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

AMALNER, BODWAD, CHALISGAON, CHOPDA, JALGAON, MUKTAINAGAR, PAROLA, YAWAL & RAVER BLOCK, JALGAON DISTRICT, MAHARASHTRA

मध्य क्षेत्र, नागपुर

Central Region, Nagpur

AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, AMALNER, BODWAD, CHALISGAON, CHOPDA, JALGAON, MUKTAINAGAR, PAROLA, YAWAL & RAVER BLOCK, JALGAON DISTRICT, MAHARASHTRA

AAP 2013-14, 2016-17 and 2017-18

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JALGAON DISTRICT AT A GLANCE

1. GENERAL INFORMATION			
	Geographical Area	:	11,762.70 Sq. km.
	Administrative Divisions	:	Block-15; Amalner, Bhadgaon, Bhusaval, Bodwad, Chalisgaon, Chopda, Dharangaon, Erandol, Jalgaon, Jamner, Muktainagar, Pachora, Parola, Raver, Yawal
	Villages	:	1519
	Population (2011)	:	42,244,42
	Normal Rainfall		755.60 mm
	Rainfall (2017)		525.50 mm
	Average Annual Rainfall (2008-17)	:	657.69 mm
2. GEOMORPHOLOGY			
	Major Physiographic unit	:	Three; Satpuda hill range, Ajanta hill range and Tapi plain
	Major Drainage	:	Tapi River
3. SOIL TYPE		:	Deep black and Medium black soils
4. LAND USE (2013) ***(www. mahasdb.maharashtra.gov.in)***			
	Forest Area	:	2183.02 sq. km.
	Cultivable Area	:	8772.94 sq. km.
	Net Area Sown	:	8027.65 sq. km.
	Double Cropped Area		724.90 sq. km.
5. PRINCIPAL CROPS (2011) ***(www. mahasdb.maharashtra.gov.in)***			
	Cotton	:	3042.31 sq. km.
	Cereals	:	1954.82 sq. km.
	Pulses	:	1131.55 sq. km.
	Banana	:	510.04 sq. km.
	Oil seeds	:	322.66 sq. km.
	Sugarcane	:	148.87 sq. km.
	Spices	:	40.17 sq. km.
6. IRRIGATION BY DIFFERENT SOURCES (2006) **Nos. / Potential Created (sq.km)**			
	Dugwells	:	122221 /2315.64
	Tubewells (Shallow and Deep)	:	13227 /303.33
	Surface flow Schemes	:	236/195.28
	Surface Lift Schemes	:	273/36.94
7. GROUND WATER MONITORING WELLS (As on 31.03.2018)			
	Dugwells	:	54
	Piezometers	:	03
8. GEOLOGY			
	Recent	:	Alluvium
	Quaternary to Recent	:	Bazada (Talus and Scree), Younger Alluvium, Older Alluvium
	Upper Cretaceous-Paleogene	:	Basalt (Deccan Traps)
9. HYDROGEOLOGY			
	Water Bearing Formation	:	Alluvium- Coarse Sand, Pebble and Gravel. Ground water occurs in Unconfined to Confined conditions.
			Basalt (Deccan Traps)- weathered, fractured/ jointed parts. Ground water occurs in Unconfined

			to Confined conditions.
	Pre-monsoon Depth to Water Level (May-2017)	:	2.70 (Jalgaon city) to 55 (Nimgaon) mbgl
	Post-monsoon Depth to Water Level (Nov.-2017)	:	0.10 (Lalmati) to 44.1 (Idgaon) mbgl
	Pre-monsoon Water Level Trend (2008-2017)	:	Rise: 0.0013 (Bambrud) to 0.42 (Pachora) m/year
			Fall: 0.0014 (Kurha) to 0.8868 (Viroda) m/year
	Post-monsoon Water Level Trend (2008-2017)	:	Rise 0.0154 (mamurabad) to 0.0494 (Raver) m/year
			Fall: 0.0020 (Patne) to 0.9383 (Nagalwadi) m/year
10. GROUND WATER EXPLORATION (As on 31/03/2018)			
	Wells Drilled	:	EW-100, OW-33, PZ-09, Total -142
	Depth Range	:	22.70 to 318.45 m bgl
	Discharge	:	Traces to 47.00 lps
	Storativity	:	1.65×10^{-2} to 1.05×10^{-4}
	Transmissivity	:	82.5 to 2314 m^2/day
11. GROUND WATER QUALITY			
	The quality of ground water is alkaline and generally suitable for drinking and irrigation purpose, however localized nitrate contamination is observed in rural areas.		
	Type of Water	:	Ca-HCO_3 and Ca-Cl
12. DYNAMIC GROUND WATER RESOURCES- (2013)			
	Net Annual Ground Water Availability	:	139554.81 ham
	Annual Ground Water Draft (Irrigation + Domestic)	:	106892.33 ham
	Allocation for Domestic and Industrial requirement up to next 25 years	:	8671.06 ham
	Stage of Ground Water Development	:	76.60 **%**
13. AWARENESS AND TRAINING ACTIVITY			
A	Mass Awareness Programme	:	2
B	Training Programme	:	3
14. ARTIFICIAL RECHARGE & RAINWATER HARVESTING			
	Projects Completed	:	Two, TE-11 and TE-17 watersheds
	Projects under Technical Guidance	:	Nil
15. GROUND WATER CONTROL & REGULATION			
	Over-Exploited Block	:	Two, Raver and Yawal
	Semi-Critical Block	:	Three, Bodwad, Muktainagar and Parola
	Notified Block	:	Nil
16. MAJOR GROUND WATER PROBLEMS AND ISSUES			
	Major part of the district shows declining trends in ground water levels, during both pre and post-monsoon periods. Deeper water level areas have been observed in parts of Yawal, Raver and Chopda Blocks. Ground water quality is affected at many places due to contamination of some inorganic parameters. High concentration of Fluoride is also observed at Varkhedi (1.26 mg/L) and Bholane (1.64 mg/L) in Shallow Aquifer, at deeper level high concentration is observed at Manegaon EW (1.44 mg/L).		

AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, AMALNER, BODWAD, CHALISGAON, CHOPDA, JALGAON, MUKTAINAGAR, PAROLA, YAWAL & RAVER BLOCK, JALGAON DISTRICT, MAHARASHTRA

AAP 2013-14, 2016-17 and 2017-18

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1.0 INTRODUCTION

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

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

Varied and diverse hydrogeological settings demand precise and comprehensive mapping of aquifers down to the optimum possible depth at appropriate scale to arrive at the robust and implementable ground water management plans. The proposed management plans will provide the **"Road Map"** for ensuring sustainable management and equitable distribution of ground water resources, thereby primarily improving drinking water security and irrigation coverage. The crux of NAQUIM is not merely on 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 Jalgaon 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

Jalgaon district, an important district of Khandesh region is situated in north western part of Maharashtra. The district is well known for Banana cultivation. It has a total geographical area of 117670.48 Sq. Km. The district lies between north latitudes 20°15' and 21°25' and east longitudes 74°55' and 76°28 in the northern part of the State abutting Madhya Pradesh in the north. The total area of the district is 11,762.70 sq.km and falls in parts of Survey of India degree sheets 46 K, 46 L, 46 P, 55 C, 55 D, and 56 O. The district is bounded on the north by Madhya Pradesh, on the east by Buldhana district, on the west by Nashik and Dhule districts and on the south by Aurangabad district. It has a total population of 4,224,442 as per 2011 census. The district has 15 towns and 1519 villages. Population density as per 2011 census is 359 persons/sq.km. The major part of the district comes under Tapi basin. Tapi is the main river flowing through the district. **(Figure 1.1 & Figure 1.2)**

Central Ground Water Board has taken up several studies in the district including Systematic Hydrogeological Survey, Reappraisal Hydrogeological Studies, Artificial Recharge Studies & National Aquifer Mapping and Management Programme etc. The data generated have been shared with the Central, State agencies as well as with the stake holders in the form of reports, maps etc.

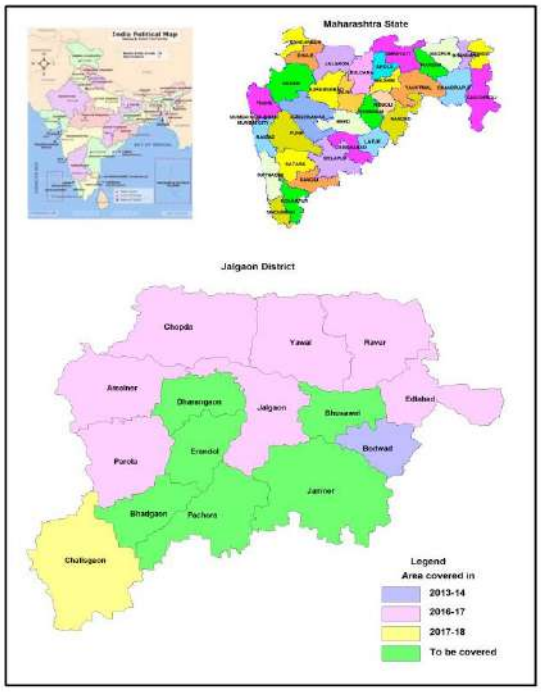


Figure 1.1 : Index map, Jalgaon District

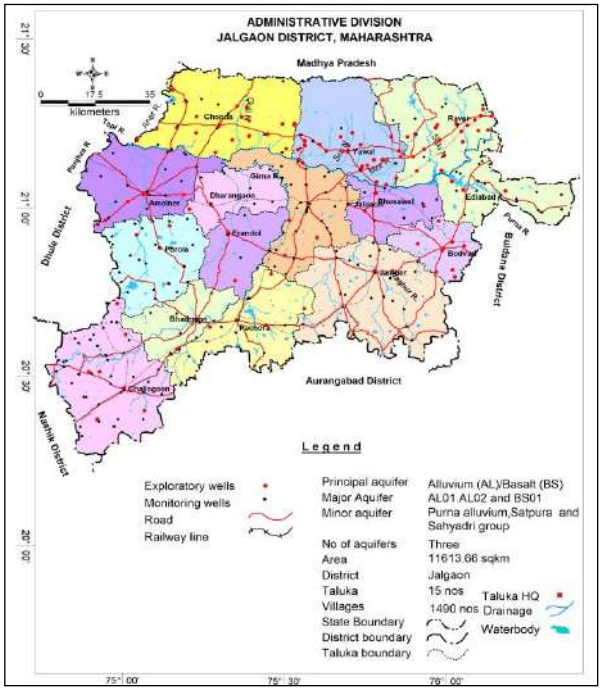


Figure 1.2: Administration map, Jalgaon District

Under the National Aquifer Mapping & Management Programme (NAQUIM) 9 blocks have been covered in three phases of XII five Year Plan**.**

I. Bodvad Block (356.69 sq km) in AAP 2013-14
II. Raver, Yawal, Chopda, Edlabad (Muktainagar), Amalner, Parola and Jalgaon Blocks (6182.55 Sq Km) in AAP 2016-17.
III. Chalisgaon block (1089.90 sq km) in AAP 2017-18

Remaining 6 blocks viz., Erandol, Jamner, Bhusaval, Pachora, Bhadgaon and Dharangaon blocks are to be covered in forthcoming years. So far, the existing and generated data has been compiled for the 9 blocks covered as given above. This report focuses the ground water situation and Management Plans for 9 blocks covering 7629.18 Sq Km area.

The ground water exploration has been done in alluvial and hard rock areas occupied by Deccan Trap Basalt. To establish the aquifer geometry, disposition and potential of aquifers, ground water exploration down to the depth of 200 mbgl has been taken up where the data gap exists and accordingly 14 exploratory wells and 1 observation wells have been constructed during the 2013-14 and 2016-17. A total of 100 EW, 33 OW and 09 Piezometers have been constructed till March 2018**.** Salient Features of Ground Water Exploration are given in **Annexure-I.**

57 existing ground water monitoring stations were being monitored 4 times in a year to assess the ground water scenario of the district. Apart from this, based on data gap analysis additional 76 KOWs and 252 micro level wells were inventoried to acquire micro level hydrogeological data to decipher the water level scenario, sub-surface lithological disposition and hydrogeological setup of shallow aquifer (Aquifer-I). The details of KOWs and GWM wells are given in **Annexure-II.** Locations of existing ground water monitoring stations and exploratory wells are shown in **Figure 1.3.**

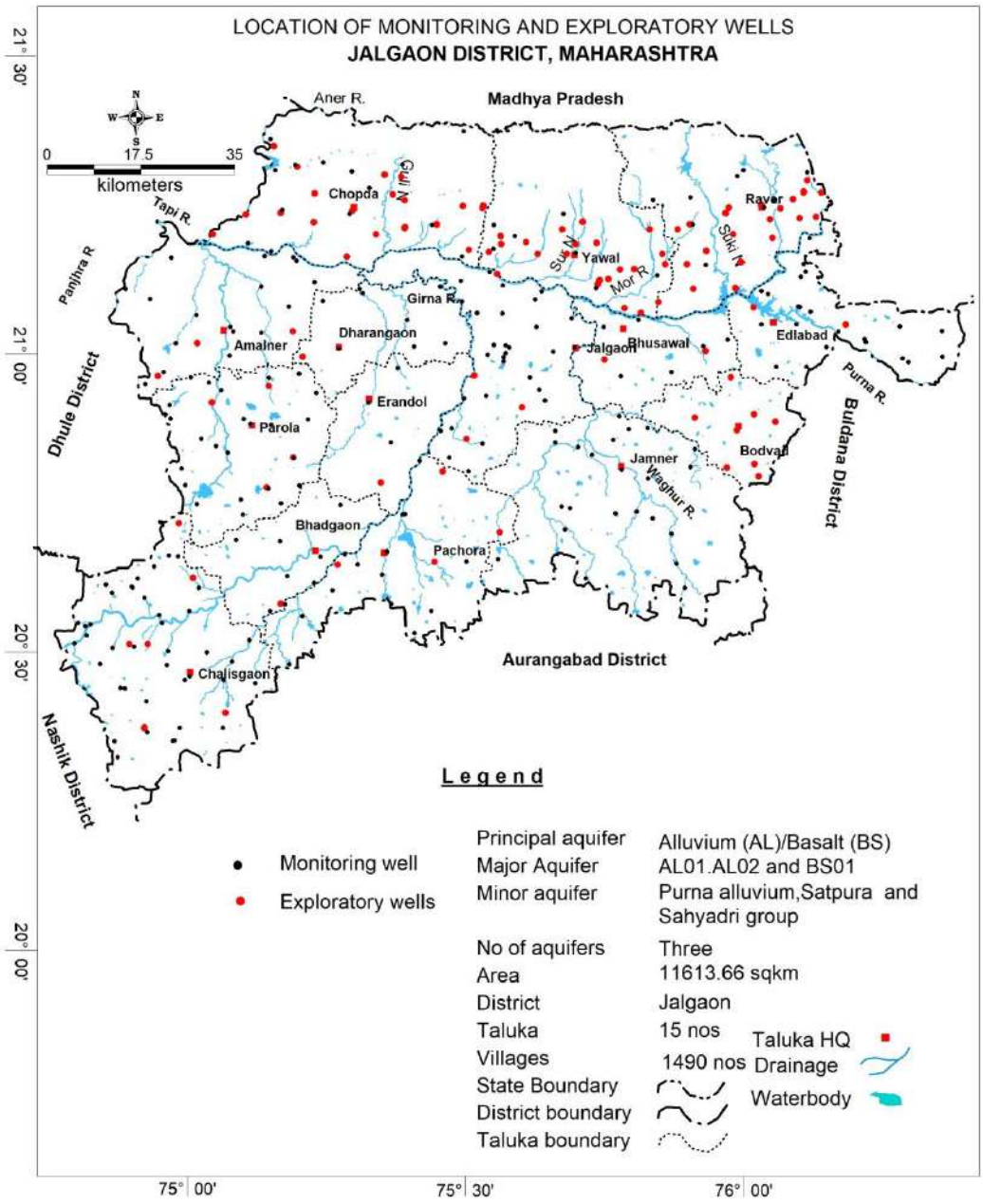


Figure 1.3: Locations of existing EW's and GW monitoring wells, Jalgaon district

1.2 Geomorphology, Drainage and Soil Types

The district can be divided into three main physiographic divisions i.e., Satpuda hill ranges in the northern part with dense forest; Tapi valley consisting of alluvial plain in the central part of the district and Ajanta hill ranges, flanking the hill ridges and small valleys in the southern part of the district. **(Figure 1.4)**

The Tapi valley contains a vast central alluvial plain from Burhanpur in the east and Dhule in the west. However, the river banks are marked by erosion, forming gully and wasteland which inhabit agriculture extension. Alluvial plain of the Tapi River is bounded in the north by steep southern escarpment of the Satpuda, a high hill mountain range trending east north east -west south west. The northern boundary of the district is marked by valleys of the Aner River and its eastern counterpart of Mamat River, which is tributary of Saki River. These two longitudinal valleys separate the southern range of the Satpuda from their northern members.

South of Tapi river valley, the area has varied physiography with undulating plains, small hill ranges and broad valleys. The Hatti hills along with Purna Valley on the east has a north west-south east trend and passes through the south east corner of Jalgaon district for about 32 km.

The Satmala, also known as the Chandur or Ajanta, breaking off sharply from the Sahyadries in the north west of Nashik, runs for about 80 km east in a series of ridges and hills formed of Basalt.

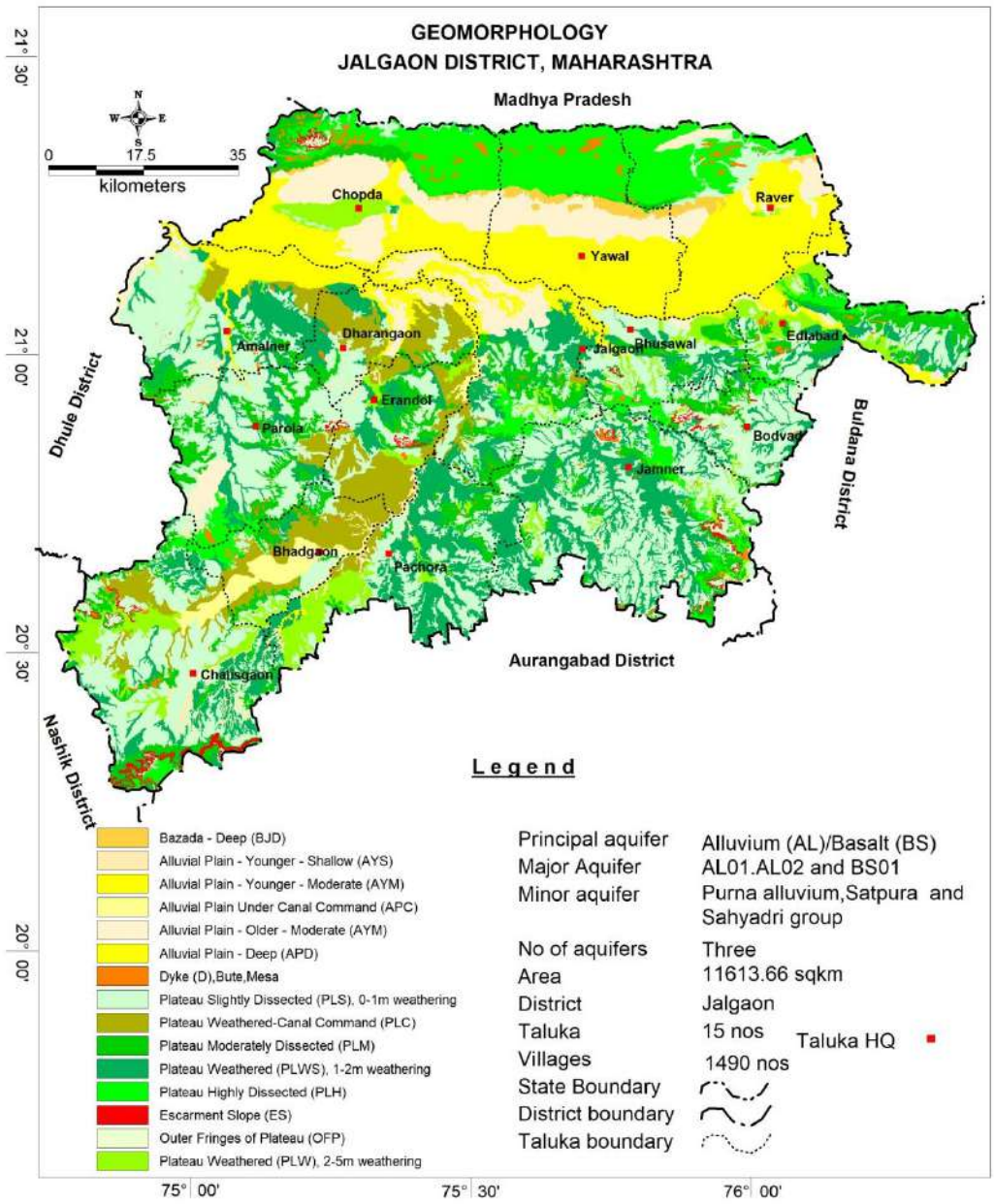


Figure 1. 4 : Geomorphology, Jalgaon district

Tapi River flows from east to west over 130 km in Jalgaon district. Tapi is the main river flowing through the district and its major tributaries viz; Bhokar, Aner, Suki, Morna, Harki, Manki, Gul, in the north and the Purna, Girna, Bahul, Bori, Vaghur, Hated in the south of Tapi river. Except the Purna and Vaghur rivers, all the southern streams have their sources along the Sahyadri. The Tapi River with pronounced meandering falls under mature stage of River. However, its tributaries on the northern banks are not mature due to which streams may change their course. These streams are controlled by easterly lineament and its course take sudden right angle turns before joining the Tapi main stream (**Figure 1.5**).

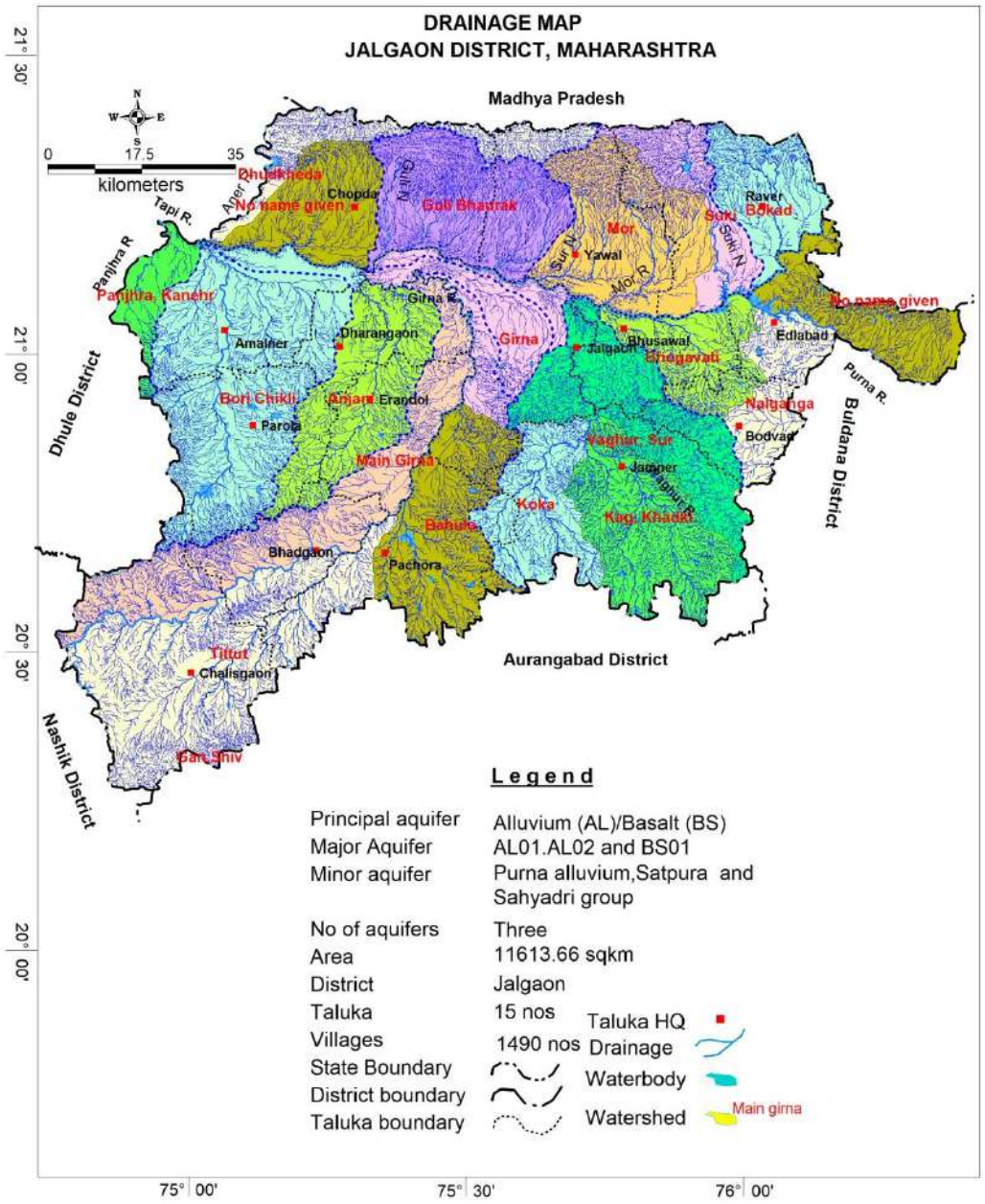


Figure 1. 5: Drainage Map, Jalgaon district

The soils in Jalgaon district are essentially derived from the basaltic lava flows and are classified as, a) Deep black soils, b) Medium black soils, c) Loamy and sandy soils and d) Forest soils. Deep black soils are observed in northern part of Amalner, Erandol, Jalgaon, Bhusaval and Edlabad blocks. Medium black soils occur over large areas in the district viz.; the central belt of the wide Tapi valley and southern hills. In Tapi alluvial basin, soils are black alluvial clay occurring in the southern parts of Yawal, Raver, Chopda, Jalgaon, Bhusaval, Chalisgaon, Amalner, and Bhadgaon blocks. Loamy soils are observed in the southern-most part of Amalner, Erandol, Jalgaon and Bhusaval blocks. Sandy soils are observed on the foothills of Satpuda ranges and near southern hillocks. Forest soils are dark brown and occur on slopes mainly in the Satpuda ranges. The thematic map of soil distribution in the district is shown in **Figure 1.6.**

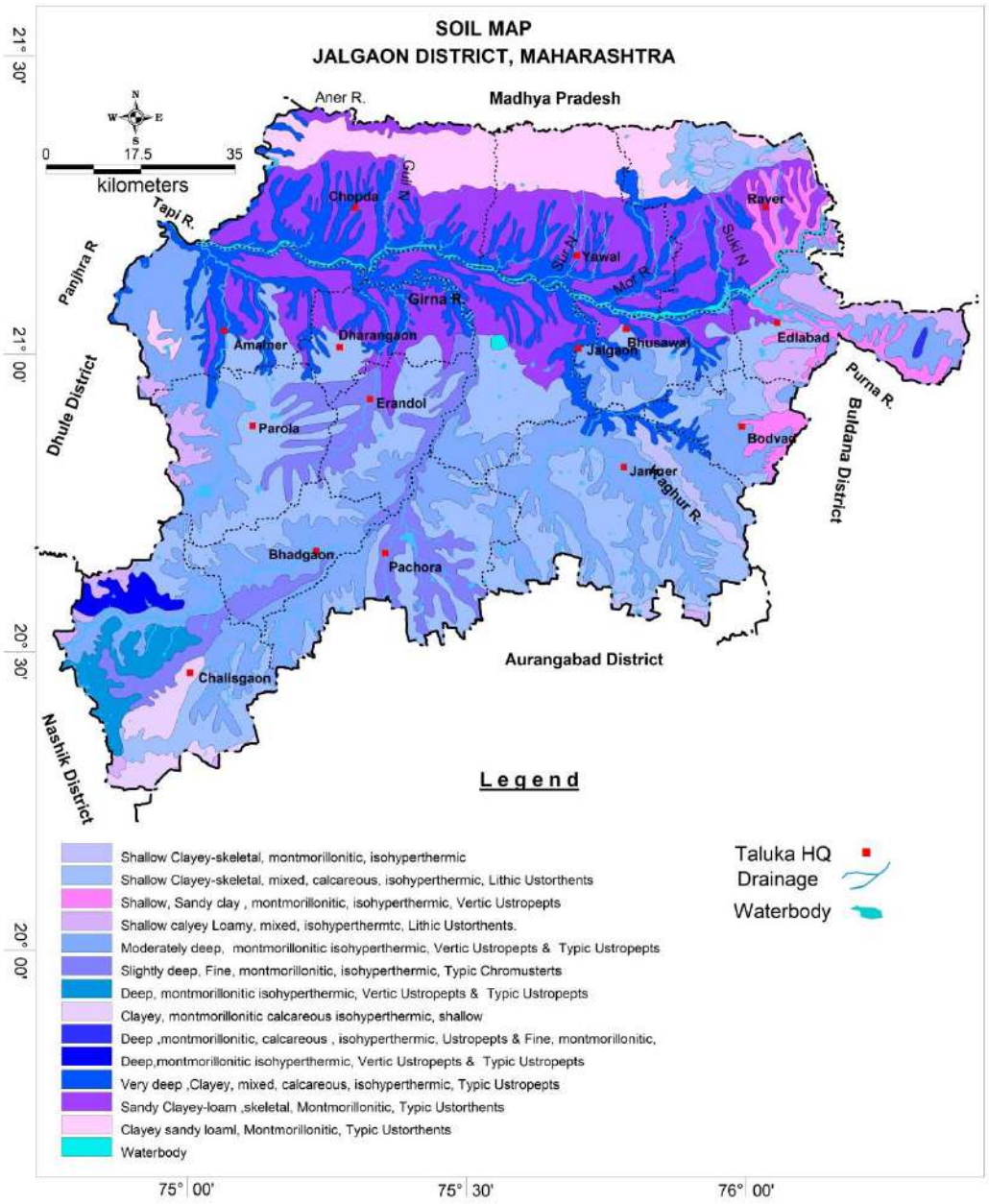


Figure 1.6: Soil Map, Jalgaon District

1.3 Climate and Rainfall

The climate of the district is characterized by a hot summer and general dryness throughout the year except during the south-west monsoon season, i.e., June to September. The mean minimum temperature is 10.8°C and means maximum temperature is 42.2°C. Jalgaon District received an average rainfall of about 521.61 mm during 2017. The average annual rainfall for the last ten years 2008-2017 ranges from 550.94 (Jamner) to 751.65 mm (Chopda) and the same is presented in **Table 1**.

Table 1. 1: Annual Rainfall (mm) Data (2008-2017)

Block	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Decadal Average
Jalgaon	422.7	754.1	752.4	735.7	320.2	1007.7	805.6	423.2	747	571.5	654.01
Bhusaval	335	683.7	821.6	542.2	366.2	915.4	685.3	641.3	842.5	440.2	627.34
Yawal	458.2	670	1057.2	626.6	490	1071.1	834.4	476.5	662.4	485.8	683.22
Raver	453.3	614	876.2	510	426.8	820.9	639.5	593.2	681.4	644.9	626.02
Muktainagar	470.6	757.6	998.8	571	365.2	773.4	446.6	448.3	548.4	387.9	576.78
Amalner	506.04	677.6	721.4	478.8	408.3	781.6	661.5	391.1	458.2	311.1	539.56

Block	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Decadal Average
Chopda	555.2	863.8	1025	695.2	485.9	1225.1	877.1	500	719.4	569.8	751.65
Erandol	663	865	864.5	686	488	926.5	904.4	524.6	768.4	643.6	733.4
Parola	573	680.1	817	563.9	555.4	1019.2	619.0	436.3	658	651	657.29
Chalisgaon	649.8	747	823.2	695.8	388	829.6	735.1	518.6	787.9	604.6	677.96
Jamner	585.2	630.2	559.7	516.1	363.2	752	507.2	435.9	658.7	501.2	550.94
Pachora	587.1	716.6	886.6	657.2	388.4	876	699.0	484.5	707.3	580.7	658.34
Bhadgaon	699.2	689	773.8	631.8	364.8	942.3	661.0	462.2	734	412.1	637.02
Dharangaon	549	752	779	585.5	356.2	1069.6	882.8	458	763.1	586.2	678.14
Bodvad	556	769	1064.4	684.9	375.8	956.9	626	496.7	568.9	433.6	653.22
District Av. RF (mm)	**537.56**	**724.65**	**854.72**	**612.05**	**409.49**	**931.15**	**705.63**	**486.03**	**687.04**	**521.61**	**657.69**

(Source : www.agri.mah.nic.in)

The Normal rainfall of the district is 707.85 mm spread over 47 rainy days in normal condition. Long term rainfall analysis (1998-2017) and annual rainfall data of last 20 years is given in **Table 1.2.**

Based on long term rainfall analysis it is observed that:

- The coefficient of variation of the annual rainfall from the normal rainfall is 30%.
- The probability of receiving Excess rainfall is observed to be 6 % and Normal rainfall to be 55 %.

Annual Average rainfall data of last twenty years is analysed and presented in **Figure 1.7.** This indicates that minimum rainfall occurred in 2012 (414.2 mm) and maximum in 2006 (1261 mm). Normal rainfall isohyet map of the district is presented in **Figure 1.8**.

Table 1.2: Long-term rainfall analysis 1998-2017, Jalgaon district

Period = 1998 to 2017				Normal Rainfall = 707.8 mm		
No. of Years = 20				Standard Deviation = 210 mm		
Year	**Annual**	**Normal**	**Departure**	Coefficient of Variation = 30%		
1998	1025.4	707.8	45	Slope= -7.355 mm/year		
1999	605.8	707.8	-14	Intercept= 785 mm		
2000	495.1	707.8	-30	Equation of Trend Line= -7.355x+785		
2001	660.4	707.8	-7	**Category**	**No. of Years**	**% of total Years**
2002	758.5	707.8	7	**Departures**		
2003	949	707.8	34	Positive	8	40
2004	655.8	707.8	-7	Negative	12	60
2005	525.1	707.8	-26	**Droughts**		
2006	1261	707.8	78	Moderate	5	25
2007	642.2	707.8	-9	Severe	0	0
2008	543.7	707.8	-23	Acute	0	0
2009	724	707.8	2	**Normal & Excess R/F**		
2010	858.9	707.8	21	Normal	11	55
2011	616.2	707.8	-13	Excess	4	6
2012	414.2	707.8	-41			
2013	963.8	707.8	36			
2014	714.1	707.8	1	***NOTE: Rainfall departure: EXCESS: > +25; NORMAL: +25 TO -25; MODERATE: -25 TO -50; SEVERE: -50 TO -75; ACUTE: < -75***		
2015	532.8	707.8	-25			
2016	683.7	707.8	-3			
2017	525.5	707.8	-26			

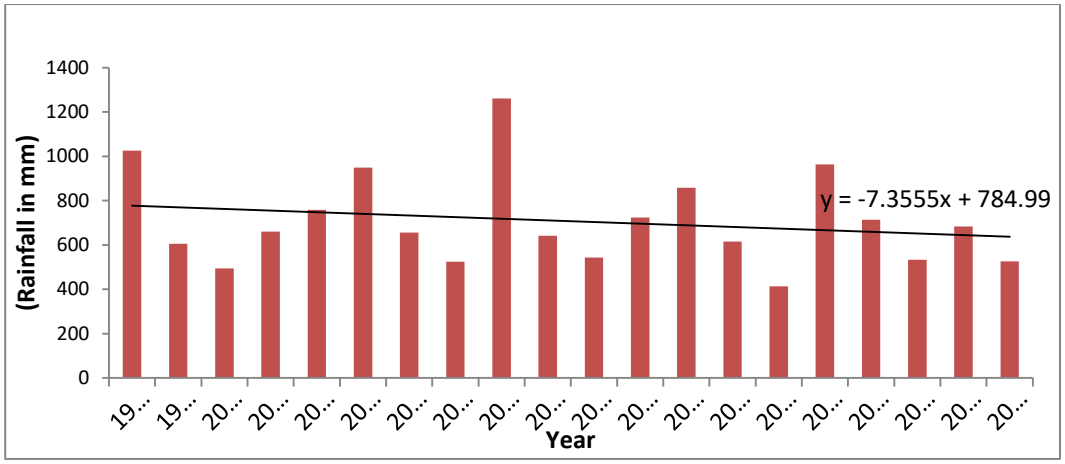


Figure 1. 7: Long term Annual Rainfall Analysis (1998-2017) of Jalgaon district

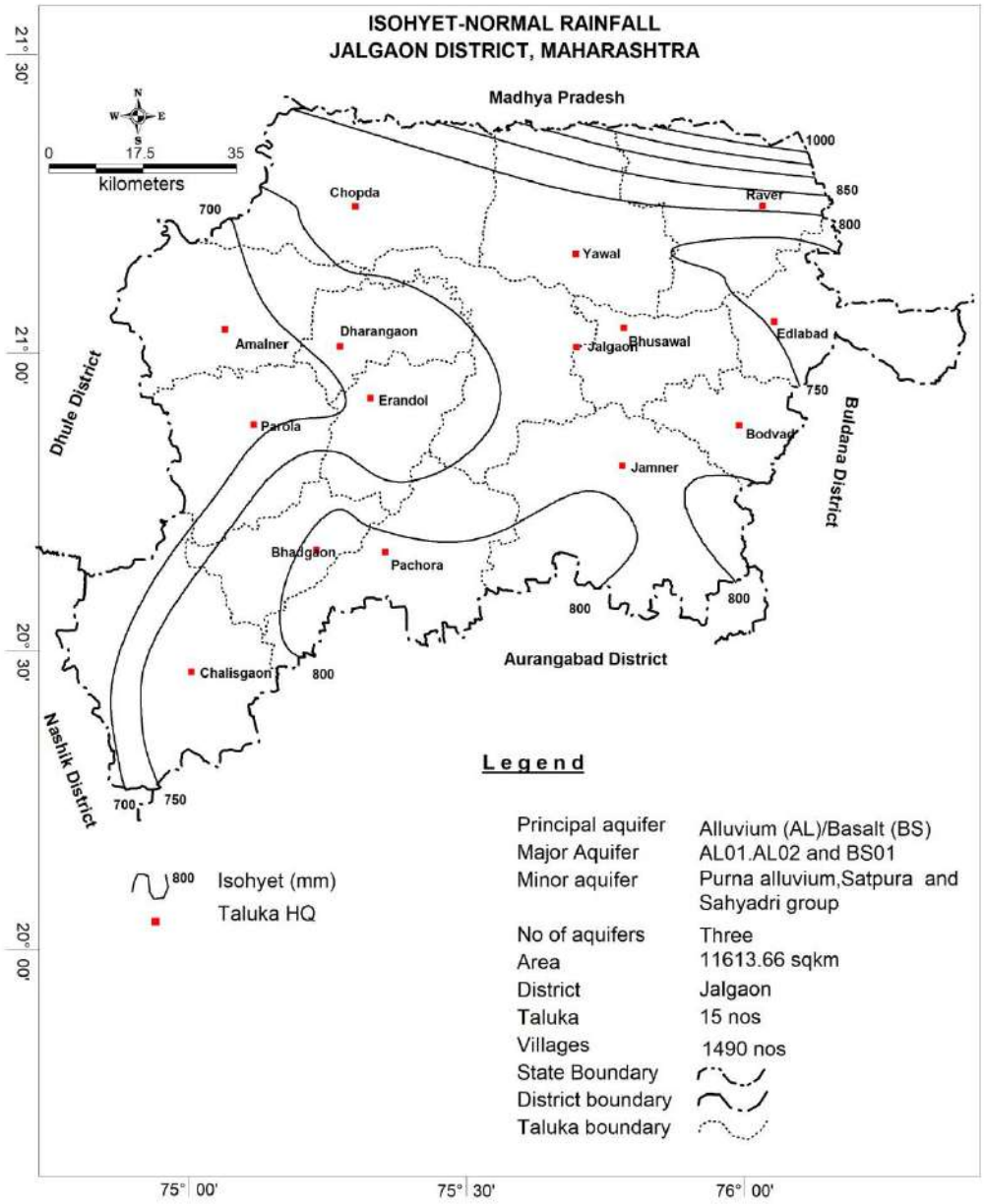


Figure 1.8: Isohyetal map of Jalgaon District

1.4 Geology

Basaltic lava flows are the major rock formations along with alluvium/Bazada. Basaltic Lava flows of the Deccan trap belonging to Upper Cretaceous - Lower Eocene age and the alluvium belonging to Quaternary to Recent age. The geological succession of Jalgaon district is presented in **Table 1. 3**.

Table 1.3: Geological Succession of Jalgaon district

Age	Group	Formation	Lithology
North of Tapi			
Quaternary (Recent to Sub-Recent)	Alluvium	Alluvium/Bazada Formation	Boulders, gravels, pebbles, Sand & clay
Upper Cretaceous to Lower Eocene	Satpura Group (Deccan trap Basalt)	• DT. Unclassified • Garga Formation • Ambabarwa Formation • Kelpani Formation • Nagartas Formation	Group of Aa, Compound, Pahoehoe type of basaltic lava flows
Tapi Valley			
Upper Cretaceous to Lower Eocene	-	Chahardih Formation	Group of Compound Pahoehoe & Aa type of basaltic lava flows
South of Tapi			
Upper Cretaceous to Lower Eocene	Sahyadri Group (Deccan trap Basalt)	• Ajanta Formation • Upper Ratangarh Formation • Lower Ratangarh Formation	Group of Megacryst, Aa, Compound, Pahoehoe type of basaltic lava flows, with dykes/intrusive /sills

1.4.1 Alluvium:

The Tapi river flows from east to west across the district forming a strip of alluvium covered land on both the sides of the river. Alluvium, belonging to the Quaternary period consists of boulders, Cobbles, Pebbles, Gravels, sand, silt, clay and Kankar. The alluvium occurs over an area of 3600 sq. km. in the northern half of the district below the Satpuda ranges. Southern part of the Satpudas was subjected to faulting and went down hundreds of meters along the Great Boundary Fault. Thickness of the alluvial deposits is also variable and ranges from paper thin in the south to more than 350 m in the north. The alluvial cover is much thicker and wider on the west, it thins out on the east and the traps are exposed in the bed of the Tapi River near Bhusaval. However, the alluvium attains a thickness of about 400 m between Adavad and Yawal.

The alluvium comprises of beds of clay and silt with lenses of Coarse sand, Gravel, and Pebbles. The entire thickness of Alluvium can be divided in to Younger Alluvium Occurring up to 80 mbgl and older alluvium occurring between Younger alluvium and the basalt Basement. The younger alluvium is yellowish brown in colour, more coarse grained and contains 2 to 5 layers of granular zones, ranging in thickness from 2 to 20 m. The older is dark brown in colour and comprises sticky clays with 1 to 3 layers of gravels and boulders.

The clast size decreases from north to south towards Tapi river; Graveliferous alluvium occupies the foothills of Satpuda hills and laterally, with progressive decrease in dominant clast size, the sandy alluvium occupies the central part of the alluvium covered area and further toward south Alluvium gets enriched in clay content in the vicinity of Tapi river. The alluvium is clayey and yellowish on the Tapi banks and adjoining ravines. The ravines are more than 30 m deep near kolnhavi, siragad and Pathrale villages. The Purna and the Girna rivers to the east and SW respectively in the district also contain alluvial cover ranging in thickness between 10 and 20 m.

1.4.2 Bazada formation:

The Bazada formation consists of mainly large sediments admixture with pebbles, gravels, sand, silt and clay in the loose form. The formation occurs at the foothills of the Satpuda hill ranges with 80 km east- west extent and it pinches on the western part of Jalgaon near Aner River.

The Bazada zone is covered by brownish to black sandy soils. These deposits are formed due to the deposition of rock fragments transported by local streams from Satpuda hill range. The maximum thickness of these deposits is not known. However, around Naygaon, it is more than 100 mbgl thick.

1.4.3 Deccan traps Basalt:

The area comprises of the Deccan basalts covering major part of the district (70 to 80 per cent) and a few strips of alluvial soil cover on both sides of the major rivers and streams. The Deccan trap lava sequence is grouped under Satpuda and Sahyadri group in the area north and south of Tapi River respectively. The inlier of lava flows immediately north of Tapi and within alluvium comprises lower Pahoehoe and upper Aa flow grouped under Chahardi formation. In Satpura group, the general thickness of individual flow varies between 15-40 m. Satpuda group is further subdivided in to six formations on the basis of megacryst, marker flows or prominent red/ green bole beds. Doleritic, basaltic and Gabbroic dykes traverse the flows. The Sahyadri group is divided into Ajanta and Ratangarh formations and Sahyadri group consist of alternate sequence of Pahoehoe and Aa flows with cumulative exposed thickness varying between 90 to 200 m.

The individual lava flow is composed of two major rock units (1) the massive part and (2) the vesicular part. Each individual lava flow consists of lower massive part becoming vesicular /amygdaloidal towards top, ranges in their individual thickness from a few centimetres to tens of meters. The flows have wide variation in colour 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. Deccan basalts are hydro geologically in-homogeneous rocks.

A borehole at Bhusaval, 367 m deep, revealed 29 flows ranging in thickness from a few m to 30 m. The systematic geo hydrological studies in Chalisgaon block and the adjoining western parts in Nasik district reveal 17 different lava flows ranging in thickness from 15 to 46 m within a vertical column of 290 m at an altitude between 319 and 609 m above M.S.L. The individual flow in the area can be separated easily with the help of 0.6 to 1.5 m thick marker horizon of red bole. The lava flow is normally horizontal in disposition, but at places they dip at 5 to 6 degrees towards west. In Aner valley and near Dalnet and north of Chopda these flows appear to be horizontal, while at Burhanpur and Raver, assume 5 degrees dip towards west.

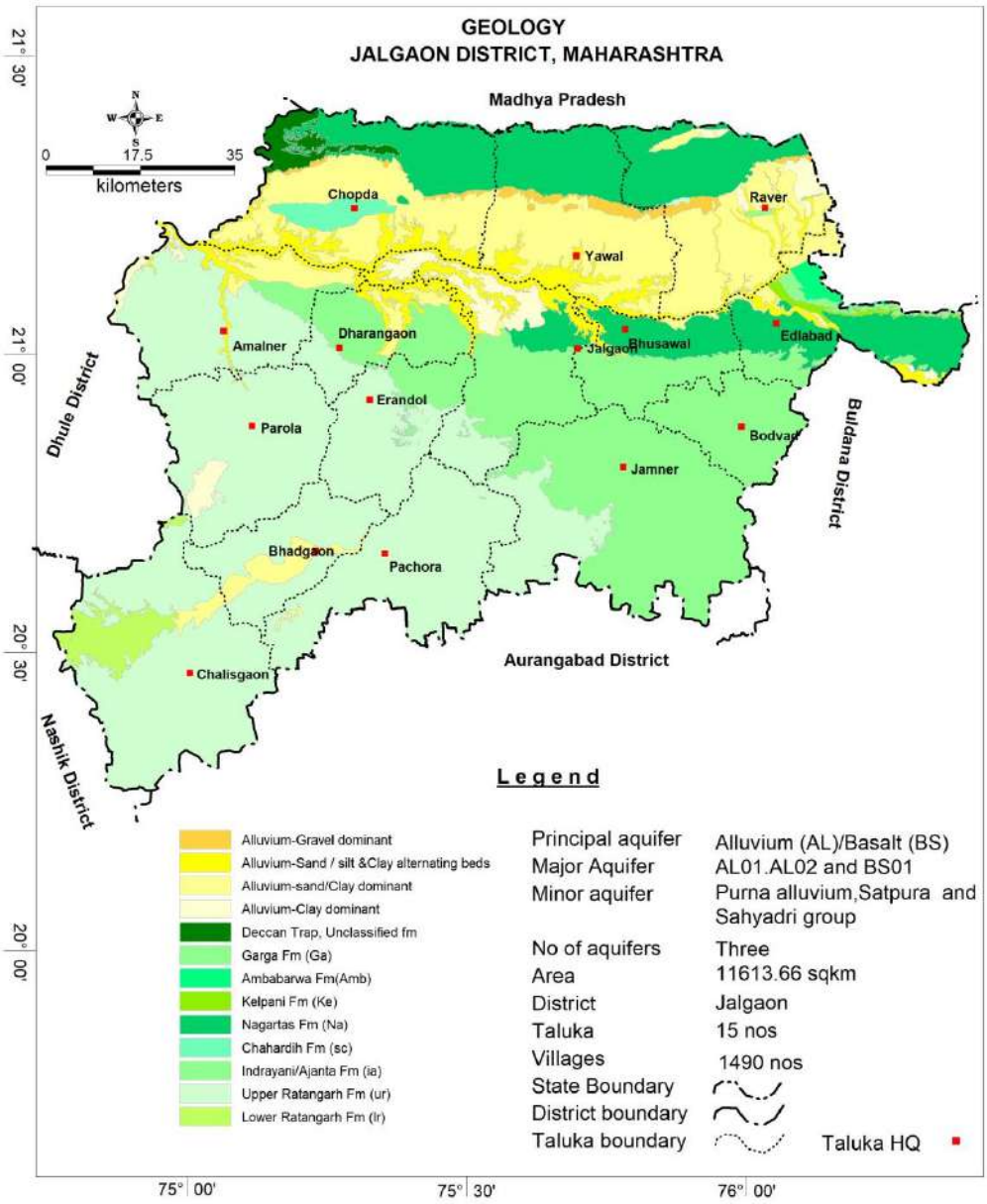


Figure 1. 9: Geological Map, Jalgaon district

2.0 HYDROGEOLOGY

Hydrogeology is concerned primarily with the mode of occurrence, distribution, movement and chemistry of water occurring in the subsurface in relation to the geological environment. The occurrence and movement of water in the subsurface is broadly governed by geological frameworks i.e., nature of rock formations including their porosity (primary and secondary) and permeability. The principal aquifers in the area is Bazada, Alluvium and Basalt and the occurrence and movement of ground water in these rocks is controlled by various factors such as grain size and clay content in Bazada, ground water accumulation in Alluvial aquifer is directly proportional to the granular zones i.e., the ground water accumulation will be higher in coarser formation and the formation clear of clayey admixture or intercalation. Whereas in Basalt, the occurrence and movement of ground water primarily depends on the degree of interconnection of secondary pores/voids developed by fracturing and weathering. The vesicles in Deccan basalt formation are invariably found filled with secondary minerals thereby reducing the primary porosity to almost nil. The hydrogeological map of area is prepared and presented in **Figure 2.1.**

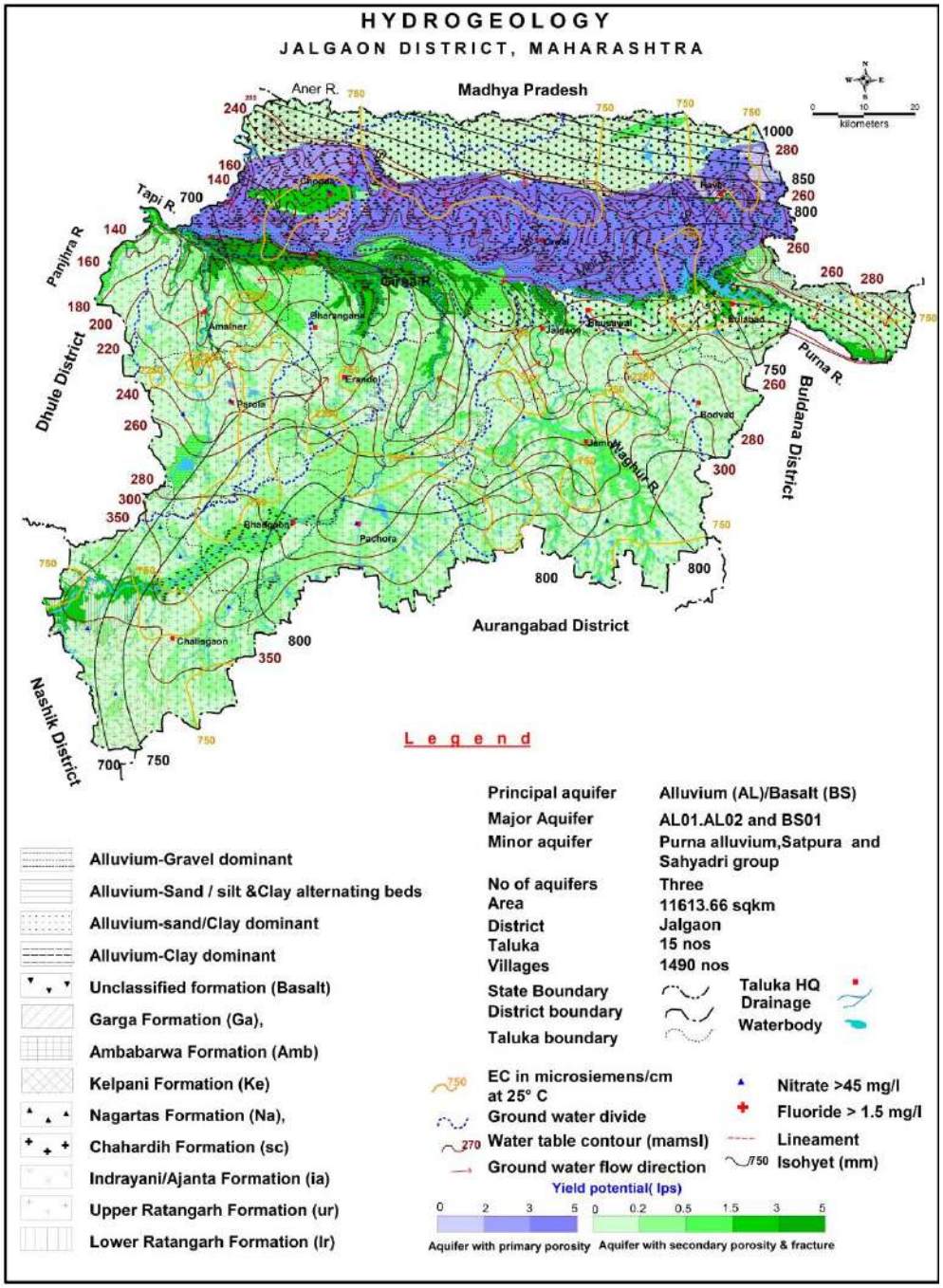


Figure 2.1: Hydrogeology, Jalgaon District

2.1 Major Aquifer Systems

Three main types of formations are observed in the area i.e., Bazada, Alluvium and Basalt. Alluvium and Basalt form the main aquifers in the district. Two aquifer Systems in Basalt and three in Alluvium are found to be prevailing in the district. Based on the existing data and the data generated so far, map of major aquifer has been prepared and depicted in **Figure 2.1.**

The aquifer units in each of the formation are listed below:

- **Bazada** – Single unit (upto 100 m)
- **Alluvium** –
  - Aquifer –I: up to 80 m,
  - Aquifer –II: 30 to 200 m and
  - Aquifer –III: > 200 m

- **Basalt**–
  - Aquifer - I up to 38 m
  - Aquifer -II 38 to 200 m

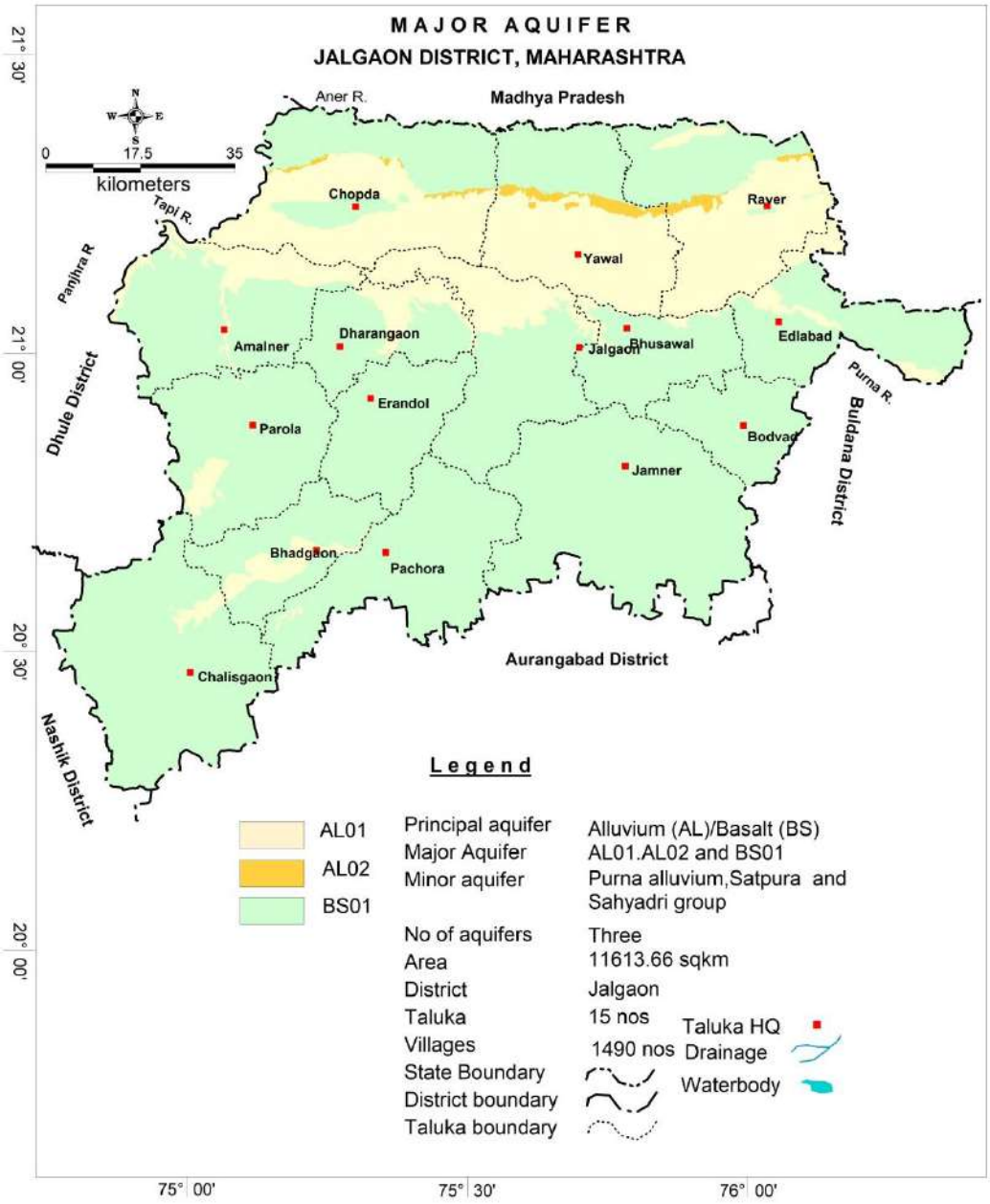


Figure 2.2: Major Aquifers, Jalgaon District

2.1.1 Occurrence of Ground Water in Bazada

The ground water in Bazada (Talus and Scree) formation occurs under unconfined and semi-confined conditions and form highly productive zone in the area. The formations are highly porous and permeable in nature, which facilitate ground water movement with much ease than in the Alluvial and Basaltic aquifers. The yield of dugwells occurring in this formation is generally higher than those tapping Basaltic and Alluvial aquifer. It generally ranges from 5 to more than 10 lps.

The depth of the dugwells in Bazada range from 16.20 to 70.60 mbgl which are the preferred ground water abstraction structures, ground water occurs in unconfined conditions and the depth to water level varies from 5.10 to 52.10 mbgl, however in majority of the wells it is between 20 and 40 mbgl.

2.1.2 Occurrence of Ground Water in Alluvium

Northern part of the district is underlain by Tapi Alluvium. Tapi Alluvium can be subdivided into two sub units, i.e., the upper younger alluvium extending down to 70-80 m depth and the deeper older alluvium attaining a maximum depth of 400 m. However, only upper 70-80 m of younger alluvium, having 2 to 5 layers of granular zones of sand and gravel ranging in thickness from 2 to 20 m, forms the potential aquifer. At deeper levels the alluvium is mostly clayey and does not form potential aquifer.

Ground water in alluvium occurs under water table, semi-confined and confined conditions. The dugwells in these formations are deep ranging from 25 to 50 mbgl in depth with yield varying from 120 to 200 m^3/day in winter and from 100 to 150 m^3/day in summer.

2.1.3 Occurrence of Ground Water in Basalt

Deccan Trap Basalt of Upper Cretaceous to Paleogene age is the major rock formation, covering about 8040 sq. km. area in central and the southern parts of the district. These rock formations are intruded by the dykes of the same period. Alluvium occurs over an area of 3600 sq. km. in the northern part of the district below the Satpura ranges. A map depicting hydrogeological features is presented in **Figure 2.2.**

Ground water in Deccan Basalt formation occurs mostly in the upper weathered and fractured parts down to 20-25 m depth. At places potential zones are encountered at deeper levels in the fractures and inter-flow zones. The upper weathered and fractured parts form phreatic aquifer and ground water occurs under water table (unconfined) conditions. At deeper levels, the ground water occurs under semi-confined conditions. The yield of dugwells with the depth range of 5-15 mbgl, tapping upper phreatic aquifer, is found between 21 and 337m^3/day. Borewells drilled down to 60-150 m depths, tapping weathered and fractured basalt are found to yield 1.8 to 52 m^3/day.

Shallow Aquifer is generally tapped by the dug wells of 9 to 38 m depth, water levels range from 0.1 to 35 mbgl and yield varies from 10-200 m^3/day. The deeper Aquifer is being tapped by borewells with depth ranging from 20-200 mbgl and the water level from 17-99.40 m bgl. Based on Ground Water Exploration, aquifer wise characteristics are given in **Table 2.1.** Maps depicting aquifer wise depth of occurrence and fractured/granular zone's thickness and yield potential are shown in **Figure 2.3 to 2.5 and 2.6 to 2.8** respectively.

Table 2. 1: Aquifer Characteristic of Jalgaon district

Major Aquifers	**Basalt (Deccan Traps)**		**Alluvium (River Alluvium)**		
Type of Aquifer	**Aquifer-I**	**Aquifer-II**	**Aquifer-I (AL02)**	**Aquifer-II (AL01)**	**Aquifer-III (AL01)**
Formation	Weathered/ Fractured Basalt	Jointed / Fractured Basalt	Alluvium-Gravel dominant or Alluvium-Sand / silt &Clay alternating beds	Alluvium-sand/Clay dominant	Alluvium-Clay dominant
Depth of Occurrence (mbgl)	9 to 38	20 to 200	27 to 80	30 to 200	120 to 350
Fractures/granular zones encountered (mbgl)	up to 30	up to 200	up to 60	up to 200	up to 350
Granular/Weathered/Fractured rocks thickness (m)	5 to 30	0.5 to 12	5 to 60	5 to 30	3 to 40
SWL (mbgl)	0.1 to 35	17.15 to 99.40	3.1 to 55	2.2 to 72.50	2.2 to 72.50
Yield	<10 to 200 m^3/day	0 to 5 lps	25 to 200 m^3/day	0 to 5 lps	0 to 2 lps
Sustainability	0.5 to 3 hrs	2 to 6 hrs	1 to 10 hrs	2 to 12 hrs	1 to 2 hrs
Transmissivity (m^2/day)	4 to 55 m^2/day	10 to 60 m^2/day	10 to 200 m^2/day	20 to 562 m^2/day	15 to 250 m^2/day

Major Aquifers	**Basalt (Deccan Traps)**		**Alluvium (River Alluvium)**		
Type of Aquifer	**Aquifer-I**	**Aquifer-II**	**Aquifer-I (AL02)**	**Aquifer-II (AL01)**	**Aquifer-III (AL01)**
Formation	Weathered/ Fractured Basalt	Jointed / Fractured Basalt	Alluvium-Gravel dominant or Alluvium-Sand / silt &Clay alternating beds	Alluvium-sand/Clay dominant	Alluvium-Clay dominant
Specific Yield/ Storativity (Sy/S)	0.02	1.0 x10^{-4} - to 2.5 X 10^{-5}	0.06-0.1	3.47 x 10^{-3} to 3.96 x 10^{-4}	3.47 x 10^{-3} to 3.96 x 10^{-4}
Suitability for drinking/ irrigation	Suitable for both (except Nitrate & Fluoride affected villages for drinking)	Suitable for both (except Nitrate & Fluoride affected villages for drinking)	Suitable for both (except Nitrate affected villages for drinking)	Suitable for both except Nitrate & Fluoride affected villages for drinking)	Suitable for both except Fluoride affected villages for drinking)

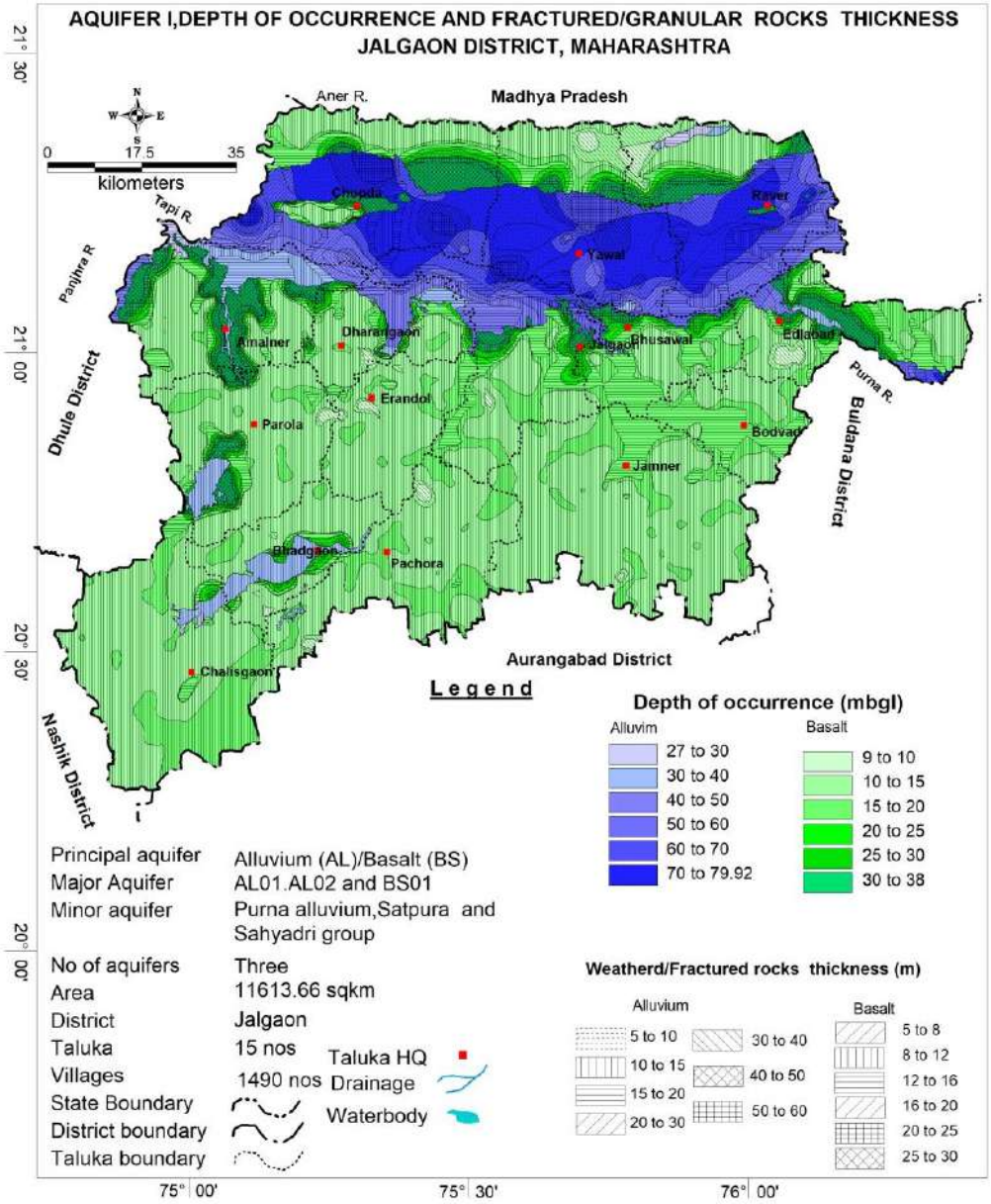


Figure 2.3: Depth of occurrence and fractured/granular rock thickness (Aquifer-I)

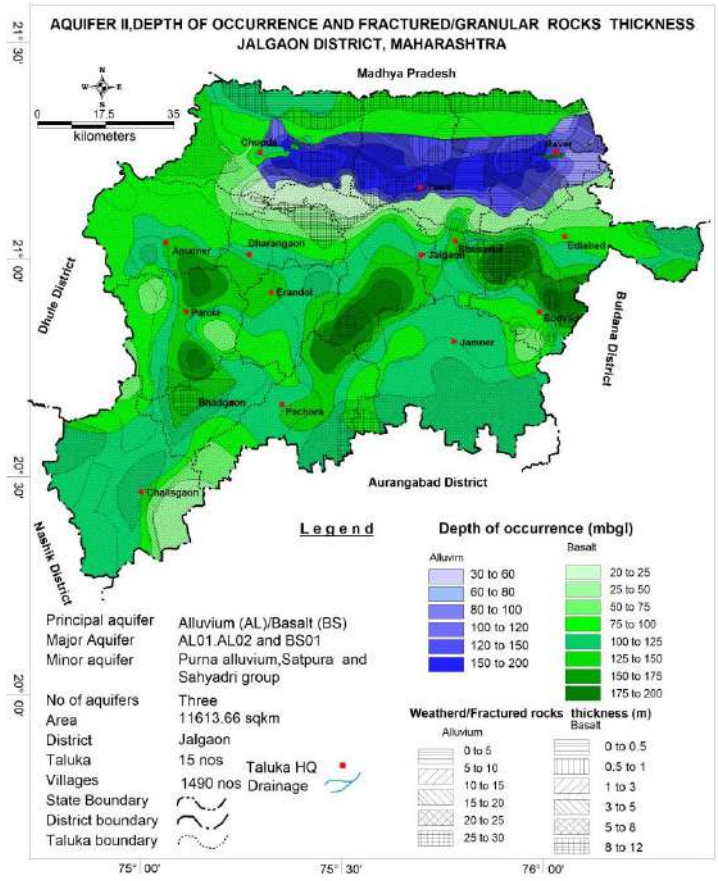


Figure 2.4: Depth of occurrence and fractured/granular rock thickness (Aquifer-II)

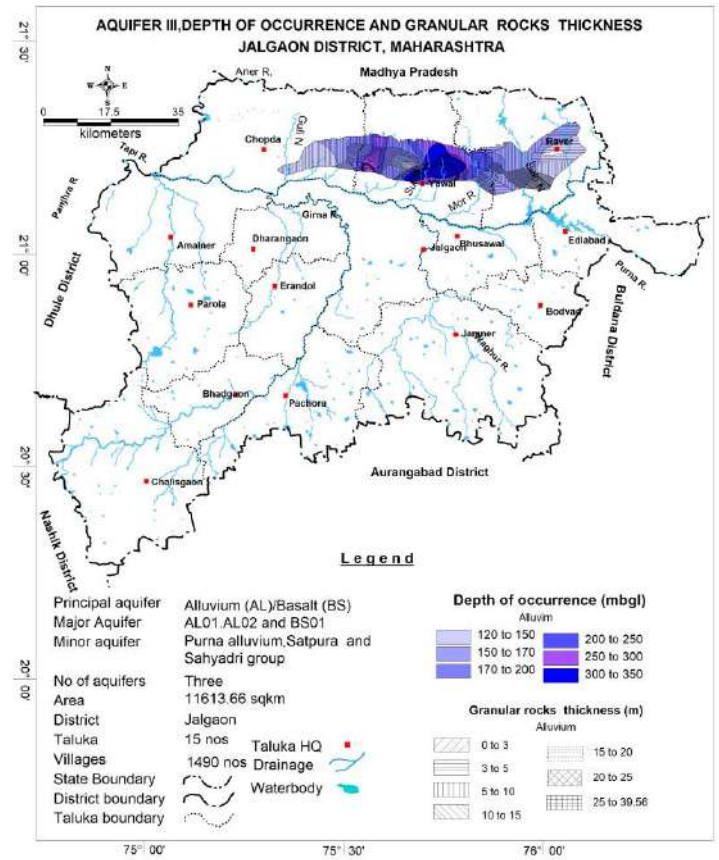


Figure 2. 5: Depth of occurrence and fractured/granular rock thickness (Aquifer-III)

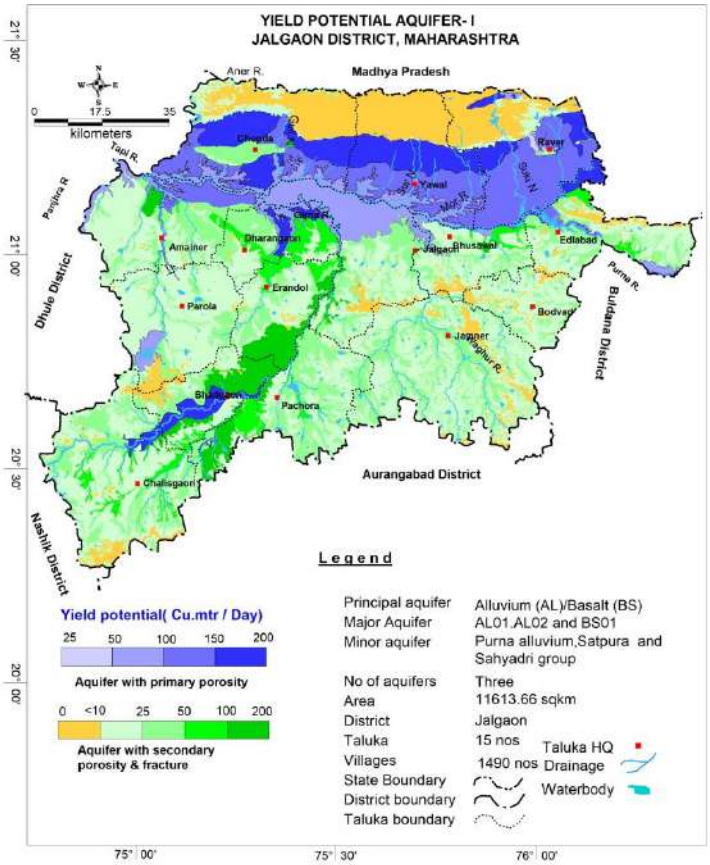


Figure 2.6: Yield Potential (Aquifer-I), Jalgaon district

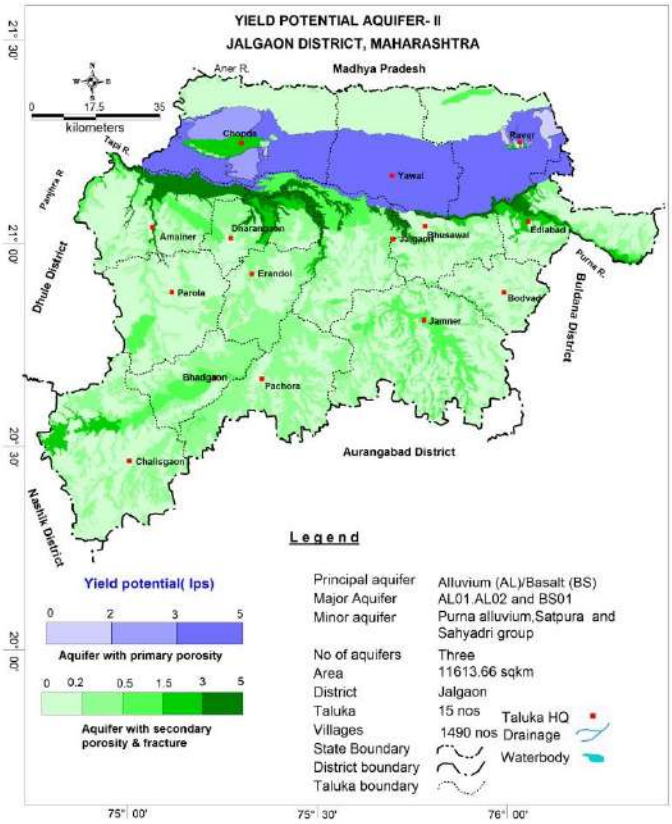


Figure 2.7: Yield Potential (Aquifer-II), Jalgaon District

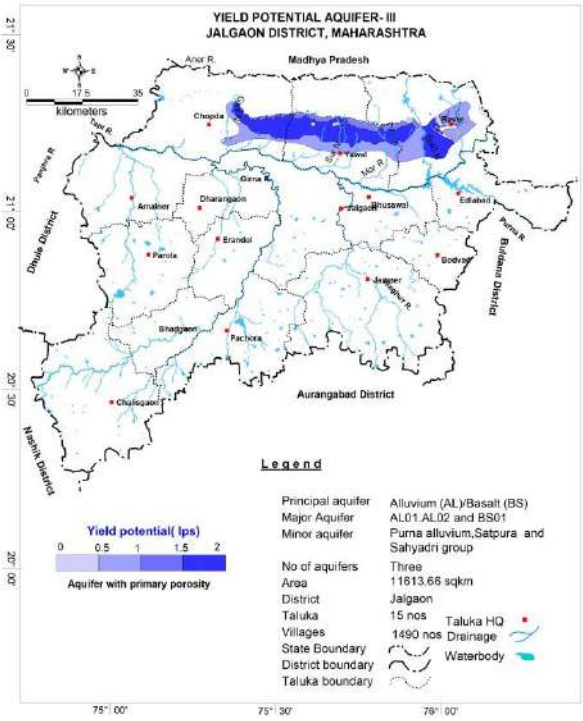


Figure 2.8: Yield Potential (Aquifer-III), Jalgaon District

Yield potential	Aquifer I	Aquifer II	Aquifer III
Alluvium	25 to 200 m^3/Day	0 to 5.0 lps	0.0 to 2.0 lps
Basalt	0 to 200 m^3/Day	0 to 5.0 lps	-

2.2 Aquifer Parameters

Aquifer parameters are available from ground water exploration carried out in the alluvial area of the district. The specific capacity ranges between 0.07 and 21.6 lps/m of drawdown and the transmissivity ranges from 82.5 to 2314 m^2/day. The Storativity varies from $1.6x10^{-2}$ and $1.057x10^{-4}$ while permeability varies from 0.19 and 154.62 m/day. The results of pumping test analysis of dugwells in basalt show that the permeability and specific capacity ranges from 1.104 to 274.08 m/day and 12.14 to 1818.18 lpm/m-dd respectively.

