

GEOMORPHOLOGY

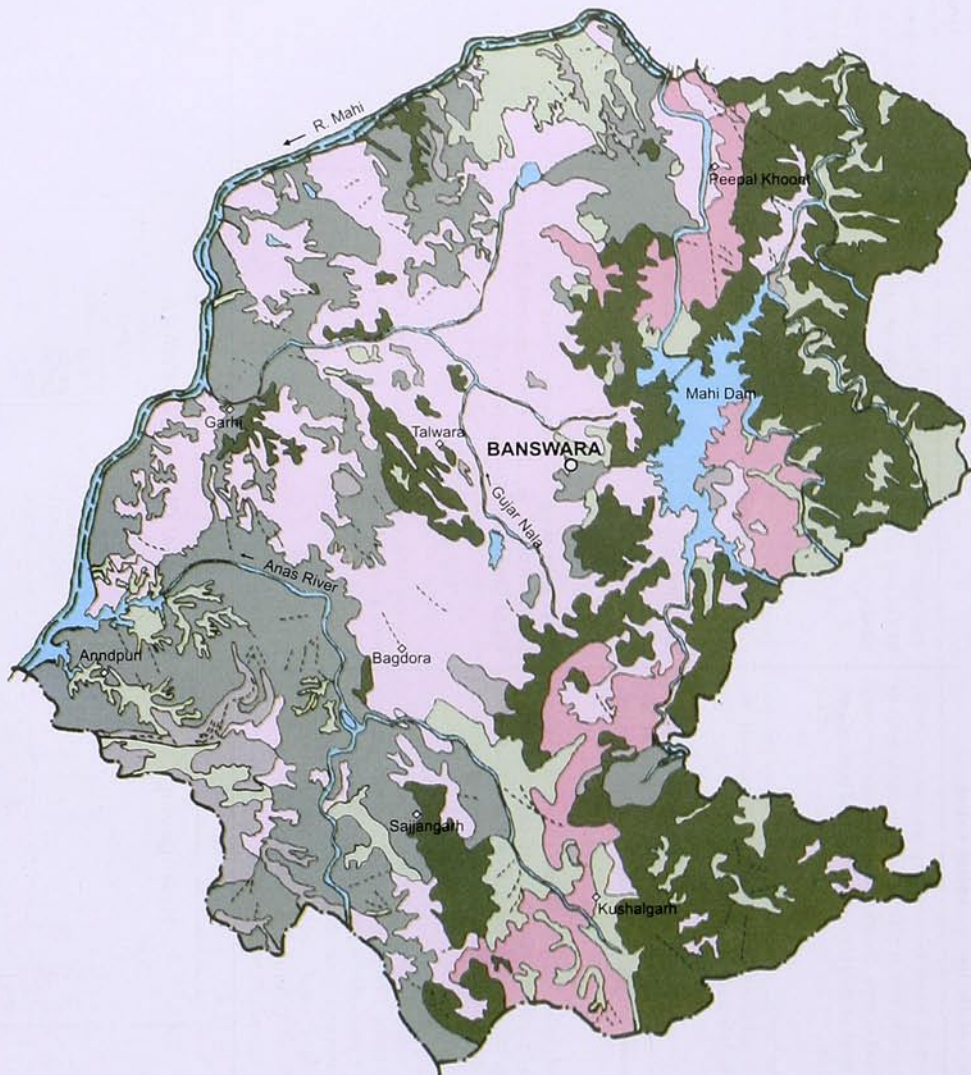
DISTRICT—BANSWARA

Landform Units	Symbol	Lithology / Material / Description	Occurrence in district	Land use/Land cover
Fluvial Origin 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.	Scattered in entire district mostly along drainage.	Single crop (Rabi / Kharif), fallow, pasture land.
Denudational Origin Piedmont Zone	PZ	Formed by coalescence of several alluvial fans by stream covering large area at foot hills, with gentle slope in humid to subhumid region.	North and south of Mahi Dam.	Double crop, single crop (Rabi / Kharif) fallow, open scrub.
Pediplain	PP	Coalescence and extensive occurrence of pediment.	Main concentration in western margin.	Marginal double crop, single crop (Rabi / Kharif), fallow, open scrub.
Burried Pediment	BP	Pediment covered essentially with relatively thicker alluvial, colluvial or weathered materials.	Scattered in entire district, main concentration in central part.	Marginal double crop, single crop (Rabi / Kharif) open scrub.
Structural Origin Plateau	PT/PL	Formed over varying lithology with extensive, flat, landscapes, bordered by escarpment on all sides. Essentially formed over horizontally layered rocky marked by extensive flat top and steep slopes. It may be criss crossed by lineament.	Along eastern margin.	Marginal double crop, single crop, (Rabi / Kharif) fallow, open scrub.
Hills Denudational Hill	DH	Steep sided, relict hills undergone denudation, comprising of varying lithology with joints, fractures and lineaments.	In south west of the district.	Forest, open scrub.
Structural Hill	SH	Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc.	Mainly concentrated in south west.	Forest, open scrub.

