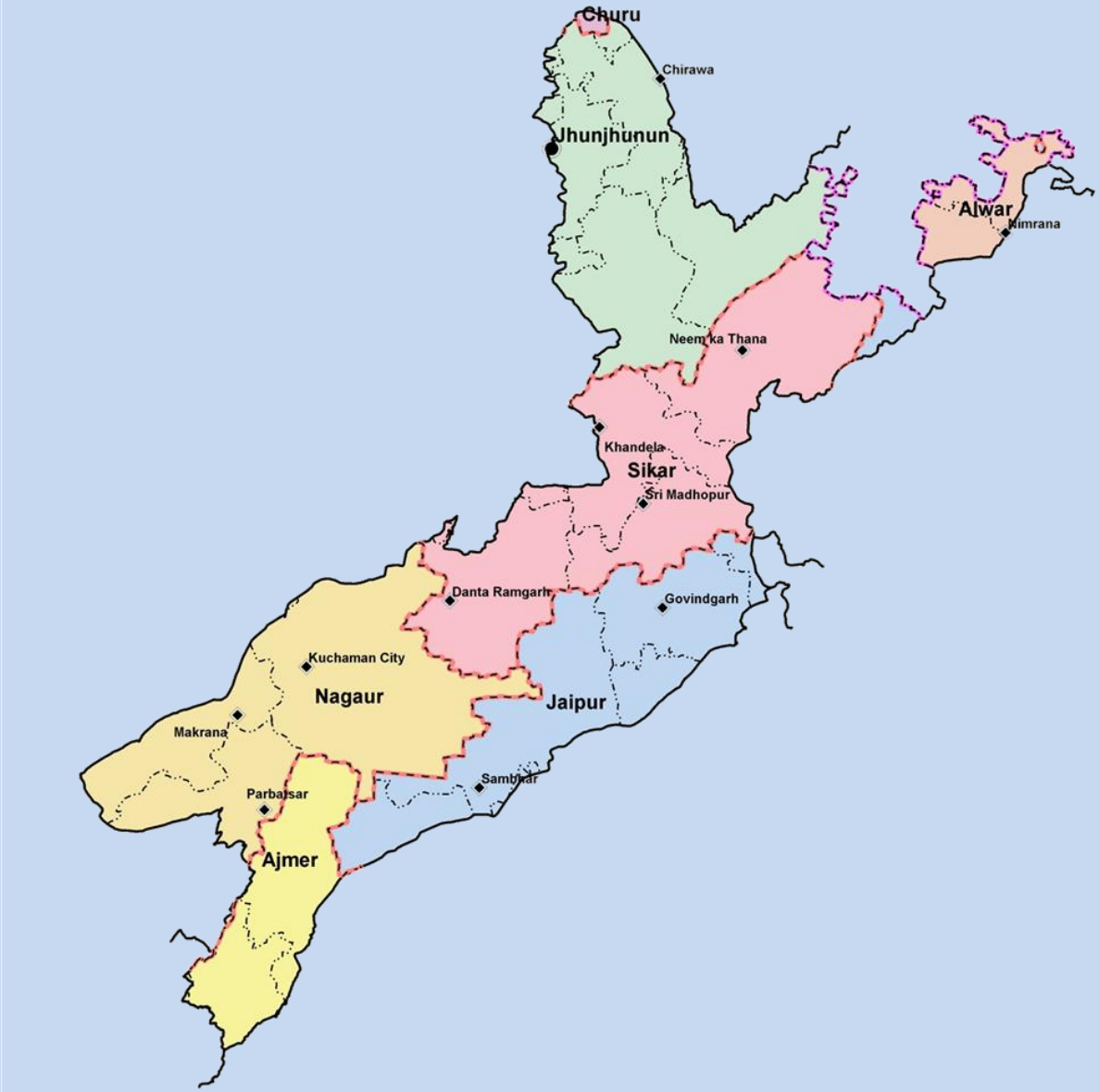
Ground Water Department,
Rajasthan

European Union
State Partnership Programme

Hydrogeological Atlas of Rajasthan

Shekhawati River Basin



2013

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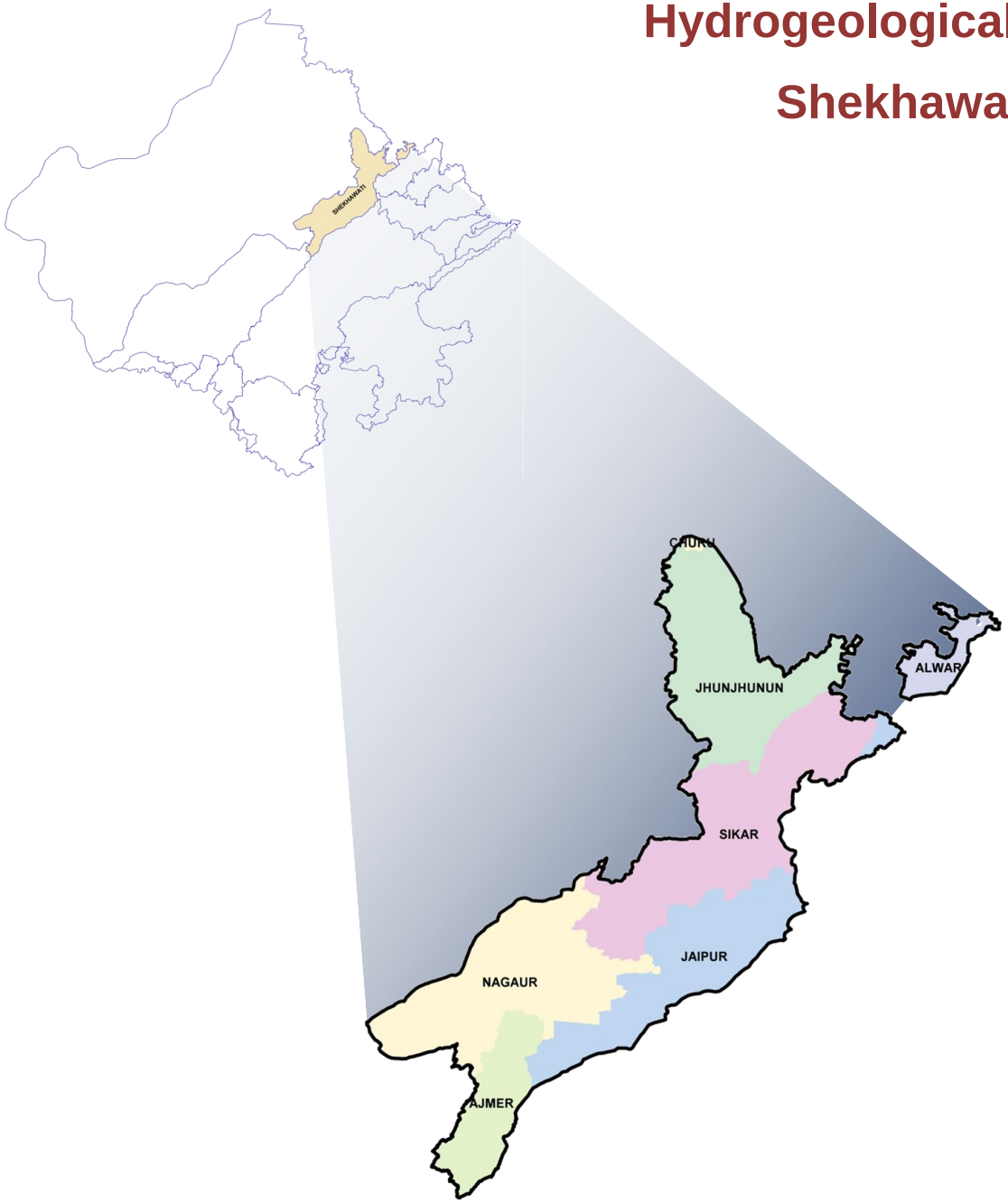
Hydrogeological Atlas of Rajasthan

Shekhawati River Basin



Contents:

2013

ADMINISTRATIVE SETUP

SHEKHAWATI RIVER BASIN

Location:

Shekhawati River Basin is located in north-eastern part of Rajasthan, extending between 26° 24' 43.62" to 28° 23' 05.52" North latitude and 74° 23' 06.73'' to 76° 30' 26.18'' East Longitudes. It covers an area of 11,238.6 Km^2 (including Kantli sub-basin), in the parts of Ajmer, Alwar, Churu, Jaipur, Jhunjhunun, Nagaur and Sikar districts. Shekhawati River Basin is surrounded by the Sabi, Banganga, and Gambhir basins in the east, Banas basin in the South and Inland drainage area basin (Outside basin) in the West. Its northern edge is bounded by Haryana state. The eastern parts of Shekhawati river basin is marked by terrain belonging to the Aravali chain, with fairly flat valleys along the Kantli and Mendha rivers and their tributaries. Shekhawati river basin is actually made up of two distinct units – one, with its main river Kantli draining northwards, the other, including Mendha river and other streams is landlocked basin draining into the Sambhar lake. Shekhawati basin is draining westwards and belongs to the Outside basin. The north eastern part of the area is also fairly flat, interspersed with moderately elevated hills.

Administrative Set-up:

Administrative, Shekhawati River Basin extends over parts of seven districts viz., Ajmer, Alwar, Churu, Jaipur, Jhunjhunun, Nagaur and Sikar; and encompasses 1,556 towns and villages within 106 administrative Blocks. Coverage wise, Sikar contributes to maximum area followed by Nagaur, Jhunjunun and Jaipur.

S. No.	District Name	Area (sq km)	% of Basin Area	Total Number of Blocks	Total Number of Towns and Villages
1	Ajmer	984.4	8.8	4	**106**
2	Alwar	418.0	3.7	2	**110**
3	Churu	26.8	0.2	1	**4**
4	Jaipur	2056.7	18.3	7	**338**
5	Jhunjhunun	2313.2	20.6	8	**299**
6	Nagaur	2555.6	22.7	6	**281**
7	Sikar	2883.9	25.7	6	**418**
Total		**11,238.6**	**100.0**	**106**	**1,556**

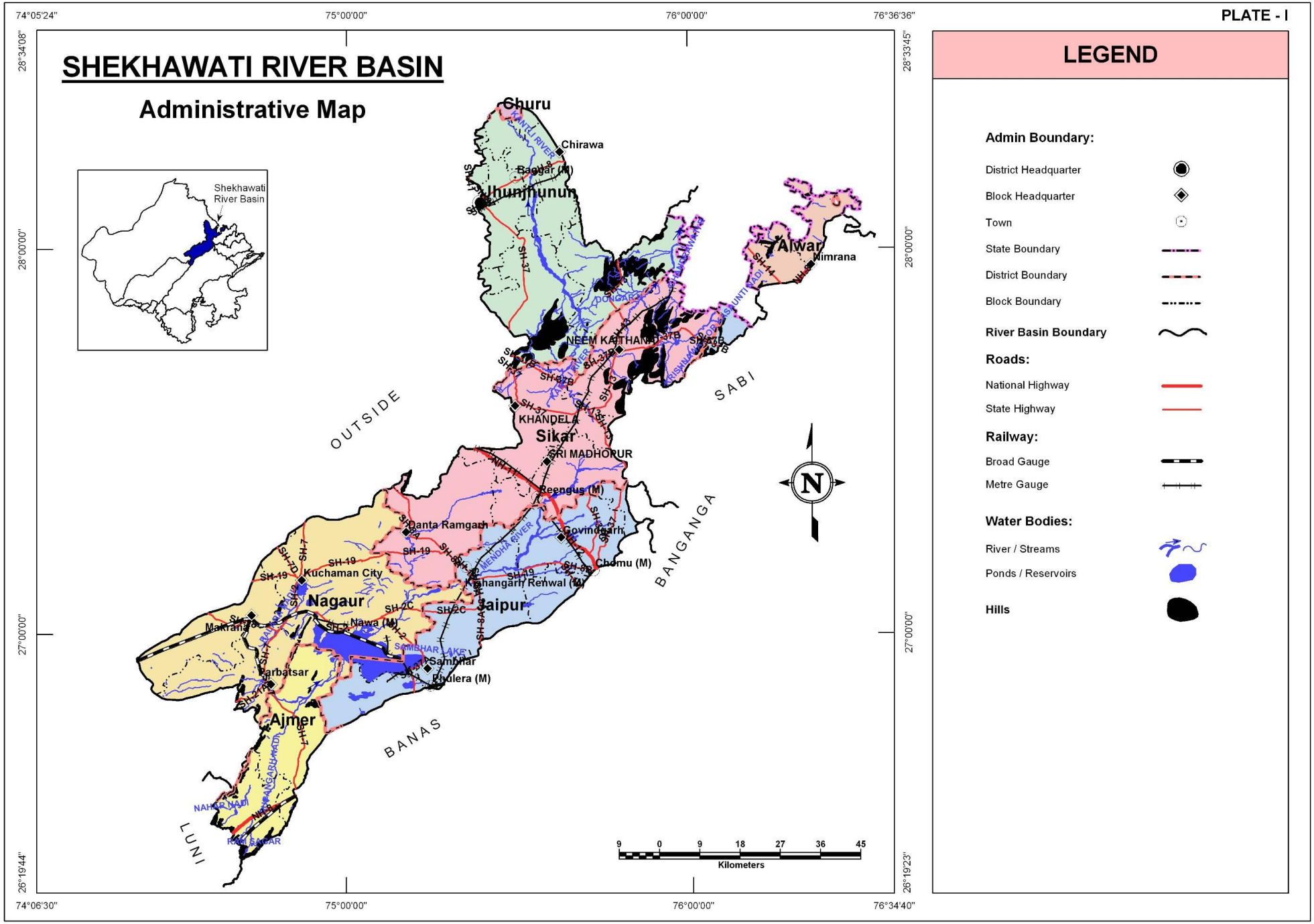
Climate:

Shekhawati River basin largely falls within semi-arid region and has an internal drainage. Rains occur in the monsoon months between June-July and September (total annual rainfall ranging between 500-1000 mm in different Blocks). Temperatures remain relatively high throughout the year and especially higher in the summer months of April to July, whereas the average daily temperatures dip down significantly in winters. While the maximum temperatures during the months of May & June can reach close to 50°C, the winter months of November to February are pleasant, with average temperatures ranging from 15–18°C and temperatures in the night falling to 2-3°C.