2.3 3-D and 2-D Aquifer Disposition

Based on the existing data, aquifer disposition in 3D, Fence diagram, 3D Bar diagram and several hydrogeological sections have been prepared along section lines shown in **Figure 2.9 to 2.17** to understand the subsurface disposition of aquifer system.

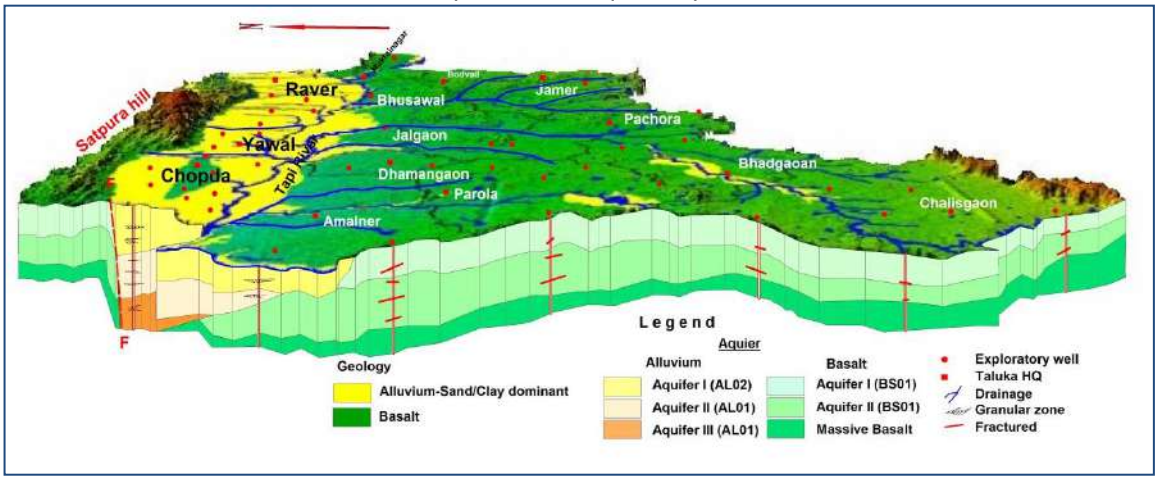


Figure 2.9: 3D Aquifer Disposition, Jalgaon District

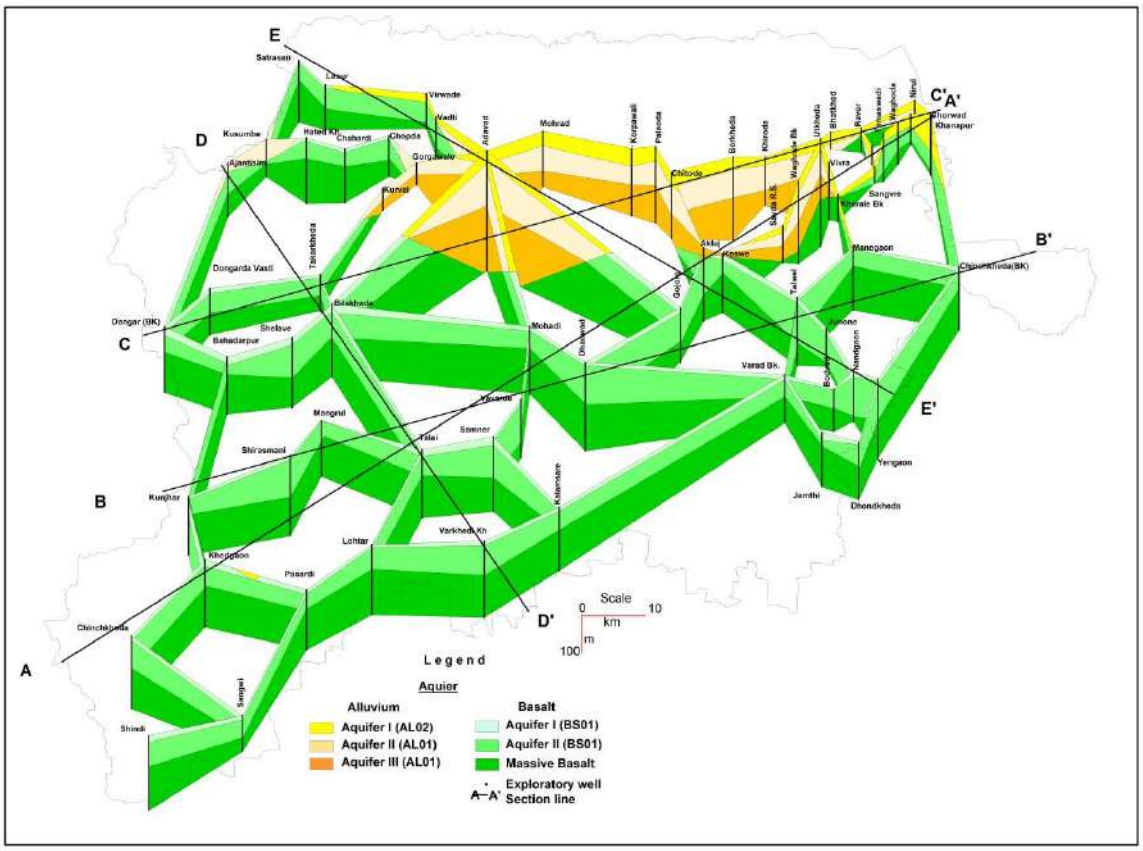


Figure 2.10: 3D Fence Diagram, Jalgaon District

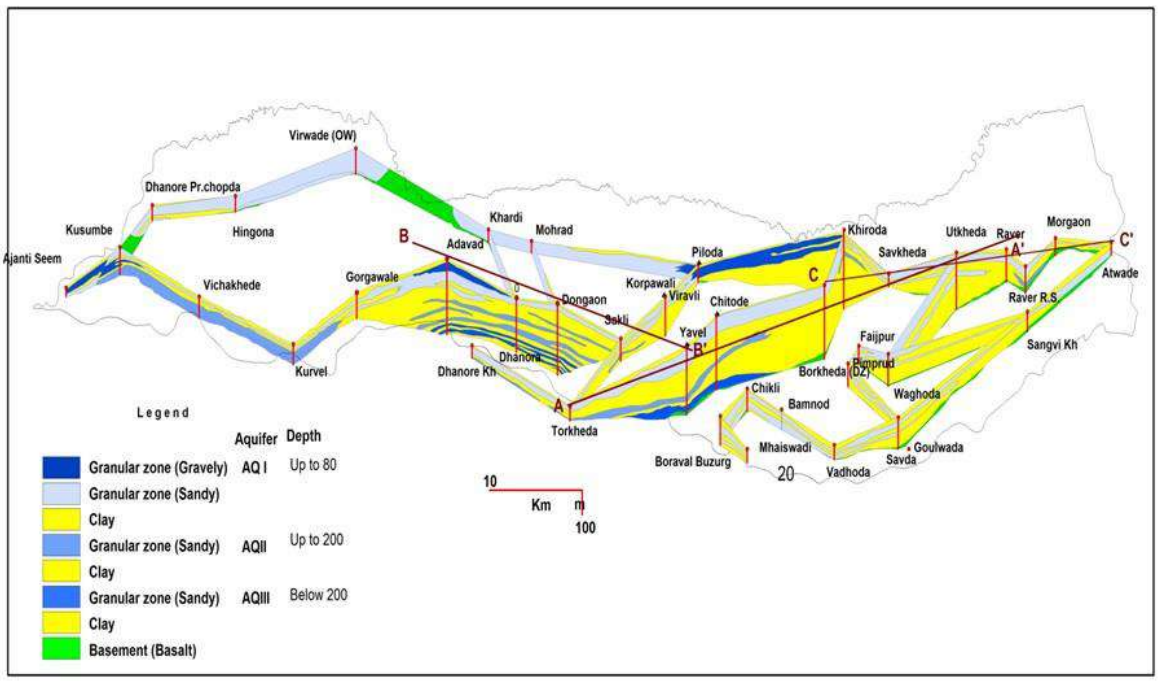


Figure 2.11: 3D Fence Diagram, Tapi Alluvium of Jalgaon District

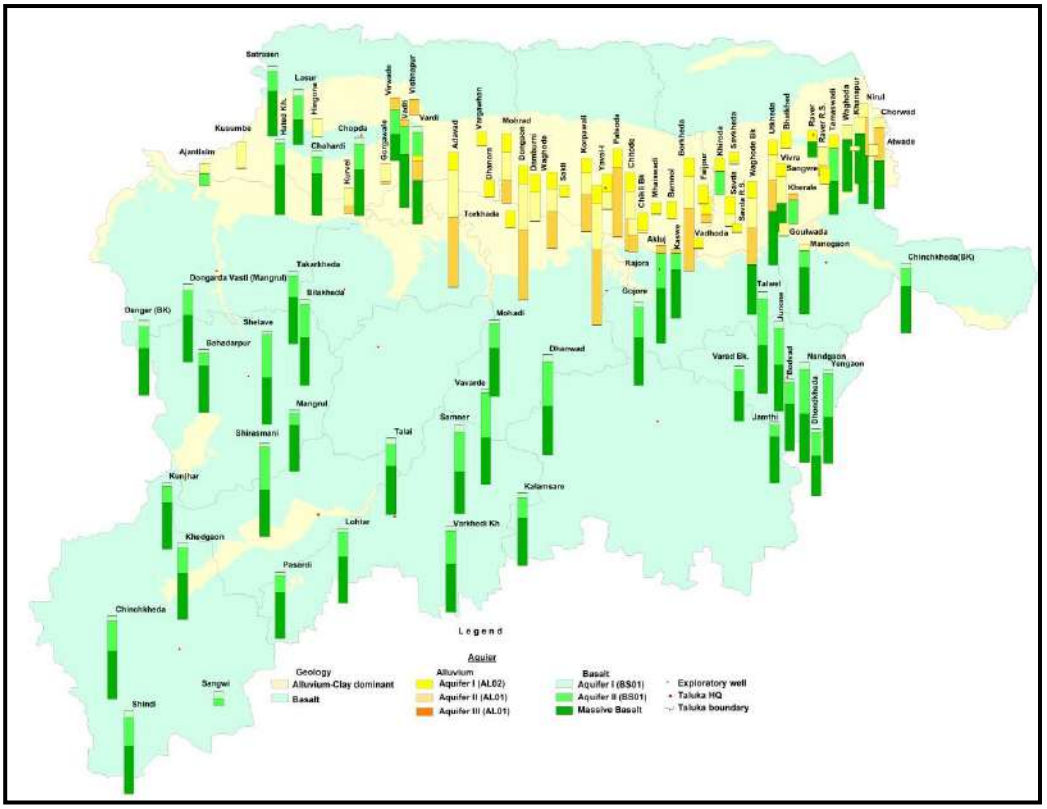


Figure 2.12: 3D Bar Diagram, Jalgaon District

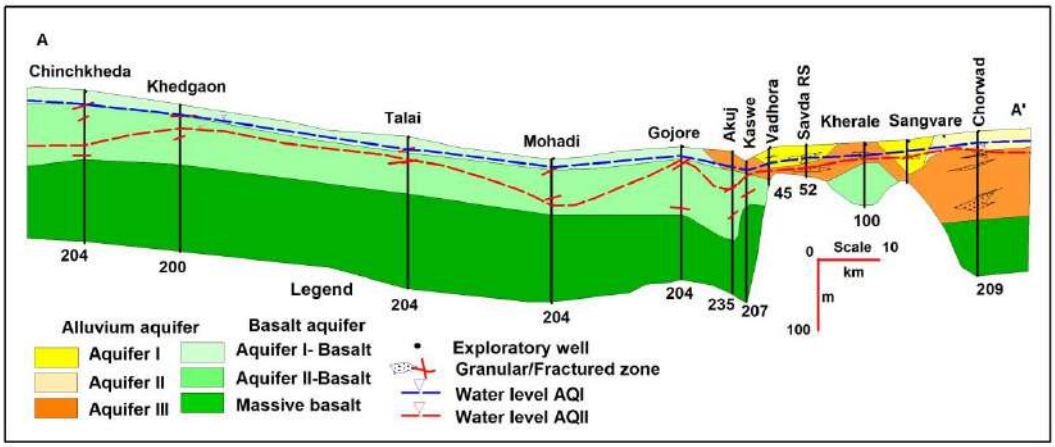


Figure 2.13 : Lithological Section

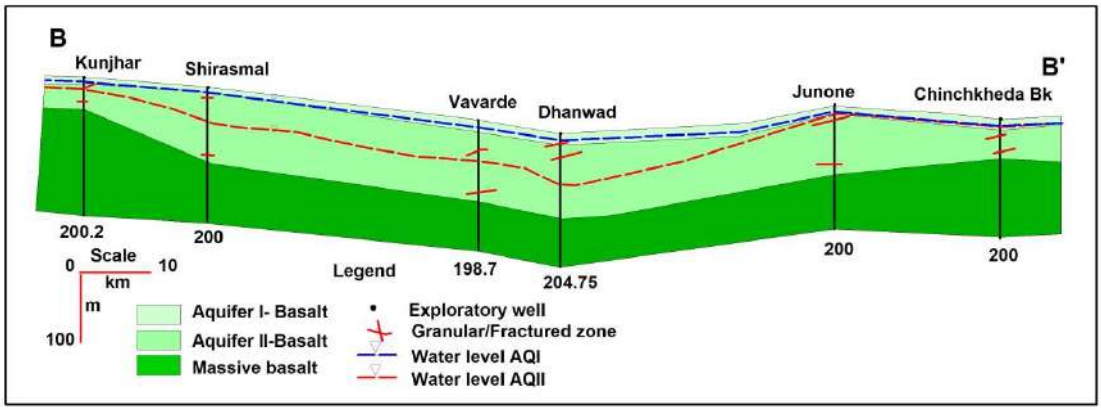


Figure 2.14: Lithological Section

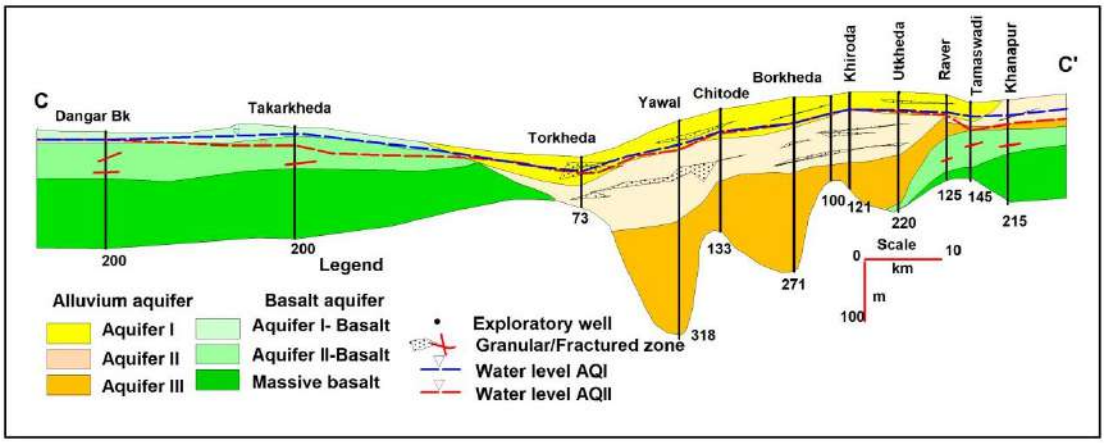


Figure 2.15: Lithological Section

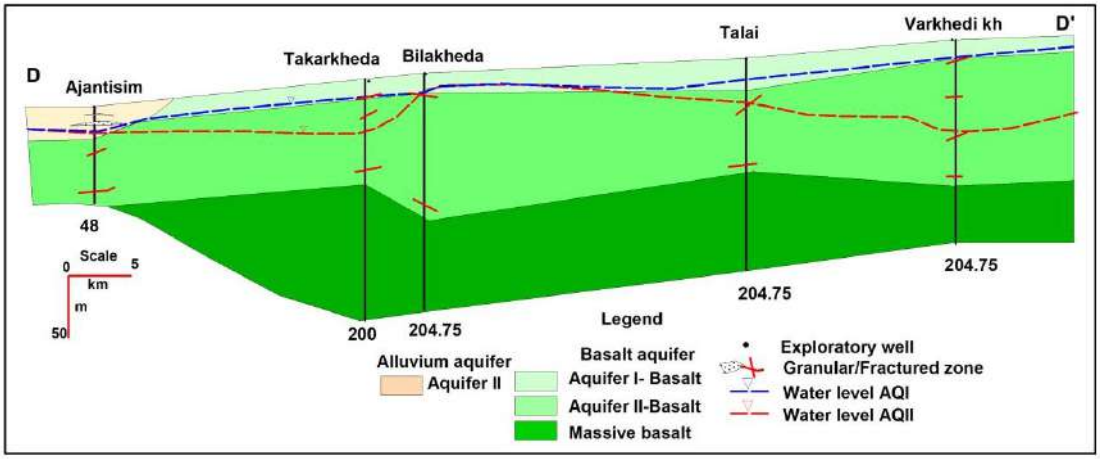


Figure 2.16: Lithological Section

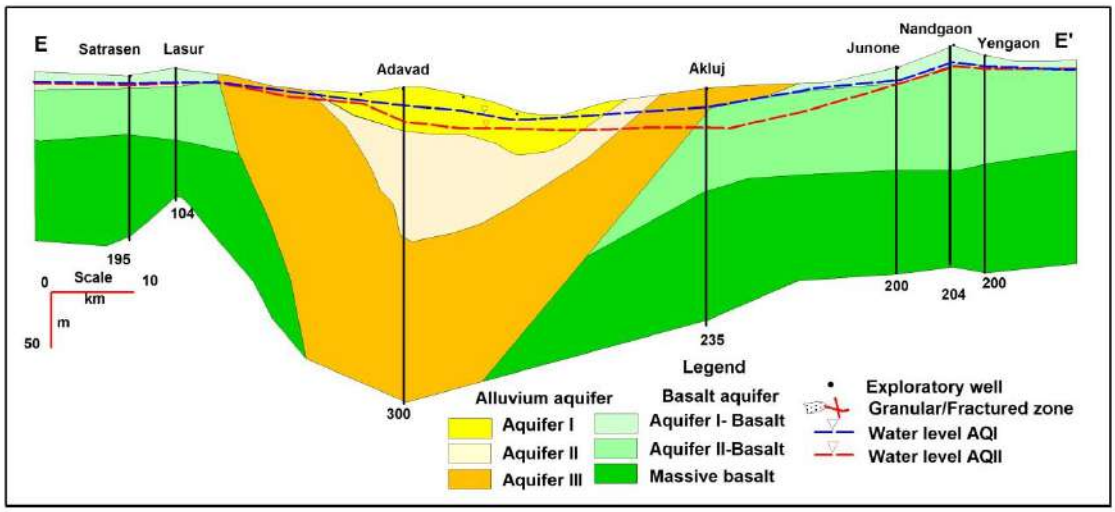


Figure 2.17: Lithological Section

3.0 WATER LEVEL SCENARIO

3.1 Depth to water level (Aquifer-I /Shallow Aquifer)

Central Ground Water Board periodically monitors 57 Ground Water monitoring wells in the Jalgaon district, four times a year i.e. in January, May (Premonsoon), August and November (Postmonsoon). Apart from this under NAQUIM studies; 76 KOWs were also established and monitored during the year 2017. These data have been used for preparation of depth to water level maps of the district. Pre-monsoon and post monsoon water levels along with fluctuation during 2017 and long-term water level trends (2008-2017) are given in **Annexure-II.**

During pre-monsoon (may 2017), depth to water ranges between 2.70 (Sivaji Udyan, Jalgaon block) and 55 mbgl (Nimgaon, Yawal block). The water levels less than 5 mbgl are observed in basaltic terrain as isolated patches in Chalisgaon, Pachora, Bhadgaon, Parola, Dharangaon and Jalgaon Blocks. The Water levels between 5-10 mbgl are observed in southern half of the district and small patches in northern parts of Chopda and Raver blocks. The water level between 10 to 20 mbgl is observed in major part of the district. The Deeper water levels between 20 and 30 mbgl are observed in the north of Tapi river covering Chopda, Raver and Yawal blocks and small isolated parts in Jalgaon, Edlabad and Amalner blocks. Deepest water level more than 30 mbgl has been observed in the north of the Tapi River covering entire Yawal block; major part of Raver; part of Chopda blocks , adjoining area of Jalgaon block and one isolated patch is also observed in south of the Jalgaon block. The deeper water levels are characteristic of Tapi basin due to its high ground water potential and over exploitation of the ground water resources. The premonsoon depth to water level map is depicted in **Figure 3.1.**

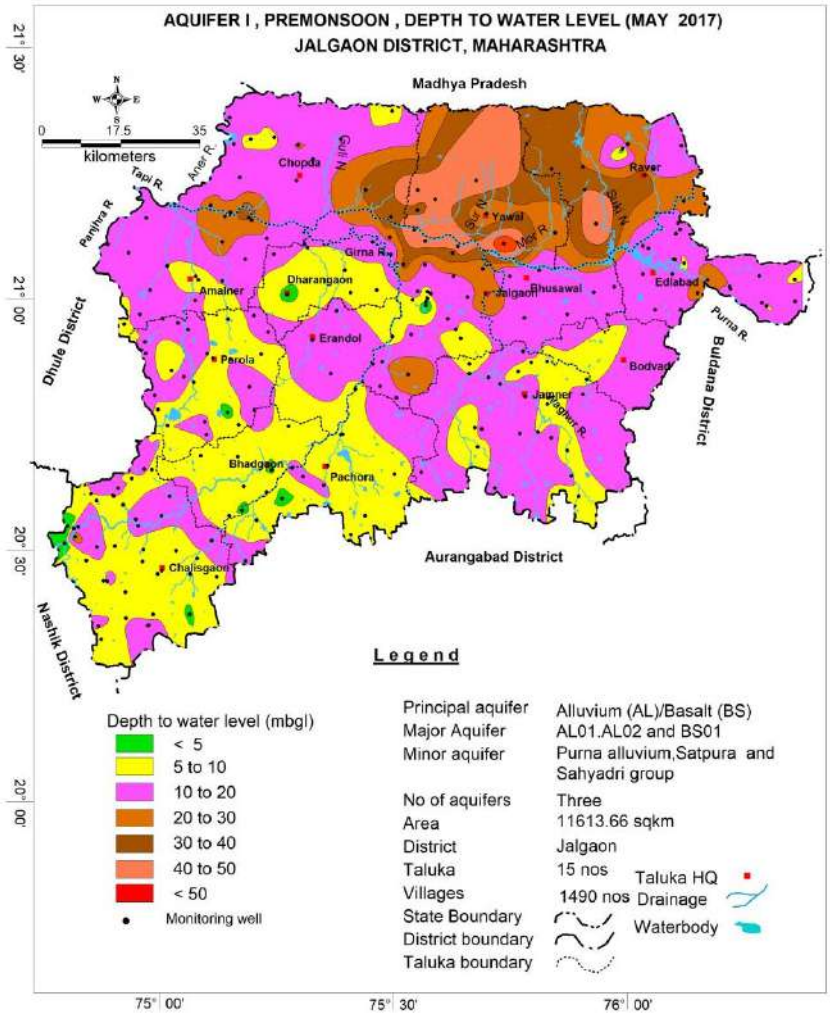


Figure 3.1: DTWL shallow aquifer (May 2017), Jalgaon District

During Post- Monsoon (Nov. 2017), depth to water level varies between 0.1 (Lalamati, Raver block) and 44.1 mbgl (Idgaon, Jalgaon block). Shallow water levels less than 2 mbgl are observed as isolated parts in Amalner, Chalisgaon, Bhadgaon, Erandol, Pachora and Jalgaon blocks. Water levels between 2 to 5 mbgl are observed covering major parts of southern portion of the district. Water levels between 5 and 10 mbgl are observed as continuous stretch in the south along the Tapi River and in isolated parts in the northern part covering Chopda and Raver blocks. The water levels between 10 to 20 mbgl have been observed covering major part in the north of Tapi River and in isolated parts in Jalgaon, Jamner, Edlabad and Chalisgaon blocks. Deeper water levels of more than 20 mbgl are observed in north of Tapi River covering major part of Yawal block and part of Raver block; isolated parts of Chopda and Jalgaon blocks. Spatial variation in post monsoon depth to water levels is shown in **Figure 3.2.**

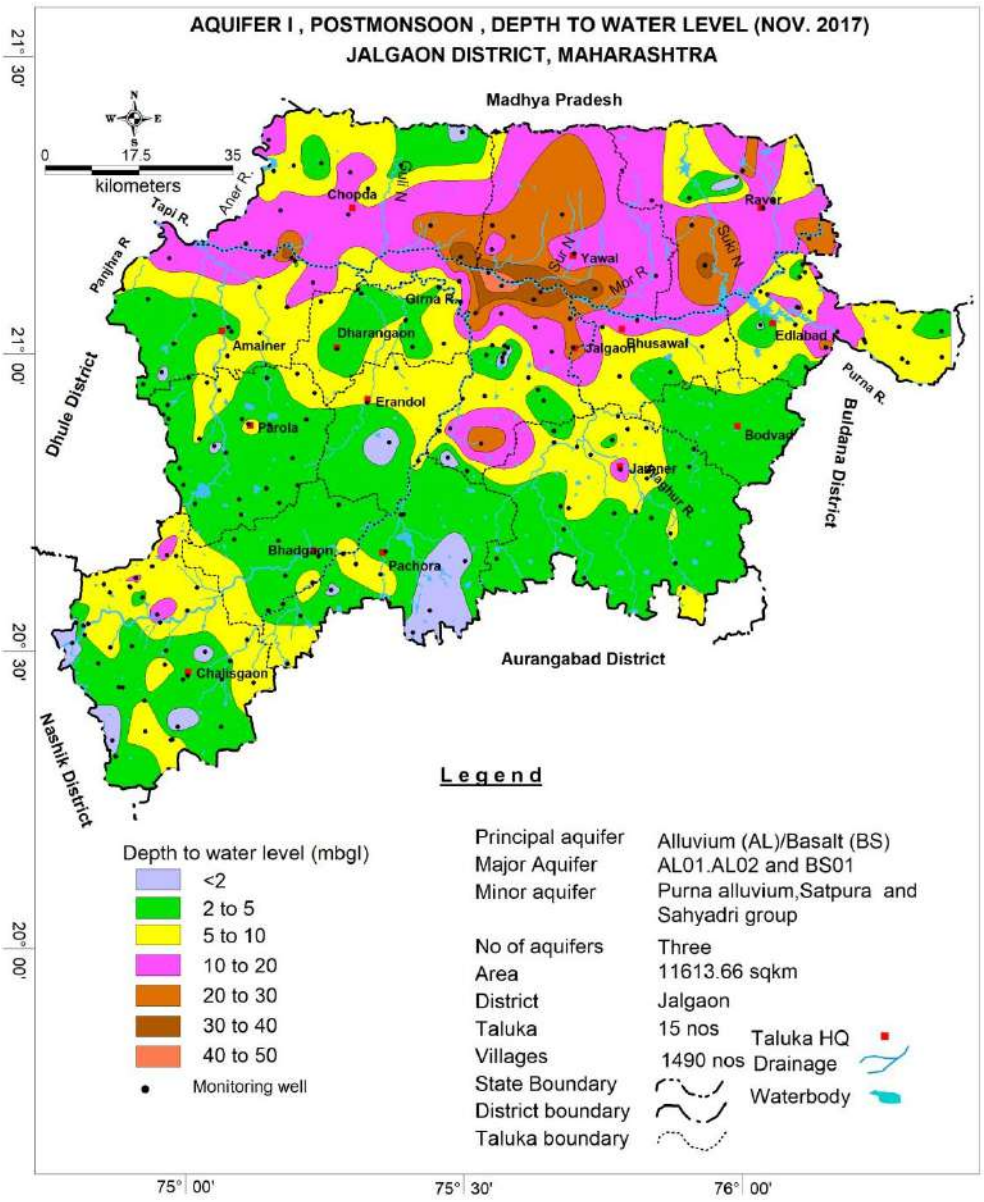


Figure 3.2: DTWL shallow aquifer (Nov. 2017), Jalgaon District

Seasonal Water Level Fluctuation (May-Nov. 2017)

It is observed that minimal water level fluctuation was observed at Karamadu, Chalisgaon block (0.20 m) while maximal water level fluctuation was observed at Chinchati, Raver block (27.2 m). Rise in water level has been observed in entire district in the range of Rise 0-2, 2-4 and >4 m. No decline in water level was observed in the District.

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

Total 142 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 Jalgaon District ranges from 12.00 (Bodvad, Bodvad block) to 140.00 mbgl (Talwel, Bhusaval block). The depth to water level less than 10 mbgl is observed only in isolated parts of Chalisgaon block. Depth to Water level between 10 to 20 mbgl has been observed in parts of Chopda, Muktainagar, Bodvad, Jamner and Chalisgaon blocks and isolated patches are also observed in rest of the blocks except Jalgaon and Parola blocks. The deeper water level between 20 and 30 mbgl are observed in major parts of Chopda, Raver and Amalner blocks and in parts of almost all the blocks. The water level between 30-40 mbgl has been observed in major part of Yawal, Raver, Jamner, and Pachora blocks and in parts of almost all the blocks except Chopda block. The water level more than 40 m has been observed in major part of south of Tapi River and small part of Yawal and Raver blocks in the north of Tapi River. The North of Tapi River, deeper water levels are observed in Tapi Alluvial formation and water levels in these areas remain deep even after the natural recharge. In the south of Tapi River, deeper water may be attributed low yield potential of the formation. The premonsoon depth to water level for Aquifer -II is given in **Figure 3.3.**

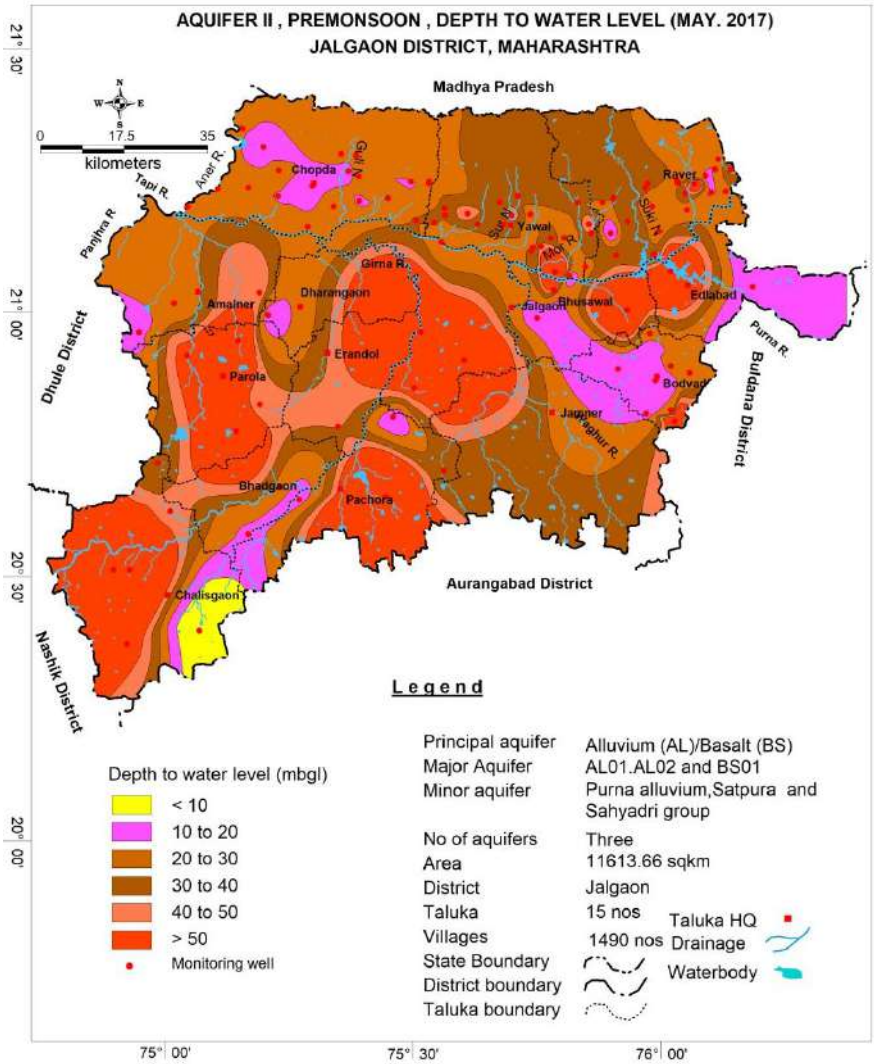


Figure 3.3: DTWL deeper aquifer (May 2017), Jalgaon District

During post monsoon (Nov. 2017), depth to water levels ranges between 4.95 (Hated Kh., Chopda block) and 58.18 mbgl (Tamaswadi, Yawal block). Depth to water level less than 10 mbgl has been observed scattered over the district in small isolated patches. Depth to water level between 10 to 20 mbgl is observed in the major part of the district. Deeper water level between

20 to 30 mbgl has been observed in major part of Jamner, Jalgaon and Yawal blocks and also observed in in parts of almost all the block except Chopda block. The deepest water level of more than 30 mbgl has been observed in major part of Pachora, Parola and Chalisgaon blocks and isolated patches in Jalgaon, Amalner, Bodvad, Raver and Yawal blocks. The post monsoon depth to water level for Aquifer –II is given in **Figure 3.4.**

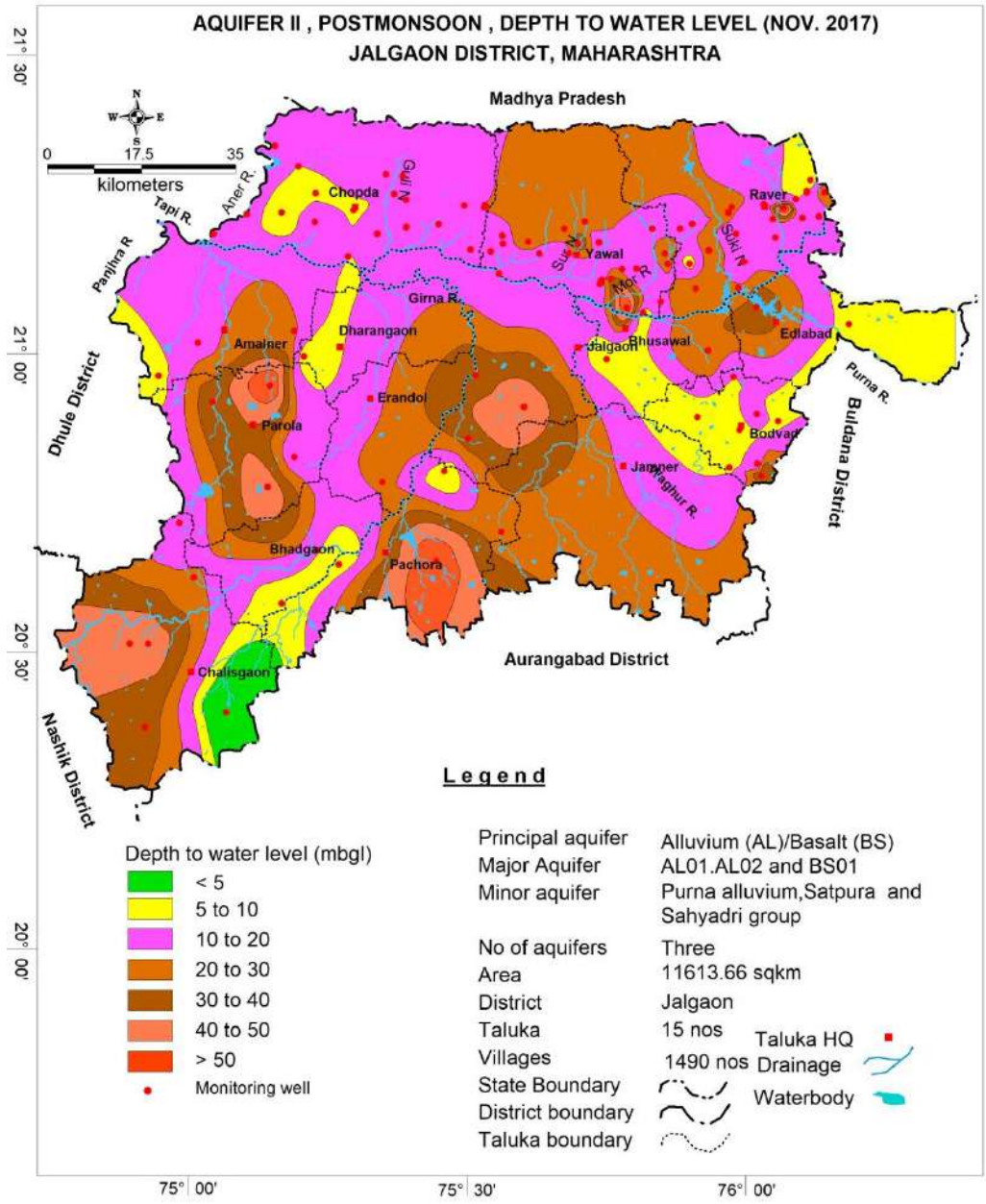


Figure 3.4: DTWL deeper aquifer (Nov. 2017), Jalgaon District

3.3 Water Level Trend (2008-2017)

During pre-monsoon, rise in water level trend has been recorded at 45 stations ranging from 0.00137 (Bamhrud kh. Pachora block) to 0.42 m/year (Pachora, Pachora block) while falling trend was observed in 76 stations varying from 0.00146 (Kurha, Edlabad block) to 0.88687 m/year (Viroda, Yawal block). During pre-monsoon, declining water level trend has been observed in about 7344.61 sq km area i.e., 62.44 % of the area. Significant decline more than 0.20 m/year has been observed in 2348.34 sq km, i.e., 19.96 % area covering major part of north of Tapi River. Rise in water level trend up to 0.2 m/year has been observed in southern, central and eastern parts of the district covering 4440.38 sq km. Rise in water level more than 0.2 m/year has been observed in about 440.27 sq km area as isolated parts in southern half of the district **(Figure 3.5).**

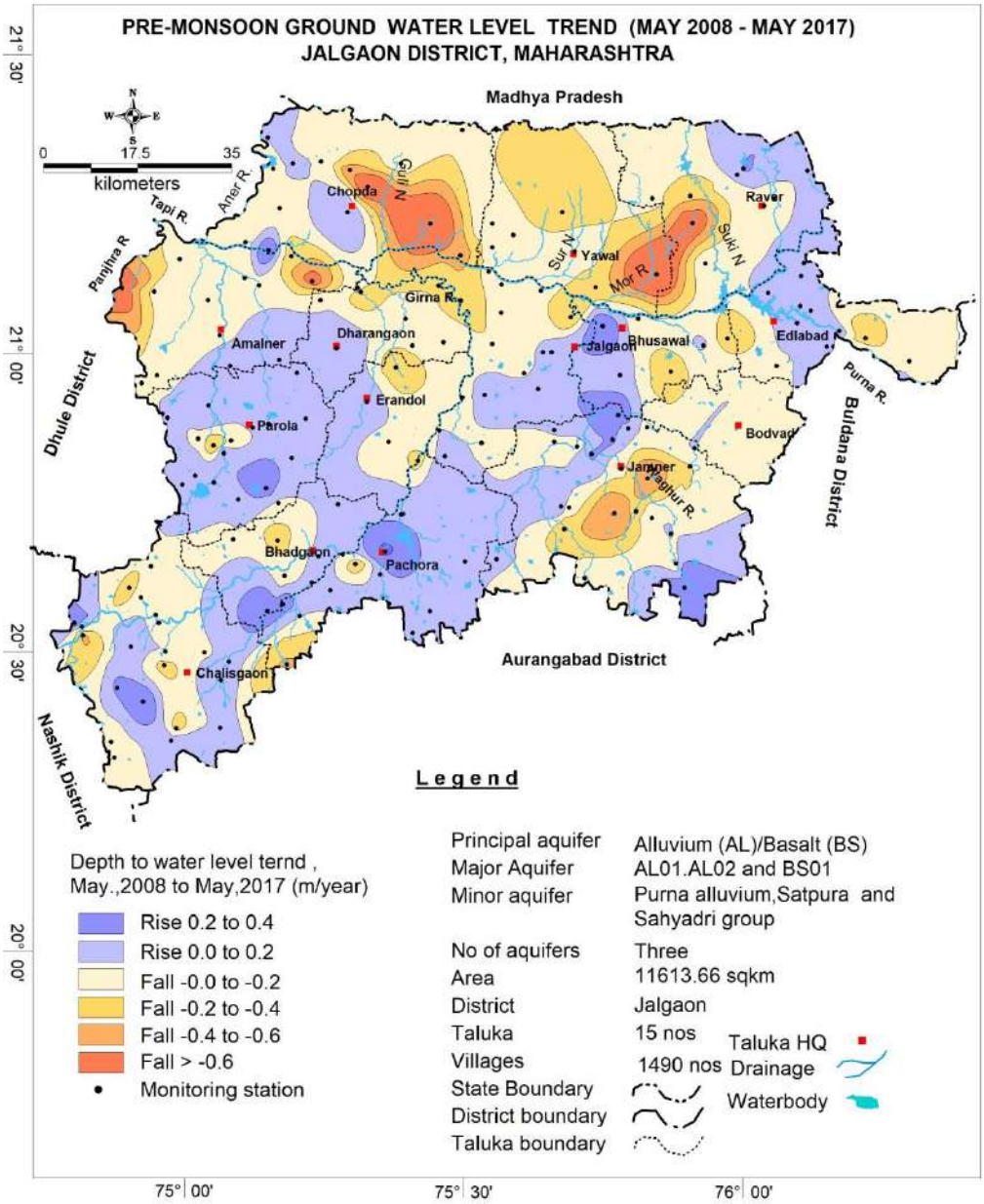


Figure 3.5: Pre-monsoon decadal trend (2008-17), Jalgaon District Fall @>0.2m/year 2348 Sq km (19.96%)

During post-monsoon, rise in water level trend has been recorded at 67 stations ranging from 0.0020 (Patne, Chalisgaon block) to 0.93833 m/year (Nagalwadi, Chopda block) while falling trend was observed in 86 stations varying from 0.01545 (Mamurabad, Jalgaon block) to 0.82887 m/year (Raver, Raver block). Rising water level trend has been observed in isolated parts in almost all the blocks. Fall in water level trend has been observed 7924.73 sq km area and covering major part of the district. Significant decline, more than 0.20 m/year has been observed in 2478.75 sq km area in major part of Yawal and Jalgaon blocks and parts of Chopda, Erandol and Dharangaon and Chalisgaon blocks **(Figure 3.6).**

In Alluvium part of the district, declining trend more than 0.2 m/year has been observed in both during pre and postmonsoon periods. These declines may be due to the overexploitation of ground water in Graveliferous /alluvial aquifers.

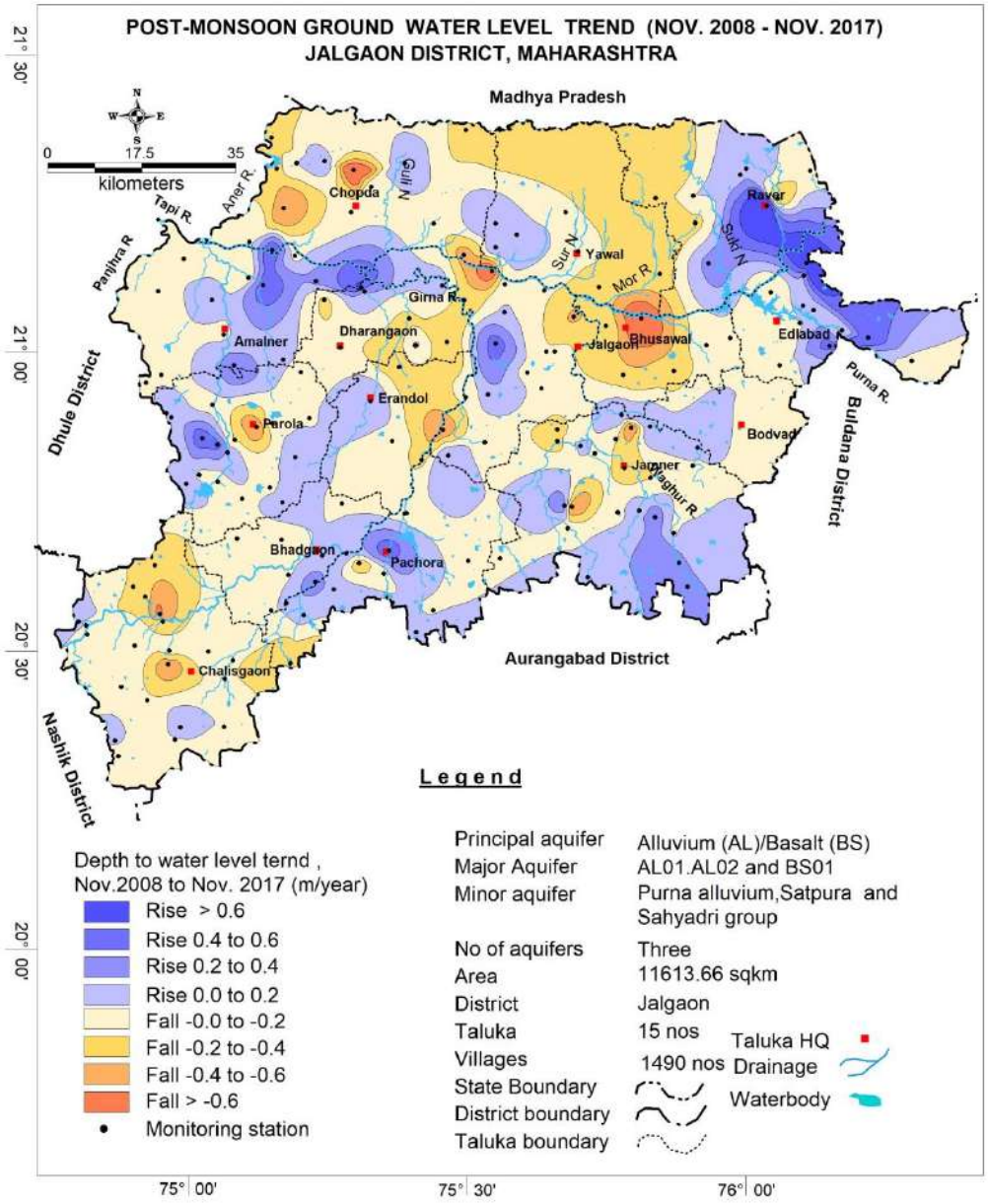
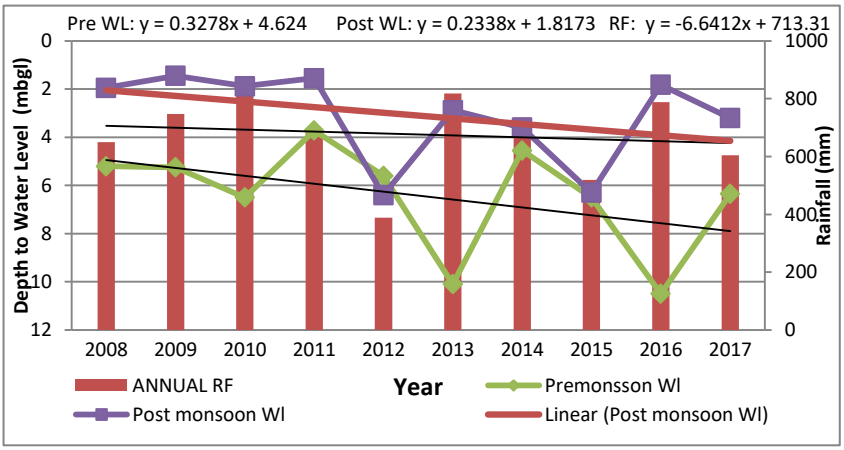


Figure 3.6: Post-monsoon decadal trend (2008-17), Jalgaon District Fall@>0.2m/year 2478.75 sq km (21.07%)

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 and industrial requirements. The analysis of hydrographs shows that the annual rising limbs in hydrographs indicate the natural recharge of groundwater regime due to monsoon rainfall, as the monsoon rainfall is the sole source of natural recharge to the ground water regime (**Figure 3.7**). However, continuous increase in the groundwater draft is indicated by the recessionary limb.

Hydrograph (2008-17), village Adgaon, Chalisgaon Block, Jalgaon District

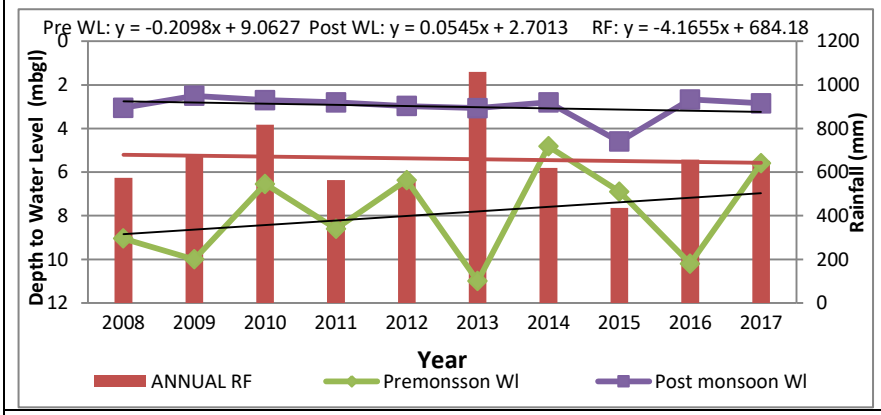


Formation: Basalt

Premonsoon and postmoonsoon Water level trend showing falling trend @ 0.3288 m/year and 0.2304 m/ year.

Positive relation between WL and Rainfall, Water level behaviour in conformity with rainfall

Hydrograph (2008-17), village Talwade kh., Parola Block, Jalgaon District

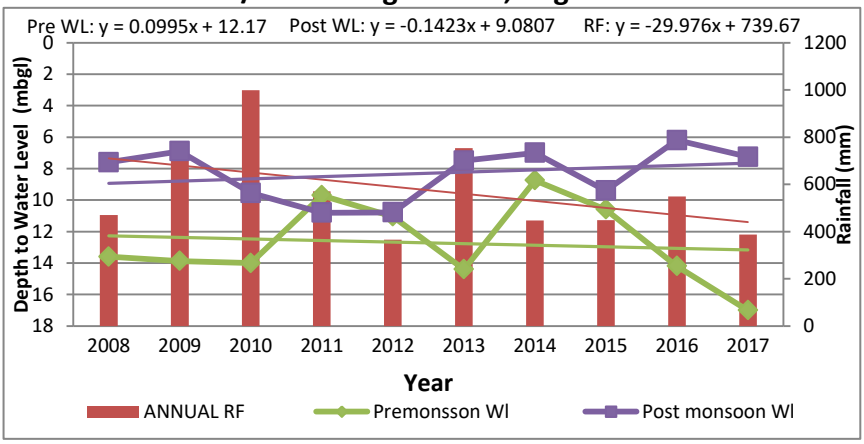


Formation: Basalt

Premonsoon Water level trend showing risng trend @ 0.209 m/year and post monsoon 0.0545 falling m/year.

Positive relation between WL and Rainfall, Water level behaviour in conformity with rainfall

Hydrograph (2008-17), village Mendhoda, Edlabad/Muktainagar Block, Jalgaon District

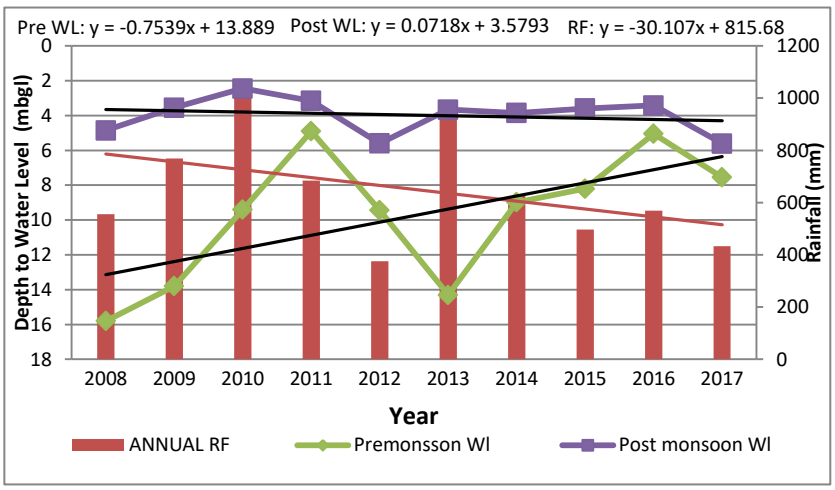


Formation: Basalt

Premonsoon and postmoonsoon Water level trend showing falling trend @ 0.0995 m/year and rising 0.142 m/year.

Fallng Rainfall trend @29.97 mm/ year Water level behaviour not in conformity to rainfall, very little effect of rainfall on recharge

Hydrograph (2008-17), village Bodvad, Bodvad Block, Jalgaon District

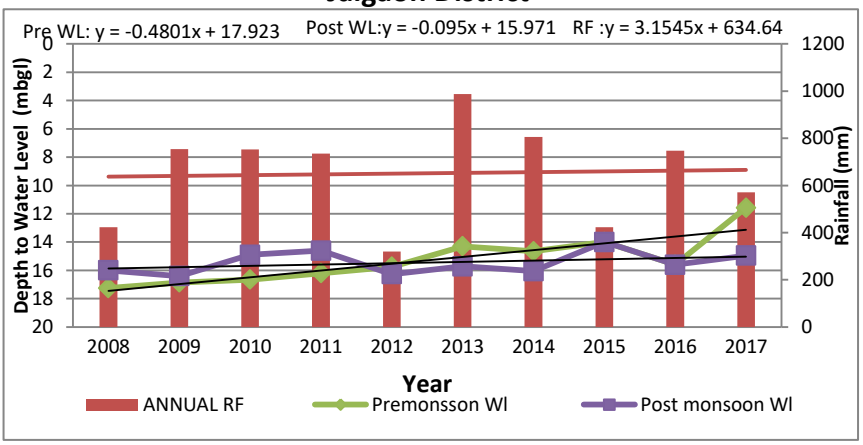


Formation: Basalt

Pre-monsoon Water level trend showing Rising trend @ 0.7539 m/year and Post monsoon falling 0.0718 m/year.

Fallng Rainfall trend @30.10 mm/ year Water level behaviour not in conformity to rainfall, very little effect of rainfall on recharge

Hydrograph (2008-17), village Naseerabad, Jalgaon Block, Jalgaon District

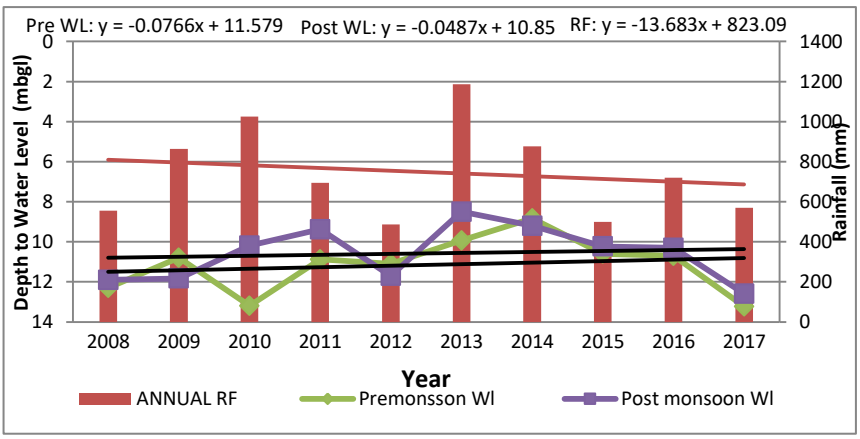


Formation: Basalt

Pre-monsoon and post-moonsoon Water level trend showing risng trend @ 0.4801 m/year And rising 0.095 m/year.

Rising Rainfall trend @3.15 mm/year Positive relation between WL and Rainfall, Water level behaviour in conformity with rainfall

Hydrograph (2008-17), village Chopda, Chopda Block, Jalgaon District



Formation: Alluvium

Pre-monsoon and post-moonsoon Water level trend showing rising trend @ 0.0766 m/year and 0.0487 m/year.

Falling Rainfall trend @13.68 mm/year Water level behaviour not in conformity to rainfall, little effect of rainfall on recharge

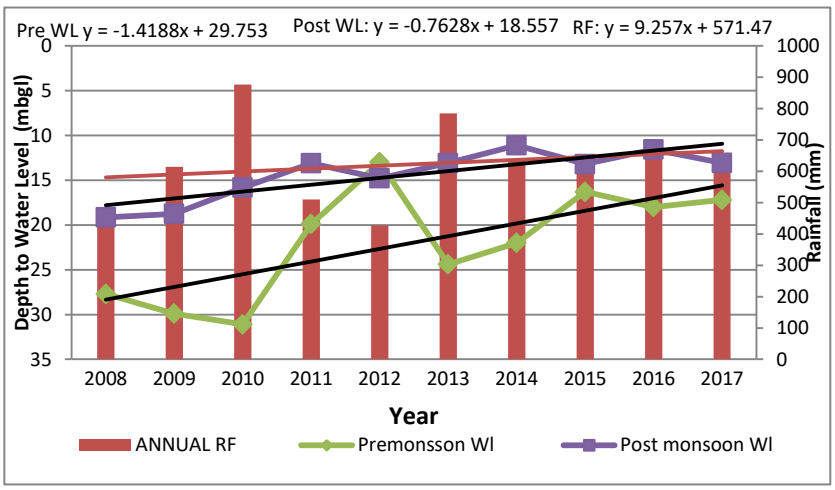
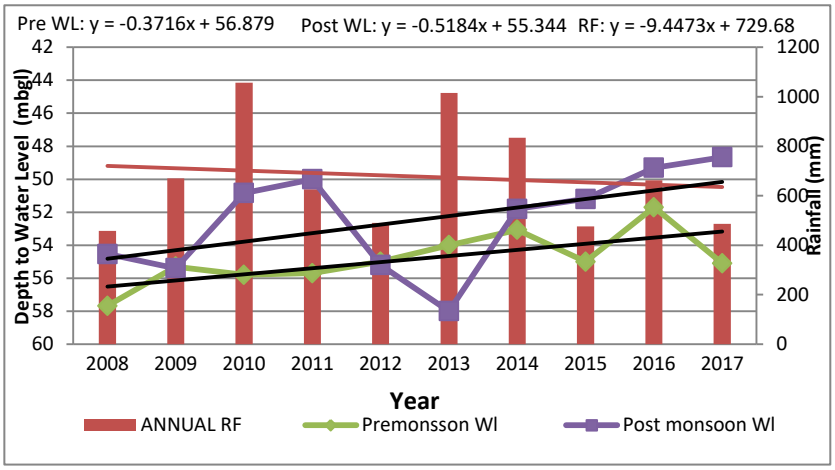
Hydrograph (2008-17), village Raver, Raver Block, Jalgaon District 	**Formation: Alluvium** Pre-monsoon and post-moonsoon Water level trend showing rising trend @ 1.4188 m/year and 0.762 m/ year. Rising Rainfall trend @9.25 mm/year Water level behaviour onformity to rainfall, positive effect of rainfall on recharge
Hydrograph (2008-17), village Faizpur, Yawal Block, Jalgaon District 	**Formation: Alluvium** Deep Water level (> 45 mbgl) Pre-monsoon and post-moonsoon Water level trend showing rising trend @ 0.371 m/year and 0.518 m/ year. Falling Rainfall trend @9.44mm/year Water level behaviour not in conformity to rainfall, little effect of rainfall on recharge

Figure 3. 7: Behaviour of Water level with respect to time

4.0 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, 49 for shallow and 07 for deeper aquifers. Ground water quality data of 159 monitoring wells of CGWB and GSDA representing shallow aquifer have been utilised to decipher the quality scenario of shallow aquifer. 179 exploratory wells - tubewells/borewells of CGWB and GSDA representing deeper aquifer have been utilised to decipher the quality scenario of deeper aquifer. The aquifer wise ranges of different chemical constituents present in ground water are given in **Table 4.1**. The details of chemical analysis are given in **Annexure III and IV.**

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

Constituents	Shallow aquifer (Aquifer-I)		Deeper aquifer (Aquifer-II & III)	
	Min	Max	Min	Max
pH	6.97	9.99	7.1	9.52
EC (µS/cm)	313	3810	397	3350
TDS (mg/l)	203	2476	216	1840

Constituents	Shallow aquifer (Aquifer-I)		Deeper aquifer (Aquifer-II & III)	
	Min	Max	Min	Max
TH (mg/l)	89.64	1065	40	885
Calcium (mg/l)	18.4	488.04	8	279
Magnesium (mg/l)	1.944	140.94	2	146
Potassium (mg/l)	0.1	45.89	0	33.2
Sodium (mg/l)	9.6	377.6	8.4	520
Carbonate (mg/l)	0	49.8484	0	244
Bi-carbonate (mg/l)	24.4	606.34	29	964
Chloride (mg/l)	14	683.653	0	858
Sulphate (mg/l)	BDL	472	BDL	256
Nitrate (mg/l)	BDL	260	BDL	281
Fluoride (mg/l)	BDL	1.64	BDL	1.44
Iron (mg/l)	BDL	1.92	BDL	1.4

***BDL- below detection limit**

4.1 Electrical Conductivity (EC)

The concentration of EC in shallow aquifer varies between 313 (Gadegaon, Jamner block) and 3810 µS/cm (Kurha Bk, Amalner block). Out of 159 samples collected from dug wells, 3 samples are having EC in range of > 3000 µS/cm. Concentration of EC >3000 µS/cm has been observed at 3 places namely Ambapimpri, Parola Block, Lonsim and Kurha, Amalner Block. 6 samples fall in the range of EC between 2250-3000 µS/cm, 109 samples fall in the range of EC between 750-2250 µS/cm, and 41 samples in the range of EC between 250-750 µS/cm. Almost entire district is covered with EC values ranging between 750-2205 µS/cm; in the small isolated parts scattered over the district the EC values are found between 250-750 µS/cm and water samples with the EC values > 2250 µS/cm are found occurring in isolated localized patches only in Amalner, Erandol, Parola and Bodvad blocks. The ground water is potable in the district. The distribution of electrical conductivity in shallow aquifers is shown in **Figure 4.1** and analytical data is presented in **Table 4.2.**

The concentration of EC in deep aquifer varies between 397 (Karadi, Parola block) and 3350 µS/cm (Yawal, Yawal block). Out of 179 samples collected from tube wells/bore wells, Concentration of EC between 250 and 750 µS/cm has been observed in 91 samples covering large part of the district in the north and 85 samples show EC values ranging between 750 to 2250 covering entire district. 2 sample is showing EC in range of 2250 to 3000 µS/cm and 1 sample is showing EC in range of 3000 to 7500 µS/cm (EC 3350; at Yawal, Yawal block). The ground water is potable in the district. The distribution of electrical conductivity in deeper aquifers is shown in **Figure 4.2** and analytical data is presented in **Table 4.2.**

Table 4. 2: Aquifer wise Electrical conductivity analytical data

S. No.	EC (µS/cm)	Shallow aquifer (Aquifer-I)		Deeper aquifer (Aquifer-II & III)	
		No. of samples	% of samples	No. of samples	% of samples
1	< 250	0	0	0	0
2	>250-750	41	26	91	51
3	>750-2250	109	69	85	47
4	2250-3000	6	4	2	1
5	3000-7500	3	2	1	1
Total samples		**159**	100	**179**	100

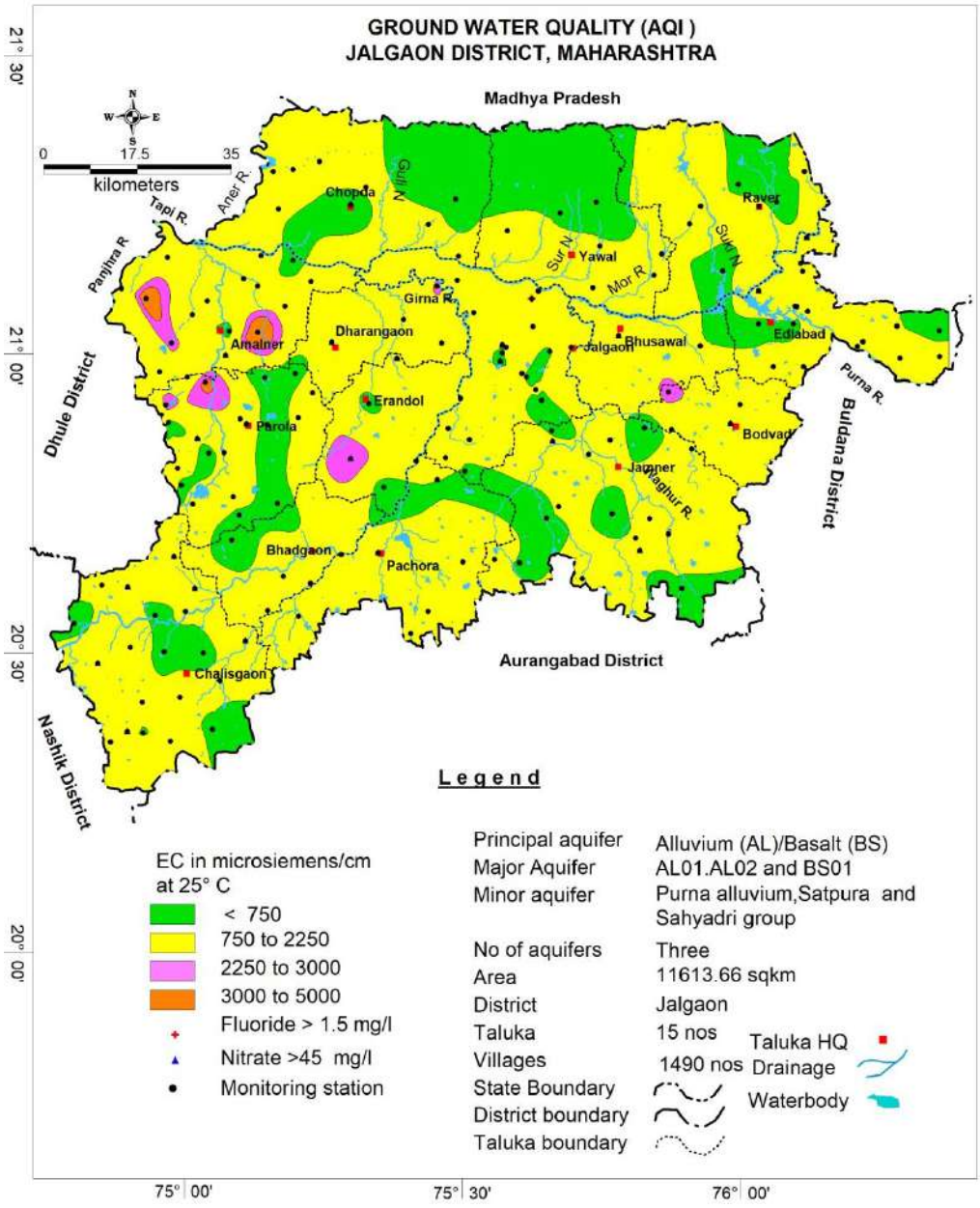


Figure 4.1: Ground water quality (Aquifer-I), Jalgaon district

Nitrate:

Nitrogen in the form of dissolved nitrate nutrient for vegetation, and the element is essential to all life. The major contribution in ground water is from sewage, waste disposal, nitrate fertilizer and decaying of organic matter. In Jalgaon district nitrate concentration varies between BDL to 260 mg/l (Abhane, Chalisgaon block). As per BIS (2012) the desirable limit is 45 mg/l. In shallow aquifer, 159 samples were analysed; out of this 23 water samples show the nitrate concentrations exceeding the desirable limit of 45 mg/l. The high concentration of Nitrate may be due to domestic waste and sewage in the urban and rural parts of district. In deeper aquifer, 179 wells were analysed and nitrate concentration varies between BDL to 281 mg/l (Vardi EW, Chopda block). Out of 179 samples 32 water samples show nitrate concentration exceeding the desirable limit of 45 mg/l. The deeper aquifer is also affected by nitrate contamination; it may be due to percolation of nitrate contaminants from the ground surface as there are no other reasons for nitrate contamination in deeper aquifers. Aquifer wise nitrate concentration is given in **Table 4.3.**

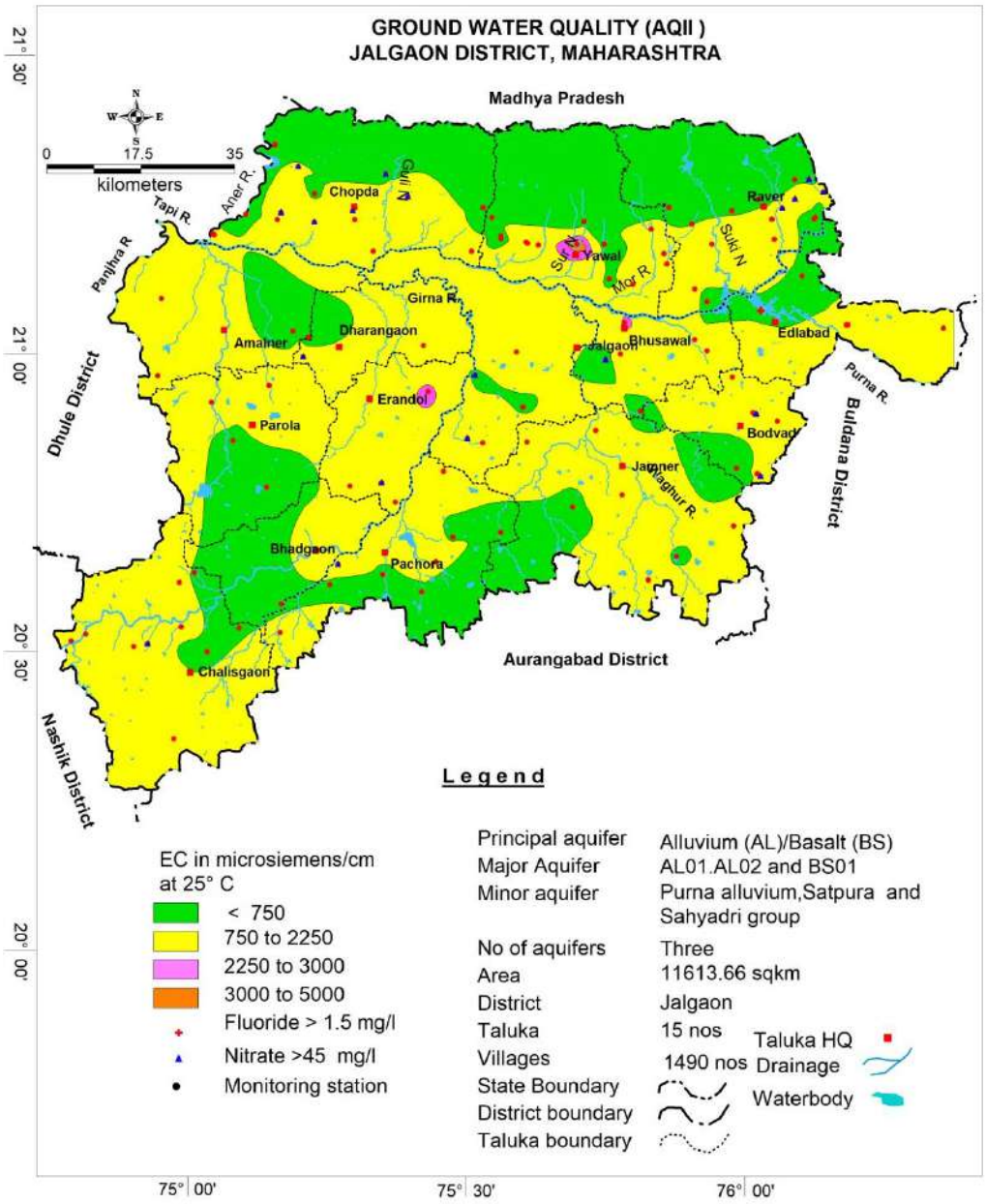


Figure 4.2: Ground water quality (Aquifer-II &III), Jalgaon District

Fluoride:

In shallow aquifer, concentration of fluoride ranges from BDL to 1.64 mg/l (Bholane, Jalgaon block). Out of 159 samples were analysed, only 2 samples show fluoride concertation more than 1 mg/l. In Deeper Aquifer, concentration of fluoride ranges from BDL to 1.44 mg/l. Out of 179 samples analysed, 8 samples show fluoride concertation more than 1 mg/l. In Deeper aquifer, the highest concentration of fluoride is found in Manegaon EW (1.44 mg/l), Muktainagar Block; it may due to the lithological reason only. Aquifer wise fluoride concentration is given in **Table 4.3.**

Table 4.3: Aquifer wise nitrate and Fluoride concentration

Block	No_3 > 45 mg/l		fluoride >1 mg/l	
	No. of samples	No. of samples	No. of samples	No. of samples
	Shallow aquifer (Aquifer-I)	Deeper aquifer (Aquifer-II & III)	Shallow aquifer (Aquifer-I)	Deeper aquifer (Aquifer-II & III)
Amalner	1	-	-	-
Bhadgaon	0	-	-	-

Block	No_3 > 45 mg/l		fluoride >1 mg/l	
	No. of samples	No. of samples	No. of samples	No. of samples
	Shallow aquifer (Aquifer-I)	Deeper aquifer (Aquifer-II & III)	Shallow aquifer (Aquifer-I)	Deeper aquifer (Aquifer-II & III)
Bhusaval	**2**	3	-	-
Bodwad	0	5	-	-
Chalisgaon	6	2	-	-
Chopda	**1**	7	-	1
Dharangaon	-	3	-	-
Erandol	3	2	-	-
Jalgaon	**2**	4	2	2
Jamner	2	-	-	-
Muktainagar	2	-	-	1
Pachora	**2**	1	-	2
Parola	2	-	-	1
Raver	-	5	-	1
Yawal	**-**	-	-	-
Total samples	**23**	**32**	**2**	**8**

4.2 Suitability Of Ground Water For Drinking Purpose

In shallow aquifer, < 2% samples are having TDS more than maximum permissible limit (MPL) and 67 % 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 12 % samples are beyond the maximum permissible limit for the parameters like TH, Ca, Mg, Cl, So_4 and No_3 indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in shallow Aquifer is given in **Table 4.4.**

In Deeper aquifer, 55% samples are having TDS within desirable limit (DL) and 45 % of samples have TDS concentration above the Desirable limit (DL) but below the MPL. The water from such area is suitable for drinking purpose. It is also seen that about 4 to 7 % samples are beyond the maximum permissible limit for the parameters like, TH, Ca, Cl, No_3 and F indicating that the water is not suitable for drinking purpose. Concentration of Chemical constituents in Deeper Aquifer is given in **Table 4.5.**

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

Parameter	Drinking water Standards (IS-10500-2012)		Total No of ground water samples	Shallow aquifer (Aquifer-I)					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
	DL	MPL		No	%	No	%	No	%
pH	6.5-8.5	-	159	150	94.3	9	5.7		0.0
TDS	500	2000	159	49	30.8	107	67.3	3	1.9
TH	300	600	159	76	47.8	71	44.7	12	7.5
Ca (mg/L)	75	200	159	88	55.3	59	37.1	12	7.5
Mg (mg/L)	30	100	159	67	42.1	87	54.7	5	3.1
Cl (mg/L)	250	1000	159	138	86.8	21	13.2		0.0
SO_4 (mg/L)	200	400	159	149	93.7	9	5.7	1	0.6
NO_3 (mg/L)	45	No relaxation	159	136	85.5	23	14.5		0.0
F (mg/L)	1	1.5	159	157	98.7	1	0.6	1	0.6

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

Table 4.5: Concentration of Chemical constituents in Deeper Aquifer

Parameter	Drinking water Standards (IS-10500-2012)		Total No of ground water samples	Deeper aquifer (Aquifer-II & III)					
				Samples (<DL)		Samples (DL-MPL)		Samples (>MPL)	
	DL	MPL		No	%	No	%	No	%
pH	6.5-8.5	-	179	162	90.5	17	9.5	-	0.0
TDS	500	2000	179	99	55.3	80	44.7	-	0.0
TH	300	600	179	115	64.2	57	31.8	7	3.9
Ca (mg/L)	75	200	179	138	84.1	20	12.2	6	3.7
Mg (mg/L)	30	100	179	70	42.4	89	53.9	6	3.6
Cl (mg/L)	250	1000	179	138	81.2	28	16.5	4	2.4
SO_4 (mg/L)	200	400	179	141	99.3	1	0.7	-	0.0
NO_3 (mg/L)	45	No relaxation	179	114	78.1	-	-	32	21.9
F (mg/L)	1	1.5	179	128	94.1	8	5.9	23	0.0

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

4.3 Suitability of Ground Water for Irrigation Purpose

The quality of Irrigation water affects the productivity, yield and quality of the crops. The quality of irrigation water depends primarily on the presence of dissolved salts and their concentrations. The Electrical Conductivity (EC), Sodium Absorption Ratio (SAR) and Residual Sodium Carbonate (RSC) are the most important quality criteria, which asses the water quality and its suitability for irrigation.

