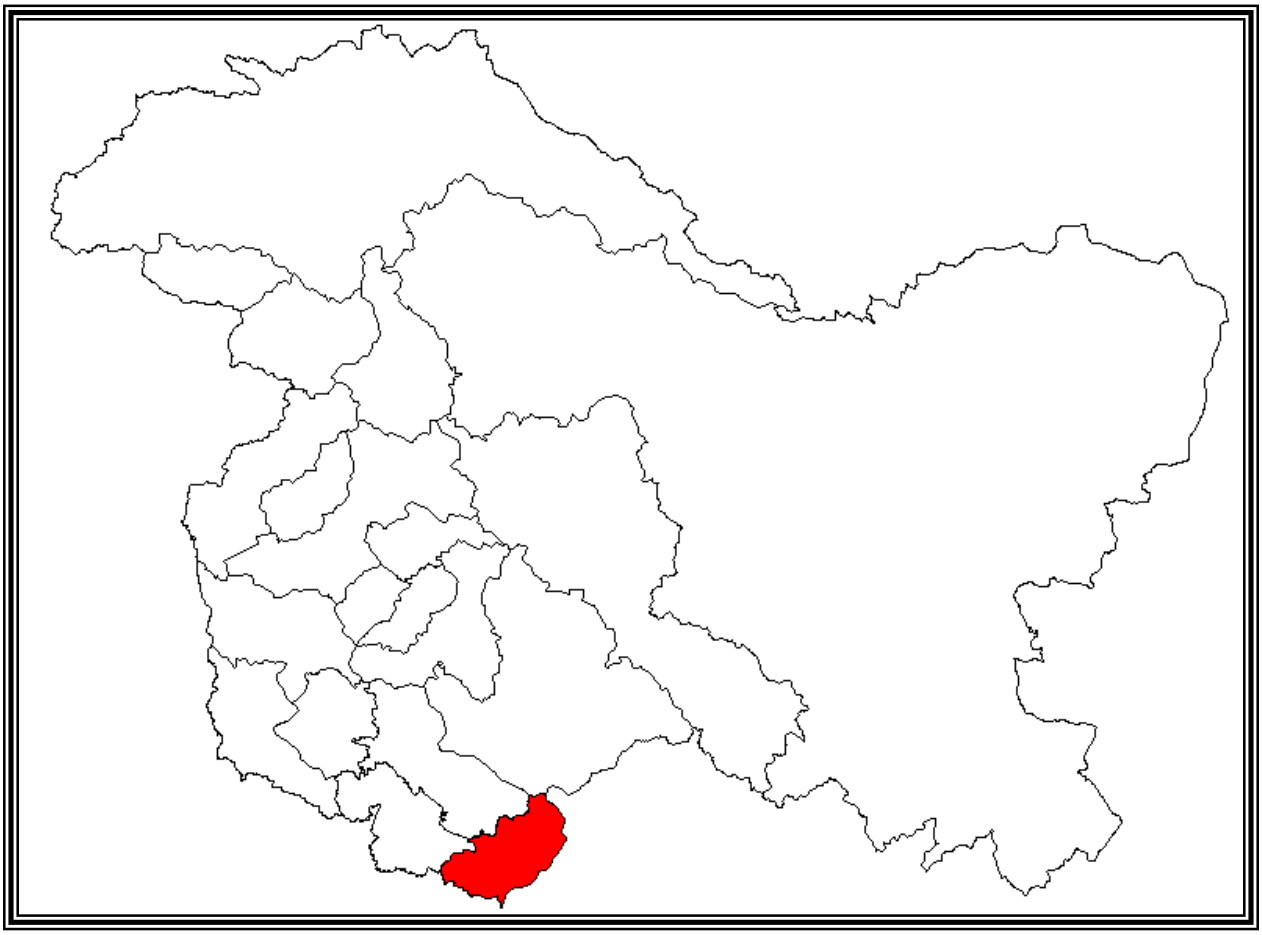
Government of India
Ministry of Water Resources
CENTRAL GROUND WATER BOARD

BROCHURE OF KATHUA DISTRICT
JAMMU & KASHMIR STATE



NORTH WESTERN HIMALAYAN REGION, JAMMU

March, 2013

BROCHURE OF KATHUA DISTRICT

JAMMU & KASHMIR

CONTENTS

KATHUA DISTRICT AT A GLANCE

Sl. No.	*ITEMS*	STATISTICS
1.	GENERAL INFORMATION	
	i) Geographical area (sq km)	2651
	ii) Administrative Divisions (2001 Census) • Number of Tehsil & Sub-tehsils • Number of CD Blocks • Number of Panchayats • Number of Villages	 4 8 245 575
	iii) Population (2001 Census) • Total population • Population Density (pers/sq km) • Rural & Urban Population • Sex Ratio (Females/1000 males) • Literacy Rate	 5,50,084 persons 201 471356 & 78728 907 69.86 %
	iv) Average Annual Rainfall (mm)	1672
2.	GEOMORPHOLOGY	
	Major Physiographic units	• Outer Plains-Sirowal and Kandi • Siwalik hills • Dun Belt • High hills/Mountains
	Altitude Ranges • Plains • High hills/Mountains	 • 280-500 m amsl • 500- 3000 m amsl
	Major Drainages	• Ravi, Ujh, Tarnah, Bein, Sewa Rivers
3.	LAND USE (sq.km) (Source- Digest of Statistics 2009-10)	
	• Forest area • Area not available for cultivation • Fallow land • Other uncultivated area • Net area sown	991.00 800.07 117.54 391.40 610.96
4.	IRRIGATION BY DIFFERENT SOURCES (Source- Digest of Statistics 2009-10) (sq km)	
	• Dug wells & shallow TW • Surface water • Springs/Tanks • Others	3.62 143.22 1.66 45.86

Sl. No.	ITEMS	STATISTICS

5.	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (As on 31.12.2013) • Number of Dug Wells • Number of Piezometers	 36 Nil
6.	PREDOMINANT GEOLOGICAL FORMATIONS	• Quaternary Alluvium • Siwalik formations • Murree formation • Granitoids • Bhaderwah slates, Phyllites and Shales
7.	HYDROGEOLOGY	
	Major Water Bearing Formations	
	1. Unconsolidated porous sediments (Alluvium)	Covering major part (25%)
	• Yield prospects • GW structures	High (5-25 lps) Dugwell, Tube wells, Handpumps & Artesian Wells
	2. Semi-consolidated formations- (Siwalik & Murree formations)	Covering (50%)
	• Yield prospects • GW structures	Low to Moderate (<3-10 lps) Springs, Handpumps, Dugwells & Tubewells
	3. Consolidated formations (Granitoids, Bhaderwah slates)	Rest 25%
	• Yield prospects • GW structures	Low Yields Springs & Handpumps
	Avg. Depth to water level • May • November	 3-15 m bgl 2- 10 m bgl
8.	GROUND WATER EXPLORATION BY CGWB (As on 31.12.2013)	
	No. of wells drilled	EW's- 60, OW's-03, PZ- 03
	Depth Range	80.00 – 450.39 m bgl
	Discharge	Meagre to 3145 lpm
	Transmissivity (m^2/day)	3.9 to 2613
9.	GROUND WATER QUALITY	
	Presence of Chemical constituents more than permissible limits (eg. EC, F, As, Fe	Fe, NO_3, F is present more than permissible limits at one or two places