Ground Water Department, Rajasthan

European Union
State Partnership Programme

PLATE - I



LEGEND

Admin Boundary:

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

Roads:

- National Highway
- State Highway

Railway:

- Broad Gauge
- Metre Gauge

Water Bodies:

- River / Streams
- Ponds / Reservoirs

Hills

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TOPOGRAPHY

Isolated hills (part of Aravalli range) are seen around Neem ka Thana in the northern part of the basin and also around Makrana and Danta Ramgarh. Otherwise, in general, the topography of the basin is flat to undulating. The higher elevations (about 976m) have been observed in the northeastern portion and lower elevations (around 265m) are observed the southwestern and northern parts indicating general sloping towards north and into Sambhar Lake. Sambhar lake is the result of inland drainage and marks topographic low and accumulates drainage from areas all around it.

Table: District wise minimum and maximum elevation

District Name	Min. Elevation (m amsl)	Max. Elevation (m amsl)
Ajmer	360.6	802.7
Alwar	265.5	575.1
Churu	282.1	301.1
Jaipur	327.4	701.7
Jhunjhunun	283.6	976.5
Nagaur	344.5	793.2
Sikar	334.0	900.3

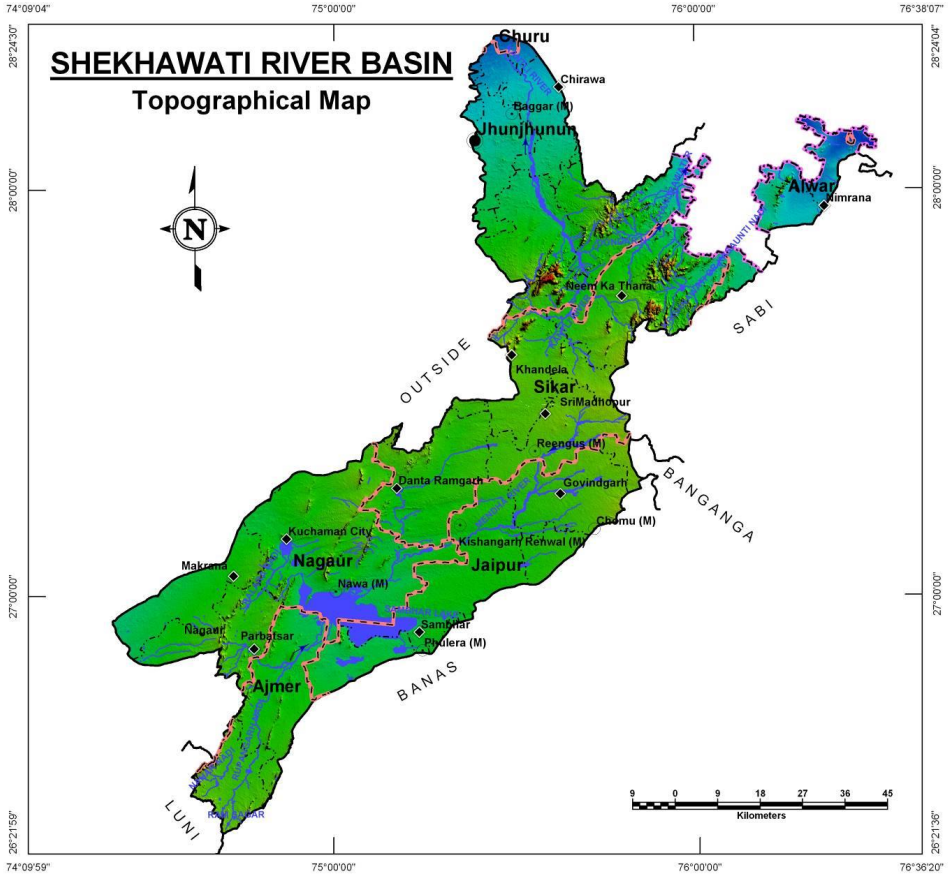
RAINFALL

The general distribution of rainfall across the basin can be understood from isohyets presented in the Plate III where the area around Kuchaman city (Nagaur) and that around Nimrana (Alwar) seem to receive the minimum rainfall of the basin that is between 400-600mm of Total annual rainfall. The hilly areas around Neem ka thana receives maximum rainfall in the basin reaching more than 1200mm in the year 2010. The annual average rainfall in the basin thus works out to 732mm. The rainfall data for available rain gauge stations is presented below.

Table: District wise total annual rainfall (based on year 2010 meteorological station recordings (http://waterresources.rajasthan.gov.in)

Rain Gauge Station	Total Monsoon Rainfall (mm)	Total Non-Monsoon Rainfall (mm)	Total Annual Rainfall (mm)
Aspur	489.0	83.0	572.0
Bagidora	447.6	132.8	580.4
Banswara	561.6	41.0	602.6
Chhoti Sadri	406.0	71.0	477.0
Dhariawad	1,175.0	54.0	1,229.0
Dungarpur	652.0	18.0	670.0
Garhi	836.5	80.5	917.0
Ghatol	663.5	66.0	729.5

PLATE - II



LEGEND

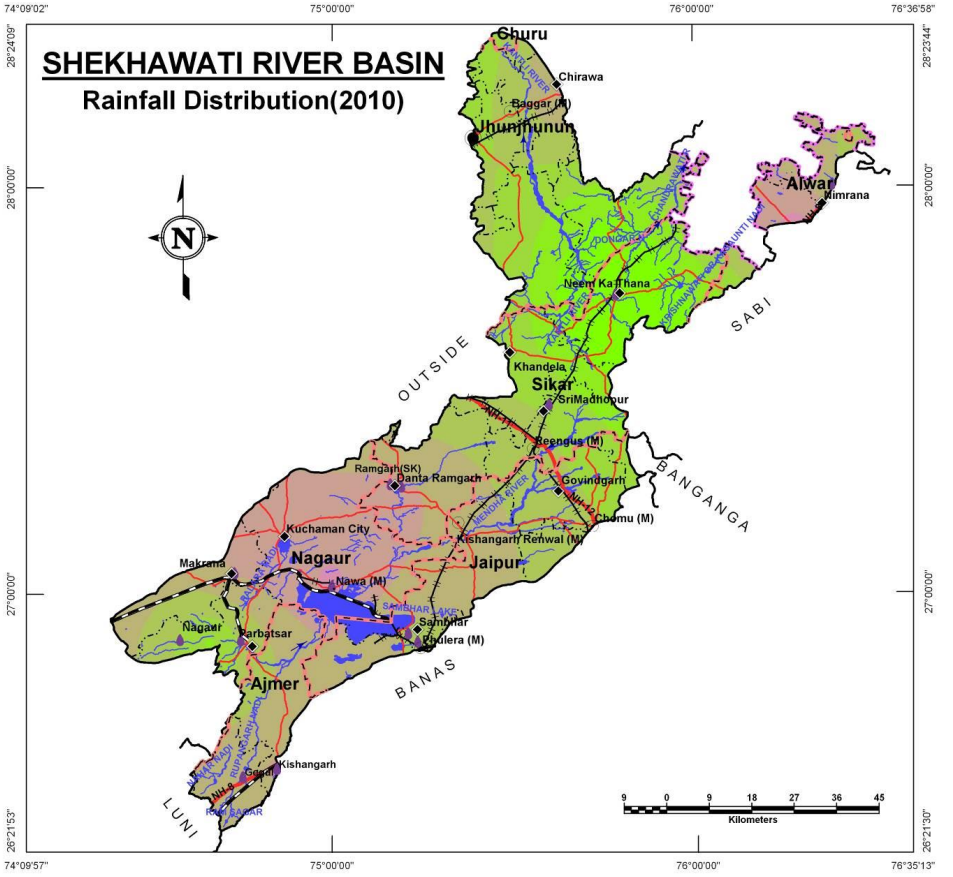
Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- State Boundary
- District Boundary
- Block Boundary
- River Basin Boundary

Water Bodies:
- River / Streams
- Ponds / Reservoirs

Elevation(m amsl):

Source : SRTM DEM

PLATE - III



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- Raingauge Station
- State Boundary
- District Boundary
- Block Boundary
- River Basin Boundary

Roads:
- National Highway
- State Highway

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

GEOLOGY

SHEKHAWATI RIVER BASIN

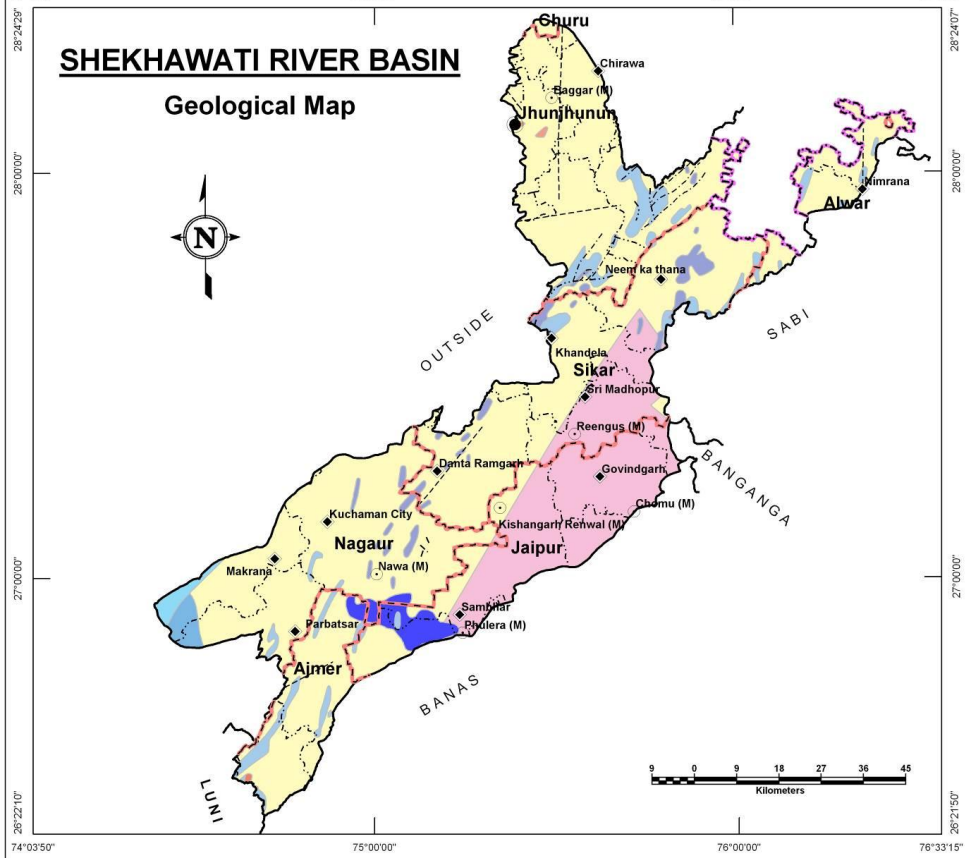
The Geology of the shekhawati River Basin is represented by the ancient rock formation from Delhi Super Group to the Recent to sub-recent Sediments. Delhi Super Group rocks of the Basin, represented by Ajabgarh and Alwar Group are mainly composed of quartzite and schists and are exposed in the north eastern part of the basin in the part of Sikar and Junjhunun district and in the south-west part of basin in the part of Ajmer and Nagaur districts. The basic and acidic intrusives of post-Delhi age in form of granites, pegmatites, amphibolites epidiorites etc. can be seen. Major part of the Shekhawati River Basin is covered by the quaternary Sediments in form of Alluvium and Aeolian Deposits consisting of sand, silt, clay, Kankar with a thick blanket of wind-blown sands and sand dunes.

Age	Super-Group	Group/Formation	Rock Types
Upper Pleistocene to Recent	-	Aeolian deposits Alluvium, Colluvium	Windblown sands, Silt, gravel, pebbles and kankar, etc., with Hill scree
----------x----------x----------Unconformity----------x----------x----------x----------			
Eocene	-	Palana (Series)	Sandstone, bentonite, Lignite
----------x----------x----------Unconformity----------x----------x----------x----------			
Upper Cambrian	Marwar	Nagaur Bilara Jodhpur	Sandstone, siltstone Shale, limestone with Dolomite Mainly sandstone with Shale and boulder bed
----------x----------x----------Unconformity----------x----------x----------			
Lower Precambrian to Upper Pre Cambrian	Post-Delhi Intrusives		Granites, pegmatites, Amphibolites, epidiorites
	Delhi	Ajabgarh	Quartzite, Amphibolite, dolomite, Marble, schists, Geneisses, migmatites, Etc.
		Alwar	Quartzites (feldspathic), conglomerates, magnetitic haematitic mica schists, etc.

