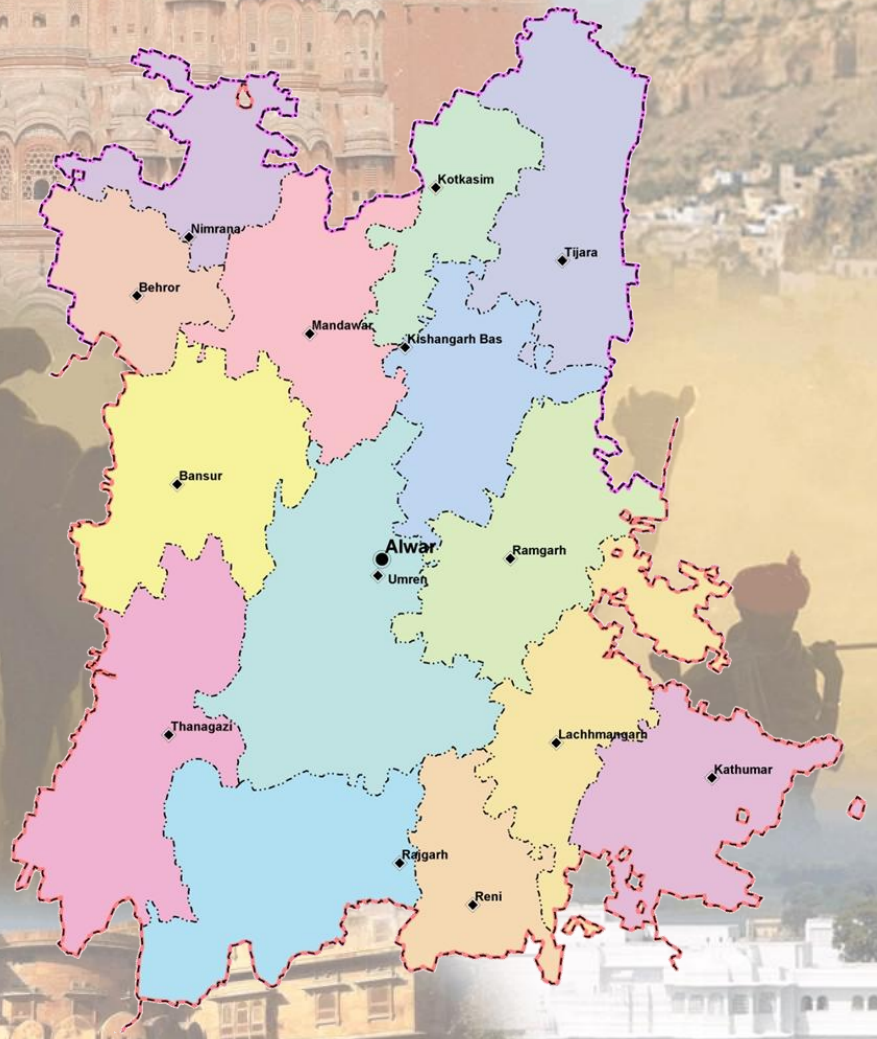
Ground Water Department,
Rajasthan

Hydrogeological Atlas of Rajasthan
Alwar District

European Union
State Partnership Programme



2013

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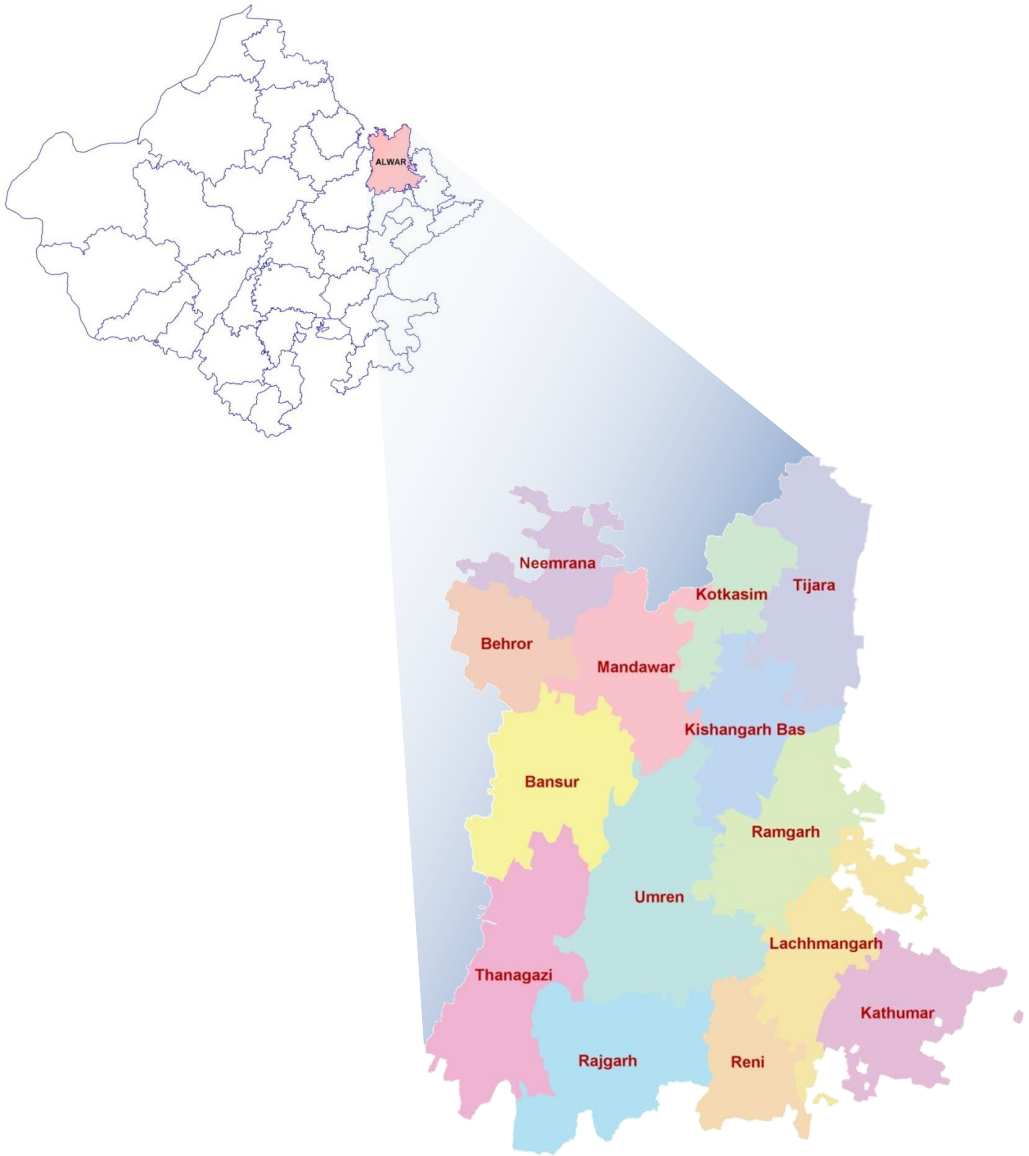
Hydrogeological Atlas of Rajasthan

Alwar District



Contents:

2013

ADMINISTRATIVE SETUP

DISTRICT – ALWAR

Location:

Alwar district is located in the eastern part of Rajasthan. It is bounded in the north by state of Haryana, in the east by Bharatpur district, south by Dausa and in the west by Jaipur district. It stretches between 27° 02' 33.21" to 28° 13' 46.14" North latitude and 76° 06' 50.32'' to 77° 15' 31.79'' East longitude covering area of 8,382.9 sq kms. Major part of the district have a systematic drainage system, as whole region is part of basins namely 'Shekhawati River Basin','Sabi River Basin','Ruparail River Basin' and 'Banganga River Basin'.

Administrative Set-up:

Alwar district is administratively divided into 14 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 District Area	Total Number of Towns and Villages
1	Bansur	2,14,351	693.2	8.3	132
2	Behror	1,62,359	363.3	4.3	91
3	Kathumar	2,27,195	577.0	6.9	161
4	Kishangarh Bas	2,08,973	507.5	6.1	142
5	Kotkasim	1,17,687	350.1	4.2	116
6	Lachhmangarh	2,35,925	603.0	7.2	187
7	Mandawar	1,97,582	590.2	7.0	142
8	Neemrana	1,43,329	373.1	4.5	87
9	Rajgarh	1,69,735	761.3	9.1	148
10	Ramgarh	2,20,219	638.0	7.6	173
11	Reni	1,36,491	385.5	4.6	102
12	Thanagazi	1,89,977	843.4	10.1	159
13	Tijara	2,80,772	680.2	8.1	207
14	Umren	4,82,387	1,017.1	12.0	156
Total		**29,86,982**	**8,382.9**	**100.0**	**2,003**

Alwar district has 2,003 towns and villages, out of which fourteen are block headquarters as well.

Climate:

The climate of the district is moderate and is part of sub-humid region. The district has a hot dry summer and a bracing cold season. Generally, winter season begins from November and lasts up to February while rainy season from July to the first half of September. While temperature continuously rises in the season from March to June it goes down after mid - November till it declines up to the minimum in the month of January. The mean annual rainfall of the district is 668.6 mm.

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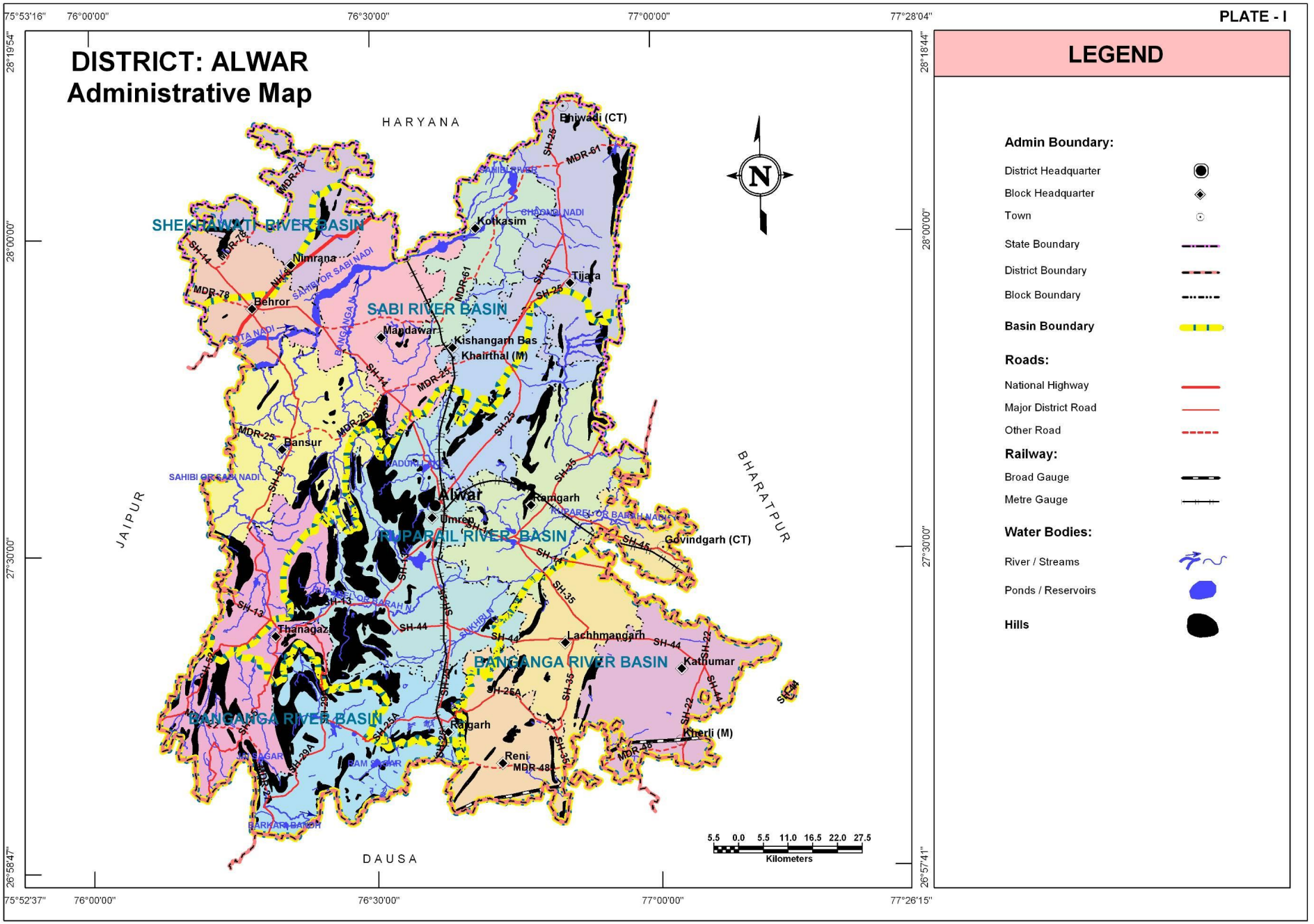
PLATE - I



