387	GONDIA	TIRORA	NAHARTOLA	GSDA	80.003982	21.477551	7.7	709	461	240							110	16	9	0.5
388	GONDIA	TIRORA	NANDNAGAR (N.V.)	GSDA	79.948751	21.428614	8.3	1737	1129	590							350	29	15	0.2
389	GONDIA	TIRORA	NAWARGAON	GSDA	79.900567	21.339804	8.3	1617	1051	560							330	5	16	0.2
390	GONDIA	TIRORA	NAWEGAON KH	GSDA	79.822329	21.34687	8.3	2514	1634	730							320	19	6	0.2
391	GONDIA	TIRORA	NAWEZARI	GSDA	79.864469	21.281575	8.3	1535	998	540							370	5	12	0.2
392	GONDIA	TIRORA	NILAGONDI	GSDA	79.883594	21.305216	8.3	1263	821	540							240	9	5	0.3
393	GONDIA	TIRORA	NIMGAOIN	GSDA	80.023365	21.401229	6.8	1374	893	480							220	9	6	0.5
394	GONDIA	TIRORA	PALDONGARI	GSDA	79.948375	21.452832	7.1	3386	2201	890							550	7	6	0.2

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
395	GONDIA	TIRORA	PANJARA	GSDA	79.85 8088	21.36 4009	6.7	1020	663	300							250	13	21	0.1
396	GONDIA	TIRORA	PARASWADA	GSDA	79.97 1138	21.51 3115	7.9	1440	936	330							200	21	17	0.3
397	GONDIA	TIRORA	PATILTOLA	GSDA	79.81 4277	21.36 1748	7.8	2582	1678	680							340	31	31	0.1
398	GONDIA	TIRORA	PINDKEPAR	GSDA	80.00 1221	21.35 2141	8.2	1535	998	470							240	21	16	0.6
399	GONDIA	TIRORA	PIPARIYA	GSDA	79.93 1002	21.53 7357	6.9	522	339	180							70	8	10	0.3
400	GONDIA	TIRORA	PUJARITOLA	GSDA	79.92 3125	21.45 1304	7.3	811	527	230							110	18	15	0.7
401	GONDIA	TIRORA	RUSTAMPUR	GSDA	80.02 2256	21.37 2672	7.6	3406	2214	600							640	13	16	0.3
402	GONDIA	TIRORA	SARANDI	GSDA	79.87 8572	21.36 8918	7.8	2006	1304	590							390	6	3	0.3
403	GONDIA	TIRORA	SARRA	GSDA	79.91 9637	21.30 483	6.8	2583	1679	870							480	16	14	0.2
404	GONDIA	TIRORA	SATONA	GSDA	79.91 7823	21.33 6158	8.4	732	476	320							140	8	11	0.8
405	GONDIA	TIRORA	SEJGAON	GSDA	80.02 6212	21.48 1536	7.5	1668	1084	410							290	26	17	0.1

S.no	DISTRICT_NAME	TAHSIL_NAME	SITE_NAME	DATA_SOURCE	LONGITUDE	LATITUDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F
406	GONDIA	TIRORA	SELOTPAR	GSDA	79.840198	21.315105	8.1	1740	1131	540							370	23	6	0.2
407	GONDIA	TIRORA	SILLI	GSDA	79.882507	21.31808	7.8	2392	1555	650							350	4	16	0.1
408	GONDIA	TIRORA	SITEPAR	GSDA	79.846989	21.268228	7.9	1065	692	360							230	8	23	0.1
409	GONDIA	TIRORA	SONEGAON	GSDA	79.997955	21.481919	6.9	586	381	180							90	6	9	0.2
410	GONDIA	TIRORA	SONEKHARI	GSDA	79.843541	21.285795	7.5	1128	733	370							240	11	20	0.2
411	GONDIA	TIRORA	SONOLI	GSDA	79.859782	21.391887	8.2	583	379	170							70	7	14	0.2
412	GONDIA	TIRORA	SUKADI	GSDA	79.97792	21.355489	6.8	791	514	320							170	25	19	0.5
413	GONDIA	TIRORA	THANEGAON	GSDA	79.963105	21.364382	6.9	2132	1386	750							480	10	18	0.8
414	GONDIA	TIRORA	UMARI	GSDA	79.884696	21.384773	8.1	977	635	320							220	6	8	0.7
415	GONDIA	TIRORA	VIHIRGAON	GSDA	79.904667	21.369787	8.3	1509	981	410							340	17	20	0.5
416	GONDIA	TIRORA	WADEGAON	GSDA	79.934638	21.326209	6.9	917	596	280							140	6	26	0.8