GEOMORPHOLOGY

Origin	Landform Unit	Description
Aeolian	Dune Valley Complex	Cluster of dunes and interdunal spaces with undulating topography formed due to wind-blown activity, comprising of unconsolidated sand and silt.
	Eolian Plain	Formed by aeolian activity, with sand dunes of varying height, 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.
	Interdunal Depression	Slightly depressed area in between the dunal complex showing moisture and fine sediments.
	Obstacle Dune	Formed on windward/leeward sides of obstacle like isolated hills or continuous chain of hills, dune to obstruction in path of sand laden winds. Badly dissected well cemented and vegetated.
	Sandy Plain	Formed of aeolian activity, wind-blown sand with gentle sloping to undulating plain, comprising of coarse sand, fine sand, silt and clay.
Structural	Dissected Plateau	Plateau, criss-crossed by fractures forming deep valleys.
Denudational	Burried 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.
	Paleochannel	Mainly buried on abandoned stream/river courses, comprising of coarse textured material of variable sizes.
	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.
	Salt Encrustation/Playa	Topographical depression comprising of clay, silt, sand and soluble salts, usually undrained and devoid of vegetation.
Hills		

PLATE - IV



LEGEND

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

River Basin Boundary

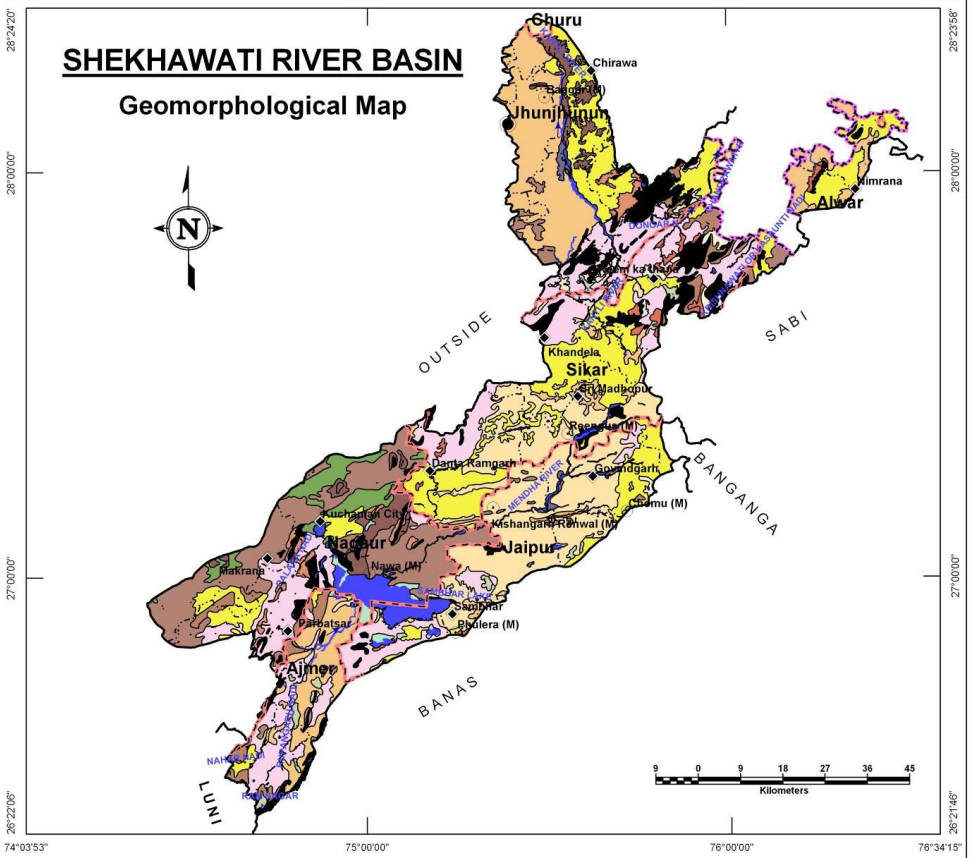
Water Bodies

Structural Features:
- Fault
- Lineament
- Shear

Geology:
- Alluvium and Wind blown sand
- Punagarh Group
- Sirohi Group
- Kumbhalgarh Group
- Ajabgarh Group
- Alwar Group
- Sand Mata Complex
- Malani Plutonic
- Erinpura Granite & Gneiss
- 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

River 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
- Flood Plain
- Ravine
- Palaeochannel
- Salt Encrustation/Playa

Structural Origin:
- Dissected Plateau

Denudational Origin:
- Pediment
- Burried Pediment
- Intermontane Valley

Aeolian Origin:
- Sandy Plain
- Eolian Plain
- Dune Valley Complex
- Obstacle Dune
- Interdunal Depression

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

AQUIFERS

SHEKHAWATI RIVER BASIN

The main aquifer in the basin is Younger Alluvium, Older Alluvium, Schist and Quartzite. Younger alluvium found in central part of the basin, consists of sand, gravel, silt and clay mostly occurring along river and nallah courses. Older Alluvium found in the central and western as well as in the northern part of the basin is comprised of unconsolidated quaternary sediments composed of fine to coarse grained sand intercalated with clay and kankar. Schist acting as an aquifer occurs in the west as well as in the south and southwestern part of the river basin. The quartzite aquifer found in the north eastern part as well as in the northern part of the basin. Ground water quality in Shekhawati basin is generally poor and occurs under water table to semi-confined to locally confined conditions.

Aquifer in Potential Zone	Area (sq km)	% of Basin Area	Description of the unit/Occurrence
Younger Alluvium	1,604.7	14.3	It is largely constituted of Aeolian and Fluvial sand, silt, clay, gravel and pebbles in varying proportions.
Older Alluvium	6,049.3	53.8	This litho unit comprises of mixture of heterogeneous fine to medium grained sand, silt and kankar.
Quartzite	1,415.6	12.6	Medium to coarse grained and varies from feldspathic grit to sericitic quartzite.
Schist	1,466.3	13.0	Medium to fine grained compact rock. The litho units are soft, friable and have closely spaced cleavage.
Gneiss	257.5	2.3	Comprises of porphyritic and non-porphyritic gneissic complex.
Non Potential Zone	445.2	4.0	Hills
Total	**11,238.6**	**100.0**	

LOCATION OF GROUND WATER MONITORING WELLS

The basin has large number of ground water monitoring stations (308) in the basin owned by RGWD (265) and CGWB (43). Only very small part of Churu district is covered in the basin therefore no wells are present in this summary. Additional 214 wells have been recommended to be added to existing water quality monitoring network.

District	Existing Ground Water Monitoring Stations			Recommended Additional Ground Water Monitoring Stations	
	CGWB	RGWD	Total	Water Level	Water quality
Ajmer	3	44	47	-	-
Alwar	4	8	12	-	14
Churu	-	-		-	-
Jaipur	9	32	41	-	26
Jhunjhunun	12	36	48	-	54
Nagaur	1	54	55	-	49
Sikar	14	91	105	-	71
Total	**43**	**265**	**308**	**-**	**214**

PLATE - VI

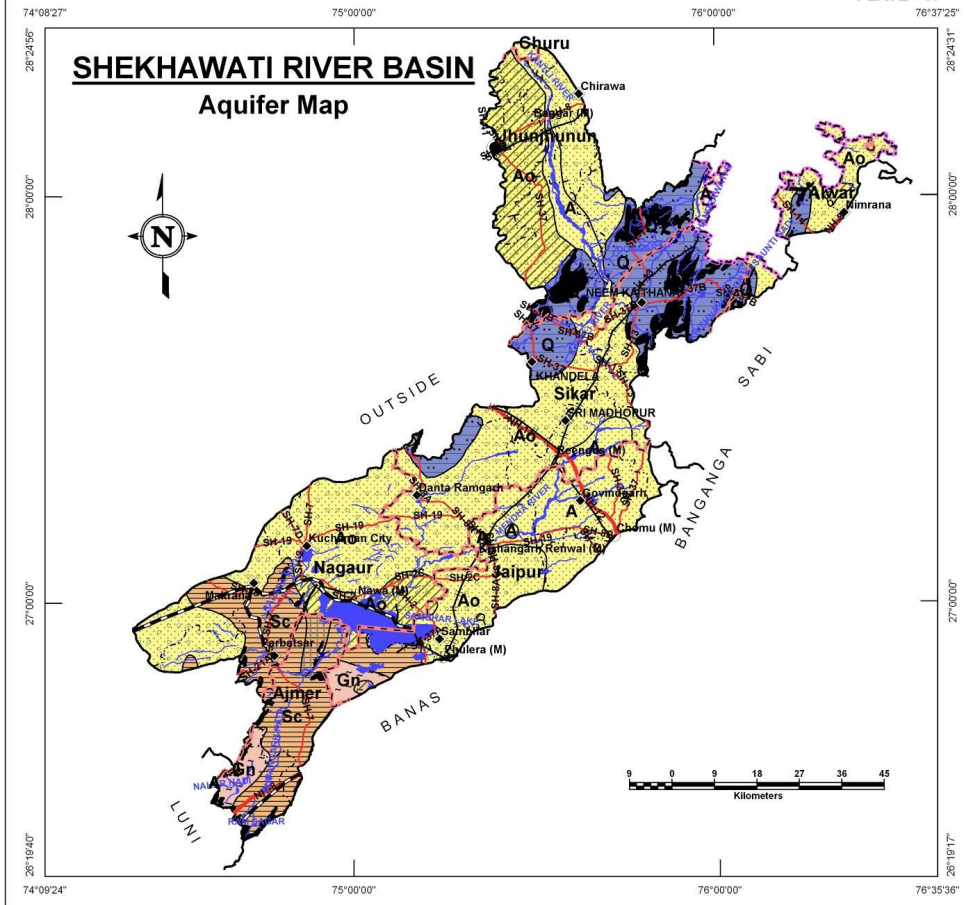
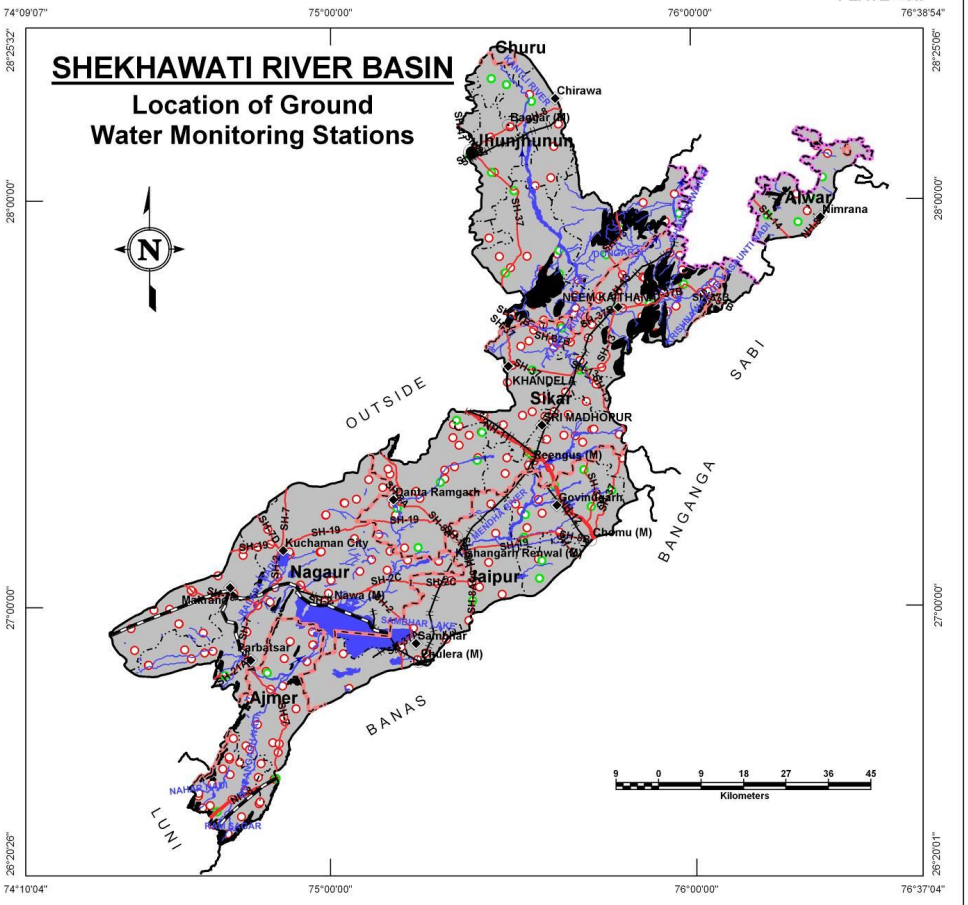


PLATE - VII



LEGEND

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

River Basin Boundary

Roads:
- National Highway
- State Highway

Railway:
- Broad Gauge
- Metre Gauge

Water Bodies:
- River / Streams
- Ponds / Reservoirs

Hills

Chemically Unsuitable

Saline Area

Aquifer:
- Younger Alluvium
- Older Alluvium
- Schist
- Quartzite
- Gneiss

Source: Ground Water Potential Zone Map - GWD,Rajasthan

LEGEND

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River Basin Boundary

Roads:
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Railway:
- Broad Gauge
- Metre Gauge

Water Bodies:
- River / Streams
- Ponds / Reservoirs

Hills

Ground Water Monitoring Stations:
- CGWB
- RGWD

LOCATION OF EXPLORATORY WELLS

In all there are 266 exploratory wells present in the basin drilled in the past by RGWD (176) and CGWB (90) spread all over the basin and these form the basis for interpretation and delineation of subsurface aquifer disposition.

District	Exploratory Wells		
	CGWB	RGWD	Total
Ajmer	12	13	25
Alwar	4	15	19
Churu	1	1	2
Jaipur	34	10	44
Jhunjhunun	26	33	59
Nagaur	14	26	40
Sikar	17	91	108
Total	**90**	**176**	**266**

DEPTH TO WATER LEVEL (PRE MONSOON – 2010)

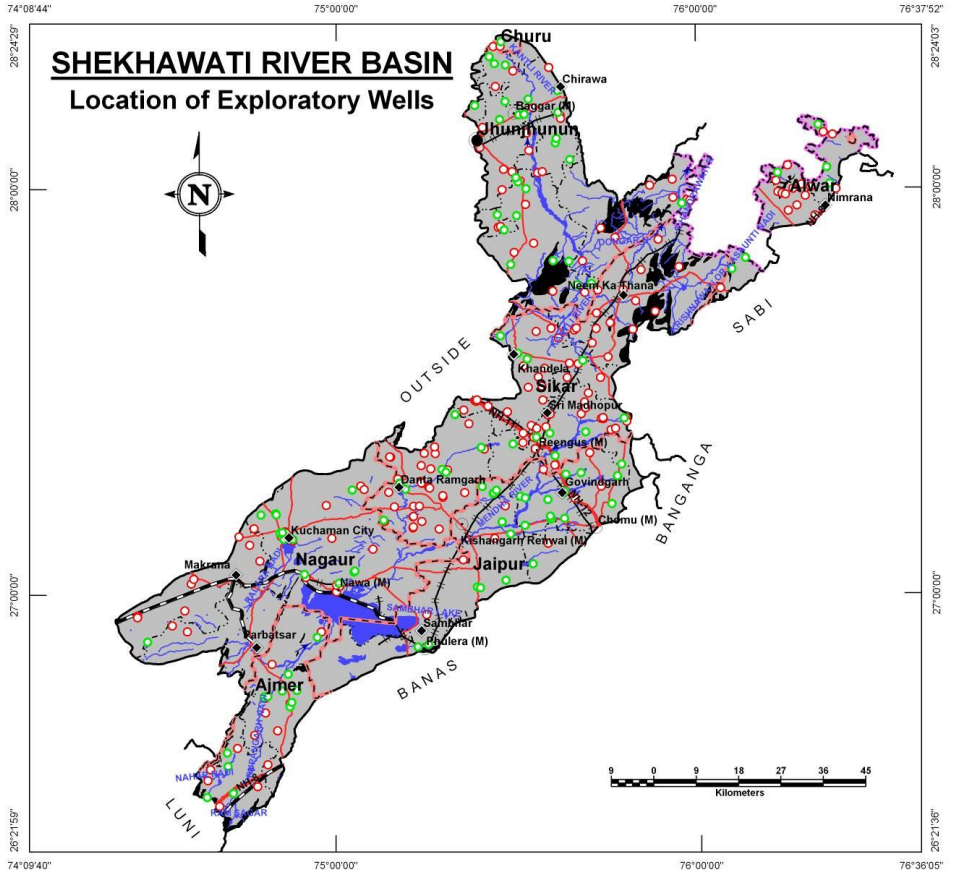
The general depth to water level in the basin ranges from more than 10 to 70 meters. A perusal of Plate IX reveals that except for the areas in the vicinity of Sambhar Lake and small pockets in the central part of the basin, the general depth to water levels is high ranging between 40-60mbgl reaching upto 70mbgl also in some areas.

