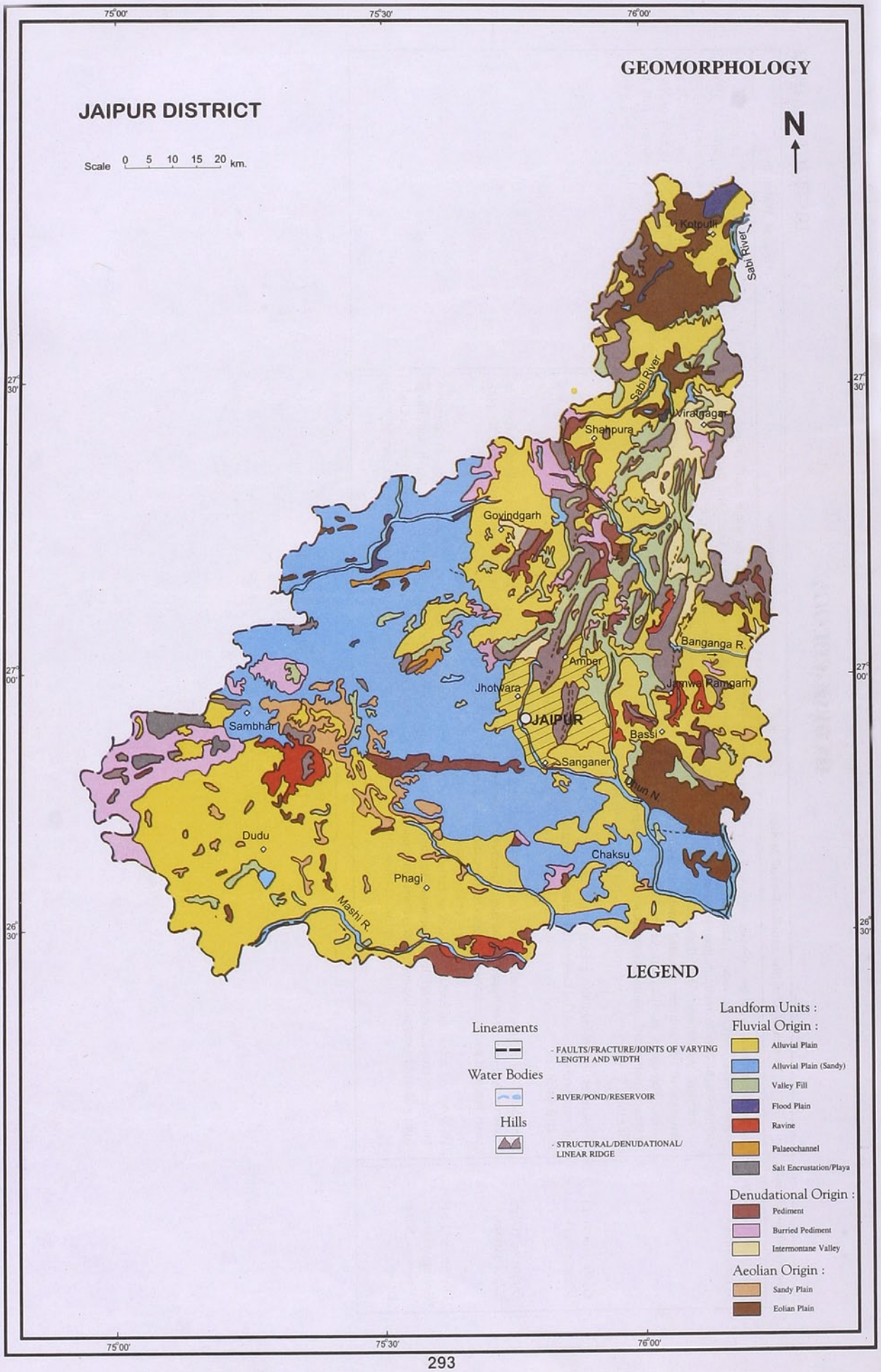
GEOMORPHOLOGY

DISTRICT—JAIPUR

Landform Units	Symbol	Lithology / Material / Description	Occurrence in district	Land use/Land cover
Fluvial Origin				
Alluvial Plain	AP	Mainly undulating land scape formed due to fluvial activity, consists of gravels, sand, silt and clay. Terrain mainly undulating, produced by extensive deposition of alluvium.	Entire southern boundry, North of Bassi, surrounding Chomu, Shahpura & Kotputli town, west of Kanota village i.e. along river Dhundh.	Double crop, single crop (Rabi / Kharif), fallow, open scrub.
Alluvial Plain (Sandy)	AP (S)	Flat to gentle undulating plain formed due to fluvial activity, mainly comprised of gravels, sand, silt and clay with unconsolidated material of varying lithology, predominantly sand along river.	Mainly concentrated in central and western part of district.	Marginal double crop, single crop (Kharif) open scrub fallow.
Valley Fill	VF	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.	Marginally in eastern part between hills.	Single crop (Rabi)
Palaeochannel	PC	Mainly burried on abandoned stream/river courses, comprising of coarse textured material of variable size.	West of Chomu town & north of Sabrampura.	Sandy area.
Salt Encrustation/ Playa	SE/PL	Topographical depressions comprising of clay, silt, sand and soluble salts, usually undrained and devoid of vegetation.	South of Sambhar lake.	Salt quarry and salt waste.
Ravine	RV	Small, narrow, deep, depression, smaller than gorges, larger than gulley, usually carved by running water.	Wind ward side of hills in eastern part, south east of Phulera town.	Single crop (Kharif), fallow, open scrub.
Flood Plain	FP	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.	Along rivers Dhundh & Mendha.	Single crop (Rabi), fallow, open scrub.
Denudational Origin				
Pediment	P	Broad gently sloping rock flooring, erosional surface of low relief between hill and plain, comprised of varied lithology, criss crossed by fractures & faults.	Along hills in eastern and northern part of district also west of Sanganer town.	Single crop (Kharif), crop open scrub.
Burried Pediment	BP	Pediment covered essentially with relatively thicker alluvial, colluvial or weathered materials.	Mainly scattered in north and north east.	Single crop (Kharif), fallow, open scrub.
Intermontane Valley	IV	Depression between mountains, generally broad & linear, filled with colluvial deposits.	Marginally in between hills near Benrath village.	Marginal double crop, single crop (Rabi/Kharif), fallow.
Eolian Origin				
Sandy Plain	SP	Formed by aeolian activity, wind blown sand with gentle sloping to undulating plain, comprising of coarse sand, fine sand, silt & clay.	South of Sambhar lake, east of Hingonia Sagar.	Single crop (Kharif), land with or without scrub.
Eolian Plain	EP	Formed by aeolian activity, with sand dunes of varying height, size, slope. Long stretches of sand sheet. Gentle sloping flat to undulating plain, comprised of fine to medium grained sand and silt. Also scattered xerophytic vegetation.	South of Kotputli town.	Single crop (Kharif) fallow, open scrub.
Hills				
Denudational Hill	DH	Steep sided, relict hills undergone denudation, comprising of varying lithology with joints, fractures and lineaments.	East & north east of Jaipur city, around of Jamwa Ramgarh lake.	Open scrub, forest, mining.
Structural Hill	SH	Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc.	Scattered in northern and eastern part.	Forest, open scrub, mining.
Linear Ridge	LR	Long narrow low-lying ridge usually barren having high run-off may form over varying lithology with controlled strike.	Scattered in eastern part.	Barren, with or without scrub, forest, mining.

