

## GEOMORPHOLOGY

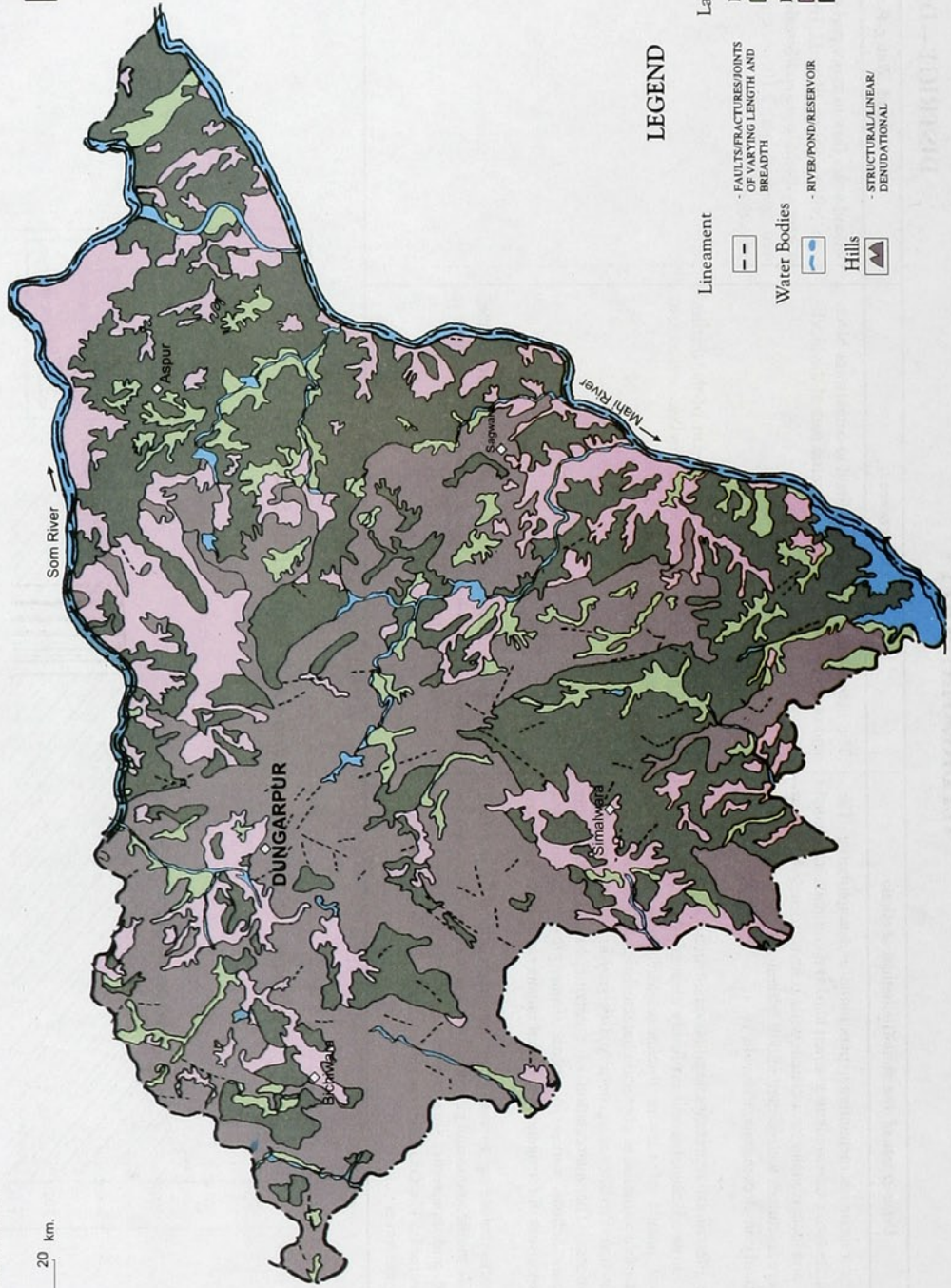
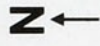
### DISTRICT—DUNGARPUR

Landform Units	Symbol	Lithology / Material / Description	Occurrence in district	Land use/Land cover
<b>Fluvial Origin</b> 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, prominent in south west and north east.	Double crop, single crop.
<b>Denudational Origin</b> Burned Pediment	BP	Pediment covered essentially with relatively thicker alluvial, colluvial or weathered materials.	Scattered in entire district, main concentration in eastern and western part of district.	Double crop, single crop (Rabi / Kharif), open scrub, fallow.
Pediplain	PP	Coalescence and extensive occurrence of pediment.	Scattered in entire district mainly in north east and southern part.	Marginal double crop, single crop (Rabi / Kharif), fallow, open scrub.
<b>Hill</b> Structural Hill	SH	Linear to arcuate hills showing definite trend-lines with varying lithology associated with folding, faulting etc.	Central and western part of the district.	Forest, mining, open scrub.