Sl. No.	***ITEMS***	**STATISTICS**

10.	DYNAMIC GROUND WATER RESOURCES (2004) in MCM (Outer Plains only)	835 sq.km
	• Annual Ground Water Recharge	39439.33
	• Net Ground Water Availability	35495.40
	• Projected Demand for Domestic and industrial uses up to 2025	3907.20
	• Stage of Ground Water Development	18.93, Safe
11.	AWARENESS AND TRAINING ACTIVITY	
	• Mass Awareness Programmes • Place • Date	Two 1) Barni 2) Govindsar 24/02/2003 04/03/2008
	• Water Management Training Programmes	Two 1) Hiranagar 2) Kathua 05-06/03.13 11-12/03/13
12.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING CCS (Schemes at Dewal, Barwal and Phangiari)	
13.	GROUND WATER CONTROL AND REGULATION	
	• Number of OE Blocks	Nil
	• No of Critical Blocks	Nil
	• No of blocks notified	Nil
14.	GROUND WATER PROBLEMS AND ISSUES	
	• Water scarcity & Deep water levels	In higher hilly areas and Kandi plains of the district.

BROCHURE OF KATHUA DISTRICT

JAMMU & KASHMIR

1.0 INTRODUCTION

Kathua is one of the prominent district of Jammu province and is often referred as the "Gateway of J&K". It lies at the southern most end of the State and is located between 34º16'00" to 32º55'00" North Latitude and between 75º 06' to 75º 54' East Longitude and is covered by SOI degree sheet No. 43 P. It is bounded by Gurdaspur district of Punjab in the South-East, Chamba district of Himachal Pradesh in North-East, District Doda and Udhampur in North and North-West, Jammu in the West and in South-West by international border with Pakistan (Plate I).

The district has a total geographical area of 2,651 sq km, comprising of 575 villages (556 inhabited villages and 19 un-Inhabited villages). Administratively, the district is divided into 04 tehsils (Kathua, Hiranagar, Basholi and Billawar) and 08 Development blocks (Kathua, Billawar, Lohimalhar, Basholi, Bani, Barnoti, Hiranagar, and Duggan)

As per 2001 census, the district has a population of 5, 50,084 persons with population density of 207 persons per sq. km. The male and female population in the district is 2,69,457 and 2,41,998 respectively with a male/female sex ratio of 898. The schedule caste population in the district is 23.15 % of the total population. The district has recorded population growth of rate of +21.50 % during the decade 1991-2001 as compared to 29.98 % at State level during the same period.

Agriculture is the main source of livelihood in the district. Wheat being the main crop in the whole district. During 2009-2010 the area covered under total food crops are 112142 ha. and total area covered under non food crops is 9335 ha..

The main sources of irrigation are canals and an area of 19436 hectares is brought under irrigation by various sources like canals, tanks, wells and other sources.

Central Ground Water Board has carried out extensive hydrogeological studies both by conventional and non-conventional methods in the district. Under Ground Water Exploration, 60 exploratory wells have been drilled ranging in depth from 80 mts to 450.00 m at present CGWB maintains 36 National Hydrograph Network Stations (NHNS), where ground water levels and quality is monitored.

2.0 CLIMATE AND RAINFALL

Various parts of the district experiences wide range of climate from sub-tropical to temperate and even Alpine in higher regions of Bani and Lohai-Malhar blocks. Due to altitudinal variations the two plain tehsils i.e Kathua and Hiranagar invariably differs in the temperatures from the two hilly tehsils i.e. Basholi and Billawar of the district. During summers temperature rises as high as 48°C and winter temperature falls as low as 3°C in the plains. In upper hilly areas it touches sub-zero.

Most of the higher areas of the two hilly tehsils experiences snowfall throughout the year. The district experiences rainfall during monsoon season and in winters and early summers. The hilly areas receive more rains than plains. The average annual rainfall in the district is 1360 mm. About 85% of the total rainfall is received during monsoon season viz. July to September and rest occurs during December to February.

3.0 PHYSIOGRAPHY AND DRAINAGE

The physiography of the district is much varying. It is occupied by high mountain ranges, valleys, gorges and canyons. The southern and south-western parts of the district are covered by gentle terrain called as Outer Plains with elevations ranging from. 280 to 500 m amsl whereas the northern and north-eastern parts are hilly and mountainous having elevations roughly between 500 and 3000 m amsl with intermountain valleys called as Dun belt. Major physiographic slope is towards south and south-west. Deep valleys and steep escarpments are the conspicuous features of the hilly terrain in the district.

The entire district is profusely drained by numerous ephemeral and small perennial streams, which originate from northern mountainous region and are flowing in southwestern direction. The perennial River Ravi that is a sub basin to Indus river along with its tributaries viz Ujh, Tarnah and Bein drains the district. Ravi river forms the district/State border with Himachal and Punjab State towards east. The major rivers draining the district are Ravi, Ujh and Sewa. Apart from the major drainage system there are number of seasonal streams (*khads*) traversing the whole district. They carry huge loads of boulders, pebbles, sand and silt during monsoon. They also generate flash floods immediately after rains causing extensive damage downstream.