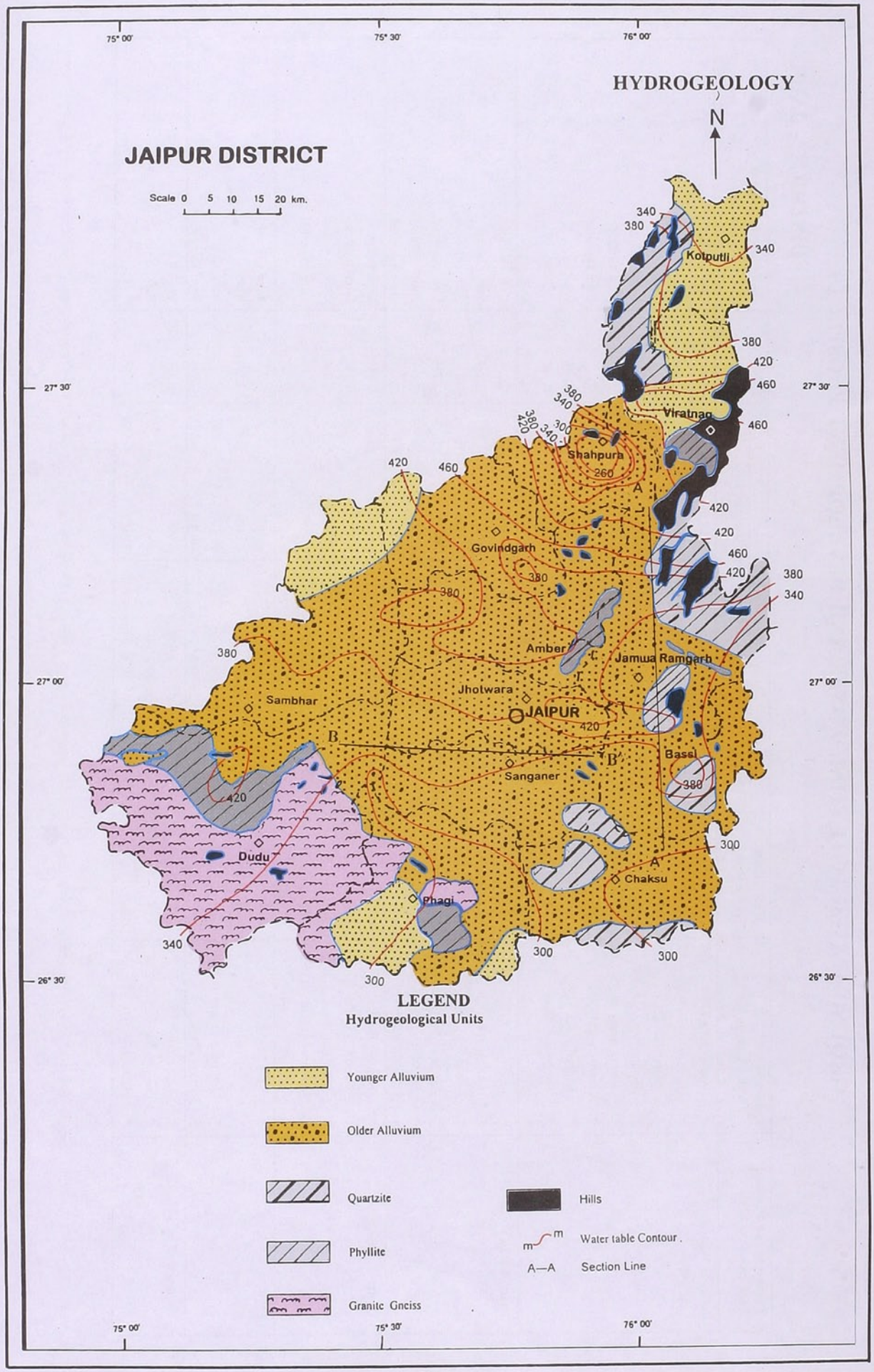

GEOMORPHOLOGY
JAIPUR DISTRICT
N
Scale 0 5 10 15 20 km.
75°00'
75°30'
76°00'
27°30'
27°00'
26°30'
Kotputli
Sabi River
Shahpura
Viratnagar
Govindgarh
Banganga R.
Amber
Jhotwara
Jamwa Ramgarh
JAIPUR
Bassi
Sambhar
Sanganer
Dhund N.
Chaksu
Dudu
Phagi
Mashi R.
LEGEND
Lineaments
- FAULTS/FRACTURE/JOINTS OF VARYING LENGTH AND WIDTH
Water Bodies
- RIVER/POND/RESERVOIR
Hills
- STRUCTURAL/DENUDATIONAL/ LINEAR RIDGE
Landform Units :
Fluvial Origin :
Alluvial Plain
Alluvial Plain (Sandy)
Valley Fill
Flood Plain
Ravine
Palaeochannel
Salt Encrustation/Playa
Denudational Origin :
Pediment
Burried Pediment
Intermontane Valley
Aeolian Origin :
Sandy Plain
Eolian Plain

