



# Detailed study of High resolution Aquifer Mapping of urban Agglomerates in Parts of Jodhpur City, Rajasthan State

## Table of Contents

1. Introduction .....	3
A) Jodhpur District .....	3
B) Geomorphology and Drainage .....	3
C) Hydrogeology .....	4
2. Priority types .....	6
3. Previous Studies: .....	7
4. Objective of the Study: .....	8
5. Existing Data and Data gap Analysis: .....	12
A) Ground Water Level & Quality Monitoring: .....	12
B) Exploration: .....	13
C) Geophysical Data: VES/TEM: .....	13
D) Soil Infiltration/ pumping test: .....	14
6. Month-wise activity plan .....	15
7. Composition of the team. ....	15
8. Team-member-wise responsibilities .....	16
9. Monthly targets.....	17

## **1. Introduction**

The National Aquifer Mapping and Management programme (NAQUIM) launched by CGWB in the year 2012 with the objectives of delineating and characterizing aquifers and preparing aquifer management plans on 1:50,000 scale. In this programme, mapping the Aquifers in 1: 50,000 scale was considered sufficient for planning requirements up to mandal level. The findings of NAQUIM studies are being utilized by many agencies, especially the State government agencies involved in ground water management and water supply but large scale implementation at ground level by the user agencies has been lacking. As per the feedback received from the agencies using the NAQUIM outputs, major limitations include non-availability of printed maps at usable scales and lack of site specific recommendations for implementation at village level. Keeping the above limitations in mind and considering the future requirements, now NAQUIM 2.0 has been taken up with broad objectives.

### **A) Jodhpur District**

Jodhpur district is situated between 25<sup>0</sup>51'08" & 27<sup>0</sup>37'09" North Latitude and 71<sup>0</sup>48'09" & 73<sup>0</sup>52'06" East Longitude covering geographical area of 22,250 sq. km. and occupies 6.68 % of total part of state. The district comes under arid zone of the Rajasthan State. Jodhpur district is part of Jodhpur Division. The district is divided into 7 Sub- division namely Jodhpur, Bhopalgarh, Luni, Osian, Phalodi, Piparcity and Shergarh and comprises of 7 tehsils & 17 blocks. The total number of villages in the district is 1838. The Jodhpur district is bounded by Nagaur in the East, Jaisalmer in the West, Bikaner in the North and Barmer as well as Pali in the South. Total population of the district is 3687165 which include 2422551 rural and 1264614 urban populations and sex ratio is 916 out of 1000 male. Decadal population growth rate of the district is 27.74% since 2011.

### **B) Geomorphology and Drainage**

Jodhpur district forms part of Great Thar Desert of Rajasthan. In this arid region, there are sand dunes, alluvial areas dotted with few hillocks and hill chains scattered in the area. In the eastern part of the district, the area between Bilara and Jodhpur is covered by alluvium deposited due to the fluvial action of Luni river system. The eastern part of the district exhibits gentle undulating topography interrupted by small ridges of hard rocks. The general elevation of plains varies from 300 m amsl in north to 150 m amsl in south. Regional slope is from north-east towards south- west direction. Orientation of alluvial plain area follows the Luni River and its tributaries. Sand dunes occupy a major part of the district north of Vindhyan escarpment in northern and northwestern part of the district. The sand dunes are transverse and longitudinal type formed due to aeolian action and overlies the denuded consolidated formations. Ridges composed of comparatively resistive rocks like granite, rhyolite and Jodhpur sandstone are found extending from Shergarh in the west to Bilara in the east. The alluvial and sand filled valleys are separated by the ridges whose crest elevation ranges from 325 to 460 m amsl. In the northern part of the district, highest peak of

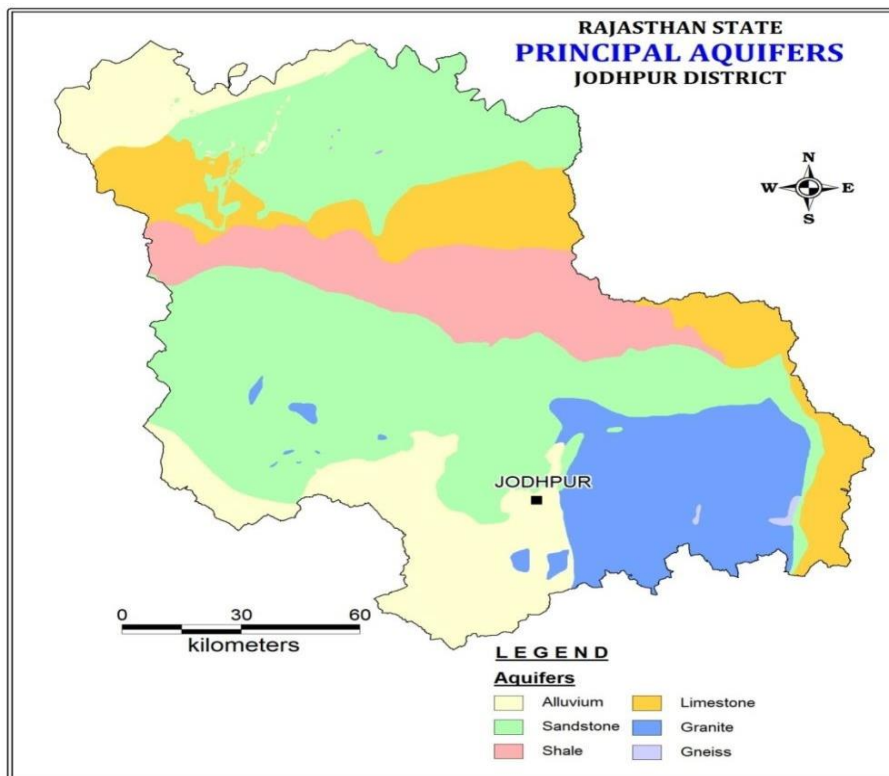
the hill is 284 m amsl. Presence of boulder bed exhibit striking plain topography around Bap and low lying outcrops of limestone, shale and sandstone layers are observed part of the district near Phalodi.