# GEOMORPHOLOGY

## DUNGARPUR DISTRICT

Scale 0 5 10 15 20 km.



### LEGEND

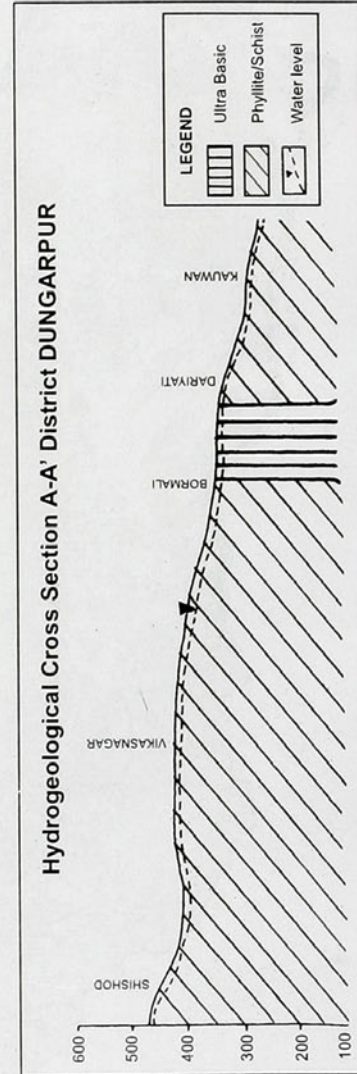
- |                         |   |  |
|-------------------------|---|--|
| <b>Lineament</b>        | - FAULTS/FRACTURES/JOINTS OF VARYING LENGTH AND BREADTH |  |
| <b>Water Bodies</b>     | - RIVER/POND/RESERVOIR                                  |  |
| <b>Hills</b>            | - STRUCTURAL/LINEAR/DENUDATIONAL                        |  |
| <b>Landform Units :</b> | <b>Fluvial Origin :</b>                                 |  |
|                         | Valley Fill   |  |
|                         | <b>Denudational Origin :</b>                            |  |
|                         | Barred Pediment   |  |
|                         | Pediplain   |  |



