केंद्रीय 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

AURANGABAD DISTRICT, MAHARASHTRA

मध्य क्षेत्र, नागपुर

Central Region, Nagpur

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

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AURANGABAD DISTRICT AT A GLANCE

1. GENERAL INFORMATION			
	Geographical Area	:	10,220 Sq. km.
	Administrative Divisions (2011)	:	Blocks-9; Aurangabad, Gangapur, Kannad, Khuldabad, Paithan, Phulambri, Sillod, Soygaon and Vaijapur
	Villages (Census 2011)	:	1356 Nos.
	Population	:	37,01,282
	Rainfall 2017	:	576.3 mm
	Normal rainfall (1998-2017)	:	734.1 mm
	Long term rainfall Trend (1998-2017)	:	Falling trend 4.47 mm/year
2. GEOMORPHOLOGY AND DRAINAGE			
	Major Physiographic unit	:	• Ajanta hill ranges • Satmala hill ranges • Godavari plains
	Major Drainage	:	Godavari and Purna
3. LAND USE (2012-13) (sources: mahasdb.maharashtra.gov.in/district Report)			
	Forest Area	:	814.15 Sq. km. (8.07 %)
	Cultivable Area	:	7592.77 Sq. km. (75.34 %)
	Net Area Sown	:	7210.50 Sq. km. (71.55 %)
	Area Sown more than Once		1387.93 Sq. km. (13.77%)
4.	**SOIL TYPE**	:	75% area of the district is covered by clayey soil and clay loam soil
5. PRINCIPAL CROPS (2017)			
	Cereals	:	3491.41 sq. km.
	Pulses	:	1532.90 sq. km.
	Cotton	:	3806.80 sq. km.
	Oil Seeds	:	312.68 sq. km.
	Sugarcane	:	213.25 sq. km.
6.	**HORTICULTURAL CROPS**		
	Citrus fruit	:	181.89 sq. km.
	Mango	:	30.10 sq. km.
	Banana	:	6.70 sq. km.
	Others	:	52.03 sq. km.
7. IRRIGATION BY DIFFERENT SOURCES (2013-14) - Nos. / Potential Created (ha)			
	Dug wells	:	16737/ 24447
	Tube wells/Bore wells	:	324 / 1092
	Other Minor Surface Sources	:	609 / 1764
	Net Irrigated Area	:	4851.22 sq. km.
8. GROUND WATER MONITORING WELLS (As on March 2018)			
	Dug wells	:	37
	Piezometers	:	02
9. GEOLOGY			
	Recent	:	Alluvium (River Alluvium)
	Late Cretaceous-Eocene	:	Deccan Traps Basalt
10. HYDROGEOLOGY			
	Water Bearing Formation	:	Alluvium- Sand and Gravel

			Under phreatic to semi-confined conditions	
			Deccan Traps: Basalt weathered, amygdaloidal, fractured and jointed. Under phreatic, semi-confined to confined conditions	
	Depth to water level in Shallow Aquifer			
	Pre-monsoon Depth to Water Level (May-2017)	:	4.4 to 27.10 mbgl	
	Post-monsoon Depth to Water Level (Nov.-2017)	:	0.3 to 22.80 mbgl	
	Depth to water level in Deeper Aquifer			
	Pre- monsoon Depth to Water Level (May-2017)	:	5.20 to 111.30 mbgl	
	Post-monsoon Depth to Water Level (Nov.-2017)	:	0.8 to 55 mbgl	
	Water level Trend (2008-17)			
	Pre- monsoon Water Level Trend (2008-2017)	:	Rise: 0.0012 to 0.418 m/year	
			Fall: 0.00022 to 0.7724 m/year	
	Post-monsoon Water Level Trend (2008-2017)	:	Rise: 0.0095 to 0.3713 m/year	
			Fall: 0.0001 to 0.8651 m/year	
11. GROUND WATER EXPLORATION (As on March 2018)				
			Alluvium	**Basalt**
	Wells Drilled	:	EW-07, OW-03, **Total -10**	EW-79, OW-11, **Total -90**
	Depth Range	:	16.25 to 28.50 mbgl	26.00 to 200.00 mbgl
	Discharge	:	0.01 to 7 lps	Traces to 25.50 lps
	Drawdown	:	2.63 to 8.69	0.80 to 72.10 m
	Transmissivity	:	52 to 757 m^2/day	< 80 m^2/day
	Storativity	:	1.7 x 10^{-3} to 4.5 x 10^{-6}	8.43 x 10^{-4} to 4.31x10^{-5}
12. GROUND WATER QUALITY				
	The potability is affected due to high concentration of Nitrate, TDS and TH at many places and at few places; both shallow and deeper aquifers are affected by high Fluoride concentration. The quality of ground water is generally alkaline and suitable for drinking and irrigation purposes.			
	Type of Water	:	Ca-Cl and Ca-HCO_3	
13. DYNAMIC GROUND WATER RESOURCES- (2013)				
	Net Annual Ground Water Availability	:	1062.19 MCM	
	Total Draft (Irrigation + Domestic+ Industrial)	:	806.45 MCM	
	Projected Demand (Domestic + Industrial)	:	64.26 MCM	
	Stage of Ground Water Development	:	75.92 %	
	Category		**Safe**	
14.	**MAJOR GROUND WATER PROBLEMS AND ISSUES** • Declining water level trend of more than 0.2 m/year has been observed particularly in southern, south western and central parts, occupying major parts of Vaijapur, Gangapur, Khuldabad, Aurangabad, Paithan, Phulambri and Sillod blocks and in isolated part in Soygaon block.			

	• Deeper water levels of more than 20 mbgl are observed in 405 sq km area of the district. • The ground water quality is adversely affected at many places due to high concentration of Nitrate and at few places; both shallow and deeper aquifers are affected by high Fluoride concentration. • About 75% area of the district is having low yield potential (<1 lps) • Southern part of the district covering Vaijapur, Gangapur and Paithan blocks fall under western drought prone area characterized by low and unpredictable rainfall of 500 to 700 mm/year. • In all the blocks of Aurangabad district increase in number of irrigation wells and stage of ground water development is observed over the period of time from 2004 to 2013 implying rising Irrigation draft.		
15.	**Aquifer Management Plan**		
	Supply side Management	:	Proposed AR structures: 400 Percolation tanks and 1063 Check dams
	Demand side Management	:	87.85 sq. km. area proposed for Drip irrigation
	Expected Benefits	:	• Stage of Ground water development will get reduced from 75.92 to 70% • 81.22 sq. km. area comes under Assured Ground Water Irrigation.

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

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

1. 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 Government. 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 groundwater management concept**".

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

Aurangabad district is a regional head quarter of the Marathwada Region in Maharashtra State. It is situated in the north central part of Maharashtra between North Latitude 19° 15' and 20° 40', and East Longitude 74° 37' and 75° 52'. The total area of the district is 10,220 sq. km. and falls in parts of survey of India degree sheets 46 L & P and 47 I & M. The district is demarcated by Godavari River in the south and Ajanta hill ranges in the north. The district is bounded by Jalgaon district in north, Nashik district in west, Ahmednagar and Beed districts in south and Jalna and Buldhana districts in east. The world-famous Ajanta and Ellora caves are situated in Aurangabad district. There are also few caves near Aurangabad City and other monuments of national fame are Bibi-ka-Maqbara and Daulatabad fort.

The district headquarters is located at Aurangabad Town. For administrative convenience, the district is divided into 9 blocks viz., Aurangabad, Gangapur, Kannad, Khuldabad, Phulambri, Soygaon, Sillod, Vaijapur and Paithan. It has a total population of 37,

01,282 as per 2011 Census. The district has 9 towns/blocks and 1356 villages. The major part of the district comes under Godavari basin and a small area of the district in the north and northwest covering Soygaon and part of Vaijapur blocks falls in Tapi basin. Godavari, Shivana and Purna are the main rivers flowing through the district. Purna and Shivana are main tributaries of Godavari River. The district is categorized as safe as per Ground Water Resources Estimation 2013. The Index map and Administrative of the Aurangabad district is presented in **Fig. 1.1 and Fig. 1.2** respectively.

Aurangabad district has been taken up under NAQUIM study in two Phases and was covered during the years 2015-16 and 2017-18.

I. Soygaon and Sillod blocks (2025.83 sq. km.) in AAP 2015-16
II. Aurangabad, Kannad, Khuldabad, Phulambri, Gangapur, Vaijapur and Paithan (7715.50 sq. km.) in AAP 2017-18.

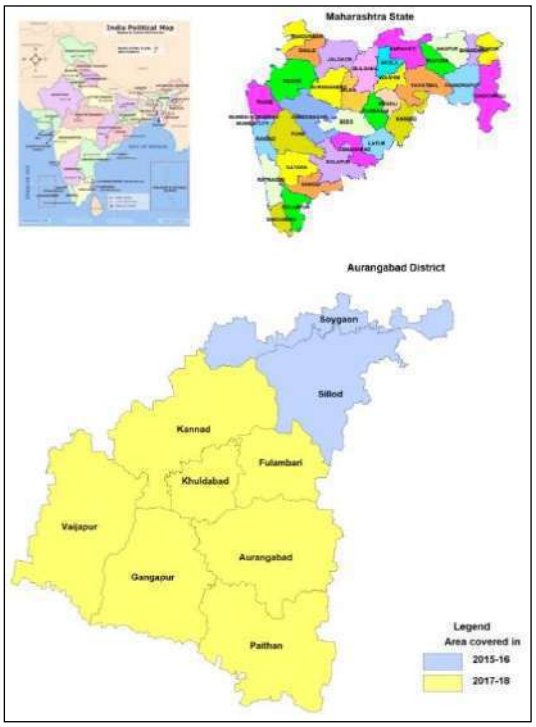


Figure 1. 1 : Index map

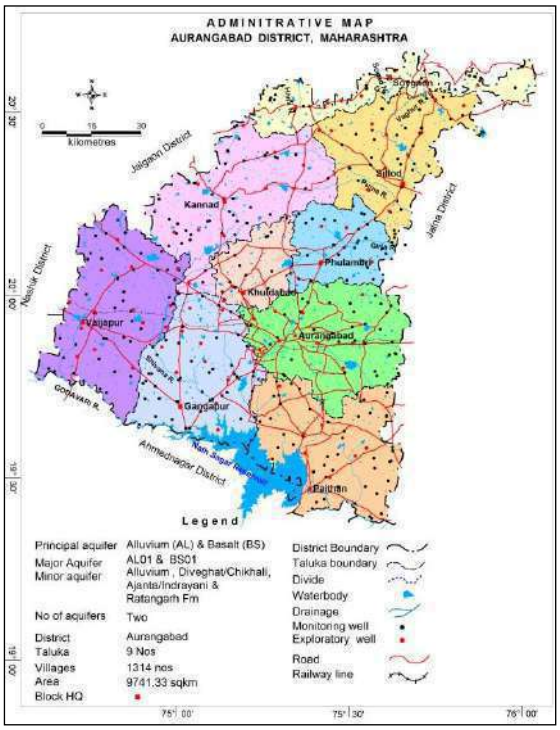


Figure 1. 2 : Administrative map

Ground water exploration in the district has been taken up in different phases since 1985-86. The ground water exploration has been carried out in alluvial and hard rock areas occupied by Deccan Trap Basalt. To establish the geometry, disposition and potential of aquifers, ground water exploration down to the depth of 200 mbgl has been taken up where the data gap exists and accordingly 22 exploratory wells and 4 observation wells have been constructed during the years 2015-16 and 2017-18. A total of 86 EWs and 14 OWs have been constructed till March 2018**.** Salient Features of Ground Water Exploration are given in **Annexure-I** and details of exploration under NAQUIM are given in **Annexure-II**.

To assess the ground water regime, 39 existing ground water monitoring stations were being monitored 4 times in a year. Based on data gap analysis additional 25 and 163 KOWs were inventoried during 2015-16 and 2017-18 respectively, to acquire micro level hydrogeological data to decipher the water level scenario, sub-surface lithological disposition and hydrogeological setup of shallow aquifer (Aquifer-I). The details of KOWs and GWM wells are given in **Annexure-III**. Locations of existing ground water monitoring stations and exploratory wells are shown in **Fig.1.3**.

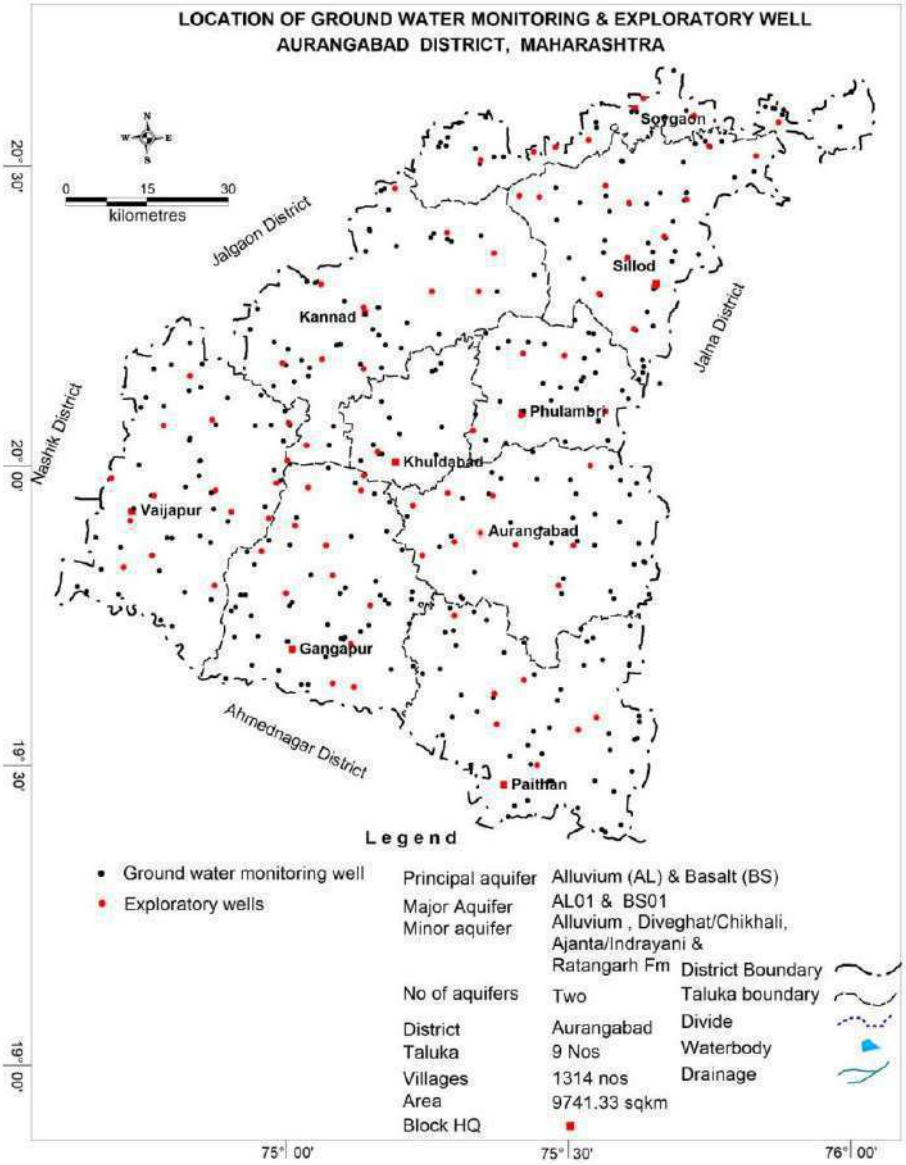


Figure 1. 3: Locations of Existing Exploratory and Ground Water Monitoring Wells

1.2 GEOMORPHOLOGY, DRAINAGE AND SOIL TYPES

The district can be broadly divided into three physiographic units namely, Ajanta hill ranges, Satmala hill ranges and Godavari Plains.

Geomorphologically, the district comprises varied topographic features and landscape consisting of high hills and plains and low-lying hills. Most of the hill ranges are located in the northern part of the district. The Satmala and Ajanta hills extend from east to west. The hills near Verul in Khuldabad block are part of these ranges which extend to Chouka hill range and Aurangabad hills. The Satmala range encompasses several hills overlooking the Tapi valley. From west to east they are Antur (826 m amsl), Satonda (552 m amsl), Abasgand (671 m amsl) and Ajantha (578 m amsl). The Satmala hill (493 m amsl) from which name of the range is derived is situated north of Kannad town.

The district forms a part of the Deccan Plateau. In general, slope of the district is towards south and southeast. The highest elevation is 958 m amsl west of Kannad in the central part and the lowest elevation is 464 m amsl east of Paithan in the eastern part. The average elevation of the district is in the order of 500 m amsl. Within it, there exists flat topped hill ranges extending over wide area and also hills separated by broad valleys.

Maximum area of district is covered with Slightly Dissected Plateaus (SDP-37% area of the district) and Plateau Weathered (PLWS-33% area of the district) with 1 to 2 m weathered thickness depending upon the extent of weathering and thickness of soil cover. The geomorphology of the area is shown in **Fig. 1.4**

Major part of the district falls in Godavari basin with a small area in north, northeastern and north western parts falling in Tapi Basin. The major river in the district is the Godavari with its tributaries namely; Purna, Dudhana and Shivana rivers. The other important tributaries of Godavari River are Sukhna, Khelna, Kham, Gulathi, Shivbhadra and Girija rivers. Hiwra, Sonand, Waghur are the tributaries of Tapi River. Depending on the drainage system, the district has been divided into 52 watersheds. The drainage pattern in the area is mainly sub-dendritic to dendritic.

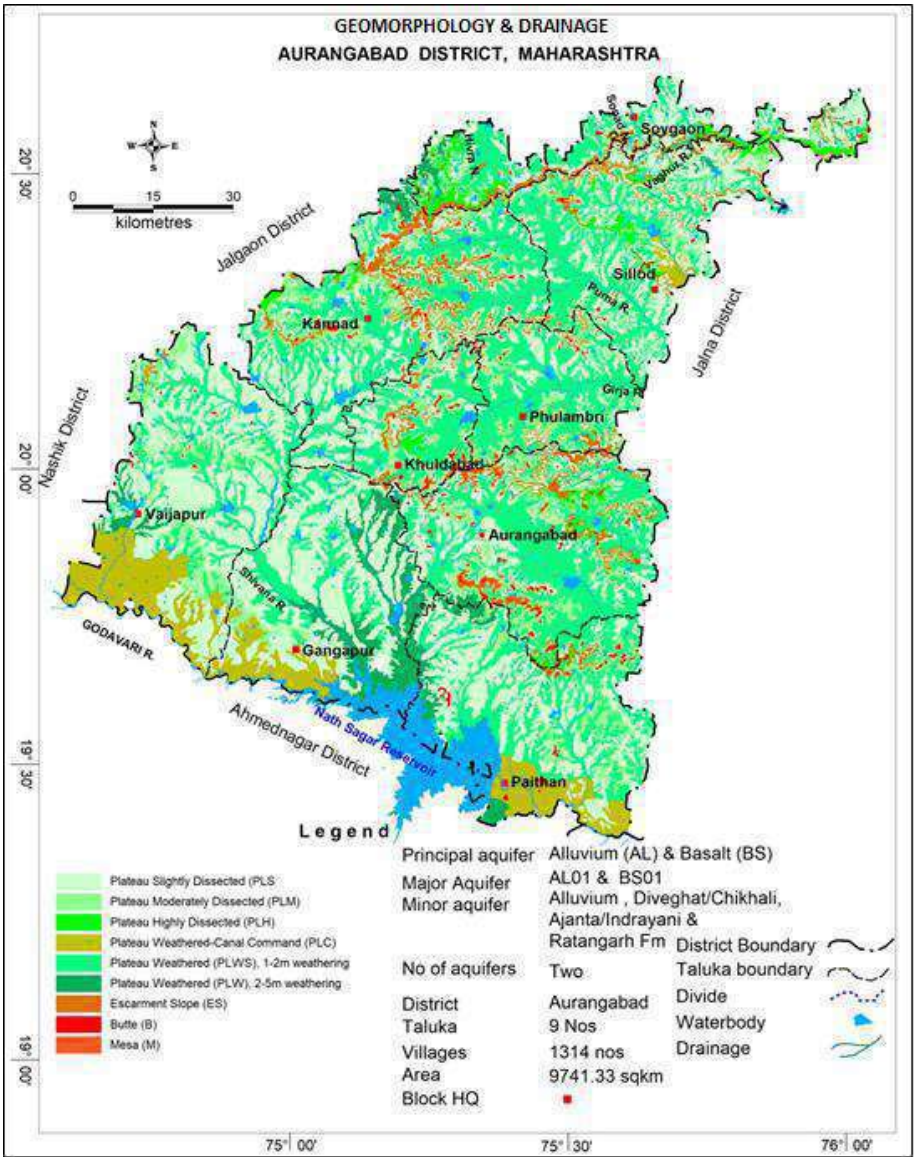


Figure 1. 4: Geomorphology and Drainage, Aurangabad District

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 major part of the district is covered by black cotton soil or 'Regur' formed by the weathering of Deccan Basalt. It is rich in plant nutrients such as lime, magnesia, iron and alkalies on which cotton and dry crops like Jowar, Bajra and Tur etc. may flourish. It swells and becomes sticky on watering while on drying it contracts and develops multiple cracks. The soil varies both in texture and thickness. In northern part of the district, soils are shallow and relatively poor while in southern part, it becomes deep (thick) and fairly rich in nutrients.

Based on the thematic map, It has been observed that the major part of the district is occupied by clayey soil and clay loam soil types. Nearly 75 % of the area is covered by Clayey soils; of which shallow to deep clayey soil, with 0 to >100 cm depth, cover 59 % area followed by clay loam soil covering 16 % area of the district. Remaining part of the district is covered by Gravelly clay loam, Gravelly sandy loam, Gravelly sandy clay loam soils. Depth of soil is more in the vicinity of main drainages and shallow away from river channels. The thematic map of soil distribution in the district is shown in **Fig. 1.5.**

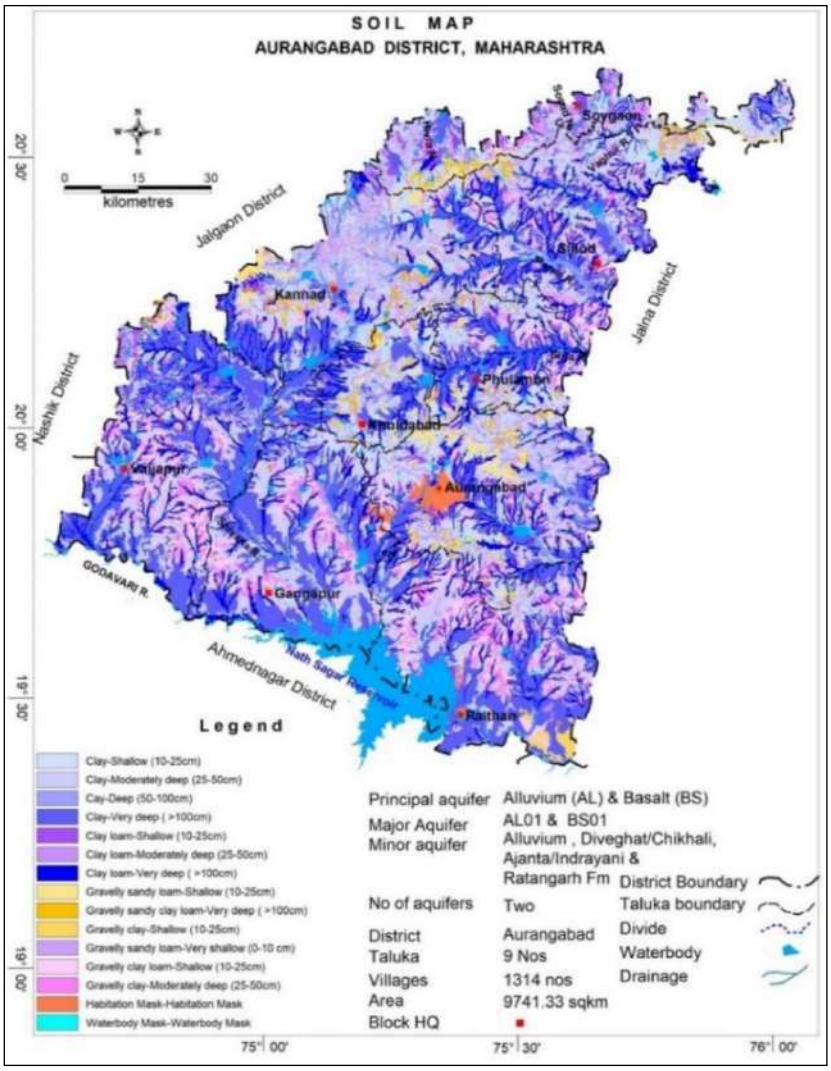


Figure 1. 5 : Soil, Aurangabad District

Soil Infiltration test: To estimate the actual rate of infiltration in various soil types and their impact on recharge to ground water in Aurangabad district, 10 soil infiltration tests were conducted at Ghaigaon, Taherpur, Kaigaon, Pategaon, Pathari, Bhadgi, Kannad, Naregaon, Chikalthana and Harsul 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 80 to 140 minutes and the final infiltration rate in the area ranged from 0.60 to 3.6 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 0.60 (Paithan and Khuldabad blocks) to 3.6 cm/hr (Aurangabad block).

Table 1. 1: Salient Features of Infiltration Tests

S.No.	Block	Location	Latitude	Longitude	Rate of infiltration (cm/hr)
1	Aurangabad	Naregaon	20°45'8.63"	76°08'59.63"	3.6
2	Aurangabad	Chikhalthana	19°52'44"	75°25'06"	1.8
3	Aurangabad	Harsul	19°56'35"	75°22'26"	2.4
4	Phulambri	Pathri	20°07’ 32.1”	75°28’ 52.3”	1.80
5	Khuldabad	Bhadgi	20°01’ 40.4”	75°14’ 28.9”	0.60
6	Kannad	Kannad	20°54'43.6"	75°57'11.7"	1.2
7	Paithan	Taherpur	19°39’ 3.8”	75°20’ 7.0”	0.60
8	Paithan	Pategaon	19°27’ 34.4”	75°23’ 59.8”	1.80
9	Vaijapur	Ghaigaon	19°53’ 54.3”	74°46’ 06.5”	1.92
10	Gangapur	Kaigaon	19°37’ 58.83”	75°01’ 45.24”	1.20

1.3 CLIMATE AND RAINFALL

The climate of the district is characterized by a hot summer 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 10.3°C. From the beginning of March, the daily temperature increases continuously. May is the hottest month with the mean maximum temperature of 39.8°C. Summer temperature will reach about 40 °C. With the onset of the south-west monsoon by the second week of June, the temperature falls appreciably.

As per Agro-climatic Zones, Aurangabad district falls under western drought prone area and Central plateau assured rainfall zone. Southern part of the district falls under Western drought prone area characterized by low and unpredictable rainfall of 500 to 700 mm/year with the number of rainy days varying between 40 to 45 days. Common dry spells last for 2 to 10 weeks. Delayed onset and early cessation of S-W monsoon is very common. Rest of the district falls in Central Plateau assured rainfall zone and is characterized by rainfall of 700 to 900 mm/year.

The normal rainfall of the district is 734.1 mm spread over 54 rainy days in normal conditions. Annual rainfall data of 1998-2017 is analysed and presented in **Fig. 1.6**. This indicates that maximum rainfall occurred in 1998 (932.2 mm) and minimum rainfall in 2012 (375.5 mm). The rainfall trend analysis shows a falling trend @ 4.47 mm/year. The rainfall analysis show that the departure of annual rainfall from the normal rainfall, expressed in terms of percentage, varied from -49 to 27 percent. The departure percent analysed denotes the rainfall variation pattern occurred during the period. The area experienced 2 times (10%) excess rainfall, 14 times (70%) normal rainfall and 4 times (20%) 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 23 % indicating that a range of ±23% of the mean

rainfall varying from 490.41 to 784.49 mm was received in the area during the period. Significantly, the analysis indicate that the 490.41 was minimum assured rainfall to have been received during the period, however exceptional years 1998, 2000 and 2012 falling out of this range were there in which the less or excess rainfall was received during the period in the area. The isohyet map of the district is depicted in **Fig. 1.7.**

The block wise annual rainfall data (1998-2017) of Aurangabad district is shown in **Table 1.3.** Based on rainfall data analysis it is observed that:

- Average Annual rainfall varies from 508.42 (Paithan block) to 708.59 mm (Soygaon block).
- The Normal annual rainfall in the district varies between 523 mm in Vaijapur block and 778.5 mm in Khuldabad block.

Table 1. 2: Long Term Rainfall Analysis (1998 to 2017) of Aurangabad District

PERIOD = 1998 to 2017						**No. of years = 20**		
YEAR	**ANNUAL**	**NORMAL**	**DEPARTURE**	**No of Rainy days**	**CATEGORY**	**NORMAL RAINFALL = 734.1 mm**		
1998	932.2	734.1	27	80	Excess	STANDARD DEVIATION = 144.52 mm		
1999	682.8	734.1	-7	57	Normal	COEFFICIENT OF VARIATION = 23%		
2000	435.1	734.1	-41	35	Moderate	MEAN=637.8		
2001	567.2	734.1	-23	50	Normal	MEDIAN=603.8		
2002	628.6	734.1	-14	48	Normal	SLOPE= -4.474 mm/Year		
2003	590.5	734.1	-20	58	Normal	INTERCEPT= 684.8 mm		
2004	625.7	734.1	-15	65	Normal	**EQUATION OF TREND LINE= -4.474 X +684.8**		
2005	533.9	734.1	-27	54	Moderate	**CATEGORY**	**NUMBER OF YEARS**	**% OF TOTAL YEARS**
2006	924	734.1	26	69	Excess	**DEPARTURES**		
2007	592.5	734.1	-19	53	Normal	POSITIVE	3	20
2008	652	734.1	-11	54	Normal	NEGATIVE	16	80
2009	691.9	734.1	-6	41	Normal	**DROUGHTS**		
2010	887.6	734.1	21	75	Normal	MODERATE	4	20
2011	589.2	734.1	-20	48	Normal	SEVERE	0	0
2012	375.5	734.1	-49	42	Moderate	ACUTE	0	0
2013	736.4	734.1	0	64	Normal	**NORMAL & EXCESS R/F**		
2014	527.3	734.1	-28	51	Moderate	NORMAL	14	70
2015	595.3	734.1	-19	47	Normal	EXCESS	2	10
2016	612.2	734.1	-17	50	Normal	**NOTE: Departure: EXCESS RAINFALL: > +25; NORMAL RAINFALL: +25 TO -25; MODERATE DROUGHT: -25 TO -50; SEVERE DROUGHT: -50 TO -75; ACUTE DROUGHT: < -75**		
2017	576.3	734.1	-21	50	Normal			

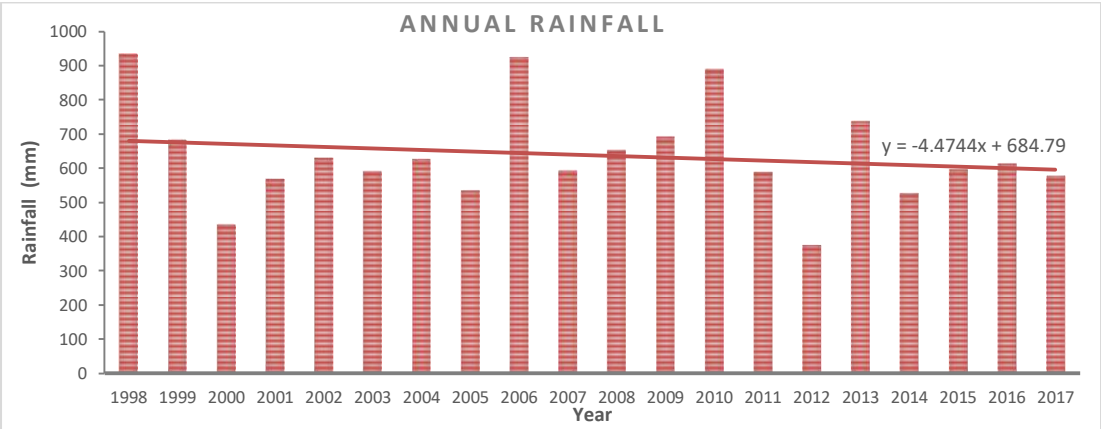


Figure 1. 6 : Annual Rainfall Pattern (1998-2017)

Table 1. 3: Block wise Annual rainfall data (2008-2017) (in mm)

Block	Normal RF	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average Rainfall (mm)
Aurangabad	737.6	746.6	731.7	802.9	668.8	406.6	724.7	526.6	716.8	735.9	663.3	**672.39**
Paithan	634.3	533.5	539.2	721.2	491.3	349	591.8	420.7	408.1	549.4	480	**508.42**
Gangapur	627.9	626.0	621.8	839.9	535.4	239	513.1	408.7	459.2	446.9	518.9	**520.89**
Vaijapur	523	614.7	635.6	868.5	523.6	388.6	500.6	414.8	457.3	569	638.6	**561.13**
Kannad	657.9	672.6	755.8	967.1	694.6	350.8	769	626.3	717.6	638.1	580.5	**677.24**
Khuldabad	778.5	841.4	670.1	1136.	580.5	371.8	594.6	470.4	614.1	585	593.3	**645.76**
Sillod	706.1	501.8	750.8	961.7	709.6	441.4	821.6	711.9	746	699.4	629.4	**697.36**
Soygaon	775.9	669.1	872.5	917.1	644	482.6	936.9	773.7	608.2	745.7	436.1	**708.59**
Phulambri	566.2	658.7	650.1	773.4	454.7	344.1	658.5	594.8	785.8	646.2	556.5	**612.28**
District Av.	**734.1**	**651.6**	**691.9**	**887.5**	**589.1**	**374.8**	**678.9**	**549.7**	**612.5**	**623.9**	**566.2**	

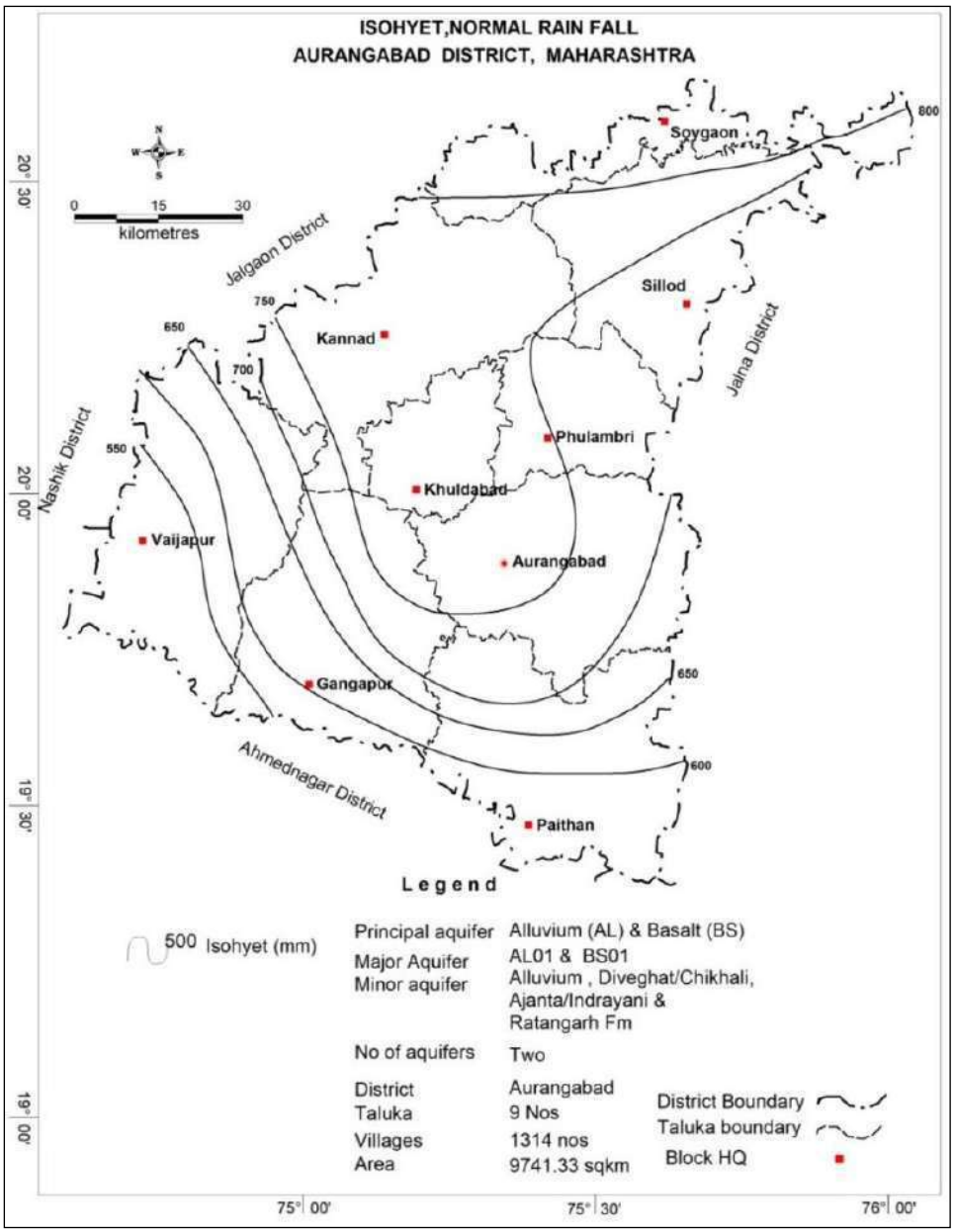


Figure 1. 7: Isohyet map of Aurangabad District

1.4 GEOLOGY

Geologically, Basalt formation (Deccan traps) is the major rock formation in the district. The major part of the district is underlain by a sequence of basaltic lava flows while alluvium occupies a small portion. The Deccan Trap has succession of flows in the elevation range and are normally horizontally disposed over a wide stretch and give rise to table-land type of topography also known as plateau. These flows occur in layered sequence ranging in thickness from few centimeters to tens of meters. Each individual flow is massive at the bottom and vesicular/amygdaloidal towards the top. The flows are separated from each other by marker horizon known as bole bed. The generalized geological sequence of the area is given in **Table 1.4** and the Geological Map of the district is depicted in **Fig.1.8.**

Table 1. 4: Generalized Geological sequence Aurangabad district

Geologic Period	Age in million years	Stratigraphic unit	Formation	Lithology	Nature and Characteristics
Sub-Recent to Recent	<1.64	River Alluvium	-	Sand, silt and clay	
		Deccan trap (Sahyadri Group)	Chikhli/Diveghat formation	Basalt hard, massive, vesicular, amygdaloidal varieties with inter-trappeans	Dark massive, fine grained compact rock, can be broken into blocks
			Ajanta/Indrayani formation		Dark, Massive, fine to medium grained, Prone to weathering effects
			Compound Pahoehoe Flow showing Megacryst character (one Flow)		Dark, Massive, fine to medium grained, Prone to weathering effects
			Upper Ratangarh formation		Dark, Massive, fine to medium grained, Prone to weathering effects
			Lower Ratangarh formation		

(GSI: DRM FIRST EDITION 1999)

ALLUVIUM:

Quaternary alluvium (<1.64 m.y.) occupies the Godavari valley with thickness varying from a few meters to 28 m. Alluvial deposits occur as narrow stretch along the course of major rivers underlain by the Deccan traps. The alluvium consists of clay, silt, sand and Gravel admixture and it is well exposed south of Vaijapur.

DECCAN TRAP BASALT:

Major part of the district is occupied by Deccan trap basaltic lava flows of Late Cretaceous to Eocene age. The Deccan Trap of Sahyadri group is divided into Lower Ratangarh, Upper Ratnagiri, Ajanta and Chikhli formations. Each individual lava flow consists of lower massive part becoming vesicular /amygdaloidal towards top, ranges in their individual thickness from a few centimeters to tens of meters. The vesicles are invariably found filled with secondary minerals. The flows have wide variation in color and texture especially when they are amygdaloidal in nature with secondary mineral infillings such as Zeolites, Calcite, and Agate and Chalcedony etc. The red /green/black bole beds constituting the marker horizons separating the two flows were discontinuous and generally inconsistent.

The Lower Ratangarh formation occurs in the western part of the district comprising of mainly pahoehoe flows. Upper Ratangarh formation occupies a large part of the district and comprises a sequence of 7 flows showing sparsely to moderately porphyritic character. The lower five flows are of compound Pahoehoe type and the top two are of Aa type. Ajanta Formation comprises 22 flows of which 5 are compound Pahoehoe type and the rest (17 flows) are Aa type. The flows are non-porphyritic to sparsely porphyritic. The famous Ajanta and Ellora caves have been carved out of the compound flows of this formation. Chikhli Formation occupying the top of isolated hills and plateau comprises 6 simple Aa and 2 compound Pahoehoe flows. The rock is dark grey, massive and non-porphyritic to sparsely porphyritic. The basalt flows show a regional gradient of 1:210 to 1:1000 in southeasterly direction. The joints are sub-vertical to vertical, varying in trend from NE-SW to NW-SE. Basic dykes intruding the flows trend NE-SW, NNE-SSW, E-W to NW-SE and are from a few hundred meters to a few kilometers in length and upto 9 meters in width. The rock is fine grained, massive and aphyric to sparsely porphyritic in texture.

The Aa flows are massive, characterized by fairly persistent fragmentary top, and impersistent clinkery basal part. The Pahoehoe flows comprise basal vesicular part with pipe amygdule, middle massive part, and top vesicular part with spherical vesicles and exhibit characteristic ropy structures, cavity and in crack fillings, and toe structures.

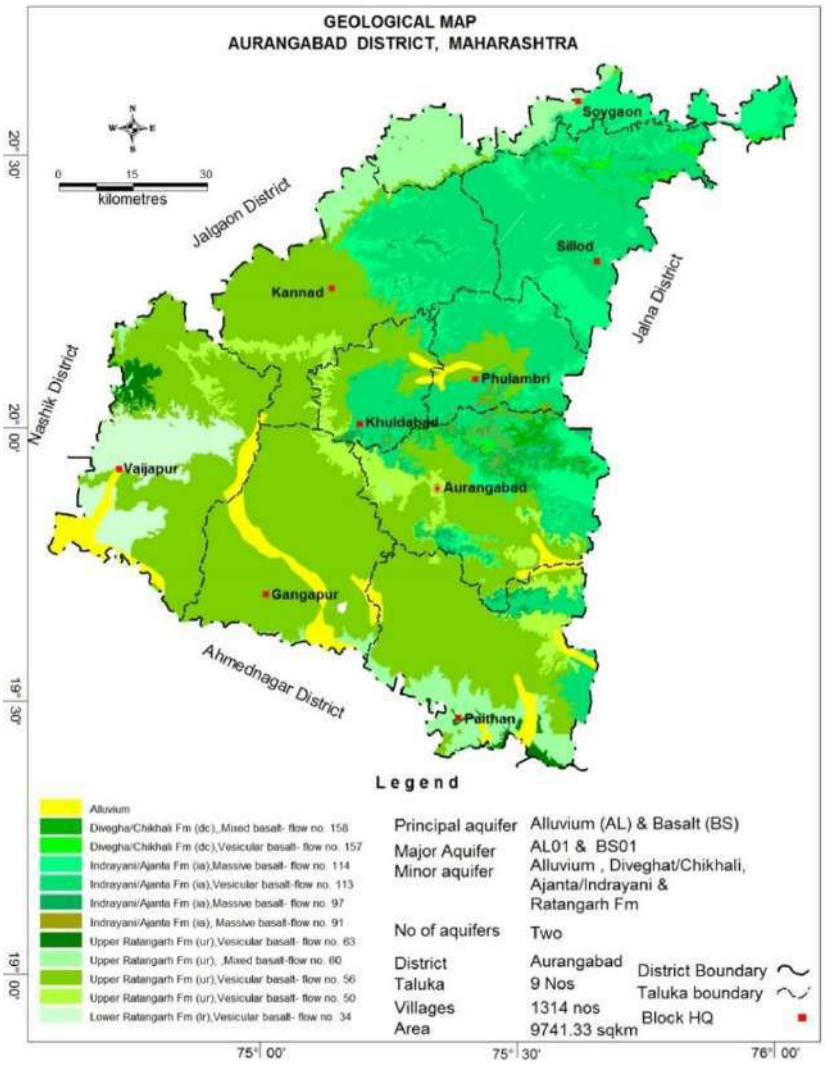


Figure 1. 8: Geological Map, Aurangabad district

2. HYDROGEOLOGY

The major part of the district is constituted by a sequence of basaltic lava flows (Deccan Trap) while alluvium occupies a small portion. The alluvium cosisting of clay, Silt, Sand and Gravel occur along the course of major rivers. The thickness of alluvium varies from few meters to 28 m. The alluvium lies directly over the Basaltic lava flows. A map depicting hydrogeology of Aurangabad district is presented in **Fig. 2.1.**

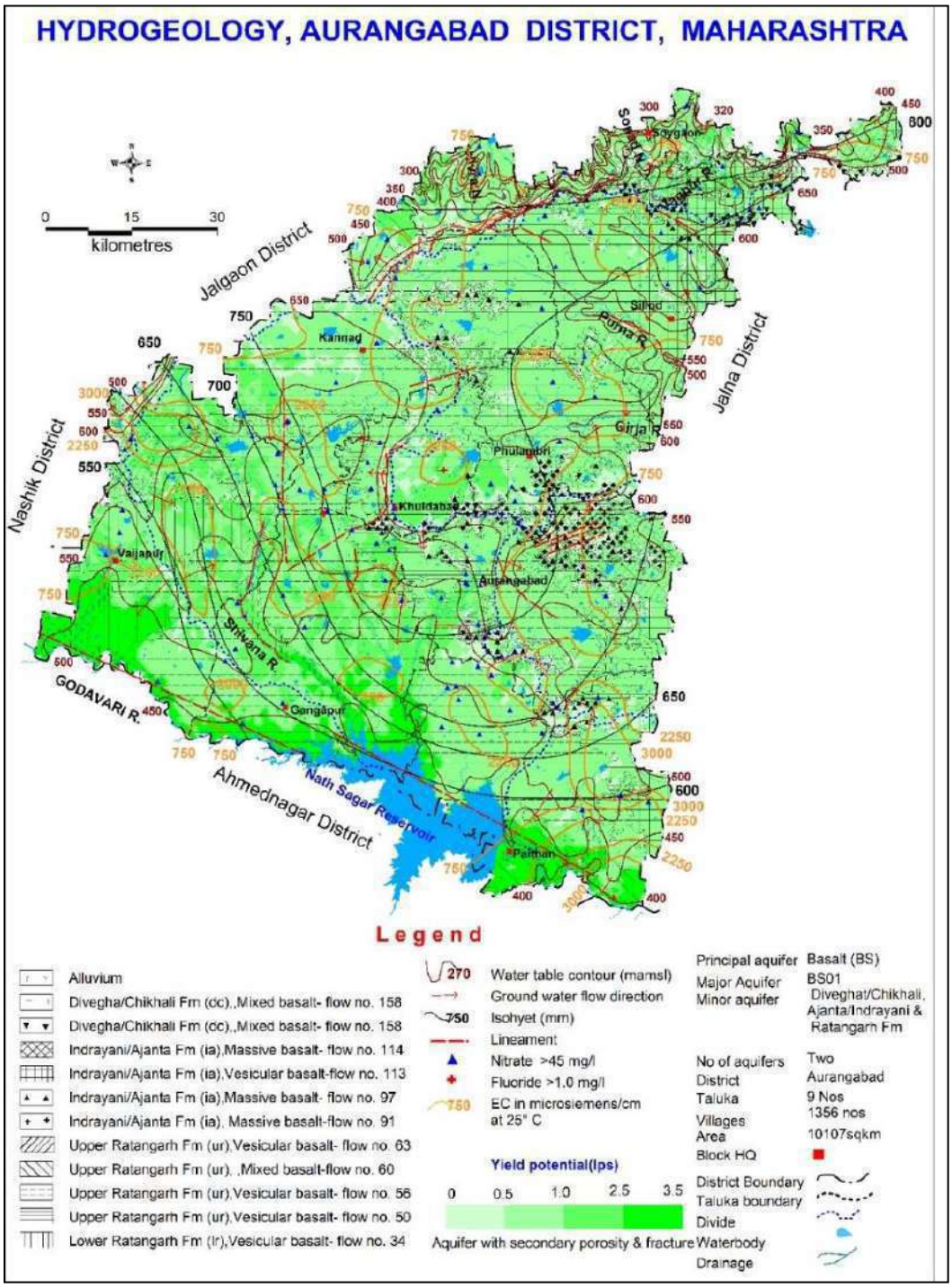


Figure 2. 1: Hydrogeology, Aurangabad District

Ground water occurs in alluvial areas of Godavari, Shivana, Purna river basins under unconfined to semi confined conditions. In Alluvial deposits, inter pore spaces constitute the potential water bearing zones and prevalence of sand and gravels renders them a high

degree of porosity and permeability and make them a potential ground water reservoir. However lithological variation results in varying water yielding capacity depending upon the predominance of sand-clay ratio.

The exploration of shallow alluvial areas of the Shivana basin reveals that the saturated thickness of the alluvium comprising clay, silt, sand and gravel ranges from 1-7 meters. The depth of alluvium- basalt contact ranges between 16.25 to 28 mbgl. The aquifer horizons were encountered up to 28.00 mbgl, comprising of coarse sand mixed with clay and silt, which constitute the potential aquifers in the area with discharge varying up to 4.50 lps. In general depth of dug wells is found up to 20 mbgl and yields varying between 60 and 120 m^3/day.

Deccan basalts are hydro geologically in-homogeneous rocks. The weathered and jointed /fractured parts of the rock constitute the zone of ground water storage and flow. The existence of multiple aquifers is characteristic of basalt and is indicative of wide variation in the joint/fracture pattern and intensity. The yield of wells is a function of permeability and transmissivity of aquifer and it depends upon the degree of weathering, intensity of joints\fractures and topographic setting of the aquifer. Due to wide variation in secondary openings, the potential areas for ground water are generally local. In general Ground water occurs under phreatic/unconfined to semi-confined conditions in basalts. Shallow Aquifer is generally tapped by the dug wells and average depth of dug wells ranging between 12.00 to 15.00 m and yield varies up to 100 m^3/day. The deeper Aquifer is being tapped by bore wells with depth ranging from 40 to 90 m. However, the maximum numbers of bore wells are limited up to 60 m depth. The yield ranges up to 2.5 lps. Potential Aquifer are generally encountered at the contact of two flows.

WATER TABLE COUNTOUR

Based on the data, a Pre-monsoon water table contour map (2017) has been prepared and presented in **Fig. 2.2**. The map depicts occurrence and movement of ground water in the basaltic and alluvial areas. The ground water flow lines are marked to show the direction of ground water flow. The elevation of water table ranges from 300 to 650 m amsl and generally follows the topography. In general, the ground water movement is towards the Godavari River. Though there is a hydraulic continuity between the trappean units, still due to the heterogeneous nature of the rock formation constituting the aquifer, there is wide variation in the water table gradient from 2 to 20 m/km. The ground water movement is generally sluggish 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.

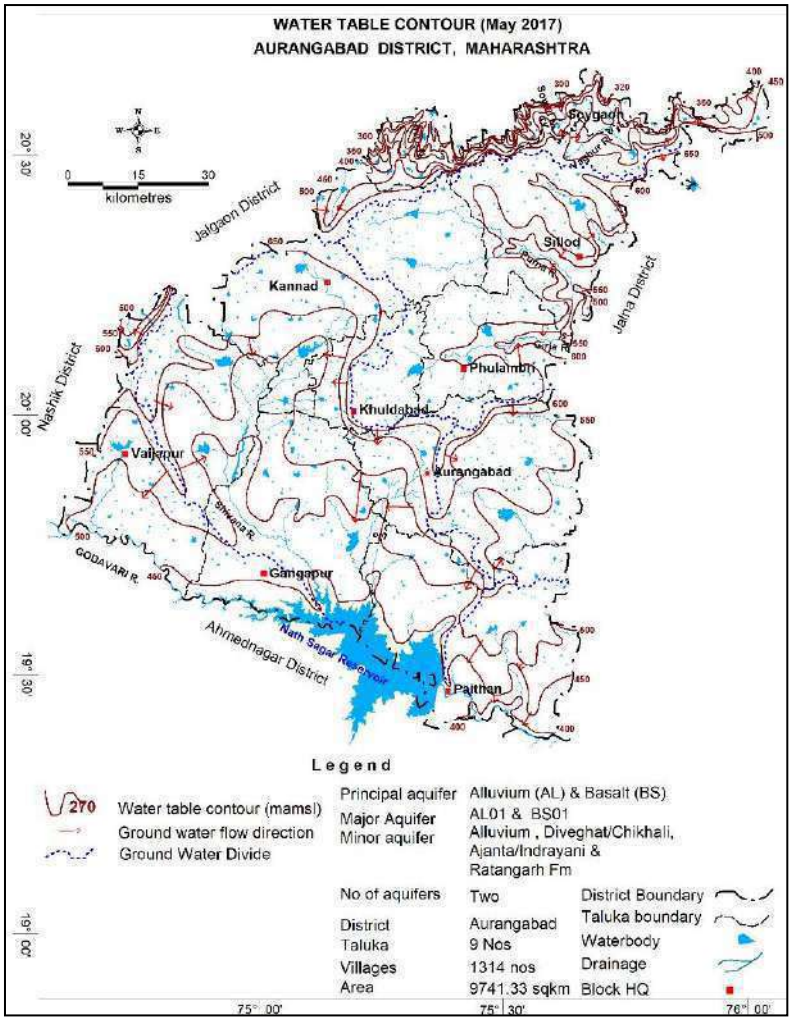


Figure 2. 2: Water Table Contour, Aurangabad district

2.1 MAJOR AQUIFER SYSTEMS

Basalt and Alluvium are the main formations constituting principal aquifers in the district. Two aquifer systems in Basalt and one in Alluvium are found to be prevailing in the district (**Fig. 2.3).** Based on the ground water exploration carried out in the alluvial and basaltic areas of 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:

Alluvium

- Aquifer –I: up to 28 m

Basalt–

- Aquifer – I: up to 30 m
- Aquifer -II: up to 178 m
-

Aquifer-I: The aquifer-I in alluvium is observed in the depth range of 15 to 28 m bgl with water levels of 8.0 to 20 mbgl and thickness of granular zone varying from 6 to 20 m. The yield of the aquifer varies from 60 to 120 m^3/day.

The Aquifer-I in Basalt formation is observed in the depth range of 8 to 30 m bgl with water levels of 0.3 to 27.1 mbgl and thickness of weathered/fractured zone varies from 5 to 20 m. The yield of the aquifer varies up to 100 m^3/day. Depth of occurrence of aquifer -I is depicted in **Fig. 2.4** and yield in the **Fig. 2.6.**

Aquifer- II: Aquifer-II in Basalt is observed in the depth range of 50 to 178 mbgl with water levels of 0.8 to 70 mbgl and thickness of weathered/fractured zone varying from 0.50 to 12 m. The aquifer-II is exploited mainly by borewells and yield of the aquifer generally varies up to 2.5 lps. Depth of occurrence of Aquifer -II is depicted in **Fig. 2.5** and yield in the **Fig. 2.7.**

Table 2. 1: Aquifer Characteristic of Major aquifers of Aurangabad district

Major Aquifer	**Alluvium**	**Basalt**	
Type of Aquifer	**Aquifer-I**	**Aquifer-I**	**Aquifer-II**
Formation	Alluvium-Sand / silt & Clay admixture	Weathered/ Fractured Basalt	Jointed/Fractured Basalt
Depth to bottom of Aquifer (mbgl)	15 to 28	8 to 30	50 to 178
Granular / Weathered/ Fractures zones encountered (mbgl)	Up to 28	up to 30	up to 178
Granular/Weathered/ Fractured rocks thickness (m)	6 to 20	5 to 20	0.5 to 12
SWL (mbgl)	8 to 20	0.3 to 27.1	0.8 to 70
Transmissivity (m^2/day)	*52 to 757	10 to 67	5 to 80
Specific Yield/ Storativity (Sy/S)	*1.7 x 10^{-3} to 4.5 x 10^{-6}	0.02	1.0x10^{-4} to 5.5x10^{-5}
Yield	60 - 120 m^3/day	up to 100 m^3/day	up to 2.5 lps
Sustainability	5-6 hrs	1 to 5 hrs	1 to 6 hrs

*: T and S values are of Alluvium aquifers in Gangapur and Vaijapur blocks.

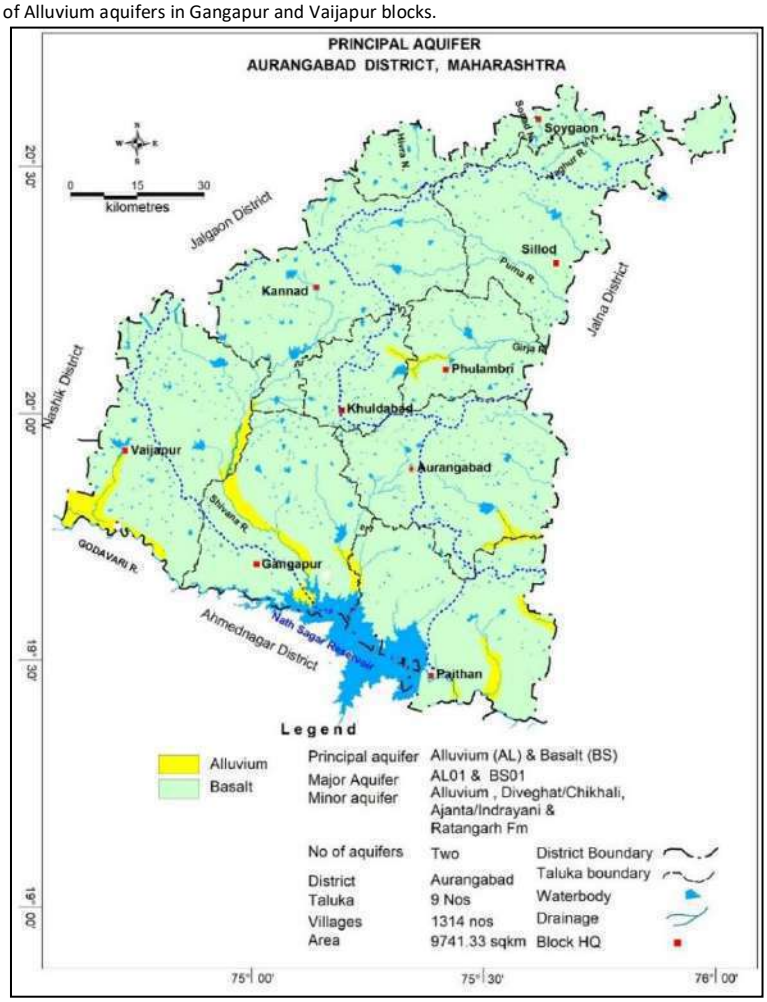


Figure 2. 3: Principal Aquifers, Aurangabad district

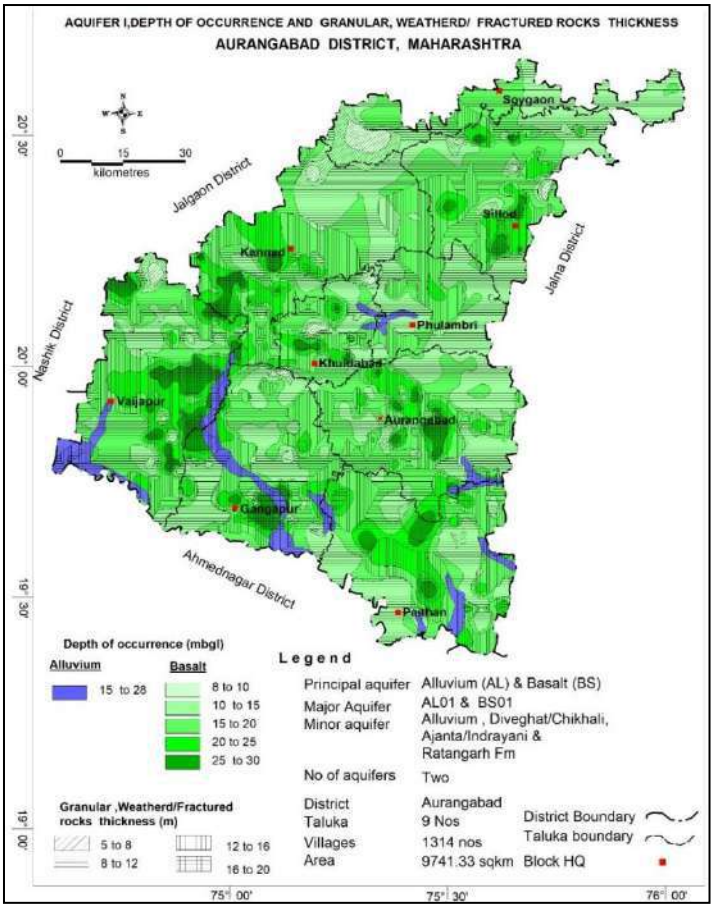


Figure 2. 4: Depth of Occurrence and Granular Zone/ Fractured rock thickness-Aquifer-I

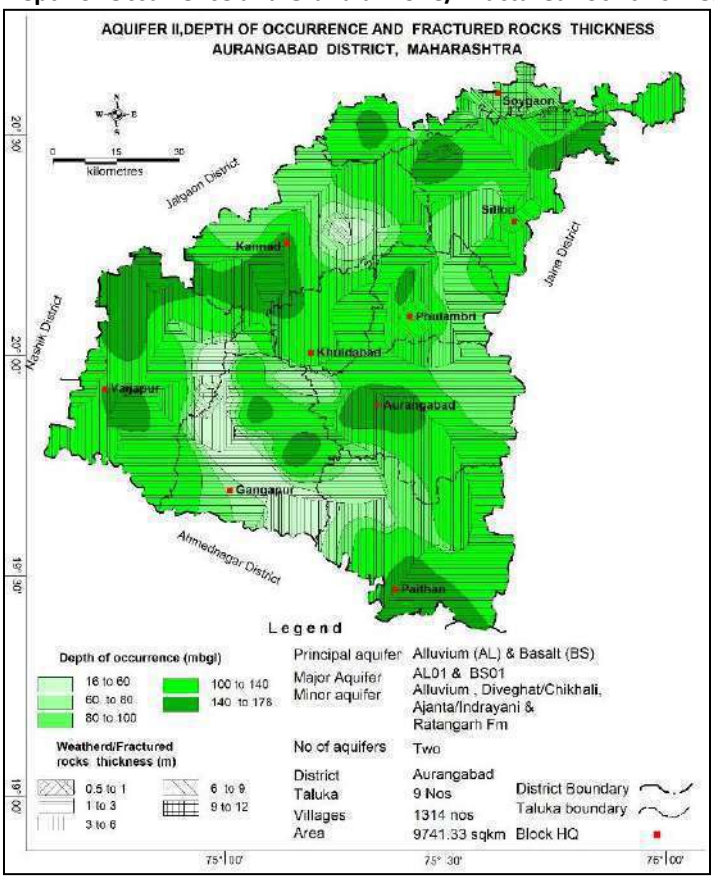


Figure 2. 5 : Depth of Occurrence and Fractured rock thickness -Aquifer-II

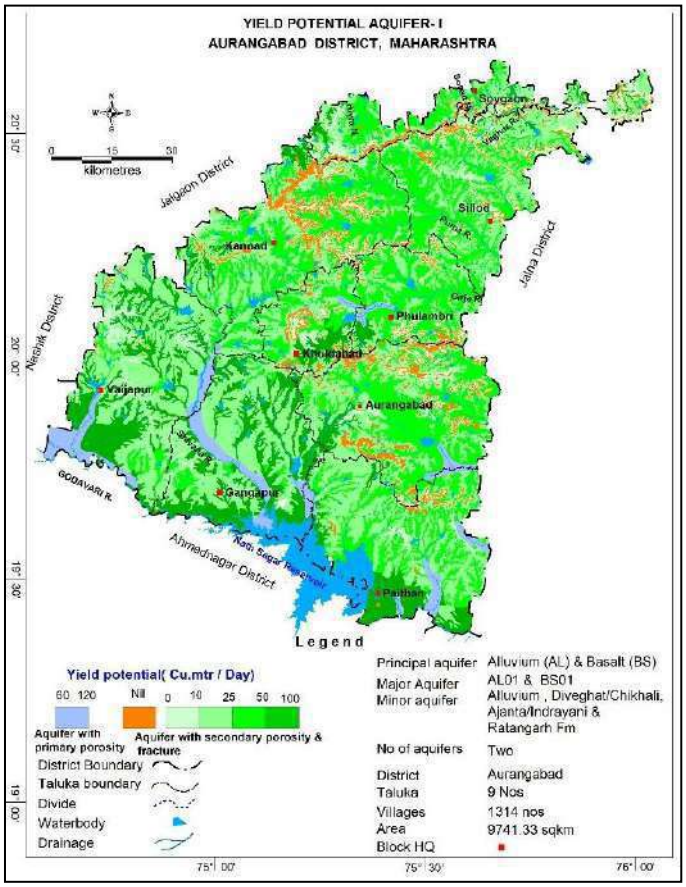


Figure 2. 6: Yield Potential Aquifer-I

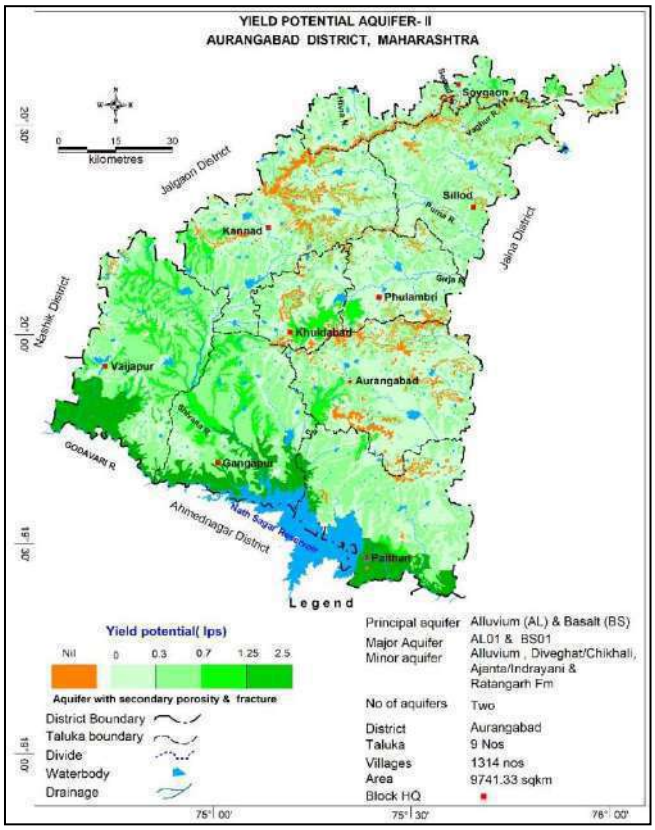


Figure 2. 5: Yield Potential, Aquifer-II

2.2 AQUIFER PARAMETERS

Aquifer parameters have been obtained from ground water exploration carried out in the alluvial areas of the district as well as from the pumping tests carried out on dug wells in Basaltic and Alluvial terrain. The transmissivity of shallow basaltic aquifers in the district is generally less than 80 m^2/day. The specific capacity of well also gives an idea about the productivity of the well and is controlled by diameter and depth. In basaltic formation the specific capacity of dug wells is generally less than 200 lpm/m of drawdown with an average of 110 lpm/m of drawdown. In Alluvium it ranges from 130-2043 lpm/m of drawdown. The pumping tests conducted on 3 shallow exploratory wells in alluvial areas indicate the transmissivity range from 52 to 757 m^2/day, Storativity range from 1.7×10^{-3} to 4.5×10^{-6} and specific capacity range between 0.03 and 3.2 lps/m of drawdown.

SPECIFIC YIELD DETERMINATION TEST: 07 pumping test on dug wells were conducted in NAQUIM area of Aurangabad district to determine the aquifer and well parameters. These parameters are calculated by Kumarswamy method. Salient details of pumping test on dug wells are given in **table 2.2.**

Table 2. 2: Salient details of pumping test on dug wells

S.No.	District	Block	Location	Latitude	Longitude	T	Sy
1	Aurangabad	Aurangabad	Harsul	19°56'35"	75°22'26"	15.25	0.016
2	Aurangabad	Phulambri	Kingaon	20°04’ 25.6”	75°21’ 02.6”	75.90	0.07
3	Aurangabad	Khuldabad	Jhari	20°06’ 08.7”	75°22’ 44.5”	24.61	0.028
4	Aurangabad	Kannad	Kannad	20°54'43.6"	75°57'11.8"	55.28	0.01
5	Aurangabad	Paithan	Taherpur	19°39’ 3.8”	75°20’ 7.0”	16.65	0.02
6	Aurangabad	Vaijapur	Ghaigaon	19°53’ 54.3”	74°46’ 06.5”	5.59	0.036
7	Aurangabad	Gangapur	Ambegaon	19°52’ 50.9”	75°11’ 09.3”	14.11	0.012

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. 2.8 to 2.14.**

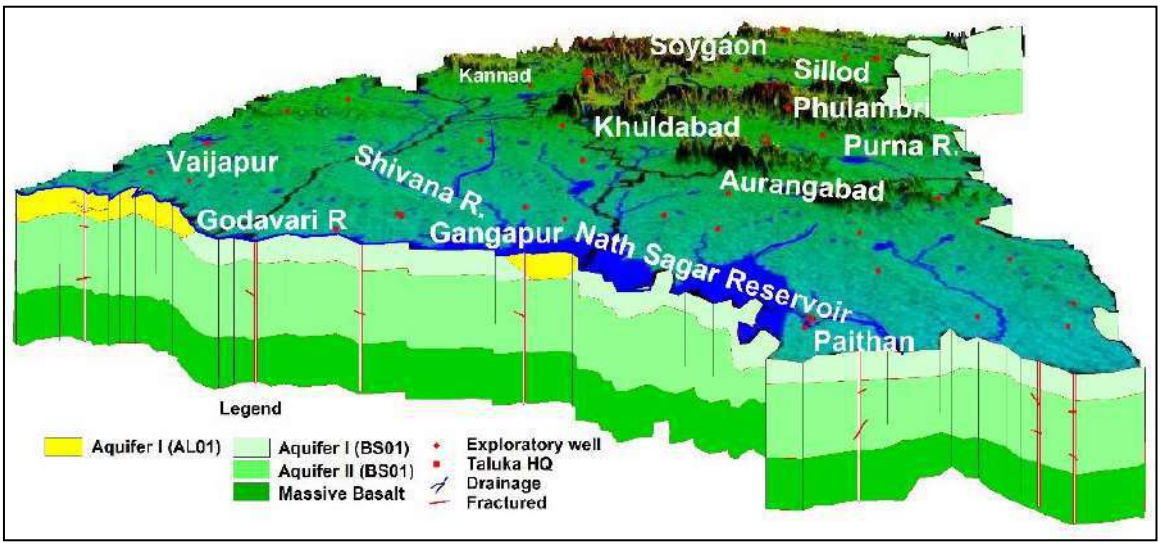


Figure 2. 6: 3D Aquifer Disposition

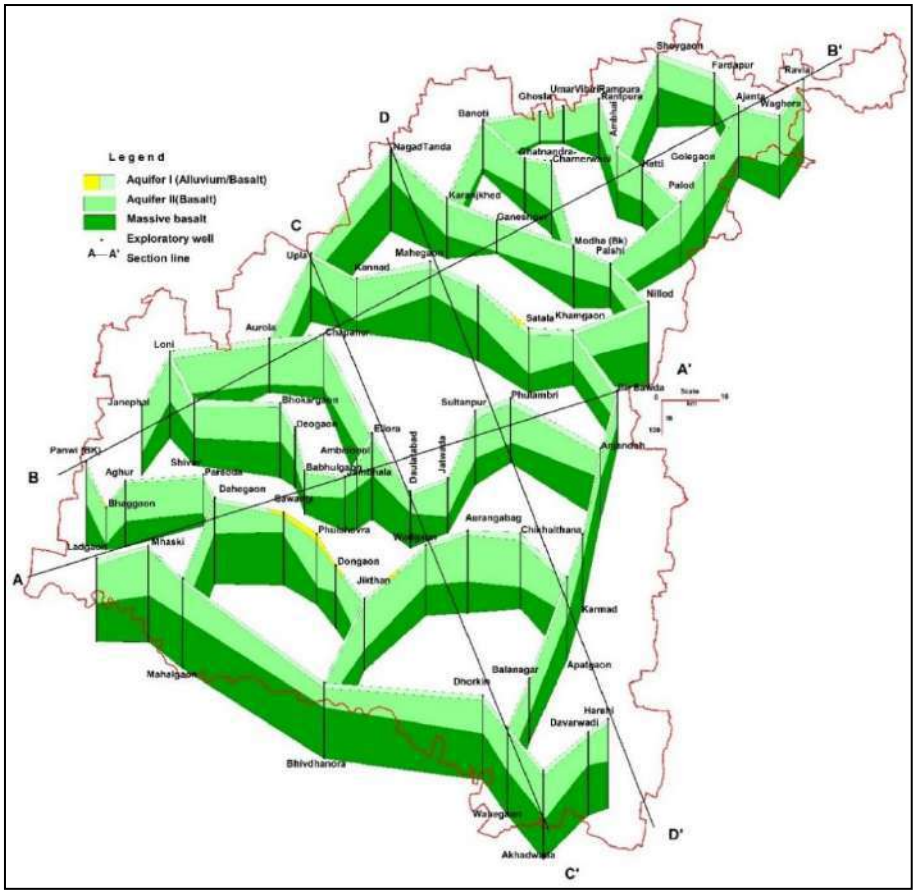


Figure 2. 7: 3D Fence Diagram

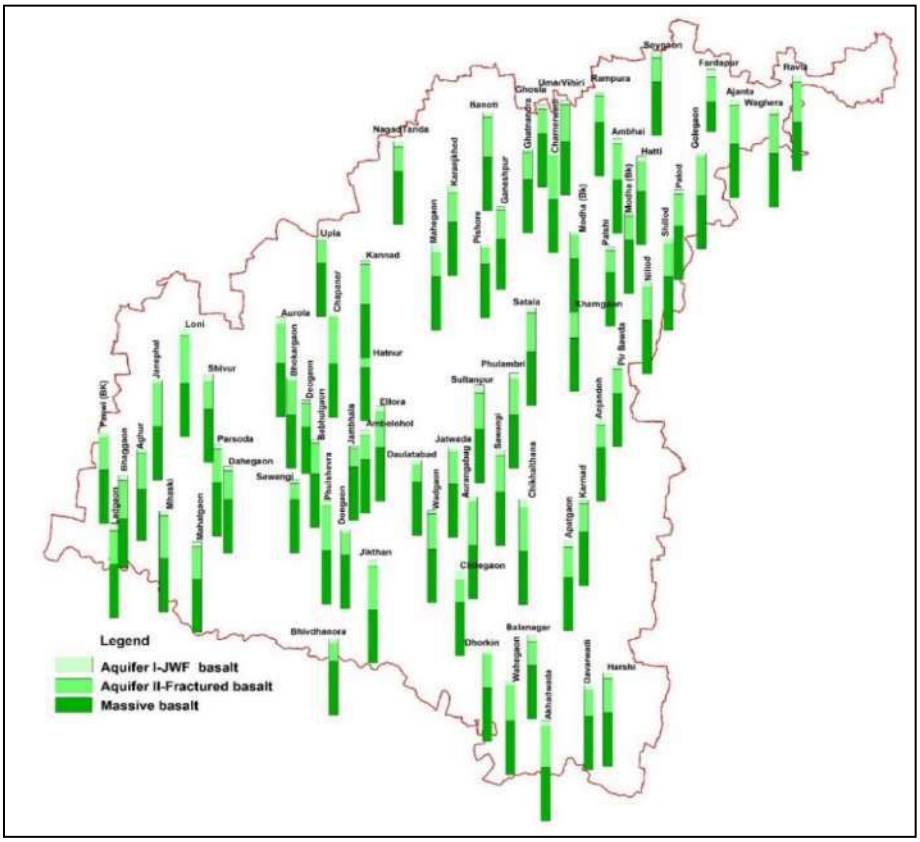


Figure 2. 8: 3D Bar Diagram

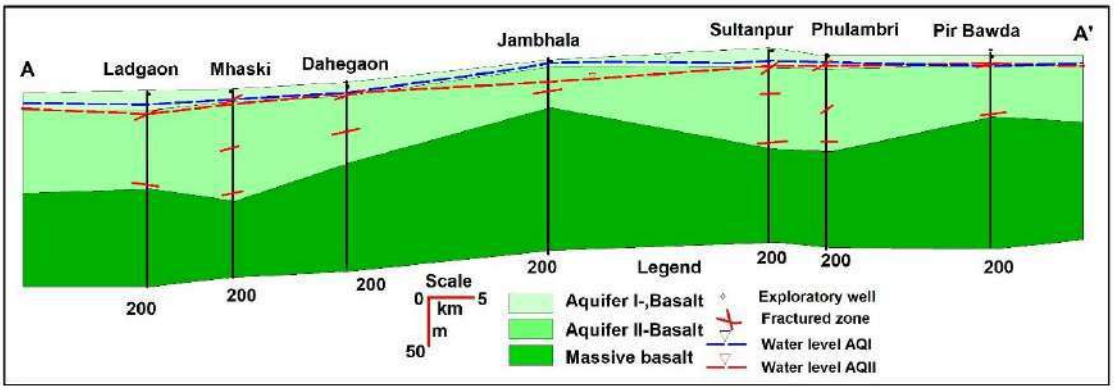


Figure 2. 9: Lithological section (A-A')

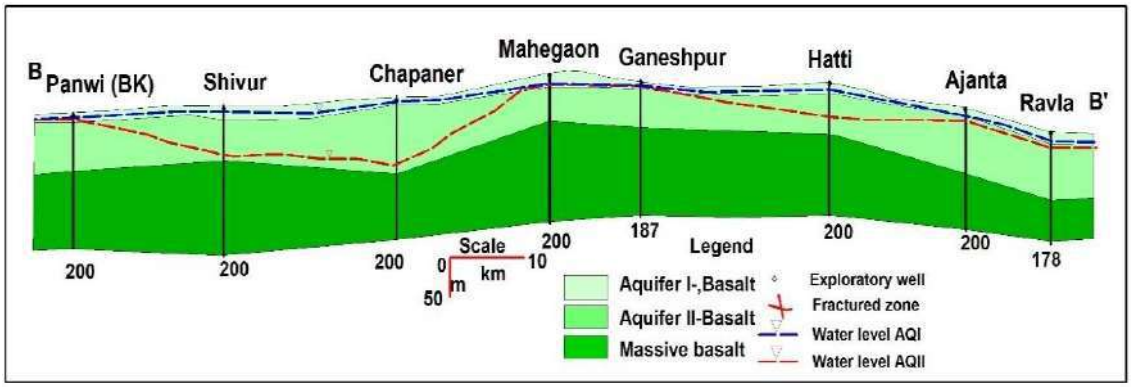


Figure 2. 10 : Lithological section (B-B')

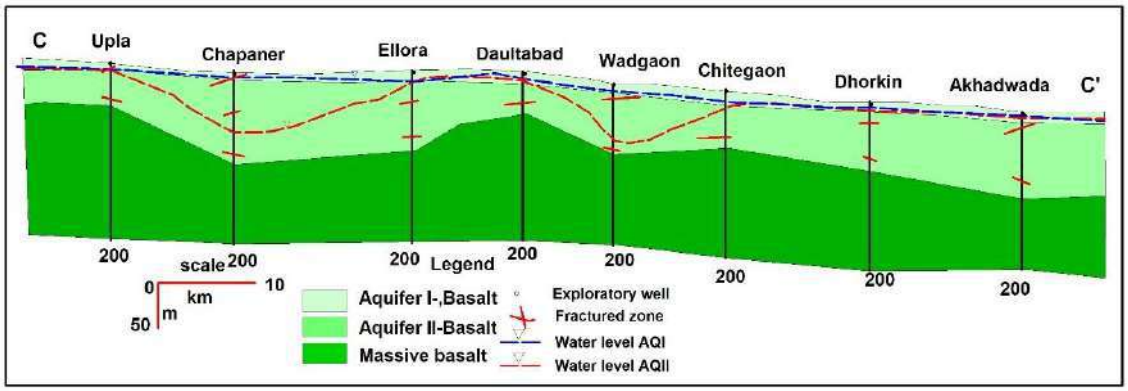


Figure 2. 11 : Lithological section (C-C')

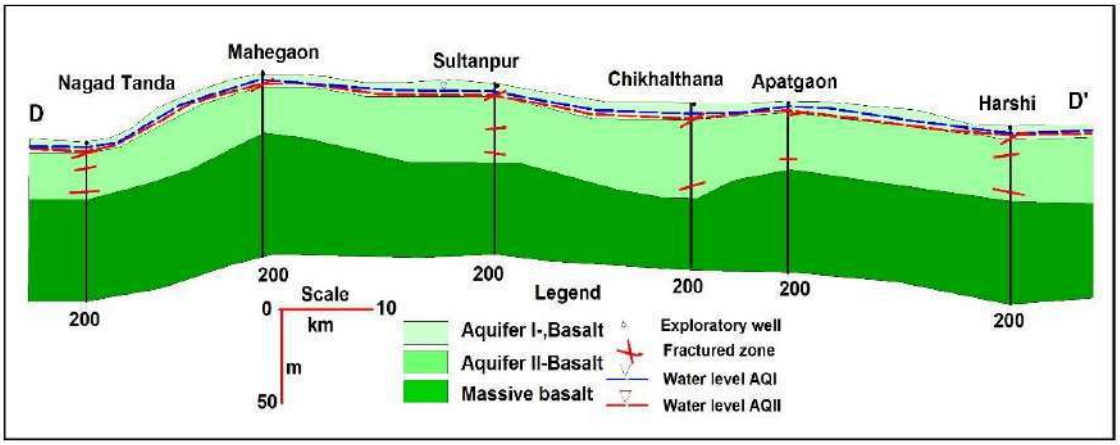


Figure 2. 12: Lithological section (D-D')

3. WATER LEVEL SCENARIO

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

Central Ground Water Board periodically monitors 39 Ground Water monitoring wells in Aurangabad district, four times a year i.e. in May (Pre-monsoon), August, November (Post-monsoon) and January. Apart from this under NAQUIM study; 25 KOWs were established during 2015 and 163 KOWs were established and monitored during the year 2017. Apart from this data, data obtained from GSDA has also been used for preparation of depth to water level maps of the district. Pre-monsoon and post monsoon water level data are given in **Annexure-III and IV**.