**Table 1. Distribution of various geomorphic units in Jodhpur District**

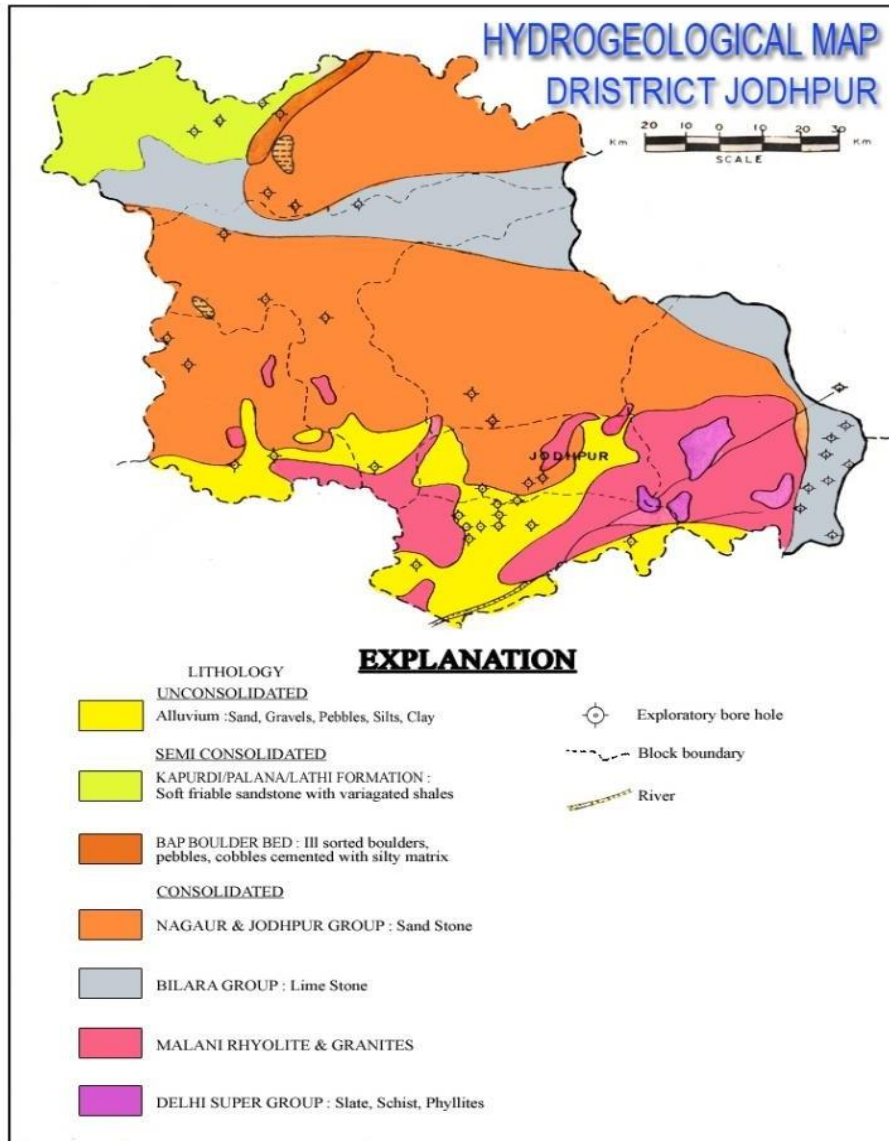
Origin	Landform Unit	Occurrence
Aeolian	Sand Dunes	North and Northwestern part of the District.
	Sandy Plains	North and Northwestern part of the District.
Fluvial	Alluvial Plains	Eastern part of the district along rivers- Luni, Mithri etc.
	Interdunal Plains	Scattered in entire district, mainly in north and western part of the district.
Denudational	Pediments	Scattered in the district, mainly in east & west.
Hills	Linear Ridges	Occur in Bilara and Osian Blocks. Extended from Shergarh in the west to Bilara in the east.
	Structural Hills	In northwestern and eastern parts of the district and Jodhpur town.

### C) Hydrogeology

Ground water occurs under unconfined to semi-confined conditions in rocks of Delhi Super Group, Jodhpur Sandstone, Bilara Limestone Nagaur Sandstone, Lathi Sandstone and unconsolidated sediments (valley fills and alluvium). These form the chief source of ground water in the district. Confined conditions are also met sometimes at deeper levels in the northwestern part of the district. Sandstone aquifer covers 12602 sq km (56.63%) and found in Osian, Bawri, Balesar, Shergarh, Phalodi and Bap blocks of Jodhpur district.



**Fig 1. Aquifer MAP of Jodhpur District**



**Fig 2. Hydrogeological Map of Jodhpur District**

Ground water occurs under unconfined to semi-confined conditions in rocks of Delhi Super Group, Jodhpur sandstone, Bilara limestone, Nagaur sandstone, Lathi sandstone and unconsolidated sediments (valley fills and alluvium). These form the chief source of ground water in the district. Confined condition is also met sometimes at deeper levels in the northwestern part of the district.

## 2. Priority types

Jodhpur is the second largest urban agglomerate of the State and has a developed industrial center. The textile processing and stainless steel re-rolling industries generate industrial waste effluent, which contains toxic elements. These industries are located in Basni industrial area of Jodhpur city. The combined industrial effluents are carried through drainage and discharged in the river Jojri having its course south of city. Industrial effluents have caused ground water pollution in downstream of the river in villages viz. Salawas, Nandwan, Bhandu Kallan etc. which is harmful for irrigation also. Suitable measures are also required to be adopted to tackle the rising water level problem observed in the Jodhpur city during last few years.

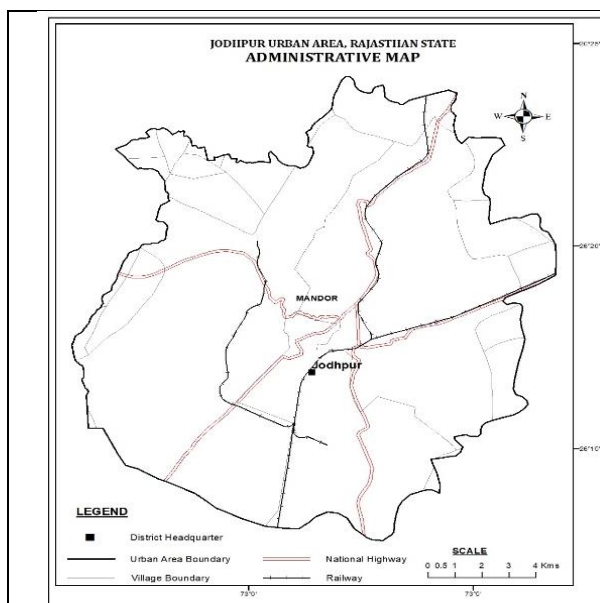


Fig 3. Administrative map of Jodhpur city : Area 247 Sq.Km

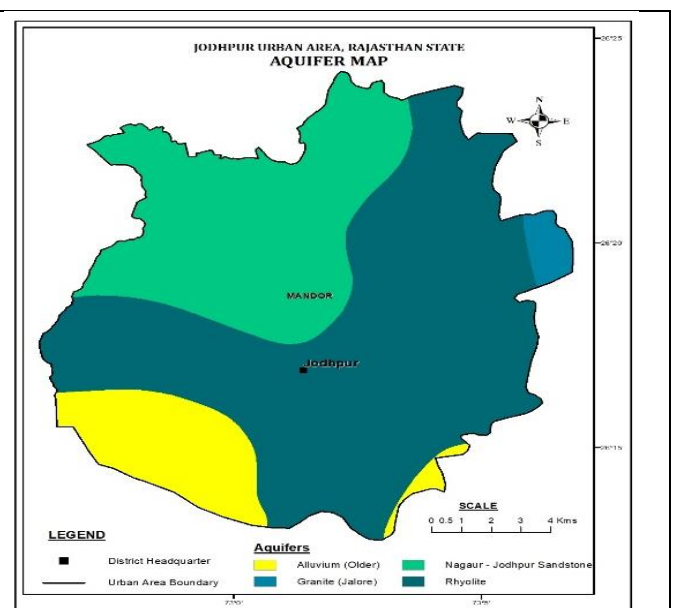


Fig 4. Aquifer Map of Jodhpur City 1

The study aims to identify, delineate and characterize the groundwater aquifer of Jodhpur City on 1: 10000 scale. Through detailed hydrogeological exploration aided with geophysical technics, a comprehensive reports will be prepared on:

1. Delineation of Aquifer in both horizontal and vertical extent.
2. Aquifer properties such as yield, transmissivity, conductivity
3. Identification of recharge & discharge zones
4. Ground Water Quality
5. Ground Water Quality Management Interventions including demarcation of safer aquifers
6. Artificial Recharge Plan
7. Plan for Conjunctive use of surface water and ground water
8. Identification of hydro-geochemical problems and remedial measure thereof.
9. Preparation of Master Plan for Sustainable Aquifer Management Plan 2030.

### **3. Previous Studies:**

A number of hydrogeological studies has been taken up earlier in the area and the details of referred reports are listed below.

- NAQUIM studies: 2017-18
- Hydrogeological Framework and Development prospects, Jodhpur District August 2005.
- Ground Water Pollution studies in Industrial Clusters of Jodhpur, District Jodhpur Rajasthan January 2014.
- Rising Water Problem in Jodhpur city area, Rajasthan 2015
- District Ground Water Brochure: 2021-22

#### **4. Objective of the Study:**

- Providing information in higher granularity with a focus on increasing density of dynamic data like ground water level and ground water quality for each aquifer.
- Improving the data base of aquifers upto 200m in 1: 10,000 or 1:5000 scale .
- To determine the effects of urbanization on ground water regime in terms of quantity and quality.
- To demarcate areas which are highly prone to ground water quality issues due to urbanization.
- Water budgeting along with source sustainability measures specifically for each village.
- Improvising issue based scientific inputs for ground water management up to village level.
- Providing printed maps to the users.
- Putting in place a strategy to ensure implementation of the recommended strategies. Involving state agencies in the studies for a sense of ownership.
- Dependency on freely available data due to lack of MOU with remote sensing agencies.



The objectives of the present study include identification, demarcation and characterization of the Aquifers of Jodhpur Urban Agglomerate in order to remediate the issues discovered in previous NAQUIM studies. This will be achieved by increasing data density and preparing implementable Aquifer Management plans.

For the current study Jodhpur Urban Cluster with an area of 675 sq. km has been selected. The study aims to deal with the issues outlined in the previous studies and it has also been planned to discuss the issues with the line Departments of the State so that necessary solutions can be highlighted and addressed in the current study.

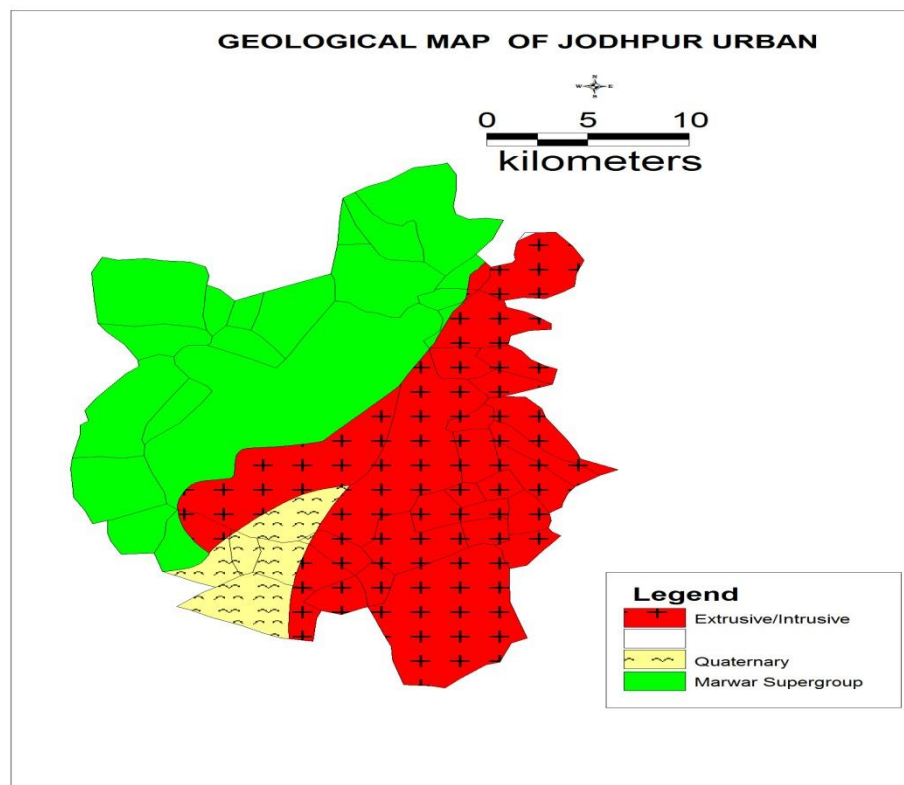
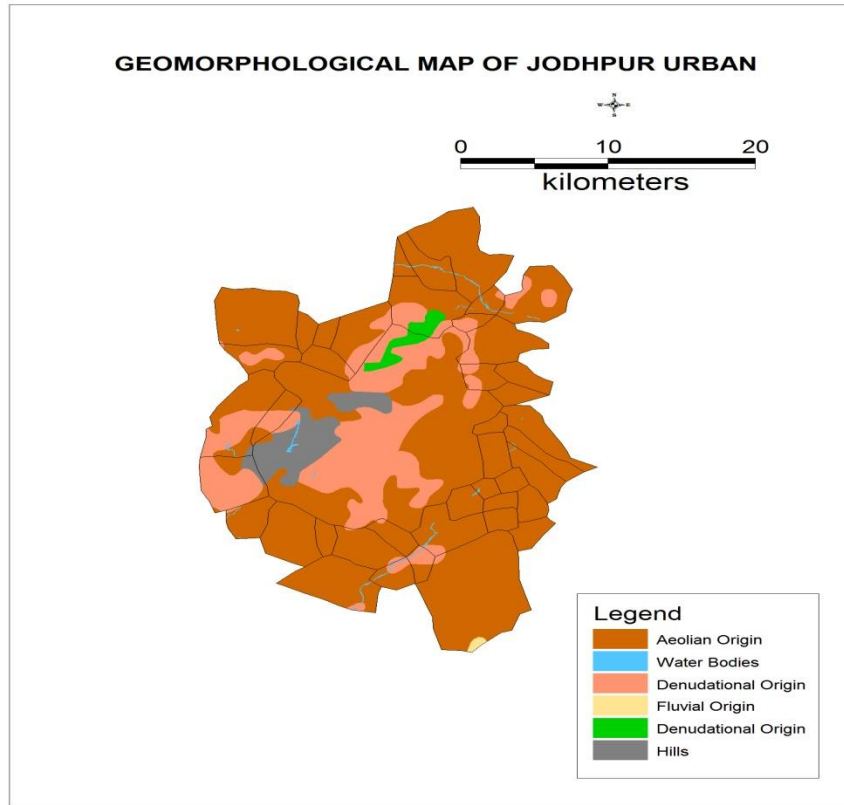