Electrical Conductivity (EC)

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

Low Salinity Water (EC: 100-250 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 (Aquifer-I)		Deeper aquifer (Aquifer-II & III)	
			No. of samples	% of samples	No. of samples	% of samples
1	Low Salinity Water	< 250	0	0	0	0
2	Medium Salinity Water	>250-750	41	26	91	51
3	High Salinity Water	>750-2250	109	69	85	47
4	Very High Salinity Water	> 2250	9	5.7	3	1.7
Total			**159**	**100**	**179**	**100**

In shallow aquifer, maximum numbers of samples fall under the category of high to medium salinity type of water. In deeper Aquifer, maximum numbers of samples fall under the category of medium to 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 Absorption 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 159 samples analysed and 11 samples are having SAR more than 10 in Alluvium parts of Amalner, Erandol, Jamner and Jalgaon blocks and 146 samples are having SAR value less than 10 in Basaltic and Alluvium formation in the district. In deeper aquifer, out of 157 samples 22 samples are having SAR value more than 10 in alluvium part of Raver, Yawal, Chopda blocks and Basalt part of Amalner, Erandol, Chalisgaon and Pachora 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							
		< 10		10-18		18-26		> 26	
		Good		Good to Permissible		Doubtful		Bad (Unsuitable)	
	Total Number of GW samples analysed	No	%	No	%	No	%	No	%
Shallow Aquifer (Aquifer-I)	159	148	93.08	10	6.28	1	0.62	-	0
Deeper Aquifer (Aquifer-II & III)	157	135	85.98	10	6.36	7	4.45	5	3.18
Total	**316**	**283**	**89.55**	**20**	**22.33**	**8**	**35.82**	**5**	**13.95**

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 (Aquifer-I)	159	154	96.86	4	2.52	1	0.63
Deeper Aquifer (Aquifer-II & III)	165	115	69.70	23	13.94	27	16.36
Total	**324**	**269**	**83.02**	**27**	**8.33**	**28**	**8.64**

In shallow aquifer, it is observed that out of 159 samples only 5 samples show 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 165 samples 50 samples show RSC more than 1.25 meq/L indicating that the ground water of the area is not suitable for irrigation.

5.0 GROUND WATER RESOURCES

5.1 Ground Water Resources – Aquifer-I

Central Ground Water Board and Ground Water Survey and Development Agency (GSDA) have jointly estimated the ground water resources of Jalgaon 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 Resources estimation was carried out in 2013 for 11762.74 sq. km. area out of which 1670.96 sq. km. is under command and 9708.00 sq. km. is non-command. About 8 sq. km. area has poor ground water quality area and that area is not considered for resource estimation. As per the estimation, the net annual ground water availability comes to be 1395.54 MCM. The gross draft for all uses is estimated at 1068.92 MCM with irrigation sector being the major consumer having a draft of 1020.10 MCM. The domestic and industrial water requirements are worked at 18.81 MCM. The net ground water availability for future irrigation is estimated at 86.71 MCM. Stage of ground water development varies from 52.68 % (Jalgaon/safe) to 109.78% (Raver/Over Exploited). Block wise assessments indicate that, out of total 15 blocks, 2 blocks i.e., Raver and Yawal are categorized as “Over-Exploited”, 2 blocks i.e., Bodvad and Muktainagar/Edlabad fall in “Semi-Critical” Category whereas remaining 10 blocks fall in “Safe” category. The overall stage of ground water development for the district is 76.60 %.

Watershed wise resources computation indicate that out of 66 watersheds TE-07, TE-17, TE-2, TE-2', TE-25, TE-41, TE-43, TE-48, TE-49 and TE-59 i.e., 10 watersheds fall in ”Over-Exploited” category; TE-3 and TE-18 in Critical category; PT, PT-13, PTW-1, TE-1, TE-11, TE-15 A, TE-19', TE-4', TE-50, TE-51, TE-55, and TE-60 fall in “Semi-Critical” category.

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

Administrative Unit	Command / Non-Command / Total	Net Annual Ground Water Availability (ham)	Existing Gross Ground Water Draft for irrigation (ham)	Existing Gross Ground Water 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
Amalner	Command	4048.84	2500.03	103.17	2603.20			**73.46/Safe**
Amalner	Non-Command	7411.35	5359.30	456.31	5815.62			
Amalner	**Total**	**11460.19**	**7859.34**	**559.48**	**8418.82**	**889.22**	**2734.26**	
Bhadgaon	Command	8370.48	6145.45	161.56	6307.01			**74.59/ Safe**
Bhadgaon	Non-Command	2074.74	1446.35	37.79	1484.14			
Bhadgaon	**Total**	**10445.22**	**7591.80**	**199.35**	**7791.15**	**417.58**	**2475.77**	
Bhusawal	Command	285.14	346.12	11.52	357.64			
Bhusawal	Non-Command	5218.05	3783.84	264.28	4048.12			**80.06/ Safe**
Bhusawal	**Total**	**5503.19**	**4129.95**	**275.80**	**4405.75**	**552.23**	**841.01**	
Bodwad	Command	56.44	2.69	2.09	4.78			**82.71/ Semi Critical**
Bodwad	Non-Command	3931.89	3078.41	215.59	3294.00			
Bodwad	**Total**	**3988.33**	**3081.10**	**217.68**	**3298.78**	**370.41**	**482.41**	
Chalisgaon	Command	3695.47	3448.85	116.59	3565.43			**75.83/ Safe**
Chalisgaon	Non-Command	10790.72	7127.60	292.31	7419.91			
Chalisgaon	**Total**	**14486.19**	**10576.45**	**408.90**	**10985.35**	**788.04**	**3275.56**	
Chopda	Command	5691.19	4485.04	147.44	4632.48			**75.62/ Safe**

Administrative Unit	Command / Non-Command / Total	Net Annual Ground Water Availability (ham)	Existing Gross Ground Water Draft for irrigation (ham)	Existing Gross Ground Water 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
Chopda	Non-Command	6591.22	4457.04	198.32	4655.35			
Chopda	**Total**	**12282.41**	**8942.08**	**345.75**	**9287.84**	**628.64**	**3168.06**	
Dharangaon	Command	3912.86	1869.34	84.55	1953.89			**56.50/ Safe**
Dharangaon	Non-Command	3633.84	2185.12	124.94	2310.06			
Dharangaon	**Total**	**7546.71**	**4054.47**	**209.49**	**4263.96**	**303.13**	**2759.99**	
Erandol	Command	3782.93	2843.95	111.72	2955.66			**64.21/ Safe**
Erandol	Non-Command	3326.96	1547.43	62.00	1609.44			
Erandol	**Total**	**7109.88**	**4391.38**	**173.72**	**4565.10**	**368.29**	**2942.42**	
Jalgaon	Command	758.92	532.56	30.22	562.79			**52.68/ Safe**
Jalgaon	Non-Command	8096.49	3883.89	218.13	4102.02			
Jalgaon	**Total**	**8855.41**	**4416.46**	**248.35**	**4664.81**	**501.99**	**3925.45**	
Jamner	Command	1113.38	1585.19	103.09	1688.28			**67.87/ Safe**
Jamner	Non-Command	12849.84	7233.29	554.68	7787.97			
Jamner	**Total**	**13963.22**	**8818.49**	**657.77**	**9476.25**	**1312.69**	**3891.74**	
Muktainagar	Command	92.19	40.95	6.59	47.54			**77.84/ Semi Critical**
Muktainagar	Non-Command	5585.52	4104.46	267.29	4371.75			
Muktainagar	**Total**	**5677.72**	**4145.41**	**273.88**	**4419.29**	**548.10**	**994.70**	
Pachora	Command	3165.87	3059.05	71.92	3130.97			**68.10/ Safe**
Pachora	Non-Command	7757.76	4012.23	296.32	4308.55			
Pachora	**Total**	**10923.62**	**7071.28**	**368.24**	**7439.52**	**754.91**	**2893.62**	
Parola	Command	2299.35	2047.98	222.87	2270.85			**86.78/ Semi Critical**
Parola	Non-Command	4861.36	3715.10	227.98	3943.08			
Parola	**Total**	**7160.71**	**5763.07**	**450.85**	**6213.92**	**601.41**	**1047.10**	
Raver	Command	1476.97	3793.57	55.88	3849.44			**109.78/ Over Exploited**
Raver	Non-Command	9801.39	8312.52	218.95	8531.47			
Raver	**Total**	**11278.36**	**12106.09**	**274.82**	**12380.9**	**335.20**	**139.69**	
Yawal	Command	1322.48	2745.25	52.64	2797.89			**104.59/ Over Exploited**
Yawal	Non-Command	7551.16	6317.82	165.17	6482.99			
Yawal	**Total**	**8873.64**	**9063.07**	**217.81**	**9280.88**	**299.23**	**983.17**	
Jalgaon District Total	Command	40072.51	35446.02	1281.84	36727.86			**76.60 %**
	Non-Command	99482.30	66564.42	3600.06	70164.48			
	Total	139554.81	102010.44	4881.90	106892.33	8671.06	32554.95	
	Total (MCM)	**1395.54**	**1020.104**	**48.8189**	**1068.923**	**86.710**	**325.549**	

5.2 Ground Water Resources – Aquifer-II & III

The ground water resources of Aquifer-II (Basalt and Alluvium) and Aquifer III (Alluvium) were also assessed to have the correct quantification of resources so that proper management strategy can be framed. So far, the resources have been estimated for the 9 blocks and remaining 6 blocks shall be completed in forthcoming years. Block wise summarized Ground Water Resources of Aquifer-II and III are given in **Table 5.2.**

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

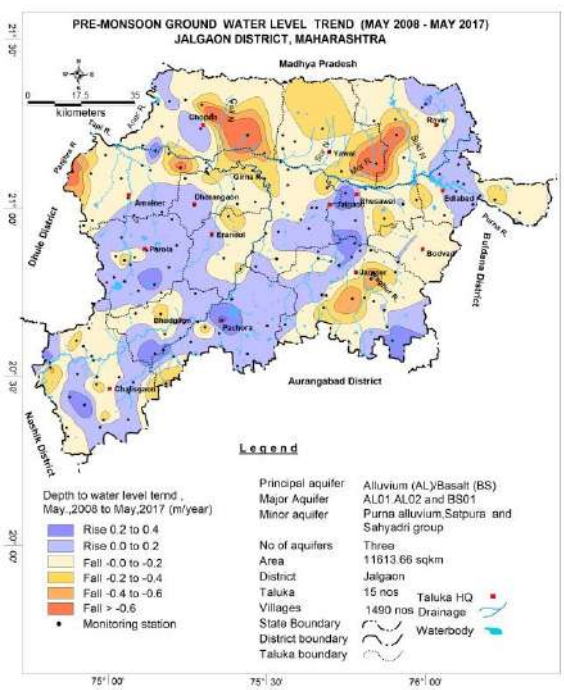
Block	(Aquifer-II)	(Aquifer-III)
	Total Resources (in MCM)	Total Resource (in MCM)
Amalner	12.08	-
Bodvad	7.203	-
Chalisgaon	23.11	-

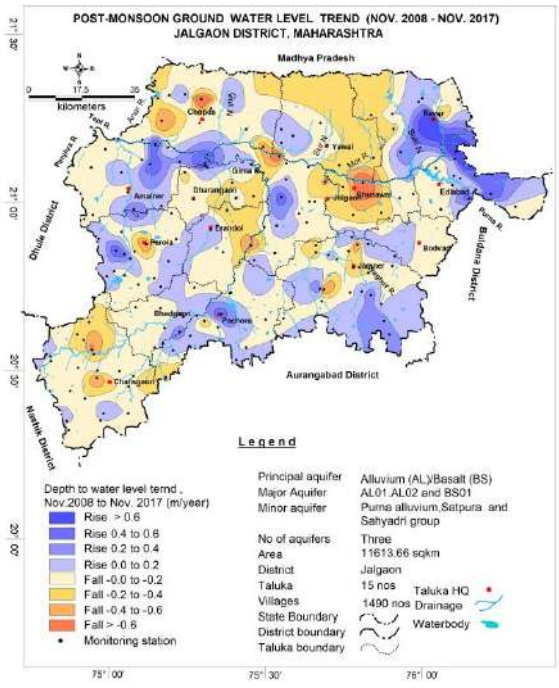
Block	(Aquifer-II)	(Aquifer-III)
	Total Resources (in MCM)	Total Resource (in MCM)
Chopda	156.88	3.28
Edlabad	12.69	-
Jalgaon	16.09	-
Parola	12.82	-
Raver	244.16	9.45
Yawal	305.41	17.54
Total	**782.958**	**30.29**

6.0 GROUND WATER RELATED ISSUES

6.1 Declining Water Levels

The ground water exploitation has resulted in decline of water levels over the period of time. In premonsoon season, decline more than 0.20 m/year has been observed in 2348.34 sq km, i.e., 19.96 % area covering major parts *of* Chopda, Yawal, Raver, Amalner, Jamner and parts of Dharangaon, Chalisgaon, Erandol and Bhusaval blocks. In post monsoon season, decline of more than 0.20 m/year has been observed in 2478.75 sq km, i.e., 21.07 % area covering major parts of Yawal, Chopda, Bhusaval, Erandol, Jamner, Jalgaon and Parola blocks.





Pre-monsoon fall @>0.2/year 2348 Sq km (19.96 %) **Post-monsoon Fall@>0.2/year 2479 Sq km (21.07%)**

6.2 Cash Crop Cultivation

In the northern part of the district, mainly north of Tapi river, banana cultivation is the most prominent cropping practice being followed over an area of about 360 sq km and entire cultivation is dependent on ground water-based irrigation system (**Figure 6.1**). To cater to the water needs of cash crops particularly banana crop the area has witnessed large scale ground water development resulting in over-exploitation of ground water resources. Banana is a water intensive crop with crop period of 12-15 months and annual crop water requirement is to the tune of 1.70 m. Thus, huge quantum of ground water is required to sustain the crop for such a long duration of 12 to 15 months. This has cascading effects on ground water regime of the area as large-scale water level decline has been observed. Though the farmers of the area have

adapted large scale micro irrigation techniques, however limited ground water availability has stunted the increase in irrigation potential. The shift in irrigation techniques, from flood to micro irrigation techniques, has created an impact on the ground water regime and as result of this at places namely Balwadi and Faizpur, Raver Block rising depth to water trends are observed over the last ten years (2008-2017) however declining trends are also observed and situation is still grave and needs to be attended.

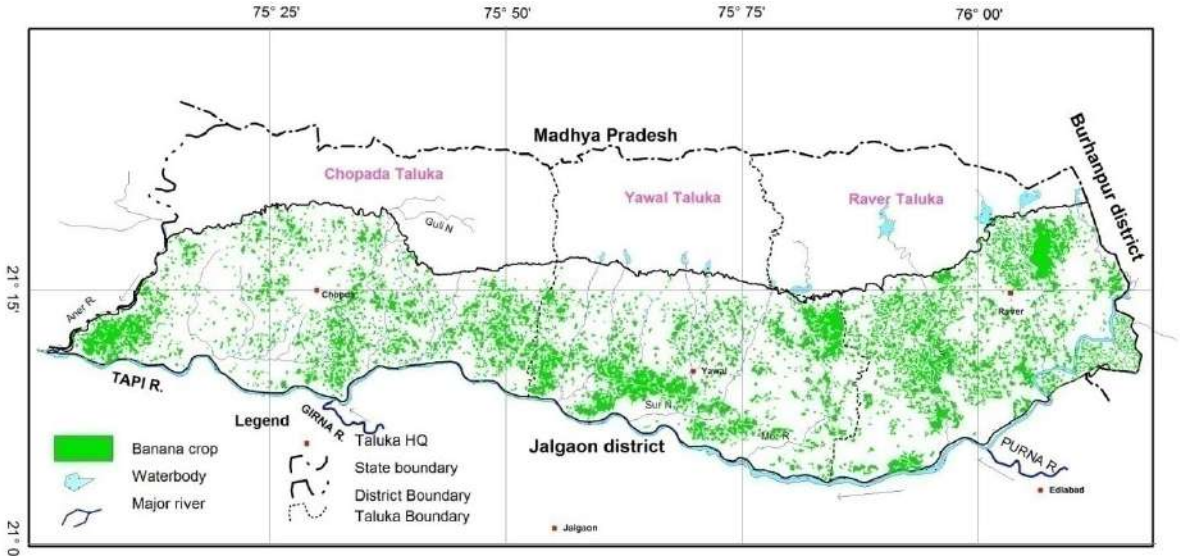


Figure 6.1: Area occupied by Banana Cultivation.

6.3 Over Exploitation

The stage of ground water development has increased over the period of time from 2004 to 2011 in 2 Blocks from 80.23% to 85.54% in Chopda Block; from 109.92% to 133.80% in Yawal Block, whereas in Raver Block it has decreased from 133.37% to 123.39%. In 2013, the stage of ground water development has decreased in all the 3 Blocks (**Figure 6.2**). However, Yawal and Raver Blocks continued to remain in Over-Exploited category and Chopda Block even though categorised as Safe, it can again migrate to Semi-Critical category if necessary precautions, for maintaining the recharge- withdrawal relation at optimum level, are not put in place.

The main reason for ground water overdraft is utilization for irrigation purpose (**Figure 6.3**). The draft for these 3 Blocks has increased from 291.96 MCM in 2004 to 301.11 MCM in 2013.

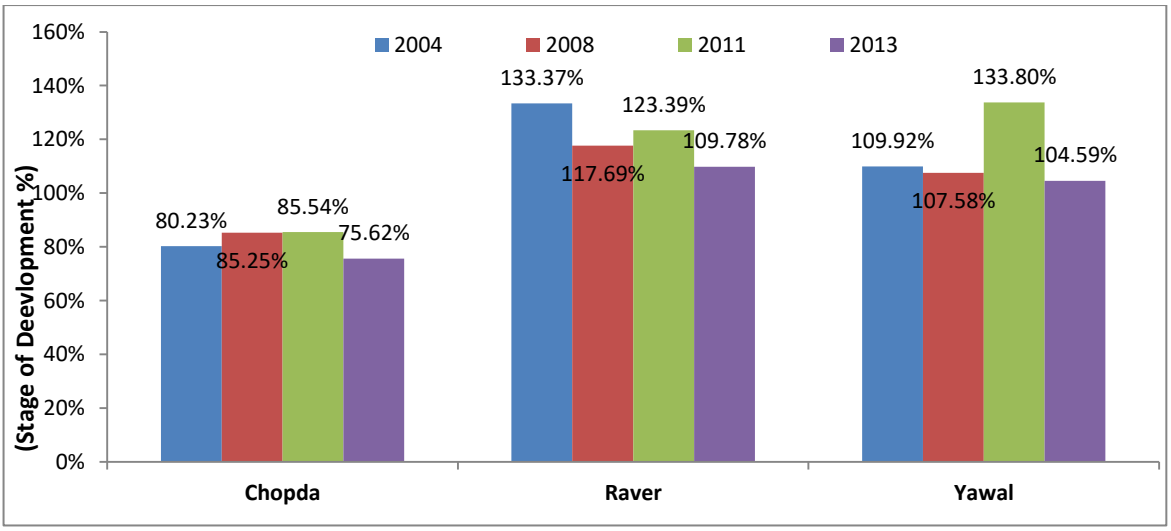


Figure 6.2: Increase in Stage of GW Development

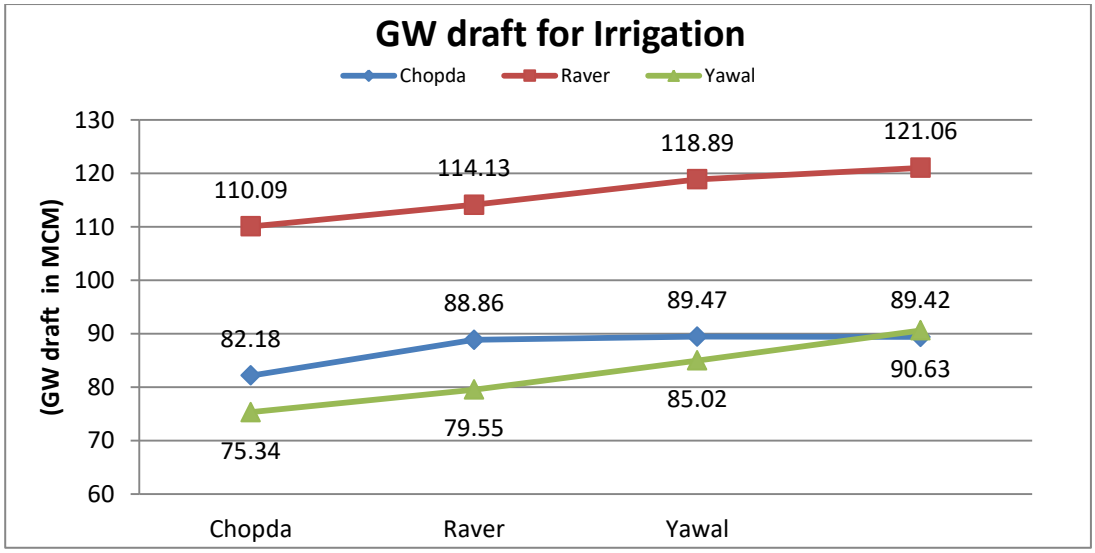


Figure 6. 3: Increase in GW Draft for Irrigation

6.4 Deeper Water Levels

The ground water exploitation has resulted in lowering of water levels and over a period of time, the ground water levels have gone down considerably. At present, the deeper water level areas of more than 20 mbgl are observed in 2501 sq.km. area i.e., 21.26 % of the area. (**Figure 3.1**)

6.5 De-saturated Granular Zones

The ground water exploitation has also resulted in de-saturation of granular zones. The granular zones consisting of sand, gravel and pebbles form the potential aquifer in alluvium. These granular zones in different proportions occur at various depths overlain and underlain by the thick and thin clay beds. The data and lithological logs generated during ground water exploration programme of CGWB and data obtained from State ground water department was utilized for identifying the disposition of granular zones and spatial distribution of water levels was also prepared. Based on the overlay analysis of these two GIS layers, the spatial distribution of de-saturated aquifers was obtained (**Figure 6.4**). The total area identified as occupied by de-saturated granular zones is 1039 sq.km.

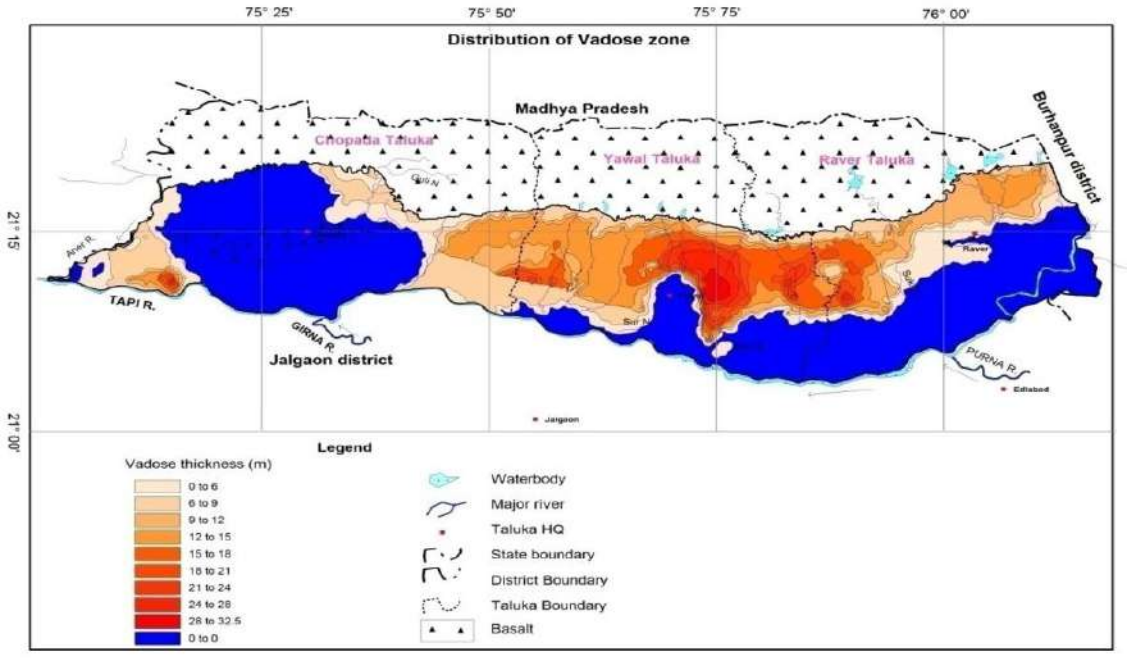


Figure 6.4: De-saturated Granular Zones.

6.6 Micro Irrigation Techniques

Micro Irrigation techniques are being practiced in the area since last decade or so. The preference of the people/stake holders has also shifted from the surface water irrigation to ground water irrigation because almost 100% of the farmers have shifted from flood irrigation to modern irrigation practices particularly for banana crop. The ground water-based drip irrigation system is preferred in the area to obtain maximum yield of the cash crop like banana over the canal / surface water-based irrigation system for banana cultivation as the ground water is the most dependable source of water supply at the time of requirement. Total area irrigated by ground water-based drip irrigation system is 517.34 sq.km as per the data provided by Agriculture Department out of the total ground water irrigated area of 707.52 sq. km.

6.7 Rainfall and Droughts

Based on the long-term rainfall analysis from 1901 to 2017 it is observed that Bodhwad and Yawal blocks experienced declining rainfall trend. Severe droughts have been experienced in Raver 2 times, Amalner 3 times, Muktainagar 4 times and Parola 3 times and once in Jalgaon blocks during 1901 to 2017 with exception of Bodhwad and Yawal blocks which have never experienced severe drought conditions during these years; however, it has experienced Moderate droughts 23 times; Raver 24 times; Amalner 22 times; Chopda 21 times; Jalgaon 19 times; Parola 17 times during the period.

7.0 GROUND WATER MANAGEMENT PLAN

The management plan has been proposed to manage the ground water resources and to arrest further decline in water levels. The management plan comprises two components namely supply-side management and demand side management. The supply side management proposed is 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. The management Plan proposed nine blocks namely Amalner, Bodwad, Chopda, Chalisgaon, Jalgaon, Raver and Yawal blocks of Jalgaon district is discussed below

7.1 Supply Side Management

The supply side management of ground water resources can be done through the artificial recharge of surplus runoff available within river sub basins and micro watersheds. Also, it is necessary to understand the unsaturated aquifer volume available for recharge. The unsaturated volume of aquifer was computed based on the area feasible for recharge, unsaturated depth below 5 mbgl and the specific yield of the aquifer. The **Table 7.1** gives the 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)
Amalner	921.78	804.21	1608.5
Bodwad	356.69	232.09	464.18
Chalisgaon	1089.9	839.13	1678.26
Chopda	1142.65	820.00	1640.00
Jalgaon	831.98	822.55	1645.1
Muktainagar	633.92	629.22	1258.33
Parola	758.06	355.22	710.43
Raver	980.66	876.17	1752.34
Yawal	913.51	824.94	1649.88
Total	**7629.15**	**6203.53**	**12407.02**

The total unsaturated volume available for artificial recharge is 12407.02 MCM and it ranges from 464.18 MCM in Bodwad block to 1752.34 MCM in Raver block. The available surplus runoff can be utilized for artificial recharge through construction of percolation tanks, Check dams and recharge shafts at suitable sites.

Thus, after taking into consideration all the factors, only 64.62 MCM of surplus water can be utilised for recharge, which is given in table 7.2. This surplus water can be utilized for constructing 368 check dams, 189 percolation tanks and 303 recharge shafts at suitable sites. The number of feasible artificial recharge structures was calculated by considering 0.20 MCM per percolation tanks, 0.03 MCM per check dam and 0.06 MCM per recharge shafts. Apart from this, through Tapi Mega recharge Scheme 278.13 MCM water Potential is available and @75% efficiency of available Volume of water is 208.59 and used to recharge the ground water. This intervention should lead to recharge @ 75% efficiency of about 208.59 MCM/year. Tentative locations of these structures are given in **Figure 7.1** and details also given in **Annexures V, VI and VII.**

The rainwater harvesting in urban areas can be adopted in 25% of the household with 50 sq. km roof area. A total of 4.13 MCM potential can be generated by taking 80% runoff coefficient. However, it is not recommended as it is economically not viable.

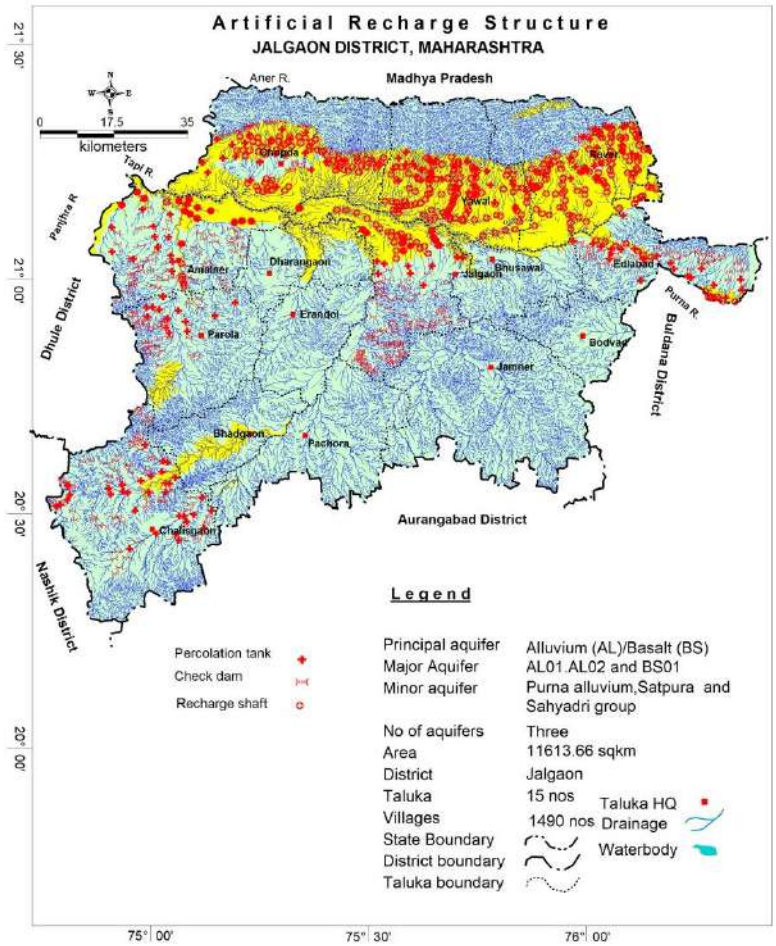


Figure 7.1: Location of Proposed Artificial Recharge structures, Jalgaon District

Table 7. 2: Proposed Artificial Recharge Structures

Block	Area feasible for recharge (sq. km.)	Unsaturated Volume (MCM)	Surplus water available for AR (MCM)	Proposed number of structures			Others	Total Volume of Water expected to be recharged@ 75 % efficiency (MCM)				Total recharged @ 75 % efficiency (MCM)
				PT	CD	RS	Tapi MRS	PT	CD	RS	Tapi MRS	
Amalner	804.21	1608.5	8.38	27	58	21	0	4.05	1.31	0.95	0	**6.31**

Block	Area feasible for recharge (sq. km.)	Unsaturated Volume (MCM)	Surplus water available for AR (MCM)	Proposed number of structures			Others	Total Volume of Water expected to be recharged@ 75 % efficiency (MCM)				Total recharged @ 75 % efficiency (MCM)
				PT	CD	RS	Tapi MRS	PT	CD	RS	Tapi MRS	
Bodwad	232.09	464.18	2.42	7	32	0	0	1.05	0.72	0	0	**1.77**
Chopda	820	1640	8.5	18	30	66	101.74	2.7	0.68	2.97	76.305	**82.655**
Chalisgaon	839.13	1678.26	8.75	33	72	0	0	4.95	1.62	0	0	**6.57**
Jalgaon	822.55	1645.1	8.58	21	86	30	0	3.15	1.935	1.35	0	**6.435**
Muktainagar	629.22	1258.33	6.56	20	41	22	0	3	0.92	0.99	0	**4.91**
Parola	355.22	710.43	3.7	13	37	0	0	1.95	0.83	0	0	**2.78**
Raver	876.17	1752.34	9.13	28	12	94	87.18	4.2	0.27	4.23	65.385	**74.085**
Yawal	824.94	1649.88	8.6	22	0	70	89.21	3.3	0	3.15	66.9075	**73.3575**
Total	**6203.53**	12407.02	**64.62**	**189**	**368**	**303**	**278.13**	**28.35**	**8.285**	**13.64**	**208.597**	**58.8725**

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 (Banana/ Sugarcane) or change in cropping pattern or both are required to save water. **Figure 7.2** depicts the proposed demand side interventions of 161.31 Sq Km area.

The micro-irrigation techniques are proposed to be adopted in 61.42 Sq. Km area in Amalner, Bodwad, Chalisgaon, Jalgaon, Muktainagar/Edlabad, Parola blocks by saving a total of 24.71 MCM. Remaining three blocks Raver, Yawal and Chopda already adopted Micro Irrigation practices are being practiced in the area since last decade or so. Almost 100% of the farmers have shifted from flood irrigation to modern irrigation practices particularly for banana crop. The ground water based drip irrigation system is preferred in the area to obtain maximum yield of the cash crop like banana as canal / surface water irrigation system is less suitable for banana cultivation **(Table 7.3).** Thus, further scope of implementing the water use efficiency measures by drip/sprinkler to save or manage the ground water resources are of limited extent in the area. No change in cropping patterns is proposed in any of the blocks.

Table 7. 3: Area proposed and water saving through Demand side interventions

Block	MICRO-IRRIGATION TECHNIQUES		CROPPING PATTERN CHANGE	
	Sugarcane/Banana /Cotton cropped/ Double cropped Area proposed (Sq. Km.)	Volume of Water saved (MCM)	Area under Water Intensive crops (Sq. Km.)	Volume of Water saved by change in cropping pattern (MCM)
Amalner	1	0.57	Not Proposed	Not Proposed
Bodhwad	13.05	5.8	Not Proposed	Not Proposed
Chopda*	*Not proposed*	-	Not Proposed	Not Proposed
Chalisgaon	8	4.56	Not Proposed	Not Proposed
Jalgaon	1.75	1.38	Not Proposed	Not Proposed
Muktainagar	2	1.58	Not Proposed	Not Proposed
Parola	**35.62**	**10.83**	Not Proposed	Not Proposed
Raver*	*Not proposed*	-	Not Proposed	Not Proposed
Yawal*	*Not proposed*	-	Not Proposed	Not Proposed
Total	**61.42**	**24.72**		

Note: * major parts of water intensive crops area already covered micro Irrigation technique

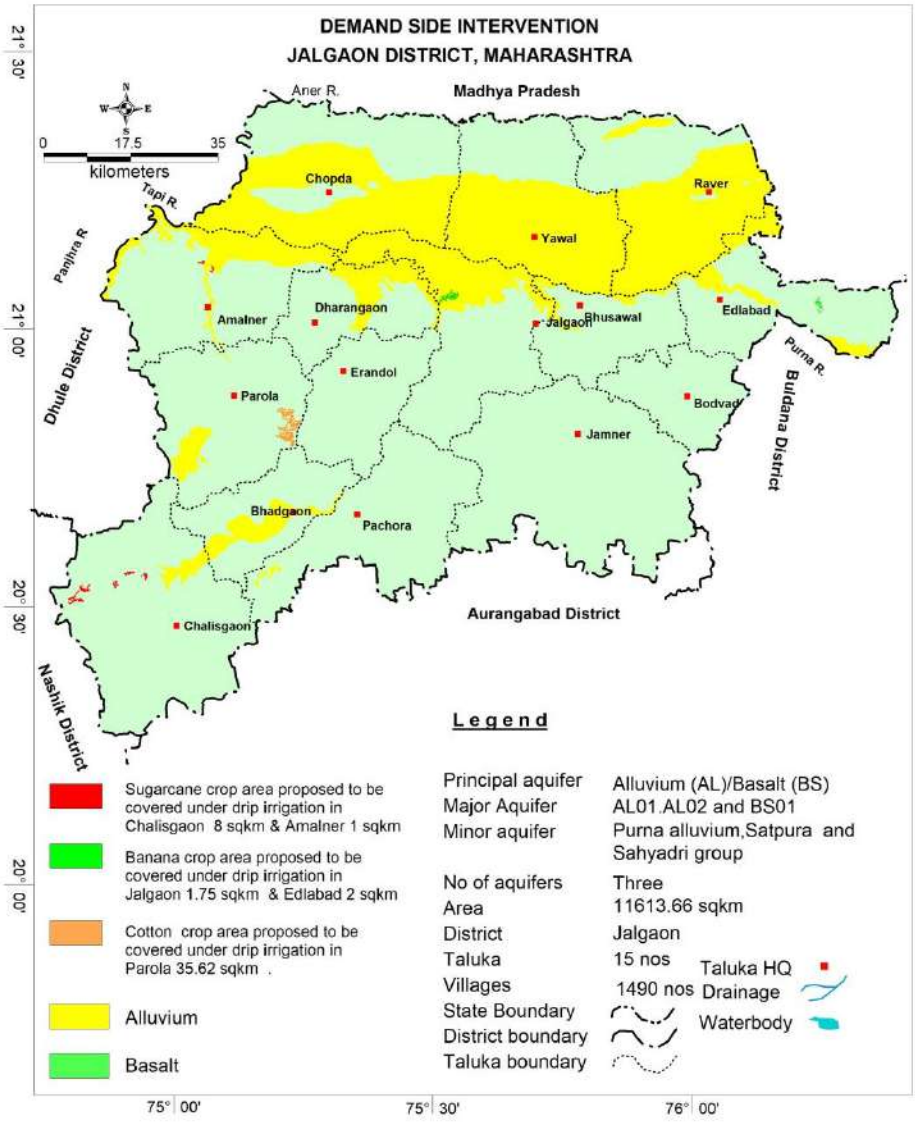


Figure 7.2: proposed Area for Demand side interventions, Jalgaon District

7.3 Expected Benefits

The impact of groundwater management plans on the groundwater system in the 9 blocks after its implementation is evaluated and the outcome shows significant improvement in groundwater scenario in the blocks as given in the **Table 7.4.**

Table 7. 4: Expected benefits after management options

Block	Water Recharged by Supply side intervention (MCM)/year	Water saving by demand side interventions (MCM)/year	Net Ground water availability (As per GWRE, 2013) (MCM)/year	Total ground water draft (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 %
Amalner	**6.31**	0.57	114.60	84.19	120.91	83.62	**69.16**
Bodwad	**1.77**	5.8	39.88	32.99	41.65	27.19	**65.27**
Chopda	**82.66**	0	122.82	92.88	205.48	92.88	**45.20**
Chalisgaon	**6.57**	4.56	144.86	109.85	151.43	105.29	**69.53**
Jalgaon	**6.44**	1.38	88.55	46.65	94.99	45.27	**47.66**
Muktainagar	**4.91**	1.58	56.78	44.19	61.69	42.61	**69.08**
Parola	**2.78**	**10.83**	71.61	62.14	74.39	51.31	**68.98**

Block	Water Recharged by Supply side interventi on (MCM)/ye ar	Water saving by demand side interventions (MCM)/year	Net Ground water availability (As per GWRE, 2013) (MCM)/year	Total ground water draft (As per GWRE, 2013) (MCM)/ye ar	Ground water resources after supply side management (MCM)/year	Ground water Draft after demand side managemen t (MCM)/year	Expecte d stage of Develop ment %
Raver	**74.09**	0	112.78	123.81	186.87	123.81	**66.25**
Yawal	**73.36**	0	88.74	92.81	162.09	92.81	**57.26**
Total	**258.87**	**24.72**	**840.63**	**689.51**	**1099.50**	**664.79**	**60.46**

7.4 Development Plan

The ground water development plan has been proposed in the view of developing the additional ground water resources available after supply side interventions to bring the stage of ground water development up to 70%. The 104.96 MCM volume of ground water generated can bring 161.331 sq km additional area under assured ground water irrigation with average crop water requirement of 0.65 m by constructing 882 Dug wells and 6109 Borewells. Block wise details are given in **Table 7.5.** The area feasible for ground development is shown in **Figure 7.3.**

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

Block	Net Ground water availability (As per GWRE, 2013) (MCM)/yea r	Ground water resources after supply side managemen t (MCM)/tear	Ground water Draft after demand side managemen t (MCM)/year	Expected stage of Develop ment %	Balance GWR available for GW Develop ment 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 @1.5 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)
Amalner	114.60	120.91	83.62	**69.16**	1.02	54	14	1.57
Bodwad	39.88	41.65	27.19	**65.27**	2	118	12	3.02
Chalisgaon	144.86	151.43	105.29	**69.53**	0.711	5	43	1.09
Jalgaon	88.55	94.99	45.27	**47.66**	21.21	141	1273	32.63
Muktainagar	56.78	61.69	42.61	**69.08**	0.6	34	4	0.87
Parola	71.61	74.39	51.31	**68.98**	0.8	5	46	1.17

Block	Net Ground water availability (As per GWRE, 2013) (MCM)/yea r	Ground water resources after supply side managemen t (MCM)/tear	Ground water Draft after demand side managemen t (MCM)/year	Expected stage of Develop ment %	Balance GWR available for GW Develop ment after STAGE OF GWD is brought to 70% (MCM)	Proposed No. of DW @1.5 ham for 10% of GWR Available)	Propose d No. of BW @1.5 ham for 90% of GWR Availabl e)	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)
Chopda*	122.82	205.48	92.88	**45.20**	50.96	340	3057	78.40
Raver*	112.78	186.87	123.81	**66.25**	**7**	**47**	**420**	10.77
Yawal*	88.74	162.09	92.81	**57.26**	20.66	138	1240	31.78
Total (9 blocks)	**840.63**	**1099.50**	**664.79**	**60.46**	**104.96**	**882**	**6109**	**161.31**

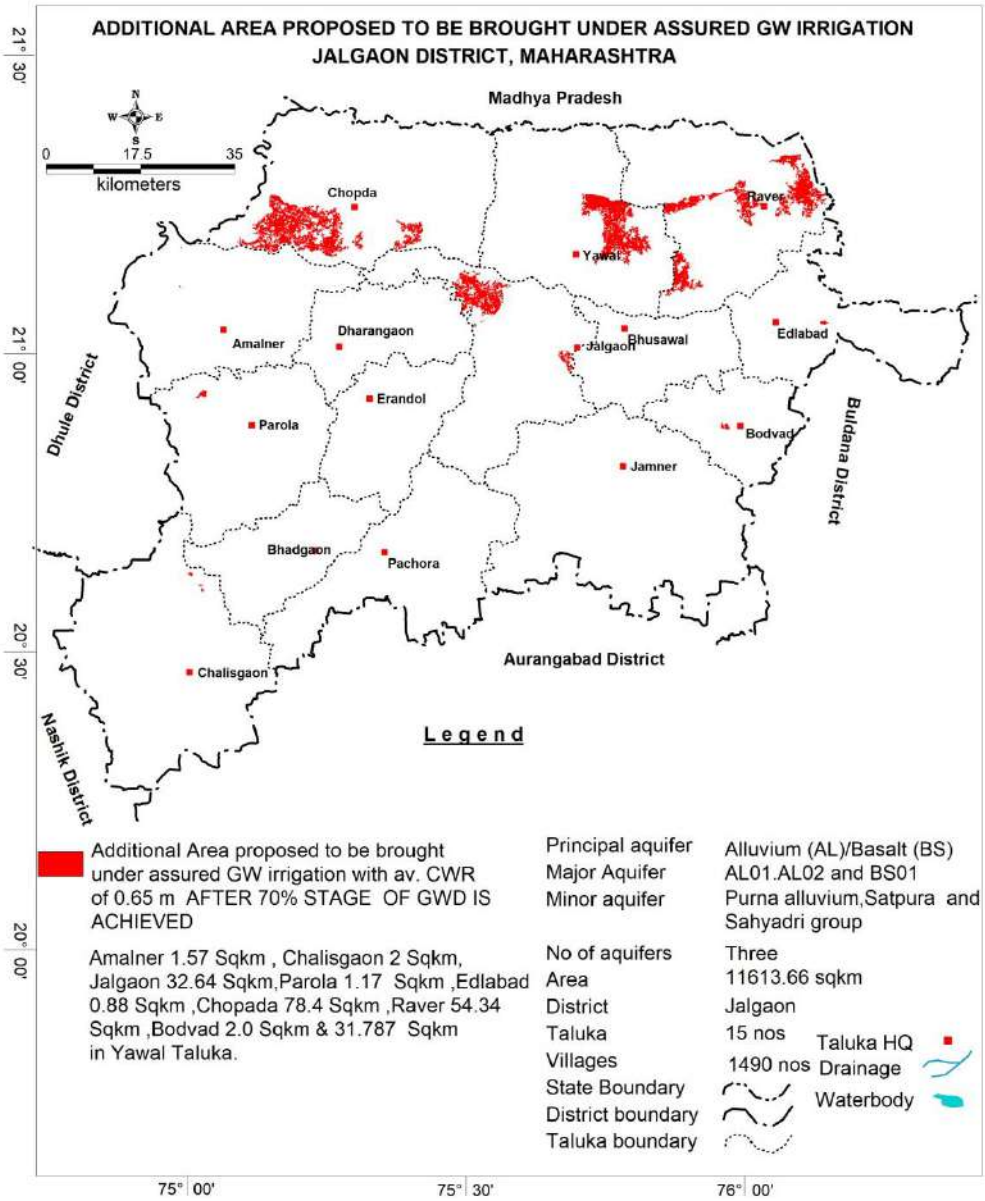


Figure 7.3: Additional area Proposed to be bought under Assured GW irrigation, Jalgaon District

8.0 SUM UP

Intensive studies were carried out to prepare block wise aquifer maps and aquifer management plans of the district based on data generated in-house; data gap analysis, data acquired from State Govt. departments and all the available data was brought on GIS platform and conforming to an integrated approach block wise GIS maps on various relevant themes were prepared.

Jalgaon district covers an area of 11762.70 sq km, out of this 383.87 sq km is hilly terrain. Geologically, the area is occupied by Basalt and Alluvium formations. The stage of ground water development is 76.60 %. The area has witnessed over exploitation; declining water level and low yield potential of aquifers are the major issues in the district. Declining water level trend of more than 0.20 m/year has been observed in 2348 sq km (19.96 % area of the total area) during pre-monsoon. Declining water level trend of more than 0.20 m/year has been observed in 2478 sq.km (21.06 % area of the total area) during post monsoon. These declines may be due to overexploitation of Graveliferous alluvial zone.

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

As a part of Supply side Management, a total 189 Percolation tanks, 368 Check dams and 303 Recharge shafts are proposed, which will augment ground water resources to the tune of 50.27 MCM (28.35 MCM by Percolation tanks, 8.28 MCM by Check dams and 13.64 MCM by Recharge Shafts).

Apart from this, through Tapi Mega recharge Scheme 278.13 MCM water Potential is available and at 75% efficiency of available Volume of water is 208.59 and used to recharge the ground water. This intervention should lead to recharge at 75% efficiency of about 208.59 MCM/year.

A total 50.27 MCM ground water resources will be augmented after adopting artificial recharge measures and 208.59 MCM water harvesting potential can be generated through Tapi mega recharge project.

As a part of Demand side Management, micro-irrigation techniques are to be adopted in 61.42 Sq. Km area thereby saving a total of 24.72 MCM. No change in cropping patterns is 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 104.96 MCM volume of ground water generated can bring 161.31 sq km additional area under assured ground water irrigation with average crop water requirement of 0.65 m by constructing 882 Dug wells and 6109 Borewells.

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

B

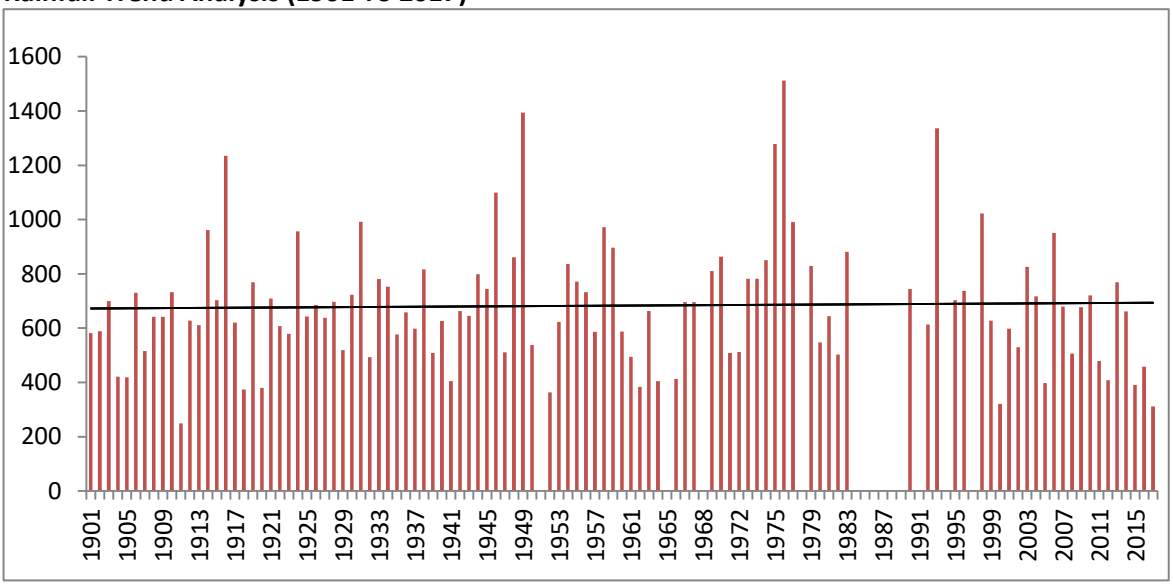
LOCK WISE AQUIFER MAPS AND MANAGEMENT PLAN

1. **AMALNER BLOCK**
2. **BODWAD BLOCK**
3. **CHALISGAON BLOCK**
4. **CHOPDA BLOCK**
5. **JALGAON BLOCK**
6. **MUKTAINAGAR BLOCK**
7. **PAROLA BLOCK**
8. **YAWAL BLOCK**
9. **RAVER BLOCK**

9.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, AMALNER BLOCK, JALGAON DISTRICT, MAHARASHTRA

1. SALIENT FEATURE	
1.1 Introduction	
Block Name	AMALNER
Geographical Area (Sq. Km.)	921.78 Sq. Km.
Hilly Area (Sq. Km)	29.12 Sq. Km.
Poor Ground Quality Area (Sq. Km.)	Nil
Population (2011)	2,87,849
Climate	Tropical Monsoon
1.2 Rainfall Analysis	
Normal Rainfall	664.8 mm
Annual Rainfall (2017)	311.1 mm
Decadal Average Annual Rainfall (2008-17)	539.5 mm
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.1829 mm/year. Probability of Normal/Excess Rainfall- 59% & 17%. Probability of Drought (Moderate/Severe)-: 21 % Moderate & 3% Severe.

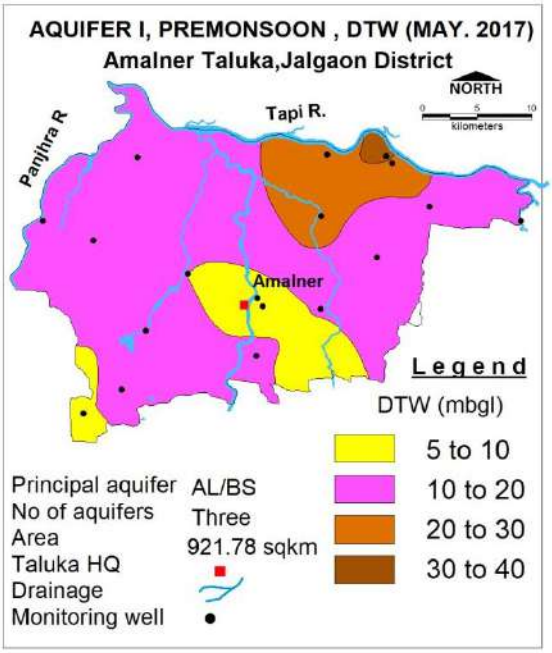
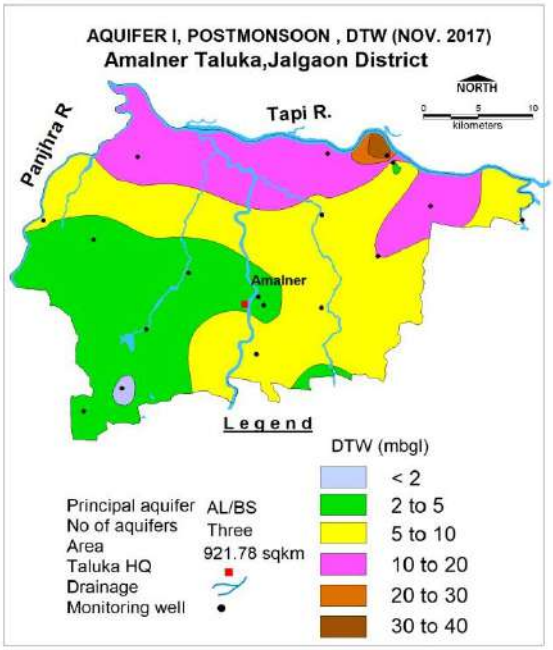
Rainfall Trend Analysis (1901 To 2017)



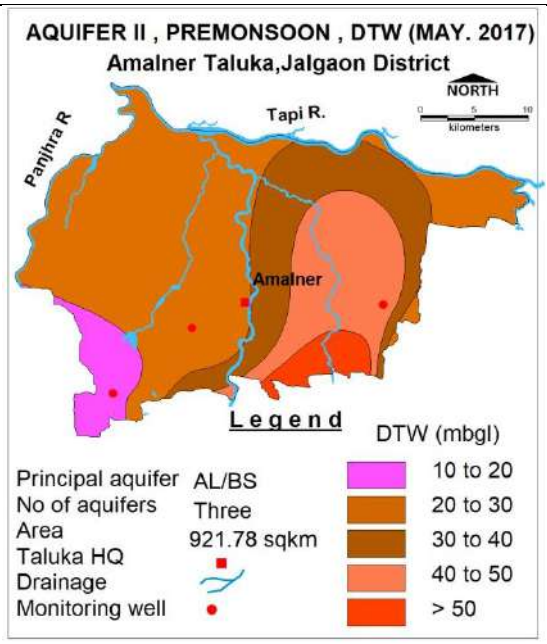
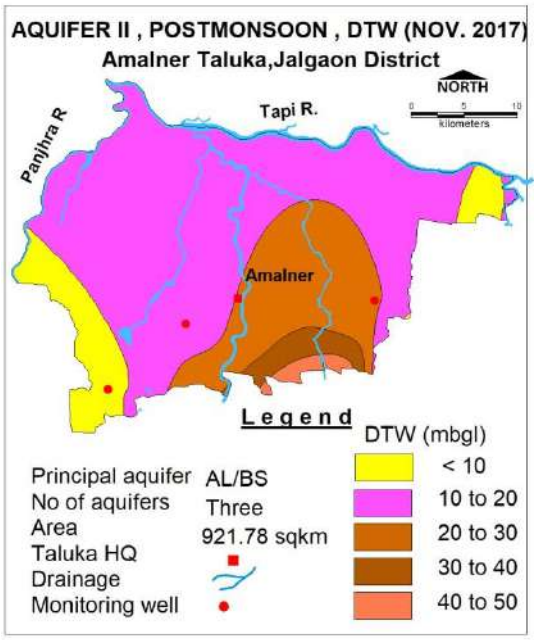
EQUATION OF TREND LINE: Y= 0.1829 x + 671.93

1.3. Geomorphology, Soil & Geology	
Geomorphic Unit	Alluvial Plains of Tapi River (younger alluvium) and Plateau (Slightly to Moderately dissected) with weathered thickness ranging from 0 to 5 m.
Soil	Clayey and Sandy soil
Geology	• Alluvium (sand/ silt and clay admixture) Age: Recent to Sub-recent • Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene
1.4. Hydrology & Drainage	
Drainage	Tapi river and its tributaries namely Panjara and Bori

Hydrology		Major project	NIL
		Bigger Minor Irrigation Project (>100 Ha.)	NIL
		Minor Irrigation Project (<100 Ha.)	NIL
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		921.78 Sq. Km.	
Forest Area		19.05 Sq. Km.	
Cultivable Area		679.40 Sq. Km.	
Net Sown Area		661.55 Sq. Km.	
Double Cropped Area		70.80 Sq. Km.	
Area under Irrigation	Surface Water	125 Sq. km.	
	Ground Water	51.04 Sq. Km.	
Area under Drip & Sprinkler Irrigation		14.64 Sq. Km.	
Principal Crops *(Reference year 2013)*		**Crop Type**	**Area (Sq. Km.)**
		Cereals	303.50
		Cotton	267.15
		Pulses	91.52
		Oil Seeds	51.23
		Banana	2.01
		Citreous fruit	0.96
		Others	3.32
1.6. Water Level Behaviour			
1.6.1. Aquifer-I/Shallow Aquifer			

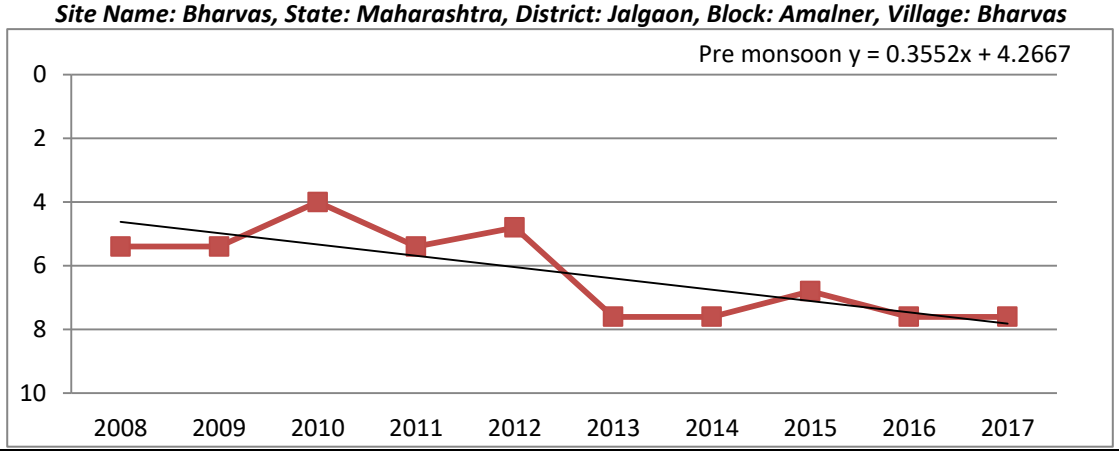
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
	
Water level less than 20 mbgl is observed in almost all parts of the block while water level in the range of 10 to 20 mbgl is observed in major part of the block; deeper water level of the magnitude of more than 20 mbgl is observed as isolated patches in eastern, western and north-western parts of the block.	Entire block is covered by water levels less than 20 mbgl, major part of the block lies in the range of 5 to 10 mbgl, in the southwestern parts part of the block is covered by water level ranging from 2 to 5 mbgl, in the vicinity of river water levels are found between 10 to 20 mbgl.

1.6.2. Aquifer-II/Deeper Aquifer

Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water level <20 mbgl is observed in smaller part of the block while water level >20 mbgl is observed over the entire block.	Water level <20 mbgl is observed in major part of the block while water level > 20 mbgl is observed in south-eastern part of the block in upstream side.
	

1.7. Hydrographs

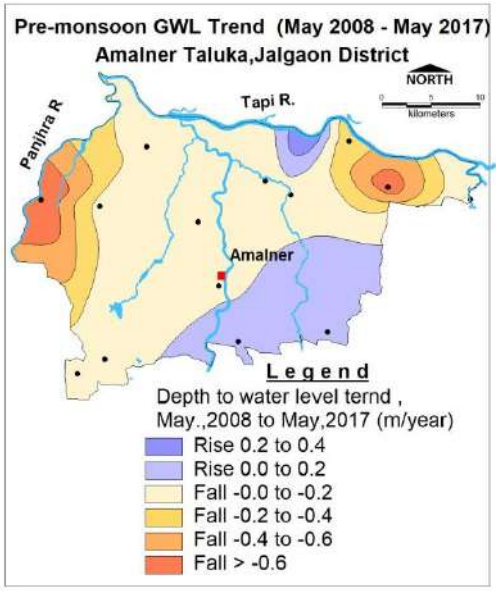
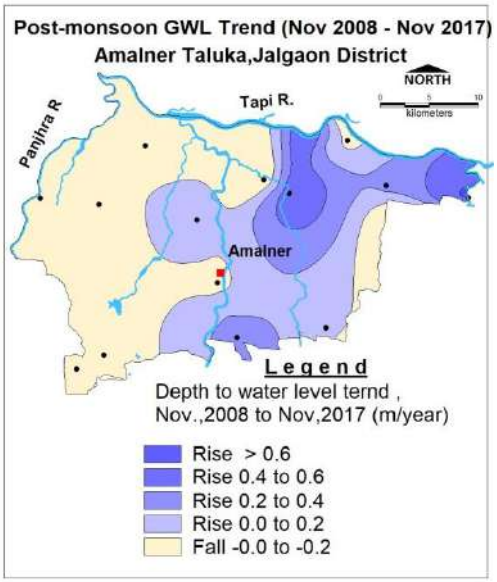
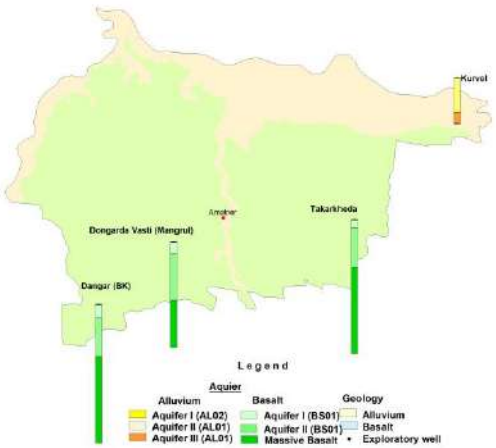
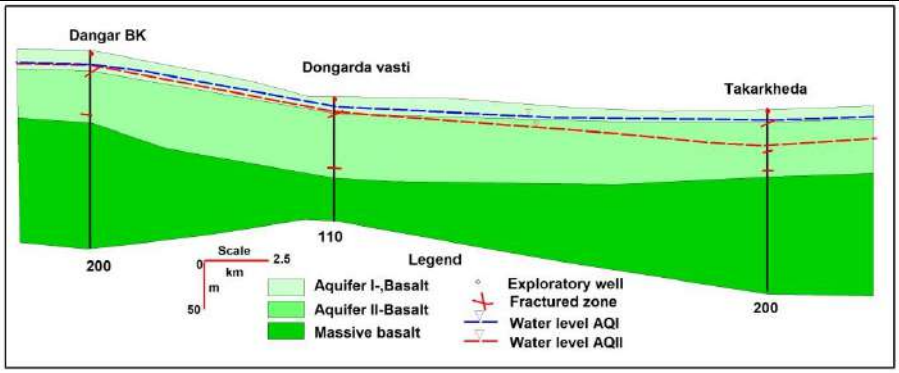
Site Name: Bharvas, State: Maharashtra, District: Jalgaon, Block: Amalner, Village: Bharvas



Hydrograph shows Pre-monsoon falling water level trend @ 0.3552 m/year

1.8. Water Level Trend (2008-17)

Pre-Monsoon trend	Post-Monsoon trend
Rising 0.1704 to 0.1994 m/year Falling 0.0385 to 0.6989 m/year	Rising 0.0472 to 0.6108 m/year Falling 0.0108 to 0.11363 m/year
Major part of the block shows declining trend up to 0.2 m/year while rising trend > 0.2 m/year has been observed in isolated parts in the block. Declining water level trend up to 0.2 m/year has been observed over the major part of the block and along the course of Tapi river while declining trend > 0.2 m/year has been observed in western and north-eastern part of the block.	Major part of the block shows rising trend up to 0.2 m/year while rising trend > 0.2 m/year has been observed in over a large part of the block covering eastern half of the block. Declining trend up to 0.2 m/year has been observed in the western half of the block.

Pre-Monsoon Water Level Trend (2008-2017)	**Post-Monsoon Water Level Trend (2008-17)**
	
2. Ground Water Issues	
• Declining Water Level trend is observed in about 436 sq. km. and covering 47 % area of the block. • Major part of the block has low yield potential (< 25 m^3/day).	
3. AQUIFER DISPOSITION	
3.1. Number of Aquifers	• **Basalt** –Aquifer-I, Aquifer-II • **Alluvium**-Aquifer-I
3.2. Lithological disposition	
3.3. Cross Section	
Section AA'	
	

3.4. Basic Aquifer Characteristics			
Major Aquifers	Basalt (Deccan Traps)		Alluvium (River Alluvium)
Type of Aquifer (Phreatic/Semiconfined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)	Aquifer-I (Phreatic)
SWL (mbgl)	8-23	19-45	10-10
Depth of Occurrence (mbgl)	10-35	20-175	27.9-50
Granular/weathered/ fractured rocks thickness (m)	6-24	1-8	5-15
Yield	<10-200 m^3/day	0 to 1.5 lps	50-150 m^3/day
Specific yield/ Storativity (S)	0.02	0.0003 -0.00021	0.06-0.08 (Clayey to Sandy)
Transmissivity (T)	15-55 m^2/day	20-60 m^2/day	30-60 m^2/day

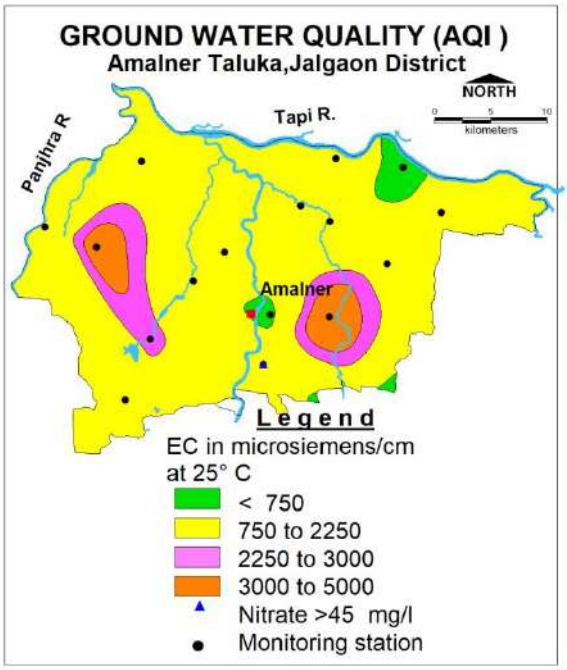
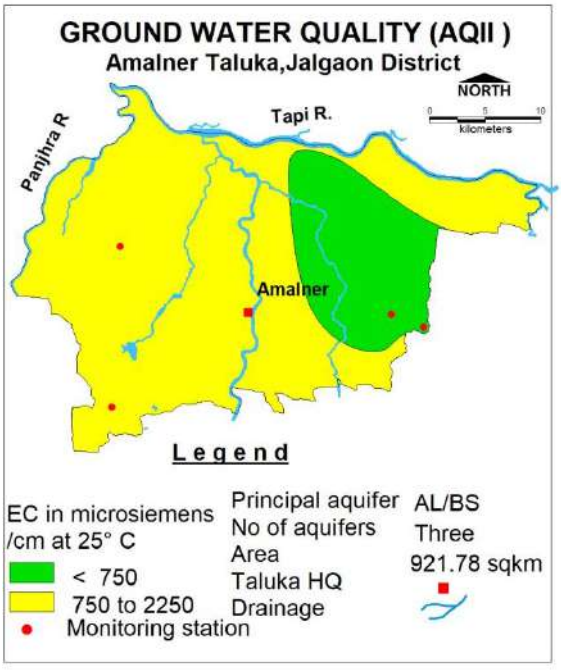
4. GROUND WATER QUALITY

4.1 Aquifer-I/ Shallow Aquifer

EC is observed upto 2250 µS/cm over a major part of the block except in some isolated patches where the EC values are found higher than 2250 µS/cm. Ground water is suitable for all purposes in major part of the block and in the high salinity areas in the east and west, is suitable for irrigation purpose with proper salinity control measures and However the water from such area is not fit for drinking purpose without treatment. Only Khakapat village is affected by high nitrate concentration i.e. 47 mg/L.

4.2 Aquifer II/Deeper Aquifer

EC is observed upto 2250 µS/cm covering whole of the block. Ground water is suitable for all purposes and deeper aquifer shows no contamination of nitrate and Fluoride.