The depth to water levels in Aurangabad district during May 2017 were found ranging between 4.4 (Anad, Sillod block) and 27.10 mbgl (Adul, Paithan block). Shallow water levels within 5 mbgl are observed in small isolated patch in Soygaon block covering only 9 sq. km. area of the block. Water levels between 5 and 10 mbgl are observed as small isolated patches over the entire district. The depth to water level between 10 to 20 mbgl has been observed covering the entire district. Deeper water levels of more than 20 mbgl are observed in isolated patches in southern half of the district and small patch also observed in eastern part of Sillod block covering 405 sq km area of the district. The Pre-monsoon depth to water level map is depicted in **Fig. 3.1.**

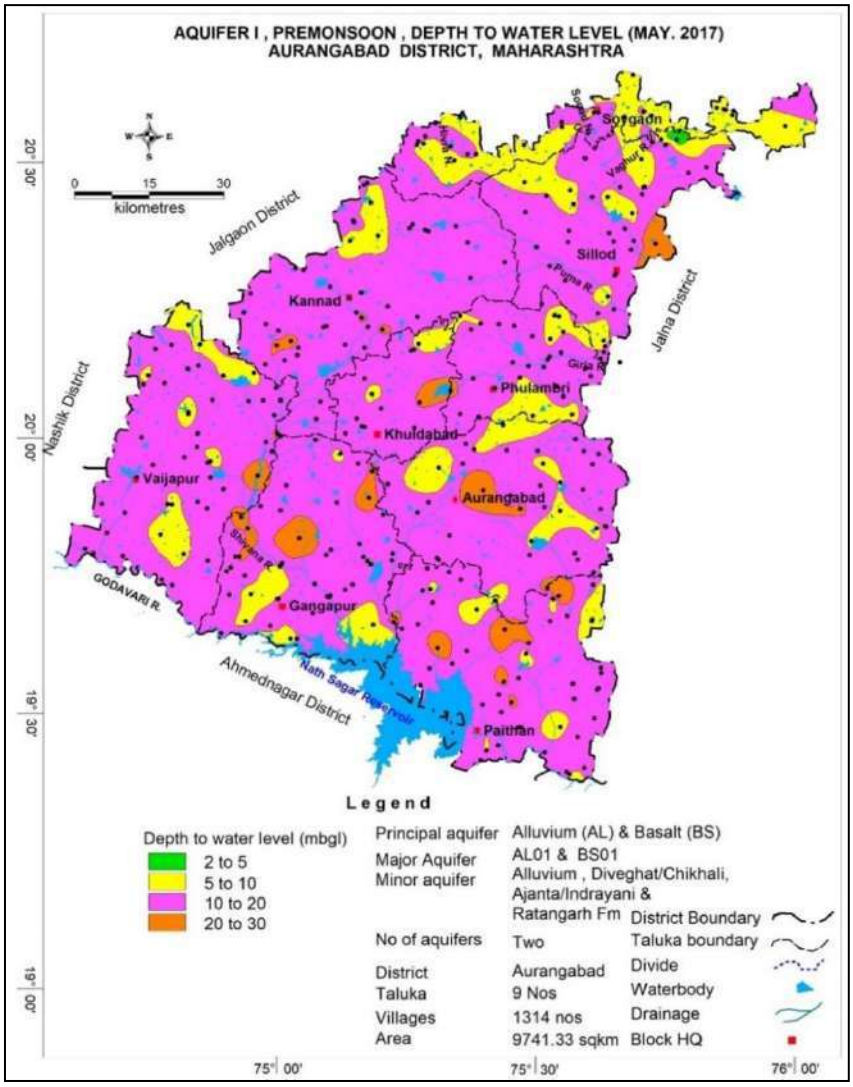


Figure 3. 1 : DTWL, Shallow Aquifer (May 2017)

The depth to water levels in Aurangabad district during Nov. 2017 were found ranging between 0.3 (Jakmatha, Gangapur block) and 22.80 mbgl (Hadas, Vaijapur block). Shallow water level less than 2 mbgl has been observed in isolated parts of Vaijapur, Gangapur, Kannad, Soygaon and Sillod blocks; Water level between 2-5 mbgl has been observed in major part of Soygaon block and parts of Sillod, Kannad, Aurangabad, Vaijapur and Gangapur blocks; isolated patches are also observed in rest of the blocks. Water levels between 5 and 10 mbgl are observed in major part of the district. The depth to water level between 10 to 20 mbgl has been observed in major part of Gangapur, Khuldabad, Vaijapur, Sillod, Phulambri and Kannad Blocks. Isolated patches are also observed in all the blocks. Deeper water levels of more than 20 mbgl are observed as isolated patches in Gangapur, Vaijapur and Khuldabad blocks covering 54 sq km area of the district. Spatial variation in post monsoon depth to water levels is shown in **Fig. 3.2.**

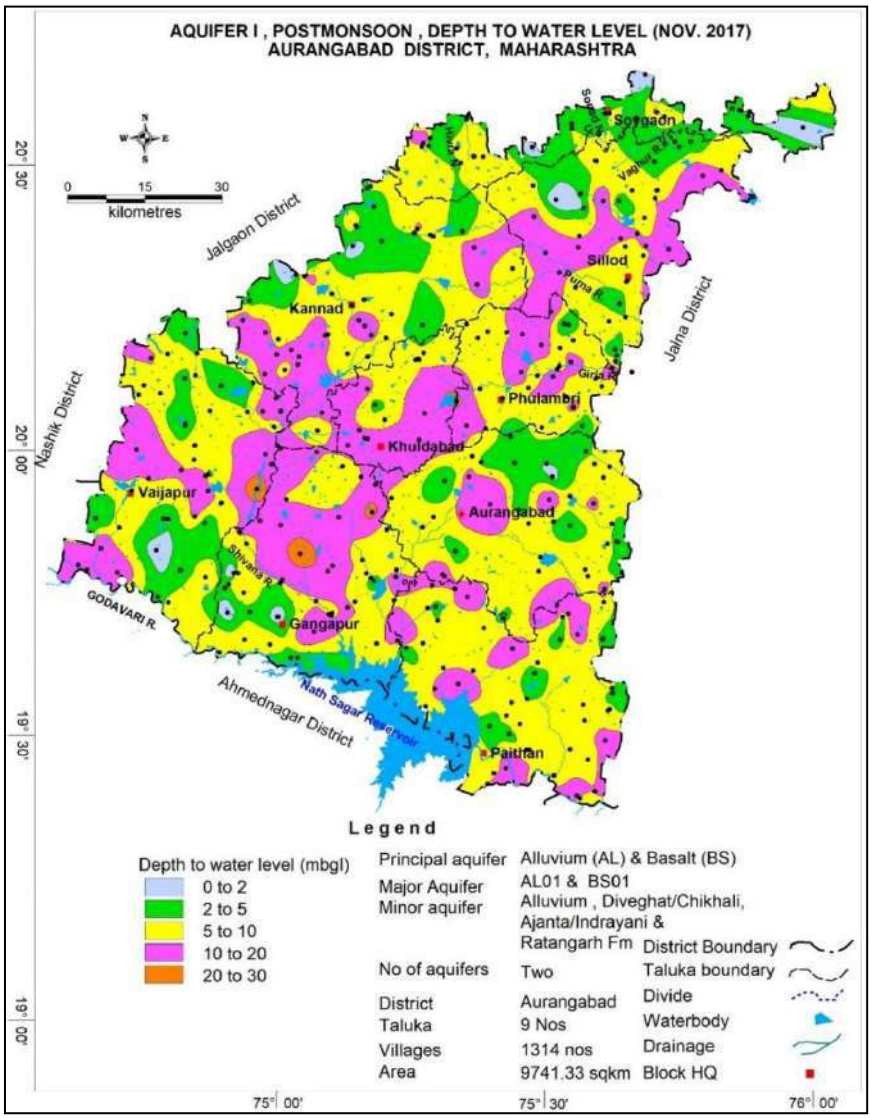


Figure 3. 2: DTWL, Shallow Aquifer (Nov. 2017)

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

Total 96 exploratory wells' data has been used for preparation of depth to water level maps of the district. The pre-monsoon (May 2017) depth to water level in Aurangabad District ranges from 5.20 (Janephal, Vaijapur block) to 111.30 mbgl (Babhulgaon, Gangapur block). The depth to water level less than 10 mbgl is observed only in isolated parts of Vaijapur block. Water level between 10 and 20 mbgl has been observed in major part of Paithan block and parts of Vaijapur, Kannad, Aurangabad, Phulambri and Sillod blocks. Isolated patches also observed in Gangapur and Khuldabad

blocks. Major parts of district show depth to water level between 20 and 30 mbgl. The deeper water level between 30 and 40 mbgl are observed in major part of Soygaon block and in parts of all other blocks except Paithan block. The deepest water level (>40 mbgl) has been observed in central and northern parts of the district covering Aurangabad, Gangapur, Vaijapur, Kannad, Phulambri and Sillod blocks. This may be due to low potential of the aquifers in the district. The Pre-monsoon depth to water level for Aquifer -II is given in **Fig. 3.3.**

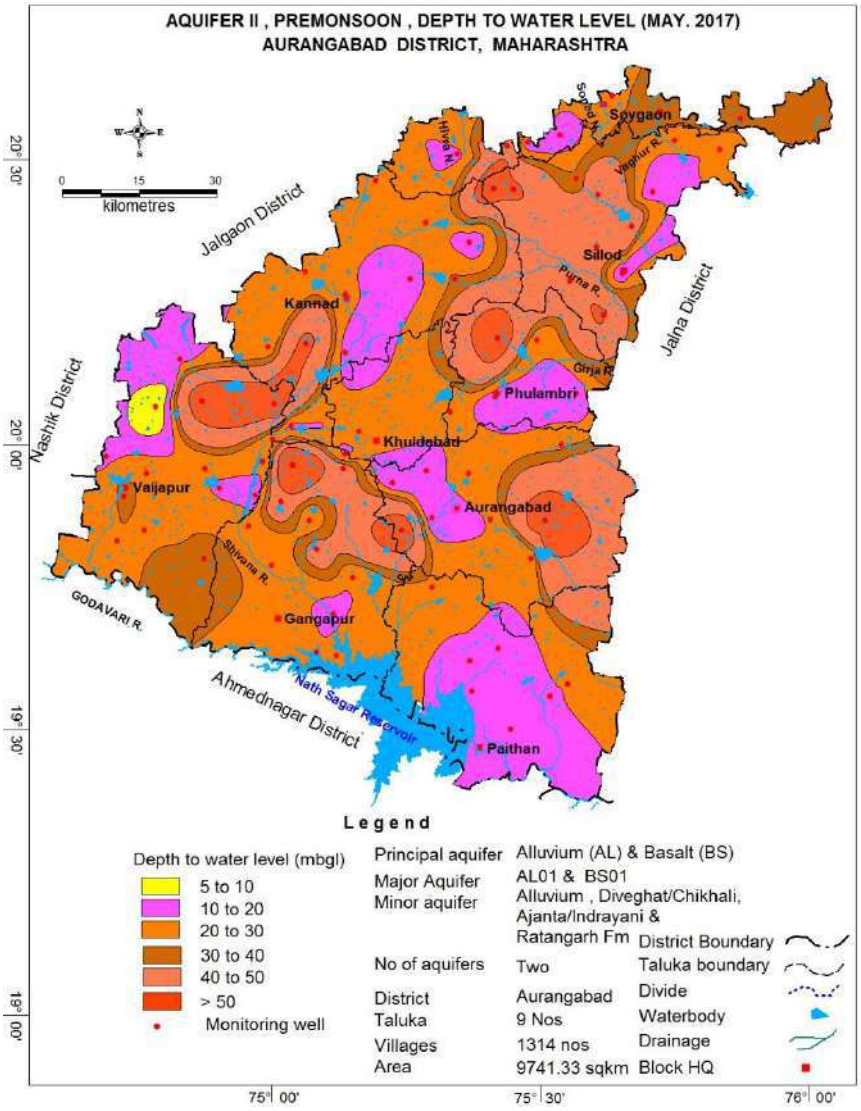


Figure 3. 3: DTWL, Deeper Aquifer (May 2017)

The post-monsoon (Nov. 2017) depth to water level in the district ranges from 0.80 (Janephal, Vaijapur block) to 55.00 mbgl (Bhokargaon, Vaijapur block). Depth to water level less than 10 mbgl has been observed in the major parts of Vaijapur, Paithan, Kannad blocks and parts of Phulambri, Gangapur and Sillod blocks. Isolated patches are also observed in rest of the blocks. The major parts of the district show water level between 10 and 20 mbgl. Water level between 20 and 30 mbgl are observed in major parts of Sillod and adjoining part of Phulambri blocks and parts of all other blocks. The deeper water level between 30 and 40 mbgl are observed in part of all the blocks except Soygaon and Khuldabad blocks. The deepest water level of more than 40 mbgl is observed in isolated parts of Aurangabad, Phulambri, Vaijapur, Gangapur, Kannad and Sillod blocks. The post monsoon depth to water level for Aquifer- II is given in **Fig. 3.4.**

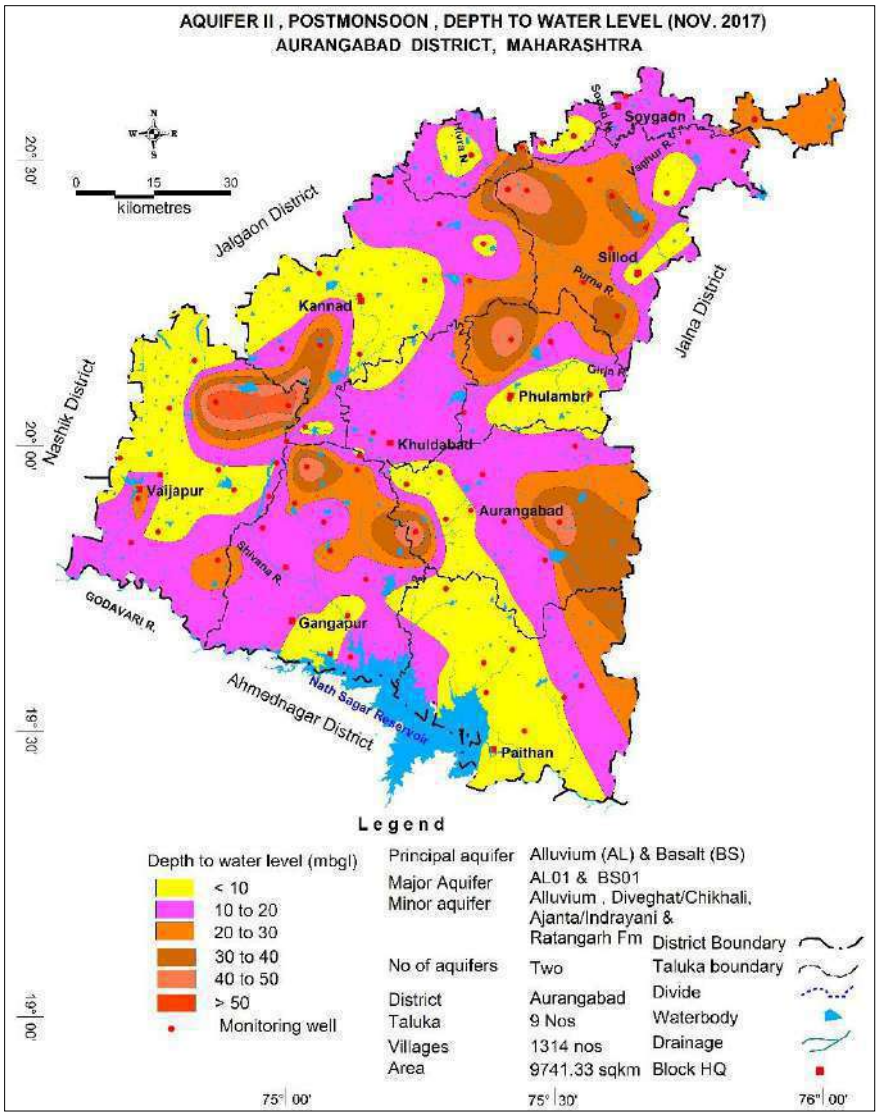


Figure 3. 4: DTWL, Deeper Aquifer (Nov. 2017)

3.3 WATER LEVEL TREND (2008-2017)

During pre-monsoon period, rising water level trend has been recorded at 32 stations ranging from 0.0012 (Narayanpur, Gangapur block) to 0.418 m/year (Jawala, Soygaon block) while falling trend was observed in 118 stations varying from 0.00022 (Murma, Paithan block) to 0.7724 m/year (Bhendala, Gangapur block).

During pre-monsoon period, declining water level trend has been observed in about 8969 sq. km. area i.e., 88 % of the area. Significant decline of more than 0.20 m/year has been observed in 2420 sq. km., i.e., 24 % of the area covering parts of Aurangabad, Paithan, Gangapur, Vaijapur, Khuldabad, Kannad and Sillod blocks and isolated parts in Soygaon and Phulambri blocks. Rise in water level trend has been observed in southern and northern parts of the district covering part of Paithan and Sillod blocks and small isolated parts are observed in all other blocks except Aurangabad and Khuldabad blocks. **(Fig.3.5)**

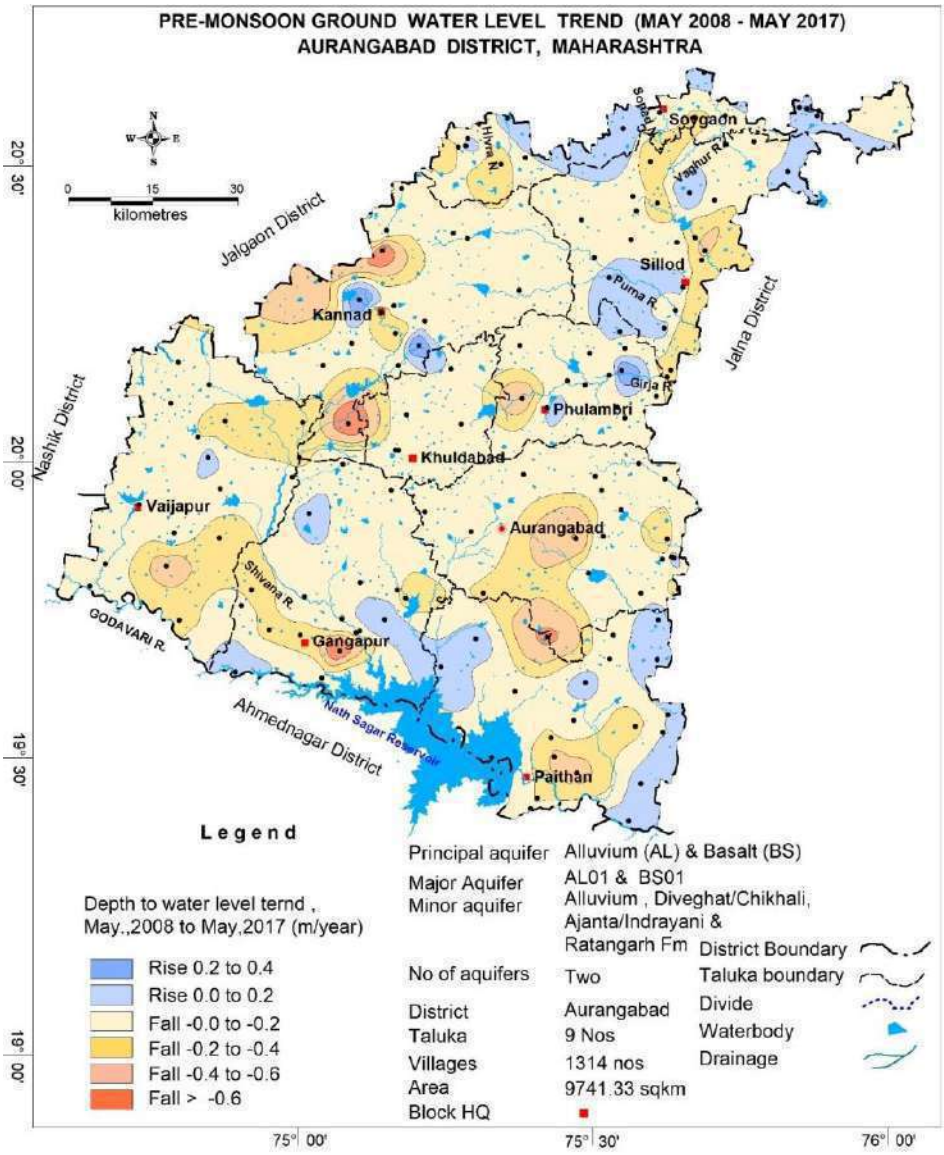


Figure 3. 5: Pre-monsoon Decadal Trend (2008-17)

Fall @>0.2m/year 2420 Sq. km. (about 24 % area of the district)

During post--monsoon period, rise in water level trend has been recorded at 21 stations and it ranges between 0.0095 m/year (Dhoregaon, Gangapur block) to 0.3713 (Vihamandva, Paithan block) while falling trend was observed at 129 stations varying from 0.0001 (Tidka, Soygaon block) to 0.8651 m/year (Bhendala, Gangapur block).

Rising water level trend has been observed in 1539 sq. km. area covering parts of the Paithan, Soygaon and Kannad blocks and small isolated patches in Aurangabad, Phulambri, Vaijapur and Gangapur blocks. Fall in water level trend has been observed in 8664 sq. km. covering major part of the district. Significant decline, more than 0.20 m/year has been observed in 2978 sq. km. area covering in parts of Gangapur, Vaijapur, Khuldabad, Kannad, and Aurangabad blocks, apart from this isolated patches are also observed in Sillod, Phulambri and Paithan blocks. (Fig 3.6) These declines may be due to the exploitation of ground water or low and erratic rainfall recevied in these areas. Water level trend data (2008-17) of observation wells of CGWB and GSDA is given in Annexure-V.

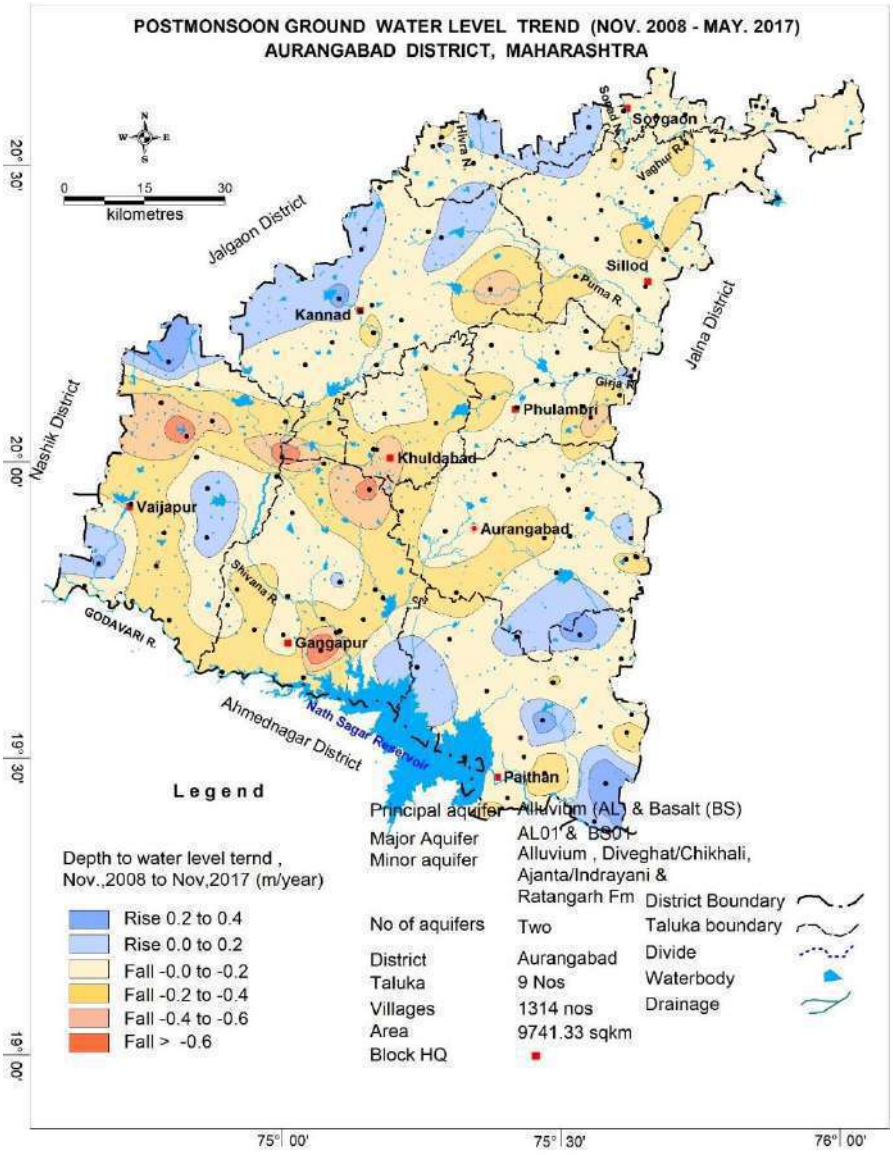
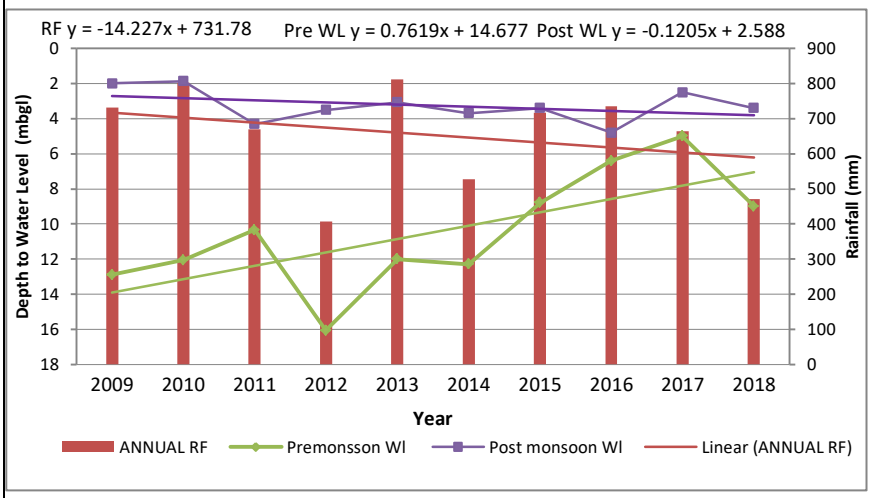
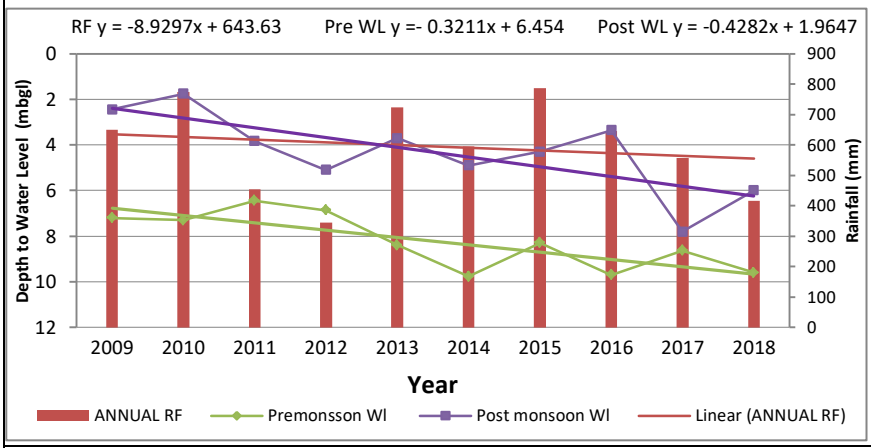
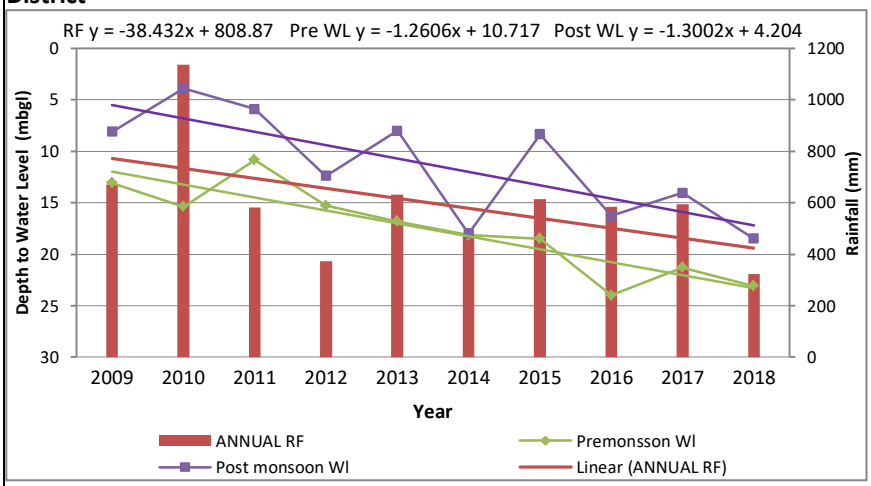


Figure 3. 6 : Post-monsoon Decadal Trend (2008-17)

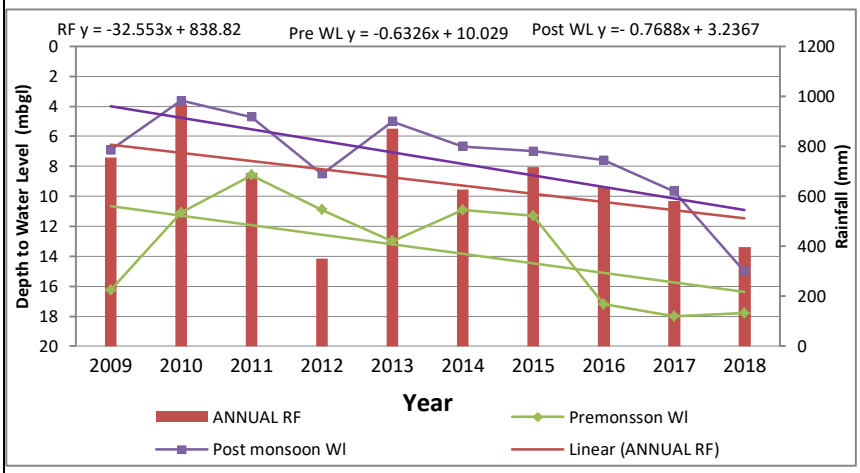
Fall @>0.2m/year 2978 Sq. km. (about 29% of the district)

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 show 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.

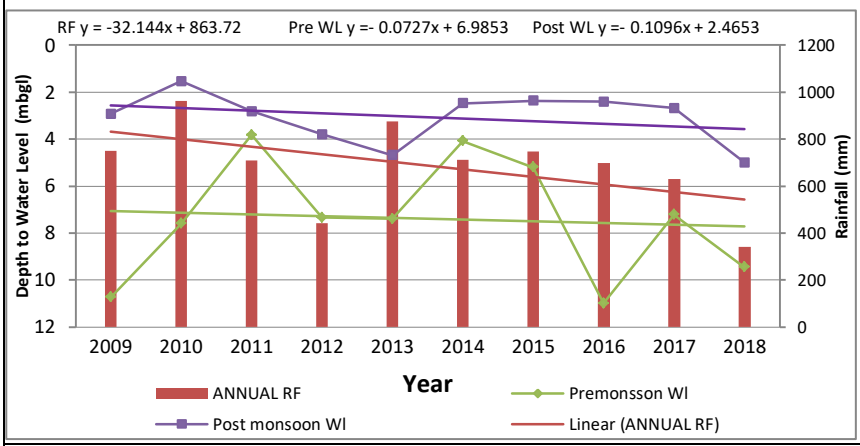
Hydrograph (2009-18), village Chauka, Aurangabad Block, Aurangabad District 	Formation: Basalt Type of Well: Dug Well Pre-monsoon Water level trend showing rising trend @ 0.76 m/year and Post-monsoon Water level trend showing falling trend @ 0.120 m/ year . Declining Rainfall trend @14.22 mm/ year Water level behaviour not in conformity with rainfall
Hydrograph (2009-18), village Pathri, Phulambri Block, Aurangabad District 	Formation: Basalt Type of Well: Dug Well Pre-monsoon and post-monsoon Water level trends are showing falling trend @ 0.32 and 0.43 m/year respectively. Declining Rainfall trend @8.93 mm/ year Water level behaviour in conformity to rainfall
Hydrograph (2009-18), village Khuldabad, Khuldabad Block, Aurangabad District 	Formation: Basalt Type of Well: Dug Well Pre-monsoon and post-moonsoon Water level trends showing falling trend @ 1.26 m/year and 1.30 m/year respectively. Fallng Rainfall trend @38.43 mm/ year Water level behaviour in conformity to rainfall, falling rainfall trend affecting on recharge

Hydrograph (2009-18), village Kannad, Kannad Block, Aurangabad District



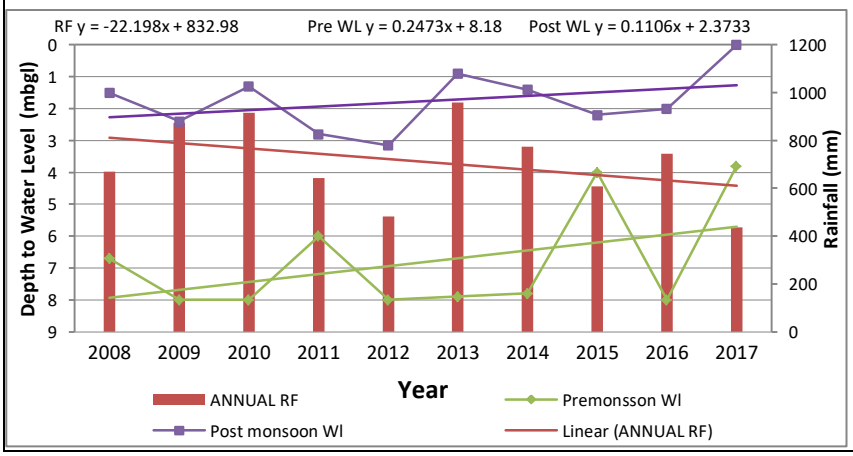
Formation: Basalt
Type of Well: Dug Well
Pre-monsoon and Post-monsoon Water level trends are showing falling trend @ 0.633 and 0.769 m/year respectively.
Fallng Rainfall trend @32.55 mm/ year
Water level behaviour in conformity to rainfall, falling rainfall trend affecting on recharge

Hydrograph (2009-18), village Ajanta, Sillod Block, Aurangabad District



Formation: Basalt
Type of Well: Dug Well
Pre-monsoon and post-moonsoon Water level trend showing falling trend @ 0.073
and 0.1096 m/year.
Falling Rainfall trend @32.14 mm/year
Water level behaviour more or less in conformity to rainfall

Hydrograph (2008-17), village Banoti, Soygaon Block, Aurangabad District



Formation: Basalt
Type of Well: Dug Well
Pre-monsoon and post-moonsoon Water level trends showing rising trend @ 0.247 m/year and 0.111 m/year.
Falling Rainfall trend @22.198 mm/year
Water level behaviour not in conformity to rainfall

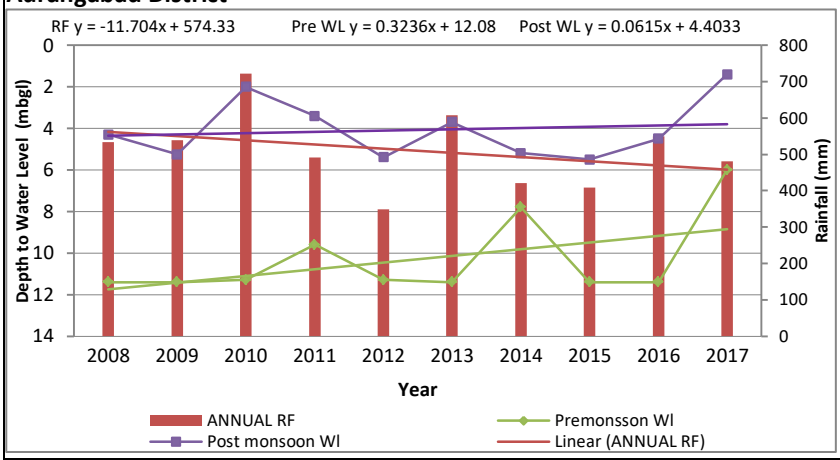
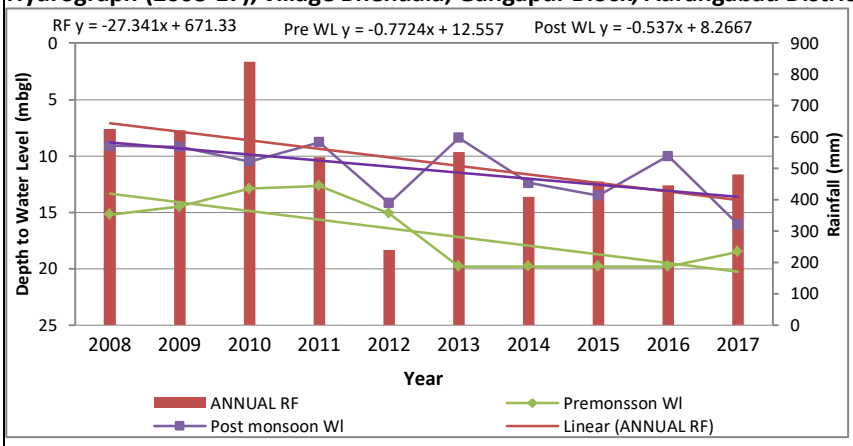
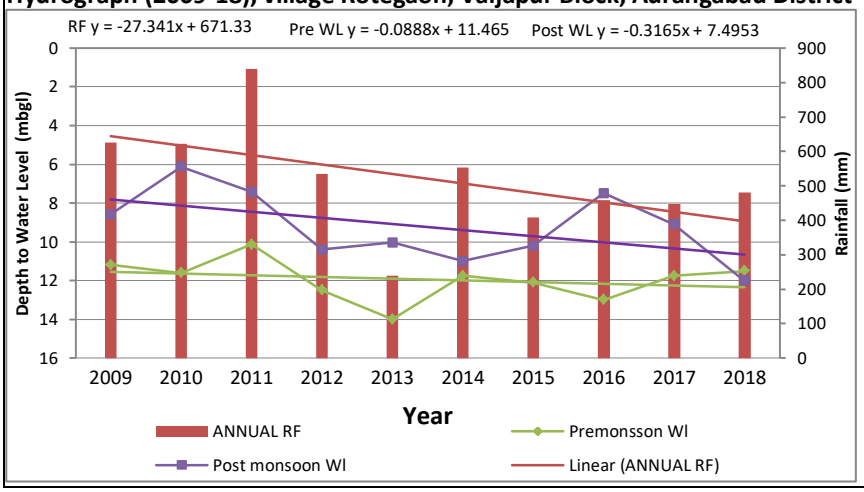
Hydrograph (2008-17), village Adgaon Jawale, Paithan Block, Aurangabad District  	Formation: Basalt Type of Well: Dug Well Pre-monsoon and post-moonsoon Water level trends showing rising trend @ 0.323 and 0.0615 m/ year. Falling Rainfall trend @11.70 mm/year Water level behaviour not in conformity to rainfall
Hydrograph (2008-17), village Bhendala, Gangapur Block, Aurangabad District  	Formation: Basalt Type of Well: Dug Well Pre-monsoon and post-moonsoon Water level trends showing falling trend @ 0.772 and 0.537 m/ year. Falling Rainfall trend @27.34 mm/year Water level behaviour in conformity to rainfall
Hydrograph (2009-18), village Rotegaon, Vaijapur Block, Aurangabad District  	Formation: Basalt Type of Well: Dug Well Pre-monsoon and post-moonsoon Water level trend showing falling trend @ 0.088 and 0.317 m/ year. Falling Rainfall trend @27.34 mm/year Water level behaviour in conformity to rainfall

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). The data gap analysis has been carried out to find out the adequacy of information on water quality and identified additional locations, 86 for shallow and 22 for deeper aquifers. Ground water quality data of 160 monitoring wells of CGWB and GSDA representing shallow aquifer have been utilised to decipher the quality scenario of shallow aquifer. 202 exploratory wells-tubewells/borewells data of CGWB and GSDA representing deeper aquifer have been utilised to

decipher the quality scenario of deeper aquifer. The aquifer wise ranges of different chemical constituents present in ground water are given in **Table 4.1**. The details of chemical analysis are given in Annexure VI and VII.

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

Constituents	Shallow aquifer		Deeper aquifer	
	Min	Max	Min	Max
pH	6.8	9.6	6.8	9.21
EC	344	8273	200	5300
TDS	220.16	6929	130	3345
TH	74.7	3346.6	70	1815
Calcium	11.2	1135.4	2	491
Magnesium	0	537.3	1	205
Potassium	0.1	434	0	299
Sodium	9.6	930.3	11.5	633
Bi-carbonate	8.54	1811.7	20.1	683
Chloride	14	1968.7	20	811
Sulphate	1	1820	0	900
Nitrate	0.2	567	BDL	760
Fluoride	BDL	5	BDL	7.6
Iron	BDL	1.9	BDL	1.8

***BDL- below detection limit**

4.1 ELECTRICAL CONDUCTIVITY (EC)

Distribution of Electrical Conductivity in Shallow Aquifer:

The concentration of EC in shallow aquifer varies between 344 (Rajangaon, Phulambri block) and 8273 µS/cm (Pachod, Paithan block). Out of 160 samples collected from dug wells, 19 samples are having EC more than 2250 µS/cm. Concentration of EC >2250 µS/cm has been observed in 1140 sq. km. area as isolated patches in Vaijapur, Paithan, Khuldabad, Kannad, Phulambri and Gangapur blocks. 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 concentration of EC in deep aquifer varies between 200 (Thergaon, Paithan block) and 5300 µS/cm (Janephal, Vaijapur block). Out of 202 samples collected from tube wells/bore wells, 29 samples are having EC more than 2250 µS/cm. Concentration of EC >2250 µS/cm has been observed in 1290 sq. km. area as isolated patches in Vaijapur, Gangapur and Paithan blocks in adjoining area of Godavari river. The ground water is potable in major parts of the district. The distribution of electrical conductivity in deeper aquifers is shown in **Fig. 4.2** and analytical data is presented in **Table 4.2**.

Table 4. 2: Aquifer wise Electrical conductivity analytical data

S.No.	EC	shallow aquifer		Deeper Aquifer	
	(µS/cm)	No. of samples	% of samples	No. of samples	% of samples
1	< 250	0	0	1	0.50
2	>250-750	37	23.13	28	13.86
3	>750-2250	104	65.00	144	71.29
4	2250-3000	5	3.13	18	8.91
5	3000-5000	14	8.75	11	5.45
Total samples		**160**		**202**	

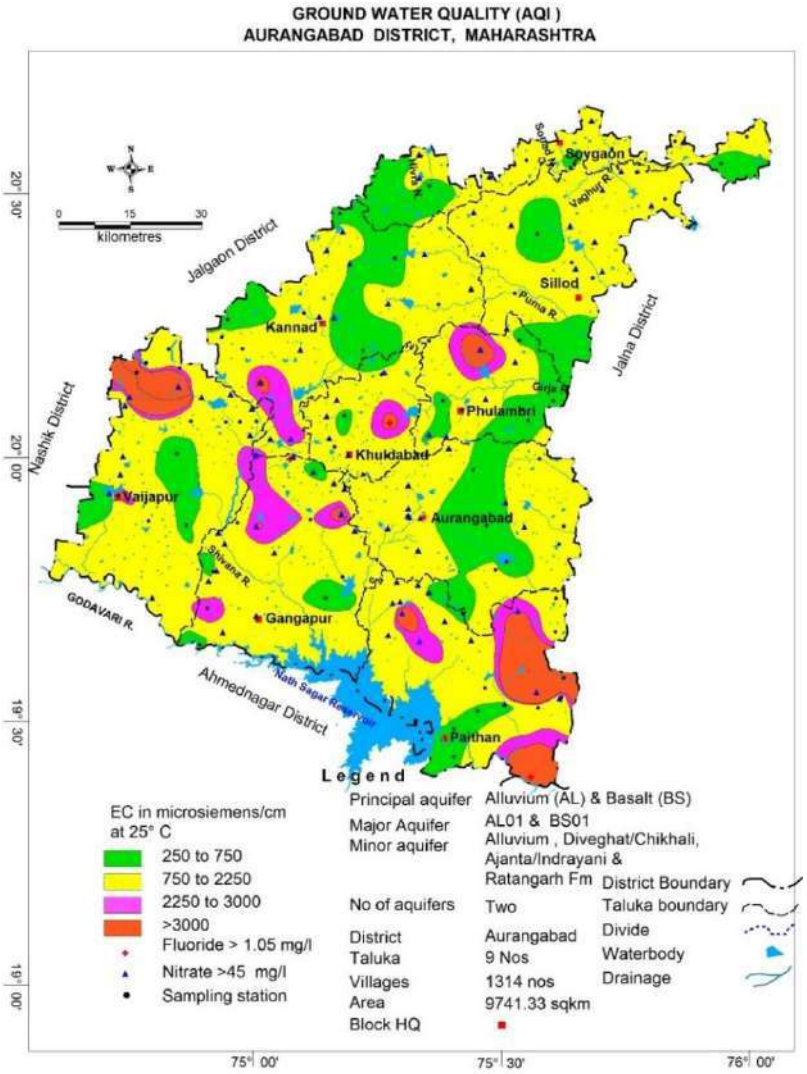


Figure 4. 1: Ground Water Quality, Aquifer-I (EC >2250 µS/cm in 1140 sq. km area)

Nitrate:

Nitrogen in the form of dissolved nitrate, a nutrient for vegetation and the element is essential to all life. The major contribution in ground water is from sewage, waste disposal, nitrate fertilizer and decaying of organic matter. From shallow aquifer, 160 samples were analyzed; out of this 88 water samples show the nitrate concentrations exceeding the desirable limit of 45 mg/l. In Aurangabad district nitrate concentration varies between 0.2 (Apegaon, Gangapur block) to 567 mg/l (Tunki, Vaijapur block). As per BIS (2012) the desirable limit is 45 mg/l. The high concentration of Nitrate may be due to domestic waste and sewage in the urban and rural parts of district.

In deeper aquifer, 202 wells were analyzed, out of this 101 water samples show nitrate concentration exceeding the desirable limit of 45 mg/l. In deeper Aquifer nitrate concentration ranges from BDL to 760 mg/l (Janephal, Vaijapur 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. Aquifer wise nitrate concentration is given in **Table 4.3**.

Fluoride:

In shallow aquifer, concentration of fluoride ranges from BDL to 5.00 mg/l. out of 160 samples analyzed, only 4 samples show fluoride concentration more than 1.5 mg/l. In shallow

aquifer, the highest concentration of fluoride is found in Vita, Kannad block (5.00 mg/l). In Deeper Aquifer, concentration of fluoride ranges from BDL to 7.6 mg/l. Out of 202 samples analyzed, only 12 samples show fluoride concentration more than 1.5 mg/l. In Deeper aquifer, the highest concentration of fluoride is found in Ambai (7.6 mg/L) in Sillod block; it may be due to the geogenic reasons. Aquifer wise fluoride concentration is given in **Table 4.3.**

Table 4. 3: Aquifer wise Nitrate and Fluoride concentration

Block	No_3 > 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
Aurangabad	10	10		2
Phulambri	6	12		
Gangapur	14	6	1	
Kannad	13	27	1	1
Khuldabad	5	2	1	
Paithan	14	16	1	3
Sillod	10	10		1
Soygaon	5			1
Vaijapur	11	18		4
Grand Total	**88**	**101**	**4**	**12**

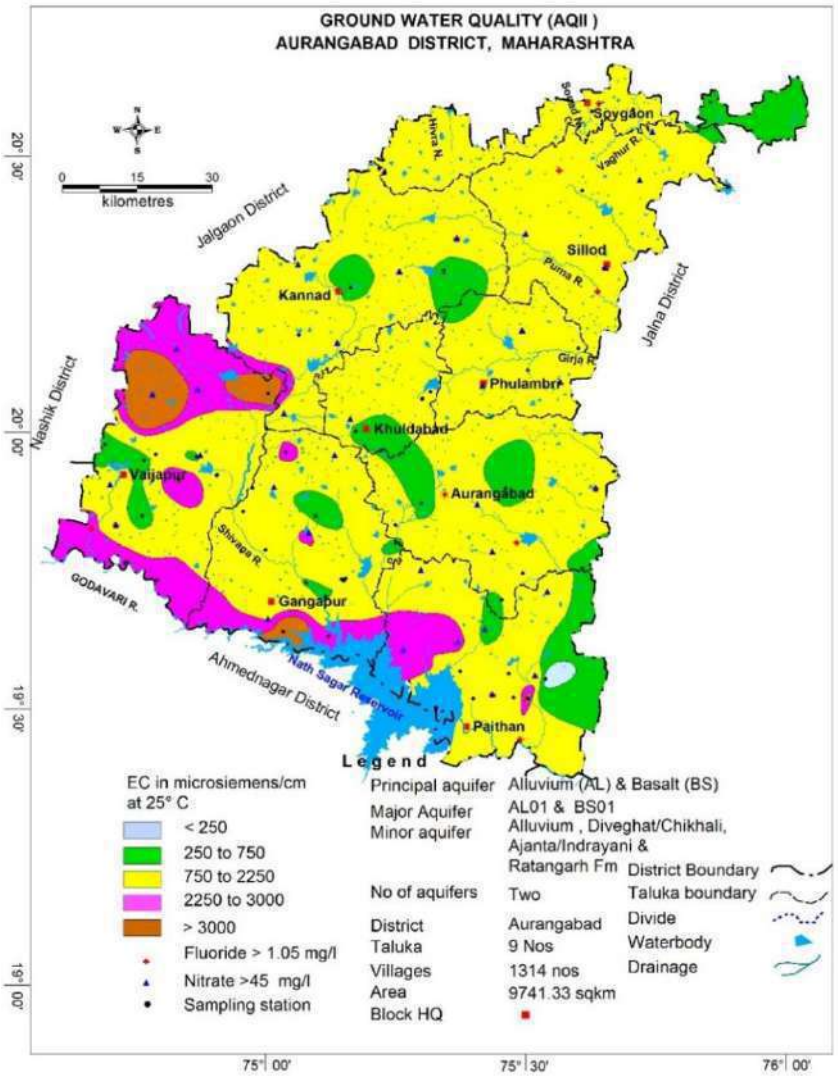


Figure 4. 2: Ground Water Quality, Aquifer-II (EC >2250 µS/cm in 1290 sq. km. area)

4.2 SUITABILITY OF GROUND WATER FOR DRINKING PURPOSE

In shallow aquifer, 6.88 % samples are having TDS more than maximum permissible limit (MPL) and 61 % 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 3 to 21 % samples are beyond the maximum permissible limit for the parameters like pH, TH, Ca, Mg, Cl, SO_4, NO_3 and Fluoride indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in shallow Aquifer is given in **Table 4.4.**

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

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Shallow aquifer					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
	DL	MPL		No	%	No	%	No	%
pH	6.5-8.5	-	141	-	-	128	90.78	13	9.22
TDS	500	2000	160	51	31.87	98	61.25	11	6.88
TH	300	600	160	55	34.37	76	47.5	29	18.13
Ca (mg/L)	75	200	160	59	36.87	67	41.87	34	21.25
Mg (mg/L)	30	100	160	34	21.25	104	65	22	13.75
Cl (mg/L)	250	1000	160	134	83.75	22	13.75	4	2.50
SO_4 (mg/L)	200	400	160	145	90.62	9	5.625	6	3.75
NO_3 (mg/L)	45	No relaxation	160	72	45	88	55	-	0.00
F (mg/L)	1	1.5	160	146	91.25	10	6.25	4	2.50

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

In Deeper aquifer, 4.95 % samples are having TDS more than maximum permissible limit (MPL) and 71 % 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 4 to 14 % samples are beyond the maximum permissible limit for the parameters like TH, Ca, Mg, SO_4, NO_3 and Fluoride indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in Deeper Aquifer is given in **Table 4.5.**

Table 4. 5: Concentration of Chemical Constituents in Deeper Aquifer

Parameter	Drinking water Standards (IS-10500-2012)		Total no of ground water samples	Deeper aquifer					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
	DL	MPL		No	%	No	%	No	%
pH	6.5-8.5	-	202	-	-	195	96.53	7	3.47
TDS	500	2000	202	49	24.26	143	70.79	10	4.95
TH	300	600	202	68	33.66	105	51.98	29	14.35
Ca (mg/L)	75	200	202	96	47.52	86	42.57	20	9.90
Mg (mg/L)	30	100	202	87	43.07	104	51.49	11	5.44
Cl (mg/L)	250	1000	202	157	77.72	45	22.28		0
SO_4 (mg/L)	200	400	197	164	83.25	25	12.69	8	4.06
NO_3 (mg/L)	45	No relaxation	202	101	50.00	101	50.00	-	-
F (mg/L)	1	1.5	202	160	79.21	29	14.36	13	6.43

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 4.6 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. 6 Classification of Ground water for Irrigation based on EC values

S. No	Water Quality Type	EC in µS/cm	Shallow aquifer		Deeper Aquifer	
			No. of Samples	% of samples	No. of samples	% of samples
1	Low Salinity Water	< 250	0	0	1	0.50
2	Medium Salinity Water	>250-750	37	23.13	28	13.86
3	High Salinity Water	>750-2250	104	65.00	144	71.29
4	Very High Salinity Water	> 2250	19	11.88	29	14.36
Total			**98**	**100**	**160**	**100**

In shallow aquifer, maximum numbers of samples fall under the category of medium to high salinity type of water. In deeper aquifer, maximum numbers of samples fall under the category of high to very high salinity type of water. The areas where very high salinity prevails (>2250 µS/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 160 samples analyzed and all samples are having SAR value less than 10. In deeper aquifer, out of 202 samples 10 samples (4 villages) are having SAR value more than 10 in Gangapur and Aurangabad blocks. The classification of ground water samples based on SAR values for its suitability for irrigation purpose is shown in **Table 4.7.**

Table 4. 7: Classification of Ground water for Irrigation based on SAR values

Characteristics	Quality	SAR value							
	Total Number of GW samples	< 10		10-18		18-26		> 26	
		Good		Good to Permissible		Doubtful		Bad (Unsuitable)	
		No	%	No	%	No	%	No	%
Shallow Aquifer	160	160	100	-	-	-	-	-	-
Deeper Aquifer	202	192	95.05	10	4.95	-	-	-	-
Total	**362**	**352**	97.24	**27**	**7.46**	-	-	-	-

Residual Sodium Carbonate (RSC)

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

Table 4. 8: Classification of Ground water for Irrigation based on RSC values

Characteristics	Quality	RSC values (meq/L)					
		< 1.25		1.25-2.50		> 2.50	
		Good		Doubtful		Bad (Unsuitable)	
	Total No of GW samples	No	%	No	%	No	%
Shallow Aquifer	160	159	99.38	-	-	1	0.63
Deeper Aquifer	202	179	88.61	10	4.95	13	6.44
Total	**362**	**338**	**93.37**	**10**	**2.76**	**14**	**3.87**

In shallow aquifer, it is observed that out of 160 samples, only 1 sample (Adagaon, Paithan block) shows RSC values more than 1.25 meq/L indicating that the ground water of the area is not suitable for irrigation while in deeper aquifer, out of 202 samples, 23 samples show RSC more than 1.25 meq/L indicating that the ground water of the area is not suitable for irrigation.

5. GROUND WATER RESOURCES

5.1 GROUND WATER RESOURCES – AQUIFER-I

Central Ground Water Board and Ground Water Survey and Development Agency (GSDA) have jointly estimated the ground water resources of Aurangabad district based on GEC-97 methodology. Block wise ground water resources are given in Table 5.1, and graphical representations of the resources on the map are shown in **Figure 5.1**.

Ground Water Resource estimation was carried out for 9501.74 sq. km. area out of which 1523.45 sq. km. is under command and 7978.29 sq. km. is non-command. About 718.67 sq. km. area is hilly and this is not considered for resource estimation. As per the estimation, the net annual ground water availability comes to be 1062.19 MCM. The gross draft for all uses is estimated at 806.45 MCM with irrigation sector being the major consumer having a draft of 773.57 MCM. The domestic and industrial water requirements are worked at 64.26 MCM. The net ground water availability for future irrigation is estimated at 232.75 MCM. Stage of ground water development varies from 65.13 % (Khuldabad) to 84.75% (Gangapur). The overall stage of ground water development for the district is 75.92%. Block wise assessments indicate that all the blocks in the district fall under “Safe” category.

Table 5. 1: Ground water resources, Aquifer-I (Shallow aquifer), Aurangabad district (2013)

Administrative Unit	Command / Non-Command / Total	Net Annual Ground Water Availability (ham)	Existing Gross GW Draft for irrigation (ham)	Existing Gross GW Draft for domestic and industrial water supply (ham)	Existing Gross Ground Water Draft for All uses (ham)	Provision for domestic and industrial requirement supply to 2025 (ham)	Net Ground Water Availability for future irrigation development (ham)	Stage of Ground Water Development (%) /Category
Aurangabad	Command	3283.06	2137.05	113.05	2250.10			
	Non-Command	9960.39	7342.64	516.94	7859.57			
	Total	13243.45	9479.69	629.99	10109.67	1199.96	2395.07	**76.34/Safe**
Phulambri	Command	516.42	237.23	7.94	245.17			
	Non-Command	4107.46	3490.07	113.62	3603.70			

Administrative Unit	Command / Non-Command / Total	Net Annual Ground Water Availability (ham)	Existing Gross GW Draft for irrigation (ham)	Existing Gross GW Draft for domestic and industrial water supply (ham)	Existing Gross Ground Water Draft for All uses (ham)	Provision for domestic and industrial requirement supply to 2025 (ham)	Net Ground Water Availability for future irrigation development (ham)	Stage of Ground Water Development (%) /Category
	Total	4623.88	3727.30	121.56	3848.86	245.89	768.15	**83.24/Safe**
Gangapur	Command	3475.17	2041.10	103.69	2144.79			
	Non-Command	9565.67	8545.59	362.12	8907.71			
	Total	13040.84	10586.69	465.81	11052.50	843.13	2394.30	**84.75/Safe**
Kannad	Command	2064.64	1511.21	54.95	1566.16			
	Non-Command	13615.87	9275.42	430.83	9706.25			
	Total	15680.51	10786.63	485.78	11272.41	973.98	3787.20	**71.89/Safe**
Khuldabad	Command	1207.53	1084.20	32.54	1116.74			
	Non-Command	5143.64	2853.97	165.57	3019.54			
	Total	6351.17	3938.17	198.11	4136.28	392.63	2098.01	**65.13/Safe**
Paithan	Command	7856.67	5194.35	124.98	5319.33			
	Non-Command	10726.36	7753.40	301.48	8054.88			
	Total	18583.03	12947.75	426.46	13374.21	857.46	4791.61	**71.97/Safe**
Sillod	Command	1830.00	1580.94	46.15	1627.09			
	Non-Command	11001.20	7576.61	325.81	7902.42			
	Total	12831.19	9157.55	371.96	9529.51	753.64	2838.00	**74.27/Safe**
Soygaon	Command	1281.30	973.11	19.04	992.15			
	Non-Command	4227.58	2552.70	77.76	2630.46			
	Total	5508.88	3525.80	96.81	3622.61	188.72	1954.41	**65.76/Safe**
Vaijapur	Command	5072.58	3950.78	158.39	4109.17			
	Non-Command	11284.22	9256.96	333.79	9590.76			
	Total	16356.80	13207.75	492.18	13699.93	971.10	2248.43	**83.76/Safe**
District Total	**Command**	**26587.37**	**18709.97**	**660.74**	**19370.71**			**75.92/Safe**
	Non-Command	**79632.38**	**58647.36**	**2627.92**	**61275.28**			
	Total (ham)	**106219.76**	**77357.33**	**3288.67**	**80645.99**	**6426.51**	**23275.18**	
	Total (MCM)	**1062.19**	**773.57**	**32.88**	**806.45**	**64.26**	**232.75**	

5.2 GROUND WATER RESOURCES – AQUIFER-II

The ground water resources of Aquifer-II (Basalt) were also assessed to have the correct quantification of resources so that proper management strategy can be framed. The total resources of aquifer-II have been estimated as 195.841 MCM. Block wise summarized Ground Water Resources of Aquifer-II are given in **Table 5.2.**

Table 5. 2: Ground Water Resources of Aquifer-II (Deeper aquifer)

Block	Aquifer	Area (Sq. km.)	Average Mean aquifer thickness (m)	Average of S	Average of Sy	Resource above confining layer (MCM)	Resource in aquifer (MCM)	Total resource (MCM)
Aurangabad	Basalt Aq-II	1474.15	3.25	0.00012975	0.0037	7.15122	15.6028	22.7540
Phulambri	Basalt Aq-II	400.29	4.666	0.0000315	0.0041	0.39256	7.98268	8.37524
Gangapur	Basalt Aq-II	1280.38	6.125	0.000079875	0.0037	0.96928	11.0869	12.0561
Kannad	Basalt Aq-II	1280.51	4.666	0.000026333	0.0041	1.40506	21.0589	22.4639
Khuldabad	Basalt Aq-II	437.56	3.25	0.00012975	0.0062	2.41244	5.93947	8.35191
Paithan	Basalt Aq-II	1499.11	3.25	0.00004	0.005	2.22859	23.6032	25.8318
Sillod	Basalt Aq-II	1284.59	5.05	0.0000779	0.0045	4.90696	17.9353	22.8423
Soygaon	Basalt Aq-II	741.24	6.125	0.00013362	0.0075	2.15417	28.2743	30.4285
Vaijapur	Basalt Aq-II	1343.97	6.125	0.00008875	0.0075	1.20615	41.5308	42.7369
Total		**9741.83**				**22.8264**	**173.014**	**195.841**

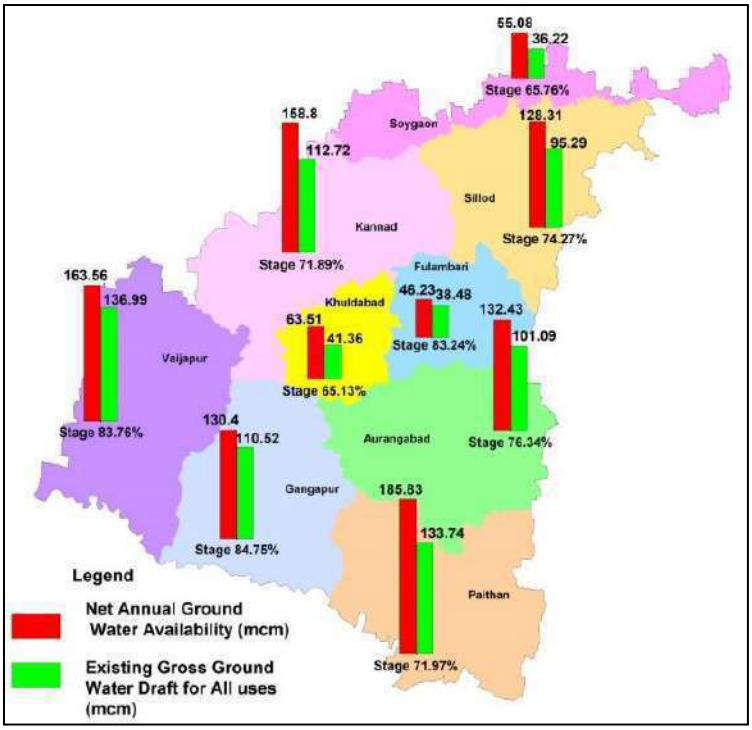
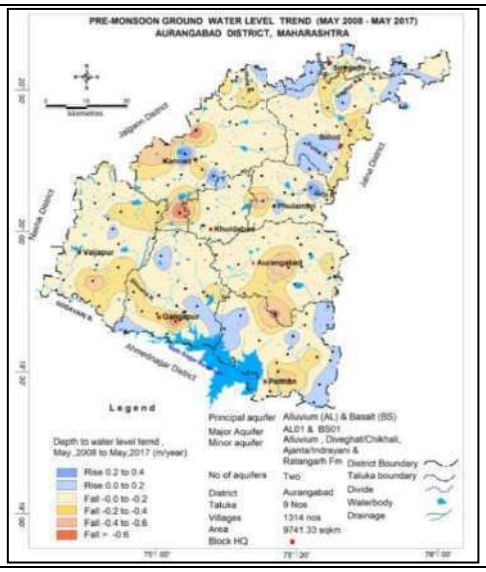
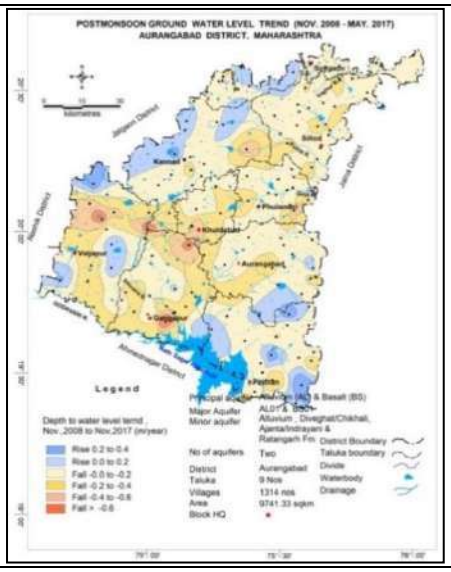


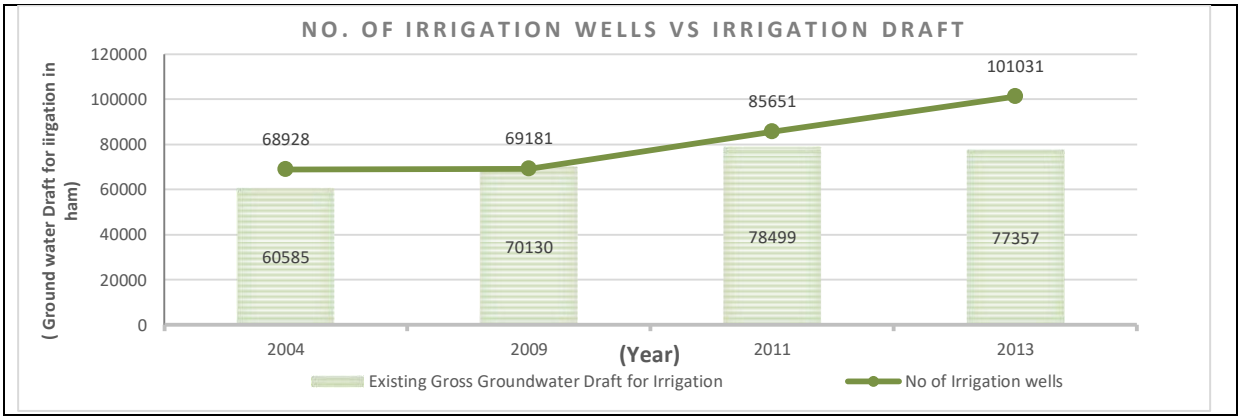
Figure 5. 1: Ground Water Resources (2013), Aurangabad district

6. GROUND WATER RELATED ISSUES

6.1 Declining Water Level trend

The ground water exploitation has resulted in decline of water levels over the period of time. In Pre-monsoon season, decline of more than 0.20 m/year has been observed in 2420 sq. km., i.e., 24 % area covering parts of Aurangabad, Vaijapur, Gangapur, Paithan, Khuldabad, Kannad and Sillod blocks and isolated parts in Soygaon and Phulambri blocks. In post monsoon season, decline of more than 0.20 m/year has been observed in 2978 sq. km., i.e., 29 % area covering parts of Gangapur, Vaijapur, Khuldabad, Kannad and Aurangabad blocks. Apart from these isolated patches are also observed in Sillod, Phulambri and Paithan blocks. The decline may be because the area has experienced increased irrigation draft and number of irrigation wells, in addition to this has received continously less annual rainfall than the normal rainfall between the period from 2008-17.

	
Pre-monsoon Fall @>0.2/year in 2420 Sq. km.	Post-monsoon Fall@>0.2/year in 2978 Sq. km.



6.2 Rainfall and Droughts

As per Agro-climatic Zones, Aurangabad district falls under Western Drought prone Area and Central Plateau Assured Rainfall Zone. Southern part of the district falls under Western Drought prone Area characterized by low and unpredictable rainfall of 500 to 700 mm/year in 40-45 days. Common dry spells will last from 2 to 10 weeks. Delayed onset and early cessation of S-W monsoon is quite common.

Based on the long-term rainfall analysis from 1901 to 2017 it is observed that all the blocks experienced declining rainfall trend except Aurangabad, Phulambri and Vaijapur blocks. Severe droughts have been observed in Gangapur, Vaijapur and Khuldabad 4 times, 2 times in Aurangabad, Kannad, Paithan and Soygaon blocks and once in Phulambri and Sillod blocks. Moderate drought experienced in Aurangabad block 16 times, 11 times in Gangapur, Kannad, Khuldabad, Paithan blocks, 12 times in Sillod and Vaijapur blocks; 8 times in Soygaon and once in Phulambri block.

Table 6. 1: Block wise Rainfall Analysis

Category	Aurangabad block	Phulambri block	Gangapur block	Kannad block	Khuldabad block	Paithan block	Sillod block	Soygaon block	Vaijapur block
Period	1901-2017	1998-2017	1951-2017	1951-2017	1951-2017	1957-2017	1951-2017	1958-2017	1952-2017
No of Years	116	20	67	67	67	57	60	53	66
Normal Rainfall (mm)	737.6	566.2	627.9	657.9	778.5	634.3	706.1	775.9	523
Standard Deviation (mm)	187	220	189	201	248	195	184	211	168
Coefficient of Variation (%)	25%	39%	30%	31%	32%	31%	26%	27%	32%
Rainfall Trend/Slope (mm/yr)	0.227	9.677	-2.919	-2.804	-4.474	-2.679	-1.913	-1.664	0.232
Departures (years)									
Positive	62	12	37	31	34	25	30	25	34
Negative	54	8	30	36	33	32	30	28	32
Droughts (years)									
Moderate	**16 times** (1907,1908, 1912,1918, 1921,1925, 1945,1951, 1964,1972, 1974,1984, 1986,2007, 2012,2014)	**1 time** (2012)	**11 times** (1952, 1972, 1982, 1984, 1992, 1994, 1997, 2002, 2014, 2015, 2016)	**11 times** (1952,1972, 1976,1982, 1986,1993, 1995,2000, 2003,2004, 2012)	**11 times** (1969,1976, 11978,1885, 1997,2001, 2005,2007, 2011,2014, 2016)	**11 times** (1962, 1965,1981, 1982,1984, 1985,1986, 1992,2012, 2014,2015)	**12 times** (1960,197 1,1972,19 82,1984,1 985,1986, 1999,2001 ,2005,200 8,2012,	**8 times** (1965, 1971, 1972, 1974, 1982, 1987 ,2012, 2017)	**12 times** (1952, 1970, 1971, 1976, 1977, 1982, 1984, 1986, 1994, 1995, 2001, 2012)

Category	Aurangabad block	Phulambri block	Gangapur block	Kannad block	Khuldabad block	Paithan block	Sillod block	Soygaon block	Vaijapur block
Severe	**2 times** (1905,1920)	**1 time** (2000)	**4 times** (1985, 1986, 2003, 2012)	**2 times** (1984, 1985)	**4 times** (1972,1984, 2000,2012)	**2 times** (1972, 2000)	**1 time** (2000)	**2 times** (1985, 2000)	**4 times** (1972, 1985, 2002 2003)
Acute	0	**1 time** (1999)	0	0	0	0	0	0	0
Normal & Excess R/F (years)									
Normal	82	13	38	41	40	30	36	32	38
Excess	16	4	14	13	12	14	11	11	12

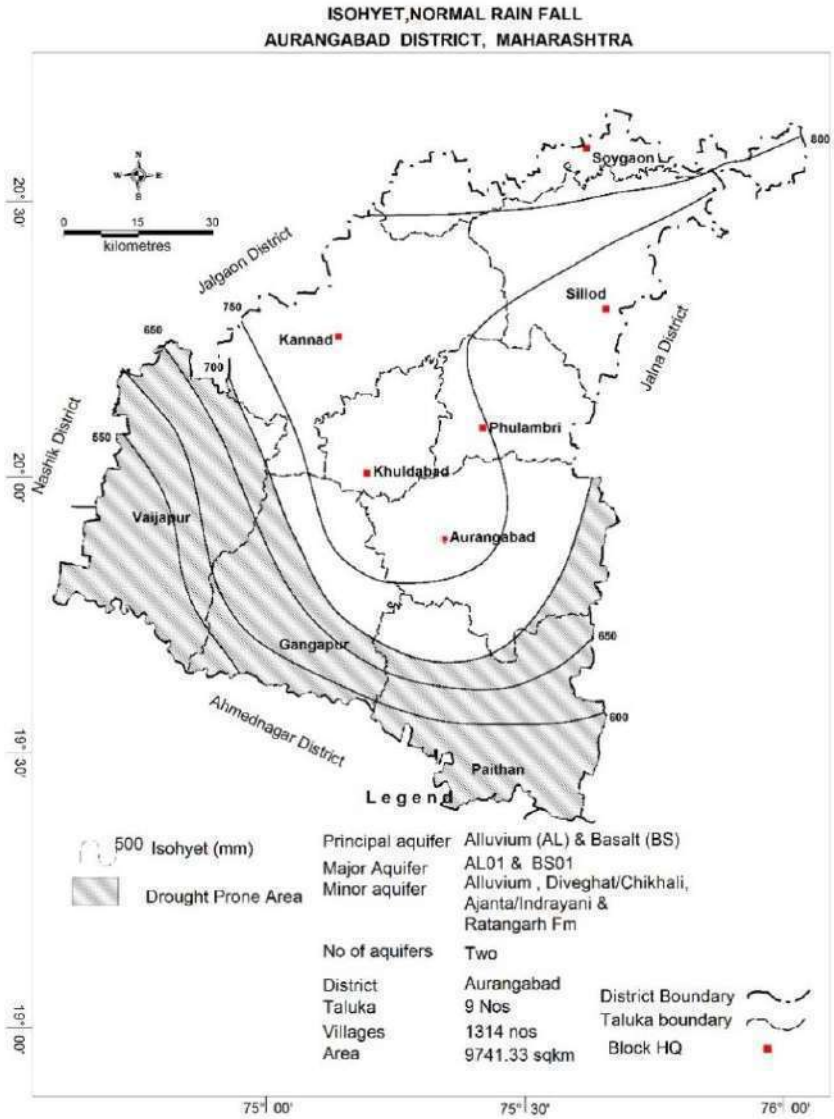


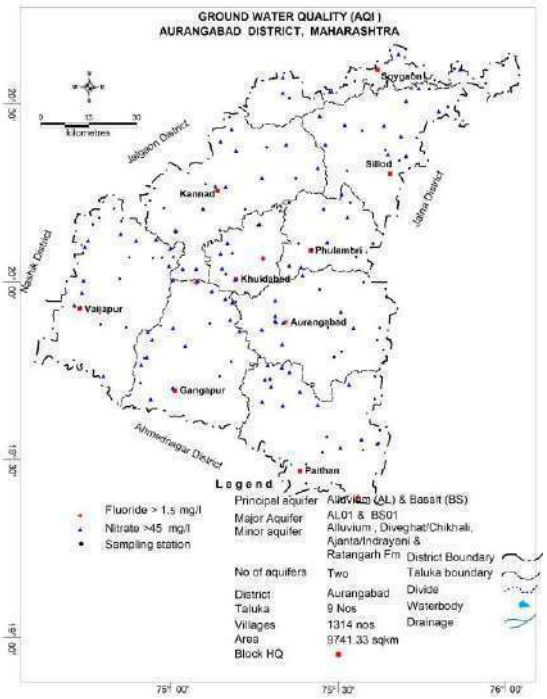
Figure 6. 1 : Drought Prone Area, Aurangabad District

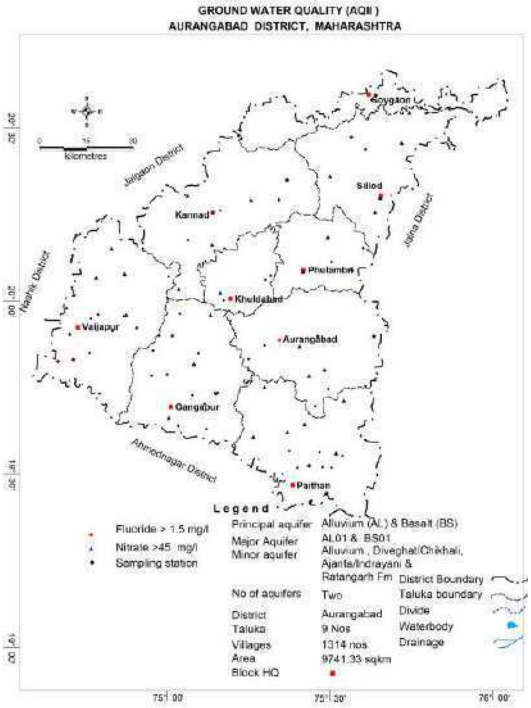
6.3 Ground Water Quality Hazard

Nitrate:

High nitrate (> 45 mg/l) is observed in 55 % samples in shallow Aquifer and 50% samples in deeper aquifer. The major contribution in ground water is from sewage, waste disposal, nitrate fertilizer and decaying of organic matter. In shallow Aquifer high nitrate concentration i.e., 567 mg/l is found in Tunki village, Vaijapur block. In deeper Aquifer high nitrate concentration i.e., 760 mg/l is found in Janephal village, Vaijapur block. High concentration of Nitrate may be due to domestic

waste and sewage in the urban and rural parts of district. 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.





Block	No of locations showing NO3 >45 mg/L	No of locations showing F >1.5 mg/L
Aurangabad	10	-
Phulambri	6	-
Gangapur	14	1
Kannad	13	1
Khuldabad	5	1
Paithan	14	1
Sillod	10	-
Soygaon	5	-
Vaijapur	11	-
Grand Total	**88**	**4**

Block	No of locations showing NO3 >45 mg/L	No of locations showing F >1.5 mg/L
Aurangabad	10	2
Phulambri	12	-
Gangapur	6	-
Kannad	27	1
Khuldabad	2	-
Paithan	16	3
Sillod	10	1
Soygaon	-	1
Vaijapur	18	4
Grand Total	**101**	**12**

Fluoride:

In shallow aquifer, concentration of fluoride ranges from BDL to 5.00 mg/l. out of 160 samples analyzed**,** only 4 samples show fluoride concentration more than 1.5 mg/l. In shallow aquifer, the highest concentration of fluoride is found in Vita, Kannad block (5.00 mg/l). In Deeper Aquifer, concentration of fluoride ranges from BDL to 7.6 mg/l. Out of 202 samples analyzed, only 12 samples show fluoride concentration more than 1.5 mg/l. In Deeper aquifer, the highest concentration of fluoride is found in Ambai (7.6 mg/L) in Sillod block; it may due to the geogenic reason only.

6.4 SUSTANABILITY:

The major part of the district is occupied by basaltic rock formation that inherently consist of limited extent of porous and pervious zone; absence of primary porosity; predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity and also, low rainfall results in poor sustainability of the aquifers. However, the erratic nature of existing joints/fractures pattern results in highly varying yield capacities of the aquifers in the area. In the area depth of potential aquifers is generally restricted up to 30 m. The potential of the fracture zones reduces substantially below 100 m depth. This causes reduction in the well yield drastically during the summers. About 75% of area of the district having low yield potential (<1 lps). In southern part of the district alluvium occurs along the major drainage/ valley fills and has shallow

thickness (up to 28 m) with limited extent. However, moderate to high yield potential areas are found in southern part of district.

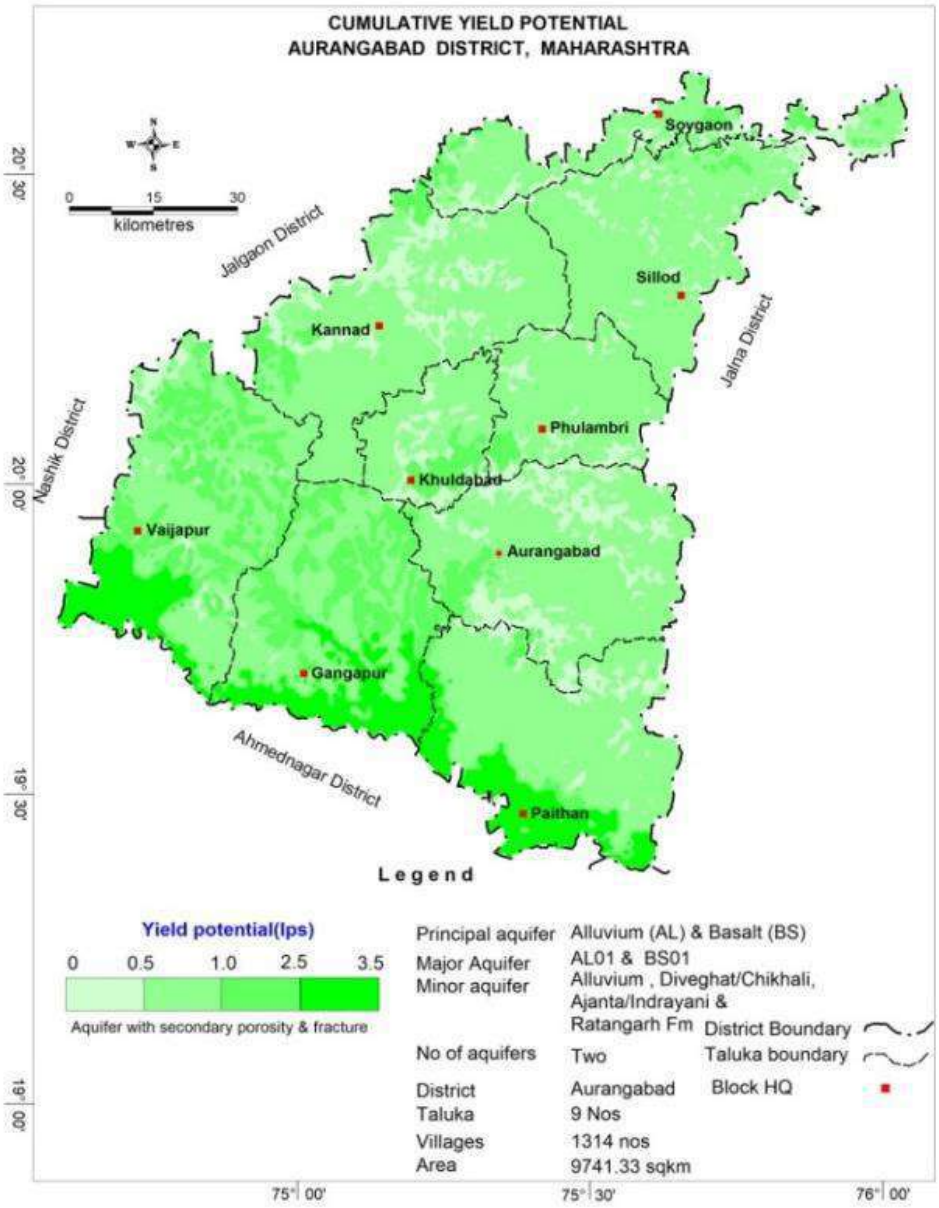


Figure 6. 2 : Cumulative yield Potential

6.5 EXPLOITATION OF GROUND WATER RESOURCES

In all the blocks of the district, stage of ground water development has increased over the period of time from 2004 to 2013 except Phulambri block where slight decrease in the stage of devlopement from 86.90% (2011) to 83.41 % (2013) is observed.

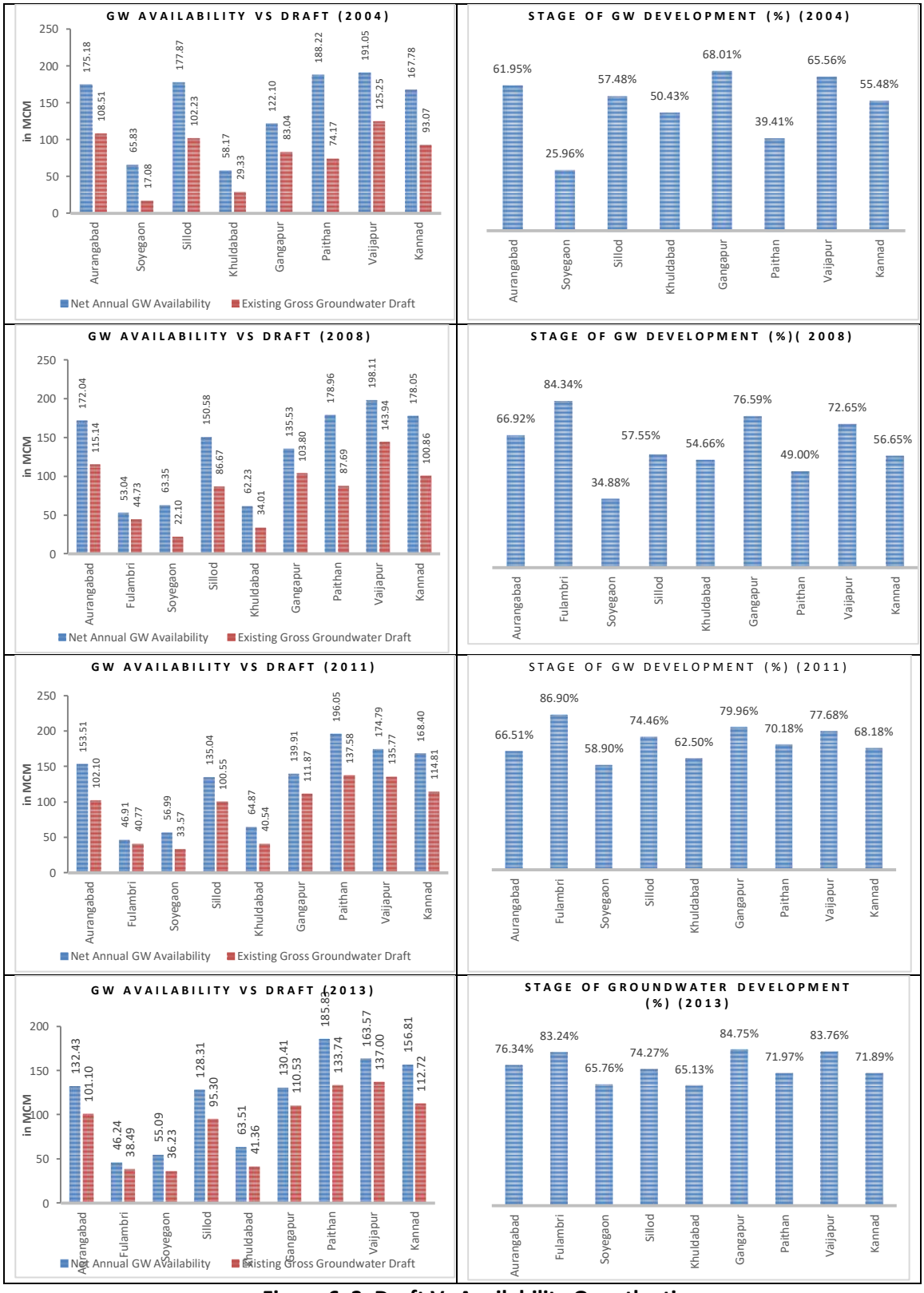


Figure 6. 3: Draft Vs Availability Over the time

7. 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 5 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)
Aurangabad	1622.08	909.2	1818.4
Phulambri	510.55	94.46	188.92
Gangapur	1280.19	1280.19	2560.38
Kannad	1393.27	1280.47	2560.94
Khuldabad	509.87	255.14	510.28
Paithan	1504.78	1384.82	2769.64
Sillod	1284.14	542.68	1085.36
Soygaon	741.69	29.48	58.96
Vaijapur	1373.84	1343.66	2687.32
Grand Total	**10220.41**	**7120.1**	**14240.2**

The total unsaturated volume available for artificial recharge is 14240 MCM ranging from 58.96 MCM in Soygaon block to 2769 MCM in Paithan 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 149.31 MCM of surplus water can be utilised for recharge, which is given in table 7.2. This surplus water can be utilized for constructing 400 percolation tanks and 1063 check 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 111.89 MCM/year. Tentative locations of these structures are given in **Fig. 7.1** and details also given in **Annexures VIII and IX.**

The rainwater harvesting in urban areas can be adopted in 25% of the household with 50 m^2 roof area. A total of 4.19 MCM potential can be generated by taking 80% runoff coefficient.

Table 7.2: Proposed Artificial Recharge Structures

Block	Geographical Area (sq. km.)	Area feasible for recharge (sq. km.)	Unsaturated Volume (MCM)	Surplus water available for AR (MCM)	Proposed number of structures		Total Volume of Water expected to be recharged@ 75 % efficiency (MCM)		Total recharged @ 75 % efficiency (MCM)
					PT	CD	PT	CD	
Aurangabad	1622.08	909.2	1818.4	19.06	52	130	10.4	3.9	**14.3**
Phulambri	510.55	94.46	188.92	1.98	5	16	1	0.48	**1.48**
Gangapur	1280.19	1280.19	2560.38	26.85	72	191	14.4	5.73	**20.13**
Kannad	1393.27	1280.47	2560.94	26.85	72	191	14.4	5.73	**20.13**
Khuldabad	509.87	255.14	510.28	5.36	15	34	3	1.02	**4.02**
Paithan	1504.78	1384.82	2769.64	29.04	80	192	16	5.76	**21.76**
Sillod	1284.14	542.68	1085.36	11.38	25	117	5	3.51	**8.51**
Soygaon	741.69	29.48	58.96	0.61	1	8	0.2	0.24	**0.44**
Vaijapur	1373.84	1343.66	2687.32	28.18	78	184	15.6	5.52	**21.12**
Grand Total	**10220.41**	**7120.1**	**14240.2**	**149.31**	**400**	**1063**	**80**	**31.89**	**111.89**

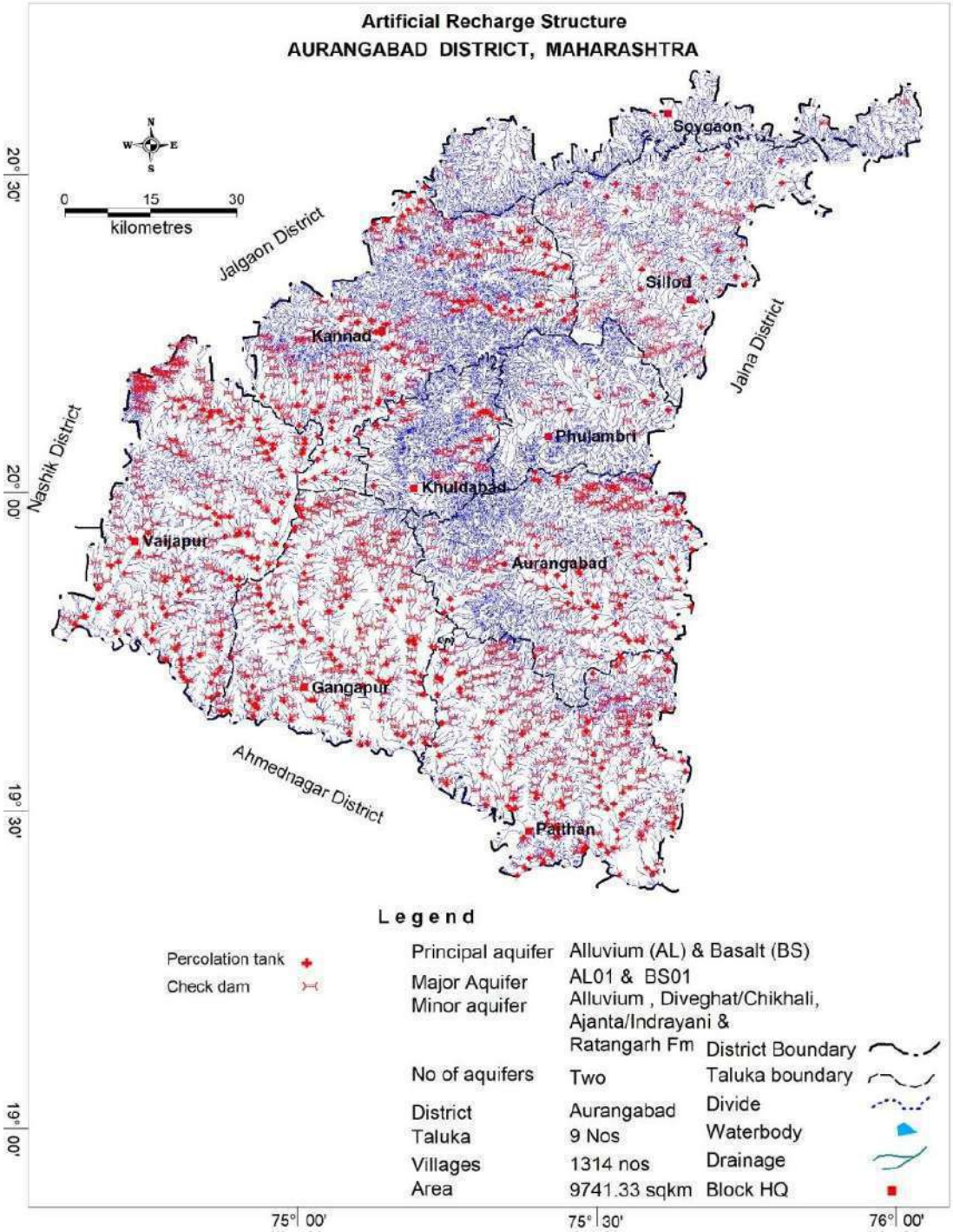


Figure 7. 1: Location of Proposed Artificial Recharge structures

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 87.85 Sq. km. area in all blocks and that would save a total of 37.4 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.

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

Block	MICROIRRIGATION TECHNIQUES				
	Sugarcane Area proposed (Sq. km.)	Citrus Area proposed (Sq. Km.)	Double crop Area proposed (Sq. km.)	Cotton crop Area proposed (Sq. km.)	Volume of Water saved (MCM)
Aurangabad	1				0.57
Phulambri	1		11	10	7.57
Gangapur	18		7	5	14.36
Kannad	1				0.57
Khuldabad	2				1.14
Paithan	2				1.14
Sillod	**5**				2.85
Soygaon		3.85			1.345
Vaijapur	5		6	10	7.85
Grand Total	**35**	**3.85**	**24**	**25**	**37.395**

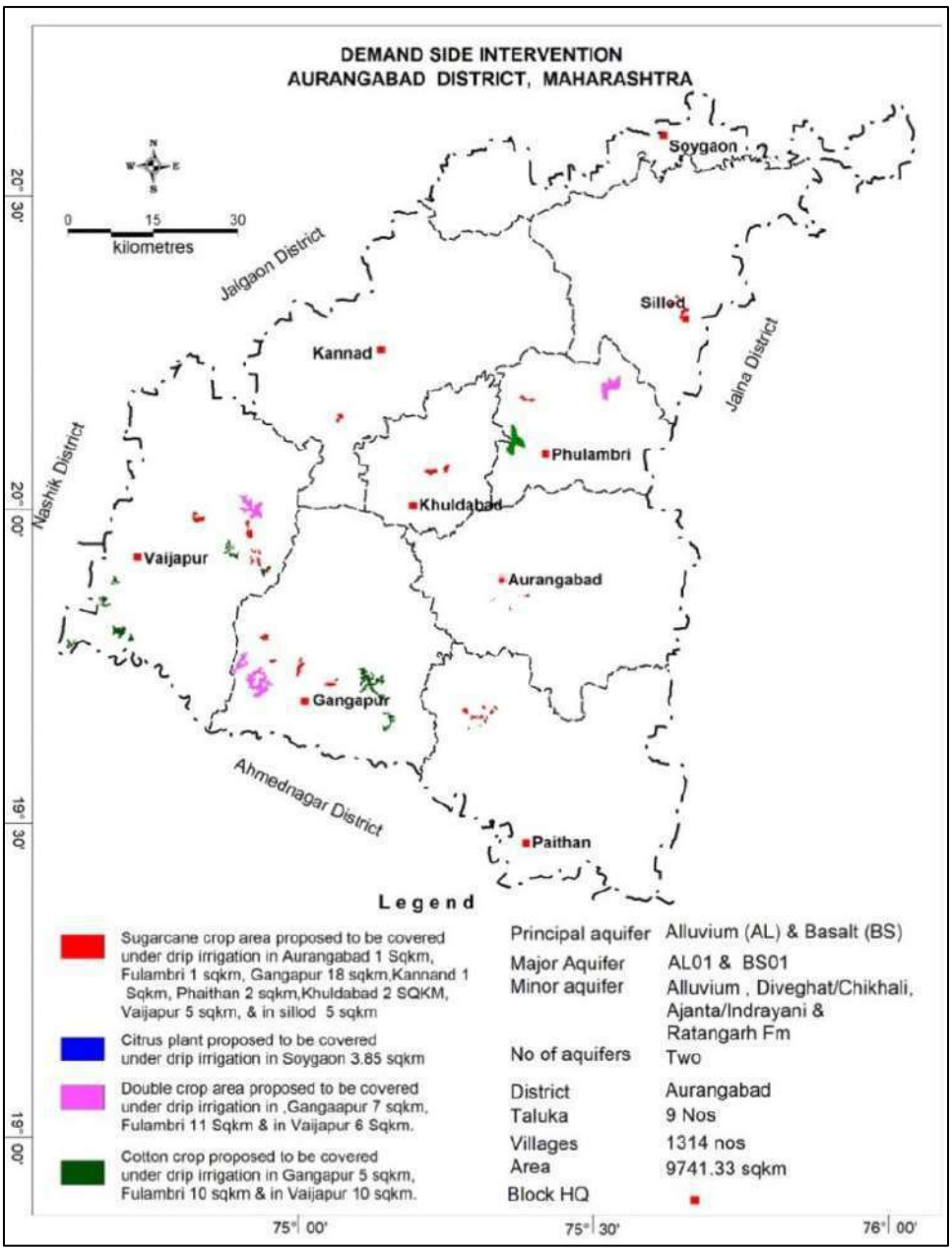


Figure 7. 2: Demand Side Intervention

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 7.4). The Stage of ground water development gets reduced and comes below 70%.