Fig 5: Geological map of Jodhpur Urban

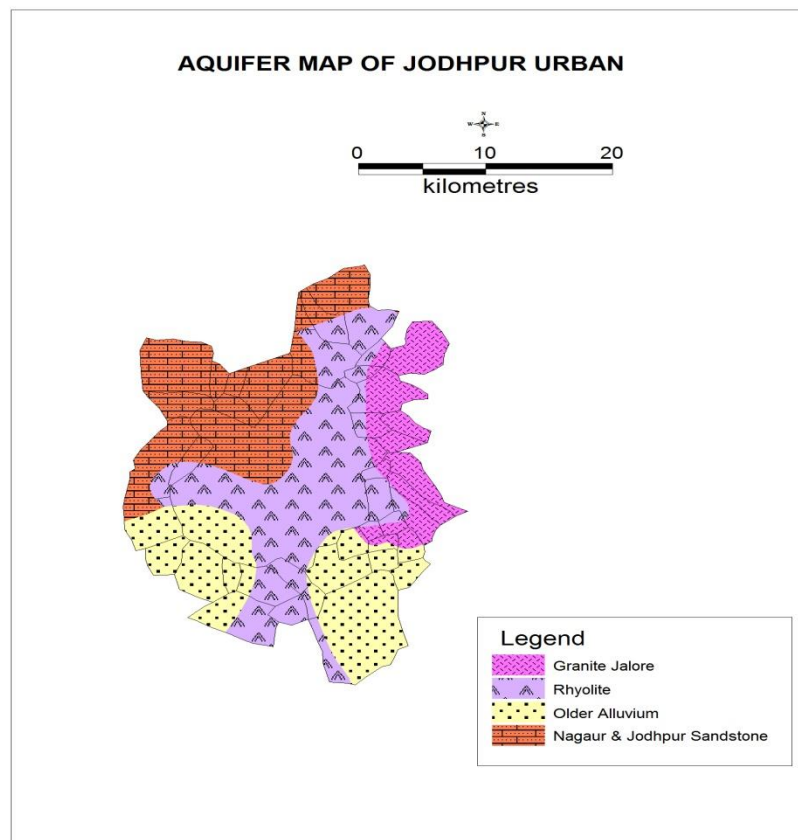
Main issues in Jodhpur urban include:

- Rapid urbanization city sprawl
- Rising Water problem in Jodhpur city
- Increased per-capita use
- Demand & supply factors
- Higher ambient temperatures
- Erratic Rainfall

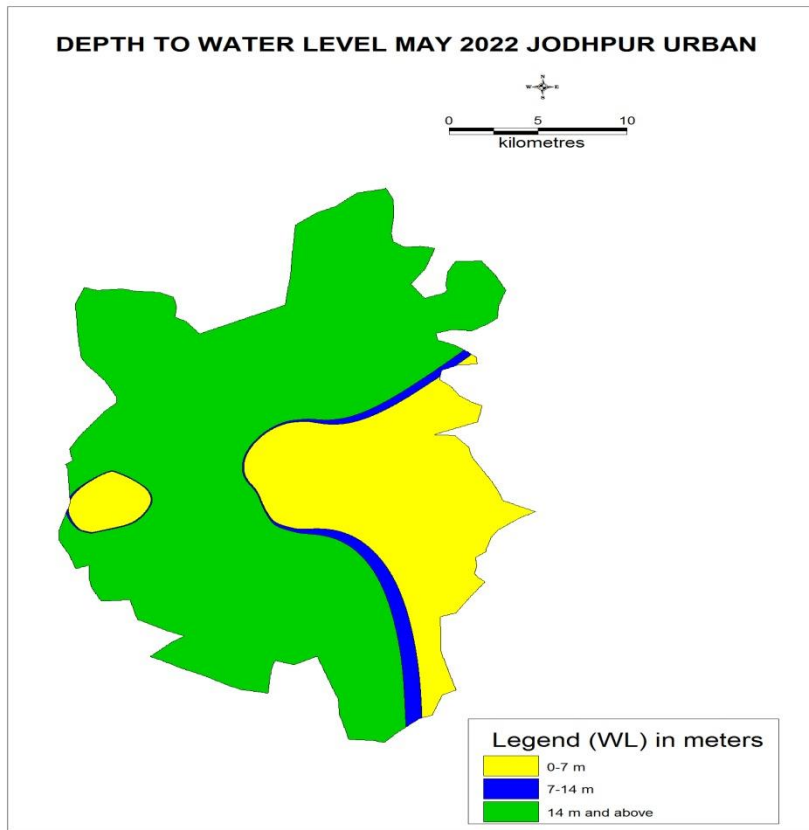
Over Exploitation of Groundwater -According to Groundwater Resource estimation 2022, Jodhpur Urban Block falls under Over exploited Category with total Annual Groundwater Recharge of 477.89 ham and , Annual Extractable Groundwater Resource of 430.10 ham and Total Extraction of 519.24 ham with Stage of Groundwater development at 120.73 %.



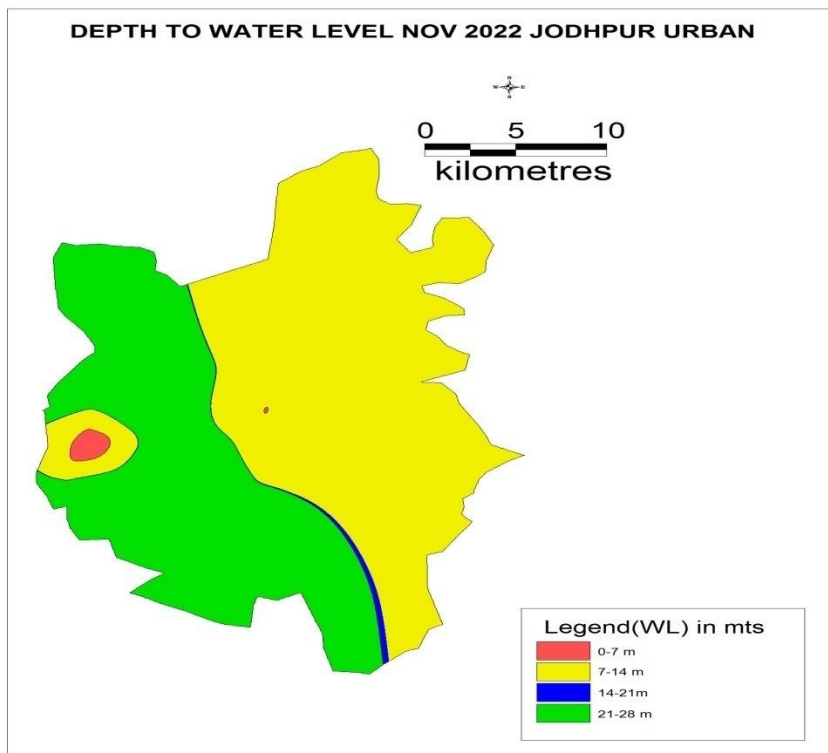
**Fig 6 :Geomorphological Map of Jodhur Urban**



**Fig 7: Aquifer Map of Jodhpur Urban**



**Fig 8: Depth To Water Level May 2022**



**Fig 9: Depth To Water Level Nov 2022**

## 5. Existing Data and Data gap Analysis:

The data generated through various hydrogeological surveys, exploration, geophysical and hydrochemical studies had been utilized to assess the data gap in the study area.