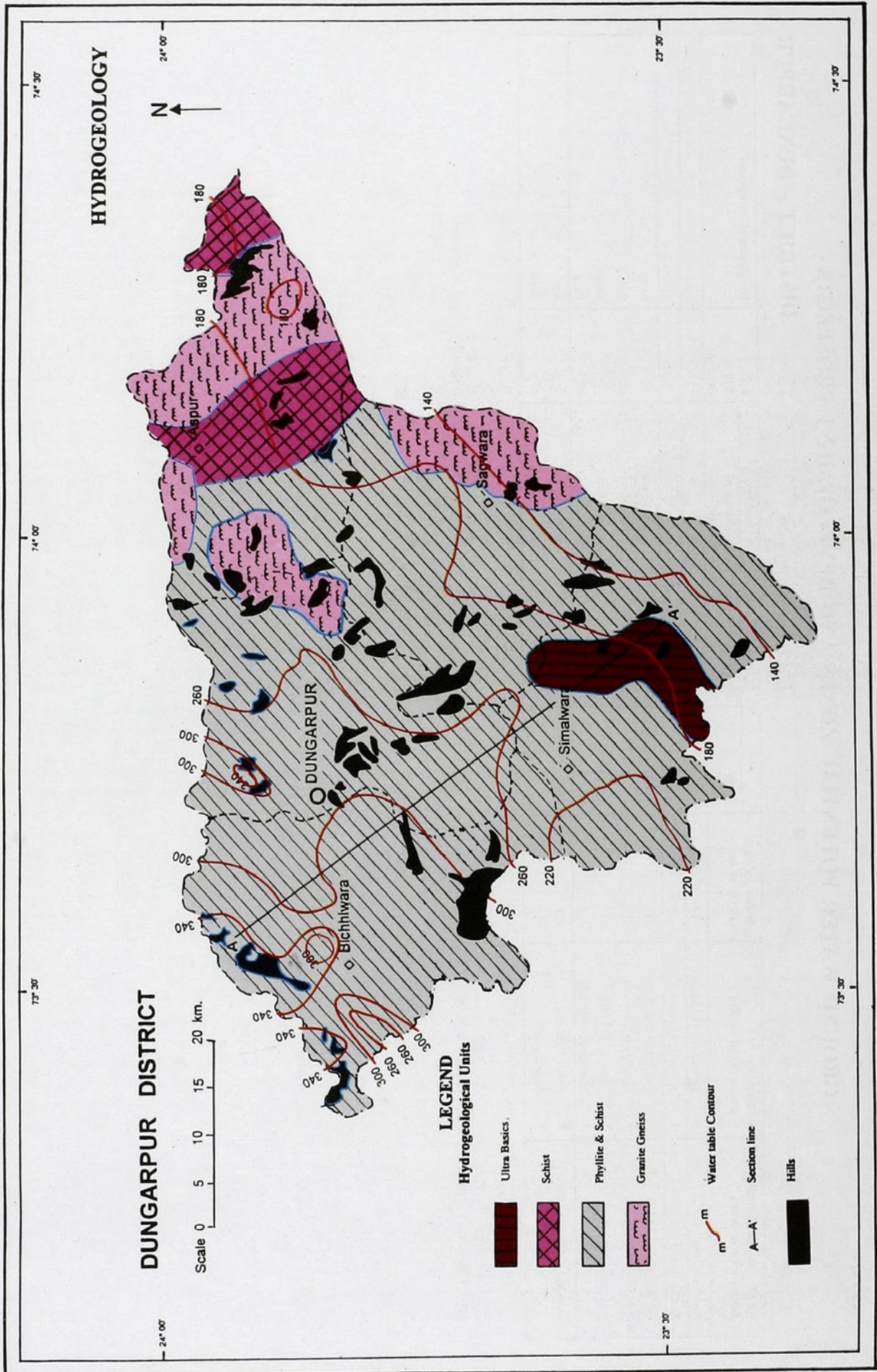
## HYDROGEOLOGY

### DISTRICT—DUNGARPUR

Hydrogeological units	Description of the unit/Geological section	Occurrence	Ground Water flow
Ultrabasics (Post Aravalli Intrusives)	These comprises serpentinite, hypersthinite and amphibolite. The litho units are fine to medium grained hard and compact, unfoliated green and occasionally associated with schists rocks. At places rocks are fractured, well jointed and exhibit significant weathering, particularly in depressions and valleys.	The litho units are mainly confined to Simalwara block and occur as elongated band in central part of the block.	Ground water flow in major part of the area varies from NW to SE or W to E. Hydraulic gradient in Aspur, Bichhiwara and Simalwara blocks have been worked out 2.10, 4.0 and 3.86 m/km respectively.
Mica schist, Phyllite and Schist (Aravalli Super Group)	These litho units represents argillaceous facies of the Aravalli Super Group. Being soft and profuseley cleaved, they occur under the soil mantle of varying thickness. Micaceous schist show considerable variation in physical characteristics and mineralogical composition. Phyllites are generally dark grey in colour and varies in hardness. The intercalation of quartzitic bands often impart hardness. Schists varies in colour from grey to green and decomposition of ferruginous material impart reddish brown stains.	Mica schist occurs in north eastern part of the district within the limit of Aspur block. Phyllite and schist encompass major part of the district.	
Banded Gneissic complex (Bhilwara Super Group)	The rocks belonging to this group are represented by alternate bands of biotite gneiss and granite. These contain some hornblende-schists and epidiorites representing interbedded altered basic igneous rocks. The Gneissic complexes often traversed by pegmatite and aplite veins.	These litho units occur in north eastern part of the district in Aspur block and localised pockets east of Sagwara along the Mahi river.	