GEOMORPHOLOGY

BANSWARA DISTRICT

Scale 0 5 10 15 20 km.



LEGEND

Lineament



- FAULTS/FRACTURES/JOINTS OF VARYING LENGTH AND BREADTH

Water Bodies



- RIVER/POND/RESERVOIR

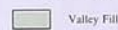


Hills

- STRUCTURAL/LINEAR/DENUDATIONAL

Landform Units :

Fluvial Origin :

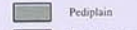


Valley Fill

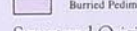
Denudational Origin :



Piedmont Zone



Pediplain



Burried Pediment

Structural Origin :

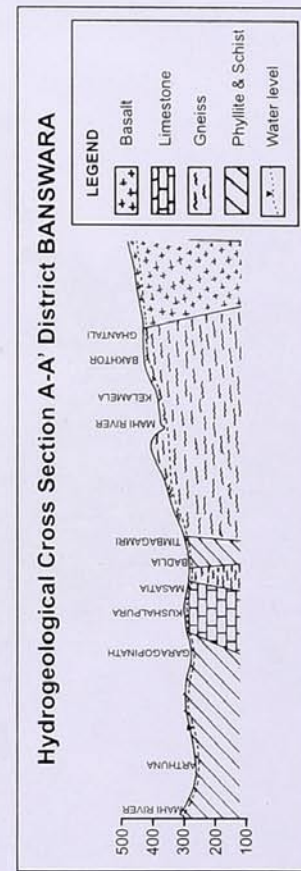


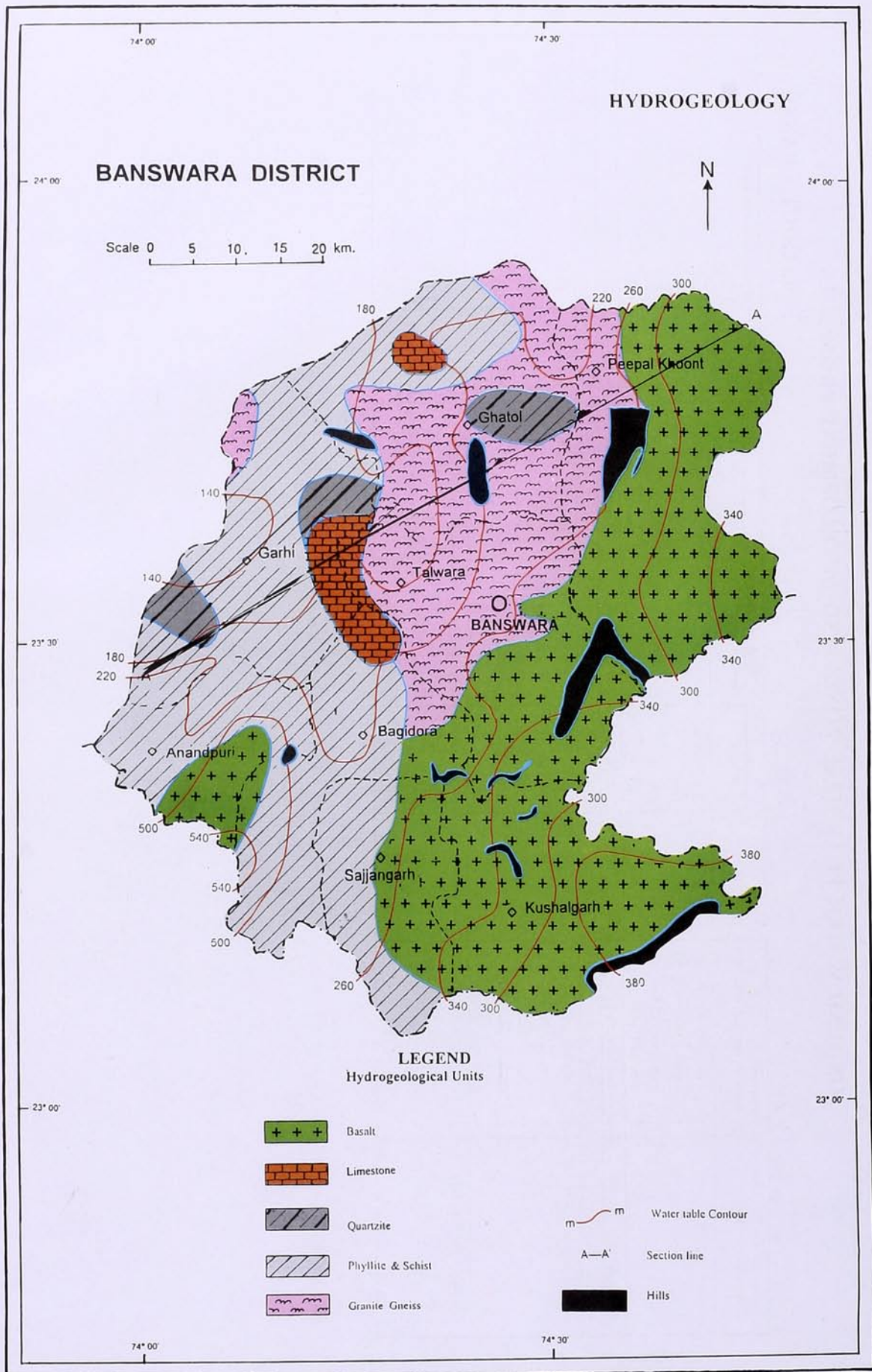
Plateau

HYDROGEOLOGY

DISTRICT—BANSWARA

Hydrogeological units	Description of the unit/Geological section	Occurrence	Ground Water flow
Basalt (Upper Cretaceous to Palaeocene)	These are generally dark green to steel grey in colour, fine to medium grained and porphyritic at places. Basalt is hard, massive amygdaloidal to vesicular type. Intratrappeans are not common, occasionally thin layer of reddish clayey material (red bole) occurs between the two flows.	The litho unit occupies Kushalgarh, Peepal Khoont blocks and extends in parts of Talwara and Sajjangarh blocks.	General direction of ground water flow has been inferred from SE to NW or E to W. Hydraulic gradient varies considerably. It is minimum around Bagidora (1.6 m/km). The southern peripheral area around Peepal Khoont generally has more steep hydraulic gradient.