### A) Ground Water Level & Quality Monitoring:

Central Ground Water Board, Western Region is monitoring 8 Pz and 8 Public Wells i.e. Total 16 nos. of Wells in the Mandore block including 8 No. of Wells in Study Area

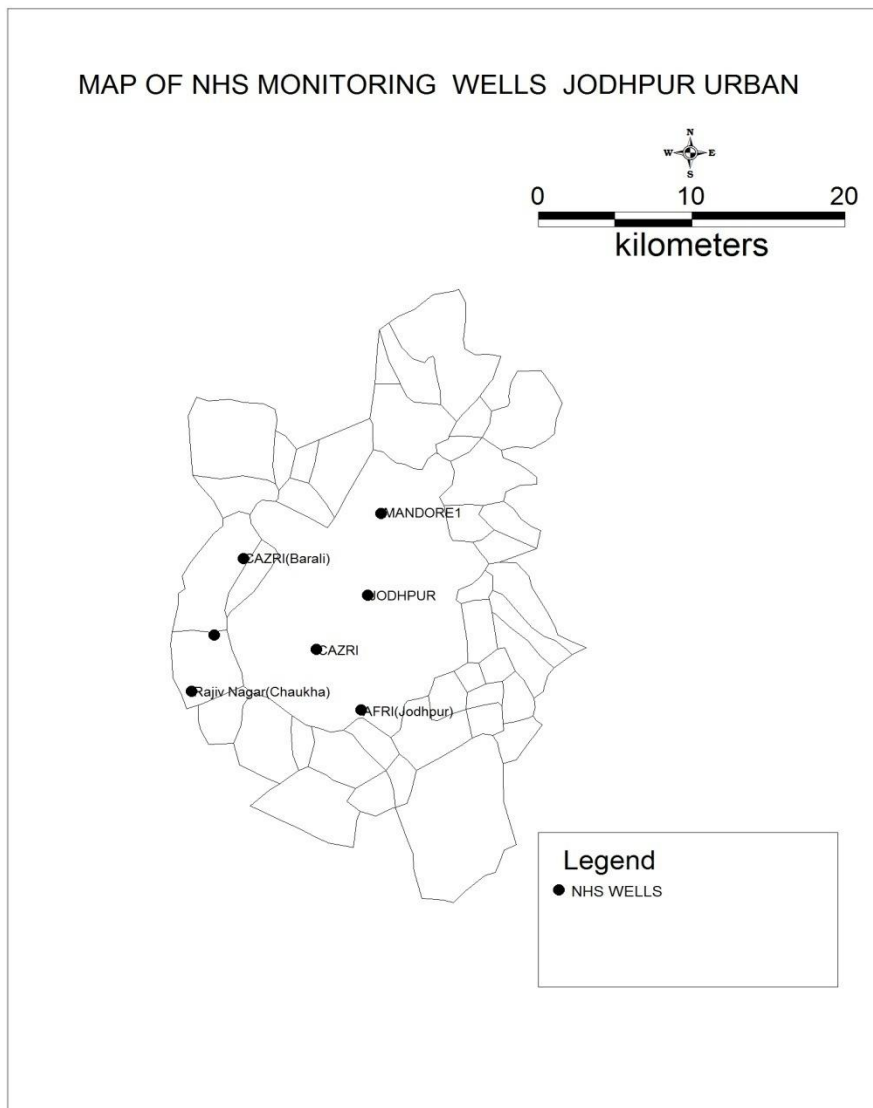
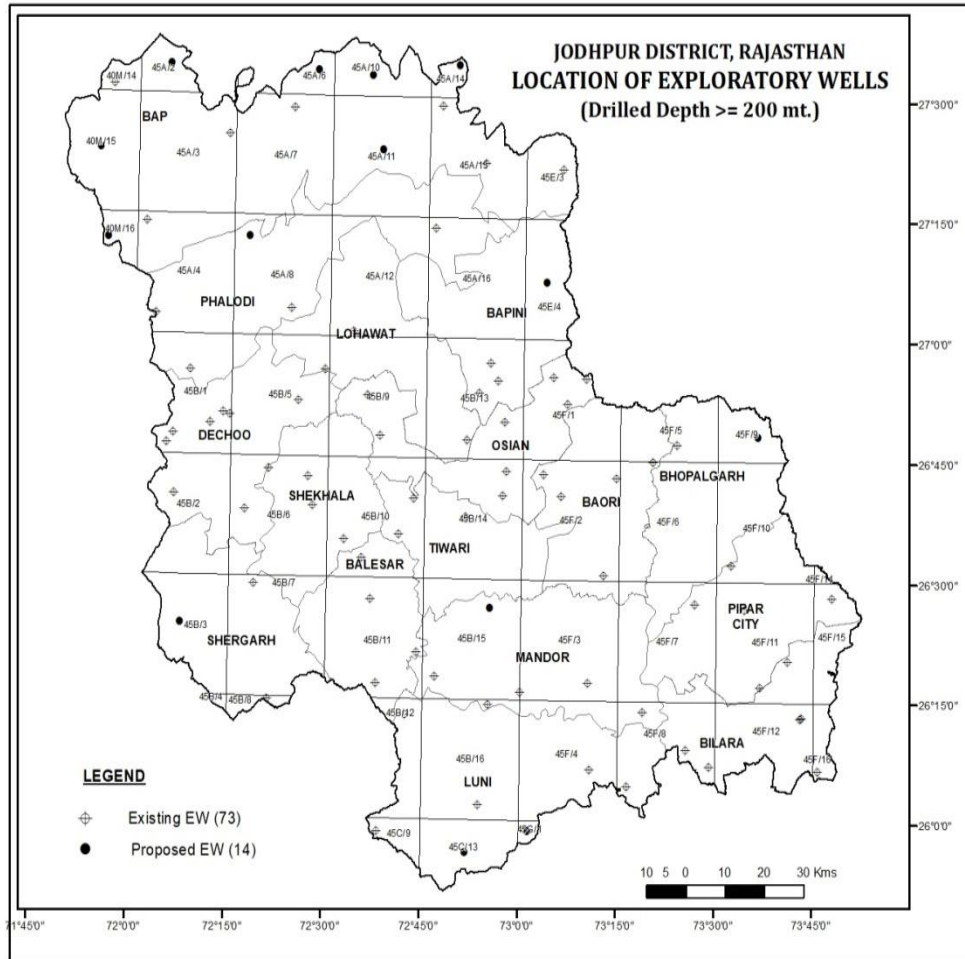