S.no	DISTRIC T_NAME	TAHSIL _NAME	SITE_NA ME	DATA_ SOURC E	LONG ITUDE	LATIT UDE	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO 3	Cl	SO4	NO3	F
417	GONDIA	TIRORA	YEDAMAK OT	GSDA	79.84 7196	21.34 7557	8.3	2123	1380	740							350	9	6	0.3



**Annexure VI: Chemical analysis of ground water samples, deeper aquifers.**

S.no	District	Taluka	Village	Well Type	Long	Lat	pH	EC	TD S	TH	Ca	Mg	Na	K	CO <sub>3</sub>	HCO <sub>3</sub>	Cl	SO <sub>4</sub>	NO <sub>3</sub>	F	DATA_SOURCE
1	Gondia	Deori	Bharregaon	Bw	80.3971	21.0636	8.2	482	313	160							90.0	0.7	13	0.2	Gsda
2	Gondia	Deori	Chichgad	Bw	80.3538	20.8864	7.5	482	313	160							70.0	0.8	16	1.0	Gsda
3	Gondia	Deori	Dawaki	Bw	80.3878	21.1022	7.9	635	413	200							100.0	3.0	21	0.2	Gsda
4	Gondia	Deori	Dewatola	Bw	80.3638	21.2370	7.3	457	297	150							90.0	0.3	39	0.2	Gsda
5	Gondia	Deori	Gotabodi	Bw	80.3555	21.1007	7.7	1405	913	410							260.0	19.0	17	0.6	Gsda
6	Gondia	Deori	Jethabhawda	Bw	80.3431	20.9853	7.8	537	349	170							110.0	0.7	11	0.1	Gsda
7	Gondia	Deori	Kadikasa	Bw	80.4377	20.8681	7.9	706	459	220							130.0	7.0	16	0.2	Gsda
8	Gondia	Deori	Kanhargaon	Bw	80.3240	21.0208	7.7	755	491	260							140.0	5.0	34	0.3	Gsda
9	Gondia	Deori	Kokodi	Bw	80.5408	20.8970	7.2	755	491	260							130.0	3.0	23	0.4	Gsda
10	Gondia	Deori	Maramjob	Bw	80.3126	21.0678	8.0	634	412	200							90.0	3.0	21	0.2	Gsda
11	Gondia	Deori	Masulkasa	Bw	80.2848	21.0273	7.7	480	312	180							90.0	0.3	17	0.2	Gsda
12	Gondia	Deori	Mehatakhedda	Bw	80.4811	20.9073	7.9	714	464	230							150.0	3.0	44	0.2	Gsda
13	Gondia	Deori	Mohandi	Bw	80.3726	20.8806	7.9	757	492	260							130.0	3.0	16	0.5	Gsda
14	Gondia	Deori	Murdoli	Bw	80.3286	21.0850	8.1	491	319	160							90.0	0.7	29	0.3	Gsda
15	Gondia	Deori	Murpar	Bw	80.4310	21.1888	7.3	488	317	190							70.0	0.4	29	0.3	Gsda

