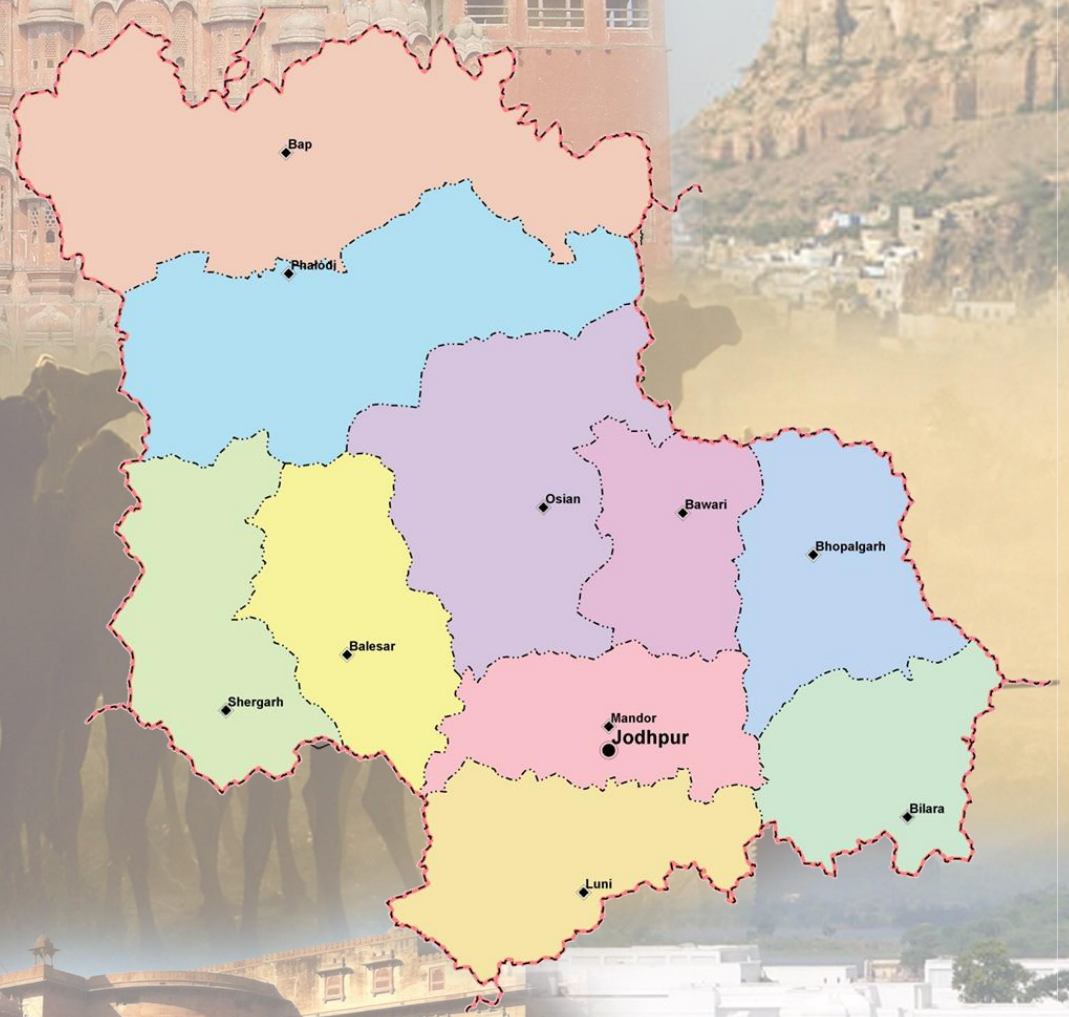
Ground Water Department,
Rajasthan

Hydrogeological Atlas of Rajasthan
Jodhpur District

European Union
State Partnership Programme



2013

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Hydrogeological Atlas of Rajasthan

Jodhpur District

Contents:

2013

ADMINISTRATIVE SETUP

DISTRICT – JODHPUR

Location:

Jodhpur is located in the western part of Rajasthan. It is bounded in the North by Bikaner district, in the East by Nagaur district, South by Pali and Barmer districts and Jaisalmer district in the West. It stretches between 25° 50' 02.92" to 27° 38' 41.37" North latitude and 71° 48' 08.24'' to 73° 52' 36.25'' East longitude covering an approximate area of 22,697 sq km. Major part of the district does not have a systematic drainage system, so most of the central and northern part is part of an 'Outside' Basin whereas the Luni River drains in the southeastern part.

Administrative Set-up:

Administratively Jodhpur district is part of Jodhpur division. This district is divided into 10 blocks. The following table summarizes the basic statistics of the district at block level.

S. No.	Block Name	Population (Based on 2001 census)	Area (Sq.km)	% of Block Area	Total Number of Towns and Villages
1	Balesar	174,179	1,839.1	8.1	125
2	Bap	157,290	4,341.6	19.1	125
3	Bawari	137,891	1,354.8	6.0	67
4	Bhopalgarh	202,321	1,806.0	8.0	86
5	Bilara	251,946	1,620.3	7.1	92
6	Luni	229,097	1,999.0	8.8	137
7	Mandor	1,002,308	1,605.2	7.1	108
8	Osian	284,290	2,847.4	12.5	108
9	Phalodi	274,674	3,314.2	14.6	112
10	Shergarh	162,656	1,969.4	8.7	107
Total		2,876,652	22,697.0	100.0	1067

Jodhpur district has 1,063 villages and 4 towns, three of the four towns being block headquarters as well.

Climate:

The climate of the district is characterized by extremes of temperature, uncertain rainfall and dryness. The winter season which starts in November lasts till February, followed by summer lasting up to June. Period from July to mid-September is monsoon season. There is a good variation between maximum and minimum temperature within the district, while the average maximum temperature is about 47°C, the minimum is 3°C. The average total annual rainfall is 320 mm.

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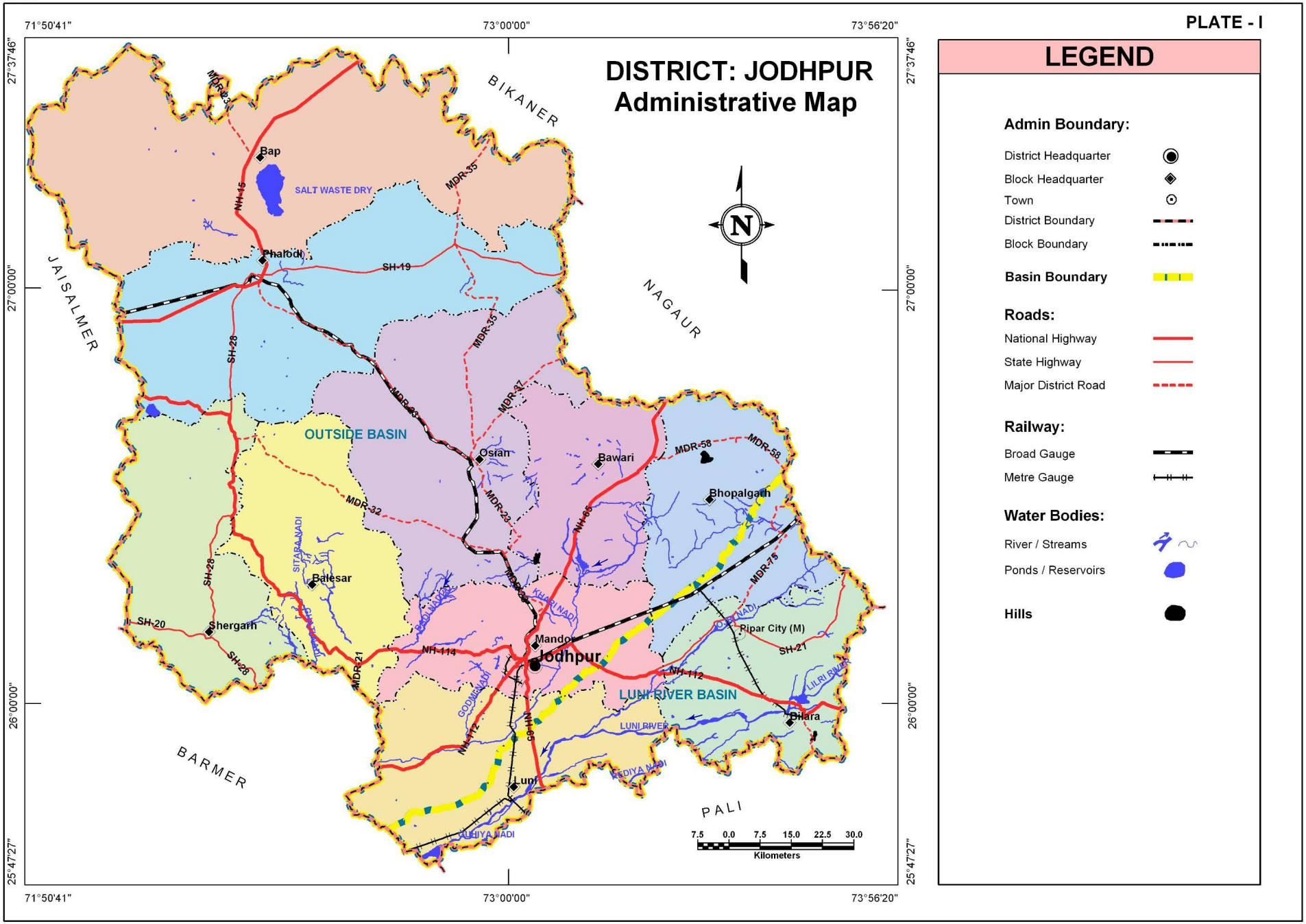
PLATE - I



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary

Basin Boundary

Roads:

- National Highway
- State Highway
- Major District Road

Railway:

- Broad Gauge
- Metre Gauge

Water Bodies:

- River / Streams
- Ponds / Reservoirs

Hills

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TOPOGRAPHY

DISTRICT – JODHPUR

Physiographically, the district can be divided into three distinct units, viz. Alluvial plain, Escarpment and Sand dunes. The alluvial plain between Jodhpur and Bilara has a gently undulating topography with maximum elevation 260m. The plain from Bilara in the east to Shergarh in the west is encircled by a group of hills, isolated hillocks and ridges separated by alluvium and sand filled valley. The western and north-western parts of the district are characterized by sand dunes. The Luni River enters the district near Jhak and flows in southwesterly direction covering Bilara, Mandor and Luni blocks, leaving the district at Dhundara to enter in the Barmer district. Minimum elevation (150 m) is found in the extreme lower part of Luni block whereas highest elevation is reached (448 m) in Bhopalgarh block.

Table: Block wise minimum and maximum elevation

S. No.	Block Name	Minimum Elevation (m amsl)	Maximum Elevation (m amsl)
1	Balesar	165.8	358.1
2	Bap	159.6	328.0
3	Bawari	223.1	435.1
4	Bhopalgarh	231.6	450.4
5	Bilara	221.1	368.0
6	Luni	142.7	283.7
7	Mandor	165.1	395.6
8	Osian	229.6	387.4
9	Phalodi	196.4	355.8
10	Shergarh	176.6	316.2

RAINFALL

The rainfall is very scanty. The general distribution of rainfall across can be visualized from isohyets presented in the Plate III where most of the district received rainfall in the range of 400-500mm in year 2010. The total average annual rainfall is 449.7 mm based on the data of available blocks. Maximum rainfall occurs in Bilara block (566.9 mm) whereas minimum was also in Bilara block (340.8 mm). Shergarh block has received maximum average annual rainfall about 480.4 mm.