Fig 10: NHS water level Monitoring well

**B) Exploration:** The available CGWB in-house Exploration data in Mandor block of Jodhpur within the study area have been compiled. CGWB has constructed 5 wells and 1 proposed within the study area. The data insufficiency within the study area is thereby identified



**Fig 11. Existing and Proposed EW for water level monitoring in Jodhpur District**

**C) Geophysical Data: VES/TEM:**

As 45 VES/TEM data is available within the Mandore block area, including 6 TEM in the study area as shown in Fig 12. details are given in Annexure 3 and Annexure 4

**Details of VES/TEM**

S.No	Block Name	Existing VES/TEM	Proposed VES/TEM
1	Mandore	17 /28	
	<b>Total</b>	<b>45</b>	

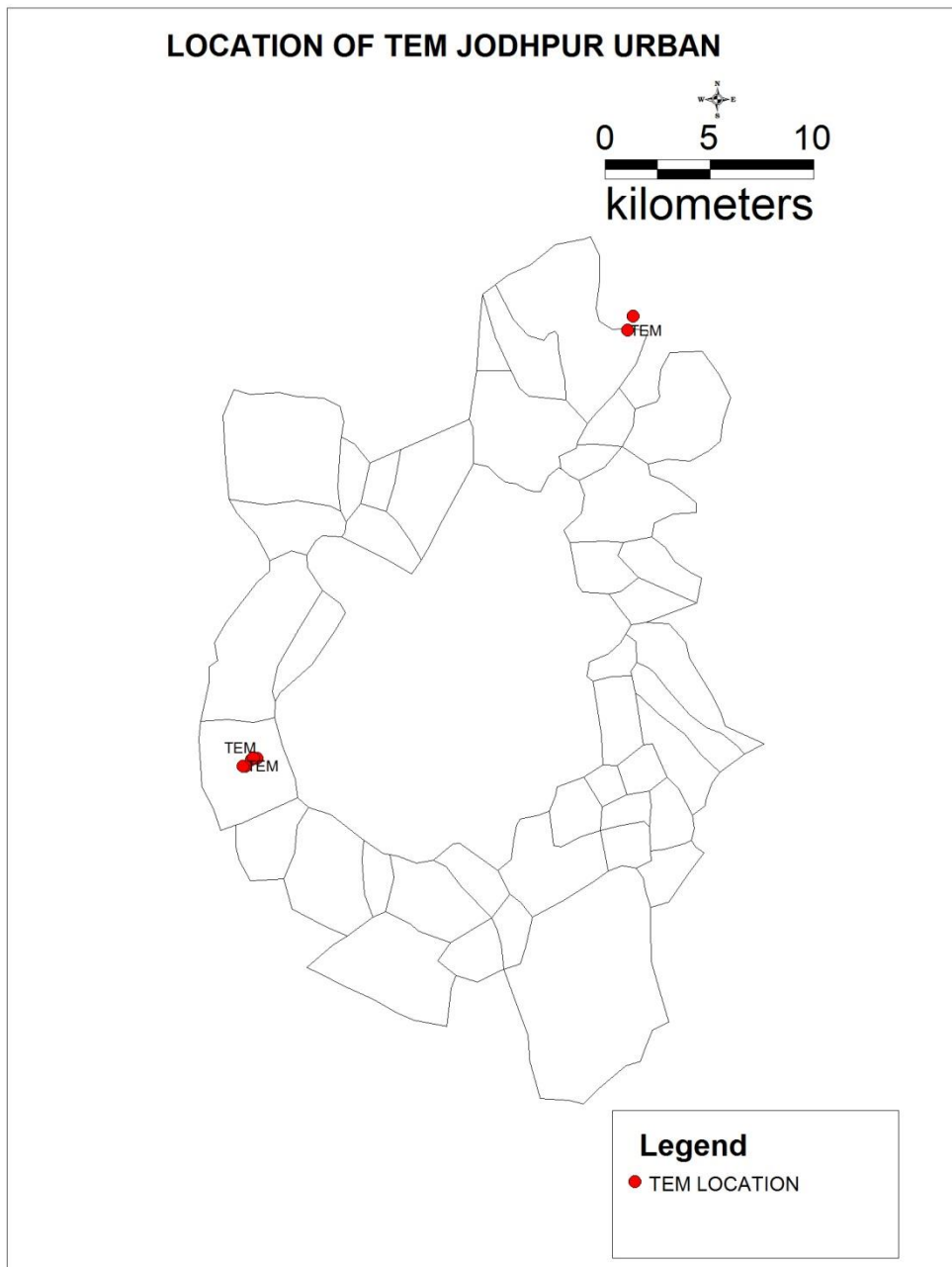


Fig 12: Location of TEM in Jodhpur Urban

**D) Soil Infiltration/ pumping test:**

As per the existing database, no infiltration test has been carried out.

Thus in the study 5 soil infiltration test and 5 pumping tests is proposed.

## 6. Month-wise activity plan

Period	Assignments to be carried out
April	<ul style="list-style-type: none"><li>• Submission of Inception report</li></ul>
May	<ul style="list-style-type: none"><li>• Pre monsoon field work.</li><li>• Meeting to be scheduled with the line Departments of Govt. of Rajasthan to discuss groundwater related issues.</li><li>• Preparation of base map with existing EW/OW, VES/TEM, WQ and WL Data</li><li>• Data Gap analysis</li></ul>
May/June	<ul style="list-style-type: none"><li>• Per- monsoon field work</li><li>• Exploratory Drilling</li></ul>
July to October	<ul style="list-style-type: none"><li>• Data Analysis and Interpretation</li></ul>
November / December	<ul style="list-style-type: none"><li>• Post- monsoon field work</li></ul>
January	<ul style="list-style-type: none"><li>• Data Analysis and Preparation of draft report</li></ul>
February/ March	<ul style="list-style-type: none"><li>• Preparation of Management Plan</li><li>• Submission of Report</li></ul>
March	<ul style="list-style-type: none"><li>• Sharing of the reports with CHQ, GWD and DM/DC</li></ul>

## 7. Composition of the team.

Composition of the Team:		
1	Team Leader	Sh. Hitesh Kamlakar Ramteke, Sc-C
2	Hydrogeologist-1	Sh. Hitesh Kamlakar Ramteke, Sc-C
3	Hydrogeologist-2	Sh. Ghanshyam Tiwari, AHG
4	Geophysicist	Dr. P.P. Dookia, Sc-B (G.P)
5	Chemist	Dr. Prerna Mathuria, ACH