Table 7.4: Expected benefits after management options

Block	Water Recharged by Supply side intervention	Water saving by demand side interventions	Net Ground water availability (As per GWRE, 2013)	Total ground water draft (As per GWRE, 2013)	Ground water resources after supply side management	Ground water Draft after demand side management	Expected stage of Develop-ment
	(MCM)/year						%
Aurangabad	14.3	0.57	132.43	101.10	146.73	100.53	**68.51**
Fulambri	1.48	7.57	46.24	38.49	47.72	30.92	**64.79**
Gangapur	20.13	14.36	130.41	110.53	150.54	96.17	**63.88**
Kannad	20.13	0.57	156.81	112.72	176.94	112.15	**63.39**
Khuldabad	4.02	1.14	63.51	41.36	67.53	40.22	**59.56**
Paithan	21.76	1.14	185.83	133.74	207.59	132.60	**63.88**
Sillod	8.51	**2.85**	128.31	95.30	136.82	92.45	**67.57**
Soygaon	0.44	1.35	55.09	36.23	55.53	34.88	**62.81**
Vaijapur	21.12	7.85	163.57	137.00	184.69	129.15	**69.93**
Grand Total	**111.89**	**37.4**	**1062.20**	**806.46**	**1174.09**	**769.06**	**65.50**

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 52.79 MCM volume of ground water generated can bring additional 81.22 sq. km. Kharif Crop area under assured ground water irrigation with average crop water requirement of 0.65 m by constructing 3167 Dug wells and 528 Bore wells. Block wise details are given in **Table 7.5**. The area feasible for ground development is shown in **Fig. 7.3**.

Table 7. 5: Block wise additional area under assured GW Irrigation

Block	Net Ground water availability (As per GWRE, 2013) (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.)
Aurangabad	132.43	146.73	100.53	68.51	2.181	131	22	3.36
Phulambri	46.24	47.72	30.92	64.79	2.484	149	25	3.82
Gangapur	130.41	150.54	96.17	63.88	9.218	553	92	14.18
Kannad	156.81	176.94	112.15	63.39	11.7	702	117	18.00
Khuldabad	63.51	67.53	40.22	59.56	7.05	423	71	10.85
Paithan	185.83	207.59	132.60	63.88	12.713	763	127	19.56
Sillod	128.31	136.82	92.45	67.57	3.32	199	33	5.11
Soygaon	55.09	55.53	34.88	62.81	3.99	239	40	6.14
Vaijapur	163.57	184.69	129.15	69.93	0.136	8	1	0.21
Grand Total	**1062.20**	**1174.09**	**769.06**	**65.50**	**52.79**	**3167**	**528**	**81.22**

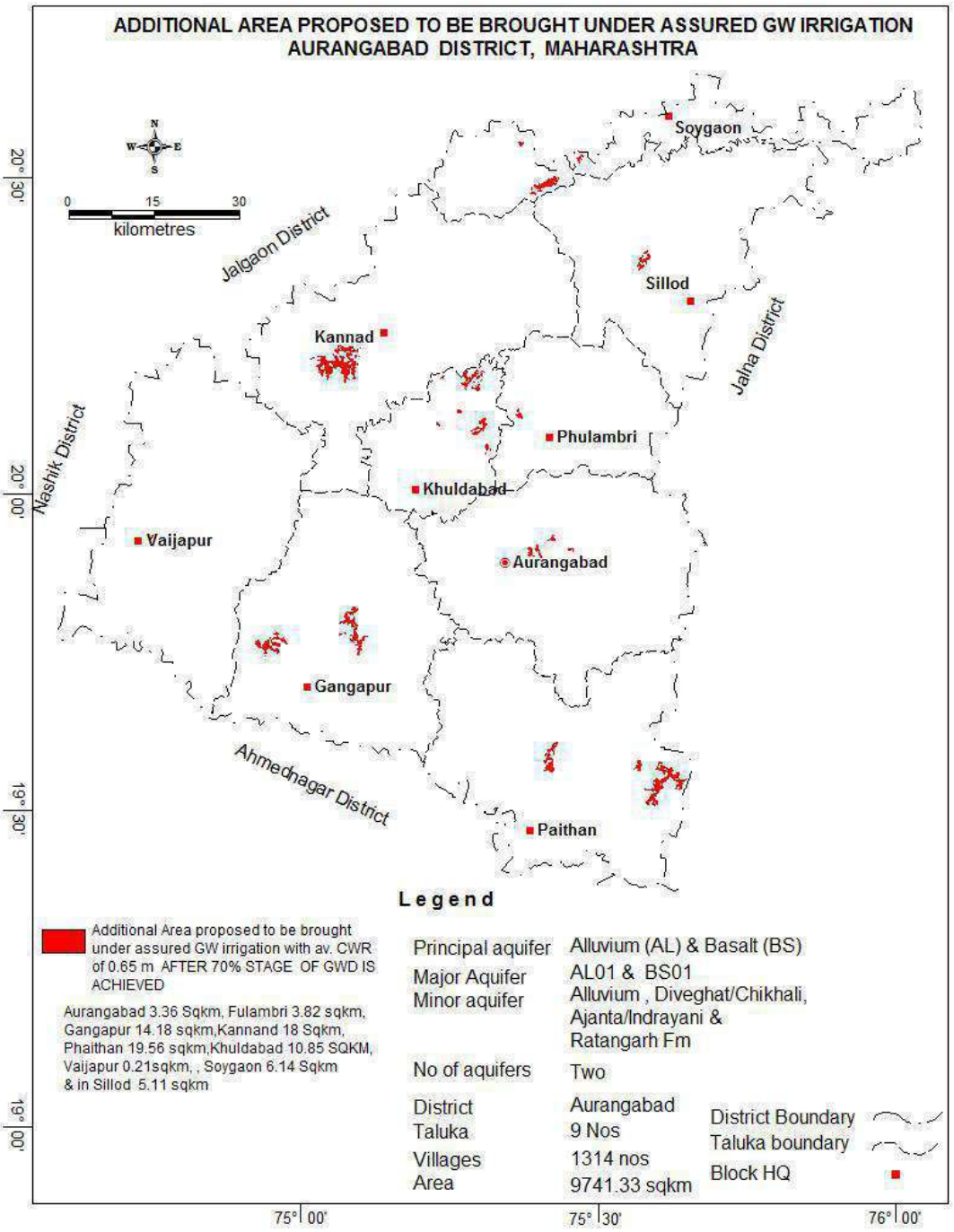


Figure 7. 3: Additional area Proposed to be bought under Assured GW irrigation

8. SUM UP

A thorough study was carried out based on data gap analysis, data generated in-house; data acquired from State Government 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 Aurangabad district.

Aurangabad district covering an area of about 10220 sq. km with 719 sq. km being hilly terrain is occupied by Basalt and Alluvium formations. The stage of ground water development of the district is 75.92%. The area has witnessed relatively high exploitation of ground water resource, declining water level, low rainfall and drought; low yield potential of aquifers and Ground Water Quality hazards (No_3) are the major issues in the district. Declining water level trend of more than 0.20 m/year has been observed in 2420 sq. km. (24% area of the total area) during pre-monsoon

(2008-17). Declining water level trend of more than 0.20 m/year has been observed in 2978 sq.km (30% area of the total area) during post monsoon (2008-17).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 400 Percolation tanks and 1063 Check dams are proposed, which will augment ground water resources to the tune of 111.89 MCM/year (80 MCM/year by Percolation tanks and 31.89 MCM/year by Check dams)

As a part of Demand side Management, micro-irrigation techniques are to be adopted in 87.85 Sq. km. area thereby saving a total of 37.4 MCM/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 52.79 MCM/year volume of ground water generated can bring 81.22 sq. km. additional area under assured ground water irrigation with average crop water requirement of 0.65 m by constructing 3167 Dug wells and 528 Bore wells.

IEC activities and capacity building activities needs to be aggressively propagated to establish the institutional framework for participatory ground water management. Under IEC activity one day Tier-III training on “water budgeting and management at local level” was conducted on 14th September 2017 at Khuldabad, Aurangabad district. A total of 125 trainees have attended the training including 20 female participants. 7 lectures were delivered during the training Programme. These types of programmes have helped the general public to understand the problems, that they will face in future if the ground water is continued to be exploited in unplanned way and also sewage wastes is not properly managed resulting in ground water pollution.

These interventions also need to be supported by regulations for deeper aquifer and hence it is recommended to regulate/ban deeper tube wells/bore wells of more than 60 m depth in these blocks, so that the deeper ground water resources are protected for future generation and also serve as ground water sanctuary in times of distress/drought.

INFORMATION, EDUCATION & COMMUNICATION (IEC) ACTIVITIES

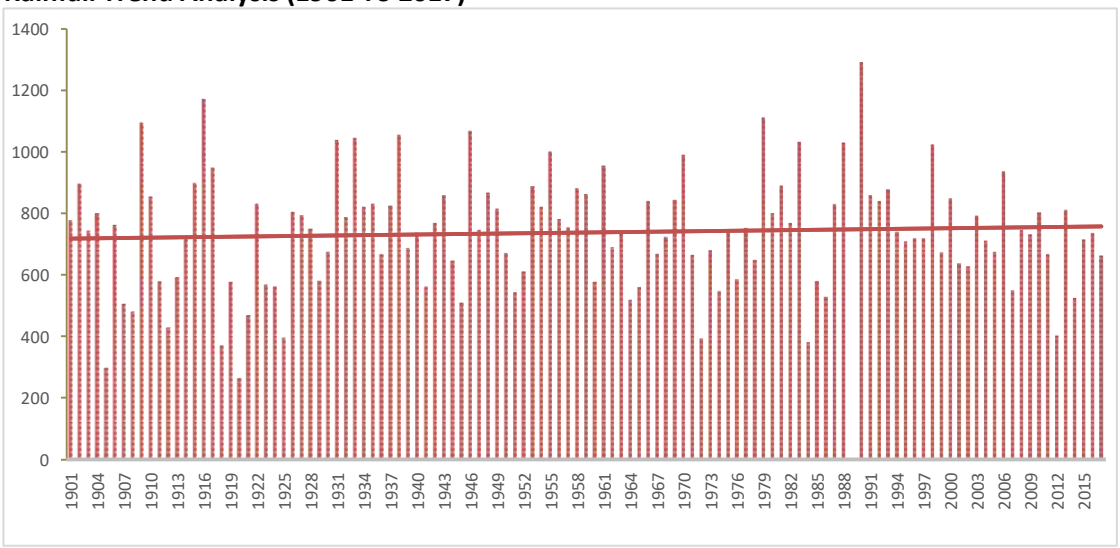
BLOCK WISE AQUIFER MAPS AND MANAGEMENT PLAN

1. AURANGABAD BLOCK
2. GANGAPUR BLOCK
3. KANNAD BLOCK
4. KHULDABAD BLOCK
5. PAITHAN BLOCK
6. PHULAMBRI BLOCK
7. SILLOD BLOCK
8. SOYGAON BLOCK
9. VAIJAPUR BLOCK

1. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, AURANGABAD BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

1. SALIENT FEATURES		
1.1 Introduction		
Block Name	**AURANGABAD**	
Geographical Area (Sq. km.)	1622.08 Sq. km.	
Hilly Area (Sq. km.)	148.01 Sq. km.	
Poor Ground Quality Area (Sq. km.)	Nil	
Population (2011)	15,90,374	
Climate	Sub-Tropical	
1.2 Rainfall Analysis		
Normal Rainfall	737.6 mm	
Annual Rainfall (2017)	663.3 mm	
Decadal Average Annual Rainfall (2008-17)	672.3 mm	
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.3532 mm/year Probability of Normal and Excess Rainfall- 70% & 14%. Probability of Droughts-: 14 % Moderate & 2% Severe	

Rainfall Trend Analysis (1901 To 2017)



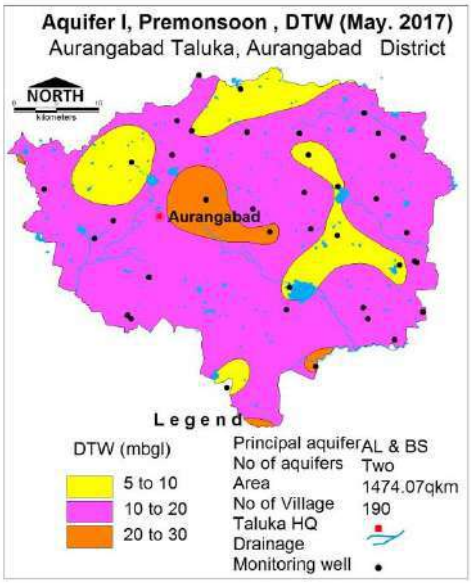
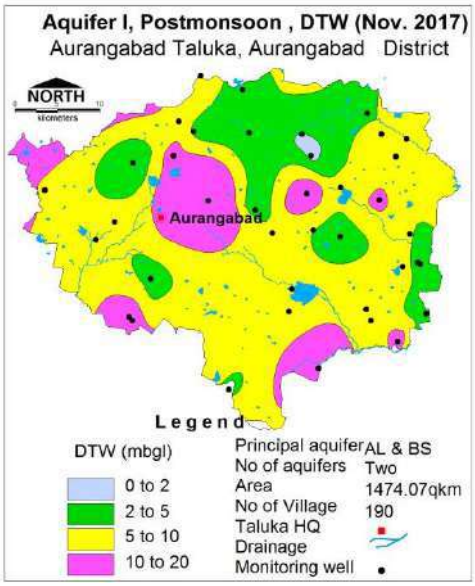
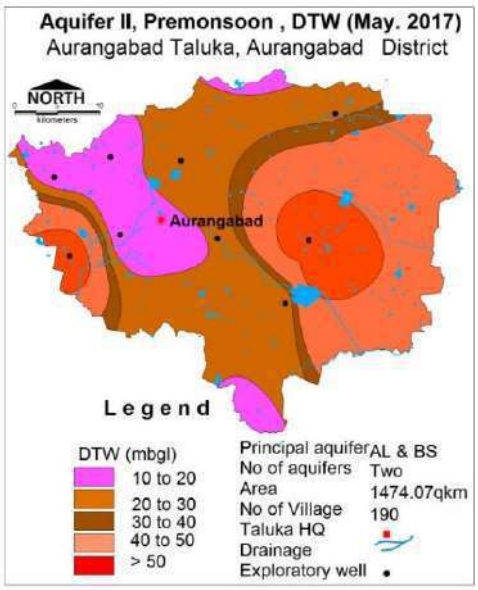
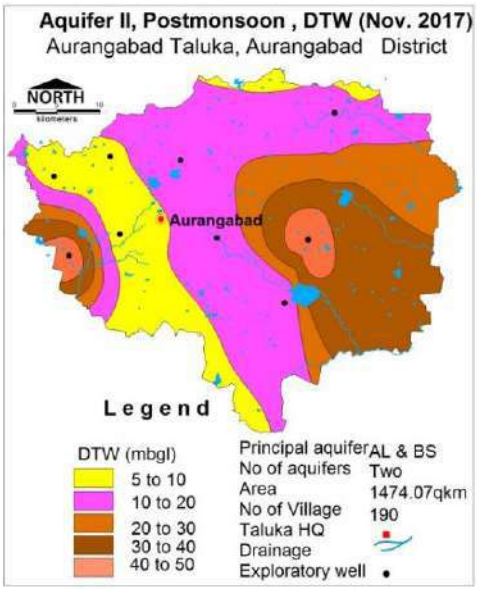
EQUATION OF TREND LINE: Y= 0.3532X+716.85

1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (Slightly to highly dissected) and Plateau weathered with 1-5 m weathered thickness	
Soil	Clayey soil (Shallow to Very deep 10 to >100 cm depth), Gravel sandy loam, Gravelly sandy clay loam, Gravelly clay loam and Clay loamy soil	
Geology	Alluvium (River Alluvium) Age: Recent to Sub Recent Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Dudhana, Kham and Sukhna Rivers; tributaries of Godavari river	
Hydrology	Major	Nil

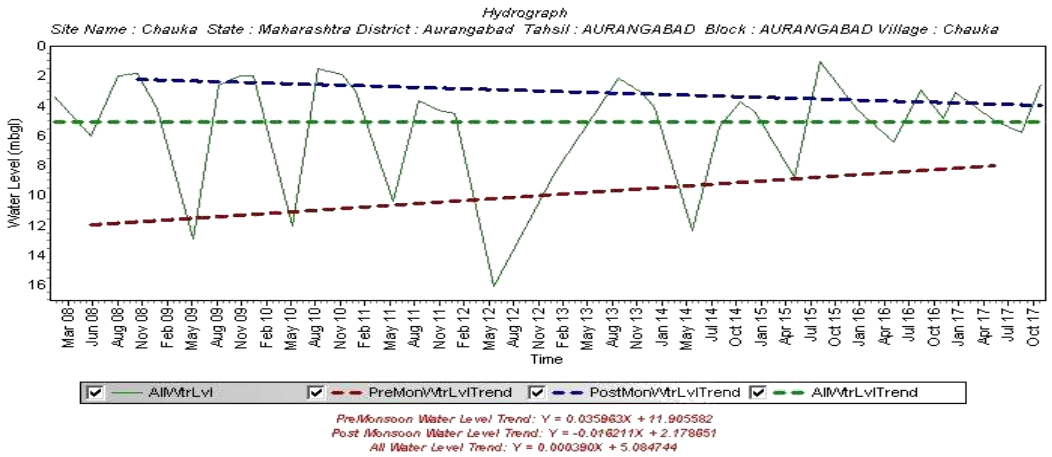
(Reference year: June 2014)	project	
	Medium project	**Completed:** 03; Sukhna, Lahuki and Girja projects generating a gross irrigation Potential of 5314 ha, Gross Storage Capacity of 27.93 MCM and Live Storage Capacity of 23.49 MCM **Ongoing: Nil**
	Irrigation Project (>250 Ha.)	**Completed**: 06; KT weir and Lift irrigation projects generating a gross irrigation Potential of 2407 ha, Gross Storage Capacity of 8.33 MCM and Live Storage Capacity of 7.34 MCM **Ongoing:** 04 projects - KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 1203 ha, Gross Storage Capacity of 9.51 MCM and Live Storage Capacity of 7.97 MCM
	Irrigation Project (<250 Ha.)	**Completed:** Through KT weir and Lift irrigation generating a gross irrigation Potential of 11925 ha and Live Storage Capacity of 50.98 MCM. **Ongoing:** Through KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 2280 ha and Live Storage Capacity of 9.84 MCM

1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		1622.08 Sq. km.	
Forest Area		224.63 Sq. km.	
Cultivable Area		870.24 Sq. km.	
Net Sown Area		562.33 Sq. km.	
Double Cropped Area		407.76 Sq. km.	
Area under Irrigation	Surface Water	57.49 Sq. km.	
	Ground Water	128.72 Sq. km.	
Principal Crops (Reference year 2017)		**Crop Type**	**Area (Sq. km.)**
		Cotton	401.17
		Cereals	375.39
		Pulses	212.49
		Oil Seeds	10.90
		Sugarcane	4.42
Horticultural Crops		Citrus fruit	49.05
		Mango	5.10
		Others	11.22

1.6. Water Level Behavior	
1.6.1. Aquifer-I/Shallow Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed in small isolated patches in northern, western and eastern parts of the block whereas water level in the range of 10 to 20 mbgl is observed almost over the entire	Water levels less than 5 mbgl are observed in northern part and isolated patches in eastern and western parts of the block; water level in the range of 5 to 10 mbgl is observed in major part of the block

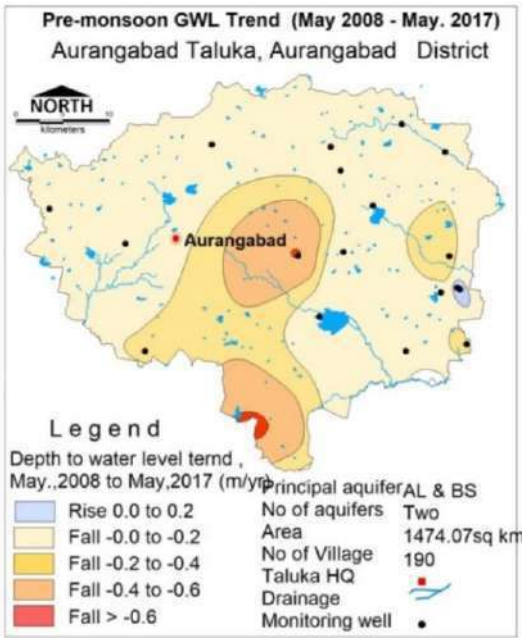
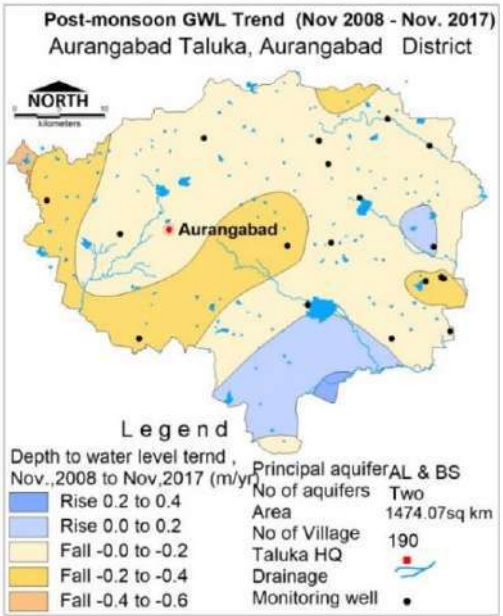
block. Deeper water level (>20 mbgl) is observed in isolated patch in central and southern-peripheral parts of the block covering 73.53 sq. km. area of the block.	whereas water level more than 10 mbgl is observed as isolated patches in central, north western and southern- peripheral parts of block covering 204 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
WL> 20 mbgl 73.53 sq. km.	**WL >10 mbgl 204 sq. km.**
1.6.2. Aquifer-II/Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level <20 mbgl is observed in smaller part in western part of the block. Water level between 20-30 mbgl is observed as continuous patch from north to south; more than 30 mbgl has been observed in western and east central parts of the block and cover about 662 sq. km. area of the block.	Water level <20 mbgl is observed in central and west central part of the block. Water level between 20-30 mbgl is observed in eastern and western parts of the block whereas Water level >30 mbgl is observed in eastern and western part of the block and cover 332 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov.-2017)**
	
WL>30 mbgl 661.92 sq. km.	**WL>30 mbgl 332.34 sq. km.**

1.7. Hydrographs



Hydrograph shows Pre-monsoon rising water level trend @0.4315 m/year and Post-monsoon falling water level trend @0.1945 m/yr.

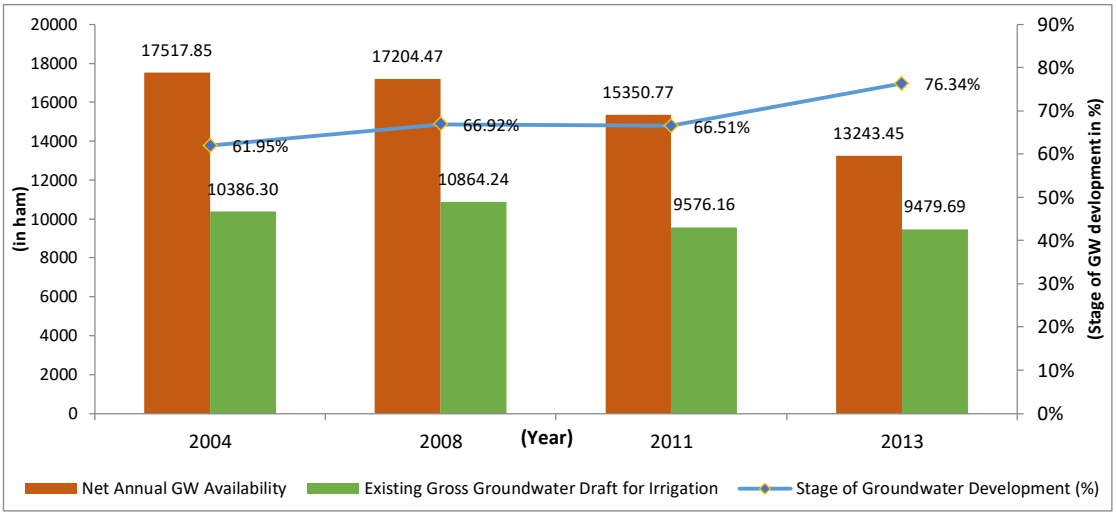
1.8. Water Level Trend (2008-17)

Pre-Monsoon trend	**Post-Monsoon trend**
Rising 0.0131 to 0.1191 m/year Falling 0.0044 to 0.6033 m/year	Rising 0.04719 m/year Falling 0.0032 to 0.3766 m/year
Major part of the block shows declining trend up to 0.2 m/year while rising trend up to 0.2 m/year has been observed in very small isolated patch in eastern side of the block. Declining water level trend >0.2 m/year has been observed in southern, Central and eastern parts of the block covering about 408 sq. km. (25%) area of the block.	Major part of the block shows declining trend up to 0.2 m/year while rising trend up to 0.2 m/year has been observed in southern part and small isolated part in eastern side of the block. Declining trend > 0.2 m/year has been observed in the central, western parts and northern and eastern peripheral parts of the block covering about 316 sq.km. (20%) area.
Pre-Monsoon Water Level Trend (2008-17)	**Post-Monsoon Water Level Trend (2008-17)**
	
Declining trend @>0.2 m/yr 408 sq. km.	**Declining trend @>0.2 m/yr 316 sq. km.**

2. Ground Water Issues

Exploitation of Ground Water: -

The draft for irrigation has decreased from 103.86 MCM to 94.79 MCM however the net ground water availability has also decreased in Aurangabad block over the time and as a result the stage of ground water development has also increased over the period of time from 2004 to 2013 from 61.95 % to 76.34%**.**



Declining water level Trend and Deeper Water Level: -

- Pre-monsoon (2008-17), decline in water level trend more than 0.2 m/year is observed in about 408 sq. km. covering about 25 % area of the block.
- Post-monsoon (2008-17), decline in water level trend more than 0.2 m/year is observed in about 316 sq. km. covering about 19 % area of the block.
- During Pre-monsoon 2017 Deeper water level > 20 mbgl is observed in about 73 sq. km. area of the block.

Ground Water Quality:

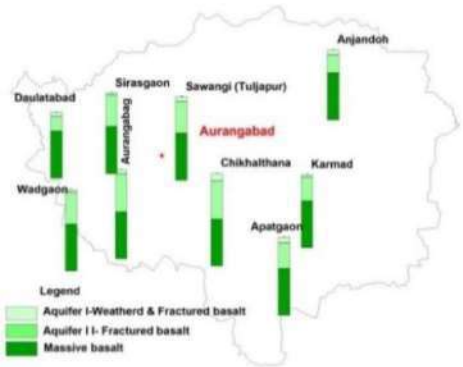
- **Nitrate Contamination**: In shallow aquifer, about 59% samples showing nitrate contamination whereas in deeper aquifer 45 % of wells are also showing nitrate contamination (NO_3 >45 mg/L).
- **Fluoride contamination:** In deeper aquifer Fluoride contamination is found in Jalgaon Feran (F=2.0) and Apatgaon (F=2.99) villages.

Low yielding Aquifer resulting poor sustainability: -

Limited extent of porous and pervious zone because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity results in poor sustainability of the aquifers. About 75 % area of the block has low yield potential (< 1 lps) and can sustain pumping only for 1 to 1.5 hrs.

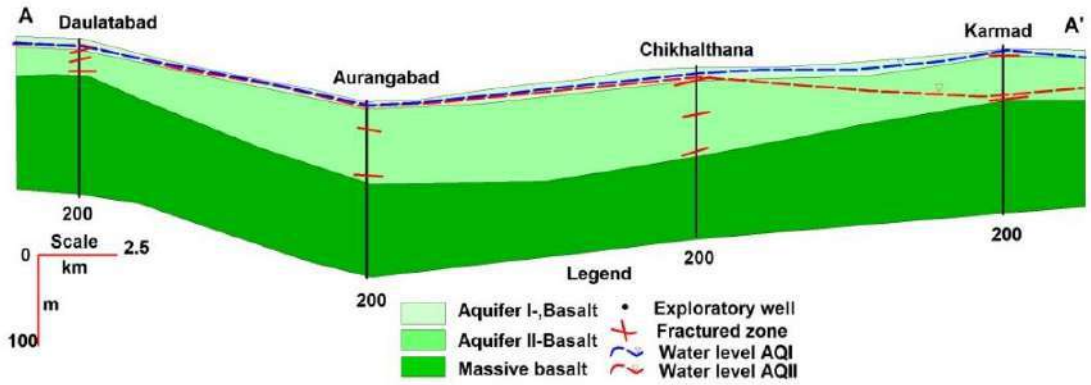
3. AQUIFER DISPOSITION	
3.1. Number of Aquifers	• Alluvium- Aquifer-I • Basalt –Aquifer-I, Aquifer-II

3.2. Lithological disposition



3.3. Cross Section

Section AA'

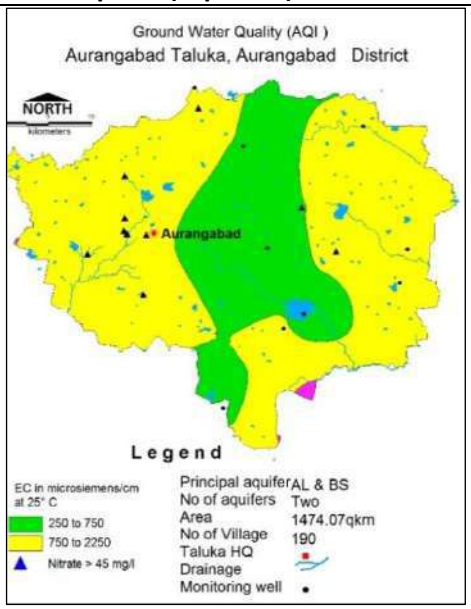


3.4. Basic Aquifer Characteristics

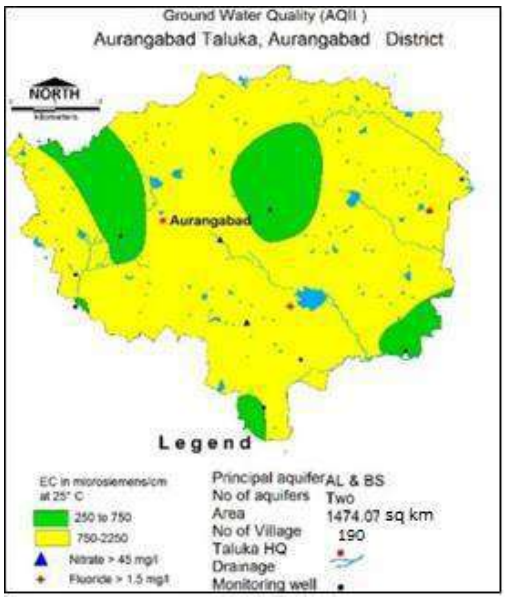
Major Aquifers	Alluvium	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi confined /Confined)	Aquifer-I	Aquifer-I (Phreatic)	Aquifer-II (Semi confined/confined)
Depth to bottom of Aquifer (mbgl)	15 to 27	9 to 29	65 to 163
Fractures/Granular zones encountered (mbgl)	Up to 27	up to 29	up to 163
Granular/Weathered/ fractured rocks thickness (m)	8 to 18	6 to 20	1 to 5
SWL (mbgl)	12-20	1.3 to 25	1.38 to 55
Yield	60-120 m^3/day	up to 100 m^3/day	up to 1.25 lps
Specific Yield/ Storativity (Sy/S)	-	0.019 to 0.028	$1.0x10^{-4}$ to $5.5x10^{-5}$
Transmissivity (T)	-	10 to 25 m^2/day	5 to 80 m^2/day
Sustainability	5-6 hrs	2 to 4 hrs	1 to 3 hrs

4. GROUND WATER QUALITY

Phreatic Aquifer (Aquifer-I)



Semi confined/Confined Aquifer(Aquifer II)



4.1 Aquifer-I/ Shallow Aquifer
EC up to 750 µS/cm is observed as continuous patch from north to south in central part of the block. EC values between 750 to 2250 µS/cm are observed in major part of the block. Ground water is suitable for all purposes in major part of the block except Nitrate affected villages.
4.2 Aquifer II/Deeper Aquifer
EC up to 750 µS/cm is observed as isolated patches in Central, western and eastern peripheral parts of the block. EC values between 750 to 2250 µS/cm are observed in major part of the block. Ground water is suitable for all purposes in major part of the block except nitrate and fluoride affected villages. Fluoride contamination is found in Jalgaon feran (2 mg/L) and Apatgaon (2.99 mg/L) villages hence ground water in these villages are not suitable for drinking purpose without treatment.
5. GROUND WATER RESOURCE
5.1 Aquifer-I/ Shallow Aquifer

Ground Water Recharge Worthy Area (Sq. km.)	1474.07
Total Annual Ground Water Recharge (MCM)	139.40
Natural Discharge (MCM)	6.97
Net Annual Ground Water Availability (MCM)	132.43
Existing Gross Ground Water Draft for irrigation (MCM)	94.79
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	6.29
Existing Gross Ground Water Draft for All uses (MCM)	101.09
Provision for domestic and industrial requirement supply to 2025(MCM)	11.99
Net Ground Water Availability for future irrigation development (MCM)	23.95
Stage of Ground Water Development (%)	76.34
Category	**SAFE**

5.2 Aquifer-II/Deeper Aquifer

Semi confined/Confined Aquifer (Basalt)

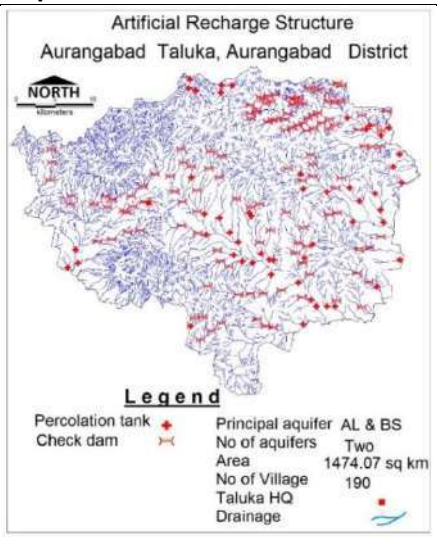
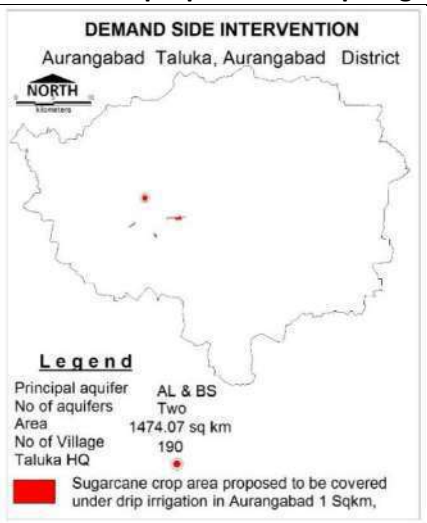
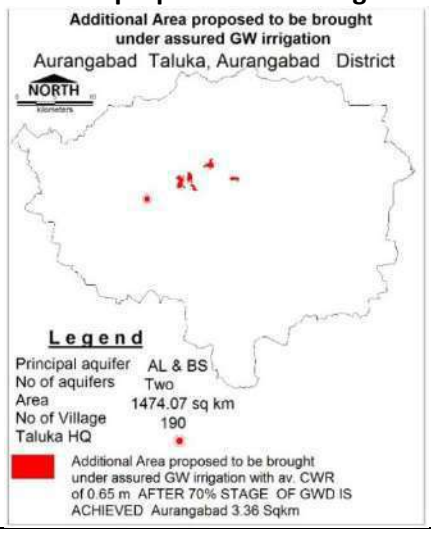
Total Area (Sq. km.)	Mean aquifer thickness (m)	Average (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
1474.15	3.25	0.0037/0.00012	37.5	22.75

6.0. GROUND WATER RESOURCE ENHANCEMENT

Available Resource (MCM)	132.43	
Gross Annual Draft (MCM)	101.09	
6.1. Supply Side Management		
SUPPLY (MCM)		
Agricultural Supply -GW	94.8	
Agricultural Supply -SW	40	
Domestic Supply - GW	6.3	
Domestic Supply - SW	1.58	
Total Supply	142.68	
Area of Block (Sq. km.)	1622.08	
Area suitable for Artificial recharge (Sq. km.)	909.2	
Type of Formation	Hard rock	Soft rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)	909.2	-
Volume of Unsaturated Zone (MCM)	1818.4	-
Average Specific Yield	0.02	-

Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	36.368	-
Surplus water Available (MCM)	19.067	
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	52	130
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	10.4	3.9
Proposed Structures		
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m^2area)	80,000	
Total RWH potential (MCM)	2.26	
Rainwater harvested / recharged @ 80% runoff co-efficient	1.808 Economically not viable & Not Recommended	

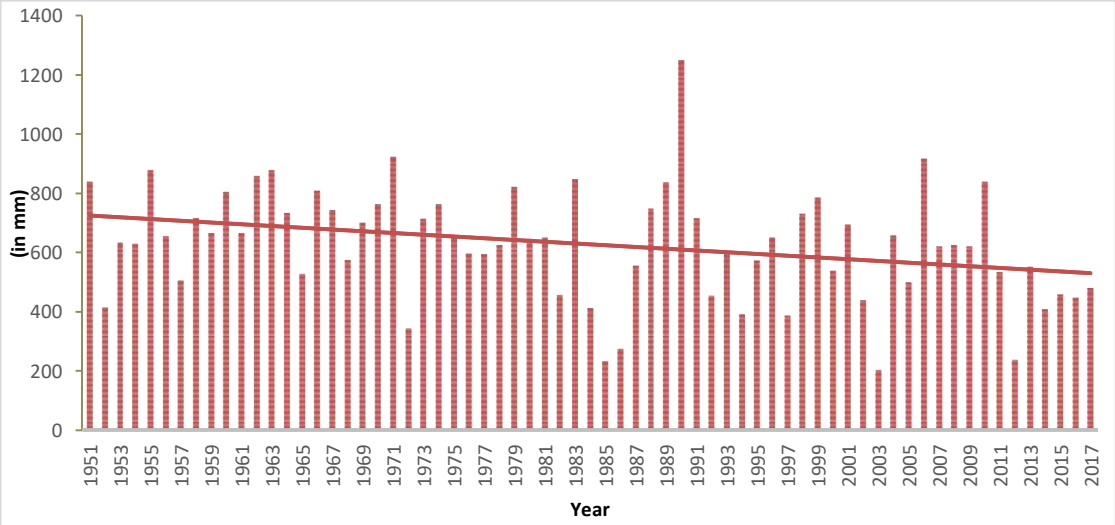
6.2. Demand Side Management	
Micro irrigation techniques	
Sugarcane Area proposed for drip irrigation (sq. km.)	1
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m	0.57
Alternate Sources	Nil
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop (ha)	Not proposed
Water Saving by Change in Cropping Pattern	Nil
6.3. EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	132.43
Additional GW resources available after Supply side interventions (MCM)	14.3
Ground Water Availability after Supply side intervention	146.73
Existing Ground Water Draft for All Uses (MCM)	101.10
GW draft after Demand Side Interventions (MCM)	100.53
Present stage of Ground Water Development (%)	76.34
Expected Stage of Ground Water Development after interventions (%)	68.51
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
Recommendation	
Ground water development is recommended to bring the stage of ground water development from 68.51 % to 70%	
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	2.181
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	131
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	22
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	3.36

Regulatory Measures	**60 m**
Supply Side Interventions	**Demand Side Interventions**
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**
	
Expected Benefits: Additional area proposed to be bought under assured GW Irrigation	
	

2. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, GANGAPUR BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

1. SALIENT FEATURES		
1.1 Introduction		
Block Name	**GANGAPUR**	
Geographical Area (Sq. km.)	1280.19 Sq. km.	
Hilly Area (Sq. km.)	Nil	
Poor Ground Quality Area (Sq. km.)	Nil	
Population (2011)	3,58,155	
Climate	Sub-Tropical	
1.2 Rainfall Analysis		
Normal Rainfall	627.9 mm	
Annual Rainfall (2017)	518.9 mm	
Decadal Average Annual Rainfall (2008-17)	520.89 mm	
Long Term Rainfall Analysis (1951-2017)	Declining Trend 2.9 mm/year. Probability of Normal and Excess Rainfall: - 57% & 21%. Probability of Drought: 16% Moderate and 6% Severe	

Rainfall Trend Analysis (1951 to 2017)



EQUATION OF TREND LINE: Y=-2.9706X+728.28

1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (slightly to moderately dissected) and Plateau weathered with 1 to 5 m weathered thickness.	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm depth), Gravel sandy loam, Gravel sandy clay loam, Gravel clay loam and Gravelly clay and Clay loam soils.	
Geology	Alluvium (River Alluvium) Age: Recent to Sub Recent Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Godavari, Shivana and Nagjnari rivers	
Hydrology **(Reference year: June 2014)**	Major project	**Completed:** Jayakwadi Project; generating a gross irrigation Potential of 2978 ha in

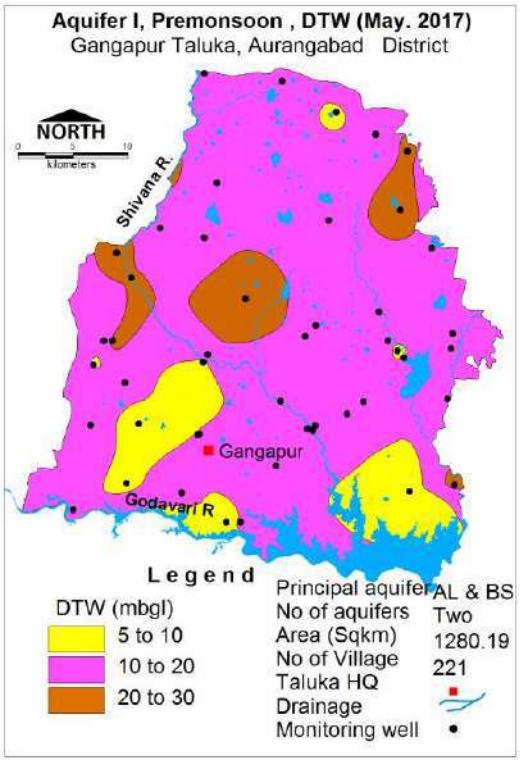
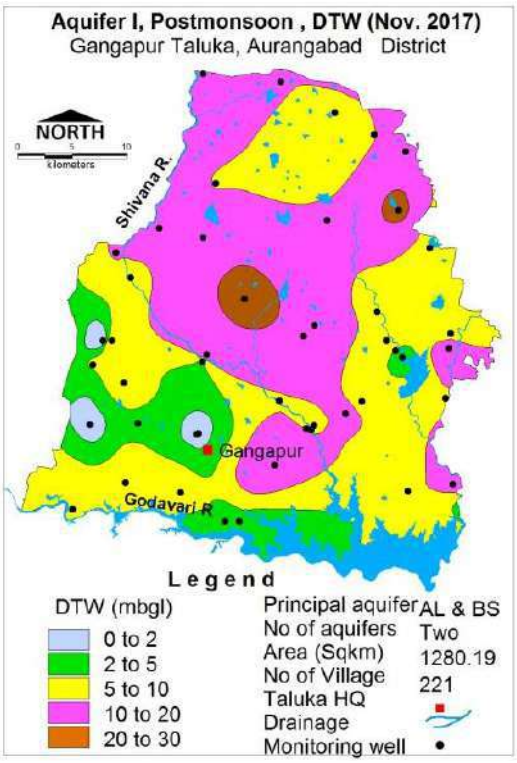
		Vaijapur block, Gross Storage Capacity of 29.09 MCM (including Paithan, Vaijapur and Gangapur blocks) and Live Storage Capacity of 21.71 MCM (including Paithan, Vaijapur and Gangapur blocks) **Ongoing:** 01; Nandur Madmeshwar Kalwa irrigation project shall be generating a gross irrigation Potential of 16404 ha, Gross Storage Capacity of 318.38 MCM (including Vaijapur and Gangapur blocks) and Live Storage Capacity of 288.99 MCM (including Vaijapur and Gangapur blocks)
	Medium project	**Completed:** 01; Tembhapuri irrigation project generating a gross irrigation Potential of 4784 ha, Gross Storage Capacity of 21.36 MCM and Live Storage Capacity of 19.26 MCM **Ongoing:** Nil
	Irrigation Project (>250 Ha)	**Completed:** 06 irrigation projects; generating a gross irrigation Potential of 1915 ha, Gross Storage Capacity of 12.04 MCM and Live Storage Capacity of 10.72 MCM **Ongoing:** 01; Sillegaon irrigation project shall be generating a gross irrigation Potential of 9.05 ha, Gross Storage Capacity of 7.983 MCM and Live Storage Capacity of 7.231 MCM
	Irrigation Project (<250 Ha)	**Completed:** Through completed KT weir and Lift irrigation projects generating a gross irrigation Potential of 7276 ha; Gross Storage Capacity 31.74 MCM and Live Storage Capacity of 31.74 MCM **Ongoing:** Through ongoing KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 852 ha; Gross Storage Capacity 4.79 MCM and Live Storage Capacity of 4.69 MCM

1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		1280.19 Sq. km.	
Forest Area		22.19 Sq. km.	
Cultivable Area		1018.96 Sq. km.	
Net Sown Area		1018.96 Sq. km.	
Double Cropped Area		164.69 Sq. km.	
Area under Irrigation	Surface Water	82.54 Sq. km.	
	Ground Water	92.00 Sq. km.	
Principal Crops (Reference year 2017)		Crop Type	Area (Sq. km.)
		Cotton	575.81
		Cereals	450.30
		Pulses	251.82
		Sugarcane	75.18

	Oil Seeds	39.68
Horticultural Crops	Citrus fruits	24.45
	Mango	2.37
	Banana	0.21
	Others	2.58

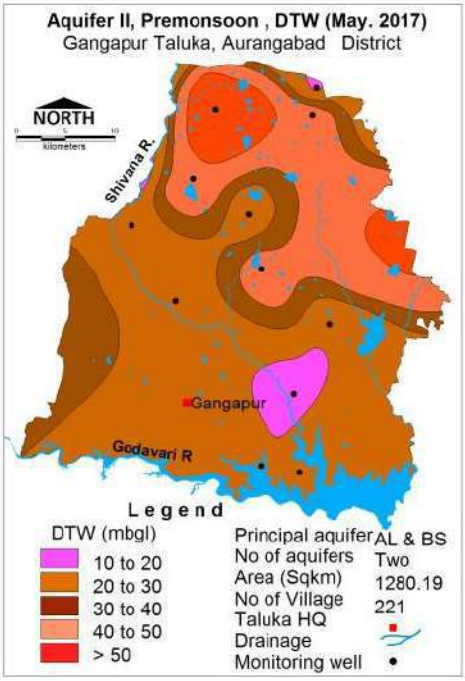
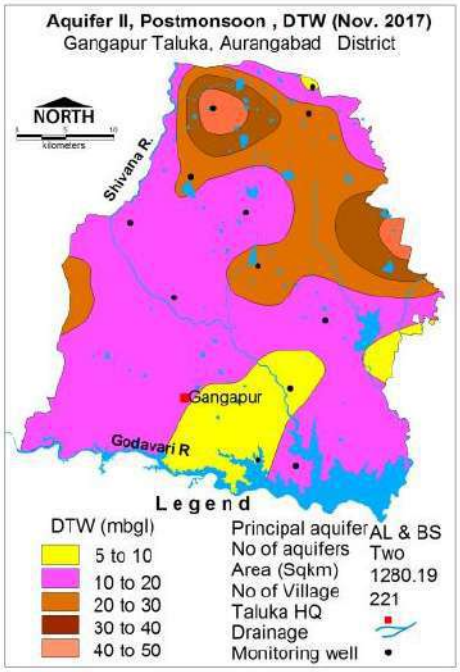
1.6. Water Level Behavior

1.6.1. Aquifer-I/Shallow Aquifer

Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water level less than 10 mbgl has been observed in southern peripheral parts of the block, near Jayakwadi project and Godavari river. Water level between 10 to 20 mbgl has been observed in major part of the block whereas more than 20 mbgl water level observed as isolated patches in northern half of the block and cover about 111.16 sq. km. area.	Water level less than 10 mbgl has been observed in southern half of the block, near Jayakwadi project and Godavari river. Water level between 5 to 10 mbgl has been observed in southern half and small part in northern and Eastern parts of the block. water level between 10 -20 mbgl has been observed in northern and central parts of the block whereas water level more than 20 mbgl has been observed as isolated patches in central and eastern parts of the block and cover about 30.88 sq. km. area.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
WL>20 mbgl 111.16 sq. km.	**WL>20 mbgl 30.88 sq. km.**

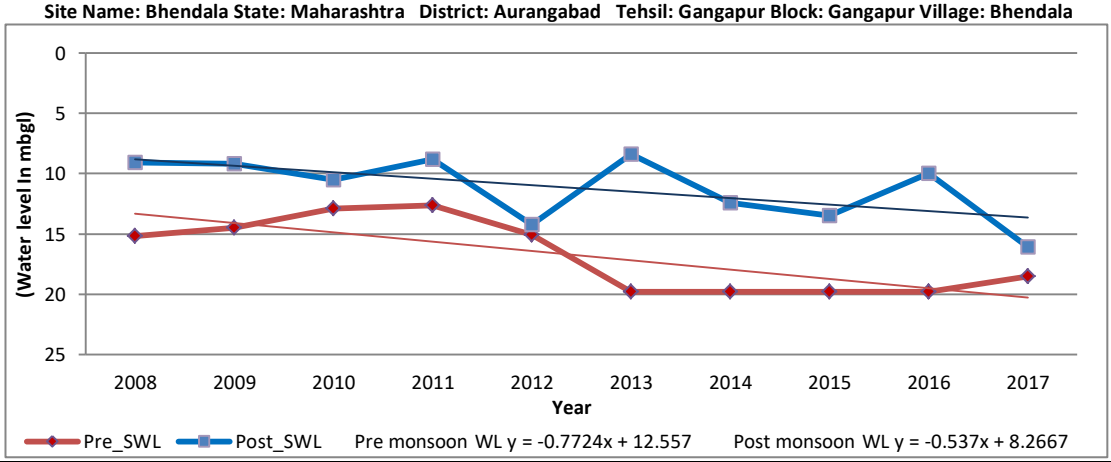
1.6.2. Aquifer-II/Deeper Aquifer

Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water level <20 mbgl is observed as one isolated patch in south central part of the block; water level between 20 -30 mbgl has been observed in major part of the block whereas water level >30 mbgl is observed in northern and eastern parts of the block	Water level <10 mbgl is observed in southern and eastern parts of the block near to Jayakwadi project; water level between 10-20 mbgl has been observed in major part of the block. Water level between 20-30 mbgl has been observed in northern part of

covering 558.57 sq. km. area of the block.	the block whereas more than 30 mbgl is observed as isolated patches in northern and eastern parts of the block and covering 107.64 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov.-2017)**
	
WL> 30 mbgl 558.57 sq. km.	**WL> 30 mbgl 107.64 sq. km.**

1.7. Hydrographs:

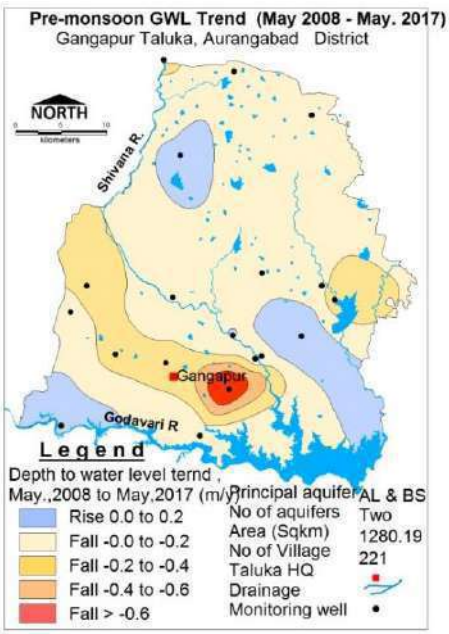
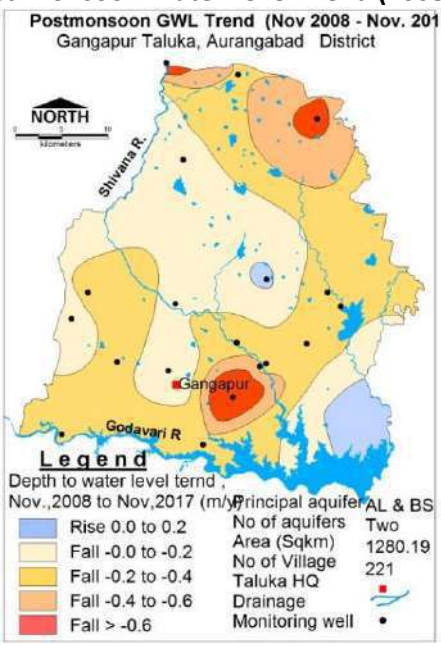
Site Name: Bhendala State: Maharashtra District: Aurangabad Tehsil: Gangapur Block: Gangapur Village: Bhendala



Hydrograph shows declining water level trend @ 0.7724 m/year during Pre-monsoon and @ 0.537 m/year during post monsoon.

1.8. Water Level Trend (2008-17)

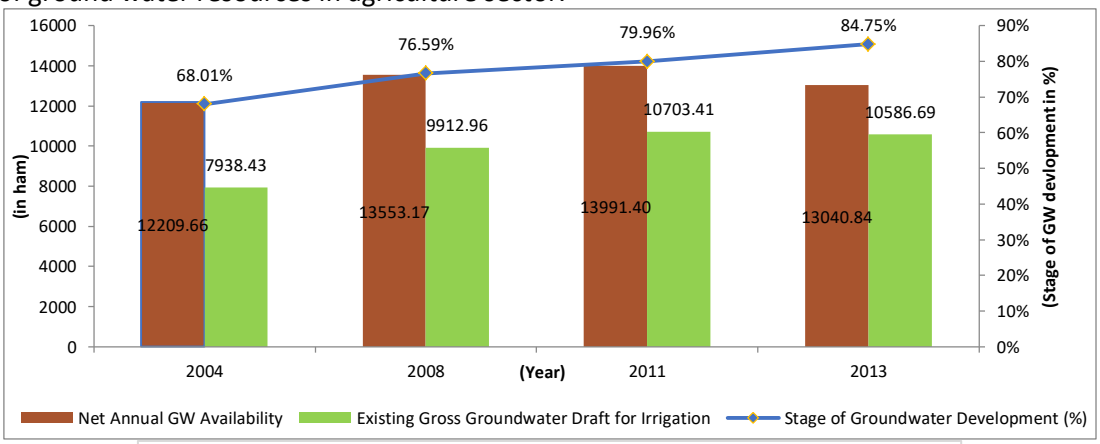
Pre-Monsoon trend	**Post-Monsoon trend**
Rising 0.00123 to 0.1843 m/year Falling 0.03413 to 0.7724 m/year	Rising 0.00952 to 0.00953 m/year Falling 0.03994 to 0.86511 m/year
Major part of the block shows declining trend up to 0.2 m/year while rise in water level up to 0.2 m/year has been observed in southern part and isolated patch in northern part of the block. Declining trend more than 0.2 m/ Year has been observed in southern half of	Declining water level trend up to 0.2 m/year has been observed in western and southern parts of the block while rise in water level up to 0.2 m/year has been observed in south eastern and central part of the block. Declining trend > 0.2 m/year has been

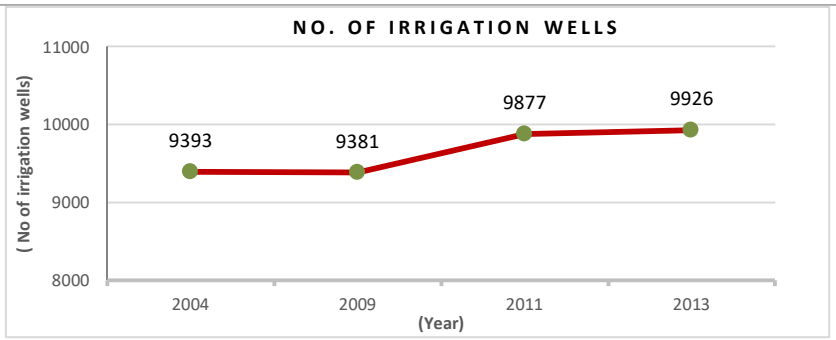
the block and covering about 238.32 sq. km. area.	observed in northern, southern and eastern parts of the block and cover 763.81 sq. km. area.
Pre-Monsoon Water Level Trend (2008-17)	**Post-Monsoon Water Level Trend (2008-17)**
	
Declining trend @>0.2 m/year 238.32 sq. km	**Declining trend @>0.2 m/yr 763.81 sq. km**

2. Ground Water Issues

Exploitation of Ground Water: -

The stage of ground water development has continuously increased from 2004 (68.01%) to 2013 (84.75%). Further, the draft for irrigation and number of irrigation wells have also increased from 79.38 to 105.86 MCM and 9393 to 9926 wells implying increased utilization of ground water resources in agriculture sector.





Declining water level Trend and Deeper Water level: -

- Pre-monsoon water level trend (2008-17), decline in water level trend more than 0.2 m/year is observed in about 238.82 sq. km. covering 19 % area of the block.
- Post-monsoon water level trend (2008-17), decline in water level more than 0.2 m/year is observed in about 763.81 sq. km. covering 60 % area of the block.
- During Pre-monsoon (2017), Deeper water level i.e., more than 20 mbgl is observed in 111.16 sq. km. area of the block.

Low Rainfall and Drought Prone Area: -

As per Agro-climatic Zones, southern part of the Gangapur block falls under "drought prone area" characterized by low and unpredictable rainfall of 500 to 700 mm/year in 40-45 days Common dry spells will last from 2 to 10 weeks. Delayed onset and early cessation of S-W monsoon is very common.

Based on the rainfall data of 1951-2017 period; the average rainfall for the period is 627.9 mm. In addition, the long-term rainfall analysis indicates a falling trend @ 2.9 mm/ year with 16% probability of moderate and 6 % of Severe droughts.

Ground Water Quality: -

Nitrate Contamination: In shallow aquifer, out of 21 samples, 14 samples i.e., 67% samples are showing nitrate contamination whereas in deeper aquifer, out of 23 samples 6 samples i.e., 26% of samples are also showing nitrate contamination (NO_3 >45 mg/L).

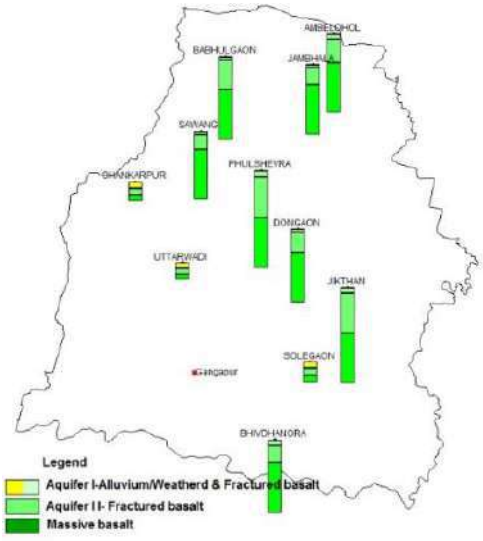
Low yielding Aquifer resulting poor sustainability: -

Limited extent of porous and pervious zone because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity results in poor sustainability of the aquifers. About 44 % area of the block has low yield potential (< 1 lps) and can sustain pumping only for 1 to 1.5 hrs.

3. AQUIFER DISPOSITION

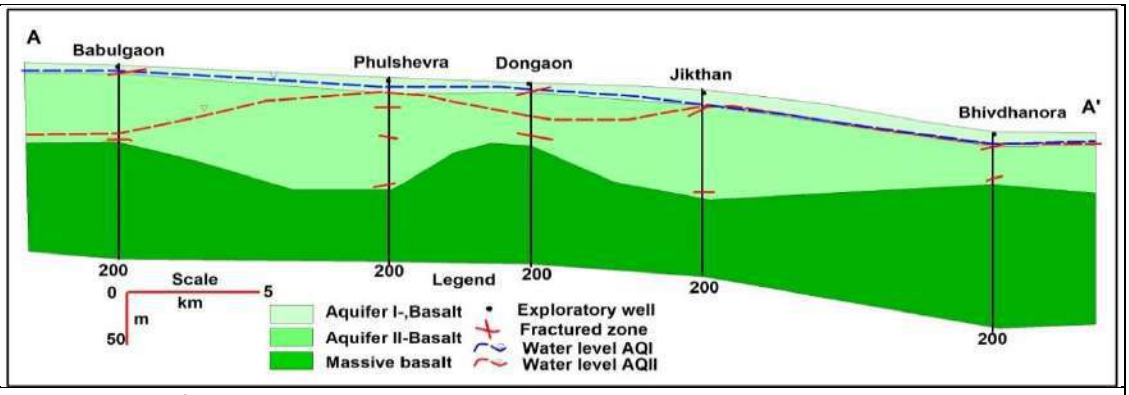
3.1. Number of Aquifers	**Alluvium-Aquifer-I** **Basalt –Aquifer-I, Aquifer-II**

3.2. Lithological disposition



3.3. Cross Section

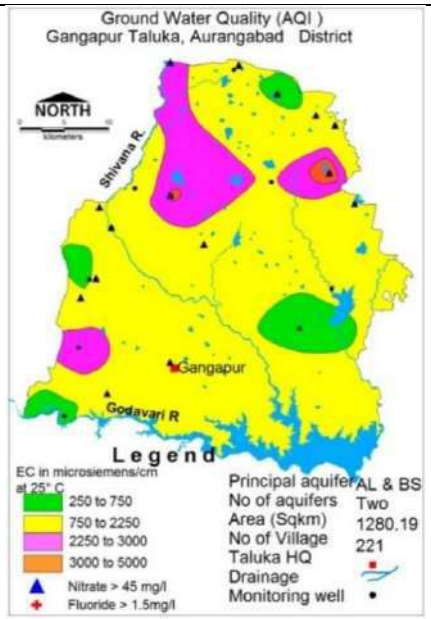
Section AA'



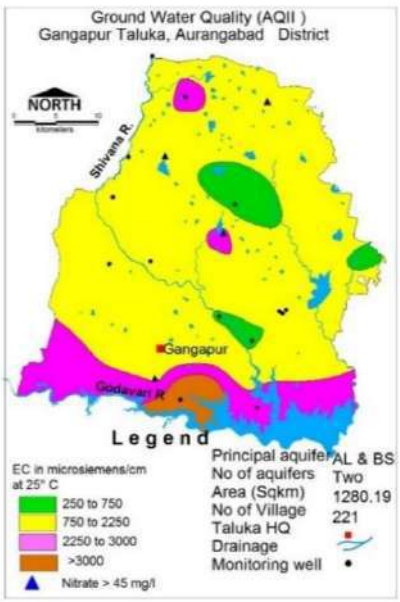
3.4. Basic Aquifer Characteristics

Major Aquifers	**Alluvium**	**Basalt (Deccan Traps)**	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I (Phreatic)	Aquifer-I (Phreatic)	Aquifer-II (Semi confined/ confined)
Depth to bottom of Aquifer (mbgl)	15 to 28	9 to 29	60 to 165
Zones/Fractures encountered (mbgl)	Up to 28	up to 29	up to 165
Granular/Weathered/Fractured rocks thickness (m)	8-20	5 to 20	1 to 12
SWL (mbgl)	12-15	0.3 to 24.53	5.2 to 45
Specific yield/ Storativity (S)	1.73 x 10^{-3} to 1.85 x 10^{-5}	0.019 to 0.028	1.0 x 10^{-4} to 5.5 x 10^{-5}
Transmissivity (T)	369-757 m^2/day	10 to 50 m^2/day	5 to 80 m^2/day
Yield	60-120 m^3/day	up to 100 m^3/day	up to 2.5 lps
Sustainability	5-6 hrs	1 to 4 hrs	1 to 6 hrs

4. GROUND WATER QUALITY



EC > 2250 µS/cm covering 169 sq. km.



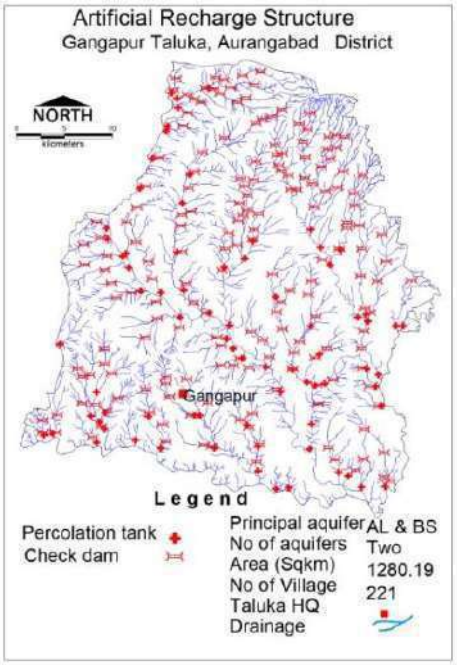
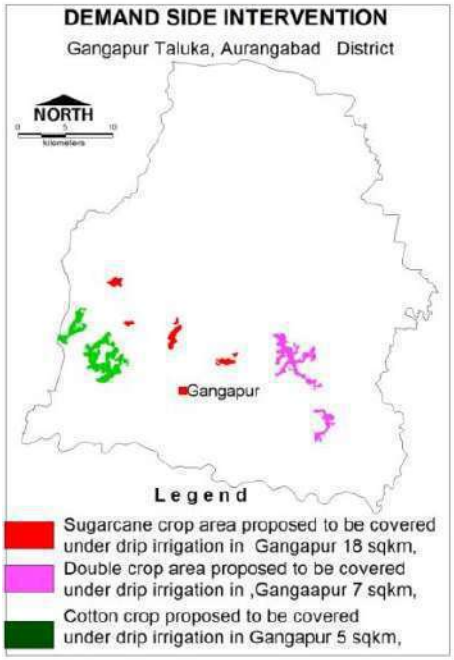
EC > 2250 µS/cm covering 263 sq. km.

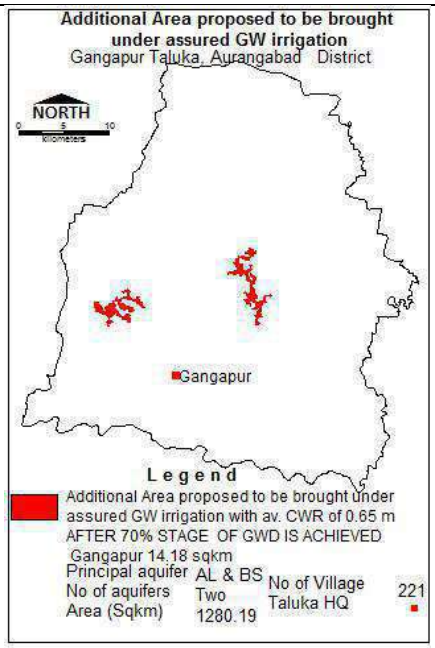
4.1 Aquifer-I/ Shallow Aquifer

EC up to 750 µS/cm is observed as isolated patches in southern half of the block; EC value between 750 to 2250 µS/cm is observed in major part of the block whereas EC more than 2250 µS/cm has been observed in northern and south western parts of the block. Ground

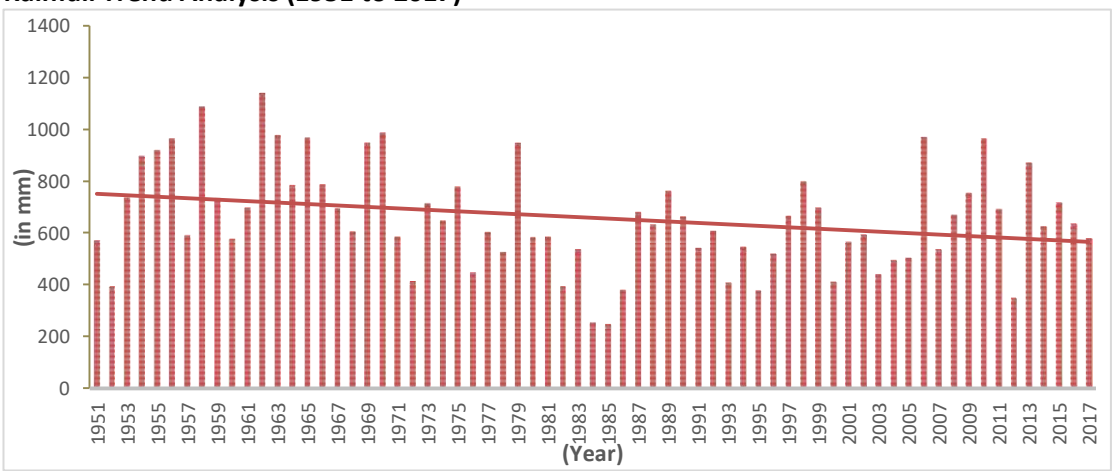
water is suitable for all purposes in major part of the block except 14 villages that are affected by Nitrate contamination and village Kinhala (F=1.60 mg/L) which is affected by Fluoride contamination.				
4.2 Aquifer II/Deeper Aquifer				
EC up to 750 µS/cm is observed as isolated patches in southern and central parts of the block; EC values between 750 to 2250 µS/cm covering major parts of the block while EC more than to 2250 µS/cm has been observed in southern part of the block. Ground water is suitable for all purposes except 6 locations in five villages which are having nitrate more than 45 mg/L and so not fit for drinking purpose without treatment.				
5. GROUND WATER RESOURCE				
5.1 Aquifer-I/ Shallow Aquifer				
Ground Water Recharge Worthy Area (Sq. km.)			1280.19	
Total Annual Ground Water Recharge (MCM)			137.27	
Natural Discharge (MCM)			6.86	
Net Annual Ground Water Availability (MCM)			130.40	
Existing Gross Ground Water Draft for irrigation (MCM)			105.86	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			4.65	
Existing Gross Ground Water Draft for All uses (MCM)			110.52	
Provision for domestic and industrial requirement supply to 2025(MCM)			8.43	
Net Ground Water Availability for future irrigation development (MCM)			23.94	
Stage of Ground Water Development (%)			**84.75**	
Category			**SAFE**	
5.2 Aquifer-II/Deeper Aquifer				
Semi confined/Confined Aquifer **(Basalt)**				
Total Area (Sq. km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
1280	6.125	0.00375/0.000079	27.5	12.05
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			130.40	
Gross Annual Draft (MCM)			110.52	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			105.87	
Agricultural Supply -SW			54	
Domestic Supply - GW			4.66	
Domestic Supply - SW			1.165	
Total Supply			165.695	
Area of Block (Sq. km.)			1280.19	
Area suitable for Artificial recharge (Sq. km.)			1280.19	
Type of Formation			Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL			1280.19	-

>5mbgl) (Sq. km.)		
Volume of Unsaturated Zone (MCM)	2560.38	-
Average Specific Yield	0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	51.20	-
Surplus water Available (MCM)	26.85	-
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	72	191
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	14.4	5.73
Proposed Structures		
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m^2area)	19000	
Total RWH potential (MCM)	0.53675	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.4294 Economically not viable & Not Recommended	
6.2. Demand Side Management		
Micro irrigation techniques		
Sugarcane crop area proposed for drip irrigation (sq. km.)	18	
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m	10.26	
Double crop area proposed for drip irrigation (sq. km.)	7	
Volume of Water Saving by use of drip (MCM), WUE- 0.40 m	2.8	
Cotton crop area proposed for drip irrigation (sq. km.)	5	
Volume of Water Saving by use of drip (MCM), WUE- 0.26 m	1.3	
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop (ha)	Not proposed	
Water Saving by Change in Cropping Pattern	Nil	
Alternate Sources	Nil	
6.3. EXPECTED BENEFITS		
Net Ground Water Availability (MCM)	130.41	
Additional GW resources available after Supply side interventions (MCM)	20.13	
Ground Water Availability after Supply side intervention	150.54	
Existing Ground Water Draft for All Uses (MCM)	110.52	
GW draft after Demand Side Interventions	96.16	

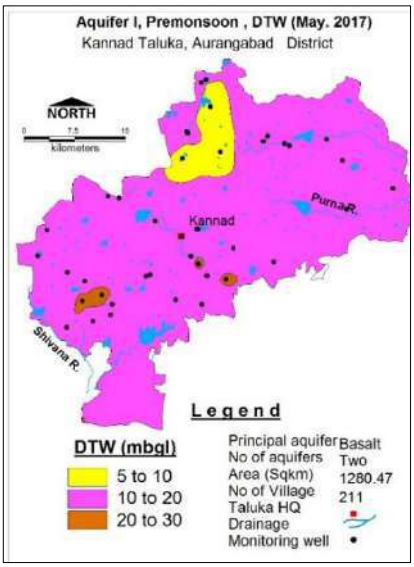
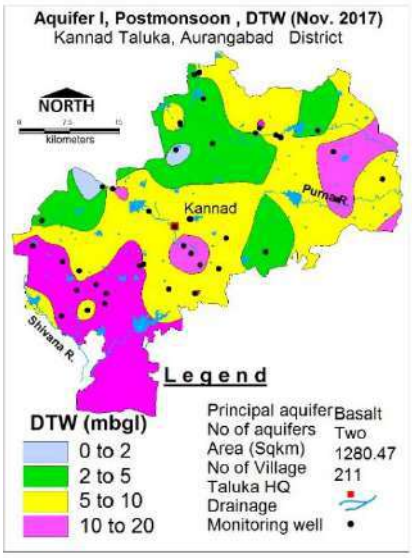
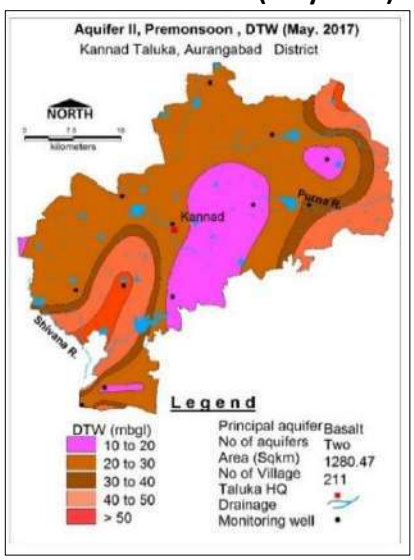
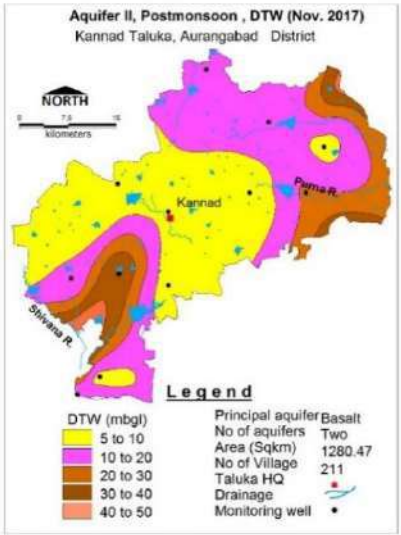
(MCM)	
Present stage of Ground Water Development (%)	84.75
Expected Stage of Ground Water Development after interventions (%)	63.88
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
Recommendation	
Ground water development is recommended to bring the stage of ground water development from 63.88% to 70%	
6.4. DEVELOPMENT PLAN	
Volume of water available for GWD to 70% (MCM)	9.218
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	533
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	92
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	14.18
Regulatory Measures	**60 m**
Supply Side Interventions	Demand Side Interventions
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**
	
Expected Benefits: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION	


Additional Area proposed to be brought under assured GW irrigation
Gangapur Taluka, Aurangabad District
NORTH
0 5 10
kilometers
Gangapur
Legend
Additional Area proposed to be brought under assured GW irrigation with av. CWR of 0.65 m AFTER 70% STAGE OF GWD IS ACHIEVED
Gangapur 14.18 sqkm
Principal aquifer AL & BS
No of aquifers Two
Area (Sqkm) 1280.19
No of Village 221
Taluka HQ

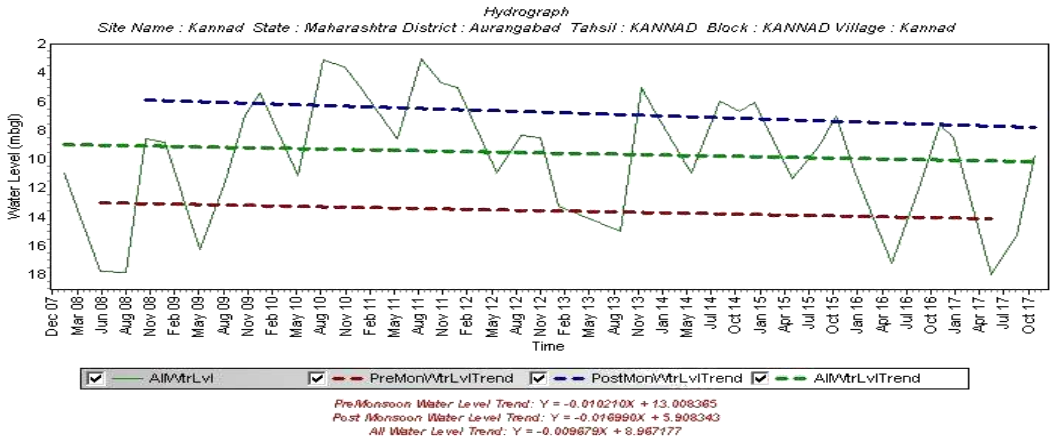
3. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, KANNAD BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

1. SALIENT FEATURES		
1.1 Introduction		
Block Name	**KANNAD**	
Geographical Area (Sq. km.)	1393.27 Sq. km.	
Hilly Area (Sq. km.)	112.80 Sq. km.	
Poor Ground Quality Area (Sq. km.)	Nil	
Population (2011)	3,41,019	
Climate	Sub-Tropical	
1.2 Rainfall Analysis		
Normal Rainfall	657.9 mm	
Annual Rainfall (2017)	580.5 mm	
Decadal Average Annual Rainfal (2008-17)	677.24 mm	
Long Term Rainfall Analysis (1951-2017)	Declining Trend 2.80 mm/year. Probability of Normal and Excess Rainfall- 62% & 19%. Probability of Droughts-: 16% Moderate and 3% Severe	
Rainfall Trend Analysis (1951 to 2017)		
		
EQUATION OF TREND LINE: Y= -2.8036 X +753.23		
1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (slightly dissected to highly dissected), Plateau Weathered with 1 to 5 m weathered thickness and Escarpment Slope	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm), Gravelly sandy loam, Gravel sandy clay loam, gravel clay loam and Gravelly clay and Clay loam soils.	
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Shivna, Khadki, Ambadi, Anjana and Purna rivers; tributaries of Godavari river	
Hydrology (Reference Year: June 2014)	Major project	Nil
	Medium	**Completed**: 04; Ambadi, Gadgadgadh,

	project	Anjana and Purna nawpur irrigation projects generating a gross irrigation Potential of 6552 ha, Gross Storage Capacity of 44.28 MCM and Live Storage Capacity of 36.87 MCM **Ongoing:** 01; Shivana Takli project shall be generating a gross irrigation Potential of 2320 ha, Gross Storage Capacity of 39.36 MCM(including Vaijapur and Kannad block) and Live Storage Capacity of 36.45 MCM (including Vaijapur and Kannad block)
	Irrigation Project (>250 Ha.)	**Completed**: 13 irrigation projects generating a gross irrigation Potential of 5231 ha, Gross Storage Capacity of 25.21 MCM and Live Storage Capacity of 22.81 MCM **Ongoing:** 05 irrigation projects shall be generating a gross irrigation Potential of 3345 ha, Gross Storage Capacity of 31.52 MCM and Live Storage Capacity of 29.49 MCM
	Irrigation Project (<250 Ha.)	**Completed:** Through completed KT weir and Lift irrigation projects generating a gross irrigation Potential of 14951 ha with Live Storage Capacity of 57.83 MCM **Ongoing:** Through ongoing KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 573 ha and Live Storage Capacity of 3.01 MCM
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area	1393.27 Sq. km.	
Forest Area	303.12 Sq. km.	
Cultivable Area	1016.60 Sq. km.	
Net Sown Area	1016.60 Sq. km.	
Double Cropped Area	132.24 Sq. km.	
Area under Irrigation – Surface Water	136.11 Sq. km.	
Area under Irrigation – Ground Water	209.23 Sq. km.	
Principal Crops (Reference year 2017)	**Crop Type**	**Area (Sq. km.)**
	Cereals	544.73
	Cotton	486.05
	Pulses	156.67
	Oil Seeds	19.66
	Sugarcane	14.84
Horticultural Crops	Citrus fruits	16.05
	Mango	3.53
	Banana	0.75
	Grapes	0.08
	Others	8.77
1.6. Water Level Behavior		
1.6.1. Aquifer-I/Shallow Aquifer		

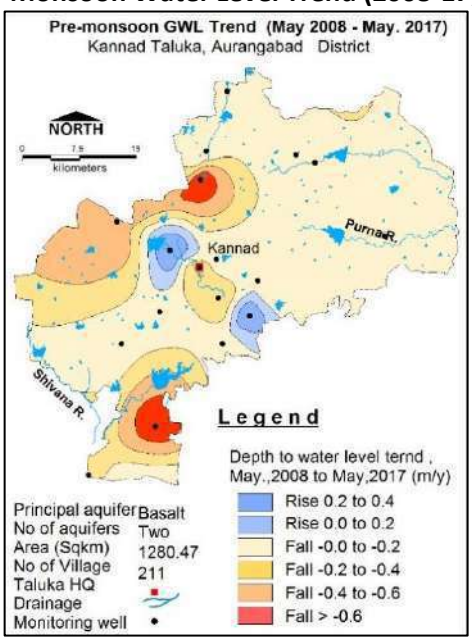
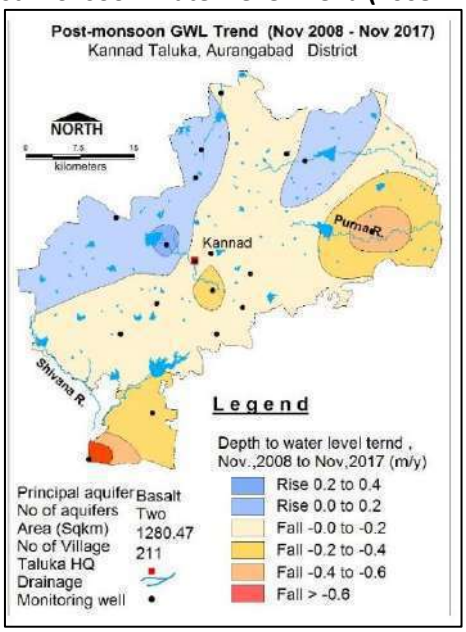
Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water level less than 10 mbgl has been observed as isolated patch in northern part of the block. Water level between 10 to 20 mbgl has been observed in major part of the block whereas more than 20 mbgl water level is observed in small isolated patches in southern half of the block covering about 18.13 sq. km. area.	Water level less than 5 mbgl has been observed as isolated patches in northern and eastern parts of the block. Water level between 5 to 10 mbgl has been observed in major part of the block whereas Water level more than 10 mbgl has been observed in south western and eastern parts of the block and cover about 385.71 sq. km. area.
Pre-Monsoon Water Level (May 2017)  **WL>20 mbgl 18.13 sq. km.**	**Post-Monsoon Water Level (Nov. 2017)**  **WL>10 mbgl 385.71 sq. km.**
1.6.2. Aquifer-II/Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level <30 mbgl is observed in major part of the block. Water level >30 mbgl is observed in eastern and south western parts of the block covering 442.55 sq. km. area of the block.	Water level <30 mbgl is observed in major part of the block. Water level more than 30 mbgl is observed in eastern and south western parts of the block covering 111.01 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)  **WL> 30 mbgl 442.55 sq. km.**	**Post-Monsoon Water Level (Nov.-2017)**  **WL> 30 mbgl 111.01 sq. km.**

1.7. Hydrographs:



Hydrograph shows Pre-monsoon declining water level trend @ 0.12252 m/year and Post monsoon declining water level trend @ 0.20388 m/year

1.8. Water Level Trend (2008-17)

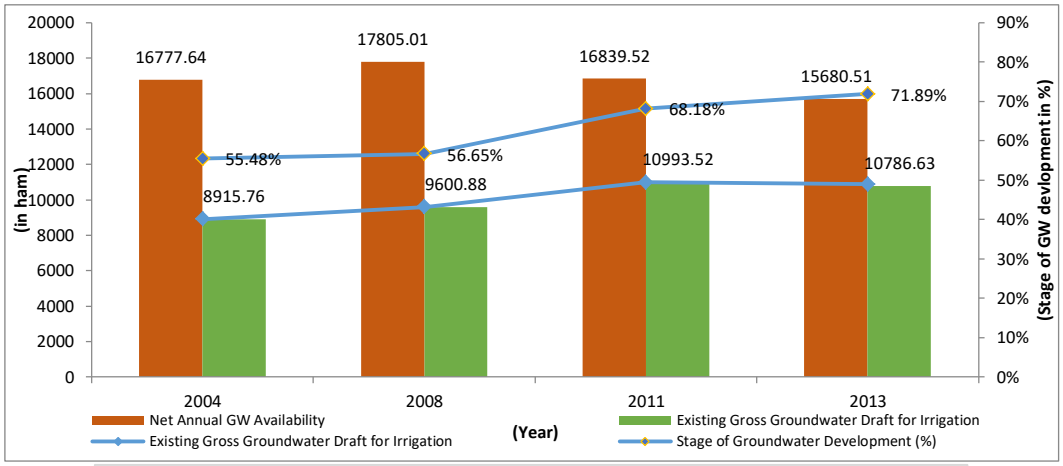
Pre-Monsoon trend	**Post-Monsoon trend**
Rising 0.3692 to 0.3736 m/year Falling 0.0170 to 0.7269 m/year	Rising 0.040 to 0.25487 m/year Falling 0.0088 to 0.7670 m/year
Major part of the block shows declining trend up to 0.2 m/year while rising trend up to 0.2 m/year have been observed in central and south eastern parts of the block. Declining water level trend >0.2 m/year have been observed in southern and western parts of the block covering about 460.87 sq. km. area.	Major part of the block shows declining trend up to 0.2 m/year while rising trend up to 0.2 m/year have been observed in northern and western parts of block. Declining trend >0.2 m/year has been observed in eastern and southern parts of the block and cover 309.31 sq. km. area.
Pre-Monsoon Water Level Trend (2008-17)	**Post-Monsoon Water Level Trend (2008-17)**
	
Declining trend @>0.2 m/yr 460.87 sq. km.	**Declining trend @>0.2 m/yr 309.31 sq. km.**

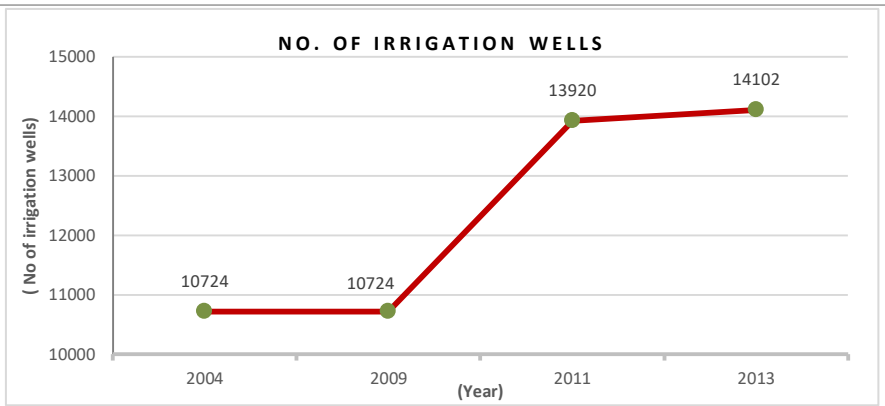
2. Ground Water Issues

Exploitation of Ground Water: -

The stage of ground water development has increased from 2004 to 2013 from 55.48% to 71.89% in Kannad block**.** Further, the draft for irrigation and number of irrigation wells have

has also increased from 89.15 MCM to 107.86 MCM and 10724 to 14102 wells implying increased utilization of ground water resources in agriculture sector.





Declining water level Trend: -

During Pre-monsoon period (2008-17), The decline in water level more than 0.2 m/year is observed in about 461 sq. km. covering 33 % area of the block.

During Post-monsoon period (2008-17), The decline in water level more than 0.2 m/year is observed in about 309.31 sq. km. covering 22.20 % area of the block.

Low rainfall and Drought:

Based on the rainfall analysis for the period 2000-2017; the average rainfall for the period 1951 to 2017 is 657.9 mm. Also, the long-term rainfall analysis indicates a falling trend @ 2.80 mm/ year with 16% probability of moderate and 3 % of Severe droughts.

Ground Water Quality: -

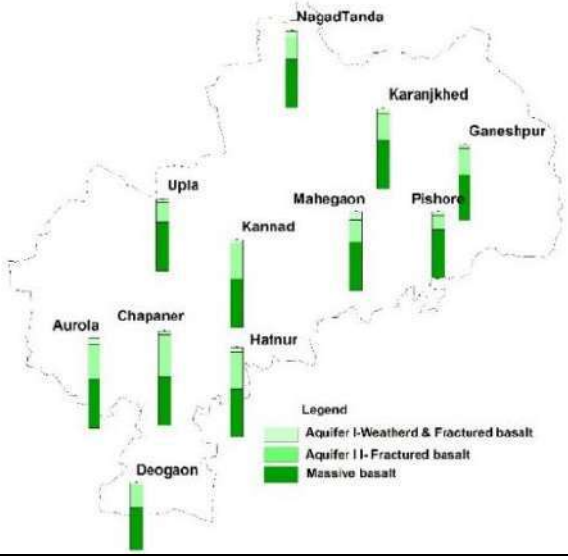
Nitrate Contamination: In shallow Aquifer, out of 21 samples 13 samples i.e., 62% samples show nitrate contamination whereas in deeper aquifer, out of 38 samples 27 samples i.e., 71% of samples are also showing nitrate contamination (NO_3 > 45 mg/L).