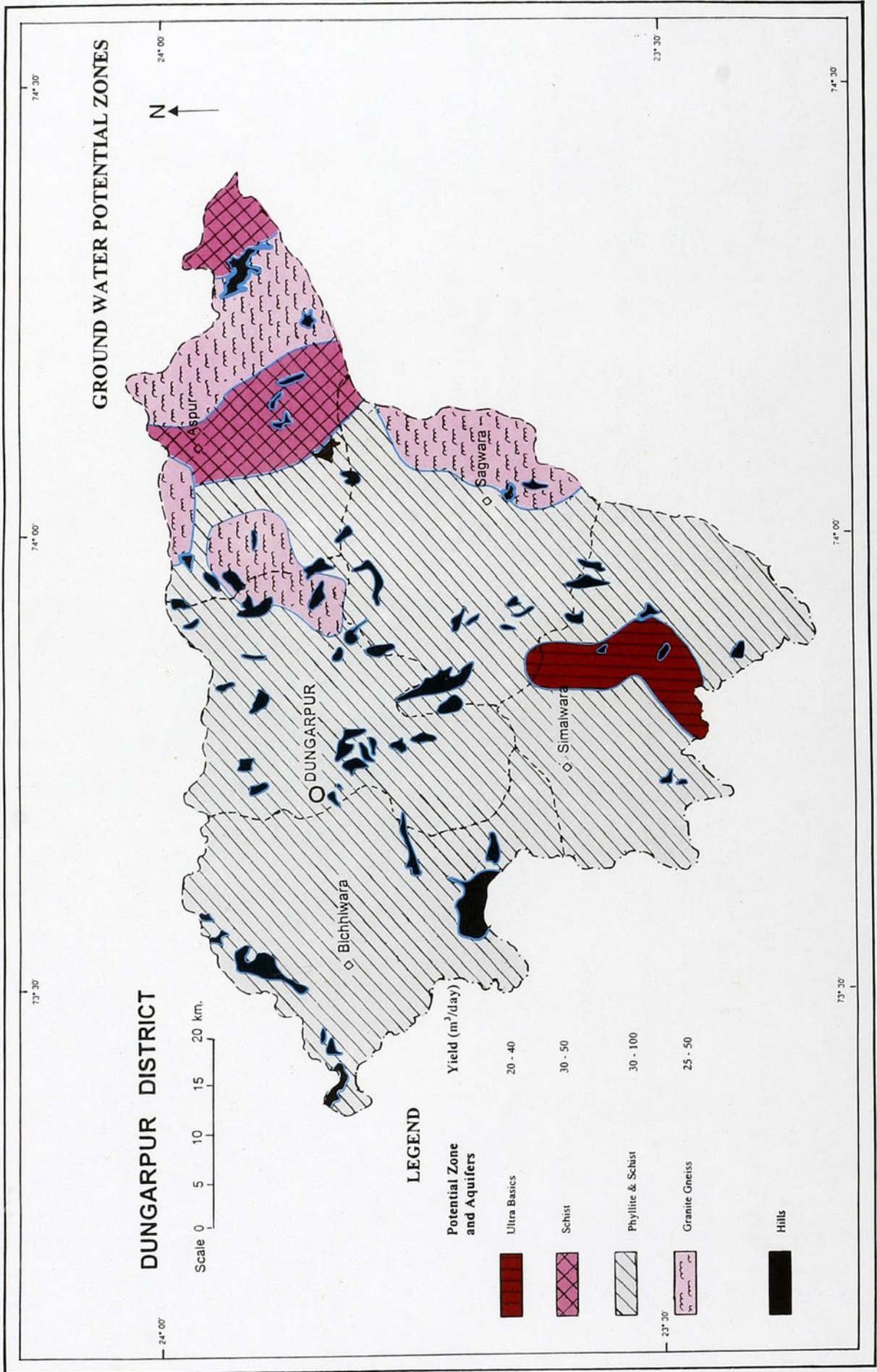
# GROUND WATER POTENTIAL ZONES AND DEVELOPMENT PROSPECTS

## DISTRICT - DUNGARPUR

Aquifer in the Potential Zone (Area in Km <sup>2</sup> )	Occurrence * Block (Area in Km <sup>2</sup> )	Water Level (1997) in m.	Type	Well Parameters		Discharge in m <sup>3</sup> /day	E.C. X10 <sup>-6</sup> siem/cm	Development Prospects
				Proposed depth in m				
Ultrabasic (81.16)	* Simalwara (81.16)	<15	DW	15-20		30-40	<2	Safe
Biotite Schist (282.06)	* Aspur (282.06)	<20	TW/DW	50-60/15-20		80-100/35-50	<2,2-4	Safe
Phyllite and Schist (1998.18)	* Bichhiwara (436.59)	<15	TW/DW	60-70/15-20		50-100/40-60	<2	Safe
	* Dungarpur (366.74)	<20	TW/DW	60-70/15-20		50-100/40-60	<2	Safe
	* Sagwara (349.03)	<15	TW/DW	60-70/15-20		50-100/40-60	<2	Safe
	* Simalwara (845.82)	<15	TW/DW	70-80/15-20		100-150/40-60	<2	Safe
Granite Gneiss (287.60)	* Aspur (232.05)	<10	DW	15-20		40-55	<2,2-4	Safe
	* Sagwara (55.55)	<10	DW	15-20		35-55	<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