Table: District wise area covered in each water level depth range

Depth to water level (m bgl) Pre Monsoon - 2010	District wise area coverage (sq km)*							Total Area (sq km)
	Ajmer	Alwar	Churu	Jaipur	Jhunjhunun	Nagaur	Sikar	
< 10	-	-	-	-	-	-	0.1	**0.1**
10 - 20	106.4	-	-	281.1	0.6	56.8	271.3	**716.2**
20 - 30	497.7	-	-	549.0	191.8	374.1	1,002.6	**2,615.2**
30 - 40	314.3	8.7	-	866.3	722.6	391.1	775.2	**3,078.2**
40 - 50	11.8	162.7	0.3	249.8	471.0	653.4	411.5	**1,960.5**
50 - 60	-	215.4	26.5	61.1	521.5	895.1	202.8	**1,922.4**
60 - 70	-	20.7	-	32.5	218.1	169.1	46.1	**486.5**
> 70	-	-	-	5.9	-	-	3.1	**9.0**
Total	**930.2**	**407.5**	**26.8**	**2,045.7**	**2,125.6**	**2,539.6**	**2,712.7**	**10,788.1**

* The area covered in the derived maps is less than the total basin 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
- River Basin Boundary

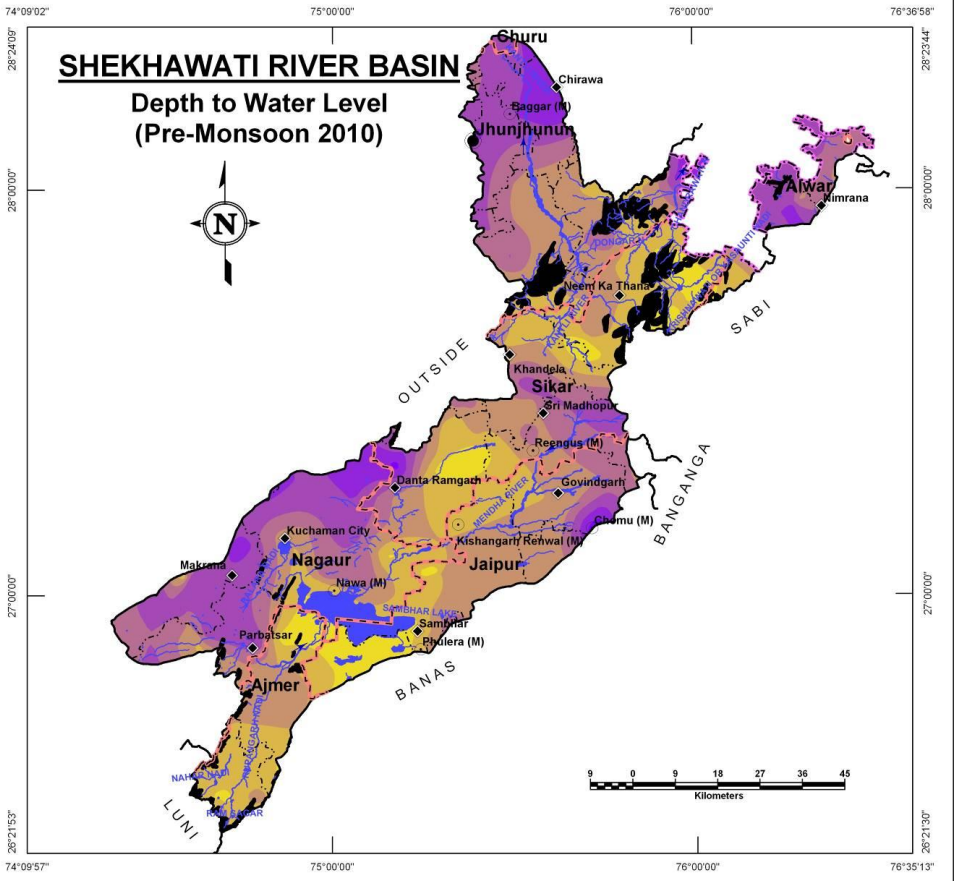
Roads
- National Highway
- State Highway

Railway
- Broad Gauge
- Metre Gauge

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

Exploratory Wells:
- CGWB
- RGWD

PLATE - IX



LEGEND

Admin Boundary:
- District Headquarter
- Block Headquarter
- Town
- State Boundary
- District Boundary
- Block Boundary
- River 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 - 70
- > 70

WATER TABLE ELEVATION (PRE MONSOON – 2010) SHEKHAWATI RIVER BASIN

Significant part of the basin is covered by hilly areas and hence the water table has shown large variation ranging from less than 180m to about 480m above mean sea level. As can be seen from Plate – X, the high water table areas are present in the central part of the basin around Sikar, extending both northwards and southwards with another high water table area in the vicinity of hilly areas of Ajmer district. The lower water table areas are towards northern most parts of the basin where the river drains out of the basin in Chirawa and Nimrana areas.

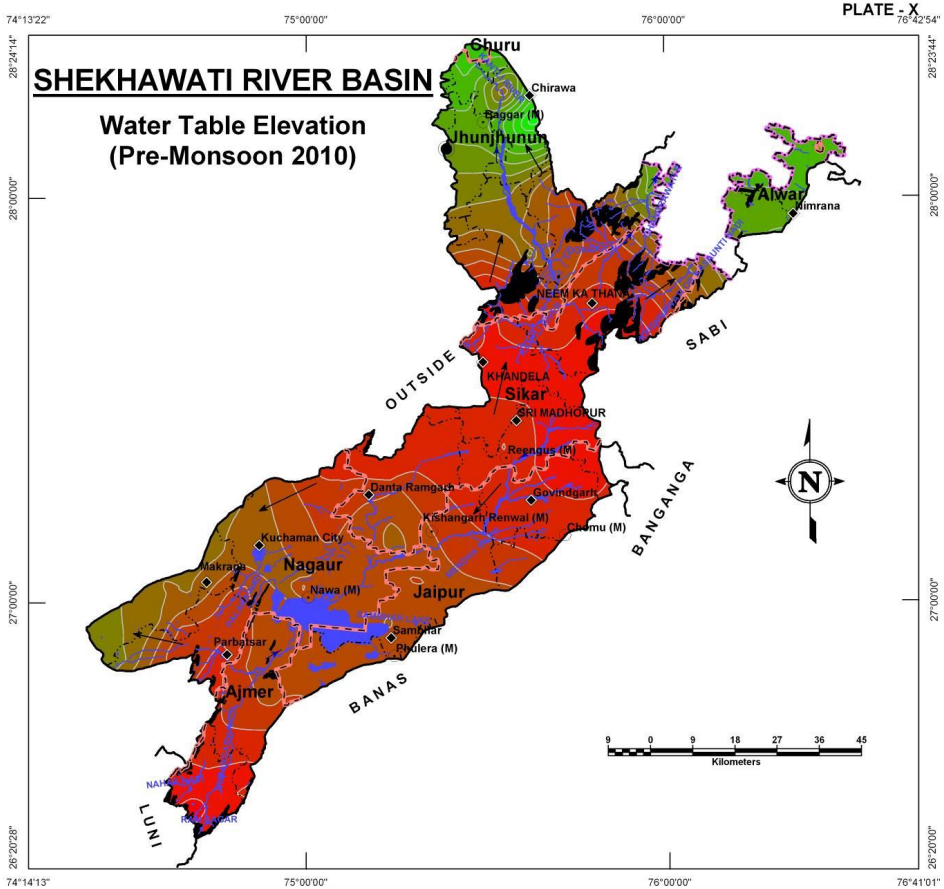
Water table elevation (m amsl) Pre Monsoon - 2010	District wise area coverage (sq km)							Total Area (sq km)
	Ajmer	Alwar	Churu	Jaipur	Jhunjhunun	Nagaur	Sikar	
< 180	-	-	-	-	4.3	-	-	**4.3**
180 - 200	-	-	-	-	16.5	-	-	**16.5**
200 - 220	-	-	-	-	27.6	-	-	**27.6**
220 - 240	-	2.5	25.6	-	72.6	-	-	**100.7**
240 - 260	-	185.6	1.2	-	191	-	-	**377.8**
260 - 280	-	206.8	-	-	281.6	-	-	**488.4**
280 - 300	-	12.6	-	-	211.1	-	-	**223.7**
300 - 320	-	-	-	8.9	214.4	114.1	-	**337.4**
320 - 340	-	-	-	44.8	280.6	265.4	16.6	**607.4**
340 - 360	-	-	-	24.3	258.8	529.4	101.5	**914**
360 - 380	236.4	-	-	843.7	270.8	1,064.90	286.4	**2702.2**
380 - 400	216.4	-	-	351.5	196	456.2	380.6	**1600.7**
400 - 440	205	-	-	570	88	109.4	1,155.90	**2128.3**
440 - 480	247.2	-	-	202.5	12.3	0.2	771.7	**1233.9**
> 480	25.2	-	-	-	-	-	-	**25.2**
Total	**930.2**	**407.5**	**26.8**	**2045.7**	**2125.6**	**2539.6**	**2712.7**	**10788.1**

WATER LEVEL FLUCTUATION (PRE TO POST MONSOON – 2010)

Ground water level fluctuation in the area has been in the range of -2 to +18 m. The distribution of fluctuation as seen in plate XI reveals the negative fluctuation areas (represented by red colour) have occupied areas in the central part and small areas in southwest and northwest. While the spatial distribution appears to be large but the amount of decline is very small (less than 2m). Rest of the area however, has shown in general rise of upto 4m and some specific pockets showing significant rise of upto 18m, which are in proximity of hardrock areas.

District Name	District wise area coverage (sq km) within fluctuation range (m)											Total Area (sq km)
	< 0	0 to 2	2 to 4	4 to 6	6 to 8	8 to 10	10 to 12	12 to 14	14 to 16	16 to 18	> 18	
Ajmer	-	56.6	169.9	113.5	236.7	276.2	47.7	21.5	7.4	0.7	-	**930.2**
Alwar	30.9	316.8	59.8	-	-	-	-	-	-	-	-	**407.5**
Churu	13.3	13.5	-	-	-	-	-	-	-	-	-	**26.8**
Jaipur	463.9	741.3	476.6	319.8	44.0	0.1	-	-	-	-	-	**2,045.7**
Jhunjhunun	343.5	820.7	400.1	251.2	120.6	72.1	51.5	24.6	16.3	20.8	4.2	**2,125.6**
Nagaur	610.9	1,806.7	69.9	25.6	20.7	5.8	-	-	-	-	-	**2,539.6**
Sikar	1,006.3	881.9	202.4	113.8	148.6	118.2	112.3	91.8	25.3	10.3	1.8	**2,712.7**
Total	**2,468.8**	**4,637.5**	**1,378.7**	**823.9**	**570.6**	**472.4**	**211.5**	**137.9**	**49.0**	**31.8**	**6.0**	**10,788.1**

PLATE - X



LEGEND

Admin Boundary:

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

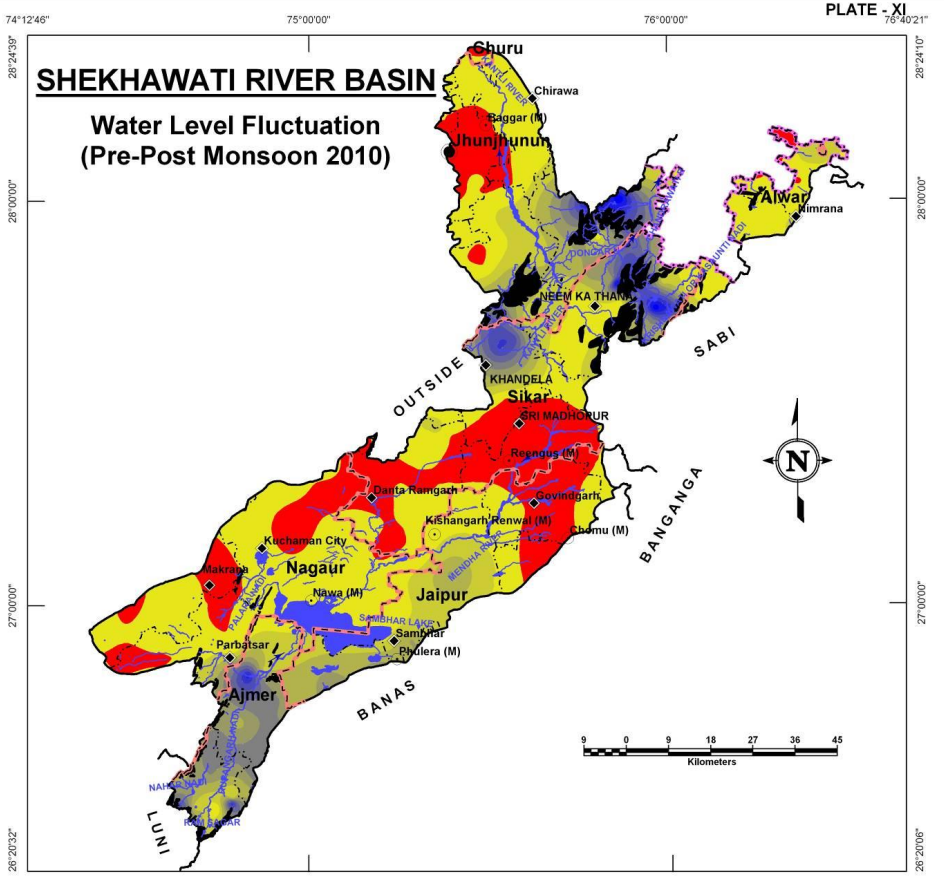
Water Bodies:

- River / Streams
- Ponds / Reservoirs
- Hills
- Water Table Elevation

Water Table Elevation(m amsl):

- <180
- 180 - 200
- 200 - 220
- 220 - 240
- 240 - 260
- 260 - 280
- 280 - 300
- 300 - 320
- 320 - 340
- 340 - 360
- 360 - 380
- 380 - 400
- 400 - 440
- 440 - 480
- >480

PLATE - XI



LEGEND

Admin Boundary:

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

Water Bodies:

- River / Streams
- Ponds / Reservoirs
- Hills

Water Level Fluctuation(m):

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

ELECTRICAL CONDUCTIVITY DISTRIBUTION — SHEKHAWATI RIVER BASIN

Sambhar lake is known for its salinity and salt production around it so the EC distribution map corroborates with this and very high ground water electrical conductivity areas are located around it i.e., in the southwestern part of the basin in Nagaur-Jaipur-Ajmer district tri-junction areas. A small patch of high ground water salinity is also seen around Nimrana in the north. These areas have shown >2000 µS/cm of EC in ground water which has very limited or no use for domestic consumption purposes. The rest of the basin is by and large good with low EC values.