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TOPOGRAPHY

DISTRICT – ALWAR

The district lies in the north-easterly part of Aravalli range and presents an excellent arch type of folded mountain belt. In the east and southeast, the district has an undulating topography. The central part to SSW part of the district is covered by hills ranges trending northeast to southwest ranging in height from 625m to 771m above mean sea level. Hilly area shows ridge topography becomes more prominent in the south western part of the district. The Sabi River controls the drainage of the north part of the district and is the largest stream in the district. The Ruparail River occupies large parts in the central and southern parts of the district. The general elevation range of the district is 250 m to 375 m amsl. Elevation ranges from a minimum of 190.3 m amsl in Tijara block in the northeastern part of the district to a maximum of 771.1 m amsl In Bansur block in western part of the district.

S. No.	Block Name	Minimum Elevation (m amsl)	Maximum Elevation (m amsl)
1	Bansur	308.2	771.1
2	Behror	295.7	581.8
3	Kathumar	191.7	405.4
4	Kishangarh Bas	244.0	514.7
5	Kotkasim	244.0	397.8
6	Lachhmangarh	204.2	439.5
7	Mandawar	260.7	609.4
8	Neemrana	264.9	503.8
9	Rajgarh	266.0	677.4
10	Ramgarh	213.8	447.7
11	Reni	234.2	520.9
12	Thanagazi	328.3	716.3
13	Tijara	190.3	433.9
14	Umren	239.2	677.4

RAINFALL

The district received fairly good rainfall in the majority of blocks and slightly less in some blocks (like Behror) in the year 2010. Average annual rainfall in Alwar district was about 761.1 mm based on the data of available blocks. Highest annual rainfall was noticed in Lachhmangarh block (1,250.9 mm) whereas lowest was in Behror block (422.0 mm). The highest average annual rainfall in the district is noticed in Thanagazi block (887.7 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)
Bansur	538.6	903.5	756.8
Behror	422.0	619.4	540.0
Kathumar	610.5	969.2	748.1
Kishangarh Bas	728.2	871.8	807.3
Kotkasim	596.1	1,005.9	858.4
Lachhmangarh	600.6	1,250.9	858.7
Mandawar	533.2	947.7	747.3

Block Name	Minimum Annual Rainfall (mm)	Maximum Annual Rainfall (mm)	Average Annual Rainfall (mm)
Neemrana	551.2	778.8	670.3
Rajgarh	657.4	880.3	775.3
Ramgarh	748.6	980.8	854.7
Reni	588.3	779.8	671.2
Thanagazi	805.7	937.3	887.7
Tijara	495.2	839.5	648.6
Umren	761.2	884.5	830.4

Ground Water Department,
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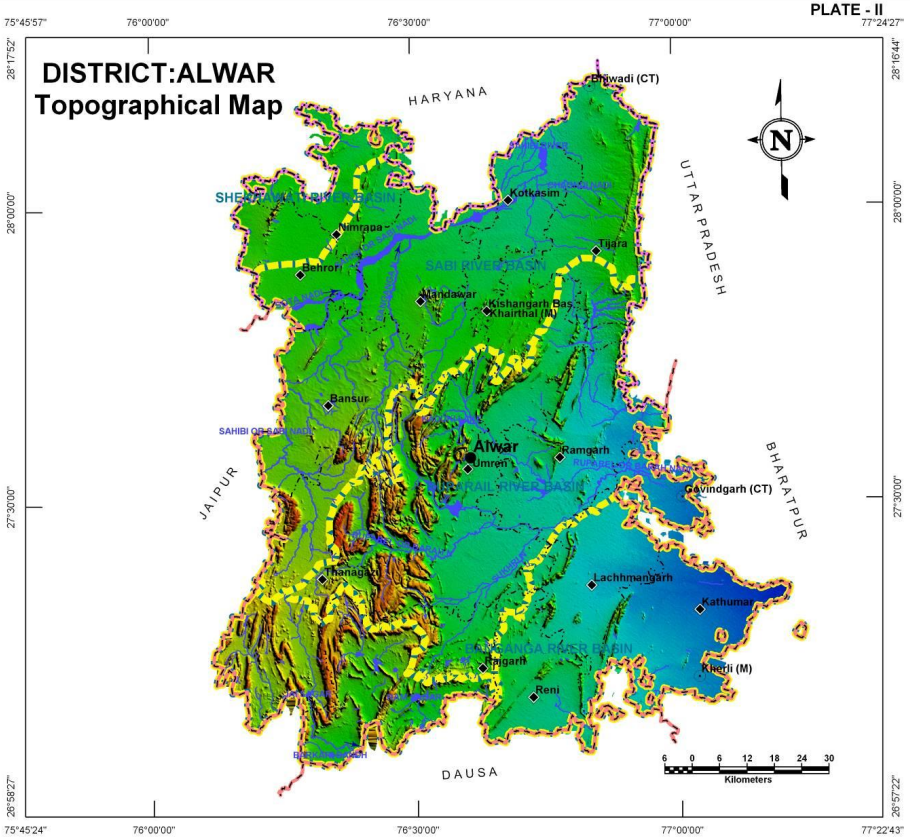
PLATE - II



LEGEND

Admin Boundary:

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

Basin Boundary

Water Bodies:

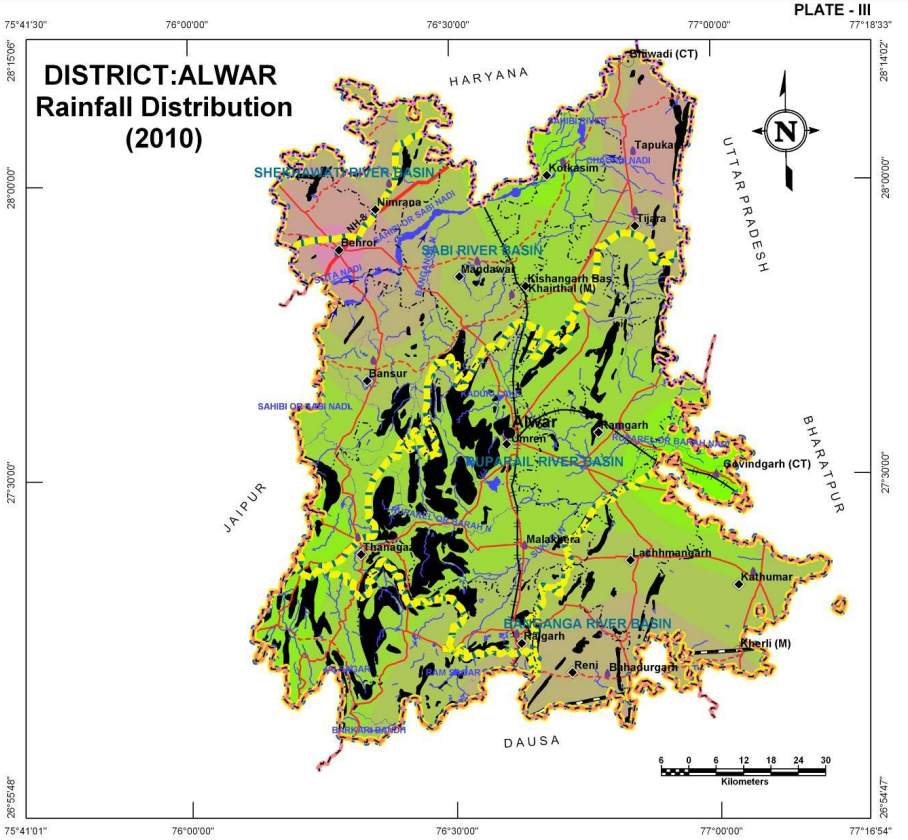
- River / Streams
- Ponds / Reservoirs

Elevation (m amsl):

771, 750, 625, 500, 375, 250, 190

Source : SRTM DEM

PLATE - III



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- Raingauge Stations
- State Boundary
- 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):

- 400-500
- 500-600
- 600-700
- 700-800
- 800-900
- 900-1000
- > 1000

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GEOLOGY

DISTRICT – ALWAR

Geologically, the district is covered primarily by rocks belonging to Aravalli and Delhi Super Group of rocks. Pre Delhi rocks of the district comprise of quartzite with interlayered schist and phyllite, impure marble & granite. Delhi Super Group starts with a basal conglomerate which is arkosic at places. The entire sequence shows a facial change from calcareous members in the lower to arenaceous members in middle and to a predominantly argillaceous nature in the upper portion. There are distinct type of Post Delhi intrusive viz. sills and dykes of amphibolites and meta-dolerite.

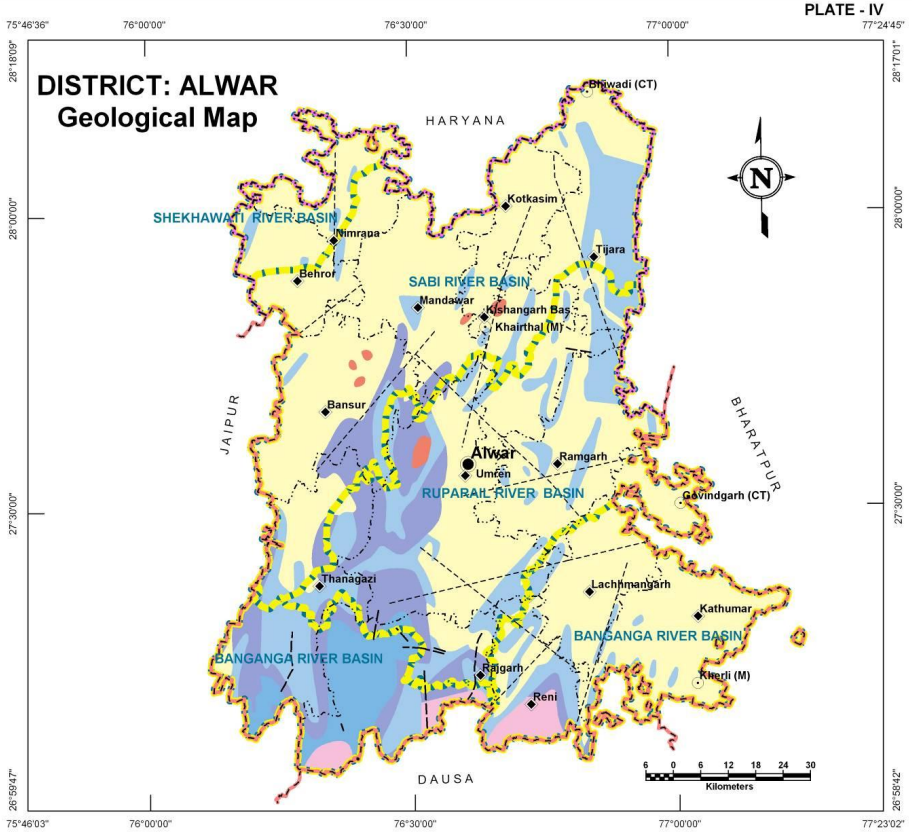
Super Group	Group	Formation
	Recent and Sub-recent	Soil, Alluvium, blown sand and nodular limestone (Kankar)
--------X--------X--------X--------X--------X--------X--------X--------X---Unconformity---X--------X--------X-------X-------X-------X-------X-------X-------		
Post-Delhi		Granite, pegmatite, quartz veins amphibolite and meta-dolerite
Delhi Supergroup	Ajabgarh group	Slates and Phyllites, quartzitic sandstone and quartzite, impure limestone
--------X--------X--------X--------X--------X--------X--------X--------X---Unconformity---X--------X--------X-------X-------X-------X-------X-------X-------		
Delhi Supergroup	Alwar group	Quartzite, arkose, grity and conglomerates, limestones (marbles), Schist (sericite, biotite, garnet and andalusite bearings) with quartzite and conglomerates.
	Raialo group	Quartzite, schist, Conglomerates
--------X--------X--------X--------X--------X--------X--------X--------X---Unconformity---X--------X--------X-------X-------X-------X-------X-------X-------		
Bhilwara Supergroup	Mangalwar Complex	Migmatite, gneisses, mica-schist sillimatite, mica-schist para amphibolite impure marble