Fluoride contamination: In shallow aquifer, Fluoride contamination is found in Vita village (F = 5.0 mg/L) while in deeper aquifer Fluoride contamination is found in Hingni village (F = 4.4 mg/L).

Low yielding Aquifer resulting poor sustainability: -

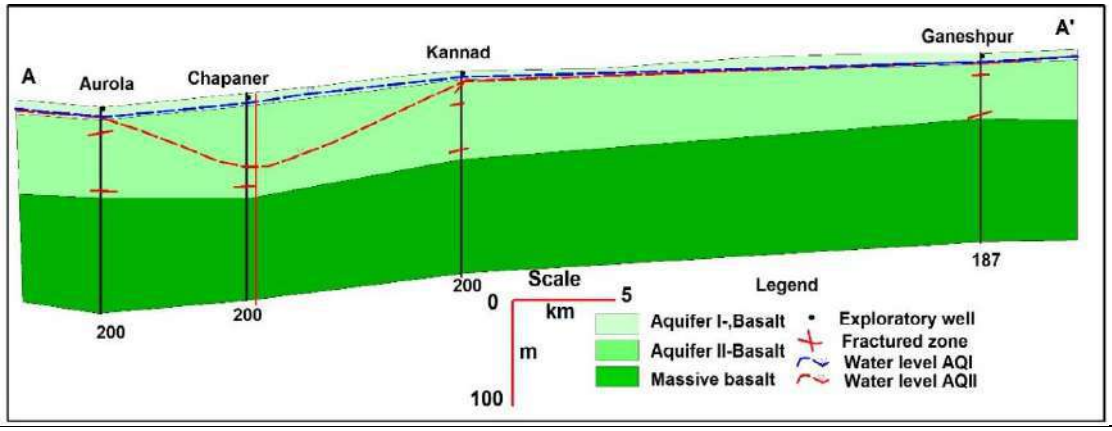
Limited extent of porous and pervious zone because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity results in poor sustainability of the aquifers. About 95 % area of the block has low yield potential (< 1 lps) and can sustain pumping only for 1 to 1.5 hrs.

3. AQUIFER DISPOSITION	
3.1. Number of Aquifers	• Basalt –Aquifer-I, Aquifer-II
3.2. Lithological disposition	



3.3. Cross Section

Section AA'



3.4. Basic Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
Depth to bottom of Aquifer (mbgl)	9 to 29	55 to 175
Fractures encountered (mbgl)	up to 29	up to 175
Weathered/Fractured rocks thickness (m)	1 to 20	1 to 9
SWL (mbgl)	1.4 to 22.5	3.22 to 67
Specific yield/ Storativity (S)	0.019 to 0.028	1.0×10^{-4} to 5.5×10^{-5}
Transmissivity (T)	10 to 45 m^2/day	5 to 80 m^2/day
Yield	up to 100 m^3/day	up to 1.25 lps
Sustainability	1 to 4 hrs	1 to 3 hrs

4. GROUND WATER QUALITY

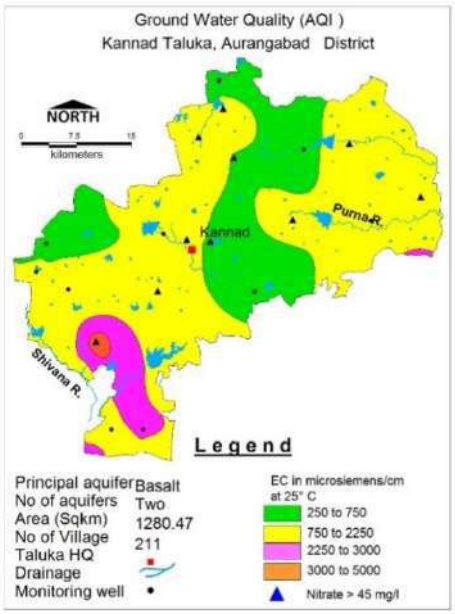
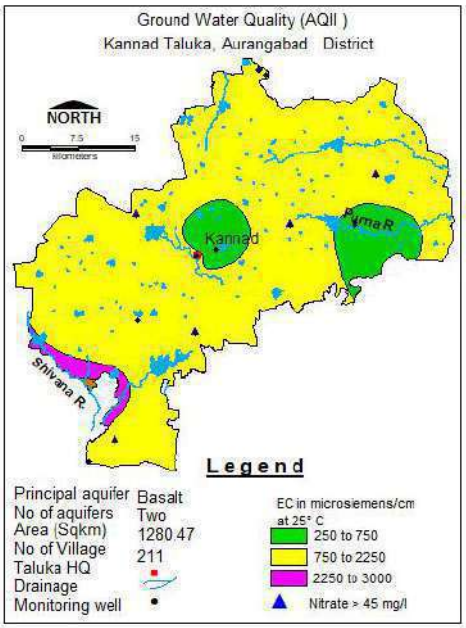
4.1 Aquifer-I/ Shallow Aquifer

EC up to 750 µS/cm is observed in continuous patch from north to south and western parts of the block; EC values between 750 to 2250 µS/cm are observed in major part of the block whereas EC more than 2250 µS/cm has been observed in southern part of the block covering about 103 sq. km. area of the block. Ground water is suitable for all purposes in major part of the block except 13 villages that are affected by Nitrate contamination and village Vita

which is affected by Fluoride contamination. In these villages ground water is not fit for drinking purpose without treatment.

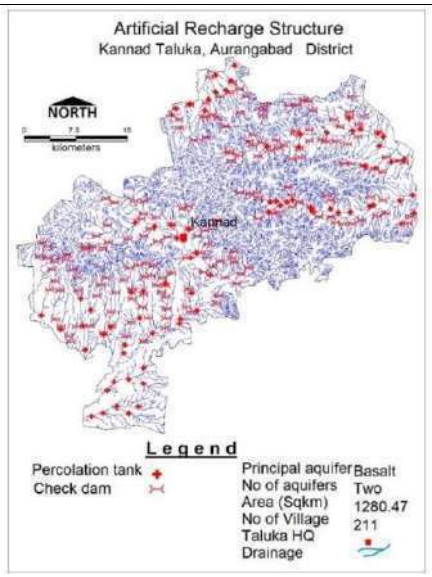
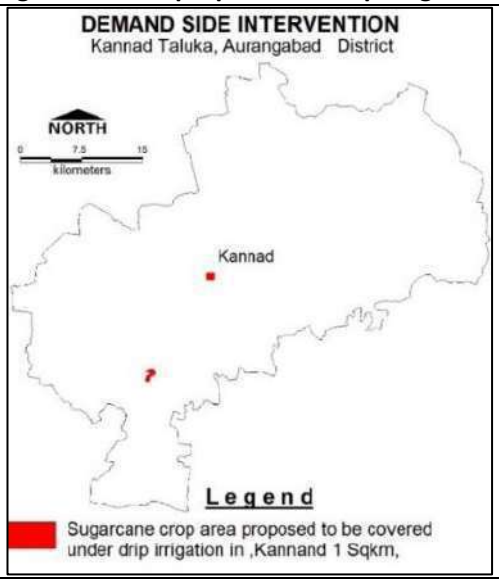
4.2 Aquifer II/Deeper Aquifer

EC up to 750 µS/cm is observed in isolated patches in central and eastern parts of the block; EC values between 750 to 2250 µS/cm cover whole of the block whereas EC more than 2250 µS/cm has been observed in southern part of the block. Ground water is suitable for all purposes except 27 locations that are having nitrate more than 45 mg/L and village Hingni that is affected by Fluoride contamination; In these villages ground water is not fit for drinking purpose without treatment.

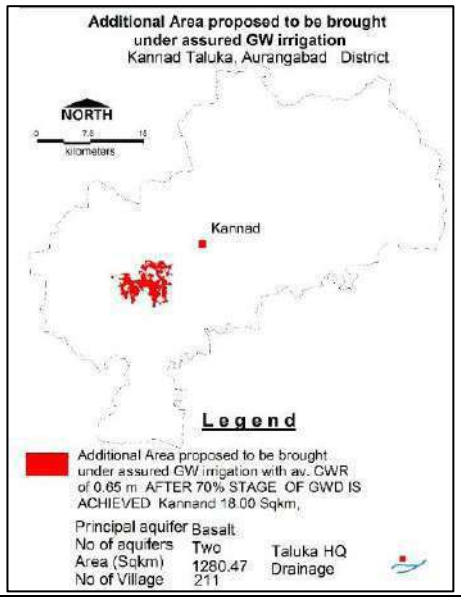
Phreatic Aquifer (Aquifer-I)	**Semi confined/Confined Aquifer (Aquifer II)**
	
EC > 2250 µS/cm covering 103 sq. km.	**EC > 2250 µS/cm covering 36 sq. km.**

5. GROUND WATER RESOURCE				
5.1 Aquifer-I/ Shallow Aquifer				
Ground Water Recharge Worthy Area (Sq. km)			1280.47	
Total Annual Ground Water Recharge (MCM)			165.38	
Natural Discharge (MCM)			8.58	
Net Annual Ground Water Availability (MCM)			156.80	
Existing Gross Ground Water Draft for irrigation (MCM)			107.86	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			4.85	
Existing Gross Ground Water Draft for All uses (MCM)			112.72	
Provision for domestic and industrial requirement supply to 2025(MCM)			9.73	
Net Ground Water Availability for future irrigation development (MCM)			37.87	
Stage of Ground Water Development (%)			71.89	
Category			**SAFE**	
5.2 Aquifer-II/Deeper Aquifer				
Semi confined/Confined Aquifer **(Basalt)**				
Total Area	Mean	Av (Sy/S)	Piezometric Head (m	Total Resource

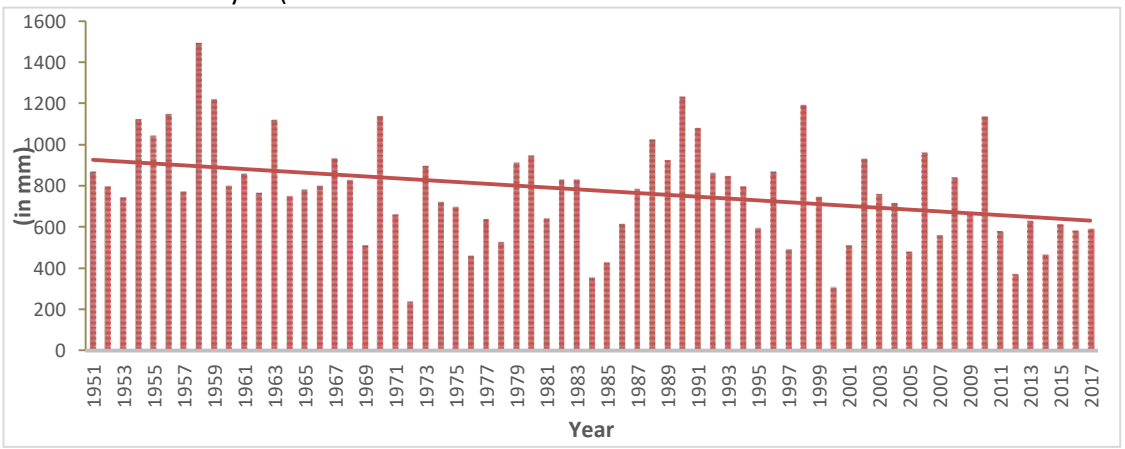
(Sq. km.)	aquifer thickness (m)		above confining layer)	(MCM)
1280.51	4.66	0.0041/0.000026	36.66	22.46
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			156.8	
Gross Annual Draft (MCM)			112.72	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			107.87	
Agricultural Supply -SW			88.48	
Domestic Supply - GW			4.86	
Domestic Supply - SW			1.21	
Total Supply			202.42	
Area of Block (Sq. km.)			1393.27	
Area suitable for Artificial recharge (Sq. km.)			1280.47	
Type of Formation			Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)			1280.47	-
Volume of Unsaturated Zone (MCM)			2560.94	-
Average Specific Yield			0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)			51.218	-
Surplus water Available (MCM)			26.85	-
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures			72	191
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			14.4	5.73
Proposed Structures				
RTRWH Structures – Urban Areas				
Households to be covered (25% with 50 m^2area)			16500	
Total RWH potential (MCM)			0.4661	
Rainwater harvested / recharged @ 80% runoff co-efficient			0.3729 Economically not viable & Not Recommended	
6.2. Demand Side Management				
Micro irrigation techniques				
Sugarcane crop area proposed for drip irrigation (sq. km.)			1	
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m			0.57	
Proposed Cropping Pattern change				
Irrigated area under Water Intensive Crop (ha)			Not proposed	

Water Saving by Change in Cropping Pattern	Nil
Alternate Sources	Nil
6.3. EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	156.8
Additional GW resources available after Supply side interventions (MCM)	20.13
Ground Water Availability after Supply side intervention	176.93
Existing Ground Water Draft for All Uses (MCM)	112.72
GW draft after Demand Side Interventions (MCM)	112.15
Present stage of Ground Water Development (%)	71.89
Expected Stage of Ground Water Development after interventions (%)	63.39
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
Recommendation	
Ground water development is recommended to bring the stage of ground water development from 63.39 % to 70%	
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	11.70
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	702
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	117
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	18.00
Regulatory Measures	**60m**
Supply Side Interventions	**Demand Side Interventions**
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**
	
Expected Benefits: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW	

IRRIGATION


Additional Area proposed to be brought
under assured GW irrigation
Kannad Taluka, Aurangabad District
NORTH
0 7.5 15
kilometers
Kannad
Legend
Additional Area proposed to be brought under assured GW irrigation with av. CWR of 0.65 m AFTER 70% STAGE OF GWD IS ACHIEVED Kannand 18.00 Sqkm,
Principal aquifer Basalt
No of aquifers Two
Area (Sqkm) 1280.47
No of Village 211
Taluka HQ
Drainage

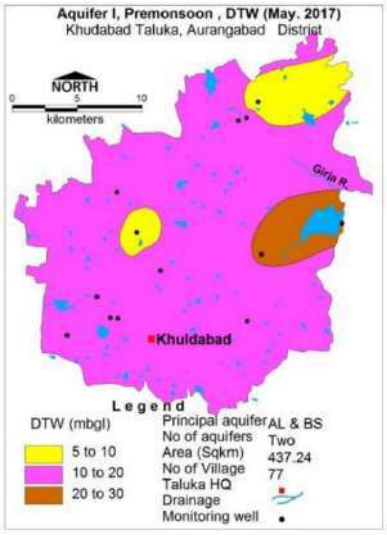
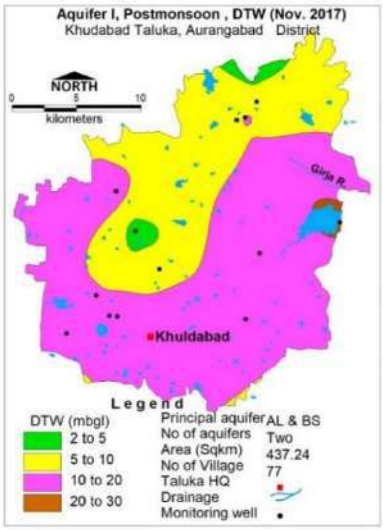
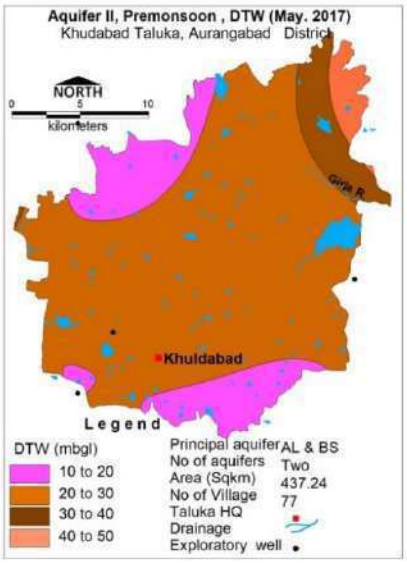
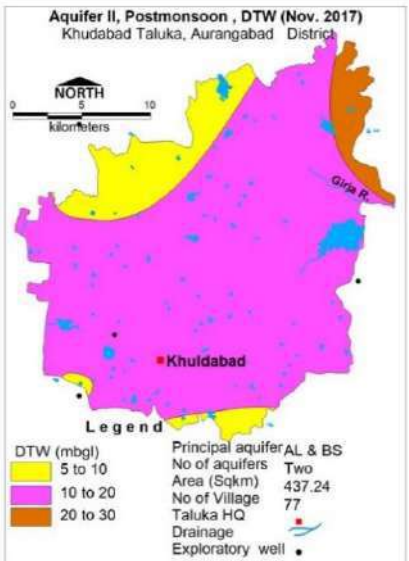
4. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, KHULDABAD BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

SALIENT FEATURES		
1.1 Introduction		
Block Name	**KHULDABAD**	
Geographical Area (Sq. km.)	509.87 Sq. km.	
Hilly Area (Sq. km.)	72.63 Sq. km.	
Poor Ground Quality Area (Sq. Km.)	Nil	
Population (2011)	1,18,328	
Climate	Sub-Tropical	
1.2 Rainfall Analysis		
Normal Rainfall	778.5 mm	
Annual Rainfall (2017)	593.3 mm	
Decadal Average Annual Rainfall (2008-17)	645.76 mm	
Long Term Rainfall Analysis (1951-2017)	Declining Trend 4.47 mm/year. Probability of Normal and Excess Rainfall- 60% & 18%. Probability of Droughts-: 16% Moderate and 6% Severe	
Rainfall Trend Analysis (1951 to 2017  **EQUATION OF TREND LINE: Y= -4.4738X+930.61**		
1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (slightly dissected to highly dissected), Plateau Weathered with 1 to 2 weathered thickness and Escarpment Slope	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm depth), Gravel sandy loam, Gravel sandy clay loam, Gravel clay loam and Gravelly clay soils.	
Geology	Alluvium (River Alluvium) Age: Recent to Sub Recent Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Shivana and Girija rivers; tributaries of Godavari river	
Hydrology (Reference Year: June 2014)	Major project	Nil
	Medium	**Completed:** 01; Girija irrigation project

	project	generating a gross irrigation Potential of 440 ha, Gross Storage Capacity of 24.50 MCM (including Aurangabad and Khuldabad blocks) and Live Storage Capacity of 21.23 MCM (including Aurangabad and Khuldabad blocks) **Ongoing:** Nil
	Irrigation Project (>250 Ha.)	**Completed:** 02; Nirgudi and Sobalgaon irrigation projects generating a gross irrigation Potential of 968 ha, Gross Storage Capacity of 4.76 MCM and Live Storage Capacity of 4.32 MCM **Ongoing:** 01; Gandheshwar irrigation project shall be generating a gross irrigation Potential of 423 ha, Gross Storage Capacity of 4.58 MCM and Live Storage Capacity of 3.09 MCM
	Irrigation Project (<250 Ha.)	**Completed:** Through completed KT weir and Lift irrigation projects generating a gross irrigation Potential of 9043 ha; Gross Storage Capacity 32.63 MCM and Live Storage Capacity of 34.64 MCM **Ongoing:** Through ongoing KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 374 ha; Gross Storage Capacity 1.85 MCM and Live Storage Capacity of 1.85 MCM

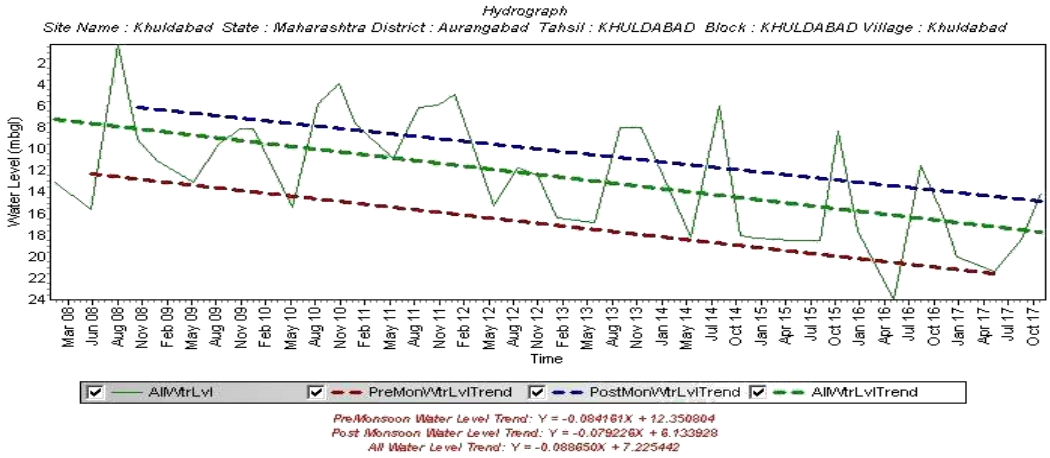
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		509.87 Sq. km.	
Forest Area		20.47 Sq. km.	
Cultivable Area		365.88 Sq. km.	
Net Sown Area		370.97 Sq. km.	
Double Cropped Area		85.35 Sq. km.	
Area under Irrigation	Surface Water	20.96 Sq. km.	
	Ground Water	18.20 Sq. km.	
Principal Crops (Reference year 2017)		Crop Type	Area (Sq. km.)
		Cereals	242.80
		Cotton	134.99
		Pulses	92.49
		Oil Seeds	25.31
		Sugarcane	11.01
Horticultural Crops		Citrus fruits	3.58
		Mango	2.60
		Others	1.55

1.6. Water Level Behavior	
1.6.1. Aquifer-I/Shallow Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed as isolated patch in northern and central parts of the block. Water level	Water level less than 5 mbgl has been observed in northern peripheral part and an isolated patch in central part of the block.

between 10 to 20 mbgl has been observed in major part of the block whereas more than 20 mbgl water level observed in isolated patches in eastern part of the block and cover about 30.45 sq. km. area.	Water level between 5 to 10 mbgl has been observed in northern and central parts of the block. Water level between 10 to 20 mbgl has been observed in major part of the block whereas Water level more than 20 mbgl has been observed in very small isolated patch in eastern part of the block and cover about 5.64 sq. km. area.
Pre-Monsoon Water Level (May 2017)  **WL>20 mbgl 30.45 sq. km.**	**Post-Monsoon Water Level (Nov. 2017)**  **WL>20 mbgl 5.64 sq. km.**
1.6.2. Aquifer-II/Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level <10 mbgl is observed in north western and southern parts of the block; water level between 20 -30 mbgl has been observed in major part of the block whereas water level >30 mbgl is observed in north eastern part of the block and cover 45.93 sq. km. area of the block.	Water level <10 mbgl is observed in northern and southern peripheral parts of the block; water level between 10-20 mbgl has been observed in major part of the block and more than 20 mbgl is observed in north eastern part of the block and cover 21.07 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)  	**Post-Monsoon Water Level (Nov.-2017)** 

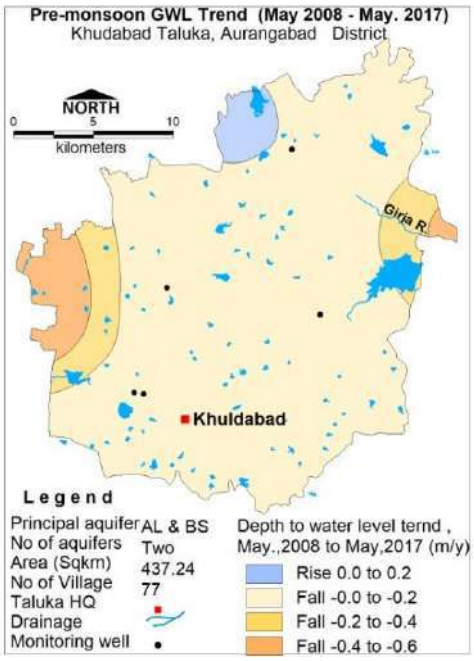
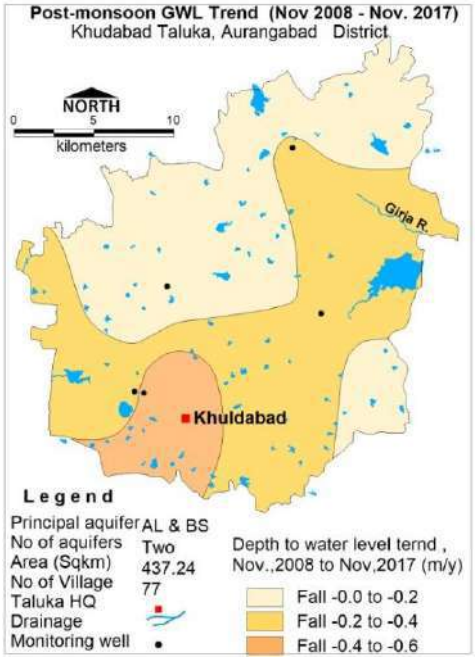
WL> 30 mbgl 45.93 sq. km.	WL> 20 mbgl 21.07 sq. km.

1.7. Hydrographs:



Hydrograph shows Pre-monsoon declining water level trend @ 1.0099 m/year and Post monsoon declining water level trend @ 0.9507 m/year

1.8. Water Level Trend (2008-17)

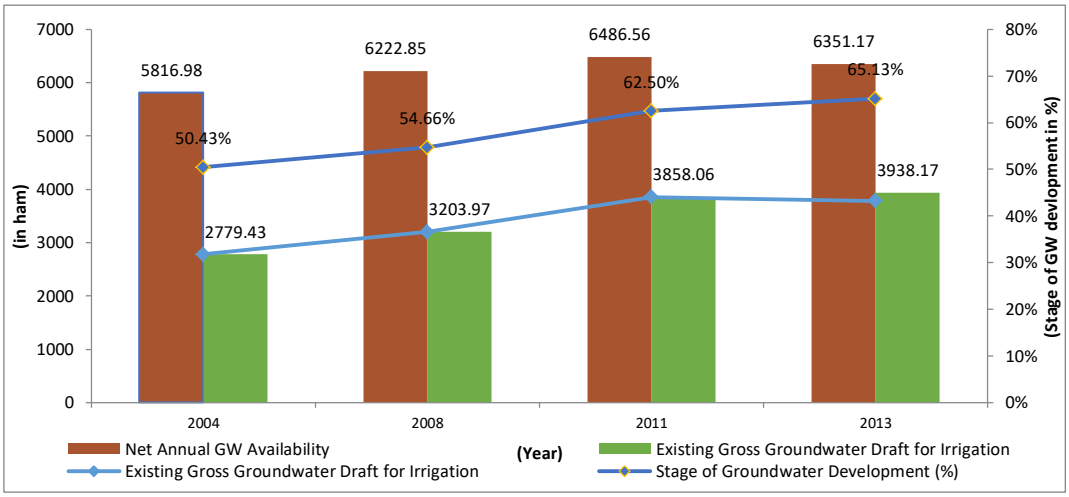
Pre-Monsoon trend Falling 0.01 to 0.1774 m/year	Post-Monsoon trend Falling 0.0873 to 0.5255 m/year
Major part of the block shows declining trend up to 0.2 m/year while decline >0.2 m/year have been observed in eastern and western parts of the block and cover about 64.57 sq. km. area.	Declining water level trend up to 0.2 m/year has been observed in northern, western and eastern parts of the block while declining trend > 0.2 m/year has been observed in southern and eastern parts of the block and cover 279.29 sq. km. area.
Pre-Monsoon Water Level Trend (2008-17)	**Post-Monsoon Water Level Trend (2008-17)**
	
Declining trend @>0.2 m/year 64.57 sq. km	**Declining trend @>0.2 m/year 279.29 sq. km.**

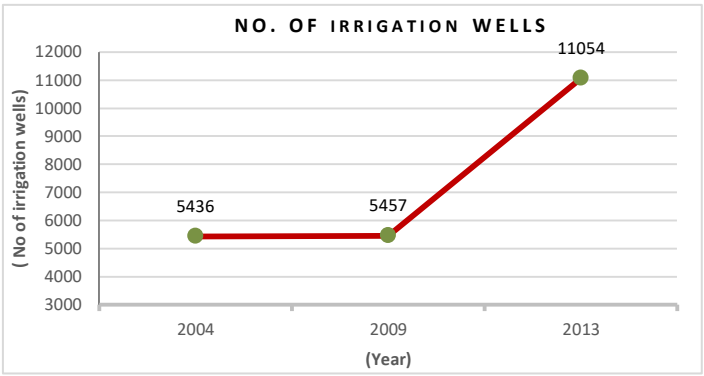
2. Ground Water Issues

Exploitation of Ground Water: -

The stage of ground water development has increased from 2004 to 2013 from 50.43% to 65.13% in Khuldabad block. Further, the draft for irrigation has also increased from 27.79

MCM to 39.38 MCM in the block.





Declining water level Trend:

Post-monsoon (2008-17): The decline in water level trend more than 0.2 m/year is observed in 279.29 sq. km. area covering 55 % area of the block.

Low rainfall and Droughts:

Based on the rainfall analysis for the period 1951-2017; the average rainfall for the period 1951 to 2017 is 778.5 mm. In addition, the long-term rainfall analysis indicates a falling trend @ 4.47 mm/ year with 16% probability of moderate and 6 % of Severe droughts.

Ground Water Quality:

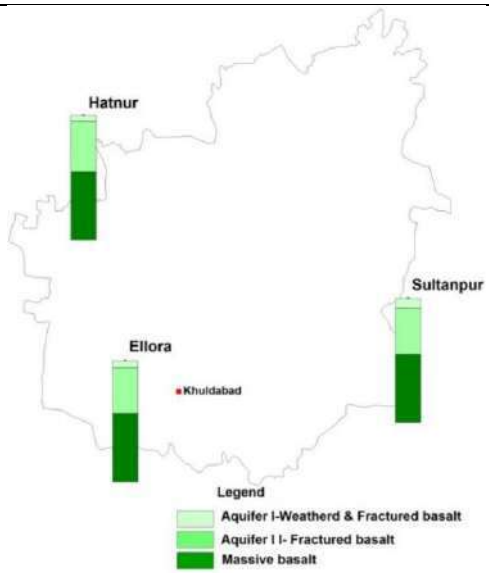
Nitrate Contamination: In shallow aquifer, out of 10 samples 5 samples i.e., 50% samples show nitrate contamination whereas in deeper aquifer, out of 9 samples 2 samples i.e., 22% of samples are also showing nitrate contamination (NO_3 >45 mg/L).

Fluoride contamination: In shallow aquifer, Fluoride contamination is found in Deolana Bk village (F=1.80 mg/L).

Low yielding Aquifer resulting poor sustainability:

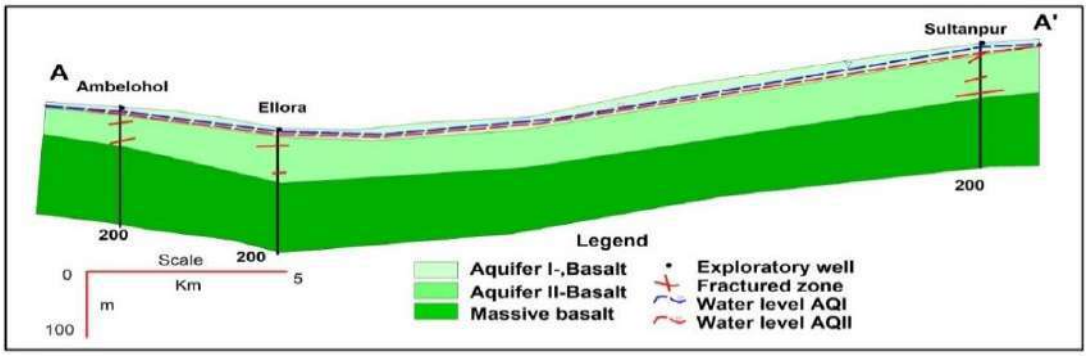
Limited extent of porous and pervious zone, because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity, results in poor sustainability of the aquifers. Major part of the block (80% area) has low yield potential (< 1 lps) and can sustain pumping only for 1-1.5 hrs.

3. AQUIFER DISPOSITION	
3.1. Number of Aquifers	Alluvium- Aquifer-I Basalt –Aquifer-I, Aquifer-II
3.2. Lithological disposition	



3.3. Cross Section

Section AA'



3.4. Basic Aquifer Characteristics

Major Aquifers	Alluvium	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I	Aquifer-I (Phreatic)	Aquifer-II (Semi confined/confined)
Depth to bottom of Aquifer (mbgl)	15 to 21	8 to 29	80 to 135
Fractures/Granular Zones encountered (mbgl)	up to 21	up to 29	up to 135
Granular/Weathered/Fractured rocks thickness (m)	6 to 16	6 to 20	2 to 5
SWL (mbgl)	8 to 20	3.9 to 20.3	14.8 to 15.7
Yield	60 to 120 m^3/day	up to 100 m^3/day	up to 1.25 lps
Specific yield/ Storativity (S)	-	0.019 to 0.028	1.0×10^{-4} to 5.5×10^{-5}
Transmissivity (T)	-	10 to 67 m^2/day	5 to 80 m^2/day
Sustainability	5-6 hrs	1 to 4 hrs	1 to 3 hrs

4. GROUND WATER QUALITY

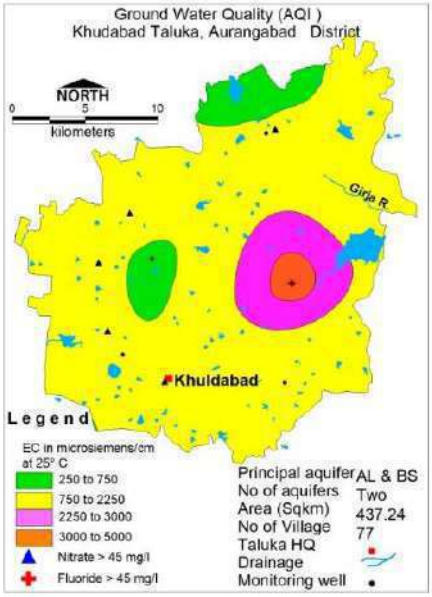
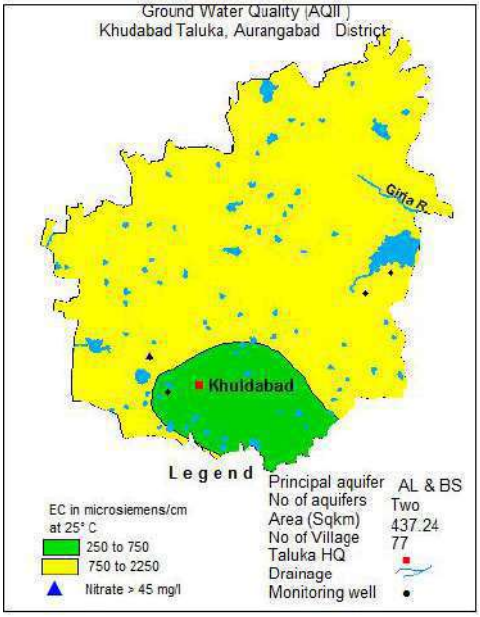
4.1 Aquifer-I/ Shallow Aquifer

EC up to 750 µS/cm is observed in northern part and an isolated patch in central part of the block; EC values between 750 to 2250 µS/cm is observed in major part of the block whereas EC more than 2250 µS/cm has been observed in isolated patch in eastern part of the block covering about 50 sq. km. area of the block. Ground water is suitable for all purposes in

major part of the block except 4 villages (5 locations) namely Khuldabad, Pipri, Verul Tanda and Bodhka that are affected by Nitrate contamination and village Deolana BK is affected by Fluoride contamination (F=1.80 mg/L).

4.2 Aquifer II/Deeper Aquifer

EC up to 750 µS/cm is observed in southern part of block while EC values between 750 to 2250 µS/cm are found in major part of the block. Ground water is suitable for all purposes except 2 locations in village Ellora that are having nitrate more than 45 mg/L so are not fit for drinking purpose without treatment.

Phreatic Aquifer (Aquifer-I)	**Semi confined/Confined Aquifer (Aquifer II)**
	
EC > 2250 µS/cm covering 50 sq. km.	

5. GROUND WATER RESOURCE

5.1 Aquifer-I/ Shallow Aquifer

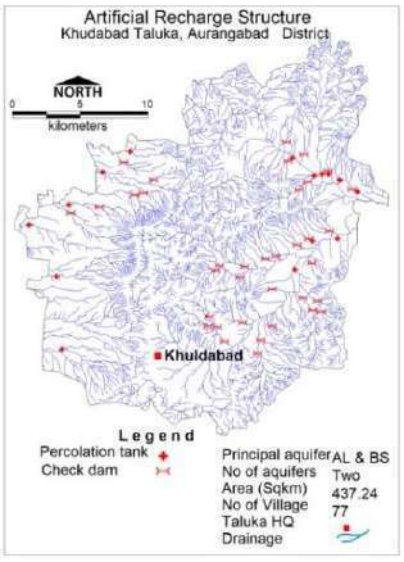
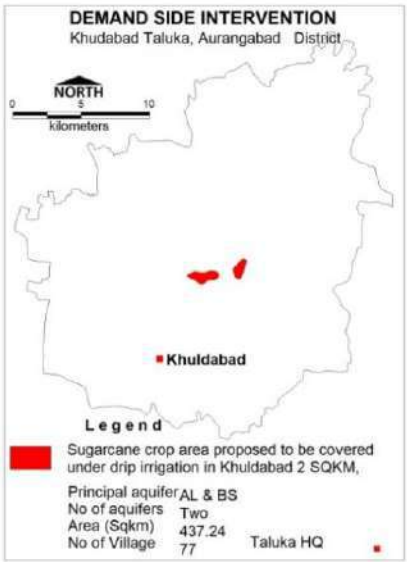
Ground Water Recharge Worthy Area (Sq. km.)	437.24
Total Annual Ground Water Recharge (MCM)	66.85
Natural Discharge (MCM)	3.34
Net Annual Ground Water Availability (MCM)	63.51
Existing Gross Ground Water Draft for irrigation (MCM)	39.38
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	1.98
Existing Gross Ground Water Draft for All uses (MCM)	41.36
Provision for domestic and industrial requirement supply to 2025(MCM)	3.92
Net Ground Water Availability for future irrigation development (MCM)	20.98
Stage of Ground Water Development (%)	65.13
Category	**SAFE**

5.2 Aquifer-II/Deeper Aquifer

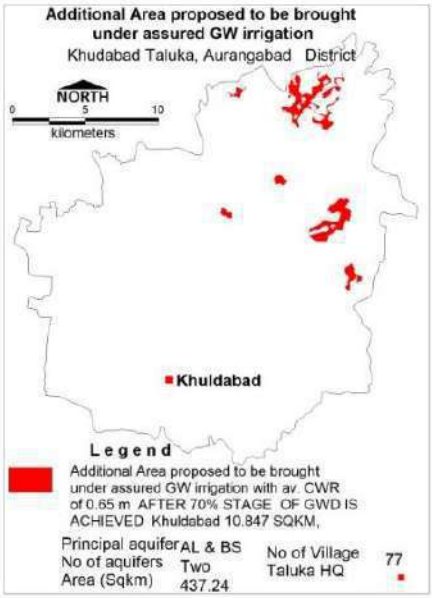
Semi confined/Confined Aquifer (Basalt)

Total Area (Sq. km.)	Mean aquifer thickness	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)

	(m)			
437.56	3.25	0.00625/0.00012	30	8.35
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			63.51	
Gross Annual Draft (MCM)			41.36	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			39.38	
Agricultural Supply -SW			14.7	
Domestic Supply - GW			1.98	
Domestic Supply - SW			0.49	
Total Supply			56.55	
Area of Block (Sq. km.)			509.87	
Area suitable for Artificial recharge (Sq. km.)			255.14	
Type of Formation			Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)			255.14	-
Volume of Unsaturated Zone (MCM)			510.28	-
Average Specific Yield			0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)			10.20	-
Surplus water Available (MCM)			5.35	-
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures			15	34
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			3	1.02
Proposed Structures				
RTRWH Structures – Urban Areas				
Households to be covered (25% with 50 m^2area)			5700	
Total RWH potential (MCM)			0.161025	
Rainwater harvested / recharged @ 80% runoff co-efficient			0.1288 Economically not viable & Not Recommended	
6.2. Demand Side Management				
Micro irrigation techniques				
Sugarcane crop area proposed for drip irrigation (sq. km.)			2	
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m			1.14	
Proposed Cropping Pattern change				
Irrigated area under Water Intensive Crop (ha)			Not proposed	

Water Saving by Change in Cropping Pattern	Nil
Alternate Sources	Nil
6.3. EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	63.51
Additional GW resources available after Supply side interventions (MCM)	4.02
Ground Water Availability after Supply side intervention	67.53
Existing Ground Water Draft for All Uses (MCM)	41.36
GW draft after Demand Side Interventions (MCM)	40.22
Present stage of Ground Water Development (%)	65.12
Expected Stage of Ground Water Development after interventions (%)	59.56
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
Recommendation	
Ground water development is recommended to bring the stage of ground water development from 59.56 % to 70%	
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	7.051
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	423
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	71
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	10.85
Regulatory Measures	**60 m**
Supply Side Interventions	**Demand Side Interventions**
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**
	

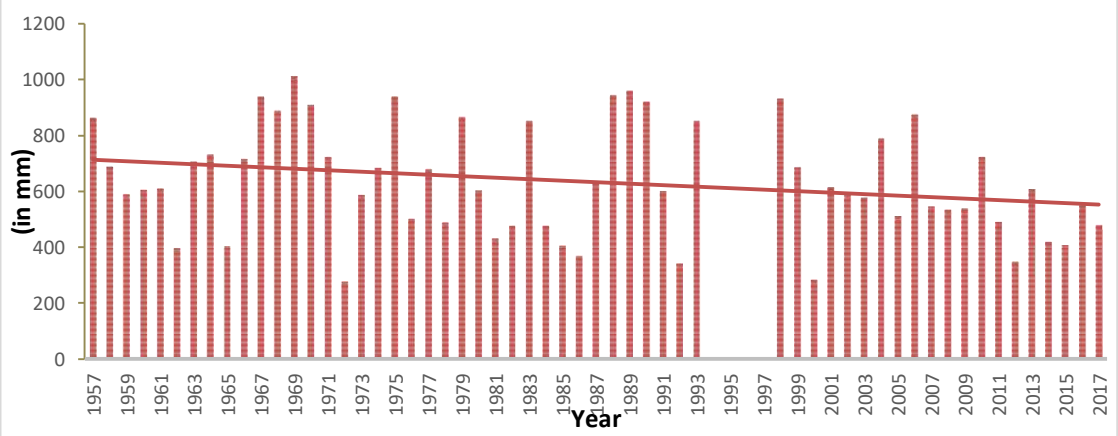
Expected Benefits: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION



5. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, PAITHAN BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

1. SALIENT FEATURES		
1.1 Introduction		
Block Name	**PAITHAN**	
Geographical Area (Sq. km.)	1504.78 Sq. km.	
Hilly Area (Sq. km.)	4.90 Sq. km.	
Poor Ground Quality Area (Sq. km.)	Nil	
Population (2011)	3,47,973	
Climate	Sub-Tropical	
1.2 Rainfall Analysis		
Normal Rainfall	634.3 mm	
Annual Rainfall (2017)	480.0 mm	
Decadal Average Annual Rainfall (2008-17)	508.4 mm	
Long Term Rainfall Analysis (1957-2017)	Declining Trend 2.67 mm/year Probability of Normal and Excess Rainfall - 52% & 25% Probability of Droughts -: 19% Moderate and 4% Severe	

Rainfall Trend Analysis (1957 to 2017)



EQUATION OF TREND LINE: Y= -2.6791 X +715.75

1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (slightly to highly dissected) and Plateau weathered with 1 to 5 weathered thickness	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm depth), Gravelly clay, Clay loam, Gravelly clay loam, Gravelly sandy loam, Gravelly sandy clay loam and Gravelly sandy loam soils	
Geology	Alluvium (River Alluvium) Age: Recent to Sub Recent Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Godavari river and its tributaries namely Yerbhadra, Yelganga, Kham rivers	
Hydrology **(Reference Year: June 2014)**	Major project	**Completed:** Jayakwadi Project; generating a gross irrigation Potential of 141640 ha in Paithan block; Gross Storage Capacity of

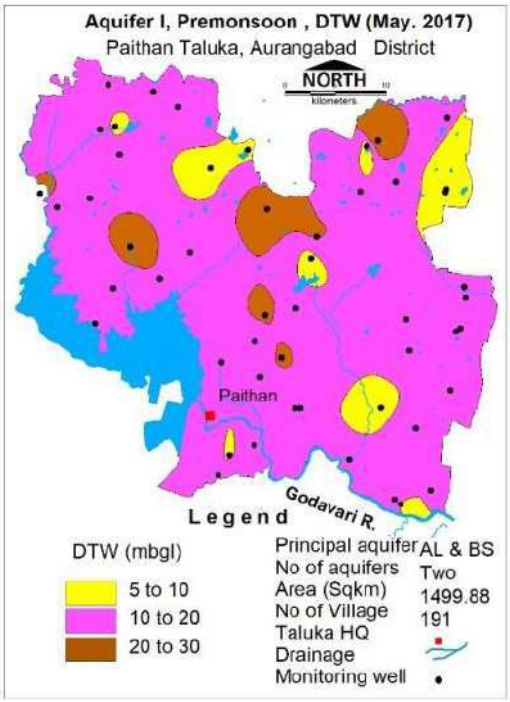
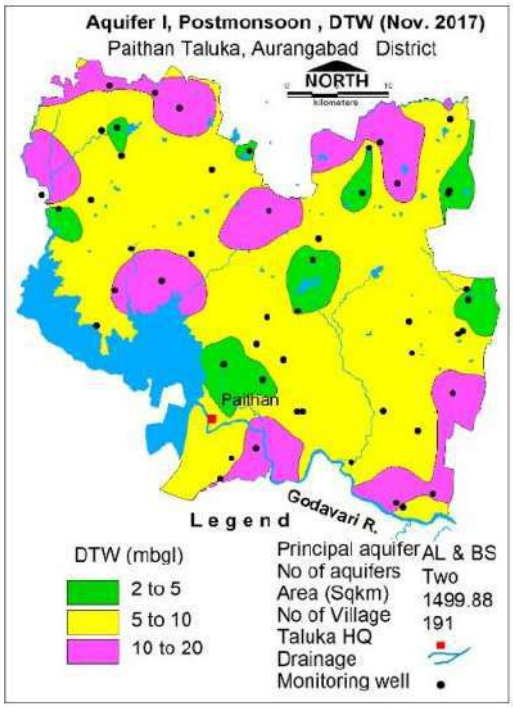
		2909 MCM (including Paithan, Gangapur and Vaijapur Blocks) and Live Storage Capacity of 2171 MCM (including Paithan, Gangapur and Vaijapur Blocks) **Ongoing:** 02; Hiranpuri and Apegaon irrigation projects shall be generating a gross irrigation Potential of 1272 ha, Gross Storage Capacity of 16.68 MCM and Live Storage Capacity of 16.68 MCM.
	Medium project	**Completed:** 02; Sukhna and Bramh-Gavhan irrigation projects generating a gross irrigation Potential of 4305 ha, Gross Storage Capacity of 21.350 MCM (Aurangabad and Paithan) and Live Storage Capacity of 18.50 MCM (Aurangabad and Paithan) **Ongoing:** 01; Bramh-Gavhan lift irrigation project shall be generating a gross irrigation Potential of 18787 ha
	Irrigation Project (>250 Ha)	**Completed:** 05 irrigation projects; generating a gross irrigation Potential of 1642 ha, Gross Storage Capacity of 8.64 MCM and Live Storage Capacity of 7.44 MCM **Ongoing:** 01; Kherda irrigation project shall be generating a gross irrigation Potential of 536 ha, Gross Storage Capacity of 6.47 MCM and Live Storage Capacity of 5.52 MCM
	Irrigation Project (<250 Ha)	**Completed:** Through completed KT weir and Lift irrigation projects generating a gross irrigation Potential of 3623 ha and Live Storage Capacity of 21.75 MCM **Ongoing:** Through ongoing KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 416 ha; Gross Storage Capacity 1.56 MCM and Live Storage Capacity of 1.56 MCM.

1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		1504.78 Sq. km.	
Forest Area		15.54 Sq. km.	
Cultivable Area		1055.01 Sq. km.	
Net Sown Area		1055.01 Sq. km.	
Double Cropped Area		52.46 Sq. km.	
Area under Irrigation	Surface Water	156.49 Sq. km.	
	Ground Water	206.08 Sq. km.	
Principal Crops (Reference year 2017)		**Crop Type**	**Area (Sq. km.)**
		Cotton	728.77
		Cereals	295.58
		Pulses	254.10
		Sugarcane	77.89

	Oil Seeds	7.72
Horticultural Crops	Citrus fruits	64.09
	Mango	4.06
	Banana	0.45
	Others	3.55

1.6. Water Level Behavior

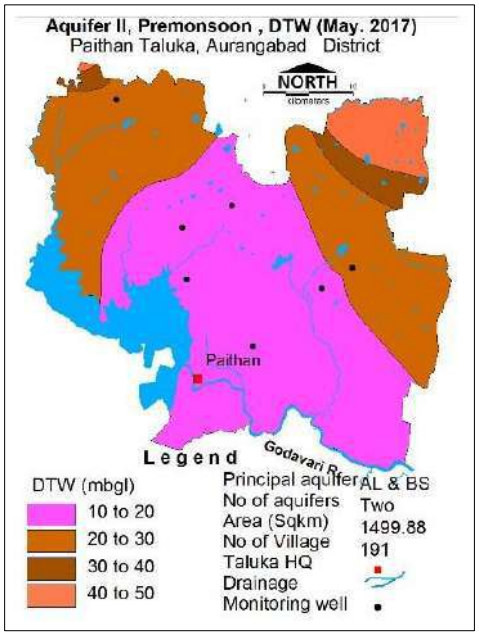
1.6.1. Aquifer-I/Shallow Aquifer

Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water level less than 10 mbgl has been observed in isolated patches in the block; Water level between 10 to 20 mbgl has been observed in major part of the block whereas more than 20 mbgl water level observed as isolated patches in northern half of the block and cover about 91.68 sq. km. area.	Water level less than 10 mbgl has been observed in isolated patches in the block; Water level between 5 to 10 mbgl has been observed in major part of the block whereas water level more than 10 mbgl has been observed as isolated patches in peripheral parts of the block and central part of the block and cover about 305.95 sq. km. area.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
WL>20 mbgl 91.68 sq. km.	**WL>10 mbgl 305.95 sq. km.**

1.6.2. Aquifer-II/Deeper Aquifer

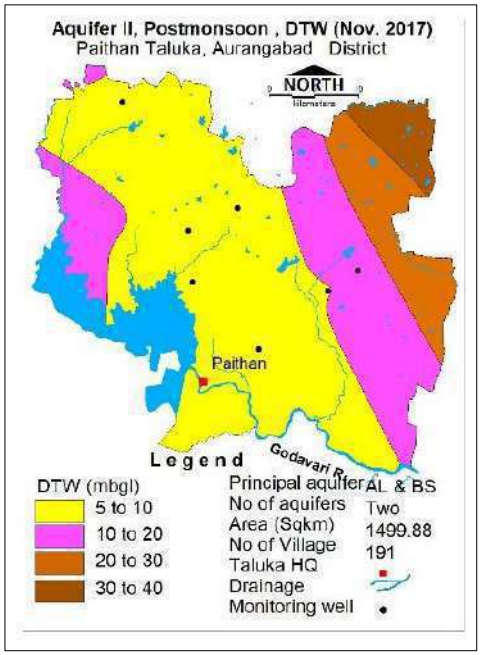
Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water level less than 20 mbgl is observed in major part of the block; water level between 20-30 mbgl has been observed in north eastern and north western parts of the block Whereas more than 30 mbgl has been observed in north eastern and north western parts of the block and cover 124.46 sq. km. area of the block.	Water level <10 mbgl is observed in major part of the block. Water level between 10 to 20 mbgl has been observed in eastern and western parts of the block; water level between 20 to 30 mbgl has been observed in north eastern and eastern parts of the block whereas Water level more than 30 mbgl has been observed in eastern part of the block and cover 57.33 sq. km. area.

Pre-Monsoon Water Level (May 2017)



WL> 30 mbgl 124.46 sq. km.

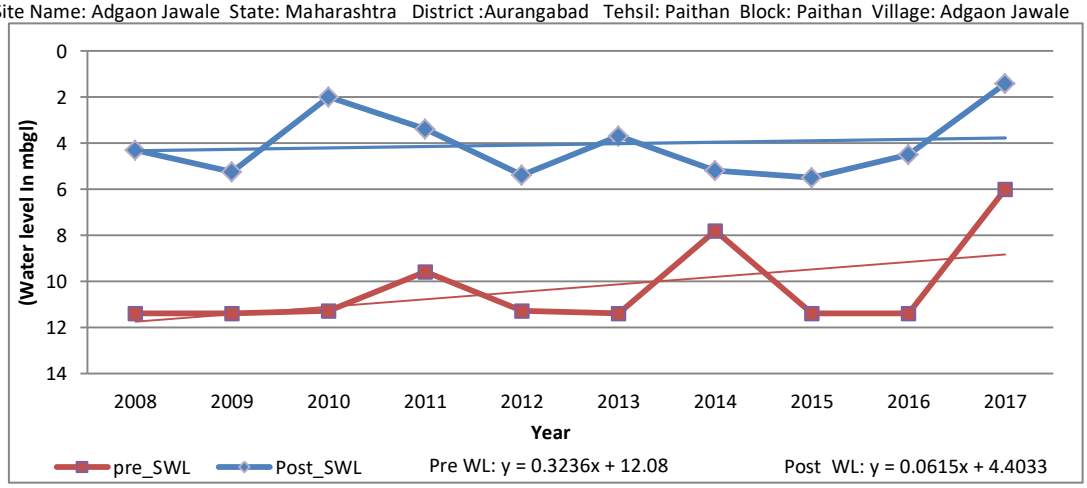
Post-Monsoon Water Level (Nov.-2017)



WL> 30 mbgl 57.33 sq. km.

1.7. Hydrographs:

Site Name: Adgaon Jawale State: Maharashtra District :Aurangabad Tehsil: Paithan Block: Paithan Village: Adgaon Jawale

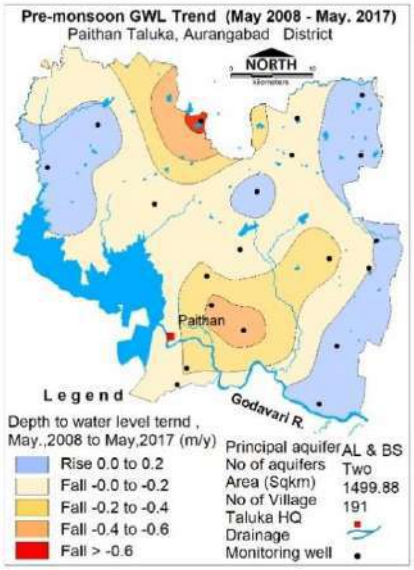


Hydrograph shows Pre-monsoon rising water level trend @ 0.3236 m/year and Post monsoon rising water level trend @ 0.0615 m/year

1.8. Water Level Trend (2008-17)

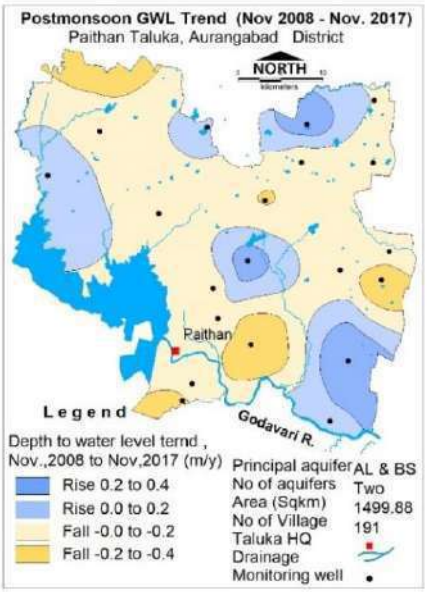
Pre-Monsoon trend	**Post-Monsoon trend**
Rising 0.0035 to 0.18 m/year Falling 0.00021 to 0.62005 m/year	Rising 0.04835 to 0.37136 m/year Falling 0.00117 to 0.3544 m/year
Major part of the block shows declining trend up to 0.2 m/year while rise in water level up to 0.2 m/year have been observed in eastern and western peripheral parts of the block. Declining trend more than 0.2 m/ Year has been observed in northern and southern parts of the block and cover about 322.70 sq. km. area.	Declining water level trend up to 0.2 m/year has been observed in major part of the block while rise in water level up to 0.2 m/year has been observed in peripheral parts and isolated patch in central part of the block. Declining trend > 0.2 m/year has been observed in northern, southern and eastern parts of the block and cover 127.29 sq. km. area.

Pre-Monsoon Water Level Trend (2008-17)



Declining trend @>0.2 m/year 322.70 sq. km.

Post-Monsoon Water Level Trend (2008-17)

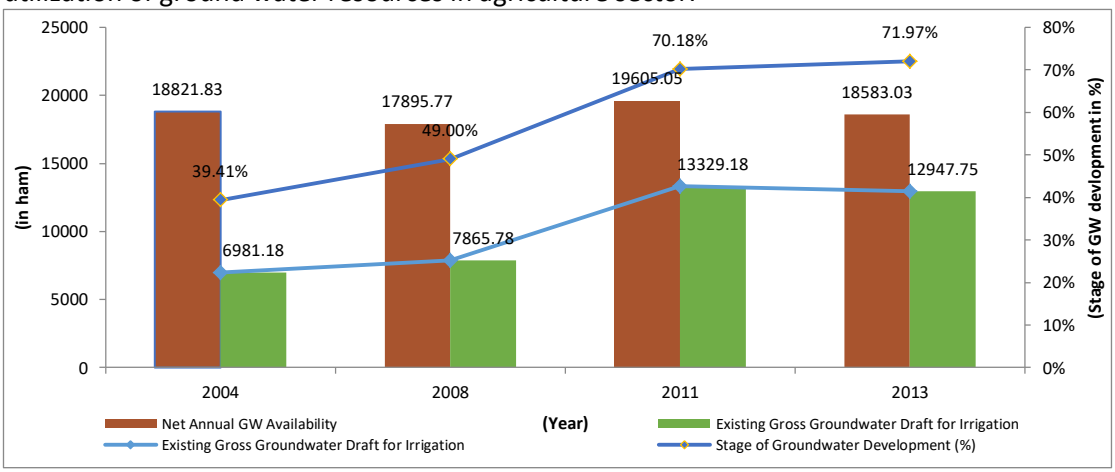


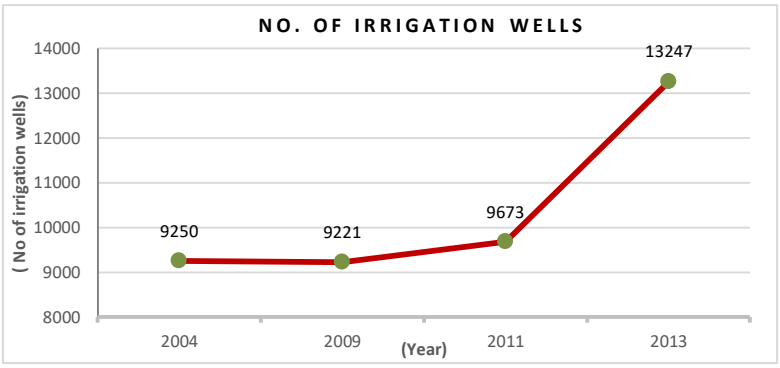
Declining trend @>0.2 m/year 127.29 sq. km.

2. Ground Water Issues

Exploitation of Ground Water: -

The stage of ground water development has continuously increased from 39.41% (2004) to 71.97% (2013). Further, the draft for irrigation and number of irrigation wells has also increased from 69.81 MCM to 129.75 MCM and 9250 to 13247 wells implying increased utilization of ground water resources in agriculture sector.





Declining water level Trend : -

- Pre-monsoon (2008-17): decline in water level trend more than 0.2 m/year is observed in about 322.70 sq. km. covering about 21 % area of the block.

- Post-monsoon (2008-17): decline in water level trend more than 0.2 m/year is observed in about 127.29 sq. km. covering about 8 % area of the block.

Low rainfall and Drought Prone Area: -

- As per Agro-climatic Zones, Paithan block falls under "drought prone area" characterized by low and unpredictable rainfall of 500 to 700 mm/year in 40-45 days. Common dry spells will last from 2 to 10 weeks. Delayed onset and early cessation of S-W monsoon is very common.
- Based on the rainfall analysis for the period 1957-2017; the average rainfall for the period 1957 to 2017 is 634.3 mm. In addition, the long-term rainfall analysis indicates a falling trend @ 2.67 mm/ year with 19% probability of moderate and 4 % of severe droughts.

Ground Water Quality: -

Nitrate Contamination: In shallow aquifer, out of 25 samples 14 samples i.e., 56% samples show nitrate contamination whereas in deeper aquifer, out of 27 samples 16 samples i.e., 59% of samples are also showing nitrate contamination (NO_3 >45 mg/L).

Fluoride contamination: In shallow aquifer, Fluoride contamination is found in Takali Ambad village (F=1.90 mg/L) while in deeper aquifer Karanjikhed (F=5.6 mg/L) and Apegaon (F=1.65 mg/L) villages are affected by Fluoride contamination.

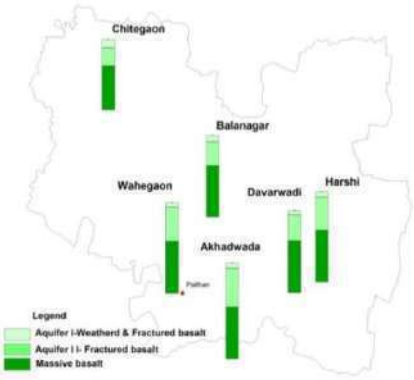
Low yielding Aquifer resulting poor sustainability:

Limited extent of porous and pervious zone, because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity, results in poor sustainability of the aquifers. Major part of the block (60% area) has low yield potential (< 1 lps) and can sustain pumping only for 1-1.5 hrs.

3. AQUIFER DISPOSITION

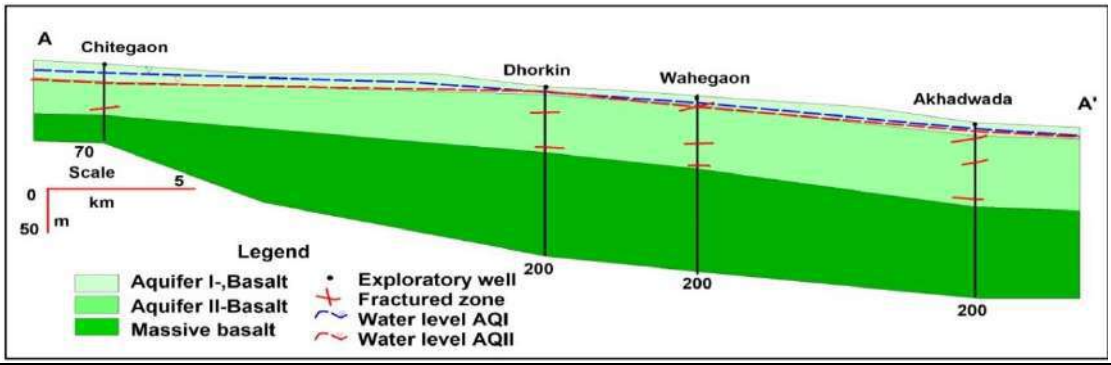
3.1. Number of Aquifers	Alluvium- Aquifer-I Basalt –Aquifer-I, Aquifer-II

3.2. Lithological disposition



3.3. Cross Section

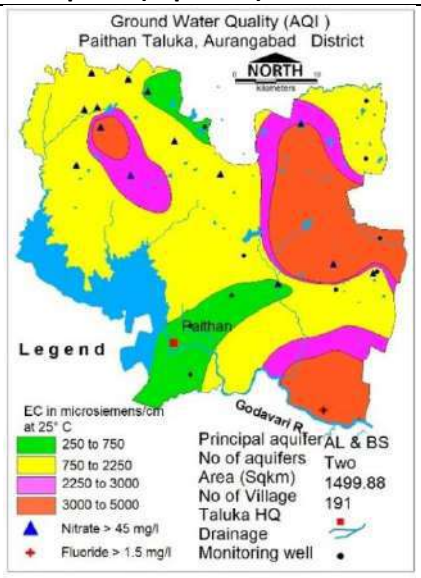
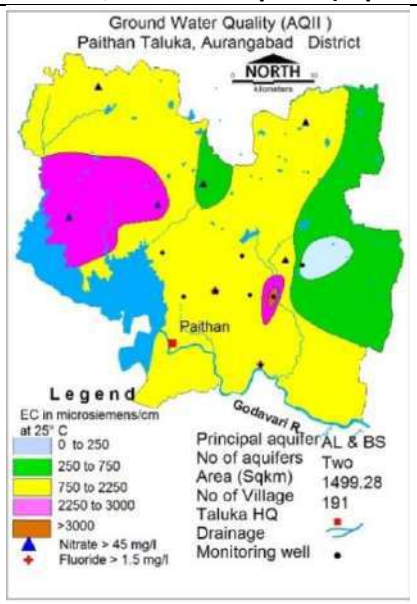
Section AA'



3.4. Basic Aquifer Characteristics

Major Aquifers	**Alluvium**	**Basalt (Deccan Traps)**	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I	Aquifer-I (Phreatic)	Aquifer-II (Semi confined/confined)
Depth to bottom of Aquifer (mbgl)	15-28	10 to 30	50 to 152
Fractures/Granular zones encountered (mbgl)	up to 28	up to 30	up to 152
Granular /Weathered/Fractured rocks thickness (m)	8 to 16	5 to 20	2 to 6
SWL (mbgl)	1.8 to 16	1.2 to 27.10	6.9 to 21
Specific yield/Storativity (S)	*1.73 x 10^{-3} to 1.85 x 10^{-5}	0.019 to 0.028	1.0 x 10^{-4} to 5.5 x 10^{-5}
Transmissivity (T)	*369-757 m^2/day	10 to 47 m^2/day	5 to 75 m^2/day
Yield	60 to 120 m^3/day	up to 100 m^3/day	up to to 2.5 lps
Sustainability	3-4 hrs	2 to 4 hrs	1 to 6 hrs
*: these values are taken from alluvium aquifer of Gangapur blocks			

4. GROUND WATER QUALITY

Phreatic Aquifer (Aquifer-I)	**Semi confined/Confined Aquifer (Aquifer II)**
	
EC > 2250 µS/cm covering 442 sq. km.	**EC > 2250 µS/cm covering 197 sq. km.**

4.1 Aquifer-I/ Shallow Aquifer

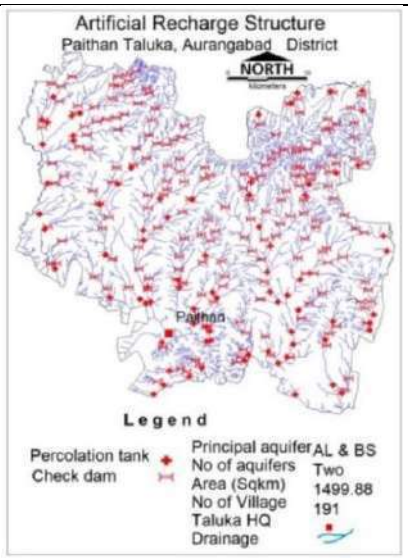
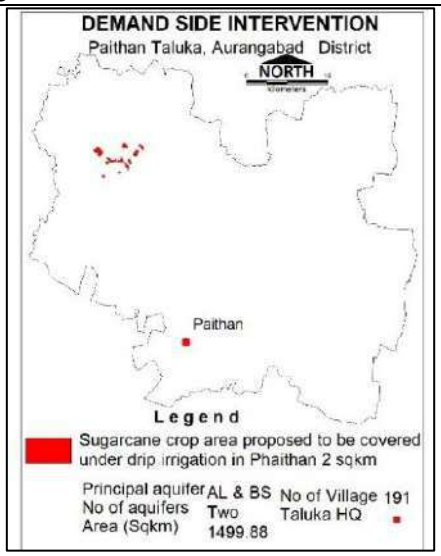
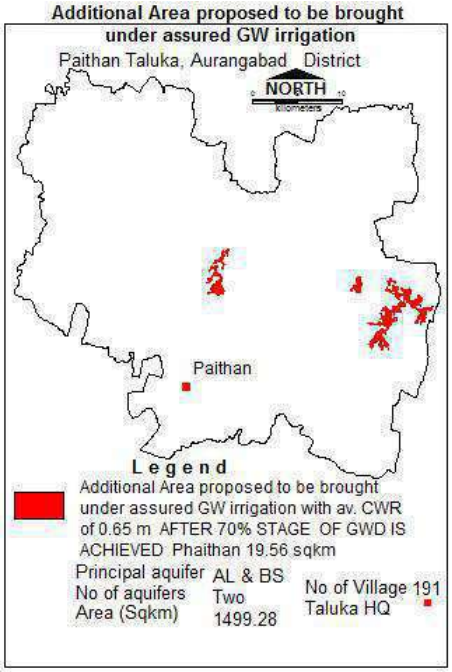
EC up to 750 µS/cm is observed in northern and southern parts of the block and EC value between 750 to 2250 µS/cm is observed in major part of the block whereas EC > 2250 µS/cm has been observed in eastern, southern and northern parts of the block covering about 442 sq. km. area of the block. Ground water is suitable for all purposes in major part of the block except 14 villages that are affected by nitrate contamination and Takli Ambad village (F=1.90 mg/L) has affected by Fluoride contamination and in these areas ground water is not suitable for drinking purpose without treatment.

4.2 Aquifer II/Deeper Aquifer

EC up to 750 µS/cm is observed in northern and north eastern parts of the block and EC values between 750 to 2250 µS/cm is observed in major part of the block. Isolated patches in south central part of the block show EC more than 2250 µS/cm. Ground water is suitable for all purposes except 16 locations that are having nitrate more than 45 mg/L; 3 locations

(Apegaon and 2 locations in Karanjikhed villages) are affected by Fluoride contamination and ground water is not suitable for drinking purpose without treatment.				
5. GROUND WATER RESOURCE				
5.1 Aquifer-I/ Shallow Aquifer				
Ground Water Recharge Worthy Area (Sq. km.)			1499.88	
Total Annual Ground Water Recharge (MCM)			195.61	
Natural Discharge (MCM)			9.78	
Net Annual Ground Water Availability (MCM)			185.83	
Existing Gross Ground Water Draft for irrigation (MCM)			129.47	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			4.26	
Existing Gross Ground Water Draft for All uses (MCM)			133.74	
Provision for domestic and industrial requirement supply to 2025(MCM)			8.57	
Net Ground Water Availability for future irrigation development (MCM)			47.91	
Stage of Ground Water Development (%)			71.97	
Category			**SAFE**	
5.2 Aquifer-II/Deeper Aquifer				
Semi confined/Confined Aquifer (Basalt)				
Total Area (Sq. km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
1499.11	3.25	0.005/0.00004	37.5	25.83
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			185.83	
Gross Annual Draft (MCM)			133.74	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			129.47	
Agricultural Supply -SW			109.55	
Domestic Supply - GW			4.26	
Domestic Supply - SW			1.065	
Total Supply			**244.345**	
Area of Block (Sq. km.)			1504.78	
Area suitable for Artificial recharge (Sq. km.)			1384.82	
Type of Formation			Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)			1384.82	-
Volume of Unsaturated Zone (MCM)			2769.64	-
Average Specific Yield			0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)			55.3928	-
Surplus water Available (MCM)			29.04	-
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings =

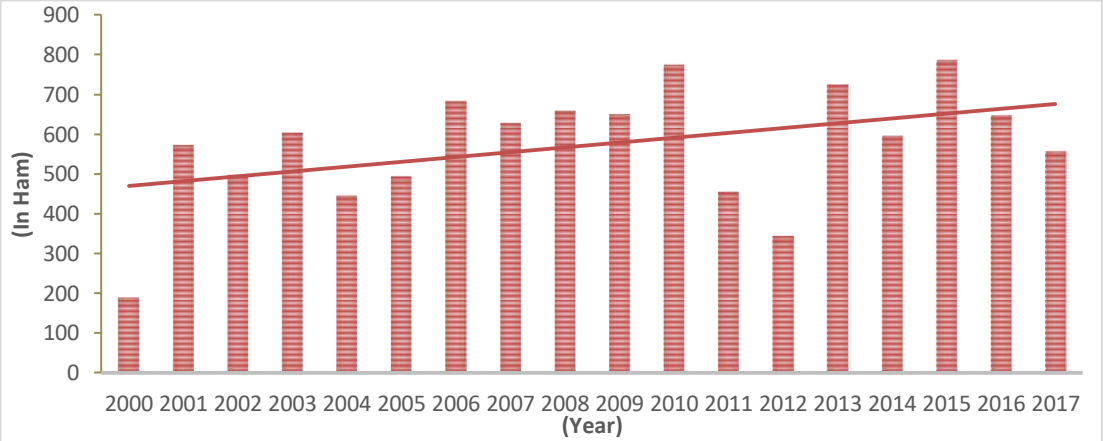
	TCM)	30 TCM)
Number of Structures	80	192
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	16	5.76
Proposed Structures		
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m^2area)	18000	
Total RWH potential (MCM)	0.5085	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.4068 Economically not viable & Not Recommended	
6.2. Demand Side Management		
Micro irrigation techniques		
Sugarcane crop area proposed for drip irrigation (sq. km.)	2	
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m	1.14	
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop (ha)	Not proposed	
Water Saving by Change in Cropping Pattern	Nil	
Alternate Sources	Nil	
6.3. EXPECTED BENEFITS		
Net Ground Water Availability (MCM)	185.83	
Additional GW resources available after Supply side interventions (MCM)	21.76	
Ground Water Availability after Supply side intervention	207.59	
Existing Ground Water Draft for All Uses (MCM)	133.74	
GW draft after Demand Side Interventions (MCM)	132.60	
Present stage of Ground Water Development (%)	71.97	
Expected Stage of Ground Water Development after interventions (%)	63.88	
Other Interventions Proposed, if any		
Alternate Water Sources Available	Nil	
Recommendation		
Ground water development is recommended to bring the stage of ground water development from 63.88% to 70%		
6.4. Development Plan		
Volume of water available for GWD to 70% (MCM)	12.71	
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	763	

Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	127
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	19.56
Regulatory Measures	**60 m**
Supply Side Interventions	**Demand Side Interventions**
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**
	
EXPECTED BENEFITS: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION 	

6. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, PHULAMBRI BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

2. SALIENT FEATURES		
1.1 Introduction		
Block Name	**PHULAMBRI**	
Geographical Area (Sq. km.)	510.54 Sq. km.	
Hilly Area (Sq. km.)	110.56 Sq. km.	
Poor Ground Quality Area (Sq. km.)	Nil	
Population (2011)	1,61,012	
Climate	Sub-Tropical	
1.2 Rainfall Analysis		
Normal Rainfall	566.2 mm	
Annual Rainfall (2017)	556.5 mm	
Decadal Average Annual Rainfall (2008-17)	612.28 mm	
Long Term Rainfall Analysis (2000-2017)	Rising Trend 12.12 mm/year. Probability of Normal and Excess Rainfall- 65% & 20%. Probability of Droughts-: 5 % Moderate, 5% Severe & 5% Acute.	

Rainfall Trend Analysis (2000 to 2017)



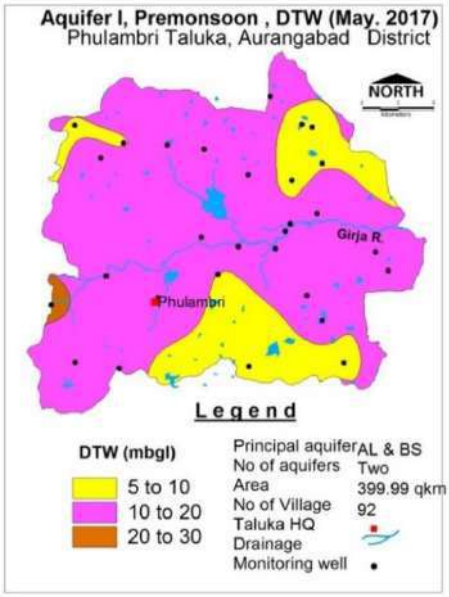
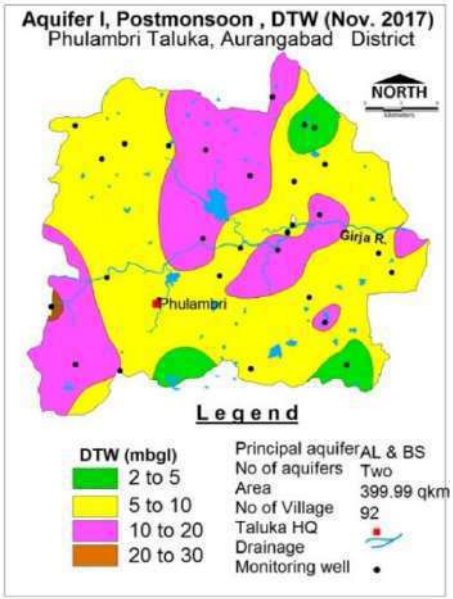
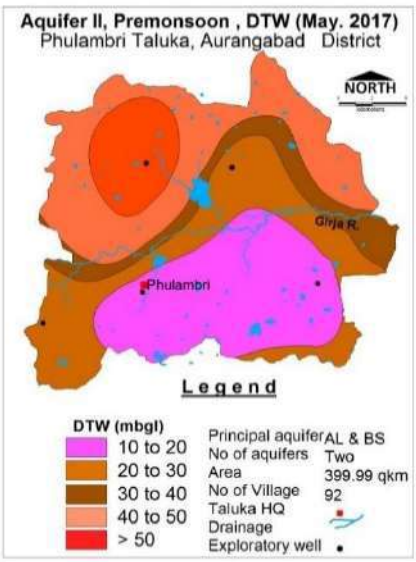
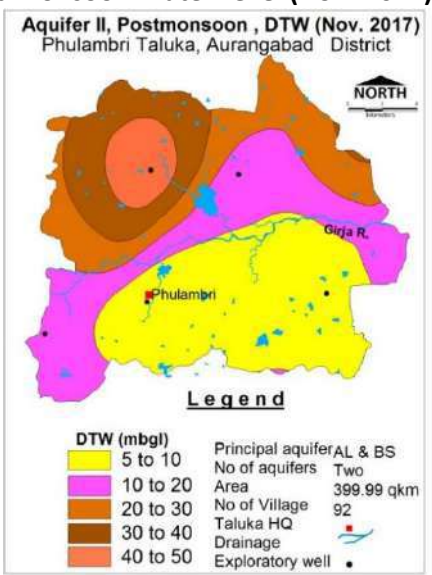
EQUATION OF TREND LINE: Y= 12.122X+457.07

1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (slightly dissected to highly dissected), Plateau weathered with 1 to 2 m weathered thickness and Escarpment Slope	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm), Gravelly Clay, Gravel sandy Clay loam, Gravel sandy loam and Gravel clay loam soils.	
Geology	Alluvium (River Alluvium) Age: Sub Recent to Recent Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Girija river tributaries of Purna river	
Hydrology	Major project	Nil
	Medium	**Completed**: Nil

	project	**Ongoing:** 01; Wakod project shall be generating a gross irrigation Potential of 2217 ha, Gross Storage Capacity of 12.65 MCM and Live Storage Capacity of 11.40 MCM
	Irrigation Project (>250 Ha.)	**Completed**: 03; Sanjul, Ganori, Jategaon irrigation projects generating a gross irrigation Potential of 1514 ha, Gross Storage Capacity of 8.038 MCM and Live Storage Capacity of 7.077 MCM **Ongoing:** 02; Phulambri and Satal irrigation projects shall be generating a gross irrigation Potential of 1050 ha, Gross Storage Capacity of 7.44 MCM and Live Storage Capacity of 6.39 MCM
	Irrigation Project (<250 Ha.)	**Completed**: Through KT weir and Lift irrigation generating a gross irrigation Potential of 9188 ha, Gross Storage Capacity of 37.81 MCM and Live Storage Capacity of 37.68 MCM **Ongoing:** Through KT weir and Lift irrigation shall be generating a gross irrigation Potential of 1644 ha, Gross Storage Capacity of 9.58 MCM and Live Storage Capacity of 9.58 MCM

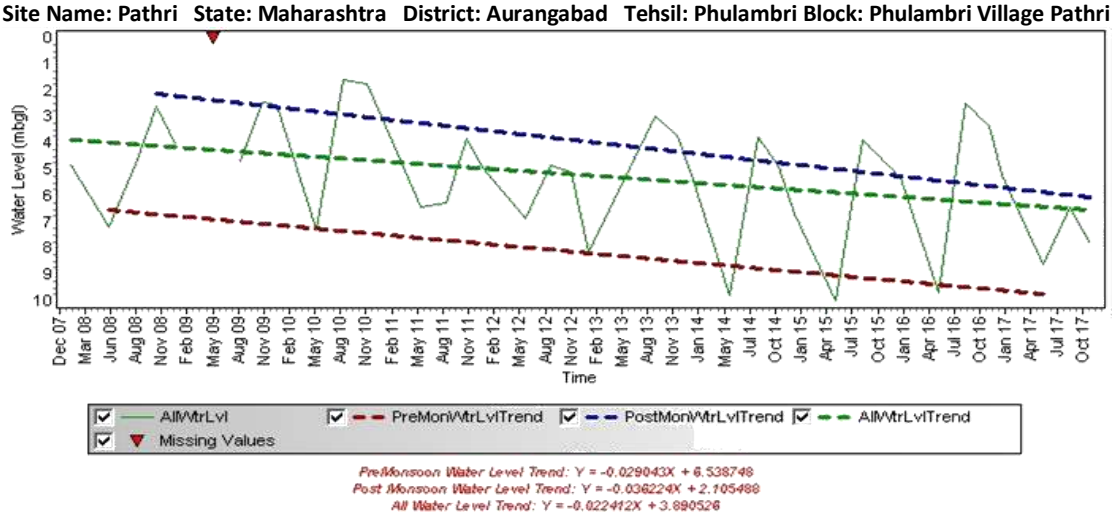
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		510.54 Sq. km.	
Forest Area		44.25 Sq. km.	
Cultivable Area		566.49 Sq. km.	
Net Sown Area		487.04 Sq. km.	
Double Cropped Area		86.57 Sq. km.	
Area under Irrigation	Surface Water	17.51 Sq. km.	
	Ground Water	117.13 Sq. km.	
Principal Crops (**Reference year 2017)**		**Crop Type**	**Area (Sq. km.)**
		Cereals	312.62
		Cotton	261.35
		Pulses	92.93
		Oil Seeds	9.02
		Sugarcane	4.59
Horticultural Crops		Mango	4.40
		Citrus fruits	1.67
		Banana	1.35
		Others	3.50

1.6. Water Level Behavior	
1.6.1. Aquifer-I/Shallow Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed in eastern, northern and southern peripheral parts of the block. Water level	Water level less than 5 mbgl has been observed in northern and southern peripheral parts of the block. Water level

between 10 to 20 mbgl has been observed in major part of the block whereas more than 20 mbgl water level is observed in very small part in western part of the block and covering about 5 sq. km. area.	between 5 to 10 mbgl is observed in major part of the block whereas Water level more than 10 mbgl has been observed in northern, central and western parts of the block covering about 211.92 sq. km. area.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
WL>10 mbgl 531.09 sq. km.	**WL>10 mbgl 211.92 sq. km.**
1.6.2. Aquifer-II/Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level <20 mbgl is observed in almost entire southern half of the block. Water level between 20-30 mbgl has been observed in central part of the block. Water level >30 mbgl is observed in northern half of the block covering 312.99 sq. km. area of the block.	Water level <10 mbgl is observed in southern half of the block. Water level between 10-20 mbgl has been observed in central part of the block. Water level more than 20 mbgl is observed in northern half of the block covering 247.58 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov.-2017)**
	
WL> 30 mbgl 312.99 sq. km.	**WL> 30 mbgl 129.79 sq. km.**

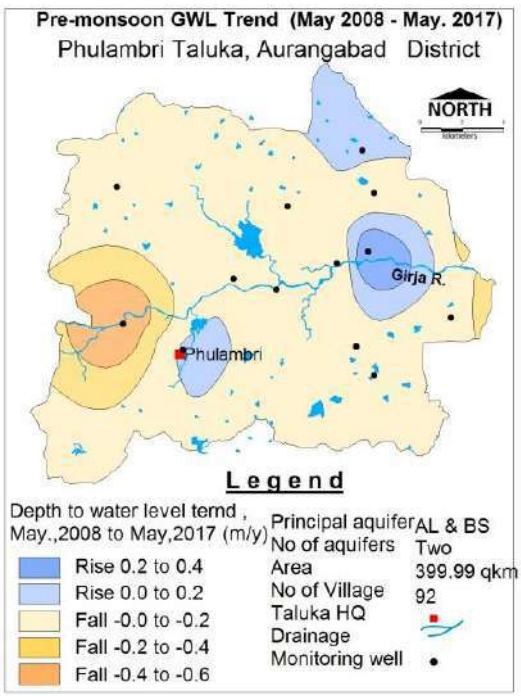
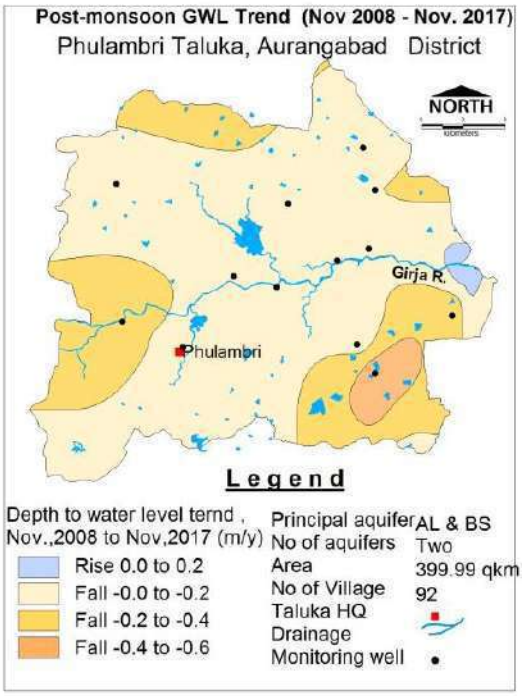
1.7. Hydrographs:

Site Name: Pathri State: Maharashtra District: Aurangabad Tehsil: Phulambri Block: Phulambri Village Pathri



Hydrograph shows Pre-monsoon declining water level trend @ 0.3485 m/year and Post monsoon declining water level trend @ 0.4346 m/year

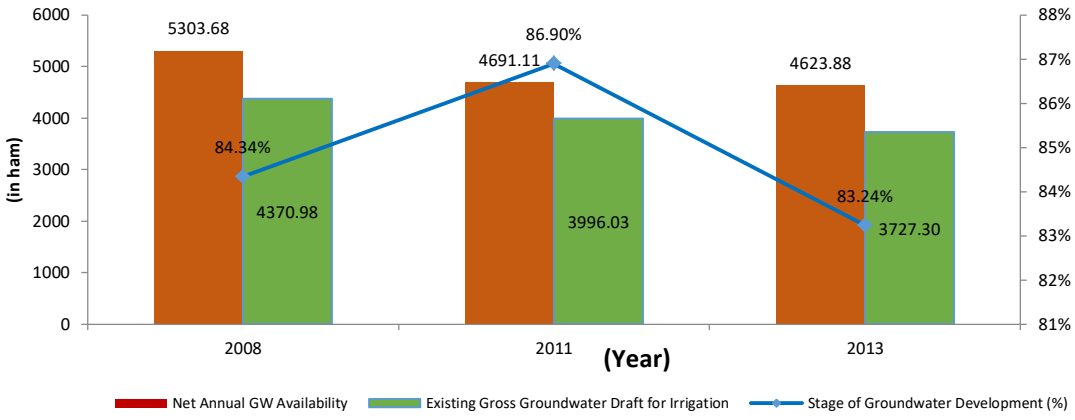
1.8. Water Level Trend (2008-17)

Pre-Monsoon trend	**Post-Monsoon trend**
Rising 0.0095 to 0.02362 m/year Falling 0.0080 to 0.5118 m/year	Falling 0.0184 to 0.5295 m/year
Major part of the block shows declining trend up to 0.2 m/year while rising trend up to 0.2 m/year has been observed in northern, eastern and western part of the block. Declining water level trend >0.2 m/year has been observed in western part of the block covering about 79.85 sq. km. area.	Major part of the block shows declining water level trend up to 0.2 m/year whereas declining trend > 0.2 m/year has been observed in northern, western southern peripheral parts of the block and cover 187.25 sq. km. area.
Pre-Monsoon Water Level Trend (2008-17)	**Post-Monsoon Water Level Trend (2008-17)**
	
Declining trend @>0.2 m/yr 79.85 sq. km.	**Declining trend @>0.2 m/yr 187.25 sq. km.**

2. Ground Water Issues

Exploitation of Ground Water: -

The stage of ground water development has increased from 2009 to 2011 and afterwards decreased slightly from 86.90% to 83.24% from 2011 to 2013 in Phulambri block**.** Further, the net ground water availability decreased from 53.03 MCM to 46.23 MCM and the draft for irrigation has also decresed from 43.70 MCM to 37.27 MCM.



Declining water level Trend: -

Post-monsoon (2008-17): Decline water level trend more than 0.2 m/year is observed in about 187.25 sq. km. covering 37 % area of the block.

Ground Water Quality: -

Nitrate Contamination: In shallow aquifer, out of 12 samples 6 samples i.e., 50% samples showing nitrate contamination whereas in deeper aquifer, 3 villages namely Pirbabda, Khamgaon and Phulambri villages are affected by nitrate contamination (NO_3 >45 mg/L).