## WATER LEVEL TRENDS

**DISTRICT : DUNGARPUR**

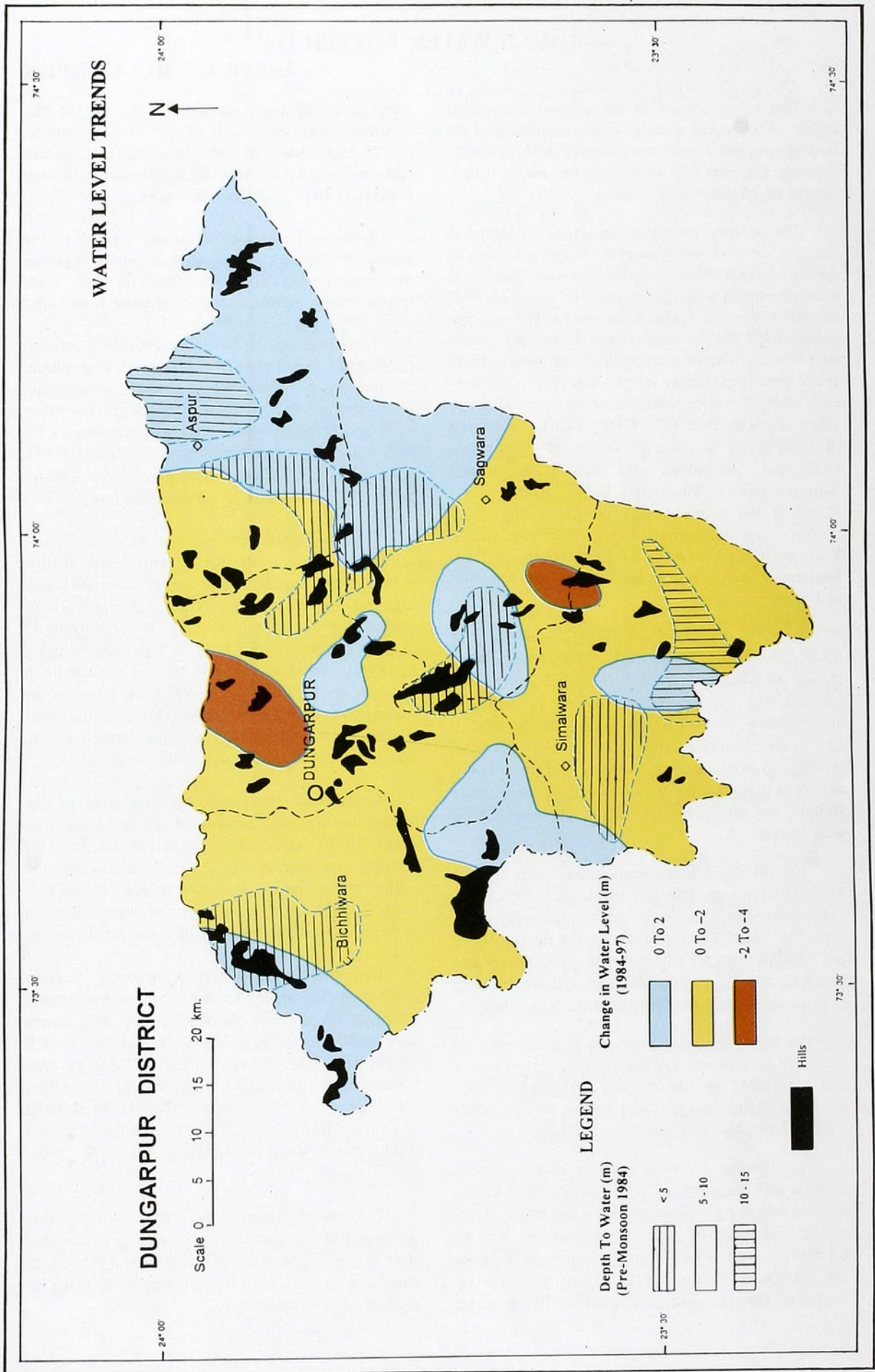
### DEPTH TO WATER LEVEL

Range in m	Area
< 5	Small pockets scattered in different parts have shallow water level less than 5 m.
5 to 10	Major part of the district, leaving aside small pockets, has depth to water level within the range.
10 to 15	Small pockets in Simalwara and Aspur blocks have depth to water level between the range.