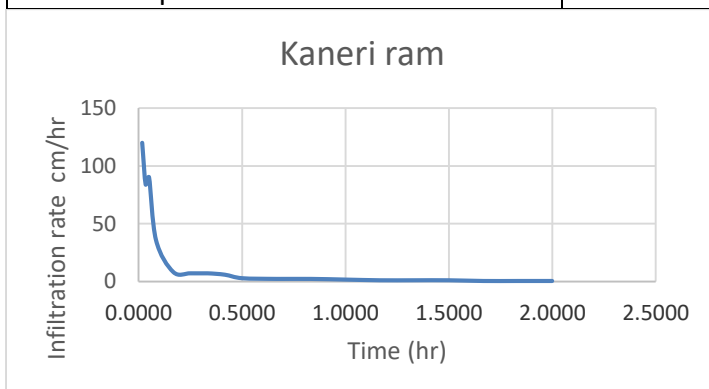
S.no	District	Taluka	Village	Well Type	Long	Lat	pH	EC	TD S	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	DATA_SOURCE
16	Gondia	Deori	Palangaon	Bw	80.4063	20.9624	7.9	765	497	260							140.0	1.0	16	0.3	Gsda
17	Gondia	Deori	Pandharpur	Bw	80.3987	21.1997	7.9	1217	791	390							230.0	0.7	24	0.9	Gsda
18	Gondia	Deori	Pandharwani	Bw	80.3412	21.0185	8.3	720	468	230							130.0	0.3	17	0.1	Gsda
19	Gondia	Deori	Rajamdongari	Bw	80.3986	21.0423	8.0	755	491	270							150.0	3.0	21	0.2	Gsda
20	Gondia	Deori	Salegaon	Bw	80.3443	21.1540	8.2	602	391	170							80.0	1.0	12	0.1	Gsda
21	Gondia	Deori	Serpar	Bw	80.3082	21.0137	7.2	1028	668	310							180.0	3.0	23	0.7	Gsda
22	Gondia	Deori	Surtoli	Bw	80.3723	21.1762	8.1	448	291	160							80.0	0.3	11	0.2	Gsda
23	Gondia	Deori	Takabedar	Bw	80.3413	21.1308	7.9	620	403	190							100.0	1.0	42	0.2	Gsda
24	Gondia	Deori	Uchepur	Bw	80.5392	20.8728	7.8	465	302	160							90.0	3.0	23	0.4	Gsda
25	Gondia	Gondia	Jabbartola	Bw	80.1761	21.5012	7.2	940	611	310							140.0	8.0	11	0.2	Gsda
26	Gondia	Gondia	Temni	Bw	80.2346	21.4739	8.1	631	410	210							80.0	4.0	3	0.8	Gsda
27	Gondia	Sadak arjuni	Kaneriram	Ew	80.0287	21.0296	6.79	537	344	240	64	19	19	13	0	165	57	28	65	0.28	cgwb
28	Gondia	Amgaon	Anjora	Ew	80.4047	21.0324	8.07	720	461	165	36	18	93	2	0	226	96	72	0	3.07	cgwb
29	Gondia	Amgaon	Bhosa	Ew	80.3500	21.4792	7.6	440	220	170	40.0	17.0	23.0	0.1		244.0	14.0		2		Cgwb
30	Gondia	Amgaon	Jamkhairi	Ew	80.3583	21.3458	7.3	200	100	75	18.0	7.0	9.4	2.0		104.0	7.0		1		Cgwb
31	Gondia	Deori	Chichgarh	Ew	80.3767	20.8933	8.6	370	190	80	20.0	7.0	47.0	2.0	12.0	177.0	14.0				Cgwb