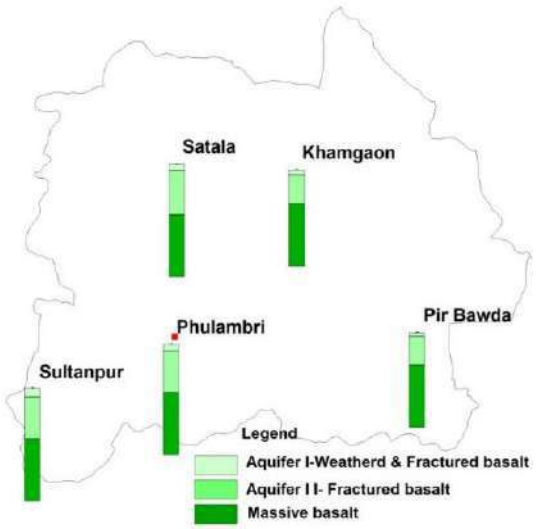
Low yielding Aquifer resulting poor sustainability: -

Limited extent of porous and pervious zone, because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity, results in poor sustainability of the aquifers. Major part of the block (90% area) has low yield potential (less than 1 lps) and can sustain pumping only for 1-1.5 hrs.

3. AQUIFER DISPOSITION

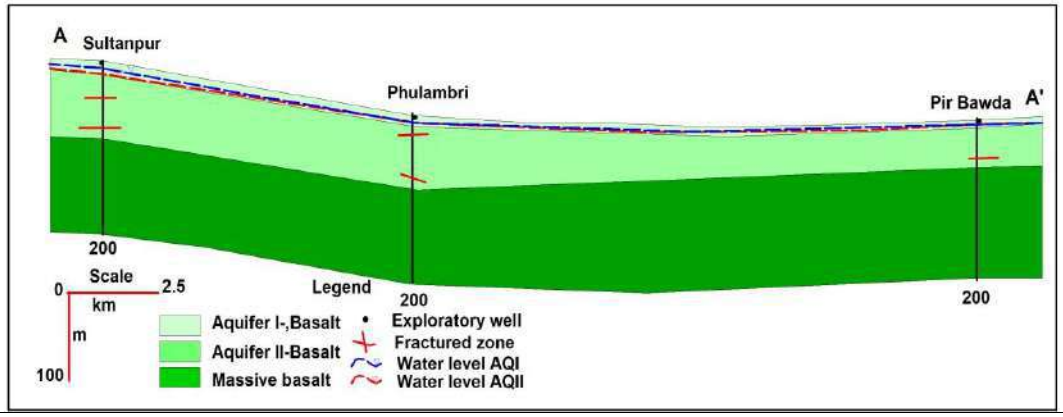
3.1. Number of Aquifers	• Alluvium- Aquifer-I, • Basalt –Aquifer-I, Aquifer-II

3.2. Lithological disposition



3.3. Cross Section

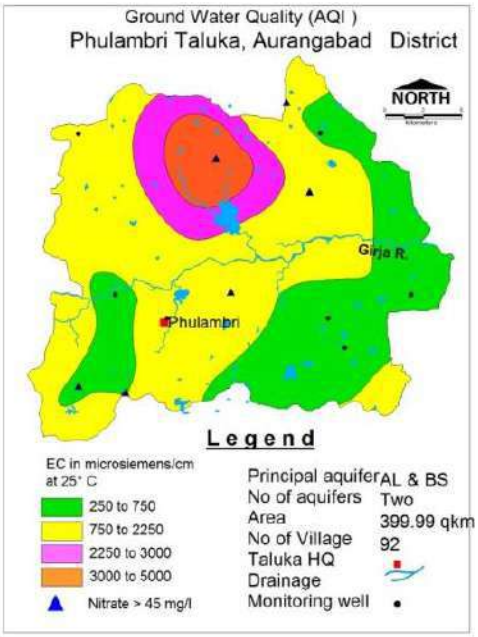
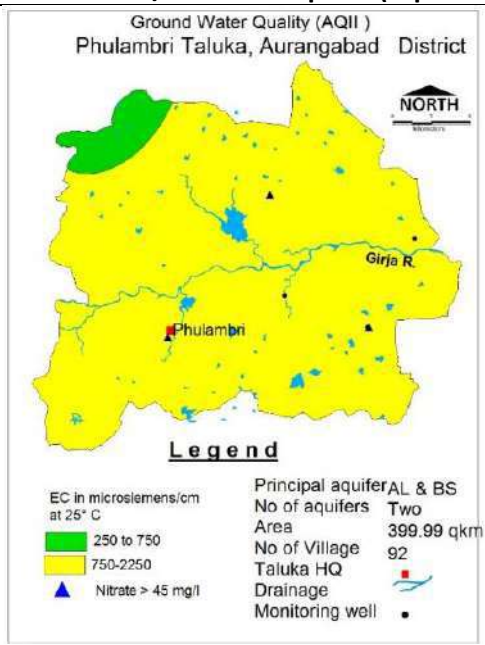
Section AA'



3.4. Basic Aquifer Characteristics

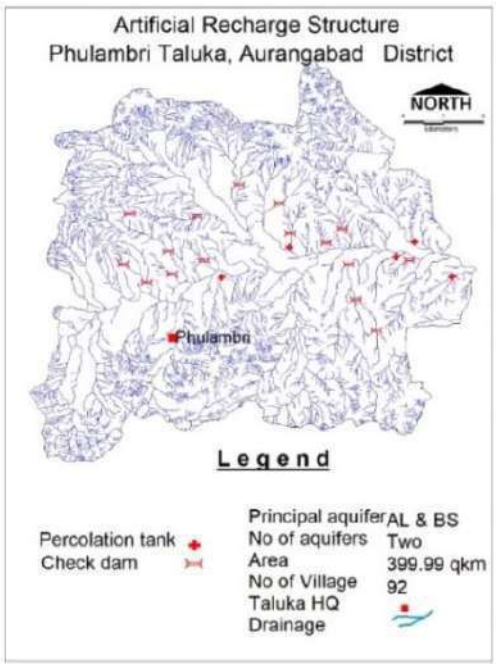
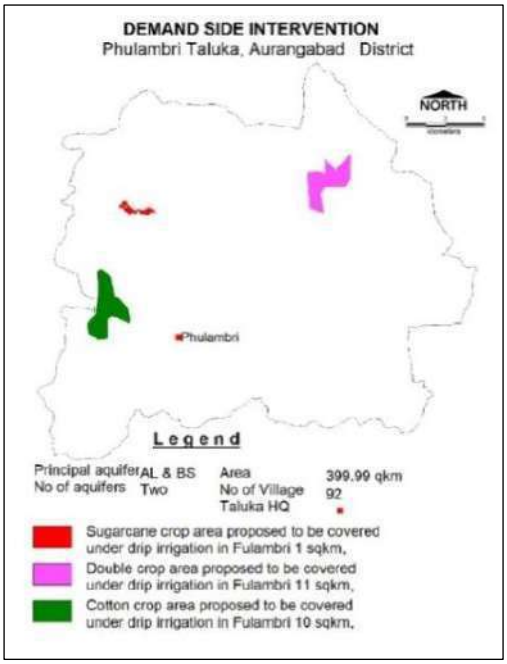
Major Aquifers	**Alluvium**	**Basalt (Deccan Traps)**	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I	Aquifer-I (Phreatic)	Aquifer-II (Semi confined /confined)
Depth to bottom of Aquifer (mbgl)	15 to 22	10 to 23	62 to 143
Fractures/ Granular zones encountered (mbgl)	up to 22	up to 23	up to 143
Granular/Weathered/Fractured rocks thickness (m)	8 to 13	7 to 16	1 to 7
SWL (mbgl)	8 to 10	2.3 to 21.3	3.22 to 45
Specific yield/ Storativity (S)	-	0.019 to 0.028	1.0 x 10^{-4} to 5.5 x 10^{-5}
Transmissivity (T)	-	10 to 25 m^2/day	5 to 80 m^2/day
Yield	60 to 120 m^3/day	up to 100 m^3/day	up to 1.25 lps
Sustainability	5-6 hrs	2 to 4 hrs	1 to 3 hrs

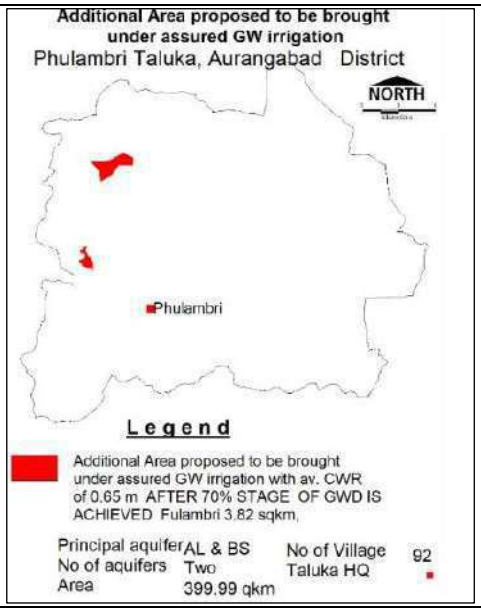
4. GROUND WATER QUALITY

Phreatic Aquifer (Aquifer-I)	**Semi confined/Confined Aquifer (Aquifer II)**
	
EC > 2250 µS/cm covering 96 sq. km.	

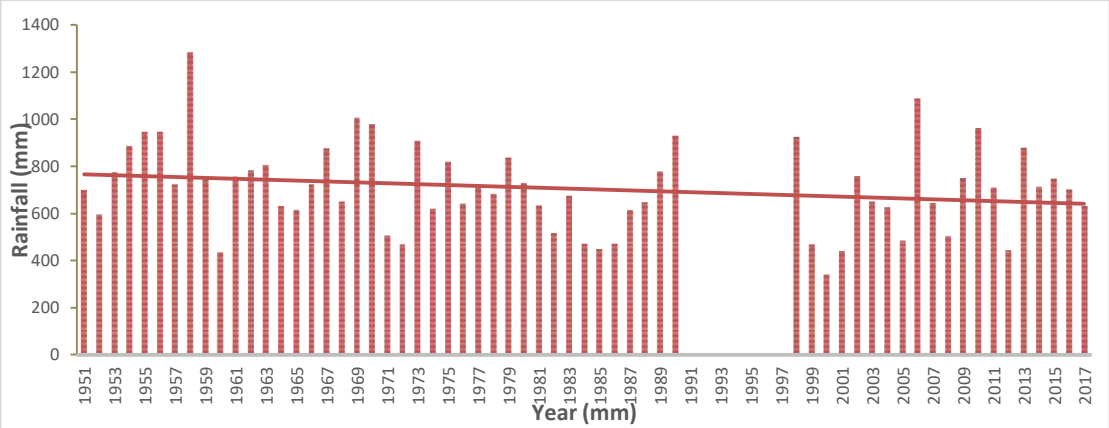
4.1 Aquifer-I/ Shallow Aquifer				
EC up to 750 µS/cm is found in eastern and southern parts of the block; EC values between 750 to 2250 µS/cm are observed in major part of the block whereas EC more than 2250 µS/cm has been observed in northern part of the block covering about 96 sq. km. area of the block. Ground water is suitable for all purposes in major part of the block except Nitrate affected villages namely Bodegaon Kh, Dongargaon Kawad, Ganori, Jatwa, Murshidawadwadi, Naigaon Aland villages. Ground water in these villages is not fit for drinking purpose without treatment.				
4.2 Aquifer II/Deeper Aquifer				
EC up to 750 µS/cm is found in north western part of the block. EC values between 750 to 2250 µS/cm covering major parts of the block. Ground water is suitable for all purposes except 3 villages namely Khamgaon, Pirbawda and Phulambri having nitrate more than 45 mg/L, ground water in these villages is not fit for drinking purpose without treatment.				
5. GROUND WATER RESOURCE				
5.1 Aquifer-I/ Shallow Aquifer				
Ground Water Recharge Worthy Area (Sq. km.)			399.98	
Total Annual Ground Water Recharge (MCM)			48.67	
Natural Discharge (MCM)			2.43	
Net Annual Ground Water Availability (MCM)			46.23	
Existing Gross Ground Water Draft for irrigation (MCM)			37.27	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			1.21	
Existing Gross Ground Water Draft for All uses (MCM)			38.48	
Provision for domestic and industrial requirement supply to 2025(MCM)			2.45	
Net Ground Water Availability for future irrigation development (MCM)			7.68	
Stage of Ground Water Development (%)			**83.24**	
Category			**SAFE**	
5.2 Aquifer-II/Deeper Aquifer				
Semi confined/Confined Aquifer (Basalt)				
Total Area (Sq. km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
400.29	4.66	0.0041/0.000031	23.33	8.37
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			46.24	
Gross Annual Draft (MCM)			38.49	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			37.27	
Agricultural Supply -SW			11.4	
Domestic Supply - GW			1.22	
Domestic Supply - SW			0.30	
Total Supply			**50.195**	
Area of Block (Sq. km.)			510.54	
Area suitable for Artificial recharge			94.46	

(Sq. km.)		
Type of Formation	Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)	94.46	-
Volume of Unsaturated Zone (MCM)	188.92	-
Average Specific Yield	0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	3.7784	-
Surplus water Available (MCM)	1.981	-
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	5	16
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	1	0.48
Proposed Structures		
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m^2area)	7800	
Total RWH potential (MCM)	0.22035	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.17628 Economically not viable & Not Recommended	
6.2. Demand Side Management		
Micro irrigation techniques		
Sugarcane crop area proposed for drip irrigation (sq. km.)	1	
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m	0.57	
Double Cropped Area proposed for drip irrigation (sq. km.)	11	
Volume of Water Saving by use of drip (MCM), WUE- 0.40 m	4.4	
Cotton cropped area proposed for drip irrigation (sq. km.)	10	
Volume of Water Saving by use of drip (MCM), WUE- 0.26 m	2.6	
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop (ha)	Not proposed	
Water Saving by Change in Cropping Pattern	Nil	
Alternate Sources	Nil	
6.3. EXPECTED BENEFITS		
Net Ground Water Availability (MCM)	46.24	
Additional GW resources available after Supply side interventions (MCM)	1.48	
Ground Water Availability after Supply side intervention	47.72	

Existing Ground Water Draft for All Uses (MCM)	38.49
GW draft after Demand Side Interventions (MCM)	30.92
Present stage of Ground Water Development (%)	83.24
Expected Stage of Ground Water Development after interventions (%)	64.79
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
Recommendation	
Ground water development is recommended to bring the stage of ground water development from 64.79 % to 70%	
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	2.484
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	149
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	25
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	3.82
Regulatory Measures	**60 m**
Supply Side Interventions	Demand Side Interventions
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**
	
EXPECTED BENEFITS: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION	


Additional Area proposed to be brought
under assured GW irrigation
Phulambri Taluka, Aurangabad District
NORTH
Phulambri
Legend
Additional Area proposed to be brought
under assured GW irrigation with av. CWR
of 0.65 m AFTER 70% STAGE OF GWD IS
ACHIEVED Fulambri 3.82 sqkm,
Principal aquifer AL & BS
No of aquifers Two
Area 399.99 qkm
No of Village 92
Taluka HQ

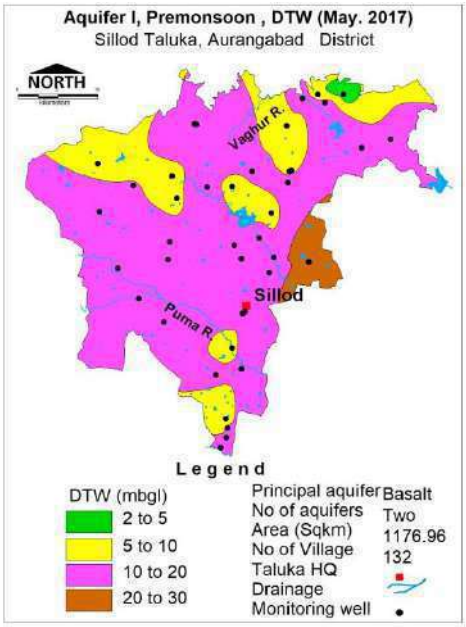
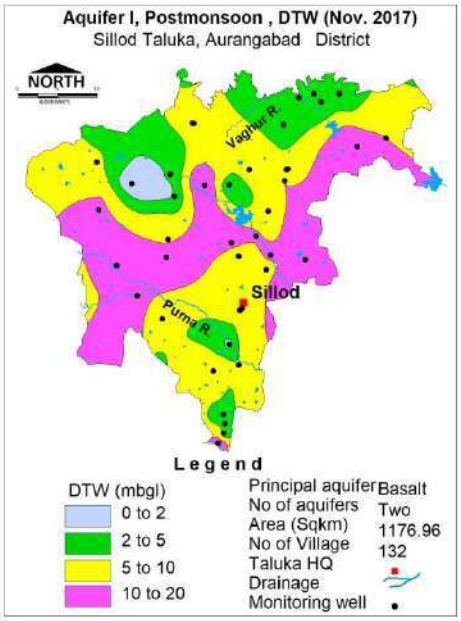
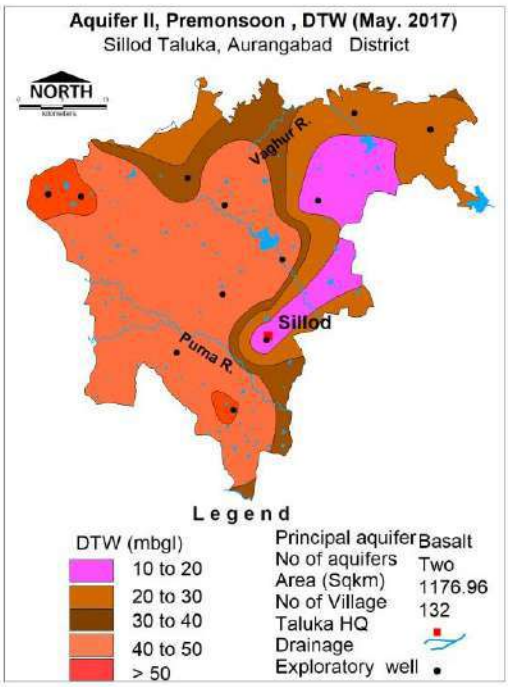
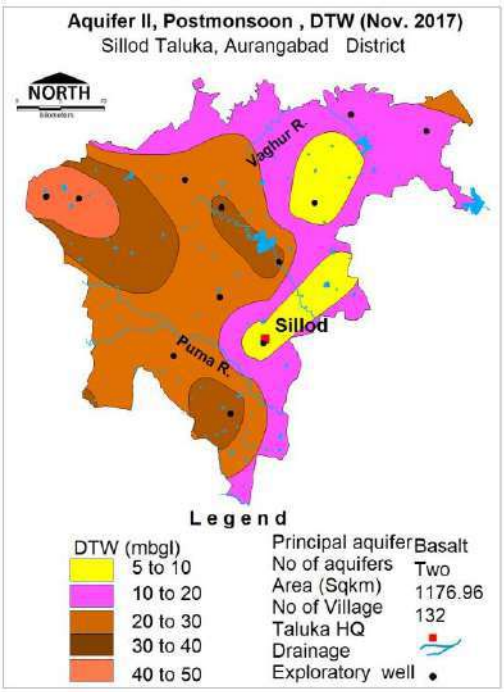
7. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, SILLOD BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

1. SALIENT FEATURES		
1.1 Introduction		
Block Name	**SILLOD**	
Geographical Area (Sq. km.)	1284.14 Sq. km.	
Hilly Area (Sq. km.)	107.18 Sq. km.	
Poor Ground Quality Area (Sq. km.)	Nil	
Population (2011)	3,59,963	
Climate	Sub-Tropical	
1.3 Rainfall Analysis		
Normal Rainfall	706.1 mm	
Annual Rainfall (2017)	629.4 mm	
Decadal Average Annual Rainfall (2008-17)	697.3 mm	
Long Term Rainfall Analysis (1951-2017)	Falling Trend 1.913 mm/year. Probability of Normal and Excess Rainfall- 60% &18%. Probability of Droughts-: 20% Moderate & 2% Severe.	
Rainfall Trend Analysis (1951 to 2017)  **EQUATION OF TREND LINE: Y=-1.9126X+769.93**		
1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (Slightly dissected to highly dissected) and Plateau weathered with 1-5 m weathered thickness	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm depth), Gravel sandy Clay loam, Gravel sandy loam, Gravel clay loam and Gravelly Clayey soils.	
Geology	• Deccan Traps (Basalt) • Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Waghur river; tributary of Tapi river and Girja, Purna, Khelna rivers; tributaries of Godavari river	
Hydrology	Major project	Nil
	Medium project	**Completed**: 03; Khelna, Ajintha Adhari and Girja projects generating a gross irrigation Potential of 3678 ha, Gross Storage Capacity of 42.49 MCM and Live Storage Capacity of

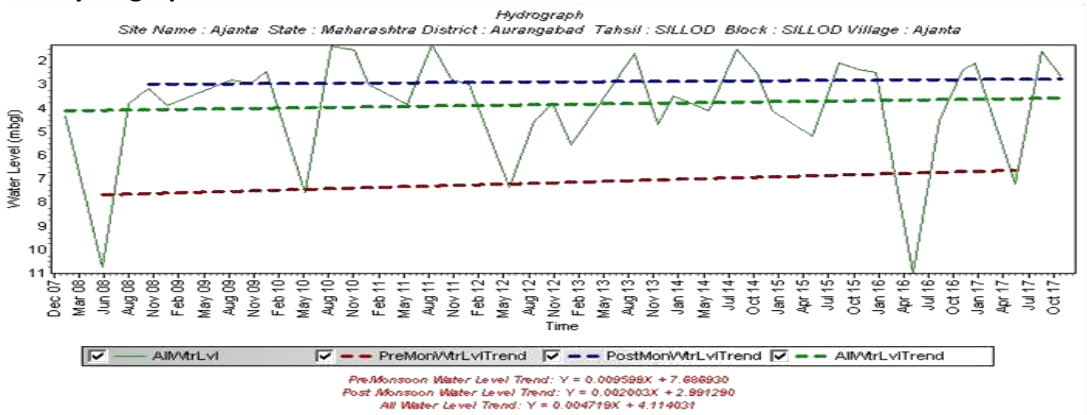
		39.95 MCM **Ongoing: Nil**
	Irrigation Project (>250 Ha.)	**Completed**: Kelgaon irrigation project generating a gross irrigation Potential of 440 ha, Gross Storage Capacity of 2.128 MCM and Live Storage Capacity of 1.903 MCM **Ongoing:** 04; Charner, Bharadi, Nillod and Hakda Jalki irrigation projects shall be generating a gross irrigation Potential of 1711 ha, Gross Storage Capacity of 18.36 MCM and Live Storage Capacity of 15.61 MCM
	Irrigation Project (<250 Ha.)	**Completed**: KT weir and Lift irrigation projects generating a gross irrigation Potential of 15301 ha and Live Storage Capacity of 63.72 MCM **Ongoing:** KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 824 ha and Live Storage Capacity of 3.56 MCM

1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		1284.14 Sq. km.	
Forest Area		28.27 Sq. km.	
Cultivable Area		1110.25 Sq. km.	
Net Sown Area		1110.25 Sq. km.	
Double Cropped Area		99.46 Sq. km.	
Area under Irrigation	Surface Water	52.26 Sq. km.	
	Ground Water	192.60 Sq. km.	
Principal Crops (Reference year 2017)		**Crop Type**	**Area (Sq. km.)**
		Cereals	586.58
		Cotton	373.28
		Pulses	247.73
		Oil Seeds	111.07
		Sugarcane	5.11
Horticultural Crops		Mango	2.90
		Citrus fruits	0.89
		Banana	0.32
		Others	2.37

1.6. Water Level Behavior	
1.6.1. Aquifer-I/Shallow Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed in isolated patches in northern and southern peripheral parts and small patch in central part of the block. Water level between 10 to 20 mbgl is observed in major part of the block whereas more than 20 mbgl water level observed in small part in eastern periphery of the block covering	Water level less than 5 mbgl has been observed as isolated patches in northern and southern parts of the block. Water level between 5 to 10 mbgl is most prominent over the major part of the block. Water level more than 10 mbgl has been found covering central part of the block as continuous patch from east to west in the block covering

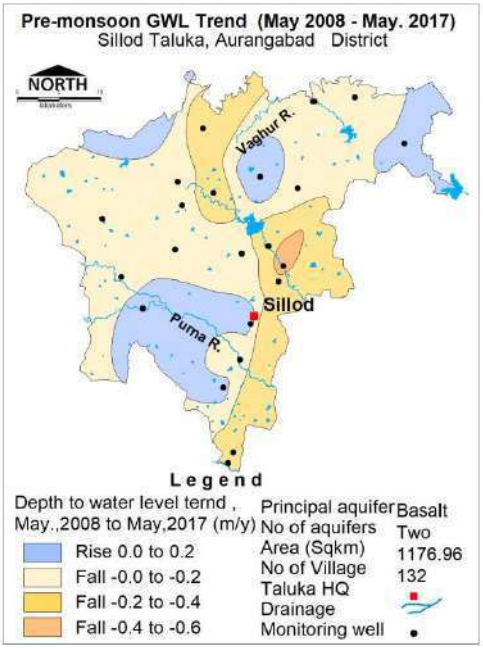
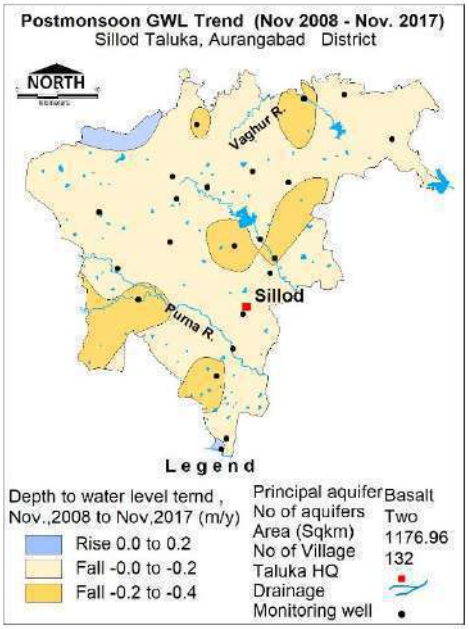
about 45.23 sq. km. area.	about 382.38 sq. km. area.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
WL>20 mbgl 45.23 sq. km.	**WL>10 mbgl 382.38 sq. km.**
1.6.2. Aquifer-II/Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level <20 mbgl is observed in small part in eastern periphery of the block. Water level between 20-30 mbgl is observed in eastern half of the block whereas >30 mbgl is observed in major part of the block in western half covering 805.65 sq. km. area of the block.	Water level <20 mbgl is observed in eastern half of the block. Water level between 20-30 mbgl is observed in western half of the block whereas >30 mbgl is observed in western, southern and central parts of the block in isolated patches covering 251.29 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov.-2017)**
	
WL>30 mbgl 805.65 sq. km.	**WL>30 mbgl 251.29 sq. km.**

1.7. Hydrographs:



Hydrograph shows Pre-monsoon rising water level trend @ 0.1151 m/year and Post monsoon rising water level trend @ 0.0240 m/year

1.8. Water Level Trend (2008-17)

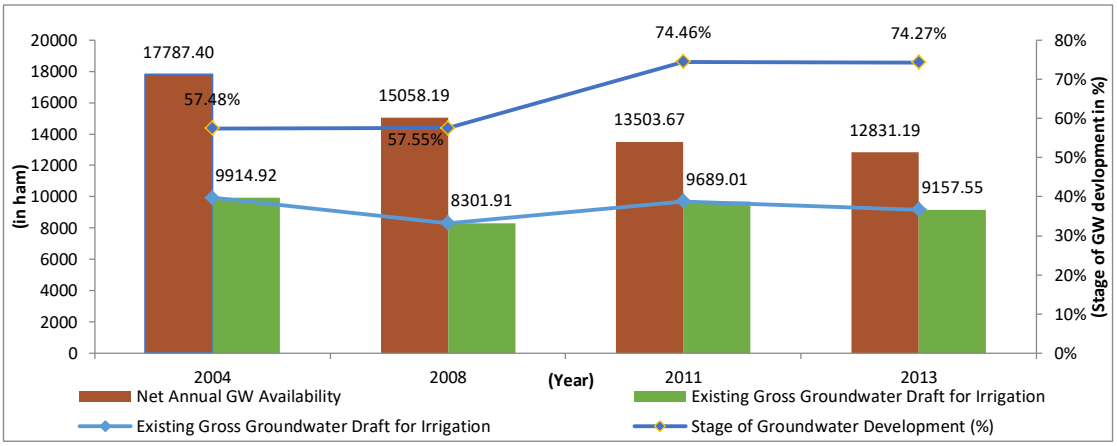
Pre-Monsoon trend	**Post-Monsoon trend**
Rising 0.0321 to 0.160 m/year Falling 0.013 to 0.5043 m/year	Rising 0.012 to 0.216 to m/year Falling 0.0153 to 0.5745 m/year
Major part of the block shows declining trend up to 0.2 m/year while rising trend up to 0.2 m/year has been observed in parts in northern and southern part of the block. Declining water level trend >0.2 m/year has been observed in a continuous patch in the north and eastern parts of the block and cover about 261.53 sq. km. area.	Major part of the block shows declining trend up to 0.2 m/year while rising trend up to 0.2 m/year has been observed in very small part in north western part of the block. Declining trend > 0.2 m/year has been observed in isolated patches across the block from north to south and covers 208.41 sq. km. area.
Pre-Monsoon Water Level Trend (2008-17)	**Post-Monsoon Water Level Trend (2008-17)**
	
Declining trend @>0.2 m/yr 261.53 sq. km.	**Declining trend @>0.2 m/yr 208.41 sq. km.**

2. Ground Water Issues

Exploitation of Ground Water: -

The draft for irrigation has decreased from 99.14 MCM to 91.57 MCM however the net ground water availability has also decreased over the time from 2004 to 2013 and as a result

the stage of ground water development has also increased over the period of time from 2004 to 2013 from 57.48% to 74.27%.



Declining water level Trend: -

Pre-monsoon (2008-17): Declining water level trend more than 0.2 m/year is observed in about 261.53 sq. km. and covering about 21 % area of the block.

Post-monsoon (2008-17): Declining water level trend more than 0.2 m/year is observed in about 208.41 sq. km. and covering about 20 % area of the block.

Low Rainfall and Drought-

Based on the rainfall Analysis from 1951 to 2017 reveals; the average rainfall for the period is 706.1 mm; also, indicates a falling rainfall trend @ 1.9126 mm/ year with 15% probability of moderate and 4 % of Severe droughts.

Ground Water Quality: -

Nitrate Contamination: In shallow aquifer, out of 16 samples, 10 samples i.e., 62% samples showing nitrate contamination whereas in deeper aquifer, out of 15 samples 10 samples i.e., 62% samples in 4 villages namely Ajanta, Golegaon, Borgaon Bazar and Sillod villages are affected by nitrate contamination (NO_3 >45 mg/L).

Fluoride contamination: In deeper Aquifer Ambhai (7.6 mg/L) village is affected by Fluoride contamination.

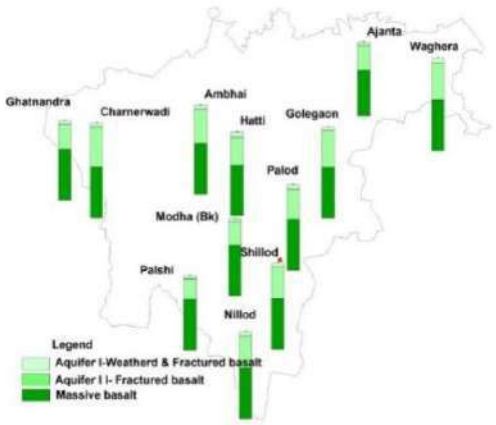
Low yielding Aquifer resulting poor sustainability: -

Limited extent of porous and pervious zone, because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity, results in poor sustainability of the aquifers. Major part of the block (90% area) has low yield potential (less than 1 lps) and can sustain pumping only for 1-1.5 hrs.

3. AQUIFER DISPOSITION

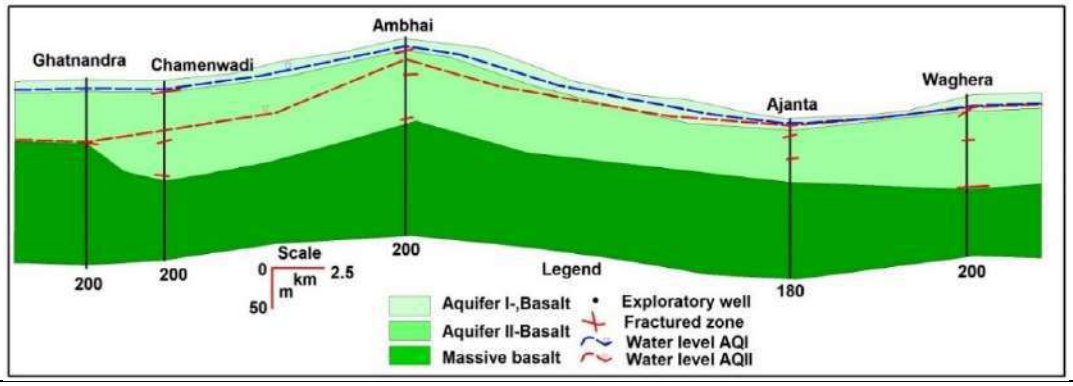
3.1. Number of Aquifers	• Basalt –Aquifer-I, Aquifer-II

3.2. Lithological disposition



3.3. Cross Section

Section AA'

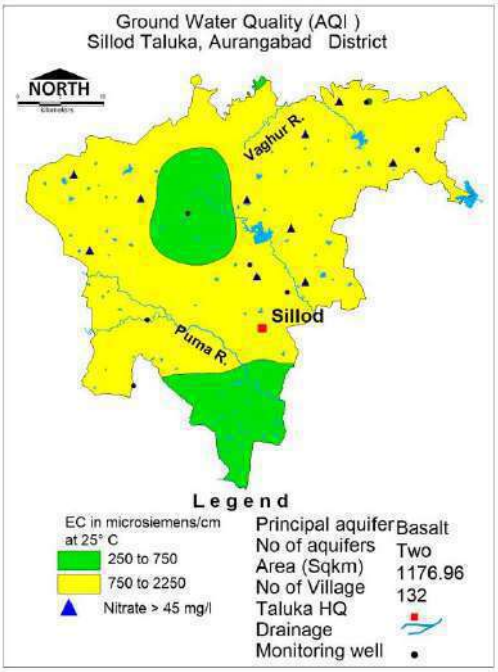


3.4. Basic Aquifer Characteristics

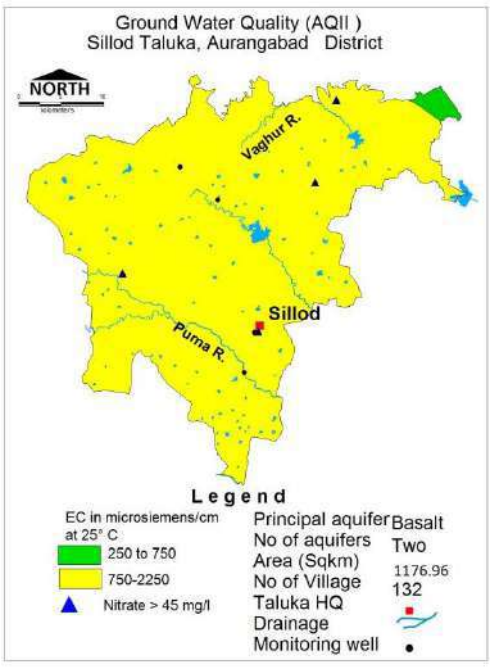
Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semi confined/confined)
Depth to bottom of Aquifer (mbgl)	8 to 29	80 to 160
Fractures encountered (mbgl)	up to 29	up to 160
Weathered/Fractured rocks thickness (m)	6 to 20	0.5 to 12
SWL (mbgl)	0.6 to 23.4	25 to 70
Specific yield/ Storativity (S)	0.019 to 0.028	1.5×10^{-4} to 9.0×10^{-4}
Transmissivity (T)	10 to 37 m^2/day	5 to 60 m^2/day
Yield	up to 50 m^3/day	up to 1.25 lps
Sustainability	1 to 2 hrs	1 to 3 hrs

4. GROUND WATER QUALITY

Phreatic Aquifer (Aquifer-I)



Semi confined/Confined Aquifer (Aquifer II)



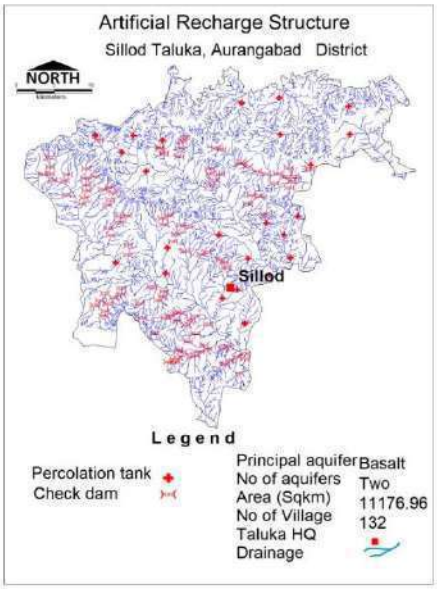
4.1 Aquifer-I/ Shallow Aquifer

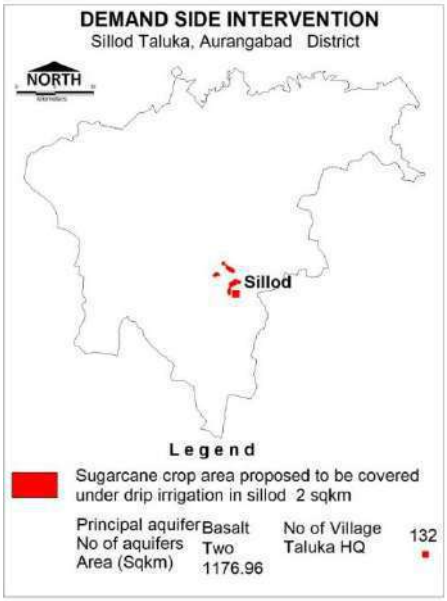
EC is observed up to 750 µS/cm is observed in central and southern parts of the block while EC values between 750 to 2250 µS/cm are observed in major part of the block. Ground

water is suitable for all purposes in major part of the block except Nitrate affected villages.				
4.2 Aquifer II/Deeper Aquifer				
EC is observed up to 750 µS/cm is observed in very small part in northern part of the block whereas EC values between 750 to 2250 µS/cm covering whole of the block. Ground water is suitable for all purposes except in village Ambhai where F>1.5 mg/L and other 4 villages namely Ajanta, Sillod, Borgaon bazar and Golegaon where nitrate is more than 45 mg/L; In these villages ground water is not fit for drinking purpose without treatment.				
5. GROUND WATER RESOURCE				
5.1 Aquifer-I/ Shallow Aquifer				
Ground Water Recharge Worthy Area (Sq. km.)			1176.96	
Total Annual Ground Water Recharge (MCM)			135.06	
Natural Discharge (MCM)			6.75	
Net Annual Ground Water Availability (MCM)			128.31	
Existing Gross Ground Water Draft for irrigation (MCM)			91.57	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			3.71	
Existing Gross Ground Water Draft for All uses (MCM)			95.29	
Provision for domestic and industrial requirement supply to 2025(MCM)			7.53	
Net Ground Water Availability for future irrigation development (MCM)			28.38	
Stage of Ground Water Development (%)			**74.27**	
Category			**SAFE**	
5.2 Aquifer-II/Deeper Aquifer				
Semi confined/Confined Aquifer (Basalt)				
Total Area (Sq. km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
1284.59	5.05	0.0045/0.000077	28	22.84
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			128.31	
Gross Annual Draft (MCM)			95.3	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			91.58	
Agricultural Supply -SW			36.6	
Domestic Supply - GW			3.71	
Domestic Supply – SW.			0.927	
Total Supply			**132.81**	
Area of Block (Sq. km.)			1284.14	
Area suitable for Artificial recharge (Sq. km.)			542.68	
Type of Formation			Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)			542.68	-
Volume of Unsaturated Zone (MCM)			1085.36	-

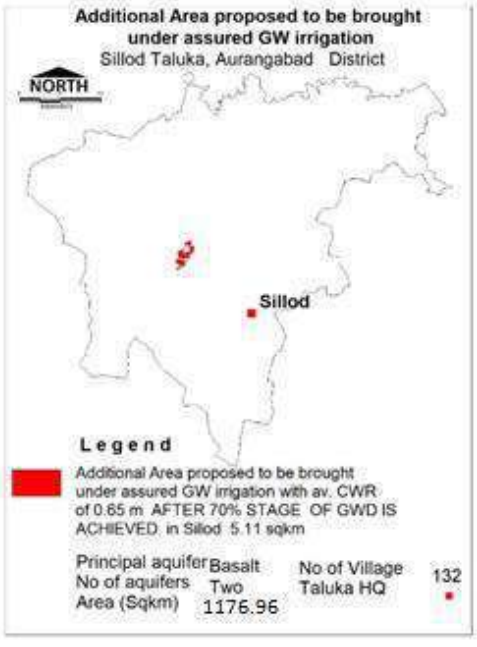
Average Specific Yield	0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	21.70	-
Surplus water Available (MCM)	11.38	-
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures	25	117
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	5	3.51
Proposed Structures		
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m^2area)	17,500	
Total RWH potential (MCM)	0.4943	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.3955 Economically not viable & Not Recommended	
6.2. Demand Side Management		
Micro irrigation techniques		
Sugarcane Area proposed for drip irrigation (sq. km.)	5	
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m	2.85	
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop (ha)	Not proposed	
Water Saving by Change in Cropping Pattern	Nil	
Alternate Sources	Nil	
6.3. EXPECTED BENEFITS		
Net Ground Water Availability (MCM)	128.31	
Additional GW resources available after Supply side interventions (MCM)	8.51	
Ground Water Availability after Supply side intervention	136.82	
Existing Ground Water Draft for All Uses (MCM)	95.3	
GW draft after Demand Side Interventions (MCM)	92.45	
Present stage of Ground Water Development (%)	74.27	
Expected Stage of Ground Water Development after interventions (%)	67.57	
Other Interventions Proposed, if any		
Alternate Water Sources Available	Nil	
Recommendation		
Ground water development is recommended to bring the stage of ground water development from 67.57 % to 70%		

6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	3.324
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	199
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	33
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	5.11
Regulatory Measures	**60 m**
Supply Side Interventions	Demand Side Interventions
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**

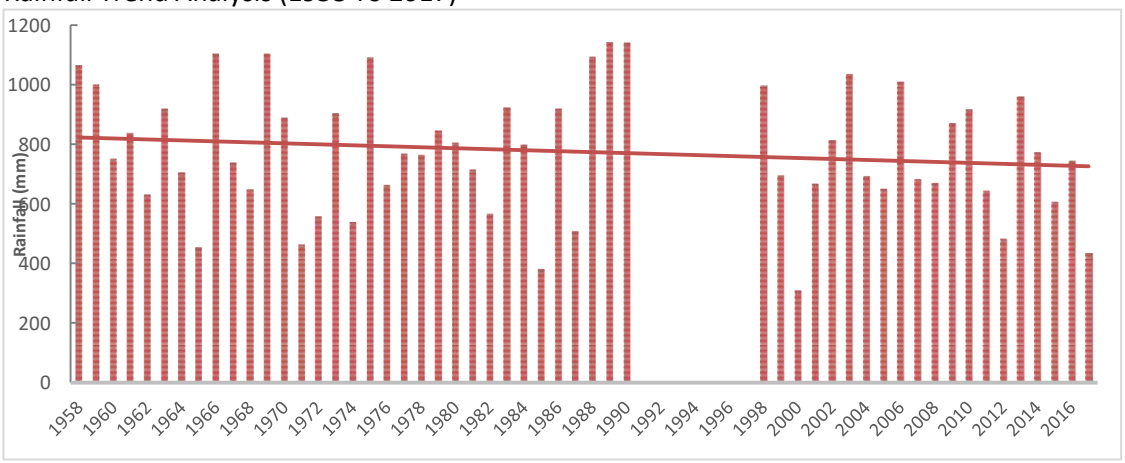




EXPECTED BENEFITS: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION



8. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, SOYGAON BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

1.SALIENT FEATURES		
1.1 Introduction		
Block Name	**SOYGAON**	
Geographical Area (Sq. km.)	741.69 Sq. km.	
Hilly Area (Sq. km.)	132.41 Sq. km.	
Poor Ground Quality Area (Sq. km.)	Nil	
Population (2011)	1,13,087	
Climate	Sub-Tropical	
1.2 Rainfall Analysis		
Normal Rainfall	775.9 mm	
Annual Rainfall (2017)	436.1 mm	
Decadal Average Annual Rainfall (2008-17)	708.5 mm	
Long Term Rainfall Analysis (1958-2017)	Falling Trend 1.6642 mm/year. Probability of Normal/Excess Rainfall- 60% &21%. Probability of Droughts-: 15 % Moderate & 4% Severe	
Rainfall Trend Analysis (1958 To 2017)		
EQUATION OF TREND LINE: Y= -1.6642X+825.26		
1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (Slightly dissected to highly dissected) and Plateau weathered with 1 to 5 m weathered thickness	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm depth), Gravelly sandy, Gravel sandy loam, Gravel Sandy clay loam, Gravelly clay soil	
Geology	Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Hivra, Waghur and Sonad rivers; tributaries of Tapi river	
Hydrology **(Reference year: June 2014)**	Major project	Nil
	Medium project	**Completed:** 01, Ajintha Adhari project generating a gross irrigation Potential of 523 ha, Gross Storage Capacity of 8.530 MCM and Live Storage Capacity of 7.650 MCM

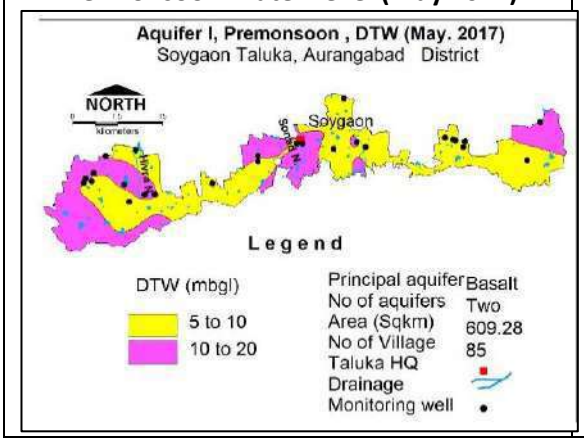
		Ongoing: Nil
	Irrigation Project (command area >250 Ha.)	**Completed:** 08 irrigation projects generating a gross irrigation potential of 3971 ha, Gross Storage Capacity of 19.29 MCM and Live Storage Capacity of 17.59 MCM **Ongoing:** 13 irrigation projects shall be generating a gross irrigation Potential of 5080 ha, Gross Storage Capacity of 30.24 MCM and Live Storage Capacity of 27.15 MCM
	Irrigation Project (command area <250 Ha.)	**Completed:** Through KT weir and Lift irrigation generating a gross irrigation Potential of 8193 ha and Live Storage Capacity of 27.27 MCM **Ongoing:** Through KT weir and Lift irrigation generating a gross irrigation Potential of 121 ha and Live Storage Capacity of 0.55 MCM

1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		741.69 Sq. km.	
Forest Area		125.11 Sq. km.	
Cultivable Area		294.56 Sq. km.	
Net Sown Area		294.56 Sq. km.	
Double Cropped Area		327.95 Sq. km.	
Area under Irrigation	Surface Water	28.84 Sq. km.	
	Ground Water	42.00 Sq. km.	
Principal Crops (Reference year 2017)		Crop Type	Area (Sq. km.)
		Cotton	246.19
		Cereals	140.66
		Pulses	65.86
		Oil Seeds	45.98
Horticultural Crops		Citrus fruits	6.10
		Banana	2.75
		Mango	0.33
		Others	1.79

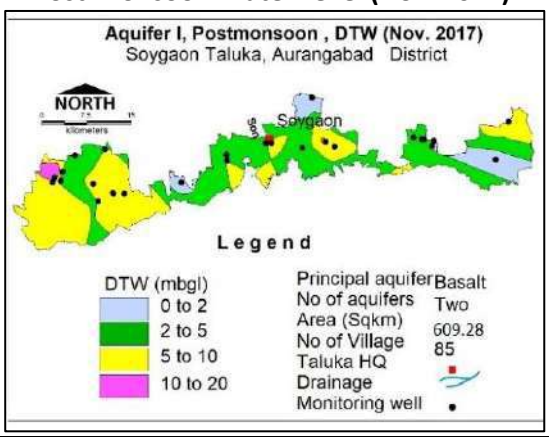
1.6. Water Level Behavior

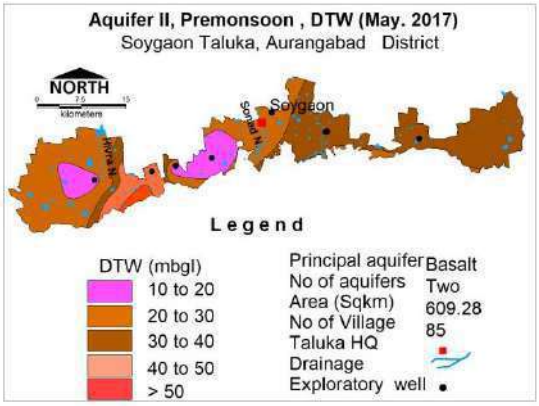
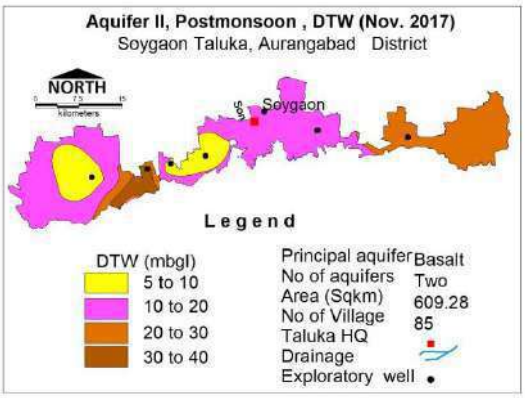
1.6.1. Aquifer-I/Shallow Aquifer

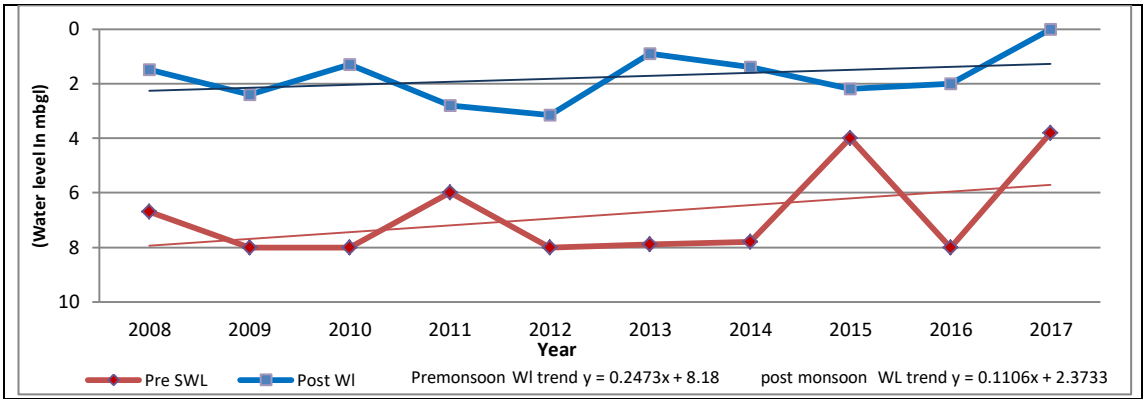
Pre-Monsoon Water Level (May 2017)



Post-Monsoon Water Level (Nov. 2017)

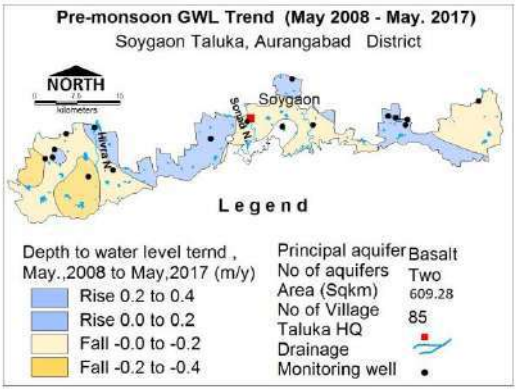
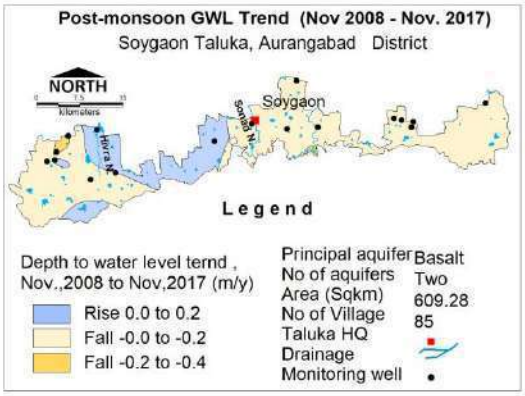


WL>10 mbgl 267.09 sq. km.	**WL>10 mbgl 9.28 sq. km.**
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed in major parts of the block whereas water level in the range of 10 to 20 mbgl is observed in eastern, western and central parts of the block covering about 267.09 sq. km. area.	Water level less than 10 mbgl has been observed over the major parts of the block and the water level more than 10 mbgl in the range of 10 to 20 mbgl is observed as isolated patch in western peripheral part of the block.
1.6.2. Aquifer-II/Deeper Aquifer	
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov.-2017)**
	
WL>30 mbgl 311.25 sq. km.	**WL>30 mbgl 25.19 sq. km.**
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level <20 mbgl is observed in smaller part in western and central parts of the block. Water level between 20-30 mbgl is observed in western and central parts of the block; water level more than 30 mbgl has been observed from central to eastern end of the block and cover major part of the block covering about 311.25 sq. km. area of the block.	Water level <20 mbgl is observed in major part of the block covering western and central parts of the block. Water level between 20-30 mbgl has been observed in eastern and western parts of the block whereas water level >30 mbgl is observed in south western parts of the block covering 25.19 sq. km. area.
1.7. Hydrographs: Site Name: Banoti State: Maharashtra District: Aurangabad Tehsil: Soygaon Block: Soygaon Village Banoti	



Hydrograph shows Pre-monsoon rising water level trend @ 0.2473 m/year and Post monsoon rising water level trend @ 0.1106 m/year.

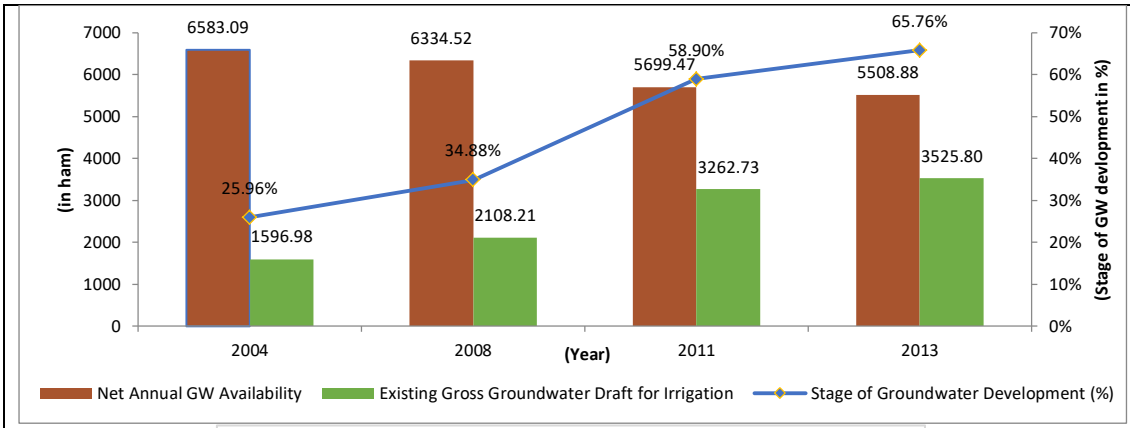
1.8. Water Level Trend (2008-17)

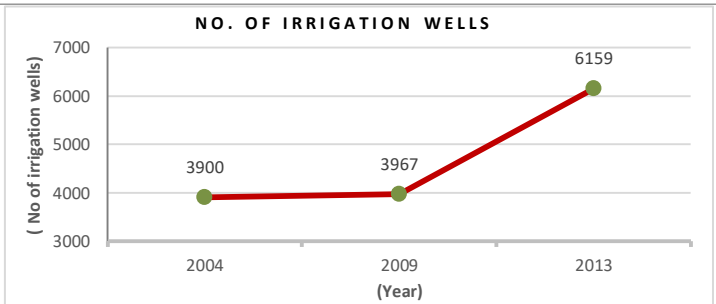
Pre-Monsoon trend	Post-Monsoon trend
Rising 0.0188 to 0.41 m/year Falling 0.001 to 0.2950 m/year	Rising 0.0611 to 0.164 m/year Falling 0.0001 to 0.3381 m/year
Major part of the block shows declining water level trend up to 0.2 m/year while rising trend up to 0.2 m/year has been observed in parts in Western and eastern sides of the block. Declining water level trend >0.2 m/year has been observed in western part of the block covering about 112.80 sq. km. area.	Major part of the block shows declining water level trend up to 0.2 m/year while rising trend upto 0.2 m/year has been observed in western half of the block. Declining trend >0.2 m/year has been observed in isolated patch in western part of the block covering about 7.65 sq. km. area.
Pre-Monsoon Water Level Trend (2008-17)	**Post-Monsoon Water Level Trend (2008-17)**
	
Declining trend @>0.2 m/yr 112.80 sq. km.	**Declining trend @>0.2 m/yr 7.65 sq. km.**

2. Ground Water Issues

Exploitation of Ground Water: -

- The stage of ground water development has increased over the period of time from 2004 to 2013 from 25.96% to 65.76% in Soygaon block. Further, the draft for irrigation and number of irrigation wells have also increased from 15.96 MCM to 35.25 MCM and 3900 to 6159 wells implying increased utilization of ground water resources in agriculture sector.
- The Net ground water availability also decreased from 2004 to 2013 from 65.83 to 55.08 MCM and corresponding ground water Draft increased continuously from 15.96 to 35.25 MCM resulting in sharp increase in stage of ground water development.





Declining water level Trend: -

Pre-monsoon (2008-17):The decline in water level trend of more than 0.2 m/year is observed in about 112.80 sq. km. covering about 15 % area of the block.

Ground Water Quality: -

Nitrate Contamination: In shallow aquifer, out of 13 samples 5 samples (38 %) i.e., Mukhed, Nimbori, Palaskhed, Ravala and Umerhire villages are affected by nitrate contamination (NO_3 >45 mg/L).

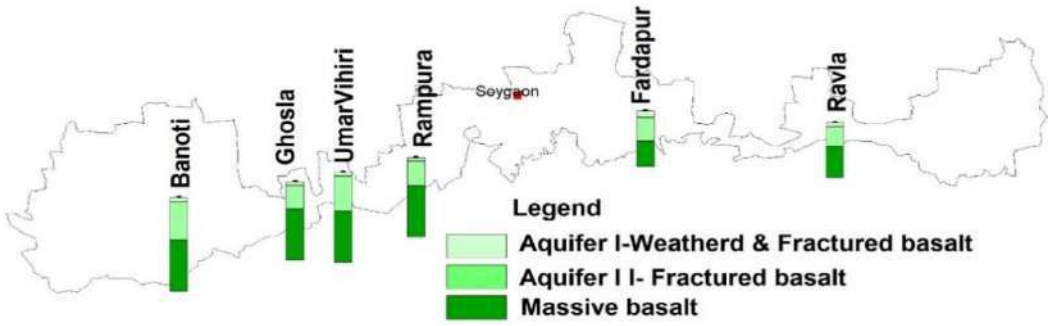
Fluoride contamination: In deeper aquifer Soygaon village (2.8 mg/L) is affected by Fluoride contamination.

Low yielding Aquifer resulting poor sustainability: -

Limited extent of porous and pervious zone, because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary porosity, results in poor sustainability of the aquifers. Major part of the block (90 % area) has low yield potential (less than 1 lps) and can sustain pumping only for 1-1.5 hrs.

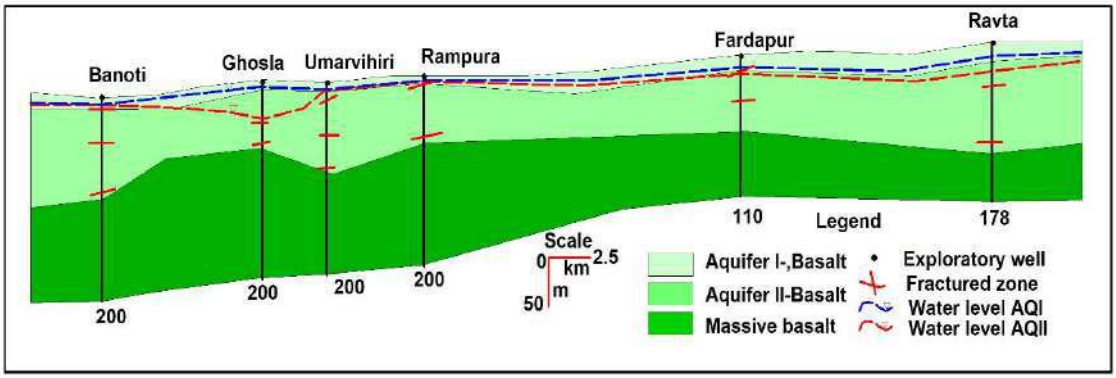
3. AQUIFER DISPOSITION	
3.1. Number of Aquifers	**Basalt –Aquifer-I, Aquifer-II**

3.2. Lithological disposition



3.3. Cross Section

Section AA’



3.4. Basic Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I (Phreatic)	Aquifer II (Semi confined/confined)
Depth to bottom of Aquifer (mbgl)	8 to 17	78 to 151
Fractures encountered (mbgl)	up to 17	up to 151
Weathered/Fractured rocks thickness (m)	5 to 14	1 to 12
SWL (mbgl)	1.1 to 15.8	6 to 65
Specific yield/ Storativity (S)	0.019 to 0.028	1.5×10^{-4} to 9.0×10^{-4}
Transmissivity (T)	10 to 47 m^2/day	5 to 70 m^2/day
Yield	Up to 100 m^3/day	up to 0.7 lps
Sustainability	2 to 4 hrs	1 to 2 hrs

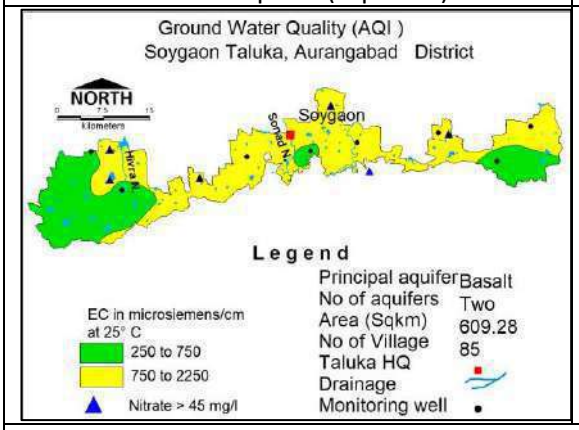
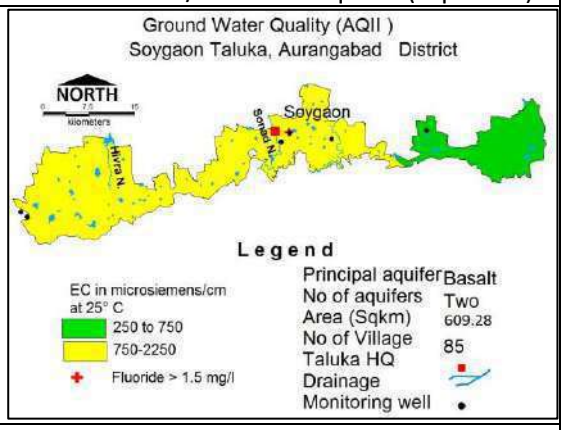
4. GROUND WATER QUALITY

4.1 Aquifer-I/ Shallow Aquifer

EC values upto 750 µS/cm are found in eastern and western part of the block whereas EC values between 750 to 2250 µS/cm are observed in major part of the block. Ground water is suitable for all purposes in major part of the block except Nitrate affected villages for drinking purposes.

4.2 Aquifer II/Deeper Aquifer

EC values upto 750 µS/cm are found in eastern part of the block and EC values between 750 to 2250 µS/cm are observed covering whole of the block. Ground water is suitable for all purposes except Soygaon village (F=2.8 mg/L) where Fluoride contamination is found in the ground water and it is not fit for drinking purpose without treatment.

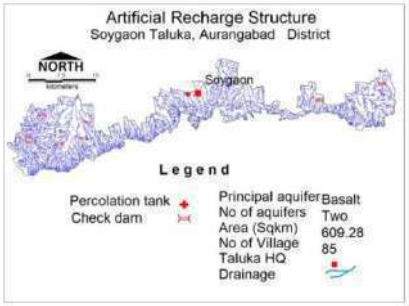
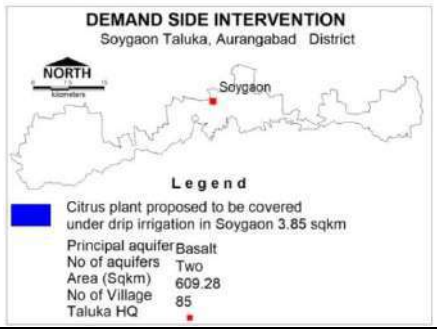
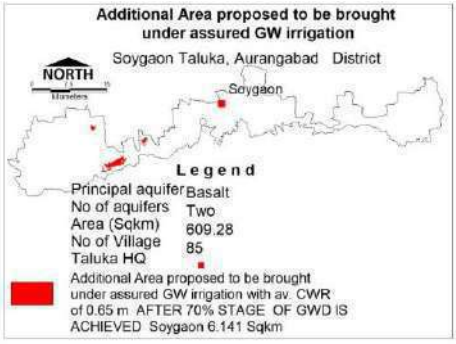
Phreatic Aquifer (Aquifer-I)	Semi confined/Confined Aquifer (Aquifer II)
	

5. GROUND WATER RESOURCE

5.1 Aquifer-I/ Shallow Aquifer

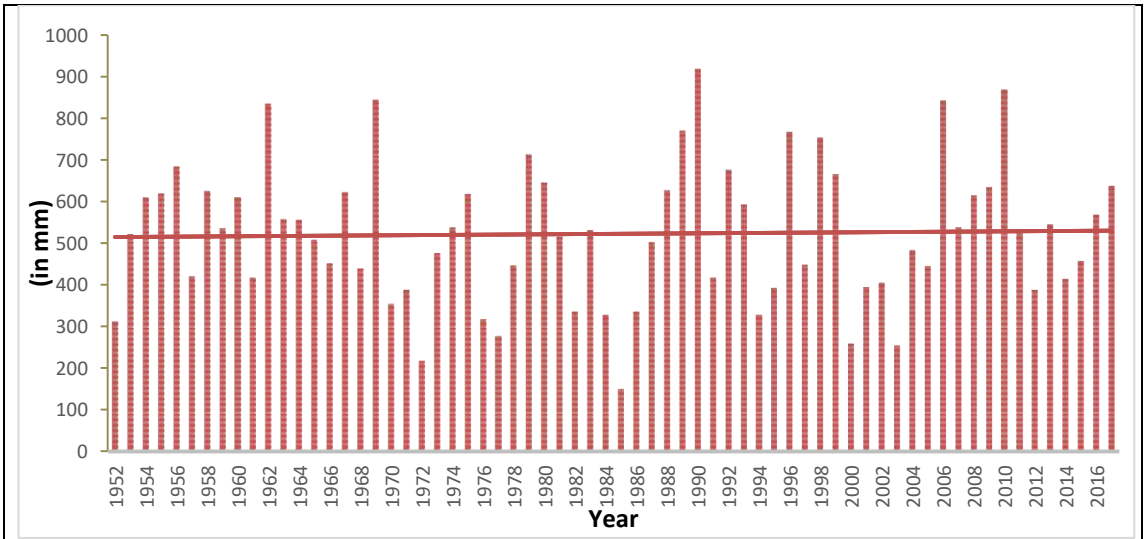
Ground Water Recharge Worthy Area (Sq. km.)			609.28	
Total Annual Ground Water Recharge (MCM)			57.98	
Natural Discharge (MCM)			2.89	
Net Annual Ground Water Availability (MCM)			55.08	
Existing Gross Ground Water Draft for irrigation (MCM)			35.25	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			0.96	
Existing Gross Ground Water Draft for All uses (MCM)			36.22	
Provision for domestic and industrial requirement supply to 2025(MCM)			1.88	
Net Ground Water Availability for future irrigation development (MCM)			19.54	
Stage of Ground Water Development (%)			**65.76**	
Category			**SAFE**	
5.2 Aquifer-II/Deeper Aquifer				
Semi confined/Confined Aquifer (Basalt)				
Total Area (Sq. km.)	Mean aquifer thickness (m)	Av (Sy/s)	Piezometric Head (m above confining layer)	Total Resource (MCM)
741.24	6.12	0.0075/0.00013	31.25	30.42
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			55.08	
Gross Annual Draft (MCM)			36.22	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			35.25	
Agricultural Supply -SW			20.2	
Domestic Supply - GW			1	
Domestic Supply - SW			0.25	
Total Supply			56.7	
Area of Block (Sq. km.)			741.69	
Area suitable for Artificial recharge (Sq. km.)			29.48	
Type of Formation			Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)			29.48	-
Volume of Unsaturated Zone (MCM)			58.96	-
Average Specific Yield			0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)			1.1792	-
Surplus water Available (MCM)			0.619	-
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures			1	8
Volume of Water expected to be conserved /			0.2	0.24

recharged @ 75% efficiency (MCM)		
Proposed Structures		
RTRWH Structures – Urban Areas		
Households to be covered (25% with 50 m^2area)	5800	
Total RWH potential (MCM)	0.163	
Rainwater harvested / recharged @ 80% runoff co-efficient	0.13108 Economically not viable & Not Recommended	
6.2. Demand Side Management		
Micro irrigation techniques		
Citrus crop Area proposed for drip irrigation (sq. km.)	3.85	
Volume of Water Saving by use of drip (MCM), WUE- 0.35 m	1.34	
Proposed Cropping Pattern change		
Irrigated area under Water Intensive Crop (ha)	Not proposed	
Water Saving by Change in Cropping Pattern	Nil	
Alternate Sources	Nil	
6.3. EXPECTED BENEFITS		
Net Ground Water Availability (MCM)	55.08	
Additional GW resources available after Supply side interventions (MCM)	0.44	
Ground Water Availability after Supply side intervention	55.52	
Existing Ground Water Draft for All Uses (MCM)	36.22	
GW draft after Demand Side Interventions (MCM)	34.87	
Present stage of Ground Water Development (%)	65.76	
Expected Stage of Ground Water Development after interventions (%)	62.81	
Other Interventions Proposed, if any		
Alternate Water Sources Available	Nil	
Recommendation		
Ground water development is recommended to bring the stage of ground water development from 62.81 % to 70%		
6.4. Development Plan		
Volume of water available for GWD to 70% (MCM)	3.9915	
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	239	
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	40	
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	6.14	
Regulatory Measures	**60 m**	

Supply Side Interventions	**Demand Side Interventions**
Proposed locations for AR structures	**Citrus Area proposed for drip Irrigation**
	
Expected Benefits**: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION**	
	

9. AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, VAIJAPUR BLOCK, AURANGABAD DISTRICT, MAHARASHTRA

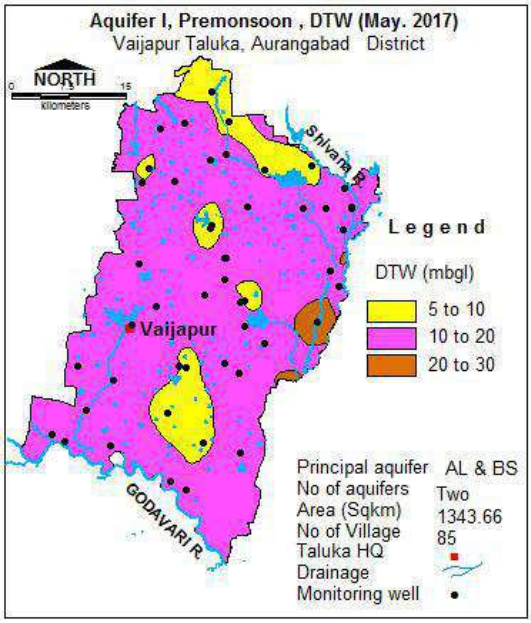
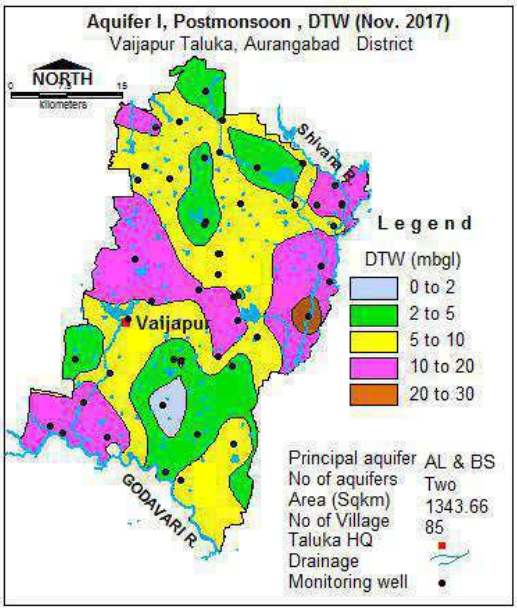
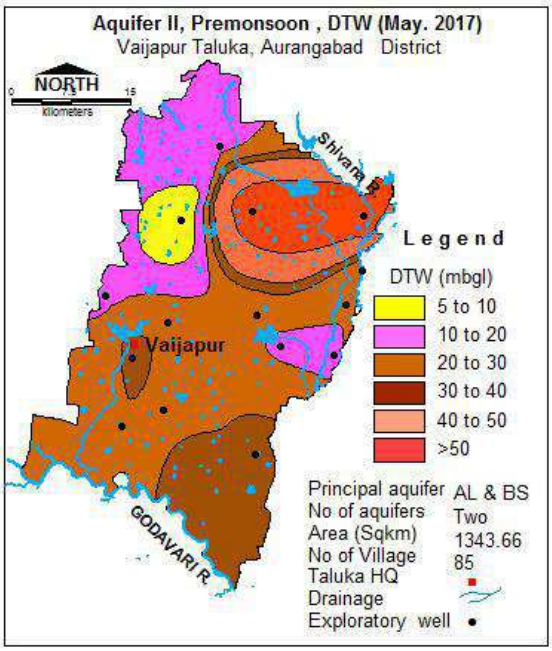
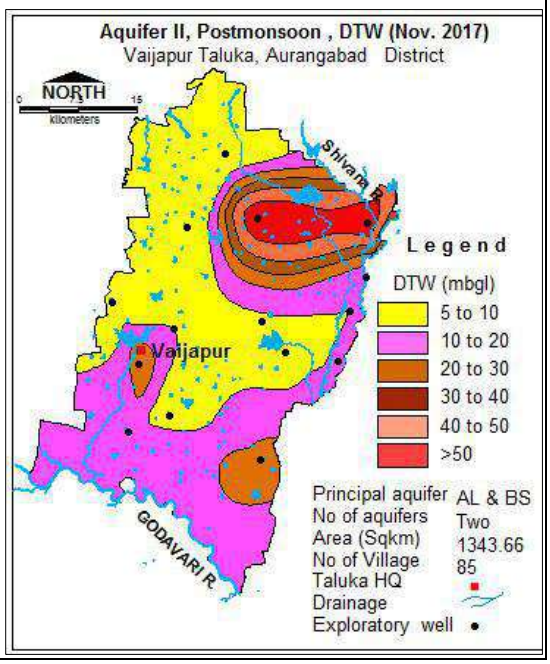
1. SALIENT FEATURES	
1.1 Introduction	
Block Name	**VAIJAPUR**
Geographical Area (Sq. km.)	1373.84 Sq. km.
Hilly Area (Sq. km.)	30.18 Sq. km.
Poor Ground Quality Area (Sq. km.)	Nil
Population (2011)	3,11,371
Climate	Sub-Tropical
1.2 Rainfall Analysis	
Normal Rainfall	523 mm
Annual Rainfall (2017)	638.6 mm
Decadal Average Annual Rainfall (2008-17)	561.1 mm
Long Term Rainfall Analysis (1952-2017)	Rising Trend 0.23 mm/year Probability of Normal/Excess Rainfall - 58% & 18% Probability of Droughts-: 18% Moderate and 6% Severe
Rainfall Trend Analysis (1952 to 2017)	

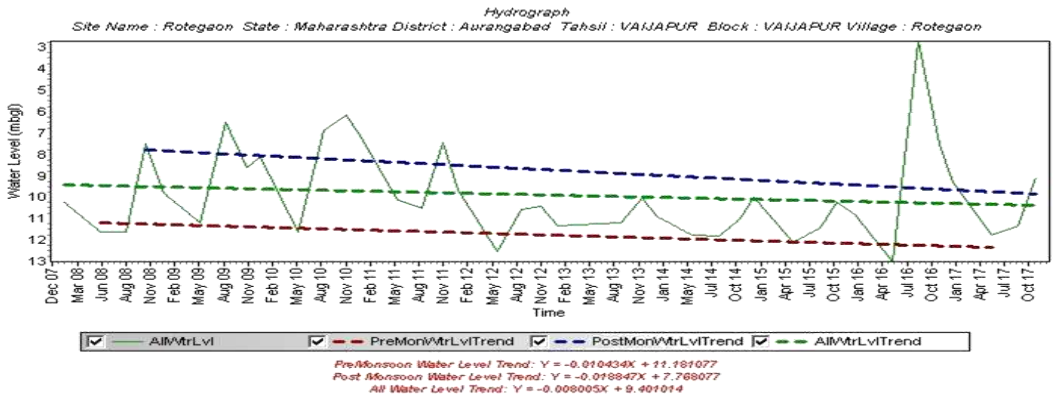
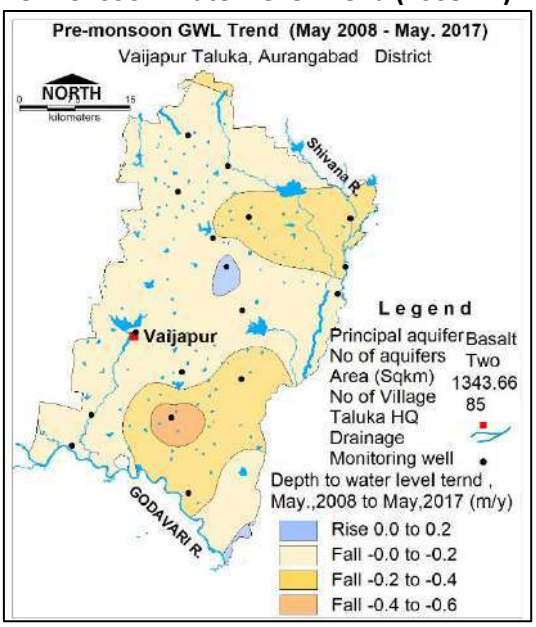
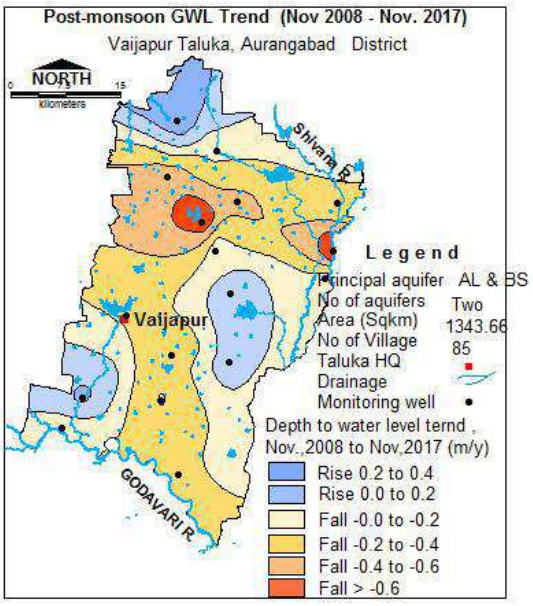


EQUATION OF TREND LINE: Y= 0.2321x+515.25

1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau slightly to moderately dissected and Plateau weathered with 1 to 5 m weathered thickness	
Soil	Clayey soil (shallow to very deep; 10 to >100 cm), Gravelly sandy Clay loam, Gravelly clay loam, Gravelly clay, and Clay loamy soil	
Geology	Alluvium (River Alluvium) Age: Recent to Sub Recent Deccan Traps (Basalt) Age: Late Cretaceous to Eocene	
1.4. Hydrology & Drainage		
Drainage	Godavari, Shivana, Narangi rivers and Streams/ tributaries of Tapi River	
Hydrology (Reference year: June 2014)	Major project	**Completed:** Jayakwadi Project; generating a gross irrigation Potential of 911 ha in Vaijapur block; Gross Storage Capacity of 2909 MCM (including Paithan, Gangapur and Vaijapur blocks) and Live Storage Capacity of 2171 MCM (including Paithan, Gangapur and Vaijapur blocks) **Ongoing:** Nandur Madhmeshwar irrigation Project shall be generating a gross irrigation Potential of 25894 ha in Vaijapur block; Gross Storage Capacity of 318.38 MCM (Vaijapur and Gangapur blocks) and Live Storage Capacity of 288.99 MCM (Vaijapur and Gangapur blocks)
	Medium project	**Completed:** 04; Dheku, Kolhi, Narangi and Bor-Dahegaon irrigation projects generating a gross irrigation Potential of 5784 ha, Gross Storage Capacity of 43.86 MCM and Live Storage Capacity of 38.37 MCM. **Ongoing:** Nil
	Irrigation Project	**Completed:** 03 Gade pimpalgaon, Jarul and Khirdi irrigation projects; generating a gross

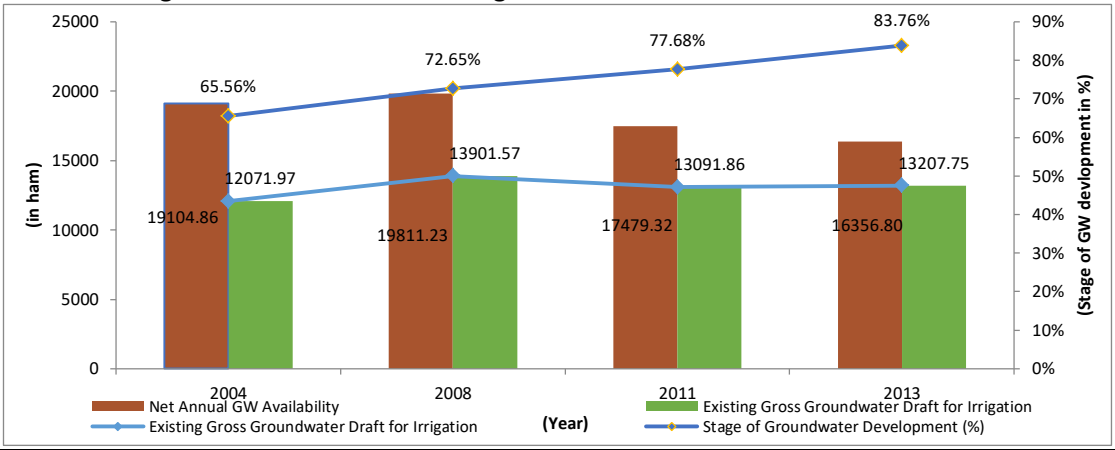
		(>250 Ha)	irrigation Potential of 1090 ha, Gross Storage Capacity of 6.95 MCM and Live Storage Capacity of 5.79 MCM. **Ongoing:** 01; Manyad irrigation project shall be generating a gross irrigation Potential of 620 ha, Gross Storage Capacity of 4.75 MCM and Live Storage Capacity of 2.70 MCM.
		Irrigation Project (<250 Ha)	**Completed:** Through completed KT weir and Lift irrigation projects generating a gross irrigation Potential of 11203 ha and Live Storage Capacity of 41.11 MCM. **Ongoing:** KT weir and Lift irrigation projects shall be generating a gross irrigation Potential of 911 ha and Live Storage Capacity of 4.13 MCM.
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		1373.84 Sq. km.	
Forest Area		30.57 Sq. km.	
Cultivable Area		1294.78 Sq. km.	
Net Sown Area		1294.78 Sq. km.	
Double Cropped Area		31.45 Sq. km.	
Area under Irrigation	Surface Water	28.70 Sq. km.	
	Ground Water	187.55 Sq. km.	
Principal Crops (Reference year 2017)		Crop Type	Area (Sq. km.)
		Cotton	599.19
		Cereals	542.75
		Pulses	158.81
		Sugarcane	20.23
		Oil Seeds	43.34
Horticultural Crops		Citrus fruits	16.01
		Mango	4.81
		Banana	0.12
		Others	16.70
1.6. Water Level Behavior			
1.6.1. Aquifer-I/Shallow Aquifer			
Pre-Monsoon (May-2017)			**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed in northern part and as isolated patches in central and southern parts of the block. Water level between 10 to 20 mbgl has been observed in major part of the block whereas more than 20 mbgl water level is observed as isolated patches in eastern part of the block and cover about 29.84 sq. km. area.			Water level less than 5 mbgl has been observed in northern and southern parts of the block; Water level between 5 to 10 mbgl has been observed in major part of the block. Water level between 10-20 mbgl has been observed all over the block in isolated parts while more than 20 mbgl water level is observed in only one isolated patch in eastern part of the block and cover about 16.13 sq. km. area.

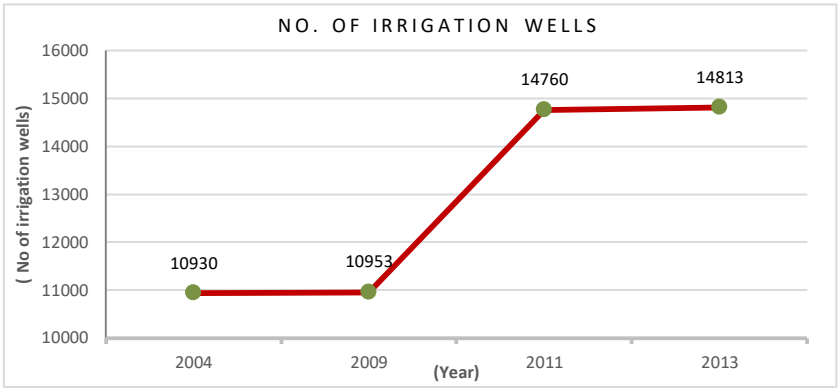
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
WL>20 mbgl 29.84 sq. km.	**WL>20 mbgl 16.13 sq. km.**
1.6.2. Aquifer-II/Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 20 mbgl is observed in north western and eastern parts of the block; water level between 20-30 mbgl has been observed in major part of the block while water level more than 30 mbgl has been observed in northern and southeastern parts of the block and cover 538.20 sq. km. area of the block.	Water level <10 mbgl is observed in major part of the block. Water level between 10-20 mbgl has been observed in southern, northern and eastern peripheral parts of the block; Water level between 20-30 mbgl has been observed in northern and southern half of the block whereas water level more than 30 mbgl has been observed in northern part of block and cover 208.17 sq. km. area of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov.-2017)**
	

WL> 30 mbgl 538.20 sq. km.	WL> 30 mbgl 208.17 sq. km.
1.7. Hydrographs: 	
Hydrograph shows Pre-monsoon declining water level trend @ 0.125 m/year and Post monsoon declining water level trend @ 0.2261 m/year	
1.8. Water Level Trend (2008-17)	
Pre-Monsoon trend Rising 0.04890 m/year Falling 0.0483 to 0.4678 m/year	Post-Monsoon trend Rising 0.0611 to 0.2816 m/year Falling 0.1030 to 0.6755 m/year
Major part of the block shows declining water level trend up to 0.2 m/year while rise in water level up to 0.2 m/year have been observed in very small isolated patch in central part of the block. Declining trend more than 0.2 m/ year has been observed in north eastern and south eastern parts of the block and cover about 471.09 sq. km. area.	Major part of the block shows declining water level trend up to 0.2 m/year while rise in water level up to 0.2 m/year has been observed in northern, eastern and southern parts of the block. Declining trend more than 0.2 m/year has been observed across the block from north to south covering about 778.87 sq. km. area. Rise in water level more than 0.2 m/year has been observed in northern peripheral parts of the block.
Pre-Monsoon Water Level Trend (2008-17)  **Declining trend @>0.2 m/year 471.09 sq. km.**	**Post-Monsoon Water Level Trend (2008-17)**  **Declining trend @>0.2 m/year 778.87 sq. km.**
2. Ground Water Issues	

Exploitation of Ground Water: -

The stage of ground water development has continuously increased from 2004 to 2013 from 65.56% to 83.76 %. Further, the draft for irrigation and Number of irrigation wells have also increased from 120.71 MCM to 132.07 MCM and 10930 to 14813 wells implying increased utilization of ground water resources in agriculture sector.





Declining water level Trend: -

The decline in water level trend more than 0.2 m/year is observed in about 778.87 sq. km. covering 57 % area of the block.

Deficient Rainfall Zone and Drought Prone Area: -

- As per Agro-climatic Zones, Vaijapur block falls under "drought prone area" characterized by low and unpredictable rainfall of 500 to 700 mm/year in 40-45 days Common dry spells will last from 2 to 10 weeks. Delayed onset and early cessation of S-W monsoon is very common.
- 18% Moderate and 6% severe droughts observed In Vaijapur block from 1952 to 2017.

Ground Water Quality: -

Nitrate Contamination: In shallow aquifer, out of 23 samples 11 samples i.e., 48% samples showing nitrate contamination whereas in deeper aquifer, out of 38 samples 18 samples i.e., 47% of samples are also showing nitrate contamination (NO_3 >45 mg/L).

Fluoride contamination: In deeper aquifer Ladgaon village (F=1.7 mg/L) is affected by Fluoride contamination.