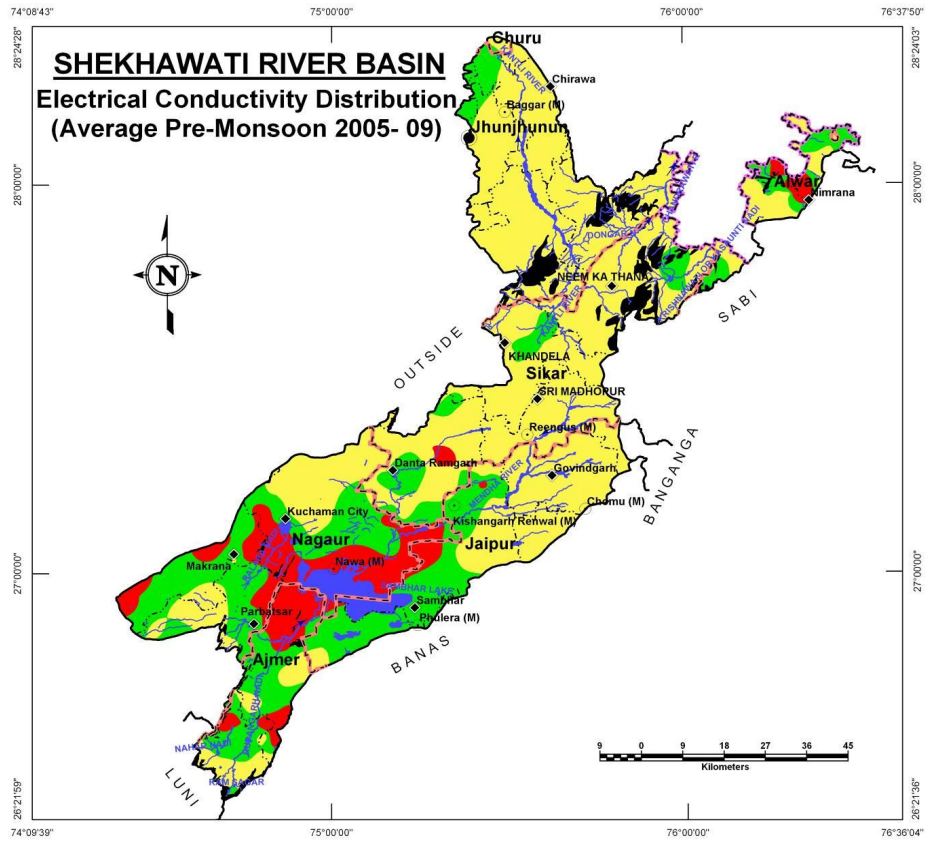
Electrical Conductivity Ranges (µS/cm at 25°C) (Ave. of years 2005-09)	District wise area coverage (sq km)														Total Area (sq km)
	Ajmer		Alwar		Churu		Jaipur		Jhunjhunun		Nagaur		Sikar		
	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	
<2000	211.9	22.8	186.2	45.7	21.2	79.2	1,155.5	56.5	1,975.6	92.9	657.6	25.9	2,259.8	83.3	**6,467.8**
2000-4000	432.0	46.4	150.5	36.9	5.6	20.8	792.9	38.8	150.0	7.1	1,047.4	41.2	412.6	15.2	**2,991.0**
>4000	286.3	30.8	70.8	17.4	-	-	97.3	4.7	-	-	834.6	32.9	40.3	1.5	**1,329.3**
Total	**930.2**	**100.0**	**407.5**	**100.0**	**26.8**	**100.0**	**2,045.7**	**100.0**	**2,125.6**	**100.0**	**2,539.6**	**100.0**	**2,712.7**	**100.0**	**10,788.1**

CHLORIDE DISTRIBUTION

Nearly half of the Shekhawati River basin has high chloride concentration in ground water as seen in green and red colours in Plate – XIII. The southwestern part of the basin spreading outwards of Sambhar lake is highly saline along with some patches in the northern part around Jhunjhunun and Nimrana. Central and north central part is low in chloride and suitable for all purposes.

Chloride Ranges (mg/l) (Ave. of years 2005-09)	District wise area coverage (sq km)														Total Area (sq km)
	Ajmer		Alwar		Churu		Jaipur		Jhunjhunun		Nagaur		Sikar		
	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	
< 250	55.3	5.9	67.2	16.5	0.3	1.0	994.3	48.6	1,660.2	78.1	610.9	24.0	1,770.8	65.3	**5,159.0**
250 - 1000	287.0	30.9	38.6	9.5	-	-	47.6	2.3	-	-	710.9	28.0	5.5	0.2	**1,089.6**
> 1000	587.9	63.2	301.7	74.0	26.5	99.0	1,003.8	49.1	465.4	21.9	1,217.8	48.0	936.4	34.5	**4,539.5**
Total	**930.2**	**100.0**	**407.5**	**100.0**	**26.8**	**100.0**	**2,045.7**	**100.0**	**2,125.6**	**100.0**	**2,539.6**	**100.0**	**2,712.7**	**100.0**	**10,788.1**

PLATE - XII



LEGEND

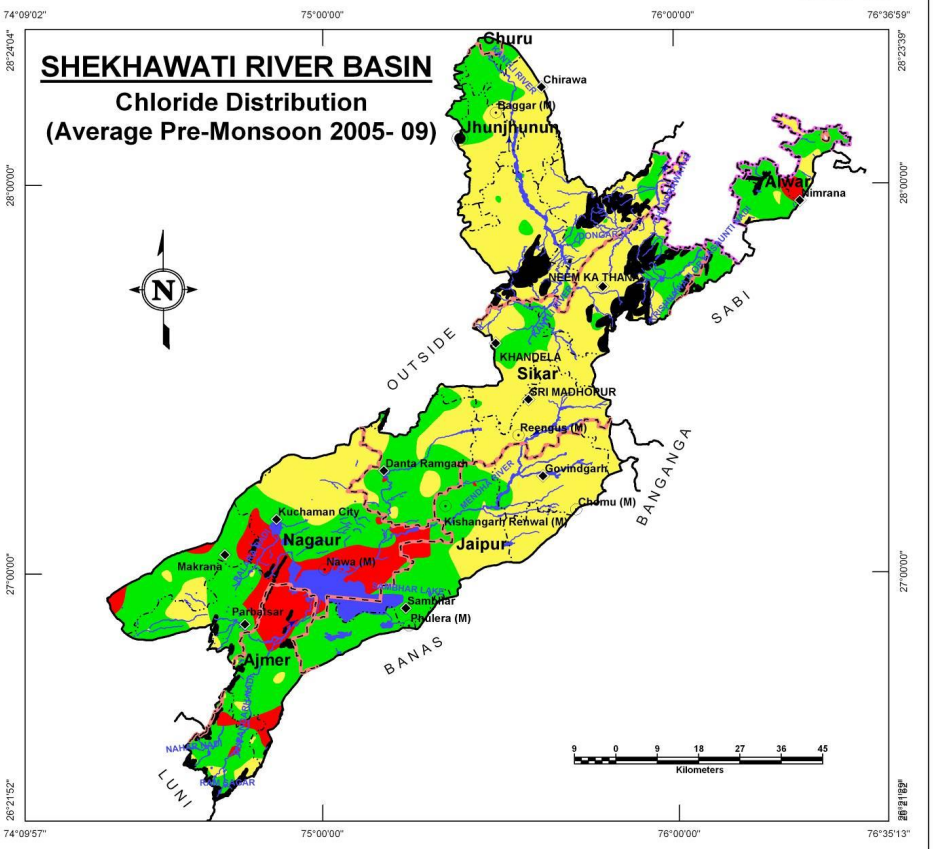
Admin Boundary:

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

Chloride Concentration (mg/l):

- < 250
- 250 - 1000
- > 1000

FLUORIDE DISTRIBUTION

Southern part of the basin within the Jaipur, Ajmer and Nagaur districts has reasonably high Fluoride concentration in ground water as represented by green and red coloured regions for 1.5 – 3.0 mg/l and > 3.0 mg/l fluoride in water respectively. Some parts in central and northern part of the basin also show presence of high fluoride in ground water. But by and large, the ground water in central and northern parts is low in fluoride and suitable for all purposes.

Fluoride Ranges (mg/l) (Ave. of years 2005-09)	District wise area coverage (sq km)														Total Area (sq km)
	Ajmer		Alwar		Churu		Jaipur		Jhunjhunun		Nagaur		Sikar		
	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	
< 1.5	296.2	31.8	306.5	75.2	-	-	955.0	46.7	1,653.7	77.8	1,249.2	49.2	1,765.8	65.1	**6,226.4**
1.5-3.0	568.2	61.1	88.7	21.8	2.6	9.7	799.7	39.1	443.3	20.9	847.7	33.4	837.7	30.9	**3,587.9**
> 3.0	65.8	7.1	12.3	3.0	24.2	90.3	291.0	14.2	28.6	1.3	442.7	17.4	109.2	4.0	**973.8**
Total	**930.2**	**100.0**	**407.5**	**100.0**	**26.8**	**100.0**	**2,045.7**	**100.0**	**2,125.6**	**100.0**	**2,539.6**	**100.0**	**2,712.7**	**100.0**	**10,788.1**

NITRATE DISTRIBUTION

High nitrate concentration in ground water renders it unsuitable for agriculture purposes. Plate – XV shows distribution of Nitrate in ground water. Central and northern part of the basin lower Nitrate presence in ground water as seen by yellow colour regions in Plate – XV (Nitrate concentration – less than 50 mg/l).The rest of the areas mainly in the southern region and around the hills in the north near Neem ka thana higher Nitrate presence in ground water can be seen (>50 mg/l).

Nitrate Ranges (mg/l) (Ave. of years 2005-09)	District wise area coverage (sq km)														Total Area (sq km)
	Ajmer		Alwar		Churu		Jaipur		Jhunjhunun		Nagaur		Sikar		
	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	Area	% age	
< 50	209.4	22.5	288.1	70.7	18.0	67.0	853.3	41.7	1,236.0	58.1	394.2	15.5	1,388.9	51.2	**4,387.9**
50-100	489.8	52.7	114.7	28.1	8.8	33.0	678.8	33.2	730.0	34.4	771.4	30.4	975.9	36.0	**3,769.4**
> 100	231.0	24.8	4.7	1.2	-	-	513.6	25.1	159.6	7.5	1,374.0	54.1	347.9	12.8	**2,630.8**
Total	**930.2**	**100.0**	**407.5**	**100.0**	**26.8**	**100.0**	**2,045.7**	**100.0**	**2,125.6**	**100.0**	**2,539.6**	**100.0**	**2,712.7**	**100.0**	**10,788.1**