4.0 GROUND WATER SCENARIO

4.1 GEOLOGY

The rock formations underlying the district ranges in age from Cambrian to Quaternary. The brief generalized geological succession in the district is given below

Formation		*Lithology*	*App. Age*
Alluvium, River terraces, Pebble beds		Boulders, Pebbles, Cobbles, gravels and coarse sand with clays and silty layer	Recent to Sub-Recent
Siwalik Group	Upper Siwalik	Conglomerate and sandstones	Upper Pliocene to Lower Pliestocene
	Middle Siwalik	Sandy, grey and brown mudstones	Upper Miocene to Middle Pliocene
	Lower Siwalik	Argillaceous, Red mudstones	Middle to Upper Miocene
Murree Group	*Upper Murree*	Purple and yellowish green mudstone	Lower to Middle Miocene
	Lower Murree	Deep Purple & choclate coloured Mudstone interbedded with sandstone	Permo-Carboniferous
Granite		Massive coarse grained porphyritic	Post Eocene

Intrusive		granites	
Panjal Group		Bedded flows of green, purple and dark colours & agglomeratic slates	Upper Carboniferous to Lower Triassic
Bhaderwah Slates		Slates	Late Pre-Cambrian to early Cambrian

Hard formations forming hilly and mountainous terrain mainly comprises of igneous and metamorphic rocks belonging to the Panjal traps and Granitic intrusives. Alluvium of Quaternary and Tertiary age (Plio-Pleistocene) underlies the Outer Plains and consists of boulders pebbles, cobbles and coarse sand forms the Kandi belt near Siwalik foothills, and fine to coarse sands with occasional beds of gravel, pebbles and intervening clayey and silty layer constitutes the Sirowal belt. This formation is important from ground water point of view and sustains the water supply system in the area.

Artesian condition is prevalent all over the Sirowal formations as wells as in transition zone between Kandi and Sirowal areas. The artesian aquifers present these formations consists of unconsolidated sediments of coarse clastics ranging in size from boulders to gravel in the loose clay matrix and occasionally alternating bands of clay of varying thickness in subordinate pack of gravels and pebbles in Sirowal belt. All the wells both handpumps and deep tubewells constructed in this zone are in autoflow conditions. Highest discharge autoflow well is located at Raghunathpura which is yielding 2700 lpm and depth of this well is 82.3 m bgl.

Two major thrust faults are observed in the district viz Main Boundary Fault and Murree Thrust. Main Boundary fault is a high angle fault along which Murree formations override the Siwalik formation. While along the Murree thrust the Pre Tertiary sequence of Panjal, Gala Bani, Sarthal-Daggar area is folded into major anticline. The most prominent structural unit in the district is Surin-Mastgarh anticline which has faulted axis. This anticline is truncated by Mandli-Kishanpur thrust which has brought upper Murree succession over Lower Siwaliks and is followed by Lower, Middle and Upper Siwalik subgroups.

4.2 HYDROGEOLOGY

Hydro-geologically, the geological formations present in the district are placed in three units viz. unconsolidated, semi consolidated and consolidated formations. The northern hilly terrain comprises semi-consolidated and consolidated formations. The southern plains comprise of unconsolidated formations i.e. Kandi (~Bhabar) and Sirowal (~Terai) formations.

In the northern most part of the hilly terrain, the highly dissected topography, steep slopes and impervious nature of rocks collectively result into more surface runoff than downward percolation. Here, ground water movement is restricted to intermountain valleys. Except these valleys these consolidated formations are ground water unworthy areas.

On the foothills of the northern hilly terrain the Quaternary and Tertiary group of rocks, Siwalik and Murree formations comprises semi-consolidated formations of the district. Ground water in these formations is mainly restricted to the secondary porosity i.e. fissures and fractures. These formations are mainly fine grained in nature.

The southern plain comprised of unconsolidated formation, which is full of loose material having plenty of primary intergranular porosity. Boulders, pebbles, cobbles and coarse sand associated with clays constitute Kandi formation. Sirowal formations are fine grained in nature. At deeper depths Sirowal strata consists of fine to coarse sands with occasional beds of gravel, pebbles and intervening clayey and silty layer.

CGWB has constructed 60 exploratory tubewells in Siwalik, Kandi and Sirowal formations. Out of these 5 tubewells are drilled in Siwalik formation, 17 in Sirowal formation and 35 in Kandi formation. In Siwalik formation the water levels range between free flow conditions to 24 m bgl within the depth range of 130 m bgl. The yield is generally low with high drawdowns. In Kandi formations the water levels ranges from 9.78 m bgl and 71.25 m bgl. The yield is between 380 lpm to 1870 lpm with drawdown around 7 m. In Sirowal formation the depth range of exploratory wells varies between 80 to 450.00 m with water levels ranging between free flow to 15 m and yield between 1628 lpm and 3145 lpm with drawdown of around 15 m

There are numerous springs in the district generally concentrated along the contact zones and also in the hilly areas. At some places hand pumps are fitted for ground water development. The yield of the shallow tube wells and hand pumps constructed along these secondary porous zones varies from 3-35 m^3/hr.

4.3 DEPTH TO WATER LEVEL

The pre monsoon depth to water level varies from 1.56 m bgl (Partial) to 30.20 m bgl (Kutah). In general the water level is within 10m bgl in most part of the outer plain. About 750 sq.km of area depth to water level is within 5 m bgl resulting in potential ground water resources. In two patches depth to water level is less than 2 m (water logging conditions prevail). Along the Taranah nala and Hiranagar areas, depth to water level is inbetween 5 to 10 m bgl. In three patches (Kootah –Nilcha-Chann ranga area, Bhagwal-Bhaktha area, Mahichak-Sumanwan area) depth to water level is inbetween 10 to 30 m bgl. In Dun valley the deepest water level is 25.83 m bgl (Dewel) and the shallowest water level is 3.25 m bgl (Mandli).

During the post monsoon period, the depth to water level varies from 1.02 m bgl (Kothian) to 25.23 m bgl (Kutah) (Fig-). There is no marked variations in the zonation of DTWL map in comparison with that of DTWL map of pre-monsoon. The water level in Dun valley ranges between 0.65 m bgl (Palan) to 25.23 m bgl (Dewal). Water levels less than 2 m (water logging conditions) prevail in and around Kathua and surrounding areas, Basoli area (Because of Gobind sagar Reservoir) and along Talia nala (south of Ramket).

The long term water level data from the 42 National Network of Hydrograph Stations (NHNS) set up in the Outer Plains of the district is available. A perusal of the long term water level trend 1986 - 2009 shows that the water levels in major part of the district are declining even though the rate of decline is very less viz. 0.05 m/year. In only one patch around Kootah- Chan Khatrian-Guda Maethian the decline is less than 0.05-0.01 m/year. In few areas along rivers and khads rise in water levels are observed.

4.4 GROUND WATER RESOURCES:

Precipitation in the form of rain and snow in the district is the major source of ground water recharge apart from the influent seepage from the perennial rivers, streams and lakes, irrigated fields and inflow from upland areas. Discharge of ground water mainly takes place from wells, tube wells and effluent seepages of ground water in the form of springs and base flow in streams. The Ground Water Resources of the district were computed for the year 2004 for the Outer Plains only as per the GEC-1997 methodology and are given below

1	Total Geographical Area	Sq.km	2,651
3	Net Ground Water Availability	MCM	35495.4
4	Ground Water Draft For Irrigation	MCM	21.93
5	Allocation For Domestic & Industrial Use up to year 2025	MCM	3907.20
6	Stage of Ground Water Development	%	18.93, Safe

The stage of ground water development in the alluvial Outer Plains portions of the district is 12% and falls in the safe category. Thus, there is scope for further ground water development.