Table: Block wise annual rainfall statistics (derived from year 2010 meteorological station data)

Block Name	Minimum Annual Rainfall (mm)	Maximum Annual Rainfall (mm)	Average Annual Rainfall (mm)
Balesar	449.1	483.7	464.1
Bap	386.6	488.3	425.3
Bawari	435.0	467.9	446.4
Bhopalgarh	414.7	493.5	464.0
Bilara	340.8	566.9	410.1
Luni	419.0	516.0	466.0
Mandor	412.9	469.2	438.9
Osian	433.6	464.2	442.3
Phalodi	420.2	520.9	459.5
Shergarh	467.6	514.0	480.4

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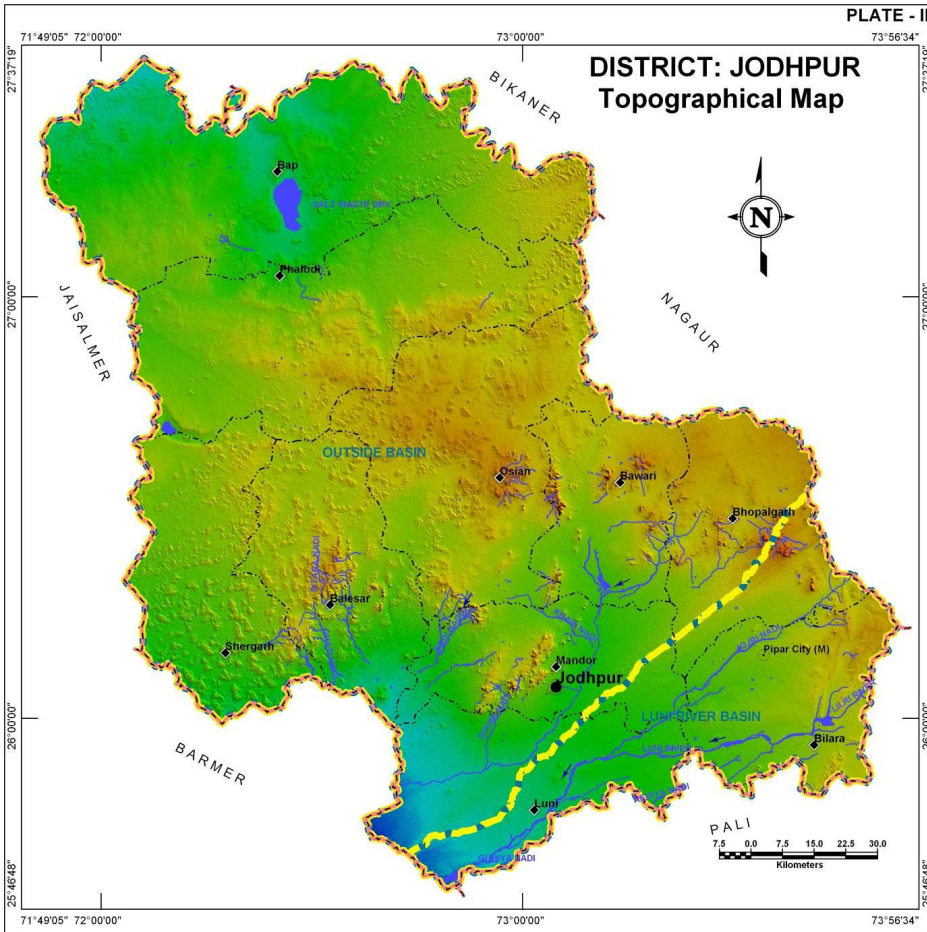
PLATE - II



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary

Basin Boundary

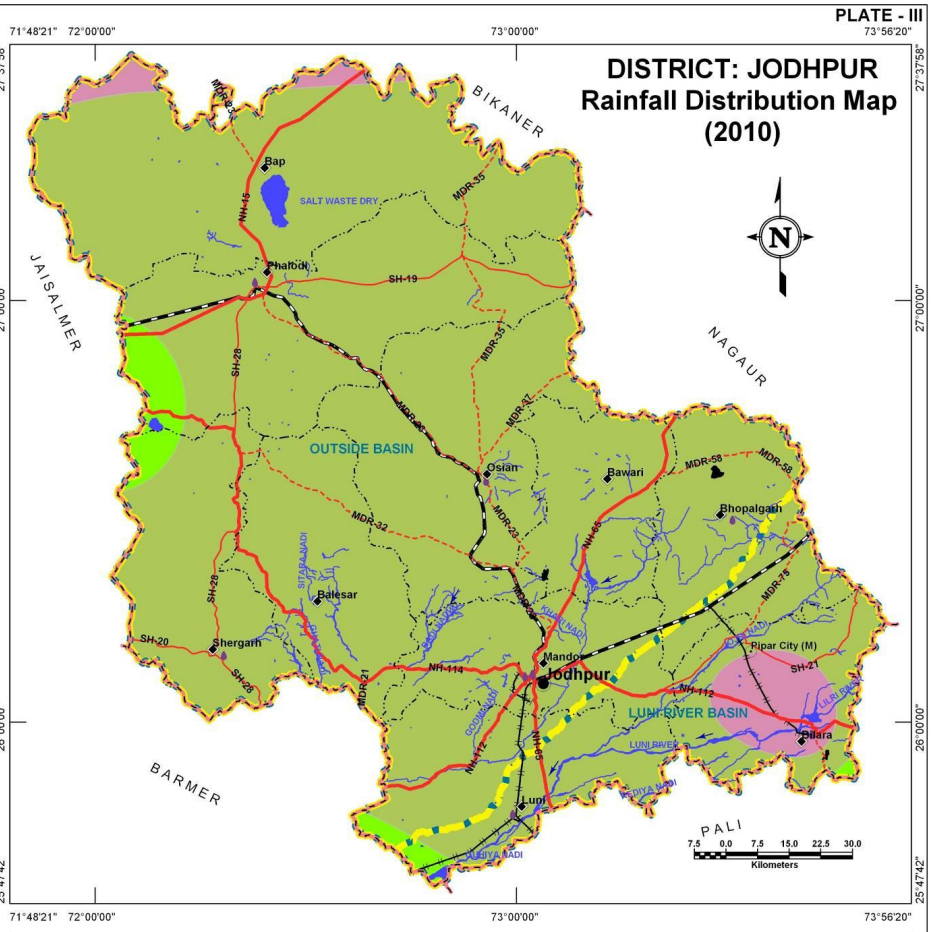
Water Bodies:
- River / Streams
- Ponds / Reservoirs

Elevation (m amsl):

448 m
400 m
350 m
300 m
250 m
200 m
150 m

Source: SRTM DEM

PLATE - III



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- Raingauge Station
- District Boundary
- Block Boundary

Basin Boundary

Roads:
- National Highway
- State Highway
- Major District Road

Railway:
- Broad Gauge
- Metre Gauge

Water Bodies:
- River / Streams
- Ponds / Reservoirs

Hills

Isohyets (mm):
- 300-400
- 400-500
- 500-600

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GEOLOGY

DISTRICT – JODHPUR

The geological configuration of Jodhpur district is represented by rocks ranging from Pre-Cambrian to Recent age. The regional geological set up indicates that the older rocks of Delhi Super Group represented by Punagarh Group include basic volcanics whereas of the Marwar Super Group, present in major part of the district is represented by Jodhpur-Bilara and Nagaur Groups. The igneous phase is represented by Erinpura Granites and Gneisses. The Palaezoic Era is represented by sandstone (Badhura formation and Bap boulder beds) of Permo-Carboniferous System. The Jurassic Era is represented by Lathi, Mayeker and Jaisalmer formations, which consist of Sandstone, Grit and Conglomerate. Alluvium and wind-blown sand cover large parts of the district. The district is traversed by major lineaments: Jaisalmer-Barwani lineaments trending NW-SE, Luni- Sukri lineament trending NE-SW. Following is the regional geological succession of rock types encountered in and around Jodhpur district.

Super Group	Group/Series	Formation
Quaternary	Recent to Sub-Recent	Alluvium andblown sand
Permo-Carboniferous	Bhadaura Series (Bap boulder bed)	Boulders, sand andclays
Marwar	Nagaur Group	Sandstone, Gypsum, siltstone and limestone
	Bilara Group	Limestone, cherty and dolomitic with shale
	Jodhpur Group	Sandstone and shale
Post-Delhi	Malani suites	Rhyolite with tuffs and granite
	Jalore granite	Granite and Gneiss
Delhi		Schist and Phyllite

GEOMORPHOLOGY

Table: Geomorphologic units, their description and distribution

Origin	Landform Units	Description of lithology
Fluvial	Alluvial Plain	Mainly undulating land scape formed due to fluvial activity consists of gravels, sand, silt and clay. Terrain mainly undulating, produced by extensive deposition of alluvium by river system.
	Alluvial Plain (Sandy)	Flat to gentle undulating plain formed due to fluvial activity, mainly comprises of gravels, sand, silt and clay with unconsolidated material of varying lithology, predominantly sand along river.
	Valley Fill	Formed by fluvial activity, usually at lower topographic locations, comprising of boulders, cobbles, pebbles gravels, sand, silt and clay. The unit has consolidated sediment deposits.
	Palaeochannel	Mainly burried on abandoned stream/river courses, comprising of coarse textured material of variable sizes.
	Salt Encrustation/Playa	Topographical depressions comprising of clay, silt, sand and soluble salts, usually undrained and devoid of vegetation.
Denudational	Pediment	Broad gently sloping rock flooring, erosional surface of low relief between hill and plain, comprised of varied lithology, crisscrossed by fractures & faults.
	Buried Pediment	Pediment covered essentially with relatively thicker alluvial, colluvial or weathered materials.
	Intermontane Valley	Depression between mountain/pediment zone, generally broad & linear filled with colluvial deposit.
	Pediplain	Pediplain essentially covered with soil cover in western part.
Aeolian	Sandy Plain	Formed of aeolian activity, wind-blown sand with gentle sloping to undulating plain, comprising of coarse sand, fine sand, silt & clay.
	Eolian Plain	Formed by aeolian activity, with sand dunes of varying heights, size, slope. Long stretches of sand sheet. Gently sloping flat to undulating plain, comprised of fine to medium grained sand and silt. Also scattered xerophytic vegetation.
	Dune Valley Complex	Clusters of dunes and inter-dunal spaces with undulating topography formed due to wind-blown activity comprising of unconsolidated sand and silt.
	Interdunal Depression	Slightly depressed area in between the dunal complex showing moisture and fine sediments.
	Desert Pavement	Desert plain having coarse angular
Hill	Denudational Hill	Steep sided, relict hills undergone denudation, comprising of varying lithology with joints, fractures and lineaments.

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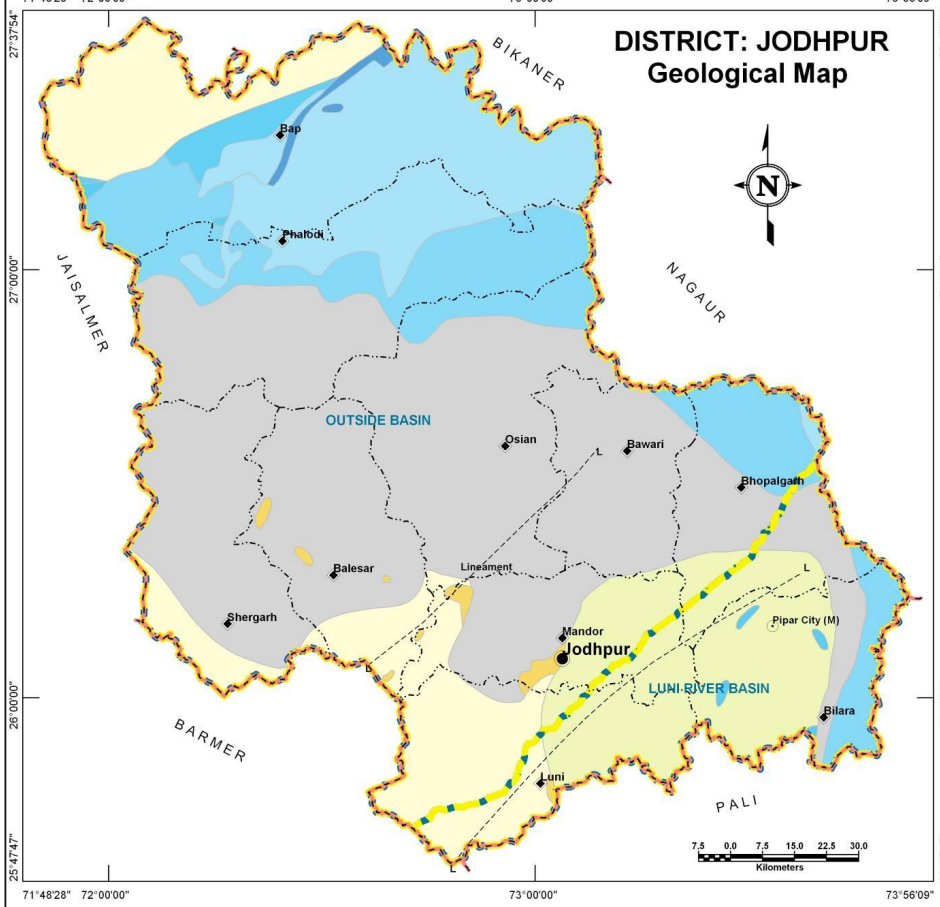
PLATE - IV

DISTRICT: JODHPUR
Geological Map



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**
- **Lineament**

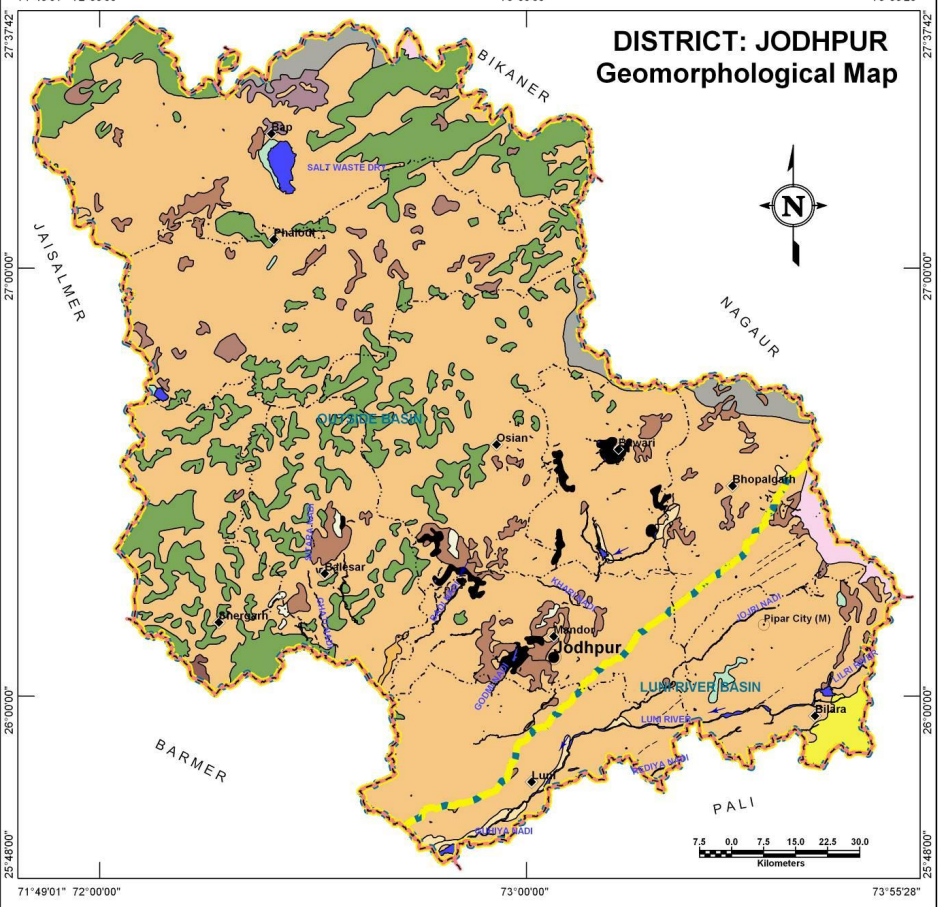
Geology:

- Alluvium and Wind blown sand
- Jaisalmer Formation
- Lathi Formation
- Mayakar Formation
- Badhura Formation
- Bap Boulder Bed
- Nagaur Group
- Bilara Group
- Jodhpur Group
- Erinpura Granite & Gneiss
- Punagarh Group
- Volcanic Suite

Source: District Resource Map of Rajasthan - GSI

PLATE - V

DISTRICT: JODHPUR
Geomorphological Map



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Lineaments:

- Faults/Fractures

Water Bodies:

- River
- Ponds / Reservoirs

Hills:

- Structural/Linear/Denudational

Landform Units:

Fluvial Origin:

- Alluvial Plain
- Alluvial Plain (Sandy)
- Palaeochannel
- Salt Encrustation/Playa

Aeolian Origin:

- Sandy Plain
- Eolian Plain
- Dune Valley Complex
- Interdunal Depression
- Desert Pavement

Denudational Origin:

- Burried Pediment
- Pediment
- Intermontane Valley
- Pediplain

Source: Ground Water Atlas of Rajasthan - SRSAC and GWD, Rajasthan

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AQUIFERS

DISTRICT – JODHPUR

Table: aquifer potential zones their area and their description

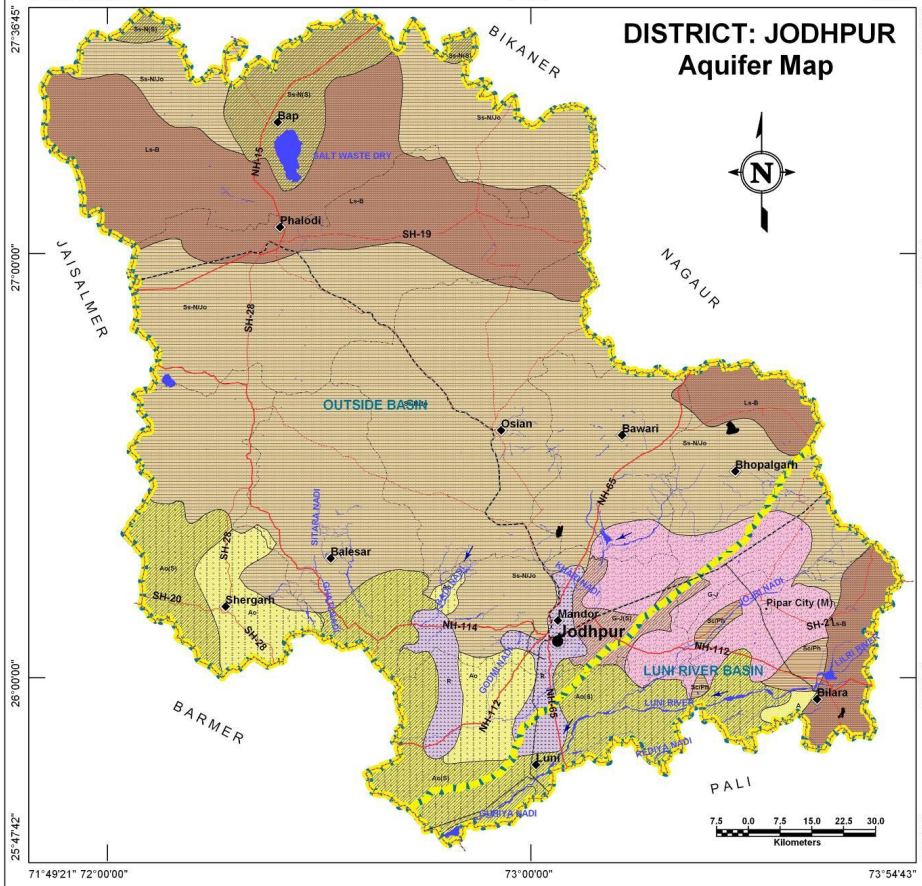
Aquifer in Potential Zone	Area (sq km)	%age of total	Description of the unit/Occurrence
Younger Alluvium	140.8	0.6	Younger and Older Alluvium mainly composed of unconsolidated to semi consolidated clay, sand gravel, pebble in varying proportions. Thickness of the litho unit varies considerably due to undulating bed rock topography. It has been tapped maximum in area south west of the district. It occurs along the stream courses and flood plains of Luni, Mithri and Jojri. Part of the litho unit in Shergarh and localized pockets in Bilara and Luni blocks which has potable ground water that has been categorized as potential area.
Older Alluvium	932.5	4.1	
Older Alluvium Saline Area	2,400.9	10.6	Part of the litho unit in Luni and localized pockets in Shergarh, Bilara and Balesar blocks which have non-potable ground water have been categorized as non-potential area (Saline area).
Jalore Granite	1,498.6	6.6	Jalore Granite belongs to Post Delhi Group, it is grey or pink in colour, medium to coarse grained, and non-porphyritic. It occupies Bhopalgarh, Bilara, Mandor and Bawari blocks.
Jalore Granite Saline Area	127.8	0.6	Part of Jalore Granite aquifer is saline also.
Bilara Limestone	4,127.4	18.2	The Bilara limestone is potential source of ground water. These are mostly dolomitic, grey or dark grey to black. The litho unit occupies extensive area in Bap and Phalodi blocks. Parts of Bilara, Bhopalgarh and Osian blocks have also been demarcated with limestone aquifer.
Rhyolite	621.5	2.7	Rhyolites are hard and compact, buff, dark brown to greenish in colour. Ground water occurs in weathered and fractured zones, hence it forms poor aquifer. It occupies Luni and Mandor blocks.
Schist	171.5	0.8	Schist belongs to Delhi Super Group occurring in south eastern part as isolated patches overlying granite. Small patches of Schist occur in Bilara block.
Nagaur Jodhpur Sandstone	11,375.7	50.1	The major aquifer in the district is formed in Sandstone; it belongs to Marwar Super Group. The Sandstone of this Group forms the chief source of ground water which occurs under confined to semi-confined conditions. Sandstone is red to pink or buff coloured, very hard and compact. It occupies Osian, Phalodi, Balesar, Bap, Bawari, Shergarh, Bhopalgarh, Mandor, and Bilara blocks in order of area encompassed by the aquifer in potential area.
Nagaur Jodhpur Sandstone - Saline Area	793.1	3.5	Part of the litho unit in Bap block has non potable ground water has been categorized as non-potential area (Saline area)
Hills	507.2	2.2	Hills and intervening valleys
Total	**22,697.0**	**100.0**	

STAGE OF GROUND WATER DEVELOPMENT

Categorization on the basis of stage of development of ground water	Block Name
Safe	Bap
Critical	Luni
Over Exploited	Bawari, Balesar, Phalodi, Shergarh
Over Exploited (Notified)	Bhopalgarh, Bilara, Mandor, Osian

Basis for categorization: Ground water development <= 70% - Safe; >70%; >90% and <=100% - Critical and >100% - Over-Exploited. In Notified blocks development of GW is not permitted any more.

PLATE - VI



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Roads:
- National Highway
- State Highway
- Major District Road

Railway:
- Broad Gauge
- Metre Gauge

Water Bodies:
- River / Streams
- Ponds / Reservoirs

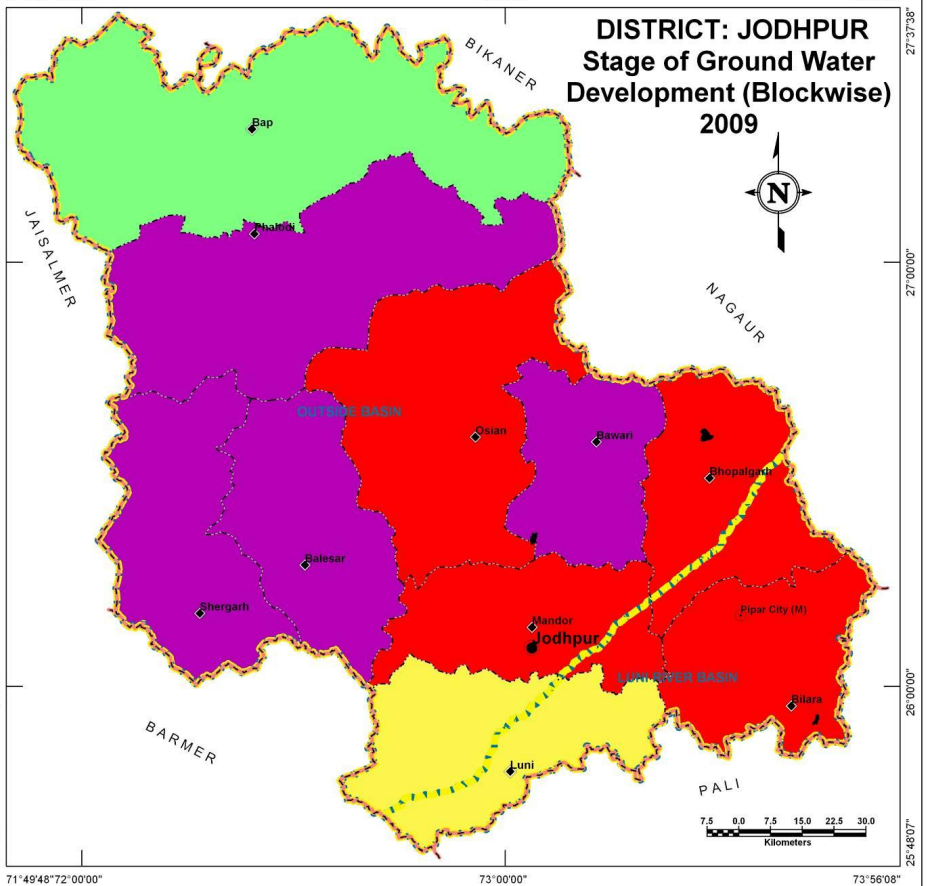
Hills

Saline Area

Aquifer:
- Younger Alluvium
- Older Alluvium
- Bilara Limestone
- Nagaur/Jodhpur Sandstone
- Schist
- Jalor Granite
- Rhyolite

Source: Ground Water Potential Zone Map - GWD, Rajasthan

PLATE - VII



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

***Categorisation of Blocks:**
- Safe
- Critical
- Over exploration
- Notified (As on Year 2011)

Source: Ground Water Department, Rajasthan

LOCATION OF EXPLORATORY AND GROUND WATER MONITORING WELLS DISTRICT – JODHPUR

Jodhpur district has a well distributed network of exploratory wells (119) and ground water monitoring stations (507) in the district owned by RGWD (92 and 481 respectively) and CGWB (27 and 26 respectively). The exploratory wells have formed the basis for delineation of subsurface aquifer distribution scenario in three dimensions. Benchmarking and optimization studies suggest that ground water level monitoring network is sufficiently distributed for appropriate monitoring but for water quality 29 additional wells in different blocks are recommended to be added to existing network for optimum monitoring of the aquifers.