Limestone (Upper Cretaceous)	The litho unit is pale purple, massive to partial crystalline and contains quartz and concretions of chalcedony. Thickness of the formation is generally less than 10 m.	Two localised pockets of the litho unit have been noticed in Talwara and Ghatol blocks.	
Quartzites (Aravalli Super Group)	These comprise conglomeratic and gritty quartzite and contain pebbles and cobbles apparently derived from members of the gneissic complex. Bands of para amphibolites often occurs in association.	The litho unit occurs in localised pockets in Garhi block.	
Phyllite and Schist (Aravalli Super Group)	Argillaceous facies of Aravalli Super Group known as Udaipur Group is represented by phyllites which are often carbonaceous, and micaceous schists, etc. These are generally soft and susceptible to weathering. The rocks have varied mineralogical composition & physical characteristics.	These litho units cover extensive area and occupies western half of the district in Anandpuri, Bagidora, Garhi Ghatol and Sajjangarh blocks.	
Banded Granite Complex (Bhilwara Super Group)	These include rock assemblages of granite, gneisses, schists, pegmatite and amphibolites. Granite is medium to coarse grained, grey to pink colour in the northern part, whereas due to intimate association with different rock types in the central part of the area, often change their original status. Gneisses are generally medium to coarse grained and crudely foliated. Schists are grey to greenish grey and medium to coarse grained.	The litho unit encompasses part of Peepal Khoont block with a small localised area in Garhi block.	