Phreatic Aquifer (Aquifer-I)	**Semiconfined/Confined Aquifer (Aquifer II)**
	

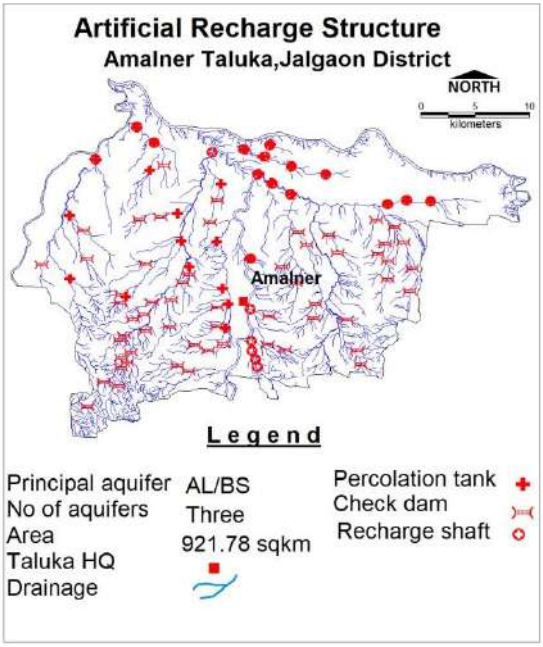
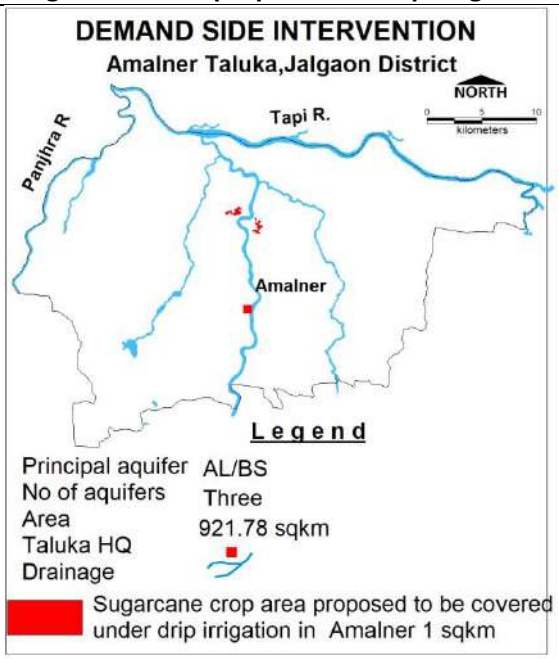
5. GROUND WATER RESOURCE

5.1 Aquifer-I/ Shallow Aquifer (Basalt & Alluvium)	
Ground Water Recharge Worthy Area (Sq. Km.)	892.66
Total Annual Ground Water Recharge (MCM)	120.63
Natural Discharge (MCM)	6.03

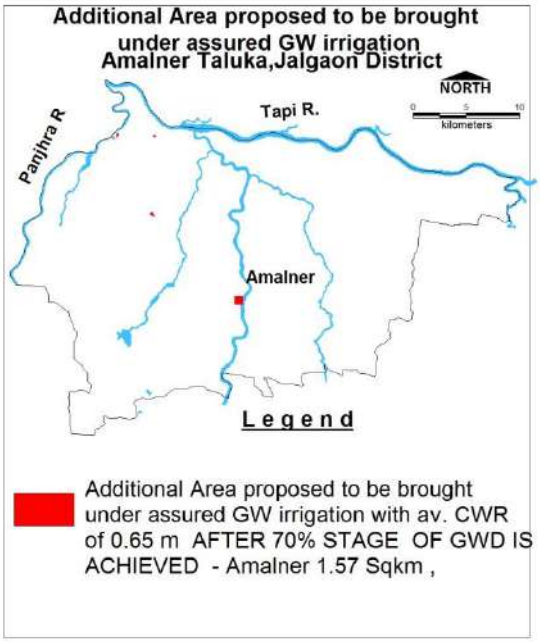
Net Annual Ground Water Availability (MCM)			114.60	
Existing Gross Ground Water Draft for irrigation (MCM)			78.59	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			5.59	
Existing Gross Ground Water Draft for All uses (MCM)			84.19	
Provision for domestic and industrial requirement supply to 2025(MCM)			8.89	
Net Ground Water Availability for future irrigation development (MCM)			27.34	
Stage of Ground Water Development (%)			73.46	
Category			**SAFE**	
5.2 Aquifer-II/Deeper Aquifer				
Semiconfined/Confined Aquifer (Basalt)				
Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av (Sy/S)	Peizometric Head (m above confining layer)	Total Resource (MCM)
804.72	3.31	0.0043	15	12.08
6.0. GROUND WATER RESOURCE ENHANCEMENT				
Available Resource (MCM)	114.60			
Gross Annual Draft (MCM)	84.18			
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW	78.59			
Agricultural Supply -SW	165.30			
Domestic Supply - GW	5.59			
Domestic Supply - SW	1.40			
Total Supply	**250.88**			
Area of Block (Sq. Km.)	921.78			
Area suitable for Artificial recharge (Sq. Km)	804.21			
Type of Formation	Hard Rock	Soft Rock		
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)	464.61	339.60		
Volume of Unsaturated Zone (MCM)	929.224	679.2		
Average Specific Yield	0.02	0.07		
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	18.58448	47.544		
Surplus water Available (MCM)	4.84381	3.54050		
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)	
Number of Structures	27	58	21	
Volume of Water expected to be conserved / recharged @ 75%	4.05	1.31	0.95	

efficiency (MCM)			
Proposed Structures			
RTRWH Structures – Urban Areas			
Households to be covered (25% with 50 m^2area)	15200		
Total RWH potential (MCM)	0.43		
Rainwater harvested / recharged @ 80% runoff co-efficient	0.34 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)	114.60		
Additional GW resources available after Supply side interventions (MCM)	6.30		
Ground Water Availability after Supply side intervention	120.90		
Existing Ground Water Draft for All Uses (MCM)	84.18		
GW draft after Demand Side Interventions (MCM)	83.61		
Present stage of Ground Water Development (%)	73.46		
Expected Stage of Ground Water Development after interventions (%)	69.16		
Other Interventions Proposed, if any			
Alternate Water Sources Available	Nil		
6.4. Development Plan			
Volume of water available for GWD to 70% (MCM)	1.02		
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available for development)	54		
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available	14		

for development)	
Additional Area to be brought under assured GW irrigation with av. CWR of 0.65 m (sq. km.)	1.57
Regulatory Measures	**60m borewell/tube well**

Supply Side Interventions	**Demand Side Interventions**
Proposed locations for AR structures	**Sugarcane Area proposed for drip Irrigation**
	

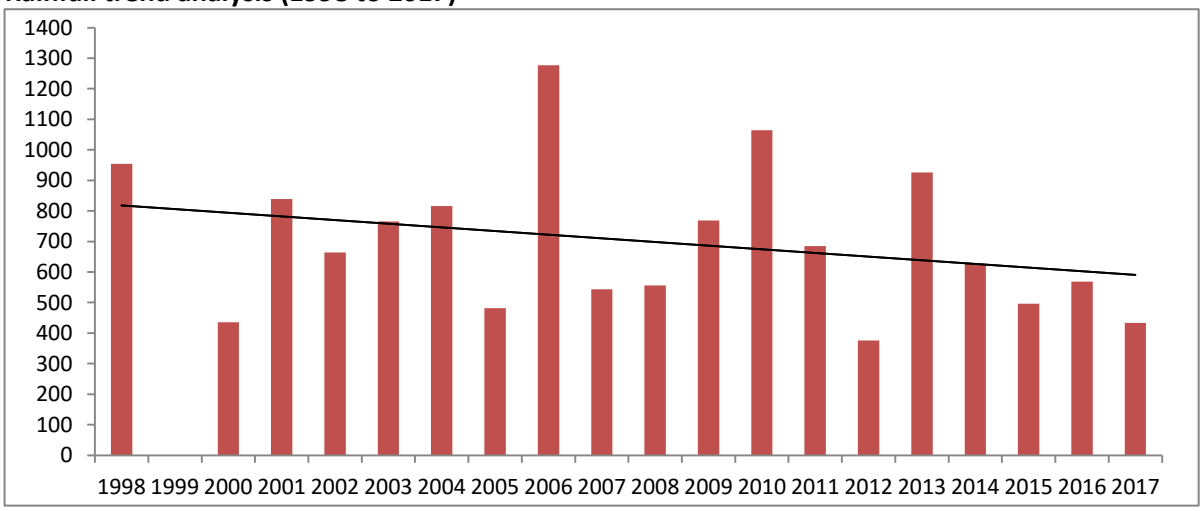
***Expected Benefits*: ADDITIONAL AREA PROPOSED TO BE BOUGHT UNDER ASSURED GW IRRIGATION**



10.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, BODVAD BLOCK, JALGAON DISTRICT, MAHARASHTRA

1. SALIENT FEATURE		
1.1 Introduction		
Block Name	BODVAD	
Geographical Area (Sq. Km.)	356.69 Sq. Km.	
Hilly Area (Sq. Km)	Nil	
Poor Ground Water Quality Area (Sq. Km.)	Nil	
Population (2011)	91,799	
Climate	Tropical Monsoon	
1.2 Rainfall Analysis		
Normal Rainfall	764.8 mm	
Annual Rainfall (2017)	433.6 mm	
Decadal Average Annual Rainfall (2008-17)	653.22 mm	
Long Term Rainfall Analysis (1998-2017)	Declining Trend 11.96 mm/year Probability of Normal/Excess Rainfall- 53% & 21%. Probability of Drought: -26% Moderate	

Rainfall trend analysis (1998 to 2017)



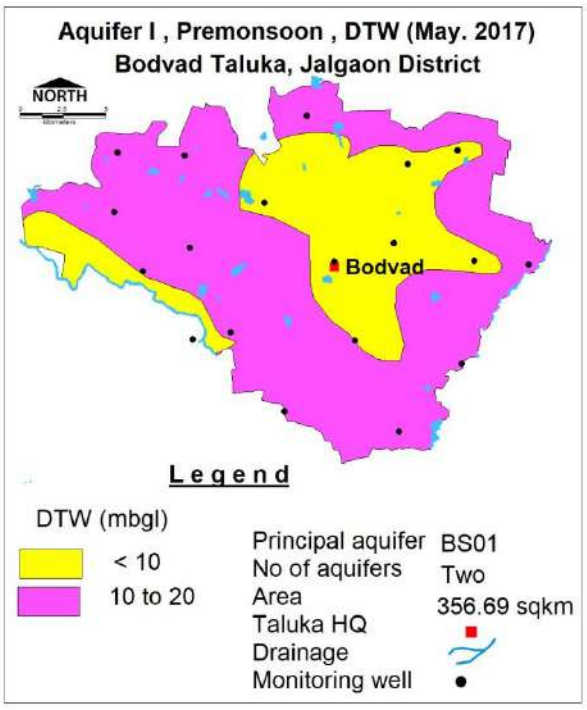
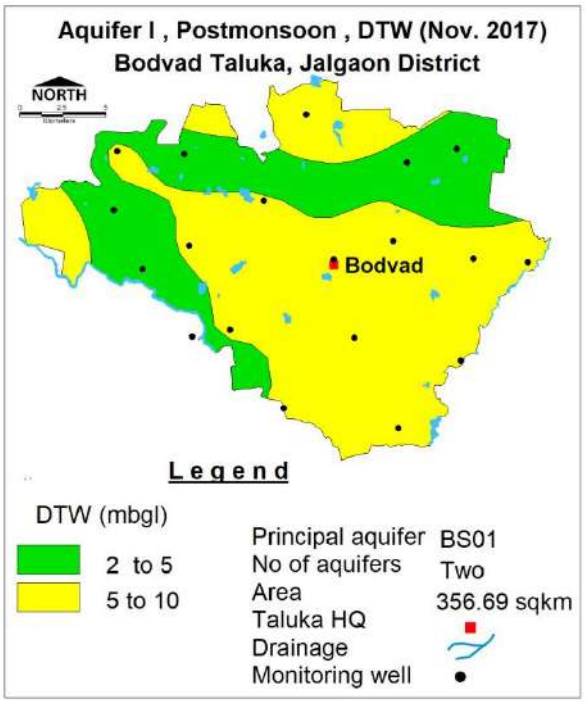
Equation of Trend Line: y= -11.961 x + 829.72

1.3. Geomorphology, soil & geology		
Geomorphic Unit	Plateau (Undissected to highly Dissected) with weathered thickness ranging from 0 to 1.	
Soil	Shallow to Slightly deep clay and sand rich Soil.	
Geology	Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene	
1.4. Hydrology & Drainage		
Drainage	Bhagavati, Waqar and Dev Rivers	
Hydrology	Major Project	Nil
	Bigger Minor Irrigation Project (>100 Ha.)	Nil
	Minor Irrigation	Completed: 02 Projects,

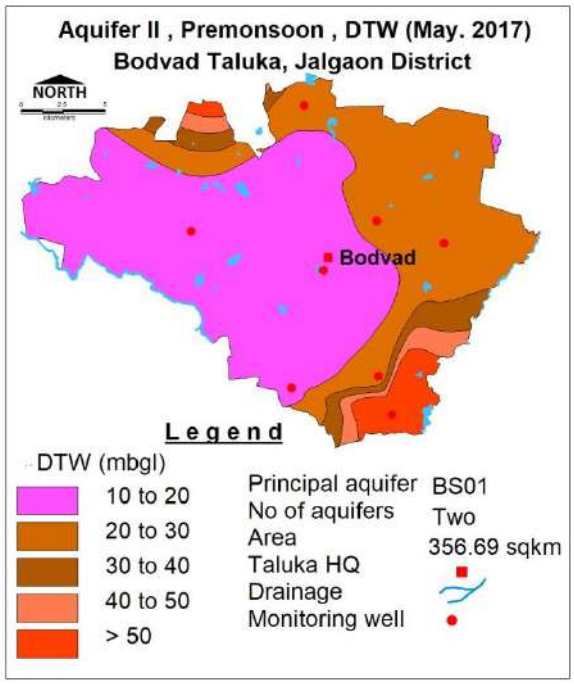
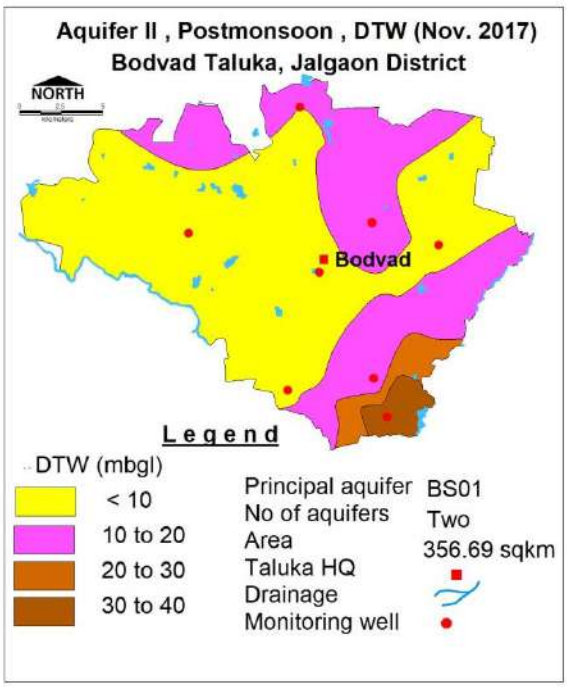
		Project (<100 Ha.)	Command Area 580 ha
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		356.69 Sq. Km.	
Forest Area		64.75 Sq. Km.	
Cultivable Area		285.32 Sq. Km.	
Net Sown Area		266.39 Sq. Km.	
Double Cropped Area		7.08 Sq. Km.	
Area under Irrigation	Surface Water	Nil	
	Ground Water	6.37 Sq. Km.	
Area under Drip & Sprinkler Irrigation		4.07 Sq. Km.	
Principal Crops		**Crop Type**	**Area (Sq. Km.)** *(Reference year 2013-14)*
		Cotton	140.77
		Cereals	77.36
		Pulses	26.62
		Oil Seeds	8.48
Horticultural Crops		Banana	2.05
		Citreous fruit	0.08
		Others	0.83

1.6. Water Level Behaviour

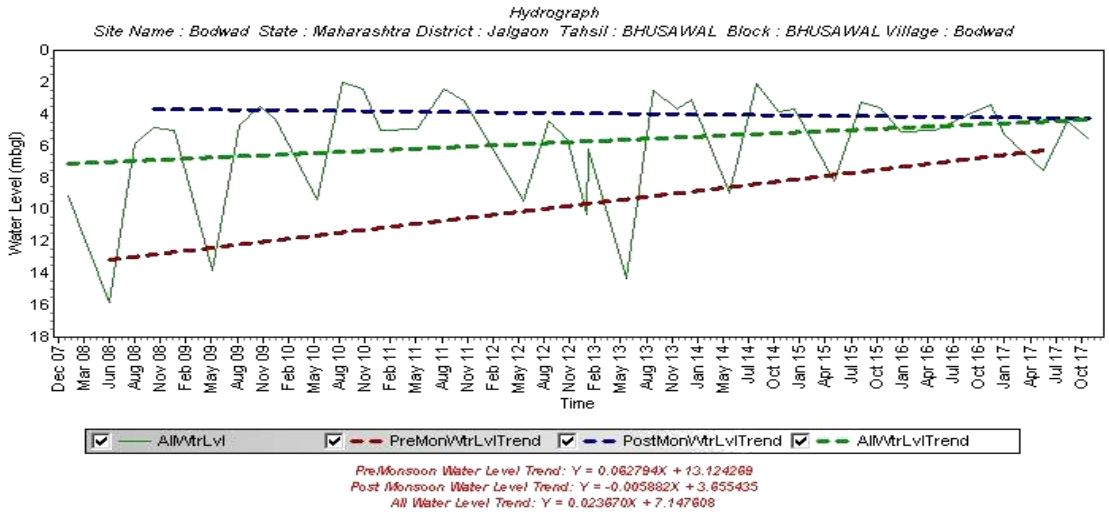
1.6.1 Aquifer-I/ Shallow Aquifer

Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed in central parts of the block while water level in the range of 10 to 20 mbgl is observed in major part of the block.	Water Level varies up to 10 mbgl; major part of the block is covered by DTW between 5 to 10 mbgl while shallow water level in the range of 2 to 5 mbgl is observed in northern and southwestern peripheral parts of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	

1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level < 20 mbgl is observed in western half of the block; water level between 20 to 30 mbgl is observed in major part of the block while water level >30 mbgl is observed in northern and south-eastern parts of the block.	Water level <10 mbgl is observed in major part of the block; 10 to 20 mbgl is observed in northern and south-eastern part of the block while >20 mbgl is observed in south-eastern part of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	

1.7. Hydrograph



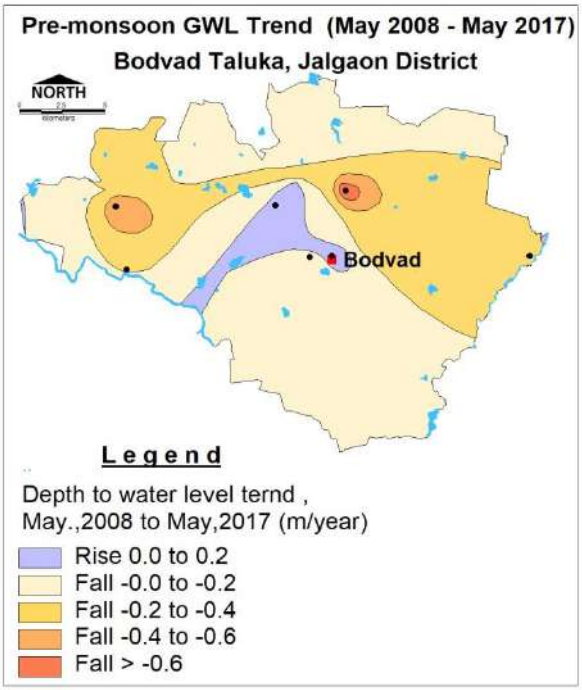
Hydrograph shows Pre-monsoon rising trend @ 0.7427 m/year and Post-monsoon declining trend @ 0.0696 m/year

1.8. Water Level Trend (Aquifer-I/ Shallow Aquifer)

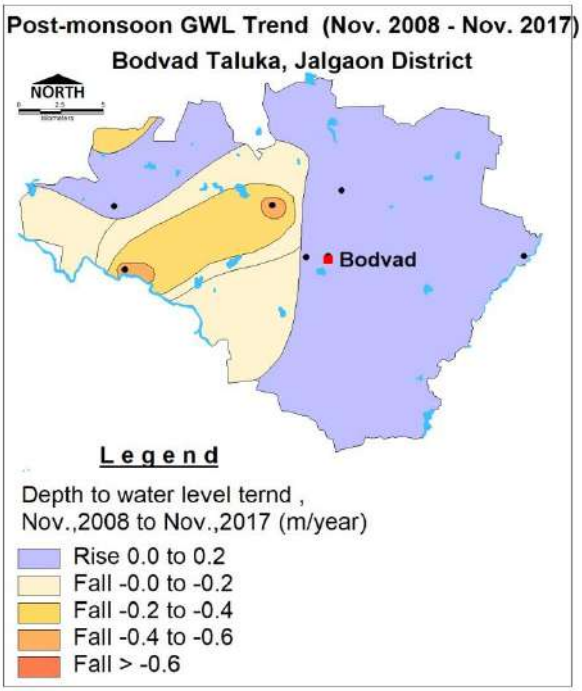
Pre-Monsoon trend (2008-2017)	**Post-Monsoon trend (2008-2017)**
Rising 0 to 0.2 m/year Falling 0 to >0.6 m/year	Rising 0 to 0.2 m/year Falling 0 to >0.6 m/year
Declining trend up to 0.2 m/year is observed in	Declining trend up to 0.2 m/year is observed in

almost entire block; decline in water level >0.2 m/year has been observed in isolated patches in northern part of the block. Rising water level trend has been observed in small isolated part in central area of the block.	western half of the block; significant rise in water level i.e., 0.2 m/year has been observed in eastern half of the block.

Premonsoon Water level Trend (2008-17)

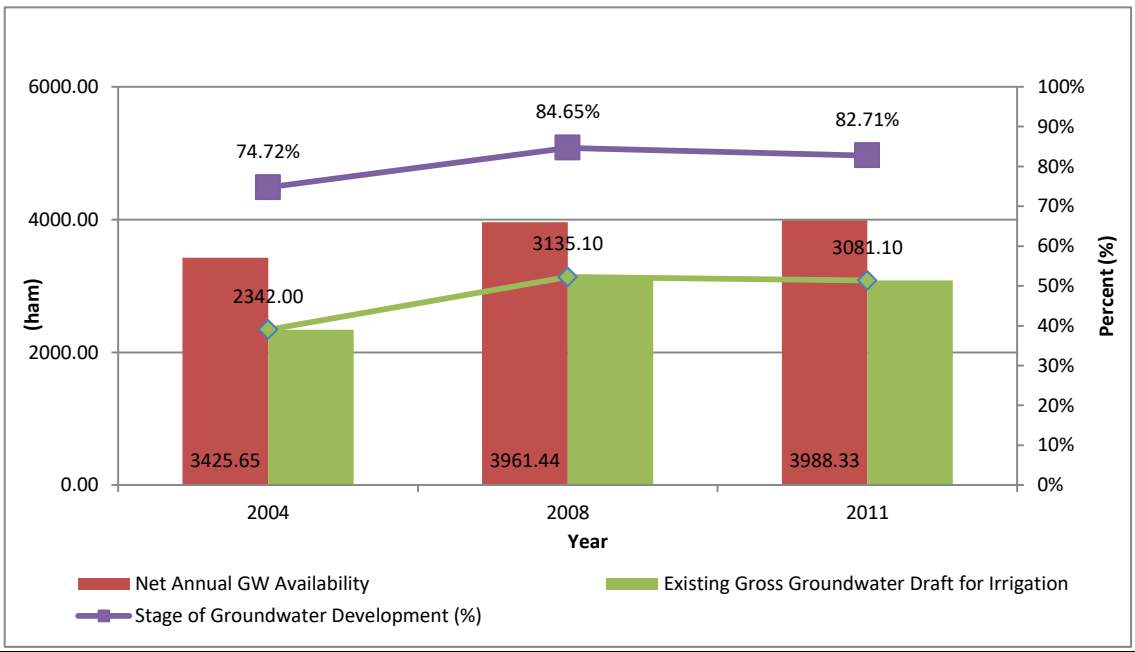


Postmonsoon Water level Trend (2008-17)



2. GROUND WATER ISSUES

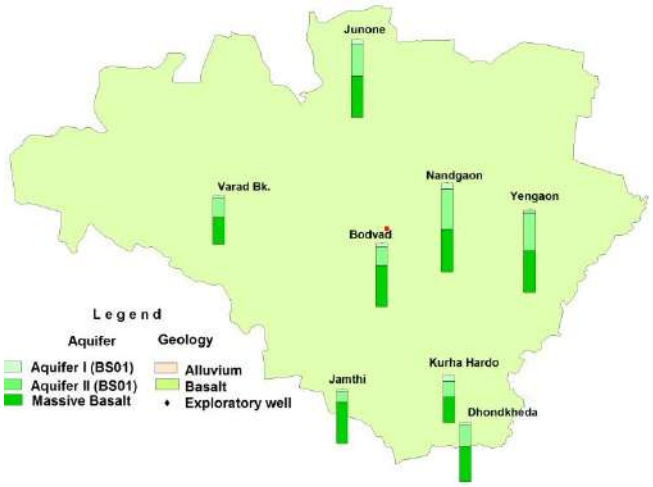
- The Ground Water Stage incresed over the period from 2008 to 2013 from 74.72% to 82.71%.
- The ground water exploitation has also resulted in declining of water levels over the period of time. At present, the premonsoon declining water level trend has been observed in about 379 sq km area.
- Major part of the block is having low yield Potential (<25 m^3/day)



3. AQUIFER DISPOSITION

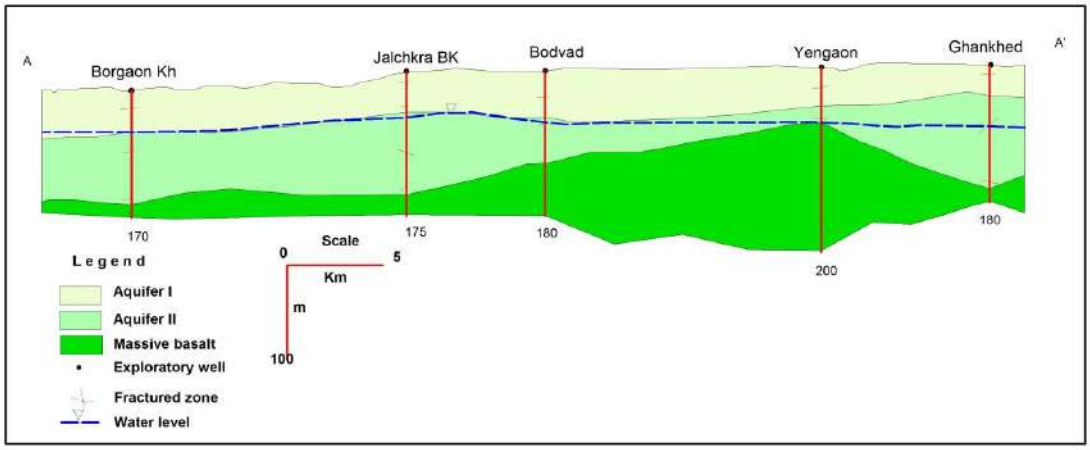
3.1. Number of Aquifers	• Basalt –Aquifer-I, Aquifer-II

3.2. Bar Diagram



3.3. Lithological Disposition

Section AA'



3.4. Basic Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)	
Type of Aquifer (Phreatic/Semiconfined/Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)
SWL (mbgl)	7-70.75	12-42
Depth of Occurrence (mbgl)	10-20	50-200
Granular/ Weathered/ Fractured rocks Thickness (m)	8-16	1-12
Yield	<10 -50 m^3/day	0-1 lps
Specific yield/Storativity (S)	0.02	0.0003 -0.00021
Transmissivity (T)	10-20	10-20

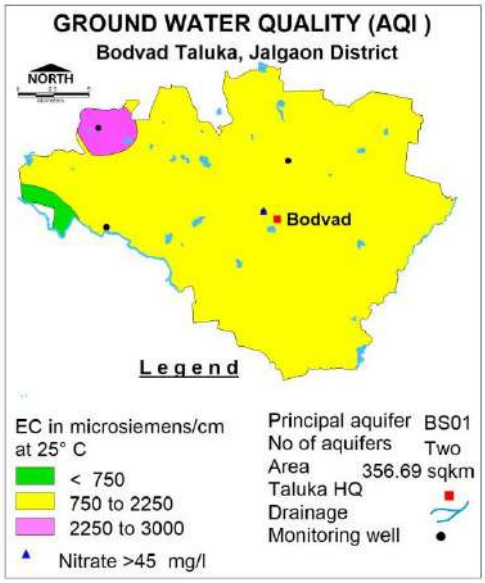
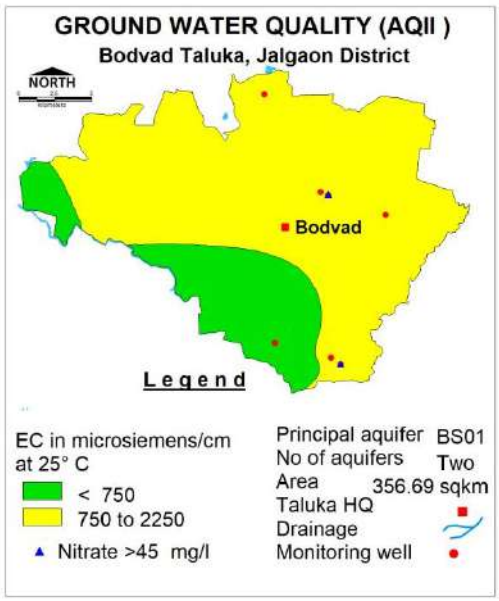
4. GROUND WATER QUALITY

4.1 Aquifer-I/ Shallow Aquifer

EC up to 2250 µS/cm observed in major part of block and ground water is suitable for all purpose. Very small part in northern part of the block shows EC> 2250 µS/cm. Only Bodvad village affected by Nitrate contamination with 69 mg/L Concentration.

4.2 Aquifer-II/ Deeper Aquifer

EC up to 2250 µS/cm observed in major part of block and ground water is suitable for all purpose. Few Villages are also affected by Nitrate contamination.

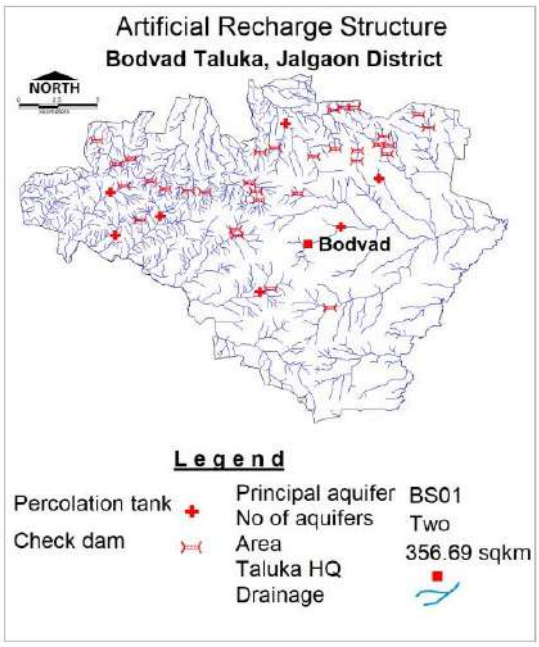
Phreatic Aquifer (Aquifer-I)	**Semiconfined/Confined Aquifer (Aquifer II)**
	

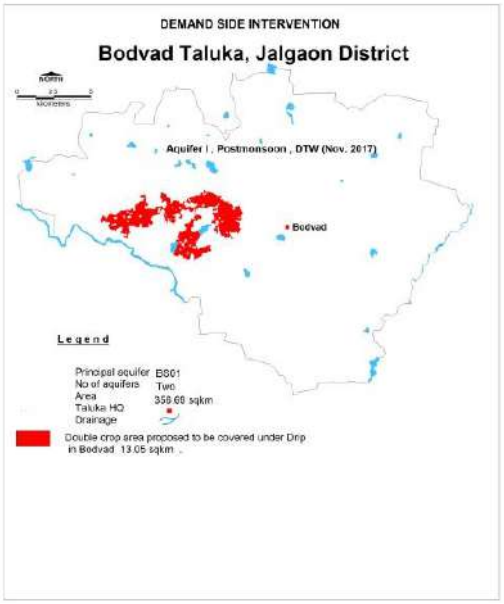
5. GROUND WATER RESOURCE				
5.1 Aquifer-I/ Shallow Aquifer (Basalt)				
Ground Water Recharge Worthy Area (Sq. Km.)	356.69			
Total Annual Ground Water Recharge (MCM)	41.98			
Natural Discharge (MCM)	2.09			
Net Annual Ground Water Availability (MCM)	39.88			
Existing Gross Ground Water Draft for irrigation (MCM)	30.81			
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	2.17			
Existing Gross Ground Water Draft for All uses (MCM)	32.98			
Provision for domestic and industrial requirement supply to 2025(MCM)	3.70			
Net Ground Water Availability for future irrigation development (MCM)	4.82			
Stage of Ground Water Development (%)	82.71			
Category	**Semi Critical**			
5.2 Aquifer-II/Deeper Aquifer (Basalt)				
Semiconfined/Confined Aquifer (Basalt)				
Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av (Sy/S)	Peizometric Head (m above confining layer)	Total Resource (MCM)
356	5.62	0.005	13.75	7.203
6.0. GROUND WATER RESOURCE ENHANCEMENT				

Available Resource (MCM)	39.88		
Gross Annual Draft (MCM)	32.99		
6.1. Supply Side Management			
SUPPLY (MCM)			
Agricultural Supply -GW	30.81		
Agricultural Supply -SW	0.00		
Domestic Supply - GW	2.18		
Domestic Supply - SW	0.97		
Total Supply	**140.74**		
Area of Block (Sq. Km.)	356.69		
Area suitable for Artificial recharge (Sq. Km)	232.09		
Type of Aquifer	Hard Rock	Soft Rock	
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)	232.09	0	
Volume of Unsaturated Zone (MCM)	464.18	0	
Average Specific Yield	0.02	0.070	
Volume of Sub surface Storage Space available for Artificial Recharge (MCM)	9.28	0	
Surplus water Available (MCM)	2.42	0	
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)
Number of Structures	7	32	-
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	1.09	0.73	-
Proposed Structures			
RTRWH Structures – Urban Areas			
Households to be covered (25% with 50 m^2area)	5174		
Total RWH potential (MCM)	0.20		
Rainwater harvested / recharged @ 80% runoff co-efficient	0.16 **Economically not viable & Not Recommended**		
6.2. Demand Side Management			
Micro irrigation techniques			
Double crop area proposed to be covered under Drip	13.05		
Volume of Water expected to be saved (MCM). Surface Flooding req-0.90 m. Drip Req. - 0.50, WUE0.4 m	5.80		
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)	39.88
Additional GW resources available after Supply side interventions (MCM)	1.77
Ground Water Availability after Supply side intervention	41.7
Existing Ground Water Draft for All Purposes (MCM)	32.99
GW draft after Demand Side Interventions (MCM)	27.19
Present stage of Ground Water Development (%)	82.72
Expected Stage of Ground Water Development after interventions (%)	65.28
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	2.0
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	118
Proposed Number of BW(@ 1.5 ham for 10% of GWR Available)	13
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	3.02
Regulatory Measures	**60m borewell/tube well**

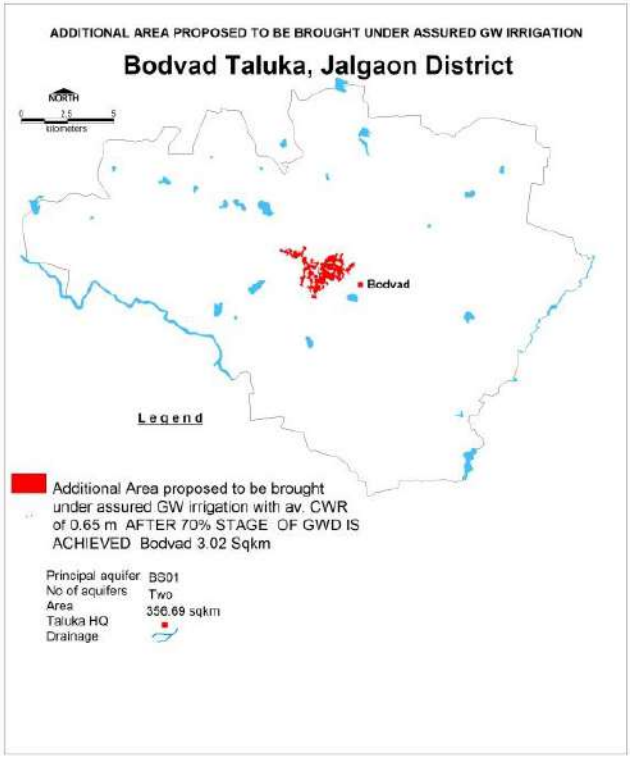
Supply Side intervention	**Demand Side intervention**
Proposed AR Structures	**Double cropped area proposed for drip Irrigation**





Expected benefits

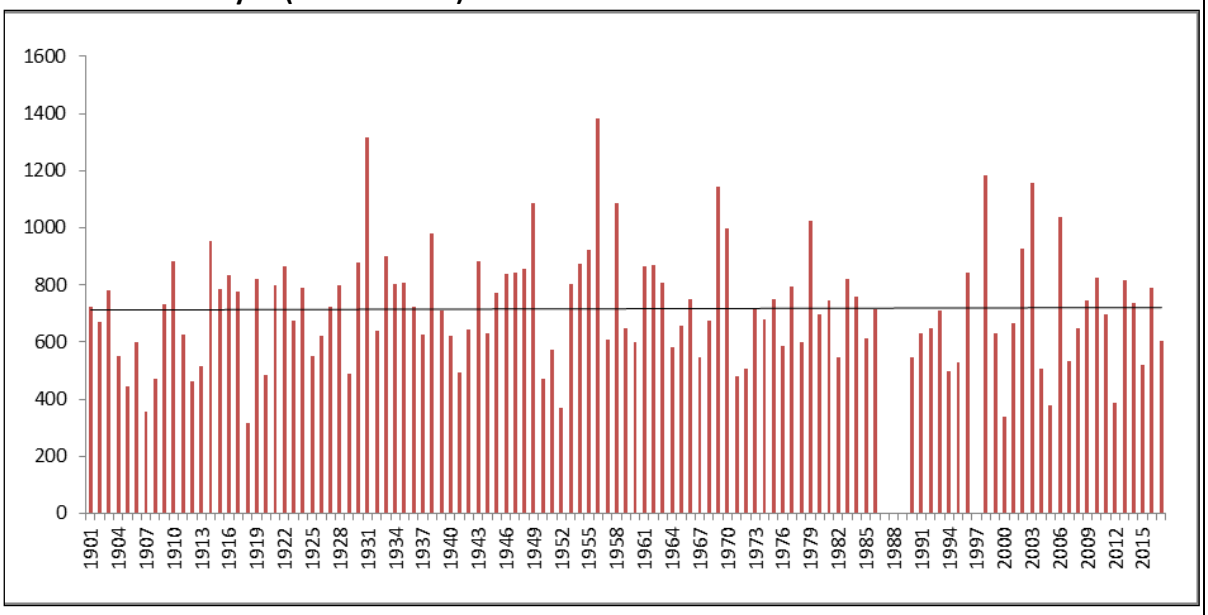
Additional area proposed to be bought under assured GW irrigation



11.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, CHALISGAON BLOCK, JALGAON DISTRICT, MAHARASHTRA

1. SALIENT FEATURE	
1.1 Introduction	
Block Name	Chalisgaon
Geographical Area (Sq. Km.)	1089.90 Sq. Km.
Hilly Area (Sq. Km)	56.55 Sq. Km.
Poor ground Water quality Area ((Sq. Km.)	Nil
Population (2011)	4,14,879
Climate	Tropical Monsoon
1.1 Rainfall Analysis	
Normal Rainfall	767.7 mm
Annual Rainfall (2017)	604.6 mm
Decadal Average Annual Rainfall (2008-17)	677.96 mm
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.0898 mm/year. Probability of Normal/Excess Rainfall- 68% & 13%. Probability of Drought (Moderate/Severe)-: 17 % Moderate & 2% Severe.

Rainfall Trend Analysis (1901 To 2017)



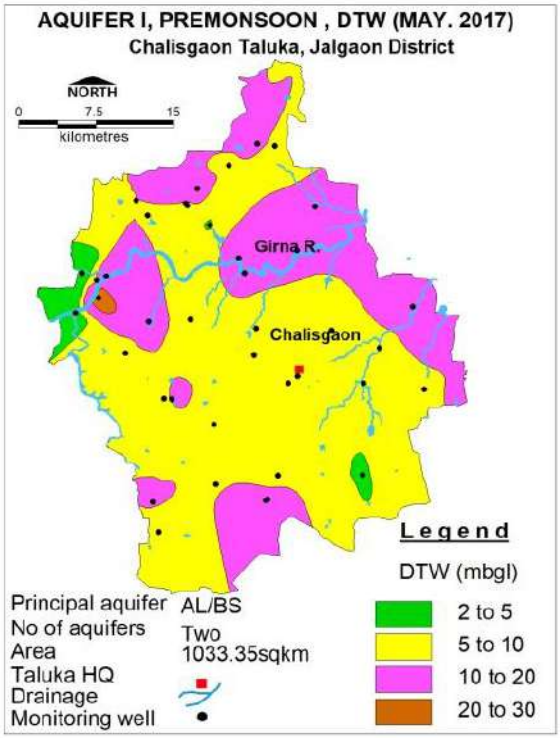
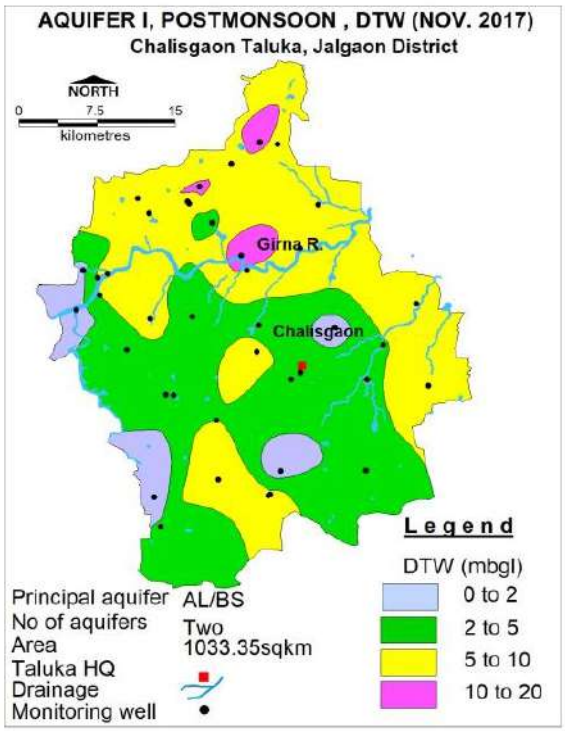
EQUATION OF TREND LINE: Y = 0.0898X + 710.87

1.3. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau Undissected to Highly Dissected with 0-5 m weathering belonging to Tapi and Satpuda and Sahyadri groups. Alluvial Plains of Girna River.(Tributary of Tapi river)
Soil	Shallow to deep Clay loamy and Clay rich Soil
Geology	• Alluvium (sand/clay dominant). Age: Recent to Sub-recent • Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene

1.4. Hydrology & Drainage			
Drainage		Girna and Titur rivers tributaries of Tapi River	
Hydrology		Major project	Nil
		medium Project	03 projects
		Bigger Minor Irrigation Project (>100 Ha.)	Nil
		Minor Irrigation Project (<100 Ha.)	Nil
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		1089.90 Sq. Km.	
Forest Area		169.35 Sq. Km.	
Net Sown Area		893.69 Sq. Km.	
Double Cropped Area		27.60 Sq. Km.	
Area under Irrigation	Surface Water	-	
	Ground Water	324.20 Sq. Km.	
Area under Drip & Sprinkler Irrigation		0.233 Sq. Km.	
Principal Crops		**Crop Type**	**Area (Sq. Km.)** *(Reference year 2013-14)*
		Cotton	281.15
		Oil Seeds	41.25
		Sugarcane	21.60
		Cereals	13.64
		Pulses	9.25
Horticultural Crops		Banana	7.40
		Citreous fruit	1.98
		Others	0.29

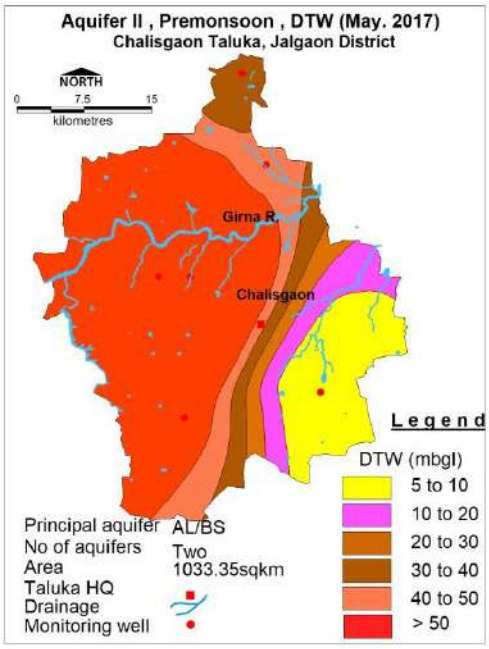
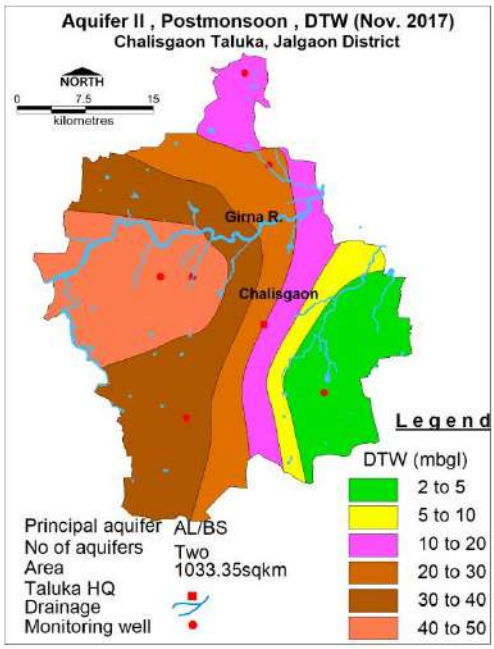
1.6. Water Level Behaviour

1.6.1 Aquifer-I/Shallow Aquifer

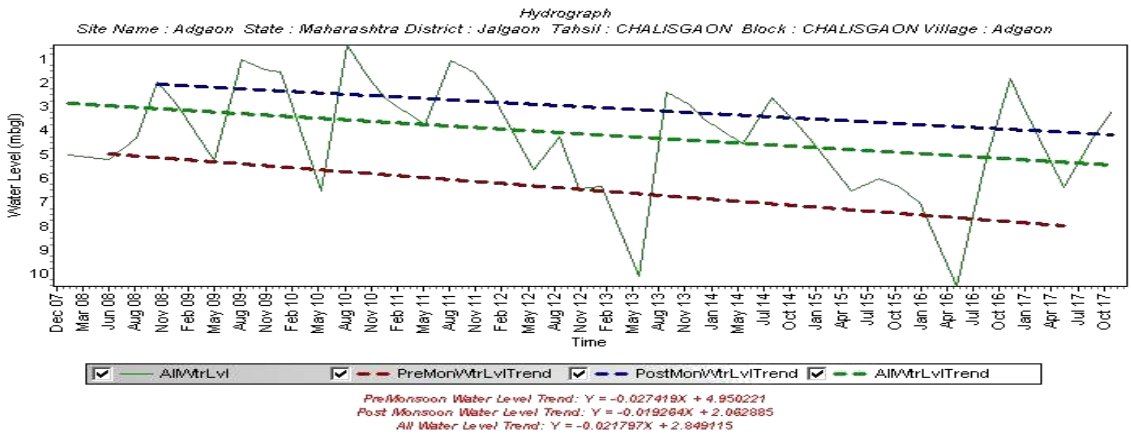
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
	

Water level less than 10 mbgl is observed covering the entire block; while water level in the range of 10 to 20 mbgl is observed in smaller isolated parts of the block.	Entire block is covered by the water levels ranging up to 10 mbgl; water level between 0 to 2 mbgl is observed in sporadic small patches; while water level in the > 10 mbgl in the range of 10 to 20 mbgl is observed in small isolated patches in northern part of the block.

1.6.2 Aquifer-II/ Deeper Aquifer

Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 10 mbgl has been observed in small isolated part in the eastern part of the block; Deeper water level of more than 50 mbgl has been observed over the major part of block.	Water level less than 5 mbgl is observed covering smaller area in eastern part of the block while water levels between 30 to 50 mbgl are observed over the major part of the block
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	

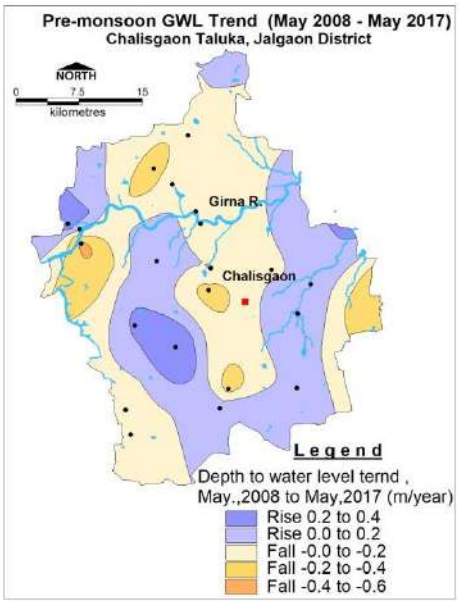
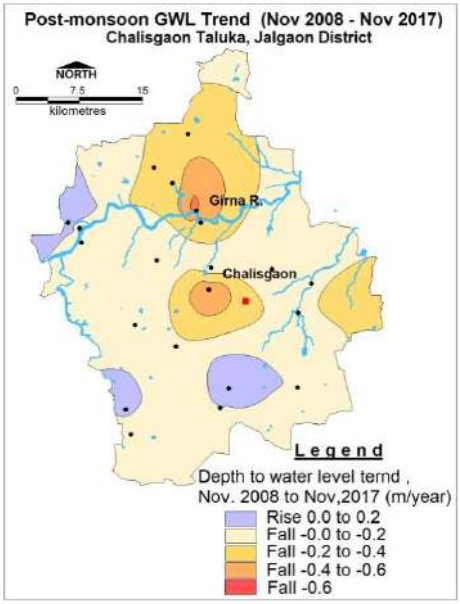
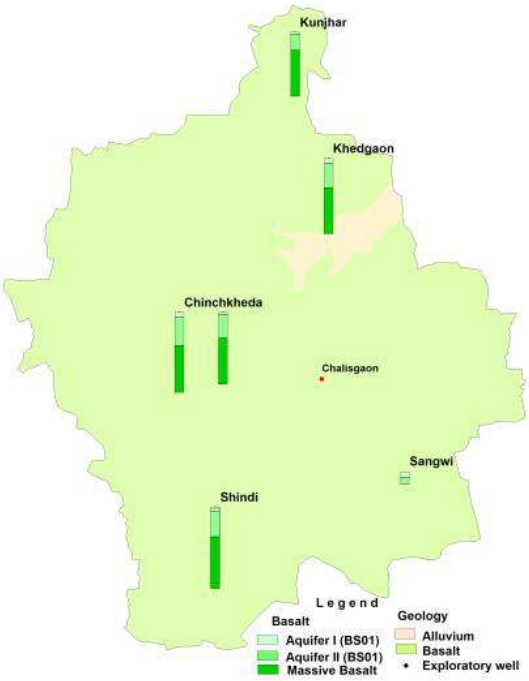
1.7. Hydrograph



Hydrograph shows Declining pre-monsoon and post monsoon water level trend @ 0.3243 m/year @ 0.2279 m/year.

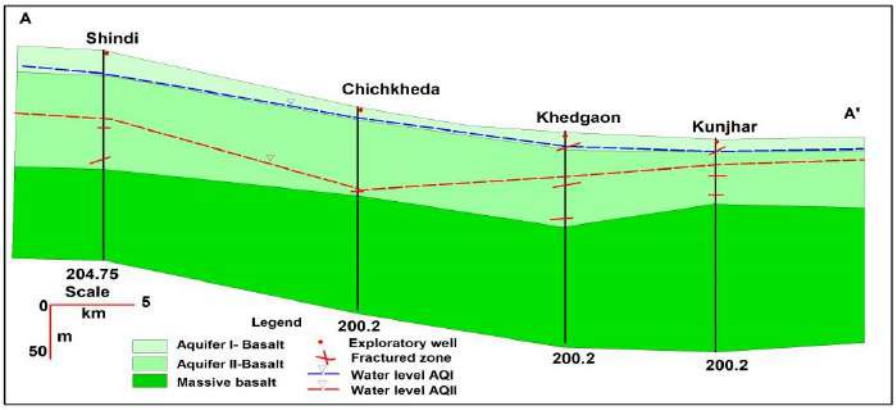
1.8 Water Level Trend (Aquifer-I/ Shallow Aquifer)

Pre-Monsoon trend	***Pre-Monsoon trend***
Rising 0.0016 to 0.3640 m/year	Rising 0.0243 to 0.1128 m/year

Falling 0.0046 to 0.4283 m/year	Falling 0.0020 to 0.6324 m/year
Declining trend up to 0.2 m/year is observed in major part of the block and more than 0.2 m/year is observed in isolated patches of the block. Rising trend is observed in eastern and western peripheral parts of the block.	Rising trend up to 0.2 m/year is observed in small isolated parts of the block. Declining trend of 0.2 m/year is observed over the entire block and > 0.2 m/year is observed in isolated parts of the block.
Premonsoon Water Level Trend (2008-17)	**Postmonsoon Water Level Trend (2008-17)**
	
2. GROUND WATER ISSUES • Declining Water Level trend >0.2 m/year is observed in 309.64 sq. km. area; covering 28.40 % area of the block. • Major part of the block has low yield potential (< 25 m^3/day).	
3. AQUIFER DISPOSITION	
3.1. Number of Aquifers	• Basalt –Aquifer-I, Aquifer-II
3.2. Lithological Disposition 	

3.3. Cross Sections

Section AA''



3.4. Basic Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)		Alluvium (River Alluvium)
Type of Aquifer (Phreatic/Semiconfined/Confined)	Aquifer-I (Phreatic)	Aquifer II (Semiconfined/confined)	Aquifer-I (Phreatic)
SWL (mbgl)	2.8-24.4	21-99.40	5-12
Depth of Occurrence (mbgl)	10-30	25-125	5-25
Granular/Weathered /Fractured rock thickness (m)	8-20	1-8	3-6
Yield	<10-100 m^3/day	0-3 lps	150-200m^3/day
Specific yield/Storativity (S)	0.02	0.0003 -0.00021	0.06-0.08 (Clayey to Sandy)
Transmissivity (T)	20-35	10-50	10-80

- GROUND WATER QUALITY

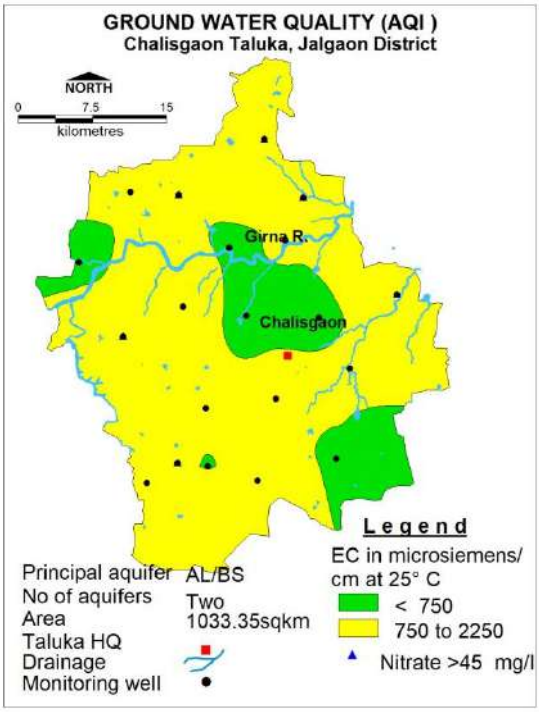
Aquifer-I/ Shallow Aquifer

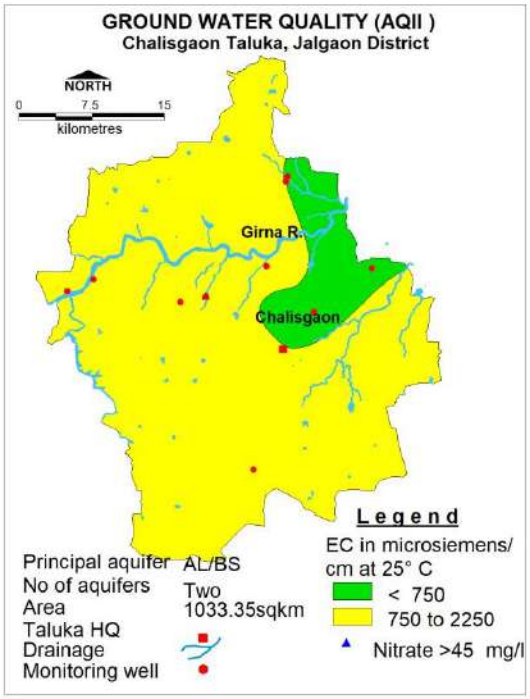
Ground water having EC up to 2250 µS/cm has been observed over the entire block and ground water is suitable for drinking as well as irrigation purposes. Few villages are also affected by Nitrate contamination.

Aquifer II /Deeper Aquifer

In Deeper aquifer also ground water is having EC up to 2250 µS/cm over the entire block over the entire block and ground water is suitable for drinking as well as irrigation purposes. Few villages are also affected by Nitrate contamination. Few villages are also affected by Nitrate contamination.

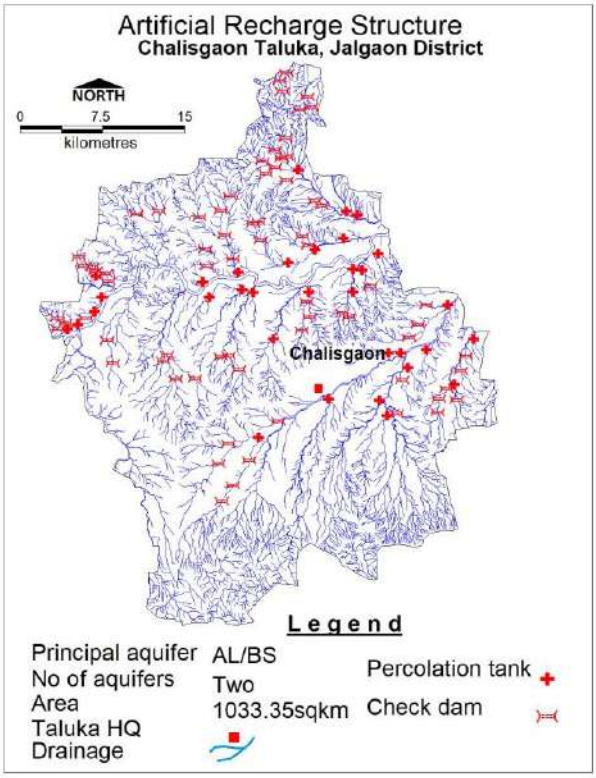
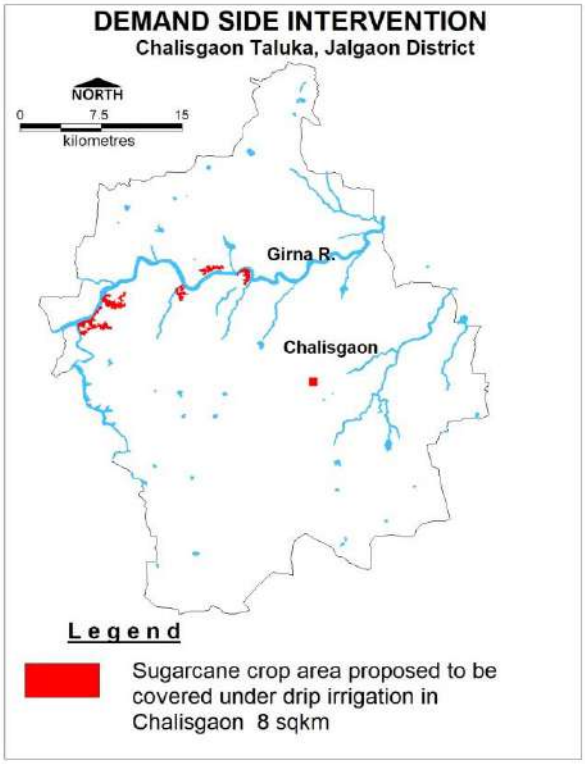
Aquifer-I/shallow Aquifer	**Aquifer II/Deeper Aquifer**

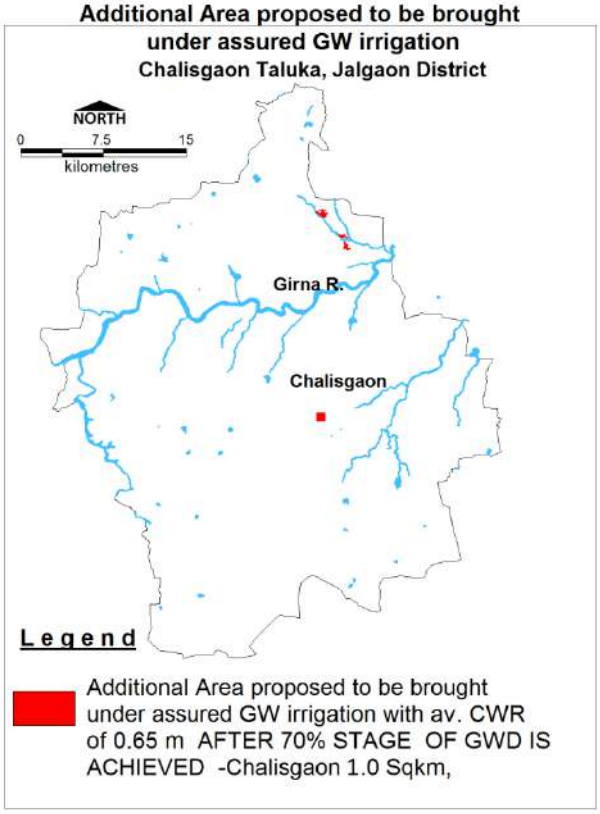




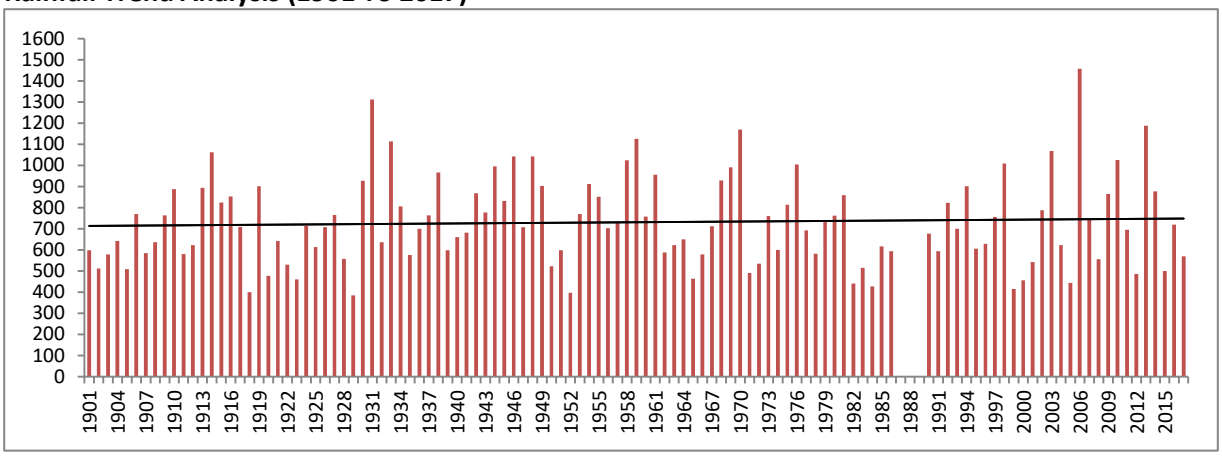
5. GROUND WATER RESOURCE				
5.1 Aquifer-I/ Shallow Aquifer (Basalt)				
Ground Water Recharge Worthy Area (Sq. Km.)			1033.35	
Total Annual Ground Water Recharge (MCM)			152.48	
Natural Discharge (MCM)			7.62	
Net Annual Ground Water Availability (MCM)			144.86	
Existing Gross Ground Water Draft for irrigation (MCM)			105.76	
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			4.08	
Existing Gross Ground Water Draft for All uses (MCM)			109.85	
Provision for domestic and industrial requirement supply to 2025(MCM)			7.88	
Net Ground Water Availability for future irrigation development (MCM)			32.75	
Stage of Ground Water Development (%)			75.83	
Category			**SAFE**	
5.2 Aquifer-II/ Deeper Aquifer (Basalt)				
Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av (Sy/S)	Peizometric head (m above confining layer)	Total Resource (MCM)
1033	4.16	0.005	15	23.11
6.0. GROUND WATER RESOURCE MANAGEMENT				
Available Resource (MCM)			144.86	
Gross Annual Draft (MCM)			109.85	
6.1. Supply Side Management				
SUPPLY (MCM)				
Agricultural Supply -GW			105.76	
Agricultural Supply -SW			0	

Domestic Supply - GW	4.09		
Domestic Supply - SW	1.0225		
Total Supply	**110.8725**		
Area of Block (Sq. Km.)	1089.90		
Area suitable for Artificial recharge (Sq. Km)	839.13		
Type of Formation	Hard Rock	Soft Rock	
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)	839.13	-	
Volume of Unsaturated Zone (MCM)	1678.26	-	
Average Specific Yield	0.020	-	
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)	33.57	-	
Surplus water Available (MCM)	8.75	-	
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)
Number of Structures	33	72	0
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	4.95	1.62	0.00
Proposed Structures			
RTRWH Structures – Urban Areas			
Households to be covered (25% with 50 m^2area)	9,200		
Total RWH potential (MCM)	0.2599		
Rainwater harvested / recharged @ 80% runoff co-efficient	0.207 **Economically not viable & Not Recommended**		
6.2. Demand Side Management			
Micro irrigation techniques			
Sugarcane Area (sq km) proposed for Drip Irrigation	8		
Volume of Water expected to be saved by use of drip (MCM). Surface Flooding req- 2.45 m. Drip Req. - 1.88, WUE- 0.57 m	4.56		
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)	144.86		
Additional GW resources available after Supply side interventions (MCM)	6.57		
Ground Water Availability after Supply side intervention	151.4		
Existing Ground Water Draft for All Uses (MCM)	109.85		
GW draft after Demand Side Interventions (MCM)	105.29		
Present stage of Ground Water Development	75.83		

(%)	
Expected Stage of Ground Water Development after interventions (%)	69.53
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	0.711
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	5
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available)	43
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	1
Regulatory Measures	**60 m bore well/tube well**
Supply Side interventions	**Demand Side interventions**
Proposed AR structures	**Sugarcane Area proposed for drip irrigation**
	
Expected Benefits: **Additional Area to be bought under assured GW irrigation**	


Additional Area proposed to be brought
under assured GW irrigation
Chalisgaon Taluka, Jalgaon District
NORTH
0
7.5
15
kilometres
Girna R.
Chalisgaon
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 -Chalisgaon 1.0 Sqkm,

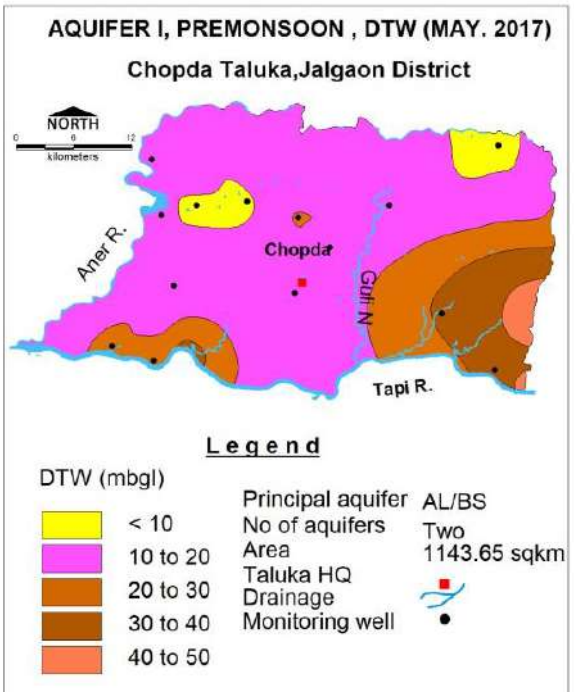
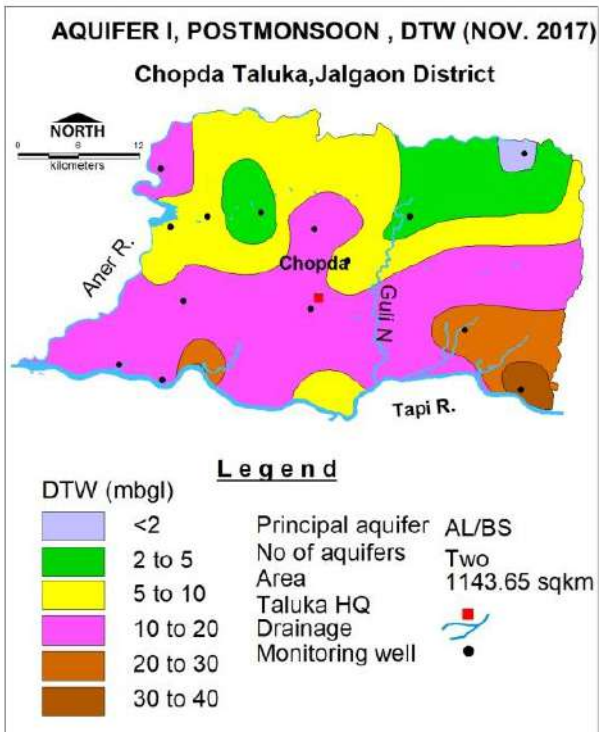
12.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, CHOPDA BLOCK, JALGAON DISTRICT, MAHARASHTRA

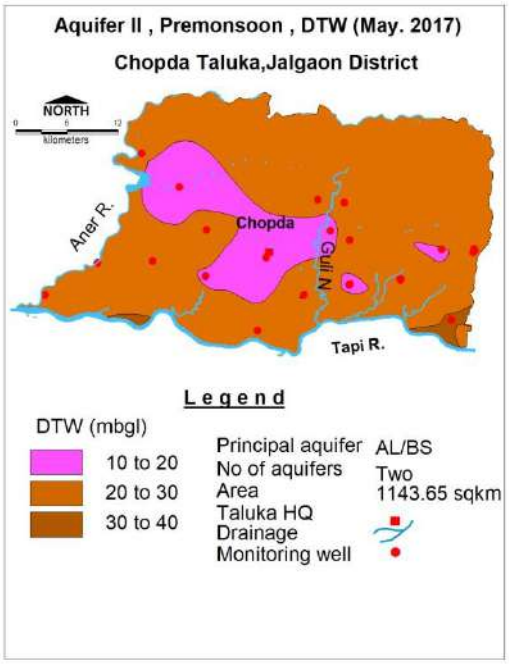
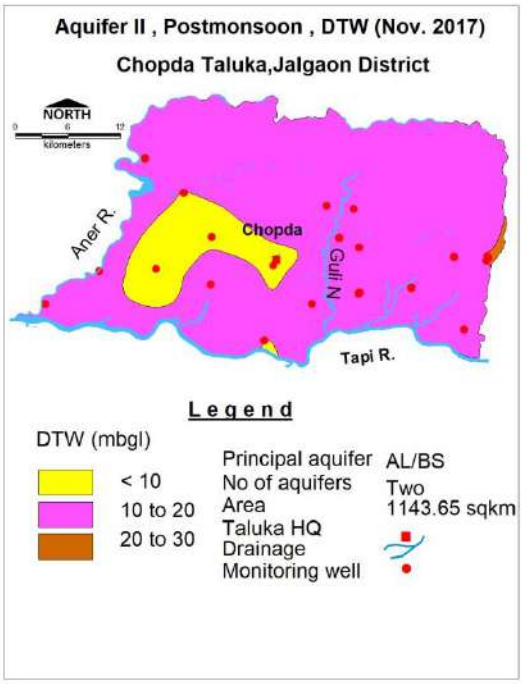
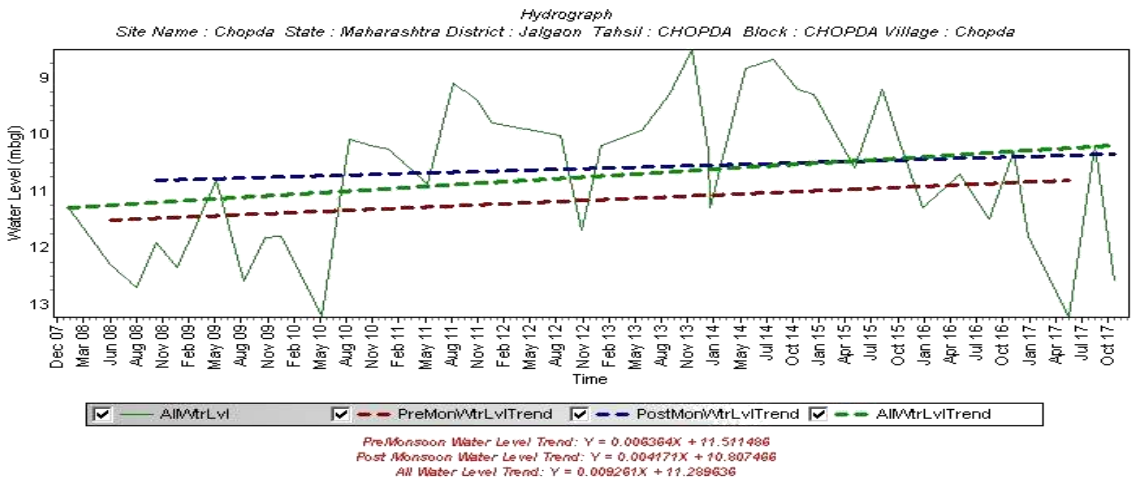
1. SALIENT FEATURE		
1.1 Introduction		
Block Name	Chopda	
Geographical Area (Sq. Km.)	1142.65 Sq. Km.	
Hilly Area (Sq. Km)	40.85 Sq. Km.	
Poor ground Water quality Area (Sq. Km.)	Nil	
Population (2011)	3,12,815	
Climate	Tropical Monsoon	
1.2 Rainfall Analysis		
Normal Rainfall	762.5 mm	
Annual Rainfall (2017)	565.8 mm	
Decadal Average Annual Rainfall (2008-17)	751.65 mm	
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.291 mm/year. Probability of Normal/Excess Rainfall- 64 % & 18%. Probability of Drought (Moderate/Severe)-: 18 % Moderate	
Rainfall Trend Analysis (1901 To 2017)		
		
EQUATION OF TREND LINE: Y= 0.291X+713.11		
1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Deccan trap Plateau (Slightly dissected to highly dissected with 0-5 m weathering) belongs to, Nagartas formation of Satpuda Group in the north followed by Piedmont zone (Bazada -Deep) and alluvial plains in the central and southern parts of the block.	
Soil	Moderate to Deep clay rich soil	
Geology	• Alluvium (Older and Younger Alluvium) Age: Recent to Sub-recent • Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene	
1.4. Hydrology & Drainage		
Drainage	Tapi River and its tributaries Aner and Gul rivers	
Hydrology	Major project	01 project (Gul project) Cultivable area: 3708 ha
	Bigger Minor Irrigation Project	01 project

		(>100 Ha.)	
		Minor Irrigation Project (<100 Ha.)	PT-03, Cement bund-326 nos, nala bund-32 nos
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		1142.65 Sq. Km.	
Forest Area		40.85 Sq. Km.	
Cultivable Area		707.92 Sq. Km.	
Net Sown Area		620.64 Sq. Km.	
Double Cropped Area		71.50 Sq. Km.	
Area under Irrigation	Surface Water	133.11 Sq. km.	
	Ground Water	292.44 Sq. Km.	
Area under Drip & Sprinkler Irrigation		205.46 Sq. Km.	
Principal Crops		**Crop Type**	**Area (Sq. Km.)** *(Reference year2013-14)*
		Cotton	309.98
		Cereals	131.56
		Pulses	112.08
		Sugarcane	44.33
		Oil Seeds	13.45
Horticultural Crops		Banana	134.30
		Citreous fruit	0.60
		Others	2.60

1.6. Water Level Behaviour

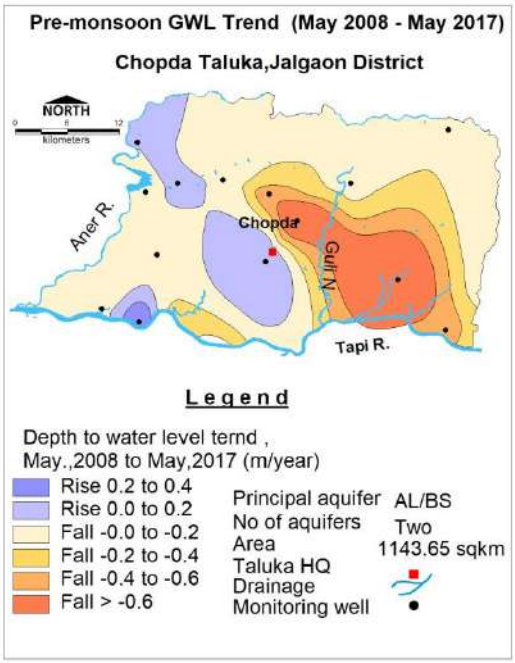
1.6.1 Aquifer-I/Shallow Aquifer

Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
	
Water level less than 10 mbgl is observed in small isolated parts of the block; while water level in the range of 10 to 20 mbgl is observed in major part of the block; deeper water level i.e., >20 mbgl has been observed as isolated	Water Level less than 10 mbgl are observed in northern half of block except small isolated patches in southern part of the block while water level between >10 mbgl are observed in southern

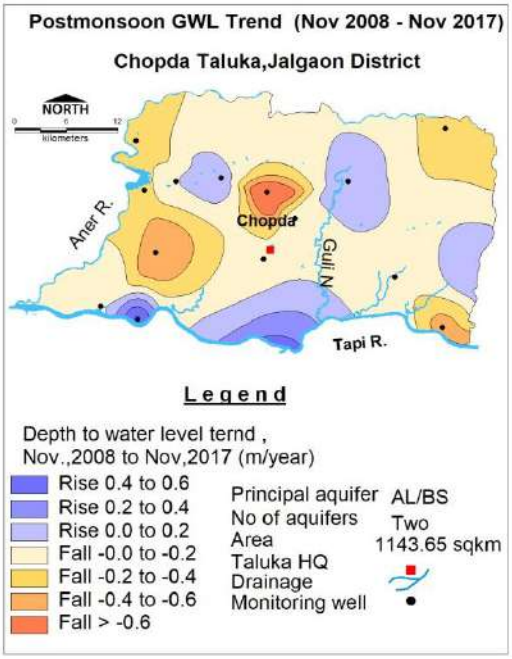
patches in south east and southern parts of the block.	half of the block.
1.6.2 Aquifer-II & III/Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level less than 20 mbgl is observed in small part of the block while water level more than 20 mbgl is observed covering the entire area of the block.	Water level less than 10 mbgl is observed in small part of the block while water level between 10 to 20 mbgl is observed covering the entire block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
1.7. Hydrograph	
	
Hydrograph shows rising water level trend during pre-monsoon and post-monsoon @ 0.0753 m/year @ 0.0493 m/year	
1.8 Water Level Trend (Aquifer-I/Shallow Aquifer)	
Pre-Monsoon trend Rising 0.0076 to 0.3587 m/year Falling 0.025 to 0.8868 m/year	**Post-Monsoon trend** Rising 0.1054 to 0.5362 m/year Falling 0.0040 to 0.9383 m/year
Declining water level trend up to 0.2 m/year is	Declining water level trend up to 0.2 m/year is

observed in major part of the block and more than 0.2 m/year is observed in southeastern part of the block. Rising trend up to 0.2 m is observed in north western and south-western parts of the block.	observed in major part of the block while rising trend up to 0.2 m is observed in smaller isolated parts of the block.

Premonsoon Water level Trend (2008-17)

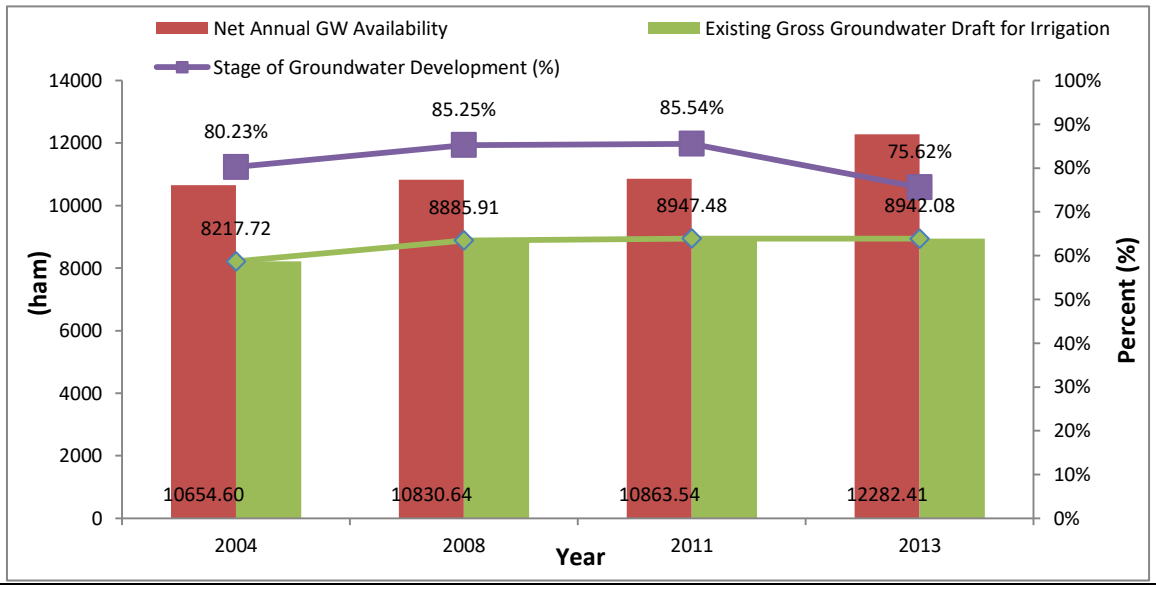


Postmonsoon Water level Trend (2007-16)



2.0 GROUND WATER ISSUES

- Ground Water based Banana cultivation, a water intensive crop, in 134.30 Sq Km area resulting in increase in ground water draft.
- Exploitation of ground water mainly for irrigation purposes results in increase in Stage of Ground Water Development Over the period.
- Declining Water Level trend is observed in 914.76 sq. km covering almost the entire block.
- Deeper Water level >20 mbgl is observed in about 105 sq km area.
- Desaturation of granular Zone/ potential Aquifer Consisting of sand, gravel and pebbles with thin layer of Clay at Various depths.