GEOMORPHOLOGY

Table: Geomorphologic units, their description and distribution

Origin	Landform Unit	Description
Aeolian	Sandy Plain	Formed of aeolian activity, wind-blown sand with gentle sloping to undulating plain, comprising of coarse sand, fine sand, silt and clay.
Denudational	Buried Pediment	Pediment covers essentially with relatively thicker alluvial, colluvial or weathered materials.
	Intermontane Valley	Depression between mountains, generally broad & linear, filled with colluvial deposits.
	Pediment	Broad gently sloping rock flooring, erosional surface of low relief between hill and plain, comprised of varied lithology, criss-crossed by fractures and faults.
Fluvial	Alluvial Plain	Mainly undulating landscape formed due to fluvial activity, comprising of gravels, sand, silt and clay. Terrain mainly undulating, produced by extensive deposition of alluvium.
	Alluvial Plain (sandy)	Flat to gentle undulating plain formed due to fluvial activity, mainly consists of gravels, sand, silt and clay with unconsolidated material of varying lithology, predominantly sand along river.
	Flood Plain	The surface or strip of relatively smooth land adjacent to a river channel formed by river and covered with water when river over flows its bank. Normally subject to periodic flooding.
	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.
	Ravine	Small, narrow, deep, depression, smaller than gorges, larger than gulley, usually carved by running water.
Hills	Denudational, structural hill, linear ridge	Steep sided, relict hills undergone denudation, comprising of varying lithology with joints, fractures and lineaments. Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc. Long narrow low-lying ridge usually barren, having high run off may form over varying lithology with controlled strike.

PLATE - IV



LEGEND

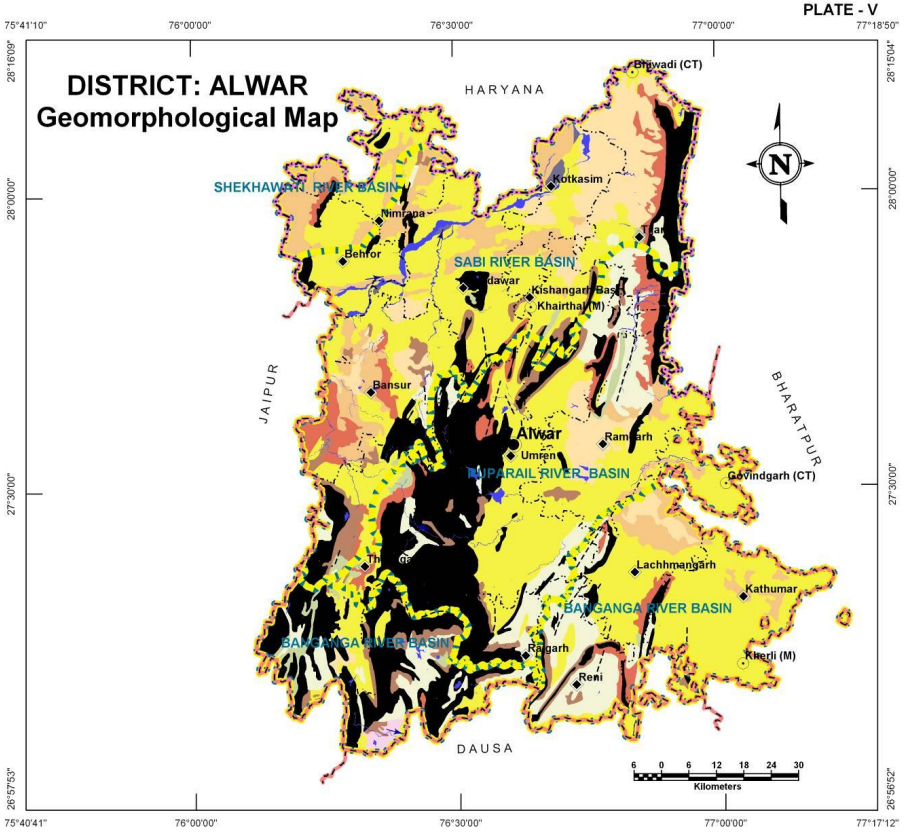
Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- State Boundary
- District Boundary
- Block Boundary
- **Basin Boundary**

Structural Features:
- Fault
- Great Boundary Fault
- Lineament

Geology:
- Alluvium and wind blown sand
- Ajabgarh Group
- Alwar Group
- Raialo Group
- Mangalwar Complex
- Bairath/Dadikar/Harsora/Chapoli/Ajitgarh/Ajmer Granite etc.

Source: District Resource Map of Rajasthan - GSI

PLATE - V



LEGEND

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

Water Bodies:
- River/Ponds/Reservoirs

Structural Features:
- Fault/Fractures/Lineament

Hills:
- Structural/Denudational/Linear Ridge

Landform Units:

Fluvial Origin:
- Alluvial plain
- Alluvial Plain (Sandy)
- Valley Fill
- Ravine
- Flood Plain

Denudational Origin:
- Pediment
- Burried Pediment
- Intermontane Valley

Aeolian Origin:
- Sandy Plain

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

AQUIFERS

DISTRICT – ALWAR

In Alwar district, aquifers are formed primarily in Older alluvium and Quartzite. Weathered and fractured parts of the massive quartzite contribute to aquifer formation whereas the sandy, gravelly and other granular parts of alluvium constitute aquifers. Quartzite forms about 22% of the area and occurs along the fringes of hilly parts in the southwestern parts of the district. The alluvium is the principal aquifer in this district as it occupies more than 67% of the district occupying eastern, northern and western parts. Typical sandy horizons constitute aquifers in alluvial areas.

Table: aquifer potential zones their area and their description

Aquifer in Potential Zone	Area (sq km)	% age of district	Description of the unit/Occurrence
Older Alluvium	5,629.0	67.2	This litho unit comprises of mixture of heterogeneous fine to medium grained sand, silt and kankar.
Quartzite	1,831.5	21.8	Medium to coarse grained and varies from feldspathic grit to sericitic quartzite.
Non Potential Zone (Hills)	922.4	11.0	-
Total	**8,382.9**	**100.0**	

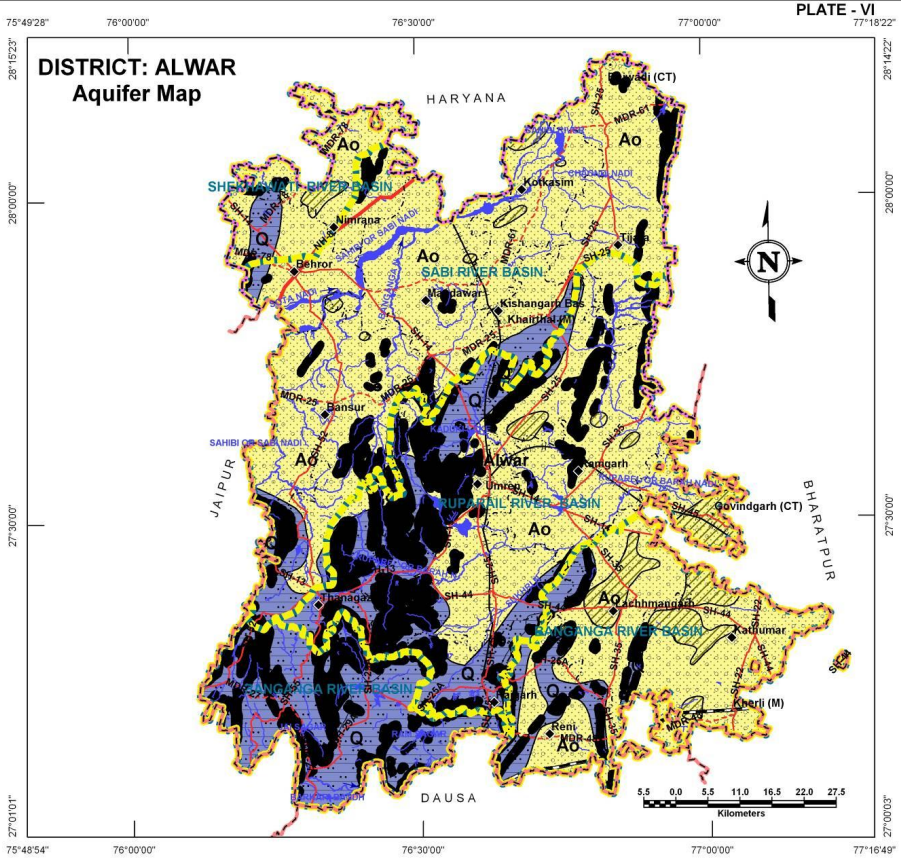
STAGE OF GROUND WATER DEVELOPMENT

Most of the blocks in the district fall under the 'over exploited' category indicating that the ground water is under stress and exploitation exceeding recharge. Two blocks viz., Behror and Rajgarh have been put in 'notified' category which implies a severely stressed ground water situation.

Categorization on the basis of stage of development of ground water	Block Name
Over Exploited	Neemrana, Bansur, Reni, Tijara, Kishangarh, Bas, Mandawar, Kotkasim, Umren, Ramgarh, Lachhmangarh, Kathumar, Thanagazi
Notified	Behror, Rajgarh

Basis for categorization: Ground water development >100% - Over-Exploited. In Notified blocks development of ground water is not permitted any more.