4.5 GROUND WATER QUALITY

CGWB monitors the quality of ground water of shallow aquifers through National Hydrograph Network Stations. In addition to these, water samples are also collected during the scientific studies whenever taken up. The range of chemical parameters in the district is summarized below.

S.No	Parameter		Range	
			Min	Max
1	pH		7.60	8.47
2	EC	µS/cm	230	2800
3	HCO_3	mg/l	98	1153
4	Cl	mg/l	7.1	248
5	NO_3	mg/l	0.01	265
6	F	mg/l	0.01	1.58
7	Ca	mg/l	20	118
8	Mg	mg/l	7.3	89
9	Na	mg/l	6.2	310
10	K	mg/l	1.1	242
11	TH as $CaCO_3$	mg/l	135	590
12	Iron	mg/l	0.08	3.64

From chemical quality point of view, ground water in the area is generally fresh and potable.

5.0 GROUND WATER MANAGEMENT AND DEVELOPMENT

5.1 GROUND WATER DEVELOPMENT

The district is endowed with bountiful of rainfall, lots of springs, snowfed nalas, springs, rivers and also number of tanks and ponds but, still the district is facing water problems in certain areas. This shows that the water resources in the district are not properly and scientifically developed and utilized to their optimum capacity.
To mitigate the water supply problems these resources need to be taken care i.e springs in the hilly areas to be developed by studying their characteristics, recharge and discharges, tanks are to be revived, rehabilitated and rejuvenated, auto flow aquifers and seasonal nalas and streams (khads) are to be properly developed and utilized besides harvesting rain water for Artificial Recharge to ground water.

5.2 WATER CONSERVATION AND ARTIFICIAL RECHARGE

Extraction of ground water through dug wells, hand pumps, tube wells and springs are the major sources of water supply to both rural and urban areas, but the availability of the water during summer is limited particularly in drought period and requires immediate attention to augment these resources. Based on the climatic conditions, topography, hydrogeology of the area, suitable structures and measures for rain water harvesting and artificial recharge to ground water are required. Roof top rainwater harvesting need to be adopted in the urban areas and hilly water deficit areas and proper scientific intervention for spring development and revival is required in water scarce areas.

In the hilly areas, roof top rainwater harvesting structures like storage tanks are recommended while, in low hill ranges, check dams and roof top rainwater harvesting structures can be adopted.

6.0 GROUND WATER RELATED ISSUES AND PROBLEMS

Even though, the district is one of the water surplus district, there are many problems related to water are observed i.e acute shortage of water in Kandi area of the district due to deep water levels, seasonal and long term reduction in the discharges of springs, water logging, shallow water levels, water quality problems at some places and the declining water levels. These ground water issues and problems are localized and need to be focused by taking micro level studies in those particular areas.

7.0 AWARENESS AND TRAINING ACTIVITY

So far two Mass Awareness Programs (MAP) had been conducted by CGWB. One at Barni in the year 2003 and other at Govindsar in the year 2008. Two III Tier water management training program has been conducted in the district.at Kathua and Hiranagar Blocks in the year 2013.

8.0 AREAS NOTIFIED BY CGWA/SGWA

The stage of ground water development in the district is 18.93% only and falls in safe category. Thus, no area or block has been notified for ground water development.

9.0 RECOMMENDATIONS

- In Outer Plains, in addition to the traditional ground water structures like dug wells and springs, shallow to medium depth tube wells can be constructed for developing the ground water resources. Ground water resources can also be developed by constructing infiltration galleries (Percolation wells).

- In hilly terrain, springs and perennial nallahs are the major sources of water. Medium to shallow bore holes and hand pumps are useful ground water structures for meeting the domestic needs.

- Continuous monitoring of water levels and chemical quality at representative areas is required to keep a watch on any adverse effect that ground water development may have in future.

- Traditional resources like springs needs to be revived, developed & protected on scientific lines for various use. The discharge of such springs can be sustained by construction of small check dams or sub-surface dykes across the nallahs/tributaries in the downstream at favourable locations.

- Small ponds/tanks can be utilized for recharging ground water. These structures can be constructed for harvesting water and utilized both for recharging and meeting the domestic needs.

- Roof top rainwater harvesting (RTRWH) practices must be adopted in water scarce & Kandi and hilly areas to augment water resource.

- Rainwater harvesting in general & RTRWH in particular is an ideal solution for augmenting water resources particularly in sloppy hilly & chronic water scarce areas. There is thus need to create awareness for water conservation and augmentation and proper waste disposal for protecting water sources

- Mining of the river beds should be prohibited as it leads to fall in the water levels & also damages the natural river system.

- People's participation is a must for any type of developmental activities. So they should be made aware for proper utilization and conservation of water resources available. In addition, micro level efforts are required for proper implementation of development programme.

CONTRIBUTORS

The brochure of Kathua district of J & K State has been prepared by Pramod Kumar Verma, AHG, North Western Himalayan Region, Jammu. This brochure has been scrutinized by Sh N.R. Bhagat, Scientist 'D' & Technical Secretary, under the overall supervision and guidance of Sh. Manoj Shrivastava, Regional Director, NWHR, Jammu.