Table: Block wise count of wells (existing and recommended)

Block Name	Exploratory Wells			Ground Water Monitoring Stations			Recommended additional wells for optimization of monitoring network	
	CGWB	RGWD	Total	CGWB	RGWD	Total	Water Level	Water Quality
Balesar	0	8	8	2	43	45	0	9
Bap	3	12	15	2	36	38	0	9
Bawari	0	8	8	1	29	30	0	0
Bhopalgarh	2	8	10	2	55	57	0	0
Bilara	0	14	14	6	52	58	0	0
Luni	5	5	10	5	46	51	0	2
Mandor	13	12	25	3	96	99	0	3
Osian	1	8	9	3	53	56	0	0
Phalodi	2	13	15	2	34	36	0	3
Shergarh	1	4	5	0	37	37	0	3
Total	**27**	**92**	**119**	**26**	**481**	**507**	**0**	**29**

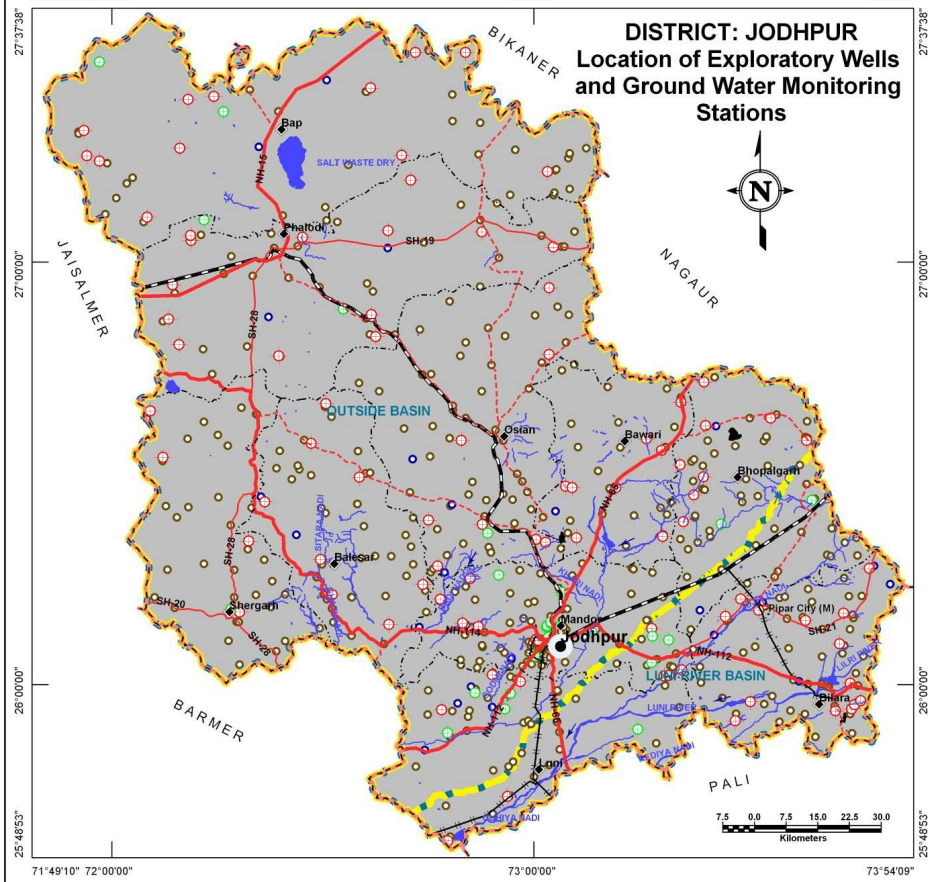
DEPTH TO WATER LEVEL (PRE MONSOON – 2010)

Depth to water level shows large variation ranging from less than 10m below ground level to about 110m below ground level. Most of the alluvial part of Luni block and adjoining parts falling within Bilara, Luni and Mandor blocks the ground water occurs at shallow depths ranging from less than 10 – 50m. There is also a shallow water zone in North around Bap the depth to water level is low, reaching about 30m. Otherwise, in general, in the central and northern parts the ground water occurs at deeper levels i.e., beyond 50m and reaching even upto 110m in major part of Osian bloc, Northern part of Bawari block, major part of Phalodi and eastern and southwestern parts of Bap block.

Depth to water level (m bgl)	Block wise area coverage (sq km)										Total Area (sq km)
	Balesar	Bap	Bawari	Bhopalgarh	Bilara	Luni	Mandor	Osian	Phalodi	Shergarh	
< 10	-	35.0	-	-	239.8	601.9	154.1	-	-	-	**1,030.8**
10 – 20	439.6	641.5	149.2	13.0	376.5	487.3	652.2	20.2	-	8.4	**2,787.9**
20 – 30	710.5	704.3	130.2	254.5	448.8	586.5	479.9	89.9	12.0	180.5	**3,597.1**
30 – 40	419.1	482.7	109.1	377.1	283.3	189.1	159.4	289.9	83.2	1,010.2	**3,403.1**
40 – 50	241.7	466.5	104.4	455.6	176.8	100.2	55.8	401.8	199.2	651.3	**2,853.3**
> 50	28.2	2,011.6	861.9	705.8	95.1	34.0	103.8	2,045.6	3,019.8	119.0	**9,024.8**
Total	**1,839.1**	**4,341.6**	**1,354.8**	**1,806.0**	**1,620.3**	**1,999.0**	**1,605.2**	**2,847.4**	**3,314.2**	**1,969.4**	**22,697.0**

* The area covered in the derived maps is less than the total district area since the hills have been excluded from interpolation/contouring.

PLATE - VIII



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary

Basin Boundary

Roads:
- National Highway
- State Highway
- Other Road

Railway:
- Broad Gauge
- Metre Gauge

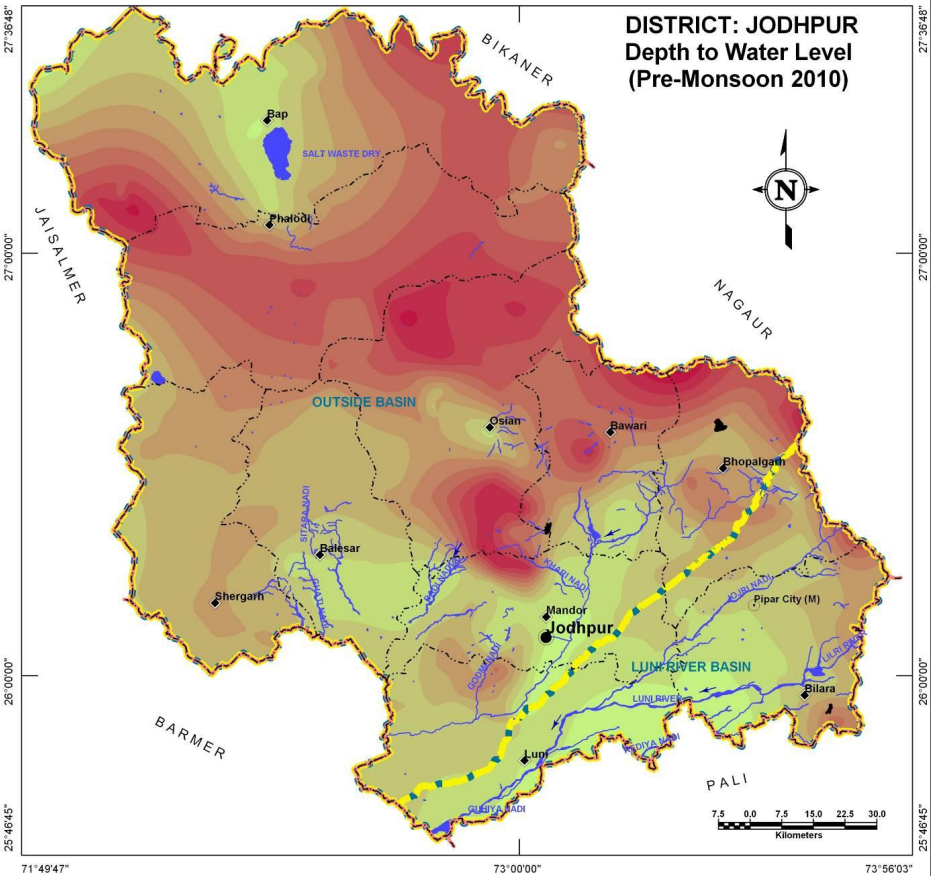
Water Bodies:
- River / Streams
- Ponds / Reservoirs

Hills

Exploratory Wells:
- CGWB
- RGWD

Ground Water Monitoring Stations:
- CGWB
- RGWD

PLATE - IX



LEGEND

Admin Boundary :
- District Headquarter
- Block Headquarter
- Town
- Dist Boundary
- Block Boundary

Basin Boundary

Water Bodies:
- River / Streams
- Ponds / Reservoirs

Hills

Depth to Water Level (m bgl) :

< 10	60-70
10-20	70-80
20-30	80-90
30-40	90-100
40-50	100-110
50-60	110-120

WATER TABLE ELEVATION (PRE MONSOON – 2010) DISTRICT – JODHPUR

The general ground water flow directions are towards southwest where the Luni River drains out of the district. There are two other depressions one North of Jodhpur and other around Bap which also have lower water tables resulting into ground water flow towards these areas.

Table: Block wise area covered in each water table elevation range

Water table elevation range (m amsl)	Block wise area coverage (sq km)										Total Area (sq km)
	Balesar	Bap	Bawari	Bhopalgarh	Bilara	Luni	Mandor	Osian	Phalodi	Shergarh	
120-140	-	-	-	-	-	154.8	-	-	-	18.2	**173.0**
140-160	5.4	70.2	-	-	-	702.2	26.5	69.3	-	60.3	**933.9**
160-180	92.8	3,318.2	19.2	-	-	426.4	154.0	226.5	452.2	139.4	**4,828.7**
180-200	357.7	586.1	133.6	2.7	-	423.4	306.4	692.7	1,976.2	358.4	**4,837.2**
200-220	317.1	213.8	511.4	45.2	42.1	290.5	937.5	1,221.6	838.5	828.6	**5,246.3**
220-240	1,064.7	153.3	429.7	771.8	760.1	1.7	168.1	530.7	47.3	564.5	**4,491.9**
240-260	1.4	-	260.9	916.6	792.3	-	12.7	96.7	-	-	**2,080.6**
260-280	-	-	-	69.7	25.8	-	-	9.9	-	-	**105.4**
Total	**1,839.1**	**4,341.6**	**1,354.8**	**1,806.0**	**1,620.3**	**1,999.0**	**1,605.2**	**2,847.4**	**3,314.2**	**1,969.4**	**22,697.0**

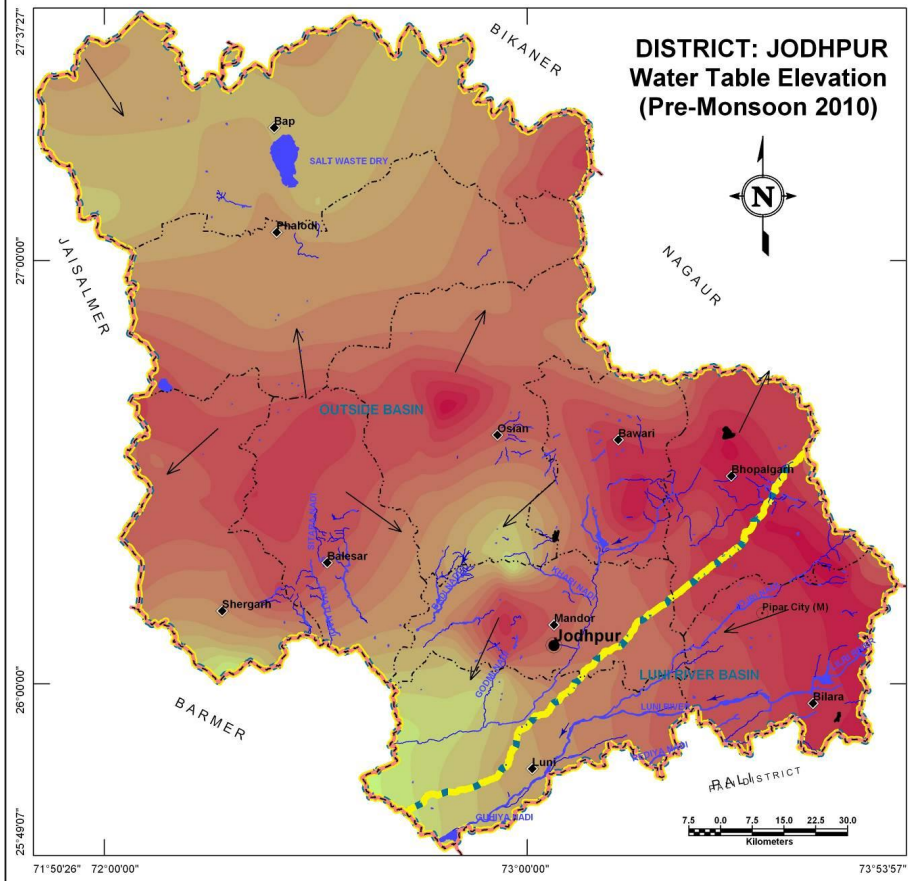
WATER LEVEL FLUCTUATION (PRE TO POST MONSOON 2010)

The red shaded areas in the Plate – XI indicate the areas that showed negative fluctuation i.e., water table has gone down in Post-Monsoon period as compared to Pre-Monsoon water levels. Otherwise, in general, most of the district has shown general rise in water table upto 4m and there are also some pockets around Bhopalgarh, Luni and Bilara blocks that have shown significant localized recharge.