HYDROGEOLOGY

DISTRICT—JAIPUR

Hydrogeological units	Description of the unit/Geological section	Occurrence	Ground Water flow
Younger Alluvium (Quaternary)	It mainly includes wind blown sand, talus and scree deposits with some fluvial deposits along drainage channels. Alluvium is composed of fine to medium grained sand, silt, clay and kanker in varying proportions. The deposits on the flank of hills is consisted of fine to coarse grained sand and angular fragments of rocks. Thickness of alluvium varies considerably. It generally increases northward and in major part of the area noticed less than 100 m.	The litho unit, leaving aside some southern peripheral blocks like Chaksu, Phagi, Dudu and part of Sambhar block, occupies major part of the area.	There is significant variation in direction of ground water flow. In northern part, it is SW to NE. Near Shahpura, there is a ground water basin. In other part, ground water flow has been inferred N to S with variation from NNE to SSW or NNW to SSE. Hydraulic gradient in southern part and near Shahpura varies from 1.33 to 13.33 m/km.
Older Alluvium (Quaternary)	It includes fine to medium grained sand, silt, clay and kanker in varying proportions. Thickness of alluvium generally encountered less than 50 m.	The litho unit covers entire Sanganer block and spreads in major part of Sambhar, Phagi, Dudu, Chaksu and Bassi blocks.	
Quartzite (Delhi Super Group)	The litho unit is generally of grey colour but fawn, buff and white colours have also been found in the area. Quartzite is medium to coarse grained and varies from feldspathic grit to sericitic quartzite.	The litho unit occurs as small localised pocket in Amber, Bairath, Bassi, Jamwa Ramgarh and Kotputli blocks.	
Phyllite and Schist, Granite Gneiss (Bhilwara Super Group)	Phyllite and schist included argillaceous meta sediments. Granite and gneiss characteristically have gneissic structure comprising light coloured feldspathic and dark ferromagnesian minerals.	Phyllite and schist occupy small area in southern peripheral part in Dudu, Jamwa Ramgarh and Phagi blocks. Granite & gneiss cover extensive area in Dudu block and extends in western peripheral part of Phagi block.	

For cross section(s) please see page no. 547

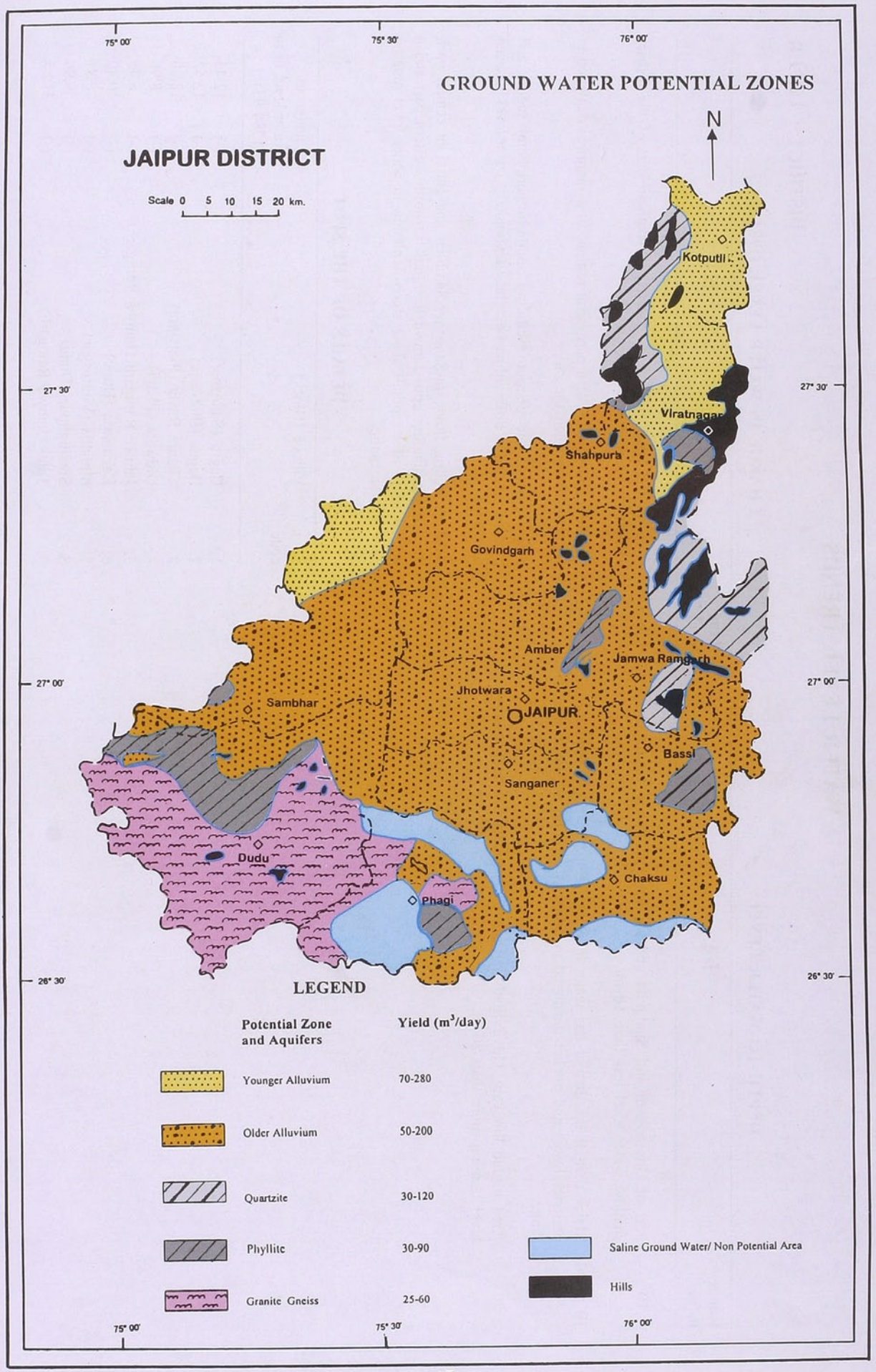

HYDROGEOLOGY
JAIPUR DISTRICT
Scale 0 5 10 15 20 km.
N
75° 00'
75° 30'
76° 00'
27° 30'
27° 00'
26° 30'
Kotputli
Viratnagar
Shahpura
Govindgarh
Amber
Jamwa Ramgarh
Jhotwara
JAIPUR
Sambhar
Sanganer
Bassi
Dudu
Chaksu
Phagi
LEGEND
Hydrogeological Units
Younger Alluvium
Older Alluvium
Quartzite
Phyllite
Granite Gneiss
Hills
Water table Contour .
Section Line