PLATE 1

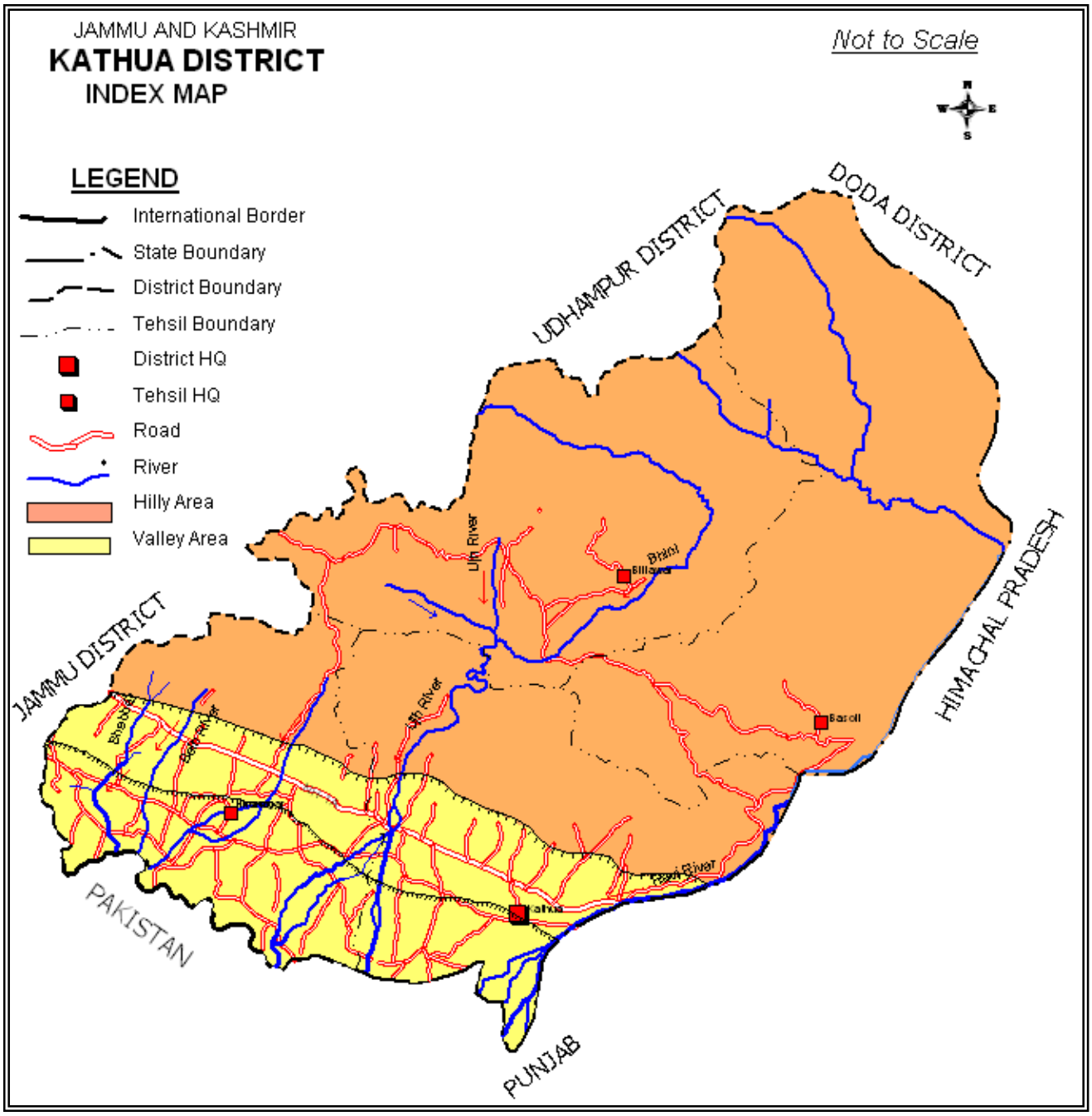

JAMMU AND KASHMIR
KATHUA DISTRICT
INDEX MAP
Not to Scale
LEGEND
International Border
State Boundary
District Boundary
Tehsil Boundary
District HQ
Tehsil HQ
Road
River
Hilly Area
Valley Area
UDHAMPUR DISTRICT
DODA DISTRICT
HIMACHAL PRADESH
JAMMU DISTRICT
PAKISTAN
PUNJAB
Ujh River
Basoli