Table: Block wise area covered in each water fluctuation zone

Water level fluctuation range (m)	Block wise area coverage (sq km)										Total Area (sq km)
	Balesar	Bap	Bawari	Bhopalgarh	Bilara	Luni	Mandor	Osian	Phalodi	Shergarh	
-4 to -2	-	13.7	-	-	-	-	10.7	-	-	-	**24.4**
-2 to 0	174.3	1,284.0	0.9	107.9	2.9	0.3	44.3	60.4	19.6	86.6	**1,781.2**
0 to 2	1,394.3	2,472.6	1,103.4	520.5	358.7	815.8	432.5	2,591.2	2,297.8	1,296.0	**13,282.8**
2 to 4	181.1	544.7	243.8	566.4	666.0	600.7	819.5	173.6	659.0	471.1	**4,925.9**
4 to 6	61.0	26.6	6.7	441.2	391.6	242.8	216.9	19.7	337.8	100.5	**1,844.8**
6 to 8	24.3	-	-	98.3	127.5	140.5	67.3	2.5	-	15.2	**475.6**
8 to 10	4.1	-	-	47.0	60.3	93.5	14.0	-	-	-	**218.9**
10 to 12	-	-	-	12.6	13.3	83.9	-	-	-	-	**109.8**
12 to 18	-	-	-	12.1	-	21.5	-	-	-	-	**33.6**
Total	**1,839.1**	**4,341.6**	**1,354.8**	**1,806.0**	**1,620.3**	**1,999.0**	**1,605.2**	**2,847.4**	**3,314.2**	**1,969.4**	**22,697.0**

PLATE - X



LEGEND

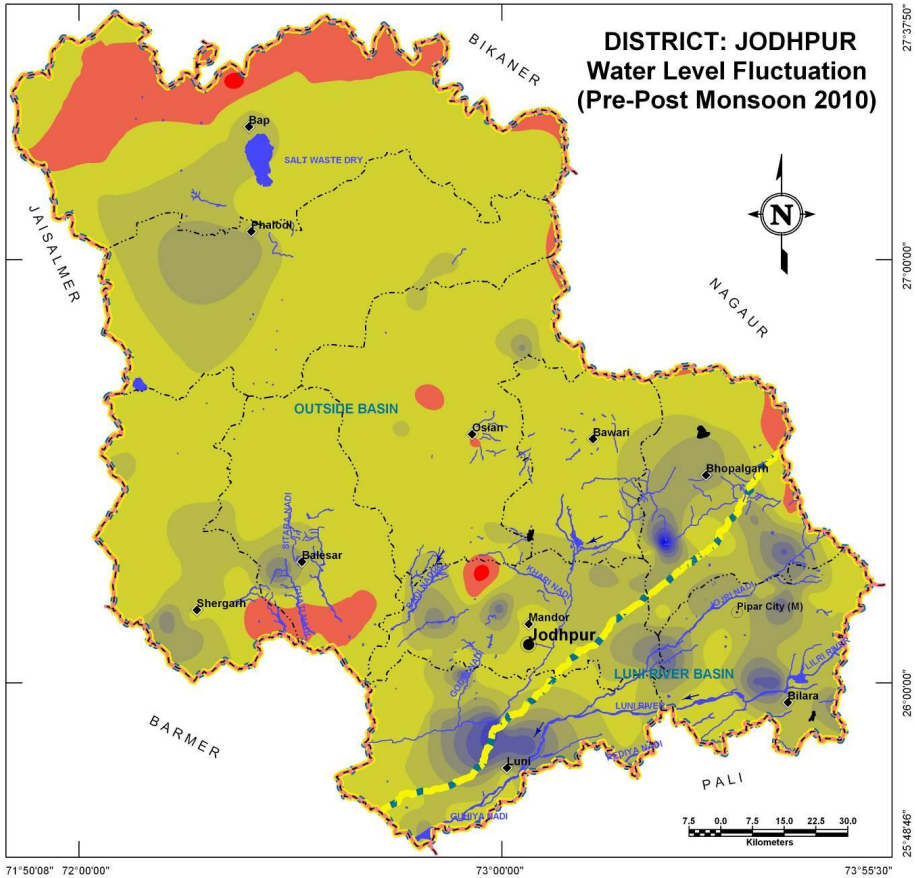
Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Water Bodies:
- River / Streams
- Ponds / Reservoirs
- **Hills**

WaterTable Elevation (m amsl):

120-130	200-210
130-140	210-220
140-150	220-230
150-160	230-240
160-170	240-250
170-180	250-260
180-190	260-270
190-200	270-280

PLATE -XI



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Water Bodies:
- River / Streams
- Ponds / Reservoirs
- **Hills**

Water Level Fluctuation (m):

-4 to -2	8 to 10
-2 to 0	10 to 12
0 to 2	12 to 14
2 to 4	14 to 16
4 to 6	16 to 18
6 to 8	> 18

GROUND WATER ELECTRICAL CONDUCTIVITY DISTRIBUTION — DISTRICT – JODHPUR

The electrical conductivity of ground water ranges from less than 2000 µS/cm to more than 10,000µS/cm. Osian, Phalodi, Balesar and Bhopalgarh blocks are largely fresh to marginally brackish water areas. Even distribution of fresh and saline ground water is seen in Bap, Shergarh and Jodhpur blocks. Rest of the blocks are largely in the brackish to saline water category. The analysis is based on average of EC values observed during Pre-Monsoon between years 2005-09.

Table: Block wise area of Electrical conductivity distribution

Electrical Conductivity Ranges (µS/cm at 25°C) (Ave. of years 2005-09)	Block wise area coverage (sq km)																				Total Area (sq km)
	Balesar		Bap		Bawari		Bhopalgarh		Bilara		Luni		Mandor		Osian		Phalodi		Shergarh		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
< 2000	854.6	46.5	79.0	1.8	79.4	5.7	354.7	19.7	79.7	4.9	77.7	3.8	308.8	19.2	1,911.4	67.1	1,106.4	33.4	290.6	14.8	**5,142.3**
2000-4000	522.7	28.4	1,577.3	36.3	1,151.8	85.2	1,054.5	58.3	157.3	9.6	358.7	18.0	409.4	25.5	912.5	32.1	1,715.6	51.8	765.6	38.9	**8,625.4**
>4000	461.8	25.1	2,685.3	61.9	123.6	9.1	396.8	22.0	1,383.3	85.5	1,562.6	78.2	887.0	55.3	23.5	0.8	492.2	14.8	913.2	46.3	**8,929.3**
Total	**1,839.1**	**100.0**	**4,341.6**	**100.0**	**1,354.8**	**100.0**	**1,806.0**	**100.0**	**1,620.3**	**100.0**	**1,999.0**	**100.0**	**1,605.2**	**100.0**	**2,847.4**	**100.0**	**3,314.2**	**100.0**	**1,969.4**	**100.0**	**22,697.0**

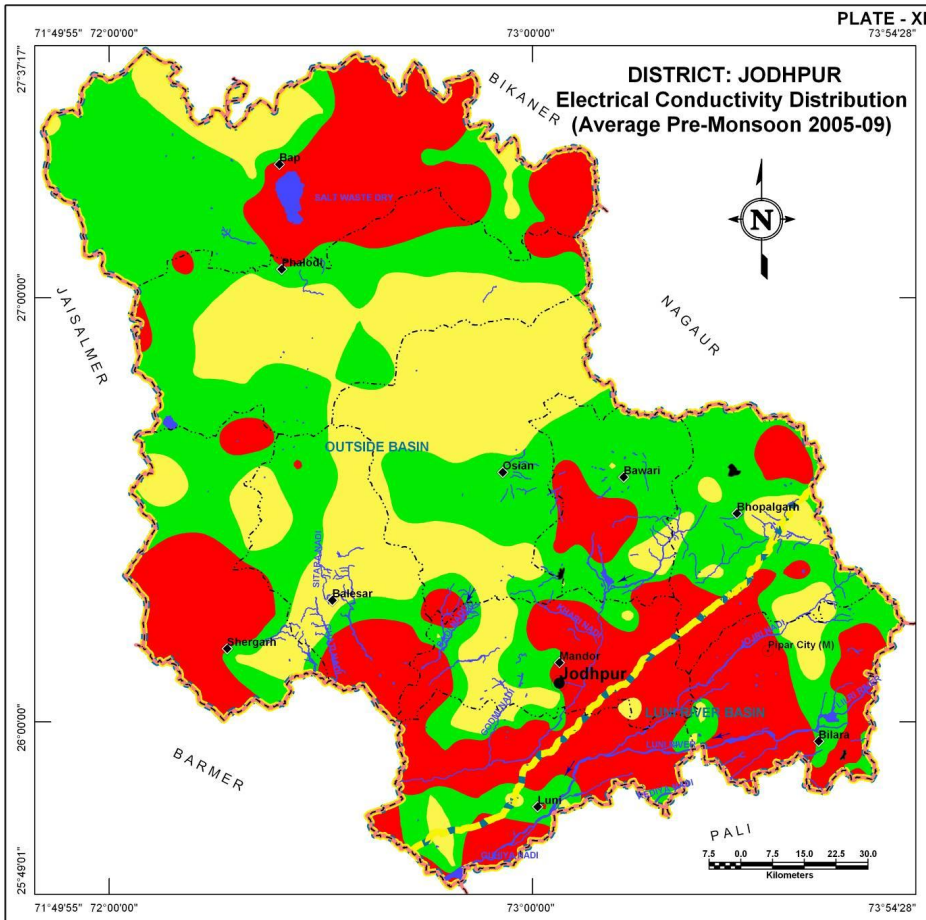
GROUND WATER CHLORIDE DISTRIBUTION

Very high chloride concentration and its erratic variation in ground water is an important concern. In Jodhpur district, the low concentration pockets are largely in the central part of the district as found north of Osian, around Balesar and to the western part of Mandor Block. Small pockets of low chloride concentration are found in the extreme east (east of Bhopalgarb and Pipar cities) and in the north (north of Bap). Very high concentrations (unsuitable for drinking and domestic purposes) are seen in southern parts of the district and in the Northern parts. In between these the areas have moderate concentrations suitable for drinking and domestic purposes.

Table: Block wise area of Chloride distribution

Chloride Concentration Range (mg/l)	Block wise area coverage (sq km)																				Total Area (sq km)
	Balesar		Bap		Bawari		Bhopalgarh		Bilara		Luni		Mandor		Osian		Phalodi		Shergarh		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
< 250	419.9	22.8	171.6	4.0	0.8	0.1	10.3	0.6	5.3	0.2	54.0	2.7	174.5	10.8	893.2	31.4	163.9	4.9	61.9	3.1	**1,955.4**
250-1000	1,017.3	55.3	2,440.3	56.2	1,279.6	94.6	1,351.9	75.1	283.5	17.5	520.1	26.0	625.3	39.0	1,933.8	67.9	2,697.9	81.4	1,059.4	53.8	**13,209.1**
> 1000	401.9	21.9	1,729.7	39.8	74.4	5.3	443.8	24.3	1,331.5	82.3	1,424.9	71.3	805.4	50.2	20.4	0.7	452.4	13.7	848.1	43.1	**7,532.5**
Total	**1,839.1**	**100.0**	**4,341.6**	**100.0**	**1,354.8**	**100.0**	**1,806.0**	**100.0**	**1,620.3**	**100.0**	**1,999.0**	**100.0**	**1,605.2**	**100.0**	**2,847.4**	**100.0**	**3,314.2**	**100.0**	**1,969.4**	**100.0**	**22,697.0**

PLATE - XII



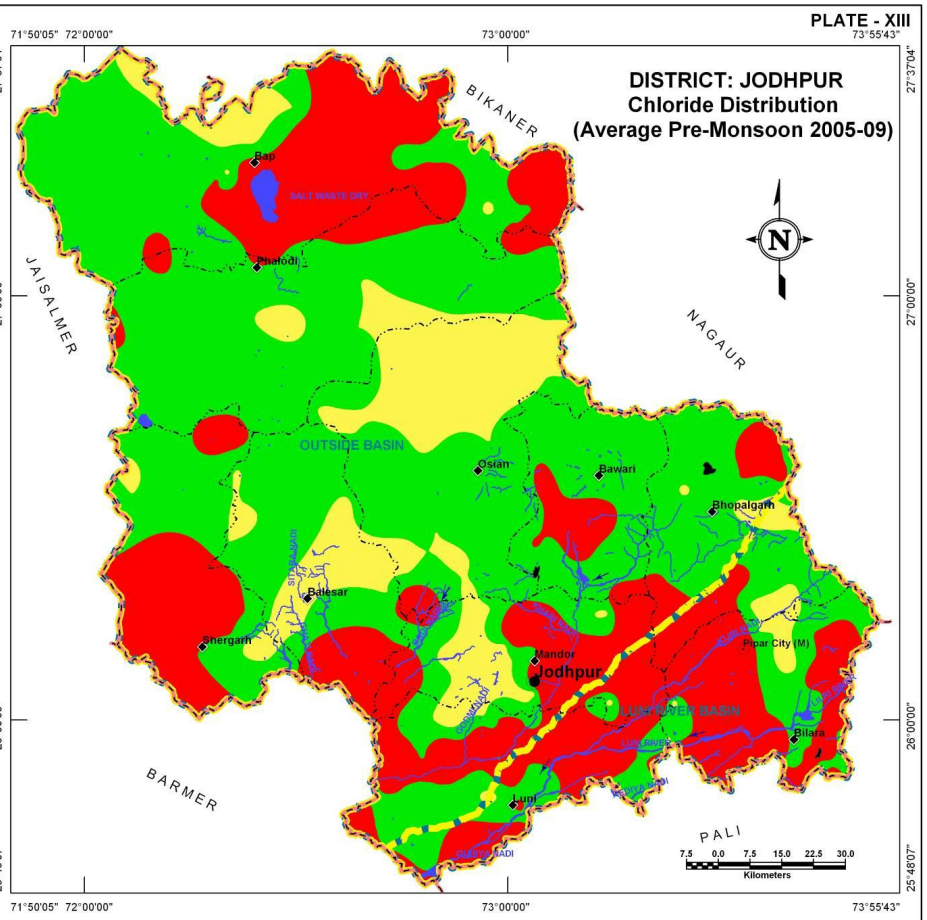
LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Water Bodies:
- River / Streams
- Ponds / Reservoirs
- **Hills**

Electrical Conductivity (µS/cm) at 25°C:
- < 2000
- 2000 - 4000
- > 4000

PLATE - XIII



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Water Bodies:
- River / Streams
- Ponds / Reservoirs
- **Hills**

Chloride Concentration (mg/l):
- < 250
- 250 - 1000
- > 1000

GROUND WATER FLUORIDE DISTRIBUTION — DISTRICT – JODHPUR

The concentration of fluoride in ground water varies from nil to 15 mg/l in the district. It is seen that higher concentration is observed in major parts of the Bap, Luni and Bawari blocks and contiguous areas in Mandor, and Shergarh blocks and towards Jaisalmer in Shergarh block. Central part constituted by whole of Phalodi, major parts of Osian and Balesar blocks are largely free from high fluoride concentration.