GROUND WATER POTENTIAL ZONES AND DEVELOPMENT PROSPECTS

DISTRICT - BANSWARA

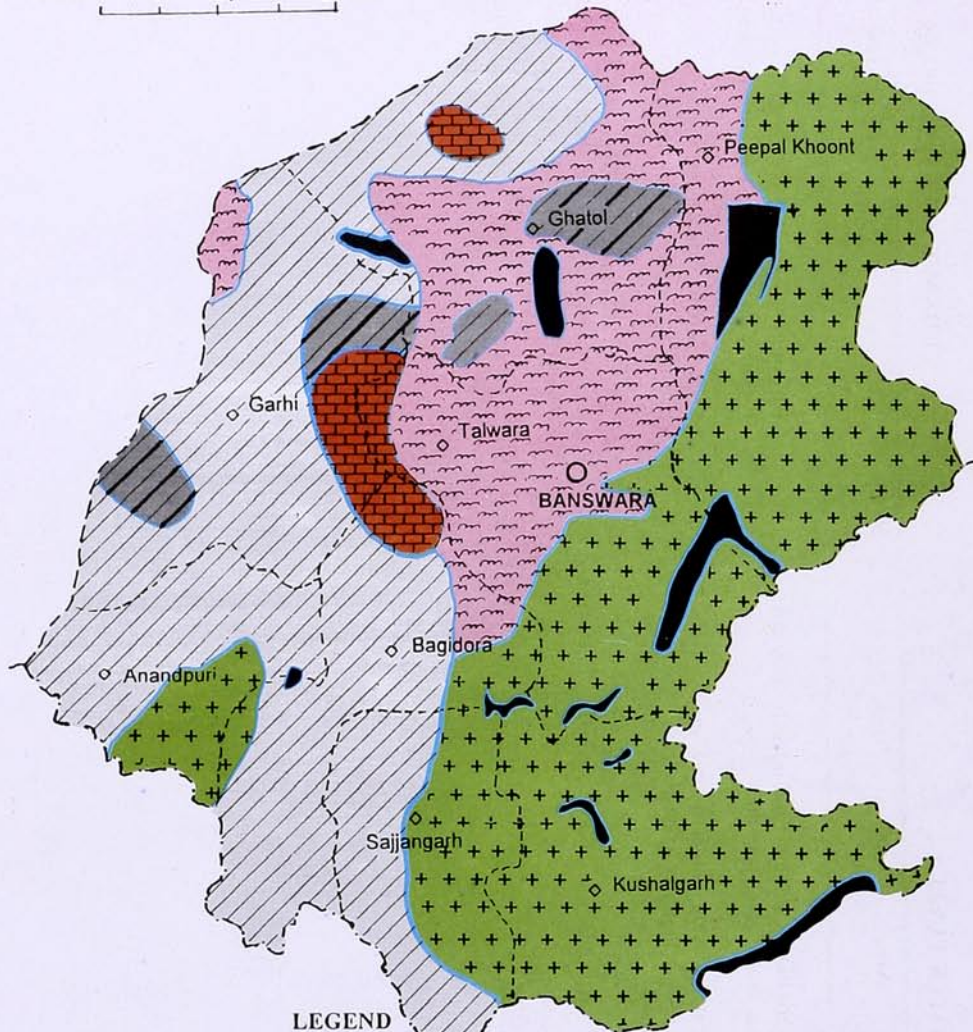
Aquifer in the Potential Zone (Area in Km ²)	Occurrence * Block (Area in Km ²)	Water Level (1997) in m.	Well Parameters		Discharge in m ³ /day	E.C. X10 ⁻⁶ siem/cm	Development Prospects
			Type	Proposed depth in m			
Basalt (1238.43)	* Kushalgarh (507.89)	<10	DW	15-20	30-75	<2	Safe
	* Peepal Khoont (435.79)	<15	DW	20-25	40-100	<2	Safe
	* Sajjangarh (73.75)	<10	DW	15-20	30-75	<2	Safe
	* Talwara (221.00)	<10	DW	15-20	30-75	<2	Safe
Limestone (80.62)	* Talwara (80.62)	<10	TW/DW	50-60/20-25	150-200/25-30	<2	Safe
	* Garhi (78.35)	<10	DW	20-25	40-100	<2	Safe
Phyllite & Schist (1005.53)	* Anandpuri (329.38)	<10	DW	20-25	35-80	<2	Safe
	* Bagidora (500.49)	<15	DW	20-25	35-80	<2	Safe
	* Garhi (551.17)	<10	DW	20-25	35-80	<2	Safe
	* Ghatol (247.77)	<10	DW	20-25	40-100	<2	Safe
	* Sajjangarh (276.72)	<10	DW	20-25	35-80	<2	Safe
	* Talwara (221.00)	<10	DW	20-25	30-75	<2	Safe
Granite Gneiss (986.49)	* Garhi (70.92)	<10	DW	20-25	35-80	<2	Safe
	* Ghatol (433.14)	<15	DW	20-25	40-100	<2	Safe
	* Peepal Khoont (168.12)	<10	DW	20-25	40-100	<2	Safe
	* Talwara (314.31)	<10	DW	20-25	40-100	<2	Safe

TW - Tube wells 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

BANSWARA DISTRICT

Scale 0 5 10 15 20 km.