GROUND WATER POTENTIAL ZONES AND DEVELOPMENT PROSPECTS

DISTRICT - JAIPUR

Aquifer in the Potential Zone (Area in Km²)	Occurrence * Block (Area in Km²)	Water Level (1997) in m.	Well Parameters			E.C. X10³µ siem/cm	Development Prospects
			Type	Proposed depth in m	Discharge in m³/day		
Younger Alluvium (4383.51)	* Amber (746.46)	<35	TW/DCB	50-90/40-60	200-250	<2	Semi Critical
	* Bairath (588.38)	<30	TW/DCB	50-90/40-60	200-250	<2	Critical
	* Bassi (218.85)	<15	TW/DCB	50-90/30-50	200-250	<2,2-4	Critical
	* Govindgarh (638.08)	<30	TW/DCB	50-90/40-60	200-250	<2	Over exploited
	* Jamwa Ramgarh (577.82)	<35	TW/DCB	50-90/40-60	200-250	<2	Semi Critical
	* Jhotwara (553.04)	<35	TW/DCB	50-90/40-60	200-250	<2	Over exploited
	* Kotputli (427.32)	<20	TW/DCB	50-90/30-50	200-250	<2,2-4	Critical
	* Sambhar (249.44)	<15	TW/DCB	50-90/30-50	200-250	<2	Critical
	* Shahpura (384.14)	<35	TW/DCB	50-90/40-60	200-250	<2	Critical
Older Alluvium (2828.96)	* Bassi (357.62)	<25	TW/DCB	50-80/30-50	75-150	<2,2-4	Over exploited
	* Chaksu (552.06)	<20	TW/DCB	50-80/30-50	75-150	<2,2-4	Semi Critical
	* Dudu (327.26)	<25	TW/DCB	50-80/30-50	75-150	<2,2-4	Over exploited
	* Phagi (396.11)	<30	TW/DCB	50-80/40-60	75-150	<2,2-4	Over exploited
	* Sambhar (582.04)	<25	TW/DCB	50-80/30-50	75-150	<2	Over exploited
	* Sanganer (613.87)	<35	TW/DCB	50-80/40-60	75-150	<2	Over exploited
Quartzite (540.72)	* Amber (104.02)	<35	TW/DW	45-70/40-50	40-100	<2	Over exploited
	* Bairath (75.60)	<10	TW/DW	45-70/30-50	40-100	<2	Over exploited
	* Bassi (54.76)	<25	TW/DW	45-70/35-50	40-100	<2,2-4	Over exploited
	* Jamwa Ramgarh (175.80)	<20	TW/DW	45-70/30-50	40-100	<2	Over exploited
	* Kotputli (130.54)	<25	TW/DW	45-70/35-50	40-100	<2,2-4	Over exploited
Phyllite and Schist (704.64)	* Chaksu (177.30)	<15	TW/DW	50-60/20-25	40-100	<2,2-4	Semi Critical
	* Dudu (407.93)	<30	TW/DW	50-60/35-50	40-100	<2,2-4	Safe
	* Jamwa Ramgarh (136.01)	<20	TW/DW	50-60/30-50	40-100	<2	Semi Critical
	* Phagi (73.40)	<15	TW/DW	50-60/30-50	40-100	<2,2-4	Semi Critical
Granite Gneiss (1431.93)	* Dudu (1055.68)	<20	TW/DW	50-70/30-50	40-80	<2,2-4	Critical
	* Jamwa Ramgarh (72.25)	<10	TW/DW	50-70/25-40	40-80	<2	Safe
	* Phagi (304.00)	<20	TW/DW	50-70/30-50	40-80	<2,2-4	Safe

TW - Tube wells **DCB** - Dug cum borewells **DW** - Dug wells **Safe** - <65% stage of development **Semi Critical** - 65-85% development **Critical** - 85-100% development **Over exploited** - >100% development


GROUND WATER POTENTIAL ZONES
JAIPUR DISTRICT
Scale 0 5 10 15 20 km.
N
75° 00'
75° 30'
76° 00'
27° 30'
27° 00'
26° 30'
Kotputli
Viratnagar
Shahpura
Govindgarh
Amber
Jamwa Ramgarh
Jhotwara
JAIPUR
Sambhar
Bassi
Sanganer
Dudu
Chaksu
Phagi
LEGEND
Potential Zone and Aquifers
Yield (m³/day)
Younger Alluvium
70-280
Older Alluvium
50-200
Quartzite
30-120
Phyllite
30-90
Granite Gneiss
25-60
Saline Ground Water/ Non Potential Area
Hills