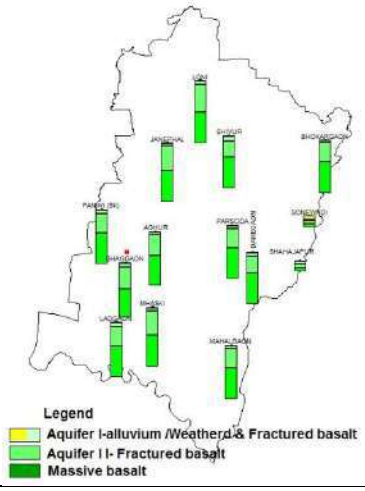
Low yielding Aquifer resulting poor sustainability:

Limited extent of porous and pervious zone, because of predominance of secondary porosity that has evolved from prevailing erratic joint pattern and also absence of primary Porosity, results in poor sustainability of the aquifers. Major part of the block covering northern and central parts (about 55%) has low yield potential (less than 1 lps) and can sustain pumping only for 1-1.5 hrs.

3. AQUIFER DISPOSITION

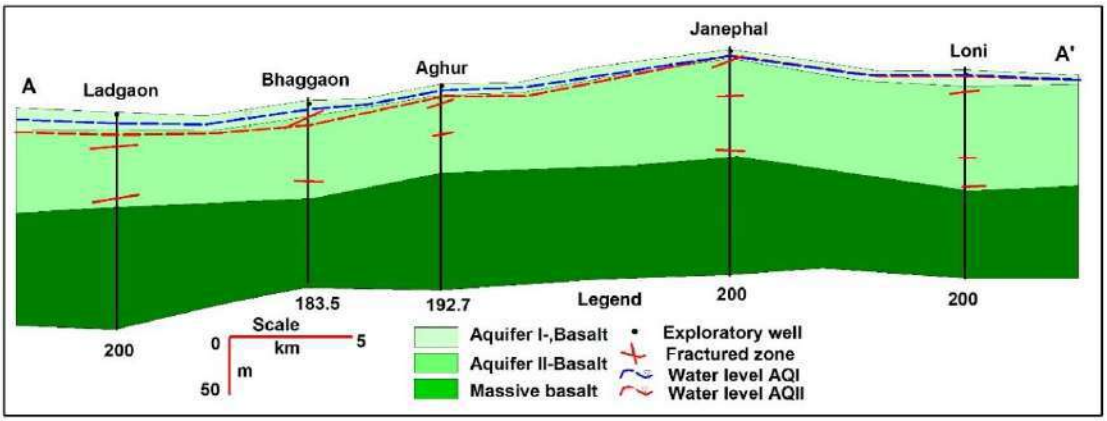
3.1. Number of Aquifers	**Alluvium-Aquifer-I** **Basalt –Aquifer-I, Aquifer-II**

3.2. Lithological disposition



3.3. Cross Section

Section AA'

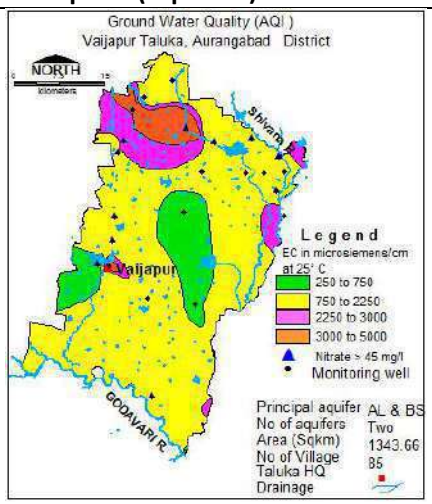
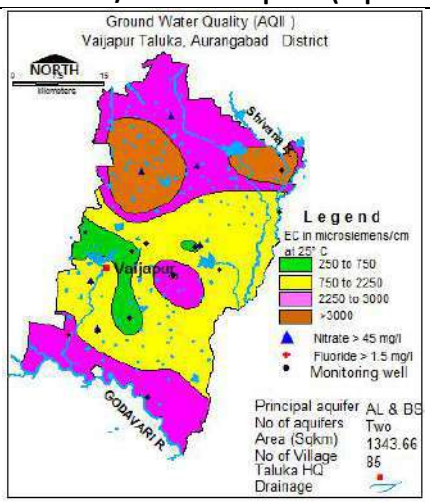


3.4. Basic Aquifer Characteristics

Major Aquifers	Alluvium	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semi confined/Confined)	Aquifer-I (Phreatic)	Aquifer-I (Phreatic)	Aquifer-II (Semi confined/confined)
Depth to bottom of Aquifer (mbgl)	12 to 28	8 to 29	55 to 178
Granular Zones/ Fractures encountered (mbgl)	up to 28	up to 29	up to 178
Granular /Weathered/Fractured rocks thickness (m)	8 to 20	6 to 20	2 to 12
SWL (mbgl)	12-15	1.2 to 23.47	0.8 to 55
Specific yield/ Storativity (S)	1.73×10^{-3} to 4.5×10^{-6}	0.019 to 0.028	1.0×10^{-4} to 5.5×10^{-5}
Transmissivity (T)	*52-757 m^2/day	10 to 45 m^2/day	5 to 80 m^2/day
Yield	60-120 m^3/day	Upto 100 m^3/day	upto 2.5 lps
Sustainability	4-6 hrs	2 to 4 hrs	1 to 6 hrs

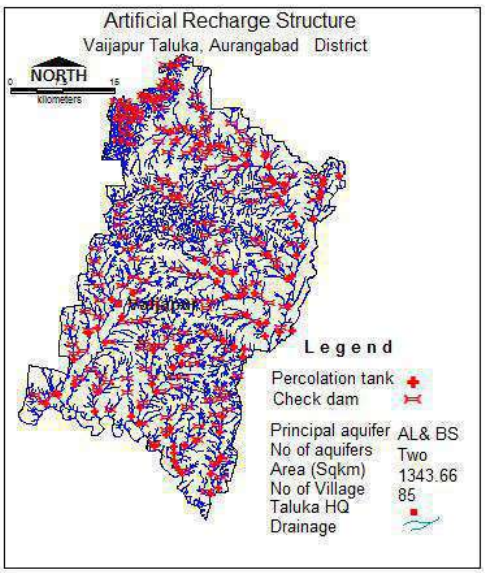
*: T and S values are of Alluvium aquifers in shivna basin (Shajatpur ,Bhiv Dhanra and Sonewadi exploration of Vaijapur and Gangapur blocks)

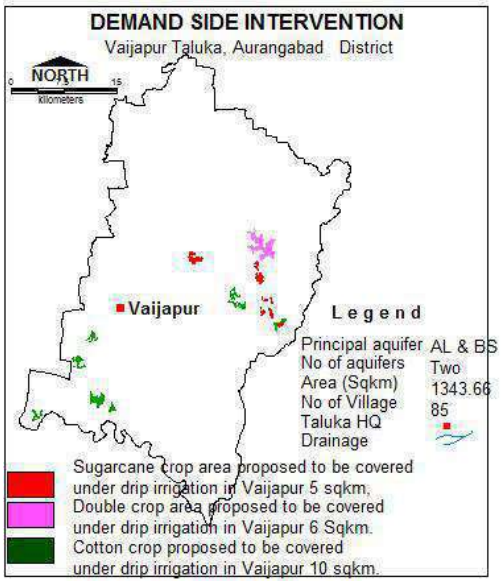
4. GROUND WATER QUALITY

4.1 Aquifer-I/ Shallow Aquifer	
EC up to 750 µS/cm is observed in small part in central and western parts of the block; EC values between 750 to 2250 µS/cm are observed in major part of the block whereas EC > 2250 µS/cm has been observed in northern half of the block and covering 272 sq. km. area of the block. Ground water is suitable for all purposes in major part of the block except in 11 villages that have been affected by nitrate contamination and ground water is not suitable for drinking purpose without treatment.	
4.2 Aquifer II/Deeper Aquifer	
EC up to 750 µS/cm is observed in as small patch in west central part of the block. EC values between 750 to 2250 µS/cm are observed in central part of the block and EC values between 2250-3000 µS/cm are observed in northern and southern parts of the block and covering 640 sq. km. area whereas EC > 3000 µS/cm has been observed in isolated patches in northern half of the block and covering 161.69 sq. km. area of the block. Ground water is suitable for all purposes except 18 locations that are having nitrate more than 45 mg/L and Ladgaon village has affected by Fluoride contamination and ground water is not suitable for drinking purpose without treatment.	
Phreatic Aquifer (Aquifer-I)	**Semi confined/Confined Aquifer (Aquifer II)**
	
EC > 2250 µS/cm covering 272.21 sq. km.	**EC > 2250 µS/cm covering 793 sq. km.**
5. GROUND WATER RESOURCE	
5.1 Aquifer-I/ Shallow Aquifer	
Ground Water Recharge Worthy Area (Sq. km.)	1343.66
Total Annual Ground Water Recharge (MCM)	172.17
Natural Discharge (MCM)	8.60
Net Annual Ground Water Availability (MCM)	163.56
Existing Gross Ground Water Draft for irrigation (MCM)	132.07
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	4.92
Existing Gross Ground Water Draft for All uses (MCM)	136.99
Provision for domestic and industrial requirement supply to 2025(MCM)	9.71
Net Ground Water Availability for future irrigation development (MCM)	22.48
Stage of Ground Water Development (%)	**83.76**
Category	**SAFE**

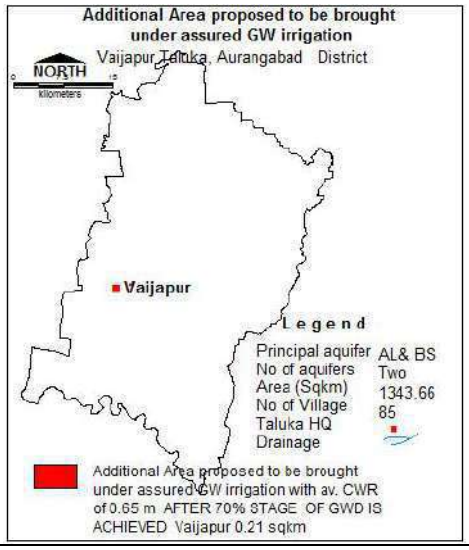
5.2 Aquifer-II/Deeper Aquifer				
Semi confined/Confined Aquifer (Basalt)				
Total Area (Sq. km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
1343.97	6.125	0.0075/0.00008	20	42.73
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			163.56	
Gross Annual Draft (MCM)			136.99	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			132.07	
Agricultural Supply -SW			20.09	
Domestic Supply - GW			4.92	
Domestic Supply - SW			1.23	
Total Supply			158.31	
Area of Block (Sq. km.)			1373.84	
Area suitable for Artificial recharge (Sq. km.)			1343.66	
Type of Formation			Hard Rock	Soft Rock
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. km.)			1343.66	-
Volume of Unsaturated Zone (MCM)			2687.32	-
Average Specific Yield			0.02	-
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)			53.746	-
Surplus water Available (MCM)			28.18	-
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)
Number of Structures			78	184
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			15.6	5.52
Proposed Structures				
RTRWH Structures – Urban Areas				
Households to be covered (25% with 50 m^2area)			15000	
Total RWH potential (MCM)			0.42375	
Rainwater harvested / recharged @ 80% runoff co-efficient			0.339 Economically not viable & Not Recommended	
6.2. Demand Side Management				
Micro irrigation techniques				
Sugarcane crop area proposed for drip irrigation (sq. km.)			5	
Volume of Water Saving by use of drip (MCM) Surface Flooding req- 2.45 m. Drip Req. - 1.88,			2.85	

WUE- 0.57 m	
Double crop area proposed for drip irrigation (sq. km.)	6
Volume of Water Saving by use of drip (MCM), WUE- 0.40 m	2.4
Cotton crop area proposed for drip irrigation (sq. km.)	10
Volume of Water Saving by use of drip (MCM), WUE- 0.26 m	2.6
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop (ha)	Not proposed
Water Saving by Change in Cropping Pattern	Nil
Alternate Sources	Nil
6.3. EXPECTED BENEFITS	
Net Ground Water Availability (MCM)	163.56
Additional GW resources available after Supply side interventions (MCM)	21.12
Ground Water Availability after Supply side intervention	184.68
Existing Ground Water Draft for All Uses (MCM)	136.99
GW draft after Demand Side Interventions (MCM)	129.14
Present stage of Ground Water Development (%)	83.76
Expected Stage of Ground Water Development after interventions (%)	69.93
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
Recommendation	
Ground water development is recommended to bring the stage of ground water development from 69.93% to 70%	
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	0.136
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	8
Proposed Number of BW (@ 1 ham for 10% of GWR Available for development)	1
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	0.21
Regulatory Measures	**60 m**
Supply Side Interventions	**Demand Side Interventions**
Proposed locations for AR structures	**Sugarcane/Double crop/ Cotton crop Areas proposed for drip Irrigation**





Expected Benefits: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION



ANNEXURES

Annexure I: Salient Features of Ground Water Exploration, Aurangabad District

S. No.	Block	Formation	Wells		Depth (mbgl)	SWL (mbgl)	Discharge (lps)	Draw-Down (m)	Zones (mbgl)
			EW	OW					
1	Aurangabad	Basalt	12	1	70.00-200.00	0.1-17.80	Traces to 1.86	6.50-45	6.50-13.50,30.70-34.80, 71.60-74.70,93.00-96.00, 132.60-135.70
2	Kannad	Basalt	11	2	36.70-200.00	3.50-8.00 (At few places Static water level in deeper Aquifer has been observed >85 mbgl)	Traces to 1.37	2.95-30.90	3.50-6.50,124.00-148.00,172-175
3	Soygaon	Basalt	5	2	98.00-200.00	5.60 – > 50	0.14-25.80	16.32-34.45	13.7-14.70, 15.00-18.10,77.0 – 78.0, 90.0-107.10,150.0-151.0,
4	Sillod	Basalt	13	1	125.50-200.00	5.25-16.50	0.02-3.17	1.88 to 72.10	3.10-6.20,13.0-16.0, 77.7 –80.8,123.0–124.0, 95.90-93.00, 132.0 – 135.0
5	Phulambri	Basalt	4	0	200	5.25-10.00	Traces to 1.73	3.22 to 21.82	5.50-9.70, 41.00
6	Khuldabad	Basalt	3	0	200	5.60-18.10 (At few places >100 mbgl has been observed)	Traces-0.78	14.80-15.70	16.00-19, 19.60-28.80
7	Vaijapur	Basalt	11	2	183.50-200.00	5.60-15.02 (At few places Static water level in deeper Aquifer has been observed > 100 mbgl)	Traces to 9.84	0.80 to 25.50	3.50-12.70,53-56,68-71,71-76. 40,123-126
		Alluvium	3	2	16.25-25.50	10.00 to 15.00	0.20 to 4.50	8.69	13.00 -16.00,21.00-23.50
8	Gangapur	Basalt	10	0	200	4.50 to 19.00, (At few places Static water level in deeper Aquifer has been observed >111.3 mbgl)	Traces to 1.80	5.40 to 48.70	7.40 to 10.40,56.20-59.30,111-114
		Alluvium	4	1	24.40-28.50	8.00 to 18.00	0.01 to 7	2.63-6.08	17.50 -18.50,24.00-25.00
9	Paithan	Basalt	10	3	26.00 - 200.00	4.8-19.19 (At few places Static water level in deeper Aquifer has been observed >100 mbgl)	Traces to 4.43	0.64-46.54	10.60-13.70,28.90-32.00,38.10-41.10,84.90-93.00,3.00-96.00,102.10-105.20,105.20-108.20
Sub-Total		**Basalt**	**79**	**11**	**26.00 – 200.00**	**0.1- 19.00**	**Traces to 25.80**	**0.80 – 72.10**	**3.10 – 175.00**
Sub-Total		**Alluvium**	**7**	**3**	**16.25-28.50**	**8.00 to 18.00**	**0.01 to 7**	**2.63-8.69**	**13.00 – 25.00**
Total			**86**	**14**	**16.25 – 200.00**	**0.1 – 19.00**	**Traces to 25.80**	**0.80 – 72.10**	**3.10 – 175.00**

Annexure II: Details of GW exploration under NAQUIM in Aurangabad district

S. No.	Block	Village	Type of Well	Topo sheet	Lattitude	Longitude	Altitude (m amsl)	Year	Depth drilled (mbgl)	Depth of casing (mbgl)	Aquifer zones encountered (mbgl)	Aquifer	SWL (mbgl)	Discharge (lps)	DD (m)	Transmissivity (m^2/day)	Storativity
1	Sillod	Palod	EW	46P/11	20.38	75.67	625	2015-16	200	20	15.00-18.00	WB	> 50	0.014	-	-	-
2	Sillod	Hatti	EW	46P/11	20.44	75.61	672	2015-16	200	20	13.7 - 19.5	WB	>50	traces	-	-	-
3	Sillod	Charnerwadi	EW	46P/7	20.43	75.45	639	2015-16	200	20	13.00 - 16.00, 132.00 - 135.00	FAB FMB	> 50	traces	-	-	-
4	Soygaon	Ravla	EW	46P/14	20.59	75.71	352	2015-16	178	20	77.00 - 78.00, 150.00 - 151.00	FMB	26.6	10.25	16.25	34.46	8.43 X 10^{-4}
5	Soygaon	Ravla	OW	46P/14	20.59	75.71	352	2015-16	122	20	15.00 - 16.00, 77.00 - 78.00	FMB	25.8	6	10.52	-	-
6	Sillod	Rampura	EW	46P/10	20.54	75.54	354	2015-16	200	20	93.00 - 96.00	FMB	6	0.014	-	-	-
7	Sillod	Ghosla	EW	46P/10	20.52	75.44	340	2015-16	200	20	13.70-14.70	AB	> 50	-	-	-	-
8	Sillod	Nillod	EW	46P/12	20.23	75.62	595	2015-16	200	20	123.00 - 124.00	FAB	> 50	0.014	-	-	-
9	Sillod	Modha (Bk)	EW	46P/11	20.35	75.61	637	2015-16	200	20	13.00 - 14.00, 38.00 - 39.00	WB, FMB	> 50	traces	-	-	-
10	Sillod	Palshi	EW	46P/11	20.29	75.55	627	2015-16	200	20	77.70 - 80.80	JFB	> 50	0.038	-	-	-
11	Aurangabad	JalgaonFeran	EW	47 M/9	19.90	75.63	564	2016-17	200	17.5	71.60-74.70, 93.00-96.00	FMB	0.1	0.58	45	0.56	-
12	Aurangabad	WarudKazi	EW	47 M/5	19.90	75.46	598	2016-17	200	29.5	10.60-13.70, 132.60-135.70	FMB	-	-	-	-	-
13	Gangapur	Babhulgaon	EW	46 M/1	19.96	75.04	539	2016-17	200	30	111-114	FAB	111.3	0.78	-	-	-
14	Kannad	Chapner	EW	46 P/4	20.18	75.06	592	2016-17	200	30	172-175	FAB	85	0.78	-	-	-
15	Kannad	Ganeshpur	EW	46P/7	20.35	75.37	670	2016-17	187	30	59-62	FAB	8	1.37	-	-	-
16	Khuldaba	Dhamangaon	EW	46P/	20.13	75.25	695	2016-17	200	20	16.00-19.00	FAB	-	-	-	-	-

S. No.	Block	Village	Type of Well	Topo sheet	Lattitude	Longitude	Altitude (m amsl)	Year	Depth drilled (mbgl)	Depth of casing (mbgl)	Aquifer zones encountered (mbgl)	Aquifer	SWL (mbgl)	Discharge (lps)	DD (m)	Transmissivity (m^2/day)	Storativity
	d	Rail		4													
17	Paithan	Adul Bk	EW	47 M/10	19.71	75.54	567	2016-17	200	17.5	10.60-13.70, 93.00-96.00	FMB	>100	meagre	-	-	-
18	Paithan	Apegaon	EW	47 M/7	19.45	75.50	446	2016-17	175.3	22	28.90-32.00, 84.90 to 93.00	FAB	19.12	3.16	31.90	133.86	5.34 X 10^{-6}
19	Paithan	Apegaon	OW	47 M/7	19.45	75.49	446	2016-17	117.4	20	30.50-32.00, 90.00-93.00	FAB	19.19	3.16	0.64	222.56	
20	Paithan	Dhakephal	EW	47 M/6	19.58	75.30	473	2016-17	200	17.5	38.10-41.10	FAB	35	meagre	-	-	-
21	Paithan	Lohgaon	EW	47M /6	19.61	75.27	471	2016-17	200	17.5	102.10-105.20	FMB	4.8	3.17	46.54	2.48	4.31X 10^{-5}
22	Paithan	Lohgaon	OW	47M /6	19.61	75.27	471	2016-17	111.3	17.5	105.20-108.20	FMB	4.8	3.17	-	-	-
23	Vaijapur	Bhokargaon	EW	46P/ 4	20.07	75.01	538	2016-17	200	30	123-126	FMB	110	1.37	-	-	-
24	Vaijapur	Ladgaon	EW	47I/ 9	19.83	74.71	495	2016-17	178.4	30	53-56	FMB	15.02	1.73	37.28	2.35	-
25	Vaijapur	Ladgaon	OW	47I/ 9	19.83	74.71	495	2016-17	200	30	53-56	FMB	14.9	0.78	42.76	0.77	-
26	Vaijapur	Mahalgaon	EW	47I/ 13	19.80	74.87	514	2016-17	200	29.5	68-71	FMB	-	-	-	-	-

Annexure III : Details of GW monitoring wells and KOWs in Aurangabad district

S.no.	Block	Location	lattitude	Longitude	Elevation (mamsl)	Formation	Aquifer	Well. Depth (m)	Diameter (m)	Height of MP (magl)	Lining (m)	Total Thickness weathered portion (m)	Thickness of fracture zone (m)	DTW (mbgl) May-17	EC (May 2017)	DTW (mbgl) Nov-17	EC (Nov-17)
1	Aurangabad	Girner	19.7825	75.3086	546	Basalt	FMB	22	10	1	5	14	7	19	450	12.7	440
2	Aurangabad	Tisgaon	19.8647	75.2714	538	Basalt	FMB	16	8	0.1	11	13	3	14	540	8	440
3	Aurangabad	Ohar	19.9461	75.3128	626	Basalt	FMB	10	7	0.8	4	5	5	5	700	2	340
4	Aurangabad	Kankora	19.9781	75.4439	818	Basalt	FMB	12	6	1	1.5	2	8	11	400	3	360
5	Aurangabad	Morhir	20.0236	75.4364	699	Basalt	FMB	9	5	0	3.6	4	5	6	330	2	340
6	Aurangabad	Sangvi Tuljapur	19.9536	75.3589	634	Basalt	FMB	20	6	1	12	15	4	16	600	12	600
7	Aurangabad	Naregaon Gopalpur	19.9058	75.3975	601	Basalt	FMB	30	6	1	15	16	9	25	700	20	780
8	Aurangabad	Sultanpur Warud Kazi	19.8958	75.4508	603	Basalt	FMB	-	-	-	-	-	-	12.00	480	3	760
9	Aurangabad	Warjhadi	19.9133	75.5083	635	Basalt	FMB	22	6	0.4	12	14	7	18	900	14.2	730
10	Aurangabad	Karmad	19.8678	75.5464	575	Basalt	FMB	12	7	0.2	3	6	6	9	390	3.7	540
11	Aurangabad	Satara Tanda	19.8231	75.3331	591	Basalt	FMB	18	10	0.5	7	13	5	12	580	4	610
12	Aurangabad	Pandhri Pimpalgaon	19.7281	75.5219	541	Basalt	FMB	28	8	0.4	9	14	11.5	20.8	720	19	530
13	Aurangabad	Chitegaon	19.7883	75.4883	555	Basalt	FMB	15	12	0.8	10	12	3	11.5	430	5	410
14	Aurangabad	Adgaon Kh.	19.7908	75.5753	534	Basalt	FMB	16	10	0.5	4	8	7	13	580	8.7	630
15	Aurangabad	Kolghar	19.7567	75.6111	514	Basalt	FMB	22	5	0.3	13	15	6	18	640	12.4	680
16	Aurangabad	Pimpalkhuta	19.9525	75.6092	588	Basalt	FMB	17	8	0.3	2.4	8	8	16	580	7	600
17	Aurangabad	Lamkanwadi	19.9764	75.5928	601	Basalt	FMB	22	6	0.2	5	11	10	19	680	8	510
18	Aurangabad	Shevga	19.9067	75.5906	574	Basalt	FMB	20	8	0.4	3	8	6	15	380	10.8	420
19	Phulambri	Mursidabadwadi	20.0387	75.3896	680	Basalt	FB	20	3	0	6	9	4	13.8	815	10.00	722
20	Phulambri	Ganori	20.0431	75.3543	685	Basalt	FB	14.6	7	0.35	6.5	10.6	2	14.1	640	10.85	710
21	Phulambri	Wanegaon BK	20.1086	75.3791	643	Basalt	FB	15.4	5	0.8	10.2	11.9	2	12.4	2552	5.70	2275
22	Phulambri	Dongargaon Kawad	20.1097	75.4689	636	Basalt	FB	10.66	7.3	0.8	1.8	1.8	6	10	1110	9.80	1146
23	Phulambri	Babhra	20.2069	75.4283	655	Basalt	WB	15.86	4.8	1.2	8.8	14	1	15.8	1127	9.4	5
24	Phulambri	Sonori	20.2085	75.3932	665	Basalt	FJB	11.2	5.6	0.8	3	6.2	2	9.8	1297	8.90	1365
25	Phulambri	Naigaon	20.2221	75.3539	705	Basalt	FMB	10.66	4	0	1	1	4	9.8	1278	8.10	1298
26	Phulambri	Bodegaon Khurd	20.2039	75.4579	656	Basalt	FB	17.93	3	0	8	8.00	3	17.3	3440	16.90	3439
27	Phulambri	Jatwa	20.2435	75.5109	664	Basalt	FMB	20.4	7.8	1	1.8	2.80	7	15.2	826	13.00	780
28	Phulambri	Umravati	20.2228	75.5361	653	Basalt	WFB	7.5	7.5	0.5	5.9	5.90	1	5.7	712	2.30	506
29	Phulambri	Naigaon aland	20.1803	75.5281	620	Basalt	FB	11.4	6	0.7	2.3	5.00	3	8.9	1993	7.90	1856
30	Phulambri	Bhalgaon	20.1290	75.5149	609	Basalt	FB	17	6	0	10	10.00	2	17	1810	16.65	1655
31	Phulambri	Wadod Bazar	20.1423	75.5229	608	Basalt	WFB	19.3	6	0.2	13.95	16.00	3	17.1	1920	9.20	1052
32	Phulambri	Georai Paiga	20.1266	75.5951	610	Basalt	WFB	15.84	6	0	1	7.50	7	15	1028	8.00	607

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33	Phulambri	Girsavli	20.0768	75.5530	652	Basalt	WFB	10	6	0	7.3	8	2	9.7	8.26	7.70	1456
34	Phulambri	Marsavli	20.0429	75.5701	741	Basalt	FMB	8.7	4	0.3	4.7	5	1	8.6	2015	3.70	940
35	Phulambri	Waghola	20.0402	75.4938	669	Basalt	FB	7.8	6	0.1	3.4	5.7	2	7.6	1237	6.60	1036
36	Phulambri	Yesgaon	20.0867	75.3349	659	Basalt	WFB	23.1	5	0.8	16.2	17	4	21.4	1420	21.30	1521
37	Ganagapur	Fatiabad	19.9400	75.1841	581	Basalt	FMB	22.00	6.00	0.20	7.40	8.00	10	21.00	895	14.00	664
38	Ganagapur	Sillegaon	19.8688	75.0069	514	Basalt	FMB	23.30	3.00	0.10	7.20	8.00	7	16.57	2182	16.00	2019
39	Ganagapur	Shahapur(Wadgaon Shivar)	19.8189	75.0432	490	Basalt	FMB	26.50	7.00	0.00	0.00	2.20	3	24.53	1563	22.47	1258
40	Ganagapur	Warkhed	19.7650	74.9106	502	Basalt	FMB	19.30	4.00	0.00	0.00	1.00	10	9.21	795	6.20	910
41	Ganagapur	Ranjangaon Narhari	19.7847	74.9273	507	Basalt	FMB	22.50	5.00	0.50	5.80	7.00	2	21.00	938	9.20	1320
42	Ganagapur	Wahegaon	19.7153	74.9081	488	Basalt	FMB	15.00	4.00	0.40	4.20	5.00	3	11.60	1792	1.30	1750
43	Ganagapur	Agar kanad gaon	19.6678	74.9391	457	Basalt	FMB	14.00	5.00	0.00	5.50	6.00	5	9.48	1426	7.23	1289
44	Ganagapur	Jamgaon	19.6596	74.9872	460	Basalt	FMB	14.00	5.00	0.70	5.70	6.00	7	12.00	3658	7.50	3688
45	Ganagapur	Kaigaon	19.6360	75.0263	463	Basalt	FMB	15.00	2.50	0.20	7.10	8.00	7	6.88	5415	3.60	756
46	Ganagapur	Gangapur	19.7079	75.0011	487	Basalt	FMB	17.50	5.00	0.70	3.50	4.00	8	8.90	968	2.40	1050
47	Ganagapur	Hakigatpur	19.7503	74.9379	499	Basalt	FAB	17.00	3.00	0.00	0.00	1.00	4	12.09	966	6.50	755
48	Ganagapur	Patchpirwadi	19.9719	75.1223	587	Basalt	FMB	18.20	6.00	0.70	4.20	7.00	3	9.40	802	5.10	720
49	Ganagapur	Hadiyabad	19.7671	75.0062	480	Basalt	FAB	12.00	5.00	0.50	5.00	6.00	5	7.58	528	4.10	620
50	Ganagapur	Murmi	19.7244	75.1317	476	Basalt	FAB	23.00	8.00	0.40	9.20	10.00	6	17.80	990	12.90	610
51	Ganagapur	Dhoregaon	19.7113	75.1017	471	Basalt	FMB	15.80	4.00	0.80	15.80	9.00	-	15.00	-	4.90	1875
52	Ganagapur	Bhoygaon	19.7348	75.0736	464	Basalt	FMB	13.50	5.50	0.70	7.40	8.00	4	10.20	415	8.10	230
53	Ganagapur	Yesgaon	19.7882	75.0949	486	Basalt	FMB	23.00	4.00	0.40	1.80	3.00	5	17.62	1885	16.28	1657
54	Ganagapur	Limbe Jalgaon	19.7763	75.1753	472	Basalt	FMB	13.00	5.00	0.40	4.10	5.00	5	8.30	2260	5.10	2764
55	Ganagapur	Kasoda	19.8080	75.1591	502	Basalt	FMB	12.00	4.50	0.50	2.30	3.00	5	11.00	1076	7.96	943
56	Ganagapur	Shivrai (Walij Kh)	19.7904	75.2234	503	Basalt	FMB	18.00	7.00	0.70	5.50	6.00	5	12.00	593	7.89	451
57	Ganagapur	Narayanpur	19.7784	75.2219	497	Basalt	FMB	19.00	6.00	0.80	16.50	16.00	4	15.71	2421	14.82	2284
58	Ganagapur	Pimparkheda	19.7372	75.2189	484	Basalt	FVB	11.40	6.00	0.40	6.00	6.00	1	12.00	1905	9.47	1483
59	Ganagapur	Sanav	20.0037	75.0068	524	Basalt	FMB	18.00	5.00	0.60	8.80	4.50	3	17.00	2506	15.70	1857
60	Ganagapur	Shivpur	19.6664	75.2252	476	Basalt	FAB	24.00	6.00	0.20	19.40	15.00	5	21.81	1240	19.80	2053
61	Ganagapur	Tarpimpri	19.6612	75.1859	485	Basalt	FAB	7.70	5.00	0.10	3.00	3.00	1.5	7.50	1486	5.50	1590
62	Ganagapur	Ghanegaon	19.8604	75.2050	523	Basalt	FAB	19.50	4.50	0.70	2.70	4.00	4	15.27	1635	6.20	933
63	Ganagapur	Ambegaon	19.8917	75.1779	551	Basalt	FAB	26.40	9.00	0.30	9.80	11.00	5	24.00	1410	21.50	1356

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64	Ganagapur	Apegaon	19.8831	75.1154	530	Basalt	FMB	17.50	7.50	0.90	3.80	5.00	3	15.03	1364	10.50	1715
65	Ganagapur	Mahebubkheda	19.8768	74.9688	504	Basalt	FMB	19.30	6.00	0.40	8.50	9.00	4	15.89	585	14.20	888
66	Ganagapur	Siresaigaon	19.8360	74.9435	496	Basalt	FMB	27.40	6.00	0.90	8.60	10.00	7	20.13	548	8.90	372
67	Ganagapur	Kate Pimpalgaon	19.8567	74.9306	496	Basalt	FMB	25.50	4.00	0.00	5.00	6.00	4	22.50	3604	10.20	2340
68	Kannad	Vitkhede	20.0349	75.0760	553	Basalt	FMB	15	5	0.4	5	6	7	11	950	5.4	720
69	Kannad	Jaitkheda	20.2203	75.2711	712	Basalt	FAB	20	10	0	no lining	5	9	17	450	3.1	320
70	Kannad	Haraswadi	20.4272	75.1811	360	Basalt	FMB	9	6	0	no lining	6	4	6	400	3	410
71	Kannad	Nagad	20.4595	75.1680	335	Basalt	FMB	20	10	0.3	9	13	3	11.7	450	4.6	410
72	Kannad	Saigavhan	20.3947	75.1475	383	Basalt	FMB	15	5	0.8	7	8	7	12.3	570	5.6	490
73	Kannad	Upla	20.3056	75.0514	679	Basalt	FMB	22	8	0.6	7	14	8	18	1100	10.5	540
74	Kannad	Mohalda Tanda	20.2644	75.1639	646	Basalt	FMB	18	6	0	8	15	2	16	320	9.4	360
75	Kannad	Hatnur	20.1697	75.1317	585	Basalt	FMB	13.5	8	0.4	1	8	5.5	13	680	8	730
76	Kannad	Kanadgaon	20.1336	74.9775	559	Basalt	FMB	22	4.5	0.2	11	12	8	19.4	800	13.4	460
77	Kannad	Vita	20.1414	75.0147	569	Basalt	FMB	18	10	0.4	3	9	9	17.5	900	8	800
78	Kannad	Javli Bk.	20.1503	75.0397	579	Basalt	FMB	16	6	80	6	9	6	15	450	12.5	480
79	Kannad	Bhokangaon	20.2022	75.1764	598	Basalt	FMB	18	5	0.4	16	1	1	17	1600	11.4	1430
80	Kannad	Aurala	20.1683	74.9994	578	Basalt	FAB	21	6	0.5	6	9	10	20.8	550	12.8	600
81	Kannad	Chinchkheda	20.2069	74.9786	615	Basalt	FMB	16	8	0.8	6	9	6	15.5	550	12.3	480
82	Kannad	Mungsapur	20.2283	74.9364	604	Basalt	FMB	20	6	0.4	8	14	4	18	500	13.9	390
83	Kannad	Chivli	20.2628	74.9492	655	Basalt	FMB	15	12	0.8	3	4	9	12	300	4.4	320
84	Kannad	Gaholi Tanda	20.1947	75.0028	618	Basalt	FAB	18	8	0.6	1	7	9	17.8	380	6	490
85	Kannad	Gaholi	20.1764	75.0269	600	Basalt	FMB	21	6	0.5	18	18	6	22	700	14.3	510
86	Kannad	Sirasgaon	20.2033	75.0956	610	Basalt	FMB	14	8	0.4	4	6	7	15	680	8	570
87	Kannad	Dongaon	20.2281	75.1533	613	Basalt	FMB	20	12	0.5	3	7	5	18	520	12	460
88	Kannad	Jamdi	20.3556	75.3681	671	Basalt	FMB	15	6	0	10	14	1	14.5	700	13.5	590
89	Kannad	Vaki Kadam	20.3842	75.3456	652	Basalt	FMB	15	7	0.5	6	9	5	14.8	730	3.8	610
90	Kannad	Karanjkhed	20.3753	75.2928	674	Basalt	FMB	15	8	0.2	2	8	7	13	800	5	550
91	Kannad	Nagapur	20.3811	75.2561	691	Basalt	FMB	14	6	0.4	2	5	8	13	800	4.7	380
92	Kannad	Mehun	20.3669	75.1950	724	Basalt	FMB	11	8	0.5	5	5	6	9	400	3	480
93	Kannad	Nachenvel	20.3189	75.4394	644	Basalt	FMB	15	8	0.5	4	13	2	14.8	600	8.3	510
94	Khuldabad	Zari	20.1712	75.2733	684	Basalt	WFB	8.2	6.8	0.8	2.7	6.6	1.5	7	845	5.50	728

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95	Khuldabad	Bodhka	20.1602	75.2646	678	Basalt	WFB	14.5	6.8	1	11	11	3	13.9	810	11.10	782
96	Khuldabad	Kasabkheda	20.0089	75.1321	579	Basalt	WFB	19.3	9	0	12.9	17.30	2	18.6	1427	15.20	1965
97	Khuldabad	Verul Tanda	20.0356	75.1541	593	Basalt	FB	14.2	5.3	0.6	6.1	11.40	3	13.9	920	10.20	993
98	Khuldabad	Pipri	20.1083	75.1687	596	Basalt	FB	13.2	3.2	0	7	11.00	2	12.9	1473	11.20	1658
99	Khuldabad	Lamangaon	20.0539	75.2008	725	Basalt	FB	15.6	10.6	0.8	9.8	13.80	2	14.3	1083	8.10	1264
100	Khuldabad	Golegaon	20.0188	75.2650	686	Basalt	FB	17.4	3.5	0.6	10.4	13.00	3	16	1018	15.50	1020
101	Paithan	Aliyabad	19.6622	75.2723	490	Basalt	FAB	18.00	5.00	0.40	2.40	4.00	3	14.31	1627	8.30	1585
102	Paithan	Wadji	19.5266	75.5741	477	Basalt	FMB	17.00	6.00	0.80	1.60	3.00	4	12.60	1549	7.20	590
103	Paithan	Murma	19.5463	75.6215	497	Basalt	FMB	16.50	4.00	0.50	3.40	4.00	3	15.00	614	12.20	1090
104	Paithan	Pachod	19.5833	75.6252	484	Basalt	FAB	15.00	3.00	0.60	4.50	5.00	3	10.50	2700	5.50	1830
105	Paithan	Adagaon	19.6704	75.6087	535	Basalt	FMB	13.00	4.00	0.30	6.40	7.00	3	6.10	1288	3.40	1036
106	Paithan	Adul	19.7134	75.5440	554	Basalt	FMB	31.00	4.00	0.90	3.40	3.00	5	27.10	987	11.20	1282
107	Paithan	Brahmangaon	19.6770	75.5605	566	Basalt	FMB	16.00	6.00	0.50	1.70	2.00	3	13.70	1151	12.52	1046
108	Paithan	Gaontanda	19.6091	75.4809	484	Basalt	FMB	14.50	5.00	0.60	4.80	5.00	4	8.10	910	2.20	571
109	Paithan	Diyanatpur	19.5581	75.4377	475	Basalt	FMB	22.00	6.00	0.40	3.00	5.00	5	21.30	870	6.50	1176
110	Paithan	Katpur	19.5166	75.3968	448	Basalt	FMB	12.00	3.00	0.20	12.00	10.00	12	11.00	4398	4.10	6000
111	Paithan	Karkin	19.9902	75.3644	478	Basalt	FMB	16.90	4.50	0.00	6.30	7.00	4	13.40	1320	8.30	1248
112	Paithan	Bidkin	19.7260	75.2964	506	Basalt	FAB	17.00	6.00	0.20	4.20	5.00	6	9.00	463	4.30	670
113	Paithan	Dinnapur	19.6189	75.3103	475	Basalt	FMB	30.00	5.00	0.80	9.80	10.00	15	23.70	1570	9.80	828
114	Paithan	Dhakephal	19.5821	75.2947	478	Basalt	FMB	14.00	5.00	0.40	3.60	4.00	4	11.00	610	10.26	542
115	Paithan	Shevata	19.5510	75.2773	471	Basalt	FMB	15.00	4.00	0.80	10.00	11.00	3	13.00	855	8.57	795
116	Paithan	Borigaon	19.5904	75.3381	471	Basalt	FAB	22.00	5.00	0.20	2.40	4.00	3	18.80	2060	16.25	1852
117	Paithan	Dadegaon	19.4424	75.4274	435	Basalt	FMB	23.00	5.00	0.50	20.00	14.00	4	18.00	7328	15.41	7015
118	Paithan	Anandpur	19.4749	75.4661	453	Basalt	FMB	18.00	5.00	0.40	5.40	10.40	3	8.70	690	4.20	1224
119	Paithan	Bramhgaon	19.4756	75.5469	442	Basalt	FMB	15.00	5.00	0.40	1.80	2.80	3	8.40	996	7.35	836
120	Paithan	Navgaon	19.4298	75.5171	435	Basalt	FMB	15.00	1.50	0.00	12.00	10.00	3	11.20	2575	7.20	2520
121	Paithan	Takli Ambad	19.3898	75.5655	440	Basalt	FMB	13.00	5.00	0.70	10.00	8.00	4	8.20	6612	6.60	2597
122	Paithan	Hiradpuri	19.4018	75.5935	437	Basalt	FAB	14.00	1.50	0.30	7.80	8.00	4	10.70	1480	10.10	2021
123	Paithan	Mharora	19.7235	75.2814	486	Basalt	FAB	19.50	4.50	0.80	7.21	8.00	5	13.90	1162	5.30	981
124	Paithan	Kakat Jalgaon	19.4912	75.6124	474	Basalt	FAB	25.00	5.50	0.10	1.80	2.00	8	17.80	785	11.40	974
125	Paithan	Chitegaon	19.7636	75.2896	522	Basalt	FAB	17.00	4.50	0.50	10.40	10.00	3	13.00	1470	10.20	2375
126	Paithan	Bokud Jalgaon	19.7573	75.3324	535	Basalt	FAB	13.20	3.50	0.00	5.40	6.00	1	13.10	1350	10.20	2295
127	Paithan	Jambli	19.7434	75.3552	542	Basalt	FMB	16.00	4.00	0.60	3.80	5.00	3	15.00	1348	12.50	1240

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128	Paithan	Gazipur	19.6889	75.3861	519	Basalt	FAB	12.50	6.00	0.40	7.50	8.00	3	8.10	1177	6.30	952
129	Paithan	Dongaon	19.6528	75.4396	519	Basalt	FAB	28.00	6.00	0.50	5.10	6.00	3	24.30	1365	12.00	2280
130	Paithan	Rahatgaon	19.5204	75.4526	470	Basalt	FMB	27.00	4.00	0.80	1.50	3.00	3	21.10	794	9.90	896
131	Vaijapur	Bhokargaon	20.0698	75.0069	537	Basalt	FMB	18.00	4.70	0.00	18.00	10.00	1	17.30	1465	14.90	1166
132	Vaijapur	Bhadli	20.1617	74.7656	581	Basalt	FMB	16.50	8.00	0.80	1.70	2.90	6	10.82	1526	10.20	841
133	Vaijapur	Parala	20.1142	74.7516	585	Basalt	FAB	9.70	4.20	0.00	0.00	1.00	1	9.58	1526	8.30	1380
134	Vaijapur	Wadji	20.0977	74.7423	611	Basalt	FMB	14.50	6.00	0.00	0.00	1.00	3	10.08	1048	9.45	956
135	Vaijapur	Bhaigaon Vaijapur	20.0018	74.7385	562	Basalt	FMB	20.00	6.00	0.00	0.00	1.00	2	18.96	1534	15.60	1864
136	Vaijapur	Aghur	19.9512	74.7609	537	Basalt	FMB	18.00	8.00	0.40	2.40	4.00	5	15.10	1932	10.10	1619
137	Vaijapur	Songaon	19.9652	74.8214	536	Basalt	FMB	19.50	7.00	0.30	5.00	6.00	9	11.90	740	10.12	651
138	Vaijapur	Parsoda	19.9578	74.8721	523	Basalt	FMB	16.50	8.00	1.00	8.20	8.00	7	9.08	1185	4.80	548
139	Vaijapur	Bhivgaon	19.9837	74.8460	541	Basalt	FMB	17.50	6.50	0.00	0.00	1.00	8	10.48	1934	7.30	1822
140	Vaijapur	Borsar	20.0090	74.8478	548	Basalt	FMB	14.50	8.00	0.20	14.50	10.00	5	12.60	1334	9.80	1187
141	Vaijapur	Kolhi	20.0473	74.8298	551	Basalt	FMB	14.50	6.00	0.90	6.50	8.00	7	6.13	1157	1.70	1842
142	Vaijapur	Manoor	20.0913	74.9979	545	Basalt	FMB	22.30	4.50	0.00	5.90	6.90	6	18.20	1626	16.20	2456
143	Vaijapur	Palkhed	19.9081	74.8970	509	Basalt	FMB	16.50	6.00	0.10	3.80	4.80	7	12.70	1012	7.50	1490
144	Vaijapur	Hadas Pimpalgaon	19.9320	74.9632	502	Basalt	FMB	25.50	6.00	0.30	20.60	20.00	2	23.47	1413	22.80	1287
145	Vaijapur	Golwadi	19.9282	74.8716	525	Basalt	FVB	19.50	6.00	0.40	2.80	4.00	2	18.50	1380	13.00	1292
146	Vaijapur	Kanak Sagaj	19.8839	74.8471	524	Basalt	FMB	16.00	6.50	0.00	2.00	3.00	2	14.79	1325	10.45	1152
147	Vaijapur	Jambargaon	19.8795	74.7972	520	Basalt	FMB	14.49	6.50	0.70	3.20	4.00	6	8.03	936	1.70	1075
148	Vaijapur	Jategaon	19.7901	74.8202	510	Basalt	FAB	15.50	6.00	0.40	2.00	3.00	6	8.81	1036	2.60	724
149	Vaijapur	Chandegaon	19.7433	74.7777	470	Basalt	FAB	15.00	5.50	0.40	3.60	4.00	5	11.29	1085	2.80	496
150	Vaijapur	Sawakhedganga	19.7861	74.7028	482	Basalt	FAB	22.50	4.50	0.20	5.60	6.00	6	15.70	2153	12.90	4844
151	Vaijapur	Lakhaganga	19.7992	74.6297	485	Basalt	FMB	18.50	3.00	0.00	17.30	15.00	1	17.30	4895	15.30	4824
152	Vaijapur	Surala	19.8810	74.6621	504	Basalt	FAB	12.00	5.00	0.80	5.10	6.00	1	10.53	6580	2.20	3367
153	Vaijapur	Shivgaon	20.0675	74.9451	532	Basalt	FMB	16.30	5.90	0.20	7.10	6.50	4	13.88	1406	5.00	1480
154	Vaijapur	Nagina Pimpalgaon	19.8641	74.7067	502	Basalt	FAB	17.20	4.50	0.70	1.00	2.00	5	12.49	885	6.30	773
155	Vaijapur	Panvi Bk	19.7778	74.8667	493	Basalt	FMB	18.00	6.00	0.10	1.80	3.00	1	17.90	1657	7.30	1832
156	Vaijapur	Bhaigaon Ganga	19.9928	74.9788	494	Basalt	FMB	17.00	5.50	1.00	10.00	10.00	1	17.00	-	16.21	4512
157	Vaijapur	Tikarkheda	20.1257	74.8283	590	Basalt	FMB	15	5.5	0.7	9	8.00	3	10	849	4.20	1335
158	Vaijapur	Pimpalgaon	20.1136	74.8963	543	Basalt	FMB	16.50	6.50	0.90	3.90	3.90	8	9.72	1565	3.00	522
159	Vaijapur	Sakegaon	20.1183	74.9556	557	Basalt	FMB	11.50	5.20	0.70	2.30	3.00	4	7.97	1505	4.90	1730

S.no.	Block	Location	lattitude	Longitude	Elevation (mamsl)	Formation	Aquifer	Well. Depth (m)	Diameter (m)	Height of MP (magl)	Lining (m)	Total Thickness weathered portion (m)	Thickness of fracture zone (m)	DTW (mbgl) May-17	EC (May 2017)	DTW (mbgl) Nov-17	EC (Nov-17)
160	Vaijapur	Jambarkheda	20.0416	74.9946	507	Basalt	FMB	14.70	8.00	1.00	5.00	4.50	1	12.00	-	8.40	1470
161	Vaijapur	Garaj	20.0685	74.9736	543	Basalt	FMB	18.00	6.00	0.40	5.50	7.00	5	14.47	1842	13.10	1750
162	Vaijapur	Naigavhan	20.1703	74.8518	580	Basalt	FMB	12.50	8.00	0.70	7.40	8.30	5	8.53	1787	5.00	1690
163	Vaijapur	Wakla	20.2059	74.8295	602	Basalt	FMB	16.00	6.40	0.40	2.60	3.00	7	8.51	1062	3.50	1350
164	Sillod	Ambhai	20.4500	75.5667	692	Basalt	-	8	-	-	-	-	-	8	-	2.2	-
165	Sillod	Amthana	20.4100	75.4794	641.7	Basalt	-	13.5	-	-	-	-	-	12.5	-	11	-
166	Sillod	Anad	20.5417	75.7722	561.7	Basalt	-	8.75	-	-	-	-	-	4.4	-	3	-
167	Sillod	Anvi	20.3583	75.6889	615.7	Basalt	-	23	-	-	-	-	-	17.5	-	10.9	-
168	Sillod	Bhavan	20.2569	75.6389	588.3	Basalt	-	8.95	-	-	-	-	-	9	-	1.65	-
169	Sillod	Borgaon bazar	20.3467	75.5014	615.3	Basalt	-	14	-	-	-	-	-	13.3	-	13	-
170	Sillod	Chondheshwar	20.5375	75.7250	552	Basalt	-	17	-	-	-	-	-	11.3	-	4.3	-
171	Sillod	Dongargaon	20.3417	75.6833	614	Basalt	-	14.9	-	-	-	-	-	10.15	-	8	-
172	Sillod	Mohol	20.4381	75.6387	364	Basalt	WVB	7.3	3.2	0.5	-	5	-	6.9	850	2.3	1020
173	Sillod	Pimpaldari	20.5069	75.7039	622	Basalt	HWB	10.9	9	0.3	-	1	-	7.8	1535	4.3	950
174	Sillod	Palshi	20.2861	75.5569	624	Basalt	HWB	10.4	8	0.5	-	4.2	-	11	1000	6.6	970
175	Sillod	Sillod	20.2975	75.6541	624	Basalt	VB	15.5	6	1	-	3	-	7.3	1460	1.3	1590
176	Sillod	Ajanta	20.5328	75.7504	503	Basalt	HWB	12.18	3.65	1.18	-	4	-	12.5	1800	2.36	1800
177	Sillod	Kaigaon	20.1770	75.6308	608	Basalt	VB	13.56	5.35	0.56	-	6	-	7.2	1070	3.9	1700
178	Sillod	Rahimabad	20.3532	75.7308	615	Basalt	FB	30	6	0.4	-	6	-	23.4	920	15.2	720
179	Sillod	Shivana	20.4817	75.7944	603	Basalt	VB	18	5	0.5	-	4	-	18.2	1270	13.56	980
180	Sillod	Lihakhedi	20.4083	75.6856	655	Basalt	WFB	12	6	0.3	-	7	-	7.8	1183	5.9	870
181	Sillod	Golegaon	20.4556	75.7078	672	Basalt	HWB	10.65	6.4	0.5	-	3	-	7.1	1720	5.5	1970
182	Sillod	Mangrul	20.3573	75.6497	645	Basalt	VB	12.5	8.5	0.5	-	2.5	-	11.6	1145	6.2	1890
183	Sillod	Bharadi	20.3559	75.5619	631	Basalt	WVB	13.7	7	1	-	10.9	-	14	1500	13.3	1350
184	Sillod	Ghatnandra	20.4642	75.4778	660	Basalt	VB	15.6	5.7	0.6	-	5.5	-	9.1	1235	5.6	920
185	Sillod	Jambhai	20.4397	75.5200	729	Basalt	HWB	4	6.7	0.6	-	2	-	10.1	1040	0.6	900
186	Sillod	Devalgaon	20.1375	75.6619	623	Basalt	VB	25	6	0.6	-	6	-	18.1	1280	6.3	1010
187	Soygaon	Fardapur	20.5931	75.7084	368	Basalt	WVB	12	7	0.2	-	10.6	-	10.7	939	10.6	1126
188	Soygaon	Soygaon	20.5914	75.6211	385	Basalt	WB	13	4	0.1	-	8	-	14.3	1108	7	1240
189	Soygaon	Savladbara	20.5664	75.9814	424	Basalt	HWB	8	3.8	0.2	-	2	-	9	1600	1.3	1570
190	Soygaon	Ravla	20.5962	75.8660	362	Basalt	VB	15	6	0.5	-	1.4	-	14.1	1540	4.6	450
191	Soygaon	Jarandi	20.5734	75.5497	342	Basalt	WB	15.3	4	0.1	-	1	-	15	1230	2.8	970
192	Soygaon	Umarhire	20.5322	75.4766	358	Basalt	WB	6.8	5.5	0.5	-	1.5	-	5.6	960	1.4	750

S.no.	Block	Location	lattitude	Longitude	Elevation (mamsl)	Formation	Aquifer	Well. Depth (m)	Diameter (m)	Height of MP (magl)	Lining (m)	Total Thickness weathered portion (m)	Thickness of fracture zone (m)	DTW (mbgl) May-17	EC (May 2017)	DTW (mbgl) Nov-17	EC (Nov-17)
193	Soygaon	Varthana	20.5154	75.3681	326	Basalt	HWB	17.1	6	0.7	-	6	-	12	560	10.3	1000
194	Soygaon	Nimbhori	20.5393	75.2732	342	Basalt	WFB	16	6	0.5	-	2.7	-	15.1	1900	13.9	1200
195	Soygaon	Mukhed	20.5297	75.3353	310	Basalt	HWB	15	3	0.8	-	4	-	10.6	922	5.6	730
196	Soygaon	Palaskhed	20.5089	75.5939	335	Basalt	WVB	16.5	3.2	0.6	-	7	-	15.2	1430	6.6	910
197	Sillod	Golegaon Budruk	20.4564	75.7100	679.1	Basalt	-	-	-	-	-	-	-	10.15	-	5.5	-
198	Sillod	Kaigaon	20.1667	75.6333	611	Basalt	-	-	-	-	-	-	-	13	-	4.12778	-
199	Soygaon	Ajanta	20.5417	75.7417	581	Basalt	-	-	-	-	-	-	-	5.2	-	2.9	-
200	Sillod	Borgaon Bazar	20.2333	75.6500	587	Basalt	-	-	-	-	-	-	-	11.5	-	5.2825	-

Annexure IV: Water level Data of monitoring wells in Aurangabad District (GSDA)

S.No.	Block	Location	Lattitude	Longitude	Elevation (m amsl)	Well Depth (m)	DTW (mbgl)	
							May-17	Nov-17
1	Aurangabad	Adgaon Sarak	19.9767	75.5031	688.10	13.00	11.40	2.00
2	Aurangabad	Adgaon Kh	19.7792	75.5806	527.30	13.70	13.70	5.70
3	Aurangabad	Adgaon sarak	19.9536	75.5133	671.10	13.00	8.10	1.70
4	Aurangabad	Apatgaon	19.8125	75.4917	545.00	12.20	8.30	6.00
5	Aurangabad	Bangaon	19.9200	75.5467	598.00	15.00	9.80	5.70
6	Aurangabad	Daultabad	19.9169	75.2142	573.00	11.70	11.00	9.00
7	Aurangabad	Dhavalapuri	19.8389	75.6361	536.80	12.25	10.60	1.30
8	Aurangabad	Dhawalapuri	19.8403	75.6333	541.00	15.00	11.90	4.10
9	Aurangabad	Girnera	19.7792	75.3125	550.00	18.70	18.40	13.00
10	Aurangabad	Golatgaon	19.8361	75.6167	548.00	11.90	9.50	7.20
11	Aurangabad	Hatmali	19.9986	75.5764	600.80	19.90	17.00	3.90
12	Aurangabad	Kautgaon (Jal.)	19.7861	75.6431	521.90	14.00	10.60	3.30
13	Aurangabad	Ladgaon	19.8750	75.5161	583.00	11.50	11.10	5.00
14	Aurangabad	Ladsawangi	19.9717	75.6211	574.00	17.00	17.00	8.20
15	Aurangabad	Padegaon	19.8833	75.2922	553.20	11.00	11.00	6.50
16	Aurangabad	Sawangi	19.9792	75.3811	669.00	14.50	9.90	4.70
17	Aurangabad	Shekta	19.8708	75.6250	548.00	13.86	12.40	5.50
18	Aurangabad	Shendra K	19.8717	75.4700	578.00	25.00	21.30	6.30
19	Ganagapur	Bhendala	19.6819	75.0694	478.30	19.80	18.50	16.10
20	Ganagapur	Dahegaon	19.7347	75.1458	482.90	13.48	12.10	7.40
21	Ganagapur	Dhoregaon	19.7972	75.1042	498.90	15.30	15.30	15.20
22	Ganagapur	Dhoregaon	19.7150	75.1036	476.70	16.00	15.30	7.00
23	Ganagapur	Jakmatha	19.7083	75.0028	488.70	14.50	11.30	0.30
24	Ganagapur	Jambhala	19.9536	75.1567	591.00	14.00	14.00	9.90
25	Ganagapur	Kaigaon	19.6358	75.0386	466.30	20.40	10.60	3.70
26	Ganagapur	Kinhala	19.9972	75.0750	549.30	14.30	13.80	10.80
27	Ganagapur	Limbejalgaon	19.7708	75.1811	496.00	10.40	10.30	3.20
28	Ganagapur	Malunja kh	19.7733	75.0100	487.00	19.00	19.00	15.00
29	Ganagapur	Manjari	19.7167	74.9500	491.00	12.50	8.50	4.50
30	Ganagapur	Narayanpur	19.7356	75.0733	478.40	15.80	14.40	11.40
31	Ganagapur	Nevergaon	19.6461	74.8928	470.30	12.70	10.80	10.00
32	Ganagapur	Ranjangaon(n)	19.7847	74.9194	513.40	12.10	12.10	0.30
33	Ganagapur	Sawangi	19.9139	75.0181	519.60	17.70	15.80	9.90
34	Ganagapur	Sayyadpur	19.7125	75.0972	471.00	17.20	17.10	15.00
35	Ganagapur	Turkabad	19.7844	75.1672	503.3	12.50	12.5	6.2
36	Ganagapur	Warkhed	19.7583	74.9028	505.8	14.25	14.25	2.7
37	Kannad	Amba	20.3083	75.0364	686.3	21.90	13	1.4
38	Kannad	Andhaner	20.2750	75.1028	639.3	21.00	19	8.5
39	Kannad	Bahirgaon	20.2181	75.1639	604.9	25.00	21	15.3
40	Kannad	Bhildari (Nagad)	20.3583	75.1417	421.9	8.20	8	1.4
41	Kannad	Chikalthan	20.1972	75.2036	609.1	23.70	20.7	6
42	Kannad	Deolana	20.0661	75.0842	551.7	22.00	15.1	11.1
43	Kannad	Deoli	20.0083	75.0006	521.9	22.50	22.5	19.5
44	Kannad	Ghusur	20.1642	75.1692	588.1	11.80	11	4.9
45	Kannad	Hasankheda	20.1639	75.0417	585.3	16.70	16.7	13.7
46	Kannad	Kannad	20.2542	75.1403	626.3	11.75	11.75	7.4
47	Kannad	Karanjkheda	20.3783	75.2858	672	18.50	15.5	8.6
48	Kannad	Nadarpur	20.2911	75.3736	664.9	21.80	17.1	10.4
49	Kannad	Nagad	20.4631	75.1750	333.3	20.00	10.29	5.3
50	Kannad	Nandgirwadi	20.2389	75.2139	659.3	12.40	12.4	7.3
51	Kannad	Rithi	20.2644	75.1617	643.3	15.30	15.1	5.4
52	Kannad	Saigavan	20.3922	75.1486	385.3	10.80	10.5	4.8
53	Kannad	Shirasgaon	20.2017	75.0900	616	16.50	15	11.6
54	Kannad	Wasadi	20.3878	75.2619	693.1	22.75	20.2	10.2
55	Khuldabad	Bodkha	20.1583	75.2583	684	13.20	13.2	8.3

S.No.	Block	Location	Lattitude	Longitude	Elevation (m amsl)	Well Depth (m)	DTW (mbgl)	
							May-17	Nov-17
56	Khuldabad	Deolana Bk	20.0653	75.2756	676.9	23.00	20.3	13.3
57	Khuldabad	Ellora	20.0214	75.1639	598.5	16.30	16.3	13.3
58	Khuldabad	Ghusur	20.0208	75.1694	601.8	11.80	10.7	9.8
59	Khuldabad	Mhaismal	20.0806	75.1833	862.8	8.60	8	3.9
60	Paithan	Aapegaon	20.1553	75.5483	607.3	16.00	14.1	11.5
61	Paithan	Adgaon Jawale	19.6683	75.5272	631.6	11.40	11.4	3.7
62	Paithan	Adgaon Jawale	19.6678	75.6081	535.4	11.40	6	5
63	Paithan	Adul kh	19.7083	75.5333	559	19.50	6.1	4
64	Paithan	Akhatwada	19.5028	75.4333	452.3	16.30	14.5	3.8
65	Paithan	Aurangpurwadi	19.6542	75.2417	472.1	12.40	11.2	3.9
66	Paithan	Bidkin	19.7014	75.3003	499.9	12.50	12	5
67	Paithan	Changatpuri	19.4153	75.3933	448.4	13.70	13.5	10
68	Paithan	Dhorkin	19.6139	75.3667	480.3	17.50	14.2	9.7
69	Paithan	Ektuni	19.7342	75.6094	521.3	16.40	11	9.5
70	Paithan	Murma	19.5436	75.6175	492.7	24.15	11.6	1.2
71	Paithan	Pachod bk	19.5736	75.6264	491.7	18.05	16.8	1.8
72	Paithan	Paithan	19.4750	75.4708	450	16.30	14.25	8.3
73	Paithan	Shewta	19.5347	75.4278	472.1	18.40	10	6
74	Paithan	Takali Ambad	19.3939	75.5594	441.2	17.20	16.35	13.8
75	Paithan	Telwadi	19.4333	75.4042	449	14.55	8.7	4.9
76	Paithan	Thergaon	19.5542	75.5708	477	20.50	12.8	9.5
77	Paithan	Tupewadi	19.6281	75.4861	505.4	23.25	21	8.5
78	Paithan	Vihamandva	19.4578	75.5800	457.7	17.00	14.8	7.4
79	Paithan	Wahegaon	19.5639	75.4667	491.6	12.10	12.1	4.9
80	Paithan	Warwandi kh	19.7056	75.4211	541.3	20.90	8.9	4.6
81	Phulambri	Aland	20.1931	75.5528	628.90	10.80	9.90	6.40
82	Phulambri	Phulambri	20.0917	75.4208	644.00	14.90	13.90	8.80
83	Phulambri	Gevrai Gungi	20.1125	75.6056	614.60	19.25	15.60	9.30
84	Phulambri	Girsawali	20.0750	75.5528	653.60	15.00	15.00	13.70
85	Phulambri	Khamgaon	20.1847	75.4931	639.80	13.70	12.80	11.60
86	Phulambri	Nidhona	20.1972	75.3750	683.70	11.00	10.80	5.50
87	Phulambri	Pal	20.1375	75.4556	626.40	18.80	17.80	11.30
88	Phulambri	Pathari	20.1306	75.4853	619.00	11.30	10.00	6.00
89	Phulambri	Ranjangaon	20.0936	75.5403	631.30	12.00	11.30	8.50
90	Phulambri	Umravati	20.2206	75.5444	645.00	9.95	9.80	3.80
91	Phulambri	Wadod Bazar I	20.1478	75.5267	602.30	12.00	11.90	4.30
92	Phulambri	Wanegaon	20.1083	75.3792	644.00	18.80	18.80	9.40
93	Sillod	Ambhai	20.4500	75.5667	692	8.00	8	2.2
94	Sillod	Amthana	20.4100	75.4794	641.6	13.50	12.5	11
95	Sillod	Anad	20.5417	75.7722	561.6	8.75	4.4	3
96	Sillod	Anvi	20.3583	75.6889	615.6	23.00	17.5	10.9
97	Sillod	Bhavan	20.2569	75.6389	588.4	8.95	9	1.65
98	Sillod	Borgaon bazar	20.3467	75.5014	615.3	14.00	14	13
99	Sillod	Chondheshwar	20.5375	75.7250	552	17.00	11.3	4.3
100	Sillod	Dongargaon	20.3417	75.6833	614	14.90	10.15	8
101	Sillod	Ghatambri	20.5083	75.5958	759.1	20.20	20	5.4
102	Sillod	Golegaon kh	20.4431	75.7056	661.3	14.40	14	10
103	Sillod	Hatti	20.4378	75.6083	664.1	30.00	14.5	14
104	Sillod	Madani	20.4917	75.8292	603	11.20	11	10
105	Sillod	Mangrul	20.3722	75.6411	639.2	12.65	12.4	12
106	Sillod	Nillod	20.2264	75.6194	606.4	15.00	10	9
107	Sillod	Nillod	20.2264	75.6194	606.4	30.00	11.05	9.8
108	Sillod	Palod	20.3800	75.6717	618.2	15.00	13.5	10.5
109	Sillod	Sillod	20.2958	75.6514	610.7	12.90	12.9	10
110	Sillod	Takali Jivrag	20.1444	75.6250	585.3	15.30	14	12.9
111	Sillod	Undangaon	20.4556	75.6625	692.7	11.45	11.45	7

S.No.	Block	Location	Lattitude	Longitude	Elevation (m amsl)	Well Depth (m)	DTW (mbgl)	
							May-17	Nov-17
112	Sillod	Upla	20.3125	75.5267	612	18.90	18	12
113	Sillod	Wadala	20.4250	75.5722	686.6	10.00	9	2.2
114	Sillod	Wadod Chatha	20.3764	75.5639	636.8	13.50	11	9.5
115	Sillod	Wadod Kh	20.1561	75.6314	595.1	15.00	10	2.3
116	Sillod	Ghatambri	20.5083	75.5958	759	20.20	20	5.4
117	Sillod	Golegaon kh	20.4431	75.7056	661.3	14.40	14	10
118	Sillod	Hatti	20.4378	75.6083	664	30.00	14.5	14
119	Sillod	Madani	20.4917	75.8292	603	11.20	11	10
120	Sillod	Mangrul	20.3722	75.6411	639.2	12.65	13	12
121	Sillod	Nillod	20.2264	75.6194	606.4	15.00	10	9
122	Sillod	Nillod	20.2264	75.6194	606.4	30.00	11.05	9.8
123	Sillod	Palod	20.3800	75.6717	618	15.00	13.5	10.5
124	Sillod	Sillod	20.2958	75.6514	610.7	12.90	12.9	10
125	Sillod	Takali Jivrag	20.1444	75.6250	585.3	15.30	14.2	12.9
126	Sillod	Undangaon	20.4556	75.6625	692.7	11.45	11.45	7
127	Sillod	Upla	20.3125	75.5267	612	18.90	18	12
128	Sillod	Wadala	20.4250	75.5722	686.7	10.00	9	2.2
129	Sillod	Wadod Chatha	20.3764	75.5639	636.8	13.50	12	9.5
130	Sillod	Wadod Kh	20.1561	75.6314	595.1	15.00	10	2.3
131	Soygaon	Amkheda	20.5914	75.6119	378.5	8.50	8.5	4.1
132	Soygaon	Amkheda I	20.5914	75.6119	378.5	12.20	11	1.53
133	Soygaon	Banoti	20.5042	75.3431	335.3	8.00	8	5
134	Soygaon	Chondeshwar	20.5375	75.7233	506.5	17.00	15.8	4.3
135	Soygaon	Fardapur	20.5858	75.7228	376.7	10.90	6.7	5.6
136	Soygaon	Galwada	20.5722	75.3056	300.4	14.70	10	2.1
137	Soygaon	Ghanegaon	20.6236	76.0022	394.5	11.30	12	7
138	Soygaon	Ghosala	20.5347	75.2833	402.4	7.30	7	3
139	Soygaon	Jamthi	20.6000	75.8494	365.3	9.25	7.3	5
140	Soygaon	Jangala Tanda	20.5833	75.6708	407.1	7.00	7	2
141	Soygaon	Jarandi	20.5644	75.5500	349	8.70	5.5	5
142	Soygaon	Jawala	20.5972	75.8625	356	7.30	7	5
143	Soygaon	Massikota	20.5819	75.3542	288.6	10.50	9.5	5
144	Soygaon	Palaskheda	20.6592	75.6872	323.3	5.45	5.45	1.1
145	Soygaon	Rawala	20.5861	75.8792	366.7	7.90	8	2
146	Soygaon	Sawaladbara	20.5944	75.8819	355.2	7.90	8	2
147	Soygaon	Tidka	20.5153	75.3847	332.4	10.40	10	9
148	Soygaon	Uppalkheda kh	20.5325	75.2700	348	10.75	10	7
149	Soygaon	Uppalkheda I	20.5478	75.2864	351.3	11.90	11.8	2
150	Soygaon	Amkheda	20.5914	75.6119	378.3	8.50	8.5	4.1
151	Soygaon	Amkheda I	20.5914	75.6119	378.3	12.20	11	1.53
152	Soygaon	Banoti	20.5042	75.3431	335.3	8.00	8	5
153	Soygaon	Chondeshwar	20.5375	75.7233	507	17.00	15.8	4.3
154	Soygaon	Fardapur	20.5858	75.7228	376.7	10.90	6.7	5.6
155	Soygaon	Galwada	20.5722	75.3056	300.4	14.70	10	2.1
156	Soygaon	Ghanegaon	20.6236	76.0022	394.4	11.30	12	7
157	Soygaon	Ghosala	20.5347	75.2833	402.3	7.30	7	3
158	Soygaon	Jamthi	20.6000	75.8494	365.3	9.25	7.3	5
159	Soygaon	Jangala Tanda	20.5833	75.6708	407	7.00	7	2
160	Soygaon	Jarandi	20.5644	75.5500	349	8.70	5.5	5
161	Soygaon	Jawala	20.5972	75.8625	356	7.30	7.5	5
162	Soygaon	Massikota	20.5819	75.3542	288.7	10.50	9.5	5
163	Soygaon	Palaskheda	20.6592	75.6872	323.3	5.45	5.45	1.1
164	Soygaon	Rawala	20.5861	75.8792	366.7	7.90	8	2
165	Soygaon	Sawaladbara	20.5944	75.8819	355.2	7.90	8	2
166	Soygaon	Tidka	20.5153	75.3847	332.3	10.40	10	9
167	Soygaon	Uppalkheda kh	20.5325	75.2700	348	10.75	10	7

S.No.	Block	Location	Lattitude	Longitude	Elevation (m amsl)	Well Depth (m)	DTW (mbgl)	
							May-17	Nov-17
168	Soygaon	Uppalkheda I	20.5478	75.2864	351.3	11.90	11.8	2
169	Vaijapur	Bhadali	20.1000	74.7833	613	15.20	15.1	6.5
170	Vaijapur	Bhokargaon	20.0681	75.0067	536.3	17.65	17.65	13.3
171	Vaijapur	Borsar	20.0083	74.8467	546.2	13.50	11.8	8.2
172	Vaijapur	Jambargaon	19.8806	74.7889	527.3	10.80	10.35	4.2
173	Vaijapur	Kangoni	19.8283	74.6717	497	18.30	18.3	15.4
174	Vaijapur	Kolhi	20.0433	74.8289	565	15.60	11	2.7
175	Vaijapur	Malisagaj	19.8722	74.8653	522.7	11.30	11.3	3.3
176	Vaijapur	Nagamthan	19.7333	74.7975	479	12.60	11.6	5.8
177	Vaijapur	Parsoda	19.9556	74.8667	529.4	23.30	18.1	13.4
178	Vaijapur	Purangaon	19.7911	74.6461	485.7	18.90	17.6	15.7
179	Vaijapur	Rajura	19.9756	74.9900	518.3	22.00	17.1	13.7
180	Vaijapur	Shivur	20.0694	74.8750	579	17.30	13.8	8.4
181	Vaijapur	Talwada	20.1689	74.7964	592	21.00	19	7.9
182	Vaijapur	Tunki	20.1314	74.8483	566.7	14.70	14.7	6.4
183	Vaijapur	Vaijapur	19.9292	74.7292	535.9	13.90	11.8	7.8
184	Vaijapur	Virgaon	19.8250	74.7750	494	17.30	9.1	1.2

Annexure V: long term ground Water trend (2008-2017)

SN	Block	Village	Lattitude	Longitude	Depth	Pre-monsoon trend (m/year)		Post-monsoon trend (m/year)	
						Rise	Fall	Rise	Fall
1	Aurangabad	Shekta	19.87083	75.625	13.86		0.33091	0.04719	
2	Aurangabad	Apatgaon	19.8125	75.49167	12.2		0.05011		0.00323
3	Aurangabad	Adgaon Kh	19.77917	75.58056	13.7		0.07692		0.00919
4	Aurangabad	Hatmali	19.99861	75.57639	19.9		0.07390		0.03879
5	Aurangabad	Bangaon	19.92	75.54667	15		0.09176		0.05489
6	Aurangabad	Sawangi	19.97917	75.38111	14.5		0.05802		0.06266
7	Aurangabad	Padegaon	19.88333	75.29222	11		0.00445		0.07395
8	Aurangabad	Adgaon sarak	19.95361	75.51333	13		0.09038		0.07727
9	Aurangabad	Ladsawangi	19.97167	75.62111	17		0.09429		0.08194
10	Aurangabad	Ladgaon	19.875	75.51611	11.5		0.02610		0.08366
11	Aurangabad	Dhavalapuri	19.83889	75.63611	12.25	0.01319			0.11245
12	Aurangabad	Kautgaon (Jal.)	19.78611	75.64306	14		0.22637		0.16452
13	Aurangabad	Adgaon Sarak	19.97667	75.50306	13		0.10583		0.17571
14	Aurangabad	Golatgaon	19.83611	75.61667	11.9		0.17009		0.24677
15	Aurangabad	Shendra K	19.87167	75.47	25		0.60333		0.26903
16	Aurangabad	Girnera	19.77917	75.3125	18.7		0.21648		0.29355
17	Aurangabad	Daultabad	19.91694	75.21417	11.7		0.19615		0.33742
18	Aurangabad	Dhawalapuri	19.84028	75.63333	15	0.11917			0.37667
19	Phulambri	Phulambri	20.09167	75.42083	14.9	0.00950			0.01840
20	Phulambri	Umravati	20.22056	75.54444	9.95	0.02363			0.02673
21	Phulambri	Nidhona	20.19722	75.375	11		0.01593		0.04002
22	Phulambri	Wadod Bazar I	20.14778	75.52667	12		0.18818		0.08636
23	Phulambri	Ranjangaon	20.09361	75.54028	12		0.04788		0.13398
24	Phulambri	Pal	20.1375	75.45556	18.8		0.00805		0.14935
25	Phulambri	Pathari	20.13056	75.48528	11.3		0.03379		0.16255
26	Phulambri	Khamgaon	20.18472	75.49306	13.7		0.02909		0.17857
27	Phulambri	Aland	20.19306	75.55278	10.8		0.10879		0.19773
28	Phulambri	Wanegaon	20.10833	75.37917	18.8		0.51182		0.34252
29	Phulambri	Gevrai Gungi	20.1125	75.60556	19.25		0.12879		0.34395
30	Phulambri	Girsawali	20.075	75.55278	15		0.12636		0.52955
31	Ganagapur	Dhoregaon	19.79722	75.10417	15.3		0.03626	0.00952	
32	Ganagapur	Jakmatha	19.70833	75.00278	14.5		0.24621		0.03994
33	Ganagapur	Warkhed	19.75833	74.90278	14.25		0.11863		0.05476
34	Ganagapur	Sawangi	19.91389	75.01806	17.7	0.01508			0.17264
35	Ganagapur	Malunja kh	19.77333	75.01	19		0.07136		0.18810
36	Ganagapur	Limbejalgaon	19.77083	75.18111	10.4		0.24698		0.24675
37	Ganagapur	Dhoregaon	19.715	75.10361	16		0.05000		0.25500
38	Ganagapur	Ranjangaon(n)	19.78472	74.91944	12.1		0.28151		0.25823
39	Ganagapur	Manjari	19.71667	74.95	12.5		0.24329		0.26883
40	Ganagapur	Nevergaon	19.64611	74.89278	12.7	0.09576			0.28582
41	Ganagapur	Dahegaon	19.73472	75.14583	13.48	0.18436			0.31126
42	Ganagapur	Narayanpur	19.73556	75.07333	15.8	0.00124			0.33355

SN	Block	Village	Lattitude	Longitude	Depth	Pre-monsoon trend (m/year)		Post-monsoon trend (m/year)	
						Rise	Fall	Rise	Fall
43	Ganagapur	Kaigaon	19.63583	75.03861	20.4		0.13256		0.34113
44	Ganagapur	Turkabad	19.78444	75.16722	12.5		0.18946		0.37532
45	Ganagapur	Kinhala	19.99722	75.075	14.3		0.03414		0.39264
46	Ganagapur	Sayyadpur	19.7125	75.09722	17.2		0.15055		0.52424
47	Ganagapur	Jambhala	19.95361	75.15667	14		0.17377		0.62965
48	Ganagapur	Bhendala	19.68194	75.06944	19.8		0.77242		0.86511
49	Kannad	Andhaner	20.275	75.10278	21	0.36928		0.25487	
50	Kannad	Karanjkheda	20.37833	75.28583	18.5		0.13308	0.19048	
51	Kannad	Saigavan	20.39222	75.14861	10.8		0.01703	0.09199	
52	Kannad	Amba	20.30833	75.03639	21.9		0.51571	0.06104	
53	Kannad	Bhildari (Nagad)	20.35833	75.14167	8.2		0.72698	0.04004	
54	Kannad	Nagad	20.46306	75.175	20		0.08813		0.00887
55	Kannad	Nandgirwadi	20.23889	75.21389	12.4		0.08626		0.01387
56	Kannad	Hasankheda	20.16389	75.04167	16.7		0.10926		0.05844
57	Kannad	Chikalthan	20.19722	75.20361	23.7	0.37370			0.06255
58	Kannad	Shirasgaon	20.20167	75.09	16.5		0.07011		0.12662
59	Kannad	Ghusur	20.16417	75.16917	11.8		0.11167		0.15250
60	Kannad	Kannad	20.25417	75.14028	11.75		0.41303		0.16342
61	Kannad	Wasadi	20.38778	75.26194	22.75		0.08297		0.18742
62	Kannad	Rithi	20.26444	75.16167	15.3		0.05192		0.19306
63	Kannad	Bahirgaon	20.21806	75.16389	25		0.35961		0.24091
64	Kannad	Deolana	20.06611	75.08417	22		0.70605		0.25087
65	Kannad	Nadarpur	20.29111	75.37361	21.8		0.20009		0.46169
66	Kannad	Deoli	20.00833	75.00056	22.5		0.24901		0.76710
67	Khuldabad	Mhaismal	20.08056	75.18333	8.6		0.06604		0.08734
68	Khuldabad	Bodkha	20.15833	75.25833	13.2		0.01154		0.20282
69	Khuldabad	Deolana Bk	20.06528	75.27556	23		0.01000		0.20595
70	Khuldabad	Ellora	20.02139	75.16389	16.3		0.11703		0.26136
71	Khuldabad	Ghusur	20.02083	75.16944	11.8		0.17747		0.52554
72	Paithan	Vihamandva	19.45778	75.58	17	0.04093		0.37136	
73	Paithan	Adul kh	19.70833	75.53333	19.5		0.06967	0.27911	
74	Paithan	Wahegaon	19.56389	75.46667	12.1		0.08736	0.27255	
75	Paithan	Takali Ambad	19.39389	75.55944	17.2	0.05604		0.15634	
76	Paithan	Aurangpurwadi	19.65417	75.24167	12.4	0.04093		0.13725	
77	Paithan	Warwandi kh	19.70556	75.42111	20.9		0.62005	0.04835	
78	Paithan	Ektuni	19.73417	75.60944	16.4	0.13187			0.00117
79	Paithan	Akhatwada	19.50278	75.43333	16.3		0.45330		0.01506
80	Paithan	Telwadi	19.43333	75.40417	14.55		0.24780		0.08043
81	Paithan	Thergaon	19.55417	75.57083	20.5		0.23242		0.08526
82	Paithan	Pachod bk	19.57361	75.62639	18.05	0.00357			0.09803
83	Paithan	Bidkin	19.70139	75.30028	12.5	0.05962			0.10335
84	Paithan	Shewta	19.53472	75.42778	18.4		0.21181		0.10952
85	Paithan	Adgaon Jawale	19.66778	75.60806	11.4	0.17538			0.13301
86	Paithan	Dhorkin	19.61389	75.36667	17.5		0.11751		0.13998
87	Paithan	Aapegaon	20.15528	75.54833	16	0.18000			0.14342

SN	Block	Village	Lattitude	Longitude	Depth	Pre-monsoon trend (m/year)		Post-monsoon trend (m/year)	
						Rise	Fall	Rise	Fall
88	Paithan	Adgaon Jawale	19.66833	75.52722	11.4		0.10237		0.16533
89	Paithan	Tupewadi	19.62806	75.48611	23.25	0.05330			0.20494
90	Paithan	Changatpuri	19.41528	75.39333	13.7		0.09643		0.20898
91	Paithan	Murma	19.54361	75.6175	24.15		0.00022		0.34762
92	Paithan	Paithan	19.475	75.47083	16.3		0.44505		0.35444
93	Sillod	Takali Jivrag	20.14444	75.625	15.3		0.19897	0.21600	
94	Sillod	Anad	20.54167	75.77222	8.75		0.18515		0.01533
95	Sillod	Sillod	20.29583	75.65139	12.9	0.03346			0.01558
96	Sillod	Ambhai	20.45	75.56667	8		0.05382		0.02424
97	Sillod	Wadod Chatha	20.37639	75.56389	13.5		0.04684		0.03374
98	Sillod	Hatti	20.43778	75.60833	30		0.32750		0.03418
99	Sillod	Undangaon	20.45556	75.6625	11.45	0.16006			0.03464
100	Sillod	Amthana	20.41	75.47944	13.5		0.06861		0.04404
101	Sillod	Dongargaon	20.34167	75.68333	14.9		0.36410		0.07912
102	Sillod	Bhavan	20.25694	75.63889	8.95		0.10028		0.08220
103	Sillod	Borgaon bazar	20.34667	75.50139	14		0.13214		0.09034
104	Sillod	Nillod	20.22639	75.61944	15	0.09107			0.09231
105	Sillod	Wadod Kh	20.15611	75.63139	15		0.31319		0.10136
106	Sillod	Madani	20.49167	75.82917	11.2	0.03214			0.12193
107	Sillod	Palod	20.38	75.67167	15		0.32162		0.16318
108	Sillod	Wadala	20.425	75.57222	10		0.08472		0.17045
109	Sillod	Golegaon kh	20.44306	75.70556	14.4		0.15113		0.19044
110	Sillod	Chondheshwar	20.5375	75.725	17		0.14901		0.19476
111	Sillod	Ghatambri	20.50833	75.59583	20.2		0.36447		0.21242
112	Sillod	Upla	20.3125	75.52667	18.9	0.06429			0.24286
113	Sillod	Mangrul	20.37222	75.64111	12.65		0.10263		0.31000
114	Sillod	Anvi	20.35833	75.68889	23		0.50432		0.37500
115	Sillod	Nillod	20.22639	75.61944	30		0.01300		0.57450
116	Soegaon	Massikota	20.58194	75.35417	10.5	0.04200		0.16411	
117	Soegaon	Jarandi	20.56444	75.55	8.7	0.18065		0.06356	
118	Soegaon	Ghosala	20.53472	75.28333	7.3	0.18806		0.06111	
119	Soegaon	Tidka	20.51528	75.38472	10.4		0.00282		0.00018
120	Soegaon	Sawaladbara	20.59444	75.88194	7.9	0.09756			0.01725
121	Soegaon	Banoti	20.50417	75.34306	8		0.29502		0.03043
122	Soegaon	Fardapur	20.58583	75.72278	10.9		0.17861		0.03077
123	Soegaon	Jangala Tanda	20.58333	75.67083	7		0.21739		0.03497
124	Soegaon	Amkheda	20.59139	75.61194	8.5		0.04516		0.03614
125	Soegaon	Jawala	20.59722	75.8625	7.3	0.41856			0.04465
126	Soegaon	Rawala	20.58611	75.87917	7.9	0.01889			0.06364
127	Soegaon	Ghanegaon	20.62361	76.00222	11.3		0.03664		0.08703

SN	Block	Village	Lattitude	Longitude	Depth	Pre-monsoon trend (m/year)		Post-monsoon trend (m/year)	
						Rise	Fall	Rise	Fall
128	Soegaon	Palaskheda	20.65917	75.68722	5.45		0.00100		0.09682
129	Soegaon	Uppalkheda kh	20.5325	75.27	10.75		0.20811		0.09809
130	Soegaon	Amkheda I	20.59139	75.61194	12.2		0.06833		0.16136
131	Soegaon	Jamthi	20.6	75.84944	9.25	0.11175			0.17743
132	Soegaon	Galwada	20.57222	75.30556	14.7		0.08130		0.20290
133	Soegaon	Uppalkheda I	20.54778	75.28639	11.9		0.01013		0.24891
134	Soegaon	Chondeshwar	20.5375	75.72333	17		0.13907		0.33818
135	Vaijapur	Talwada	20.16889	74.79639	21		0.13901	0.28169	
136	Vaijapur	Kangoni	19.82833	74.67167	18.3		0.04835	0.21663	
137	Vaijapur	Parsoda	19.95556	74.86667	23.3		0.05330	0.09085	
138	Vaijapur	Malisagaj	19.87222	74.86528	11.3		0.30522	0.06110	
139	Vaijapur	Purangaon	19.79111	74.64611	18.9		0.05687		0.10306
140	Vaijapur	Borsar	20.00833	74.84667	13.5	0.04890			0.13062
141	Vaijapur	Rajura	19.97556	74.99	22		0.12473		0.15119
142	Vaijapur	Tunki	20.13139	74.84833	14.7		0.05000		0.17199
143	Vaijapur	Vaijapur	19.92917	74.72917	13.9		0.08571		0.21153
144	Vaijapur	Bhokargaon	20.06806	75.00667	17.65		0.25165		0.23341
145	Vaijapur	Nagamthan	19.73333	74.7975	12.6		0.23764		0.25484
146	Vaijapur	Jambargaon	19.88056	74.78889	10.8		0.05769		0.35855
147	Vaijapur	Virgaon	19.825	74.775	17.3		0.46786		0.40239
148	Vaijapur	Shivur	20.06944	74.875	17.3		0.34945		0.43062
149	Vaijapur	Bhadali	20.1	74.78333	15.2		0.11484		0.49177
150	Vaijapur	Kolhi	20.04333	74.82889	15.6		0.19192		0.67556