S.no	District	Taluka	Village	Well Type	Long	Lat	pH	EC	TD S	TH	Ca	Mg	Na	K	CO 3	HCO 3	Cl	SO 4	NO 3	F	DATA_SOURCE
32	Gondiya	Deori	Chichgarh	Ow	80.3767	20.8933	8.1	480	235	145	34.0	15.0	42.0	4.0		268.0	14.0				Cgwb
33	Gondiya	Deori	Hardoli	Ew	80.3967	21.2189	8.1	450	220	190	40.0	22.0	12.0	2.0		226.0	21.0	5.0	1		Cgwb
34	Gondiya	Deori	Hardoli	Ow	80.3967	21.2189	8.0	480	235	210	46.0	23.0	13.0	1.0		268.0	11.0		3		Cgwb
35	Gondiya	Gondiya	Kudwa	Ew	80.1861	21.4750	8.9	300	155	95	22.0	10.0	23.0	4.0	36.0	73.0	21.0				Cgwb
36	Gondiya	Gondiya	Rajegaon	Ew	80.2372	21.5583	8.0	390	210	150	32.0	17.0	20.0	6.0		122.0	60.0	10.0	2		Cgwb
37	Gondiya	Goregaon	Akotola	Ew	80.2708	21.2708	8.2	420	210	145	34.0	14.0	25.0	6.0		232.0	11.0	5.0			Cgwb
38	Gondiya	Goregaon	Kaulewara	Ew	80.1500	21.3931	8.6	260	130	115	30.0	10.0	7.0	2.0	18.0	110.0	7.0				Cgwb
39	Gondiya	Sadak-Arjuni	Kosamthondi	Ew	80.0792	21.2083	8.0	550	260	235	36.0	35.0	14.0	6.0		274.0	32.0				Cgwb
40	Gondiya	Sadak-Arjuni	Kosamthondi	Ow	80.0792	21.2083	7.7	380	180	160	36.0	17.0	10.0	3.0		201.0	11.4				Cgwb
41	Gondiya	Sadak-Arjuni	Sadak Arjuni	Ew	80.1567	21.0958	8.3	440	220	200	40.0	24.0	9.0	3.0		165.0	60.0		2		Cgwb
42	Gondiya	Salekasa	Kawarabandh	Ew	80.4500	21.3597	8.2	480	245	165	44.0	13.0	35.0	4.0		281.0	7.0				Cgwb
43	Gondiya	Tirora	Dawaniwara	Ew	80.0528	21.5042	7.8	300		60	18.0	4.0				128.0	21.0				Cgwb
44	Gondiya	Tirora	Dawaniwara	Ow	80.0528	21.5042	7.8	280		65	20.0	4.0				128.0	21.0				Cgwb
45	Gondiya	Tirora	Nawejhari	Ew	79.8528	21.2833	8.4	530	270	105	14.0	17.0	69.0	7.0	18.0	226.0	32.0				Cgwb

## Annexure VII: Soil Infiltration test data

### Soil infiltration test data-1

Date	08-01-2022
Unique ID no.	G-1
Village	Kaneri Ram
Taluka	Sadak Arjuni
District	Gondia
Coordinates	21.02931, 80.112036
Elevation/RL (mamsl)	264
Initial water level	29
Geology	GraniteGneisses
Soil Type	Clayey loam
Final Infiltration Rate	0.6
Total Precipitation	10.95

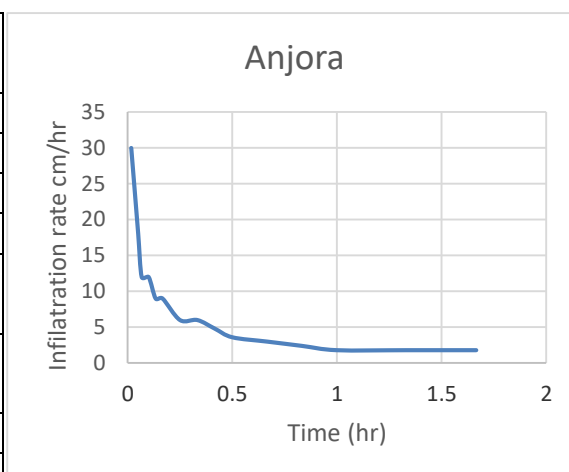


S.no	Duration (min)	Cum Time (min)	Water level Depth (cm)	Infiltrated water depth (cm)	Infiltration rate (cm/hr)
1	1.00	1	27.00	2.00	120
2	1.00	2	27.60	1.40	84
3	1.00	3	27.50	1.50	90
4	2.00	5	27.80	1.20	36
5	5.00	10	28.30	0.70	8.4
6	5.00	15	28.40	0.60	7.2
7	5.00	20	28.40	0.60	7.2
8	5.00	25	28.50	0.50	6
9	10.00	30	28.50	0.50	3
10	10.00	40	28.60	0.40	2.4
11	10.00	50	28.60	0.40	2.4
12	10.00	60	28.70	0.30	1.8
13	10.00	70	28.80	0.20	1.2
14	10.00	80	28.80	0.20	1.2
15	10.00	90	28.85	0.15	0.9
16	10.00	100	28.90	0.10	0.6
17	10.00	110	28.90	0.10	0.6