WATER LEVEL TRENDS

DISTRICT : JAIPUR

DEPTH TO WATER LEVEL

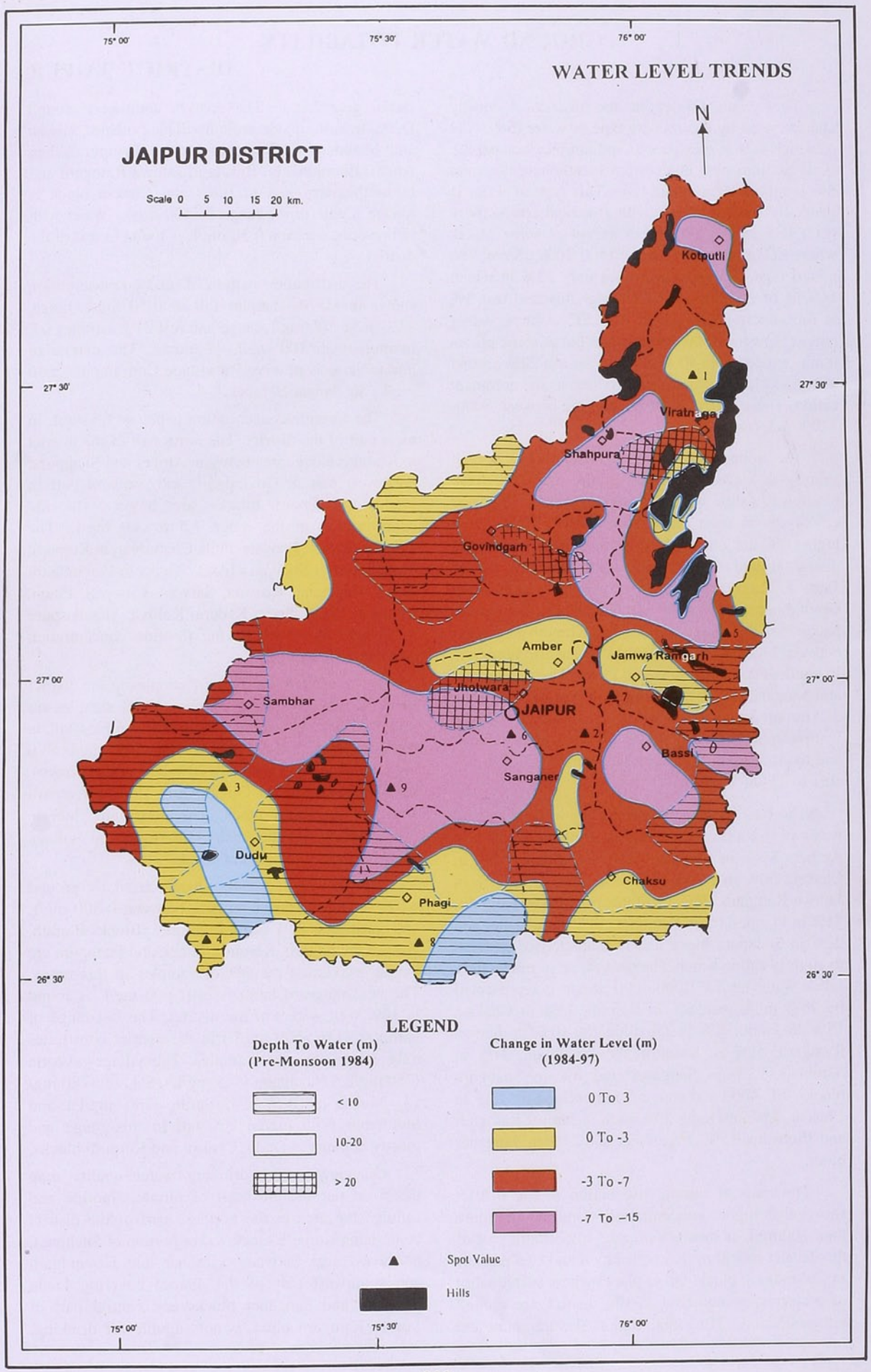
Range in m	Area
< 10	Part of Govindgarh and Shahpura and southern peripheral region has shallow water level less than 10 m.
10 to 20	Major part of the district has water level between the range, southern peripheral area and pockets scattered in different parts do not lie in the range.
> 20	Area around Jhotwara, Govindgarh and east of Shahpura has deep water level ranging more than 20 m.

CHANGE IN WATER LEVEL (1984-1997)

Range in m	Area
0 to 3	Area around Dudu and Phagi situated in southern part of the district exhibit marginal rise in water level.
0 to -3	Southern and northwestern peripheral region show marginal depletion in water level between the range.
-3 to -7	Major part of the district excluding southern peripheral region and pockets located in different part exhibits depletion in water level between the range.
-7 to -15	Area encircling Jhotwara-Sanganer-Sambhar and Bassi in central part, Shahpura extending upto Jamwa Ramgarh in north-western part and a pocket north of Kotputali show steep depletion in water level ranging between the range.

DETAILS OF THE SPOT

Spot code	Village (Block)	Change in water level in m (1984-97)
1.	Bagru (Sanganer)	(-) 12.43
2.	Begus (Jhotwara)	(-) 12.52
3.	Chaura Rasta (Jhotwara)	(-) 12.20
4.	Didwata (Phagi)	(-) 8.90
5.	Jamwa Ramgarh (Jamwa Ramgarh)	(-) 8.45
6.	Kachnaria (Dudu)	(-) 10.40
7.	Mandha (Viratnagar)	(-) 8.81
8.	Sursinghpur (Dudu)	(-) 9.90
9.	Tolai (Jamwa Ramgarh)	(-) 11.85


WATER LEVEL TRENDS
JAIPUR DISTRICT
Scale 0 5 10 15 20 km.
N
75° 00'
75° 30'
76° 00'
27° 30'
27° 00'
26° 30'
Kotputli
Viratnagar
Shahpura
Govindgarh
Amber
Jamwa Ramgarh
Jhotwara
JAIPUR
Sambhar
Sanganer
Bassi
Dudu
Chaksu
Phagi
1
2
3
4
5
6
7
8
9
LEGEND
Depth To Water (m)
(Pre-Monsoon 1984)
< 10
10-20
> 20
Change in Water Level (m)
(1984-97)
0 To 3
0 To -3
-3 To -7
-7 To –15
Spot Value
Hills

GROUND WATER POTABILITY

DISTRICT JAIPUR

The ground water in the district is mostly characterised by bicarbonate type of water (56%) out of which 42% is classified as sodium bicarbonate, 8% is of calcium plus magnesium bicarbonate type and 6% is mixed bicarbonate type. This type of water is generally fresh in nature with electrical conductivity (EC) less than 1500 µS/cm except at some places where EC of water is between 1500-3000 µS/cm. The mixed type of water constitutes only 22% in which 14% is of Na-mix, 5% is Ca-Mg- mix and rest 3% is mix-mix type of water. The EC of these water ranges between 1500-3000 µS/cm but at some places it may exceed upto 4000 µS/cm. The rest 22% ground water is chloride type having sodium as the dominant cation. These waters have EC ranging between 3000-12000 µS/cm.

The ground water is characterised by low to high salinity as viewed from the salinity map. The fresh to slightly saline water having EC below 2000 µS/cm occurs in most part of the district. Waters with higher EC are observed in south eastern part of the district around village Chaksu, central eastern part of Jamwa Ramgarh block, northwest side near Govindgarh and part of Sambhar block. Two small patches of this range one around Kotputli and other between Shahpura and Amber block are also observed. In southwest a patch between Phagi, Dudu, Sambhar and Sanganer block also have such type of water. The maximum salinity of water is found at village Untirampura (EC 12000 µS/cm) in Sanganer block and the minimum at village Mozmabad (EC 390 µS/cm) in Dudu block.