## 8. Team-member-wise responsibilities

Role	Responsibilities
Team Lead	<ul style="list-style-type: none"> <li>- Planning, Supervision and Execution of the Project</li> <li>- Work distribution and monitoring of activities of other team members</li> <li>- Preparation of the inception report.</li> <li>- Timely Delivery of the envisaged Outputs</li> <li>- Finalisation of the management plan</li> <li>- Presentations at different forums, sharing of the outputs.</li> <li>- Preparation of the draft report as per the approved Quality Standards and its Final Submission.</li> </ul>
Expert (Hydrogeology)-1	<ul style="list-style-type: none"> <li>- Field Data Collection (Exploration, Pz construction, Water Level, Water Quality, Pumping Tests, Infiltration tests, demand/supply data, sample surveys and others)</li> <li>- Sample collection for quality studies</li> <li>- Secondary Data collection</li> <li>- Entering data in database (WIMS)</li> </ul>
Expert (Hydrogeology)-2	<ul style="list-style-type: none"> <li>- Integration of data, preparation of thematic maps, preparation cross sections etc.</li> <li>- Consultation with allied experts like agriculture, irrigation, agro-economics etc.</li> <li>- Preparation of Management Plan</li> <li>- Assisting the Team Lead in preparing maps and reports</li> </ul>
Expert (Geophysics)	<ul style="list-style-type: none"> <li>- Field Geophysical Surveys</li> <li>- Interpretation of field data</li> <li>- Entering data in database (WIMS)</li> <li>- Integration with existing geophysical and lithology data</li> <li>- Preparation of inferred lithologs</li> <li>- Suggesting potential sites for construction of water wells/artificial recharge</li> <li>- Preparation of Tables, graphs and maps for reports</li> <li>- Assisting the Team Lead in preparing the Report</li> </ul>
Expert (Hydro chemistry)	<ul style="list-style-type: none"> <li>- Sample collection for quality studies</li> <li>- Analysis of samples.</li> <li>- Integration with existing data</li> <li>- Validation and interpretation of data</li> <li>- Entering data in database (WIMS)</li> <li>- Preparation of Tables, graphs and maps for reports</li> <li>- Assisting the Team Lead in preparing the reports</li> </ul>





### Annexure1- NHS (Pre Mansoon)Water monitoring wells

DISTRICT	BLOCK	VILLAGE	TYPE	AGENCY	LONG	LAT	MP	DEPTH	ELEVATION	MAY_2015	MAY_2016	MAY_2017	MAY_2018	MAY_2019	MAY_2020	MAY_2021	MAY_2022
JODHPUR	Mandore	AFRI(Jodhpur)	PZ	CGWB	73.0297	26.2297	0.5	56	216	16.62	17.4	16.95	16.35	16.93	16.18	0	16.4
JODHPUR	Mandore	BAMBORE	Dug	Public well	72.725	26.3292	0	16	194	13.4	14.6	14.63	14.1	14.75	14.6	14.5	15
JODHPUR	Mandore	Bisalpur	PZ	CGWB	73.3139	26.2333	0.5	203	218	6.1	7.55	4.3	4.3	6.6	4.35	5.35	6.6
JODHPUR	Mandore	CAZRI	PZ	CGWB	73	26.2667	0.61	75.5	242	26.49	26.19	25.89	24.19	24.23	22.04	0	20.39
JODHPUR	Mandore	CAZRI(Barali)	PZ	CGWB	72.9519	26.3219	1	206.15	282	22.8	22.5	17.6	22.4	0	23.7	0	26.2
JODHPUR	Mandore	CHOPASNI NATH	Dug	Public well	72.9333	26.275	0.35	16.8	251	4.95	6.85	4.85	5.75	6.6	5.05	6.6	7.15
JODHPUR	Mandore	DANGIWAS	Dug	Public well	73.2742	26.2667	1.58	23.25	225	11.38	11.32	10.82	8.17	9.02	8.25	8.02	10.12
JODHPUR	Mandore	HEM NAGAR	EW	CGWB	72.7817	26.2961	0.5	200	202	0	0	0	0	0	36.07	32.97	33.75
JODHPUR	Mandore	JODHPUR	Dug	Public well	73.0333	26.3	1.61	42.99	257	7.62	17.89	6.89	7.99	11.69	6.97	8.29	10.34
JODHPUR	Mandore	KARANI	Dug	Public well	72.825	26.2722	1.85	65.15	213	44.15	50.45	51.85	48.95	51	0	51.75	0
JODHPUR	Mandore	MANDORE1	Dug	Public well	73.0417	26.35	1.26	35.54	245	8.54	9.24	9.44	8.34	12.94	10.31	11.84	16.94
JODHPUR	Mandore	Rajiv Nagar(Chaukha)	PZ	CGWB	72.9186	26.2403	0.68	126	242	21.22	17.72	17.52	17.42	0	0	0	0
JODHPUR	Mandore	Rajwa	Dug	Shyam Singh	72.8358	26.3308	0	32.8	226.459	0	0	0	0	0	0	0	0
JODHPUR	Mandore	Rohil Kalan_DW	Dug	Resham Khan	72.8642	26.2467	1	33	230	0	0	0	28.2	0	0	0	0
JODHPUR	Mandore	Salodi	PZ	CGWB	72.8489	26.4131	1	200.05	237	19.35	19.15	19.9	17.3	23.6	0	36.9	27.1
JODHPUR	Mandore	SODER KI DHANI	EW	CGWB	73.1736	26.2869	0.5	200	221	0	0	0	0	14.03	13.59	14.65	15.1