PLATE - XIV

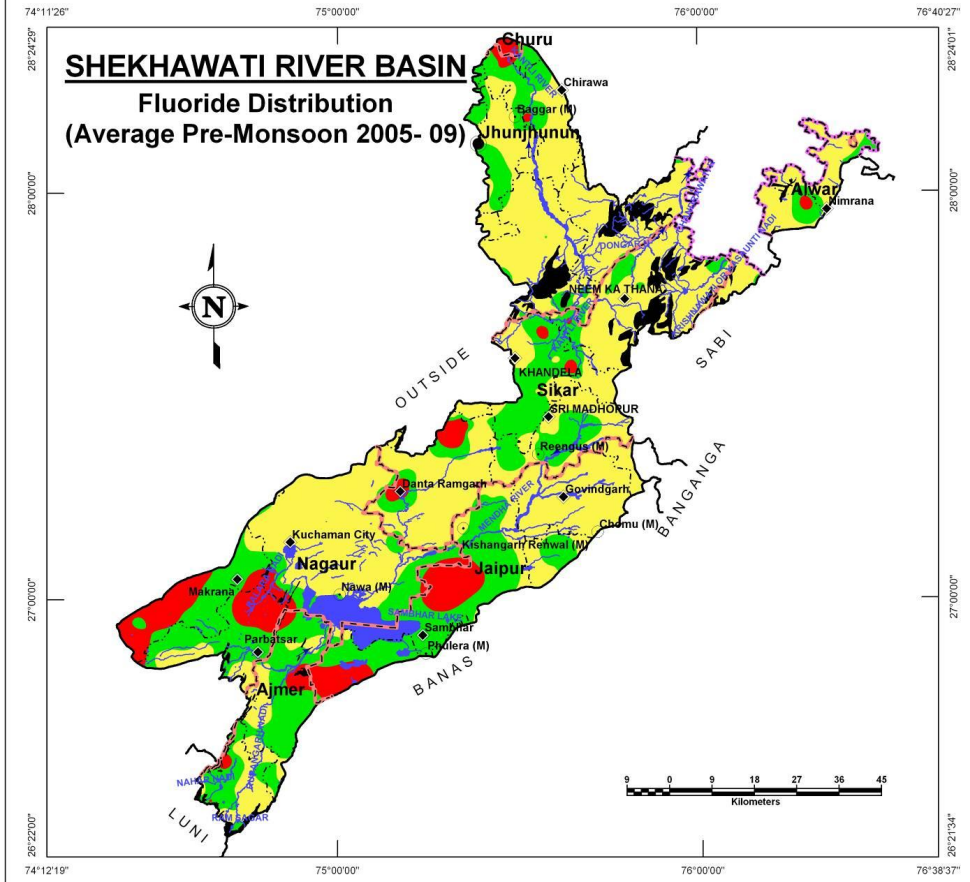
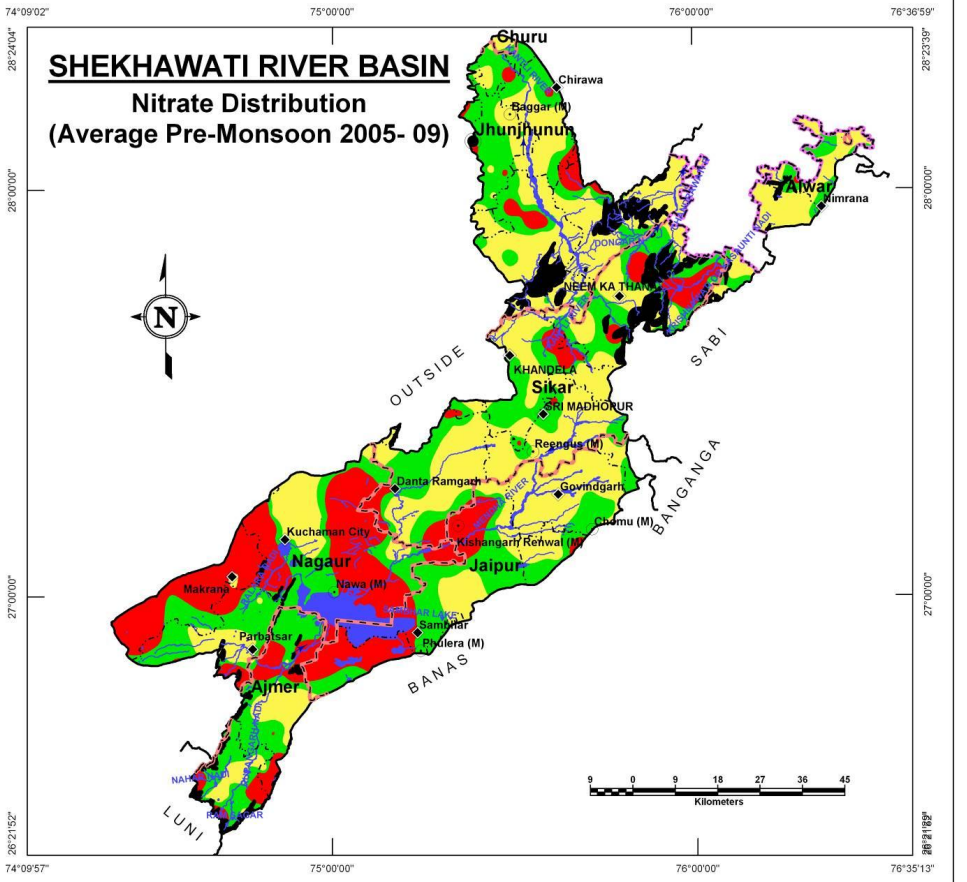


PLATE - XV



LEGEND

Admin Boundary:

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

Water Bodies:

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

Fluoride Concentration (mg/l):

- < 1.5
- 1.5-3.0
- > 3.0

LEGEND

Admin Boundary:

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

Water Bodies:

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

Nitrate Concentration (mg/l):

- < 50
- 50-100
- > 100

DEPTH TO BEDROCK

SHEKHAWATI RIVER BASIN

Below the variable thickness cover of alluvium lies the massive bedrock. In Shekhawati River Basin the major rocks types that constitute the bedrock are: quartzite, schist and gneiss. These rocks are overlain by alluvial deposits of sand, clay, silt, cobble and kankar. The depth to bedrock thus, represents the sub surface topography defined by the hard rocks beneath alluvial deposits and fractured bedrock. Plate XVI showing Depth to bedrock in meters below ground level indicates that depth to bed rock is at shallow levels in southern part of the river basin which gradually deepens towards the central part. The depth to bedrock in the river basin varies from more than 100 m bgl in the western, northwestern and northern parts of the basin whereas in the vicinity of hardrock areas around Neem Ka Thana the bedrock is encountered at very shallow depths of <20m.

Depth to Bedrock (m bgl)	District wise area coverage (sq km)							Total Area (sq km)
	Ajmer	Alwar	Churu	Jaipur	Jhunjhunun	Nagaur	Sikar	
< 40	400.4	-	-	19.0	105.9	3.1	572.9	**1,101.3**
40-60	387.3	-	-	580.5	401.5	730.0	836.1	**2,935.4**
60-80	142.5	18.2	-	1,306.5	307.3	998.3	1,174.8	**3,947.6**
80-100	-	243.6	0.3	139.7	1,091.9	610.9	119.5	**2,205.9**
> 100	-	145.7	26.5	-	219.0	197.3	9.4	**597.9**
Total	**930.2**	**407.5**	**26.8**	**2,045.7**	**2,125.6**	**2,539.6**	**2,712.7**	**10,788.1**

UNCONFINED AQUIFER

Unconfined aquifers in alluvial and in hard rock areas have been delineated and presented here. Since the hydrogeological properties are different for alluvial and hard rock aquifers, the aquifers have been mapped as two separate groups.

Alluvial areas

Alluvial aquifers in unconfined state attain very good thicknesses in the basin reaching more than 80m. These aquifers are principally formed in Nagaur, Jhunjhunun, Jaipur and Sikar districts falling within the basin.

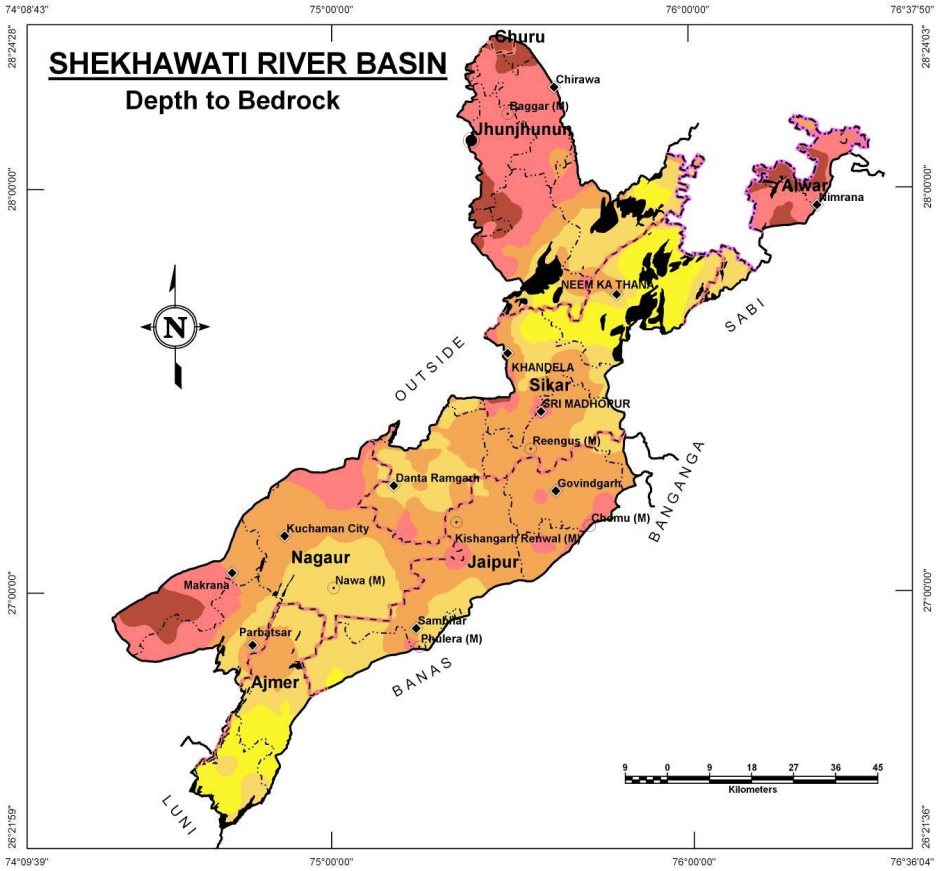
Unconfined aquifer Thickness (m)	District wise area coverage (sq km)							Total Area (sq km)
	Ajmer	Alwar	Churu	Jaipur	Jhunjhunun	Nagaur	Sikar	
< 10	0.9	261.4	26.8	916.5	1,149.2	1,273.1	716.7	**4,344.6**
10-20	-	65.5	-	458.7	426.1	378.6	606.0	**1,934.9**
20-30	-	36.9	-	324.5	99.9	163.4	421.5	**1,046.2**
30-40	-	26.1	-	59.0	6.5	95.3	70.2	**257.1**
40-50	-	13.4	-	3.4	-	52.4	13.4	**82.6**
50-60	-	4.1	-	-	-	21.0	3.2	**28.3**
60-70	-	-	-	-	-	12.7	0.5	**13.2**
70-80	-	-	-	-	-	12.3	-	**12.3**
> 80	-	-	-	-	-	1.7	-	**1.7**
Total	**0.9**	**407.4**	**26.8**	**1,762.1**	**1,681.7**	**2,010.5**	**1,831.5**	**7,720.9**

Hard rock areas

Weathered and fractured zones containing water under unconfined conditions are mapped to represent here as aquifers. These are very prominent in Sikar, Jhunjhunun, Ajmer and Jaipur districts attaining in general, 10-40m and often reaching 60m thickness.

Unconfined aquifer Thickness (m)	District wise area coverage (sq km)							Total Area (sq km)
	Ajmer	Alwar	Churu	Jaipur	Jhunjhunun	Nagaur	Sikar	
< 10	161.7	0	-	5.3	274.8	83.6	392.9	**918.3**
10-20	447.5	0	-	11.1	63.1	406.4	353.5	**1,281.6**
20-30	205.3	0.1	-	20.9	37.3	26.5	100.2	**390.3**
30-40	70.8	-	-	167.8	46.6	9.2	26.6	**321.0**
40-50	37.6	-	-	56.5	17.2	3.4	5.8	**120.5**
50-60	6.4	-	-	22	4	-	2.2	**34.6**
> 60	-	-	-	-	0.9	-	0	**0.9**
Total	**929.3**	**0.1**	**-**	**283.6**	**443.9**	**529.1**	**881.2**	**3,067.2**

PLATE - XVI



LEGEND

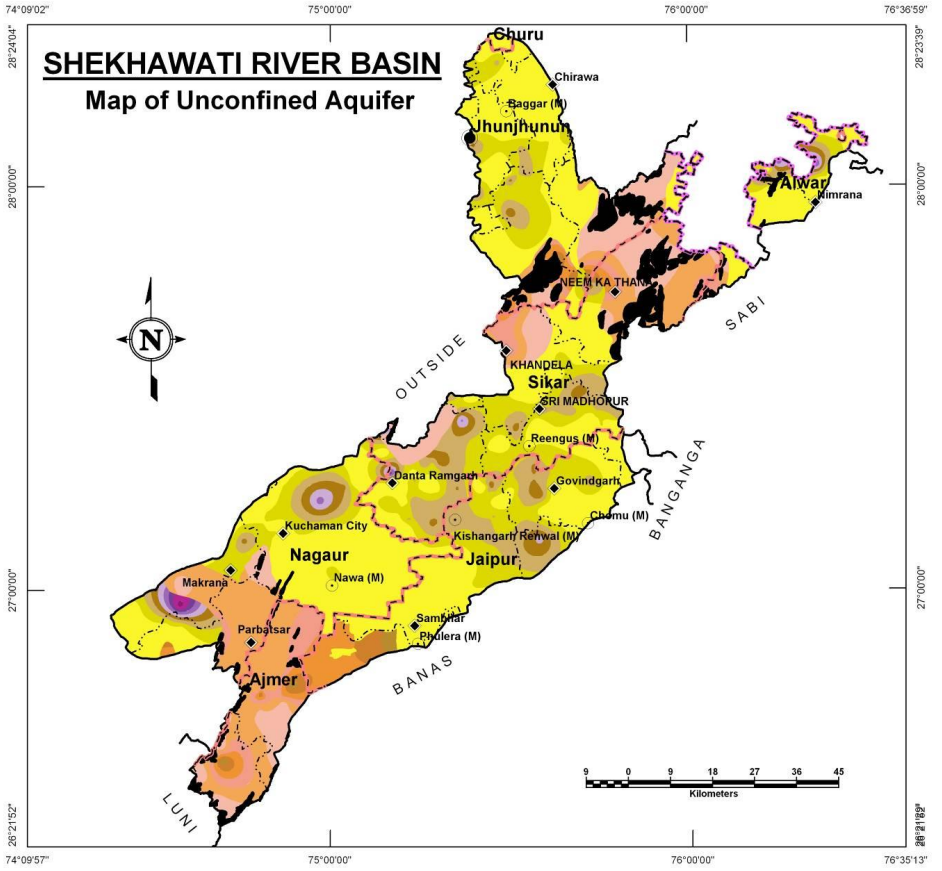
Admin Boundary:

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

Depth to Bedrock (m bgl):

- <20
- 40-60
- 60-80
- 80-100
- >100

PLATE - XVII



LEGEND

Admin Boundary:

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

Aquifer Thickness (m):

Alluvial Area:	Weathered & Fractured Zone in Hardrock Area :
< 10	<10
10-20	10-20
20-30	20-30
30-40	30-40
40-50	40-50
50-60	50-60
60-70	>60
70-80	
>80	