The bar diagram of salinity shows that ground water in 0-2000 us/cm range is available in 80% in Amber, 84% in Bairath, 100% in Bassi, 73% in Chaksu, 50% in Dudu, 92% in Govindgarh, 60% in Jamwa Ramgarh, 70% in Jhotwara, 48% in Kotputli, 71% in Phagi, 84% in Sambhar, 50% in Sanganer and 92% in Shahpura block and is characterised as fresh to slightly saline water. The next range of moderately saline water i.e. EC 2000-4000 µS/cm is represented by 20% in Amber, 6% in Bairath, 13% in Chaksu, 15% in Dudu, 8% in Govindgarh, 10% in Jamwa Ramgarh, 52% in Kotputli, 29% in Phagi, 31% in Sambhar, 25% in Sanganer and 8% in Shahpura blocks. EC 4000 and above is represented by 13% in Chaksu, 35% in Dudu, 30% each in Jamwa Ramgarh and Jhotwara, 15% in Sambhar and 25% in Sanganer block.

The map of nitrate distribution in the district shows that higher concentration of nitrate i.e. more than 100mg/L is mostly observed in northern part of the district including Kotputli block and two patches in Govindgarh block. Other places where such quality of water is encountered in the district are around villages Manda, Hingonia, Gadota, Untirampura and Bagru near Jaipur. The area in southwest around Dudu, in eastern side around village Nithara, Saiwad and Shahpura in Shahpura block, Bhanpurakallan, Andhi, Bhoojdhanlu, Rasala in Jamwa Ramgarh and in southeastern part in Bassi and Chaksu block is having nitrate in the range 51-100 mg/L. Water with nitrate concentration 0-50 mg/L is found in rest of the district.

The distribution pattern of nitrate concentration shows that 37% samples fall in 0-50 mg/L range, 42% in 51-100 mg/L range and rest 21% samples fall in more than 100 mg/L of nitrate. The maximum nitrate value is observed at village Untirampur (2640 mg/L) in Sanganer block.

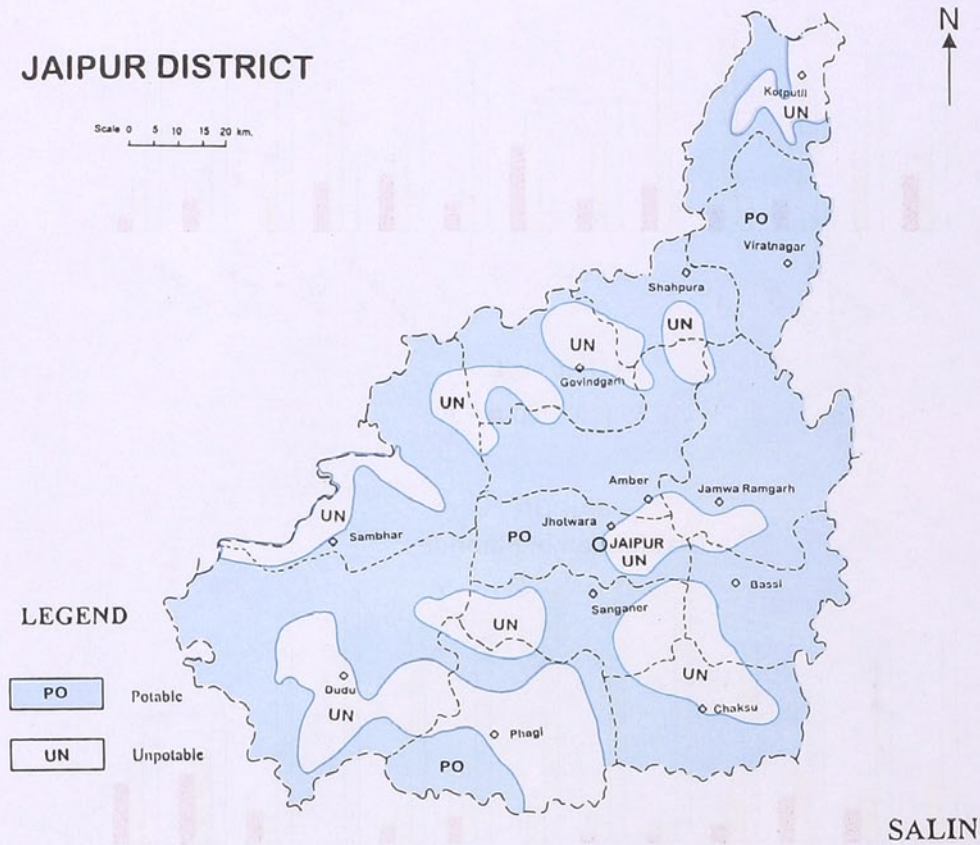
The fluoride concentration is below 1.5 mg/L in most part of the district. The north part of the district in Kotputli block, area between Amber and Shahpura, northwest part in Govindgarh and southern part in Dudu and Phagi blocks are having fluoride concentration in the range 1.5 to 3.0 mg/L. The villages Gonera, Ponyala, Putli, Chaturbhuj in Kotputli, Mohanpura in Shahpura block, Tigria in Govindgarh block, Dhamana, Korsina, Sarwad, Chatyali, Phagi, Choru in Phagi block, Kadera, Kohlye, Sheodaspura in Chaksu block are having fluoride concentration more than 3.0 mg/L.

It is observed that 75% of samples in the district lie in the range 0-1.5 mg/L whereas 17% samples are in 1.5 to 3.0 mg/L range. Only 8% samples fall in the range more than 3.0 mg/L. The higher range (>3.0 mg/L) of fluoride is found in 20% samples in Chaksu, 15% in Dudu, 8% in Govindgarh, 19% in Kotputli and 35% in Phagi block. The maximum fluoride concentration in the district is found at village Manoharpura in Shahpura block.