LEGEND

Potential Zone and Aquifers Yield (m³/day)



Basalt

30-75



Limestone

60-150



Quartzite

30-60



Phyllite & Schist

25-80



Granite Gneiss

30-100



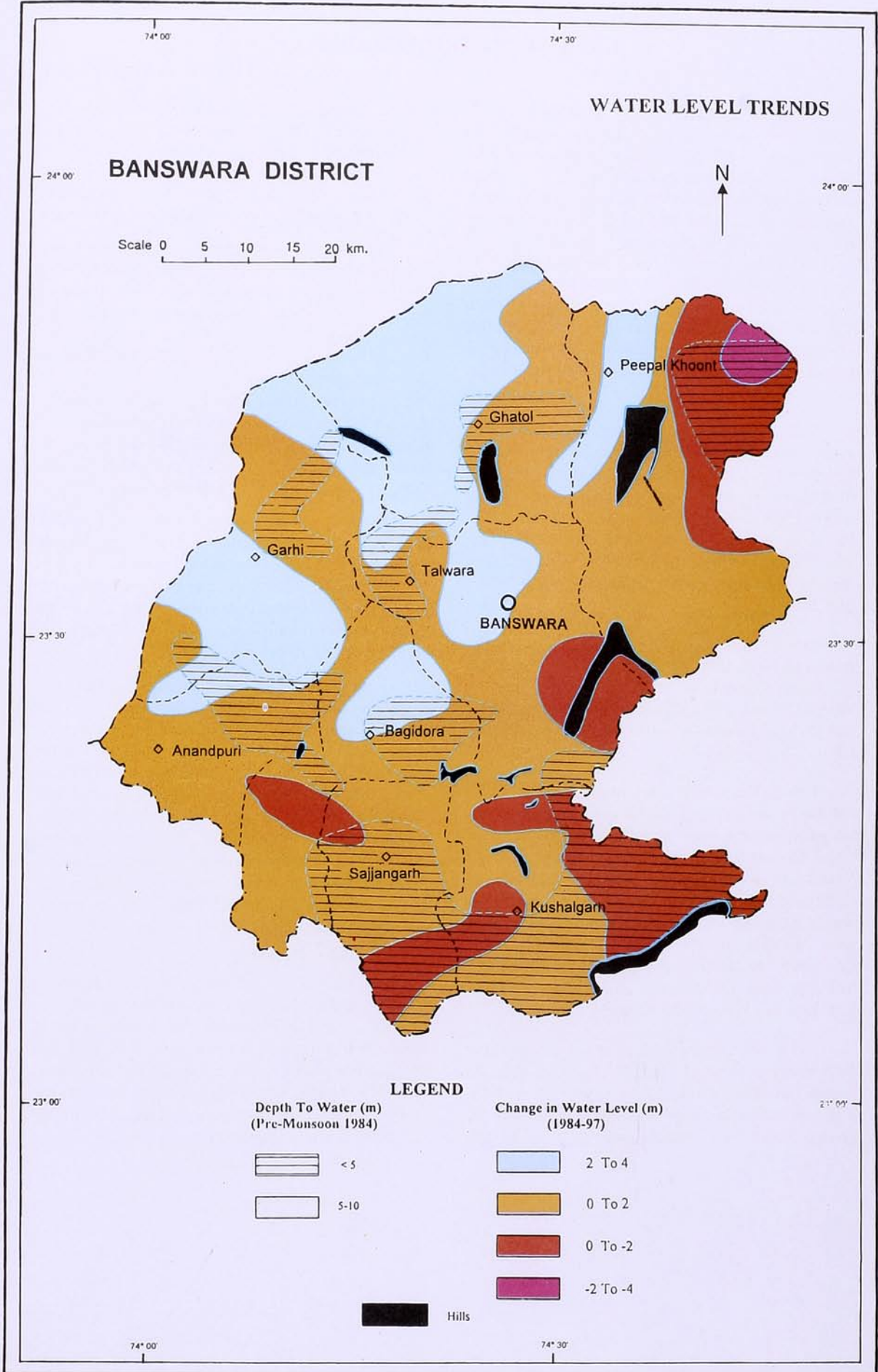
Hills

WATER LEVEL TRENDS

DISTRICT : BANSWARA

CHANGE IN WATER LEVEL (1984-1997)