18	10.00	120	28.90	0.10	0.6
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### Soil infiltration test data-2

Date	07-02-2022
Unique ID no.	G/2
Village	Anjora
Taluka	Amgaon
District	Gondia
Coordinates	21.299127, 80.404729
Elevation/RL (mamsl)	322
Initial water level	18
Geology	Granite Gneisses
Soil Type	Gravelly clay loam
Final Infiltration Rate	1.8
Total Precipitation	6.5



S.NO	Duration (min)	Cum Time (min)	Water level Depth (cm)	Infiltrated water depth (cm)	Infiltration rate (cm/hr)
1	1.00	1	17.50	0.50	30
2	1.00	2	17.60	0.40	24
3	1.00	3	17.70	0.30	18
4	1.00	4	17.80	0.20	12
5	2.00	6	17.60	0.40	12
6	2.00	8	17.70	0.30	9
7	2.00	10	17.70	0.30	9
8	5.00	15	17.50	0.50	6
9	5.00	20	17.50	0.50	6
10	5.00	25	17.50	0.40	4.8
11	5.00	30	17.50	0.30	3.6
12	10.00	40	17.00	0.50	3
13	10.00	50	17.00	0.40	2.4
14	10.00	60	17.00	0.30	1.8
15	20.00	80	16.00	0.60	1.8
16	20.00	100	16.40	0.60	1.8

**Annexure VIII E: Location of proposed Percolation tanks in Gondia district**

S.NO	TALUKA	VILLAGE	Type	LONGITUDE	LATTITUDE
1	Amgaon	Makkitola	Percolation tank	80.316766	21.334181
2	Gondiya	Ghiwari	Percolation tank	80.192636	21.531073
3	Gondiya	Gondi Tola	Percolation tank	80.222531	21.557465
4	Gondiya	Katangi Kala (Ct)	Percolation tank	80.168721	21.491871
5	Gondiya	Lodhi Tola	Percolation tank	80.21312	21.54597
6	Gondiya	Mundipar	Percolation tank	80.138608	21.489668
7	Gondiya	Nawegaon	Percolation tank	80.183905	21.516819
8	Gondiya	Rajegaon	Percolation tank	80.249002	21.568988
9	Goregaon	Asalpani	Percolation tank	80.091949	21.330568
10	Goregaon	Babai	Percolation tank	80.23935	21.311085
11	Goregaon	Bagadbandh	Percolation tank	80.09518	21.372726
12	Goregaon	Bodunda	Percolation tank	80.082415	21.302764
13	Goregaon	Bodunda	Percolation tank	80.10922	21.31516
14	Goregaon	Borgaon	Percolation tank	80.134847	21.37734
15	Goregaon	Dawdipar	Percolation tank	80.246449	21.369817
16	Goregaon	Ghoti	Percolation tank	80.204141	21.326491
17	Goregaon	Hirapur	Percolation tank	80.113307	21.29089
18	Goregaon	Hirapur	Percolation tank	80.09944	21.293367
19	Goregaon	Nawargaon	Percolation tank	80.11131	21.364032
20	Goregaon	Nonitola	Percolation tank	80.272245	21.333643
21	Goregaon	Pindakepar	Percolation tank	80.165937	21.285655
22	Goregaon	Ramatola	Percolation tank	80.135003	21.286212
23	Goregaon	Ramatola	Percolation tank	80.144563	21.2881
24	Goregaon	Sonegaon	Percolation tank	80.119192	21.391348
25	Goregaon	Sukhapur	Percolation tank	80.133498	21.356085

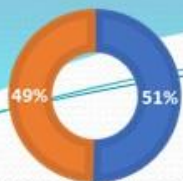
**Annexure IX: Location of proposed Check dams in Gondia district.**