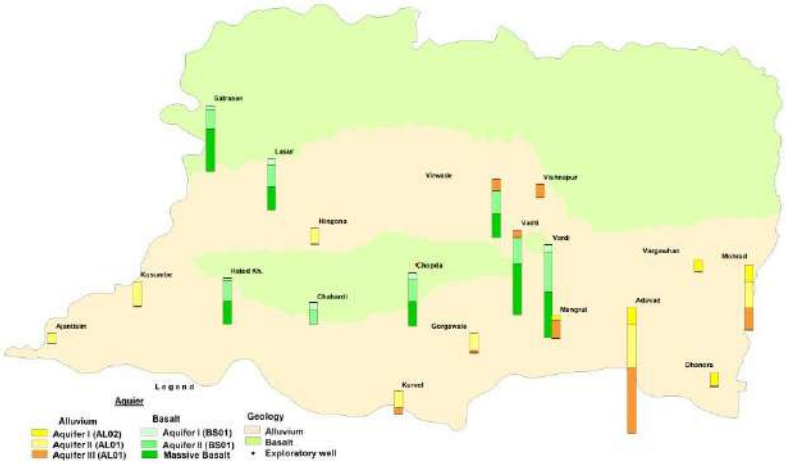


3. AQUIFER DISPOSITION

3.1. Number of Aquifers

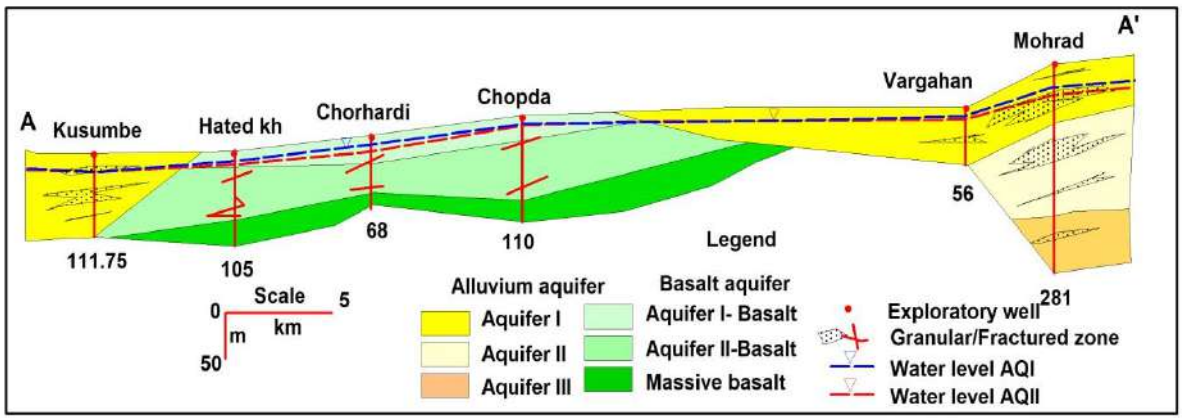
- Basalt – Aquifer-I, Aquifer-II
- Alluvium - Aquifer-I,II, &III

3.2. Lithological Disposition



3.3. Cross Sections

Section AA'



3.4. Basic Aquifer Characteristics

Major Aquifer	Basalt (Deccan Traps)		Alluvium		
Type of Aquifer (Phreatic/Semiconfined/ Confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)	Aquifer-III (Semiconfined/confined)
SWL (mbgl)	9.5-26.30	1.8-16	9-46	2.2-37.50	2.2-37.50
Depth of Occurrence (mbgl)	10-35	20-150	30-79.2	100-120	120-200
Granular/weathered /fractured rocks thickness (m)	6-24	0.5-12	10-60	2-30	5-20
Yield	<10-50 m^3/day	0-3 lps	50-400 m^3/day	3-10 lps	1-3lps
Specific yield/ Storativity(S)	0.02	0.0003-0.000057	0.06-0.1	3.47 x 10^{-3} to 3.96 x 10^{-4}	3.47 x 10^{-3} to 3.96 x 10^{-4}
Transmissivity (T)	10-20	15-45	25-150	20-562	15-250

4.0 GROUND WATER QUALITY

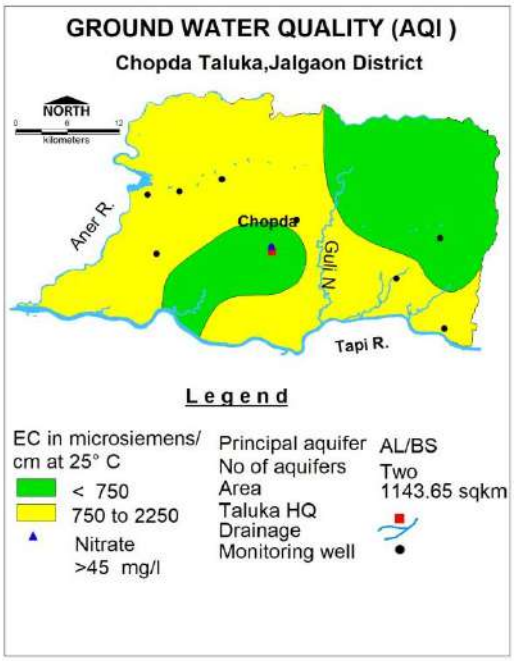
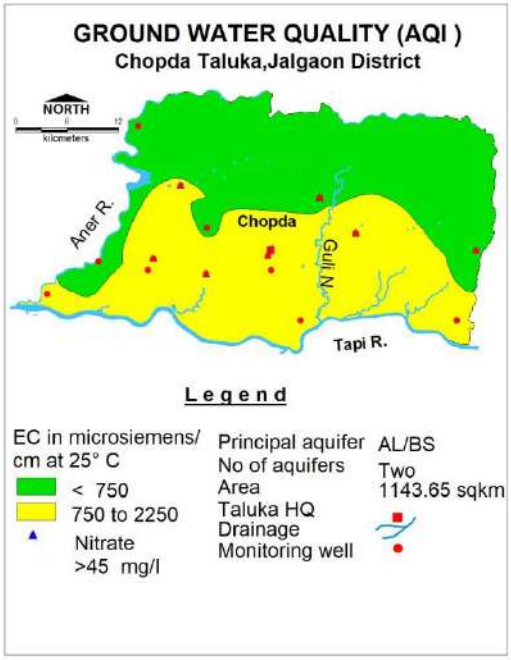
4.1 Aquifer-I /Shallow Aquifer

EC between 750 and 2250 µS/cm are observed over the entire block. Ground water is suitable for all

purposes in major part of the block. EC values <750 µS/cm are observed in north-eastern and eastern parts of the block. Ground water is suitable for drinking as well as irrigation purposes. Only in Chopda village ground water is affected by Nitrate contamination (51 mg/l).

4.2 Aquifer II & III/Deeper Aquifer

EC between 750 and 2250 µS/cm in southern half of the block and in northern half of the block EC varies up to 750 µS/cm. Ground water is suitable for is suitable for drinking as well as irrigation purposes. Few villages are affected by Nitrate contamination.

Phreatic Aquifer (Aquifer-I)	Semiconfined/Confined Aquifer (Aquifer II & III)
	

5. GROUND WATER RESOURCE

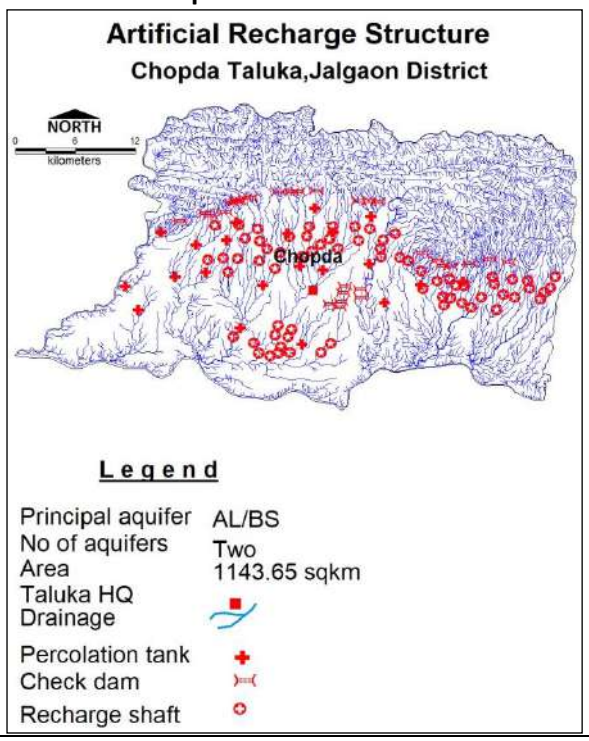
5.1 Aquifer-I/ Shallow Aquifer (Basalt & Alluvium)

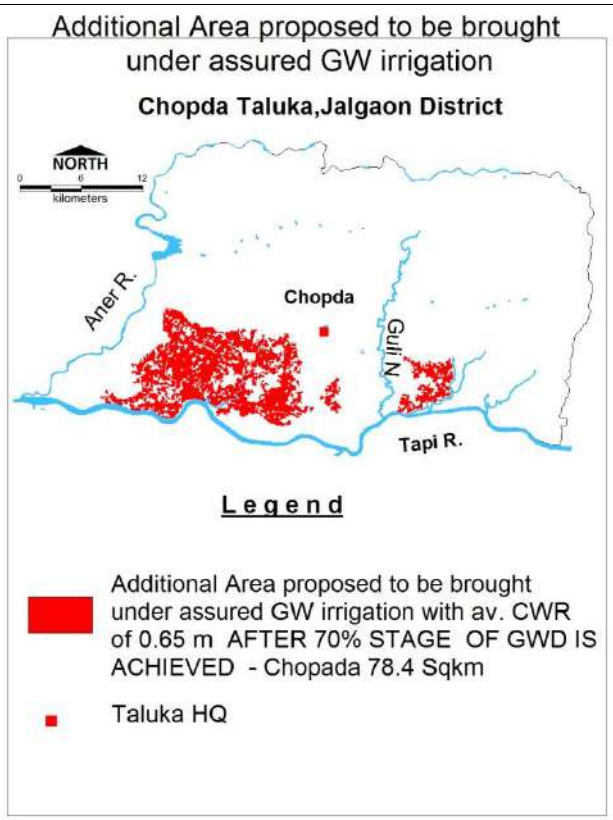
Ground Water Recharge Worthy Area (Sq. Km.)	1101.80
Total Annual Ground Water Recharge (MCM)	130.26
Natural Discharge (MCM)	7.43
Net Annual Ground Water Availability (MCM)	122.82
Existing Gross Ground Water Draft for irrigation (MCM)	89.42
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	3.45
Existing Gross Ground Water Draft for All Uses (MCM)	92.87
Provision for domestic and industrial requirement supply to 2025(MCM)	6.28
Net Ground Water Availability for future irrigation development (MCM)	31.68
Stage of Ground Water Development (%)	75.62
Category	**SAFE**

5.2 Aquifer-II/ Deeper Aquifer

Formation	Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av(Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
Basalt	897	2.7	0.0045	10-25	12.50

Alluvium	245	13.73	0.04	40-70	144.38
Aquifer-III/ Deeper Aquifer (Alluvium)					
Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av(Sy/S)	Piezometric Head (m above confining layer)		Total Resource (MCM)
124.55	12.5	0.0037	110-120		3.28
6.0. GROUND WATER RESOURCE ENHANCEMENT					
Available Resource (MCM)			122.82		
Gross Annual Draft (MCM)			92.87		
6.1. Supply Side Management					
SUPPLY (MCM)					
Agricultural Supply -GW			89.42		
Agricultural Supply -SW			133.11		
Domestic Supply - GW			4.71		
Domestic Supply - SW			0.625		
Total Supply			**227.865**		
Area of Block (Sq. Km.)			1142.65		
Area suitable for Artificial recharge (Sq. Km)			820		
Type of Formation			Hard Rock	Soft Rock	
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)			200	620	
Volume of Unsaturated Zone (MCM)			400	1240	
Average Specific Yield			0.020	0.070	
Volume of Sub Surface Storage Space available for Artificial Recharge (MCM)			8	86.80	
Surplus water Available (MCM)			0	8.5	
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)
Number of Structures			**18**	30	66
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			2.7	0.68	2.97
RTRWH Structures – Urban Areas					
Households to be covered (25% with 50 m^2area)			12,987		
Total RWH potential (MCM)			0.4707715		
Rainwater harvested / recharged @ 80% runoff co-efficient			0.3766 **Economically not viable & Not Recommended**		
6.2. Demand Side Management					
Micro irrigation techniques					
Irrigation Area (ha) proposed for irrigation through Sprinkler			Not proposed		
Water Saving by use of Sprinklers			Nil		
Proposed Cropping Pattern change					
Irrigated area under Water Intensive Crop(ha)			Not proposed		
Water Saving by Change in Cropping Pattern			Nil		

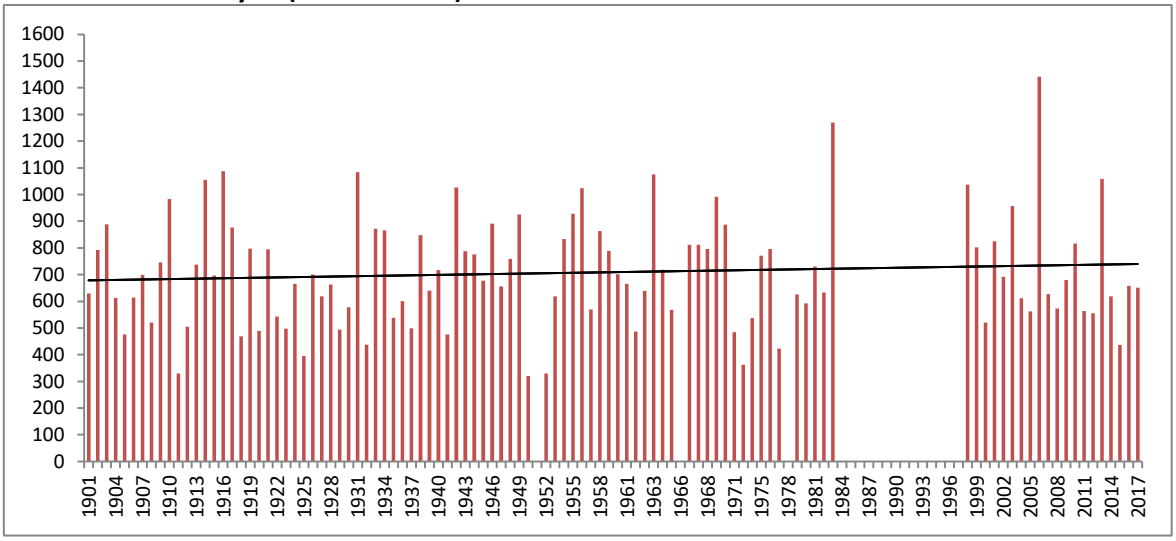
Other Interventions Proposed, if any	
Alternate Water Sources Available	
Tapi Mega Recharge Scheme	**101.74**
Quantum of water recharged- Tapi MRS (MCM)	**76.30**
6.3. Expected Benefits	
Net Ground Water Availability (MCM)	122.82
Additional GW resources available after Supply side interventions (MCM)	82.65
Ground Water Availability after Supply side intervention	205.46
Existing Ground Water Draft for All Uses (MCM)	92.87
GW draft after Demand Side Interventions (MCM)	92.87
Present stage of Ground Water Development (%)	75.62
Expected Stage of Ground Water Development after interventions (%)	45.20
6.4.Development Plan	
Volume of water available for GWD to 70% (MCM)	50.96
Proposed Number of DW(@ 1.5 ham for 10% of GWR Available)	340
Proposed Number of BW(@ 1.5 ham for 90% of GWR Available)	3057
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	78.39
Regulatory Measures	**80 m borewell/tube well**
Supply side intervention	**Demand side intervention**
Proposed AR Structures 	**MAJOR ARE OF WATER INTENSIVE CROP ALREADY COVERED BY MICRO IRRIGATION TECHNIQUE**
Additional area proposed to be bought under assured GW irrigation	


Additional Area proposed to be brought under assured GW irrigation
Chopda Taluka,Jalgaon District
NORTH
0 6 12
kilometers
Aner R.
Chopda
Gulin N.
Tapi R.
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 - Chopada 78.4 Sqkm
Taluka HQ

13.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, PAROLA BLOCK, JALGAON DISTRICT, MAHARASHTRA

1.SALIENT FEATURE	
1.1 Introduction	
Block Name	Parola
Geographical Area (Sq. Km.)	758.06 Sq. Km.
Hilly Area (Sq. Km)	46.46 Sq. Km.
Poor ground water quality area (Sq. Km.)	Nil
Population (2011)	1,96,863
Climate	Tropical Monsoon
1.2 Rainfall Analysis	
Normal Rainfall	703.3 mm
Annual Rainfall (2017)	651 mm
Decadal Average Annual Rainfall (2008-17)	657.29 mm
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.525 mm/year. Probability of Normal/Excess Rainfall- 62% & 18%. Probability of Drought (Moderate/Severe)-: 17 % Moderate & 3% Severe.

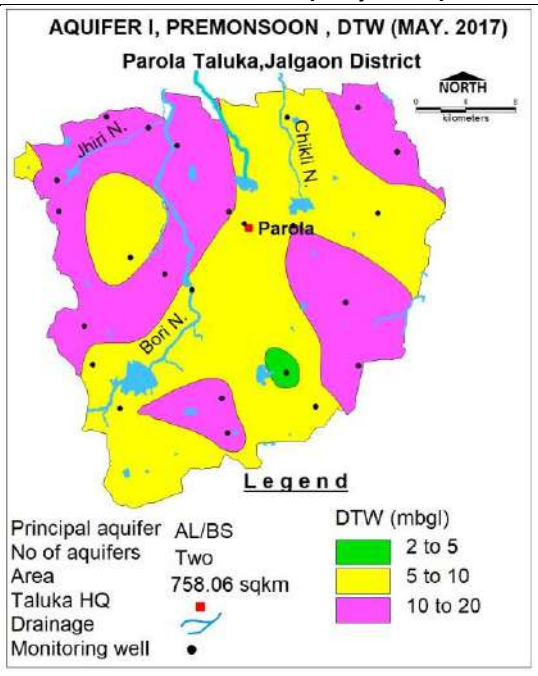
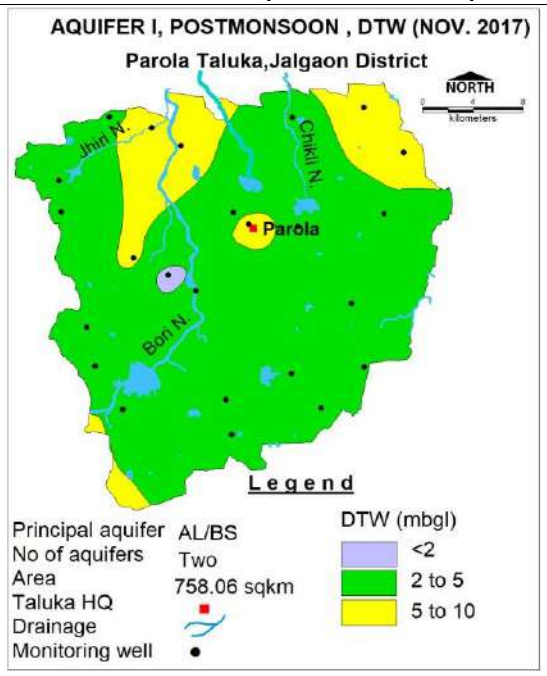
Rainfall Trend Analysis (1901 to 2017)

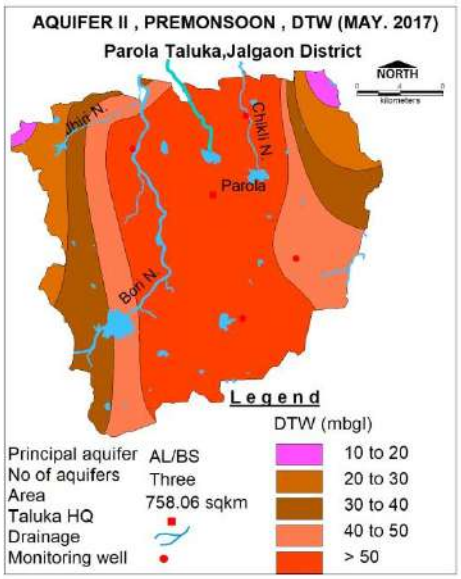
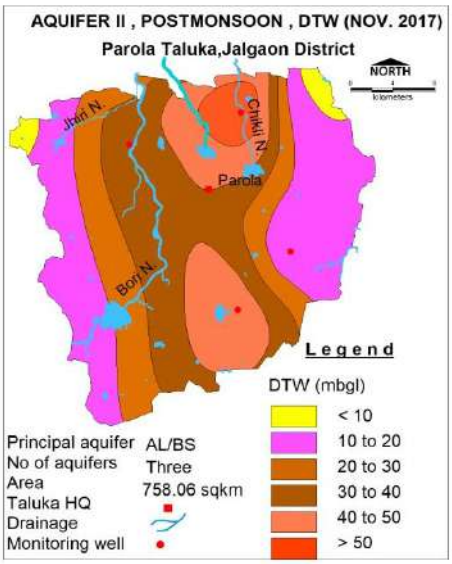
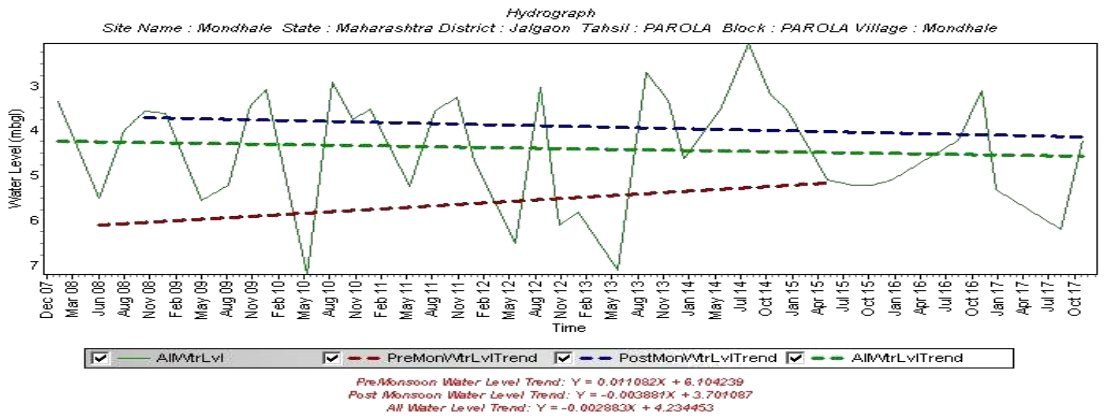


EQUATION OF TREND LINE: Y= 0.5252X +677.82

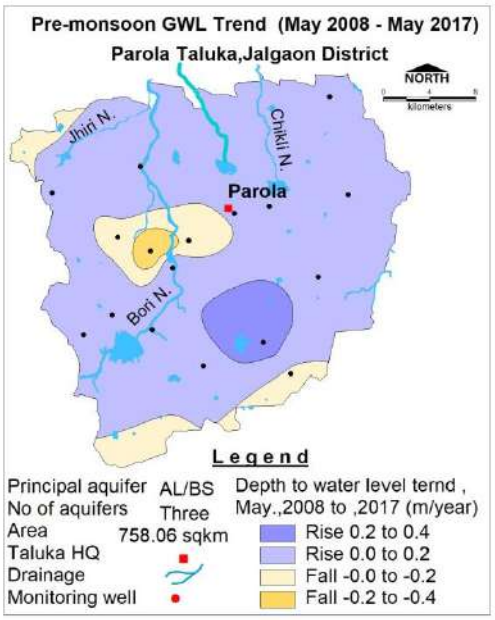
1.3. Geomorphology, Soil & Geology	
Geomorphic Unit	Plateau (Slightly Dissected to highly Dissected) with weathered thickness ranging from 0 to 2 m. Alluvial Plain (Younger and Older)
Soil	Slightly to moderately deep clay and sand rich soil
Geology	• Alluvium (Sand/ Silt/Clay Dominant). Age: Recent to Sub-recent • Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene
1.4.Hydrology & Drainage	
Drainage	Bori and Chikhli River

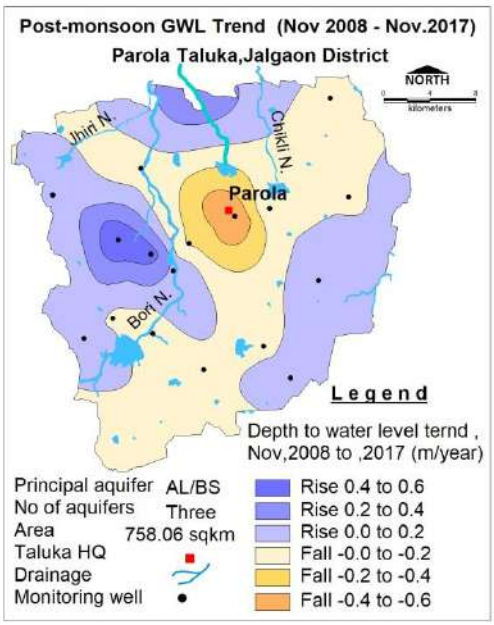
Hydrology		**Major project**	**Completed -02 (Bhokarbari and Bori projects)** **Command Area :2388 and 9007 ha**
		Bigger Minor Irrigation Project (>100 Ha.)	**Completed**: - 2 medium projects
		Minor Irrigation Project (<100 Ha.)	02 project: Command area 21.25 ha
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		758.06 Sq. Km.	
Forest Area		106.40 Sq. Km.	
Cultivable Area		630.13 Sq. Km.	
Net Sown Area		536.08 Sq. Km.	
Double Cropped Area		6.66 Sq. Km.	
Area under Irrigation	Surface Water	81 Sq. Km.	
	Ground Water	40.22 Sq. Km.	
Area under Drip & Sprinkler Irrigation		16.88 Sq. Km.	
Principal Crops		**Crop Type**	**Area (Sq. Km.)** *(Reference year 2013-14)*
		Cereals	125.72
		Cotton	83.89
		Pulses	40.30
		Oil Seeds	8.26
		Sugarcane	0.57
Horticultural Crops		Banana	1.10
		Citreous fruit	0.54
		Others	0.80
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 is observed over a major part of the block while water level in the	Water Level less than 10 mbgl is observed in entire block while water level in the range of 2

range of 10 to 20 mbgl is observed in isolated parts of the block.	to 5 mbgl covers the major part of the block.
1.6.2 Aquifer-II/ Deeper Aquifer	
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
Water level between 10 to 20 mbgl is observed in small patches in north-eastern and north-western part of the block; water level > 20 mbgl has been observed in major part of the block. Deeper water level i.e., >50 mbgl is observed in central part of the block.	Water level less than 20 mbgl is observed in eastern and western peripheral parts of the block while water level between 20 to 40 mbgl are observed covering major parts in central area of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov. 2017)**
	
1.7. Hydrograph	
	
Hydrograph shows pre-monsoon rising trend @ 0.1311 m/year and post-monsoon declining trend @ 0.0459 m/year	
1.8 Water Level Trend (Aquifer-I/ Shallow aquifer)	
Pre-Monsoon trend (2008-17) Rising 0.0193 to 0.3137 m/year Falling 0.0243 to 0.3812 m/year	**Post-Monsoon trend (2008-17)** Rising 0.0677 to 0.4809 m/year Falling 0.0084 to 0.5310 m/year
Rising water level trend up to 0.2 m/year is observed in major part of the block while rising trend > 0.2 m/year is observed as isolated patch in southern part of the block. Declining	Rising water level trend up to 0.2 m/year is observed in large part of the block while declining trend up to 0.2 m/year is observed in equally large part of the block.

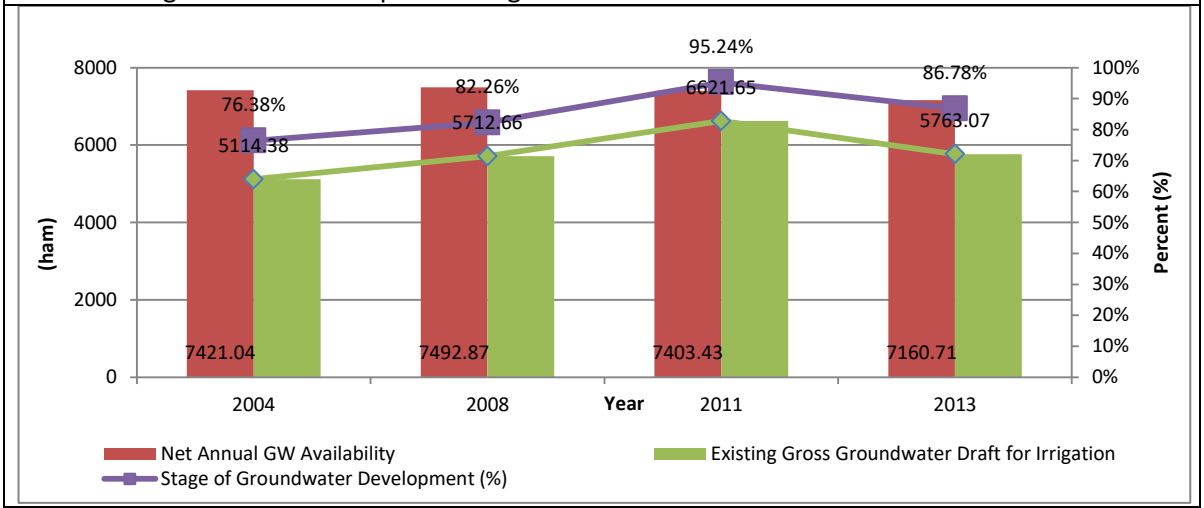
trend up to 0.2 m/year is observed in very small isolated parts of the block.

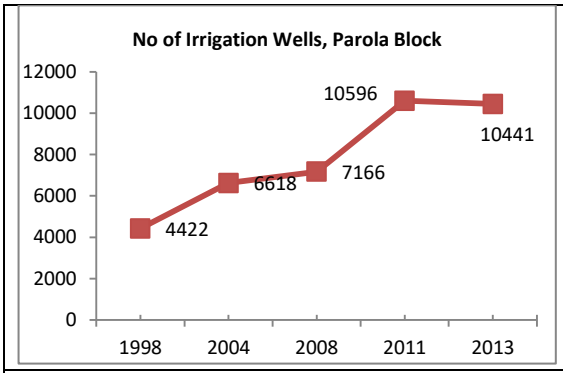


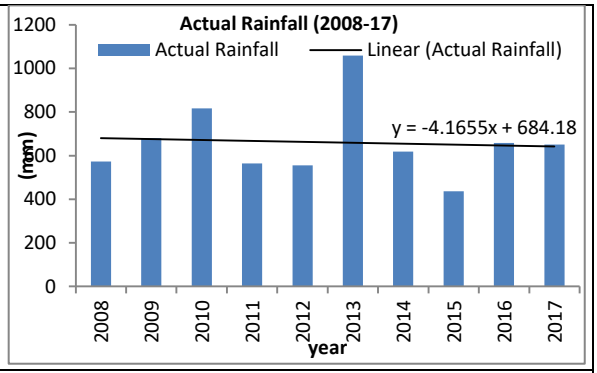


2. GROUND WATER ISSUES

- Declining Water Level trend is observed in 411.52 sq. km. area; covering 54.28 % area of the block.
- Major part of the block has low yield potential (< 25 m^3/day).
- Exploitation of ground water resources mainly for irrigation is indicated by rising draft and growing number of Irrigation Wells results in increased in Stage of Ground Water Development Over the period.
- Declining rainfall with Frequent Droughts.



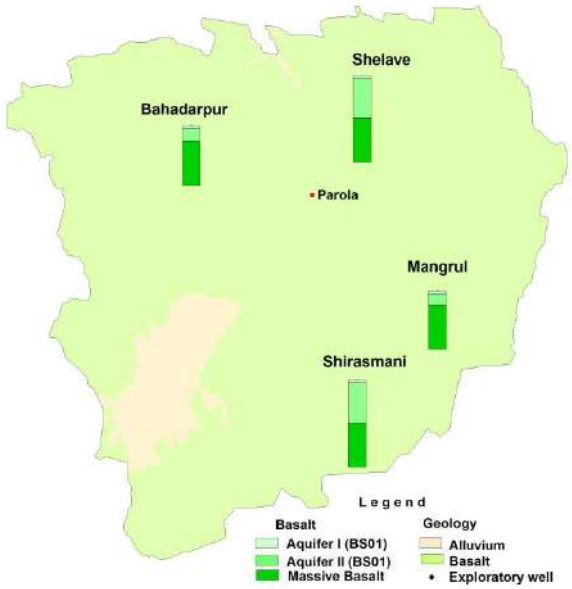




3. AQUIFER DISPOSITION

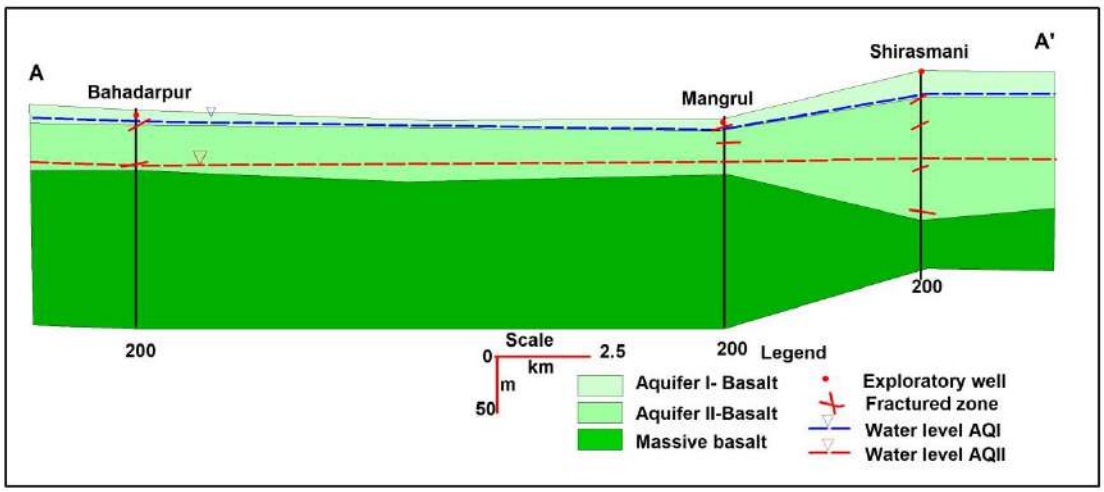
3.1. Number of Aquifers	Basalt –Aquifer-I, Aquifer-II Alluvium- Aquifer-I

3.2. Lithological Disposition



3.3. Cross Sections

Section AA'



3.4. Basic Aquifer Characteristics

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

Confined)		/confined)	
SWL (mbgl)	4.4-20	35-78	4-15
Depth of Occurrence (mbgl)	10-35	50-200	5-20
Granular/Weathered/ Fractured rocks thickness (m)	5-30	1-8	10-15
Yield	<10-50m^3/day	0-1.5	50-100m^3 /day
Specific yield/ Storativity (S)	0.02	0.0003 -0.00021	0.06-0.08 (Clayey to Sandy)
Transmissivity (T)	10-35	14-40	-

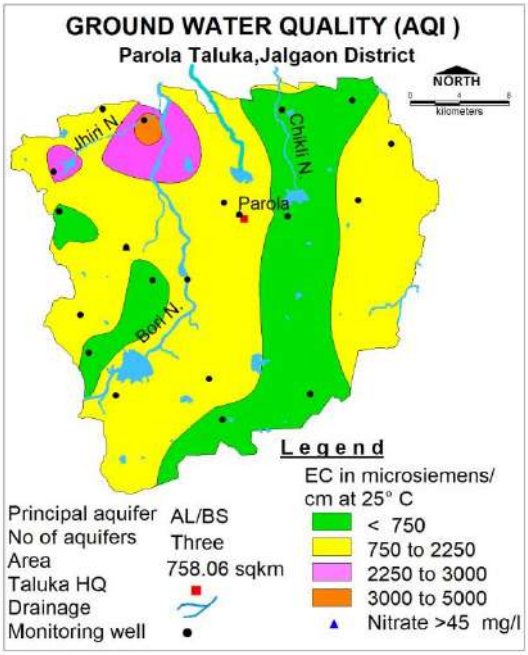
4. GROUND WATER QUALITY

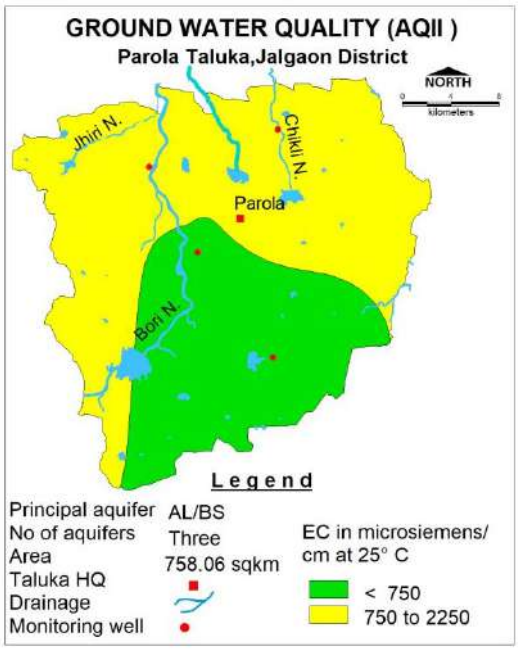
4.1 Aquifer-I/ Shallow Aquifer

EC > 2250 µS/cm has been observed as isolated patch in north western part of the block; A large part of the block is covered by the EC ranging up to 2250 µS/cm. Major part of the area is covered by the EC varying between 750 to 2250 µS/cm. Over major part of block ground water is suitable for drinking as well as irrigation purposes. Few villages are affected by Nitrate contamination.

4.2 Aquifer-II/ Deeper Aquifer

EC < 750 µS/cm has been observed in southern part of the block; A large part of the block is covered by the EC ranging between 750 and 2250 µS/cm in the northern half of the block. Ground water is suitable for drinking as well as irrigation purposes.





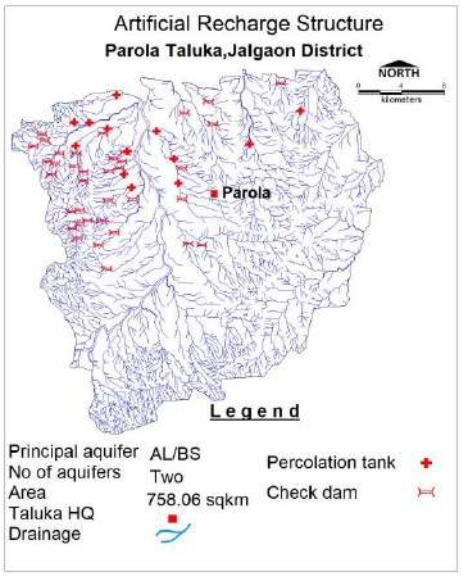
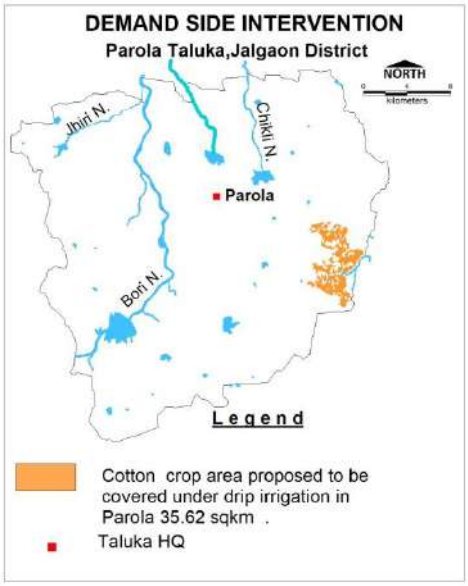
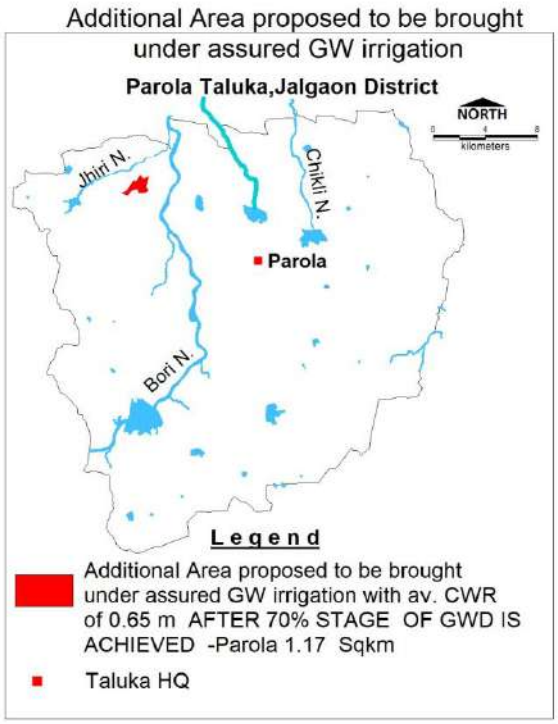
5. GROUND WATER RESOURCE

5.1 Aquifer-I/ Shallow Aquifer (Basalt)

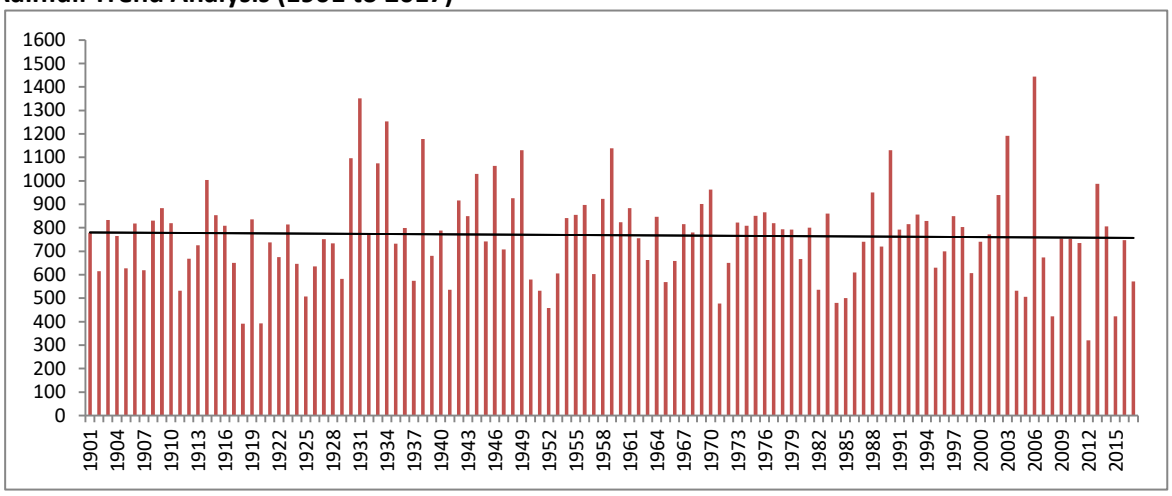
Ground Water Recharge Worthy Area (Sq. Km.)	711.60
Total Annual Ground Water Recharge (MCM)	75.37
Natural Discharge (MCM)	3.76
Net Annual Ground Water Availability (MCM)	71.60
Existing Gross Ground Water Draft for irrigation (MCM)	57.63
Existing Gross Ground Water Draft for	4.50

domestic and industrial water supply (MCM)					
Existing Gross Ground Water Draft for All uses (MCM)			62.13		
Provision for domestic and industrial requirement supply to 2025(MCM)			6.01		
Net Ground Water Availability for future irrigation development (MCM)			10.47		
Stage of Ground Water Development %			86.78		
Category			**Semi Critical**		
5.2 Aquifer-II/ Deeper Aquifer (Basalt)					
Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av(Sy/S)	Peizometric Head (m above confining layer)		Total Resource (MCM)
758.62	5.62	0.005	10-15		12.82
6.0. GROUND WATER RESOURCE MANAGEMENT					
Available Resource (MCM)			71.61		
Gross Annual Draft (MCM)			62.14		
6.1. Supply Side Management					
SUPPLY (MCM)					
Agricultural Supply -GW			57.63		
Agricultural Supply -SW			105.7		
Domestic Supply - GW			4.51		
Domestic Supply - SW			1.1275		
Total Supply			**168.9675**		
Area of Block (Sq. Km.)			758.06		
Area suitable for Artificial recharge (Sq. Km)			355.03		
Type of Formation			Hard Rock	Soft Rock	
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)			355.22	0	
Volume of Unsaturated Zone (MCM)			710.44	0	
Average Specific Yield			0.020	0.070	
Volume of Sub surface Storage Space available for Artificial Recharge (MCM)			14.21	0	
Surplus water Available (MCM)			3.703	0	
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)
Number of Structures			13	37	0
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			1.95	0.83	0.00
Proposed Structures					
RTRWH Structures – Urban Areas					
Households to be covered (25% with 50 m^2area)			10,000		
Total RWH potential (MCM)			0.46		
Rainwater harvested / recharged @ 80% runoff co-efficient			0.368 **Economically not viable & Not Recommended**		
6.2. Demand Side Management					
Micro irrigation techniques					

Micro Irrigation Techniques in 50% of Cotton cropped area proposed to be covered under Drip (sq.km.)	35.62
Volume of Water expected to be saved (MCM). Surface Flooding req- 0.815 m. Drip Req. - 0.511, WUE- 0.304 m	10.82
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)	71.62
Additional GW resources available after Supply side interventions (MCM)	2.78
Ground Water Availability after Supply side intervention	74.4
Existing Ground Water Draft for all uses (MCM)	62.14
GW draft after Demand Side Interventions (MCM)	51.31
Present stage of Ground Water Development (%)	86.78
Expected Stage of Ground Water Development after interventions (%)	68.97
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	0.8
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	5
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available)	46
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	1.17
Regulatory Measures	**60 m borewell/tube well**

Supply side Interventions	**Demand side Interventions**
Proposed AR Structures	**Additional area to be bought under assured GW Irrigation**
	
Expected Benefits:Additional area to be bought under assured GW Irrigation	
	

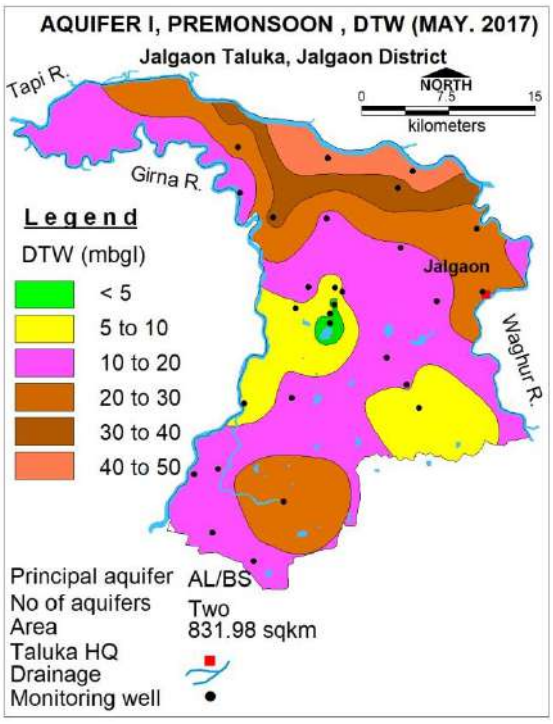
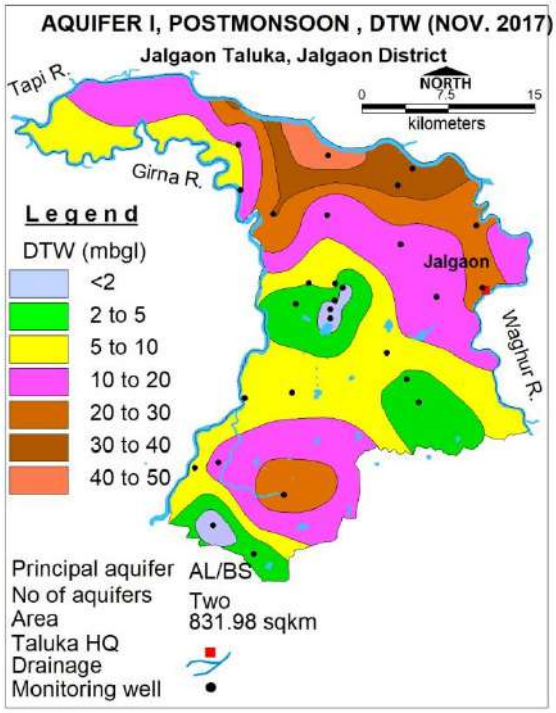
14.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, JALGAON BLOCK, JALGAON DISTRICT, MAHARASHTRA

1.0 SALIENT FEATURE		
1.1 Introduction		
Block Name	Jalgaon	
Geographical Area (Sq. Km.)	831.98 Sq. Km.	
Hilly Area (Sq. Km)	Nil	
Population (2011)	6,76,041	
Climate	Tropical Monsoon	
1.2 Rainfall Analysis		
Normal Rainfall	781.9 mm	
Annual Rainfall (2017)	571.5 mm	
Decadal Average Annual Rainfall (2008-17)	654.01 mm	
Long Term Rainfall Analysis (1901-2017)	Falling Trend 0.20 mm/year. Probability of Normal/Excess Rainfall- 70 % & 13%. Probability of Drought (Moderate/Severe)-: 16 % Moderate & 1% Severe	
Rainfall Trend Analysis (1901 to 2017)  *EQUATION OF TREND LINE: Y = -0.2013X + 780.39*		
1.3. Geomorphology, Soil & Geology		
Geomorphic Unit	Plateau (Slightly dissected to highly dissected) with weathered thickness ranging from 0 to 5 m. Alluvial Plain (Younger and Older)	
Soil	Shallow to deep Clay rich soil.	
Geology	• Alluvium (River Alluvium) Age: Recent to Sub-recent • Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene	
1.4. Hydrology & Drainage		
Drainage	Tapi River and its tributaries Waghur and Girna rivers	
Hydrology	Major Project	03 projects; Aner, Girna, Panjan and Waghur projects Command Area:8813 ha, 1065 ha, 28702 ha,

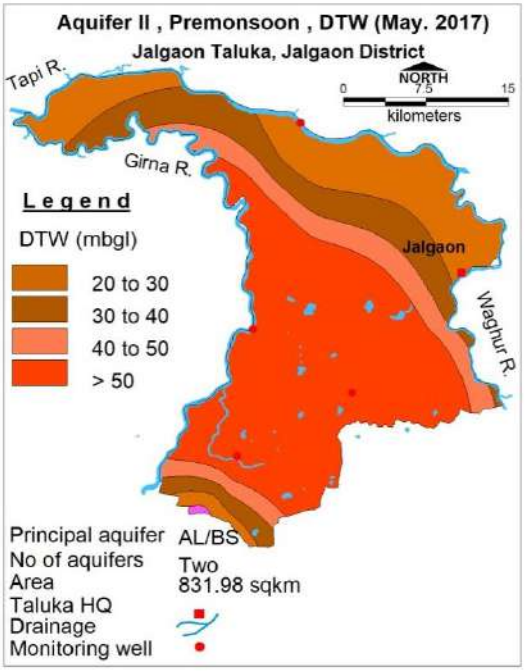
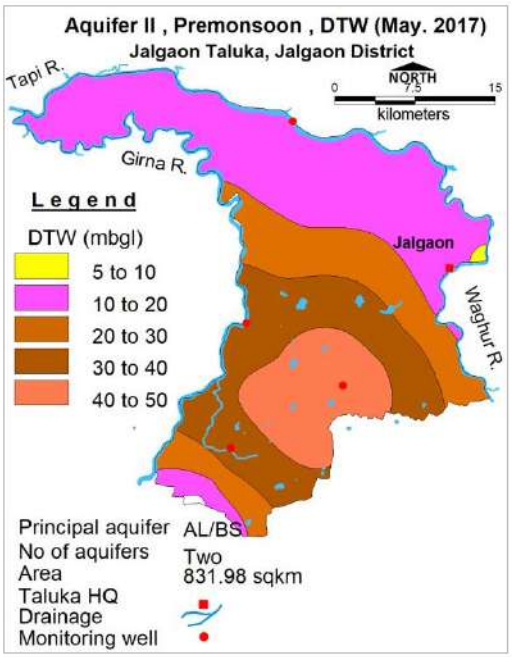
		34403 ha respectively
	Minor Irrigation Project	02 projects, Command area 20 ha
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern		
Geographical Area	831.98 Sq. Km.	
Forest Area	188.95 Sq. Km.	
Cultivable Area	598.98 Sq. Km.	
Net Sown Area	535.74 Sq. Km.	
Double Cropped Area	58.45 Sq. Km.	
Area under Irrigation – Surface Water	137 Sq. Km	
Area under Irrigation – Ground Water	26.08 Sq. Km.	
Area under Drip & Sprinkler Irrigation	2.68 Sq. Km.	
Principal Crops	**Crop Type**	**Area (Sq. Km.)** *(Reference year 2013-14)*
	Cotton	232.10
	Pulses	207.43
	Cereals	98.98
	Oil Seeds	38.66
	Sugarcane	4.82
Horticultural Crops	Banana	35.04
	Citreous fruit	0.74
	Others	0.83

1.6.Water Level Behaviour

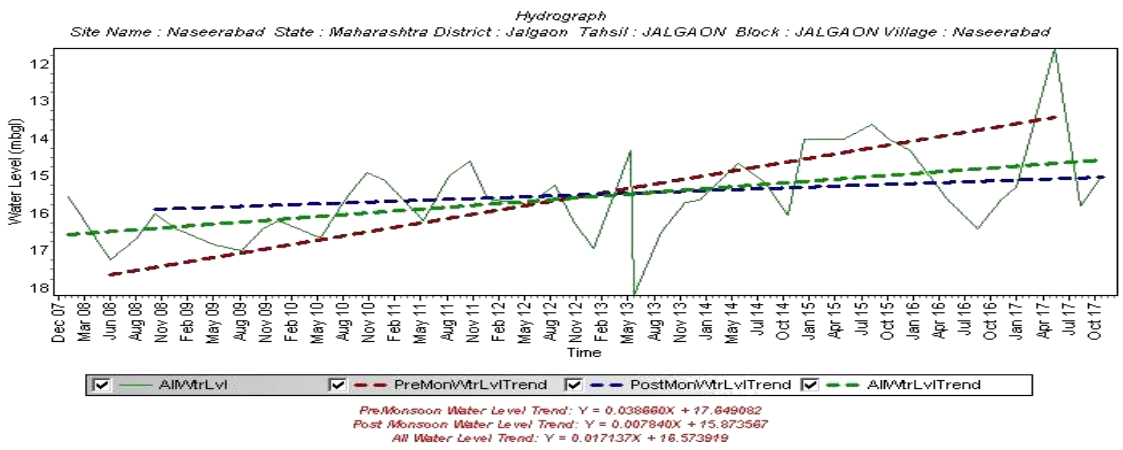
1.6.1 Aquifer-I/ Shallow Aquifer

Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
	
Water levels between 10 to 40 mbgl are observed covering major part of the block while water level <10 mbgl is observed in small isolated patches in north-eastern and western part of the block.	Water levels between 2 to 40 mbgl are observed covering entire extent of the block while water levels up to 20 mbgl are observed covering major parts of the block.

1.6.2 Aquifer-II/Deeper Aquifer

Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water level between 20 to 50 mbgl is observed in northern and southern peripheries of the block while water level more than 50 mbgl is observed in major part of the block.	Water level less than 20 mbgl is observed in northern and southern peripheries of the block while water level between 10 to 20 mbgl is observed in major part of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov 2017)**
	

1.7. Hydrograph



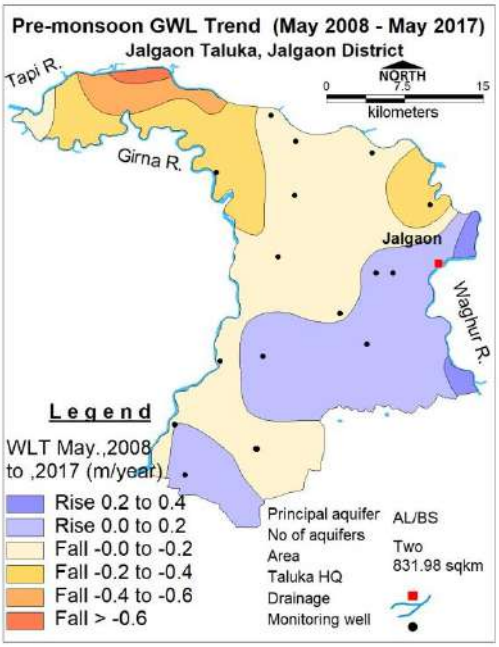
Hydrograph shows pre-monsoon and post monsoon rising water level trend @ 0.4572m/year and @ 0.0927 m/year respectively.

1.8 Water Level Trend Aquifer-I/ Shallow Aquifer

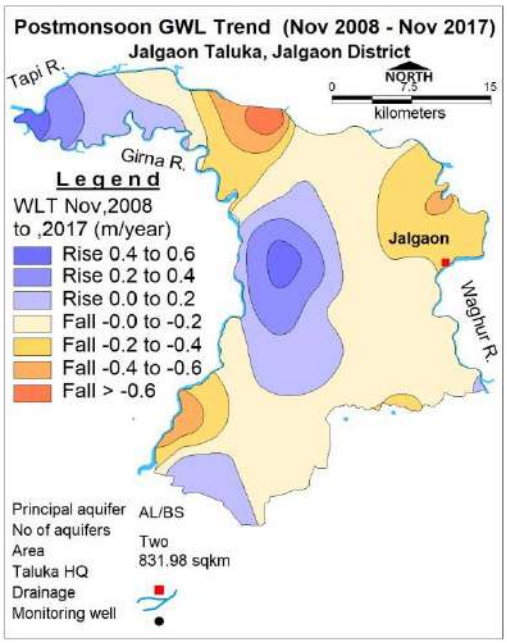
Pre-Monsoon trend (2008-17)	**Post -Monsoon trend (2008-17)**
Rising 0.0206 to 0.1725 m/year Falling 0.030 to 0.3329 m/year	Rising 0.0154 to 0.4466 m/year Falling 0.747 to 0.0230 m/year
Rising water level trend up to 0.2 m/year is observed as continuous patch from west to east. Declining trend up to 0.2 m/year is observed over the major part of the block and more than 0.2 m/year has been observed in	Declining water level trend up to 0.2 m/year is observed in major parts of the block and more than 0.2 m/year is observed in isolated patches.

small parts in north western part of the bock.

Premonsoon Water Level Trend (2008-17)

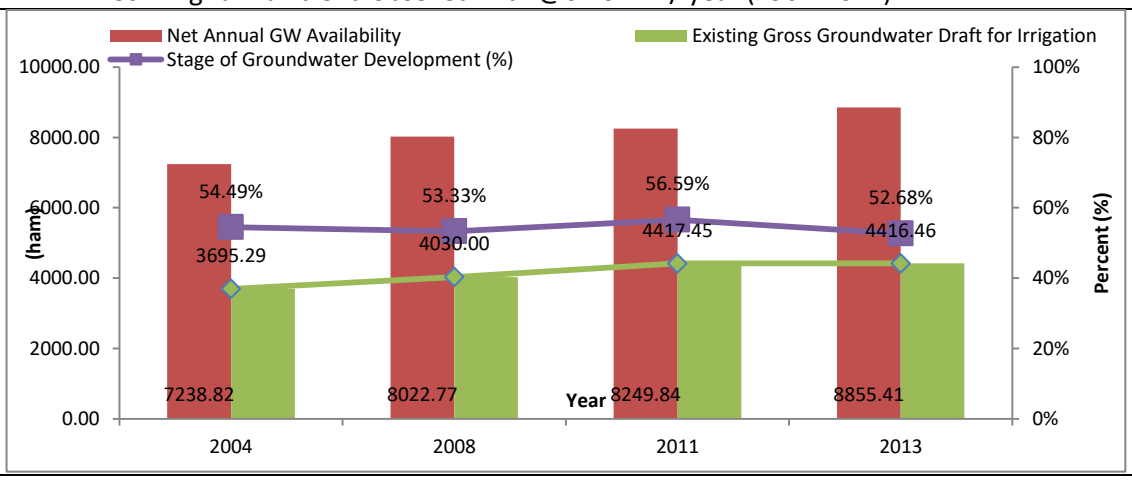


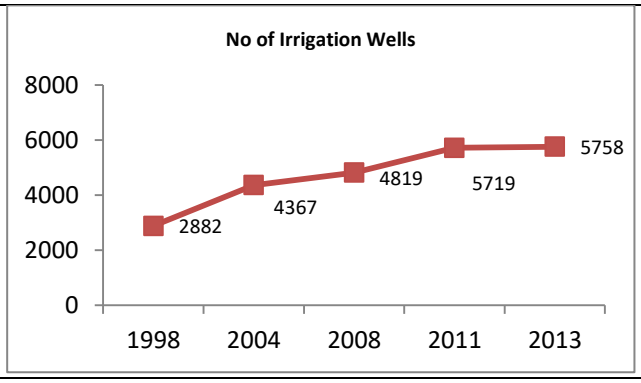
Postmonsoon Water Level Trend (2008-17)



3. GROUND WATER ISSUES

- Ground Water based Banana cultivation, a water intensive crop, in 35.04 Sq Km areas resulting in increased number of irrigation wells and consequential increased ground water draft.
- Declining Water Level trend is observed in 567.44 sq. km covering about 68.2% area of the entire block.
- Duribg post monsoon Deeper Water level >20 mbgl is observed in about 184 sq km (22.11 %) area.
- Declining rainfall trend obseved with @0.20 mm/ year (1901-2017)

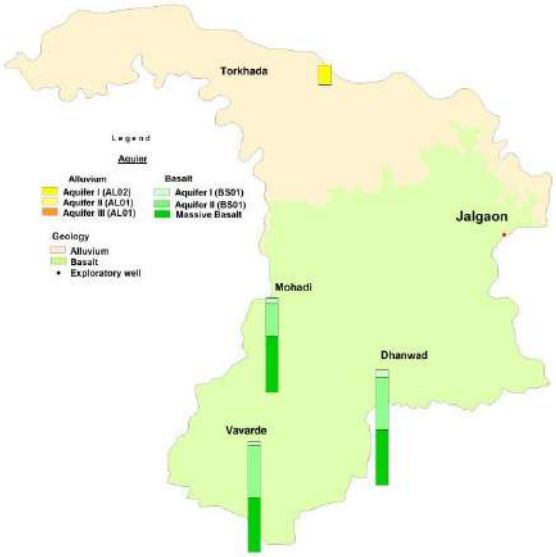




3. AQUIFER DISPOSITION

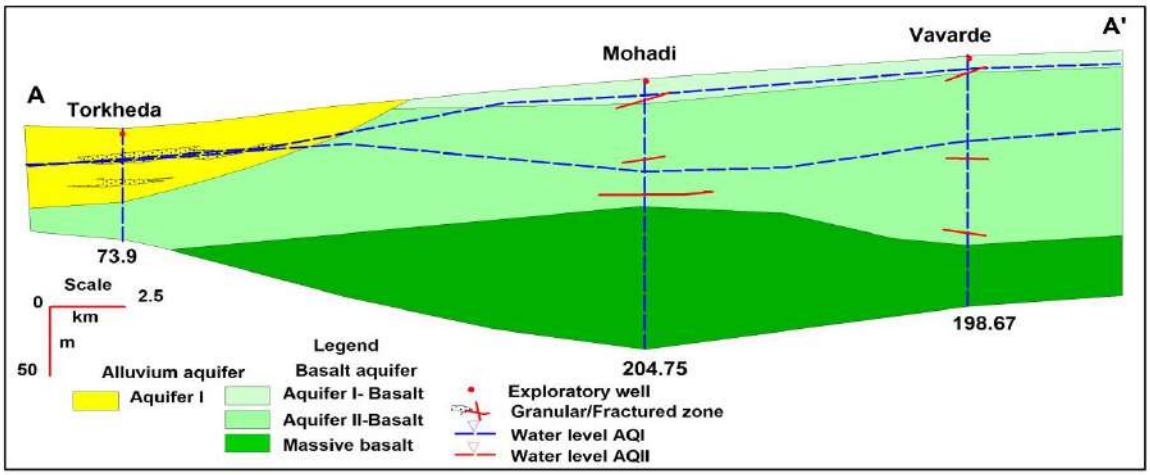
3.1. Number of Aquifers	• Basalt –Aquifer-I, Aquifer-II • Alluvium- Aquifer-I

3.2. Lithological Disposition



3.3. Cross Sections

Section AA'



3.4. Basic Aquifer Characteristics

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

		/confined)	
SWL (mbgl)	1-24.95	35-88	9.55-50
Depth of Occurrence (mbgl)	9-35	20-200	30-79.92
Granular/Weathered/ Fractured rocks thickness (m)	5-24	1-12	10-60
Yield	<10-200 m3/day	0-5 lps	50-400 m3/day
Specific yield/ Storativity (S)	0.018-0.02	0.000057	0.06-0.08
Transmissivity (T)	10-45	15-35	25-100

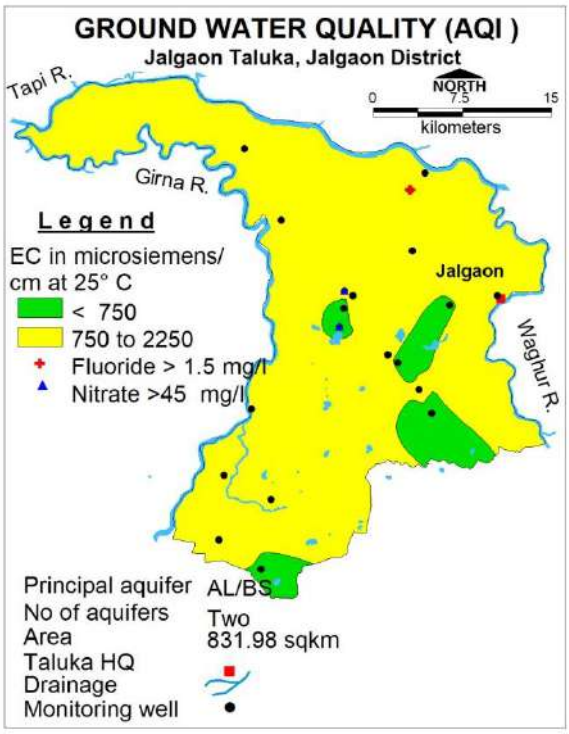
4. GROUND WATER QUALITY

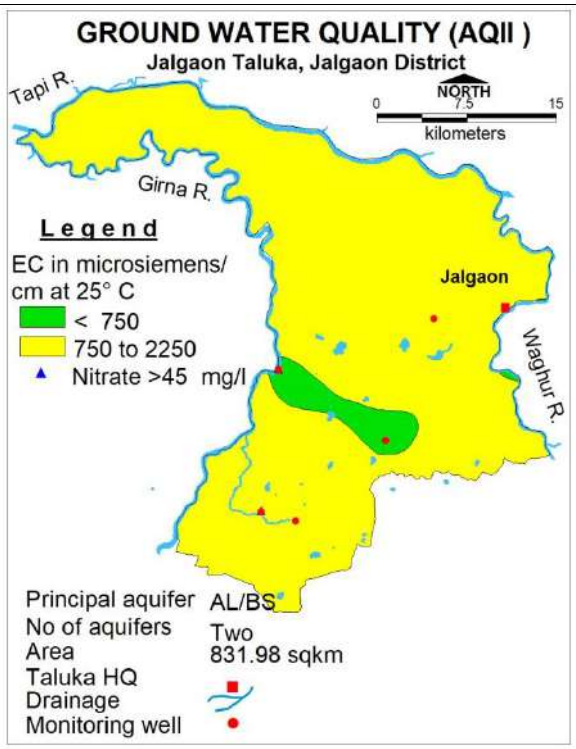
4.1 Aquifer-I/ Shallow Aquifer

EC ranges up to 2250 µS/cm have been observed over the entire block. In major part of the block EC values vary between 750 to 2250 µS/cm; EC less than 750 µS/cm is observed in small isolated patches. Ground water is suitable for dinking as well as irrigation purposes Fluoride and Nitrate and Fluoride contamination is observed in few villages.

4.2 Aquifer-II/ Deeper Aquifer

EC ranges up to 2250 µS/cm have been observed over the entire block. In major part of the block EC values vary between 750 to 2250 µS/cm; EC less than 750 µS/cm is observed in small isolated patches. Ground water is suitable for dinking as well as irrigation purposes. Nitrate and Fluoride contamination is observed in few villages.





5. GROUND WATER RESOURCE & EXTRACTION

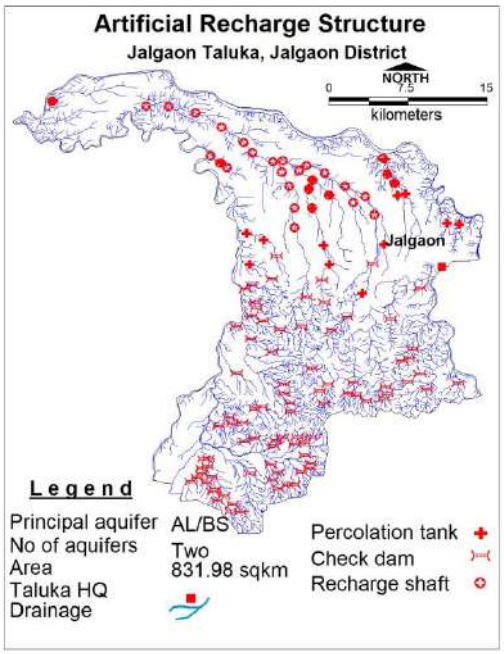
5.1 Aquifer-I/ Shallow Aquifer (Basalt & Alluvium)

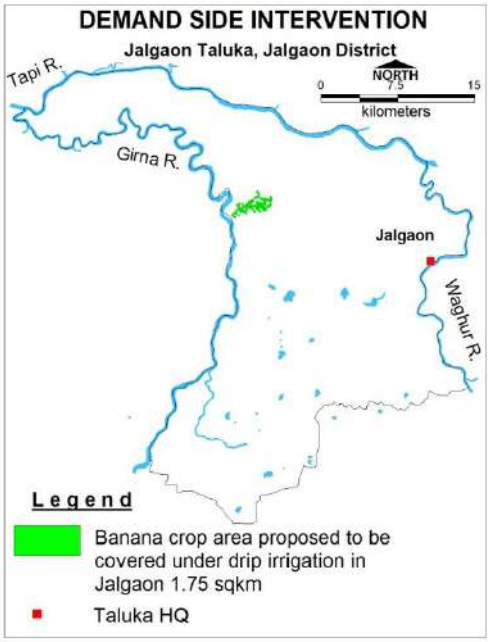
Ground Water Recharge Worthy Area (Sq. Km.)	831.98
Total Annual Ground Water Recharge (MCM)	93.21
Natural Discharge (MCM)	4.66
Net Annual Ground Water Availability (MCM)	88.55

Existing Gross Ground Water Draft for irrigation (MCM)			44.16			
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			2.48			
Existing Gross Ground Water Draft for All uses (MCM)			46.64			
Provision for domestic and industrial requirement supply to 2025(MCM)			5.01			
Net Ground Water Availability for future irrigation development (MCM)			39.25			
Stage of Ground Water Development %			52.68			
Category			**SAFE**			
5.2 Aquifer-II/Deeper Aquifer (Basalt & Alluvium)						
Aquifer	Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)	
Basalt	828.09	4.64	0.005	10-20	14.45	
Alluvium	3.2	10	0.05	70	1.635	
6.0. GROUND WATER RESOURCE MANAGEMENT						
Available Resource (MCM)			88.55			
Gross Annual Draft (MCM)			46.65			
6.1. Supply Side Management						
SUPPLY (MCM)						
Agricultural Supply -GW			44.16			
Agricultural Supply -SW			267.00			
Domestic Supply - GW			2.48			
Domestic Supply - SW			0.62			
Total Supply			**314.26**			
Area of Block (Sq. Km.)			831.98			
Area suitable for Artificial recharge (Sq. Km)			822.55			
Type of Formation			Hard Rock		Soft Rock	
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)			513.051		309.5	
Volume of Unsaturated Zone (MCM)			1026.10		619.00	
Average Specific Yield			0.02		0.07	
Volume of Sub surface Storage Space available for Artificial Recharge (MCM)			20.52		43.33	
Surplus water Available (MCM)			5.349		3.227	
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)		Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)
Number of Structures			21		86	30
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			3.15		1.935	1.35

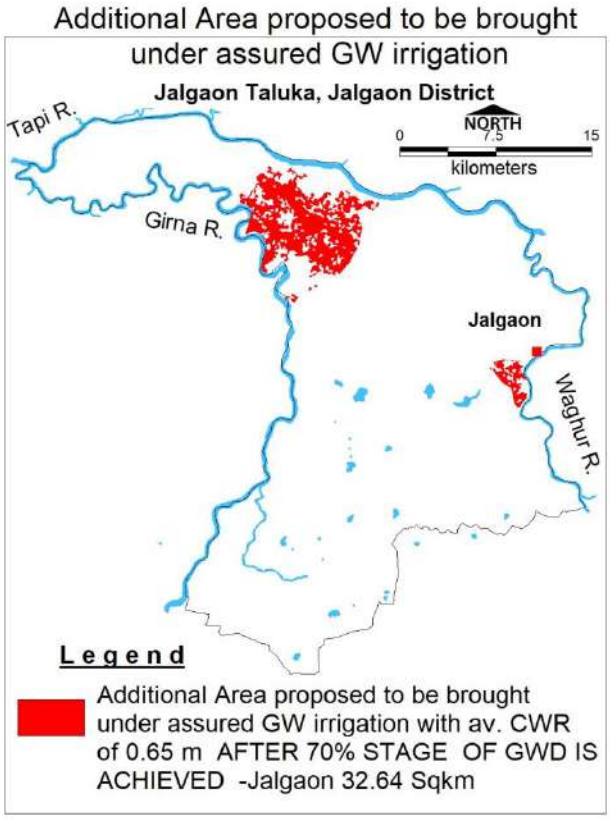
Proposed Structures	
RTRWH Structures – Urban Areas	
Households to be covered (25% with 50 m^2area)	36,600
Total RWH potential (MCM)	0.94428
Rainwater harvested / recharged @ 80% runoff co-efficient	0.7554 **Economically not viable & Not Recommended**
6.2. Demand Side Management	
Micro irrigation techniques	
Banana crop Area (sq km) proposed to be covered under Drip	1.75
Volume of Water expected to be saved through drip (MCM). Surface Flooding req- 1.76 m. Drip Req. - 0.97, WUE- 0.79 m	1.3825
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)	88.55
Additional GW resources available after Supply side interventions (MCM)	6.437
Ground Water Availability after Supply side intervention	94.985
Existing Ground Water Draft for All Uses (MCM)	46.65
GW draft after Demand Side Interventions (MCM)	45.27
Present stage of Ground Water Development (%)	52.68
Expected Stage of Ground Water Development after interventions (%)	47.66
Other Interventions Proposed, if any	
Alternate Water Sources Available	Nil
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	21.21
Proposed Number of DW (@ 1.5 ham for 90% of GWR Available)	141
Proposed Number of BW (@ 1.5 ham for 10% of GWR Available)	1273
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	32.64
Regulatory measures	**80 borewells/ tubewells**

Supply Side interventions	Demand Side interventions
Proposed AR Structures	**Additional area proposed to be bought under assured GW irrigation**





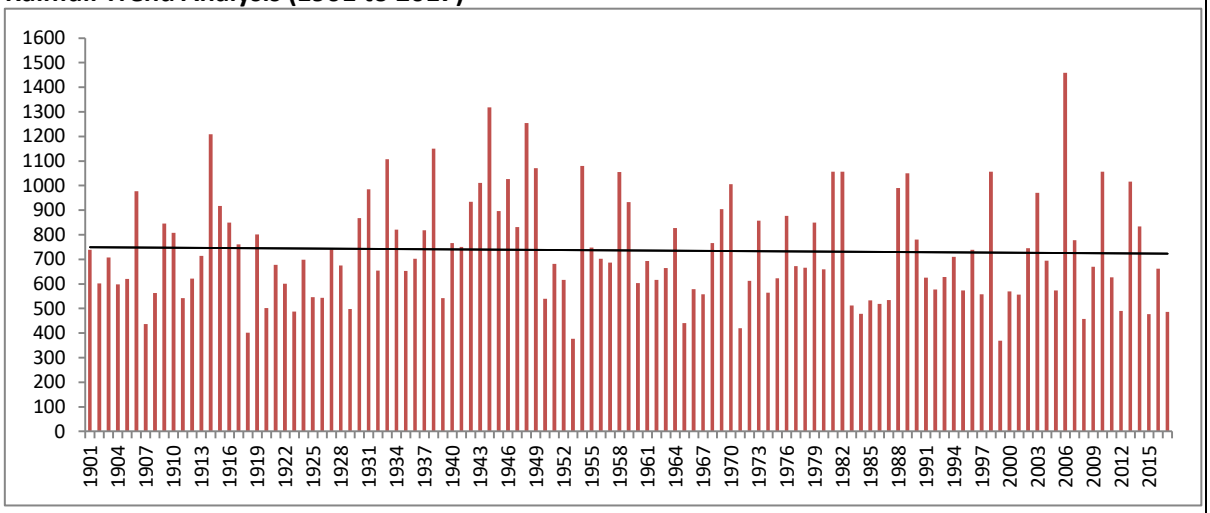
Expected benefits:
Additional area proposed to be bought under assured GW irrigation



15.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, YAWAL BLOCK, JALGAON DISTRICT, MAHARASHTRA

1.0 SALIENT FEATURE	
1.1 INTRODUCTION	
Block Name	Yawal
Geographical Area (Sq. Km.)	913.50 Sq. Km.
Hilly Area (Sq. Km)	75.81 Sq. Km.
Poor Ground Water Quality (Sq. Km.)	Nil
Population (2011)	2,72,242
Climate	Tropical Monsoon
1.2 Rainfall Analysis	
Normal Rainfall	854.1 mm
Annual Rainfall (2017)	783.8 mm
Decadal Average Annual Rainfall (2008-17)	683.22 mm
Long Term Rainfall Analysis (1901-2017)	Falling Trend 0.22 mm/year. Probability of Normal/Excess Rainfall- 59 % & 21%. Probability of Drought (Moderate/Severe)-: 20 % Moderate

Rainfall Trend Analysis (1901 to 2017)



EQUATION OF TREND LINE: Y= -0.2233x+749.94

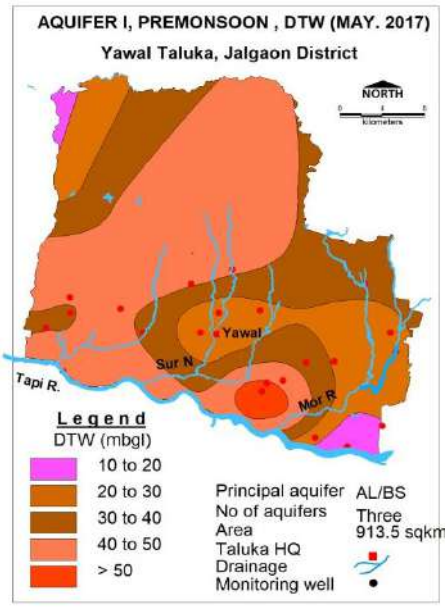
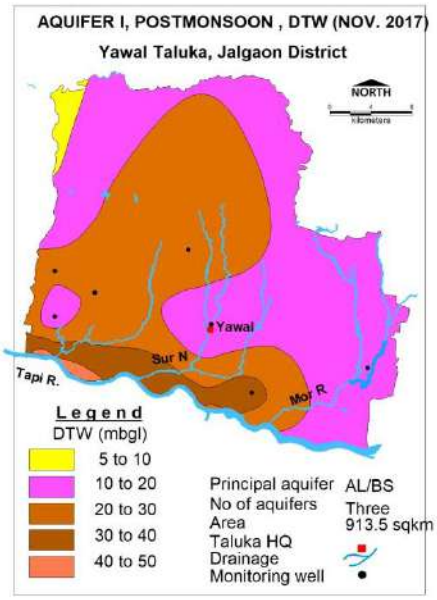
1.3. Geomorphology, Soil & Geology

Geomorphic Unit	Deccan trap Plateau (highly dissected) belongs to Satpuda Group, Nagartas formation in the North followed by Piedmont zone Bazada (Deep) and alluvial plains in the central and southern parts of the block.
Soil	Moderate to Very deep Clayey soil in Central and Southern part of the block and Clayey Sandy-Loamy Soil in northern part of the block.
Geology	• Alluvium (River Alluvium) Age: Recent to Sub-recent • Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene

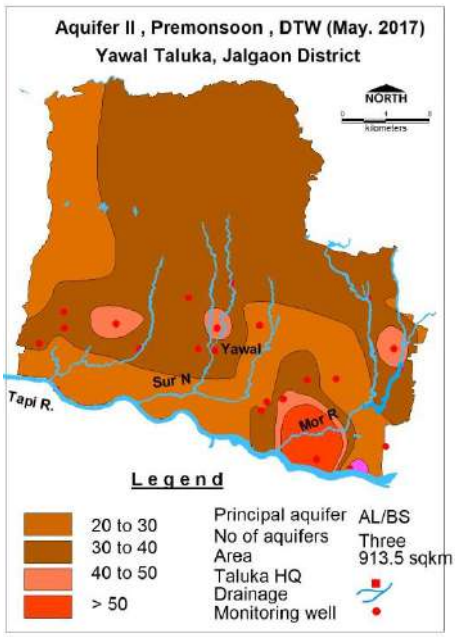
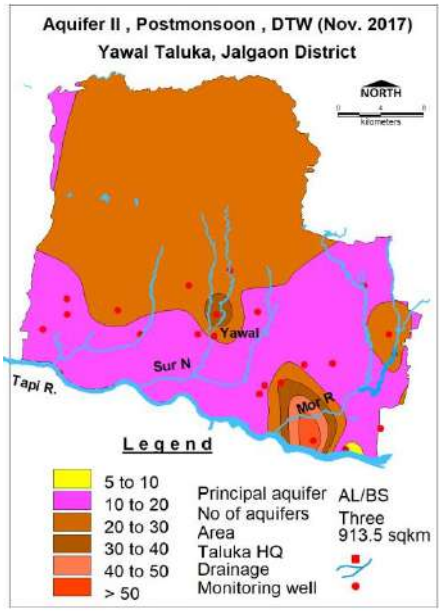
1.4. Hydrology & Drainage			
Drainage		Tapi River and its tributary Mor River; Sur and Hated Nala originate from Satpuda hill	
Hydrology		Major Project	Mor project; Command Area 3198 ha
		Medium / Irrigation Project	1 medium and 5 minor projects
		Minor Irrigation Project	34 CD, 88 Nala bunds and 06 PT
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		913.50 Sq. Km.	
Forest Area		332.93 Sq. Km.	
Net Sown Area		535.24 Sq. Km.	
Double Cropped Area		27.79 Sq. Km.	
Area under Irrigation	Surface Water	110.60 Sq. km	
	Ground Water	155.60 Sq. Km.	
Area under Drip & Sprinkler Irrigation		104.30 Sq. Km.	
Principal Crops		**Crop Type**	**Area (Sq. Km.)** *(Reference year 2013-14)*
		Cotton	180.05
		Pulses	96.40
		Cereals	58.30
		Sugarcane	24.84
		Oil Seeds	18.60
Horticultural Crops		Banana	92.85
		Citreous fruit	0.32
		Others	0.11

1.6. Water Level Behaviour

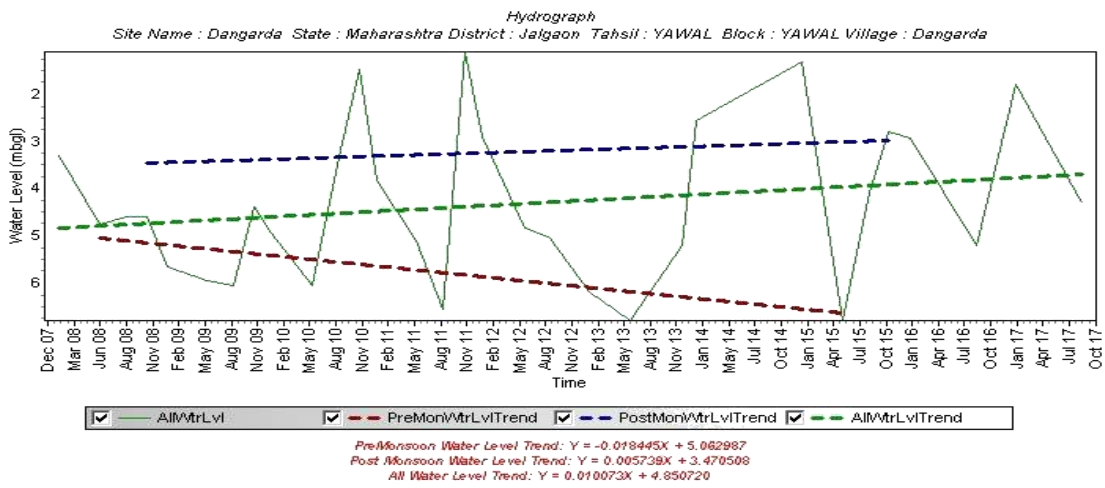
1.6.1 Aquifer-I/Shallow Aquifer

Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
	
Over the major part of the block depth to water level ranges from 20 to 50 mbgl. Water levels between 10 to 20 mbgl are observed in small isolated patches in the block.	Water levels ranging between 10 to 40 mbgl are observed in major part of the block while water level <10 mbgl is observed in small isolated parts in the block.