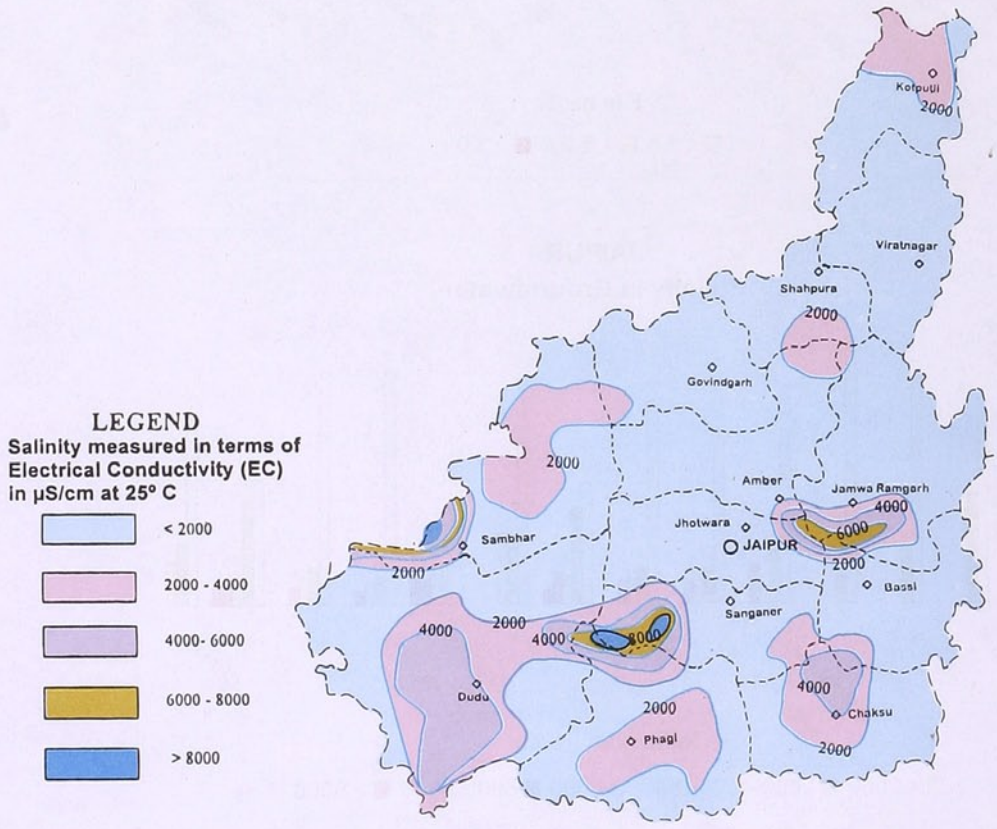
The district is mostly characterised by ground water having hardness ranging between 0-300 mg/L and constitutes 81% of total samples. Blocks Bairath, Bassi, Govindgarh, Kotputli, Phagi, and Shahpura are having maximum number of samples in this range. The next range of hardness 301-600 mg/L is found in 16% well waters of the district. The last range of hardness (TH >600 mg/L) in the district constitutes only 3% of the total samples. The villages Akoria (750 mg/L), Nayagaon (845 mg/L), Sakhun (780 mg/L), Narena (710 mg/L), Sarun (780 mg/L) and Sunderpur (705 mg/L) etc. fall in this range and mostly belongs to Dudu, Chaksu and Kotputli blocks.

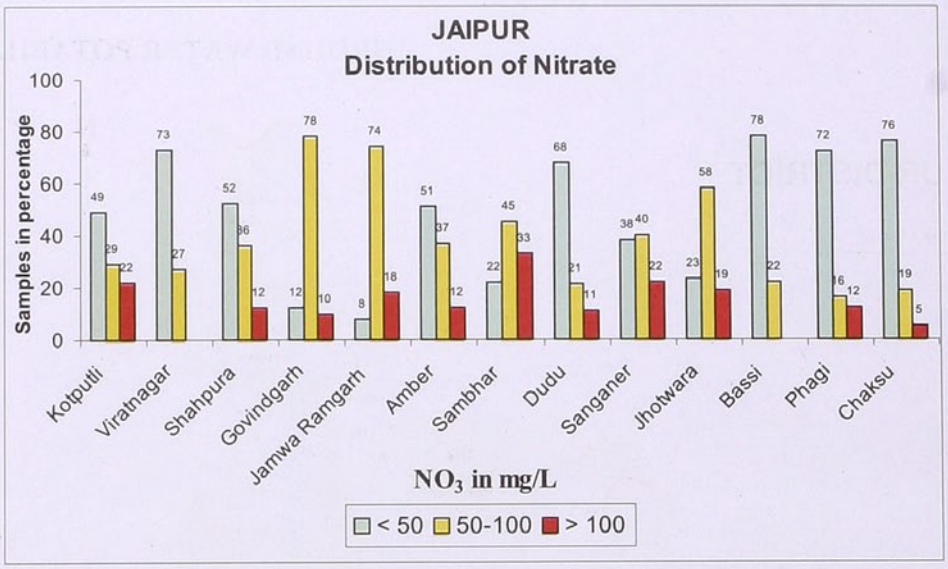
On viewing the drinking water quality map based on permissible limit of nitrate, fluoride and salinity, the area in the northern part of the district comprising Kotputli block, lower portion of Shahpura, northwest area between Sambhar and Govindgarh and southwest part of the district covering Dudu Sambhar and Sanganer blocks and central part of Jamwa Ramgarh block is not suitable for drinking.