S.No	DISTRICT	TALUKA	VILLAGE	Type	LONGITUDE	LATTITUDE
1	Gondiya	Amgaon	Makkitola	Check dam	80.30644	21.328416
2	Gondiya	Amgaon	Makkitola	Check dam	80.3047	21.336134
3	Gondiya	Amgaon	Surkuda	Check dam	80.30043	21.341584
4	Gondiya	Gondiya	Chandanitola	Check dam	80.19965	21.509672
5	Gondiya	Gondiya	Chargaon	Check dam	80.23994	21.553563
6	Gondiya	Gondiya	Chutiya	Check dam	80.14198	21.450925
7	Gondiya	Gondiya	Dhakni	Check dam	80.15226	21.470109
8	Gondiya	Gondiya	Ghiwari	Check dam	80.19878	21.543792
9	Gondiya	Gondiya	Halbi Tola	Check dam	80.20728	21.519848
10	Gondiya	Gondiya	Jabbar Tola	Check dam	80.18353	21.502596
11	Gondiya	Gondiya	Katang Tola	Check dam	80.19096	21.503304
12	Gondiya	Gondiya	Kudwa (Ct)	Check dam	80.1719	21.48407
13	Gondiya	Gondiya	Kudwa (Ct)	Check dam	80.1765	21.48904
14	Gondiya	Gondiya	Lodhi Tola	Check dam	80.21009	21.535586
15	Gondiya	Gondiya	Murpar	Check dam	80.23046	21.552264
16	Gondiya	Gondiya	Rajegaon	Check dam	80.23265	21.560223
17	Gondiya	Gondiya	Rajegaon	Check dam	80.24302	21.560664
18	Gondiya	Gondiya	Rawanwadi	Check dam	80.22334	21.534501
19	Gondiya	Gondiya	Rawanwadi	Check dam	80.23563	21.541432
20	Gondiya	Gondiya	Sawari	Check dam	80.21393	21.515095
21	Gondiya	Gondiya	Sawari	Check dam	80.22198	21.523579
22	Gondiya	Gondiya	Tanda	Check dam	80.26055	21.379386
23	Gondiya	Gondiya	Tanda	Check dam	80.25762	21.389757
24	Gondiya	Goregaon	Asalpani	Check dam	80.08327	21.316482
25	Gondiya	Goregaon	Asalpani	Check dam	80.08284	21.328281
26	Gondiya	Goregaon	Babai	Check dam	80.25696	21.315865
27	Gondiya	Goregaon	Bagadbandh	Check dam	80.10709	21.349749
28	Gondiya	Goregaon	Bagadbandh	Check dam	80.0957	21.35311
29	Gondiya	Goregaon	Bagadbandh	Check dam	80.10416	21.360119
30	Gondiya	Goregaon	Bagadbandh	Check dam	80.09209	21.363912
31	Gondiya	Goregaon	Bagadbandh	Check dam	80.0884	21.370293
32	Gondiya	Goregaon	Bagholi	Check dam	80.14021	21.364529
33	Gondiya	Goregaon	Bodunda	Check dam	80.07686	21.298908
34	Gondiya	Goregaon	Bodunda	Check dam	80.07812	21.305835
35	Gondiya	Goregaon	Bodunda	Check dam	80.10669	21.307646
36	Gondiya	Goregaon	Bodunda	Check dam	80.08089	21.309786
37	Gondiya	Goregaon	Bodunda	Check dam	80.1	21.31008
38	Gondiya	Goregaon	Bodunda	Check dam	80.09065	21.314667
39	Gondiya	Goregaon	Chichgaontola	Check dam	80.16346	21.380533
40	Gondiya	Goregaon	Chilhati	Check dam	80.27214	21.321689
41	Gondiya	Goregaon	Dawdipar	Check dam	80.25748	21.361546
42	Gondiya	Goregaon	Dawdipar	Check dam	80.25724	21.371447
43	Gondiya	Goregaon	Dongarutola	Check dam	80.15014	21.377615