1.6.2 Aquifer-II/ Deeper Aquifer

Pre-Monsoon (May-2017)	Post-Monsoon (November-2017)
Water levels ranging from 20 to 50 mbgl are observed covering the entire block; while water levels between 30 to 40 mbgl are observed in large part of the block.	Water levels ranging from 10 to 40 mbgl are observed covering the entire block while water levels between 10 to 30 mbgl are observed in large part of the block.
Pre-Monsoon Water Level (May 2017)	**Post-Monsoon Water Level (Nov 2017)**
	

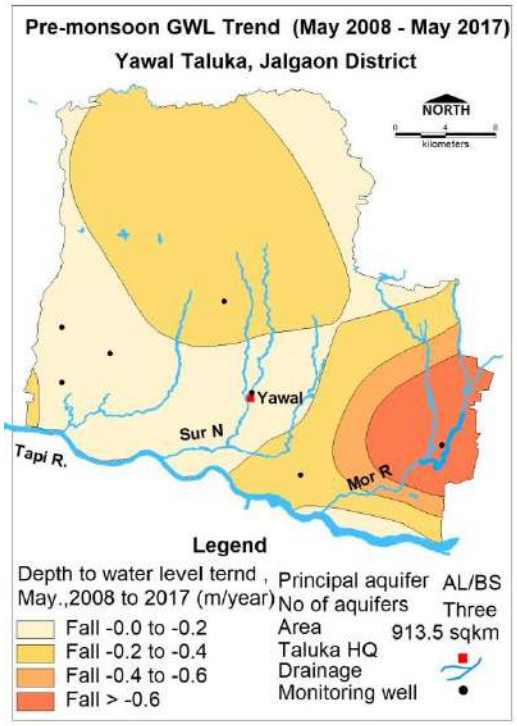
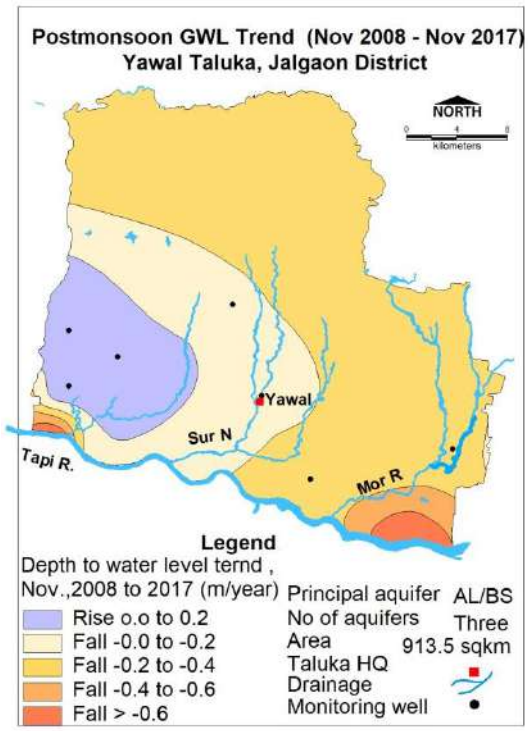
1.8. Hydrograph



Hydrograph shows premonsoon declining water level trend @ 0.2181 m/year and post monsoon Rising trend @0.0679 m/year.

1.8 Water Level Trend

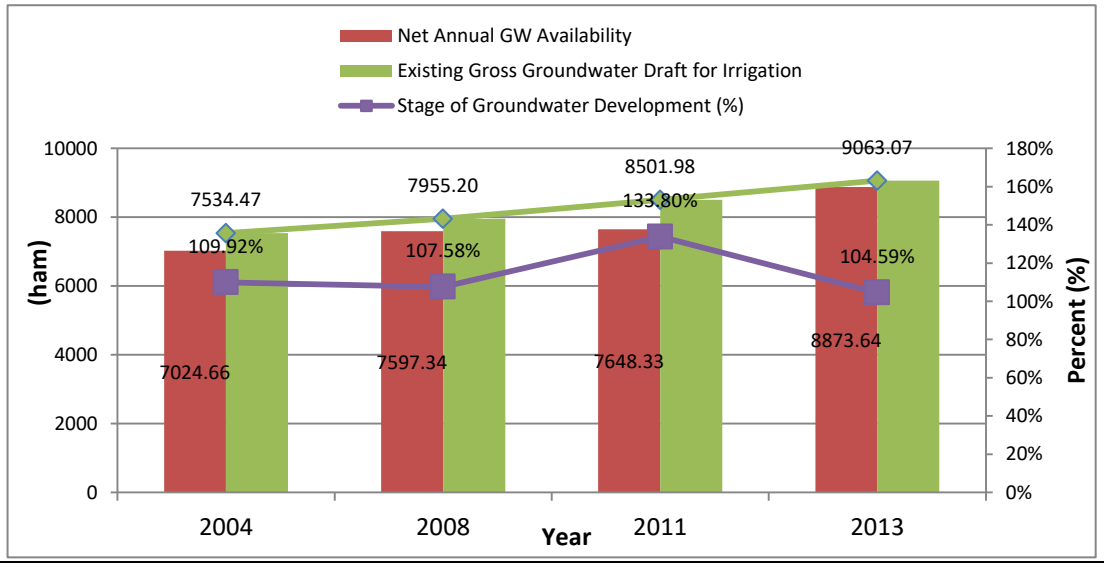
Pre-Monsoon trend	**Post -Monsoon trend**
Falling 0.03186 to 0.8868 m/year	Rising 0.17 to 0.19 m/year Falling 0.1229 to 0.31m/year
Declining trend up to 0.2 m/year is observed in northern and southern parts of the block and more than 0.2 m/year has been observed in small area in South Eastern and North Central part of the bock.	Rising Water level trend up to 0.2 m/year is observed in a small area in western part of the block and Declining water level trend up to 0.2 m/year is observed in major part of the block.

Premonsoon Water Level Trend (2007-16)	Postmonsoon Water Level Trend (2007-16)
	
Declining trend >@ 0.2 m/yr in 568.54 sq km	**Declining trend >@ 0.2 m/yr in 593.66 sq km**

2. Ground Water issues

- Ground Water based Banana cultivation, a water intensive crop, in 139.29 Sq Km area results in increase in ground water draft and consequential over-exploitation of ground water resources results in increase of Stage of Ground Water Development Over the period.
- Declining Water Level trend is observed in 811 sq. km covering almost the entire block.
- Deeper Water level >20 mbgl is observed in about 451 sq km area.
- Desaturation of granular Zone/ potential Aquifer Consisting of sand, gravel and pebbles with thin layer of Clay at Various depths.

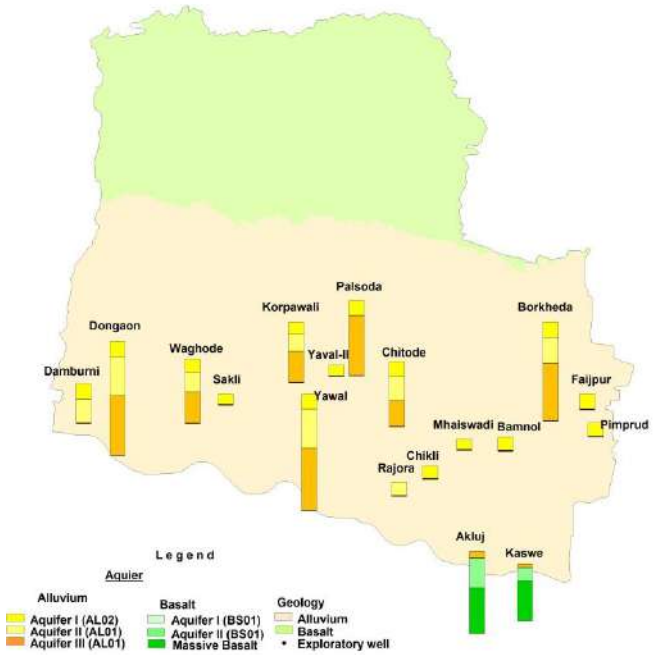
INCREASE GROUND WATER DRAFT OVER THE PERIOD



3. AQUIFER DISPOSITION

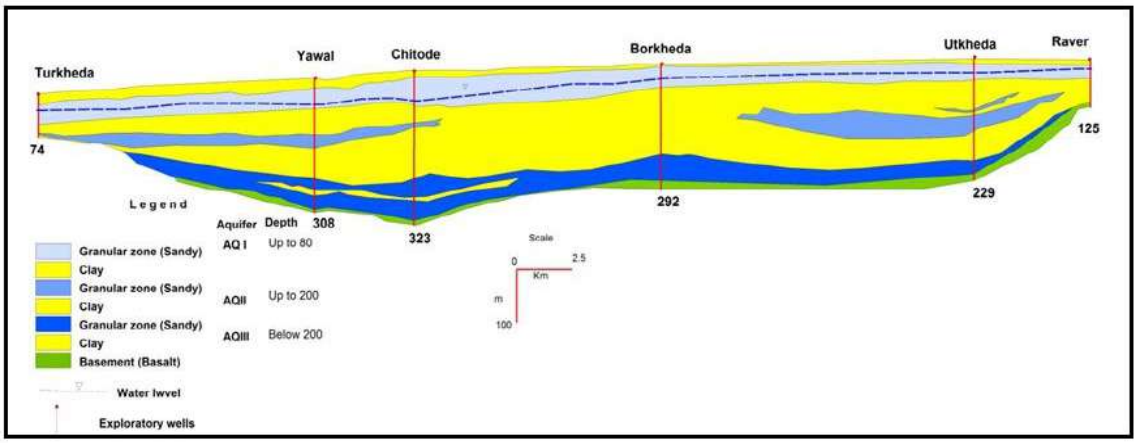
3.1. Number of Aquifers	• Basalt –Aquifer-I, Aquifer-II • Alluvium- Aquifer-I, II, & III

3.2. Lithological Disposition



3.3. Cross Sections

Section AA'



3.4. Basic Aquifer Characteristics

Major Aquifers	Basalt (Deccan Traps)		Alluvium (River Alluvium)		
Type of Aquifer (Phreatic/Semiconfined/confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined /confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined /confined)	Aquifer-III (Semiconfined/confined)
SWL (mbgl)	7.5-18.5	5.4-20	12.4-55	7.69-72.50	7.69-72.50
Depth of Occurrence (mbgl)	9-35	20-150	30-79.92	100-120	90-350
Granular/Weathered /Fractured rocks thickness (m)	5-20	0.5-12	10-60	2-30	1-39.56
Yield	<10 m3/day	0- 0.2 lps	50-200 m^3/day	3-10 lps	0.5-2 lps
Specific yield/ Storativity (S)	0.02	0.000057	0.06-0.1	3.47×10^{-3} to 3.96×10^{-4}	3.47×10^{-3} to 3.96×10^{-4}
Transmissivity (T)	10-20	15-45	25-150	20-562	15-250

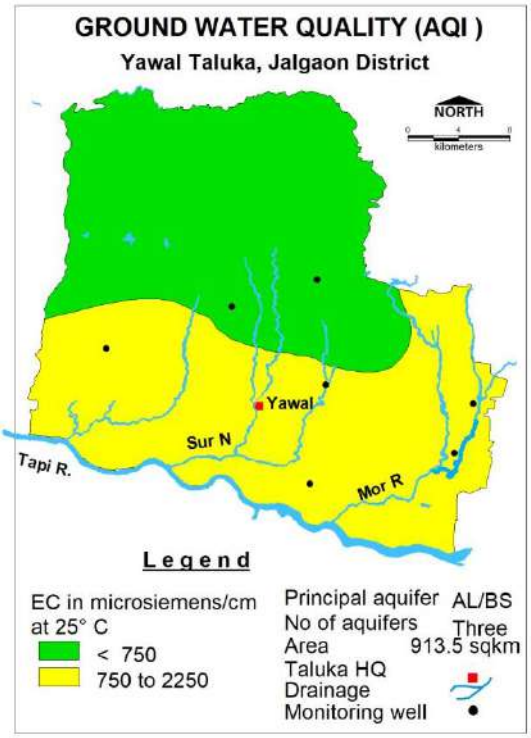
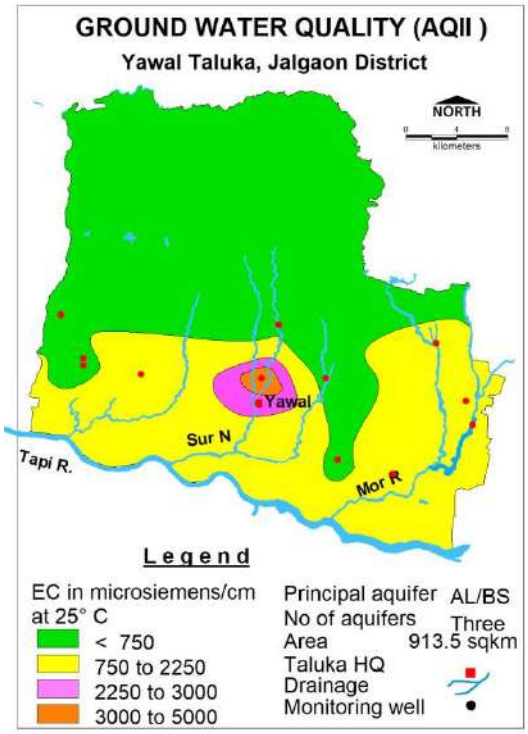
4.CHEMICAL QUALITY OF GROUND WATER &CONTAMINATION

4.1 Aquifer-I/Shallow Aquifer

EC values ranging up to 2250 µS/cm have been observed covering the entire block. EC values ranging up to 750 µS/cm have been observed covering northern part of the block; while in southern part the EC values range from 750 to 2250 µS/cm. Ground water is suitable for Drinking as well as irrigation purposes.

4.2 Aquifer II & Aquifer III /Deeper Aquifer

In Deeper aquifers also, EC values ranging up to 2250 µS/cm have been observed covering the entire block. EC values ranging upto 750 µS/cm have been observed covering northern part of the block; while in southern part the EC values range from 750 to 2250 µS/cm. A small isolated patch near Yawal is observed having EC > 2250 µS/cm. In major part of the block ground water is suitable for drinking as well as irrigation purposes.

Aquifer-I/ Shallow Aquifer	Aquifer II & III/ Deeper Aquifer
	

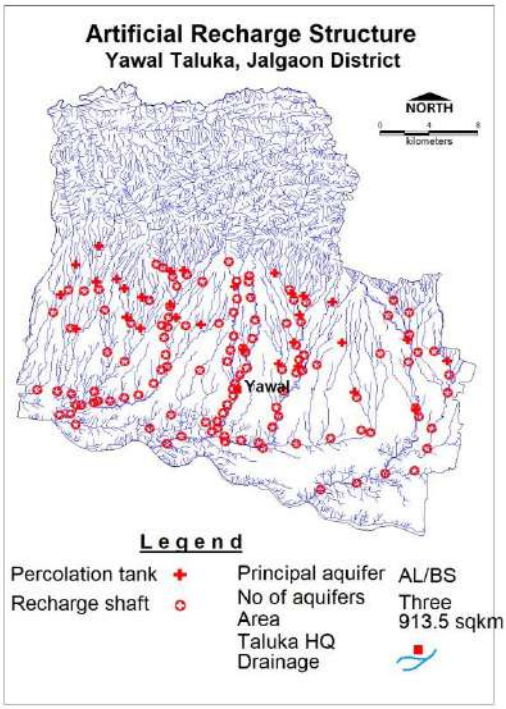
5. GROUND WATER RESOURCE

5.1 Aquifer-I/ Shallow Aquifer (Basalt & Alluvium)

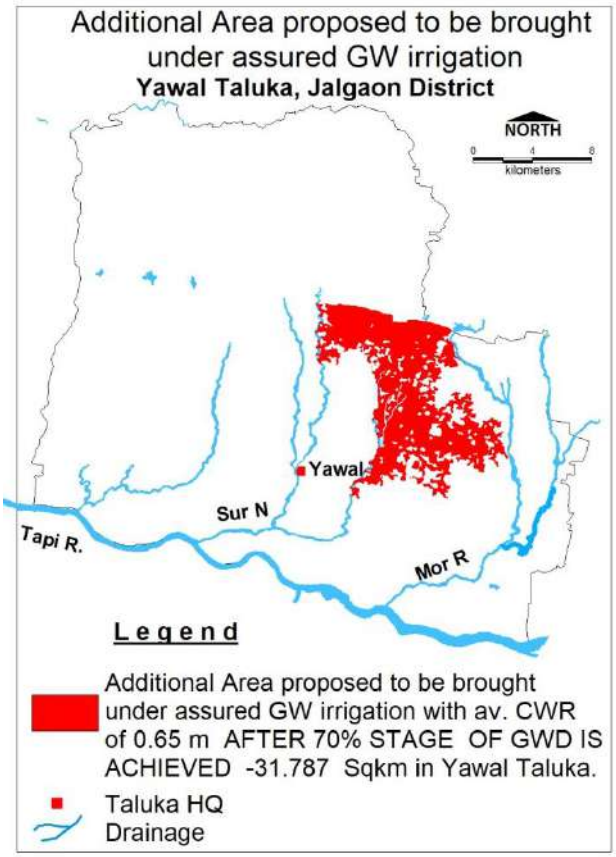
Ground Water Recharge Worthy Area (Sq. Km.)	837.69
Total Annual Ground Water Recharge (MCM)	93.40
Natural Discharge (MCM)	4.67
Net Annual Ground Water Availability (MCM)	88.73
Existing Gross Ground Water Draft for irrigation (MCM)	90.63
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)	2.17
Existing Gross Ground Water Draft for All uses (MCM)	92.80
Provision for domestic and industrial	2.99

requirement supply to 2025(MCM)					
Net Ground Water Availability for future irrigation development (MCM)			9.83		
Stage of Ground Water Development (%)			104.59		
Category			**Over Exploited**		
5.2 Aquifer-II/Deeper Aquifer (Basalt & Alluvium)					
Aquifer	Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
Basalt	437.06	2.7	0.005	**10-15**	9.521
Alluvium	400.63	13.73	0.06	**40-90**	295.89
Aquifer-III/Deeper Aquifer (Alluvium)					
Total Area (Sq. Km.)		Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
339.23		15.97	0.003	55-120	17.54
6.0. GROUND WATER RESOURCE MANAGEMENT					
Available Resource (MCM)			88.73		
Gross Annual Draft (MCM)			92.80		
6.1. Supply Side Management					
SUPPLY (MCM)					
Agricultural Supply -GW			90.63		
Agricultural Supply -SW			110.20		
Domestic Supply - GW			2.17		
Domestic Supply - SW			0.54		
Total Supply			**203.54**		
Area of Block (Sq. Km.)			913.51		
Area suitable for Artificial recharge (Sq. Km)			824.94		
Type of Formation			Hard Rock	Soft Rock	
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)			0	824.94	
Volume of Unsaturated Zone (MCM)			0	1649.88	
Average Specific Yield			0.02	0.07	
Volume of Sub surface Storage Space available for Artificial Recharge (MCM)			0	115.49	
Surplus water Available (MCM)			0.00	8.60	
Proposed Structures			Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)
Number of Structures			22	0	**70**
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)			3.3	0	3.15
Proposed Structures					
RTRWH Structures – Urban Areas					
Households to be covered (25% with 50 m^2area)			12156.2		
Total RWH potential (MCM)			0.45160283		
Rainwater harvested / recharged @ 80%			0.361		

runoff co-efficient	**Economically not viable & Not Recommended**
6.2. Demand Side Management	
Micro irrigation techniques	
Irrigation Area (ha) proposed for irrigation through Sprinkler	Not proposed (Already major area covered under in MI)
Water Saving by use of Sprinklers	Nil
Proposed Cropping Pattern change	
Irrigated area under Water Intensive Crop(ha)	Not proposed
Water Saving by Change in Cropping Pattern	Nil
Other Interventions Proposed, if any	
Alternate Water Sources Available- (Tapi Mega Recharge Scheme) (MCM)	89.21
Quantum of water recharged- Tapi MRS	66.91
6.3. Expected Benefits	
Net Ground Water Availability (MCM)	88.73
Additional GW resources available after Supply side interventions (MCM)	73.36
Ground Water Availability after Supply side intervention	162.09
Existing Ground Water Draft for All Uses (MCM)	92.80
GW draft after Demand Side Interventions (MCM)	92.80
Present stage of Ground Water Development (%)	104.59
Expected Stage of Ground Water Development after interventions (%)	57.25
6.4. Development Plan	
Volume of water available for GWD to 70% (MCM)	20.66125
Proposed Number of DW (@ 1.5 ham for 10% of GWR Available)	138
Proposed Number of BW (@ 1.5 ham for 90% of GWR Available)	1240
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	32
Regulatory measures	**60 borewells/ tubewells**

Supply Side Interventions	Demand Side Interventions
Proposed AR Structures 	**MAJOR ARE OF WATER INTENSIVE CROP ALREADY COVERED BY MICRO IRRIGATION TECHNIQUE**

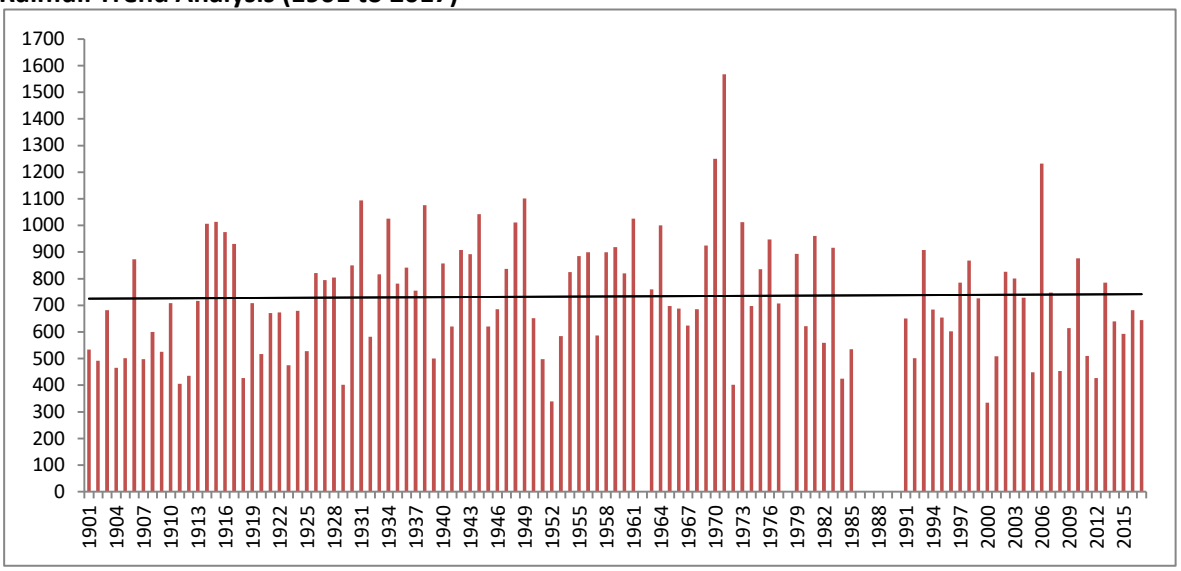
Expected Benefits: **Additional area proposed to be bought under assured GW irrigation**



16.0 AQUIFER MAPS AND GROUND WATER MANAGEMENT PLAN, RAVER BLOCK, JALGAON DISTRICT, MAHARASHTRA

1.0 SALIENT FEATURE	
1.1 Introduction	
BLOCK NAME	RAVER
Geographical Area (Sq. Km.)	980.66 Sq. Km.
Hilly Area (Sq. Km)	41.59 Sq. Km.
Poor ground water quality area (Sq. Km.)	Nil
Population (2011)	3,12,082
Climate	Tropical Monsoon
1.2 Rainfall Analysis	
Normal Rainfall	770.2 mm
Annual Rainfall (2017)	644.9 mm
Decadal Average Annual Rainfall (2008-17)	626.02 mm
Long Term Rainfall Analysis (1901-2017)	Rising Trend 0.142 mm/year. Probability of Normal/Excess Rainfall- 57 % & 19%. Probability of Drought (Moderate/Severe)-: 22 % Moderate & 2% Severe

Rainfall Trend Analysis (1901 to 2017)



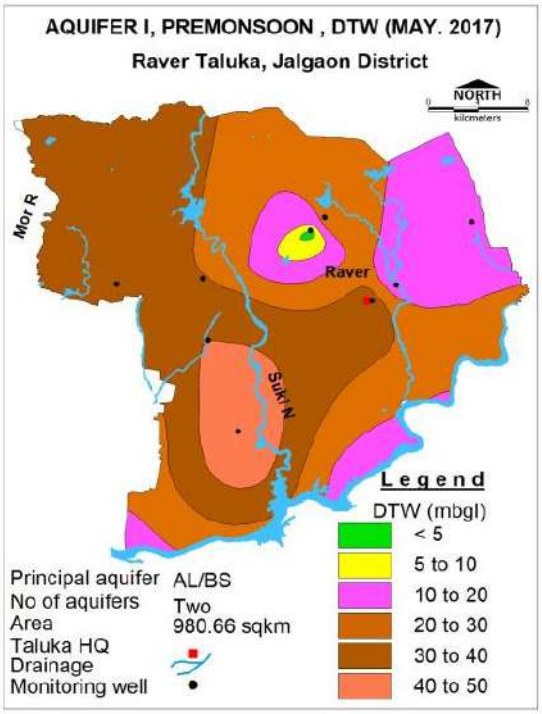
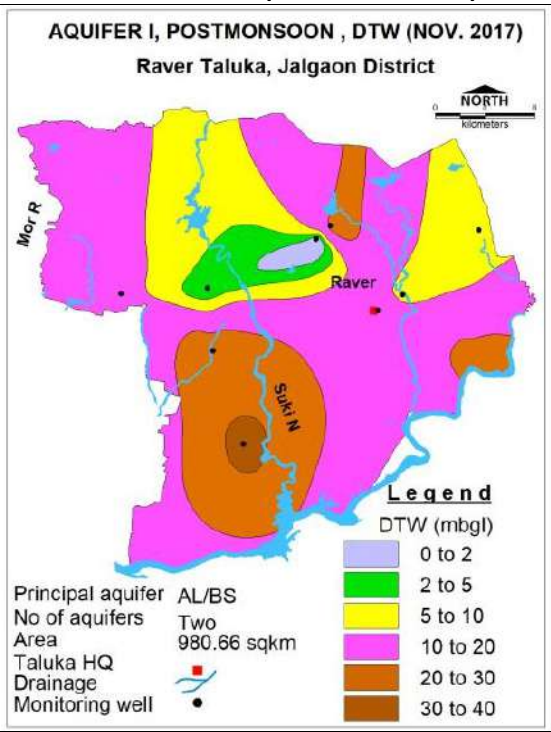
EQUATION OF TREND LINE: Y= 0.142x+724.76

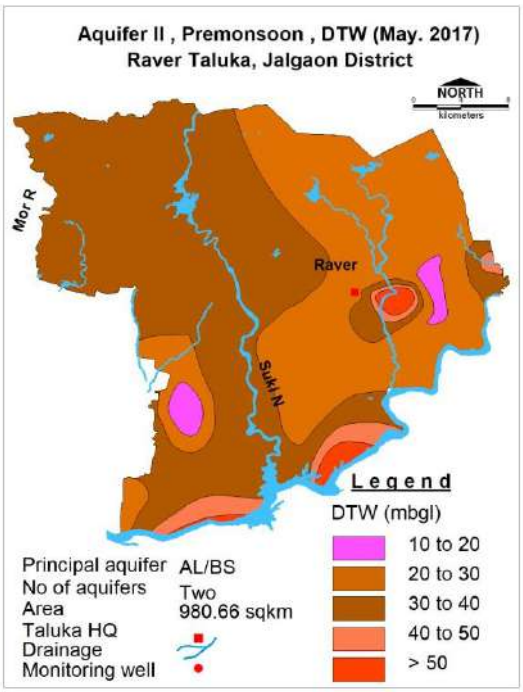
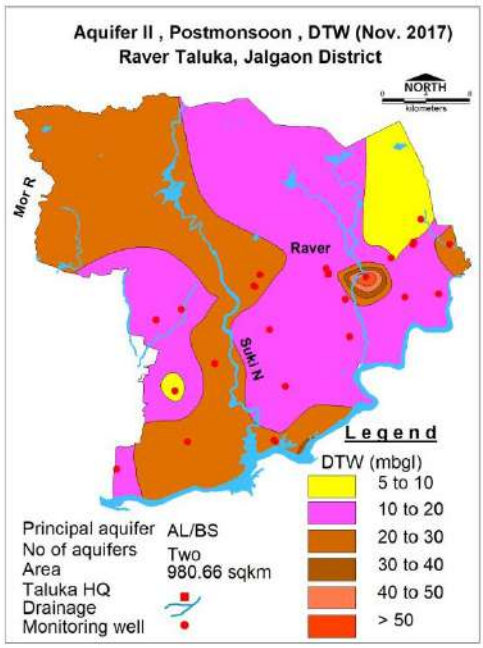
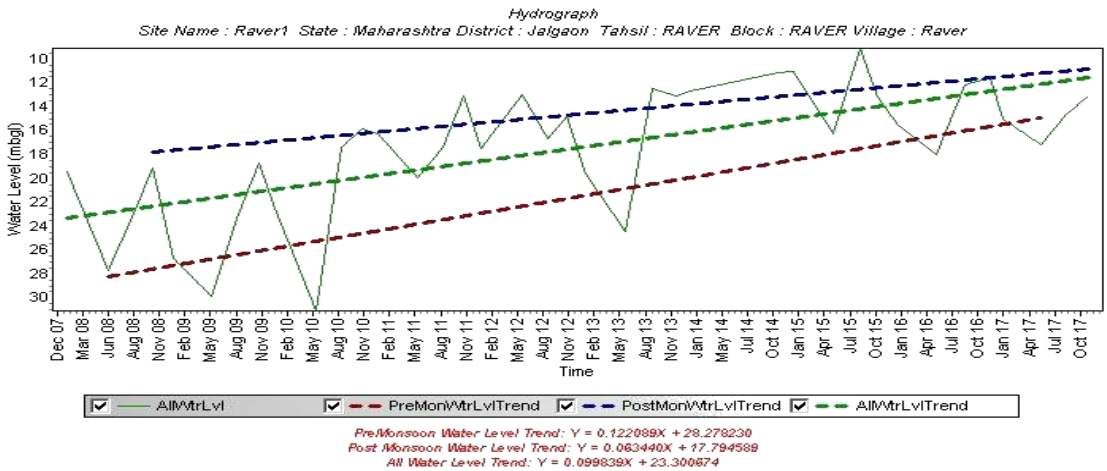
1.3. Geomorphology, Soil & Geology	
Geomorphic Unit	Deccan trap Plateau (highly dissected to slightly dissected) with 1-2 m weathering belonging to Nagartas Formation of Satpuda Group in the north followed by piedmont zone (Bazada Deep) and alluvial plains in the central and southern parts of the block.
Soil	Shallow to Very deep Clayey soil and Sandy Clayey Soil
Geology	• Alluvium (River Alluvium) Age: Recent to Sub-recent • Deccan Traps (Basalt) Age: Upper Cretaceous to Lower Eocene

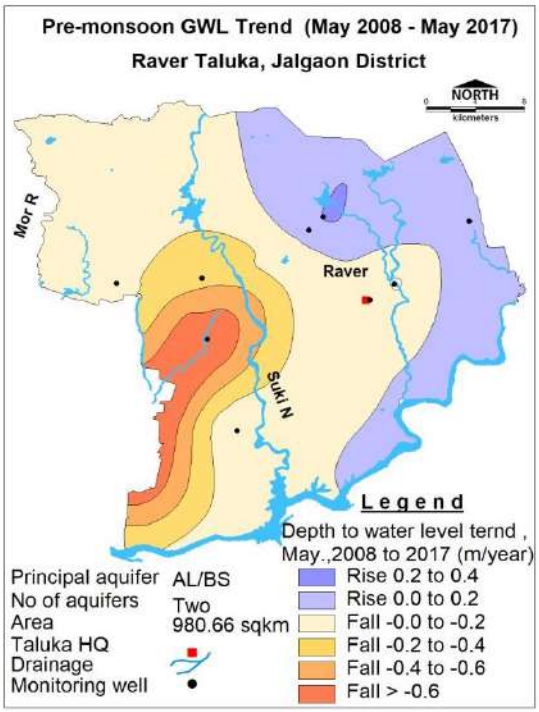
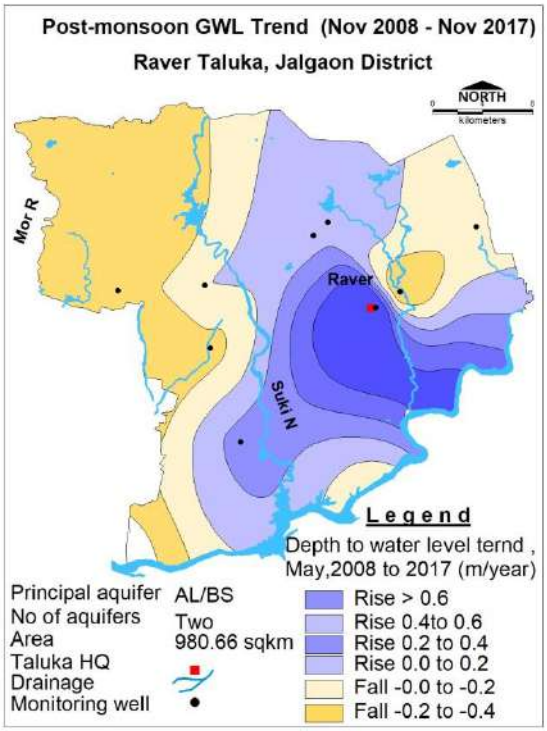
1.4. Hydrology & Drainage			
Drainage		Tapi River and its tributary namely Mor River and Suki Nala	
Hydrology		Major project	02 Abhora and Sukli Projects Command Area 1754 ha and 9191 ha respectively
		Bigger Minor Irrigation Project (>100 Ha.)	2 medium projects
		Minor Irrigation Project (<100 Ha)	135 CD, 18 PT and 11 others
1.5. Land Use, Agriculture, Irrigation & Cropping Pattern			
Geographical Area		980.66 Sq. Km.	
Forest Area		260.17 Sq. Km.	
Cultivable Area		637.63 Sq. Km.	
Net Sown Area		610.62 Sq. Km.	
Double Cropped Area		87.63 Sq. Km.	
Area under Irrigation	Surface Water	29.20 Sq. Km	
	Ground Water	259.48 Sq. Km.	
Area under Drip & Sprinkler Irrigation		207.58 Sq. Km.	
Principal Crops		**Crop Type**	**Area (Sq. Km.)** *(Reference year 2013-14)*
		Cereals	149.53
		Cotton	128.96
		Pulses	52.28
		Oil Seeds	14.29
Horticultural Crops		Banana	222.15
		Citreous fruit	0.09
		Mango	0.40

1.6. Water Level Behaviour

1.6.1 Aquifer-I/ Shallow Aquifer

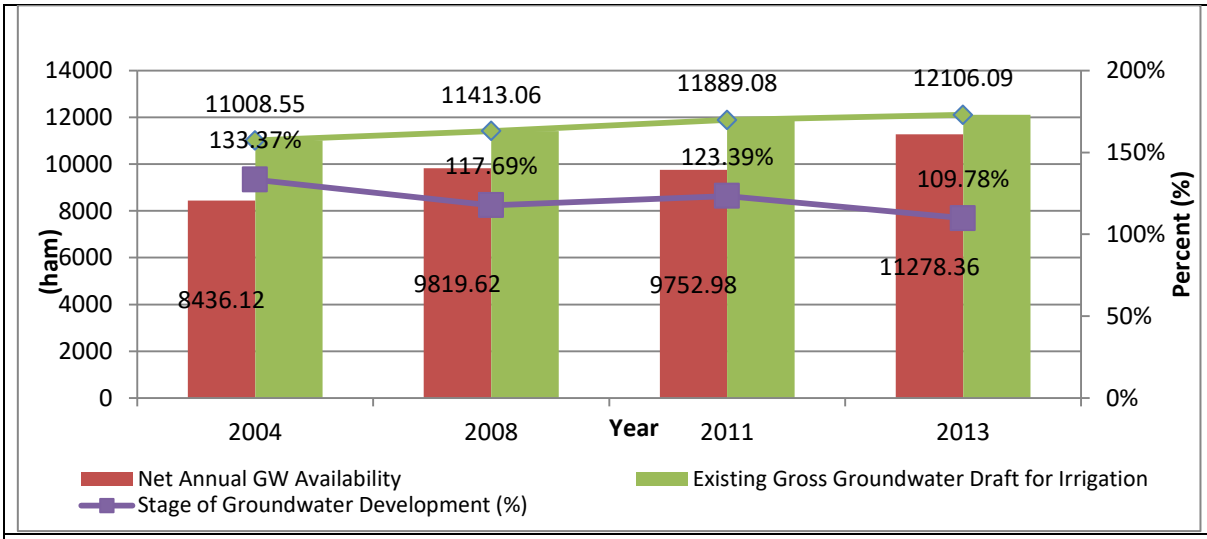
Pre-Monsoon (May-2017)	**Post-Monsoon (November-2017)**
	

Water levels ranging from 10 to 50 mbgl cover the entire block while water levels between 20 to 50 mbgl are prominent and cover the large part of the block; water levels between 10 to 20 mbgl are observed in small isolated patches in the block.	Water levels ranging from 2 to 30 mbgl are observed covering major part of the block while water levels between 10 to 20 mbgl are observed over the large part of the block. Water levels >30 mbgl are found in small isolated patches in southwestern part of the block.
1.6.2 Aquifer-II & III/ Deeper Aquifer	
Water levels ranging from 20 to 50 mbgl are observed covering whole of the block while water level between 20 to 40 mbgl are found covering large part of the block; while water levels between 10 to 20 mbgl and > 50 mbgl in small isolated patches in the block.	Water levels ranging from 5 to 30 mbgl are observed covering the entire block; while water levels between 10 to 30 mbgl cover the major part of the block; water levels between 5 to 10 mbgl and > 30 mbgl are fond occurring in small isolated patches in the block.
	**Post-Monsoon Water Level (Nov 2017)** 
1.7. Hydrograph 	
Hydrograph shows pre-monsoon rising trend @ 1.444 m/year and post-monsoon rising trend @ 0.7504 m/year	

1.8 Water level Trend	
1.8.1 Aquifer I/Shallow Aquifer	
Pre-Monsoon trend Rising 0.0148 to 0.2046 m/year Falling 0.0494 to 0.7359 m/year	**Post -Monsoon trend** Rising 0.1216 to 0.8288 m/year Falling 0.0027 to 0.3783 m/year
Rising water level trend up to 0.2 m/year is observed as continuous patch from north to south in peripheral part of the block. Declining trend up to 0.2 m/year is observed as a continuous patch from north to south in western half of the block; Declining water level trend of more than 0.2 m/year has been observed in small parts in western peripheries of the block.	Declining water level trend up to 0.2 m/year is observed in western and eastern peripheral parts of the block and more than 0.2 m/year are observed in parallel configuration in western and eastern peripheral parts of the block**.** Rising water level trends from 0.2 to 0.6 m/year are observed covering central part of the block extending from north to south.
Premonsoon Water Level Trend (2008-17)	**Postmonsoon Water Level Trend (2008-17)**
	

2. Ground Water Issues

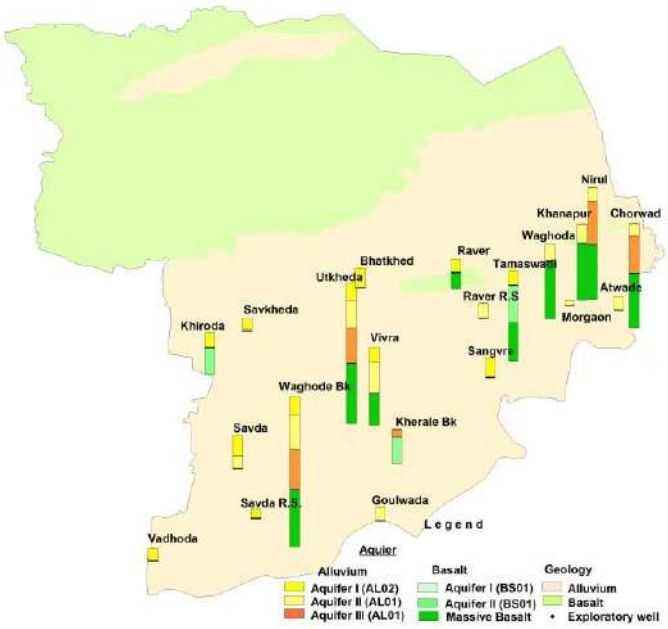
- Ground Water based Banana cultivation, a water intensive crop, in 148.72 Sq Km area results in increase in ground water draft.
- Declining Water Level trend is observed in 478.95 sq km(48.83%) area of the block.
- Deeper Water level >20 mbgl is observed in about 195 sq km (19.88%) area.
- Desaturation of granular Zone/ potential Aquifer Consisting of sand, gravel and pebbles with thin layer of Clay at Various depths.



3. AQUIFER DISPOSITION

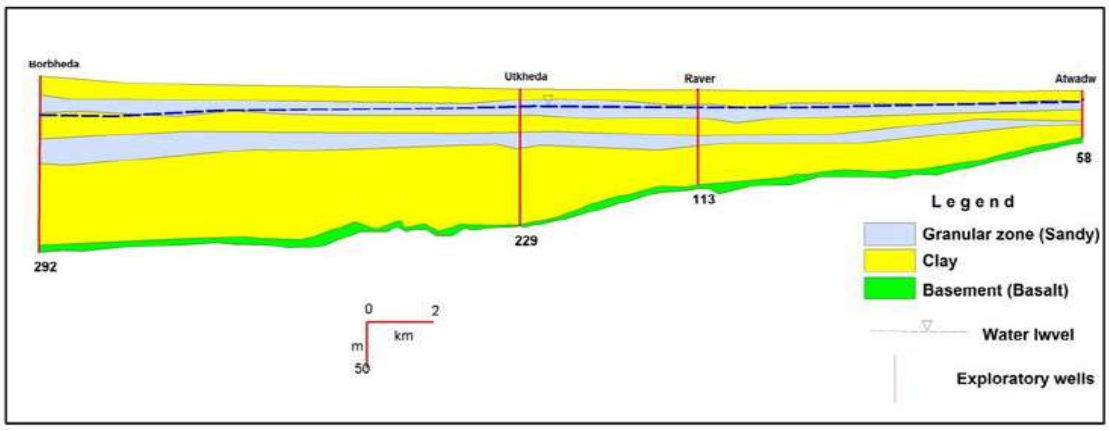
3.1. Number of Aquifers	• Basalt –Aquifer-I, Aquifer-II • Alluvium- Aquifer-I, II, & III

3.2. Lithological Disposition



3.3. Cross Sections

Section AA'



3.4. Basic Aquifer Characteristics					
Major Aquifers	Basalt (Deccan Traps)		Alluvium (River Alluvium)		
Type of Aquifer (Phreatic/Semiconfined/confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined /confined)	Aquifer-I (Phreatic)	Aquifer-II (Semiconfined/confined)	Aquifer-III (Semiconfined/confined)
SWL (mbgl)	0.1-21.4	17.15-25	3.1-46	6.06-42	6.06-42
Depth of Occurrence (mbgl)	9-20	25-50	27-79.92	30-120	90-250
Granular/Weathered/ Fractured rocks thickness (m)	5-15	0.5-12	10-40	2-30	1-15
Yield	0-50 m^3/day	0-1 lps	25-400 m^3/day	0-5 lps	0-2 lps
Specific yield/ Storativity (S)	0.02	0.000054	0.06-0.1	3.47×10^{-3} to 3.96×10^{-4}	3.47×10^{-3} to 3.96×10^{-4}
Transmissivity (T)	20-30	15-30	15-145	50-250	30-90

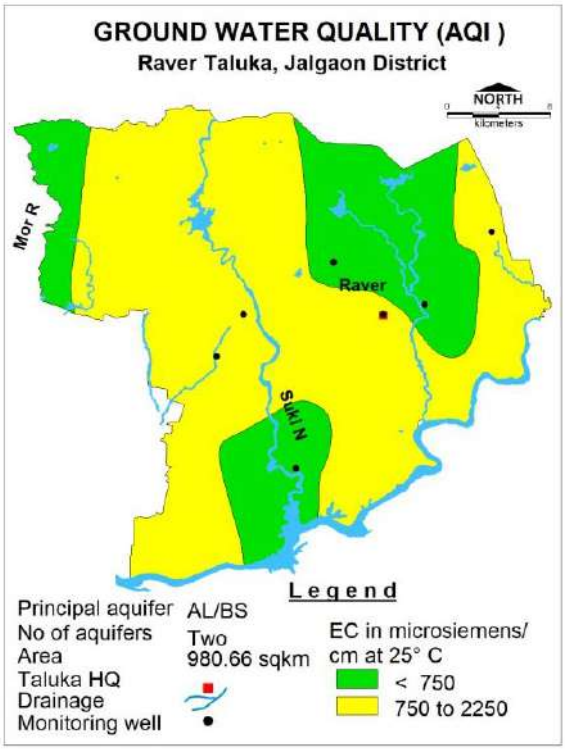
4.CHEMICAL QUALITY OF GROUND WATER &CONTAMINATION

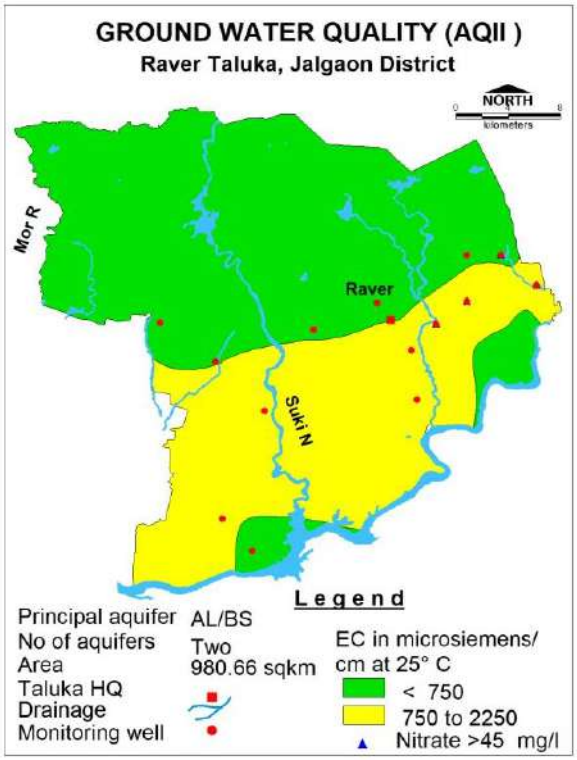
4.1 Aquifer-I/ Shallow Aquifer

EC values ranging up to 2250 µS/cm have been observed covering the entire block; while EC values between 750 to 2250 µS/cm are observed covering large part of the block and EC values < 750 µS/cm are observed covering small isolated parts in peripheral parts of the block. Ground water is suitable for Drinking as well as irrigation purposes.

4.2 Aquifer II & Aquifer III/ Deeper Aquifer

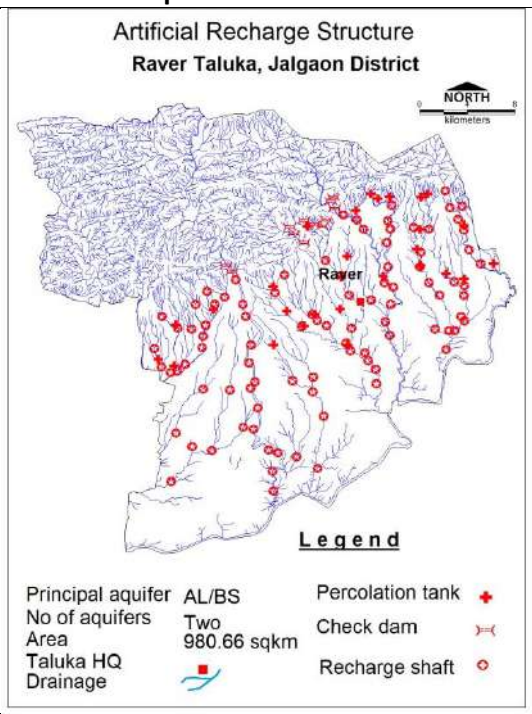
EC values ranging up to 2250 µS/cm have been observed covering the entire block; while EC values between 750 to 2250 µS/cm are observed covering southern half of the block and EC values < 750 µS/cm are observed covering northern half of the block. Ground water is suitable for Drinking as well as irrigation purposes. Few villages also affected by nitrate Contamination and only Shinai village affected by Fluoride Contamination with 1.06 mg/L Concentration.



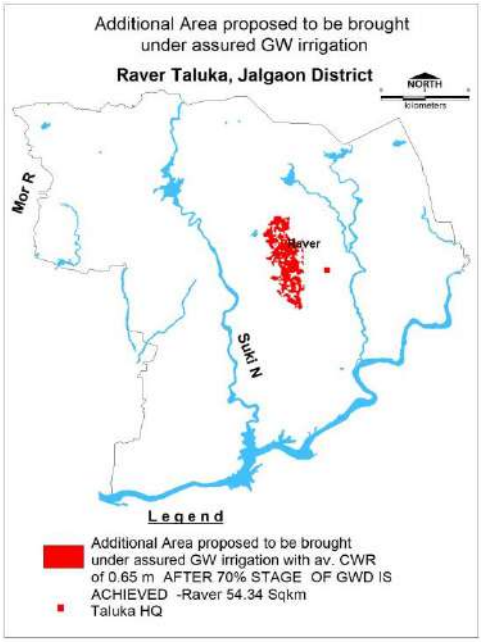


5. GROUND WATER RESOURCE					
5.1 Aquifer-I/ Shallow Aquifer (Basalt & Alluvium)					
Ground Water Recharge Worthy Area (Sq. Km.)			939.07		
Total Annual Ground Water Recharge (MCM)			118.71		
Natural Discharge (MCM)			5.93		
Net Annual Ground Water Availability (MCM)			112.78		
Existing Gross Ground Water Draft for irrigation (MCM)			121.06		
Existing Gross Ground Water Draft for domestic and industrial water supply (MCM)			2.74		
Existing Gross Ground Water Draft for All uses (MCM)			123.80		
Provision for domestic and industrial requirement supply to 2025(MCM)			3.35		
Net Ground Water Availability for future irrigation development (MCM)			1.39		
Stage of Ground Water Development %			109.78		
Category			**Over Exploited**		
5.2 Aquifer-II/Deeper Aquifer (Basalt & Alluvium)					
Aquifer	Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av (Sy/S)	Piezometric Head (m above confining layer)	Total Resource (MCM)
Basalt	566	1.75	0.005	10-20	5.26
Alluvium	414	13.73	0.06	45-80	233.65
5.3 Aquifer-III/ Deeper Aquifer (Alluvium)					
Aquifer	Total Area (Sq. Km.)	Mean aquifer thickness (m)	Av (Sy/S)	piezometric Head (m above confining layer)	Total Resource (MCM)
Alluvium	274.86	6.37	0.0045	75-120	9.45
6.0. GROUND WATER RESOURCE ENHANCEMENT					
Available Resource (MCM)			112.78		
Gross Annual Draft (MCM)			123.80		
6.1. Supply Side Management					
SUPPLY (MCM)					
Agricultural Supply -GW			121.06		
Agricultural Supply -SW			29.20		
Domestic Supply - GW			1.14		
Domestic Supply - SW			0.69		
Total Supply			**152.09**		
Area of Block (Sq. Km.)			980.66		
Area suitable for Artificial recharge (Sq. Km)			876.17		
Type of formation			Hard Rock	Soft Rock	
Area feasible for Artificial Recharge (WL >5mbgl) (Sq. Km.)			458.569	417.6	

Volume of Unsaturated Zone (MCM)	917.14	835.20	
Average Specific Yield	0.02	0.07	
Volume of Sub surface Storage Space available for Artificial Recharge (MCM)	18.34	58.46	
Surplus water Available (MCM)	4.78	4.35	
Proposed Structures	Percolation Tank (Av. Gross Capacity-100 TCM*2 fillings = 200 TCM)	Check Dam (Av. Gross Capacity-10 TCM * 3 fillings = 30 TCM)	Recharge shaft (Av. Gross Capacity-60 TCM)
Number of Structures	28	**12**	94
Volume of Water expected to be conserved / recharged @ 75% efficiency (MCM)	4.2	0.27	4.23
Proposed Structures			
RTRWH Structures – Urban Areas			
Households to be covered (25% with 50 m^2area)	13,725		
Total RWH potential (MCM)	0.509		
Rainwater harvested / recharged @ 80% runoff co-efficient	0.4078 **Economically not viable & Not Recommended**		
6.2. Demand Side Management			
Micro irrigation techniques			
Irrigation Area (ha) proposed for irrigation through Sprinkler	Not proposed (already major area covered under MI)		
Water Saving by use of Sprinklers	Nil		
Proposed Cropping Pattern change			
Irrigated area under Water Intensive Crop(ha)	Not proposed		
Water Saving by Change in Cropping Pattern	Nil		
Other Interventions Proposed, if any			
Alternate Water Sources Available (Tapi-Mega Recharge Scheme)	87.18		
Quantum of water recharged -Tapi MRS)	65.39		
6.3.Expected Benefits			
Net Ground Water Availability (MCM)	112.78		
Additional GW resources available after Supply side interventions (MCM)	74.09		
Ground Water Availability after Supply side intervention	186.86		
Existing Ground Water Draft for All Uses (MCM)	123.80		
GW draft after Demand Side Interventions (MCM)	123.80		
Present stage of Ground Water Development (%)	109.78		
Expected Stage of Ground Water Development after interventions (%)	66.25		
6.4.Development Plan			

Volume of water available for GWD to 70% (MCM)	7.00
Proposed Number of DW(@ 1.5 ham for 10% of GWR Available)	47
Proposed Number of BW(@ 1.5 ham for 90% of GWR Available)	420
Additional Area (sq.km.) proposed to be brought under assured GW irrigation with av. CWR of 0.65 m	10.77
Regulatory measures	**80 borewells/ tubewells**
Supply Side interventions	**Demand Side interventions**
Proposed AR Structures	**Not Proposed**
	**MAJOR ARE OF WATER INTENSIVE CROP ALREADY COVERED BY MICRO IRRIGATION TECHNIQUE**

Expected Benefits: Additional Area proposed to be brought under assured GW irrigation



ANNEXURES

Annexure I: Salient Features of Ground Water Exploration, Jalgaon district (As on March 2018)

Taluka	Type of Well			Lithology	Depth Range	Static Water Level (m bgl)	Discharge (lps)	Zones
	EW	OW	PZ		(m bgl)			(m bgl)
Amalner	**3**	**-**	**-**	Basalt	200	45-75	meagre	26.00-29.00, 89.00-90.00
Bhadgaon	3	-	-	Basalt	200.2	6.40- 7.14	0.38-1.41	50.00- 177.00
Bhusawal	5	-	-	Basalt and Alluvium	168.35- 204.35	6.50- 140.00	1.37- 7.76	9.00- 200.00
Bodwad	8	1	-	Basalt	124-204.75	7.0 - > 100	Traces to 12.0	13.00 – 184
Chalisgaon	4	-	-	Basalt	200.2	25.00- 99.40	--	--
Chopda	20	13	2	Basalt and Alluvium	56.00-300.00	4.95 to 20.90	0.81- 30.50	7.00-181.40
Dharangaon	1	-	-	Basalt	204.75	8	0.78	18.2- 143
Erandol	1	-	-	Basalt	204.75	40	Traces	30 -31.85
Jalgaon	4	1	-	Basalt and Alluvium	198-67- 204.75	32.00 – 88.00	0.38 – 20.00	12.00- 197.00
Jamner	1	-	-	Basalt	204.75	70	1.37	29 -30 ,121 -123
Muktainagar	2	-	-	Basalt	200	13.9-128	0.38	16.80-19.90, 65.60-68.70, 77.80-80.90
Pachora	5	-	-	Basalt	175.95- 204.75	5.20- 100.00	0.14- 29.16	9.00- 175
Parola	3	-	-	Basalt	200	158-182	meagre	37.00-38.00, 56.00-59.00, 181.50-184.50
Raver	19	9	3	Basalt and Alluvium	22.70- 229.00	4.95 to 72.50	Traces to 47.00	9.10-162
Yawal	21	9	4	Basalt and Alluvium	45.50- 318.45	18.00 to >100	Traces to 38.00	10.36- 271.00
Total	**100**	**33**	**9**		**22.70– 318.45**	**4.95 to 179.00**	**Traces to 47.00**	**7.00 to 271.00**

Annexure II: Details of GW monitoring wells and KOWs in Jalgaon district

S.no.	Block	Location	Agency Name	Topo sheet	Alt. (mamsl)	Form -ation	Aquifer	Well Depth (m)	Diam eter (m)	MP (magl)	Lining (m)	Total Thickness weatherd portion (m)	Depth to Fractures (mbgl)	Thickn ess of fractur e zone (m)	DTW (mbgl) May-17	Spot EC	DTW (mbgl) Nov.-17	Spot EC	Pre trend (m/year)	Post trend (m/year)
1	Amalner	Dangar Bk.	Public	46L/13	255	Basalt	FMB	18	8	1	3	2.5			17	1200	1.6	1200		
2	Amalner	Jalod	Public	46O/4	175	alluvium	Sand & Gravel	27	4	0.5	3	NA			27	2100	18	1900		
3	Amalner	Kurha Bk.	Public	46O/4	198	Basalt	FMB	11	4	0.3	3	2			10.1	4500	8	1900		
4	Amalner	Amalner (M Cl)	Public	46O/4	180	Basalt	FMB	9	5	0.4	3	5			8.9	750	3.5	740		
5	Amalner	Khakarpat	Public	46P/1	197	Basalt	FMB	11	5.5	0.3	3	6.5			10.3	1100	7.4	1600		
6	Amalner	Matgavan	Public		174	Basalt		40							39		38			
7	Amalner	Savkheda	Public		172.9	Basalt		19.5							19.5		17			
8	Amalner	Chopdai	Public		263	Basalt		12							8		3.8			
9	Amalner	Kamatwadi Bk	Public		160	Basalt		16							14		5			
10	Amalner	Mudi pr. dangr	Public		184.7	Basalt		18.5							18.5		5.1			
11	Amalner	Pimpri. p. jalod.	Public		169.1	Basalt		21.5							23		8.8			
12	Amalner	Nisardi	Public	46K/16	216	Basalt	FMB	13	6	GL	3	6			12	2800	4.4	1640		
13	Amalner	Rundhati	Public	46O/4	209	alluvium	Sand & Gravel	30	4	0.4	3	NA			22	550	3.8	1600		
14	Amalner	Lon Sim	Public	46K/16	195	Basalt	FMB	12	6	0.6	3	7			10.15	4000	3.4	4600		
15	Amalner	Kalamsare	Public	46K/16	171	Basalt	FMB	14	6	0.2	3	10			12	1800	11	900		
16	Amalner	Galvade	Public	46O/4	196	Basalt	FMB	13	6.5	0.6	3	7			10	880	3.8	1000		
17	Amalner	Dahivad	Public	46O/4	168	Basalt	FMB	15	7	1	3	5			12	1800	10	1950		
18	Bhadgaon	Balad kh.	Public		267.6	Basalt		12.1							8.8		7.7		-0.081	-0.330
19	Bhadgaon	Pimparkhed	Public		273.6	Basalt		10.3							5.3		3.9		-0.052	0.015
20	Bhadgaon	Tongaon	Public		267.2	Basalt		7.9							4.8		2.9		-0.023	-0.024
21	Bhadgaon	Kajgaon	Public		294.2	Basalt		15.5							6.4		4		-0.294	0.028
22	Bhadgaon	Nimbhore	Public		276.9	Basalt		12							7.4		3		0.085	0.009
23	Bhadgaon	Vadgaon nalbandi	Public		285.9	Basalt		12.31							9.3		4.6		0.253	0.084
24	Bhadgaon	Pendgaon	Public		311.2	Basalt		9							9		4.2		0.027	0.054
25	Bhusawal	Kandari	Public		206.8	Basalt		15.4							14.6		12.8		0.092	0.758

S.no.	Block	Location	Agency Name	Topo sheet	Alt. (mamsl)	Form -ation	Aquifer	Well Depth (m)	Diam eter (m)	MP (magl)	Lining (m)	Total Thickness weatherd portion (m)	Depth to Fractures (mbgl)	Thickn ess of fractur e zone (m)	DTW (mbgl) May-17	Spot EC	DTW (mbgl) Nov.-17	Spot EC	Pre trend (m/year)	Post trend (m/year)
26	Bhusawal	Sakegaon	Public		204.3	Basalt		18							12.2		9.7		-0.380	0.289
27	Bhusawal	Kahurkheda	Public		257.3	Basalt		15.5							10.1		5.9		0.335	0.058
28	Bhusawal	Kurhe p.n.	Public		248.7	Basalt		14							11.6		5.2		-0.091	0.345
29	Bhusawal	Talvel	Public		222.2	Basalt		16.2							16		9.4		-0.018	0.132
30	Bhusawal	Vichave	Public		250.7	Basalt		16.5							13.2		4.4		0.330	0.293
31	Chalisgaon	Daregaon	Public	46L/14	355	Basalt	WB	10.75	-	0.8	3.2	-	-	-	10	513	8.5	612		
32	Chalisgaon	Londhe	Public	46L/14	326	Basalt	WB	12.4	6	0.5	9.2	-	-	-	9.5	779	7.2	760		
33	Chalisgaon	Kharadi	Public	46L/15	405	Basalt	FMB	13.1	5	0.3	5.9	-	11.8	-	11.3	889	11	674		
34	Chalisgaon	Talonde Pr. Dehere	Public	46L/15	363.8	Basalt	WB	9.85	7	1	4.3	-	-	-	8.3	2036	3.7	2346		
35	Chalisgaon	Dhamangaon	Public	46L/14	636	Basalt	FB	13	7	0.82	2.75	5.3	11	-	13	858	11.2	1254		
36	Chalisgaon	Bhamare Kh	Public	46P/2	94	Basalt	FMB	15.7	5.2	0.65	5.4	-	11.5	-	13.6	1333	9.7	1308		
37	Chalisgaon	Shewari	Public	46L/15	373.7	Basalt	JB	13.85	10.9	1.1	3.95		10.8	-	11.15	877	4	616		
38	Chalisgaon	Sayagaon	Public	46L/14	346	Basalt	WB	4.5	-	0.9	2.2	-	-	-	4	2778	1.1	2267		
39	Chalisgaon	Tamaswadi	Public	46L/14	327.8	Basalt	WB	16.5	7	1	7.3				15.2	363	7.4	504		
40	Chalisgaon	Tambole Bk.	Public	46L/15	346.7	Basalt	WB	11.1	7	1	5.9	-	-	-	7	803	3.9	721		
41	Chalisgaon	Rajmane	Public		347.4	Basalt		10							9		6.95		0.067	0.339
42	Chalisgaon	Khadki. bk.	Public		326.2	Basalt		11							4.8		4.3		0.027	0.331
43	Chalisgaon	Sevanagar	Public		342.4	Basalt		12.5							2.8		1.8		-0.308	-0.107
44	Chalisgaon	Hirapur	Public		377	Basalt		12.6							6		5		-0.364	0.177
45	Chalisgaon	Wakdi	Public		330.2	Basalt		11							5.6		4.4		-0.165	0.188
46	Chalisgaon	Bodhre	Public		384.7	Basalt		14.35							4.9		2.8		-0.066	0.009
47	Chalisgaon	Bilkheda	Public		339.7	Basalt		8.35							8.3		5.8		0.240	0.478
48	Chalisgaon	Mundkheda bk.	Public		319.3	Basalt		12							7.4		4.85		-0.088	0.177
49	Chalisgaon	Upkheda	Public		332.1	Basalt		11.36							7.7		5.1		0.005	0.178

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50	Chalisgaon	Adgaon	Public		336.6	Basalt		13							6.2		3.5		-0.113	0.062
51	Chalisgaon	Dasegaon. bk.	Public		312	Basalt		20							12		9.1		0.087	0.253
52	Chalisgaon	Mehunbare	Public		316.4	Basalt		16							16		13.1		0.093	0.632
53	Chalisgaon	Bhoras bk.	Public		327.5	Basalt		8.56							7.2		3.9		-0.002	0.135
54	Chalisgaon	Kharjai	Public		335.5	Basalt		14							5.5		1.45		0.015	0.014
55	Chalisgaon	Shevri	Public		381.9	Basalt		12							7		2.6		-0.220	0.054
56	Chalisgaon	Rajdehre	Public		455.1	Basalt		10.8							7.7		2.1		0.098	0.132
57	Chalisgaon	Chinchgavan	Public		339	Basalt		12							12		5.7		0.294	0.230
58	Chalisgaon	Vadgaon lambe.	Public		395.1	Basalt		10							7.55		0.95		0.228	-0.113
59	Chalisgaon	Patne	Public		414.9	Basalt		15.95							12.6		4.05		-0.075	0.002
60	Chalisgaon	Pimpalgaon	Public		427.4	Basalt		10.2							10.2		1.1		0.096	-0.024
61	Chalisgaon	Pilkhod	Public		342.3	Basalt		24.2							24.2		5		0.428	0.128
62	Chalisgaon	Chalisgaon	Public		346	Basalt	WB	7.45	1.9	0.7	2	7.45	-	-	5.25	1177	3.2	1057		
63	Chalisgaon	Karamadu	Public	46L14	381	Basalt	FMB	14.4	7.5	0.6	2.95	-	10.1	-	14.1	642	13.9	672		
64	Chalisgaon	Abhone	Public	46L/14	390	Basalt	FMB	10.6	-	0.5	3	-	-	-	6.5	1269	6.1	995		
65	Chalisgaon	Chinchgavhan	Public	46L/14	339.7	Basalt	JB	15.35	-	1	2.9	5.85	7.3	-	7.3	1191	6.3	1304		
66	Chalisgaon	Chambhardi Bk.	Public	46P/3	339	Basalt	WB	10.55	5	0.3	6.6	-	-	-	9.4	1023	7.6	787		
67	Chalisgaon	Borkhede Bk	Public	46P/2	293.4	Basalt	WB	11.8	8.7	0.4	5.5	11.6	-	-	11.6	1821	9.1	1601		
68	Chalisgaon	Shindi	Public	46L/15	404	Basalt	WB	8.6	5	0.6	1.8	-	-	-	8.1	815	7.6	488		
69	Chalisgaon	Patana	Public	46L/15	413	Basalt	WB	14.3	5	1	8.5	-	-	-	12.5		6.9	739		
70	Chalisgaon	Varkhede Kh.	Public	46L/14	340	Basalt	WB	13.8	5.5	0.7	2.8	6	10.4	-	13.6	1068	6.1	1167		
71	Chalisgaon	Bahal	Public	46P/2	302.9	Basalt	WB	16	4.5	0.35	5.1	11.95	-	-	11.95	2591	9	2327		
72	Chopda	Adawad	Public		190.7			34							31		21		0.826	0.095
73	Chopda	Chopda	Public		190.2			25.3							13.5		12.5		-0.171	0.118
74	Chopda	Hated .bk.	Public		185.4			16.6							14		11.7		0.092	0.555
75	Chopda	Lahasur	Public		259			12.5							8.9		6.3		-0.071	0.004
76	Chopda	Nagalwadi	Public		240.6			21.1							20.5		17.6		0.522	0.938

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77	Chopda	Satrasen	Public		235.8			17							16		12.5		-0.008	0.370
78	Chopda	Mitawali	Public		168.5			45							37.5		34		0.466	0.450
79	Chopda	Galangi	Public		158.8			21							21		17.1		0.058	0.027
80	Chopda	Maratha	Public		217.8			22.4							11.2		6.55		0.170	0.250
81	Chopda	Deoziri	Public		431.8			12							8.9		1.8		0.177	-0.278
82	Chopda	Karjane	Public		257			23.5							9.4		2.2		0.025	-0.105
83	Chopda	Budhagaon	Public		163.9			40.1							22.5		14.8		-0.359	-0.536
84	Chopda	Vishnapur	Public		280.5			14.6							12		4.1		0.126	-0.132
85	Chopda	Adgaon	Public		213.9			14							14		6.1		0.887	0.100
86	Dharangaon	Paldhi Kh.	Public		208.7	Basalt		13.5							6.4		6.1		0.105	0.355
87	Dharangaon	Dharangaon	Public		217.4	Basalt		9.7							4.6		3.4		-0.180	0.174
88	Dharangaon	Zurkheda	Public		180.2	Basalt		8							8		5		0.063	0.231
89	Dharangaon	Rotwad	Public		177	Basalt		18							12.5		8.2		0.024	0.218
90	Dharangaon	Bhamardi	Public		167.2	Basalt		16.2							8.9		4.3		0.283	-0.161
91	Dharangaon	Musli Kh.	Public		202	Basalt		16							8.9		2.4		0.163	-0.018
92	Dharangaon	Chandsar Bk	Public		181.6	Basalt		20							14.5		4.9		0.224	-0.050
93	Edlabad	Sukli	Public		230	Basalt		13.5							8.7		8.1		-0.176	-0.159
94	Edlabad	Chikhli	Public		226.9			24.3							23		21.5		-0.114	-0.445
95	Edlabad	Kurha	Public		243.6			14							9.8		8.1		0.001	0.035
96	Edlabad	Muktainagar	Public		218			15							11.2		9.3		-0.089	0.011
97	Edlabad	Shemalde	Public		225.6			37.2							12.7		10.2		-0.029	0.163
98	Edlabad	Sarola	Public		292.6			10.65							10.65		6.5		0.016	0.094
99	Edlabad	Dui	Public		226.6			20.3							16		10		-0.145	-0.117
100	Edlabad	Pimpri Pancham	Public		239.1			11.6							12		4.8		-0.024	-0.205
101	Edlabad	Nandwel	Public		223.4			25.75							24		16.2		-0.092	0.011
102	Edlabad	Karaki	Public		231.3			17.71							13		3.5		-0.106	-0.788
103	Edlabad	Nimkhedi bk.	Public		234			35.2							24		12.4		0.277	-0.525
104	Erandol	Pimpri seem.	Public		221.1			17.2							7.9		5.5		0.250	0.250
105	Erandol	Pimpalkotha bk.	Public		205.1			15							11		8.1		0.284	0.284
106	Erandol	Erandol	Public		219.1			13.9							13		5.1		-0.193	-0.193
107	Erandol	Galapur	Public		263.8			19.5							14.1		1.3		0.072	0.072
108	Jalgaon	Bholane	Public	46O/12	233	Alluvi	Sand &	40	3	0.3	5	NA			36.2	1300	31.6	1480		

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						um	Gravel													
109	Jalgaon	Umale	Public	46P/9	275	Baslat	FMB	15	6.5	0.2	3	5.5			5	800	3.5	750		
110	Jalgaon	Jalgaon Kh.	Public	55O/12	196	Alluvi um	Sand & Gravel	30	5	0.4	3	NA			29	2500	22.4	2600		
111	Jalgaon	Nandra Bk.	Public	46O/8	192	Alluvi um	Sand & Gravel	24	4	0.4	3	NA			21.8	1400	10	1200		
112	Jalgaon	Asoda	Public	46O/12	187	Alluvi um	Sand & Gravel	25	3.5	0.5	3	NA			19.6	1400	16.8	2450		
113	Jalgaon	Phupnagri	Public	46O/12	239	Alluvi um	Sand & Gravel	34	4	0.4	3	NA			31	1930	30.2	2400		
114	Jalgaon	Dhamangaon	Public		185			48.5							43.5		43.2			
115	Jalgaon	Jalke	Public		233.8			96							24.95		23.7			
116	Jalgaon	Dapore	Public		206.2			9.9							7.9		6.5			
117	Jalgaon	Kanalda	Public		185.1			18							12.1		9.55			
118	Jalgaon	Kadgaon	Public		188.1			24.2 5							24.25		20.5			
119	Jalgaon	Shirsoli	Public		224.9			15.5							10.8		7			
120	Jalgaon	Bholane	Public		174.1			45							45		39.1			
121	Jalgaon	Idgaon	Public		174.1			50							50		44.1			
122	Jalgaon	Jalgaon (primprala)	Public		208.6			18.5							11		5			
123	Jalgaon	Chincholi	Public		252.9			15							11		4.45			
124	Jalgaon	Mamurabad	Public		192.4			24.1 5							19		11			
125	Jalgaon	Mhasawad	Public		218.3			17.3							17.3		8			
126	Jalgaon	Jalgaon (M Cl)	Public	46O/12	216	Basalt	FMB	11	4	GL	3	5			10.7	1920	1.5	2430		
127	Jalgaon	Pathri	Public	46P/9	229	Basalt	FMB	19	5	0.8	3	14			14.4	2450	1	2000		
128	Jalgaon	Lonwadi Bk.	Public	46P/9	245	Basalt	FMB	19	8	0.6	3	8			18.2	750	2.5	1500		
129	Jalgaon	Vakadi	Public	46P/5	212	Basalt	FMB	21	5.5	GL	3	16			19	1600	12.5	1300		
130	Jamner	Garkheda bk.	Public		248.7	Basalt		8.5							8		7.8		-0.066	0.588
131	Jamner	Jalandri bk.	Public		295	Basalt		10							6.8		5.6		-0.011	0.032
132	Jamner	Lahasar	Public		272.1	Basalt		10.5							7.1		5.8		0.571	0.203
133	Jamner	Sonale	Public		290.6	Basalt		13.1							12.7		10.1		0.093	0.574
134	Jamner	Neri digar.	Public		249.1	Basalt		10							10		7.1		0.065	0.253