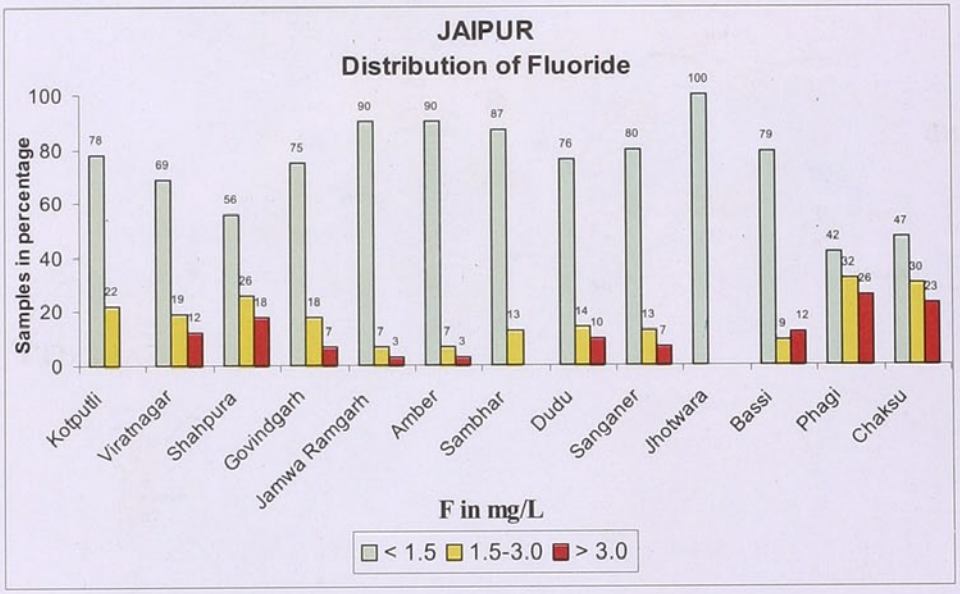
GROUND WATER POTABILITY

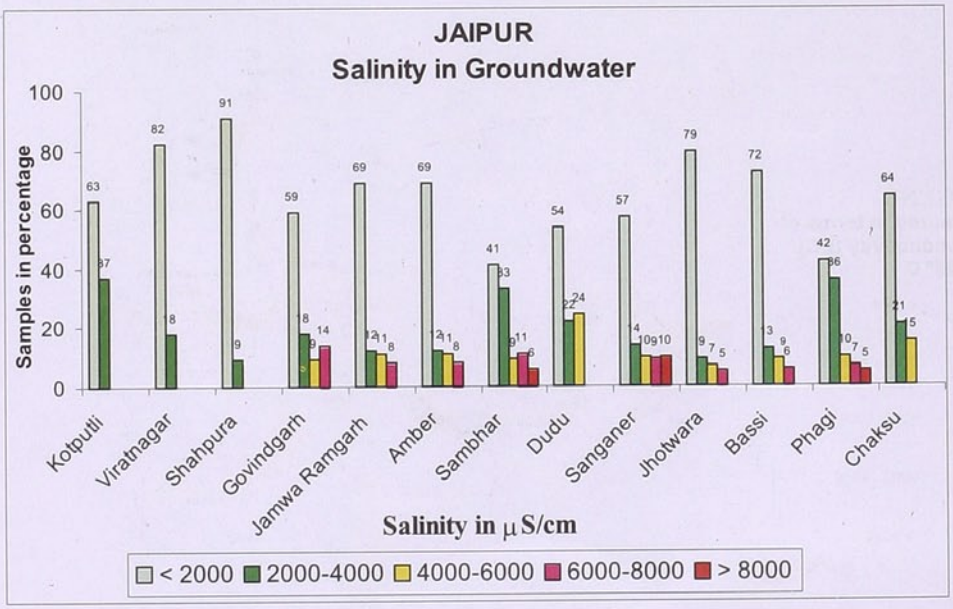


SALINITY

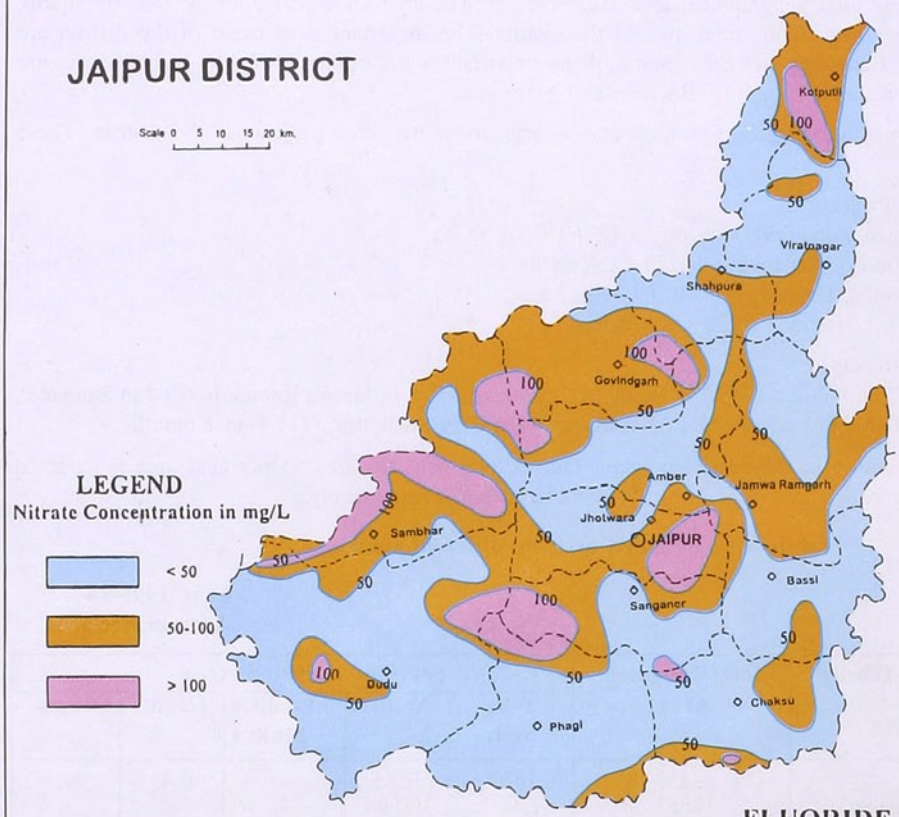



JAIPUR
Distribution of Nitrate
Samples in percentage
100
80
60
40
20
0
49 29 22
73 27
52 36 12
12 78 10
8 74 18
51 37 12
22 45 33
68 21 11
38 40 22
23 58 19
78 22
72 16 12
76 19 5
Kotputli
Viratnagar
Shahpura
Govindgarh
Jamwa Ramgarh
Amber
Sambhar
Dudu
Sanganer
Jhotwara
Bassi
Phagi
Chaksu
NO3 in mg/L
< 50
50-100
> 100


JAIPUR
Distribution of Fluoride
Samples in percentage
100
80
60
40
20
0
78 22
69 19 12
56 26 18
75 18 7
90 7 3
90 7 3
87 13
76 14 10
80 13 7
100
79 9 12
42 32 26
47 30 23
Kotputli
Viratnagar
Shahpura
Govindgarh
Jamwa Ramgarh
Amber
Sambhar
Dudu
Sanganer
Jhotwara
Bassi
Phagi
Chaksu
F in mg/L
< 1.5
1.5-3.0
> 3.0


JAIPUR
Salinity in Groundwater
Samples in percentage
100
80
60
40
20
0
63 37
82 18
91 9
59 8 9 14
69 12 11 8
69 12 11 8
41 33 9 11 6
54 22 24
57 14 10 10
79 9 7 5
72 3 9 6
42 36 10 7 5
64 21 15
Kotputli
Viratnagar
Shahpura
Govindgarh
Jamwa Ramgarh
Amber
Sambhar
Dudu
Sanganer
Jhotwara
Bassi
Phagi
Chaksu
Salinity in μS/cm
< 2000
2000-4000
4000-6000
6000-8000
> 8000

NITRATE DISTRIBUTION



FLUORIDE DISTRIBUTION