S.No	DISTRICT	TALUKA	VILLAGE	Type	LONGITUDE	LATTITUDE
44	Gondiya	Goregaon	Garada	Check dam	80.18416	21.294251
45	Gondiya	Goregaon	Ghoti	Check dam	80.19185	21.318536
46	Gondiya	Goregaon	Girola	Check dam	80.0909	21.382671
47	Gondiya	Goregaon	Girola	Check dam	80.09755	21.389291
48	Gondiya	Goregaon	Girola	Check dam	80.0886	21.391134
49	Gondiya	Goregaon	Girola	Check dam	80.10326	21.393401
50	Gondiya	Goregaon	Goregaon	Check dam	80.19554	21.33384
51	Gondiya	Goregaon	Hirapur	Check dam	80.11792	21.296286
52	Gondiya	Goregaon	Hirapur	Check dam	80.10561	21.298821
53	Gondiya	Goregaon	Hirapur	Check dam	80.11272	21.305854
54	Gondiya	Goregaon	Malpuri	Check dam	80.12286	21.295987
55	Gondiya	Goregaon	Malpuri	Check dam	80.13369	21.29832
56	Gondiya	Goregaon	Nawargaon	Check dam	80.12377	21.362928
57	Gondiya	Goregaon	Nawargaon	Check dam	80.12441	21.372601
58	Gondiya	Goregaon	Nawargaon	Check dam	80.10113	21.377016
59	Gondiya	Goregaon	Nonitola	Check dam	80.28197	21.329507
60	Gondiya	Goregaon	Nonitola	Check dam	80.28322	21.335589
61	Gondiya	Goregaon	Pindakepar	Check dam	80.16567	21.291007
62	Gondiya	Goregaon	Pindakepar	Check dam	80.16305	21.294634
63	Gondiya	Goregaon	Pindakepar	Check dam	80.15347	21.298597
64	Gondiya	Goregaon	Ramatola	Check dam	80.13535	21.291763
65	Gondiya	Goregaon	Ramatola	Check dam	80.14802	21.295957
66	Gondiya	Goregaon	Silegaon	Check dam	80.17114	21.360392
67	Gondiya	Goregaon	Sonegaon	Check dam	80.10188	21.381214
68	Gondiya	Goregaon	Sonegaon	Check dam	80.10265	21.385622
69	Gondiya	Goregaon	Sonegaon	Check dam	80.10814	21.390156
70	Gondiya	Goregaon	Soni	Check dam	80.27813	21.349581
71	Gondiya	Goregaon	Timezari	Check dam	80.1155	21.332124
72	Gondiya	Goregaon	Timezari	Check dam	80.10379	21.342228



# PROPOSED MANAGEMENT PLAN



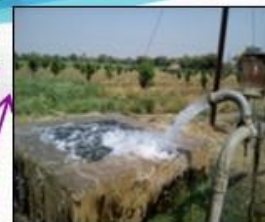
■ GW Augmentation by WC and AR ■ WUE



Aquifer I Resources –  
Dy- 625.49 MCM

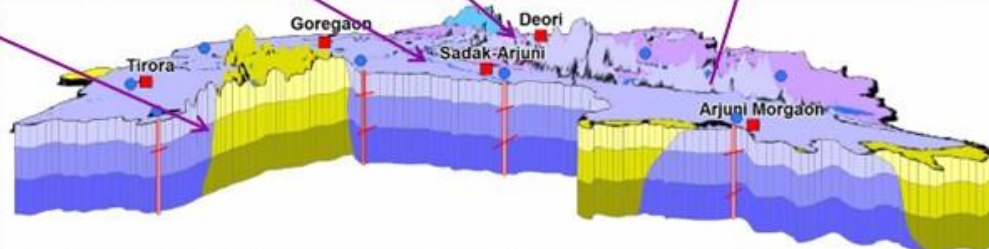


Total Draft –  
163.61 MCM



## GW SCENARIO AFTER IMPLEMENTING

- A. Artificial Recharge  
GWA 621.54 + 5.35 MCM by AR = 630. MCM
- B. WUE- 5.24 MCM



## GW AVAILABLE FOR DEVELOPMENT PLAN

After SOD of 70% = 283.23 MCM

## PROBABLE BENEFITS AFTER IMPLEMENTING AR & WUE

### MEASURES

- Additional GW Resources by Supply side AR = 5.35 MCM
- Water saving through adopting (Micro Irrigation) = 5.24 MCM
- Balance GWR available for Development after SOD 70% – 283.2 MCM
- Assured GW Irrigation in ADDITIONAL 435.74 sq km area
- Even after above, SOD will be 70% (safe category)
- Increase in SOE from 28.20% to 70% can trigger socio-economic development in the Region