PLATE - VI



LEGEND

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

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

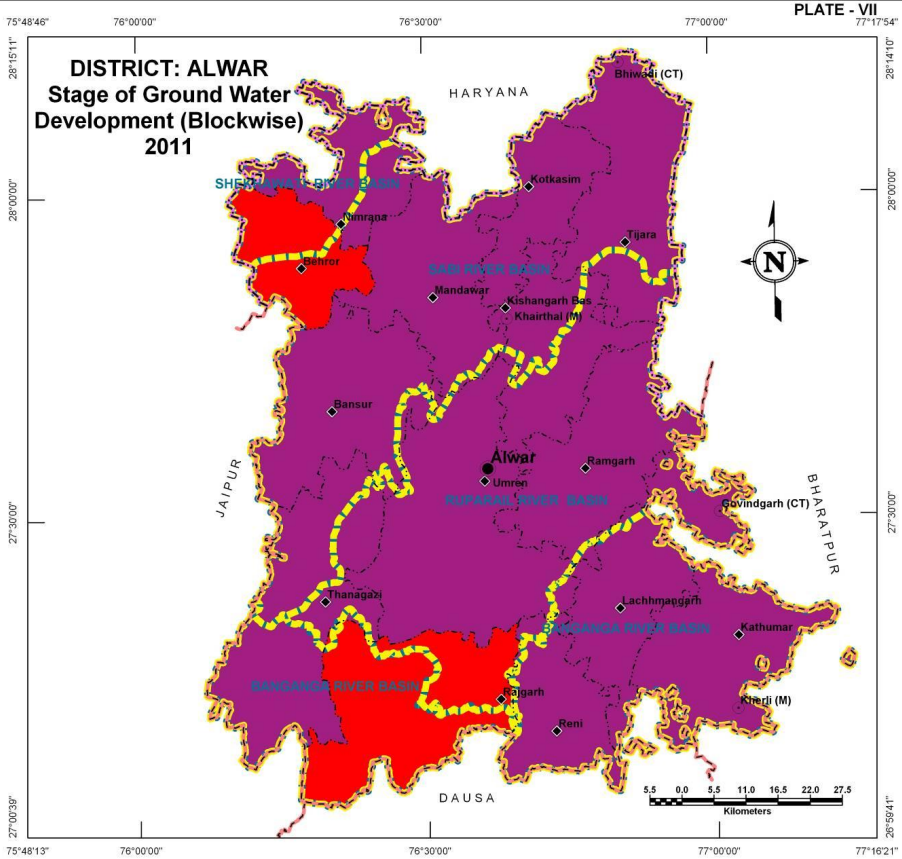
Railway:
- Broad Gauge
- Metre Gauge

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

Aquifer:
- Older Alluvium
- Quartzite

Source: Ground Water Potential Zone Map - GWD, Rajasthan

PLATE - VII



LEGEND

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

Stage of Ground Water Development:
- Over-Exploited
- Notified

Source: Ground Water Department, Rajasthan

LOCATION OF EXPLORATORY AND GROUND WATER MONITORING WELLS DISTRICT – ALWAR

The district has a well distributed network of large number of exploratory wells (310) and ground water monitoring stations (177) in the district owned by RGWD (268 and 116 respectively) and CGWB (42 and 61 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 should be strengthened by adding 54 additional wells in six blocks and 232 additional wells to effectively monitor the water quality.

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
Bansur	1	12	**13**	4	9	**13**	-	24
Behror	1	23	**24**	6	9	**15**	-	13
Kathumar	4	17	**21**	3	5	**8**	-	21
Kishangarh Bas	3	26	**29**	4	9	**13**	3	13
Kotkasim	3	13	**16**	5	6	**11**	-	14
Lachhmangarh	1	21	**22**	7	10	**17**	-	21
Mandawar	6	9	**15**	7	6	**13**	1	25
Neemrana	5	9	**14**	4	8	**12**	-	15
Rajgarh	5	8	**13**	3	11	**14**	23	2
Ramgarh	-	14	**14**	6	10	**16**	-	26
Reni	-	7	**7**	-	3	**3**	4	12
Thanagazi	7	7	**14**	2	12	**14**	15	6
Tijara	3	24	**27**	6	12	**18**	-	23
Umren	3	78	**81**	4	6	**10**	8	17
Total	**42**	**268**	**310**	**61**	**116**	**177**	**54**	**232**

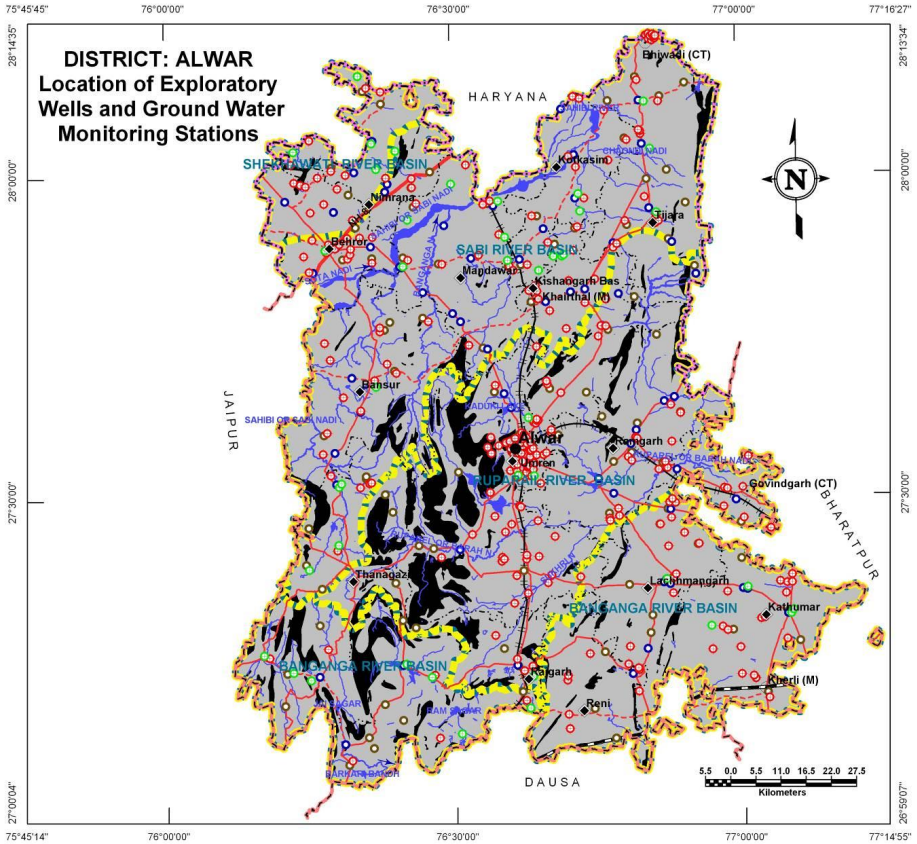
DEPTH TO WATER LEVEL (PRE MONSOON – 2010)

10m interval has been adopted to depict the depth to ground water levels in Alwar district as shown in Plate – IX. Depth to water level varies significantly from less than 10m below ground level to more than 60m bgl. Northwestern part of the district i.e., Bansur – Behror – Neemrana region shows deeper water levels of 30m - 50m in general, and reaching upto >60m below ground level in some areas. In northeastern, southeastern and southwestern parts, the water level is moderately deep around (10-30m bgl), the water level is quite shallow occasionally even less than 10m bgl in isolated patches in the district. The central part of the district has moderately deep ground water ranging in depth from 20-40m bgl.

Depth to water level (m bgl)	Block wise area coverage (sq km) *														Total Area (sq km)
	Bansur	Behror	Kathumar	Kishangarh Bas	Kotkasim	Lachhmangarh	Mandawar	Neemrana	Rajgarh	Ramgarh	Reni	Thanagazi	Tijara	Umren	
<10	1.9	-	-	-	-	9.1	-	-	1.3	5.9	-	6.6	-	-	**24.8**
10-20	75.1	-	403.1	78.3	241.2	242.6	24.1	-	328.3	301.3	-	237.8	470.6	130.0	**2,532.4**
20-30	317.6	12.0	168.9	191.2	108.9	315.0	316.5	20.6	131.2	163.8	228.8	341.9	162.9	109.5	**2,588.8**
30-40	166.7	53.6	-	143.5	-	21.4	209.9	83.5	130.1	109.2	119.7	67.6	-	263.6	**1,368.8**
40-50	50.9	75.7	-	56.7	-	-	30.0	164.3	-	11.8	-	5.1	-	231.4	**625.9**
50-60	11.5	179.5	-	-	-	-	-	90.9	-	-	-	-	-	-	**281.9**
>60	3.7	34.2	-	-	-	-	-	-	-	-	-	-	-	-	**37.9**
Total	**627.4**	**355.0**	**572.0**	**469.7**	**350.1**	**588.1**	**580.5**	**359.3**	**590.9**	**592.0**	**348.5**	**659.0**	**633.5**	**734.5**	**7,460.5**

* 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
- State Boundary
- District Boundary
- Block Boundary

Basin Boundary

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

Railway:
- Broad Gauge
- Metre Gauge

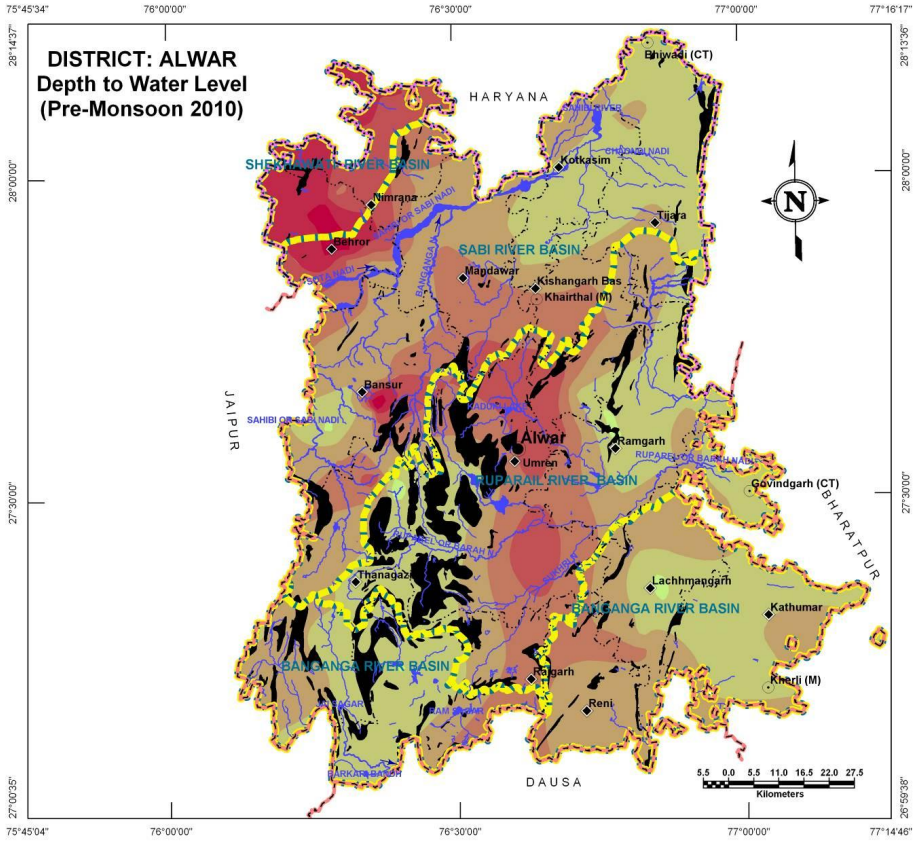
Water Bodies:
- River / Streams
- Ponds / Reservoirs

Hills

Exploratory Wells:
- CGWB
- RGWD

Ground Water Monitoring Stations:
- CGWB
- RGWD

PLATE - IX



LEGEND

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

Basin Boundary

Water Bodies:
- River / Streams
- Ponds / Reservoirs

Hills

Depth to Water Level (m bgl):
- < 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- > 60

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

General flow direction of ground water is shown in water table map (Plate – X). In the central and southern part of the district, a west to east flow is indicated whereas in the northern part, a northwesterly trend is seen. The maximum water table elevation in the district reaches a high of >440m amsl in the southwest part (Thanagazi block) of the district and the minimum is seen towards southeastern part of the district where water table elevation <200m amsl in the Kathumar block is observed.