### CHANGE IN WATER LEVEL (1984-1997)

Range in m	Area
0 to 2	Part of Aspur and Sagwara located near Jakham, Som and Mahi rivers and small pockets scattered in different blocks exhibit marginal rise in water level upto 2m.
0 to -2	Major part the district, leaving aside area along drainage courses in eastern part and small pockets scattered in different blocks, show marginal depletion in water level within the range.
-2 to -4	A localised pocket in Dungarpur block situated along northern boundary exhibit depletion in water level between the range.







## GROUND WATER POTABILITY

### DISTRICT DUNGARPUR

The ground water in the district has varied nature of chemical quality which is influenced by hydrogeological formations and geographic features. Salinity, fluoride and nitrate are the major factors which affect water quality most.

The salinity measured in terms of electrical conductivity (EC) varies from fresh with minimum of 230  $\mu\text{S}/\text{cm}$  at Bhachriya (Seemalwara block) to moderately saline having maximum value of 4300  $\mu\text{S}/\text{cm}$  at Kariyana (Sagwara block). The average value of EC for the district is 1032  $\mu\text{S}/\text{cm}$ . Nearly 91.5% water sources in the district fall in the salinity level of fresh to slightly saline water (EC < 2000  $\mu\text{S}/\text{cm}$ ) whereas 7.8% ground water have moderately saline character (EC 2000-4000  $\mu\text{S}/\text{cm}$ ). Occurrence of fresh water is more frequently in Bichhiwara, Dungarpur, Seemalwara and parts of Aspur and Sagwara blocks. Moderately saline ground water found in the southern part of Aspur block and northern part of Sagwara block. Only one village Kariyana in Sagwara block has EC 4300  $\mu\text{S}/\text{cm}$ ; Such moderately saline waters are derived from phyllite and schist aquifers.

Fresh bicarbonate type of waters have low total dissolved solids (TDS). Nearly 70.9% waters have shown bicarbonate type of character with either calcium and magnesium or sodium as dominant cation. Mixed type of waters have been observed in 24.1% and Chloride type in 4.9% water samples. Among cationic species, calcium and magnesium occurs as major cation in 84.4% well waters whereas sodium and potassium are major cations in 15.6% well waters.

The nitrate in the ground water varies from 4 mg/L (Bichriya in Seemalwara block) to 408 mg/L (Talora in Aspur block) with an average value of 45 mg/L. In 87.2% of ground waters the nitrate values are within 50 mg/L, whereas 4.3% well waters fall in the nitrate range of 50-100 mg/L. Above 100 mg/L of nitrate content are observed in 8.5% well waters.

On viewing the map showing distribution of nitrate in ground water of the district, it is observed that high range of nitrate above 100 mg/L is seen mostly in Aspur and Sagwara blocks, besides some localised patches distributed here and there.

On viewing the map showing distribution of fluoride and bar diagram, it is observed that 63.8% of well waters have fluoride within the range of 1.5 mg/L. This type of well waters can be seen at Bichhiwara, Seemalwara, Dungarpur, parts of Sagwara and Small part of Aspur block. Higher range (1.5-3.0 mg/L) of fluoride content is seen in 19.2% water

samples. In 17% water samples which cover the area in entire north-eastern part of the district, southern part of Aspur, northern part of Sagwara and western part of Dungarpur blocks, the ground water has fluoride content more than 3.0 mg/L.

In the district, granite, schist and phyllites are the sources of fluoride in ground water. It is observed that high content of fluoride occurs in those wells tapping either granite, schist or phyllite formation.

Total hardness as calcium carbonate in ground water of the district varies from 110 mg/L Gamridewal (Bichhiwara) to 1070 mg/L at Jethana (Sagwara) with an average of 347 mg/L. Nearly 39.7% ground waters have total hardness within 300 mg/L, whereas 53.2% well waters have total hardness in the range of 300-600 mg/L. Only 7.1% of it have total hardness above 600 mg/L and unsuitable for domestic use.