Table: Block wise area of Fluoride distribution

Fluoride concentration Range (mg/l)	Block wise area coverage (sq km)																				Total Area (sq km)
	Balesar		Bap		Bawari		Bhopalgarh		Bilara		Luni		Mandor		Osian		Phalodi		Shergarh		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
< 1.5	1,099.0	59.8	1,343.1	30.9	53.0	3.7	550.7	30.6	102.5	6.3	416.3	20.8	378.8	23.6	1,527.0	53.6	858.5	25.8	754.7	38.3	**7,083.6**
1.5-3.0	546.7	29.7	2,012.8	46.4	794.6	58.8	1,094.3	60.8	1,033.6	63.9	882.3	44.2	587.6	36.6	1,259.7	44.3	2,288.2	69.1	742.9	37.7	**11,242.7**
> 3.0	193.4	10.5	985.7	22.7	507.2	37.5	161.0	8.6	484.2	29.8	700.4	35.0	638.8	39.8	60.7	2.1	167.5	5.1	471.8	24.0	**4,370.7**
Total	**1,839.1**	**100.0**	**4,341.6**	**100.0**	**1,354.8**	**100.0**	**1,806.0**	**100.0**	**1,620.3**	**100.0**	**1,999.0**	**100.0**	**1,605.2**	**100.0**	**2,847.4**	**100.0**	**3,314.2**	**100.0**	**1,969.4**	**100.0**	**22,697.0**

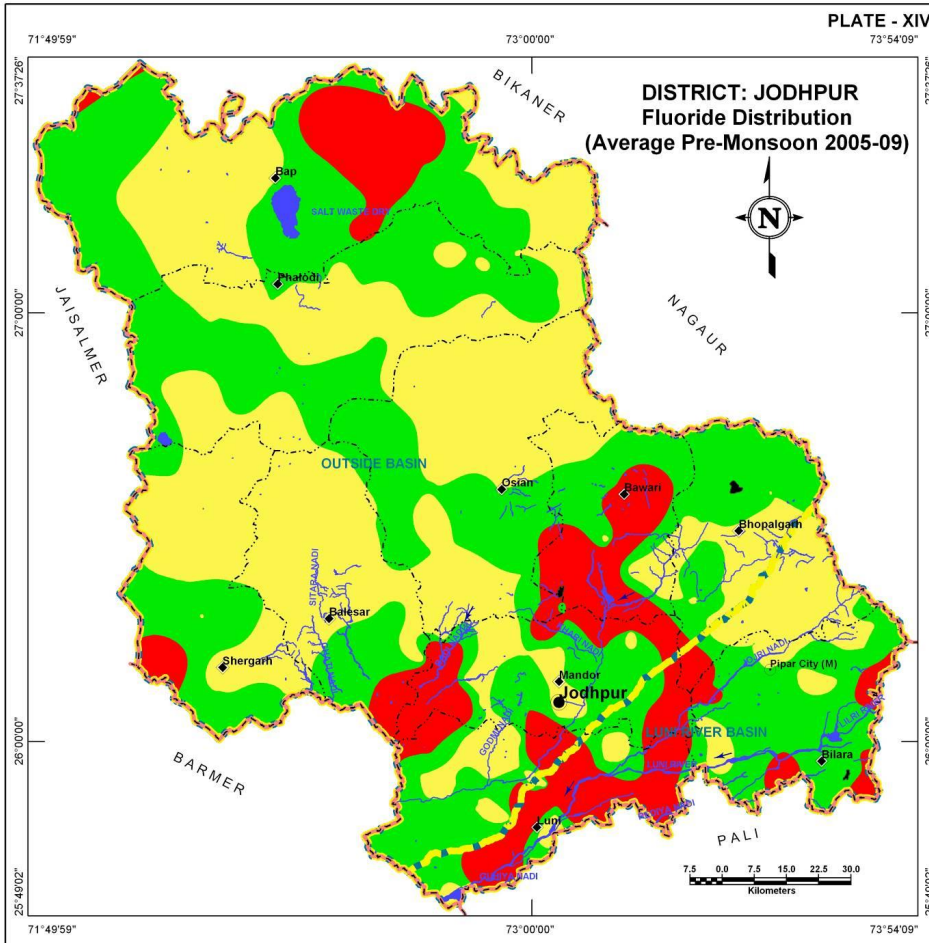
GROUND WATER NITRATE DISTRIBUTION

High nitrate concentration in ground water renders it unsuitable for agriculture purposes. Plate – XV shows distribution of Nitrate in ground water of Jodhpur district. Low nitrate concentration (<50 mg/l) area is shown in yellow color and occupies approximately 20% of the district which is suitable for agriculture purpose. Such low Nitrate areas are largely present in the northern part of the district. The areas with moderately high nitrate concentration (50-100 mg/l) are shown in green color occupying approximately 37% of the district area. Remaining 43% of the district viz. eastern part of Bap block, Southern part of Shergarh block, Eastern parts of Mandor, Bopalgarh and Bilara blocks is covered with high nitrate concentration (>100 mg/l) which is shown in red colored patches is spread over the district as patches leaving the ground water unsuitable for agriculture purpose.

Table: Block wise area of Nitrate distribution

Nitrate concentration range (mg/l)	Block wise area coverage (sq km)																				Total Area (sq km)
	Balesar		Bap		Bawari		Bhopalgarh		Bilara		Luni		Mandor		Osian		Phalodi		Shergarh		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
< 50	139.8	7.6	712.9	16.4	0.2	0.0	108.3	6.0	424.4	26.2	293.1	14.7	107.5	6.7	531.0	18.7	1997.1	60.3	100.4	5.1	4414.7
50-100	250.7	13.6	1378.2	31.7	792.9	58.5	986.6	54.5	469.5	29.0	877.7	43.9	473.1	29.5	1833.0	64.4	948.6	28.6	471.7	24.0	8482.0
> 100	1448.6	78.8	2250.5	51.8	561.7	41.5	711.1	39.5	726.4	44.8	828.2	41.4	1024.6	63.8	483.4	17.0	368.5	11.1	1397.3	71.0	9800.3
Total	1839.1	100.0	4341.6	100.0	1354.8	100.0	1806.0	100.0	1620.3	100.0	1999.0	100.0	1605.2	100.0	2847.4	100.0	3314.2	100.0	1969.4	100.0	22697.0

PLATE - XIV



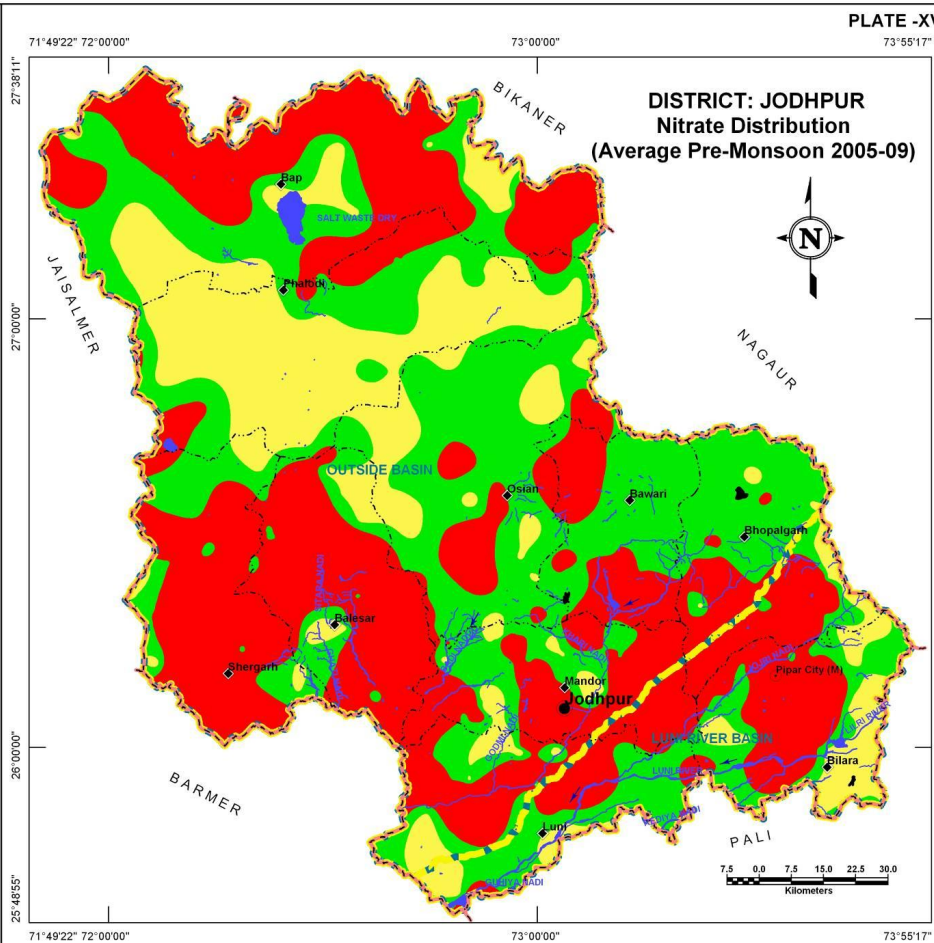
LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Water Bodies:
- River / Streams
- Ponds / Reservoirs
- **Hills**

Fluoride Concentration (mg/l):
- < 1.5
- 1.5 - 3.0
- > 3

PLATE -XV



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary
- **Basin Boundary**

Water Bodies:
- River / Streams
- Ponds / Reservoirs
- **Hills**

Nitrate Concentration (mg/l):
- < 50
- 50 - 100
- > 100

DEPTH TO BEDROCK

DISTRICT – JODHPUR

The entire area of the district is underlined by the hard rocks at different depths. From hydrogeologic perspective, the beginning of massive bedrock has been considered for defining top of bedrock surface. The major rock types occurring in the district are Sandstone, Limestone, Schist, Phyllite, Rhyolite and Granite. These rocks are overlain by alluvial deposits of sand, clay, silt and admixture of these in different proportions and thicknesses. On perusal of the map of depth to bed rock in meters below ground level it can be interpreted that the bedrock occurs at shallow depths in southern parts whereas further northwards, the depth to bedrock increases reaching to about 240m bgl. The central part (in Osian, Bewari and Balesar blocks), southern part (in Luni, Mandor and Bilara blocks) and western part in Shergarh block of the district varies with a thickness range of 20 – 80 meter. Small patches of depth less than 20m bgl are found in Bewari and Balesar blocks.

Depth to bedrock range (m bgl)	Block wise area coverage (sq km)																				Total Area (sq km)
	Balesar		Bap		Bawari		Bhopalgarh		Bilara		Luni		Mandor		Osian		Phalodi		Shergarh		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
< 20	-	-	-	-	8.3	0.6	2.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	**10.4**
20-40	117.9	6.4	-	-	20.7	1.5	13.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	**152.0**
40-60	465.3	25.3	-	-	96.5	7.1	63.7	3.5	108.8	6.7	488.0	24.4	48.0	3.0	65.8	2.3	-	-	61.9	3.1	**1,398.0**
60-80	980.3	53.3	-	-	934.2	69.1	784.7	43.6	984.5	60.7	620.1	31.0	622.0	38.7	697.9	24.5	694.5	21.0	1,340.6	68.1	**7,658.8**
80-100	198.3	10.8	54.1	1.2	208.3	15.4	894.6	49.7	527.0	32.6	890.9	44.6	916.0	57.1	1,304.9	45.8	806.3	24.3	566.9	28.8	**6,367.3**
100-120	77.3	4.2	121.3	2.8	43.0	3.0	44.3	2.5	-	-	-	-	19.2	1.2	376.6	13.3	828.2	25.0	-	-	**1,509.9**
120-140	-	-	528.0	12.2	18.6	1.4	3.1	0.2	-	-	-	-	-	-	214.4	7.5	611.8	18.5	-	-	**1,375.9**
140-160	-	-	1,055.5	24.3	12.8	1.0	0.1	-	-	-	-	-	-	-	113.8	4.0	240.1	7.3	-	-	**1,422.3**
160-180	-	-	941.6	21.7	8.5	0.6	-	-	-	-	-	-	-	-	54.3	1.9	82.2	2.5	-	-	**1,086.6**
180-200	-	-	881.1	20.3	3.9	0.3	-	-	-	-	-	-	-	-	17.5	0.6	25.9	0.6	-	-	**928.4**
200-220	-	-	543.0	12.5	-	-	-	-	-	-	-	-	-	-	2.2	0.1	21.6	0.7	-	-	**566.8**
220-240	-	-	217.0	5.0	-	-	-	-	-	-	-	-	-	-	-	-	3.6	0.1	-	-	**220.6**
Total	**1,839.1**	**100.0**	**4,341.6**	**100.0**	**1,354.8**	**100.0**	**1,806.0**	**100.0**	**1,620.3**	**100.0**	**1,999.0**	**100.0**	**1,605.2**	**100.0**	**2,847.4**	**100.0**	**3,314.2**	**100.0**	**1,969.4**	**100.0**	**22,697.0**

UNCONFINED AQUIFER

Alluvial areas

Aquifer in alluvial material is formed in southern part of the district largely around Luni River, with thickness varying from less than 10 meter and reaching upto 40 meter. Most part of Luni block has unconfined aquifer formed in alluvial material with thickness from 10 to 20 meter and reaching a maximum of 30m in the southwest corner of the block. In southern part of Shergarh block also there is good thickness of alluvial aquifer. Small patches high thicknesses are also found in Balesar and Bilara blocks.