Range in m	Area	Range in m	Area
< 5	Part of Sajjanganr and Kushalgarh blocks and localised pockets scattered in different blocks have shallow water level less than 5 m.	2 to 4	Part of Talwara and Ghatol blocks and area around Garhi, Bagidora and Peepal Khoont exhibit rise in water level within the range.
5 to 10	Major part of the district, leaving aside southern area and pockets scattered in different parts lie in this depth range.	0 to 2	Major part of district, leaving aside pockets in different blocks, shows rise in water level within the range.
		0 to -2	Part of Kushalgarh, Talwara and Peepal Khoont blocks situated along eastern periphery exhibit marginal depletion in water level within the range.
		-2 to -4	A very small patch [1% of total geographical area] in north eastern corner of Peepal Khoont exhibit depletion within this range.



GROUND WATER POTABILITY DISTRICT BANSWARA

Ground water in the district is fresh; having low salinity characterised by calcium magnesium bicarbonate. 89.6% groundwater in the district have bicarbonate type of character with Ca+Mg as dominant cations. Sodium bicarbonate type of groundwater is seen in 9.1% samples. The mixed anionic character is shown by 7.8% of ground water, out of these 6.5% have calcium+magnesium dominance and only 1.3% have sodium dominance. Mixed type of groundwater is found in blocks - Ghatol, Sajjangarh and Talwara. The rest 2.6% of ground water have sodium chloride type of character. It is also inferred that around 87% of ground water have dominance of Ca+Mg amongst cations.

Salinity as depicted by electrical conductivity expressed in microsiemens/cm varies from 210 in Umedgarh to 2700 in Chhinch of block Bagidora. 97.4% groundwater in the district have EC values within 1500 μ S/cm. Ground water in village Chhaja, block Anandpuri, Jalana, block Garhi, Delwara, Block Ghatol, Bilari and Chhota Loharia of block Sajjangarh have EC values in the range of 1500-2000 μ S/Cm.

Salinity depicted as total dissolved solids varies from 149 mg/L in village Umedgarh to 1535 mg/L in village Chhinch of block Bagidora. Except in village Chhinch of Bagidora, the ground water in the district have total dissolved solids within 1500 mg/L.

Though the ground water has low salinity level, but due to dominance of calcium and magnesium, the total hardness of water is relatively high. It varies from 65 mg/L in village Bhamarkot of block Kushalgarh to 643 mg/L in village Delwara of block Ghatol. 85.2% of ground water have total hardness within 300 mg/L whereas 14.3% of groundwater have total hardness in the range of 300-600 mg/L. Comparatively, the Ground water in block Kushalgarh has low hardness whereas groundwater in block Bagidora has higher total hardness values.

The nitrate in ground water of the district varies from traces to 206 mg/L. In 83% of ground water the nitrate values are within 50 mg/L whereas in 7.4%, it has nitrate in the range of 51-100 mg/L. Only 3% ground water have nitrate above 100 mg/L. The

highest value of nitrate (206 mg/L) occurs at village Jalana block Garhi. On viewing the map showing distribution of nitrate, it is seen that higher range of 51-100 mg/L occurs in Bagidora and Ghatol blocks. The nitrate content above 100 mg/L is seen only in localised patches distributed throughout the district.

The fluoride concentration in ground water varies from 0.06 mg/L in village Umrai of block Talwara to a maximum of 6.45 mg/L in village Bilari of Sajjangarh block. 86% of ground water have fluoride within 1.5 mg/L whereas 10.9% of ground water have fluoride in the range of 1.5-3.0 mg/L, which covers substantial part of Ghatol, Garhi and some small part in other blocks. About 3% of ground water having fluoride >3.0 mg/L occur in village Bhamarkot of Khushalgarh block, Semlia of Pipalkhoont block, Bilari and Bada Muska of Sajjangarh block and Samgara, Kupra and Shivpura of Talwara block.