Though chloride and sulphate in ground water are also additive factors for drinking water quality, their higher concentration is mostly associated with high salinity. In the district all well waters have chloride value within 1000 mg/L. It varies from 13 mg/L at Bachriya to 674 mg/L at Kariyana (Sagwara block) with an average of 128 mg/L. The sulphate in groundwater is mostly below 400 mg/L which is the maximum desirable limit as per ICMR drinking water standards. Only at Kotisar in Aspur block the well water contains sulphate above 400 mg/L.

Considering the heavy textured soils of the district having clay content of 20-30%, the well waters of EC upto 2000  $\mu\text{S}/\text{cm}$  can be used for growing salt tolerant crops. 91.5% well waters are falling in this range. The salinity map shows that entire district except a saline patch in Aspur and north of Sagwara, has good quality of water for irrigation.

Irrigation with waters containing sodium percentage more than 70 and RSC more than 2 meq/L impart alkalinity to the soil. 99.3% well waters have sodium percentage below 70 and 96.4% well waters have RSC below 2 meq/L. Water of only Gamaridewal village (Bichhiwara block) has sodium percentage more than 70 and well waters of Amartia (Aspur), Banwasa (Aspur), Gamari dewal (Bichhiwara), Vamasa (Sagwara) have RSC more than 2 meq/L.

The potability map of the district indicates that major part of the district have potable ground water. Only in some parts of Aspur, Sagwara and Dungarpur blocks, the ground water is unsuitable for drinking on account of fluoride content.



# GROUND WATER POTABILITY

## DUNGARPUR DISTRICT

Scale 0 5 10 15 20 km.

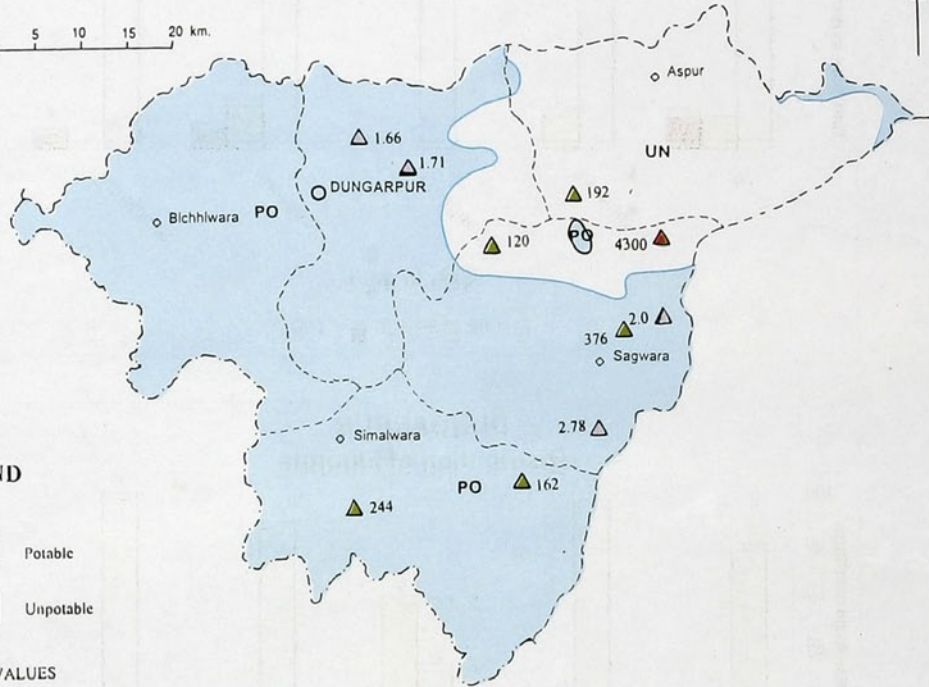


### LEGEND

- PO Potable
- UN Unpotable

### SPOT VALUES

- ▲ Electrical Conductivity above 4000  $\mu\text{S}/\text{cm}$
- ▲ Nitrate above 100 mg/L
- ▲ Fluoride above 1.5 mg/L



## SALINITY

### LEGEND

Salinity measured in terms of Electrical Conductivity (EC) in  $\mu\text{S}/\text{cm}$  at 25° C

- < 2000
- 2000 - 4000