PLATE II

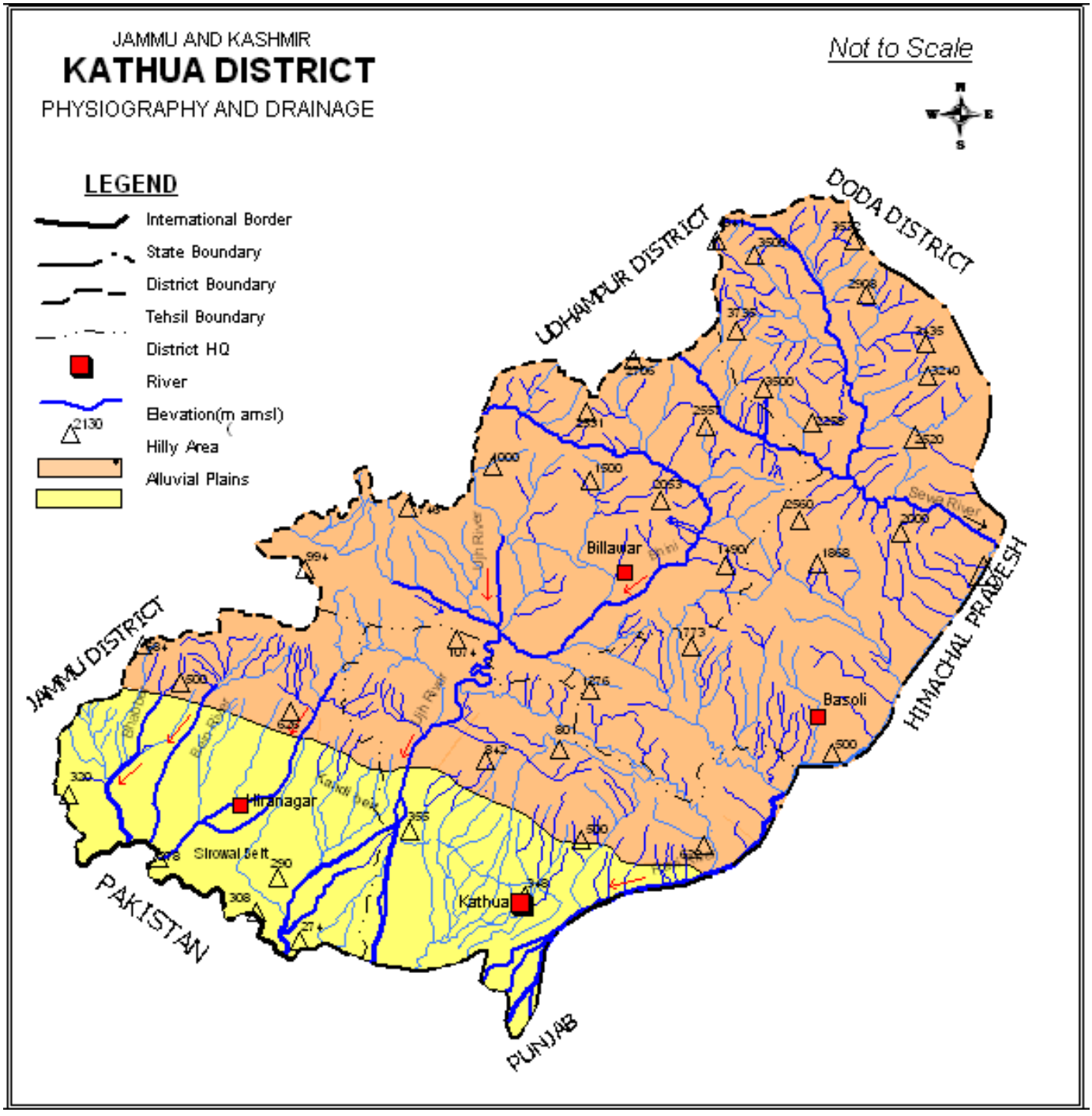

JAMMU AND KASHMIR
KATHUA DISTRICT
PHYSIOGRAPHY AND DRAINAGE
Not to Scale
LEGEND
International Border
State Boundary
District Boundary
Tehsil Boundary
District HQ
River
Elevation(m amsl)
Hilly Area
Alluvial Plains
UDHAMPUR DISTRICT
DODA DISTRICT
JAMMU DISTRICT
HIMACHAL PRADESH
PAKISTAN
PUNJAB
Billawar
Basoli
Hiranagar
Kathua
Siowal Belt
Ujh River
Sewa River
Kandi Belt

PLATE III

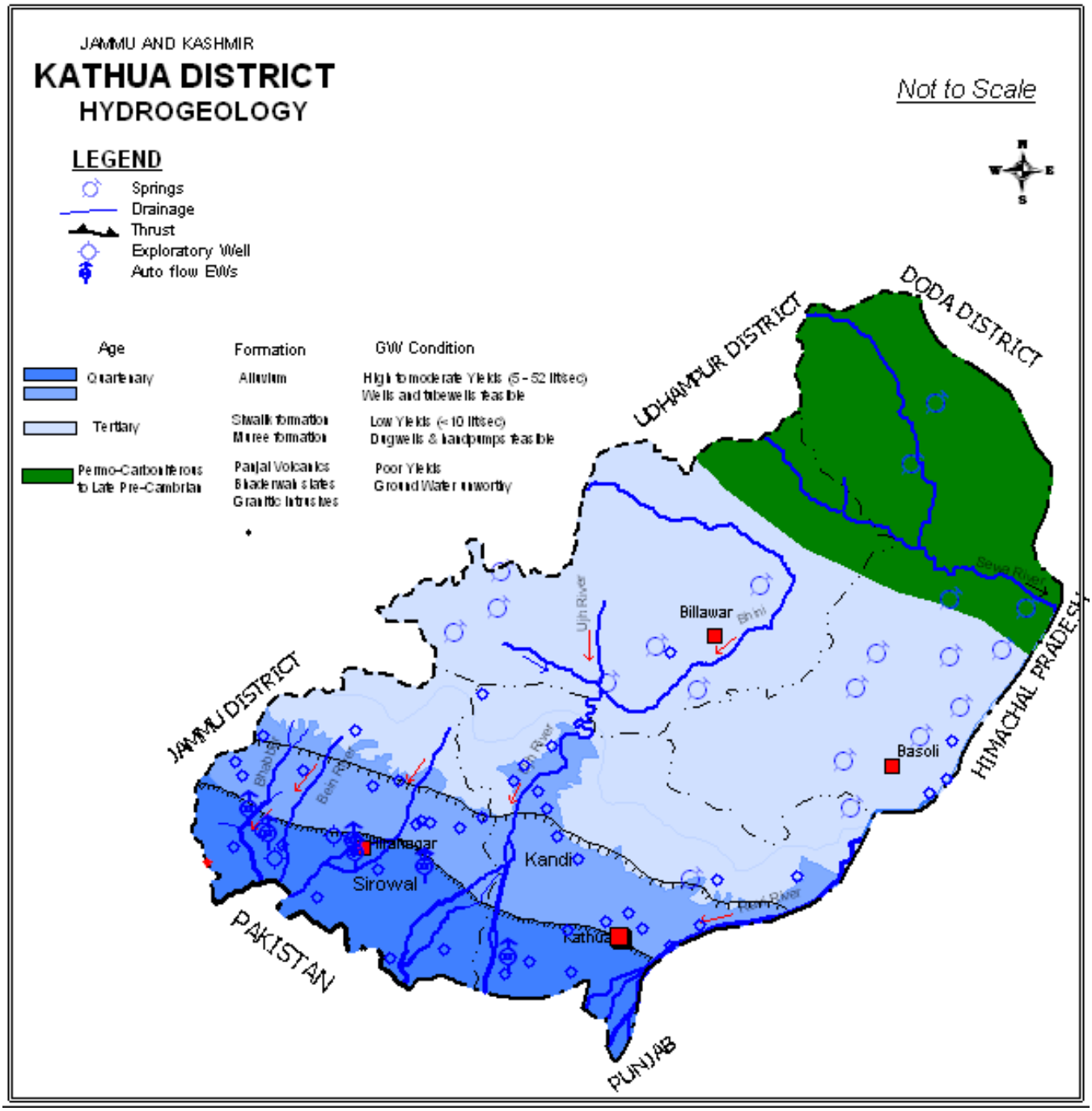

JAMMU AND KASHMIR
KATHUA DISTRICT
HYDROGEOLOGY
Not to Scale
LEGEND
Springs
Drainage
Thrust
Exploratory Well
Auto flow EWs
Age
Formation
GW Condition
Quarternary
Alluvium
High to moderate Yields (5 - 52 lit/sec)
Wells and tubewells feasible
Tertiary
Siwalik formation
Murree formation
Low Yields (< 10 lit/sec)
Dugwells & handpumps feasible
Permo-Carboniferous to Late Pre-Cambrian
Panjal Volcanics
Blaini/Krol slates
Granitic intrusives
Poor Yields
Ground Water unworthy
UDHAMPUR DISTRICT
DODA DISTRICT
HIMACHAL PRADESH
JAMMU DISTRICT
PAKISTAN
PUNJAB
Billawar
Basoli
Kandi
Sirowal
Kathua
Ujh River
Bein River
Sewa River