CROSS SECTIONS

SHEKHAWATI RIVER BASIN

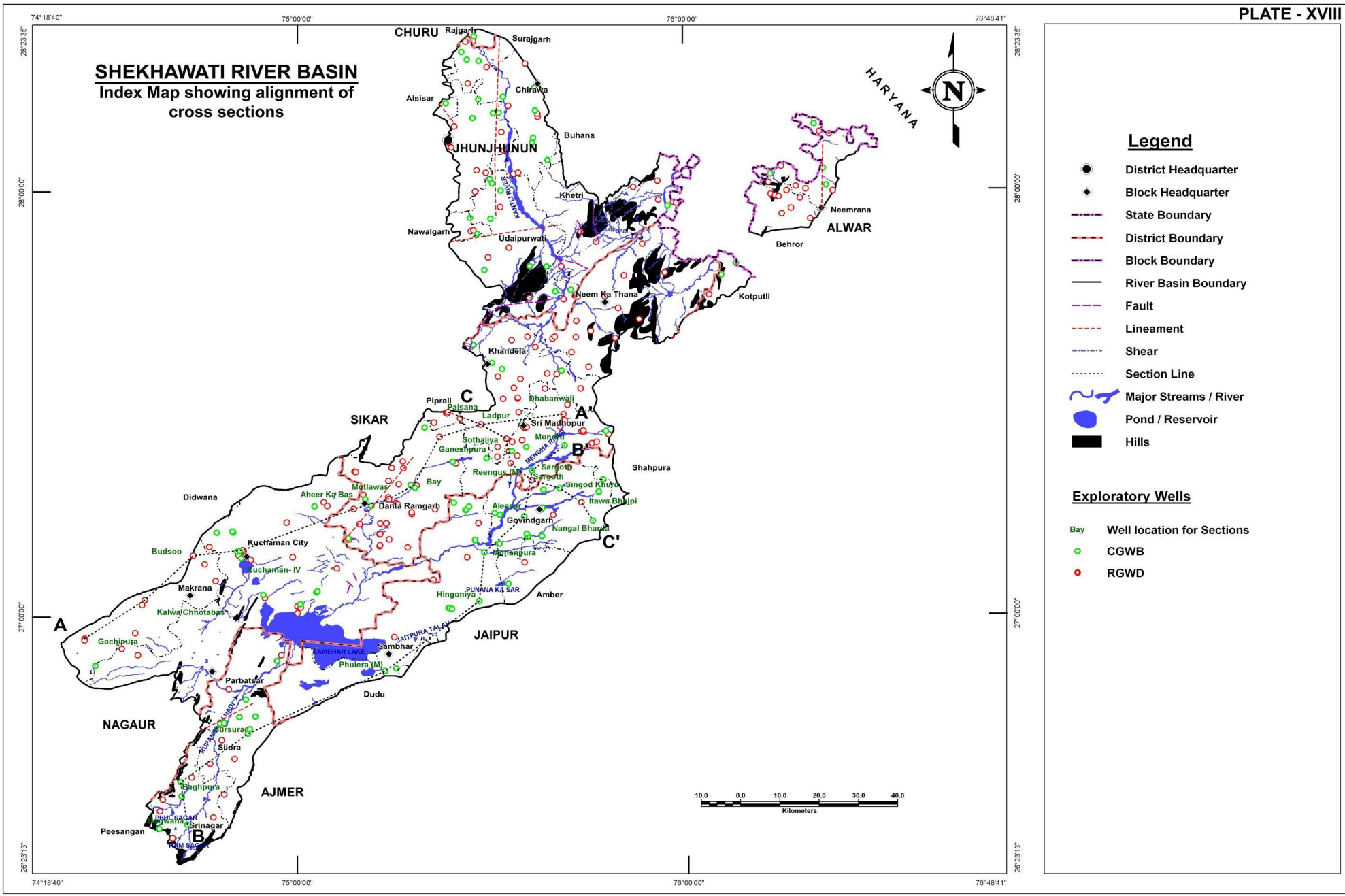
Three hydrogeologic cross sections have been drawn to visualize sub-surface distribution of lithology. This has been overlaid with water table elevation of pre-monsoon 2010 and then structural faults from geologic map. The alignment of the cross sections is shown in Plate – XVIII and corresponding sections are presented in Plates – XIX through XXI. The broad orientation of the sections is as given below:

Name of Section Line	Orientation
Section AA’	SW – NE
Section BB’	SW – NE
Section CC’	NW – SE

PLATE - XVIII

SHEKHAWATI RIVER BASIN

Index Map showing alignment of cross sections



Legend

- District Headquarter
- Block Headquarter
- State Boundary
- District Boundary
- Block Boundary
- River Basin Boundary
- Fault
- Lineament
- Shear
- Section Line
- Major Streams / River
- Pond / Reservoir
- Hills

Exploratory Wells

- Bay — Well location for Sections
- CGWD
- RGWD

CROSS SECTIONS

SHEKHAWATI RIVER BASIN

Section A-A':

The section A-A' is one of the longest section trending in SW-NE direction, cutting across the basin and covering a distance of about 140 kms (Plate – XIX). The lithologs of 10 boreholes were taken to prepare this cross-section. The section depicts the disposition of different layers of topsoil, sand, and clay along with weathered and fractured zones of quartzite, schist and gneiss. On perusal of the cross section, it is apparent that in the southwestern part of the section the alternative sequence of sand and clay is forming the major aquifer system in these areas. The whole section taken along the basin mostly comprises of the alluvial sand and weathered and fractured quartzite which forms aquifers. Gneiss constitutes the basement.

It is observed from pre-monsoon 2010 data the ground water level varies from 340 m amsl to 485 m amsl flowing southwestwards following topography.

Section B-B':

This section is the longest of the sections plotted in the area and trends in SW-NE extending for 150 kms across as shown in Plate – XX. The lithologs of 9 boreholes were utilized for preparing this section. The section depicts the disposition of different layers of sand and clay along with weathered and fractured zones of quartzite, schist and gneiss. On perusal of the cross section, it is revealed that the southwestern part of the river basin is predominantly constituted of hardrock (schist and gneiss). Due to availability of lithologs of limited depths the continuity of the gneissic base is not confirmed as moved towards north east. But in the northeastern part of the river basin, the alluvial sand forms the aquifer system and in the central part of the river basin the alternative bands of alluvial sand and clay form the local confined aquifers. The sandy aquifers in the northeastern part often reach a thickness of about 50m half of which is saturated as indicated in the sections.

It is observed from pre monsoon 2010 data the ground water table varies from 445 m amsl to 475 m amsl from NW – SE of the section drawn in the Shekhawati river basin.

PLATE - XIX

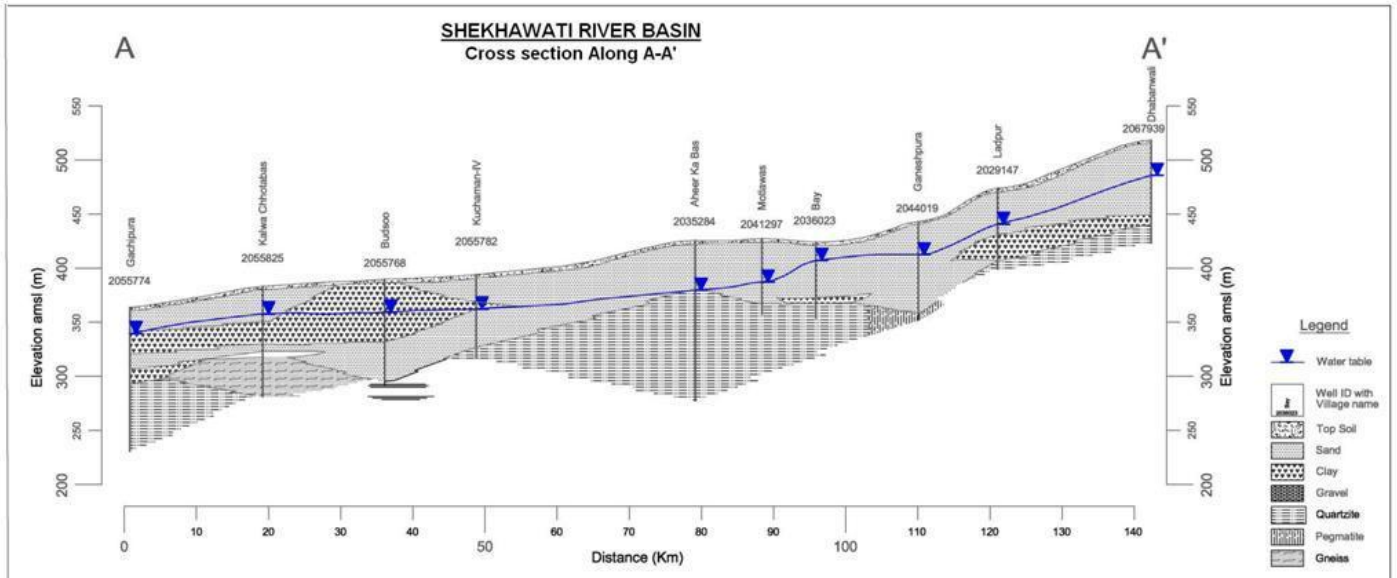
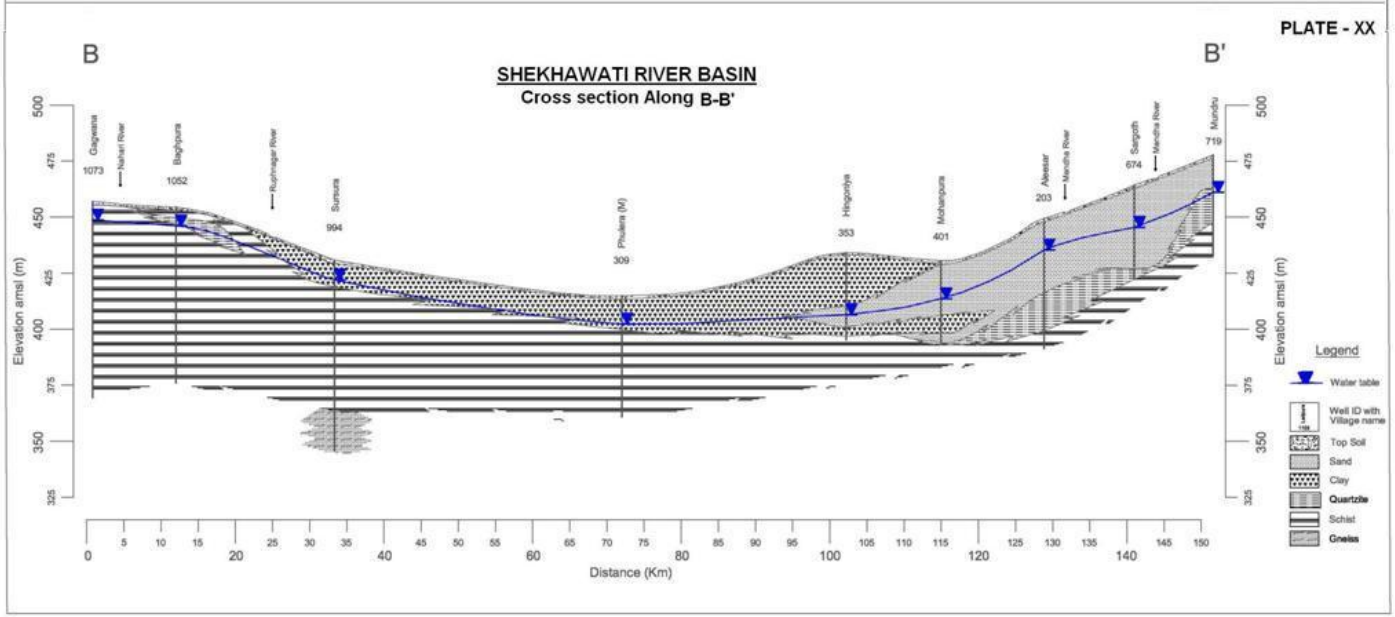


PLATE - XX

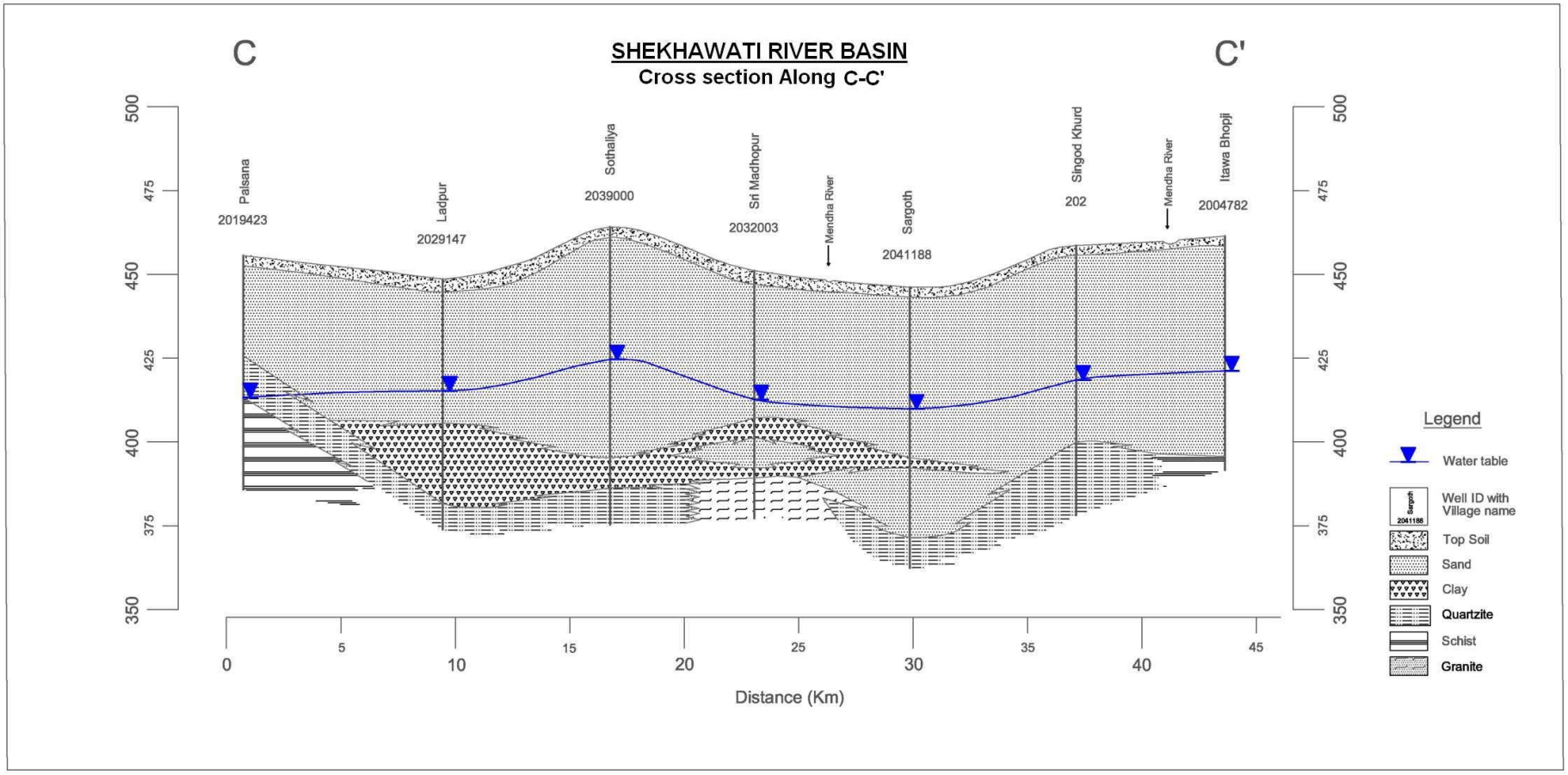


Section C-C':

The C-C' section has been selected across the basin trending from NW-SE in the central part of the basin and covers an area of around 47.5 kms (Plate – XXI). The lithologs of 8 boreholes were utilized for preparing this cross-section. The section reveals the disposition of different layers of sand and clay along with quartzite, schist and granite. In the cross section, sand is the predominant lithotype occupying major part of the section. In some wells towards northwestern part of the cross section quartzites are encountered with limited thickness of weathered and fractured zone. Granite comprises the bedrock which is overlain by quartzite.