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

Water table elevation (m amsl) range	Block wise area coverage (sq km)														Total Area (sq km)
	Bansur	Behror	Kathumar	Kishangarh Bas	Kotkasim	Lachhmangarh	Mandawar	Neemrana	Rajgarh	Ramgarh	Reni	Thanagazi	Tijara	Umren	
< 200	-	-	272.7	-	-	46.1	-	-	-	10.9	-	-	-	-	**329.7**
200 - 220	-	-	298.7	9.7	-	445.2	-	-	-	238.9	5.0	-	-	117.7	**1,115.2**
220 - 240	-	-	0.6	137.3	66.4	94.6	-	2.5	11.2	331.6	209.8	-	9.6	192.5	**1,056.1**
240 - 260	-	9.3	-	132.0	206.9	2.2	114.4	260.0	58.6	10.6	133.7	-	224.7	187.7	**1,340.1**
260 - 280	1.8	227.6	-	190.5	76.8	-	321.6	96.8	67.7	-	-	-	231.4	78.7	**1,292.9**
280 - 300	59.5	113.4	-	0.2	-	-	127.2	-	87.2	-	-	-	145.8	77.7	**611.0**
300 - 320	212.8	4.7	-	-	-	-	17.3	-	119.2	-	-	-	22.0	30.7	**406.7**
320 - 340	151.9	-	-	-	-	-	-	-	99.6	-	-	11.8	-	25.5	**288.8**
340 - 360	172.8	-	-	-	-	-	-	-	63.6	-	-	111.3	-	13.5	**361.2**
360 - 380	28.6	-	-	-	-	-	-	-	33.9	-	-	180.0	-	5.8	**248.3**
380 - 400	-	-	-	-	-	-	-	-	29.1	-	-	164.8	-	2.9	**196.8**
400 - 440	-	-	-	-	-	-	-	-	20.6	-	-	190.9	-	1.8	**213.3**
> 440	-	-	-	-	-	-	-	-	0.2	-	-	0.2	-	-	**0.4**
Total	**627.4**	**355.0**	**572.0**	**469.7**	**350.1**	**588.1**	**580.5**	**359.3**	**590.9**	**592.0**	**348.5**	**659.0**	**633.5**	**734.5**	**7,460.5**

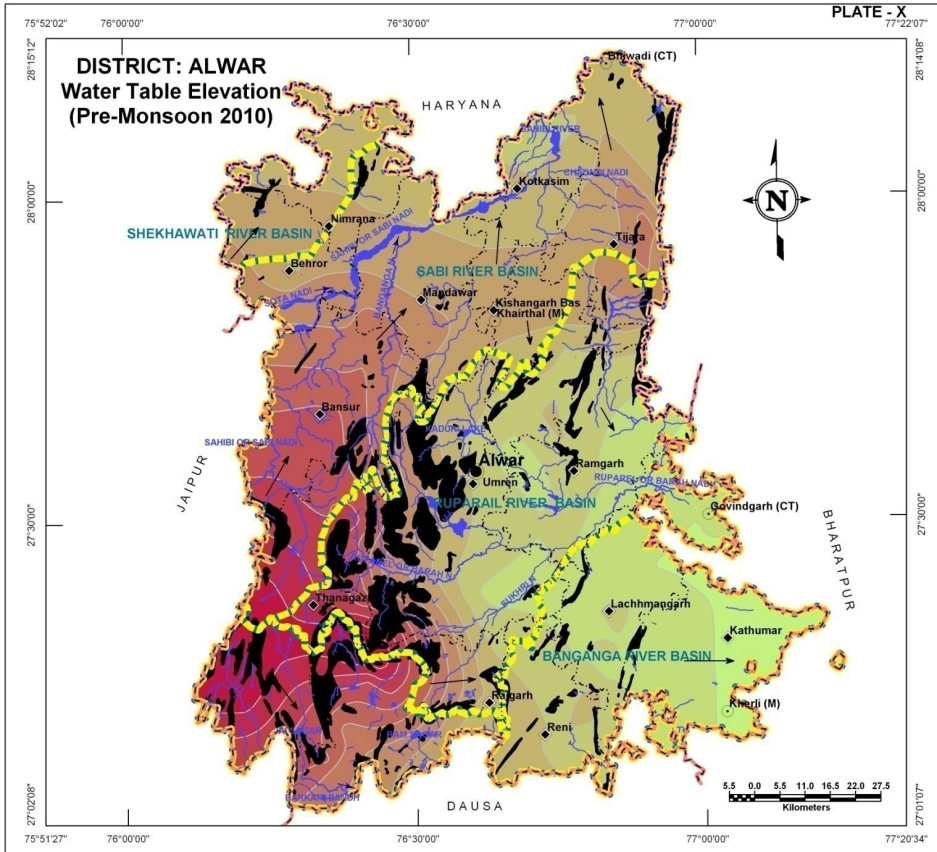
WATER LEVEL FLUCTUATION (PRE TO POST MONSOON 2010)

A 2m contour interval adopted to visualize the ground water level fluctuation reveals a fall of 6 m in one area and rise in other areas by upto 12m (Plate XI). The –ve fluctuation areas (indicated by red/pink color regions) are the areas where overexploitation is taking place and even after monsoon recharge water level has not risen and has actually gone down with respect to pre-monsoon levels. Such large ground water depletion areas are located around Bansur, Umren, and Kishangarh Bas, western part of Lachhmangarh and Tijara, eastern part of Kotakasim and in some isolated pockets. Rest of the district has shown a general to significant rise in ground water level in the post monsoon season with respect to pre monsoon region. Maximum rise of more than 12m is noticed in the eastern part of Reni block.

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)
	Bansur	Behror	Kathumar	Kishangarh Bas	Kotkasim	Lachhmangarh	Mandawar	Neemrana	Rajgarh	Ramgarh	Reni	Thanagazi	Tijara	Umren	
<-6	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.8**
-6 – -4	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	**2.8**
-4 – -2	9.9	-	-	-	-	14.1	-	-	-	-	-	1.2	-	0.4	**25.6**
-2 – 0	106.5	14.3	50.7	24.8	163.1	96.6	26.0	30.9	-	7.9	34.2	9.4	87.9	94.7	**747.0**
0 – 2	408.8	317.7	266.4	250.5	187.0	345.4	530.7	264.8	22.0	260.7	142.8	163.4	418.4	209.0	**3,787.6**
2 – 4	81.2	23.0	240.7	194.4	-	95.9	23.8	63.6	206.9	318.4	94.3	148.0	127.2	322.8	**1,940.2**
4 – 6	17.4	-	14.2	-	-	13.0	-	-	311.6	5.0	32.8	228.0	-	107.6	**729.6**
6 – 8	-	-	-	-	-	11.8	-	-	48.5	-	20.2	109.0	-	-	**189.5**
8 – 10	-	-	-	-	-	8.2	-	-	1.9	-	13.1	-	-	-	**23.2**
10 – 12	-	-	-	-	-	2.7	-	-	-	-	7.9	-	-	-	**10.6**
>12	-	-	-	-	-	0.4	-	-	-	-	3.2	-	-	-	**3.6**
Total	**627.4**	**355.0**	**572.0**	**469.7**	**350.1**	**588.1**	**580.5**	**359.3**	**590.9**	**592.0**	**348.5**	**659.0**	**633.5**	**734.5**	**7,460.5**

PLATE - X



LEGEND

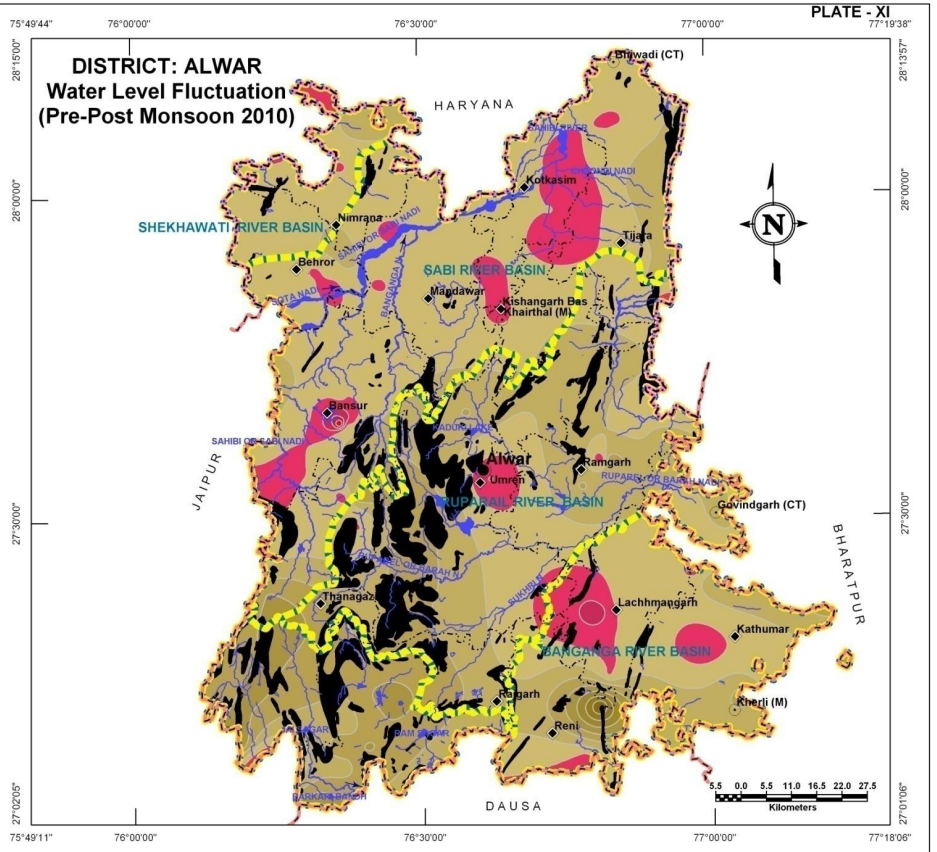
Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- State Boundary
- District Boundary
- Block Boundary
- **Basin Boundary**
- **Water Bodies:**
- River / Streams
- Ponds / Reservoirs
- **Hills**
- **Water Table Elevation**

Water Table Elevation(m amsl):

- <200
- 200 - 220
- 220 - 240
- 240 - 260
- 260 - 280
- 280 - 300
- 300 - 320
- 320 - 340
- 340 - 360
- 360 - 380
- 380 - 400
- 400 - 440
- >440

PLATE - XI



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- State Boundary
- District Boundary
- Block Boundary
- **Basin Boundary**
- **Water Bodies:**
- River / Streams
- Ponds / Reservoirs
- **Hills**

Water Level Fluctuation(m):

- < -6
- -6 to -4
- -4 to -2
- -2 to 0
- 0 to 2
- 2 to 4
- 4 to 6
- 6 to 8
- 8 to 10
- 10 to 12
- >12

GROUND WATER ELECTRICAL CONDUCTIVITY DISTRIBUTION — DISTRICT – ALWAR

The Electrical conductivity (at 25°C) distribution map is presented in plate XII. The areas with low EC values in ground water (<2000 µS/cm) are shown in yellow color and occupies almost 74% of the district area indicating that, by and large the ground water in this region is suitable for domestic purpose. The areas with moderately high EC values (2000 – 4000 µS/cm) are shown in green color occupy 20% of the district area and largely northern and southeastern part of the district. Remaining small part of the district approximately 6% has shown high EC values in ground water (>4000 µS/cm) which is shown in red color, largely around Lachhmangarh and Ramgarh. The ground water in this region is not suitable for domestic purpose.