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

SN	Block	Village	Agency	Type	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µS/cm	Mg/L															
1	Aurangabad	PES_polytec	CGWB	DW	-	824	438	240	54	26	102	5.52	0	329	106	34	62	0.10	0	2.85	0.59	48.7
2	Aurangabad	Police HQ	CGWB	DW	-	932	492	320	74	33	109	4.68	0	311	117	39	142	0.09	0	2.64	-1.31	43.0
3	Aurangabad	PWD RH	CGWB	DW	-	823	433	345	92	28	87	7.17	0	427	85	12	104	0.09	0	2.03	0.09	36.4
4	Aurangabad	Vidhyapeeth	CGWB	DW	-	1331	702	540	74	86	102	3.38	0	220	199	31	206	0.10	0	1.91	-7.21	29.5
5	Aurangabad	Chauka	CGWB	DW	-	2053	1095	710	176	66	115	11.40	0	268	312	49	285	0.12	0	1.88	-9.82	27.1
6	Aurangabad	Chitegaon	CGWB	DW	8.1	798	510.72	254	75	44	33	0.80	0	293	72	24	20	0.60	0	0.74	-2.52	16.5
7	Aurangabad	Golatgaon	GSDA	DW	8.3	1087	707	460	38	88	81	0.90	0	304	154	109	14	0.30	0.1	1.63	-4.22	27.7
8	Aurangabad	Hatmali	GSDA	DW	7.8	1044	679	452	77	63	78	1.20	0	248	150	101	24.5	0.10	0.1	1.60	-4.98	27.5
9	Aurangabad	Kankora	CGWB	DW	7.8	617	394.88	239	144	23	12	0.90	0	259	26	10	32	0.30	0	0.24	-4.87	5.5
10	Aurangabad	Karmad	CGWB	DW	7.8	882	564.48	328.7	179	36	19	1.30	0	185	108	43	100	0.40	0	0.34	-8.91	6.7
11	Aurangabad	Ohar	CGWB	DW	7.7	1047	670.08	373.5	169	50	25	2.10	0	244	85	44	160	0.50	0	0.43	-8.55	8.2
12	Aurangabad	Satara Tanda	CGWB	DW	7.8	1047	670.08	463.1	214	61	20	1.10	0	259	108	60	120	0.40	0	0.30	-11.44	5.3
13	Aurangabad	Shekta	GSDA	DW	8.8	861	560	296	19	60	80	1.70	8	295	114	29	1.3	1.20	1.7	2.03	-0.80	37.4
14	Aurangabad	ShendraK	GSDA	DW	7.8	448	291	207	48	21	77	0.40	1	160	130	15	8.1	0.40	0.7	2.32	-1.48	44.8
15	Aurangabad	Tisgaon	CGWB	DW	7.6	765	489.6	283.9	174	27	18	0.60	0	249	67	33	60	0.30	0	0.33	-6.82	6.7
16	Aurangabad	Wanegaon	GSDA	DW	7.8	715	465	192	13	39	28	2.20	1	117	52	46	9.8	0.90	0.44	0.87	-1.89	24.7
17	Aurangabad	Warjhadi	CGWB	DW	7.7	745	476.8	283.9	154	32	15	1.00	0	156	41	52	150	0.40	0	0.29	-7.75	6.3
18	Phulambri	Bodegaon Khurd	CGWB	DW	7.5	3437	2199	1215.1	324	217	237	2.10	0	688	476	530	250	0.50	0	2.50	-22.73	23.4
19	Phulambri	Dongargaon Kawad	CGWB	DW	7.5	1060	678.4	428.3	159	65	51	1.30	0	356	87	27	200	0.30	0	0.86	-7.50	14.5
20	Phulambri	Ganori	CGWB	DW	7.6	687	439.68	259	115	35	45	1.60	0	327	44	39	78	0.30	0	0.94	-3.25	18.9
21	Phulambri	Jatwa	CGWB	DW	7.6	781	499.84	333.7	135	48	31	5.00	0	225	64	37	58	0.20	0	0.58	-7.03	12.1
22	Phulambri	Mursidabadwadi	CGWB	DW	7.4	719	460.16	328.7	105	55	29	1.10	0	273	31	18	76	0.30	0	0.57	-5.23	11.6
23	Phulambri	Naigaon	CGWB	DW	7.8	1243	795.52	567.7	120	109	35	14.40	0	493	105	46	20	0.30	0	0.56	-6.86	11.3
24	Phulambri	Naigaon aland	CGWB	DW	7.7	2001	1280.6	622.5	80	132	94	2.90	0	410	275	12	280	0.50	0	1.50	-8.12	21.9
25	Phulambri	Umravati	CGWB	DW	7.7	705	451.2	333.7	135	48	24	1.70	0	356	39	17	42	0.30	0	0.44	-4.87	9.0
26	Ganagapur	Gangapur-3	CGWB	DW	-	1649	874	805	170	92	25	1.59	0	201	238	13	302	0.10	0	0.38	-12.82	6.5
27	Ganagapur	Jambhala	CGWB	DW	-	787	417	340	64	44	73	0.42	0	311	71	43	60.91	0.10	0	1.73	-1.71	32.0
28	Gangapur	Aga kanad gaon	CGWB	DW	7.8	1504	962.56	552.8	388	40	90	2.20	0	464	180	106	160	0.20	0	1.16	-15.10	14.9
29	Gangapur	Ambegaon	CGWB	DW	7.3	3425	2192	1125.5	697	104	177	1.60	0	322	774	138	220	0.20	0	1.65	-38.15	15.1
30	Gangapur	Apegaon	CGWB	DW	7.7	2230	1427.2	851.6	408	108	33	8.40	0	444	375	70	0.2	0.54	0	0.37	-22.00	5.3
31	Gangapur	Dahegaon	GSDA	DW	7.47	506	329	196	40	23	32	0.60	0	112	56	74	2.82	1.10	0.6	1.01	-2.08	26.6
32	Gangapur	Fatiabad	CGWB	DW	7.6	792	506.88	323.7	139	45	42	1.10	0	181	98	29	80	0.40	0	0.79	-7.70	14.9
33	Gangapur	Ghanegaon	CGWB	DW	8.1	1282	820.48	488	219	65	29	0.50	0	185	283	61	60	0.10	0	0.44	-13.29	7.1
34	Gangapur	Jakmatha	GSDA	DW	8.47	458	298	172	34	21	23	0.60	4	152	42	10	1.18	0.80	0.7	0.78	-0.81	23.1

SN	Block	Village	Agency	Type	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µS/cm	Mg/L															
35	Gangapur	Kate Pimpalgaon	CGWB	DW	7.6	1806	1155.8	747	374	91	60	0.80	0	527	244	120	160	0.20	0	0.72	-17.51	9.1
36	Gangapur	Kinhala	GSDA	DW	8.39	932	606	348	37	62	29	0.10	16	228	40	84	4.76	1.60	0.5	0.67	-2.70	15.3
37	Gangapur	Limbejalgaon	GSDA	DW	8.07	830	540	344	37	61	41	0.20	0	328	62	10	13.5	1.10	0.68	0.95	-1.50	20.5
38	Gangapur	Mahebubkheda	CGWB	DW	8.1	1168	747.52	283.9	65	53	76	0.70	0	361	116	19	0.5	0.00	0	1.69	-1.69	30.3
39	Gangapur	Nevergaon	GSDA	DW	7.98	521	339	212	59	16	31	0.10	2	202	46	15	5.56	1.30	0.9	0.92	-0.87	24.0
40	Gangapur	Patchpirwadi	CGWB	DW	7.5	686	439.04	318.7	154	40	24	0.60	0	234	39	16	60	0.20	0	0.44	-7.16	8.6
41	Gangapur	Ranjangaon	CGWB	DW	8	1918	1227.5	597.6	244	86	125	11.50	0	366	265	120	70	0.10	0	1.75	-13.27	22.9
42	Gangapur	Ranjangaon(n)	GSDA	DW	8.16	592	385	280	38	45	21	1.10	3	213	32	65	8.8	0.30	0.5	0.54	-2.01	14.3
43	Gangapur	Sanav	CGWB	DW	7.7	2560	1638.4	1060.7	593	114	90	1.50	0	537	414	176	120	0.30	0	0.88	-30.19	9.2
44	Gangapur	Shahapur	CGWB	DW	7.5	1947	1246.0	527.9	433	23	111	1.00	0	151	267	126	280	0.10	0	1.41	-21.08	17.1
45	Gangapur	Sillegaon	CGWB	DW	8.5	3026	1936.6	627.5	70	136	442	0.90	29	888	296	72	80	0.50	0	7.10	0.89	56.8
46	Gangapur	Siresaigaon	CGWB	DW	7.7	755	483.2	333.7	199	33	31	0.70	0	234	62	36	72	0.30	0	0.53	-8.81	9.7
47	Gangapur	Wahegaon	CGWB	DW	7.8	2846	1821.4	612.5	95	126	319	2.80	0	268	540	390	25	0.20	0	5.05	-10.69	48.0
48	Gangapur	Warkhed	CGWB	DW	8.1	853	545.92	333.7	164	41	34	1.20	0	161	75	72	180	0.10	0	0.62	-8.96	11.6
49	Kannad	Andhaner	GSDA	DW	9.4	815	530	172	24	27	68	30.00	28	12	114	27	17.8	0.60	0.5	2.25	-2.32	51.9
50	Kannad	Chinchkheda	CGWB	DW	8	1084	693.76	388.4	164	55	27	0.60	0	361	62	17	20	0.60	0	0.47	-6.78	8.7
51	Kannad	Chivli	CGWB	DW	8	611	391.04	259	105	38	17	2.00	0	278	18	13	6	0.60	0	0.37	-3.76	8.8
52	Kannad	Devgaon-1	CGWB	DW	-	1364	124	515	130	46	96	1.70	0	250	234	45	149	0.10	0	1.85	-6.21	29.1
53	Kannad	Haraswadi	CGWB	DW	7.8	1026	656.64	453.2	239	52	12	1.20	0	254	77	65	150	0.30	0	0.18	-12.07	3.3
54	Kannad	Hasta	CGWB	DW	-	821	435	390	96	36	42	1.68	0	305	74	36	77.05	0.10	0	0.93	-2.81	19.4
55	Kannad	Kannad	CGWB	DW	-	1301	691	515	100	64	87	1.65	0	299	223	38	92	0.09	0	1.67	-5.41	27.1
56	Kannad	Karanjkheda	GSDA	DW	8.3	540	351	232	29	39	41	2.00	3	154	78	10	8.5	0.80	0.2	1.17	-2.02	28.3
57	Kannad	Kinnal	CGWB	DW	-	881	466	395	108	30	66	1.42	0	214	106	42	175	0.12	0	1.45	-4.41	27.0
58	Kannad	Mehun	CGWB	DW	7.7	740	473.6	308.8	95	52	17	1.00	0	171	59	33	160	0.40	0	0.34	-6.21	7.7
59	Kannad	Mohalda Tanda	CGWB	DW	7.8	632	404.48	288.8	169	29	10	1.00	0	254	28	10	48	0.40	0	0.18	-6.69	3.9
60	Kannad	Mungsapur	CGWB	DW	8.1	887	567.68	263.9	75	46	51	0.70	0	405	33	17	30	1.20	0	1.14	-0.88	22.9
61	Kannad	Nachenvel	CGWB	DW	8	1040	665.6	478.1	264	52	16	2.60	0	286	82	33	130	0.40	0	0.24	-12.79	4.2
62	Kannad	Nadarpur	GSDA	DW	8.1	825	536	288	18	59	67	0.80	0	188	110	55	19	0.90	0.4	1.70	-2.68	33.6
63	Kannad	Nagad	GSDA	DW	8.6	504	328	200	16	39	44	0.10	5	142	78	10	8.1	0.60	0.1	1.35	-1.49	32.4
64	Kannad	Saigavan	GSDA	DW	8.6	1269	812	516	51	94	100	1.00	0	239	192	48	49	0.90	0.3	1.91	-6.40	29.8
65	Kannad	Sirasgaon	CGWB	DW	8.3	1074	687.36	408.4	90	77	28	1.30	43	100	90	26	280	0.50	0	0.52	-7.77	10.3
66	Kannad	Vaki Kadam	CGWB	DW	8	1274	815.36	448.2	224	55	30	1.00	0	278	90	51	170	0.60	0	0.47	-11.13	7.9
67	Kannad	Vita	CGWB	DW	8.3	3122	1998.0	781.9	224	136	248	1.20	72	615	208	500	50	5.00	0	3.23	-9.88	32.6
68	Kannad	Vitkhede	CGWB	DW	7.9	2634	1685.7	961.1	374	143	124	11.20	0	273	265	470	240	0.70	0	1.38	-25.95	15.7
69	Kannad	Wadali	GSDA	DW	8.3	394	252	176	29	25	22	1.00	2	102	40	19	9	0.80	0.2	0.72	-1.78	21.8

SN	Block	Village	Agency	Type	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µS/cm	Mg/L															
70	Khuldabad	Bodhka	CGWB	DW	7.8	776	496.64	214.1	115	24	91	2.10	0	317	39	16	58	0.50	0	2.01	-2.52	34.1
71	Khuldabad	Khuldabad	CGWB	DW	-	871	464	335	58	46	102	1.10	0	470	82	30	57.12	0.11	0	2.42	0.99	39.9
72	Khuldabad	Pipri	CGWB	DW	7.7	1490	953.6	542.8	130	100	60	0.70	0	517	98	21	280	0.30	0	0.97	-6.26	15.2
73	Khuldabad	Verul Tanda	CGWB	DW	7.9	959	613.76	393.4	75	77	50	0.40	0	459	54	17	78	0.40	0	0.96	-2.58	17.7
74	Khuldabad	Walur Tanda	CGWB	DW	-	1053	611	380	64	53	77	5.38	0	372	96	40	96	0.10	0	1.72	-1.51	31.5
75	Khultabad	Bodkha	GSDA	DW	7.6	800	520	320	45	51	11	0.20	0	300	20	12	13.8	0.80	0.59	0.27	-1.48	7.1
76	Khultabad	DeolanaBk	GSDA	DW	7.2	3150	2016	1232	357	83	180	25.00	0	900	340	302	8	1.80	0.2	2.23	-9.88	25.6
77	Khultabad	Ellora	GSDA	DW	9.6	972	632	196	11	41	103	6.50	16	60	144	45	20.8	0.60	0.4	3.20	-2.42	54.2
78	Khultabad	Golegaon	GSDA	DW	7.5	1060	689	420	32	83	73	0.50	0	264	134	90	12.3	0.80	0.38	1.55	-4.08	27.5
79	Khultabad	Mhaismal	GSDA	DW	7.5	562	365	272	61	29	20	0.50	1	251	28	55	2	0.10	0.2	0.53	-1.30	14.0
80	Paithan	Adagaon	CGWB	DW	8.1	1530	979.2	318.7	80	58	247	0.90	0	820	118	176	3	0.50	0	5.12	4.67	55.1
81	Paithan	Adulkh	GSDA	DW	7.7	3020	1963	1380	96	277	340	0.50	0	1037	616	49	95.5	0.75	0.5	3.98	-10.60	34.9
82	Paithan	Aliyabad	CGWB	DW	7.9	1492	954.88	582.7	319	64	67	2.10	0	117	216	81	190	0.10	0	0.89	-19.29	12.2
83	Paithan	Bidkin	GSDA	DW	7.3	3750	2438	1280	99	251	362	1.70	0	819	684	98	92.7	0.70	1.7	4.40	-12.18	38.1
84	Paithan	Bidkin	CGWB	DW	7.9	1514	968.96	448.2	110	82	249	0.80	0	673	231	67	50	0.50	0	4.38	-1.21	47.0
85	Paithan	Bokud Jalgaon	CGWB	DW	7.7	1270	812.8	517.9	239	68	53	6.70	0	259	105	72	140	0.20	0	0.77	-13.29	12.3
86	Paithan	Chitegaon	CGWB	DW	7.7	1534	981.76	577.7	329	61	65	2.80	0	386	177	75	210	0.30	0	0.87	-15.09	12.0
87	Paithan	Dawarwadi	CGWB	DW	-	650	350	215	40	28	88	11.91	0	214	67	10	121.0	0.27	0	2.61	-0.80	49.0
88	Paithan	Dongaon	CGWB	DW	8.3	1006	643.84	408.4	130	68	61	1.10	24	264	159	77	72	0.20	0	1.08	-6.93	18.2
89	Paithan	Ektuni	GSDA	DW	7.7	1020	663	492	64	81	86	0.70	0	325	156	31	44.5	0.88	0.7	1.68	-4.52	27.5
90	Paithan	Gazipur	CGWB	DW	7.6	1129	722.56	438.2	234	50	70	1.00	0	254	134	50	170	0.30	0	1.08	-11.63	16.2
91	Paithan	Jambli	CGWB	DW	7.8	691	442.24	159.4	90	17	95	2.70	0	337	67	31	60	0.80	0	2.41	-0.35	41.7
92	Paithan	Mharora	CGWB	DW	8.5	1053	673.92	254	65	46	144	1.30	34	386	67	38	170	0.50	0	3.34	0.42	47.2
93	Paithan	Murma	GSDA	DW	7.6	1556	1011	456	58	76	120	84.70	0	354	212	3	51.2	0.36	0.9	2.44	-3.32	44.7
94	Paithan	Murma	CGWB	DW	7.8	1630	1043.2	612.5	264	85	84	1.30	0	493	211	168	3	0.40	0	1.15	-12.08	15.4
95	Paithan	Pachod	CGWB	DW	7.7	8273	5294.7	3346.6	1135	537	817	4.60	0	761	1236	1820	23	0.20	0	5.00	-88.50	26.1
96	Paithan	Paithan	GSDA	DW	8.3	728	473	252	32	42	57	0.40	5	227	90	12	5.5	0.50	0.2	1.56	-1.16	33.1
97	Paithan	Rahatgaon	CGWB	DW	7.5	563	360.32	214.1	95	29	36	3.40	0	151	69	46	19	0.10	0	0.83	-4.64	18.8
98	Paithan	Taherpur	CGWB	DW	-	2756	1471	1005	194	126	92	2.07	0	537	461	51	122	0.18	0	1.26	-11.32	16.8
99	Paithan	TakaliAmbad	GSDA	DW	8.5	3710	2412	589	80	95	114	2.30	87	352	220	11	4.4	1.90	1.5	2.05	-3.12	29.9
100	Paithan	Telwadi	GSDA	DW	7.8	662	430	252	35	40	102	0.40	1	187	192	7	6.55	0.36	1.6	2.80	-1.94	47.0
101	Paithan	Thergaon	GSDA	DW	7.0	10000	6929	2000	800	0	795	434.0	0	1812	1440	56	184	1.33	1.4	7.73	-10.30	53.3
102	Paithan	Wadji	CGWB	DW	7.6	1188	760.32	473.1	289	45	46	1.10	0	361	141	174	30	0.20	0	0.67	-12.21	10.1
103	Paithan	Wahegaon	GSDA	DW	7.2	1427	928	532	67	88	138	0.40	0	399	252	25	33.2	0.47	0.47	2.61	-4.10	36.1
104	Paithan	Warwandikh	GSDA	DW	7.9	642	417	260	50	33	24	11.10	2	186	46	21	20.8	0.72	1.6	0.65	-2.09	20.4
105	Phulambri	GevraiGungi	GSDA	DW	6.9	550	358	200	30	30	30	0.60	0	176	56	1	6.7	0.60	0.2	0.92	-1.11	24.8

SN	Block	Village	Agency	Type	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µS/cm	Mg/L															
106	Phulambri	Girsawali	GSDA	DW	9.1	450	293	108	22	13	32	0.20	3	24	60	12	8.1	1.00	0.2	1.34	-1.66	39.3
107	Phulambri	Phulambri	GSDA	DW	7.7	850	553	276	69	25	60	0.30	0	253	110	11	5.5	0.80	0.5	1.57	-1.38	32.2
108	Phulambri	Ranjangaon	GSDA	DW	8.5	344	224	140	22	20	11	0.30	3	89	14	34	2	0.70	0.3	0.39	-1.25	14.2
109	Sillod	Ajanta	CGWB	DW	-	1218	649	420	92	46	89	62.64	0	366	174	36	114	0.09	0	1.88	-2.41	39.4
110	Sillod	Anad	GSDA	DW	7.5	746	485	228	35	34	29	6.30	0	140	48	73	11.2	0.80	0.2	0.82	-2.26	23.6
111	Sillod	Deulgaon	CGWB	DW	7.4	1298	830.72	244.02	164	19	151	16.23	0	200	123	262	48	0.44	0	2.97	-6.53	41.6
112	Sillod	Dongargaon	GSDA	DW	8.9	843	548	152	34	17	27	0.10	16	9	42	52	10.6	0.70	0.3	0.94	-2.38	27.6
113	Sillod	Ghatnandra	CGWB	DW	7.4	1239	792.96	263.94	45	53	105	1.28	0	137	67	278	50	0.38	0	2.52	-4.38	41.1
114	Sillod	Jambhai	CGWB	DW	7.5	903	577.92	184.26	100	21	98	18.83	0	151	46	189	47	0.25	0	2.34	-4.19	41.6
115	Sillod	Lihakhedi	CGWB	DW	7.6	1240	793.6	393.42	254	34	70	4.15	0	127	44	354	47	0.23	0	1.10	-13.41	16.9
116	Sillod	Madani	GSDA	DW	8.1	1315	855	552	88	81	130	1.90	0	381	240	70	26.5	0.90	0.2	2.41	-4.80	34.1
117	Sillod	Mangrul	GSDA	DW	9	827	538	248	42	35	65	11.10	8	99	110	69	20	0.70	0.2	1.79	-3.06	38.5
118	Sillod	Mangrul	CGWB	DW	7.3	1211	775.04	249	134	28	63	2.13	0	117	80	168	47	0.45	0	1.29	-7.09	23.7
119	Sillod	Mohol	CGWB	DW	7.6	820	524.8	214.14	120	23	83	0.83	0	200	31	161	46	0.43	0	1.83	-4.59	31.7
120	Sillod	Pimpaldari	CGWB	DW	7.5	1498	958.72	398.4	184	52	153	0.97	0	239	149	282	47	0.45	0	2.57	-9.58	33.2
121	Sillod	Rahimabad	CGWB	DW	7.5	841	538.24	199.2	95	25	41	0.85	0	176	33	39	46	0.44	0	0.95	-3.94	20.7
122	Sillod	Shivana	CGWB	DW	7.3	1374	879.36	368.52	204	40	95	4.62	0	234	69	271	48	0.32	0	1.59	-9.66	23.9
123	Sillod	Upla	GSDA	DW	7.3	1120	728	256	27	46	26	1.20	0	224	36	46	7	0.60	1.9	0.71	-1.45	18.6
124	Sillod	Wadala	GSDA	DW	9.2	359	233	116	13	20	36	1.80	8	52	68	23	0.62	0.50	0.1	1.44	-1.22	40.7
125	Soygaon	Fardapur	GSDA	DW	8.1	1485	965	652	109	92	164	2.40	0	500	312	85	20	0.80	0.4	2.79	-4.84	35.5
126	Soygaon	Galwada	GSDA	DW	7.6	498	324	300	72	29	26	2.90	1	267	48	32	4	0.00	0.2	0.66	-1.59	16.8
127	Soygaon	Ghanegaon	GSDA	DW	7.9	1042	677	388	75	49	80	5.10	0	216	146	86	19	0.70	0.1	1.76	-4.22	31.6
128	Soygaon	Jamthi	GSDA	DW	7.6	759	493	316	42	52	26	0.30	1	239	40	56	12	1.20	0.2	0.63	-2.37	15.2
129	Soygaon	Jarandi	GSDA	DW	8.8	926	602	320	37	55	84	22.40	16	175	150	71	14	0.70	0.1	2.05	-3.00	39.8
130	Soygaon	Jarandi	CGWB	DW	7.5	707	452.48	194.22	80	28	26	1.51	0	200	31	30	43	0.39	0	0.65	-2.99	15.9
131	Soygaon	Mukhed	CGWB	DW	7.5	949	607.36	343.62	219	30	59	0.46	0	195	51	198	47	0.49	0	1.00	-10.25	16.2
132	Soygaon	Nimbhori	CGWB	DW	7.5	2256	1443.8	493.02	189	74	222	14.01	0	185	257	502	50	0.32	0	3.47	-12.50	39.2
133	Soygaon	Palaskhed	CGWB	DW	7.5	1303	833.92	253.98	120	33	112	2.92	0	185	113	164	49	0.78	0	2.34	-5.62	36.3
134	Soygaon	Palaskheda	GSDA	DW	9.3	435	283	128	40	7	27	0.10	7	40	42	42	3.8	0.60	0.2	1.05	-1.66	31.7
135	Soygaon	Ravla	CGWB	DW	7.6	1682	1076.4	383.46	139	59	64	1.49	0	185	157	154	50	0.30	0	1.14	-8.81	19.2
136	Soygaon	Umarhire	CGWB	DW	7.5	1075	688	244.02	115	31	122	0.88	0	156	69	252	52	0.45	0	2.60	-5.76	39.1
137	Soygaon	Varthan	CGWB	DW	6.8	351	224.64	74.7	50	6	39	5.54	0	88	26	28	27	0.44	0	1.40	-1.55	38.2
138	Vaijapur	Bhadli	CGWB	DW	7.9	5230	3347.2	1469.1	319	280	432	6.30	0	937	848	780	14.7	0.40	0	4.25	-23.57	32.7
139	Vaijapur	Bhaigaon Vaijapur	CGWB	DW	7.5	1603	1025.9	632.5	339	71	74	0.70	0	512	254	75	100	0.30	0	0.95	-14.41	12.4
140	Vaijapur	Bhokargaon	CGWB	DW	8	1622	1038.0	647.4	120	128	82	1.50	0	478	177	78	44	0.40	0	1.24	-8.69	17.9
141	Vaijapur	Borsar	GSDA	DW	8.4	581	378	220	32	34	28	0.30	6	202	38	17	2.4	0.70	0.4	0.81	-0.89	21.6

SN	Block	Village	Agency	Type	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µS/cm	Mg/L															
142	Vaijapur	Garaj	CGWB	DW	7.7	1463	936.32	622.5	184	107	36	3.10	0	469	126	42	19.8	0.40	0	0.51	-10.30	8.3
143	Vaijapur	Jambargaon	GSDA	DW	8.4	1290	839	432	54	72	100	4.80	19	273	130	114	20.7	1.10	0.7	2.09	-3.52	34.1
144	Vaijapur	Jambargaon	CGWB	DW	7.5	1480	947.2	552.8	244	75	47	0.90	0	366	190	69	170	0.30	0	0.67	-12.37	10.1
145	Vaijapur	Malisagaj	GSDA	DW	8.2	670	436	248	38	37	46	0.10	3	189	62	62	9.53	0.90	0.7	1.28	-1.76	28.9
146	Vaijapur	Manoor	CGWB	DW	7.7	1417	906.88	612.5	349	64	26	1.10	0	395	183	64	170	0.20	0	0.34	-16.22	4.9
147	Vaijapur	Nagamthan	GSDA	DW	8	1487	952	588	99	83	109	9.00	0	300	200	40	51	0.70	0.2	1.95	-6.84	29.7
148	Vaijapur	Naigavhan	CGWB	DW	8	2239	1432.9	752	174	140	90	2.90	0	864	152	100	4.3	0.30	0	1.22	-6.11	16.4
149	Vaijapur	Parala	CGWB	DW	7.7	6833	4373.1	2021.9	687	324	930	5.70	0	781	1969	150	280	0.80	0	7.32	-48.25	39.9
150	Vaijapur	Pimpalgaon	CGWB	DW	7.8	903	577.92	343.6	144	48	40	0.40	0	317	67	36	60	0.60	0	0.73	-6.00	13.5
151	Vaijapur	Rotegaon	CGWB	DW	-	764	405	395	96	38	25	3.49	0	238	53	15	132.0	0.09	0	0.55	-4.01	12.9
152	Vaijapur	Sakegaon	CGWB	DW	7.8	998	638.72	418.3	244	42	25	2.10	0	410	59	53	60	0.10	0	0.39	-8.97	6.9
153	Vaijapur	Shivgaon	CGWB	DW	7.9	1557	996.48	508	105	98	95	1.80	0	493	157	148	15	0.30	0	1.60	-5.21	23.8
154	Vaijapur	Shivur	GSDA	DW	8.3	1020	663	376	123	17	55	0.10	8	156	106	88	22	0.80	0.8	1.24	-4.70	24.2
155	Vaijapur	Talwada	GSDA	DW	8.2	924	601	320	40	53	65	0.50	0	204	88	95	17.5	0.90	1.1	1.58	-3.06	30.7
156	Vaijapur	Tunki	CGWB	DW	-	6612	3514	3105	449	482	141	10.74	0	439	1624	52	567	0.18	0	1.10	-54.94	9.3
157	Vaijapur	Vaijapur	GSDA	DW	8.5	3600	2340	1124	160	176	468	4.60	31	352	864	280	20.9	1.00	0.6	6.07	-15.66	47.7
158	Vaijapur	Vaijapur	CGWB	DW	-	685	364	145	50	5	85	1.89	0	165	78	13	101	0.14	0	3.05	-0.21	56.2
159	Vaijapur	Wadji	CGWB	DW	7.9	822	526.08	343.6	159	45	49	0.80	0	395	85	37	54	0.50	0	0.88	-5.18	15.5
160	Vaijapur	Wakla	CGWB	DW	7.7	1032	660.48	418.3	115	74	70	1.20	0	273	162	75	25.8	0.50	0	1.24	-7.32	20.6

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

SN	Block	Village	Agency	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µs/cm	Mg/L															
1	Aurangabad	Dhawalapuri	GSDA	BW	7.6	993	645	420	73.6	57.3	74	0.2	0	224.5	130	100	18	1.1	0.2	1.6	-4.7	27.7
2	Aurangabad	Kachne	GSDA	BW	7.9	750	488	312	40	51.5	69	1.9	2	269.9	106	29	12.4	0.8	0.4	1.7	-1.7	32.8
3	Aurangabad	Kadrabad	GSDA	BW	7.4	1560	1014	632	128	75.8	220	6.4	0	561.2	366	121	18.1	0.2	0.6	3.8	-3.4	43.5
4	Aurangabad	Kolghar	GSDA	BW	7.95	585	380	208	25.6	35	18.1	0.6	1.4	163.6	32	25	11.1	1.1	0.6	0.5	-1.4	16.2
5	Aurangabad	Pandharpur	GSDA	BW	7.6	1396	207	336	124.8	5.8	124.3	1	0.4	99.6	234	123	11.1	0.6	0.5	2.9	-5.1	44.7
6	Aurangabad	Patoda	GSDA	BW	9.21	610	397	108	17.6	15.6	64.6	0.3	3.1	20.1	104	12	13.4	0.7	0.7	2.7	-1.7	56.6
7	Aurangabad	Jalgaon Feran	CGWB	BW	7.7	1851	1203	255	86	10	270	7.3	0	274	165	100	260	1.5	0	7.3	-0.6	70.0
8	Aurangabad	Jalgaon Feran	CGWB	BW	7.7	1852	1204	607	133	66	78	6.4	0	351	131	90	290	0.28	0	1.4	-6.3	22.7
9	Aurangabad	Jalgaon Feran	CGWB	BW	7.8	1872	1217	260	88	10	275	6.8	0	309	168	110	250	1.5	0	7.4	-0.2	69.9
10	Aurangabad	Jalgaon Feran	CGWB	BW	7.8	2071	1346	311	108	10	300	4.6	0	232	202	130	320	2	0	7.4	-2.4	67.9
11	Aurangabad	Warud Kazi	CGWB	BW	7.9	455	296	224	41	29	22	1.2	0	232	21	26	8	0.64	0	0.6	-0.6	18.2
12	Aurangabad	Aurangabag	CGWB	BW	7.4	650	342	305	80	26	18	0.2	0	317	53	NA	6.7	0.05	0	0.4	-0.9	11.4
13	Aurangabad	Chikalthana	CGWB	BW	7.5	1280	689	520	128	49	54	1.1	0	311	211	34	56	0.4	0	1.0	-5.3	18.6
14	Aurangabad	Chikalthana	CGWB	BW	7.5	1270	711	375	112	23	114	2	0	226	225	68	53	0.8	0	2.6	-3.8	40.1
15	Aurangabad	Apatgaon	CGWB	BW	7	1850	1117	185	72	1	339	9.2	0	183	390	208	4.8	1.07	0	10.9	-0.7	80.3
16	Aurangabad	Apatgaon	CGWB	BW	7.3	1860	1106	245	80	11	310	2.1	0	116	404	236	3.6	1.45	0	8.6	-3.0	73.4
17	Aurangabad	Apatgaon	CGWB	BW	7.5	910	529	70	24	2	179	2	0	247	113	64	18	2.99	0	9.4	2.7	85.2
18	Aurangabad	Apatgaon	CGWB	BW	7	1850	1117	185	72	1	339	9.2	0	183	390	208	4.8	1.07	0	10.9	-0.7	80.3
19	Aurangabad	Chincholi	CGWB	BW	7.2	1100	620	440	118	35	40	1.2	0	305	85	28	160	0.43	0	0.8	-3.8	16.8
20	Aurangabad	Chincholi	CGWB	BW	7.1	1100	609	410	132	19	40	1.5	0	311	78	28	155	0.24	0	0.9	-3.1	17.9
21	Aurangabad	Chincholi	CGWB	BW	7.2	1100	620	440	118	35	40	1.2	0	305	85	28	160	0.43	0	0.8	-3.8	16.8
22	Aurangabad	Chincholi	CGWB	BW	7.1	1100	609	410	132	19	40	1.5	0	311	78	28	155	0.24	0	0.9	-3.1	17.9
23	Phulambri	Khamgaon	CGWB	BW	7.4	1060	632	330	78	33	91	2	0	305	85	40	150	0.79	0	2.2	-1.6	37.7
24	Phulambri	Khamgaon	CGWB	BW	7.4	1000	575	300	82	23	88	3.5	0	354	85	4	112	0.86	0	2.2	-0.2	39.5
25	Phulambri	Khamgaon	CGWB	BW	7.4	1060	632	330	78	33	91	2	0	305	85	40	150	0.79	0	2.2	-1.6	37.7
26	Phulambri	Khamgaon	CGWB	BW	7.4	1000	575	300	82	23	88	3.5	0	354	85	4	112	0.86	0	2.2	-0.2	39.5
27	Phulambri	Khamgaon	CGWB	BW	7.4	1060	632	330	78	33	91	2	0	305	85	40	150	0.79	0	2.2	-1.6	37.7
28	Phulambri	Khamgaon	CGWB	BW	7.4	1000	575	300	82	23	88	3.5	0	354	85	4	112	0.86	0	2.2	-0.2	39.5
29	Phulambri	Khamgaon	CGWB	BW	7.4	1060	632	330	78	33	91	2	0	305	85	40	150	0.79	0	2.2	-1.6	37.7
30	Phulambri	Pir Bawda	CGWB	BW	7.5	950	524	325	92	23	54	4.4	0	336	75	20	87	0.88	0	1.3	-1.0	27.5
31	Phulambri	Pir Bavda	CGWB	BW	7.5	950	524	325	92	23	54	4.4	0	336	75	20	87	0.88	0	1.3	-1.0	27.5
32	Phulambri	Pir Bavda	CGWB	BW	7	1050	559	260	74	18	99	1.7	0	201	231	28	6	0.5	0	2.7	-1.9	45.6
33	Phulambri	Phulambri	CGWB	BW	7.6	1500	820	600	156	51	48	1.9	0	378	209	27	137	0.42	0	0.9	-5.8	15.1
34	Phulambri	Phulambri	CGWB	BW	7.7	1620	894	690	174	62	52	2.3	0	372	220	37	160	0.43	0	0.9	-7.7	14.4

SN	Block	Village	Agency	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µs/cm	Mg/L															
35	Phulambri	Phulambri	CGWB	BW	7.6	1500	820	600	156	51	48	1.9	0	378	209	27	137	0.42	0	0.9	-5.8	15.1
36	Phulambri	Sultanpur	CGWB	BW	7.1	800	448	135	48	4	111	0.5	0	250	99	26	32	1.18	0	4.1	1.4	63.9
37	Phulambri	Sultanpur	CGWB	BW	6.8	880	474	130	46	4	124	1.5	0	293	110	38	4	1.14	0	4.7	2.2	67.4
38	Phulambri	Sultanpur	CGWB	BW	7.1	800	448	135	48	4	111	0.5	0	250	99	26	32	1.18	0	4.1	1.4	63.9
39	Gangapur	Agathan	GSDA	BW	7.77	977	635	352	70.4	42.8	60.9	0.4	0	209.8	102	95	18.5	0.6	0.3	1.4	-3.6	27.4
40	Gangapur	Babargaon	GSDA	BW	8.3	735	478	192	52.8	14.6	15	1	3.1	166.8	28	22	3.89	1.3	0.6	0.5	-1.0	15.0
41	Gangapur	Bhivdhanora	CGWB	BW	8.38	2200	1258	250	46	33	426	2	3.9	512	195	280	0	0	0	11.7	3.5	78.7
42	Gangapur	Bhivdhanora	CGWB	BW	8.32	2900	2165	380	62	55	633	5.1	21	500	248	900	0	0	0	14.1	1.3	78.4
43	Gangapur	Dahegaon	GSDA	BW	7.66	735	478	380	70.4	49.6	71	0.7	0	280.6	130	47	17.1	1	0.6	1.6	-3.0	29.0
44	Gangapur	Derda	GSDA	BW	8.09	426	277	144	19.2	23.3	12.3	1.1	1	86.9	20	35.5	6.5	0.7	0.6	0.4	-1.4	16.4
45	Gangapur	Jamgaon	GSDA	BW	8.1	2210	1414	528	136	45.7	200	1	0	172	374	62	52	1.2	0.4	3.8	-7.7	45.2
46	Gangapur	Kaigaon	GSDA	BW	7.69	3850	2503	1020	97.6	188.6	500	2.8	0	522.2	646	600	18.7	1.1	0.7	6.8	-11.8	51.7
47	Gangapur	Shankarpur	CGWB	BW	7.8	1600	962	170	2.4	27	304	3.12	0	390	184	225	0	0	0	12.2	4.1	85.0
48	Gangapur	Singi	GSDA	BW	7.83	1237	791.68	400	59.2	61.2	89.1	0.9	0.8	119.2	166	118	37.6	0.8	0.4	1.9	-6.0	32.8
49	Gangapur	Solegaon	CGWB	BW	8	670	360	160	28	22	78	0	0	287	36	43	0	0	0	2.7	1.5	51.4
50	Gangapur	Uttarwadi	CGWB	BW	8.1	1350	720	75	16	9	265	4	0	592	121	0	0	0	0	13.1	8.2	88.3
51	Gangapur	Babulgaon	CGWB	BW	7.2	2435	1365	836	294	24	155	8.2	0	71	539	300	8	0.24	0	2.3	-15.5	29.4
52	Gangapur	Dongaon	CGWB	BW	7.3	2400	1396	460	86	59	341	4	0	683	248	190	126	1.18	0	6.9	2.0	62.0
53	Gangapur	Jambhola	CGWB	BW	7.6	1450	846	545	122	58	81	2	0	354	145	86	174	0.72	0	1.5	-5.1	24.7
54	Gangapur	Jambhala	CGWB	BW	7.6	1450	846	545	122	58	81	2	0	354	145	86	174	0.72	0	1.5	-5.1	24.7
55	Gangapur	Sawangi	CGWB	BW	7.4	890	469	328	68	38	52	2.4	0	384	53	NA	62	0.77	0	1.3	-0.2	26.2
56	Gangapur	Dongaon	CGWB	BW	7.3	2400	1396	460	86	59	341	4	0	683	248	190	126	1.18	0	6.9	2.0	62.0
57	Gangapur	Shankarpur	CGWB	BW	7.8	1600	962	170	2	27	304	3.1	0	390	184	225	0	0	0	12.3	4.1	85.1
58	Gangapur	Uttarwadi	CGWB	BW	8.1	1350	720	75	16	9	265	4	0	592	121	NA	0	0	0	13.1	8.2	88.3
59	Gangapur	Solegaon	CGWB	BW	8	670	360	160	28	22	78	0.1	0	287	36	43	0	0	0	2.7	1.5	51.4
60	Gangapur	Bhivdhanora	CGWB	BW	8.4	2200	1258	250	46	33	426	2	3.9	512	195	280	0	0	0	11.7	3.5	78.7
61	Gangapur	Bhivdhanora	CGWB	BW	8.3	2900	2165	380	62	55	633	5.1	21	500	248	900	0	0	0	14.1	1.3	78.4
62		Dahegaon pyt	CGWB	BW	8	1220	672	330	46	52	140	0.8	0	317	188	79	7	0.75	0	3.4	-1.4	48.1
63		Dahegaon dril	CGWB	BW	7.9	1050	547	280	40	44	120	0.5	0	281	128	65	8	0.54	0	3.1	-1.0	48.2
64		Dahegaon	CGWB	BW	8	1220	672	330	46	52	140	0.8	0	317	188	79	7	0.75	0	3.4	-1.4	48.1
65		Dahegaon	CGWB	BW	7.9	1050	547	280	40	44	120	0.5	0	281	128	65	8	0.54	0	3.1	-1.0	48.2
66	Kannad	Deoli	CGWB	BW	8.56	1000	560	195	411	21	148	4	36	220	124	90	0	0	0	1.9	-17.5	22.7
67	Kannad	Hingni[ts-20]	GSDA	BW	9	2430	1555	240	48	29.2	60	1	19.2	144	114	20	11	4.4	0.3	1.7	-1.8	35.4
68	Kannad	Kannad[t-3]	GSDA	BW	8.3	887	577	180	41.6	18.5	79	1	0	124.4	110	29	13.7	0.7	0.6	2.6	-1.6	49.0
69	Kannad	Pishor[ts-19]	GSDA	BW	8.7	741	474	372	48	61.2	32	1	14.7	313	58	10	11	1	0.3	0.7	-1.8	16.0
70	Kannad	Rithi	GSDA	BW	8.2	338	220	148	17.6	25.3	50.4	0.2	2.1	137.9	70	19	7.57	0.7	0.3	1.8	-0.6	42.6

SN	Block	Village	Agency	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µs/cm	Mg/L															
71	Kannad	Chapaner	CGWB	BW	8	870	461	383	72	49	31	1	0	137	109	136	23	0.18	0	0.7	-5.4	15.3
72	Kannad	Chapaner	CGWB	BW	7.7	952	503	337	51	50	73	0.8	0	77	212	172	1	0.03	0	1.7	-5.4	32.4
73	Kannad	Ganeshpur	CGWB	BW	8.1	823	436	342	45	55	42	3.7	0	220	70	64	77	1.2	0	1.0	-3.2	22.1
74	Kannad	Ganeshpur	CGWB	BW	8.2	1026	546	403	59	61	62	7.7	12	208	89	62	140	1.5	0	1.4	-4.2	26.6
75	Kannad	Ganeshpur	CGWB	BW	8.2	1101	553	398	67	55	53	8.4	12	137	82	114	130	1.2	0	1.2	-5.2	24.2
76	Kannad	Deogaon	CGWB	BW	7.2	1740	1018	710	210	45	72	1	0	372	238	65	201	0.37	0	1.2	-8.1	18.2
77	Kannad	Deogaon	CGWB	BW	7.4	1560	982	580	176	34	92	2	0	165	234	109	253	0.34	0	1.7	-8.9	25.9
78	Kannad	Deogaon	CGWB	BW	7.2	1740	1018	710	210	45	72	1	0	372	238	65	201	0.37	0	1.2	-8.1	18.2
79	Kannad	Deogaon	CGWB	BW	7.4	1560	982	580	176	34	92	2	0	165	234	109	253	0.34	0	1.7	-8.9	25.9
80	Kannad	Deogaon	CGWB	BW	7.2	1740	1018	710	210	45	72	1	0	372	238	65	201	0.37	0	1.2	-8.1	18.2
81	Kannad	Upla	CGWB	BW	7.7	1060	596	295	68	30	107	1.3	0	262	117	48	93	0.35	0	2.7	-1.6	44.4
82	Kannad	Upla	CGWB	BW	7.7	1060	596	295	68	30	107	1.3	0	262	117	48	93	0.35	0	2.7	-1.6	44.4
83	Kannad	Upla	CGWB	BW	7.7	1060	596	295	68	30	107	1.3	0	262	117	48	93	0.35	0	2.7	-1.6	44.4
84	Kannad	Pishore	CGWB	BW	7.4	530	286	135	44	6	58	1.5	0	195	43	29	6.5	0.9	0	2.2	0.5	48.7
85	Kannad	Pishore	CGWB	BW	7.4	530	286	135	44	6	58	1.5	0	195	43	29	6.5	0.9	0	2.2	0.5	48.7
86	Kannad	Pishore	CGWB	BW	7.4	530	286	135	44	6	58	1.5	0	195	43	29	6.5	0.9	0	2.2	0.5	48.7
87	Kannad	Mehegaon	CGWB	BW	7.3	1140	624	485	144	30	36	1.5	0	390	85	36	96	0.32	0	0.7	-3.3	14.2
88	Kannad	Mehegaon	CGWB	BW	7.3	1190	645	440	120	34	65	3	0	476	78	33	73	0.58	0	1.3	-1.0	24.8
89	Kannad	Mehegaon	CGWB	BW	7.2	1300	747	555	196	16	36	1	0	390	121	43	139	0.4	0	0.7	-4.7	12.5
90	Kannad	Mehegaon	CGWB	BW	7.2	1200	725	520	152	34	39	1.1	0	384	121	44	142	0.29	0	0.7	-4.1	14.2
91	Kannad	Mehegaon	CGWB	BW	7.3	1140	624	485	144	30	36	1.5	0	390	85	36	96	0.32	0	0.7	-3.3	14.2
92	Kannad	Mehegaon	CGWB	BW	7.3	1190	645	440	120	34	65	3	0	476	78	33	73	0.58	0	1.3	-1.0	24.8
93	Kannad	Mehegaon	CGWB	BW	7.2	1300	747	555	196	16	36	1	0	390	121	43	139	0.4	0	0.7	-4.7	12.5
94	Kannad	Mehegaon	CGWB	BW	7.2	1200	725	520	152	34	39	1.1	0	384	121	44	142	0.29	0	0.7	-4.1	14.2
95	Kannad	Mahegaon	CGWB	BW	7.3	1140	624	485	144	30	36	1.5	0	390	85	36	96	0.32	0	0.7	-3.3	14.2
96	Kannad	Mahegaon	CGWB	BW	7.3	1190	645	440	120	34	65	3	0	476	78	33	73	0.58	0	1.3	-1.0	24.8
97	Kannad	Mahegaon	CGWB	BW	7.2	1300	747	555	196	16	36	1	0	390	121	43	139	0.4	0	0.7	-4.7	12.5
98	Kannad	Hatnur	CGWB	BW	7.4	2230	1360	765	162	87	146	25	0	421	277	108	344	0.74	0	2.3	-8.4	31.4
99	Kannad	Hatnur	CGWB	BW	8.1	1860	1186	575	78	92	149	24	0	98	287	137	370	0.41	0	2.7	-9.9	38.2
100	Kannad	Hatnur	CGWB	BW	7.4	2230	1360	765	162	87	146	25	0	421	277	108	344	0.74	0	2.3	-8.4	31.4
101	Kannad	Hatnur	CGWB	BW	8.1	1860	1186	575	78	92	149	24	0	98	287	137	370	0.41	0	2.7	-9.9	38.2
102	Kannad	Hatnur	CGWB	BW	8.1	1860	1186	575	78	92	149	24	0	98	287	137	370	0.41	0	2.7	-9.9	38.2
103	Kannad	Deoli	CGWB	BW	8.6	1000	560	195	411	21	148	4	36	220	124	90	0	0	0	1.9	-17.5	22.7
104	Khuldabad	Ellora	CGWB	BW	7.3	940	514	305	80	26	75	2.5	0	427	46	10	61	0.07	0	1.9	0.9	35.1
105	Khuldabad	Ellora	CGWB	BW	7.7	860	486	240	58	23	87	2	0	268	96	42	44	0.34	0	2.4	-0.4	44.4
106	Khuldabad	Ellora	CGWB	BW	7.3	940	514	305	80	26	75	2.5	0	427	46	10	61	0.07	0	1.9	0.9	35.1

SN	Block	Village	Agency	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µs/cm	Mg/L															
107	Khuldabad	Ellora	CGWB	BW	7.7	860	486	240	58	23	87	2	0	268	96	42	44	0.34	0	2.4	-0.4	44.4
108	Khuldabad	Ellora	CGWB	BW	7.7	860	486	240	58	23	87	2	0	268	96	42	44	0.34	0	2.4	-0.4	44.4
109	Khuldabad	KV, A,bad	CGWB	BW	7.4	650	342	305	80	26	18	0.2	0	317	53	NA	6.7	0.05	0	0.4	-0.9	11.4
110	Khuldabad	KV, A,bad	CGWB	BW	7.5	650	332	275	60	30	22	0.5	0	275	46	16	20	0.19	0	0.6	-1.0	15.1
111	Khuldabad	KV, A,bad	CGWB	BW	7.1	600	319	190	60	10	52	0.7	0	275	50	NA	9.1	0.28	0	1.6	0.7	37.3
112	Khultabad	Wadodbk.	GSDA	BW	7.56	780	507	204	32	30.1	41	14.8	0	97.6	76	76.5	12.6	0.4	0.2	1.2	-2.5	34.6
117	Paithan	Apegaon[ts-9]	GSDA	BW	7.46	1432	931	324	44.8	51.5	93.2	0.4	0	320.9	172	4	1.65	1.65	0.8	2.3	-1.2	38.5
118	Paithan	Dera	GSDA	BW	7.78	3240	2106	420	36.8	79.7	154.3	1.2	0	229.4	284	95	2.75	0.63	1.8	3.3	-4.6	44.5
119	Paithan	Katpur[ts-8]	GSDA	BW	7.34	1091	709	284	46.4	40.8	73.1	0.4	0	219.6	140	13	14.2	0.63	1.1	1.9	-2.1	36.0
120	Paithan	Thergaon[ts-7]	GSDA	BW	8.51	200	130	88	16	11.7	11.5	0.6	2.4	77.5	22	10	1.13	0.8	1.2	0.5	-0.4	22.6
121	Paithan	Wahegaon[t-1]	GSDA	BW	8.19	1407	915	440	131.2	27.2	84.3	2.3	0	48.8	162	286	8.2	0.6	0.8	1.7	-8.0	29.7
122	Paithan	Adul Bk	CGWB	BW	7.6	2157	1142	632	145	64	138	51.2	0	167	268	210	210	0.14	0	2.4	-9.8	36.9
123	Paithan	Lohagaon	CGWB	BW	7.5	2662	1411	566	223	2	233	2.7	0	89	534	220	120	0.23	0	4.3	-9.9	47.4
124	Paithan	Lohagaon	CGWB	BW	7.4	2676	1418	566	215	7	248	2.4	0	42	522	340	130	0.22	0	4.5	-10.6	48.9
125	Paithan	Lohagaon	CGWB	BW	7.5	2829	1501	612	237	5	278	1.6	0	77	620	230	150	0.21	0	4.9	-11.0	49.7
126	Paithan	Chitegaon	CGWB	BW	6.8	1850	1070	465	104	50	164	45	0	366	256	152	115	1.24	0	3.3	-3.3	47.1
127	Paithan	Chitegaon	CGWB	BW	7.5	1580	871	530	72	85	120	0.8	0	342	262	32	127	0.65	0	2.3	-5.0	33.1
128	Paithan	Chitegaon	CGWB	BW	7.8	1440	868	370	96	32	174	2.5	0	207	248	84	127	0.68	0	3.9	-4.0	50.7
129	Paithan	Chitegaon	CGWB	BW	7.5	1500	877	340	92	27	190	0.3	0	171	291	148	43	0.45	0	4.5	-4.0	54.8
130	Paithan	Chitegaon	CGWB	BW	6.8	1850	1070	465	104	50	164	45	0	366	256	152	115	1.24	0	3.3	-3.3	47.1
131	Paithan	Chitegaon	CGWB	BW	7.5	1500	877	340	92	27	190	0.3	0	171	291	148	43	0.45	0	4.5	-4.0	54.8
132	Paithan	Balanagar	CGWB	BW	7.9	580	320	230	64	17	23	0.4	0	250	25	15	49	0.56	0	0.7	-0.5	18.0
133	Paithan	Balanagar	CGWB	BW	7.9	580	320	230	64	17	23	0.4	0	250	25	15	49	0.56	0	0.7	-0.5	18.0
134	Paithan	Dhorkingaon	CGWB	BW	7.2	2600	1486	1025	206	124	106	10	0	390	408	138	299	0.35	0	1.4	-14.1	19.2
135	Paithan	Dhorkin	CGWB	BW	7.2	2600	1486	1025	206	124	106	10	0	390	408	138	299	0.35	0	1.4	-14.1	19.2
136	Paithan	Wahegaon	CGWB	BW	7.4	1100	640	435	112	38	43	0.7	0	207	92	224	26	0.39	0	0.9	-5.3	17.8
137	Paithan	Wahegaon	CGWB	BW	7.4	1100	640	435	112	38	43	0.7	0	207	92	224	26	0.39	0	0.9	-5.3	17.8
138	Paithan	Dawarwadi	CGWB	BW	8	1760	1092	190	60	10	303	0.9	0	445	170	192	132	1.27	0	9.5	3.5	77.5
139	Paithan	Davarwadi	CGWB	BW	8	1760	1092	190	60	10	303	0.9	0	445	170	192	132	1.27	0	9.5	3.5	77.5
140	Paithan	Akhatwade	CGWB	BW	7.9	1150	670	345	80	35	100	1.5	0	275	74	230	12	0.81	0	2.3	-2.4	38.9
141	Paithan	Akhadwada	CGWB	BW	7.9	1150	670	345	80	35	100	1.5	0	275	74	230	12	0.81	0	2.3	-2.4	38.9
142	Paithan	Karanjkhed	CGWB	BW	7.5	2400	1446	375	146	2	371	2	0	281	454	270	60	5.6	0	8.3	-2.9	68.4
143	Paithan	Karanjkhed	CGWB	BW	7.7	1800	1097	245	90	5	300	2	0	262	309	180	80	5.6	0	8.3	-0.6	72.7
144	Phulambri	Pendgaonaland	GSDA	BW	7.56	1390	904	424	80	54.4	90.9	0.9	0	324.5	170	19	21.7	0.8	0.2	1.9	-3.2	31.9
145	Phulambri	Pirbawada	GSDA	BW	7.4	1120	728	388	112	26.2	68.1	0.3	0	291.6	120	80	5.1	0.6	0.5	1.5	-3.0	27.7
146	Phulambri	Waghalgaon	GSDA	BW	7.5	1250	813	388	60.8	57.3	52.3	1	0	340.4	96	37	11.9	1.2	0.5	1.2	-2.2	22.9

SN	Block	Village	Agency	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µs/cm	Mg/L															
147	Sillod	Bhavan	GSDA	BW	7.69	1288	837	352	73.6	40.8	119.5	1.8	0	85.4	226	132	24.1	-	0.3	2.8	-5.6	42.7
148	Sillod	Hatti	GSDA	BW	7.6	807	525	396	80	47.6	31.2	0.5	0	316	54	54	20	0.7	0.2	0.7	-2.7	14.7
149	Sillod	Sillod	GSDA	BW	7.7	1615	1050	660	136	77.8	168	0.7	0	391.6	312	136	34	0.8	0.2	2.8	-6.8	35.7
150	Sillod	Ambhai	CGWB	BW	7.1	900	494	205	74	5	100	12.5	0	348	75	50	2.5	0.99	0	3.0	1.6	53.2
151	Sillod	Ambhai	CGWB	BW	7.1	1400	800	180	64	5	234	6	0	256	181	170	10	7.6	0	7.6	0.6	74.1
152	Sillod	Golegaon	CGWB	BW	7.3	1520	852	570	118	67	86	1.5	0	421	188	45	135	1.23	0	1.6	-4.5	24.9
153	Sillod	Golegaon	CGWB	BW	7.5	1470	786	565	104	74	76	2	0	409	156	40	130	0.91	0	1.4	-4.6	22.9
154	Sillod	Borgaon Bazar	CGWB	BW	7.1	890	469	340	102	21	33	2.5	0	409	28	18	59	0.4	0	0.8	-0.1	18.0
155	Sillod	Borgaon Bazar	CGWB	BW	7.3	830	462	325	94	22	32	1.6	0	317	39	19	95	0.43	0	0.8	-1.3	18.0
156	Sillod	Borgaon Bazar	CGWB	BW	7.1	890	469	340	102	21	33	2.5	0	409	28	18	59	0.4	0	0.8	-0.1	18.0
157	Sillod	Borgaon Bazar	CGWB	BW	7.3	830	462	325	94	22	32	1.6	0	317	39	19	95	0.43	0	0.8	-1.3	18.0
158	Sillod	Shillod	CGWB	BW	7.2	2000	1184	835	308	16	58	1	0	305	316	93	240	0.72	0	0.9	-11.7	13.2
159	Sillod	Ajanta	CGWB	BW	7.4	1770	1101	445	112	40	137	105	0	372	209	82	230	0.68	0	2.8	-2.8	49.3
160	Sillod	Ajanta	CGWB	BW	7.5	1780	1137	340	100	22	164	124	0	366	217	86	240	0.82	0	3.9	-0.8	60.2
161	Sillod	Ajanta	CGWB	BW	6.9	2000	1186	710	258	16	110	3	0	299	302	87	260	0.68	0	1.8	-9.3	25.5
162	Soygaon	Galwada	GSDA	BW	7.29	924	601	336	75.2	36	41.5	2.2	0	170.8	70	69.5	30.4	0.8	0.4	1.0	-3.9	21.7
163	Soygaon	Jamthi	GSDA	BW	9.2	451	293	104	16	15.6	50.7	0.8	11.3	75.9	70	13	3.9	1.3	0.3	2.2	-0.5	51.6
164	Soygaon	Shoygaon	CGWB	BW	7.4	910	482	280	86	16	79	2	0	390	53	29	22	0.86	0	2.0	0.8	38.3
165	Soygaon	Shoygaon	CGWB	BW	7.7	900	460	240	54	26	95	1.5	0	360	57	30	16	0.99	0	2.7	1.1	46.3
166	Soygaon	Shoygaon	CGWB	BW	8.1	810	420	225	28	38	82	3	0	348	57	31	5	2.8	0	2.4	1.2	44.6
167	Soygaon	Fardapur	CGWB	BW	8	890	475	155	56	4	130	0.5	0	92	163	76	22	0.95	0	4.5	-1.6	64.4
168	Soygaon	Fardapur	CGWB	BW	7.9	900	510	155	56	4	132	1	0	92	160	81	30	0.99	0	4.6	-1.6	64.8
169	Vaijapur	Jambargaon	GSDA	BW	8.18	1152	749	244	83.2	8.7	139	0.3	0	131.8	208	110	4.1	0.6	0.8	3.9	-2.7	55.4
170	Vaijapur	Nagamthan	GSDA	BW	7.92	2650	1723	820	80	150.7	312	1.2	0	527	426	377	8.1	0.3	0.6	4.7	-7.8	45.3
171	Vaijapur	Parsoda	GSDA	BW	8.22	605	393	200	16	38.9	23.6	0.2	3.1	200.8	38	16	1.42	0.8	0.3	0.7	-0.6	20.5
172	Vaijapur	Shahajapur	CGWB	BW	7.8	3030	2010	700	36	148	483	47	580	580	788	216	0	0	0	7.9	14.9	61.4
173	Vaijapur	Shahajapur	CGWB	BW	7.9	3030	1700	720	44	148	345	55	641	641	547	235	0	0	0	5.6	17.5	53.3
174	Vaijapur	Bokargaon	CGWB	BW	6.9	3522	1861	1173	452	11	245	97.9	0	89	811	560	3	0.49	0	3.1	-22.0	35.9
175	Vaijapur	Bokargaon	CGWB	BW	7.1	3808	2018	1255	491	7	270	96.8	0	83	784	570	5	0.47	0	3.3	-23.8	36.1
176	Vaijapur	Ladgaon	CGWB	BW	7.7	775	410	296	43	45	21	0.6	0	77	109	75	33	1.6	0	0.5	-4.6	13.7
177	Vaijapur	Ladgaon	CGWB	BW	8	1006	525	500	63	81	58	9.4	0	202	131	134	96	0.8	0	1.1	-6.5	22.0
178	Vaijapur	Ladgaon	CGWB	BW	7.9	1205	638	332	59	44	82	9.6	0	107	219	128	68	1.4	0	2.0	-4.8	36.7
179	Vaijapur	Ladgaon	CGWB	BW	7.9	1375	729	306	51	43	142	8.9	0	71	248	116	86	1.6	0	3.5	-4.9	51.3
180	Vaijapur	Ladgaon	CGWB	BW	6.8	1386	735	352	45	57	131	9.3	0	113	246	136	71	1.7	0	3.1	-5.1	46.1
181	Vaijapur	Ladgaon	CGWB	BW	8.1	1394	739	383	65	52	122	8.4	0	172	248	126	70	1.5	0	2.7	-4.7	42.3
182	Vaijapur	Ladgaon	CGWB	BW	8	1464	776	357	78	39	136	9.4	0	172	263	120	84	1.7	0	3.1	-4.3	46.4

SN	Block	Village	Agency	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO_3	HCO_3	Cl	SO4	NO_3	F	Fe	SAR	RSC	%Na
						µs/cm	Mg/L															
183	Vaijapur	Panvi Bk	CGWB	BW	8.3	490	272	120	24	15	55	0.3	0	195	35	19	26	0.68	0	2.2	0.8	49.6
184	Vaijapur	Parsoda	CGWB	BW	7.9	950	510	310	38	52	68	0.4	0	305	106	34	59	0.5	0	1.7	-1.2	32.4
185	Vaijapur	Aghur	CGWB	BW	7.7	570	295	190	44	19	44	0.6	0	287	28	2	13	0.46	0	1.4	0.9	33.9
186	Vaijapur	Bhaggaon	CGWB	BW	8	1140	610	400	50	67	74	0.4	0	372	110	67	55	0.29	0	1.6	-1.9	28.7
187	Vaijapur	Mhaski	CGWB	BW	7.6	450	230	155	36	16	27	0.1	0	214	28	12	3	0.46	0	0.9	0.4	27.4
188	Vaijapur	Panwi (BK)	CGWB	BW	8.3	490	272	120	24	15	55	0.3	0	195	35	19	26	0.68	0	2.2	0.8	49.6
189	Vaijapur	Parsoda	CGWB	BW	7.9	950	510	310	38	52	68	0.4	0	305	106	34	59	0.5	0	1.7	-1.2	32.4
190	Vaijapur	Aghur	CGWB	BW	7.7	570	295	190	44	19	44	0.6	0	287	28	2	13	0.46	0	1.4	0.9	33.9
191	Vaijapur	Bhaggaon	CGWB	BW	8	1140	610	400	50	67	74	0.4	0	372	110	67	55	0.29	0	1.6	-1.9	28.7
192	Vaijapur	Mhaski	CGWB	BW	7.6	450	230	155	36	16	27	0.1	0	214	28	12	3	0.46	0	0.9	0.4	27.4
193	Vaijapur	Loni	CGWB	BW	7.5	2600	1547	525	146	39	342	4	0	445	398	146	249	0.79	0	6.5	-3.2	58.8
194	Vaijapur	Loni	CGWB	BW	7.5	2600	1547	525	146	39	342	4	0	445	398	146	249	0.79	0	6.5	-3.2	58.8
195	Vaijapur	Loni	CGWB	BW	7.5	2600	1547	525	146	39	342	4	0	445	398	146	249	0.79	0	6.5	-3.2	58.8
196	Vaijapur	Shirur	CGWB	BW	7.4	2800	1780	875	281	42	232	15	0	128	514	261	370	0.45	0	3.4	-15.4	37.4
197	Vaijapur	Shirur	CGWB	BW	7.4	2800	1780	875	281	42	232	15	0	128	514	261	370	0.45	0	3.4	-15.4	37.4
198	Vaijapur	Janephal	CGWB	BW	7.2	5300	3345	1815	388	205	192	299	0	384	731	578	760	0.87	0	2.0	-30.0	30.6
199	Vaijapur	Janephal	CGWB	BW	7.2	5300	3345	1815	388	205	192	299	0	384	731	578	760	0.87	0	2.0	-30.0	30.6
200	Vaijapur	Janephal	CGWB	BW	7.2	4300	3345	1815	388	205	192	299	0	384	731	578	760	0.87	0	2.0	-30.0	30.6
201	Vaijapur	Shahajapur	CGWB	BW	7.9	3030	1700	720	44	148	345	55	641	641	547	235	0	0	0	5.6	17.5	53.3
113	Vaijapur	Sonewadi	CGWB	BW	7.9	1000	550	280	38	45	110	4	0	384	135	19	0	0	0	2.9	0.7	46.6
114	Vaijapur	Sonewadi	CGWB	BW	7	1350	750	325	44	52	173	0	0	409	238	29	0	0	0	4.2	0.2	53.7
115	Vaijapur	Sonewadi	CGWB	BW	7	1350	750	325	44	52	173	0.1	0	409	238	29	0	0	0	4.2	0.2	53.7
116	Vaijapur	Sonewadi	CGWB	BW	7.9	1000	550	280	38	45	110	4	0	384	135	19	0	0	0	2.9	0.7	46.6
202	Vaijapur	Shahajapur	CGWB	BW	7.8	3030	2010	700	36	148	483	47	580	580	788	216	0	0	0	7.9	14.9	61.4

Annexure VIII: Location of proposed Percolation tanks in Aurangabad district

S.NO.	Village	Block	X	Y	Type of structure
1	Alampur	Aurangabad	75.619	19.9773	Percolation Tank
2	Ambikapur	Aurangabad	75.547	19.7741	Percolation Tank
3	Apatgaon	Aurangabad	75.497	19.8034	Percolation Tank
4	Aurangabad (Urban)	Aurangabad	75.433	19.8695	Percolation Tank
5	Aurangabad (Urban)	Aurangabad	75.4138	19.8741	Percolation Tank
6	Aurangabad (Urban)	Aurangabad	75.4164	19.8495	Percolation Tank
7	Bendewadi (N.W)	Aurangabad	75.6589	19.9106	Percolation Tank
8	Bhalgaon	Aurangabad	75.4946	19.8209	Percolation Tank
9	Bhalgaon	Aurangabad	75.4734	19.817	Percolation Tank
10	Bhalgaon	Aurangabad	75.461	19.819	Percolation Tank
11	Bhalgaon	Aurangabad	75.4845	19.828	Percolation Tank
12	Bhambarda	Aurangabad	75.5661	19.8997	Percolation Tank
13	Chauka	Aurangabad	75.4032	20.0179	Percolation Tank
14	Chauka	Aurangabad	75.3949	20.021	Percolation Tank
15	Chauka	Aurangabad	75.3962	20.0318	Percolation Tank
16	Daigavhan	Aurangabad	75.5532	19.7666	Percolation Tank
17	Daregaon	Aurangabad	75.6483	19.9294	Percolation Tank
18	Demani	Aurangabad	75.6369	19.8643	Percolation Tank
19	Demani	Aurangabad	75.6327	19.8787	Percolation Tank
20	Fattepur	Aurangabad	75.4721	19.8716	Percolation Tank
21	Fattepur	Aurangabad	75.4693	19.8758	Percolation Tank
22	Gadhe Jalgaon	Aurangabad	75.598	19.865	Percolation Tank
23	Gadiwat Tanda (N.V)	Aurangabad	75.3972	19.7429	Percolation Tank
24	Garkheda	Aurangabad	75.5001	19.8202	Percolation Tank
25	Gharegaon Ektuni	Aurangabad	75.5664	19.7666	Percolation Tank
26	Gharegaon Pimpri	Aurangabad	75.5765	19.7663	Percolation Tank
27	Golatgaon	Aurangabad	75.6568	19.8202	Percolation Tank
28	Jaipur	Aurangabad	75.5369	19.9033	Percolation Tank
29	Jalgaon Feran	Aurangabad	75.626	19.8977	Percolation Tank
30	Kanchanpur	Aurangabad	75.6563	19.9443	Percolation Tank
31	Karanjgaon	Aurangabad	75.6066	19.8892	Percolation Tank
32	Kawadgaon Jalna	Aurangabad	75.6283	19.7887	Percolation Tank
33	Ladsawangi	Aurangabad	75.6149	19.9731	Percolation Tank
34	Mangrul	Aurangabad	75.548	19.8382	Percolation Tank
35	Morvira	Aurangabad	75.4488	20.0242	Percolation Tank
36	Nipani	Aurangabad	75.4509	19.8261	Percolation Tank
37	Pandharpur	Aurangabad	75.254	19.8327	Percolation Tank
38	Pandharpur	Aurangabad	75.2441	19.8112	Percolation Tank
39	Patoda	Aurangabad	75.2571	19.8168	Percolation Tank
40	Pimpri Bk	Aurangabad	75.5307	19.7939	Percolation Tank
41	Pisadevi	Aurangabad	75.3983	19.9165	Percolation Tank
42	Sanjkheda	Aurangabad	75.5361	19.7454	Percolation Tank
43	Satala	Aurangabad	75.4353	20.0247	Percolation Tank
44	Satala	Aurangabad	75.4343	20.0157	Percolation Tank
45	Sayyadpur	Aurangabad	75.6332	19.9663	Percolation Tank
46	Sayyadpur	Aurangabad	75.6428	19.9748	Percolation Tank
47	Selud	Aurangabad	75.5913	19.9863	Percolation Tank
48	Shevga	Aurangabad	75.5941	19.9045	Percolation Tank
49	Sundarwadi	Aurangabad	75.4457	19.8524	Percolation Tank
50	Takli Shimpi	Aurangabad	75.4566	19.8412	Percolation Tank
51	Uchalti	Aurangabad	75.5382	19.8227	Percolation Tank
52	Warzadi	Aurangabad	75.5335	19.9206	Percolation Tank
53	Borgaon Arj	Phulambri	75.5928	20.1534	Percolation Tank
54	Georai Gungi	Phulambri	75.6198	20.1298	Percolation Tank
55	Jalgaon Mete	Phulambri	75.5796	20.1432	Percolation Tank
56	Lahanyachiwadi	Phulambri	75.454	20.1296	Percolation Tank
57	Mahal Kinhola	Phulambri	75.5027	20.1498	Percolation Tank
58	Agar Kanadgaon	Gangapur	74.9278	19.6674	Percolation Tank

S.NO.	Village	Block	X	Y	Type of structure
59	Agar Kanadgaon	Gangapur	74.9332	19.6757	Percolation Tank
60	Agar Kanadgaon	Gangapur	74.925	19.6481	Percolation Tank
61	Agar Kanadgaon	Gangapur	74.9325	19.6611	Percolation Tank
62	Agar Kanadgaon	Gangapur	74.919	19.6729	Percolation Tank
63	Agar Wadgaon	Gangapur	75.1164	19.6057	Percolation Tank
64	Ambelohal	Gangapur	75.148	19.8311	Percolation Tank
65	Ambelohal	Gangapur	75.1579	19.8147	Percolation Tank
66	Anafpur	Gangapur	75.006	19.9625	Percolation Tank
67	Anafpur	Gangapur	74.9957	19.9455	Percolation Tank
68	Anafpur	Gangapur	74.9939	19.9406	Percolation Tank
69	Bagadi	Gangapur	74.9636	19.6503	Percolation Tank
70	Bhendala	Gangapur	75.075	19.6646	Percolation Tank
71	Bhiw-Dhonora	Gangapur	75.1371	19.6417	Percolation Tank
72	Bhiw-Dhonora	Gangapur	75.0858	19.6444	Percolation Tank
73	Bolegaon	Gangapur	75.061	19.7365	Percolation Tank
74	Chinchkheda	Gangapur	74.9801	19.9146	Percolation Tank
75	Dahegaon	Gangapur	75.1472	19.7308	Percolation Tank
76	Dhamori Bk.	Gangapur	75.1939	19.7172	Percolation Tank
77	Dhamori Bk.	Gangapur	75.2035	19.7004	Percolation Tank
78	Dhamori Bk.	Gangapur	75.2058	19.7119	Percolation Tank
79	Dhoregaon	Gangapur	75.1206	19.7165	Percolation Tank
80	Dinwada	Gangapur	75.0001	19.9767	Percolation Tank
81	Gajgaon	Gangapur	75.0807	19.8369	Percolation Tank
82	Galnimb	Gangapur	75.0861	19.6213	Percolation Tank
83	Galnimb	Gangapur	75.104	19.6042	Percolation Tank
84	Gangapur	Gangapur	75.0221	19.6735	Percolation Tank
85	Gangapur	Gangapur	75.0278	19.6733	Percolation Tank
86	Haibatpur	Gangapur	74.8812	19.6567	Percolation Tank
87	Hanumantgaon	Gangapur	75.1084	19.6958	Percolation Tank
88	Hirapur	Gangapur	75.2231	19.7577	Percolation Tank
89	Hirapur	Gangapur	75.2304	19.7577	Percolation Tank
90	Jamgaon	Gangapur	74.9889	19.6428	Percolation Tank
91	Jikthan	Gangapur	75.1384	19.7575	Percolation Tank
92	Kaigaon	Gangapur	75.0421	19.6432	Percolation Tank
93	Kasoda	Gangapur	75.1682	19.8289	Percolation Tank
94	Katepimpalgaon	Gangapur	74.9345	19.8498	Percolation Tank
95	Khadak Waghalgaon	Gangapur	74.9361	19.8396	Percolation Tank
96	Khopeshwar	Gangapur	74.9889	19.7894	Percolation Tank
97	Kobapur	Gangapur	75.0573	19.7582	Percolation Tank
98	Kodapur	Gangapur	75.1392	19.6653	Percolation Tank
99	Kolghar	Gangapur	75.0369	19.7697	Percolation Tank
100	Limbe Jalgaon	Gangapur	75.1853	19.7658	Percolation Tank
101	Mahalaxmikheda	Gangapur	75.1755	19.6167	Percolation Tank
102	Maliwadgaon	Gangapur	75.0358	19.9815	Percolation Tank
103	Malunja Kh.	Gangapur	75.0081	19.7655	Percolation Tank
104	Mehebubkheda	Gangapur	74.9682	19.8871	Percolation Tank
105	Mendhi	Gangapur	74.9693	19.7904	Percolation Tank
106	Mudhesh Wadgaon	Gangapur	74.9247	19.6951	Percolation Tank
107	Nagapur	Gangapur	75.2089	19.6826	Percolation Tank
108	Nawabpur	Gangapur	74.9765	19.6723	Percolation Tank
109	Palasgaon	Gangapur	75.0726	19.8211	Percolation Tank
110	Part Of Nevargaon	Gangapur	74.8724	19.655	Percolation Tank
111	Pimpalwadi	Gangapur	75.0934	19.7189	Percolation Tank
112	Rampuri	Gangapur	75.1387	19.8482	Percolation Tank
113	Sarifpur	Gangapur	75.0548	19.7454	Percolation Tank
114	Savkheda	Gangapur	75.1892	19.606	Percolation Tank
115	Shahapur	Gangapur	75.0522	19.8133	Percolation Tank
116	Shahapur Kadim	Gangapur	75.1431	19.7013	Percolation Tank
117	Shahapur Kadim	Gangapur	75.1345	19.705	Percolation Tank

S.NO.	Village	Block	X	Y	Type of structure
118	Shahapur Kadim	Gangapur	75.1524	19.7032	Percolation Tank
119	Shekta	Gangapur	75.0053	19.8269	Percolation Tank
120	Shivrai	Gangapur	75.1936	19.7683	Percolation Tank
121	Shivrai	Gangapur	75.1954	19.7617	Percolation Tank
122	Sillegon	Gangapur	75.0105	19.8729	Percolation Tank
123	Sultanabad	Gangapur	75.0177	19.9	Percolation Tank
124	Sultanpur	Gangapur	75.2125	19.6064	Percolation Tank
125	Surewadi	Gangapur	75.0703	19.7272	Percolation Tank
126	Tanduladi	Gangapur	75.0117	19.7913	Percolation Tank
127	Vairagad	Gangapur	75.0053	19.9715	Percolation Tank
128	Wadali	Gangapur	74.9542	19.8257	Percolation Tank
129	Warkhed	Gangapur	74.8889	19.7406	Percolation Tank
130	Wazar	Gangapur	75.1661	19.6201	Percolation Tank
131	Yesaon	Gangapur	75.1032	19.785	Percolation Tank
132	Zodegaon	Gangapur	74.9568	19.8123	Percolation Tank
133	Zodegaon	Gangapur	74.9506	19.823	Percolation Tank
134	Ambegaon Kh.	Kannad	75.2568	20.3736	Percolation Tank
135	Andhaner	Kannad	75.1001	20.2681	Percolation Tank
136	Athegaon	Kannad	75.0781	20.1481	Percolation Tank
137	Aurala	Kannad	74.9959	20.1732	Percolation Tank
138	Aurali	Kannad	75.0097	20.1586	Percolation Tank
139	Banshendra	Kannad	75.1146	20.1935	Percolation Tank
140	Belkheda	Kannad	75.2063	20.4596	Percolation Tank
141	Bhokangaon	Kannad	75.1773	20.2041	Percolation Tank
142	Bormal Tanda	Kannad	75.1845	20.4448	Percolation Tank
143	Borsar Kh.	Kannad	75.0558	20.1014	Percolation Tank
144	Chapaner	Kannad	75.0667	20.1817	Percolation Tank
145	Debhegaon	Kannad	75.084	20.0824	Percolation Tank
146	Deogaon	Kannad	75.0273	20.0225	Percolation Tank
147	Deogaon	Kannad	75.0465	20.0315	Percolation Tank
148	Deolana	Kannad	75.0838	20.0615	Percolation Tank
149	Deoli	Kannad	75.011	20.0181	Percolation Tank
150	Deopul	Kannad	75.275	20.2958	Percolation Tank
151	Digaon	Kannad	75.4485	20.3566	Percolation Tank
152	Gondegaon	Kannad	75.0576	20.1126	Percolation Tank
153	Haraswadi	Kannad	75.17	20.421	Percolation Tank
154	Hasanabad	Kannad	75.1234	20.415	Percolation Tank
155	Hatnoor	Kannad	75.1356	20.1464	Percolation Tank
156	Hatnoor	Kannad	75.1586	20.1575	Percolation Tank
157	Hatnoor	Kannad	75.1509	20.1803	Percolation Tank
158	Jaitapur	Kannad	75.1143	20.1333	Percolation Tank
159	Jaitapur	Kannad	75.0967	20.1277	Percolation Tank
160	Jamdi (Ja)	Kannad	75.4086	20.3449	Percolation Tank
161	Jamdi (Ja)	Kannad	75.3941	20.3468	Percolation Tank
162	Jawali Kh.	Kannad	75.0379	20.1355	Percolation Tank
163	Kanadgaon (Kannad)	Kannad	74.968	20.1328	Percolation Tank
164	Kanadgaon Werul	Kannad	75.063	20.0223	Percolation Tank
165	Kannad(Urban)	Kannad	75.1402	20.2498	Percolation Tank
166	Kannad(Urban)	Kannad	75.1231	20.2699	Percolation Tank
167	Karanjkheda Jahagir	Kannad	75.3014	20.373	Percolation Tank
168	Karanjkheda Khalsa	Kannad	75.3032	20.3892	Percolation Tank
169	Khadki	Kannad	75.3566	20.2861	Percolation Tank
170	Lohagaon	Kannad	75.3874	20.3968	Percolation Tank
171	Makrunpur	Kannad	75.1304	20.2528	Percolation Tank
172	Malpur	Kannad	75.1579	20.2337	Percolation Tank
173	Mategaon	Kannad	75.2589	20.2868	Percolation Tank
174	Mohadi	Kannad	75.4055	20.2963	Percolation Tank
175	Mohadi	Kannad	75.4001	20.2941	Percolation Tank
176	Mohara	Kannad	75.4444	20.272	Percolation Tank

S.NO.	Village	Block	X	Y	Type of structure
177	Mundwadi	Kannad	75.0718	20.2732	Percolation Tank
178	Naad Tanda	Kannad	75.1845	20.4674	Percolation Tank
179	Nachanwel	Kannad	75.4426	20.3019	Percolation Tank
180	Nachanwel	Kannad	75.4602	20.3089	Percolation Tank
181	Nadarpur	Kannad	75.3731	20.287	Percolation Tank
182	Narsingpur	Kannad	75.1472	20.2646	Percolation Tank
183	Newpur Khalsa	Kannad	75.3402	20.3917	Percolation Tank
184	Palaskheda	Kannad	75.0024	20.1058	Percolation Tank
185	Palaskheda	Kannad	75.0283	20.126	Percolation Tank
186	Palshi Kh.	Kannad	75.2843	20.3006	Percolation Tank
187	Pangra	Kannad	75.1993	20.4465	Percolation Tank
188	Sahangaon	Kannad	74.9408	20.1513	Percolation Tank
189	Saigavhan	Kannad	75.1488	20.4288	Percolation Tank
190	Saigavhan	Kannad	75.1288	20.4232	Percolation Tank
191	Sakharwel	Kannad	75.2928	20.303	Percolation Tank
192	Shafepur	Kannad	75.318	20.2921	Percolation Tank
193	Shafepur	Kannad	75.3218	20.287	Percolation Tank
194	Shafiabad	Kannad	75.3459	20.2907	Percolation Tank
195	Shelgaon	Kannad	75.4304	20.3531	Percolation Tank
196	Shelgaon Khalsa	Kannad	75.4136	20.3737	Percolation Tank
197	Shirasgaon	Kannad	75.0838	20.1828	Percolation Tank
198	Sonwadi	Kannad	75.2115	20.48	Percolation Tank
199	Tad Pimpalgaon	Kannad	75.063	20.0673	Percolation Tank
200	Tad Pimpalgaon	Kannad	75.0428	20.0641	Percolation Tank
201	Takli Antur	Kannad	75.3711	20.4108	Percolation Tank
202	Takli Bk.	Kannad	75.4617	20.2851	Percolation Tank
203	Tapargaon	Kannad	75.134	20.1401	Percolation Tank
204	Vita	Kannad	74.9993	20.1369	Percolation Tank
205	Vitkheda	Kannad	75.0765	20.0313	Percolation Tank
206	Vitthalpur	Kannad	75.1498	20.2269	Percolation Tank
207	Wadgaon (Jadhav)	Kannad	75.175	20.4354	Percolation Tank
208	Wakad	Kannad	75.4115	20.3908	Percolation Tank
209	Wakad	Kannad	75.4193	20.3858	Percolation Tank
210	Waki Kadim	Kannad	75.3763	20.394	Percolation Tank
211	Wasadi	Kannad	75.2698	20.3009	Percolation Tank
212	Wasadi	Kannad	75.261	20.3006	Percolation Tank
213	Galleborgaon	Khuldabad	75.1035	20.0929	Percolation Tank
214	Kasabkheda	Khuldabad	75.1266	20.0104	Percolation Tank
215	Kautgaon	Khuldabad	75.175	20.1421	Percolation Tank
216	Khaspur	Khuldabad	75.1316	20.1068	Percolation Tank
217	Palasgaon	Khuldabad	75.1554	20.1282	Percolation Tank
218	Palaswadi	Khuldabad	75.1229	20.0589	Percolation Tank
219	Sawangi Bazar	Khuldabad	75.3152	20.1272	Percolation Tank
220	Sawangi Bazar	Khuldabad	75.3053	20.126	Percolation Tank
221	Sawangi Bazar	Khuldabad	75.3107	20.1271	Percolation Tank
222	Shekapur	Khuldabad	75.2899	20.1377	Percolation Tank
223	Sultanpur	Khuldabad	75.2915	20.0635	Percolation Tank
224	Tajnapur	Khuldabad	75.3235	20.1231	Percolation Tank
225	Tajnapur	Khuldabad	75.3357	20.1153	Percolation Tank
226	Wadhod Kh.	Khuldabad	75.3038	20.0824	Percolation Tank
227	Yesgaon	Khuldabad	75.3217	20.0841	Percolation Tank
228	Adgaon	Paithan	75.6128	19.6577	Percolation Tank
229	Adul Kh.	Paithan	75.5322	19.7285	Percolation Tank
230	Adwali	Paithan	75.4358	19.4593	Percolation Tank
231	Agapur	Paithan	75.4809	19.4429	Percolation Tank
232	Akthawada	Paithan	75.4428	19.5074	Percolation Tank
233	Amrapur	Paithan	75.3097	19.5567	Percolation Tank
234	Antarwali Khandi	Paithan	75.5871	19.6494	Percolation Tank
235	Apegaon	Paithan	75.5055	19.4467	Percolation Tank

S.NO.	Village	Block	X	Y	Type of structure
236	Aurangpur	Paithan	75.2397	19.6377	Percolation Tank
237	Awade Uchegaon	Paithan	75.5377	19.3983	Percolation Tank
238	Ballapur	Paithan	75.2467	19.7358	Percolation Tank
239	Ballapur	Paithan	75.2332	19.7098	Percolation Tank
240	Borigaon	Paithan	75.3547	19.584	Percolation Tank
241	Bramhagaon	Paithan	75.5332	19.4693	Percolation Tank
242	Changatpur	Paithan	75.3866	19.4246	Percolation Tank
243	Dadaon Bk.	Paithan	75.5434	19.5284	Percolation Tank
244	Dadegaon Jahagir	Paithan	75.425	19.4277	Percolation Tank
245	Dadegaon Jahagir	Paithan	75.4307	19.458	Percolation Tank
246	Dalwadi	Paithan	75.3605	19.52	Percolation Tank
247	Dawarwadi	Paithan	75.5076	19.5664	Percolation Tank
248	Dawarwadi	Paithan	75.5283	19.5101	Percolation Tank
249	Dawarwadi	Paithan	75.5035	19.537	Percolation Tank
250	Dera	Paithan	75.5073	19.5144	Percolation Tank
251	Dhorka	Paithan	75.384	19.5987	Percolation Tank
252	Dhupkeda	Paithan	75.3244	19.6368	Percolation Tank
253	Dinnaur	Paithan	75.3024	19.6138	Percolation Tank
254	Ekturi	Paithan	75.6182	19.7431	Percolation Tank
255	Ekturi	Paithan	75.618	19.7199	Percolation Tank
256	Georai Kh.	Paithan	75.4934	19.7155	Percolation Tank
257	Ghargaon	Paithan	75.5804	19.7419	Percolation Tank
258	Hiradpuri	Paithan	75.5827	19.4092	Percolation Tank
259	Hiradpuri	Paithan	75.5936	19.3995	Percolation Tank
260	Hiwara Chondhla	Paithan	75.5827	19.4811	Percolation Tank
261	Indegaon	Paithan	75.5353	19.4556	Percolation Tank
262	Isarwadi	Paithan	75.3553	19.5728	Percolation Tank
263	Islampur	Paithan	75.2708	19.6861	Percolation Tank
264	Ismailpur	Paithan	75.3674	19.3985	Percolation Tank
265	Kadethan Bk.	Paithan	75.554	19.6365	Percolation Tank
266	Kadethan Bk.	Paithan	75.5498	19.6243	Percolation Tank
267	Kapuswadi	Paithan	75.4136	19.6189	Percolation Tank
268	Karanj Kheda	Paithan	75.4382	19.5138	Percolation Tank
269	Karkin	Paithan	75.375	19.6206	Percolation Tank
270	Katpur	Paithan	75.3985	19.5193	Percolation Tank
271	Katpur	Paithan	75.397	19.5275	Percolation Tank
272	Kekat Jalgaon	Paithan	75.6314	19.4888	Percolation Tank
273	Kherda	Paithan	75.4941	19.5879	Percolation Tank
274	Mahamadpur	Paithan	75.3796	19.4088	Percolation Tank
275	Mankapur	Paithan	75.2364	19.5855	Percolation Tank
276	Mavasgavhan	Paithan	75.2304	19.6026	Percolation Tank
277	Maygaon	Paithan	75.4765	19.4365	Percolation Tank
278	Mharola	Paithan	75.2693	19.7139	Percolation Tank
279	Mharola	Paithan	75.2703	19.6914	Percolation Tank
280	Mharola	Paithan	75.2788	19.7172	Percolation Tank
281	Mirkheda	Paithan	75.6268	19.471	Percolation Tank
282	Mirkheda	Paithan	75.6265	19.4791	Percolation Tank
283	Muradabad	Paithan	75.5402	19.7399	Percolation Tank
284	Murma	Paithan	75.6475	19.5606	Percolation Tank
285	Nandalgaon	Paithan	75.34	19.6553	Percolation Tank
286	Nandar	Paithan	75.5167	19.503	Percolation Tank
287	Navgaon	Paithan	75.5174	19.4338	Percolation Tank
288	Navgaon	Paithan	75.5278	19.4405	Percolation Tank
289	Pachalgaon	Paithan	75.4294	19.5557	Percolation Tank
290	Pachod Kh.	Paithan	75.6431	19.5777	Percolation Tank
291	Paithan (Urban)	Paithan	75.3638	19.5032	Percolation Tank
292	Paithan (Urban)	Paithan	75.4154	19.4785	Percolation Tank
293	Paithan (Urban)	Paithan	75.4154	19.4956	Percolation Tank
294	Ranjangaon Khuri	Paithan	75.2335	19.6817	Percolation Tank

S.NO.	Village	Block	X	Y	Type of structure
295	Ranjani	Paithan	75.24	19.7067	Percolation Tank
296	Saigaon	Paithan	75.4102	19.4183	Percolation Tank
297	Salwadgaon	Paithan	75.5418	19.4937	Percolation Tank
298	Shekta	Paithan	75.2491	19.5411	Percolation Tank
299	Telwadi	Paithan	75.3773	19.4573	Percolation Tank
300	Tupewadi	Paithan	75.4845	19.6387	Percolation Tank
301	Vihamandwa	Paithan	75.5737	19.4603	Percolation Tank
302	Waghade	Paithan	75.4345	19.4697	Percolation Tank
303	Waghade	Paithan	75.4307	19.4749	Percolation Tank
304	Water Mask	Paithan	75.3581	19.5017	Percolation Tank
305	Water Mask	Paithan	75.3511	19.5064	Percolation Tank
306	Water Mask	Paithan	75.3143	19.5083	Percolation Tank
307	Yasinpur	Paithan	75.4825	19.6246	Percolation Tank
308	Ambhai	Sillod	75.5688	20.4801	Percolation Tank
309	Amsari	Sillod	75.8071	20.5217	Percolation Tank
310	Balapur	Sillod	75.7192	20.4875	Percolation Tank
311	Borgaon Sarani	Sillod	75.5089	20.3332	Percolation Tank
312	Dahigaon	Sillod	75.7061	20.319	Percolation Tank
313	Dhanora	Sillod	75.5729	20.3207	Percolation Tank
314	Dongargaon	Sillod	75.6786	20.3386	Percolation Tank
315	Korhala	Sillod	75.483	20.4866	Percolation Tank
316	Leha	Sillod	75.7019	20.3815	Percolation Tank
317	Mangrul	Sillod	75.641	20.3671	Percolation Tank
318	Pimpaldari	Sillod	75.7181	20.5314	Percolation Tank
319	Pimpalgaon Ghat	Sillod	75.5168	20.4657	Percolation Tank
320	Rehimabad	Sillod	75.7325	20.3394	Percolation Tank
321	Rehimabad	Sillod	75.7483	20.328	Percolation Tank
322	Relgaon	Sillod	75.5481	20.4432	Percolation Tank
323	Sarola	Sillod	75.7246	20.367	Percolation Tank
324	Sarola	Sillod	75.7422	20.3893	Percolation Tank
325	Shivana	Sillod	75.7587	20.4508	Percolation Tank
326	Shivana	Sillod	75.8091	20.4875	Percolation Tank
327	Sillod (Urban)	Sillod	75.6455	20.2909	Percolation Tank
328	Sillod (Urban)	Sillod	75.6644	20.301	Percolation Tank
329	Sirsala	Sillod	75.5317	20.4859	Percolation Tank
330	Wangi Bk.	Sillod	75.5752	20.3512	Percolation Tank
331	Warud Kh.	Sillod	75.6743	20.2602	Percolation Tank
332	Wasai	Sillod	75.67	20.5252	Percolation Tank
333	Amkheda	Soegaon	75.5964	20.5931	Percolation Tank
334	Amanatpuradi	Vaijapur	74.9612	19.9544	Percolation Tank
335	Aurangpur	Vaijapur	74.8853	19.9617	Percolation Tank
336	Awwalgaon	Vaijapur	74.8084	19.7098	Percolation Tank
337	Awwalgaon	Vaijapur	74.8364	19.7433	Percolation Tank
338	Babhulgaon Bk.	Vaijapur	74.969	20.0365	Percolation Tank
339	Babhulgaon Bk.	Vaijapur	74.9516	20.0538	Percolation Tank
340	Babtara	Vaijapur	74.6281	19.792	Percolation Tank
341	Bajathan	Vaijapur	74.8667	19.6833	Percolation Tank
342	Ballali Sagaj	Vaijapur	74.8882	19.8666	Percolation Tank
343	Bendawadi	Vaijapur	74.8778	19.9304	Percolation Tank
344	Bhaigaon Ganga	Vaijapur	74.9835	19.9968	Percolation Tank
345	Bhalgaon	Vaijapur	74.7467	19.7764	Percolation Tank
346	Bhalgaon	Vaijapur	74.7581	19.7871	Percolation Tank
347	Bhatana	Vaijapur	74.9358	20.1	Percolation Tank
348	Bhatana	Vaijapur	74.9317	20.1141	Percolation Tank
349	Bhaur	Vaijapur	74.6669	19.85	Percolation Tank
350	Bhivgaon	Vaijapur	74.8607	19.9675	Percolation Tank
351	Bhivgaon	Vaijapur	74.8488	19.9763	Percolation Tank
352	Bhokargaon	Vaijapur	75.0071	20.0618	Percolation Tank
353	Bhokargaon	Vaijapur	75.0086	20.0679	Percolation Tank