The water level varies from 435 m amsl to 450 m amsl as per the data of pre monsoon 2010. The water level is quite deep often reaching about 40m below ground level. The thickness of saturation zone is lower than the unsaturated zone above it that indicates that significant part of aquifer is already exploited but this also provides opportunity to plan recharge structures in the area.

PLATE - XXI


C
C'
SHEKHAWATI RIVER BASIN
Cross section Along C-C'
Palsana
2019423
Ladpur
2029147
Sothaliya
2039000
Sri Madhopur
2032003
Mendha River
Sargoth
2041188
Singod Khurd
202
Mendha River
Itawa Bhopji
2004782
500
475
450
425
400
375
350
0
5
10
15
20
25
30
35
40
45
Distance (Km)
Legend
Water table
Well ID with Village name
Top Soil
Sand
Clay
Quartzite
Schist
Granite

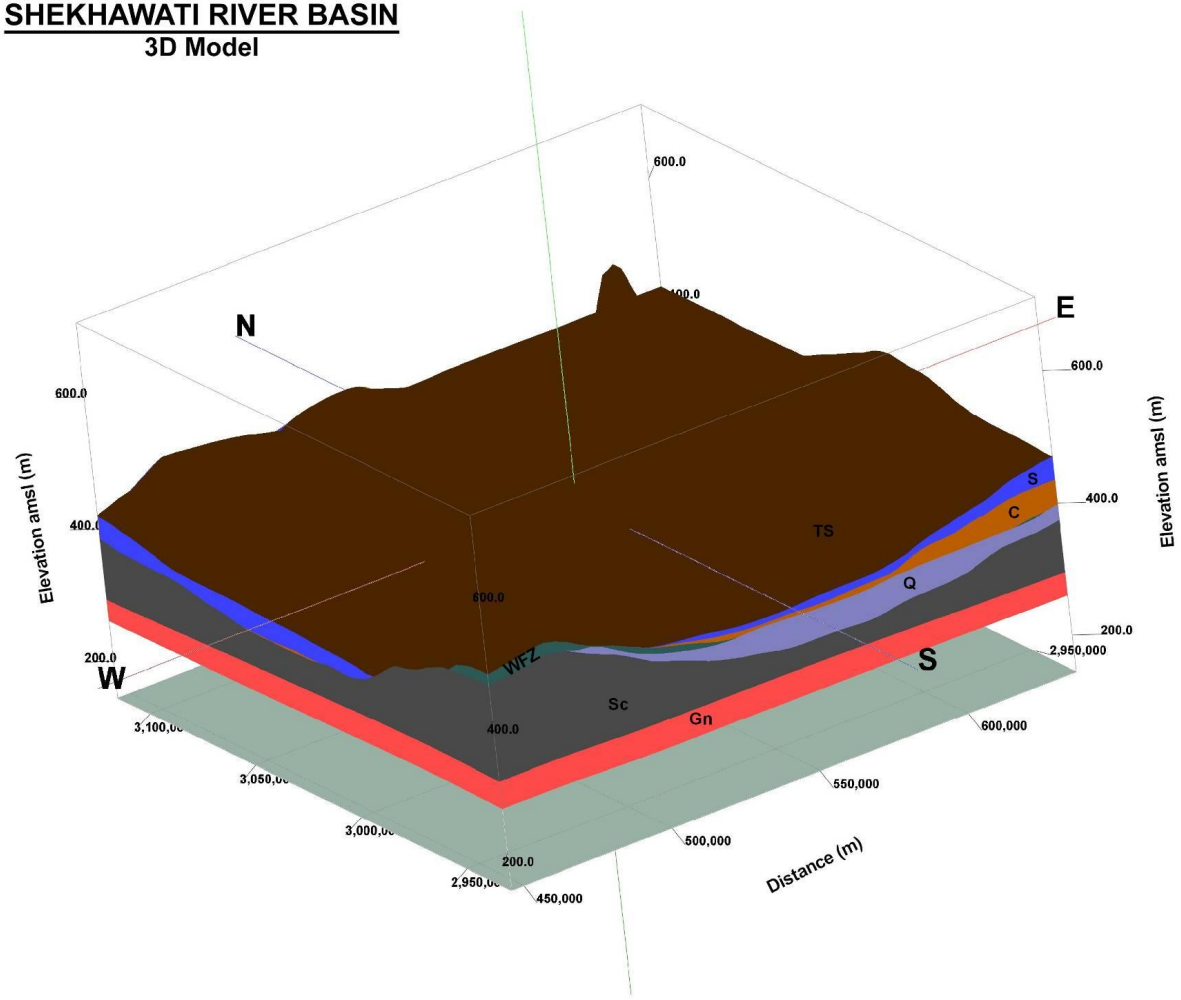
3D MODEL OF AQUIFERS

SHEKHAWATI RIVER BASIN

Plate – XXII presents one view of the comprehensive 3D model prepared for the basin using all the lithologs and this shows various litho-stratigraphic units in the entire river basin. With this model it is apparent that beneath the top soil there is a small patch of weathered and fractured zone that would form unconfined aquifer. The sandy aquifer is observed in the northwest, southwest as well as in the southeastern part acting as a major aquifer which is overlain by top soil and underlain by Quartzite, Schist and Gneissose bedrock.

PLATE - XXII

SHEKHAWATI RIVER BASIN
3D Model



Legend

- TS — Top Soil
- S — Sand
- C — Clay
- WFZ — Weathered & Fractured zone
- Q — Quartzite
- Sc — Schist
- Gn — Gneiss

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.

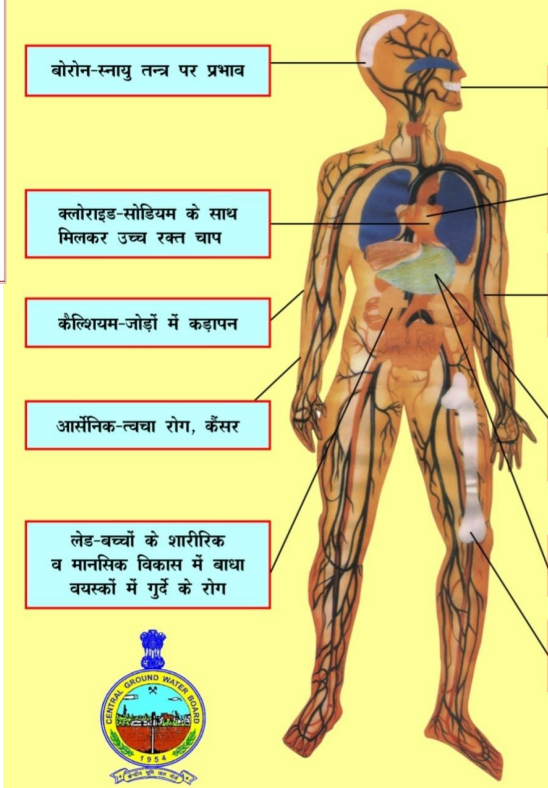
(Contd…)

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
- 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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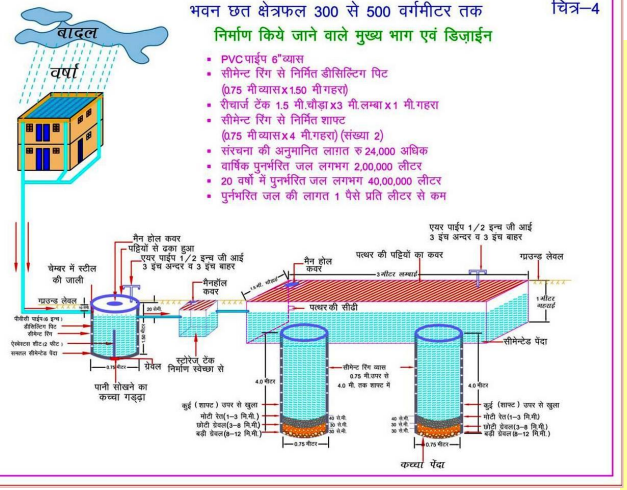
भूजल अमूल्य है इसे प्रदूषित न करें।

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

निर्माण किये जाने वाले मुख्य भाग एवं डिज़ाईन

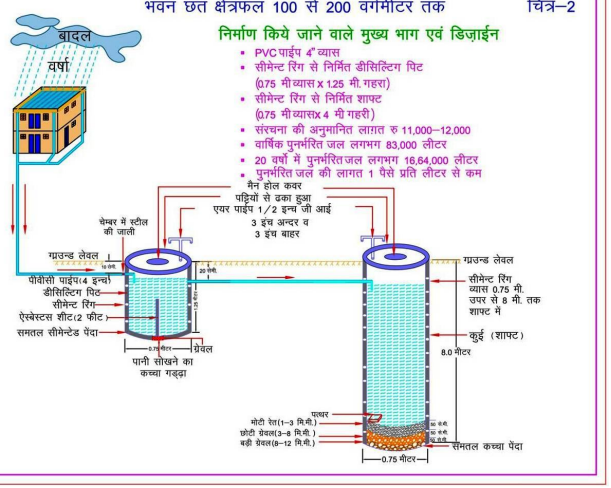
- PVC पाईप 6" व्यास
- सीमेन्ट रिंग से निर्मित डीसिल्टिंग पिट (0.75 मी व्यास x 1.50 मी गहरा)
- रीचार्ज टेंक 1.5 मी.चौड़ा x 3 मी.लम्बा x 1 मी.गहरा
- सीमेन्ट रिंग से निर्मित शाफ्ट (0.75 मी व्यास x 4 मी.गहरा) (संख्या 2)
- संरचना की अनुमानित लागत रु 24,000 अधिक
- वार्षिक पुनर्भरित जल लगभग 2,00,000 लीटर
-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

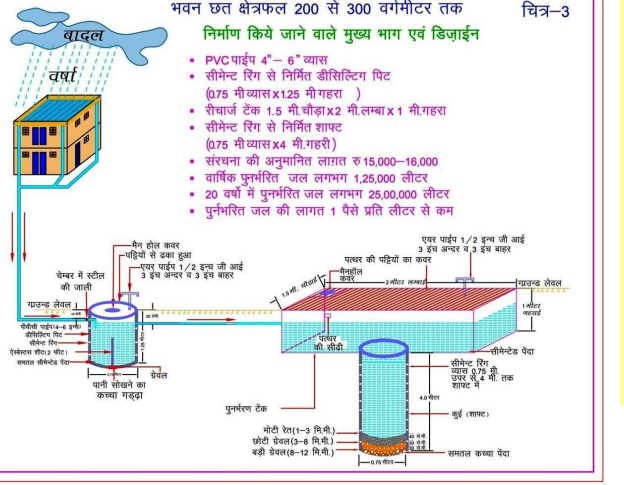
- PVC पाईप 4" व्यास
- सीमेन्ट रिंग से निर्मित डीसिल्टिंग पिट (0.75 मी व्यास x 1.25 मी. गहरा)
- सीमेन्ट रिंग से निर्मित शाफ्ट (0.75 मी व्यास x 4 मी गहरी)
- संरचना की अनुमानित लागत रु 11,000–12,000
- वार्षिक पुनर्भरित जल लगभग 83,000 लीटर
- 20 वर्षो में पुनर्भरित जल लगभग 16,64,000 लीटर
- पुनर्भरित जल की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

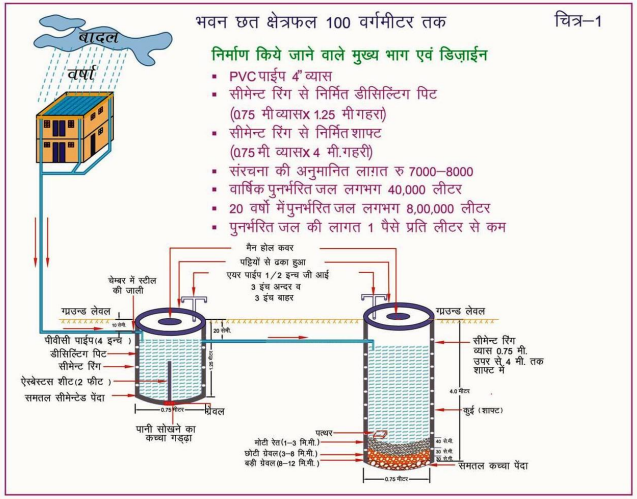
- PVC पाईप 4"– 6" व्यास
- सीमेन्ट रिंग से निर्मित डीसिल्टिंग पिट (0.75 मी व्यास x 1.25 मी गहरा)
- रीचार्ज टेंक 1.5 मी.चौड़ा x 2 मी.लम्बा x 1 मी.गहरा
- सीमेन्ट रिंग से निर्मित शाफ्ट (0.75 मी व्यास x 4 मी.गहरी)
- संरचना की अनुमानित लागत रु 15,000–16,000
- वार्षिक पुनर्भरित जल लगभग 1,25,000 लीटर
- 20 वर्षो 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 लागत रु 7000–8000
- वार्षिक पुनर्भरित जल लगभग 40,000 लीटर
- 20 वर्षो में पुनर्भरित जल लगभग 8,00,000 लीटर
- पुनर्भरित जल की लागत 1 पैसे प्रति लीटर से कम



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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