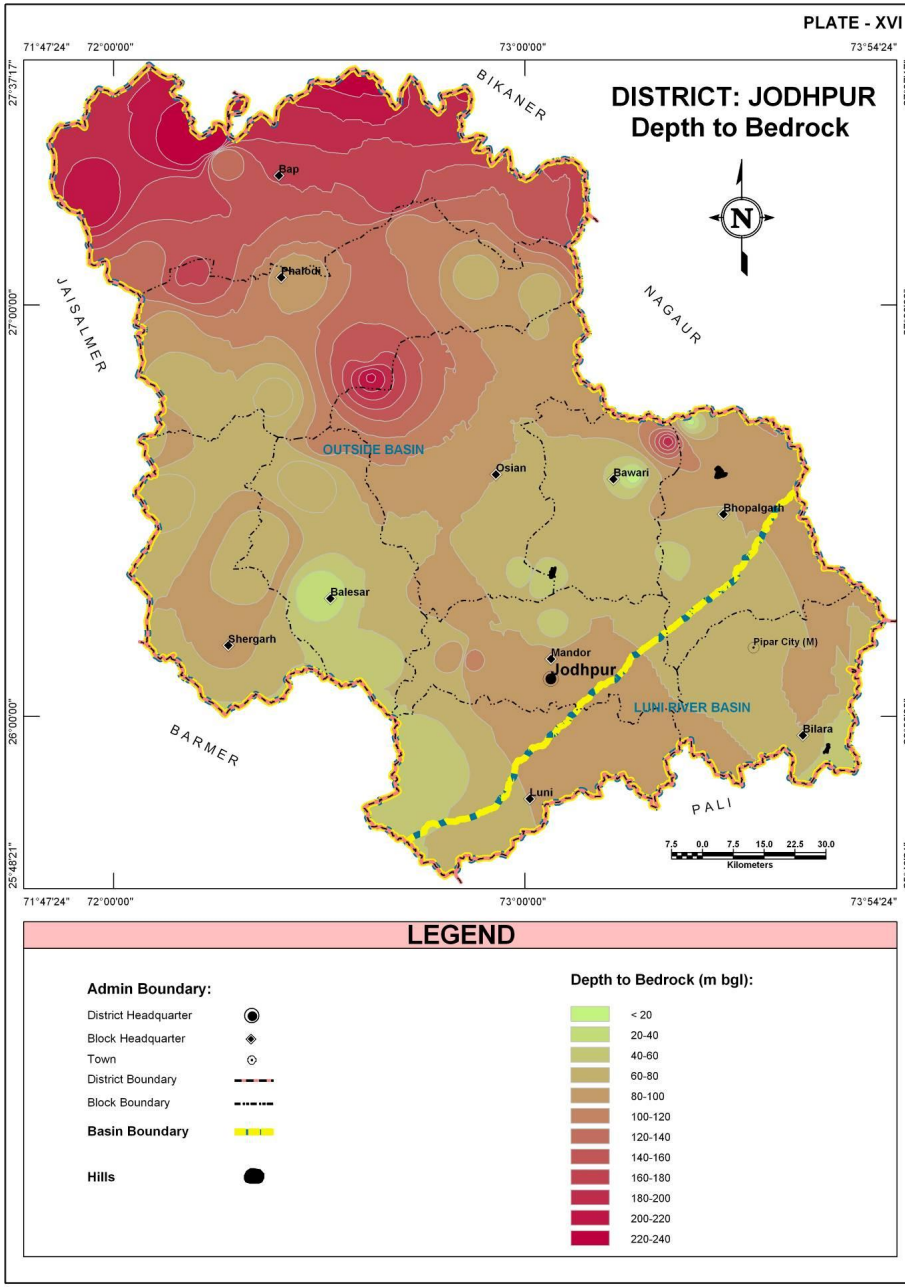
Unconfined aquifer Thickness (m)	Block wise area coverage (sq km)										Total Area (sq km)
	Balesar	Bap	Bawari	Bhopalgarh	Bilara	Luni	Mandor	Osian	Phalodi	Shergarh	
< 10	95.4	-	-	-	305.6	964.6	65.4	-	-	1,019.2	**2,450.2**
10-20	244.6	-	-	-	-	656.6	50.5	-	-	-	**951.7**
20-30	41	-	-	-	-	25.9	28.7	-	-	-	**95.6**
> 30	1.5	-	-	-	-	-	11.8	-	-	-	**13.3**
Total	**382.5**	**-**	**-**	**-**	**305.6**	**1,647.1**	**156.4**	**-**	**-**	**1,019.2**	**3,510.8**

Hardrock areas

Weathered, fractured and jointed rock formations form the phreatic aquifer in the areas where hard rocks are exposed or occur at shallow depths. Such zone ranges in thickness from less than 10m to 80m throughout the district except in the southern part. These high thickness zones occur in the form of isolated patches only, whereas the general thickness in the district is less than 40m. These formations constitute very good aquifers in the eastern part of Phalodi block and in southern part of Mandor and Bilara blocks reaching a thickness of more than 40 meters.

Unconfined aquifer Thickness (m)	Block wise area coverage (sq km)										Total Area (sq km)
	Balesar	Bap	Bawari	Bhopalgarh	Bilara	Luni	Mandor	Osian	Phalodi	Shergarh	
<10	582.1	886.8	754.5	1,443.30	289.6	0.6	397.9	1,842.00	1,053.60	240.7	**7,491.1**
10-20	429.7	1,556.30	249.1	245.3	206.6	325.9	199.1	488.9	483.4	317.6	**4,501.9**
20-30	183.7	945.5	194.7	101.7	465.9	14.9	193.5	244.4	400.6	258.4	**3,003.3**
30-40	121.8	431.3	91.4	15.7	209.8	4.9	264.5	116.6	510.8	118.2	**1,885.0**
40-50	77.6	245.6	65.1	-	91	3.5	300.8	83.5	637.5	10.5	**1,515.1**
50-60	38.6	273.3	-	-	47.2	2.1	74.3	56.5	184.7	4.8	**681.5**
60-70	22.3	2.8	-	-	4.6	0	14.1	14.4	43.6	-	**101.8**
> 70	0.8	-	-	-	-	-	4.6	1.1	-	-	**6.5**
Total	**1,456.6**	**4,341.6**	**1,354.8**	**1,806.0**	**1,314.7**	**351.9**	**1,448.8**	**2,847.4**	**3,314.2**	**950.2**	**19,186.2**

PLATE - XVI



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary

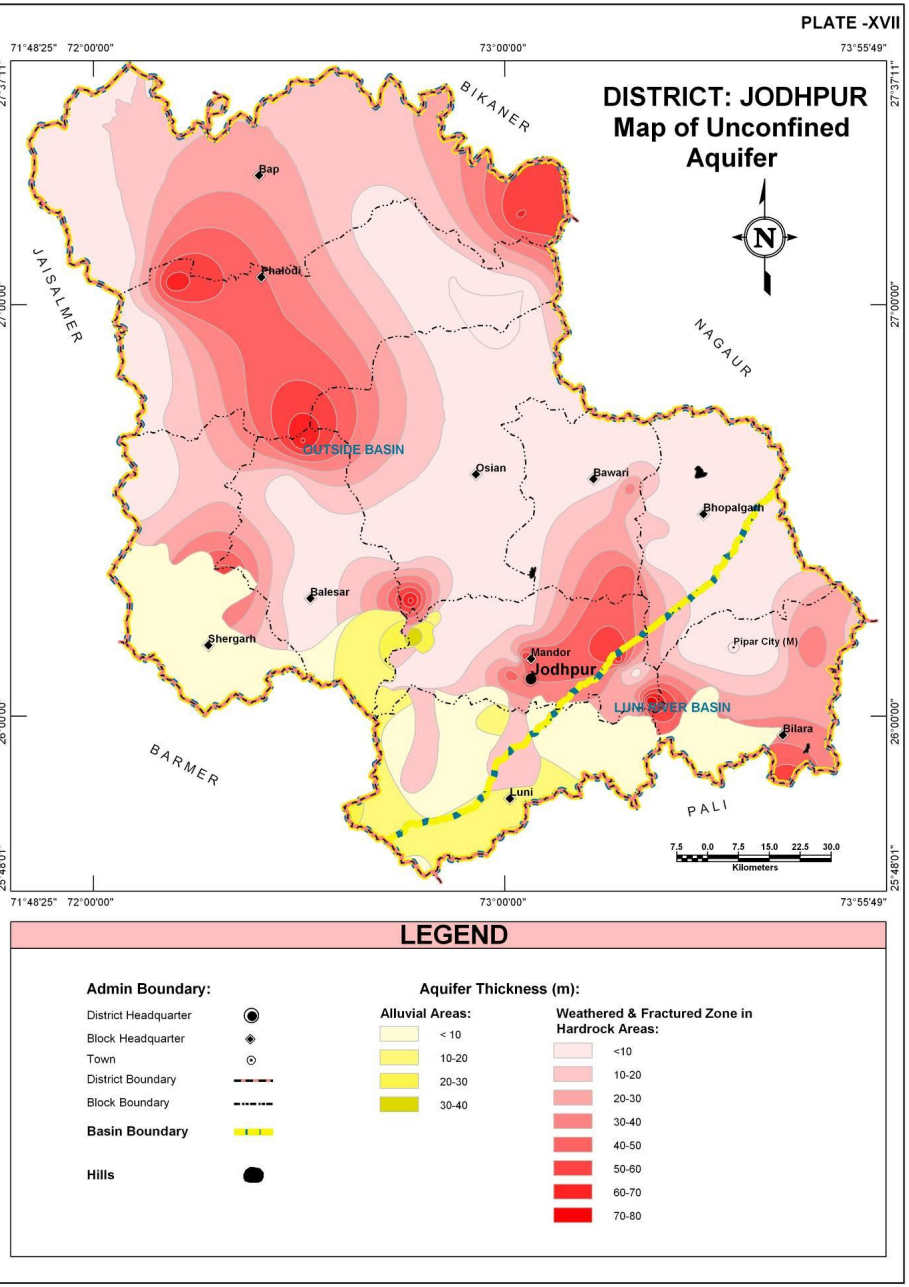
Basin Boundary

Hills

Depth to Bedrock (m bgl):

- < 20
- 20-40
- 40-60
- 60-80
- 80-100
- 100-120
- 120-140
- 140-160
- 160-180
- 180-200
- 200-220
- 220-240

PLATE -XVII



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- District Boundary
- Block Boundary

Basin Boundary

Hills

Aquifer Thickness (m):

Alluvial Areas:

- < 10
- 10-20
- 20-30
- 30-40

Weathered & Fractured Zone in Hardrock Areas:

- <10
- 10-20
- 20-30
- 30-40
- 40-50
- 50-60
- 60-70
- 70-80

Glossary of terms

S. No.	Technical Terms	Definition
1	AQUIFER	A saturated geological formation which has good permeability to supply sufficient quantity of water to a Tube well, well or spring.
2	ARID CLIMATE	Climate characterized by high evaporation and low precipitation.
3	ARTIFICIAL RECHARGE	Addition of water to a ground water reservoir by man-made activity
4	CLIMATE	The sum total of all atmospheric or meteorological influences principally temperature, moisture, wind, pressure and evaporation of a region.
5	CONFINED AQUIFER	A water bearing strata having confined impermeable overburden. In this aquifer, water level represents the piezometric head.
6	CONTAMINATION	Introduction of undesirable substance, normally not found in water, which renders the water unfit for its intended use.
7	DRAWDOWN	The drawdown is the depth by which water level is lowered.
8	FRESH WATER	Water suitable for drinking purpose.
9	GROUND WATER	Water found below the land surface.
10	GROUND WATER BASIN	A hydro-geologic unit containing one large aquifer or several connected and interrelated aquifers.
11	GROUND WATER RECHARGE	The natural infiltration of surface water into the ground.
12	HARD WATER	The water which does not produce sufficient foam with soap.
13	HYDRAULIC CONDUCTIVITY	A constant that serves as a measure of permeability of porous medium.
14	HYDROGEOLOGY	The science related with the ground water.
15	HUMID CLIMATE	The area having high moisture content.
16	ISOHYET	A line of equal amount of rainfall.
17	METEOROLOGY	Science of the atmosphere.
18	PERCOLATION	It is flow through a porous substance.
19	PERMEABILITY	The property or capacity of a soil or rock for transmitting water.
20	pH	Value of hydrogen-ion concentration in water. Used as an indicator of acidity (pH < 7) or alkalinity (pH > 7).
21	PIEZOMETRIC HEAD	Elevation to which water will rise in a piezometers.
22	RECHARGE	It is a natural or artificial process by which water is added from outside to the aquifer.
23	SAFE YIELD	Amount of water which can be extracted from ground water without producing undesirable effect.
24	SALINITY	Concentration of dissolved salts.
25	SEMI-ARID	An area is considered semiarid having annual rainfall between 10-20 inches.
26	SEMI-CONFINED AQUIFER	Aquifer overlain and/or underlain by a relatively thin semi-pervious layer.
27	SPECIFIC YIELD	Quantity of water which is released by a formation after it's complete saturation.
28	TOTAL DISSOLVED SOLIDS	Total weight of dissolved mineral constituents in water per unit volume (or weight) of water in the sample.