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135	Jamner	Mundkheda bk.	Public		262.3	Basalt		14.5							9		5.6		0.030	-0.153
136	Jamner	Rampura	Public		259.6	Basalt		11.8 1							7.8		4.2		-0.216	0.189
137	Jamner	Godri	Public		342.7	Basalt		12							9		5.1		-0.336	-0.211
138	Jamner	Shahapur	Public		280.7	Basalt		11							9.8		5.8		0.328	-0.109
139	Jamner	Gadegaon p.n.	Public		258.2	Basalt		11.6 1							7.7		3		-0.049	0.257
140	Jamner	Gangapuri	Public		239.5	Basalt		19							13.3		8.6		-0.380	-0.143
141	Jamner	Hiverkheda bk.	Public		240.5	Basalt		11.3 1							11		6.2		-0.218	0.007
142	Jamner	Wadi	Public		285.9	Basalt		10							8		3.1		-0.003	-0.157
143	Jamner	Jamner	Public		257	Basalt		18.3							17		11.2		0.157	0.319
144	Jamner	Pahur peth.	Public		301	Basalt		10.5							8.2		2.1		0.346	0.112
145	Jamner	Malkheda digar.	Public		316.4	Basalt		13							11.1		5		-0.019	0.062
146	Jamner	Paldhi	Public		291.6	Basalt		15.5							8.7		2.3		-0.098	-0.242
147	Jamner	Chinchkheda bk.	Public		240	Basalt		16							13.1		6.5		0.055	-0.023
148	Jamner	Waghari	Public		303.1	Basalt		12.5							11.8		4.2		0.210	0.042
149	Jamner	Madani	Public		323.3	Basalt		13.5							10.8		2.8		0.088	-0.309
150	Jamner	Wakod	Public		342.6	Basalt		15							11		2.3		0.127	-0.180
151	Jamner	Talegaon	Public		284.7	Basalt		15							11.5		1.9		0.019	-0.289
152	Jamner	Bhagdare	Public		273.9	Basalt		16							14.5		2.9		0.603	0.031
153	Edlabad	Karki	Public	55C/4	241	Basalt	FMB	18	6.5	0.4	3	3			14.4	2120	7			
154	Edlabad	Ruikhed	Public	55D/1	271	Basalt	FMB	18	6.5	0.1	3	12			16.2	2200	2.5			
155	Edlabad	Sula	Public	55D/5	270	Basalt	FMB	17	5	GL	3	5			16.4	980	9.2			
156	Edlabad	Halkheda	Public	55C/8	292	Basalt	FMB	10	5	0.1	3	6			9.6	780	4.3			
157	Edlabad	Kurha Kakora	Public	55D/5	223	Basalt	FMB	15	4	0.3	1	5			14.8	1610	6.2			
158	Edlabad	Icchapur	Public	55C/4	226	Basalt	FMB	15	5	0.4	3	8			14.5	2180	6.4			
159	Edlabad	Dui	Public	55C/4	229	Alluvi um	Sand & Gravel	28	5	0.4	3	NA			22	2100	12.2			
160	Edlabad	Morjhari	Public	55C/8	272	Basalt	FWB	14	6	GL	3	NA			13	790	5.2			
161	Edlabad	Narvel	CGWB		376.77			27	0	0.5	0				26.49		23.1			
162	Edlabad	Mendhoda	CGWB		237.36			17.7	0	0.7	0				14.2		9.4			
163	Edlabad	Muktai Nagar-1	CGWB		229			16.3	0	1	0				13.3		1.8			

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164	Pachora	Ghusardi	Public		283	Basalt		25.61							4		2.9		-0.332	-0.074
165	Pachora	Dujkheda	Public		242.3	Basalt		11.1							8.1		6.9		0.035	0.231
166	Pachora	Sarola kh.	Public		269.9	Basalt		15							10.6		8.4		-0.084	0.097
167	Pachora	Anturli bk. p. p.	Public		260.3	Basalt		18							11.1		8.8		0.292	0.282
168	Pachora	Galan bk.	Public		277.9	Basalt		8							4.2		1.7		-0.072	-0.081
169	Pachora	Pachora	Public		255.2	Basalt		16.21							5.5		2.7		-0.420	-0.484
170	Pachora	Nagardeola bk	Public		289.5	Basalt		16.61							7.6		4.5		-0.004	-0.055
171	Pachora	Hadsan	Public		241	Basalt		10							5.5		1.9		-0.359	-0.089
172	Pachora	Dighi	Public		323	Basalt		15							11.5		7.7		0.411	0.357
173	Pachora	Satgaon	Public		317.7	Basalt		9.7							5		1.1		-0.104	-0.069
174	Pachora	Shindad	Public		300.6	Basalt		7.5							5.1		1		-0.021	0.008
175	Pachora	Vadgaon ambe.	Public		292.7	Basalt		16.96							6.2		1.5		-0.048	0.035
176	Pachora	Dongargaon	Public		289.7	Basalt		12							9		4.2		-0.045	-0.038
177	Pachora	Bambrud .kh.p.p.	Public		255.3	Basalt		12.3							10.8		5.8		-0.001	-0.126
178	Parola	Palashkhede Bk.	Public	46P/1	240	Basalt	FMB	16	6	0.8	3	7.5			14	2100	7.7	1660		
179	Parola	Badarde	Public	46P/1	253	Basalt	FMB	12	8	0.6	3	7			10.2	2400	4.3	1630		
180	Parola	Chiklod Kh.	Public	46P/1	227	Basalt	FMB	10	6	0.5	3	3			7	550	3.4	430		
181	Parola	Karmad Bk.	Public	46P/1	250	Basalt	FMB	11	6	0.8	3	7			10	1480	4.3	1100		
182	Parola	Mondhale	Public	46P/1	237	Basalt	FMB	8	6	0.2	3	4			6	1340	2.4	1050		
183	Parola	Pimpalkhote	Public	46L/13	260	Basalt	FMB	12	3	0.5	3	4			10.25	3000	3.4	2200		
184	Parola	Sumthana	Public	46P/1	211	Basalt	FMB	14	6	0.5	3	4			10.3	1050	4.6	890		
185	Parola	Shirasmani	Public		286	Basalt		9.65							4.4		2.4			
186	Parola	Sarve Bk	Public		266.2	Basalt		9.9							6.7		3.7			
187	Parola	Dholi	Public		288	Basalt		8							7		3.9			
188	Parola	Rajwad	Public		218.8	Basalt		12.5							11		6.9			
189	Parola	Titvishiv	Public		299.4	Basalt		10.81							6.4		2.1			
190	Parola	Mhasve	Public		248.1	Basalt		10							10		4.4			
191	Parola	Adgaon	Public		271.1	Basalt		10.5							10.5		4.1			

S.no.	Block	Location	Agency Name	Topo sheet	Alt. (mamsl)	Form -ation	Aquifer	Well Depth (m)	Diam eter (m)	MP (magl)	Lining (m)	Total Thickness weatherd portion (m)	Depth to Fractures (mbgl)	Thickn ess of fractur e zone (m)	DTW (mbgl) May-17	Spot EC	DTW (mbgl) Nov.-17	Spot EC	Pre trend (m/year)	Post trend (m/year)
192	Parola	Jamde	Public		261.8	Basalt		15							12		3.1			
193	Parola	Mangrool	Public		280.7	Basalt		15.7							15		3.9			
194	Parola	Mundane. Pr. Amalner.	Public		242	Basalt		20							20		1.6			
195	Parola	Anchalgaon	Public	46P/1	307	Basalt	FMB	20	6	0.4	3	9			19.2	600	2.3	950		
196	Parola	Ambapimpri	Public	46P/1	212	Basalt	FMB	15	8	0.8	3	3			12	3700	6.2	2300		
197	Parola	Karadi	Public	46L/13	294	Basalt	FMB	15.5	7	0.3	3	6			14	2000	3.6	3000		
198	Raver	Mohgan bk.	Public		323.5			24.65							24		21.4		-0.205	-0.122
199	Raver	Lalmati	Public		306.7			8.1							4.2		0.1		-0.015	-0.143
200	Raver	Padle bk.	Public		277			20							10.1		5		-0.118	0.123
201	Raver	Bhokari	Public		256.9			17.75							16.1		9.1		0.207	0.342
202	Raver	Waghoda bk.	Public		228			46.55							46		31.1		0.085	-0.245
203	Raver	Raver	Public		259.9			32.1							32		16		0.049	-0.829
204	Raver	Savkheda kh.	Public		249.4			43.6							40		23.4		0.736	0.241
205	Raver	Lohare	Public		451			35.45							34.5		11.6		0.162	-0.378
206	Raver	Chinchati	Public		327.1			35.7							30.3		3.1		0.367	0.003
207	Yawal	Yawal	Public		218.3			35							22		12.4		0.065	0.123
208	Yawal	Viroda	Public		214.3	alluvium		24.75							24		12.8		0.887	0.257
209	Yawal	Giradgaon	Public		212.5	alluvium		38							41		21		0.108	-0.190
210	Yawal	Mohrale	Public		274	alluvium		50							50		28.1		0.311	0.180
211	Yawal	Dambhurni	Public		194.5	alluvium		38.9							38.9		16.2		0.120	-0.170
212	Yawal	Nimgaon	Public		203.2	alluvium		50.55							55		32.1		0.324	0.310
213	Yawal	Chincholi	Public		221.7	alluvium		45							44		20.8		0.032	-0.190
214	Jalgaon	Balajipeth	CGWB		213.9			8.64	0	0.82	0				8		5.8			
215	Jalgaon	Harivitthal Nagar	CGWB		208.6			10.1	0	0.2	0				9.8		3.97			
216	Chopda	Mondhale	CGWB		254.76			7.86	0	0.66	0				5.5		5.2			

S.no.	Block	Location	Agency Name	Topo sheet	Alt. (mamsl)	Form -ation	Aquifer	Well Depth (m)	Diam eter (m)	MP (magl)	Lining (m)	Total Thickness weatherd portion (m)	Depth to Fractures (mbgl)	Thickn ess of fractur e zone (m)	DTW (mbgl) May-17	Spot EC	DTW (mbgl) Nov.-17	Spot EC	Pre trend (m/year)	Post trend (m/year)
217		Kasamwadi	CGWB		218.3			8.01	0	0.55	0				3.5		2.31			
218	Jalgaon	Shivaji Udhyan	CGWB		229.3			6.7	0	0.9	0				2.7		1.3			
219	Jalgaon	Naseerabad	CGWB		216.79			20	0	0.6	0				15.6		14			
220	Parola	Parola-1	CGWB		249.7	Basalt		14.85	0	2.85	0				7.9		5.8			
221	Amalner	Amalner-1	CGWB		182	Basalt		7.8	0	0.6	0				7.2		4.1			
222	Parola	Talwade Kd	CGWB		287.13			11.9	0	0.4	0				10.2		4.6			
223	Jalgaon	Sindhi Colony	CGWB		223.3	Basalt		7.53	0	0.4	0				7.2		1.2			
224		Kusumbe-1	CGWB		259			16.5	0	1	0				14.4		8.3			
225		Sirsala	CGWB		306			14.9	0	0.9	0				13		5.5			

BWL: Below water level, GL: Ground level

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

SL. No.	Block	Village	Type	pH	EC	TH	TDS	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
					µS/cm		Mg/ L												%	meq/L
1	Amalner	Amalner (M Cl)	DW	7.5	703	154.38	-	89.64	15.73	50.35	4.43	0.00	180.56	43.69	62.0	43.00	0.49	0.00	2.88	-2.81
2	Amalner	Dahivad	DW	7.6	1725	343.62	-	209.16	32.67	100.51	1.47	0.00	126.88	164.49	279.0	13.00	0.69	0.00	3.78	-11.05
3	Amalner	Dangar Bk.	DW	7.2	974	129.48	-	119.52	2.42	117.18	1.17	0.00	24.40	182.48	130.0	34.00	0.27	0.00	6.02	-5.76
4	Amalner	Dhar	DW	8.05	1182	152	768	38.40	13.61	170.00	1.40	0.00	110.04	228.00	0.0	0.00	0.00	0.00	14.27	-1.23
5	Amalner	Galvade	DW	7.7	762	149.4	-	89.64	14.52	70.80	1.33	0.00	136.64	61.68	123.0	21.00	0.45	0.00	4.06	-3.43
6	Amalner	Jalod	DW	7.9	1861	154.38	-	74.70	19.36	377.60	1.32	0.00	405.04	197.90	210.0	43.00	0.89	0.00	23.19	1.32
7	Amalner	Kalamsare	DW	7.7	1640	343.62	-	159.36	44.78	100.83	0.97	0.00	146.40	149.07	252.0	43.00	0.89	0.00	4.22	-9.24
8	Amalner	Khakarpat	DW	7.6	920	189.24	-	89.64	24.20	77.57	0.74	0.00	190.32	56.54	37.0	47.00	0.88	0.00	4.34	-3.35
9	Amalner	Kurha Bk.	DW	7.4	3810	672.3	-	268.92	98.02	337.10	0.95	0.00	234.24	683.65	367.0	42.00	0.56	0.00	10.67	-17.65
10	Amalner	Lon Sim	DW	7.7	3484	582.66	-	169.32	100.44	352.90	2.51	0.00	253.76	578.28	472.0	42.00	0.74	0.00	13.44	-12.56
11	Amalner	Mehergaon	DW	8.35	768	143	499	54.00	1.94	21.30	0.80	2.31	109.58	32.00	18.0	0.00	0.24	0.27	1.62	-0.98
12	Amalner	Mudi pr.dangr	DW	7.73	956	412	621	83.20	49.57	43.90	0.40	0.00	335.50	80.00	56.0	0.00	0.35	0.19	2.38	-2.73
13	Amalner	Mundane	DW	9.07	485	141	315	30.00	16.04	35.90	0.50	11.88	107.54	50.00	15.0	0.00	0.35	0.33	3.28	-0.66
14	Amalner	Nisardi	DW	7.7	2414	567.72	-	348.60	53.25	68.20	0.66	0.00	146.40	218.46	296.0	7.90	0.32	0.00	1.99	-19.38
15	Amalner	Pimpri. p. jalod	DW	8	853	257	554	89.60	8.02	65.40	0.70	0.00	215.94	120.00	18.0	0.00	0.24	0.22	3.81	-1.59
16	Amalner	Rundhati	DW	7.7	458	134.46	-	99.60	8.47	28.70	17.28	0.00	170.80	20.56	28.0	44.00	0.39	0.00	1.59	-2.87
17	Amalner	Savkheda	DW	8.01	1294	428	841	73.60	59.29	76.80	0.60	0.00	391.62	112.00	72.0	0.00	0.30	0.16	4.26	-2.13
18	Bhadgaon	Balad kh.	DW	7.29	1152	212	749	72.00	7.78	145.00	1.20	0.00	180.56	208.00	59.0	0.00	0.00	0.00	9.39	-1.27
19	Bhadgaon	Kajgaon	DW	7.65	1088	384	707	86.40	40.82	112.80	2.50	0.00	224.48	212.00	90.0	0.00	0.00	0.00	6.16	-3.99
20	Bhadgaon	Nimbhore	DW	8.37	1272	332	827	41.60	55.40	81.50	0.80	7.20	263.52	106.00	16.0	0.00	0.50	0.27	5.52	-2.08
21	Bhadgaon	Pendgaon	DW	9.19	411	158	267	30.00	20.17	31.90	0.20	18.58	127.64	42.00	16.0	0.00	0.35	0.25	2.84	-0.45
22	Bhusawal	Bhusawal	DW	-	884	355	468	80.16	37.67	82.93	1.08	0.00	225.70	184.34	21.0	81.00	0.23	0.00	4.70	-3.40
23	Bhusawal	Bodwad	DW	-	880	360	440	70.14	44.96	70.95	2.64	0.00	280.60	138.26	60.0	69.00	0.40	0.00	4.16	-2.60
24	Bhusawal	Borgaon	DW	8.17	984	408	640	68.40	57.59	57.30	0.70	0.00	247.66	110.00	92.0	0.00	0.33	0.19	3.28	-4.09
25	Bhusawal	Sonoti	DW	8.01	1317	506	856	106.00	58.56	63.60	3.40	0.00	307.44	114.00	129.0	0.00	0.14	0.21	3.09	-5.07
26	Bhusawal	Talvel	DW	8.39	756	282	491	32.80	48.60	45.50	0.40	3.61	156.27	84.00	84.7	0.00	0.23	0.27	3.40	-2.95
27	Bhusawal	Vichve	DW	7.55	2440	743	1586	65.20	140.94	193.00	26.6	0.00	435.54	314.00	240.0	0.00	0.05	0.14	9.35	-7.71
28	Chalisgaon	Abhane	DW	7.8	1950	677.3	-	353.60	78.70	17.50	1.30	0.00	219.60	251.90	120.0	260.00	0.60	0.00	0.50	-20.52
29	Chalisgaon	Adgaon	DW	6.97	1596	480	1037	145.60	28.19	97.60	0.90	0.00	379.42	182.00	80.8	0.00	0.00	0.00	4.36	-3.37
30	Chalisgaon	Bhamare Kh	DW	7.8	1946	508	-	209.20	72.60	18.40	1.20	0.00	239.10	138.80	130.0	160.00	0.40	0.00	0.66	-12.49
31	Chalisgaon	Bhoras bk.	DW	9.3	395	195	257	31.60	28.19	32.00	0.20	22.43	119.58	50.00	45.0	0.00	0.14	0.29	2.67	-1.19
32	Chalisgaon	Bhoras Kh	DW	8.1	1280	403.4	-	174.30	55.70	29.00	0.70	0.00	351.40	97.70	86.0	47.30	0.70	0.00	1.15	-7.52
33	Chalisgaon	Bodar	DW	-	604	295	320	50.10	41.32	46.83	4.63	0.00	329.40	85.08	26.0	11.00	0.57	0.00	3.14	-0.50
34	Chalisgaon	Borkhede Bk	DW	8	829	234.1	-	84.70	36.30	15.30	0.90	0.00	234.20	36.00	34.0	27.90	0.60	0.00	0.85	-3.38
35	Chalisgaon	Chinchgavhan	DW	7.9	915	308.8	-	114.50	47.20	87.10	1.70	0.00	351.40	48.80	22.0	79.00	0.50	0.00	4.18	-3.84
36	Chalisgaon	Daregaon	DW	7.9	846	348.6	-	54.80	71.40	53.70	2.50	0.00	322.10	64.30	36.0	29.40	0.40	0.00	3.18	-3.33

SL. No.	Block	Village	Type	pH	EC	TH	TDS	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
					µS/cm		Mg/ L												%	meq/L
37	Chalisgaon	Hirapur	DW	7.89	1181	292	768	70.40	28.19	115.90	0.80	0.00	189.10	216.00	70.0	0.00	0.00	0.00	7.11	-2.73
38	Chalisgaon	Kharadi	DW	7.9	674	293.8	-	94.60	48.40	25.90	0.70	0.00	297.70	33.40	26.0	23.00	0.30	0.00	1.34	-3.82
39	Chalisgaon	Kharjai	DW	9.99	397	141	258	21.60	21.14	28.10	0.40	49.85	54.27	38.00	16.0	0.00	0.18	0.27	2.80	-0.27
40	Chalisgaon	Mehunbare	DW	8.87	640	183	416	30.00	26.24	37.30	0.10	8.05	115.58	50.00	67.0	0.00	0.35	0.86	3.20	-1.49
41	Chalisgaon	Patne	DW	8.23	1833	581	1191	71.20	97.93	144.00	0.80	0.00	355.02	272.00	61.0	0.00	0.55	0.56	7.41	-5.79
42	Chalisgaon	Pimpalgaon	DW	8.14	2060	627	1339	91.20	96.96	142.00	0.70	0.00	420.90	258.00	23.0	0.00	0.55	0.10	6.78	-5.63
43	Chalisgaon	Sevanagar	DW	8.03	632	228	411	46.40	27.22	57.50	0.90	2.00	198.94	82.00	46.0	0.00	0.30	0.32	4.19	-1.23
44	Chalisgaon	Shindi	DW	7.3	1224	378.5	-	94.60	69.00	87.10	1.10	0.00	424.60	79.70	86.0	160.00	0.60	0.00	4.32	-3.44
45	Chalisgaon	Talonde Pr	DW	7.9	1331	537.8	-	109.60	104.10	54.40	0.90	0.00	444.10	123.40	104.0	170.00	0.30	0.00	2.41	-6.76
46	Chalisgaon	Tambole Bk.	DW	7.8	1308	478.1	-	69.70	99.20	76.50	0.90	0.00	522.20	133.60	100.0	41.40	0.50	0.00	3.95	-3.08
47	Chalisgaon	Wakdi	DW	8.14	1169	394	760	71.20	52.49	94.00	0.40	0.00	385.52	142.00	15.0	0.00	0.14	0.11	5.37	-1.55
48	Chopda	Adawad	DW	7.49	1084	304	705	40.00	49.57	73.60	1.40	0.00	268.40	140.00	0.0	0.00	0.00	0.00	5.16	-1.68
49	Chopda	Adgaon	DW	8.19	782	249	508	52.40	28.67	29.30	2.80	0.00	195.20	56.00	11.0	0.00	0.50	0.19	2.02	-1.78
50	Chopda	Chopda	DW	-	655	210	346	46.09	23.09	56.00	2.22	0.00	189.10	102.81	10.0	51.00	0.53	0.00	4.16	-1.10
51	Chopda	Deoziri	DW	8.07	386	131	251	40.80	7.05	21.20	4.80	1.53	138.41	34.00	11.0	0.00	0.18	0.30	1.80	-0.30
52	Chopda	Hated .bk.	DW	8.1	815	314	530	78.40	28.67	74.80	0.70	0.00	256.20	132.00	18.0	0.00	0.43	0.63	4.38	-2.07
53	Chopda	Karjane	DW	8.59	990	347	744	50.40	53.70	81.10	0.70	9.60	186.66	120.00	85.0	0.00	0.35	0.52	5.21	-3.55
54	Chopda	Lahasur	DW	8.02	1277	457	830	63.60	72.41	79.30	0.30	0.00	344.04	120.00	87.0	0.00	0.30	0.40	4.48	-3.49
55	Chopda	Maratha	DW	7.93	776	298	504	40.80	47.63	37.10	0.10	0.00	231.80	70.00	38.0	0.00	0.35	1.71	2.60	-2.16
56	Chopda	Mitawali	DW	7.63	942	224	612	43.20	28.19	29.50	0.70	0.00	295.24	48.00	0.0	0.00	0.00	0.00	2.20	0.36
57	Edlabad	Mendhoda	DW	-	1850	710	981	112.22	104.51	88.00	6.12	0.00	323.30	340.32	44.0	87.00	0.45	0.00	3.87	-8.90
58	Edlabad	Muktai Nagar-1	DW	-	674	215	358	42.08	26.73	92.00	0.63	0.00	384.30	85.08	11.0	16.00	0.92	0.00	6.97	2.00
59	Erandol	Chandsar	DW	7.61	2290	539	1489	73.60	86.27	193.00	26.1	0.00	307.44	340.00	166.0	0.00	0.35	0.13	10.08	-5.73
60	Erandol	Dharangaon	DW	-	1382	400	733	78.16	49.82	74.00	4.21	0.00	335.50	113.44	38.0	114.0	0.95	0.00	4.11	-2.50
61	Erandol	Erandol	DW	-	667	300	354	60.12	36.46	51.22	0.82	0.00	225.70	124.08	50.0	43.00	0.17	0.00	3.26	-2.30
62	Erandol	Kasoda	DW	-	2699	1065	1432	246.49	109.37	125.22	3.78	0.00	353.80	666.46	58.0	193.0	0.37	0.00	4.07	-15.50
63	Erandol	Paldhi kh.	DW	8.45	1812	612	1178	89.60	94.28	177.00	26.8	4.80	418.46	336.00	97.0	0.00	0.24	0.11	8.54	-5.21
64	Erandol	Pimpalkotha	DW	-	1800	605	954	122.24	72.91	117.00	6.90	0.00	268.40	329.69	46.0	148.0	0.36	0.00	5.24	-7.70
65	Erandol	Pimpri seem.	DW	7.95	1746	408	1135	108.80	33.05	172.00	5.80	0.00	606.34	228.00	0.0	0.00	0.00	0.00	8.67	1.79
66	Erandol	Zurkheda	DW	8.03	1142	306	742	73.60	29.65	84.00	0.80	0.00	280.60	116.00	67.0	0.00	0.50	0.15	5.04	-1.51
67	Jalgaon	Asoda	DW	7.8	1289	199.2	-	89.64	26.62	187.62	1.46	0.00	322.08	110.52	138.0	15.00	0.71	0.00	10.43	-1.38
68	Jalgaon	Bholane	DW	7.7	1313	304	853	78.40	26.24	131.90	2.90	0.00	215.94	200.00	85.0	0.00	0.00	0.00	7.78	-2.53
69	Jalgaon	Bholane	DW	8	1258	89.64	-	39.84	12.10	185.60	0.62	0.00	463.60	33.41	72.0	40.00	1.64	0.00	15.46	4.61
70	Jalgaon	Chincholi	DW	8.05	810	260	557	49.60	33.05	66.60	0.20	0.00	241.56	93.00	49.0	0.00	0.40	0.29	4.62	-1.24
71	Jalgaon	Dapore	DW	7.63	1350	420	878	88.00	48.60	80.30	0.30	0.00	378.20	130.00	75.0	0.00	0.40	0.33	4.28	-2.19
72	Jalgaon	Balajipeth	DW	-	832	295	440	60.12	35.24	99.13	45.89	0.00	378.20	106.35	31.0	61.00	0.53	0.00	6.34	0.30
73	Jalgaon	Kasamwadi	DW	-	443	225	228	60.12	18.23	52.66	4.34	0.00	268.40	85.08	10.0	27.00	0.29	0.00	3.57	-0.10
74	Jalgaon	Shivaji Udhyan	DW	-	707	340	374	78.16	35.24	53.82	1.97	0.00	231.80	88.63	11.0	124.0	0.45	0.00	3.10	-3.00

SL. No.	Block	Village	Type	pH	EC	TH	TDS	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
					µS/cm		Mg/ L												%	meq/L
75	Jalgaon	Jalgaon (M Cl)	DW	7.5	1618	318.72	-	179.28	33.88	116.02	1.94	0.00	253.76	192.76	139.0	39.00	0.38	0.00	4.67	-7.58
76	Jalgaon	Jalgaon Kh.	DW	7.7	2227	413.34	-	174.30	58.09	208.62	2.52	0.00	287.92	233.88	185.0	8.00	0.39	0.00	8.25	-8.76
77	Jalgaon	Jalke	DW	7.63	1316	406	855	68.80	56.86	50.30	0.20	0.00	419.68	96.00	21.0	0.00	0.40	0.16	2.88	-1.23
78	Jalgaon	Kusumbe kh.	DW	8.17	918	276	597	44.80	39.85	60.30	3.10	0.00	253.76	102.00	32.0	0.00	0.73	0.21	4.23	-1.36
79	Jalgaon	Kusumbe-1	DW	-	506	245	268	68.14	18.23	18.15	0.82	0.00	189.10	81.54	13.0	34.00	0.48	0.00	1.17	-1.80
80	Jalgaon	Lonwadi Bk.	DW	7.7	644	179.28	-	94.62	20.57	31.40	0.48	0.00	170.80	28.27	73.0	23.00	0.49	0.00	1.73	-3.62
81	Jalgaon	Nandra Bk.	DW	7.8	1269	174.3	-	69.72	25.41	189.10	1.98	0.00	287.92	143.93	168.0	41.00	0.52	0.00	11.75	-0.85
82	Jalgaon	Naseerabad	DW	-	681	280	360	62.12	30.38	66.59	4.59	0.00	292.80	106.35	19.0	28.00	0.20	0.00	4.27	-0.80
83	Jalgaon	Pathri	DW	7.6	2189	473.1	-	288.84	44.78	85.48	1.71	0.00	151.28	292.99	98.0	39.00	0.48	0.00	2.73	-15.62
84	Jalgaon	Phupnagri	DW	7.8	1794	293.82	-	94.62	48.41	209.42	1.78	0.00	287.92	210.75	135.0	42.00	0.70	0.00	10.84	-3.99
85	Jalgaon	Umale	DW	7.7	684	199.2	-	119.52	19.36	29.61	1.15	0.00	195.20	48.83	39.0	39.00	0.45	0.00	1.47	-4.36
86	Jalgaon	Vakadi	DW	8	1583	209.16	-	74.70	32.67	226.28	3.09	0.00	351.36	167.06	69.0	39.00	1.26	0.00	13.38	-0.66
87	Jamner	Bhagdare	DW	7.9	625	326	406	84.80	27.70	25.70	0.30	2.22	297.74	42.00	31.0	0.00	0.88	0.32	1.46	-1.56
88	Jamner	Gadegaon p.n.	DW	7.63	313	126	203	29.20	12.88	18.10	0.10	0.48	119.50	34.00	6.0	0.00	0.27	0.60	1.71	-0.54
89	Jamner	Godri	DW	7.89	600	269	390	65.20	25.76	26.00	0.10	1.80	246.17	48.00	30.0	0.00	0.72	0.34	1.66	-1.28
90	Jamner	Hiverkheda bk.	DW	7.93	1007	441	655	66.80	66.58	57.90	0.10	0.00	407.48	110.00	36.0	0.00	0.44	0.18	3.27	-2.13
91	Jamner	Jalandri bk.	DW	7.59	2270	548	1476	62.40	95.26	140.00	1.00	0.00	422.12	260.00	0.0	0.00	0.00	0.00	7.53	-4.03
92	Jamner	Kharsane	DW	7.59	321	151	209	32.80	16.77	10.60	0.10	0.41	111.57	20.00	26.0	0.00	0.27	0.39	0.93	-1.17
93	Jamner	Malkheda digar.	DW	7.83	1540	296	1001	100.80	10.69	208.00	0.70	0.00	128.10	392.00	0.0	0.00	0.00	0.00	11.39	-3.81
94	Jamner	Mundkheda bk.	DW	7.65	327	143	213	27.60	17.98	9.60	0.10	0.60	143.38	16.00	8.0	0.00	0.38	1.92	0.90	-0.49
95	Jamner	Neri	DW	-	1471	665	781	132.26	81.42	27.36	0.85	0.00	195.20	244.61	44.0	150.00	0.57	0.00	1.17	-10.10
96	Jamner	Paldhi	DW	7.85	1030	502	670	44.00	95.26	57.50	1.00	0.00	468.48	110.00	37.0	0.00	0.44	0.21	3.39	-2.36
97	Jamner	Rampura	DW	8.09	1058	473	688	73.60	70.23	59.00	2.60	0.00	391.62	110.00	40.0	0.00	0.38	0.39	3.19	-3.03
98	Jamner	Shendurni	DW	-	626	230	331	56.11	21.87	24.30	13.3	0.00	213.50	74.45	12.0	13.00	0.40	0.00	1.67	-1.10
99	Jamner	Shengola	DW	-	789	295	418	90.18	17.01	30.98	2.55	0.00	195.20	113.44	45.0	41.00	0.66	0.00	1.76	-2.70
100	Jamner	Talegaon	DW	7.99	966	308	628	36.80	52.49	74.10	2.00	0.00	259.86	136.00	0.0	0.00	0.00	0.00	5.27	-1.90
101	Jamner	Vakdi	DW	-	897	380	476	64.13	53.47	67.69	15.44	0.00	341.60	145.35	60.0	48.00	0.62	0.00	4.01	-2.00
102	Jamner	Wadi	DW	7.87	1677	734	1090	190.80	62.45	146.00	0.60	0.00	416.02	280.00	137.0	0.00	0.33	0.00	5.53	-7.84
103	Jamner	Wakod	DW	8.09	1040	404	676	73.60	53.46	57.70	2.40	0.00	356.24	106.00	33.0	0.00	0.44	0.13	3.25	-2.23
104	Edlabad	Dui	DW	7.65	1584	661	1030	148.40	70.47	107.00	10.2	0.00	407.48	192.00	142.0	0.00	0.33	0.15	4.45	-6.53
105	Edlabad	Dui	DW	7.5	1630	328.68	-	189.24	33.88	103.33	0.90	0.00	204.96	190.19	146.0	42.00	0.55	0.00	4.06	-8.87
106	Edlabad	Halkheda	DW	7.9	665	209.16	-	114.54	22.99	29.77	1.95	0.00	244.00	28.27	37.0	43.00	0.46	0.00	1.50	-3.61
107	Edlabad	Icchapur	DW	7.3	1716	363.54	-	249.00	27.83	69.82	2.71	0.00	195.20	231.31	81.0	11.00	0.42	0.00	2.43	-11.52
108	Edlabad	Karaki	DW	8.19	1026	441	667	73.60	62.45	57.50	2.50	0.00	387.96	110.00	30.0	0.00	0.44	0.21	3.17	-2.45
109	Edlabad	Karki	DW	7.4	1667	378.48	-	189.24	45.99	67.46	0.98	0.00	190.32	195.33	127.0	43.00	0.23	0.00	2.61	-10.11
110	Edlabad	Kurha Kakora	DW	7.7	1491	333.66	-	129.48	49.62	79.68	1.91	0.00	248.88	167.06	70.0	39.00	0.46	0.00	3.62	-6.46
111	Edlabad	Morjhari	DW	7.6	756	204.18	-	124.50	19.36	29.09	2.67	0.00	214.72	35.98	52.0	8.00	0.41	0.00	1.42	-4.29
112	Edlabad	Muktainagar	DW	8.31	625	249	406	32.80	40.58	36.10	0.40	3.09	160.81	65.00	29.0	0.00	0.38	0.16	2.80	-2.24

SL. No.	Block	Village	Type	pH	EC	TH	TDS	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
					µS/cm		Mg/ L												%	meq/L
113	Edlabad	Nimkhedi bk.	DW	7.69	826	347	537	65.20	44.71	35.40	0.40	0.00	307.44	58.00	30.0	0.00	0.33	0.24	2.13	-1.89
114	Edlabad	Ruikhed	DW	7.8	1286	249	-	119.52	31.46	93.18	2.45	0.00	200.08	118.23	123.0	40.00	0.50	0.00	4.52	-5.27
115	Edlabad	Sarola	DW	7.99	979	184	636	51.20	13.61	89.00	1.10	0.00	128.10	170.00	31.0	0.00	0.00	0.00	6.59	-1.58
116	Edlabad	Sukli	DW	7.94	991	288	644	22.40	56.38	44.00	0.40	0.00	280.60	64.00	34.0	0.00	0.00	0.00	3.49	-1.16
117	Edlabad	Sula	DW	7.8	921	159.36	-	64.74	22.99	117.60	2.35	0.00	356.24	35.98	46.0	8.00	0.82	0.00	7.60	0.72
118	Edlabad	Narvel	DW	-	889	410	470	86.17	47.39	82.15	1.43	21.00	408.70	109.90	36.0	55.00	0.20	0.00	4.42	-0.80
119	Pachora	Bambrud	DW	8.11	963	204	626	44.80	22.36	63.20	11.2	0.00	236.68	82.00	35.8	0.00	0.00	0.00	4.77	-0.20
120	Pachora	Lasgaon	DW	-	754	335	399	68.14	40.10	66.74	2.05	0.00	366.00	88.63	56.0	58.00	0.62	0.00	4.01	-0.70
121	Pachora	Nagardeola bk	DW	7.69	773	228	502	24.00	40.82	60.90	11.1	0.00	261.08	82.00	36.5	0.00	0.00	0.00	5.16	-0.28
122	Pachora	Pachora	DW	-	942	435	499	74.15	60.76	74.06	3.04	0.00	347.70	159.53	34.0	80.00	0.33	0.00	4.09	-3.00
123	Pachora	Satgaon	DW	7.4	1289	380	838	124.80	16.52	109.60	2.60	0.00	308.66	202.00	60.0	0.00	0.00	0.00	5.36	-2.53
124	Pachora	Shindad	DW	8.89	1183	303	769	76.40	27.22	86.00	0.70	10.80	206.18	114.00	18.0	0.00	0.43	0.52	5.11	-2.31
125	Pachora	Vadgaon ambe.	DW	7.11	1303	280	847	99.20	7.78	167.00	1.10	0.00	275.72	214.00	79.6	0.00	0.00	0.00	9.28	-1.07
126	Parola	Adgaon	DW	8.23	1001	270	651	66.40	25.27	61.50	0.50	10.80	190.32	96.00	44.0	0.00	0.80	0.29	3.90	-1.91
127	Parola	Ambapimpri	DW	7.1	3141	502.98	-	488.04	3.63	294.40	2.40	0.00	34.16	614.26	97.0	18.00	0.71	0.00	7.50	-24.09
128	Parola	Anchalgaon	DW	7.5	488	144.42	-	69.72	18.15	41.89	1.22	0.00	117.12	30.84	80.0	44.00	0.72	0.00	2.66	-3.05
129	Parola	Badarde	DW	7.4	2038	468.12	-	273.90	47.20	60.48	1.55	0.00	92.72	267.29	173.0	43.00	0.31	0.00	1.98	-16.03
130	Parola	Chiklod Kh.	DW	7.2	523	119.52	-	64.74	13.31	33.02	2.05	0.00	107.36	38.55	38.0	44.00	0.29	0.00	2.20	-2.57
131	Parola	Dholi	DW	8.05	400	148	260	33.60	15.55	33.50	1.40	1.21	114.73	64.00	14.0	0.00	0.35	0.07	2.94	-1.04
132	Parola	Jamde	DW	7.9	528	174	343	36.80	19.93	14.10	0.60	1.11	148.85	26.00	24.0	0.00	0.35	0.09	1.16	-1.00
133	Parola	Karadi	DW	7.5	1760	219.12	-	184.26	8.47	214.32	3.14	0.00	39.04	313.56	200.0	40.00	0.68	0.00	8.81	-9.25
134	Parola	Karmad Bk.	DW	7.6	1339	323.7	-	154.38	41.14	52.05	1.42	0.00	161.04	82.24	206.0	18.00	0.37	0.00	2.22	-8.45
135	Parola	Mhasve	DW	9.04	431	125	280	24.80	15.31	44.30	1.00	10.41	101.04	62.00	16.0	0.00	0.24	0.33	4.39	-0.49
136	Parola	Mondhale	DW	-	841	320	446	44.09	51.04	37.00	2.89	0.00	280.60	88.63	10.0	58.00	0.71	0.00	2.50	-1.80
137	Parola	Mondhale	DW	7.7	1212	189.24	-	94.62	22.99	118.20	3.17	0.00	175.68	141.36	127.0	44.00	0.76	0.00	6.47	-3.73
138	Parola	Palashkhede Bk.	DW	7.2	1935	249	-	214.14	8.47	219.74	1.61	0.00	39.04	344.40	258.0	39.00	0.58	0.00	8.39	-10.74
139	Parola	Parola-1	DW	-	2195	790	1164	156.31	97.22	121.00	22.21	0.00	292.80	425.40	53.0	182.0	0.26	0.00	4.77	-11.00
140	Parola	Pimpalkhote	DW	7.5	2627	557.76	-	313.74	59.30	137.20	3.35	0.00	146.40	285.28	210.0	43.00	0.23	0.00	4.18	-18.14
141	Parola	Rajwad	DW	8.4	440	95	286	18.40	11.91	28.80	0.20	2.14	90.73	38.00	14.0	0.00	0.14	0.45	3.29	-0.34
142	Parola	Sarve. bk.	DW	7.99	842	351	547	21.20	72.41	27.70	26.3	0.00	352.58	50.00	11.0	0.00	0.10	0.13	2.06	-1.24
143	Parola	Sumthana	DW	7.7	851	194.22	-	79.68	27.83	76.58	1.88	0.00	185.44	48.83	80.0	17.00	0.75	0.00	4.47	-3.23
144	Parola	Talwade Kd	DW	-	659	315	350	60.12	40.10	46.05	1.98	0.00	335.50	74.45	16.0	33.00	0.30	0.00	2.90	-0.80
145	Parola	Titvishiv	DW	7.09	610	184	397	33.60	24.30	36.80	0.40	0.20	170.80	65.00	14.0	0.00	0.10	0.25	3.07	-0.87
146	Raver	Balvadi	DW	-	554	255	294	56.11	27.95	52.45	1.72	0.00	353.80	63.81	10.0	7.00	0.13	0.00	3.53	0.70
147	Raver	Bhokri	DW	8.51	451	220	293	22.80	39.61	9.60	0.50	5.66	186.18	18.00	8.0	0.00	0.05	0.11	0.83	-1.16
148	Raver	Lalmati	DW	8.39	535	249	348	40.80	35.72	10.40	0.50	5.68	246.20	14.00	7.0	0.00	0.11	0.09	0.77	-0.75
149	Raver	Lohara	DW	8.41	1653	408	1074	49.60	69.01	135.00	0.20	4.80	398.94	202.00	28.0	0.00	0.50	0.14	8.31	-1.46
150	Raver	Padle bk.	DW	7.81	789	310	513	62.00	37.67	35.40	0.40	0.00	268.40	68.00	20.0	0.00	0.37	0.18	2.22	-1.79

SL. No.	Block	Village	Type	pH	EC	TH	TDS	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
					µS/cm		Mg/ L												%	meq/L
151	Raver	Raver1	DW	-	974	360	515	50.10	57.11	37.60	0.47	0.00	256.20	131.17	32.0	34.00	0.29	0.00	2.39	-3.00
152	Raver	Savkheda kh.	DW	7.67	1340	364	871	78.40	40.82	102.00	2.20	0.00	366.00	166.00	30.0	0.00	0.22	0.10	5.79	-1.27
153	Yawal	Dangarda	DW	-	575	295	305	78.16	24.30	40.91	3.20	0.00	396.50	46.09	11.0	25.00	0.26	0.00	2.43	0.60
154	Yawal	Faizpur	DW	-	782	255	415	28.06	44.96	102.80	0.73	0.00	408.70	81.54	56.0	12.00	0.20	0.00	8.16	1.60
155	Yawal	Kingaon	DW	-	1110	490	589	102.20	57.11	54.11	0.31	0.00	237.90	198.52	43.0	44.00	0.11	0.00	2.67	-5.90
156	Yawal	Mohrale	DW	7.97	719	265	467	57.20	29.65	32.10	1.40	1.74	198.22	60.00	44.0	0.00	0.16	0.23	2.13	-1.99
157	Yawal	Nimgaon	DW	8.03	1218	352	792	46.40	57.35	109.00	1.30	0.00	336.72	196.00	19.0	0.00	0.40	0.18	7.10	-1.52
158	Yawal	Sangvi Bk	DW	-	771	360	409	40.08	63.19	60.27	0.67	0.00	341.60	99.26	33.0	12.00	0.26	0.00	4.02	-1.60
159	Yawal	Viroda	DW	7.75	1240	490	806	65.20	79.46	80.90	0.40	0.00	400.16	120.00	90.0	0.00	0.11	0.20	4.46	-3.23
Desirable limit (DL)						**200**	**500**	**75**	**30**					**250**	**200**	**45**	**1.5**		**0**	
Maximum permissible limit (MPL)						**600**	**2000**	**200**	**100**					**1000**	**400**	**---**	**--**		**18**	
Minimum				6.97	313	89.64	203	18.4	1.944	9.6	0.1	0	24.4	14	0	0	0	0	0.498075	-24.0921
Maximum				9.99	3810	1065	1586	488.04	140.94	377.6	45.89	49.848	606.34	683.653	472	260	1.64	1.92	23.1918	4.614564

Annexure IV: Chemical analysis of ground water samples, Deeper aquifers

SN	Block	Village	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
1	Raver	Utkheda	OW	8.5	750	415	250	12	54.0	81.0	0.1	33.0	354.0	32	-	-	-	0.0	7.3	1.85949
2	Raver	Utkheda	EW	8	690	360	215	30	34.0	58.0	4	0.0	354.0	32	10	-	-	0.0	4.8	1.5072
3	Raver	Raver R.S. (OW)	OW	8.3	1450	960	115	20	16.0	350.0	8	0.0	964.0	50	24	-	-	0.0	37.3	13.48532
4	Raver	Raver R.S.	EW	8.4	1250	644	155	28	28.0	215.0	0.1	51.0	610.0	43	-	-	-	0.0	18.7	7.99641
5	Raver	Savkheda	OW	8.5	750	415	250	12	54.0	81.0	0.1	33.0	354.0	32	-	-	-	0.0	7.3	1.85949
6	Raver	Savkheda	EW	8	740	352	315	44	50.0	25.0	0.1	0.0	372.0	46	-	-	-	0.0	1.7	-0.21302
7	Yawal	Borkheda	EW	8.6	550	282	225	22	41.0	32.0	2	18.0	323.0	14	-	-	-	0.0	2.8	1.42222
8	Yawal	Pimprud	OW	8	870	480	240	32	39.0	106.0	2.7	0.0	506.0	-	-	-	-	0.0	8.3	3.48723
9	Yawal	Pimprud	EW	8.3	840	468	230	32	36.0	104.0	1.6	0.0	488.0	43	-	-	-	0.0	8.3	3.43908
10	Raver	Savda R.S.	EW	8	1050	370	290	18	80.0	124.0	0.1	0.0	451.0	135	-	-	-	0.0	9.2	-0.08951
11	Raver	Atwade	EW	7.7	430	240	150	12	5.0	71.0	0.1	0.0	122.0	64	20	-	-	0.0	10.5	0.98933
12	Chopda	Virwade (OW)	OW	8.3	440	240	55	10	7.0	78.0	0.1	0.0	201.0	43	-	-	-	0.0	12.0	2.21936
13	Chopda	Virwade	EW	8.4	500	270	60	10	9.0	85.0	4	0.0	238.0	36	5	-	-	0.0	12.6	2.66121
14	Chopda	Hingo-	OW	7.7	710	375	240	38	35.0	57.0	11	0.0	397.0	35	-	-	-	0.0	4.3	1.73048
15	Chopda	Hingo-	EW	7.5	700	390	210	28	34.0	69.0	0.1	0.0	336.0	50	20	-	-	0.0	5.8	1.31198
16	Raver	Mohrad (OW)	OW	8	550	310	190	24	32.0	51.0	0.1	0.0	348.0	18	-	-	-	0.0	4.5	1.87284
17	Raver	Mohrad (DZOW)	OW	8.6	470	225	55	10	77.0	74.0	0.1	6.0	232.0	11	-	-	-	0.0	6.0	-2.83287
18	Chopda	Mohrad	EW	8	500	250	180	20	32.0	32.0	4	0.0	281.0	18	-	-	-	0.0	3.0	0.97431
19	Chopda	Kusumbe	OW	8.1	530	290	105	14	11.0	76.0	0.1	0.0	201.0	71	5	-	-	0.0	9.7	1.6906
20	Chopda	Kusumbe	EW	7.9	480	240	165	28	23.0	32.0	4	0.0	262.0	18	-	-	-	0.0	2.9	1.00431
21	Yawal	Palsoda (DZOW)	OW	8.3	520	300	260	22	50.0	25.0	2	0.0	566.0	18	-	-	-	0.0	2.1	4.06444
22	Yawal	Palsoda	EW	7.7	520	277	235	34	36.0	25.0	27	0.0	317.0	21	-	-	-	0.0	2.0	0.53659
23	Yawal	Borkheda (DZ)	OW	7.8	1430	824	150	24	22.0	276.0	3.9	0.0	92.0	372	80	-	-	0.0	26.3	-1.5001
24	Chopda	Ajantisim	OW	8	720	390	275	26	51.0	51.0	0.1	244	110.0	-	29	-	-	0.0	4.0	4.44123
25	Chopda	Ajantisim	EW	8	660	395	240	10	52.0	64.0	0.1	0.0	214.0	107	53	-	-	0.0	6.0	-1.27062
26	Yawal	Dongaon	EW	8.3	460	240	130	20	14.0	48.0	0.1	0.0	275.0	7	-	-	-	0.0	5.2	2.35719
27	Yawal	Dongaon (OW)	OW	8.5	600	335	40	8	5.0	117.0	1.6	15.0	244.0	43	15	-	-	0.0	20.4	3.68846
28	Raver	Waghode	OW	7.8	1800	1050	365	32	69.0	267.0	2.3	0.0	122.0	560	125	-	-	0.0	18.5	-5.27523
29	Yawal	Chitode	EW	7.9	590	290	150	10	30.0	67.0	0.1	0.0	342.0	11	-	-	-	0.0	7.6	2.63768
30	Yawal	Chikli O.W.	OW	8.7	630	300	180	10	38.0	60.0	0.1	6.0	360.0	4	-	-	-	0.0	6.3	2.47436
31	Yawal	Chikli Bk	EW	8.3	720	360	280	20	41.0	69.0	0.1	0.0	439.0	7	-	-	-	0.0	6.1	2.82332
32	Chopda	Mangrule	PZ	7.8	1170	576	140	22	21.0	205.0	2.3	0.0	464.0	43	21	29	0.52	0.0	20.3	4.77907
33	Chopda	Dhanora	PZ	7.3	880	445	365	82	39.0	35.0	0.2	0.0	451.0	35	1	25	0.1	0.0	2.0	0.09078

SN	Block	Village	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
34	Yawal	Faijpur	PZ	8.2	950	485	235	24	43.0	107.0	1.6	0.0	476.0	46	7	18	0.22	0.0	8.9	3.06557
35	Yawal	Bamnol	PZ	8.6	1000	515	255	30	44.0	115.0	2	21.0	470.0	46	5	15	-	0.0	9.0	3.28547
36	Yawal	Yaval-I	PZ	7.7	3350	1840	515	96	67.0	520.0	4	0.0	445.0	858	40	28	0.8	0.0	25.8	-3.01028
37	Chopda	Vavarde	EW	7.7	1140	669	320	70	35.0	114.0	0.8	0.0	104.0	227	119	50	1.22	0.0	6.9	-4.66859
38	Raver	Shi-i	EW	8.3	1500	857	210	60	15.0	256.0	0.5	0.0	122.0	354	105	4	1.06	0.0	17.6	-2.22877
39	Bhusawal	Talwil	EW	7.6	1530	868	355	112	18.0	191.0	1	0.0	165.0	351	110	2	0.94	0.0	9.8	-4.36567
40	Bhusawal	Talwel	EW	7.6	1530	868	355	112	18.0	191.0	1	0.0	165.0	351	110	2	0.94	0.0	9.8	-4.36567
41	Dharangaon	Bilakheda	EW	7.5	1430	810	560	34	115	70.0	7.2	0.0	226.0	206	115	150	0.45	0.0	4.1	-7.45581
42	Dharangaon	Bilakheda	EW	7.5	1210	687	485	52	86.0	58.0	4	0.0	159.0	181	102	124	0.64	0.0	3.4	-7.06573
43	Dharangaon	Bilakheda	EW	7.5	1210	687	485	52	86.0	58.0	4	0.0	159.0	181	102	124	0.64	0.0	3.4	-7.06573
44	Bhusawal	Gojore	EW	7.9	580	329	215	46	24.0	20.0	0.2	0.0	177.0	25	37	88	0.56	0.0	1.5	-1.36933
45	Bhusawal	Gojore	EW	7.8	580	337	225	54	22.0	21.0	0.3	0.0	165.0	28	40	88	0.71	0.0	1.5	-1.80063
46	Bhusawal	Gojore	EW	7.8	580	337	225	54	22.0	21.0	0.3	0.0	165.0	28	40	88	0.71	0.0	1.5	-1.80063
47	Jalgaon	Mohavi	EW	7.7	730	395	255	38	39.0	45.0	3.1	0.0	268.0	46	37	53	0.42	0.0	3.3	-0.71299
48	Jalgaon	Mohadi	EW	7.7	720	385	265	46	36.0	45.0	3	0.0	232.0	50	39	49	0.51	0.0	3.2	-1.45536
49	Jalgaon	Mohadi	EW	8	700	357	235	18	46.0	45.0	2.8	0.0	268.0	43	33	35	0.46	0.0	4.0	-0.29102
50	Jalgaon	Mohadi	EW	7.7	720	385	265	46	36.0	45.0	3	0.0	232.0	50	39	49	0.51	0.0	3.2	-1.45536
51	Jalgaon	Dhenwadi	EW	7.8	700	430	150	32	17.0	109.0	1.4	0.0	165.0	128	38	21	1.4	0.0	9.7	-0.29138
52	Bodwad	--gaon	EW	7.8	1020	591	395	48	64.0	49.0	1	0.0	183.0	124	76	137	0.48	0.0	3.1	-4.66239
53	Bodwad	--gaon	EW	7.9	1090	620	390	48	66.0	58.0	0.4	0.0	207.0	131	81	131	0.66	0.0	3.6	-4.43361
54	Bodwad	--gaon	EW	7.9	1090	620	390	48	66.0	58.0	0.4	0.0	207.0	131	81	131	0.66	0.0	3.6	-4.43361
55	Jalgaon	Vavarda	EW	7.7	1140	669	320	70	35.0	114.0	0.8	0.0	104.0	227	119	50	1.22	0.0	6.9	-4.66859
56	Pachora	Samner	EW	9.2	1080	622	290	86	18.0	121.0	0.3	0.0	104.0	266	76	2	0.52	0.0	7.0	-4.06806
57	Pachora	Samner	EW	7.8	1240	673	340	88	29.0	128.0	0.7	0.0	110.0	269	101	2	0.65	0.0	7.1	-4.97471
58	Bodvad	Dhondkhede	EW	7.7	850	485	180	36	22.0	106.0	1	0.0	226.0	121	52	33	0.74	0.0	8.7	0.09736
59	Bodwad	Dha-kheda	EW	8	740	400	295	38	49.0	34.0	0.2	0.0	250.0	64	24	64	0.75	0.0	2.4	-1.83091
60	Bodwad	Dha-kheda	EW	8	700	371	260	26	47.0	33.0	0.1	0.0	250.0	53	24	62	0.54	0.0	2.6	-1.06753
61	Bodwad	Dha-kheda	EW	7.7	850	485	180	36	22.0	106.0	1	0.0	226.0	121	52	33	0.74	0.0	8.7	0.09736
62	Erandol	Talai	EW	7.5	1150	652	440	50	77.0	66.0	1	0.0	262.0	96	113	117	0.67	0.0	4.0	-4.53715
63	Erandol	Talai	EW	7.5	1150	652	440	50	77.0	66.0	1	0.0	262.0	96	113	117	0.67	0.0	4.0	-4.53715
64	Pachora	Kalemraza	EW	7.8	490	260	145	30	17.0	45.0	2	0.0	195.0	46	16	6	0.54	0.0	4.1	0.30012
65	Pachora	Kalemraza	EW	7.4	580	277	230	38	33.0	24.0	8.3	0.0	232.0	35	15	8	0.48	0.0	1.8	-0.80929
66	Pachora	Varkhedi	EW	8.2	1740	1000	490	160	22.0	171.0	1.6	0.0	85.0	486	87	28	0.52	0.0	7.4	-8.40123
67	Pachora	Lohtar	EW	8.3	1710	1012	140	44	7.0	329.0	4	0.0	598.0	131	74	123	1.4	0.0	26.9	7.02959
68	Chalisgaon	Khadgaon	EW	7.8	600	306	210	40	27.0	40.0	3.6	0.0	256.0	39	21	7	0.65	0.0	3.1	-0.02199
69	Bhadgaon	Pasardi	EW	7.5	400	216	120	28	12.0	40.0	0.2	0.0	153.0	28	28	3	0.54	0.0	3.9	0.12299
70	Bhadgaon	Pasardi	EW	8.2	700	397	190	40	22.0	68.0	0.5	0.0	98.0	85	130	2	0.74	0.0	5.4	-2.20016
71	Chalisgaon	Chinchkheda	EW	7.8	890	539	190	34	26.0	103.0	1.3	0.0	171.0	103	39	147	0.74	0.0	8.5	-1.03345

SN	Block	Village	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
72	Chalisgaon	Chinchkheda	EW	7.8	890	539	190	34	26.0	103.0	1.3	0.0	171.0	103	39	147	0.74	0.0	8.5	-1.03345
73	Chopda	Satragen	OW	7.2	610	396.5	260	26	47.4	28.0	7	0.0	317.0	32	12.4	5	0.47	0.0	2.2	-0.00232
74	Chopda	Satragen	EW	7.2	600	390	255	40	37.7	26.0	5	0.0	323.0	28	12.2	5	0.47	0.0	1.9	0.195637
75	Raver	Nirul	PYT	7.6	690	448.5	360		-	-	-	-	-	-	-	77	BDL	0.0	-	-
76	Chopda	Vardi	EW-PYT	8	1980	1287	500		-	-	-	-	-	-	-	281	BDL	0.0	-	-
77	Chopda	Vadti	E.W -PYT	7.1	500	325	430		-	-	-	-	-	-	-	28	BDL	0.0	-	-
78	Raver	Charwad	E.W - PYT	7.9	900	585	470		-	-	-	-	-	-	-	112	BDL	0.0	-	-
79	Raver	Waghoda	EW	7.5	2000	1300	665		-	-	-	-	-	-	-	193	0.91	0.0	-	-
80	Raver	Tamaswadi	E.W - PYT	7.6	1210	786.5	550		-	-	-	-	-	-	-	131	BDL	0.0	-	-
81	Raver	Tamaswadi	OW - PYT	7.6	1180	767	480		-	-	-	-	-	-	-	118	BDL	0.0	-	-
82	Chopda	Chopda	OW-PYT	8.3	1160	754	210		-	-	-	-	-	-	-	15	0.15	0.0	-	-
83	Chopda	Chopda	EW-PYT	7.5	2080	1352	340		-	-	-	-	-	-	-	110	BDL	0.0	-	-
84	Chopda	Hated Kh	EW-PYT	8.1	1540	1001	780		-	-	-	-	-	-	-	224	BDL	0.0	-	-
85	Chopda	Hated Kh	OW-PYT	8.4	1460	949	410		-	-	-	-	-	-	-	156	0.62	0.0	-	-
86	Chopda	Chahardi	E.W - PYT	7.9	1480	962	450		-	-	-	-	-	-	-	55	0.38	0.0	-	-
87	Chopda	Chahardi	PYT	7.9	1340	871	280		-	-	-	-	-	-	-	35	0.77	0.0	-	-
88	Chopda	Satrasen	EW(APT)	7.3	720	468	195	30	29.2	75.0	13	0.0	336.0	39	13.2	21	0.37	0.0	6.3	1.607172
89	Chopda	Satraren	APT	7.5	660	429	340	78	35.0	-	-	0.0	183.0	64	-	25	0.1	0.0	-	-3.77298
90	Chopda	Satraren	EW APT	7.5	660	429	340	78	35.0	-	-	0.0	183.0	64	-	25.5	0.1	0.0	-	-3.77298
91	Chopda	Hatedkhurd	APT	7.3	1130	734.5	375	14	83.0	90.0	16	0.0	384.0	145	47	41	0.45	0.0	6.8	-1.23491
92	Chopda	Chahadi	OW APT	7.4	1530	994.5	220	24	38.9	255.0	18	0.0	653.0	163	48.3	5	0.68	0.0	21.8	6.303989
93	Bodwad	Junnone	EWPYT	7.7	2242	1457.3	885	114	146.0	-	-	0.0	177.0	383	96	23	0.44	0.0	-	-14.8019
94	Bodwad	Yengaon	EWPYT	8.2	1283	833.95	400	48	68.0	-	-	0.0	287.0	230	58	39	0.59	0.0	-	-3.28699
95	Amalner	Danger (BK)Amalner	Exploration	8	1158	752.7	294	249	11.0	117.0	0.52	0.0	44.0	337	62	7	0.55	0.0	4.1	-12.6091
96	Amalner	Lon Bk.	Borewell	7.45	1680	1092	400	40	72.9	200.0	9.2	0.0	330.6	258	0	0	0	0.0	12.9	-2.57641
97	Amalner	Lone	Borewell	8.55	416	270.4	155	37.6	14.8	23.0	4.9	4.8	143.1	42	14	0	0.18	0.3	1.9	-0.58874
98	Amlner	Takarkheda	Exploration	8.1	540	351	144	75	17.0	52.0	0.29	0.0	63.0	100	50	7	0.41	0.0	3.2	-4.10886
99	Bhusawal	Bhusawal	Borewell	7.91	2320	1508	722	245.6	26.2	197.0	25.7	0.0	400.2	340	162	0	0.5	0.9	6.9	-7.85216
100	Bhusawal	Chorwad	Borewell	7.64	1428	928.2	444	92.8	51.5	145.9	33.2	0.0	384.3	270	63.8	0	0	0.0	7.6	-2.56998
101	Bhusawal	Mandve digar	Borewell	8.03	671	436.15	314	57.2	41.6	45.9	1.7	3.0	300.9	70	21	0	0.38	0.7	2.9	-1.2458
102	Bhusawal	-ndgaon	Borewell	8.1	2230	1449.5	694	106	104.2	197.0	5	0.0	307.4	336	256	0	0.5	0.3	8.8	-8.82573
103	Bhusawal	Varangaon	Borewell	8.11	1209	785.85	543	76.8	85.3	85.0	0.5	0.0	351.4	124	138	0	0.33	1.3	4.4	-5.09221
104	Chalisgaon	Adgaon	Borewell	8	1511	982.15	444	102.8	45.4	152.0	1.3	0.0	192.8	286	48	0	0.35	0.3	7.7	-5.70569
105	Chalisgaon	Kharjai	Borewell	8.89	506	328.9	178	31.6	24.1	24.6	0.5	9.4	129.2	34	46	0	0.35	0.3	2.1	-1.12914
106	Chalisgaon	Khedi Khedgaon	Borewell	8.59	1268	824.2	320	21.6	64.6	75.1	0.7	4.8	259.9	100	25	0	0.5	0.3	5.8	-1.97403

SN	Block	Village	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
107	Chalisgaon	Mandurni	Borewell	8.17	1003	651.95	369	61.6	52.2	59.2	0.7	0.0	255.0	100	32	0	0.75	0.1	3.6	-3.18993
108	Chalisgaon	Pat-	Borewell	8.6	1813	1178.45	510	40	99.6	180.0	0.6	4.8	318.4	280	57	0	0.35	0.1	10.7	-4.81352
109	Chalisgaon	Pilkhod	Borewell	8.21	973	632.45	361	46.4	59.5	55.9	0.5	0.0	262.3	98	11	0	0.75	0.2	3.6	-2.91252
110	Chalisgaon	Vadgaon Lambe	Borewell	7.74	1010	656.5	372	84.8	38.9	88.5	2.1	0.0	240.3	168	82	0	0	0.0	4.9	-3.49408
111	Chopda	Ajantisim	Exploration	7.97	660	429	240	10	52.0	64.0	0	0.0	214.0	107	53	0	0	0.1	6.0	-1.27062
112	Chopda	Ajantisim	Exploration	8.02	720	468	275	26	51.0	51.0	0	244.0	110.0	0	29	0	0	0.0	4.0	4.44123
113	Chopda	Chopda	Borewell	7.91	1403	911.95	204	33.6	29.2	148.0	5.9	0.0	276.9	228	0	0	0	0.0	12.0	0.458883
114	Chopda	Hingo-	Exploration	7.5	700	455	210	28	34.0	69.0	0	0.0	336.0	50	20	0	0	0.0	5.8	1.31198
115	Chopda	Hingo-	Exploration	7.67	710	461.5	240	38	35.0	57.0	11	0.0	397.0	35	0	0	0	0.0	4.3	1.73048
116	Chopda	Kusumbe	Exploration	7.91	480	312	165	28	23.0	32.0	4	0.0	262.0	18	0	0	0	0.0	2.9	1.00431
117	Chopda	Kusumbe	Exploration	8.09	530	344.5	105	14	11.0	76.0	0	0.0	201.0	71	5	0	0	0.0	9.7	1.6906
118	Chopda	Mohrad	Exploration	8	500	325	180	20	32.0	32.0	4	0.0	281.0	18	0	0	0	0.0	3.0	0.97431
119	Chopda	Virwade	Exploration	8.43	500	325	60	10	9.0	85.0	4	0.0	238.0	36	5	0	0	0.0	12.6	2.66121
120	Chopda	Virwade (OW)	Exploration	8.34	440	286	55	10	7.0	78.0	0	0.0	201.0	43	0	0	0	0.0	12.0	2.21936
121	Erandol	Adgaon	Borewell	7.85	926	601.9	396	116	25.8	54.8	2.8	0.0	319.6	98	51	0	0.24	0.2	2.7	-2.67324
122	Erandol	Eklag-	Borewell	7.95	1252	813.8	502	68.4	80.4	86.4	0.8	0.0	444.1	122	62	0	0.3	0.1	4.7	-2.75048
123	Erandol	Kharchi bk.	Borewell	7.57	2310	1501.5	596	50.4	114.2	191.0	26.5	0.0	396.5	336	149	0	0.43	0.1	10.4	-5.41384
124	Erandol	Pastane .kh	Borewell	8.39	1860	1209	616	57.2	114.9	171.0	26.7	9.6	412.4	326	98	0	0.3	0.2	9.0	-5.2302
125	Jalgaon	Jalgaon	Borewell	7.22	1316	855.4	272	70.4	23.3	156.0	1.2	0.0	246.4	202	0	0	0	0.0	9.7	-1.39182
126	Jalgaon	Jalke	Borewell	8.04	1908	1240.2	498	83.2	70.5	146.0	0.6	0.0	381.9	272	71	0	0.92	0.3	7.6	-3.69378
127	Jamner	Dhalgaon	Borewell	8.25	1006	653.9	461	72	68.3	60.3	0.2	0.0	408.7	114	36	0	0.44	0.4	3.3	-2.51461
128	Jamner	Kapuswadi	Borewell	7.59	1160	754	352	56	51.5	84.6	1.5	0.0	176.9	162	0	0	0	0.0	5.3	-4.13294
129	Jamner	Khadgaon	Borewell	7.53	1598	1038.7	571	119.2	66.3	104.0	0.8	0.0	419.7	182	143	0	0.5	0.2	4.8	-4.52502
130	Jamner	Kodoli	Borewell	7.75	1638	1064.7	620	39.2	126.8	166.0	1.2	0.0	375.8	278	183	0	0.23	0.2	9.2	-6.23109
131	Jamner	Palaskheda mirache	Borewell	7.91	1490	968.5	506	65.2	83.3	98.0	3.4	0.0	400.2	180	110	0	0.72	0.3	5.3	-3.54896
132	Jamner	So-le	Borewell	7.95	616	400.4	294	58.8	35.7	26.2	1.3	2.3	277.6	46	27	0	0.33	0.2	1.7	-1.24535
133	Jamner	Takali pimpri	Borewell	8.25	714	464.1	108	22.4	12.6	73.8	0.6	2.5	151.4	134	0	0	0	0.0	7.8	0.410157
134	Muktai-gar	Chinchakheda(BK PYT)	Exploration	7.9	919	597.35	369	204	40.0	37.0	0.09	0.0	244.0	111	86	30	0.26	0.0	1.4	-9.47204
135	Muktai-gar	Chinchakheda (BK)Drilling 200 mtr	Exploration	8	848	551.2	319	259	15.0	48.0	0.18	0.0	195.0	100	100	30	0.27	0.0	1.7	-10.9624
136	Muktai-gar	Halkheda	Borewell	7.23	1148	746.2	224	75.2	8.7	150.3	1.2	0.0	196.4	204	94	0	0	0.0	9.5	-1.24941
137	Muktai-gar	Manegaon 3 Drilling 200 mtr	Exploration	7.8	610	396.5	85	65	5.0	106.0	0.14	0.0	83.0	129	45	14	1.44	0.0	7.3	-2.29458

SN	Block	Village	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
138	Muktai-gar	Pimpri pancham	Borewell	8.15	532	345.8	212	36	29.6	26.7	1.3	2.2	165.7	44	29	0	0.44	0.2	2.1	-1.44304
139	Pachora	Khurad bk.	Borewell	9	659	428.35	170	24.8	26.2	39.9	0.1	14.9	158.6	56	13	0	1.3	0.3	3.7	-0.29745
140	Pachora	-chankheda	Borewell	8.79	442	287.3	166	33.2	20.2	36.4	0.9	9.1	156.6	50	16	0	0.18	0.2	3.1	-0.44896
141	Pachora	Neri	Borewell	7.35	1252	813.8	308	112	6.8	119.5	2.1	0.0	268.4	200	58.1	0	0	0.0	6.3	-1.7493
142	Pachora	Sarola.kh.	Borewell	8.61	642	417.3	203	28.4	32.1	45.9	0.1	5.6	145.2	66	50	0	0.5	0.3	3.9	-1.49219
143	Pachora	Wadi Shewade	Borewell	9.52	435	282.75	149	24.8	21.1	37.4	0.5	37.7	74.6	52	26	0	0.24	1.4	3.5	-0.4946
144	Parola	Bahadarpur Parola	Exploration	8.2	1263	820.95	349	279	17.0	116.0	0.41	0.0	102.0	306	111	7	0.3	0.0	3.9	-13.6493
145	Parola	Karadi	Borewell	8.41	397	258.05	144	28.8	17.5	33.4	1.5	2.0	84.8	64	23	0	0.4	0.2	3.1	-1.42066
146	Parola	Shelava Parola	Exploration	7.7	1327	862.55	374	279	23.0	133.0	0.34	0.0	29.0	352	131	7	0.38	0.0	4.4	-15.3395
147	Parola	Shirasmani Parola	Exploration	8.4	414	269.1	149	139	2.0	28.0	0.6	10.0	93.0	41	47	16	0.26	0.0	1.3	-5.24311
148	Parola	Undirkheda	Borewell	9.52	629	408.85	178	34.8	22.1	21.1	0.1	50.9	76.5	36	14	0	1.36	0.4	1.8	-0.6048
149	Raver	Ahirwadi	Tubewell	7.94	546	354.9	237	32.8	37.7	8.4	0.5	1.9	238.0	14	7	0	0.16	0.0	0.7	-0.77491
150	Raver	Gaulwada	Exploration	8.02	420	273	135	8	28.0	33.0	2.3	0.0	226.0	18	0	0	0	0.0	4.0	1.00082
151	Raver	Mohrad (DZOW)	Exploration	8.63	470	305.5	55	10	77.0	74.0	0	6.0	232.0	11	0	0	0	0.0	6.0	-2.83287
152	Raver	Mohrad (OW)	Exploration	8	550	357.5	190	24	32.0	51.0	0	0.0	348.0	18	0	0	0	0.0	4.5	1.87284
153	Raver	Rasalpur	Tubewell	8.29	477	310.05	257	36	40.6	10.9	0.7	4.7	259.2	20	5	0	0.35	0.1	0.8	-0.73244
154	Raver	Raver R.S.	Exploration	8.35	1250	812.5	155	28	28.0	215.0	0	51.0	610.0	43	0	0	0	0.0	18.7	7.99641
155	Raver	Raver R.S. (OW)	Exploration	8.3	1450	942.5	115	20	16.0	350.0	8	0.0	964.0	50	24	0	0	0.0	37.3	13.48532
156	Raver	Savda R.S.	Exploration	8	1050	682.5	290	18	80.0	124.0	0	0.0	451.0	135	0	0	0	0.0	9.2	-0.08951
157	Raver	Savkheda	Exploration	8.03	740	481	315	44	50.0	25.0	0	0.0	372.0	46	0	0	0	0.0	1.7	-0.21302
158	Raver	Savkheda	Exploration	8.5	750	487.5	250	12	54.0	81.0	0	33.0	354.0	32	0	0	0	0.0	7.3	1.85949
159	Raver	Utkheda	Exploration	8	690	448.5	215	30	34.0	58.0	4	0.0	354.0	32	10	0	0	0.0	4.8	1.5072
160	Raver	Utkheda	Exploration	8.5	750	487.5	250	12	54.0	81.0	0	33.0	354.0	32	0	0	0	0.0	7.3	1.85949
161	Raver	Waghode	Exploration	7.8	1800	1170	365	32	69.0	267.0	2.34	0.0	122.0	560	125	0	0	0.0	18.5	-5.27523
162	Yawal	Borkheda	Exploration	8.57	550	357.5	225	22	41.0	32.0	2	18.0	323.0	14	0	0	0	0.0	2.8	1.42222
163	Yawal	Borkheda (DZ)	Exploration	7.75	1430	929.5	150	24	22.0	276.0	3.9	0.0	92.0	372	80	0	0	0.0	26.3	-1.5001
164	Yawal	Chikli Bk	Exploration	8.3	720	468	280	20	41.0	69.0	0	0.0	439.0	7	0	0	0	0.0	6.1	2.82332
165	Yawal	Chikli O.W.	Exploration	8.7	630	409.5	180	10	38.0	60.0	0	6.0	360.0	4	0	0	0	0.0	6.3	2.47436
166	Yawal	Chincholi	Tubewell	7.73	676	439.4	265	62	26.7	32.2	0.2	1.3	250.7	48	25	0	0.52	0.2	2.1	-1.13864
167	Yawal	Chitode	Exploration	7.91	590	383.5	150	10	30.0	67.0	0	0.0	342.0	11	0	0	0	0.1	7.6	2.63768
168	Yawal	Dongaon	Exploration	8.3	460	299	130	20	14.0	48.0	0	0.0	275.0	7	0	0	0	0.0	5.2	2.35719
169	Yawal	Dongaon	Exploration	8.3	610	396.5	45	8	6.1	120.0	1.56	0.0	268.0	43	15	0	0	0.0	20.4	3.491351
170	Yawal	Dongaon (OW)	Exploration	8.5	600	390	40	8	4.9	117.0	1.56	15.0	244.0	43	15	0	0	0.0	20.4	3.699981

SN	Block	Village	Source	pH	EC	TDS	TH	Ca	Mg	Na	K	CO3	HCO3	Cl	SO4	NO3	F	Fe	SAR	RSC
171	Yawal	Palsoda	Exploration	7.71	520	338	235	34	36.0	25.0	27	0.0	317.0	21	0	0	0	0.0	2.0	0.53659
172	Yawal	Palsoda (DZOW)	Exploration	8.29	520	338	260	22	50.0	25.0	2	0.0	566.0	18	0	0	0	0.0	2.1	4.06444
173	Yawal	Pimprud	Exploration	8.3	840	546	230	32	36.0	104.0	1.6	0.0	488.0	43	0	0	0	0.0	8.3	3.43908
174	Yawal	Pimprud	Exploration	8	870	565.5	240	32	39.0	106.0	2.7	0.0	506.0	0	0	0	0	0.0	8.3	3.48723
175	Yawal	Waghoda	Tubewell	8	790	513.5	244	60.8	22.4	68.5	2.6	0.0	203.7	130	26	0	0.44	0.1	4.6	-1.53857
176	Chopra	Ghosdogaon	Tubewell	7.69	1195	776.75	288	50	39.6	76.1	3.1	0.0	236.7	140	53.9	0	0	0.0	5.1	-1.87417
177	Yawal	Dongaon	EW	8.3	610	396.5	45	8	6.0	120.0	1.6	0.0	268.0	43	15	-	-	0.0	20.4	3.49958
178	Raver	Gaulwada	EW	8	420	273	135	8	28.0	33.0	2.3	0.0	226.0	18	-	-	-	0.0	4.0	1.00082
179	Chopda	Lasur	EW	8.2	770	500.5	480		-	-	-	-	-	-	-	81	BDL	0.0	-	-
Desirable limit (DL)						**500**	**200**	**75**	**30**					**250**	**200**	**45**	**1.5**		**0**	
Maximum permissible limit (MPL)						**2000**	**600**	**200**	**100**					**1000**	**400**	**---**	**--**		**18**	
Minimum				**7.1**	**397**	**216**	**40**	**8**	**2**	**8.4**	**0**	**0**	**29**	**0**	**BDL**	**BDL**	**BDL**	**BDL**	**0.7**	**-15.3395**
Maximum				**9.52**	**3350**	**1840**	**885**	**279**	**146**	**520**	**33.2**	**244**	**964**	**858**	**256**	**281**	**1.44**	**1.40**	**37.32**	**13.49**