### Annexure 2- NHS (Post Mansoon)Water monitoring wells

DISTRICT	BLOCK	VILLAGE	TYPE	AGENCY	LONG	LAT	MP	DEPTH	ELEVATION	NOV_2015	NOV_2016	NOV_2017	NOV_2018	NOV_2019	NOV_2020	NOV_2021	NOV_2022
JODHPUR	Mandore	AFRI(Jodhpur)	PZ	CGWB	73.0297	26.2297	0.5	56	216	17.05	16.65	15.92	16.75	16.34	16	16.2	15.43
JODHPUR	Mandore	BAMBORE	Dug	Public well	72.725	26.3292	0	16	194	15.6	14.6	14.1	14.1	14.35	14.1	14.1	14.9
JODHPUR	Mandore	Bisalpur	PZ	CGWB	73.3139	26.2333	0.5	203	218	2.9	6.9	7	5	3.4	4.36	6.1	4.3
JODHPUR	Mandore	CAZRI	PZ	CGWB	73	26.2667	0.61	75.5	242	26.09	25.19	23.94	23.89	29.29	20.79	20.19	19.99
JODHPUR	Mandore	CAZRI(Barali)	PZ	CGWB	72.9519	26.3219	1	206.15	282	19.5	18.5	18.1	24.5	19.15	19.7	22.6	23
JODHPUR	Mandore	CHOPASNI NATH	Dug	Public well	72.9333	26.275	0.35	16.8	251	4.6	3.45	5.35	5.75	5.05	4.37	4.75	4.25
JODHPUR	Mandore	DANGIWAS	Dug	Public well	73.2742	26.2667	1.58	23.25	225	10.07	8.17	7.12	8.62	5.17	6.42	7.12	7.02
JODHPUR	Mandore	HEM NAGAR	EW	CGWB	72.7817	26.2961	0.5	200	202	0	0	0	0	0	33.05	34.2	34.1
JODHPUR	Mandore	JODHPUR	Dug	Public well	73.0333	26.3	1.61	42.99	257	7.09	5.74	6.59	9.59	6.19	5.79	12.69	6.99
JODHPUR	Mandore	KARANI	Dug	Public well	72.825	26.2722	1.85	65.15	213	49.35	51.85	47.35	51.95	52.35	48.25	47.65	0
JODHPUR	Mandore	MANDORE1	Dug	Public well	73.0417	26.35	1.26	35.54	245	7.44	6.54	6.04	9.84	9.94	8.88	13.04	8.19
JODHPUR	Mandore	Rajiv Nagar(Chaukha)	PZ	CGWB	72.9186	26.2403	0.68	126	242	16.72	16.12	16.82	17.72	0	0	0	16.72
JODHPUR	Mandore	Rajwa	Dug	Shyam Singh	72.8358	26.3308	0	32.8	226.459	0	0	0	0	0	0	0	0
JODHPUR	Mandore	Rohil Kalan_DW	Dug	Resham Khan	72.8642	26.2467	1	33	230	0	0	0	27.9	29.4	28.2	0	0
JODHPUR	Mandore	Salodi	PZ	CGWB	72.8489	26.4131	1	200.05	237	0	13.3	8.6	21.7	18.5	16.56	28.1	20
JODHPUR	Mandore	SODER KI DHANI	EW	CGWB	73.1736	26.2869	0.5	200	221	0	0	0	0	13.7	13.5	13.8	13.6

### Annexure 3- TEM Details in Block

AAP	Village	Block	District	Date	Longitude	Latitude	Elevation (m amsl)	Loop Type	Tx Loop Size (m)	Tx Loop Turns	Rx Loop Size (m)	Rx Loop Turn	Loop Offset (m)	Stn. Interval (m)	No. of Runs	No. of TEM
2021-22	IIHT-1 Chokha	Mandore	Jodhpur	22-12-2021	72°55'36.49"	26°15'27.01"	239.2	Coincident	95	1	95	1	2	10	18	6
2021-22	IIHT-2 Chokha	Mandore	Jodhpur	23-12-2021	72°55'38.89"	26°15'27.37"	249.2	Coincident	80	1	80	1	2	10	9	3
2021-22	IIHT-3 Chokha	Mandore	Jodhpur	23-12-2021	72°55'34.33"	26°15'26.98"	241.8	Coincident	40	1	40	1	2	10	8	3
2021-22	IIHT-4 Chokha	Mandore	Jodhpur	26-12-2021	72°55'49.25"	26°15'37.31"	243.2	Coincident	40	1	40	1	2	10	5	1
2021-22	IIHT-5 Chokha	Mandore	Jodhpur	26-12-2021	72°55'59.20"	26°15'39.64"	229.8	Coincident	20	2	20	2	2	10	3	1
2021-22	IIHT-6 Chokha	Mandore	Jodhpur	27-12-2021	72°55'52.64"	26°15'39.82"	251.4	Coincident	20	2	20	2	2	10	9	3
2021-22	Ayurveda Univ.1 Karwad	Mandore	Jodhpur	29-12-2021	73°06'34.93"	26°26'50.32"	241	Coincident	85	1	85	1	2	10	22	6
2021-22	Ayurveda Univ.2 Karwad	Mandore	Jodhpur	30-12-2021	73°06'48.62"	26°27'19.43"	231.8	Coincident	100	1	100	1	2	10m upto 30m & 5 m at 5th Stn.	14	5

### Annexure 3- VES Details in Block

State	District	Block	Village	Latitude	Longitude	Typr of Study (VES/TEM)	Year of Study	Inhouse/Outsourcing
Rajasthan	Jodhpur	Mandore	RAU Karwad-1	26°27'12.00"	73°06'44.72"	VES	2021-22	Inhouse
Rajasthan	Jodhpur	Mandore	RAU Karwad-2	26°27'19.2"	73°06'45.43"	VES	2021-22	Inhouse
Rajasthan	Jodhpur	Mandore	RAU Karwad-3	26°26'45.65"	73°06'33.92"	VES	2021-22	Inhouse
Rajasthan	JODHPUR	Mandore	Dantipara	26°16'28.6"	73°19'59.2"	VES	2015-16	Inhouse
Rajasthan	JODHPUR	Mandore	Dangiyawas	26°15'29.7"	73°17'14"	VES	2015-16	Inhouse
Rajasthan	JODHPUR	Mandore	Bombee Dariyan	26°18'56.9"	72°45'20"	VES	2015-16	Inhouse
Rajasthan	JODHPUR	Mandore	Raimalwara	26°53'5.2"	73°0'16.2"	VES	2015-16	Inhouse
Rajasthan	Jodhpur	Mandore	Miyasni	26°11'23.9"	73°14'36.5"	VES	2013-14	Inhouse
Rajasthan	Jodhpur	Mandore	Toliwas(Bisalpur)	26°13'34"	73°18'42"	VES	2013-14	Inhouse
Rajasthan	Jodhpur	Mandore	Banar	26°19'35.4"	73°09'51.2"	VES	2013-14	Inhouse
Rajasthan	JODHPUR	Mandore	Bisalpur(B1)	26°14'22"	73°21'07"	VES	2012-13	Inhouse
Rajasthan	JODHPUR	Mandore	Bisalpur(B1.B)	26°14'22"	73°21'07"	VES	2012-13	Inhouse
Rajasthan	JODHPUR	Mandore	Bisalpur(B2)	26°14'27"	73°21'12"	VES	2012-13	Inhouse
Rajasthan	JODHPUR	Mandore	Bisalpur(B4-a)	26°15'02"	73°21'23"	VES	2012-13	Inhouse
Rajasthan	JODHPUR	Mandore	Bisalpur(B4-b)	26°15'02"	73°21'23"	VES	2012-13	Inhouse
Rajasthan	JODHPUR	Mandore	Bisalpur(B5)	26°15'02"	73°21'30"	VES	2012-13	Inhouse
Rajasthan	JODHPUR	Mandore	Bisalpur(B7)	26°14'43.5"	73°21'14"	VES	2012-13	Inhouse

**References:**

- NAQUIM Study: “Aquifer Mapping and Management Plans”, CGWB, WR Jaipur.
- Dynamic Groundwater Resources Report, 2022, CGWB, WR, Jaipur