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)
	Bansur		Behror		Kathumar		Kishangarh Bas		Kotkasim		Lachhmangarh		Mandawar		Neemrana		Rajgarh		Ramgarh		Reni		Thanagazi		Tijara		Umren		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
<2000	620.0	98.8	292.2	82.3	80.7	14.1	398.4	84.8	241.1	68.9	186.0	31.6	444.6	76.5	94.6	26.3	554.8	93.9	326.2	55.1	291.7	83.7	624.4	94.7	633.5	100.0	734.5	100.0	**5,522.7**
2000-4000	7.4	1.2	51.0	14.4	375.9	65.7	67.6	14.4	95.7	27.3	286.9	48.8	105.3	18.2	204.2	56.9	35.5	6.0	213.2	36.0	56.8	16.3	32.7	5.0	-	-	-	-	**1,507.8**
>4000	-	-	11.8	3.3	115.4	20.2	3.7	0.8	13.3	3.8	115.2	19.6	30.6	5.3	60.5	16.8	0.6	0.1	52.6	8.9	-	-	1.9	0.3	-	-	-	-	**430.0**
Total	**627.4**	**100.0**	**355.0**	**100.0**	**572.0**	**100.0**	**469.7**	**100.0**	**350.1**	**100.0**	**588.1**	**100.0**	**580.5**	**100.0**	**359.3**	**100.0**	**590.9**	**100.0**	**592.0**	**100.0**	**348.5**	**100.0**	**659.0**	**100.0**	**633.5**	**100.0**	**734.5**	**100.0**	**7,460.5**

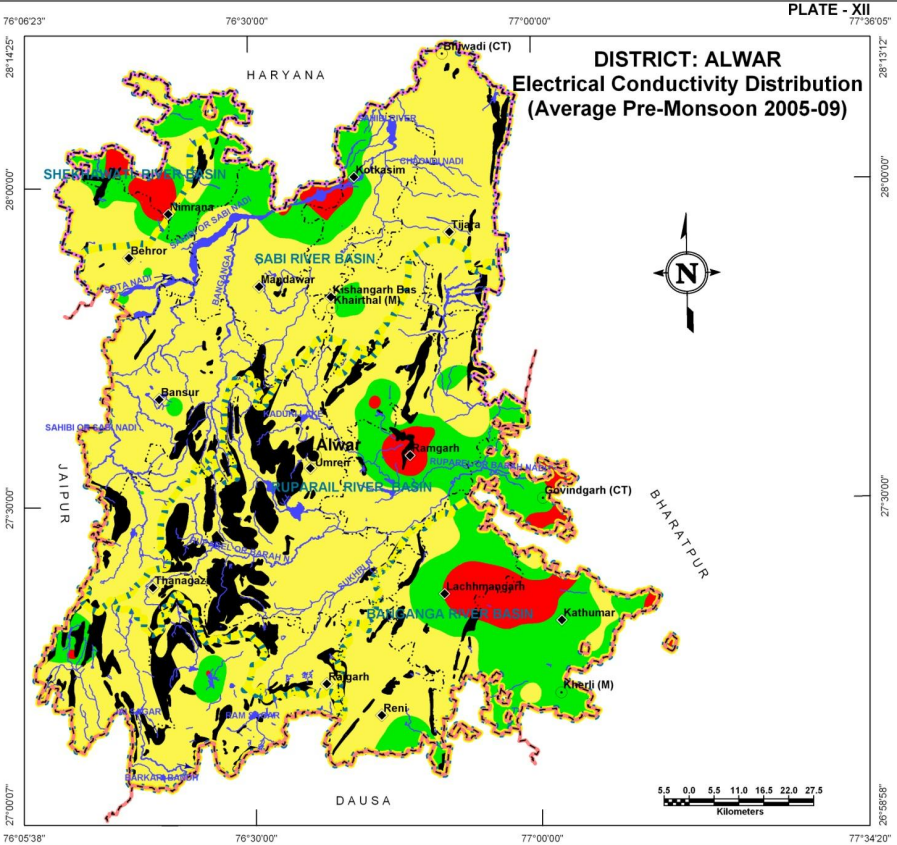
GROUND WATER CHLORIDE DISTRIBUTION

High chloride concentration in ground water also renders it unsuitable for domestic and other purposes. The yellow colored regions in plate XIII are such areas where chloride concentration is low (<250 mg/l) occupy approximately 65% of the district area and is suitable for domestic purpose. The areas with moderately high chloride concentration (250-1000mg/l) are shown in green color and occupy approximately 31% of the district area, largely northwestern and eastern part of the district around Lachhmangarh and Ramgarh. Remaining small part of the district approximately 4% falls under high chloride concentration (>1000 mg/l) area, largely around Lachhmangarh and Ramgarh. The ground water in this region is not suitable for domestic purpose.

Table: Block wise area of Chloride distribution

Chloride Concentration Range (mg/l) (Ave. of years 2005-09)	Block wise area coverage (sq km)																												Total Area (sq km)
	Bansur		Behror		Kathumar		Kishangarh Bas		Kotkasim		Lachhmangarh		Mandawar		Neemrana		Rajgarh		Ramgarh		Reni		Thanagazi		Tijara		Umren		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
<250	596.7	95.0	128.3	36.0	21.0	4.0	354.1	75.0	217.0	62.0	139.7	23.7	397.6	68.5	65.0	18.1	514.2	87.1	194.8	32.9	279.5	80.2	582.0	88.3	631.4	99.7	707.0	96.3	**4,828.3**
250-1000	30.7	5.0	220.5	62.0	443.2	77.0	115.4	25.0	121.3	34.6	336.9	57.3	169.3	29.2	261.9	72.9	76.5	12.9	346.2	58.5	69.0	19.8	77.0	11.7	2.1	0.3	27.5	3.7	**2,297.5**
>1000	-	-	6.2	2.0	107.8	19.0	0.2	-	11.8	3.4	111.5	19.0	13.6	2.3	32.4	9.0	0.2	-	51.0	8.6	-	-	-	-	-	-	-	-	**334.7**
Total	**627.4**	**100.0**	**355.0**	**100.0**	**572.0**	**100.0**	**469.7**	**100.0**	**350.1**	**100.0**	**588.1**	**100.0**	**580.5**	**100.0**	**359.3**	**100.0**	**590.9**	**100.0**	**592.0**	**100.0**	**348.5**	**100.0**	**659.0**	**100.0**	**633.5**	**100.0**	**734.5**	**100.0**	**7,460.5**

PLATE - XII



LEGEND

Admin Boundary:

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

Basin Boundary

Water Bodies:

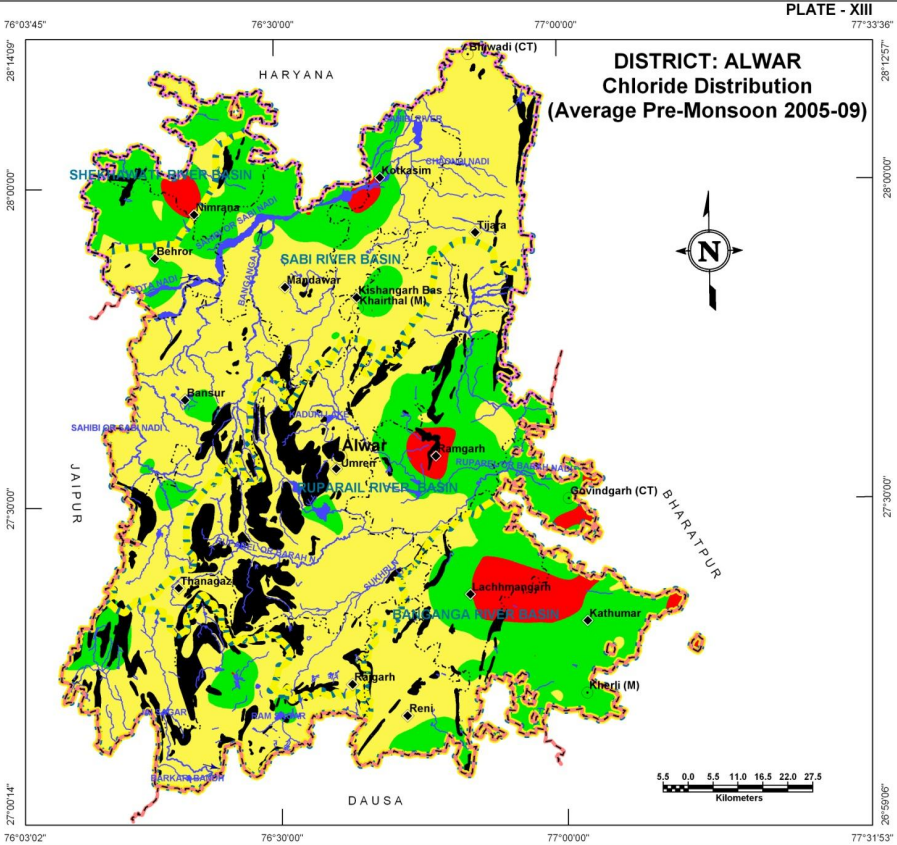
- River / Streams
- Ponds / Reservoirs

Hills

Electrical Conductivity (µS/cm at 25°C):

- < 2000
- 2000-4000
- >4000

PLATE - XIII



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- State Boundary
- 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 – ALWAR

The Fluoride concentration map is presented in Plate – XIV. The areas with low concentration (i.e.,>1.5 mg/l) are shown in yellow color and occupies almost 80% of the district area which is suitable for domestic purpose. The area with moderately high concentration (1.5-3.0 mg/l) in green color patches scattered, largely around Ramgarh, northern part of Kotkasim and Behror. Remaining small part of the district (approximately 5%) has high Fluoride concentration (>3.0 mg/l) which is shown in red color, largely northern part of Kotkasim and around Kekri which are the areas where ground water is not suitable for domestic purpose.

Table: Block wise area of Fluoride distribution

Fluoride concentration range (mg/l) (Ave. of years 2005-09)	Block wise area coverage (sq km)																												Total Area (sq km)
	Bansur		Behror		Kathumar		Kishangarh Bas		Kotkasim		Lachhmangarh		Mandawar		Neemrana		Rajgarh		Ramgarh		Reni		Thanagazi		Tijara		Umren		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
<1.5	537.0	85.6	277.4	78.1	272.8	47.6	444.2	94.6	166.2	47.5	397.2	67.6	500.3	86.2	287.5	80.0	553.9	93.7	296.8	50.1	326.3	94.0	604.6	92.0	605.5	95.6	696.7	94.9	**5,966.4**
1.5-3.0	81.7	13.0	65.5	18.5	166.2	29.1	25.5	5.4	113.5	32.4	130.2	22.1	80.2	13.8	71.6	19.9	37.0	6.3	235.9	39.9	22.2	6.0	54.4	8.0	21.1	3.3	37.8	5.1	**1,142.8**
>3.0	8.7	1.4	12.1	3.4	133.0	23.3	-	-	70.4	20.1	60.7	10.3	-	-	0.2	0.1	-	-	59.3	10.0	-	-	-	-	6.9	1.1	-	-	**351.3**
Total	**627.4**	**100.0**	**355.0**	**100.0**	**572.0**	**100.0**	**469.7**	**100.0**	**350.1**	**100.0**	**588.1**	**100.0**	**580.5**	**100.0**	**359.3**	**100.0**	**590.9**	**100.0**	**592.0**	**100.0**	**348.5**	**100.0**	**659.0**	**100.0**	**633.5**	**100.0**	**734.5**	**100.0**	**7,460.5**

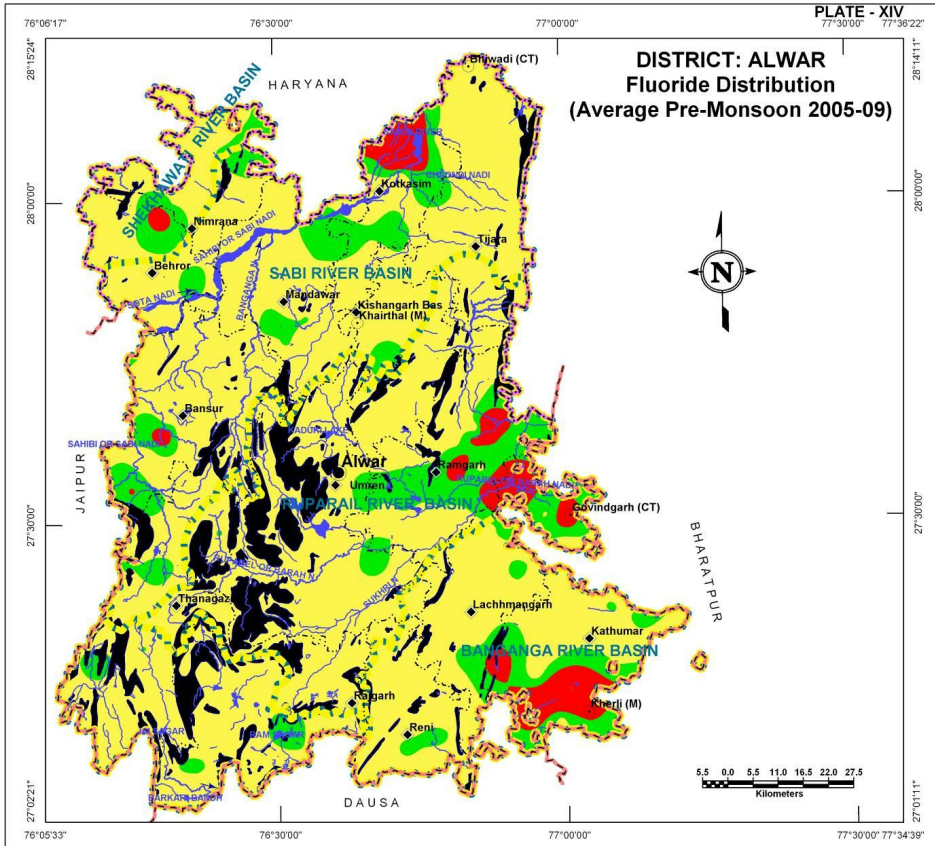
GROUND WATER NITRATE DISTRIBUTION

Plate XV shows distribution of Nitrate in ground water. Low nitrate concentration (<50 mg/l) is shown in yellow color and occupies approximately 59% of the district area which is suitable for agriculture purpose. The areas with moderately high nitrate concentration (50-100 mg/l) are shown in green color that is seen as scattered patches all over the district mainly in the north, and occupy approximately 29% of the district area. Remaining part of the district is covered with high nitrate concentration (>100 mg/l) which is shown in red colored areas where the ground water is not suitable for agriculture purpose.