Annexure V: Location of proposed Percolation tanks in Jalgaon district

SN	District	Taluka	Village	X	Y	Type of structure
1	Jalgaon	Amalner	Amalner	75.0709	21.0746	Percolation tank
2	Jalgaon	Amalner	Amalner	75.0518	21.0368	Percolation tank
3	Jalgaon	Amalner	Amalner	75.0471	21.0495	Percolation tank
4	Jalgaon	Amalner	Amalner (Rural)	75.0496	21.0163	Percolation tank
5	Jalgaon	Amalner	Ardi	74.961	21.0428	Percolation tank
6	Jalgaon	Amalner	Bharvas	74.911	21.1104	Percolation tank
7	Jalgaon	Amalner	Bhortek	75.0071	21.1124	Percolation tank
8	Jalgaon	Amalner	Dhar	75.0417	21.0888	Percolation tank
9	Jalgaon	Amalner	Galwade Bk.	75.0169	21.0677	Percolation tank
10	Jalgaon	Amalner	Galwade Bk.	75.0104	21.0895	Percolation tank
11	Jalgaon	Amalner	Hingone Kh.Pr.Jalod	75.0893	21.1697	Percolation tank
12	Jalgaon	Amalner	Jalod	75.1384	21.145	Percolation tank
13	Jalgaon	Amalner	Javakhede	74.9117	21.0576	Percolation tank
14	Jalgaon	Amalner	Kalamsare	74.9862	21.1711	Percolation tank
15	Jalgaon	Amalner	Kalamsare	74.9823	21.148	Percolation tank
16	Jalgaon	Amalner	Karan Khede	75.0453	21.1369	Percolation tank
17	Jalgaon	Amalner	Mehargaon	75.1087	21.1284	Percolation tank
18	Jalgaon	Amalner	Mungase	75.2314	21.1227	Percolation tank
19	Jalgaon	Amalner	Nimb	74.9708	21.1838	Percolation tank
20	Jalgaon	Amalner	Nimbhore	75.108	21.1516	Percolation tank
21	Jalgaon	Amalner	Nimbhore	75.0828	21.1593	Percolation tank
22	Jalgaon	Amalner	Nimbhore	75.0903	21.1378	Percolation tank
23	Jalgaon	Amalner	Patonde	75.1937	21.1205	Percolation tank
24	Jalgaon	Amalner	Patonde	75.2106	21.1232	Percolation tank
25	Jalgaon	Amalner	Pingalwade	75.0795	21.1455	Percolation tank
26	Jalgaon	Amalner	Satri	75.0666	21.1653	Percolation tank
27	Jalgaon	Amalner	Shahapur	74.9347	21.1569	Percolation tank
28	JALGAON	Bodvad	Nadgaon	76.0129	20.8878	Percolation tank
29	JALGAON	Bodvad	Junone Digar	75.979	20.9469	Percolation tank
30	JALGAON	Bodvad	Varhad Kh.	75.9027	20.8938	Percolation tank
31	JALGAON	Bodvad	Borgaon	75.8754	20.8828	Percolation tank
32	JALGAON	Bodvad	Surwade Bk.	75.8727	20.9074	Percolation tank
33	JALGAON	Bodvad	Kolhadi	76.0358	20.9153	Percolation tank
34	JALGAON	Bodvad	Shelwad	75.9633	20.8506	Percolation tank
35	Jalgaon	Chalisgaon	Bahal	75.027	20.5885	Percolation tank
36	Jalgaon	Chalisgaon	Bahal	75.0392	20.6079	Percolation tank
37	Jalgaon	Chalisgaon	Bahal	75.0294	20.6108	Percolation tank
38	Jalgaon	Chalisgaon	Bahal	75.0435	20.5622	Percolation tank
39	Jalgaon	Chalisgaon	Bhamare Bk.	75.141	20.5057	Percolation tank
40	Jalgaon	Chalisgaon	Bhaur	74.9788	20.5685	Percolation tank
41	Jalgaon	Chalisgaon	Bhoras Kh.	74.9654	20.5057	Percolation tank
42	Jalgaon	Chalisgaon	Borkhede Bk.	75.0352	20.5442	Percolation tank
43	Jalgaon	Chalisgaon	Borkhede Bk.	75.0355	20.5634	Percolation tank
44	Jalgaon	Chalisgaon	Borkhede Kh.	75.077	20.4937	Percolation tank
45	Jalgaon	Chalisgaon	Chalisgaon Urban	75.0142	20.456	Percolation tank
46	Jalgaon	Chalisgaon	Chambhardi Bk.	75.124	20.468	Percolation tank
47	Jalgaon	Chalisgaon	Dasegaon Bk.	74.948	20.5439	Percolation tank
48	Jalgaon	Chalisgaon	Hirapur	74.9526	20.424	Percolation tank
49	Jalgaon	Chalisgaon	Jamada	75.002	20.5788	Percolation tank
50	Jalgaon	Chalisgaon	Mandurne	74.8091	20.5282	Percolation tank
51	Jalgaon	Chalisgaon	Mandurne	74.7849	20.5138	Percolation tank
52	Jalgaon	Chalisgaon	Mandurne	74.794	20.5174	Percolation tank
53	Jalgaon	Chalisgaon	Mehunbare	74.9349	20.5605	Percolation tank
54	Jalgaon	Chalisgaon	Mundkhede Bk.	75.0831	20.4817	Percolation tank
55	Jalgaon	Chalisgaon	Patonda	75.0666	20.4937	Percolation tank
56	Jalgaon	Chalisgaon	Pimpri Kh.	74.9382	20.5462	Percolation tank
57	Jalgaon	Chalisgaon	Pohare	74.9873	20.645	Percolation tank

SN	District	Taluka	Village	X	Y	Type of structure
58	Jalgaon	Chalisgaon	Sevanagar	74.8102	20.5575	Percolation tank
59	Jalgaon	Chalisgaon	Tekwade Bk.	75.0575	20.5759	Percolation tank
60	Jalgaon	Chalisgaon	Tirpole	74.9038	20.5525	Percolation tank
61	Jalgaon	Chalisgaon	Umbarkhede	74.9093	20.54	Percolation tank
62	Jalgaon	Chalisgaon	Upkhede	74.8153	20.5397	Percolation tank
63	Jalgaon	Chalisgaon	Vadgaon Lambe	74.9962	20.5445	Percolation tank
64	Jalgaon	Chalisgaon	Waghadu	75.0587	20.4549	Percolation tank
65	Jalgaon	Chalisgaon	Waghali	75.1185	20.5337	Percolation tank
66	Jalgaon	Chalisgaon	Waghali	75.0996	20.4965	Percolation tank
67	Jalgaon	Chalisgaon	Wakadi	75.0654	20.4423	Percolation tank
68	Jalgaon	Chopda	Adgaon	75.3199	21.2975	Percolation tank
69	Jalgaon	Chopda	Adwad	75.4456	21.2528	Percolation tank
70	Jalgaon	Chopda	Ambade	75.3545	21.2686	Percolation tank
71	Jalgaon	Chopda	Chahardi	75.2301	21.2106	Percolation tank
72	Jalgaon	Chopda	Chahardi	75.2517	21.2491	Percolation tank
73	Jalgaon	Chopda	Chaugaon	75.217	21.2899	Percolation tank
74	Jalgaon	Chopda	Chaugaon	75.2262	21.3063	Percolation tank
75	Jalgaon	Chopda	Chopda	75.2876	21.2665	Percolation tank
76	Jalgaon	Chopda	Chopda	75.3098	21.2632	Percolation tank
77	Jalgaon	Chopda	Galangi	75.1188	21.2485	Percolation tank
78	Jalgaon	Chopda	Galwade	75.1668	21.2571	Percolation tank
79	Jalgaon	Chopda	Ghodgaon	75.1315	21.2269	Percolation tank
80	Jalgaon	Chopda	Hatede Bk.	75.1968	21.2612	Percolation tank
81	Jalgaon	Chopda	Lasur	75.1873	21.2863	Percolation tank
82	Jalgaon	Chopda	Machale	75.3692	21.2333	Percolation tank
83	Jalgaon	Chopda	Mamlade	75.2761	21.2963	Percolation tank
84	Jalgaon	Chopda	Nagalwadi	75.3023	21.3191	Percolation tank
85	Jalgaon	Chopda	Shikawal	75.1534	21.2975	Percolation tank
86	Jalgaon	Chopda	Tawase Bk.	75.2896	21.1956	Percolation tank
87	Jalgaon	Chopda	Vardi	75.4045	21.25	Percolation tank
88	Jalgaon	Chopda	Virwade	75.3561	21.3118	Percolation tank
89	Jalgaon	Edlabad	Bodwad	76.2407	21.0022	Percolation tank
90	Jalgaon	Edlabad	Bodwad	76.2334	21.0054	Percolation tank
91	Jalgaon	Edlabad	Changdeo	76.0156	21.0754	Percolation tank
92	Jalgaon	Edlabad	Chinchkhede Bk.	76.1943	21.0341	Percolation tank
93	Jalgaon	Edlabad	Chinchkhede Kh.	76.3541	20.9988	Percolation tank
94	Jalgaon	Edlabad	Chinchol	75.9705	21.0805	Percolation tank
95	Jalgaon	Edlabad	Dhamangaon	76.2639	21.0216	Percolation tank
96	Jalgaon	Edlabad	Edlabad	76.08	21.0631	Percolation tank
97	Jalgaon	Edlabad	Edlabad	76.0528	21.0426	Percolation tank
98	Jalgaon	Edlabad	Ghodasgaon	76.1315	21.0424	Percolation tank
99	Jalgaon	Edlabad	Khamani	76.1626	21.0489	Percolation tank
100	Jalgaon	Edlabad	Korhale	76.32	20.9595	Percolation tank
101	Jalgaon	Edlabad	Kothali	76.0574	21.0629	Percolation tank
102	Jalgaon	Edlabad	Kothe	76.0846	21.1349	Percolation tank
103	Jalgaon	Edlabad	Kurhe	76.2931	20.9863	Percolation tank
104	Jalgaon	Edlabad	Mahalkhede	76.2017	21.021	Percolation tank
105	Jalgaon	Edlabad	Manegaon	76.0339	21.0691	Percolation tank
106	Jalgaon	Edlabad	Sukali	76.1105	21.0649	Percolation tank
107	Jalgaon	Edlabad	Tarode	76.1254	20.997	Percolation tank
108	Jalgaon	Edlabad	Wadhone	76.3572	20.976	Percolation tank
109	Jalgaon	Jalgaon	Asoda	75.5966	21.0704	Percolation tank
110	Jalgaon	Jalgaon	Asoda	75.5804	21.0586	Percolation tank
111	Jalgaon	Jalgaon	Bhokar	75.3427	21.1507	Percolation tank
112	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5231	21.0108	Percolation tank
113	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5202	21.0377	Percolation tank
114	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5908	21.0273	Percolation tank
115	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5962	21.0111	Percolation tank
116	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5361	21.032	Percolation tank

SN	District	Taluka	Village	X	Y	Type of structure
117	Jalgaon	Jalgaon	Kadgaon	75.6589	21.07	Percolation tank
118	Jalgaon	Jalgaon	Kadgaon	75.6658	21.0713	Percolation tank
119	Jalgaon	Jalgaon	Kadgaon	75.7043	21.0464	Percolation tank
120	Jalgaon	Jalgaon	Kanalde	75.4968	21.098	Percolation tank
121	Jalgaon	Jalgaon	Kanalde	75.4875	21.1033	Percolation tank
122	Jalgaon	Jalgaon	Kanaswade	75.656	21.0808	Percolation tank
123	Jalgaon	Jalgaon	Kanaswade	75.6499	21.0882	Percolation tank
124	Jalgaon	Jalgaon	Kanaswade	75.6474	21.1013	Percolation tank
125	Jalgaon	Jalgaon	Mamurabad	75.5804	21.0835	Percolation tank
126	Jalgaon	Jalgaon	Mamurabad	75.5775	21.0758	Percolation tank
127	Jalgaon	Jalgaon	Nashirabad	75.6463	21.0283	Percolation tank
128	Jalgaon	Jalgaon	Nashirabad	75.6265	20.9866	Percolation tank
129	Jalgaon	Jalgaon	Tighre	75.7155	21.0454	Percolation tank
130	Jalgaon	Parola	Ambapimpri	75.0648	20.9321	Percolation tank
131	Jalgaon	Parola	Bahadarpur	75.0388	20.9152	Percolation tank
132	Jalgaon	Parola	Bahadarpur	75.0359	20.8955	Percolation tank
133	Jalgaon	Parola	Dahigaon	75.1944	20.9492	Percolation tank
134	Jalgaon	Parola	Indhave	75.005	20.9392	Percolation tank
135	Jalgaon	Parola	Indhave	74.9909	20.9395	Percolation tank
136	Jalgaon	Parola	Jirali	74.9927	20.9196	Percolation tank
137	Jalgaon	Parola	Mahalpur	75.0806	20.9085	Percolation tank
138	Jalgaon	Parola	Shelave Bk.	75.1483	20.921	Percolation tank
139	Jalgaon	Parola	Shevage Bk.	75.0846	20.888	Percolation tank
140	Jalgaon	Parola	Shirsode	75.0424	20.8844	Percolation tank
141	Jalgaon	Parola	Sumthane	75.0291	20.9624	Percolation tank
142	Jalgaon	Parola	Sumthane	75.0212	20.9342	Percolation tank
143	Jalgaon	Raver	Ahirwadi	76.0829	21.2998	Percolation tank
144	Jalgaon	Raver	Ambhode Kh.	76.0309	21.314	Percolation tank
145	Jalgaon	Raver	Ambhode Kh.	76.0213	21.3201	Percolation tank
146	Jalgaon	Raver	Bhatkhede	75.9895	21.228	Percolation tank
147	Jalgaon	Raver	Chorwad	76.1423	21.2743	Percolation tank
148	Jalgaon	Raver	Karjod	76.0833	21.2734	Percolation tank
149	Jalgaon	Raver	Karjod	76.1041	21.2667	Percolation tank
150	Jalgaon	Raver	Karjod	76.0803	21.2852	Percolation tank
151	Jalgaon	Raver	Khanapur	76.1185	21.263	Percolation tank
152	Jalgaon	Raver	Khirode Pr. Yawal	75.8857	21.2292	Percolation tank
153	Jalgaon	Raver	Khirode Pr. Yawal	75.8717	21.2033	Percolation tank
154	Jalgaon	Raver	Khirode Pr.Raver	76.0196	21.2645	Percolation tank
155	Jalgaon	Raver	Khirode Pr.Raver	76.0242	21.2798	Percolation tank
156	Jalgaon	Raver	Khirode Pr.Raver	76.0091	21.2973	Percolation tank
157	Jalgaon	Raver	Kusumbe Bk.	75.9641	21.2575	Percolation tank
158	Jalgaon	Raver	Lalmati	75.9922	21.302	Percolation tank
159	Jalgaon	Raver	Lohare	75.9161	21.2402	Percolation tank
160	Jalgaon	Raver	Mohagan Bk.	76.0834	21.3237	Percolation tank
161	Jalgaon	Raver	Mohagan Bk.	76.0888	21.3262	Percolation tank
162	Jalgaon	Raver	Padale Bk.	76.1182	21.3029	Percolation tank
163	Jalgaon	Raver	Pimpri	76.0432	21.3264	Percolation tank
164	Jalgaon	Raver	Pimpri	76.0584	21.3241	Percolation tank
165	Jalgaon	Raver	Pimpri	76.049	21.3228	Percolation tank
166	Jalgaon	Raver	Rasalpur	76.0532	21.2651	Percolation tank
167	Jalgaon	Raver	Raver (Rural)	76.0245	21.2137	Percolation tank
168	Jalgaon	Raver	Raver (Rural)	75.998	21.2365	Percolation tank
169	Jalgaon	Raver	Raver (Rural)	76.0182	21.2407	Percolation tank
170	Jalgaon	Raver	Rozode	75.8844	21.1985	Percolation tank
171	Jalgaon	Raver	Savkhede Kh.	75.9056	21.224	Percolation tank
172	Jalgaon	Raver	Utkhede	75.9755	21.239	Percolation tank
173	Jalgaon	Raver	Vivare Kh	75.9647	21.214	Percolation tank
174	Jalgaon	Yawal	Atrawal	75.7453	21.1825	Percolation tank
175	Jalgaon	Yawal	Bhalod	75.7897	21.1633	Percolation tank

SN	District	Taluka	Village	X	Y	Type of structure
176	Jalgaon	Yawal	Bhorkhede Kh	75.7721	21.2294	Percolation tank
177	Jalgaon	Yawal	Borale	75.6487	21.218	Percolation tank
178	Jalgaon	Yawal	Chincholi	75.5573	21.2348	Percolation tank
179	Jalgaon	Yawal	Chitode	75.7417	21.2001	Percolation tank
180	Jalgaon	Yawal	Chunchale	75.6206	21.2102	Percolation tank
181	Jalgaon	Yawal	Chunchale	75.6216	21.2333	Percolation tank
182	Jalgaon	Yawal	Chunchale	75.6438	21.2522	Percolation tank
183	Jalgaon	Yawal	Chunchale	75.6439	21.2281	Percolation tank
184	Jalgaon	Yawal	Dahigaon	75.6683	21.2129	Percolation tank
185	Jalgaon	Yawal	Dangarkuthora	75.7267	21.2507	Percolation tank
186	Jalgaon	Yawal	Dangarkuthora	75.7496	21.2339	Percolation tank
187	Jalgaon	Yawal	Dangarkuthora	75.7463	21.2199	Percolation tank
188	Jalgaon	Yawal	Dangarkuthora	75.7401	21.2358	Percolation tank
189	Jalgaon	Yawal	Dongaon	75.5697	21.2096	Percolation tank
190	Jalgaon	Yawal	Faizpur	75.8629	21.1865	Percolation tank
191	Jalgaon	Yawal	Hingone	75.7799	21.1998	Percolation tank
192	Jalgaon	Yawal	Ichkheda	75.5857	21.2443	Percolation tank
193	Jalgaon	Yawal	Ichkheda	75.5876	21.2705	Percolation tank
194	Jalgaon	Yawal	Khalkot	75.5693	21.2571	Percolation tank
195	Jalgaon	Yawal	Kingaon Bk	75.6098	21.2184	Percolation tank
196	Jalgaon	Yawal	Korpawli	75.695	21.2409	Percolation tank
197	Jalgaon	Yawal	Naigaon	75.6075	21.2397	Percolation tank
198	Jalgaon	Yawal	Naigaon	75.602	21.2464	Percolation tank
199	Jalgaon	Yawal	Nhavi P Yaval	75.8315	21.2017	Percolation tank
200	Jalgaon	Yawal	Savkhedesim	75.6549	21.2531	Percolation tank
201	Jalgaon	Yawal	Virode	75.838	21.1502	Percolation tank
202	Jalgaon	Yawal	Yawal	75.7019	21.1947	Percolation tank
203	Jalgaon	Yawal	Yawal	75.7296	21.1843	Percolation tank

Annexure VI: Location of proposed check dam in Jalgaon district

Sn	District	Taluka	Village	X	Y	Type of structure
1	Jalgaon	Amalner	Amalner	75.0424	21.0342	Check dam
2	Jalgaon	Amalner	Amalner	75.0878	21.0268	Check dam
3	Jalgaon	Amalner	Amalner	75.0997	21.0675	Check dam
4	Jalgaon	Amalner	Ambasan	75.0115	21.0547	Check dam
5	Jalgaon	Amalner	Anora	74.9563	21.0376	Check dam
6	Jalgaon	Amalner	Anora	74.9571	21.0447	Check dam
7	Jalgaon	Amalner	Bilkhede	75.0871	21.003	Check dam
8	Jalgaon	Amalner	Chopdai	74.927	20.9511	Check dam
9	Jalgaon	Amalner	Dahiwad	75.1937	21.0726	Check dam
10	Jalgaon	Amalner	Dahiwad	75.2074	21.0884	Check dam
11	Jalgaon	Amalner	Dahiwad	75.1912	21.0871	Check dam
12	Jalgaon	Amalner	Dahiwad	75.1847	21.0783	Check dam
13	Jalgaon	Amalner	Dahiwad	75.1995	21.1012	Check dam
14	Jalgaon	Amalner	Dahiwad Kh.(N.V.)	75.2135	21.0473	Check dam
15	Jalgaon	Amalner	Dahiwad Kh.(N.V.)	75.1934	21.0575	Check dam
16	Jalgaon	Amalner	Dangar Bk.	74.9545	20.9683	Check dam
17	Jalgaon	Amalner	Dangar Bk.	74.9412	20.972	Check dam
18	Jalgaon	Amalner	Dangar Bk.	74.9567	20.9835	Check dam
19	Jalgaon	Amalner	Deogaon	75.1116	21.0544	Check dam
20	Jalgaon	Amalner	Dhanore	75.0359	21.1052	Check dam
21	Jalgaon	Amalner	Dheku Seem.	75.0169	21.0615	Check dam
22	Jalgaon	Amalner	Ekrukhi	75.1692	20.9865	Check dam
23	Jalgaon	Amalner	Indrapimpri	75.0165	20.9808	Check dam
24	Jalgaon	Amalner	Indrapimpri	75.0071	20.9855	Check dam
25	Jalgaon	Amalner	Jaitpir	74.992	21.1095	Check dam
26	Jalgaon	Amalner	Janave	74.9574	20.9915	Check dam
27	Jalgaon	Amalner	Janave	74.9657	20.9966	Check dam
28	Jalgaon	Amalner	Janave	74.9621	20.9882	Check dam
29	Jalgaon	Amalner	Kachare	75.1494	21.0796	Check dam
30	Jalgaon	Amalner	Kalamsare	74.9949	21.1524	Check dam
31	Jalgaon	Amalner	Khadke	74.9675	21.0241	Check dam
32	Jalgaon	Amalner	Khaparkhede Pr.Dangri	75.0424	21.1237	Check dam
33	Jalgaon	Amalner	Khavashi	75.1836	21.1068	Check dam
34	Jalgaon	Amalner	Khokar Pat	75.1022	20.9989	Check dam
35	Jalgaon	Amalner	Lon Chara	74.9236	21.0985	Check dam
36	Jalgaon	Amalner	Londhave	74.9996	21.0178	Check dam
37	Jalgaon	Amalner	Mangarul	75.0475	21.0036	Check dam
38	Jalgaon	Amalner	Mangarul	75.0417	21.0181	Check dam
39	Jalgaon	Amalner	Manjardi	75.1411	21.0941	Check dam
40	Jalgaon	Amalner	Nimzari	75.2153	21.0662	Check dam
41	Jalgaon	Amalner	Nisardi	74.9772	21.0282	Check dam
42	Jalgaon	Amalner	Nisardi	74.9787	21.0144	Check dam
43	Jalgaon	Amalner	Palasdal	75.1292	21.0366	Check dam
44	Jalgaon	Amalner	Palasdal	75.1274	21.0252	Check dam
45	Jalgaon	Amalner	Pilode	75.1138	21.0965	Check dam
46	Jalgaon	Amalner	Pilode	75.1217	21.0861	Check dam
47	Jalgaon	Amalner	Pimpale Bk.	75.001	21.0403	Check dam
48	Jalgaon	Amalner	Pimpale Kh.	74.9844	21.0386	Check dam
49	Jalgaon	Amalner	Rameshwar Kh.	75.1573	21.0238	Check dam
50	Jalgaon	Amalner	Ranaiche	74.9596	21.0107	Check dam
51	Jalgaon	Amalner	Ranaiche	74.9558	21.0065	Check dam
52	Jalgaon	Amalner	Sabagavhan	74.9733	21.1072	Check dam
53	Jalgaon	Amalner	Sarbete Bk.	75.1663	20.9979	Check dam
54	Jalgaon	Amalner	Shirsale Bk.	74.9783	21.0705	Check dam
55	Jalgaon	Amalner	Shirud	75.0341	20.9979	Check dam
56	Jalgaon	Amalner	Shirud	75.0219	21.0023	Check dam
57	Jalgaon	Amalner	Vavade	74.9264	21.0743	Check dam
58	Jalgaon	Bodvad	Muktal	75.8905	20.8915	Check dam

Sn	District	Taluka	Village	X	Y	Type of structure
59	Jalgaon	Bodvad	Dhanori	75.8847	20.9266	Check dam
60	Jalgaon	Bodvad	Dhanori	75.8765	20.9236	Check dam
61	Jalgaon	Bodvad	Kholpimpri	75.8969	20.9138	Check dam
62	Jalgaon	Bodvad	Kholpimpri	75.9058	20.9093	Check dam
63	Jalgaon	Bodvad	Kholpimpri	75.9196	20.9085	Check dam
64	Jalgaon	Bodvad	Salshingi	75.9299	20.9078	Check dam
65	Jalgaon	Bodvad	Vichave	75.8642	20.9368	Check dam
66	Jalgaon	Bodvad	Surwade Bk.	75.8806	20.9111	Check dam
67	Jalgaon	Bodvad	Jalchakra Kh.	75.9485	20.8863	Check dam
68	Jalgaon	Bodvad	Jalchakra Kh.	75.9499	20.883	Check dam
69	Jalgaon	Bodvad	Salshingi	75.9628	20.9029	Check dam
70	Jalgaon	Bodvad	Farkande	76.0084	20.9547	Check dam
71	Jalgaon	Bodvad	Amadgaon	76.0091	20.9323	Check dam
72	Jalgaon	Bodvad	Amadgaon	75.9962	20.9279	Check dam
73	Jalgaon	Bodvad	Salshingi	75.9727	20.9331	Check dam
74	Jalgaon	Bodvad	Salshingi	75.9638	20.9304	Check dam
75	Jalgaon	Bodvad	Salshingi	75.9574	20.9129	Check dam
76	Jalgaon	Bodvad	Salshingi	75.961	20.908	Check dam
77	Jalgaon	Bodvad	Salshingi	75.9865	20.9069	Check dam
78	Jalgaon	Bodvad	Manur Bk.	76.006	20.8417	Check dam
79	Jalgaon	Bodvad	Shelwad	75.9702	20.8523	Check dam
80	Jalgaon	Bodvad	Shirsale	76.066	20.9443	Check dam
81	Jalgaon	Bodvad	Shirsale	76.0601	20.9518	Check dam
82	Jalgaon	Bodvad	Hingane	76.0416	20.9342	Check dam
83	Jalgaon	Bodvad	Hingane	76.0389	20.9392	Check dam
84	Jalgaon	Bodvad	Hingane	76.0408	20.9295	Check dam
85	Jalgaon	Bodvad	Hingane	76.036	20.9347	Check dam
86	Jalgaon	Bodvad	Amadgaon	76.0224	20.9251	Check dam
87	Jalgaon	Bodvad	Amadgaon	76.0228	20.9312	Check dam
88	Jalgaon	Bodvad	Farkande	76.0144	20.956	Check dam
89	Jalgaon	Bodvad	Farkande	76.0207	20.956	Check dam
90	Jalgaon	Chalisgaon	Abhane	74.9764	20.6714	Check dam
91	Jalgaon	Chalisgaon	Alwadi	74.8248	20.4852	Check dam
92	Jalgaon	Chalisgaon	Alwadi	74.8202	20.5046	Check dam
93	Jalgaon	Chalisgaon	Chambhardi Bk.	75.1105	20.4561	Check dam
94	Jalgaon	Chalisgaon	Chambhardi Bk.	75.1172	20.4641	Check dam
95	Jalgaon	Chalisgaon	Chambhardi Kh.	75.1301	20.4792	Check dam
96	Jalgaon	Chalisgaon	Chinchgavhan	74.9007	20.606	Check dam
97	Jalgaon	Chalisgaon	Dahiwad	74.9196	20.6114	Check dam
98	Jalgaon	Chalisgaon	Dahiwad	74.9276	20.6234	Check dam
99	Jalgaon	Chalisgaon	Daregaon	74.8458	20.6088	Check dam
100	Jalgaon	Chalisgaon	Deoli	74.9263	20.4915	Check dam
101	Jalgaon	Chalisgaon	Deoli	74.9196	20.4906	Check dam
102	Jalgaon	Chalisgaon	Dhamangaon	74.9529	20.6023	Check dam
103	Jalgaon	Chalisgaon	Dhamangaon	74.9544	20.5871	Check dam
104	Jalgaon	Chalisgaon	Dhamangaon	74.9477	20.6008	Check dam
105	Jalgaon	Chalisgaon	Don Digar	74.9355	20.4803	Check dam
106	Jalgaon	Chalisgaon	Eklahare	75.134	20.4912	Check dam
107	Jalgaon	Chalisgaon	Hatale	75.1099	20.4446	Check dam
108	Jalgaon	Chalisgaon	Hirapur	74.9263	20.4187	Check dam
109	Jalgaon	Chalisgaon	Ichchhapur	74.9971	20.5237	Check dam
110	Jalgaon	Chalisgaon	Ichchhapur	74.9904	20.5123	Check dam
111	Jalgaon	Chalisgaon	Jamada	74.9965	20.5828	Check dam
112	Jalgaon	Chalisgaon	Jamada	74.991	20.5903	Check dam
113	Jalgaon	Chalisgaon	Jawale	75.1264	20.4552	Check dam
114	Jalgaon	Chalisgaon	Kadhere	74.9059	20.5794	Check dam
115	Jalgaon	Chalisgaon	Kalamadu	74.973	20.6548	Check dam
116	Jalgaon	Chalisgaon	Kalamadu	74.9669	20.6619	Check dam
117	Jalgaon	Chalisgaon	Kalamadu	74.9562	20.6519	Check dam

Sn	District	Taluka	Village	X	Y	Type of structure
118	Jalgaon	Chalisgaon	Kalamadu	74.9669	20.6474	Check dam
119	Jalgaon	Chalisgaon	Kalamadu	74.9587	20.6422	Check dam
120	Jalgaon	Chalisgaon	Khadaki Bk.	74.97	20.4375	Check dam
121	Jalgaon	Chalisgaon	Khadaki Seem	74.923	20.5911	Check dam
122	Jalgaon	Chalisgaon	Khedi Kh.	75.002	20.6197	Check dam
123	Jalgaon	Chalisgaon	Khedi Kh.	75.0078	20.6154	Check dam
124	Jalgaon	Chalisgaon	Kunzar	74.9986	20.6971	Check dam
125	Jalgaon	Chalisgaon	Kunzar	74.9956	20.7056	Check dam
126	Jalgaon	Chalisgaon	Kunzar	74.9889	20.6942	Check dam
127	Jalgaon	Chalisgaon	Kunzar	74.9739	20.7102	Check dam
128	Jalgaon	Chalisgaon	Kunzar	74.9715	20.7185	Check dam
129	Jalgaon	Chalisgaon	Kunzar	74.9773	20.725	Check dam
130	Jalgaon	Chalisgaon	Londhe	74.8651	20.6111	Check dam
131	Jalgaon	Chalisgaon	Mandurne	74.8013	20.5228	Check dam
132	Jalgaon	Chalisgaon	Mandurne	74.7829	20.5188	Check dam
133	Jalgaon	Chalisgaon	Mandurne	74.7775	20.5138	Check dam
134	Jalgaon	Chalisgaon	Mandurne	74.7763	20.5228	Check dam
135	Jalgaon	Chalisgaon	Mehunbare	74.93	20.5717	Check dam
136	Jalgaon	Chalisgaon	Mundkhede Bk.	75.0785	20.4712	Check dam
137	Jalgaon	Chalisgaon	Nhave	75.0508	20.5491	Check dam
138	Jalgaon	Chalisgaon	Pimpri Bk.Pr.Chalisga	74.93	20.3844	Check dam
139	Jalgaon	Chalisgaon	Pimpri Bk.Pr.De	74.8968	20.4726	Check dam
140	Jalgaon	Chalisgaon	Pimpri Bk.Pr.De	74.88	20.4723	Check dam
141	Jalgaon	Chalisgaon	Pohare	74.977	20.6562	Check dam
142	Jalgaon	Chalisgaon	Pohare	74.9773	20.6365	Check dam
143	Jalgaon	Chalisgaon	Rokade	75.0739	20.4441	Check dam
144	Jalgaon	Chalisgaon	Sevanagar	74.8096	20.5614	Check dam
145	Jalgaon	Chalisgaon	Sevanagar	74.8071	20.5649	Check dam
146	Jalgaon	Chalisgaon	Sevanagar	74.7993	20.5654	Check dam
147	Jalgaon	Chalisgaon	Sevanagar	74.7951	20.5732	Check dam
148	Jalgaon	Chalisgaon	Shindi	74.9203	20.3713	Check dam
149	Jalgaon	Chalisgaon	Shirasgaon	74.8724	20.492	Check dam
150	Jalgaon	Chalisgaon	Talegaon	74.9175	20.4027	Check dam
151	Jalgaon	Chalisgaon	Talegaon	74.9446	20.4052	Check dam
152	Jalgaon	Chalisgaon	Talonde Pr. Dehere	74.869	20.4872	Check dam
153	Jalgaon	Chalisgaon	Tarwade Bk.	75.0319	20.5237	Check dam
154	Jalgaon	Chalisgaon	Tarwade Bk.	75.0261	20.5272	Check dam
155	Jalgaon	Chalisgaon	Tirpole	74.9077	20.5654	Check dam
156	Jalgaon	Chalisgaon	Upkhede	74.821	20.5535	Check dam
157	Jalgaon	Chalisgaon	Upkhede	74.8189	20.5597	Check dam
158	Jalgaon	Chalisgaon	Vadgaon Lambe	74.995	20.5363	Check dam
159	Jalgaon	Chalisgaon	Waghali	75.0846	20.5066	Check dam
160	Jalgaon	Chalisgaon	Waghali	75.0922	20.5172	Check dam
161	Jalgaon	Chalisgaon	Waghali	75.0996	20.5337	Check dam
162	Jalgaon	Chopda	Adwad	75.4519	21.2692	Check dam
163	Jalgaon	Chopda	Angurne	75.267	21.3339	Check dam
164	Jalgaon	Chopda	Chaugaon	75.2264	21.3251	Check dam
165	Jalgaon	Chopda	Chaugaon	75.2284	21.3261	Check dam
166	Jalgaon	Chopda	Chaugaon	75.2344	21.3282	Check dam
167	Jalgaon	Chopda	Chaugaon	75.2399	21.329	Check dam
168	Jalgaon	Chopda	Chopda	75.3168	21.2327	Check dam
169	Jalgaon	Chopda	Chopda	75.3271	21.2347	Check dam
170	Jalgaon	Chopda	Chopda	75.3295	21.2428	Check dam
171	Jalgaon	Chopda	Chopda	75.3309	21.2487	Check dam
172	Jalgaon	Chopda	Forest	75.2219	21.3241	Check dam
173	Jalgaon	Chopda	Forest	75.4712	21.2734	Check dam
174	Jalgaon	Chopda	Garatad (N.V.)	75.3257	21.2293	Check dam
175	Jalgaon	Chopda	Khardi	75.4893	21.27	Check dam
176	Jalgaon	Chopda	Lasur	75.2157	21.3157	Check dam

Sn	District	Taluka	Village	X	Y	Type of structure
177	Jalgaon	Chopda	Lasur	75.2017	21.3125	Check dam
178	Jalgaon	Chopda	Lasur	75.1968	21.3147	Check dam
179	Jalgaon	Chopda	Nagalwadi	75.304	21.3351	Check dam
180	Jalgaon	Chopda	Rukhankhede Pr.Chopda	75.3464	21.2386	Check dam
181	Jalgaon	Chopda	Rukhankhede Pr.Chopda	75.3459	21.2456	Check dam
182	Jalgaon	Chopda	Shikawal	75.1718	21.3074	Check dam
183	Jalgaon	Chopda	Varad	75.2797	21.334	Check dam
184	Jalgaon	Chopda	Varad	75.2859	21.3344	Check dam
185	Jalgaon	Chopda	Vardi	75.4063	21.2782	Check dam
186	Jalgaon	Chopda	Vardi	75.4252	21.2671	Check dam
187	Jalgaon	Chopda	Vardi	75.433	21.2666	Check dam
188	Jalgaon	Chopda	Vardi	75.4201	21.2724	Check dam
189	Jalgaon	Chopda	Virwade	75.3445	21.326	Check dam
190	Jalgaon	Chopda	Virwade	75.3547	21.3257	Check dam
191	Jalgaon	Chopda	Virwade	75.3631	21.3249	Check dam
192	Jalgaon	Edlabad	Changdeo	76.0117	21.052	Check dam
193	Jalgaon	Edlabad	Changdeo	76.0089	21.0589	Check dam
194	Jalgaon	Edlabad	Changdeo	76.0101	21.0677	Check dam
195	Jalgaon	Edlabad	Charthane	76.2486	21.0577	Check dam
196	Jalgaon	Edlabad	Charthane	76.2569	21.056	Check dam
197	Jalgaon	Edlabad	Charthane	76.2694	21.0532	Check dam
198	Jalgaon	Edlabad	Charthane	76.2639	21.0332	Check dam
199	Jalgaon	Edlabad	Chinchkhede Bk.	76.1861	21.0515	Check dam
200	Jalgaon	Edlabad	Chinchkhede Bk.	76.1898	21.058	Check dam
201	Jalgaon	Edlabad	Dhamangaon	76.2651	21.0406	Check dam
202	Jalgaon	Edlabad	Dhamangaon	76.2745	21.033	Check dam
203	Jalgaon	Edlabad	Dhamangaon	76.2855	21.0364	Check dam
204	Jalgaon	Edlabad	Dhule	76.3465	21.017	Check dam
205	Jalgaon	Edlabad	Dhule	76.3465	21.0321	Check dam
206	Jalgaon	Edlabad	Edlabad	76.0705	21.0426	Check dam
207	Jalgaon	Edlabad	Edlabad	76.0681	21.0529	Check dam
208	Jalgaon	Edlabad	Edlabad	76.0583	21.029	Check dam
209	Jalgaon	Edlabad	Ghodasgaon	76.109	21.0475	Check dam
210	Jalgaon	Edlabad	Ghodasgaon	76.1324	21.0324	Check dam
211	Jalgaon	Edlabad	Ghodasgaon	76.1425	21.0358	Check dam
212	Jalgaon	Edlabad	Ghodasgaon	76.1239	21.0264	Check dam
213	Jalgaon	Edlabad	Halkhede	76.3529	21.0389	Check dam
214	Jalgaon	Edlabad	Hartale	76.0132	21.0424	Check dam
215	Jalgaon	Edlabad	Ichchhapur	76.2392	21.0201	Check dam
216	Jalgaon	Edlabad	Kasarkhede	75.9949	21.0688	Check dam
217	Jalgaon	Edlabad	Kasarkhede	75.9864	21.0779	Check dam
218	Jalgaon	Edlabad	Khamani	76.162	21.0643	Check dam
219	Jalgaon	Edlabad	Mahalkhede	76.2071	21.0415	Check dam
220	Jalgaon	Edlabad	Mahalkhede	76.2212	21.0472	Check dam
221	Jalgaon	Edlabad	Manegaon	76.0339	21.06	Check dam
222	Jalgaon	Edlabad	Morzira	76.2809	21.0483	Check dam
223	Jalgaon	Edlabad	Morzira	76.287	21.0563	Check dam
224	Jalgaon	Edlabad	Rajure	76.3124	21.048	Check dam
225	Jalgaon	Edlabad	Rajure	76.3008	21.0404	Check dam
226	Jalgaon	Edlabad	Salbardi	76.0352	21.033	Check dam
227	Jalgaon	Edlabad	Takali	76.2096	21.0557	Check dam
228	Jalgaon	Edlabad	Talkhede	76.3252	20.9974	Check dam
229	Jalgaon	Edlabad	Talkhede	76.3282	21.0133	Check dam
230	Jalgaon	Edlabad	Vadhave	75.9925	21.0472	Check dam
231	Jalgaon	Edlabad	Wadhone	76.3654	21.0179	Check dam
232	Jalgaon	Edlabad	Wadhone	76.3611	20.9849	Check dam
233	Jalgaon	Jalgaon	Beli	75.6524	20.9649	Check dam
234	Jalgaon	Jalgaon	Bilwadi	75.4851	20.8454	Check dam
235	Jalgaon	Jalgaon	Chincholi	75.5986	20.9546	Check dam

Sn	District	Taluka	Village	X	Y	Type of structure
236	Jalgaon	Jalgaon	Devhari	75.595	20.9087	Check dam
237	Jalgaon	Jalgaon	Devhari	75.6137	20.9016	Check dam
238	Jalgaon	Jalgaon	Dhanwad	75.5802	20.9222	Check dam
239	Jalgaon	Jalgaon	Dhanwad	75.5871	20.9028	Check dam
240	Jalgaon	Jalgaon	Forest	75.5489	20.8195	Check dam
241	Jalgaon	Jalgaon	Forest	75.5707	20.834	Check dam
242	Jalgaon	Jalgaon	Forest	75.5638	20.8234	Check dam
243	Jalgaon	Jalgaon	Forest	75.5777	20.8372	Check dam
244	Jalgaon	Jalgaon	Forest	75.579	20.8414	Check dam
245	Jalgaon	Jalgaon	Forest	75.5737	20.8483	Check dam
246	Jalgaon	Jalgaon	Forest	75.5609	20.8858	Check dam
247	Jalgaon	Jalgaon	Forest	75.5912	20.8927	Check dam
248	Jalgaon	Jalgaon	Forest	75.5543	20.909	Check dam
249	Jalgaon	Jalgaon	Forest	75.5548	20.9013	Check dam
250	Jalgaon	Jalgaon	Forest	75.5599	20.893	Check dam
251	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5478	21.0183	Check dam
252	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5438	20.9987	Check dam
253	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5752	20.9837	Check dam
254	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5509	20.9558	Check dam
255	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5283	20.979	Check dam
256	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5917	20.979	Check dam
257	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5894	20.9979	Check dam
258	Jalgaon	Jalgaon	Jawkhede	75.4916	20.819	Check dam
259	Jalgaon	Jalgaon	Jawkhede	75.4891	20.8175	Check dam
260	Jalgaon	Jalgaon	Jawkhede	75.4833	20.8249	Check dam
261	Jalgaon	Jalgaon	Kandari	75.6854	20.9048	Check dam
262	Jalgaon	Jalgaon	Kandari	75.6461	20.8967	Check dam
263	Jalgaon	Jalgaon	Kandari	75.6492	20.901	Check dam
264	Jalgaon	Jalgaon	Kandari	75.6481	20.9068	Check dam
265	Jalgaon	Jalgaon	Kandari	75.6683	20.9109	Check dam
266	Jalgaon	Jalgaon	Kandari	75.6795	20.918	Check dam
267	Jalgaon	Jalgaon	Kandari	75.6692	20.9312	Check dam
268	Jalgaon	Jalgaon	Kandari	75.6627	20.9284	Check dam
269	Jalgaon	Jalgaon	Kusumbe Kh	75.5708	20.9578	Check dam
270	Jalgaon	Jalgaon	Lonwadi Bk	75.4932	20.8092	Check dam
271	Jalgaon	Jalgaon	Lonwadi Kh	75.5145	20.7995	Check dam
272	Jalgaon	Jalgaon	Lonwadi Kh	75.5078	20.8064	Check dam
273	Jalgaon	Jalgaon	Lonwadi Kh	75.4995	20.8138	Check dam
274	Jalgaon	Jalgaon	Lonwadi Kh	75.5057	20.8007	Check dam
275	Jalgaon	Jalgaon	Mohadi	75.5253	20.9673	Check dam
276	Jalgaon	Jalgaon	Mohadi	75.5354	20.9632	Check dam
277	Jalgaon	Jalgaon	Mohadi	75.5292	20.9738	Check dam
278	Jalgaon	Jalgaon	Nagziri	75.5109	20.9583	Check dam
279	Jalgaon	Jalgaon	Nashirabad	75.6359	21.0116	Check dam
280	Jalgaon	Jalgaon	Nashirabad	75.6123	20.9659	Check dam
281	Jalgaon	Jalgaon	Nashirabad	75.6793	20.9911	Check dam
282	Jalgaon	Jalgaon	Nimgaon Bk	75.6726	20.939	Check dam
283	Jalgaon	Jalgaon	Pathari	75.4689	20.8259	Check dam
284	Jalgaon	Jalgaon	Raipur	75.7144	20.9097	Check dam
285	Jalgaon	Jalgaon	Savkhede Bk	75.5188	20.9901	Check dam
286	Jalgaon	Jalgaon	Savkhede Bk	75.5251	20.9937	Check dam
287	Jalgaon	Jalgaon	Shirsoli P.B.	75.5442	20.9364	Check dam
288	Jalgaon	Jalgaon	Shirsoli P.B.	75.5244	20.9476	Check dam
289	Jalgaon	Jalgaon	Shirsoli P.N.	75.5161	20.8762	Check dam
290	Jalgaon	Jalgaon	Shirsoli P.N.	75.4948	20.8729	Check dam
291	Jalgaon	Jalgaon	Shirsoli P.N.	75.5071	20.8752	Check dam
292	Jalgaon	Jalgaon	Shirsoli P.N.	75.504	20.8808	Check dam
293	Jalgaon	Jalgaon	Shirsoli P.N.	75.5114	20.9185	Check dam
294	Jalgaon	Jalgaon	Shirsoli P.N.	75.5278	20.888	Check dam

Sn	District	Taluka	Village	X	Y	Type of structure
295	Jalgaon	Jalgaon	Shirsoli P.N.	75.5343	20.8895	Check dam
296	Jalgaon	Jalgaon	Umale	75.6184	20.91	Check dam
297	Jalgaon	Jalgaon	Umale	75.6207	20.8996	Check dam
298	Jalgaon	Jalgaon	Umale	75.6301	20.8944	Check dam
299	Jalgaon	Jalgaon	Vadali	75.4884	20.8298	Check dam
300	Jalgaon	Jalgaon	Vadali	75.4842	20.8389	Check dam
301	Jalgaon	Jalgaon	Vadali	75.479	20.8326	Check dam
302	Jalgaon	Jalgaon	Vadali	75.4795	20.837	Check dam
303	Jalgaon	Jalgaon	Vadali	75.4813	20.8449	Check dam
304	Jalgaon	Jalgaon	Vadali	75.475	20.8296	Check dam
305	Jalgaon	Jalgaon	Vasantwadi	75.5183	20.8601	Check dam
306	Jalgaon	Jalgaon	Vitner	75.5237	20.8328	Check dam
307	Jalgaon	Jalgaon	Vitner	75.5438	20.8269	Check dam
308	Jalgaon	Jalgaon	Vitner	75.5429	20.8402	Check dam
309	Jalgaon	Jalgaon	Vitner	75.5489	20.8338	Check dam
310	Jalgaon	Jalgaon	Vitner	75.5575	20.8229	Check dam
311	Jalgaon	Jalgaon	Vitner	75.5732	20.8589	Check dam
312	Jalgaon	Jalgaon	Vitner	75.5797	20.8641	Check dam
313	Jalgaon	Jalgaon	Vitner	75.5456	20.856	Check dam
314	Jalgaon	Jalgaon	Vitner	75.5534	20.8634	Check dam
315	Jalgaon	Jalgaon	Vitner	75.5474	20.8607	Check dam
316	Jalgaon	Jalgaon	Vitner	75.528	20.8628	Check dam
317	Jalgaon	Jalgaon	Vitner	75.5645	20.8575	Check dam
318	Jalgaon	Jalgaon	Vitner	75.5669	20.8636	Check dam
319	Jalgaon	Parola	Bahadarpur	75.0318	20.9011	Check dam
320	Jalgaon	Parola	Bahadarpur	75.0343	20.9063	Check dam
321	Jalgaon	Parola	Bahadarpur	75.0367	20.9141	Check dam
322	Jalgaon	Parola	Bhilali	75.09	20.9473	Check dam
323	Jalgaon	Parola	Bholane	74.9706	20.8952	Check dam
324	Jalgaon	Parola	Bholane	74.9738	20.905	Check dam
325	Jalgaon	Parola	Bholane	74.9913	20.9024	Check dam
326	Jalgaon	Parola	Bholane	74.9996	20.89	Check dam
327	Jalgaon	Parola	Dabapimpri	75.1156	20.9384	Check dam
328	Jalgaon	Parola	Dabapimpri	75.1116	20.9573	Check dam
329	Jalgaon	Parola	Dalwel	74.996	20.8651	Check dam
330	Jalgaon	Parola	Dalwel	74.9938	20.8412	Check dam
331	Jalgaon	Parola	Dalwel	74.9895	20.85	Check dam
332	Jalgaon	Parola	Dalwel	75.0158	20.856	Check dam
333	Jalgaon	Parola	Dalwel	75.0028	20.8567	Check dam
334	Jalgaon	Parola	Dalwel	74.996	20.8534	Check dam
335	Jalgaon	Parola	Jirali	75.0223	20.8982	Check dam
336	Jalgaon	Parola	Jirali	75.0264	20.9088	Check dam
337	Jalgaon	Parola	Jirali	74.9996	20.8974	Check dam
338	Jalgaon	Parola	Khedi Dhok	75.1764	20.973	Check dam
339	Jalgaon	Parola	Mondhale Pr. Amalner	75.0273	20.8459	Check dam
340	Jalgaon	Parola	Mondhale Pr. Amalner	75.0131	20.8356	Check dam
341	Jalgaon	Parola	Pimpalkote	74.9623	20.9294	Check dam
342	Jalgaon	Parola	Pimpalkote	74.965	20.9245	Check dam
343	Jalgaon	Parola	Pimpalkote	74.9544	20.9194	Check dam
344	Jalgaon	Parola	Pimpalkote	74.978	20.9132	Check dam
345	Jalgaon	Parola	Pimpalkote	74.9929	20.9132	Check dam
346	Jalgaon	Parola	Shevage Bk.	75.0882	20.9008	Check dam
347	Jalgaon	Parola	Shevage Bk.	75.0882	20.8749	Check dam
348	Jalgaon	Parola	Shevage Pr.Bahal	75.0203	20.8152	Check dam
349	Jalgaon	Parola	Shirsode	75.0219	20.8732	Check dam
350	Jalgaon	Parola	Shirsode	75.0439	20.8745	Check dam
351	Jalgaon	Parola	Sub Gavhan Kh	74.9884	20.8638	Check dam
352	Jalgaon	Parola	Sumthane	75.0167	20.9297	Check dam
353	Jalgaon	Parola	Undirkhede	75.1058	20.8358	Check dam

Sn	District	Taluka	Village	X	Y	Type of structure
354	Jalgaon	Parola	Undirkhede	75.0936	20.8365	Check dam
355	Jalgaon	Parola	Vasant Nagar	74.9673	20.9063	Check dam
356	Jalgaon	Raver	Ambhode Bk.	76.014	21.3155	Check dam
357	Jalgaon	Raver	Ambhode Bk.	76.007	21.3068	Check dam
358	Jalgaon	Raver	Forest	75.9777	21.3019	Check dam
359	Jalgaon	Raver	Forest	75.9814	21.2967	Check dam
360	Jalgaon	Raver	Forest	75.9893	21.2901	Check dam
361	Jalgaon	Raver	Forest	75.9266	21.273	Check dam
362	Jalgaon	Raver	Jinsi	76.0111	21.3207	Check dam
363	Jalgaon	Raver	Jinsi	76.0128	21.3239	Check dam
364	Jalgaon	Raver	Lalmati	75.9894	21.3063	Check dam
365	Jalgaon	Raver	Lalmati	76.0041	21.3024	Check dam
366	Jalgaon	Raver	Lalmati	75.9974	21.3035	Check dam
367	Jalgaon	Raver	Lohare	75.9312	21.2682	Check dam

Annexure VII: Location of proposed Site for Recharge Shaft tanks in Jalgaon district

SN	District	Block	Village	X	Y	Type of structure
1	Jalgaon	Amalner	Amalner	75.0716	21.0325	Recharge Shaft
2	Jalgaon	Amalner	Fapore Bk.	75.073	20.9982	Recharge Shaft
3	Jalgaon	Amalner	Fapore Kh.	75.0763	20.9907	Recharge Shaft
4	Jalgaon	Amalner	Hingone Kh.Pr-Amalner	75.0723	21.0061	Recharge Shaft
5	Jalgaon	Amalner	Jalod	75.1384	21.145	Recharge Shaft
6	Jalgaon	Amalner	Kalali	75.0657	21.1662	Recharge Shaft
7	Jalgaon	Amalner	Kalali	75.0887	21.1695	Recharge Shaft
8	Jalgaon	Amalner	Kalamsare	74.9861	21.1714	Recharge Shaft
9	Jalgaon	Amalner	Kanhere	75.0776	20.9846	Recharge Shaft
10	Jalgaon	Amalner	Mehargaon	75.1071	21.1285	Recharge Shaft
11	Jalgaon	Amalner	Mungase	75.2314	21.1228	Recharge Shaft
12	Jalgaon	Amalner	Nandgaon	75.0719	21.0747	Recharge Shaft
13	Jalgaon	Amalner	Nimb	74.9706	21.1845	Recharge Shaft
14	Jalgaon	Amalner	Nimbhore	75.0912	21.1376	Recharge Shaft
15	Jalgaon	Amalner	Nimbhore	75.0844	21.1598	Recharge Shaft
16	Jalgaon	Amalner	Nimbhore	75.1082	21.152	Recharge Shaft
17	Jalgaon	Amalner	Patonde	75.1935	21.1205	Recharge Shaft
18	Jalgaon	Amalner	Patonde	75.2105	21.1235	Recharge Shaft
19	Jalgaon	Amalner	Pingalwade	75.0783	21.145	Recharge Shaft
20	Jalgaon	Amalner	Pragane Dangari	75.0376	21.1637	Recharge Shaft
21	Jalgaon	Amalner	Shahapur	74.9342	21.1578	Recharge Shaft
22	Jalgaon	Chopda	Adgaon	75.3198	21.3027	Recharge shaft
23	Jalgaon	Chopda	Adgaon	75.3409	21.3027	Recharge shaft
24	Jalgaon	Chopda	Adgaon	75.3246	21.2828	Recharge shaft
25	Jalgaon	Chopda	Adgaon	75.3442	21.2899	Recharge shaft
26	Jalgaon	Chopda	Adwad	75.4443	21.2333	Recharge shaft
27	Jalgaon	Chopda	Adwad	75.4534	21.2295	Recharge shaft
28	Jalgaon	Chopda	Adwad	75.4631	21.2388	Recharge shaft
29	Jalgaon	Chopda	Adwad	75.4756	21.2509	Recharge shaft
30	Jalgaon	Chopda	Adwad	75.4468	21.2488	Recharge shaft
31	Jalgaon	Chopda	Adwad	75.4387	21.2491	Recharge shaft
32	Jalgaon	Chopda	Adwad	75.4324	21.2553	Recharge shaft
33	Jalgaon	Chopda	Adwad	75.4742	21.2571	Recharge shaft
34	Jalgaon	Chopda	Adwad	75.4337	21.238	Recharge shaft
35	Jalgaon	Chopda	Akhatwade	75.2797	21.2097	Recharge shaft
36	Jalgaon	Chopda	Akulkhede	75.2639	21.2647	Recharge shaft
37	Jalgaon	Chopda	Bidgaon	75.5199	21.2372	Recharge shaft
38	Jalgaon	Chopda	Bidgaon	75.5349	21.2574	Recharge shaft
39	Jalgaon	Chopda	Bidgaon	75.5238	21.2434	Recharge shaft
40	Jalgaon	Chopda	Bidgaon	75.5296	21.2473	Recharge shaft
41	Jalgaon	Chopda	Chahardi	75.2481	21.1882	Recharge shaft
42	Jalgaon	Chopda	Chahardi	75.2431	21.1973	Recharge shaft
43	Jalgaon	Chopda	Chahardi	75.2639	21.2045	Recharge shaft
44	Jalgaon	Chopda	Chahardi	75.2664	21.2133	Recharge shaft
45	Jalgaon	Chopda	Chahardi	75.2763	21.2027	Recharge shaft
46	Jalgaon	Chopda	Chahardi	75.2691	21.1939	Recharge shaft
47	Jalgaon	Chopda	Chahardi	75.2672	21.188	Recharge shaft
48	Jalgaon	Chopda	Chahardi	75.2589	21.1857	Recharge shaft
49	Jalgaon	Chopda	Chahardi	75.2231	21.2031	Recharge shaft
50	Jalgaon	Chopda	Chaugaon	75.2351	21.2924	Recharge shaft
51	Jalgaon	Chopda	Chaugaon	75.2287	21.3042	Recharge shaft
52	Jalgaon	Chopda	Chaugaon	75.247	21.3006	Recharge shaft
53	Jalgaon	Chopda	Chopda	75.2993	21.2807	Recharge shaft
54	Jalgaon	Chopda	Chopda	75.2899	21.2761	Recharge shaft
55	Jalgaon	Chopda	Chunchade	75.2486	21.2717	Recharge shaft
56	Jalgaon	Chopda	Chunchade	75.2561	21.2823	Recharge shaft
57	Jalgaon	Chopda	Chunchade	75.2489	21.2895	Recharge shaft
58	Jalgaon	Chopda	Dhanwadi (N.V.)	75.3174	21.1968	Recharge shaft

SN	District	Block	Village	X	Y	Type of structure
59	Jalgaon	Chopda	Ichhapur	75.508	21.2537	Recharge shaft
60	Jalgaon	Chopda	Kazipura	75.2184	21.2614	Recharge shaft
61	Jalgaon	Chopda	Khardi	75.4844	21.2413	Recharge shaft
62	Jalgaon	Chopda	Khardi	75.4933	21.255	Recharge shaft
63	Jalgaon	Chopda	Khardi	75.4953	21.2385	Recharge shaft
64	Jalgaon	Chopda	Kurvel	75.3082	21.1885	Recharge shaft
65	Jalgaon	Chopda	Lasur	75.199	21.273	Recharge shaft
66	Jalgaon	Chopda	Lasur	75.206	21.3037	Recharge shaft
67	Jalgaon	Chopda	Loni	75.4778	21.2274	Recharge shaft
68	Jalgaon	Chopda	Majare Hingone	75.2278	21.2738	Recharge shaft
69	Jalgaon	Chopda	Majare Hingone	75.2134	21.2743	Recharge shaft
70	Jalgaon	Chopda	Mamlade	75.2686	21.2794	Recharge shaft
71	Jalgaon	Chopda	Mamlade	75.2775	21.2936	Recharge shaft
72	Jalgaon	Chopda	Mangrul	75.4257	21.239	Recharge shaft
73	Jalgaon	Chopda	Mangrul	75.4268	21.2315	Recharge shaft
74	Jalgaon	Chopda	Nagalwadi	75.3165	21.2917	Recharge shaft
75	Jalgaon	Chopda	Nagalwadi	75.3079	21.2868	Recharge shaft
76	Jalgaon	Chopda	Narwade	75.3661	21.2754	Recharge shaft
77	Jalgaon	Chopda	Narwade	75.3658	21.2832	Recharge shaft
78	Jalgaon	Chopda	Tawase Bk.	75.278	21.1885	Recharge shaft
79	Jalgaon	Chopda	Vadati	75.3924	21.2718	Recharge shaft
80	Jalgaon	Chopda	Vadati	75.3841	21.2747	Recharge shaft
81	Jalgaon	Chopda	Varad	75.2966	21.3029	Recharge shaft
82	Jalgaon	Chopda	Varad	75.2946	21.2944	Recharge shaft
83	Jalgaon	Chopda	Vardi	75.4069	21.2465	Recharge shaft
84	Jalgaon	Chopda	Vardi	75.4202	21.2532	Recharge shaft
85	Jalgaon	Chopda	Vardi	75.4049	21.2625	Recharge shaft
86	Jalgaon	Chopda	Vargavhan	75.5097	21.247	Recharge shaft
87	Jalgaon	Chopda	Virwade	75.3797	21.2964	Recharge shaft
88	Jalgaon	Chopda	Virwade	75.3686	21.2904	Recharge shaft
89	Jalgaon	Chopda	Virwade	75.3553	21.301	Recharge shaft
90	Jalgaon	Edlabad	Anturli	76.1297	21.1767	Recharge shaft
91	Jalgaon	Edlabad	Anturli	76.1425	21.1969	Recharge shaft
92	Jalgaon	Edlabad	Anturli	76.1498	21.1942	Recharge shaft
93	Jalgaon	Edlabad	Anturli	76.1604	21.1914	Recharge shaft
94	Jalgaon	Edlabad	Belaswadi	76.1107	21.1607	Recharge shaft
95	Jalgaon	Edlabad	Belkhede	76.1156	21.1691	Recharge shaft
96	Jalgaon	Edlabad	Edlabad	76.0915	21.0746	Recharge shaft
97	Jalgaon	Edlabad	Ghodasgaon	76.149	21.0459	Recharge shaft
98	Jalgaon	Edlabad	Ghodasgaon	76.1181	21.0591	Recharge shaft
99	Jalgaon	Edlabad	Khamkhede	76.0678	21.07	Recharge shaft
100	Jalgaon	Edlabad	Korhale	76.3135	20.9519	Recharge shaft
101	Jalgaon	Edlabad	Mel Sangave	76.0225	21.0809	Recharge shaft
102	Jalgaon	Edlabad	Naigaon	76.076	21.1496	Recharge shaft
103	Jalgaon	Edlabad	Narvel	76.1251	21.1729	Recharge shaft
104	Jalgaon	Edlabad	Pimprale	76.2932	20.9582	Recharge shaft
105	Jalgaon	Edlabad	Pimprale	76.2845	20.9618	Recharge shaft
106	Jalgaon	Edlabad	Pimprale	76.2801	20.9613	Recharge shaft
107	Jalgaon	Edlabad	Pimprale	76.3005	20.961	Recharge shaft
108	Jalgaon	Edlabad	Raigaon	76.342	20.9511	Recharge shaft
109	Jalgaon	Edlabad	Sukali	76.1306	21.0497	Recharge shaft
110	Jalgaon	Edlabad	Therole	76.2739	20.9724	Recharge shaft
111	Jalgaon	Edlabad	Uchande	76.0437	21.0794	Recharge shaft
112	Jalgaon	Jalgaon	Asoda	75.6107	21.078	Recharge Shaft
113	Jalgaon	Jalgaon	Asoda	75.5804	21.0596	Recharge Shaft
114	Jalgaon	Jalgaon	Asoda	75.5959	21.0704	Recharge Shaft
115	Jalgaon	Jalgaon	Asoda	75.6182	21.0643	Recharge Shaft
116	Jalgaon	Jalgaon	Bhadli Bk	75.6377	21.0536	Recharge Shaft
117	Jalgaon	Jalgaon	Bhokar	75.3419	21.1507	Recharge Shaft

SN	District	Block	Village	X	Y	Type of structure
118	Jalgaon	Jalgaon	Bholane	75.629	21.0692	Recharge Shaft
119	Jalgaon	Jalgaon	Jalgaon (Ma-2)	75.5645	21.0429	Recharge Shaft
120	Jalgaon	Jalgaon	Kanalde	75.5256	21.1065	Recharge Shaft
121	Jalgaon	Jalgaon	Kanalde	75.5177	21.1153	Recharge Shaft
122	Jalgaon	Jalgaon	Kanalde	75.4875	21.1043	Recharge Shaft
123	Jalgaon	Jalgaon	Kanalde	75.4961	21.098	Recharge Shaft
124	Jalgaon	Jalgaon	Kanaswade	75.656	21.0806	Recharge Shaft
125	Jalgaon	Jalgaon	Kanaswade	75.6492	21.0887	Recharge Shaft
126	Jalgaon	Jalgaon	Kanaswade	75.6452	21.1022	Recharge Shaft
127	Jalgaon	Jalgaon	Mamurabad	75.575	21.0958	Recharge Shaft
128	Jalgaon	Jalgaon	Mamurabad	75.5534	21.0998	Recharge Shaft
129	Jalgaon	Jalgaon	Mamurabad	75.5808	21.0833	Recharge Shaft
130	Jalgaon	Jalgaon	Mamurabad	75.5685	21.0914	Recharge Shaft
131	Jalgaon	Jalgaon	Mamurabad	75.5645	21.0598	Recharge Shaft
132	Jalgaon	Jalgaon	Mamurabad	75.5595	21.078	Recharge Shaft
133	Jalgaon	Jalgaon	Mamurabad	75.5527	21.0904	Recharge Shaft
134	Jalgaon	Jalgaon	Mamurabad	75.5444	21.0991	Recharge Shaft
135	Jalgaon	Jalgaon	Mamurabad	75.5775	21.0754	Recharge Shaft
136	Jalgaon	Jalgaon	Nandgaon	75.4489	21.1462	Recharge Shaft
137	Jalgaon	Jalgaon	Nandre Bk	75.4972	21.1284	Recharge Shaft
138	Jalgaon	Jalgaon	Nandre Bk	75.4734	21.1405	Recharge Shaft
139	Jalgaon	Jalgaon	Phupani	75.428	21.1465	Recharge Shaft
140	Jalgaon	Jalgaon	Sujde	75.5919	21.0894	Recharge Shaft
141	Jalgaon	Raver	Ahirwadi	76.0776	21.3013	Recharge shaft
142	Jalgaon	Raver	Ahirwadi	76.0902	21.3005	Recharge shaft
143	Jalgaon	Raver	Ajande	76.041	21.2024	Recharge shaft
144	Jalgaon	Raver	Ajande	76.0268	21.2098	Recharge shaft
145	Jalgaon	Raver	Ajande	76.0472	21.1958	Recharge shaft
146	Jalgaon	Raver	Ambhode Kh.	76.0212	21.3107	Recharge shaft
147	Jalgaon	Raver	Ambhode Kh.	76.032	21.3073	Recharge shaft
148	Jalgaon	Raver	Bhatkhede	75.9997	21.2324	Recharge shaft
149	Jalgaon	Raver	Bhatkhede	76.0074	21.2283	Recharge shaft
150	Jalgaon	Raver	Bhatkhede	75.9958	21.2367	Recharge shaft
151	Jalgaon	Raver	Bhokari	76.0592	21.2441	Recharge shaft
152	Jalgaon	Raver	Bhokari	76.061	21.257	Recharge shaft
153	Jalgaon	Raver	Chinawal	75.9451	21.2005	Recharge shaft
154	Jalgaon	Raver	Chinawal	75.907	21.2122	Recharge shaft
155	Jalgaon	Raver	Chinchol	75.9647	21.1052	Recharge shaft
156	Jalgaon	Raver	Dasanoor	75.9403	21.1526	Recharge shaft
157	Jalgaon	Raver	Dasanoor	75.9483	21.1512	Recharge shaft
158	Jalgaon	Raver	Faizpur	75.8646	21.1761	Recharge shaft
159	Jalgaon	Raver	Gaulkhede	75.9422	21.2353	Recharge shaft
160	Jalgaon	Raver	Golwadi	75.9831	21.1309	Recharge shaft
161	Jalgaon	Raver	Kalmode	75.8685	21.2116	Recharge shaft
162	Jalgaon	Raver	Kandwel	76.0001	21.1221	Recharge shaft
163	Jalgaon	Raver	Karjod	76.0835	21.2832	Recharge shaft
164	Jalgaon	Raver	Karjod	76.0828	21.2722	Recharge shaft
165	Jalgaon	Raver	Karjod	76.09	21.2603	Recharge shaft
166	Jalgaon	Raver	Kerhale Kh.	76.057	21.2722	Recharge shaft
167	Jalgaon	Raver	Kerhale Kh.	76.0563	21.2904	Recharge shaft
168	Jalgaon	Raver	Khanapur	76.1106	21.2612	Recharge shaft
169	Jalgaon	Raver	Khanapur	76.1189	21.2583	Recharge shaft
170	Jalgaon	Raver	Khanapur	76.1319	21.2744	Recharge shaft
171	Jalgaon	Raver	Khanapur	76.1226	21.285	Recharge shaft
172	Jalgaon	Raver	Khirode Pr. Yawal	75.8874	21.2266	Recharge shaft
173	Jalgaon	Raver	Khirode Pr. Yawal	75.8748	21.2352	Recharge shaft
174	Jalgaon	Raver	Khirode Pr.Raver	76.0371	21.3004	Recharge shaft
175	Jalgaon	Raver	Khirode Pr.Raver	76.0193	21.2657	Recharge shaft
176	Jalgaon	Raver	Khirwad	76.1039	21.2108	Recharge shaft

SN	District	Block	Village	X	Y	Type of structure
177	Jalgaon	Raver	Khirwad	76.0952	21.2257	Recharge shaft
178	Jalgaon	Raver	Kochoor Bk.	75.908	21.1811	Recharge shaft
179	Jalgaon	Raver	Kumbharkhade	75.9465	21.2141	Recharge shaft
180	Jalgaon	Raver	Kusumbe Kh.	75.9735	21.2662	Recharge shaft
181	Jalgaon	Raver	Lohare	75.9252	21.2497	Recharge shaft
182	Jalgaon	Raver	Lohare	75.911	21.2539	Recharge shaft
183	Jalgaon	Raver	Lohare	75.94	21.2441	Recharge shaft
184	Jalgaon	Raver	Lohare	75.9342	21.2627	Recharge shaft
185	Jalgaon	Raver	Lohare	75.9172	21.2443	Recharge shaft
186	Jalgaon	Raver	Maskawad Bk.	75.915	21.1355	Recharge shaft
187	Jalgaon	Raver	Morgaon Bk.	76.1187	21.2319	Recharge shaft
188	Jalgaon	Raver	Morgaon Bk.	76.1161	21.2353	Recharge shaft
189	Jalgaon	Raver	Morgaon Kh.	76.1109	21.2249	Recharge shaft
190	Jalgaon	Raver	Morgaon Kh.	76.1063	21.2249	Recharge shaft
191	Jalgaon	Raver	Nimbol	76.0476	21.185	Recharge shaft
192	Jalgaon	Raver	Padale Bk.	76.1138	21.3074	Recharge shaft
193	Jalgaon	Raver	Padale Bk.	76.1183	21.2995	Recharge shaft
194	Jalgaon	Raver	Padale Kh	76.1167	21.3172	Recharge shaft
195	Jalgaon	Raver	Padale Kh	76.107	21.3161	Recharge shaft
196	Jalgaon	Raver	Padale Kh	76.1031	21.3286	Recharge shaft
197	Jalgaon	Raver	Pimpri	76.0569	21.3063	Recharge shaft
198	Jalgaon	Raver	Pimpri	76.0588	21.3005	Recharge shaft
199	Jalgaon	Raver	Pimpri	76.0599	21.3178	Recharge shaft
200	Jalgaon	Raver	Punkhede	76.0583	21.221	Recharge shaft
201	Jalgaon	Raver	Punkhede	76.0549	21.2313	Recharge shaft
202	Jalgaon	Raver	Puri	75.964	21.12	Recharge shaft
203	Jalgaon	Raver	Rasalpur	76.0541	21.2605	Recharge shaft
204	Jalgaon	Raver	Raver	76.0436	21.2473	Recharge shaft
205	Jalgaon	Raver	Raver (Rural)	76.0277	21.2264	Recharge shaft
206	Jalgaon	Raver	Raver (Rural)	76.0255	21.2512	Recharge shaft
207	Jalgaon	Raver	Raver (Rural)	76.0069	21.2769	Recharge shaft
208	Jalgaon	Raver	Raver (Rural)	76.0385	21.2083	Recharge shaft
209	Jalgaon	Raver	Raver (Rural)	76.0233	21.2154	Recharge shaft
210	Jalgaon	Raver	Rozode	75.8869	21.1944	Recharge shaft
211	Jalgaon	Raver	Rozode	75.8742	21.1976	Recharge shaft
212	Jalgaon	Raver	Rozode	75.8816	21.1936	Recharge shaft
213	Jalgaon	Raver	Rozode	75.8932	21.1994	Recharge shaft
214	Jalgaon	Raver	Savda	75.8858	21.1484	Recharge shaft
215	Jalgaon	Raver	Savkhede Bk.	75.8986	21.2258	Recharge shaft
216	Jalgaon	Raver	Savkhede Bk.	75.9019	21.2442	Recharge shaft
217	Jalgaon	Raver	Savkhede Kh.	75.9077	21.2204	Recharge shaft
218	Jalgaon	Raver	Savkhede Kh.	75.9099	21.2288	Recharge shaft
219	Jalgaon	Raver	Singanoor	75.9519	21.1671	Recharge shaft
220	Jalgaon	Raver	Singat	75.968	21.1336	Recharge shaft
221	Jalgaon	Raver	Singat	75.9606	21.136	Recharge shaft
222	Jalgaon	Raver	Thorgavhan	75.882	21.1126	Recharge shaft
223	Jalgaon	Raver	Utkhede	75.966	21.253	Recharge shaft
224	Jalgaon	Raver	Vivare Bk.	75.9968	21.1903	Recharge shaft
225	Jalgaon	Raver	Vivare Bk.	75.9801	21.1873	Recharge shaft
226	Jalgaon	Raver	Vivare Bk.	75.9876	21.2279	Recharge shaft
227	Jalgaon	Raver	Vivare Bk.	75.9962	21.1789	Recharge shaft
228	Jalgaon	Raver	Wadgaon	75.9497	21.1865	Recharge shaft
229	Jalgaon	Raver	Waghadi	76.0052	21.161	Recharge shaft
230	Jalgaon	Raver	Waghod	76.0987	21.2509	Recharge shaft
231	Jalgaon	Raver	Waghod	76.1183	21.2505	Recharge shaft
232	Jalgaon	Raver	Waghode Bk.	75.9297	21.1803	Recharge shaft
233	Jalgaon	Raver	Waghode Bk.	75.9461	21.182	Recharge shaft
234	Jalgaon	Raver	Waghode Kh	75.899	21.1384	Recharge shaft
235	Jalgaon	Yawal	Adgaon	75.5638	21.2387	Recharge shaft

SN	District	Block	Village	X	Y	Type of structure
236	Jalgaon	Yawal	Anjale	75.7631	21.0918	Recharge shaft
237	Jalgaon	Yawal	Atrawal	75.7484	21.1791	Recharge shaft
238	Jalgaon	Yawal	Atrawal	75.7436	21.1777	Recharge shaft
239	Jalgaon	Yawal	Awar	75.5568	21.1469	Recharge shaft
240	Jalgaon	Yawal	Bhalod	75.7914	21.1593	Recharge shaft
241	Jalgaon	Yawal	Bhalshiv	75.682	21.1369	Recharge shaft
242	Jalgaon	Yawal	Bhalshiv	75.6877	21.1274	Recharge shaft
243	Jalgaon	Yawal	Bhalshiv	75.6813	21.142	Recharge shaft
244	Jalgaon	Yawal	Bhalshiv	75.6767	21.1346	Recharge shaft
245	Jalgaon	Yawal	Bhalshiv	75.687	21.131	Recharge shaft
246	Jalgaon	Yawal	Bhortek	75.7915	21.0967	Recharge shaft
247	Jalgaon	Yawal	Borale	75.6419	21.2111	Recharge shaft
248	Jalgaon	Yawal	Borale	75.6374	21.2126	Recharge shaft
249	Jalgaon	Yawal	Borale	75.6427	21.2182	Recharge shaft
250	Jalgaon	Yawal	Borawal Bk	75.7173	21.1223	Recharge shaft
251	Jalgaon	Yawal	Borawal Kh	75.714	21.1261	Recharge shaft
252	Jalgaon	Yawal	Borkhede Bk	75.8328	21.2219	Recharge shaft
253	Jalgaon	Yawal	Borkhede Bk	75.8205	21.2311	Recharge shaft
254	Jalgaon	Yawal	Chincholi	75.5517	21.2219	Recharge shaft
255	Jalgaon	Yawal	Chitode	75.7438	21.1978	Recharge shaft
256	Jalgaon	Yawal	Chunchale	75.646	21.2484	Recharge shaft
257	Jalgaon	Yawal	Chunchale	75.6275	21.2308	Recharge shaft
258	Jalgaon	Yawal	Chunchale	75.6331	21.2577	Recharge shaft
259	Jalgaon	Yawal	Chunchale	75.6383	21.255	Recharge shaft
260	Jalgaon	Yawal	Chunchale	75.6441	21.2263	Recharge shaft
261	Jalgaon	Yawal	Dagadi	75.5838	21.1556	Recharge shaft
262	Jalgaon	Yawal	Dagadi	75.5843	21.1642	Recharge shaft
263	Jalgaon	Yawal	Dagadi	75.587	21.1567	Recharge shaft
264	Jalgaon	Yawal	Dahigaon	75.6565	21.2124	Recharge shaft
265	Jalgaon	Yawal	Dambhurni	75.5548	21.1642	Recharge shaft
266	Jalgaon	Yawal	Dambhurni	75.5659	21.1622	Recharge shaft
267	Jalgaon	Yawal	Dangarkuthora	75.7512	21.2294	Recharge shaft
268	Jalgaon	Yawal	Dangarkuthora	75.7416	21.2314	Recharge shaft
269	Jalgaon	Yawal	Dangarkuthora	75.7359	21.214	Recharge shaft
270	Jalgaon	Yawal	Dangarkuthora	75.7383	21.2388	Recharge shaft
271	Jalgaon	Yawal	Dangarkuthora	75.7474	21.2152	Recharge shaft
272	Jalgaon	Yawal	Dongaon	75.5651	21.2106	Recharge shaft
273	Jalgaon	Yawal	Faizpur	75.8525	21.1937	Recharge shaft
274	Jalgaon	Yawal	Hambardi	75.8099	21.1917	Recharge shaft
275	Jalgaon	Yawal	Ichkheda	75.5877	21.239	Recharge shaft
276	Jalgaon	Yawal	Karanji	75.847	21.1218	Recharge shaft
277	Jalgaon	Yawal	Kasarkhede	75.5761	21.2377	Recharge shaft
278	Jalgaon	Yawal	Kingaon Bk	75.6129	21.2142	Recharge shaft
279	Jalgaon	Yawal	Kingaon Bk	75.5923	21.2238	Recharge shaft
280	Jalgaon	Yawal	Korpawli	75.697	21.2321	Recharge shaft
281	Jalgaon	Yawal	Korpawli	75.6943	21.2219	Recharge shaft
282	Jalgaon	Yawal	Korpawli	75.7061	21.2447	Recharge shaft
283	Jalgaon	Yawal	Kosgaon	75.8141	21.1034	Recharge shaft
284	Jalgaon	Yawal	Mahelkhedi	75.6825	21.2142	Recharge shaft
285	Jalgaon	Yawal	Manwel	75.6077	21.1594	Recharge shaft
286	Jalgaon	Yawal	Manwel	75.6189	21.1614	Recharge shaft
287	Jalgaon	Yawal	Marul	75.8161	21.2197	Recharge shaft
288	Jalgaon	Yawal	Mohrale	75.7064	21.249	Recharge shaft
289	Jalgaon	Yawal	Mohrale	75.6693	21.2445	Recharge shaft
290	Jalgaon	Yawal	Mohrale	75.6905	21.2593	Recharge shaft
291	Jalgaon	Yawal	Mohrale	75.6965	21.2449	Recharge shaft
292	Jalgaon	Yawal	Nhavi P Adawad	75.539	21.1652	Recharge shaft
293	Jalgaon	Yawal	Nhavi P Yawal	75.8327	21.2058	Recharge shaft
294	Jalgaon	Yawal	Nhavi P Yawal	75.8399	21.1928	Recharge shaft