(Contd…)

S. No.	Technical Terms	Definition
29	TRANSMISSIBILITY	It is defined as the rate of flow through an aquifer of unit width and total saturation depth under unit hydraulic gradient. It is equal to product of full saturation depth of aquifer and its coefficient of permeability.
30	UNCONFINED AQUIFER	A water bearing formation having permeable overburden. The water table forms the upper boundary of the aquifer.
31	UNSATURATED ZONE	The zone below the land surface in which pore space contains both water and air.
32	WATER CONSERVATION	Optimal use and proper storage of water.
33	WATER RESOURCES	Availability of surface and ground water.
34	WATER RESOURCES MANAGEMENT	Planned development, distribution and use of water resources.
35	WATER TABLE	Water table is the upper surface of the zone of saturation at atmospheric pressure.
36	ZONE OF SATURATION	The ground in which all pores are completely filled with water.
37	ELECTRICAL CONDUCTIVITY	Flow of free ions in the water at 25C mu/cm.
38	CROSS SECTION	A Vertical Projection showing sub-surface formations encountered in a specific plane.
39	3-D PICTURE	A structure showing all three dimensions i.e. length, width and depth.
40	GWD	Ground Water Department
41	CGWB	Central Ground Water Board
42	CGWA	Central Ground Water Authority
43	SWRPD	State Water Resources Planning Department
44	EU-SPP	European Union State Partnership Programme
45	TOPOGRAPHY	Details of drainage lines and physical features of land surface on a map.
46	GEOLOGY	The science related with the Earth.
47	GEOMORPHOLOGY	The description and interpretation of land forms.
48	PRE MONSOON SURVEY	Monitoring of Ground Water level from the selected DKW/Piezometer before Monsoon (carried out between 15th May to 15th June)
49	POST-MONSOON SURVEY	Monitoring of Ground Water level from the selected DKW/Piezometer after Monsoon (carried out between 15th October to 15th November)
50	PIEZOMETER	A non-pumping small diameter bore hole used for monitoring of static water level.
51	GROUND WATER FLUCTUATION	Change in static water level below ground level.
52	WATER TABLE	The static water level found in unconfined aquifer.
53	DEPTH OF BED ROCK	Hard & compact rock encountered below land Surface.
54	G.W. MONITORING STATION	Dug wells selected on grid basis for monitoring of state water level.
55	EOLIAN DEPOSITS	Wind-blown sand deposits

Ground Water Department,
Rajasthan

European Union
State Partnership Programme

भूजल में घुले मुख्य तत्वों की अधिकता का मानव शरीर पर दुष्प्रभाव

- बोरोन-स्नायु तन्त्र पर प्रभाव
- क्लोराइड-सोडियम के साथ मिलकर उच्च रक्त चाप
- कैल्शियम-जोड़ों में कड़ापन
- आर्सेनिक-त्वचा रोग, कैंसर
- लेड-बच्चों के शारीरिक व मानसिक विकास में बाधा वयस्कों में गुर्दे के रोग
- फ्लोराइड - दंत क्षरण
- सोडियम-हृदय, गुर्दा व रक्त परिसंचरण रोगों से ग्रसित लोगों को हानिकारक
- नाइट्रेट-नवजात शिशुओं में ब्लू बेबी बीमारी (मेथमोग्लोबिनिमिया)
- सल्फेट-अधिकता में मैग्नेशियम के साथ मिलकर दस्तावर
- आयरन-आयरन जीवाणु से आमाशय संबंधी रोग
- फ्लोराइड-जोड़ों में अकड़न, हड्डियों में मुड़ाव

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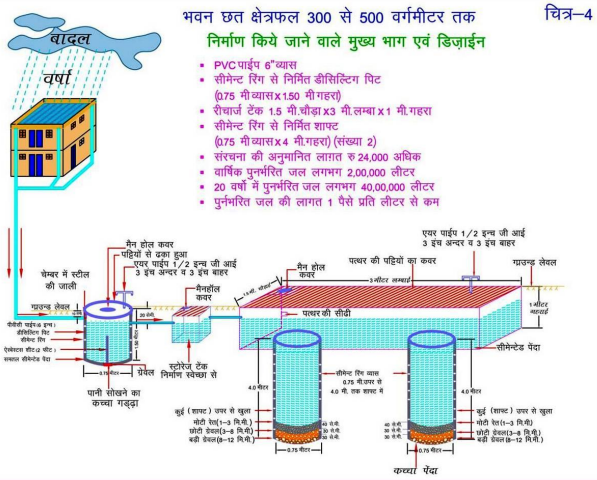
भूजल अमूल्य है इसे प्रदूषित न करें।

भवन छत क्षेत्रफल 300 से 500 वर्गमीटर तक — चित्र–4

निर्माण किये जाने वाले मुख्य भाग एवं डिज़ाईन

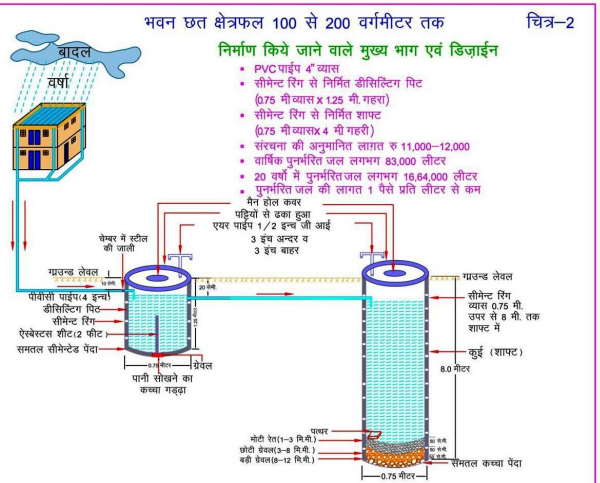
- PVC पाईप 6" व्यास
- सीमेन्ट रिंग से निर्मित डीसिल्टिंग पिट (0.75 मी.व्यास x 1.50 मी.गहरा)
- रीचार्ज टेंक 1.5 मी.चौड़ा x 3 मी.लम्बा x 1 मी.गहरा
- सीमेन्ट रिंग से निर्मित शाफ्ट (0.75 मी.व्यास x 4 मी.गहरा) (संख्या 2)
- संरचना की अनुमानित लाग़त रु 24,000 अधिक
- वार्षिक पुनर्भरित जल लगभग 2,00,000 लीटर
- 20 वर्षों में पुनर्भरित जल लगभग 40,00,000 लीटर
- पुर्नभरित जल की लागत 1 पैसे प्रति लीटर से कम



भवन छत क्षेत्रफल 100 से 200 वर्गमीटर तक — चित्र–2

निर्माण किये जाने वाले मुख्य भाग एवं डिज़ाईन

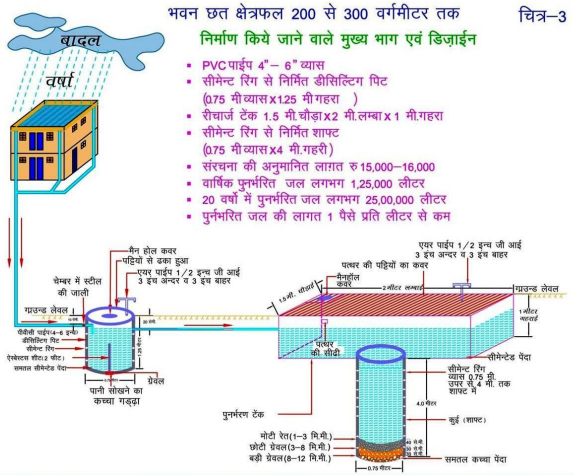
- PVC पाईप 4" व्यास
- सीमेन्ट रिंग से निर्मित डीसिल्टिंग पिट (0.75 मी.व्यास x 1.25 मी.गहरा)
- सीमेन्ट रिंग से निर्मित शाफ्ट (0.75 मी.व्यास x 4 मी गहरी)
- संरचना की अनुमानित लाग़त रु 11,000–12,000
- वार्षिक पुनर्भरित जल लगभग 83,000 लीटर
- 20 वर्षों में पुनर्भरितजल लगभग 16,64,000 लीटर
- पुनर्भरित जल की लागत 1 पैसे प्रति लीटर से कम



भवन छत क्षेत्रफल 200 से 300 वर्गमीटर तक — चित्र–3

निर्माण किये जाने वाले मुख्य भाग एवं डिज़ाईन

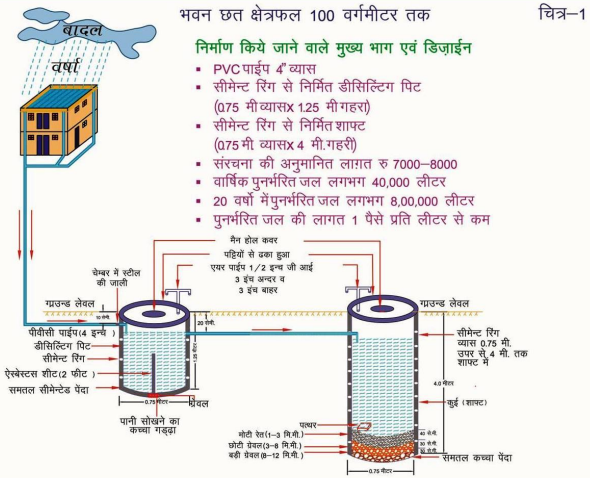
- PVC पाईप 4" – 6" व्यास
- सीमेन्ट रिंग से निर्मित डीसिल्टिंग पिट (0.75 मी.व्यास x 1.25 मी.गहरा)
- रीचार्ज टेंक 1.5 मी.चौड़ा x 2 मी.लम्बा x 1 मी.गहरा
- सीमेन्ट रिंग से निर्मित शाफ्ट (0.75 मी.व्यास x 4 मी.गहरी)
- संरचना की अनुमानित लाग़त रु 15,000–16,000
- वार्षिक पुनर्भरित जल लगभग 1,25,000 लीटर
- 20 वर्षों में पुनर्भरित जल लगभग 25,00,000 लीटर
- पुर्नभरित जल की लागत 1 पैसे प्रति लीटर से कम



भवन छत क्षेत्रफल 100 वर्गमीटर तक — चित्र–1

निर्माण किये जाने वाले मुख्य भाग एवं डिज़ाईन

- PVC पाईप 4" व्यास
- सीमेन्ट रिंग से निर्मित डीसिल्टिंग पिट (0.75 मी.व्यास x 1.25 मी.गहरा)
- सीमेन्ट रिंग से निर्मित शाफ्ट (0.75 मी व्यास x 4 मी.गहरी)
- संरचना की अनुमानित लाग़त रु 7000–8000
- वार्षिक पुनर्भरित जल लगभग 40,000 लीटर
- 20 वर्षों में पुनर्भरित जल लगभग 8,00,000 लीटर
- पुनर्भरित जल की लागत 1 पैसे प्रति लीटर से कम



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Myths and Facts about Ground Water

S No	Myths	Facts
1	What is Ground Water • an underground lake • a net work of underground rivers • a bowl filled with water	Water which occurs below the land in geological formations/rocks is Ground water
2	Ground Water occurs everywhere beneath the Land Surface	Not really, it depends on the nature of rock formation
3	There is a relationship between ground water and surface water	Not all the places. Near streams/rivers there is relation
4	Groundwater is not renewable resource	It is renewable source and every year it is being recharged through rain/applied irrigation etc
5	Ground water is unlimited and deeper you drill more discharge	It is limited to annual recharge from rain/applied irrigation. The discharge may not increase if you go deeper
6	Ground Water moves rapidly	The movement of ground water is very slow
7	Ground water pumped from wells is thousands of years old	Generally the ground water being tapped through wells is a few years old
8	If water taste good—it is safe to drink	It may have other chemicals e.g. fluoride, nitrates etc which are harmful
9	Water from free flowing tube wells is very pure	This water can also be contaminated so test before use
10	If I recharge my TW/DW/HP it will not benefit me	It will also benefit you and also adjoing wells
11	There is no static ground water resources in Rajasthan	Rajasthan is also having Static GW resources, and being tapped in most of areas as GW annual withdrawal is more than annual recharge
12	I cannot meet annual cooking and drinking water requirement by rain water harvesting	The water requirement for drinking and cooking is only 8 lit/day. You can harvest this water for family of 5 persons from roof top or paved area of 75 Sq m to meet annual requirement
13	You can increase ground water recharge	This can be done by harvesting the rain water and storing in sub surface reservoir (GW) by constructing the recharge structures
14	You cannot use abandoned TW/HP/DW for ground water recharge	These should be used as recharge structures as harvested rain water is directly put into GW reservoir
15	Putting waste near HP/TW will not cause any problem	Such actions will pollute wells and water

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