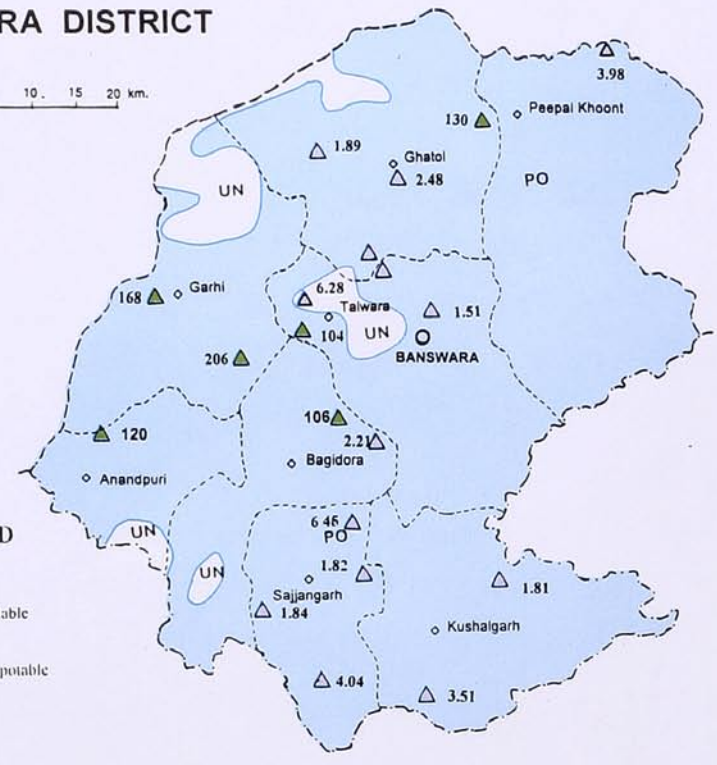
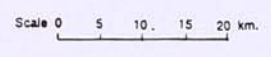
On viewing map showing fluoride distribution, it is seen that the district is free from fluoride problem ($F < 1.5$ mg/L) except some localised patches in northwest (Garhi block), central part (Talwara block) and southwest (Anandpuri block) of the district, where fluoride values above 1.5 mg/L are observed.

Ground water in the district is suitable for irrigation on clay-loam soils of the district with the condition that at no time the depth of water level should be less than 1.5 metre. This is stressed in the command area which is prone to water logging condition and the depth to water level may reach less than 1.5 metre. The sodium is less than 70% of total cations in 96.1% ground water. The 3.9% of ground water having Na% above 70 may create alkali hazard. Similarly, 91.3% ground water have residual sodium carbonate below 2.0 meq/L. Only 8.7% of ground water may impart alkali hazard as their R.S.C. value is more than 2.0 meq/L.

Suitability of ground water for drinking, judged by three main constituents viz salinity, nitrate and fluoride as per ICMR standard for drinking water is shown in quality map of the district. It is seen that except a few places in Garhi, Talwara and Anandpuri (Bhukiya) blocks having high fluoride content, the ground water in the district is suitable for drinking and other domestic purposes.