PLATE IV

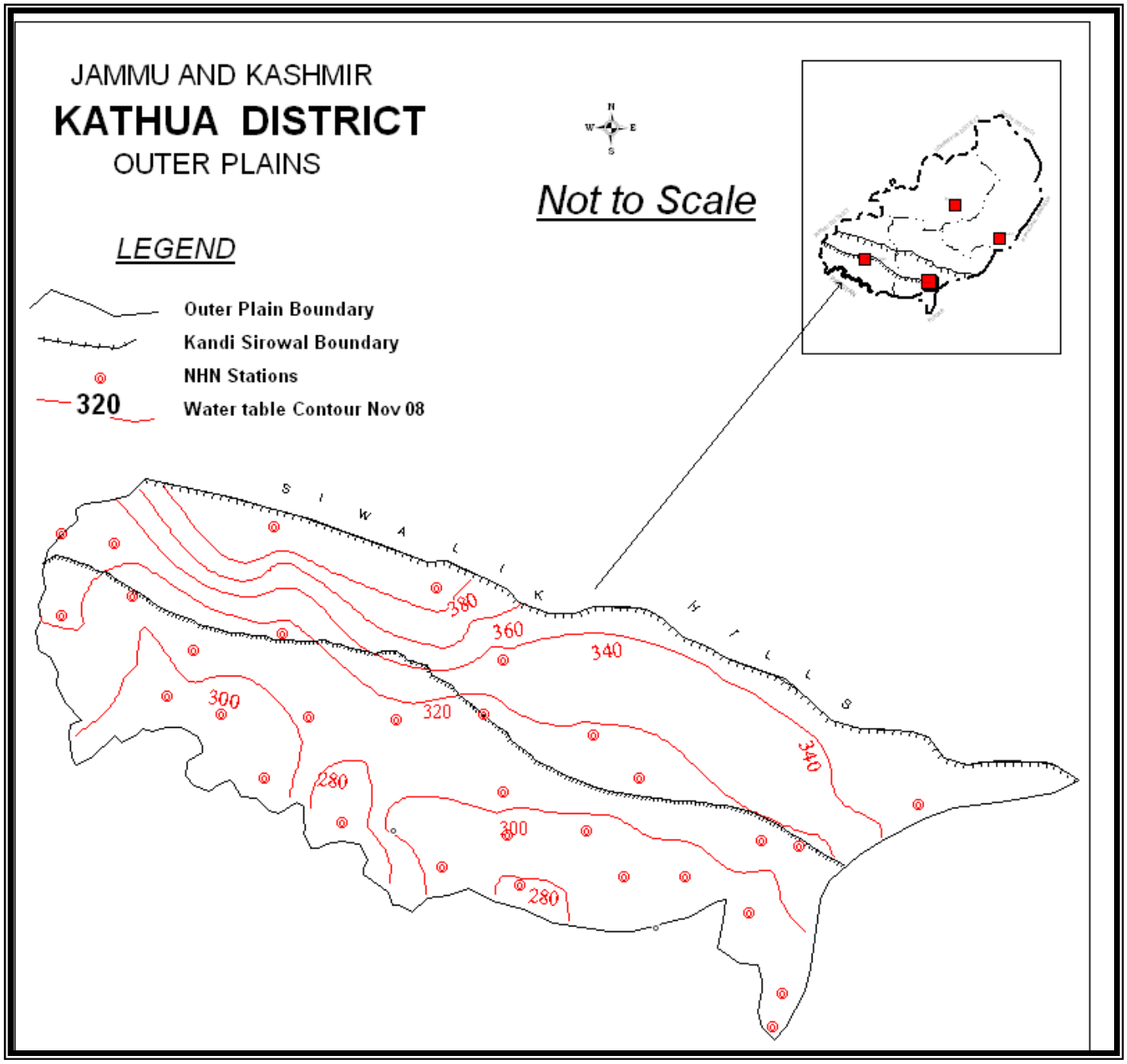


PLATE V

JAMMU AND KASHMIR

KATHUA DISTRICT

GROUND WATER RESOURCES

Not to Scale

LEGEND

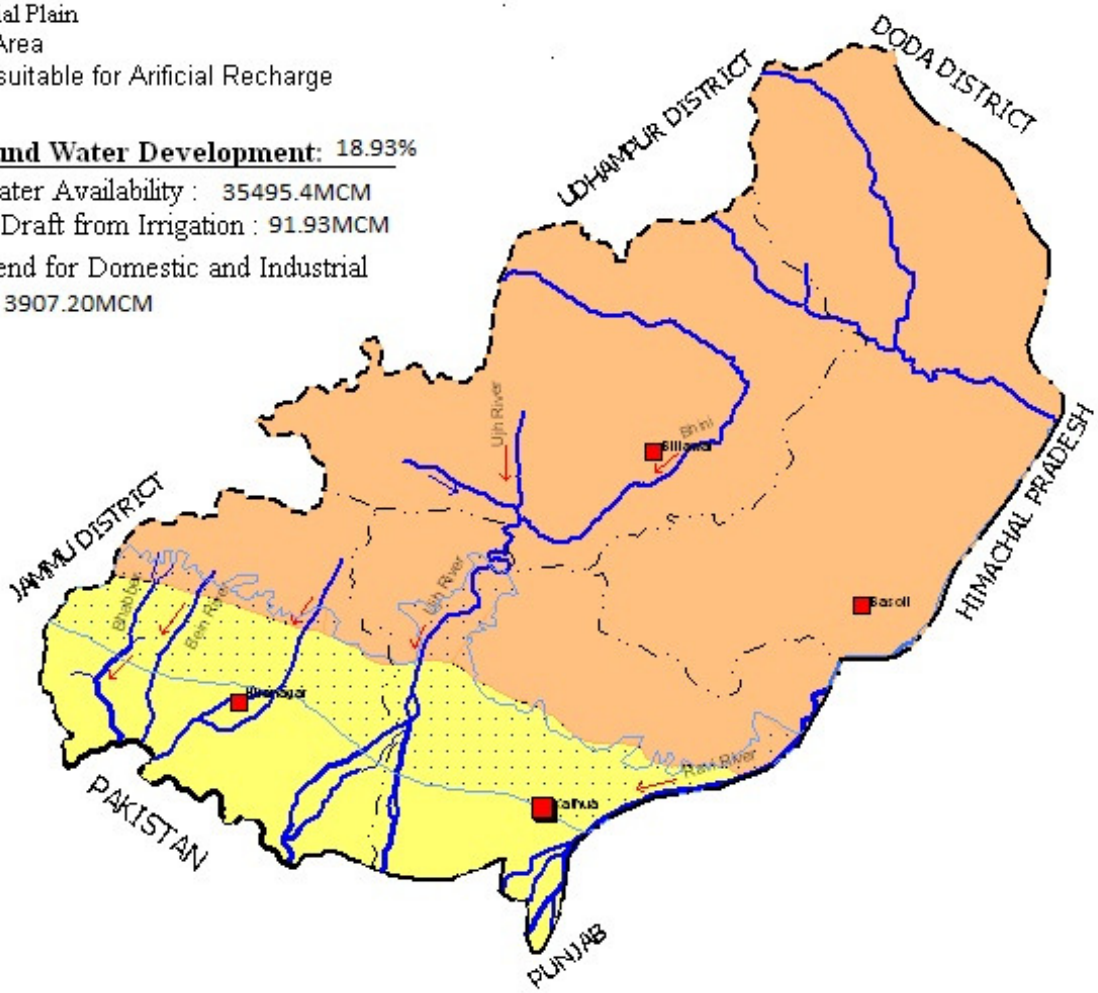
- District Boundary
- District Headquarter
- Drainage
- Alluvial Plain
- Hilly Area
- Area suitable for Arificial Recharge