Table: Block wise area of Nitrate distribution

Nitrate concentration range (mg/l) (Ave. of years 2005-09)	Block wise area coverage (sq km)																												Total Area (sq km)
	Bansur		Behror		Kathumar		Kishangarh Bas		Kotkasim		Lachhmangarh		Mandawar		Neemrana		Rajgarh		Ramgarh		Reni		Thanagazi		Tijara		Umren		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
<50	414.8	66.1	322.1	90.7	223.8	39.1	198.2	42.2	184.3	52.7	418.2	71.1	295.3	50.9	140.2	39.0	381.6	64.6	324.2	54.7	313.0	89.8	411.6	62.5	145.5	23.0	653.0	88.9	**4,425.8**
50-100	167.7	26.7	30.7	8.7	294.8	51.6	161.7	34.4	129.6	37.0	116.4	19.8	246.2	42.4	167.1	46.5	138.4	23.4	140.0	23.7	35.5	10.2	186.6	28.3	292.7	46.2	63.8	8.7	**2,171.2**
>100	44.9	7.2	2.2	0.6	53.4	9.3	109.8	23.4	36.2	10.3	53.5	9.1	39.0	6.7	52.0	14.5	70.9	12.0	127.8	21.6	-	-	60.8	9.2	195.3	30.8	17.7	2.4	**863.5**
Total	**627.4**	**100.0**	**355.0**	**100.0**	**572.0**	**100.0**	**469.7**	**100.0**	**350.1**	**100.0**	**588.1**	**100.0**	**580.5**	**100.0**	**359.3**	**100.0**	**590.9**	**100.0**	**592.0**	**100.0**	**348.5**	**100.0**	**659.0**	**100.0**	**633.5**	**100.0**	**734.5**	**100.0**	**7,460.5**

PLATE - XIV



LEGEND

Admin Boundary:

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

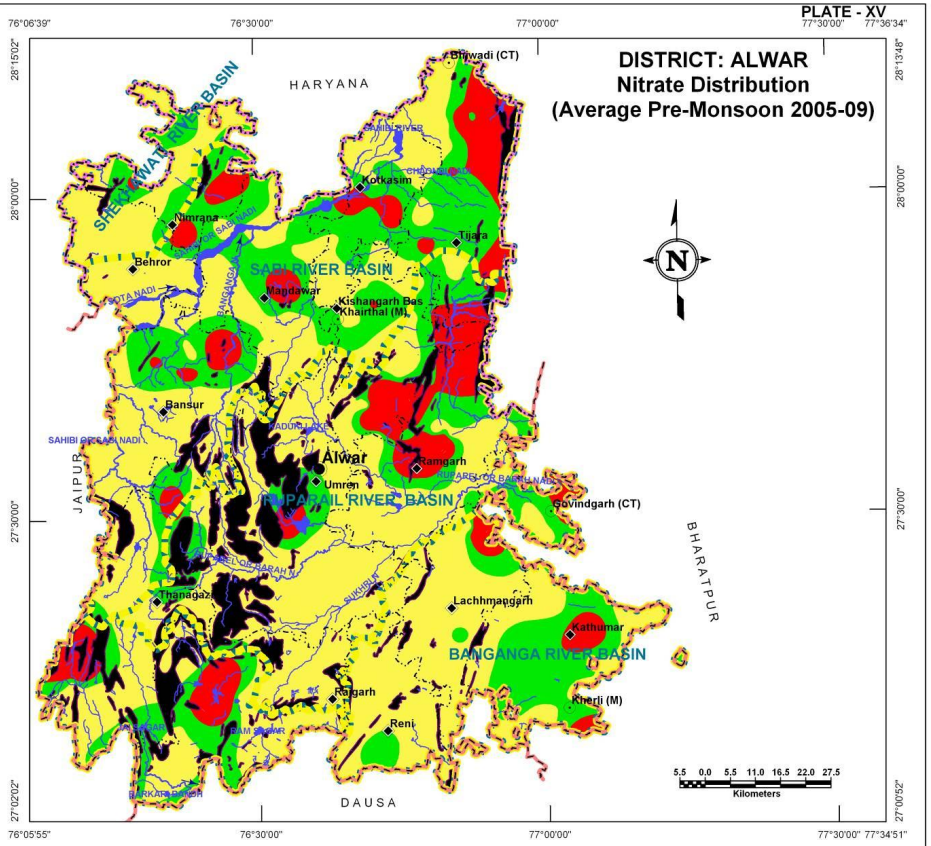
Water Bodies:

- River / Streams
- Ponds / Reservoirs
- **Hills**

Fluoride Concentration (mg/l):

- < 1.5
- 1.5-3.0
- > 3.0

PLATE - XV



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- State Boundary
- 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 – ALWAR

Plate XVI depicts the distribution of bedrock depth from ground level. The beginning of massive bedrock has been considered for defining top of bedrock surface. The major rock type occurring in the district is quartzite. These rocks are overlain by alluvial deposits of sand, clay, silt and admixture of these in different proportions and thicknesses. The map reveals that the bedrock surface is highly undulating in the eastern and northern parts whereas is relatively even in central parts of the district. It varies from upto 60m bgl to more than 120m bgl. Shallow bedrock is found in the northernmost part of Tijara block (less than 40m bgl). Deepest occurrence of bedrock is found in northern part of Kotkasim block (more than 120m bgl). The areas in the central part have moderately deep bedrock at around 60 to 80 meter below ground level.

Depth to bedrock (m bgl)	Block wise area coverage (sq km)																												Total Area (sq km)
	Bansur		Behror		Kathumar		Kishangarh Bas		Kotkasim		Lachhmangarh		Mandawar		Neemrana		Rajgarh		Ramgarh		Reni		Thanagazi		Tijara		Umren		
	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	Area	%age	
<40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.2	2.9	-	-	**18.2**
40-60	118.9	19.0	-	-	-	-	164.6	35.0	1.8	0.5	-	-	16.1	2.8	-	-	116.2	19.7	9.0	1.5	-	-	577.8	87.7	38.1	6.0	177.3	24.1	**1,219.8**
60-80	279.5	44.5	25.9	7.3	5.8	1.0	301.0	64.1	107.0	30.6	85.0	14.5	345.7	59.5	18.8	5.2	474.7	80.3	313.1	52.9	340.7	97.8	81.2	12.3	117.7	18.6	556.3	75.8	**3,052.4**
80-100	229.0	36.5	226.4	63.8	495.8	86.7	4.1	0.9	55.9	16.0	365.0	62.0	148.5	25.6	237.5	66.1	-	-	269.7	45.6	7.8	2.2	-	-	165.5	26.1	0.9	0.1	**2,206.1**
100-120	-	-	102.7	28.9	70.4	12.3	-	-	63.6	18.2	138.1	23.5	70.2	12.1	103.0	28.7	-	-	0.2	-	-	-	-	-	196.4	31.0	-	-	**744.6**
>120	-	-	-	-	-	-	-	-	121.8	34.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	97.6	15.4	-	-	**219.4**
Total	**627.4**	**100.0**	**355.0**	**100.0**	**572.0**	**100.0**	**469.7**	**100.0**	**350.1**	**100.0**	**588.1**	**100.0**	**580.5**	**100.0**	**359.3**	**100.0**	**590.9**	**100.0**	**592.0**	**100.0**	**348.5**	**100.0**	**659.0**	**100.0**	**633.5**	**100.0**	**734.5**	**100.0**	**7,460.5**

UNCONFINED AQUIFER

Unconfined aquifer in alluvial areas

Most part of the district has thick cover of alluvium. In unconfined conditions the alluvial aquifer attains a thickness of more than 70m. The general thickness is upto 40m. Perusal of Plate – XVII reveals a this aquifer is spread in most parts of the district with moderate thickness of upto 20m, in general, and in some pockets attaining more than >40m thickness. The maximum thickness of alluvium has noticed in the Tijara block.

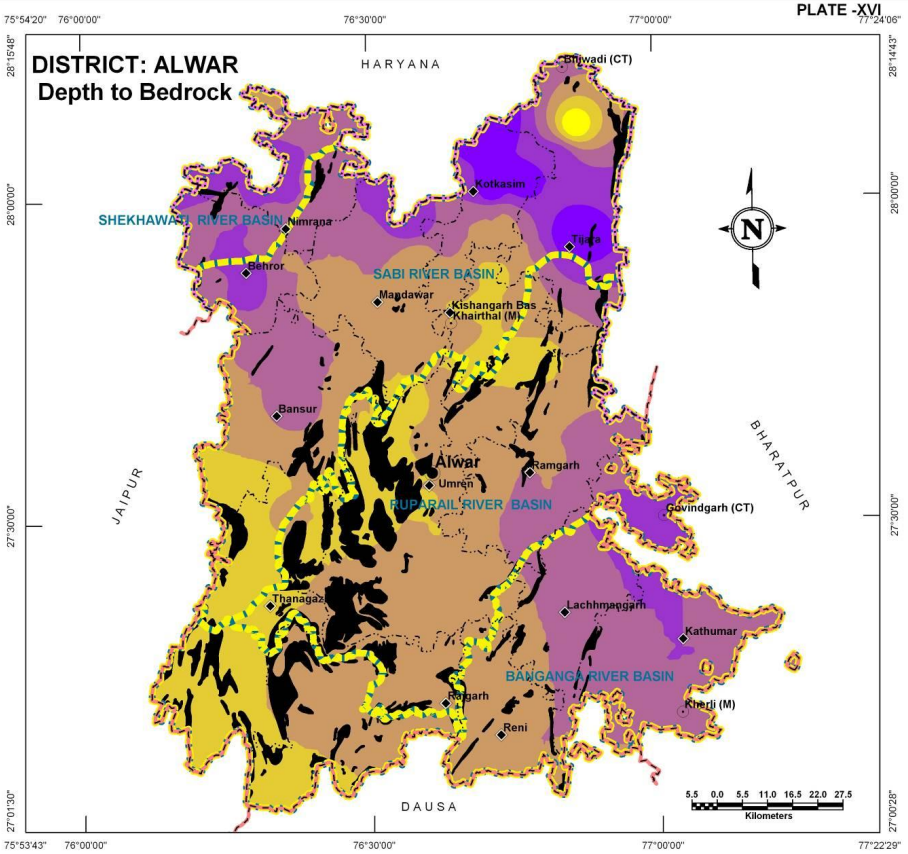
Unconfined aquifer hardrock areas

Weathered, fractured and jointed rock formations occurring at shallower depths constitute good unconfined aquifers. Such zone ranges in thickness from less than 10m to slightly more than 20m and occurring along the fringes of hills in the southwestern part of the district.