S.NO.	Village	Block	X	Y	Type of structure
354	Chandegaon	Vaijapur	74.8006	19.7598	Percolation Tank
355	Chenduphal	Vaijapur	74.856	19.6769	Percolation Tank
356	Chigatgaon	Vaijapur	74.8084	20.1353	Percolation Tank
357	Chigatgaon	Vaijapur	74.8001	20.1455	Percolation Tank
358	Chinchadgaon	Vaijapur	74.813	19.8612	Percolation Tank
359	Dagpimpalgaon	Vaijapur	74.7786	19.7371	Percolation Tank
360	Dagpimpalgaon	Vaijapur	74.7566	19.7681	Percolation Tank
361	Dawala	Vaijapur	74.6871	19.8846	Percolation Tank
362	Dhondalgaon	Vaijapur	74.9475	19.9722	Percolation Tank
363	Dhondalgaon	Vaijapur	74.9343	19.9849	Percolation Tank
364	Ekodi Sagaj	Vaijapur	74.8996	19.8529	Percolation Tank
365	Ekodi Sagaj	Vaijapur	74.9016	19.8642	Percolation Tank
366	Gadhe Pimpalgaon	Vaijapur	74.8548	19.7011	Percolation Tank
367	Gadhe Pimpalgaon	Vaijapur	74.8703	19.7235	Percolation Tank
368	Gadhe Pimpalgaon	Vaijapur	74.8615	19.7133	Percolation Tank
369	Ghogaraon	Vaijapur	74.8674	19.7564	Percolation Tank
370	Hadas Pimpalgaon	Vaijapur	74.9628	19.9201	Percolation Tank
371	Hamrapur	Vaijapur	74.8154	19.7033	Percolation Tank
372	Hanumantgaon	Vaijapur	74.8032	19.8397	Percolation Tank
373	Hanumantgaon	Vaijapur	74.8167	19.8456	Percolation Tank
374	Jalgaon	Vaijapur	74.9514	19.8861	Percolation Tank
375	Jalgaon	Vaijapur	74.9322	19.8973	Percolation Tank
376	Kangoni	Vaijapur	74.6685	19.8186	Percolation Tank
377	Kangoni	Vaijapur	74.6662	19.8188	Percolation Tank
378	Karanjgaon	Vaijapur	74.9156	19.9368	Percolation Tank
379	Khambala	Vaijapur	74.7099	19.8724	Percolation Tank
380	Khirdi	Vaijapur	74.9317	19.8807	Percolation Tank
381	Khirdi Kannad	Vaijapur	75.033	20.0883	Percolation Tank
382	Lakhani	Vaijapur	74.997	20.033	Percolation Tank
383	Lakhganga	Vaijapur	74.6421	19.8054	Percolation Tank
384	Lausurgaon	Vaijapur	74.968	19.9583	Percolation Tank
385	Mali Sagaj	Vaijapur	74.8737	19.8734	Percolation Tank
386	Manoor	Vaijapur	75.012	20.0778	Percolation Tank
387	Mirakhnagar	Vaijapur	74.87	19.9612	Percolation Tank
388	Nagamthan	Vaijapur	74.8048	19.7184	Percolation Tank
389	Nagamthan	Vaijapur	74.8058	19.7284	Percolation Tank
390	Nagamthan	Vaijapur	74.8045	19.7374	Percolation Tank
391	Nagamthan	Vaijapur	74.7949	19.753	Percolation Tank
392	Nagamthan	Vaijapur	74.8203	19.7389	Percolation Tank
393	Nandur Dhok	Vaijapur	74.6991	19.8076	Percolation Tank
394	Nandur Dhok	Vaijapur	74.6965	19.7818	Percolation Tank
395	Panvi Bk.	Vaijapur	74.8716	19.7759	Percolation Tank
396	Parsod	Vaijapur	74.8643	19.9506	Percolation Tank
397	Pathri	Vaijapur	74.9734	20.0255	Percolation Tank
398	Pimpalgaon Khandala	Vaijapur	74.905	20.1155	Percolation Tank
399	Pimpalgaon Khandala	Vaijapur	74.8895	20.1119	Percolation Tank
400	Plkhed	Vaijapur	74.9229	19.8963	Percolation Tank
401	Plkhed	Vaijapur	74.9063	19.9069	Percolation Tank
402	Purangaon	Vaijapur	74.6452	19.8047	Percolation Tank
403	Rahegavhan	Vaijapur	74.8975	19.9334	Percolation Tank
404	Rahegavhan	Vaijapur	74.9027	19.9363	Percolation Tank
405	Salegaon	Vaijapur	75.0115	20.0835	Percolation Tank
406	Satana	Vaijapur	74.7773	19.8617	Percolation Tank
407	Sawkhed Khandala	Vaijapur	74.868	20.127	Percolation Tank
408	Shioor	Vaijapur	74.9032	20.1036	Percolation Tank
409	Shivgaon	Vaijapur	74.9478	20.0632	Percolation Tank
410	Shivgaon	Vaijapur	74.9581	20.0686	Percolation Tank
411	Shivgaon	Vaijapur	74.9584	20.0754	Percolation Tank
412	Sirasgaon	Vaijapur	74.7801	19.8073	Percolation Tank

S.NO.	Village	Block	X	Y	Type of structure
413	Tunki	Vaijapur	74.8553	20.1272	Percolation Tank
414	Tunki	Vaijapur	74.8529	20.1214	Percolation Tank
415	Tunki	Vaijapur	74.8418	20.1309	Percolation Tank
416	Undirwadi	Vaijapur	74.9731	19.9846	Percolation Tank
417	Vaijapur (Rural)	Vaijapur	74.7193	19.9285	Percolation Tank
418	Vaijapur(Urban)	Vaijapur	74.6996	19.891	Percolation Tank
419	Vaijapur(Urban)	Vaijapur	74.7335	19.9054	Percolation Tank
420	Vaijapur(Urban)	Vaijapur	74.7498	19.9368	Percolation Tank
421	Virgaon	Vaijapur	74.7744	19.8183	Percolation Tank
422	Waghla	Vaijapur	74.9431	20.079	Percolation Tank
423	Waghla	Vaijapur	74.9371	20.0842	Percolation Tank

Note: Construction of AR structures may be takenup at these sites after field checks/verification only

Annexure IX: Location of proposed check dam in Aurangabad district

S.NO.	Village	Block	X	Y	Type of structure
1	Abdimandi (N.V)	Aurangabad	75.2248	19.9343	Checkdam
2	Adgaon Bk	Aurangabad	75.434	19.8191	Checkdam
3	Adgaon Kh	Aurangabad	75.5777	19.7728	Checkdam
4	Adgaon Sarak	Aurangabad	75.4984	19.9837	Checkdam
5	Adgaon Sarak	Aurangabad	75.504	19.9843	Checkdam
6	Adgaon Sarak	Aurangabad	75.5149	19.9719	Checkdam
7	Adgaon Sarak	Aurangabad	75.5229	19.9749	Checkdam
8	Adgaon Sarak	Aurangabad	75.5299	19.9778	Checkdam
9	Adgaon Sarak	Aurangabad	75.5361	19.9801	Checkdam
10	Adgaon Sarak	Aurangabad	75.5426	19.986	Checkdam
11	Adgaon Sarak	Aurangabad	75.5144	19.9848	Checkdam
12	Anjandoh	Aurangabad	75.5243	20.0016	Checkdam
13	Anjandoh	Aurangabad	75.5294	20.0045	Checkdam
14	Anjandoh	Aurangabad	75.5257	20.0084	Checkdam
15	Anjandoh	Aurangabad	75.5206	20.01	Checkdam
16	Anjandoh	Aurangabad	75.5314	20.0099	Checkdam
17	Anjandoh	Aurangabad	75.5358	20.0027	Checkdam
18	Anjandoh	Aurangabad	75.5485	19.9895	Checkdam
19	Anjandoh	Aurangabad	75.5542	20.0178	Checkdam
20	Anjandoh	Aurangabad	75.5511	20.0217	Checkdam
21	Anjandoh	Aurangabad	75.5423	20.0204	Checkdam
22	Aurangabad(Urban)	Aurangabad	75.2931	19.8819	Checkdam
23	Aurangabad(Urban)	Aurangabad	75.2913	19.8943	Checkdam
24	Aurangabad(Urban)	Aurangabad	75.2996	19.8912	Checkdam
25	Aurangabad(Urban)	Aurangabad	75.3229	19.8946	Checkdam
26	Aurangabad(Urban)	Aurangabad	75.3377	19.906	Checkdam
27	Aurangabad(Urban)	Aurangabad	75.3141	19.8778	Checkdam
28	Aurangabad(Urban)	Aurangabad	75.3172	19.8756	Checkdam
29	Aurangabad(Urban)	Aurangabad	75.3255	19.8829	Checkdam
30	Aurangabad(Urban)	Aurangabad	75.3188	19.8527	Checkdam
31	Aurangabad(Urban)	Aurangabad	75.3345	19.8546	Checkdam
32	Aurangabad(Urban)	Aurangabad	75.3858	19.8605	Checkdam
33	Aurangabad(Urban)	Aurangabad	75.4055	19.8512	Checkdam
34	Aurangabad(Urban)	Aurangabad	75.3866	19.8885	Checkdam
35	Aurangabad(Urban)	Aurangabad	75.3397	19.8882	Checkdam
36	Aurangabad(Urban)	Aurangabad	75.3711	19.9182	Checkdam
37	Aurangabad(Urban)	Aurangabad	75.3773	19.8999	Checkdam
38	Aurangabad(Urban)	Aurangabad	75.405	19.8773	Checkdam
39	Aurangabad(Urban)	Aurangabad	75.405	19.9014	Checkdam
40	Aurangpur	Aurangabad	75.6336	19.9527	Checkdam
41	Bangaon	Aurangabad	75.5902	19.9486	Checkdam
42	Bangaon	Aurangabad	75.5487	19.9179	Checkdam
43	Bhalgaon	Aurangabad	75.4829	19.84	Checkdam
44	Bhogalwadi	Aurangabad	75.6052	19.9724	Checkdam
45	Borwadi	Aurangabad	75.4907	20.0034	Checkdam
46	Borwadi	Aurangabad	75.4973	20.0053	Checkdam
47	Borwadi	Aurangabad	75.5169	19.9914	Checkdam
48	Chartha	Aurangabad	75.6095	19.989	Checkdam
49	Chitegaon	Aurangabad	75.4707	19.7801	Checkdam
50	Chitte Pimplagaon	Aurangabad	75.487	19.7804	Checkdam
51	Darakwadi	Aurangabad	75.6186	19.7943	Checkdam
52	Dharmapur	Aurangabad	75.2478	19.8856	Checkdam
53	Dharmapur	Aurangabad	75.2486	19.8946	Checkdam
54	Dhondkheda	Aurangabad	75.4834	20.0104	Checkdam
55	Dhondkheda	Aurangabad	75.4707	20.0011	Checkdam
56	Dhondkheda	Aurangabad	75.4789	19.9963	Checkdam
57	Donwada	Aurangabad	75.4877	20.0079	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
58	Donwada	Aurangabad	75.4936	20.0116	Checkdam
59	Donwada	Aurangabad	75.5019	20.0133	Checkdam
60	Dudhad	Aurangabad	75.5815	19.9596	Checkdam
61	Dudhad	Aurangabad	75.5771	19.9041	Checkdam
62	Fattepur	Aurangabad	75.471	19.8819	Checkdam
63	Gadiwat	Aurangabad	75.4091	19.7268	Checkdam
64	Gadiwat	Aurangabad	75.4117	19.7536	Checkdam
65	Gadiwat Tanda (N.V)	Aurangabad	75.4019	19.7526	Checkdam
66	Georai Kubri	Aurangabad	75.5786	19.9537	Checkdam
67	Ghardon	Aurangabad	75.4226	19.7373	Checkdam
68	Ghardon Tanda (N.V)	Aurangabad	75.435	19.7468	Checkdam
69	Golatgaon	Aurangabad	75.6059	19.8325	Checkdam
70	Golatgaon	Aurangabad	75.6191	19.8342	Checkdam
71	Golwadi	Aurangabad	75.2986	19.8442	Checkdam
72	Hatmali	Aurangabad	75.5758	20.0043	Checkdam
73	Hatmali	Aurangabad	75.5834	20.0051	Checkdam
74	Hivra	Aurangabad	75.5373	19.8576	Checkdam
75	Ibrahimpur	Aurangabad	75.5093	19.7848	Checkdam
76	Jadgaon	Aurangabad	75.5272	19.8284	Checkdam
77	Jadgaon	Aurangabad	75.5303	19.8398	Checkdam
78	Jogwada	Aurangabad	75.224	19.9489	Checkdam
79	Kadrabad	Aurangabad	75.4899	19.7427	Checkdam
80	Kanhapur	Aurangabad	75.4215	19.9472	Checkdam
81	Karhol	Aurangabad	75.603	19.8045	Checkdam
82	Kolghar	Aurangabad	75.6095	19.7648	Checkdam
83	Kumbhephal	Aurangabad	75.4958	19.8546	Checkdam
84	Ladgaon	Aurangabad	75.516	19.8761	Checkdam
85	Ladsawangi	Aurangabad	75.6245	19.978	Checkdam
86	Ladsawangi	Aurangabad	75.6406	19.9943	Checkdam
87	Lamkana	Aurangabad	75.5406	19.9713	Checkdam
88	Lamkana	Aurangabad	75.549	19.974	Checkdam
89	Lamkana	Aurangabad	75.559	19.98	Checkdam
90	Lamkana	Aurangabad	75.5687	19.9846	Checkdam
91	Lamkana	Aurangabad	75.5681	19.9733	Checkdam
92	Lamkana	Aurangabad	75.5757	19.9778	Checkdam
93	Laygaon	Aurangabad	75.4793	19.7509	Checkdam
94	Lingdari	Aurangabad	75.4719	19.9856	Checkdam
95	Lingdari	Aurangabad	75.4707	19.9914	Checkdam
96	Lingdari	Aurangabad	75.4777	19.9929	Checkdam
97	Lingdari	Aurangabad	75.4926	19.9815	Checkdam
98	Mahalpimpri	Aurangabad	75.436	19.9421	Checkdam
99	Mandki	Aurangabad	75.4195	19.9272	Checkdam
100	Mandki	Aurangabad	75.4324	19.9165	Checkdam
101	Mangrul	Aurangabad	75.5412	19.8361	Checkdam
102	Naigavhan	Aurangabad	75.5542	19.9918	Checkdam
103	Naigavhan	Aurangabad	75.5673	20.0051	Checkdam
104	Naigavhan	Aurangabad	75.5689	20.0146	Checkdam
105	Naigavhan	Aurangabad	75.5787	20.027	Checkdam
106	Nanakwadi	Aurangabad	75.3522	19.9209	Checkdam
107	Nipani	Aurangabad	75.4443	19.8125	Checkdam
108	Pachod	Aurangabad	75.4562	19.7799	Checkdam
109	Pardari	Aurangabad	75.4179	19.7892	Checkdam
110	Pimpal Khunta	Aurangabad	75.5998	19.95	Checkdam
111	Pimpal Khunta	Aurangabad	75.6214	19.9522	Checkdam
112	Pimpalgaon Pandhari	Aurangabad	75.4992	19.7414	Checkdam
113	Pimpri Bk	Aurangabad	75.5448	19.8033	Checkdam
114	Pisadevi	Aurangabad	75.3879	19.9343	Checkdam
115	Pisadevi	Aurangabad	75.3977	19.9296	Checkdam
116	Satana	Aurangabad	75.5681	19.8734	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
117	Satana	Aurangabad	75.5789	19.8751	Checkdam
118	Shahapur	Aurangabad	75.5355	19.7767	Checkdam
119	Shernapur	Aurangabad	75.2224	19.9133	Checkdam
120	Sultanpur	Aurangabad	75.6338	19.9715	Checkdam
121	Sultanpur	Aurangabad	75.4539	19.8917	Checkdam
122	Tisgaon	Aurangabad	75.2766	19.8858	Checkdam
123	Tuljapur	Aurangabad	75.3855	19.9496	Checkdam
124	Uchalti	Aurangabad	75.5357	19.8167	Checkdam
125	Wahegaon	Aurangabad	75.6336	19.8476	Checkdam
126	Waladgaon	Aurangabad	75.2815	19.8417	Checkdam
127	Warood	Aurangabad	75.4826	19.8858	Checkdam
128	Warzadi	Aurangabad	75.5178	19.927	Checkdam
129	Warzadi	Aurangabad	75.5354	19.9128	Checkdam
130	Zalta	Aurangabad	75.4301	19.8318	Checkdam
131	Adgaon Bk.	Phulambri	75.4151	20.1469	Checkdam
132	Adgaon Kh.	Phulambri	75.5502	20.1138	Checkdam
133	Babhulgaon Kh.	Phulambri	75.4358	20.1705	Checkdam
134	Jalgaon Mete	Phulambri	75.589	20.141	Checkdam
135	Kanhori	Phulambri	75.4182	20.1316	Checkdam
136	Lhamgaon	Phulambri	75.4953	20.1792	Checkdam
137	Mahal Kinhola	Phulambri	75.5033	20.159	Checkdam
138	Mamnabad	Phulambri	75.4663	20.1916	Checkdam
139	Marsawali	Phulambri	75.5844	20.0249	Checkdam
140	Pal	Phulambri	75.441	20.1406	Checkdam
141	Pimpalgaon Walan	Phulambri	75.3998	20.1255	Checkdam
142	Pirbawada	Phulambri	75.5655	20.0934	Checkdam
143	Wadod Bajar	Phulambri	75.5456	20.1379	Checkdam
144	Wadod Bajar	Phulambri	75.5292	20.1525	Checkdam
145	Wadod Bajar	Phulambri	75.5409	20.162	Checkdam
146	Wahegaon	Phulambri	75.3876	20.1722	Checkdam
147	Agar Kanadgaon	Gangapur	74.9294	19.6626	Checkdam
148	Agar Kanadgaon	Gangapur	74.9211	19.6529	Checkdam
149	Akoli Wadgaon	Gangapur	74.9128	19.8152	Checkdam
150	Akoli Wadgaon	Gangapur	74.9118	19.8337	Checkdam
151	Alamgirpur	Gangapur	74.918	19.7114	Checkdam
152	Alamgirpur	Gangapur	74.9325	19.7357	Checkdam
153	Ambegaon	Gangapur	75.1815	19.882	Checkdam
154	Ambelohal	Gangapur	75.15	19.8196	Checkdam
155	Anafpur	Gangapur	75.0153	19.9576	Checkdam
156	Anafpur	Gangapur	75.0109	19.9455	Checkdam
157	Apegaon	Gangapur	75.1189	19.8859	Checkdam
158	Apegaon	Gangapur	75.1243	19.8852	Checkdam
159	Babargaon	Gangapur	75.0764	19.7182	Checkdam
160	Babhulgaon	Gangapur	75.029	19.9677	Checkdam
161	Babhulgaon	Gangapur	75.0479	19.9757	Checkdam
162	Bargipur	Gangapur	75.1417	19.8693	Checkdam
163	Bargipur	Gangapur	75.1528	19.8835	Checkdam
164	Bhagathan	Gangapur	74.9651	19.8688	Checkdam
165	Bhalgaon	Gangapur	74.9858	19.764	Checkdam
166	Bhendala	Gangapur	75.0764	19.6621	Checkdam
167	Bhendala	Gangapur	75.08	19.6748	Checkdam
168	Bhendala	Gangapur	75.0681	19.6691	Checkdam
169	Bhiw-Dhonora	Gangapur	75.0873	19.646	Checkdam
170	Bolegaon	Gangapur	75.049	19.7387	Checkdam
171	Butte Wadgaon	Gangapur	75.0086	19.8517	Checkdam
172	Chinchkheda	Gangapur	74.9868	19.9156	Checkdam
173	Dahegaon	Gangapur	75.1541	19.7365	Checkdam
174	Derhal	Gangapur	75.0516	19.9888	Checkdam
175	Derhal	Gangapur	75.0702	19.9927	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
176	Derhal	Gangapur	75.0821	19.9839	Checkdam
177	Dhamori Bk.	Gangapur	75.1971	19.7001	Checkdam
178	Dhamori Bk.	Gangapur	75.1898	19.7177	Checkdam
179	Dhamori Kh.	Gangapur	75.0526	19.9342	Checkdam
180	Dhoregaon	Gangapur	75.1202	19.7172	Checkdam
181	Dighi	Gangapur	75.1088	19.7798	Checkdam
182	Dinwada	Gangapur	75.0019	19.979	Checkdam
183	Domegaon	Gangapur	75.1002	19.8059	Checkdam
184	Dongaon	Gangapur	75.0997	19.954	Checkdam
185	Dongaon	Gangapur	75.0901	19.9521	Checkdam
186	Dongaon	Gangapur	75.0837	19.948	Checkdam
187	Eklahera	Gangapur	75.1743	19.8498	Checkdam
188	Fatulabad	Gangapur	75.1489	19.9069	Checkdam
189	Fulshevra	Gangapur	75.0707	19.8615	Checkdam
190	Fulshevra	Gangapur	75.0751	19.8662	Checkdam
191	Fulshevra	Gangapur	75.0663	19.8563	Checkdam
192	Gajgaon	Gangapur	75.0806	19.8391	Checkdam
193	Gajgaon	Gangapur	75.0819	19.8478	Checkdam
194	Galnimb	Gangapur	75.0842	19.6295	Checkdam
195	Gangapur	Gangapur	75.0189	19.6733	Checkdam
196	Gangapur	Gangapur	75.0355	19.6851	Checkdam
197	Gangapur(Urban)	Gangapur	75.0148	19.7075	Checkdam
198	Gangapur(Urban)	Gangapur	74.9977	19.6909	Checkdam
199	Gangapur(Urban)	Gangapur	74.9936	19.7031	Checkdam
200	Gangapur(Urban)	Gangapur	75.0448	19.747	Checkdam
201	Gangapur(Urban)	Gangapur	74.9944	19.709	Checkdam
202	Gavli Shivra	Gangapur	75.0728	19.8888	Checkdam
203	Gavli Shivra	Gangapur	75.0816	19.8947	Checkdam
204	Gavli Shivra	Gangapur	75.0754	19.8798	Checkdam
205	Gavli Shivra	Gangapur	75.0684	19.8956	Checkdam
206	Gavli Shivra	Gangapur	75.0674	19.8726	Checkdam
207	Golegaon	Gangapur	75.0567	19.8445	Checkdam
208	Gopalwadi	Gangapur	74.9641	19.8362	Checkdam
209	Guru Dhanora	Gangapur	75.1608	19.707	Checkdam
210	Haibatpur	Gangapur	75.1903	19.8986	Checkdam
211	Haibatpur	Gangapur	74.8841	19.6573	Checkdam
212	Haibatpur	Gangapur	74.8856	19.6739	Checkdam
213	Hanumantgaon	Gangapur	75.1049	19.6977	Checkdam
214	Ismailpur	Gangapur	75.1727	19.9351	Checkdam
215	Ismailpur	Gangapur	75.1639	19.9246	Checkdam
216	Jamgaon	Gangapur	74.9936	19.6485	Checkdam
217	Jamgaon	Gangapur	74.9907	19.6645	Checkdam
218	Jikthan	Gangapur	75.1437	19.766	Checkdam
219	Jogeshwari	Gangapur	75.2136	19.8181	Checkdam
220	Kaigaon	Gangapur	75.0397	19.6441	Checkdam
221	Kaigaon	Gangapur	75.0322	19.6455	Checkdam
222	Kalegaon	Gangapur	75.1044	19.7704	Checkdam
223	Kalegaon	Gangapur	75.1101	19.7548	Checkdam
224	Kasoda	Gangapur	75.1665	19.8298	Checkdam
225	Kasoda	Gangapur	75.1893	19.8298	Checkdam
226	Katepimpalgaon	Gangapur	74.9288	19.8401	Checkdam
227	Katepimpalgaon	Gangapur	74.9247	19.8557	Checkdam
228	Khadak Narala	Gangapur	75.0839	19.9117	Checkdam
229	Khadgaon	Gangapur	75.065	19.8332	Checkdam
230	Khojewadi	Gangapur	75.1709	19.9025	Checkdam
231	Khojewadi	Gangapur	75.165	19.8876	Checkdam
232	Khopeshwar	Gangapur	74.9801	19.8016	Checkdam
233	Kinhal	Gangapur	75.0888	19.9966	Checkdam
234	Kobapur	Gangapur	75.079	19.7518	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
235	Kolghar	Gangapur	75.0342	19.7694	Checkdam
236	Kolghar	Gangapur	75.0218	19.7792	Checkdam
237	Limbe Jalgaon	Gangapur	75.1924	19.7743	Checkdam
238	Mahalaxmikheda	Gangapur	75.1831	19.6217	Checkdam
239	Mahmadpur	Gangapur	75.1911	19.7527	Checkdam
240	Maliwadgaon	Gangapur	75.034	19.981	Checkdam
241	Maliwadgaon	Gangapur	75.0438	19.9912	Checkdam
242	Maliwadgaon	Gangapur	75.042	19.9803	Checkdam
243	Malunja Kh.	Gangapur	75.0076	19.7562	Checkdam
244	Mangegaon	Gangapur	75.1562	19.6431	Checkdam
245	Manjari	Gangapur	74.9237	19.6836	Checkdam
246	Manjari	Gangapur	74.9351	19.6777	Checkdam
247	Manjari	Gangapur	74.9459	19.6894	Checkdam
248	Maujadabad	Gangapur	75.0614	19.7203	Checkdam
249	Maujadabad	Gangapur	75.049	19.7203	Checkdam
250	Mehebubkheda	Gangapur	74.9739	19.8888	Checkdam
251	Mhasa	Gangapur	74.9843	19.7801	Checkdam
252	Mohali	Gangapur	74.9734	19.7465	Checkdam
253	Mudhesh Wadgaon	Gangapur	74.933	19.7216	Checkdam
254	Mudhesh Wadgaon	Gangapur	74.9397	19.7128	Checkdam
255	Murmi	Gangapur	75.1427	19.7274	Checkdam
256	Mustafabad	Gangapur	75.1823	19.8703	Checkdam
257	Nagapur	Gangapur	75.2059	19.6821	Checkdam
258	Naigaon	Gangapur	75.239	19.8001	Checkdam
259	Nandeda	Gangapur	75.1867	19.8518	Checkdam
260	Nandeda	Gangapur	75.1748	19.8543	Checkdam
261	Nawabpur	Gangapur	74.9775	19.6763	Checkdam
262	Pachapirwadi	Gangapur	75.1096	19.9606	Checkdam
263	Padalsa	Gangapur	75.0588	19.9815	Checkdam
264	Padalsa	Gangapur	75.065	19.9678	Checkdam
265	Padampur	Gangapur	75.0904	19.744	Checkdam
266	Pahadpur	Gangapur	75.1323	19.8966	Checkdam
267	Part Of Nevargaon	Gangapur	74.8711	19.6573	Checkdam
268	Part Of Nevargaon	Gangapur	74.8711	19.6685	Checkdam
269	Pekalwadi	Gangapur	75.1639	19.9368	Checkdam
270	Pendapur	Gangapur	75.0971	19.7284	Checkdam
271	Pimpri	Gangapur	74.9444	19.7835	Checkdam
272	Pimpri	Gangapur	74.9397	19.7977	Checkdam
273	Potul	Gangapur	75.1329	19.9161	Checkdam
274	Potul	Gangapur	75.1308	19.9303	Checkdam
275	Pratappur	Gangapur	75.0863	19.8626	Checkdam
276	Raipur	Gangapur	75.0733	19.9717	Checkdam
277	Rajangaon Pol	Gangapur	75.1158	19.8986	Checkdam
278	Rajangaon Pol	Gangapur	75.1085	19.9034	Checkdam
279	Rajura	Gangapur	75.136	19.7869	Checkdam
280	Ranjangaon Narhari	Gangapur	74.9335	19.8098	Checkdam
281	Ranjngaon	Gangapur	75.2095	19.8435	Checkdam
282	Sanav	Gangapur	75.0039	19.9902	Checkdam
283	Sarangpur	Gangapur	75.1277	19.7426	Checkdam
284	Sarangpur	Gangapur	75.1217	19.7323	Checkdam
285	Sawangi	Gangapur	75.0303	19.9205	Checkdam
286	Shah Nawajpur	Gangapur	75.1028	19.9275	Checkdam
287	Shah Nawajpur	Gangapur	75.1046	19.918	Checkdam
288	Shah Nawajpur	Gangapur	75.1101	19.9195	Checkdam
289	Shahapur	Gangapur	75.05	19.8098	Checkdam
290	Shahapur Kadim	Gangapur	75.1445	19.7016	Checkdam
291	Shankarpur	Gangapur	75.1909	19.6323	Checkdam
292	Shekta	Gangapur	75.0101	19.8269	Checkdam
293	Shingi	Gangapur	74.9599	19.7889	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
294	Shirodi	Gangapur	75.1391	19.7993	Checkdam
295	Shivrai	Gangapur	75.1976	19.7698	Checkdam
296	Siddhanath Wadgaon	Gangapur	74.9765	19.8181	Checkdam
297	Siddhapur	Gangapur	74.9739	19.6972	Checkdam
298	Sillegon	Gangapur	75.0101	19.862	Checkdam
299	Sillegon	Gangapur	75.0192	19.8648	Checkdam
300	Sindhi Sirasgon	Gangapur	75.1401	19.8913	Checkdam
301	Sindhi Sirasgon	Gangapur	75.158	19.9146	Checkdam
302	Singpur	Gangapur	75.0531	19.8298	Checkdam
303	Siregaon	Gangapur	75.0164	19.8869	Checkdam
304	Siresaigaon	Gangapur	74.9547	19.8552	Checkdam
305	Sultanabad	Gangapur	75.0226	19.9015	Checkdam
306	Sultanpur	Gangapur	75.2116	19.6153	Checkdam
307	Surewadi	Gangapur	75.0676	19.727	Checkdam
308	Takli	Gangapur	75.1556	19.9234	Checkdam
309	Takli	Gangapur	75.1567	19.9348	Checkdam
310	Takliwadi	Gangapur	75.1349	19.942	Checkdam
311	Takliwadi	Gangapur	75.1272	19.9473	Checkdam
312	Talpim	Gangapur	75.1919	19.6602	Checkdam
313	Tanduladi	Gangapur	75.0143	19.7972	Checkdam
314	Tandulwadi	Gangapur	75.2113	19.6385	Checkdam
315	Tembhapri	Gangapur	75.189	19.7364	Checkdam
316	Turkabad Kharadi	Gangapur	75.1883	19.8045	Checkdam
317	Vairagad	Gangapur	75.0153	19.9746	Checkdam
318	Vairagad	Gangapur	75.0221	19.9707	Checkdam
319	Wahegaon	Gangapur	74.9112	19.7099	Checkdam
320	Wahegaon	Gangapur	74.9107	19.6845	Checkdam
321	Wahegaon	Gangapur	74.9061	19.7172	Checkdam
322	Waluj Bk.	Gangapur	75.2048	19.7991	Checkdam
323	Warkhed	Gangapur	74.8973	19.7474	Checkdam
324	Warzadi	Gangapur	75.138	19.9571	Checkdam
325	Wasusagaon	Gangapur	75.1065	19.9083	Checkdam
326	Wazar	Gangapur	75.1626	19.6319	Checkdam
327	Yesaon	Gangapur	75.1178	19.7911	Checkdam
328	Yesgavhan	Gangapur	75.217	19.6117	Checkdam
329	Zanzari	Gangapur	75.1461	19.6838	Checkdam
330	Zodegaon	Gangapur	74.9351	19.823	Checkdam
331	Amba	Kannad	75.0433	20.2989	Checkdam
332	Ambala	Kannad	75.0309	20.3043	Checkdam
333	Ambegaon Bk.	Kannad	75.2442	20.3604	Checkdam
334	Ambegaon Bk.	Kannad	75.261	20.3681	Checkdam
335	Amdabad	Kannad	75.4187	20.3023	Checkdam
336	Andhaner	Kannad	75.0935	20.2652	Checkdam
337	Andhaner	Kannad	75.1013	20.28	Checkdam
338	Athegaon	Kannad	75.0666	20.1412	Checkdam
339	Aurala	Kannad	74.9672	20.1835	Checkdam
340	Bahirgaon	Kannad	75.1681	20.208	Checkdam
341	Banshendra	Kannad	75.1233	20.2068	Checkdam
342	Banshendra	Kannad	75.1101	20.2	Checkdam
343	Banshendra	Kannad	75.1018	20.1908	Checkdam
344	Banshendra	Kannad	75.1098	20.1818	Checkdam
345	Banshendra	Kannad	75.115	20.1755	Checkdam
346	Banshendra	Kannad	75.1147	20.1901	Checkdam
347	Bhokangaon	Kannad	75.1805	20.2139	Checkdam
348	Bhopewadi	Kannad	75.2278	20.4393	Checkdam
349	Bhopewadi	Kannad	75.2182	20.4483	Checkdam
350	Bhopewadi	Kannad	75.2083	20.4575	Checkdam
351	Bibkhea	Kannad	74.9912	20.2008	Checkdam
352	Bibkhea	Kannad	74.9861	20.211	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
353	Bramhani Garada	Kannad	75.1468	20.2941	Checkdam
354	Chapaner	Kannad	75.0681	20.185	Checkdam
355	Chapaner	Kannad	75.0562	20.1971	Checkdam
356	Chapaner	Kannad	75.0684	20.1728	Checkdam
357	Chikhalthan	Kannad	75.1981	20.2008	Checkdam
358	Chikhalthan	Kannad	75.2136	20.193	Checkdam
359	Chimnapur	Kannad	75.2375	20.3883	Checkdam
360	Chinchkheda Kh.	Kannad	75.0448	20.1811	Checkdam
361	Chincholi	Kannad	75.3692	20.3765	Checkdam
362	Chincholi	Kannad	75.3843	20.3859	Checkdam
363	Dabhadi	Kannad	75.1745	20.2447	Checkdam
364	Dabhadi	Kannad	75.1722	20.2265	Checkdam
365	Dahigaon	Kannad	75.4177	20.3402	Checkdam
366	Deopul	Kannad	75.2732	20.2868	Checkdam
367	Digaon	Kannad	75.4413	20.3549	Checkdam
368	Digar Wadi	Kannad	75.3024	20.3002	Checkdam
369	Dudhmal	Kannad	75.3083	20.434	Checkdam
370	Ganeshpur	Kannad	75.3651	20.3509	Checkdam
371	Ganeshpur	Kannad	75.3742	20.3504	Checkdam
372	Gavhali	Kannad	75.0184	20.1765	Checkdam
373	Gavhali	Kannad	75.0246	20.1913	Checkdam
374	Ghatshendra	Kannad	75.3497	20.4082	Checkdam
375	Gudma	Kannad	75.0314	20.2003	Checkdam
376	Haraswadi	Kannad	75.1973	20.4	Checkdam
377	Haraswadi	Kannad	75.1877	20.4104	Checkdam
378	Haraswadi	Kannad	75.1802	20.4155	Checkdam
379	Haraswadi	Kannad	75.1722	20.4116	Checkdam
380	Haraswadi	Kannad	75.1678	20.4116	Checkdam
381	Hasankheda	Kannad	75.0381	20.156	Checkdam
382	Hasta	Kannad	75.2442	20.2785	Checkdam
383	Hatnoor	Kannad	75.116	20.1475	Checkdam
384	Hatnoor	Kannad	75.1163	20.1594	Checkdam
385	Hatnoor	Kannad	75.1497	20.1556	Checkdam
386	Hatnoor	Kannad	75.1437	20.1624	Checkdam
387	Hiarkheda (Gautala)	Kannad	75.1386	20.2912	Checkdam
388	Jaitapur	Kannad	75.1142	20.1342	Checkdam
389	Jaitapur	Kannad	75.0842	20.1172	Checkdam
390	Jalgaonghat	Kannad	75.0912	20.1478	Checkdam
391	Jalgaonghat	Kannad	75.0824	20.1624	Checkdam
392	Jamdi (F)	Kannad	75.0347	20.2472	Checkdam
393	Jamdi (Ja)	Kannad	75.4073	20.3436	Checkdam
394	Jamdi (Ja)	Kannad	75.3923	20.3475	Checkdam
395	Jamdi Kh.	Kannad	75.1911	20.2224	Checkdam
396	Jawakheda Bk.	Kannad	75.3892	20.2766	Checkdam
397	Jawali Kh.	Kannad	75.0394	20.1373	Checkdam
398	Jehur	Kannad	74.9597	20.2219	Checkdam
399	Jehur	Kannad	74.9555	20.2114	Checkdam
400	Jehur	Kannad	74.9602	20.1957	Checkdam
401	Kanadgaon (Kannad)	Kannad	74.9607	20.1453	Checkdam
402	Kanadgaon (Kannad)	Kannad	74.9685	20.1361	Checkdam
403	Kannad(Rural)	Kannad	75.165	20.2333	Checkdam
404	Kannad(Urban)	Kannad	75.123	20.2712	Checkdam
405	Karanjkheda Jahagir	Kannad	75.2804	20.3742	Checkdam
406	Karanjkheda Jahagir	Kannad	75.3163	20.3806	Checkdam
407	Karanjkheda Jahagir	Kannad	75.3021	20.3706	Checkdam
408	Karanjkheda Jahagir	Kannad	75.3052	20.3585	Checkdam
409	Karanjkheda Jahagir	Kannad	75.2922	20.3566	Checkdam
410	Karanjkheda Khalsa	Kannad	75.2952	20.39	Checkdam
411	Karanjkheda Khalsa	Kannad	75.2965	20.3939	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
412	Karanjkheda Khalsa	Kannad	75.2995	20.4274	Checkdam
413	Karanjkheda Khalsa	Kannad	75.2876	20.4269	Checkdam
414	Kesapur	Kannad	75.0604	20.1235	Checkdam
415	Khaparkheda	Kannad	75.0096	20.1371	Checkdam
416	Khatkheda	Kannad	75.2911	20.3096	Checkdam
417	Khatkheda	Kannad	75.2866	20.3196	Checkdam
418	Kheda	Kannad	75.0839	20.1784	Checkdam
419	Khedi	Kannad	75.4486	20.3517	Checkdam
420	Kolwadi	Kannad	75.012	20.2411	Checkdam
421	Kolwadi	Kannad	75.0032	20.2421	Checkdam
422	Kolwadi	Kannad	75.0262	20.2392	Checkdam
423	Kondbari	Kannad	75.2513	20.4129	Checkdam
424	Kondbari	Kannad	75.2503	20.4211	Checkdam
425	Kondbari	Kannad	75.2523	20.4284	Checkdam
426	Lohagaon	Kannad	75.3849	20.4022	Checkdam
427	Lohagaon	Kannad	75.3929	20.4129	Checkdam
428	Lonza	Kannad	75.2192	20.4175	Checkdam
429	Lonza	Kannad	75.1907	20.4391	Checkdam
430	Makrunpur	Kannad	75.1173	20.2545	Checkdam
431	Mategaon	Kannad	75.2649	20.2853	Checkdam
432	Mehun Puranwadi	Kannad	75.2047	20.3668	Checkdam
433	Mehun Puranwadi	Kannad	75.2039	20.3643	Checkdam
434	Mehun Puranwadi	Kannad	75.2063	20.3544	Checkdam
435	Mohadi	Kannad	75.4021	20.3067	Checkdam
436	Mohara	Kannad	75.4538	20.2721	Checkdam
437	Mohara	Kannad	75.4558	20.2813	Checkdam
438	Moharda	Kannad	75.1696	20.2625	Checkdam
439	Moharda	Kannad	75.181	20.2693	Checkdam
440	Moharda	Kannad	75.1888	20.2756	Checkdam
441	Mundwadi	Kannad	75.0619	20.2513	Checkdam
442	Mundwadi Tanda	Kannad	75.0806	20.278	Checkdam
443	Mungsapur	Kannad	74.9379	20.2287	Checkdam
444	Mungsapur	Kannad	74.9506	20.2265	Checkdam
445	Nagad	Kannad	75.1762	20.4638	Checkdam
446	Nagapur	Kannad	75.2719	20.3713	Checkdam
447	Nagapur	Kannad	75.2696	20.3815	Checkdam
448	Nandgirwadi	Kannad	75.2072	20.2265	Checkdam
449	Nandgirwadi	Kannad	75.2105	20.2353	Checkdam
450	Nandgirwadi	Kannad	75.2111	20.2207	Checkdam
451	Narsingpur	Kannad	75.1474	20.2659	Checkdam
452	Newpur Khalsa	Kannad	75.3338	20.3822	Checkdam
453	Newpur Khalsa	Kannad	75.3392	20.3796	Checkdam
454	Nimbhora	Kannad	75.2447	20.3045	Checkdam
455	Nimbhora	Kannad	75.2426	20.3126	Checkdam
456	Nimbhora	Kannad	75.2333	20.3111	Checkdam
457	Nimbhora	Kannad	75.218	20.3126	Checkdam
458	Nimdongri	Kannad	75.1898	20.1767	Checkdam
459	Nimdongri	Kannad	75.187	20.1665	Checkdam
460	Nipani	Kannad	74.9529	20.1845	Checkdam
461	Palasgaon	Kannad	75.0977	20.2158	Checkdam
462	Palasgaon	Kannad	75.0945	20.2029	Checkdam
463	Palshi Kh.	Kannad	75.2918	20.2936	Checkdam
464	Pangra	Kannad	75.2047	20.4444	Checkdam
465	Pedakwadi	Kannad	74.9765	20.2311	Checkdam
466	Pedakwadi	Kannad	74.9749	20.2248	Checkdam
467	Pimparkheda	Kannad	75.3762	20.2717	Checkdam
468	Pishore	Kannad	75.3408	20.3084	Checkdam
469	Pishore	Kannad	75.3459	20.3024	Checkdam
470	Pishore	Kannad	75.3182	20.2931	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
471	Rail Navadi	Kannad	75.0847	20.2554	Checkdam
472	Rail Navadi	Kannad	75.1041	20.2484	Checkdam
473	Rampurwadi	Kannad	75.1716	20.3845	Checkdam
474	Rewoolgaon	Kannad	75.3162	20.3956	Checkdam
475	Rithi	Kannad	75.1593	20.2552	Checkdam
476	Rojwepur	Kannad	75.3536	20.3799	Checkdam
477	Saegaon	Kannad	74.9819	20.1167	Checkdam
478	Saigavhan	Kannad	75.1484	20.4274	Checkdam
479	Saigavhan	Kannad	75.1342	20.398	Checkdam
480	Saigavhan	Kannad	75.1336	20.4092	Checkdam
481	Saigavhan	Kannad	75.1542	20.3816	Checkdam
482	Sarola	Kannad	75.4227	20.2852	Checkdam
483	Sarola	Kannad	75.4108	20.2818	Checkdam
484	Shafepur	Kannad	75.3296	20.2809	Checkdam
485	Shafiabad	Kannad	75.3457	20.28	Checkdam
486	Shafiabad	Kannad	75.3519	20.2732	Checkdam
487	Shelgaon	Kannad	75.4232	20.359	Checkdam
488	Shirasgaon	Kannad	75.085	20.2015	Checkdam
489	Shirasgaon	Kannad	75.0881	20.2192	Checkdam
490	Shirodi	Kannad	74.9925	20.1837	Checkdam
491	Shivrai	Kannad	75.1471	20.1847	Checkdam
492	Sirjapur Tanda	Kannad	75.0759	20.2166	Checkdam
493	Sirjapur Tanda	Kannad	75.0635	20.2129	Checkdam
494	Sitanaik Tanda(N.V)	Kannad	75.0024	20.2382	Checkdam
495	Takli Antur	Kannad	75.3725	20.418	Checkdam
496	Takli Antur	Kannad	75.3722	20.4121	Checkdam
497	Talner	Kannad	75.321	20.4206	Checkdam
498	Talner	Kannad	75.3147	20.433	Checkdam
499	Tandulwadi	Kannad	74.9421	20.2467	Checkdam
500	Tandulwadi	Kannad	74.9493	20.2421	Checkdam
501	Teladi	Kannad	75.0837	20.2843	Checkdam
503	Umberheda	Kannad	75.2173	20.3613	Checkdam
504	Upla	Kannad	75.0702	20.3014	Checkdam
505	Vita	Kannad	74.9791	20.1232	Checkdam
506	Vita	Kannad	74.9899	20.1361	Checkdam
507	Vitthalpur	Kannad	75.1445	20.2272	Checkdam
508	Wadali	Kannad	75.2302	20.2136	Checkdam
509	Wadali	Kannad	75.2204	20.2051	Checkdam
510	Wadgaon (Jadhav)	Kannad	75.1716	20.4308	Checkdam
511	Wadhod	Kannad	75.3771	20.449	Checkdam
512	Wadhod	Kannad	75.3761	20.4381	Checkdam
513	Wadichimnpur	Kannad	75.2494	20.3776	Checkdam
514	Wadichimnpur	Kannad	75.2366	20.3748	Checkdam
515	Wadichimnpur	Kannad	75.2324	20.3794	Checkdam
516	Wadner	Kannad	75.0329	20.2693	Checkdam
517	Wadner Tanda	Kannad	75.0174	20.2554	Checkdam
518	Waghul Kheda	Kannad	75.3633	20.2712	Checkdam
519	Wakad	Kannad	75.4123	20.3925	Checkdam
520	Waki Kadim	Kannad	75.3591	20.3995	Checkdam
521	Bhandegaon	Khuldabad	75.2973	20.0447	Checkdam
522	Bhataji	Khuldabad	75.2416	20.0155	Checkdam
523	Bhataji	Khuldabad	75.2364	20.0254	Checkdam
524	Bhataji	Khuldabad	75.2297	20.0259	Checkdam
525	Bhataji	Khuldabad	75.2307	20.0323	Checkdam
526	Deolana Bk.	Khuldabad	75.2706	20.0704	Checkdam
527	Deolana Kh.	Khuldabad	75.2781	20.0719	Checkdam
528	Gadana	Khuldabad	75.2755	20.0505	Checkdam
529	Ghodegoan	Khuldabad	75.2654	20.0077	Checkdam
530	Golegaon	Khuldabad	75.2755	20.0262	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
531	Golegaon	Khuldabad	75.2672	20.0164	Checkdam
532	Indapur	Khuldabad	75.2856	20.148	Checkdam
533	Kautgaon	Khuldabad	75.1704	20.1346	Checkdam
534	Khandi Pimpalgaon	Khuldabad	75.31	20.0354	Checkdam
535	Khandi Pimpalgaon	Khuldabad	75.3074	20.0427	Checkdam
536	Khandi Pimpalgaon	Khuldabad	75.304	20.0364	Checkdam
537	Khaspur	Khuldabad	75.1329	20.1011	Checkdam
538	Khaspur	Khuldabad	75.1533	20.105	Checkdam
539	Mamnapur	Khuldabad	75.2543	20.0284	Checkdam
540	Matargaon	Khuldabad	75.2931	20.0797	Checkdam
541	Nirgudi Bk.	Khuldabad	75.1841	20.1144	Checkdam
542	Nirgudi Bk.	Khuldabad	75.1779	20.113	Checkdam
543	Nirgudi Kh.	Khuldabad	75.1914	20.123	Checkdam
544	Rail	Khuldabad	75.2864	20.1356	Checkdam
545	Sawangi Bazar	Khuldabad	75.3151	20.129	Checkdam
546	Sawangi Bazar	Khuldabad	75.2947	20.1166	Checkdam
547	Shekapur	Khuldabad	75.298	20.1397	Checkdam
548	Tajnapur	Khuldabad	75.332	20.1169	Checkdam
549	Takali	Khuldabad	75.238	20.0661	Checkdam
550	Takali	Khuldabad	75.2351	20.0629	Checkdam
551	Viramgaon	Khuldabad	75.2522	20.0583	Checkdam
552	Viramgaon	Khuldabad	75.2558	20.0651	Checkdam
553	Wadhod Bk.	Khuldabad	75.3037	20.0678	Checkdam
554	Yesgaon	Khuldabad	75.3162	20.0889	Checkdam
555	Abdullapur	Paithan	75.5146	19.6924	Checkdam
556	Adgaon	Paithan	75.6213	19.6606	Checkdam
557	Adgaon	Paithan	75.6084	19.6651	Checkdam
558	Adul Bk.	Paithan	75.5426	19.7177	Checkdam
559	Adul Bk.	Paithan	75.5239	19.6753	Checkdam
560	Adul Kh.	Paithan	75.54	19.7329	Checkdam
561	Adul Kh.	Paithan	75.5312	19.727	Checkdam
562	Adul Tanda	Paithan	75.5089	19.6651	Checkdam
563	Adul Tanda	Paithan	75.5151	19.6714	Checkdam
564	Agapur	Paithan	75.475	19.4491	Checkdam
565	Akthawada	Paithan	75.4389	19.5032	Checkdam
566	Akthawada	Paithan	75.425	19.5106	Checkdam
567	Amrapur	Paithan	75.3177	19.5516	Checkdam
568	Anandpur	Paithan	75.4788	19.4678	Checkdam
569	Antarwali Khandi	Paithan	75.5866	19.6597	Checkdam
570	Antarwali Khandi	Paithan	75.5814	19.6685	Checkdam
571	Antarwali Khandi	Paithan	75.5788	19.6507	Checkdam
572	Apegaon	Paithan	75.5079	19.4427	Checkdam
573	Babhulgaon	Paithan	75.2695	19.7583	Checkdam
574	Balanagar	Paithan	75.4535	19.6102	Checkdam
575	Balanagar	Paithan	75.4747	19.6314	Checkdam
576	Ballapur	Paithan	75.2537	19.7304	Checkdam
577	Bangala Tanda(N.V)	Paithan	75.2866	19.6923	Checkdam
578	Bani Tanda	Paithan	75.2965	19.7241	Checkdam
579	Bani Tanda	Paithan	75.2985	19.7075	Checkdam
580	Bidkin	Paithan	75.3239	19.6982	Checkdam
581	Bidkin	Paithan	75.332	19.7156	Checkdam
582	Bidkin	Paithan	75.3224	19.7117	Checkdam
583	Bidkin	Paithan	75.3099	19.7099	Checkdam
584	Bokud Jalgaon	Paithan	75.3379	19.7531	Checkdam
585	Bokud Jalgaon	Paithan	75.3348	19.7602	Checkdam
586	Bokud Jalgaon	Paithan	75.3234	19.7587	Checkdam
587	Brahamangaon	Paithan	75.5519	19.6758	Checkdam
588	Brahamangaon	Paithan	75.5633	19.6831	Checkdam
589	Brahamangaon	Paithan	75.5395	19.6732	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
590	Brahamangaon	Paithan	75.5395	19.6768	Checkdam
591	Changatpur	Paithan	75.3998	19.4276	Checkdam
592	Chauryahattar Jalgao	Paithan	75.3053	19.5863	Checkdam
593	Chauryahattar Jalgao	Paithan	75.3136	19.599	Checkdam
594	Dabhral	Paithan	75.6079	19.706	Checkdam
595	Dabhral	Paithan	75.6089	19.6909	Checkdam
596	Dadegaon Jahagir	Paithan	75.4229	19.4314	Checkdam
597	Dadegaon Jahagir	Paithan	75.4177	19.4366	Checkdam
598	Dadegaon Kh.	Paithan	75.5497	19.5356	Checkdam
599	Dadegaon Kh.	Paithan	75.5599	19.5353	Checkdam
600	Dalwadi	Paithan	75.3623	19.5294	Checkdam
601	Daregaon	Paithan	75.4757	19.6475	Checkdam
602	Dawarwadi	Paithan	75.4965	19.5511	Checkdam
603	Dera	Paithan	75.4996	19.5257	Checkdam
604	Devgan	Paithan	75.5763	19.7104	Checkdam
605	Devgan	Paithan	75.5737	19.6987	Checkdam
606	Devgan	Paithan	75.5788	19.6992	Checkdam
607	Devgan	Paithan	75.5871	19.7046	Checkdam
608	Dhangaon	Paithan	75.3721	19.5873	Checkdam
609	Dhorka	Paithan	75.4016	19.6049	Checkdam
610	Dhorka	Paithan	75.3607	19.6098	Checkdam
611	Dinnaur	Paithan	75.3027	19.6151	Checkdam
612	Dinnaur	Paithan	75.2944	19.6292	Checkdam
613	Diyantpur	Paithan	75.4488	19.5492	Checkdam
614	Dongan	Paithan	75.4291	19.643	Checkdam
615	Dongan	Paithan	75.4291	19.6551	Checkdam
616	Dongan	Paithan	75.4353	19.6465	Checkdam
617	Dongir Tanda(N.V)	Paithan	75.4045	19.7024	Checkdam
618	Ekturi	Paithan	75.6042	19.7231	Checkdam
619	Ekturi	Paithan	75.6167	19.7373	Checkdam
620	Gadhgaon Paitha	Paithan	75.2594	19.6453	Checkdam
621	Gazipur	Paithan	75.3711	19.6826	Checkdam
622	Geora Bashi	Paithan	75.4042	19.6396	Checkdam
623	Geora Bashi	Paithan	75.384	19.6573	Checkdam
624	Geora Bashi	Paithan	75.3998	19.6507	Checkdam
625	Geora Bashi	Paithan	75.3988	19.6648	Checkdam
626	Geora Bk.	Paithan	75.4944	19.7041	Checkdam
627	Georai Marda	Paithan	75.5426	19.6346	Checkdam
628	Georai Marda	Paithan	75.5366	19.6458	Checkdam
629	Georai Marda	Paithan	75.5397	19.6563	Checkdam
630	Georai Marda	Paithan	75.5436	19.6554	Checkdam
631	Georai Marda	Paithan	75.5436	19.6463	Checkdam
632	Ghargaon	Paithan	75.5825	19.7402	Checkdam
633	Gidhada	Paithan	75.2778	19.6786	Checkdam
634	Harhsi Bk.	Paithan	75.5409	19.5531	Checkdam
635	Harhsi Bk.	Paithan	75.5487	19.5745	Checkdam
636	Hiradpuri	Paithan	75.5959	19.4031	Checkdam
637	Hiradpuri	Paithan	75.6016	19.4163	Checkdam
638	Hiwara Chondhla	Paithan	75.5869	19.4754	Checkdam
639	Inayatpur	Paithan	75.5195	19.5912	Checkdam
640	Isarwadi	Paithan	75.3493	19.5653	Checkdam
641	Itawa	Paithan	75.3255	19.748	Checkdam
642	Jambhali	Paithan	75.3623	19.7397	Checkdam
643	Jambhali	Paithan	75.3586	19.7448	Checkdam
644	Kadethan Bk.	Paithan	75.5478	19.6186	Checkdam
645	Kadethan Bk.	Paithan	75.5555	19.6415	Checkdam
646	Kadethan Bk.	Paithan	75.5835	19.6205	Checkdam
647	Kadethan Bk.	Paithan	75.5768	19.6339	Checkdam
648	Kadethan Bk.	Paithan	75.568	19.6558	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
649	Kadethan Bk.	Paithan	75.5566	19.6478	Checkdam
650	Kadethan Kh.	Paithan	75.5213	19.6182	Checkdam
651	Kadethan Kh.	Paithan	75.5268	19.6288	Checkdam
652	Kapuswadi	Paithan	75.412	19.62	Checkdam
653	Karanj Kheda	Paithan	75.4503	19.5208	Checkdam
654	Karkin	Paithan	75.3794	19.6239	Checkdam
655	Karkin	Paithan	75.3825	19.6397	Checkdam
656	Karkin	Paithan	75.3832	19.6302	Checkdam
657	Karkin	Paithan	75.3602	19.6236	Checkdam
658	Kasarpadli	Paithan	75.4413	19.5826	Checkdam
659	Katpur	Paithan	75.4022	19.5238	Checkdam
660	Katpur	Paithan	75.3949	19.5287	Checkdam
661	Kaudgaon	Paithan	75.3224	19.6551	Checkdam
662	Kekat Jalgaon	Paithan	75.6213	19.4957	Checkdam
663	Kekat Jalgaon	Paithan	75.6156	19.5032	Checkdam
664	Kekat Jalgaon	Paithan	75.6281	19.5032	Checkdam
665	Khadgaon	Paithan	75.5321	19.6004	Checkdam
666	Kherda	Paithan	75.4839	19.5965	Checkdam
667	Kherda	Paithan	75.4762	19.5765	Checkdam
668	Koli Bodkha	Paithan	75.625	19.5162	Checkdam
669	Koli Bodkha	Paithan	75.6216	19.5257	Checkdam
670	Krishnapur	Paithan	75.3483	19.728	Checkdam
671	Lohagaon Kh.	Paithan	75.2488	19.6371	Checkdam
672	Mahamadpur	Paithan	75.3716	19.4125	Checkdam
673	Mankapur	Paithan	75.2405	19.5883	Checkdam
674	Mankapur	Paithan	75.2571	19.5721	Checkdam
675	Maygaon	Paithan	75.4677	19.4342	Checkdam
676	Maygaon	Paithan	75.4724	19.4403	Checkdam
677	Mharola	Paithan	75.2763	19.7255	Checkdam
678	Mharola	Paithan	75.2845	19.7021	Checkdam
679	Mharola	Paithan	75.2729	19.717	Checkdam
680	Mirkheda	Paithan	75.6234	19.4788	Checkdam
681	Mohalkheda	Paithan	75.3172	19.639	Checkdam
682	Mudhalwadi	Paithan	75.3972	19.5402	Checkdam
683	Nandalgaon	Paithan	75.3586	19.6655	Checkdam
684	Nandalgaon	Paithan	75.3431	19.6576	Checkdam
685	Nandalgaon	Paithan	75.3462	19.6767	Checkdam
686	Nandar	Paithan	75.5014	19.4635	Checkdam
687	Nandar	Paithan	75.4954	19.506	Checkdam
688	Nanegaon	Paithan	75.4856	19.5607	Checkdam
689	Navgaon	Paithan	75.5312	19.4402	Checkdam
690	Nilaigaon	Paithan	75.3693	19.7221	Checkdam
691	Nilaigaon	Paithan	75.3649	19.7092	Checkdam
692	Pachalgaon	Paithan	75.426	19.5482	Checkdam
693	Pachod Bk.	Paithan	75.6203	19.5814	Checkdam
694	Padli	Paithan	75.3908	19.6868	Checkdam
695	Padli	Paithan	75.3835	19.6814	Checkdam
696	Paithan Kheda	Paithan	75.256	19.7475	Checkdam
697	Paithan Kheda	Paithan	75.2441	19.7499	Checkdam
698	Pangara	Paithan	75.3193	19.749	Checkdam
699	Panthewadi	Paithan	75.4234	19.4857	Checkdam
700	Parundi Tanda	Paithan	75.4965	19.6456	Checkdam
701	Patode Wadgaon	Paithan	75.3369	19.7373	Checkdam
702	Patode Wadgaon	Paithan	75.3462	19.7646	Checkdam
703	Pimpalwadi (Pirachi)	Paithan	75.3498	19.5404	Checkdam
704	Porgaon Tanda(N.V)	Paithan	75.4014	19.69	Checkdam
705	Purundi	Paithan	75.5022	19.6578	Checkdam
706	Pusegaon	Paithan	75.5	19.5731	Checkdam
707	Rahatgaon	Paithan	75.4529	19.5321	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
708	Ranjangaon Dandga	Paithan	75.5621	19.5877	Checkdam
709	Ranjangaon Dandga	Paithan	75.5478	19.6034	Checkdam
710	Ranjangaon Dandga	Paithan	75.5965	19.601	Checkdam
711	Ranjangaon Dandga	Paithan	75.5633	19.5951	Checkdam
712	Ranjangaon Khuri	Paithan	75.2343	19.7084	Checkdam
713	Ranjangaon Khuri	Paithan	75.2338	19.7011	Checkdam
714	Saigaon	Paithan	75.4068	19.4241	Checkdam
715	Sajegaon	Paithan	75.6097	19.586	Checkdam
716	Salwadgaon	Paithan	75.5452	19.4842	Checkdam
717	Shekta	Paithan	75.2431	19.5458	Checkdam
718	Shekta	Paithan	75.2503	19.5467	Checkdam
719	Shekta	Paithan	75.2457	19.6601	Checkdam
720	Shivani	Paithan	75.3177	19.7334	Checkdam
721	Shringarwadi	Paithan	75.471	19.4805	Checkdam
722	Somapuri	Paithan	75.2892	19.6758	Checkdam
723	Sonwadi Kh.	Paithan	75.5145	19.5775	Checkdam
724	Tanda Bk.	Paithan	75.5027	19.6056	Checkdam
725	Tanda Kh.	Paithan	75.4819	19.6189	Checkdam
726	Taru Pimpaladi	Paithan	75.2965	19.5316	Checkdam
727	Telwadi	Paithan	75.3783	19.4519	Checkdam
728	Thergaon	Paithan	75.5766	19.5477	Checkdam
729	Thergaon	Paithan	75.5709	19.5599	Checkdam
730	Thergaon	Paithan	75.5752	19.5638	Checkdam
731	Thergaon	Paithan	75.5952	19.5538	Checkdam
732	Tupewadi	Paithan	75.4877	19.6426	Checkdam
733	Vihamandwa	Paithan	75.5752	19.4534	Checkdam
734	Vihamandwa	Paithan	75.5778	19.4671	Checkdam
735	Wadgavhan Bk.	Paithan	75.3617	19.6919	Checkdam
736	Wadji	Paithan	75.5538	19.501	Checkdam
737	Wadji	Paithan	75.5704	19.5127	Checkdam
738	Waghade	Paithan	75.4312	19.4754	Checkdam
739	Wahegaon	Paithan	75.3985	19.5545	Checkdam
740	Wahegaon	Paithan	75.4244	19.579	Checkdam
741	Wahegaon	Paithan	75.4045	19.5746	Checkdam
742	Warundi Bk.	Paithan	75.4358	19.5721	Checkdam
743	Water Mask	Paithan	75.3602	19.5164	Checkdam
744	Water Mask	Paithan	75.3374	19.5194	Checkdam
745	Water Mask	Paithan	75.311	19.5179	Checkdam
746	Wawa	Paithan	75.4327	19.5958	Checkdam
747	Ambhai	Sillod	75.5705	20.4644	Checkdam
748	Ambhai	Sillod	75.5654	20.4707	Checkdam
749	Amthana	Sillod	75.4715	20.4266	Checkdam
750	Amthana	Sillod	75.4712	20.4197	Checkdam
751	Amthana	Sillod	75.4683	20.4109	Checkdam
752	Amthana	Sillod	75.4652	20.4037	Checkdam
753	Andhari	Sillod	75.4888	20.2878	Checkdam
754	Andhari	Sillod	75.4819	20.2823	Checkdam
755	Andhari	Sillod	75.4981	20.2838	Checkdam
756	Andhari	Sillod	75.4958	20.275	Checkdam
757	Andhari	Sillod	75.4933	20.2693	Checkdam
758	Babhulgaon Bk.	Sillod	75.5937	20.2264	Checkdam
759	Babhulgaon Bk.	Sillod	75.5889	20.2283	Checkdam
760	Bhaiaon	Sillod	75.5855	20.2156	Checkdam
761	Bhaiaon	Sillod	75.5891	20.2194	Checkdam
762	Borgaon Bajar	Sillod	75.5023	20.3664	Checkdam
763	Borgaon Kasari	Sillod	75.646	20.2313	Checkdam
764	Borgaon Kasari	Sillod	75.6538	20.2327	Checkdam
765	Charner	Sillod	75.471	20.446	Checkdam
766	Charner	Sillod	75.4437	20.4315	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
767	Charner	Sillod	75.4476	20.4388	Checkdam
768	Chinchan	Sillod	75.4927	20.4214	Checkdam
769	Chinchkheda	Sillod	75.6274	20.2597	Checkdam
770	Dhawada	Sillod	75.4697	20.434	Checkdam
771	Dhawada	Sillod	75.4832	20.4369	Checkdam
772	Didgaon	Sillod	75.5244	20.3426	Checkdam
773	Digras	Sillod	75.7381	20.4361	Checkdam
774	Doiphoda	Sillod	75.5249	20.3534	Checkdam
775	Dongargaon	Sillod	75.6505	20.3276	Checkdam
776	Gavhali Tanda	Sillod	75.6674	20.2	Checkdam
777	Gavhali Tanda	Sillod	75.6744	20.2177	Checkdam
778	Gavhali Tanda	Sillod	75.6748	20.2234	Checkdam
779	Georai Shemi	Sillod	75.5592	20.248	Checkdam
780	Ghatnandra	Sillod	75.4251	20.4401	Checkdam
781	Ghatnandra	Sillod	75.4244	20.448	Checkdam
782	Ghatnandra	Sillod	75.4241	20.4595	Checkdam
783	Ghatnandra	Sillod	75.4153	20.4401	Checkdam
784	Ghatnandra	Sillod	75.4282	20.4329	Checkdam
785	Golegaon Bk.	Sillod	75.7167	20.4404	Checkdam
786	Golegaon Bk.	Sillod	75.7307	20.4467	Checkdam
787	Golegaon Kh.	Sillod	75.7019	20.4396	Checkdam
788	Golegaon Kh.	Sillod	75.7271	20.4362	Checkdam
789	Golegaon Kh.	Sillod	75.7347	20.4308	Checkdam
790	Golegaon Kh.	Sillod	75.7122	20.429	Checkdam
791	Jalki (Vasai)	Sillod	75.6372	20.4711	Checkdam
792	Khedi	Sillod	75.6786	20.4041	Checkdam
793	Khullod	Sillod	75.6448	20.4694	Checkdam
794	Korhala	Sillod	75.4872	20.4807	Checkdam
795	Kotandra	Sillod	75.5127	20.3816	Checkdam
796	Kotandra	Sillod	75.5001	20.3745	Checkdam
797	Krhala	Sillod	75.5727	20.2673	Checkdam
798	Krhala	Sillod	75.5794	20.2691	Checkdam
799	Krhala	Sillod	75.5869	20.2737	Checkdam
800	Krhala	Sillod	75.5919	20.273	Checkdam
801	Krhala	Sillod	75.5999	20.2585	Checkdam
802	Krhala	Sillod	75.6056	20.2644	Checkdam
803	Krhala	Sillod	75.6101	20.2693	Checkdam
804	Krhala	Sillod	75.5871	20.263	Checkdam
805	Krhala	Sillod	75.6114	20.2484	Checkdam
806	Leha	Sillod	75.6926	20.4135	Checkdam
807	Leha	Sillod	75.6831	20.4143	Checkdam
808	Leha	Sillod	75.6996	20.3908	Checkdam
809	Lonwadi	Sillod	75.4951	20.2964	Checkdam
810	Lonwadi	Sillod	75.5156	20.2949	Checkdam
811	Lonwadi	Sillod	75.5161	20.3028	Checkdam
812	Lonwadi	Sillod	75.5064	20.2914	Checkdam
813	Mangrul	Sillod	75.6475	20.3332	Checkdam
814	Mangrul	Sillod	75.6425	20.3366	Checkdam
815	Modha Bk.	Sillod	75.5988	20.3472	Checkdam
816	Modha Bk.	Sillod	75.6185	20.3436	Checkdam
817	Modha Bk.	Sillod	75.6265	20.3462	Checkdam
818	Mohal	Sillod	75.6299	20.446	Checkdam
819	Mohal	Sillod	75.6297	20.4398	Checkdam
820	Mohal	Sillod	75.6299	20.4259	Checkdam
821	Mohal	Sillod	75.6362	20.4323	Checkdam
822	Mohal	Sillod	75.6432	20.4387	Checkdam
823	Nillod	Sillod	75.6108	20.2222	Checkdam
824	Nillod	Sillod	75.6051	20.22	Checkdam
825	Nillod	Sillod	75.6164	20.2263	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
826	Nillod	Sillod	75.6017	20.2389	Checkdam
827	Nillod	Sillod	75.6221	20.2345	Checkdam
828	Nillod	Sillod	75.6274	20.2295	Checkdam
829	Palshi	Sillod	75.5558	20.3035	Checkdam
830	Palshi	Sillod	75.54	20.2848	Checkdam
831	Palshi	Sillod	75.5431	20.2664	Checkdam
832	Palshi	Sillod	75.5634	20.2877	Checkdam
833	Palshi	Sillod	75.5688	20.2919	Checkdam
834	Palshi	Sillod	75.5709	20.2981	Checkdam
835	Pangri	Sillod	75.591	20.4706	Checkdam
836	Pangri	Sillod	75.5903	20.4603	Checkdam
837	Pangri	Sillod	75.5943	20.4788	Checkdam
838	Pangri	Sillod	75.5979	20.483	Checkdam
839	Pendgaon(Amthana)	Sillod	75.4456	20.4148	Checkdam
840	Shindephal	Sillod	75.4979	20.4027	Checkdam
841	Shindephal	Sillod	75.5015	20.4089	Checkdam
842	Shindephal	Sillod	75.5057	20.4167	Checkdam
843	Shindephal	Sillod	75.5019	20.4239	Checkdam
844	Shivana	Sillod	75.7578	20.4457	Checkdam
845	Talni	Sillod	75.5238	20.3899	Checkdam
846	Talni	Sillod	75.5148	20.3892	Checkdam
847	Talwada	Sillod	75.6477	20.2109	Checkdam
848	Talwada	Sillod	75.6638	20.2204	Checkdam
849	Talwada	Sillod	75.6549	20.216	Checkdam
850	Undangaon	Sillod	75.6712	20.4531	Checkdam
851	Undangaon	Sillod	75.6784	20.4485	Checkdam
852	Undangaon	Sillod	75.6897	20.4435	Checkdam
853	Undangaon	Sillod	75.6669	20.4529	Checkdam
854	Wadod Chatha	Sillod	75.5706	20.3791	Checkdam
855	Wadod Chatha	Sillod	75.5691	20.3868	Checkdam
856	Wadod Chatha	Sillod	75.5776	20.3904	Checkdam
857	Wadodpan Kh.	Sillod	75.7312	20.4233	Checkdam
858	Wangi Bk.	Sillod	75.5824	20.3587	Checkdam
859	Wangi Kh.	Sillod	75.5927	20.3779	Checkdam
860	Wangi Kh.	Sillod	75.5866	20.3673	Checkdam
861	Wangi Kh.	Sillod	75.6015	20.3762	Checkdam
862	Warkhedi	Sillod	75.5761	20.2143	Checkdam
863	Warkhedi	Sillod	75.5837	20.2138	Checkdam
864	Kinhi	Soegaon	75.2522	20.5085	Checkdam
865	Kinhi	Soegaon	75.2551	20.4964	Checkdam
866	Molkheda	Soegaon	76.0138	20.614	Checkdam
867	Plashi	Soegaon	75.3184	20.495	Checkdam
868	Rawala	Soegaon	75.8784	20.5812	Checkdam
869	Uppalkheda Sutonda	Soegaon	75.281	20.5509	Checkdam
870	Wakadi	Soegaon	75.3795	20.5365	Checkdam
871	Warthan	Soegaon	75.3694	20.5051	Checkdam
872	Aghur	Vaijapur	74.7637	19.9508	Checkdam
873	Alapurwadi	Vaijapur	74.8085	20.0646	Checkdam
874	Aurangpur	Vaijapur	74.8864	19.9625	Checkdam
875	Awwalgaon	Vaijapur	74.8382	19.7462	Checkdam
876	Babhulgaon Bk.	Vaijapur	74.9485	20.0516	Checkdam
877	Babhultel	Vaijapur	74.8437	20.1735	Checkdam
878	Babhultel	Vaijapur	74.8372	20.1796	Checkdam
879	Babhultel	Vaijapur	74.8488	20.1602	Checkdam
880	Babtara	Vaijapur	74.6254	19.7949	Checkdam
881	Babtara	Vaijapur	74.6125	19.8022	Checkdam
882	Babulkheda	Vaijapur	75.0277	20.1283	Checkdam
883	Bajathan	Vaijapur	74.8703	19.697	Checkdam
884	Balhegaon	Vaijapur	74.9022	20.1339	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
885	Balhegaon	Vaijapur	74.9115	20.1285	Checkdam
886	Belgaon	Vaijapur	74.6617	19.8897	Checkdam
887	Bhadali	Vaijapur	74.7546	20.173	Checkdam
888	Bhadali	Vaijapur	74.7474	20.1747	Checkdam
889	Bhadali	Vaijapur	74.7533	20.1597	Checkdam
890	Bhadali	Vaijapur	74.7541	20.1633	Checkdam
891	Bhadali	Vaijapur	74.7497	20.1662	Checkdam
892	Bhadali	Vaijapur	74.7546	20.1675	Checkdam
893	Bhadali	Vaijapur	74.7432	20.1757	Checkdam
894	Bhadali	Vaijapur	74.7396	20.1808	Checkdam
895	Bhadali	Vaijapur	74.737	20.184	Checkdam
896	Bhadali	Vaijapur	74.7362	20.1441	Checkdam
897	Bhadali	Vaijapur	74.7347	20.1524	Checkdam
898	Bhadali	Vaijapur	74.738	20.1589	Checkdam
899	Bhadali	Vaijapur	74.7349	20.1643	Checkdam
900	Bhadali	Vaijapur	74.7334	20.1696	Checkdam
901	Bhadali	Vaijapur	74.7326	20.175	Checkdam
902	Bhadali	Vaijapur	74.7336	20.1794	Checkdam
903	Bhadali	Vaijapur	74.7251	20.1847	Checkdam
904	Bhadali	Vaijapur	74.7285	20.1638	Checkdam
905	Bhadali	Vaijapur	74.7303	20.1604	Checkdam
906	Bhaggaon	Vaijapur	74.7018	19.9043	Checkdam
907	Bhaggaon	Vaijapur	74.6829	19.9113	Checkdam
908	Bhagur	Vaijapur	74.8659	19.8493	Checkdam
909	Bhagur	Vaijapur	74.8936	19.8279	Checkdam
910	Bhaigaon Vaijapur	Vaijapur	74.7523	19.9946	Checkdam
911	Bhaigaon Vaijapur	Vaijapur	74.7409	19.9917	Checkdam
912	Bhaigaon Vaijapur	Vaijapur	74.7357	20.0082	Checkdam
913	Bhatana	Vaijapur	74.9322	20.1169	Checkdam
914	Bhivgaon	Vaijapur	74.8667	19.9854	Checkdam
915	Bhivgaon	Vaijapur	74.8393	19.98	Checkdam
916	Bhokargaon	Vaijapur	74.9995	20.0566	Checkdam
917	Biloni	Vaijapur	74.729	20.0243	Checkdam
918	Biloni	Vaijapur	74.73	20.038	Checkdam
919	Biloni	Vaijapur	74.7342	20.0501	Checkdam
920	Borol	Vaijapur	74.8841	20.1563	Checkdam
921	Borsar	Vaijapur	74.8481	20.0107	Checkdam
922	Borsar	Vaijapur	74.8543	20.0253	Checkdam
923	Borsar	Vaijapur	74.8693	20.0009	Checkdam
924	Borsar	Vaijapur	74.875	20.0175	Checkdam
925	Chandegaon	Vaijapur	74.7942	19.7569	Checkdam
926	Chandegaon	Vaijapur	74.7953	19.7739	Checkdam
927	Chandgaon	Vaijapur	74.6995	19.9605	Checkdam
928	Chenduphal	Vaijapur	74.8507	19.6775	Checkdam
929	Chigatgaon	Vaijapur	74.7877	20.1487	Checkdam
930	Chigatgaon	Vaijapur	74.7976	20.1448	Checkdam
931	Chigatgaon	Vaijapur	74.8066	20.1324	Checkdam
932	Chinchadgaon	Vaijapur	74.8118	19.865	Checkdam
933	Chinchadgaon	Vaijapur	74.8196	19.867	Checkdam
934	Chinchadgaon	Vaijapur	74.8175	19.8831	Checkdam
935	Chorwaghalgaon	Vaijapur	74.8271	19.8544	Checkdam
936	Chorwaghalgaon	Vaijapur	74.832	19.844	Checkdam
937	Dagpimpalgaon	Vaijapur	74.7782	19.7398	Checkdam
938	Dagpimpalgaon	Vaijapur	74.7616	19.7657	Checkdam
939	Daskul	Vaijapur	74.8468	20.1397	Checkdam
940	Daskul	Vaijapur	74.8488	20.1495	Checkdam
941	Dawala	Vaijapur	74.6876	19.8865	Checkdam
942	Dhondalgaon	Vaijapur	74.9242	19.9985	Checkdam
943	Dhondalgaon	Vaijapur	74.9325	19.9873	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
944	Dhondalgaon	Vaijapur	74.9454	19.9776	Checkdam
945	Dhondalgaon	Vaijapur	74.9682	19.999	Checkdam
946	Gadhe Pimpalgaon	Vaijapur	74.861	19.715	Checkdam
947	Gadhe Pimpalgaon	Vaijapur	74.8719	19.7179	Checkdam
948	Ghaigaon	Vaijapur	74.7538	19.8986	Checkdam
949	Ghaigaon	Vaijapur	74.7657	19.9001	Checkdam
950	Ghogaraon	Vaijapur	74.8652	19.7637	Checkdam
951	Golwadi	Vaijapur	74.8882	19.9311	Checkdam
952	Goygaon	Vaijapur	74.6907	19.8368	Checkdam
953	Hadas Pimpalgaon	Vaijapur	74.9584	19.9176	Checkdam
954	Hajipurwadi	Vaijapur	74.9371	20.0628	Checkdam
955	Hajipurwadi	Vaijapur	74.9128	20.0535	Checkdam
956	Hamrapur	Vaijapur	74.8175	19.7043	Checkdam
957	Hanumantgaon	Vaijapur	74.8025	19.8267	Checkdam
958	Hanumantgaon	Vaijapur	74.8191	19.8261	Checkdam
959	Hilalpur	Vaijapur	74.8025	20.0763	Checkdam
960	Hilalpur	Vaijapur	74.7823	20.069	Checkdam
961	Hilalpur	Vaijapur	74.7717	20.0734	Checkdam
962	Jalgaon	Vaijapur	74.9527	19.8904	Checkdam
963	Jambaraon	Vaijapur	74.7976	19.8771	Checkdam
964	Jambaraon	Vaijapur	74.7958	19.8907	Checkdam
965	Janephal	Vaijapur	74.8123	20.058	Checkdam
966	Janephal	Vaijapur	74.8061	20.0588	Checkdam
967	Janephal	Vaijapur	74.7968	20.0597	Checkdam
968	Jarul	Vaijapur	74.7487	19.9795	Checkdam
969	Jategaon	Vaijapur	74.8232	19.7871	Checkdam
970	Jategaon	Vaijapur	74.8398	19.7618	Checkdam
971	Jiri	Vaijapur	74.897	20.1456	Checkdam
972	Kanak Sagaj	Vaijapur	74.8538	19.8805	Checkdam
973	Kanak Sagaj	Vaijapur	74.8491	19.8863	Checkdam
974	Kangoni	Vaijapur	74.6731	19.8241	Checkdam
975	Kapus Wadgaon	Vaijapur	74.7414	19.8066	Checkdam
976	Kapus Wadgaon	Vaijapur	74.7399	19.8241	Checkdam
977	Karanjgaon	Vaijapur	74.9361	19.9219	Checkdam
978	Karanjgaon	Vaijapur	74.9208	19.9324	Checkdam
979	Karanjgaon	Vaijapur	74.919	19.9474	Checkdam
980	Khambala	Vaijapur	74.7165	19.8728	Checkdam
981	Khamdala	Vaijapur	74.7958	20.018	Checkdam
982	Kharaj	Vaijapur	74.7971	20.1191	Checkdam
983	Kiratpur	Vaijapur	74.6803	19.8607	Checkdam
984	Kolhi	Vaijapur	74.8419	20.0268	Checkdam
985	Kolhi	Vaijapur	74.8206	20.0497	Checkdam
986	Koradgaon	Vaijapur	74.789	20.0833	Checkdam
987	Koradgaon	Vaijapur	74.7929	20.0802	Checkdam
988	Ladgaon	Vaijapur	74.7134	19.8192	Checkdam
989	Ladgaon	Vaijapur	74.6995	19.8124	Checkdam
990	Ladgaon	Vaijapur	74.7041	19.828	Checkdam
991	Lakh Khandala	Vaijapur	74.6969	19.9931	Checkdam
992	Lakhganga	Vaijapur	74.6404	19.8037	Checkdam
993	Loni Bk	Vaijapur	74.8092	19.9664	Checkdam
994	Loni Kh.	Vaijapur	74.8147	20.147	Checkdam
995	Loni Kh.	Vaijapur	74.8178	20.1497	Checkdam
996	Loni Kh.	Vaijapur	74.8299	20.1436	Checkdam
997	Mahalgaon	Vaijapur	74.8693	19.7973	Checkdam
998	Mahalgaon	Vaijapur	74.8683	19.8115	Checkdam
999	Mahalgaon	Vaijapur	74.876	19.8022	Checkdam
1000	Makarmatpur	Vaijapur	74.7774	19.9229	Checkdam
1001	Mali Sagaj	Vaijapur	74.8825	19.8622	Checkdam
1002	Manoor	Vaijapur	75.0021	20.0763	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
1003	Manoor	Vaijapur	75.0003	20.086	Checkdam
1004	Mhaski	Vaijapur	74.7626	19.863	Checkdam
1005	Mhaski	Vaijapur	74.7657	19.8358	Checkdam
1006	Mirakhnagar	Vaijapur	74.8714	19.9625	Checkdam
1007	Mirakhnagar	Vaijapur	74.846	19.9586	Checkdam
1008	Nadi	Vaijapur	74.7626	19.7929	Checkdam
1009	Naigavhan	Vaijapur	74.8507	20.1645	Checkdam
1010	Nandgaon	Vaijapur	74.701	19.9449	Checkdam
1011	Pangavhan	Vaijapur	74.8098	20.0063	Checkdam
1012	Panvi Bk.	Vaijapur	74.861	19.7774	Checkdam
1013	Panvi Bk.	Vaijapur	74.8532	19.7954	Checkdam
1014	Panvi Khandala	Vaijapur	74.6953	19.9771	Checkdam
1015	Parala	Vaijapur	74.7831	20.1315	Checkdam
1016	Parala	Vaijapur	74.7422	20.1397	Checkdam
1017	Parala	Vaijapur	74.7279	20.1337	Checkdam
1018	Parala	Vaijapur	74.7362	20.1327	Checkdam
1019	Parala	Vaijapur	74.7466	20.1288	Checkdam
1020	Pendephal	Vaijapur	74.8434	20.111	Checkdam
1021	Pimpalgaon Khandala	Vaijapur	74.904	20.1171	Checkdam
1022	Plkhed	Vaijapur	74.8817	19.9061	Checkdam
1023	Plkhed	Vaijapur	74.898	19.9073	Checkdam
1024	Plkhed	Vaijapur	74.9172	19.8997	Checkdam
1025	Pokhari	Vaijapur	74.9654	20.0877	Checkdam
1026	Rahegavhan	Vaijapur	74.9019	19.9425	Checkdam
1027	Rotegaon	Vaijapur	74.7487	19.9571	Checkdam
1028	Sanjarpurwadi	Vaijapur	74.9185	20.0053	Checkdam
1029	Satana	Vaijapur	74.7782	19.8668	Checkdam
1030	Satana	Vaijapur	74.7846	19.8661	Checkdam
1031	Satana	Vaijapur	74.7644	19.8727	Checkdam
1032	Sawandgaon	Vaijapur	74.8305	19.9605	Checkdam
1033	Sawkhed Ganga	Vaijapur	74.7171	19.7842	Checkdam
1034	Sawkhed Khandala	Vaijapur	74.8672	20.1285	Checkdam
1035	Sawkhed Khandala	Vaijapur	74.8789	20.1217	Checkdam
1036	Shioor	Vaijapur	74.8558	20.0984	Checkdam
1037	Shioor	Vaijapur	74.8794	20.1101	Checkdam
1038	Shioor	Vaijapur	74.8882	20.0977	Checkdam
1039	Shioor	Vaijapur	74.9343	20.0826	Checkdam
1040	Shioor	Vaijapur	74.8797	20.0665	Checkdam
1041	Shioor	Vaijapur	74.8639	20.0758	Checkdam
1042	Shioor	Vaijapur	74.934	20.0735	Checkdam
1043	Shivgaon	Vaijapur	74.9581	20.0765	Checkdam
1044	Shivrai	Vaijapur	74.8372	19.9238	Checkdam
1045	Shivrai	Vaijapur	74.8509	19.9153	Checkdam
1046	Shivrai	Vaijapur	74.8577	19.9241	Checkdam
1047	Sirasgaon	Vaijapur	74.8066	19.8144	Checkdam
1048	Sirasgaon	Vaijapur	74.788	19.8085	Checkdam
1049	Surala	Vaijapur	74.6661	19.8564	Checkdam
1050	Surala	Vaijapur	74.6655	19.8688	Checkdam
1051	Takli Sagaj	Vaijapur	74.8657	19.8771	Checkdam
1052	Talwad	Vaijapur	74.7937	20.1913	Checkdam
1053	Talwad	Vaijapur	74.7867	20.1886	Checkdam
1054	Talwad	Vaijapur	74.7787	20.1893	Checkdam
1055	Talwad	Vaijapur	74.781	20.182	Checkdam
1056	Talwad	Vaijapur	74.7831	20.1745	Checkdam
1057	Talwad	Vaijapur	74.7751	20.1859	Checkdam
1058	Talwad	Vaijapur	74.7709	20.1888	Checkdam
1059	Talwad	Vaijapur	74.7652	20.1932	Checkdam
1060	Talwad	Vaijapur	74.7621	20.1918	Checkdam
1061	Talwad	Vaijapur	74.766	20.1857	Checkdam

S.NO.	Village	Block	X	Y	Type of structure
1062	Tidhi	Vaijapur	74.789	19.9151	Checkdam
1063	Titarkheda	Vaijapur	74.8224	20.1171	Checkdam
1064	Titarkheda	Vaijapur	74.8333	20.121	Checkdam
1065	Tunki	Vaijapur	74.8499	20.1181	Checkdam
1066	Tunki	Vaijapur	74.8395	20.129	Checkdam
1067	Vaijapur(Urban)	Vaijapur	74.7487	19.9243	Checkdam
1068	Vaijapur(Urban)	Vaijapur	74.7512	19.9381	Checkdam
1069	Vaijapur(Urban)	Vaijapur	74.7342	19.9444	Checkdam
1070	Vaijapur(Urban)	Vaijapur	74.7031	19.9264	Checkdam
1071	Vaijapur(Urban)	Vaijapur	74.7352	19.8982	Checkdam
1072	Virgaon	Vaijapur	74.7771	19.8272	Checkdam
1073	Wakla	Vaijapur	74.8162	20.2404	Checkdam
1074	Wakla	Vaijapur	74.8064	20.2333	Checkdam
1075	Wakla	Vaijapur	74.7929	20.2319	Checkdam
1076	Wakla	Vaijapur	74.8054	20.2278	Checkdam
1077	Wakla	Vaijapur	74.7929	20.2095	Checkdam
1078	Wakla	Vaijapur	74.7986	20.2105	Checkdam
1079	Wakla	Vaijapur	74.81	20.203	Checkdam
1080	Wakla	Vaijapur	74.8022	20.2005	Checkdam
1081	Wakla	Vaijapur	74.7955	20.2003	Checkdam
1082	Wakla	Vaijapur	74.7883	20.2034	Checkdam
1083	Wakla	Vaijapur	74.8364	20.1925	Checkdam
1084	Wakti	Vaijapur	74.8786	19.7837	Checkdam

Note: Construction of AR structures may be takenup at these sites after field checks/verification only

PROPOSED MANAGEMENT PLAN

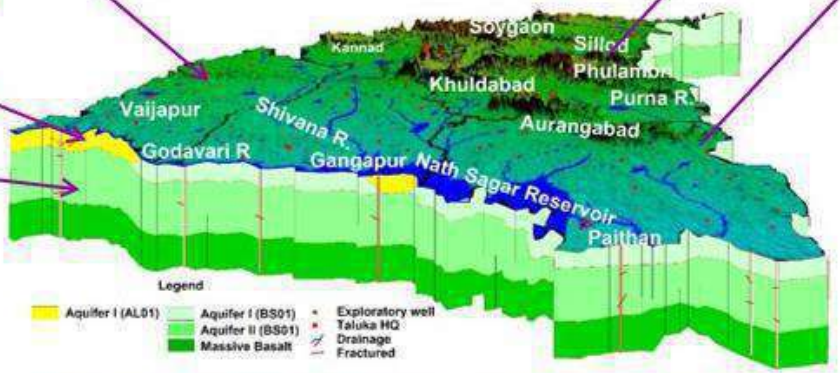
37.39 MCM-Volume of Water saved through micro Irrigation techniques (Drip Irrigation)

Aquifer I Resources –
Dynamic: - 1062.19 MCM

Augmentation by AR –
111.89 MCM

Aquifer II Resources –
195.84 MCM

Total Draft –
806.45 MCM



Total Resources – 1258.03 MCM

PROBABLE BENEFITS AFTER IMPLEMENTING AR & WUE MEASURES

GW SENAREO AFTER IMPLEMENTING
Artificial Recharge
GWA 1062.19 + 111.89 MCM by AR
= 1174.08 MCM

- ✓ **81.22 sq km Additional area mostly under Kharif can be brought under assured irrigation after implementation of artificial recharge to ground water**
- ✓ **Stage of Ground Water Development will be reduced from 75.90% to 70%**