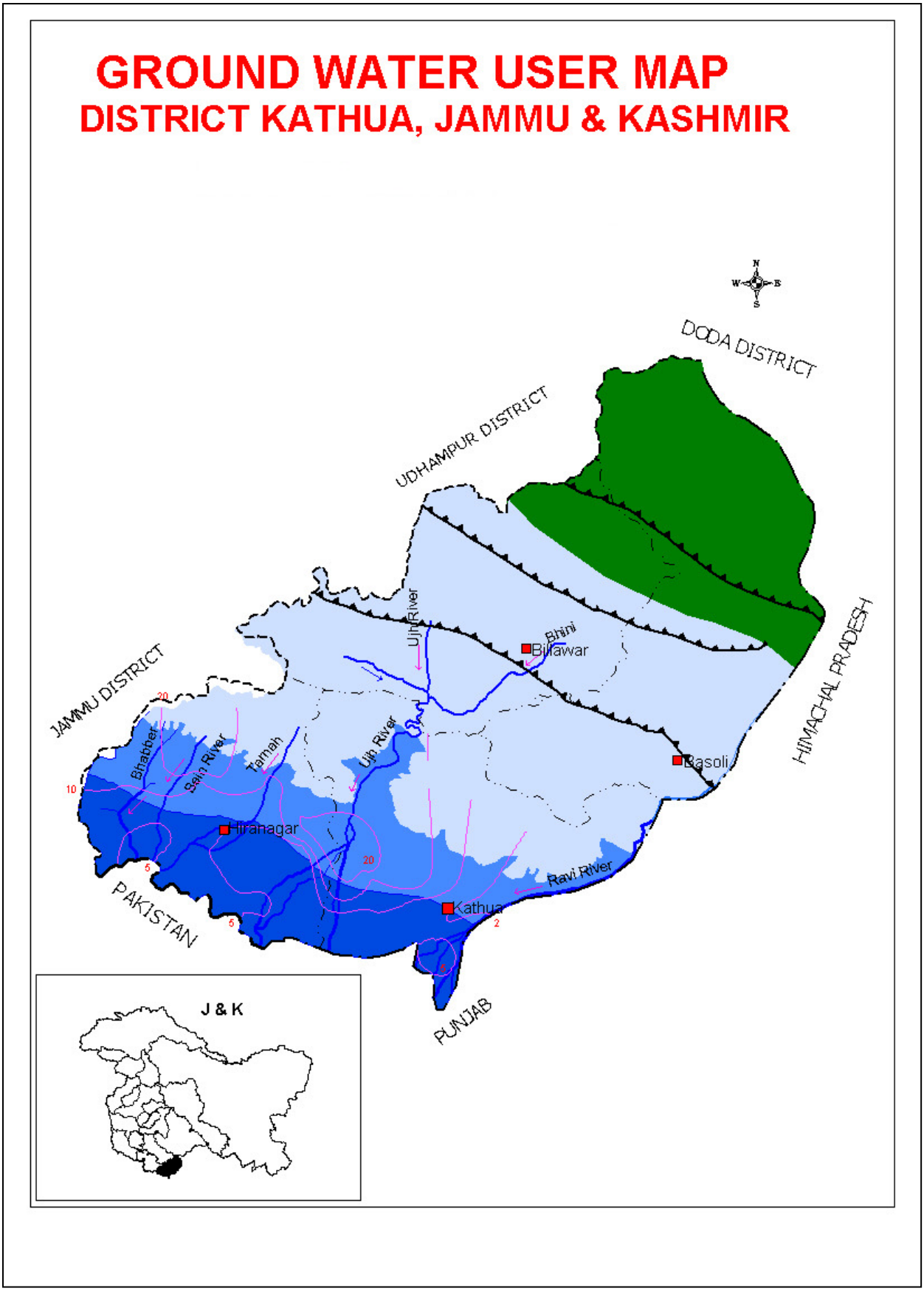
Stage of Ground Water Development: 18.93%

Net Ground Water Availability : 35495.4MCM

Ground Water Draft from Irrigation : 91.93MCM

Projected demend for Domestic and Industrial use upto 2025: 3907.20MCM




GROUND WATER USER MAP
DISTRICT KATHUA, JAMMU & KASHMIR
N
W
E
S
DODA DISTRICT
UDHAMPUR DISTRICT
JAMMU DISTRICT
HIMACHAL PRADESH
PAKISTAN
PUNJAB
Ujh River
Bhini
Billawar
Basoli
Bhatbeer
Sain River
Tarnah
Ujh River
Hiranagar
Kathua
Ravi River
20
10
5
20
5
2
J & K

LEGEND

	Wells feasible	Rigs suitable	Depth of well (m)	Discharge (lpm)	Suitable artificial recharge structures
Soft rock aquifers	Tube well Dug Well	Percussion, Rotary, DTH with Odex Manual	80 to 120 ✯ 6 to 12	380 to 900 400 to 700	Check dam, Recharge Shaft/pit
Hard rock aquifers	Tube well Dug Well Spring Development	DTH with Odex Manual	60 to 90 ✯ 10 to 20	500 to 750 300 to 500 30 to 700	

5 Water level contour (m bgl)
(Pre monsoon decadal mean, 1993-2002)

Major Drainage

Tehsil boundary ■ Tehsil HQ

District boundary ■ District HQ

State boundary ▲▲▲ Thrust

International boundary

DISTRICT KATHUA

OTHER INFORMATIONS

Total area	2651 sq.km
No. of tehsils	4
Major drainage	Ravi, Ujh Rivers
Population	5,50.084 (2001 Census)
Rainfall	1360 mm
Temperature	3^0 C to 48^0 C
Regional geology	Soft rock : - Alluvium, Siwaliks Hard rock : - Panjal traps
Ground water quality	EC<750 micro mhos/cm at 25^0C
Stage of GW development	18.93 %
Name of watershed/ tehsil showing intensive GW development	Nil

Note : ✯ limited to explored depth /
Areas with depth to water level > 8 m bgl are suitable for artificial recharge