Table: Combined table showing aquifer thickness in Alluvial (Alluv.) and Hardrock (HR) aquifers

Unconfined aquifer Thickness (m)	Block wise Area Coverage (sq km)																												Total Area (sq km)	
	Bansur		Behror		Kathumar		Kishangarh Bas		Kotkasim		Lachhmangarh		Mandawar		Neemrana		Rajgarh		Ramgarh		Reni		Thanagazi		Tijara		Umren			
	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR	Alluv.	HR
< 10	422.7	3.4	330.2	-	163.3	-	221.5	55.0	89.1	-	157.7	0.1	423.8	7.8	179.1	-	50.1	379.8	147.7	0.2	224.7	95.7	146.9	177.7	78.1	0.2	396.2	130.9	**3,031.1**	**850.8**
10-20	164.7	4.9	18.8	-	268.7	-	152.8	24.5	190.6	-	275.9	-	118.3	4.8	102.9	-	9.2	151.8	257.6	-	28.1	-	2.3	328.7	284.4	-	79.6	123.6	**1,953.9**	**638.3**
20-30	30.2	-	5.5	0.1	69.8	-	9.5	6.4	66.5	-	116.6	-	25.8	-	34.1	-	-	-	137.3	-	-	-	-	3.4	153.2	-	4.2	-	**652.7**	**9.9**
30-40	1.5		0.4		58.3		-		2.6		36.9		-		25.7		-		49.2		-		-		83.9		-		**258.5**	**-**
40-50	-		-		11.9		-		0.8		0.9		-		13.4		-		-		-		-		30.2		-		**57.2**	**-**
50-60	-		-		-		-		0.4		-		-		4.1		-		-		-		-		2.0		-		**6.5**	**-**
60-70	-		-		-		-		0.1		-		-		-		-		-		-		-		1.0		-		**1.1**	**-**
> 70	-		-		-		-		-		-		-		-		-		-		-		-		0.5		-		**0.5**	**-**
Total	**619.1**	**8.3**	**354.9**	**0.1**	**572.0**	**-**	**383.8**	**85.9**	**350.1**	**-**	**588.0**	**0.1**	**567.9**	**12.6**	**359.3**	**-**	**59.3**	**531.6**	**591.8**	**0.2**	**252.8**	**95.7**	**149.2**	**509.8**	**633.3**	**0.2**	**480.0**	**254.5**	**5,961.5**	**1,499.0**

PLATE -XVI



LEGEND

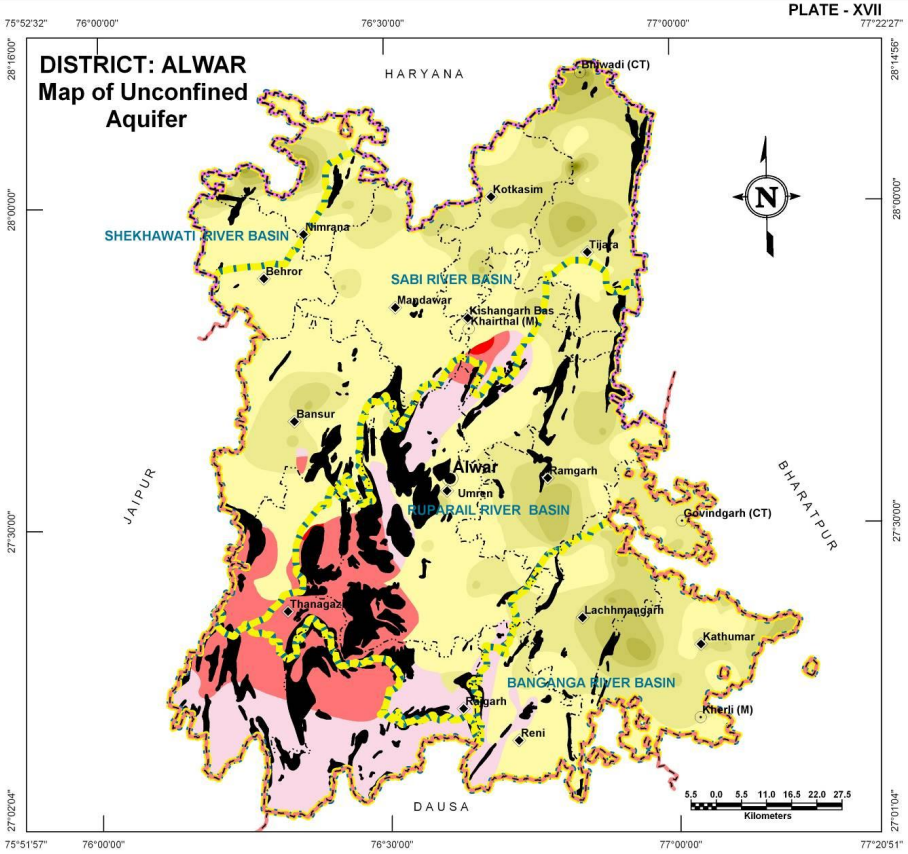
Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- State Boundary
- District Boundary
- Block Boundary
- Basin Boundary
- Hills

Depth to Bedrock (m bgl):

- <40
- 40-60
- 60-80
- 80-100
- 100-120
- >120

PLATE - XVII



LEGEND

Admin Boundary:

- District Headquarter
- Block Headquarter
- Town
- State Boundary
- District Boundary
- Block Boundary
- Basin Boundary
- Hills

Aquifer Thickness (m):

Alluvial Area	Weathered & Fractured Zone in Hardrock Area
<10	<10
10-20	10-20
20-30	>20
30-40	
40-50	
50-60	
60-70	
>70	

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 its complete saturation.
28	TOTAL DISSOLVED SOLIDS	Total weight of dissolved mineral constituents in water per unit volume (or weight) of water in the sample.

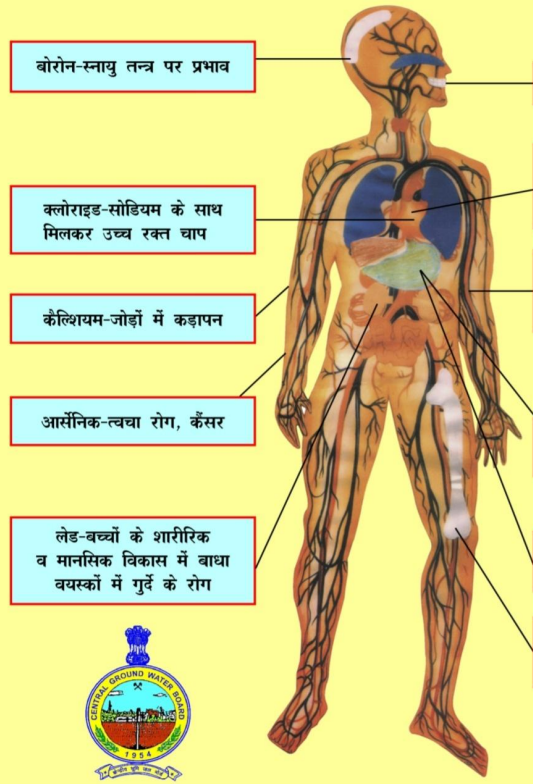
(Contd…)

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

केन्द्रीय भूमि जल बोर्ड,
पश्चिमी क्षेत्र, जयपुर
जल संसाधन मंत्रालय
भारत सरकार
e-mail:cgwbwr@sancharnet.in

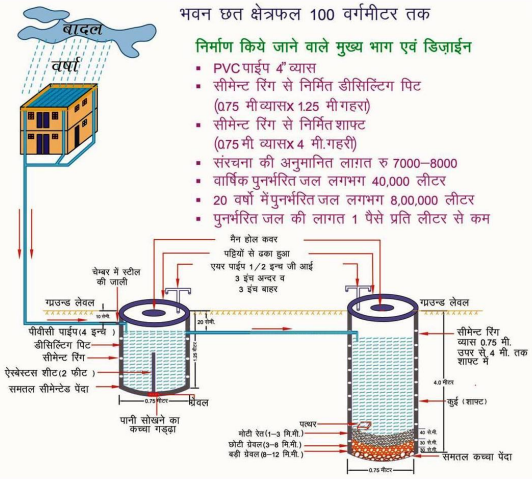
भूजल अमूल्य है इसे प्रदूषित न करें।

चित्र–1

भवन छत क्षेत्रफल 100 वर्गमीटर तक

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 लागत 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

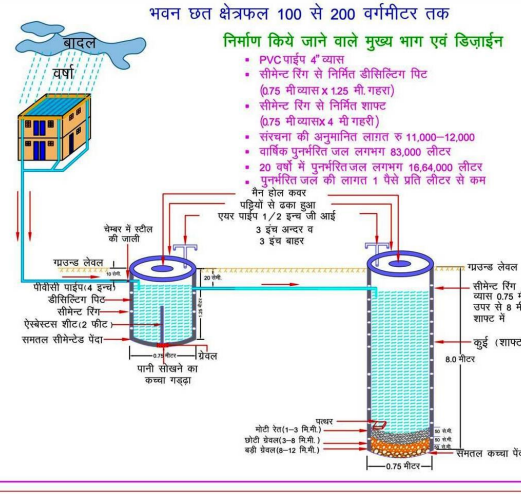


चित्र–2

भवन छत क्षेत्रफल 100 से 200 वर्गमीटर तक

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 लागत रु 11,000–12,000
- वार्षिक पुनर्भरित जल लगभग 83,000 लीटर
- 20 वर्षों में पुनर्भरित जल लगभग 16,64,000 लीटर
- पुनर्भरित जल की लागत 1 पैसे प्रति लीटर से कम

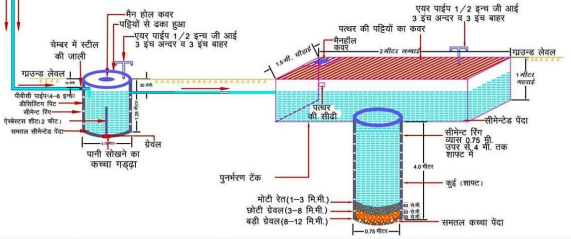


चित्र–3

भवन छत क्षेत्रफल 200 से 300 वर्गमीटर तक

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 लागत रु 15,000–16,000
- वार्षिक पुनर्भरित जल लगभग 1,25,000 लीटर
- 20 वर्षों में पुनर्भरित जल लगभग 25,00,000 लीटर
- पुनर्भरित जल की लागत 1 पैसे प्रति लीटर से कम

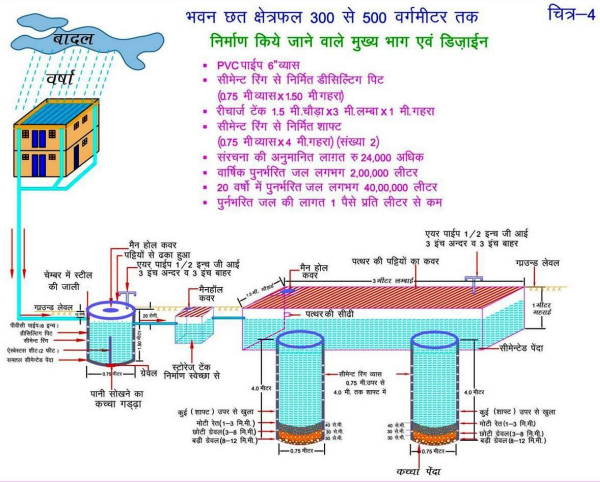


चित्र–4

भवन छत क्षेत्रफल 300 से 500 वर्गमीटर तक

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 लागत रु 24,000 अधिक
- वार्षिक पुनर्भरित जल लगभग 2,00,000 लीटर
- 20 वर्षों में पुनर्भरित जल लगभग 40,00,000 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

ROLTA

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