GROUND WATER POTABILITY

BANSWARA DISTRICT



LEGEND

- PO Potable
- UN Unpotable

SPOT VALUES

- ▲ Nitrate above 100 mg/L
- ▲ Fluoride above 1.5 mg/L

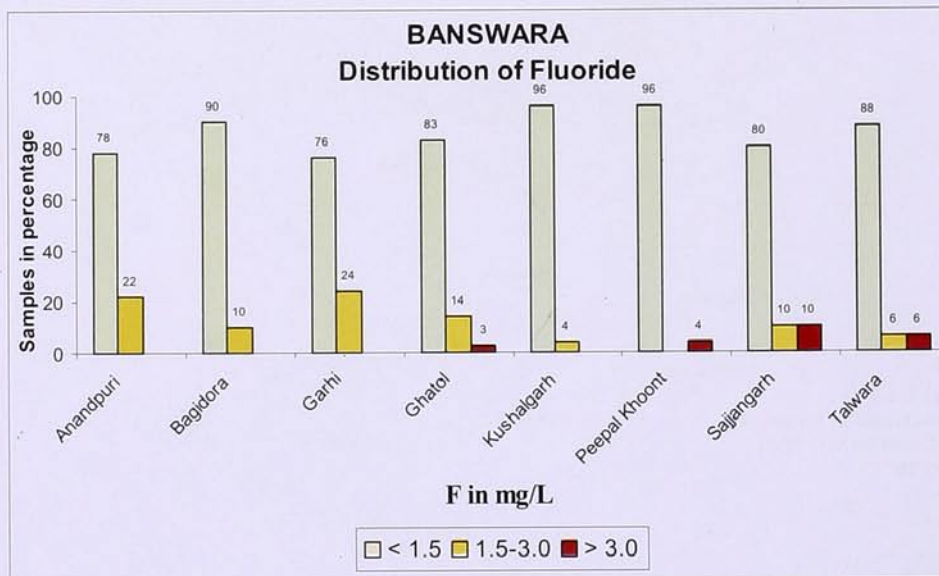
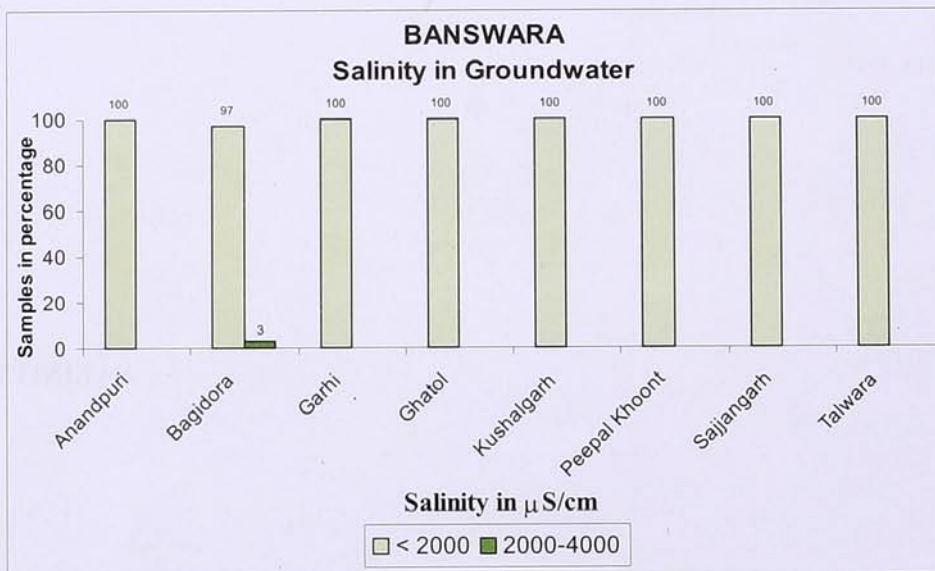
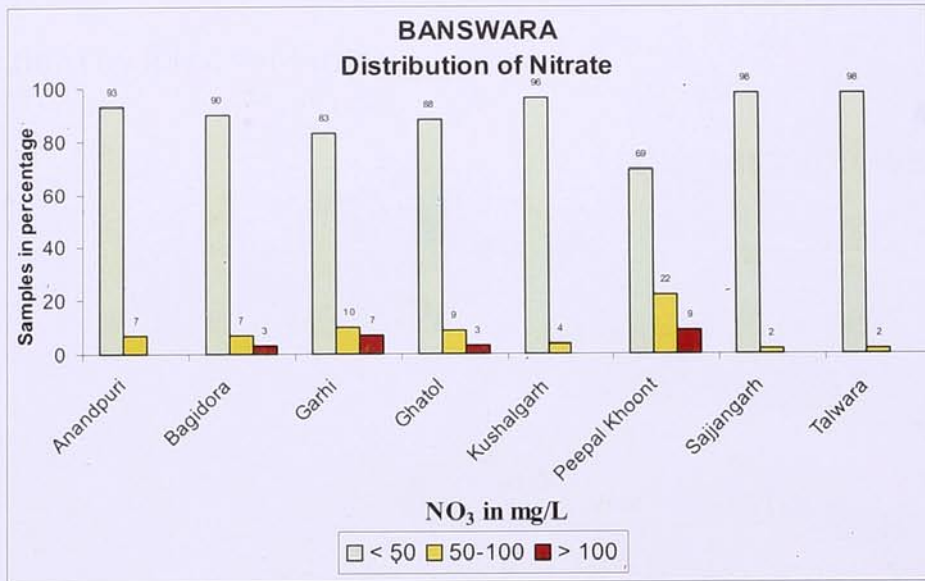
SALINITY



LEGEND

Salinity measured in terms of Electrical Conductivity (EC) in uS/cm at 25° C

- < 2000
- 2000 - 4000



NITRATE DISTRIBUTION

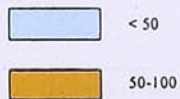
BANSWARA DISTRICT

Scale 0 5 10 15 20 km.



LEGEND

Nitrate Concentration in mg/L



FLUORIDE DISTRIBUTION

LEGEND

Fluoride Concentration in mg/L

