

**DISTRICT GROUND WATER BROCHURE OF
JALAUN DISTRICT, U.P.**

(A.A.P.: 2012-2013)

By

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**DISTRICT GROUND WATER BROCHURE OF JALAUN DISTRICT,
UTTAR PRADESH 2012-13**

1.	GENERAL INFORMATION	
	Geographical Area (Sq km) 2010-11	: 4544.34
	Administrative Divisions (As on 31.3.2011)	
	Number of Tehsils/Blocks	: Tehsil 5/Block 9
	Number of Panchayat/Villages	: Panchayat 564/ Villages 1151
	Population (As on 2011 Census)	: 16.70 Lacs
	Average Annual Rainfall (mm)	: 862
2.	GEOMORPHOLOGY	
	Major Physiographic units	: Ganga Alluvial Plain which is sub-divided in Older and Newer Alluvial Plains.
	Major Drainages	: Ganga and Ramganga rivers
3.	LAND USE (Sq.Km) 2010-11	
	Forest area	: 28.178 sq. km.
	Net area sown	: 3435.74 sq. km.
	Gross area sown	: 4210.41 sq.km.
4.	MAJOR SOIL TYPES	: Sandy loam and clayey
5.	Area under principal crops (As on 2010-11)	: 4210.41 sq.km.
6.	IRRIGATION BY DIFFERENT SOURCES (Number of structures/Area (Sq.Km)- 2010-11	
	Dugwells	3014 / 184.80 sq. km.
	Tubewells , Borewells	: 11510 / 473.71 sq.km.
	Canals	: 1488.66 sq.km./1916 Km length

	Other sources	: 14.88 sq.km
	Net Irrigated area	: 2096.09 sq. km.
	Gross irrigated area	: 2212.53 sq. km.
7.	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-3-2012)	
	No of Dug Wells	: 27
	No of Piezometers	: Nil
8.	PREDOMINANT GEOLOGICAL FORMATIONS	: Quaternary Alluvium underlain by Bundelkhand granite and quartz reefs.
9.	HYDROGEOLOGY AND AQUIFER GROUP	: Shallow Aquifer : Unconfined, down to 40 to 80 mbgl. , coarse to medium sand, gravel with presence of clay lenses at places. Moderate Aquifer : Semi-Confined to Confined, 110 to 145 mbgl., coarse sand and gravel with clay lenses at places.
	Major Water bearing formation	: Sand and Gravel
	Pre-monsoon Depth to water level (m. bgl) during May 2012.	: 0.56 to 31.20
	Post-monsoon Depth to water level (m. bgl) during November 2012.	: 1.48 to 29.65
	Long term water level trend in 10 yrs (2003 - 2012) in m/yr	: Pre-Monsoon: Rise 0.0279 - 0.4377 m (Gohan - Gopalpur) Fall 0.0256 -1.295 m (Churkhi- Hardoi) Post- Monsoon: Rise 0.0686 -0.4453m (Gohan-Gopalpura) Fall 0.0203-0.6585m (Jalaun-Damras)
10	GROUND WATER EXPLORATION BY CGWB (As on 31.3.2012)	
	No of wells drilled (EW, OW, PZ, SH, Total)	: 3 (EW), 3 (SH)
	Depth Range (mbgl)	: 83.60 to 150 mbgl

	Discharge (lpm)	:	2645 to 3474
	Storativity (S)	:	-
	Transmissivity (m ² /day)	:	1390 to 5755
11.	GROUND WATER QUALITY		
	Presence of Chemical constituents more than permissible limit (e.g. EC, Cl, F, As, Fe)	:	None (All the constituents are within normal range)
	Type of Water	:	Good
12.	DYNAMIC GROUND WATER RESOURCES (2009) (MCM)		
	Annual Replenishable Ground Water Resources	:	1210.62
	Gross Annual Ground Water Draft	:	469.53
	Projected Demand for Domestic / Industrial Uses upto 2025	:	63.32
	Stage of Ground Water Development	:	(38.78 %) All blocks are under "Safe" category
13.	AWARENESS AND TRAINING ACTIVITY		
	Mass Awareness Programmes organized	:	None
	Water Management Training Programme organized	:	None
14.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING		
	Projects completed by CGWB (No & Amount spent)	:	Nil
	Projects under technical guidance of CGWB (Numbers)	:	Nil
15.	GROUND WATER CONTROL AND REGULATION		
	Number Of OE Blocks	:	Nil
	No of Critical Blocks	:	Nil
	No of blocks notified	:	Nil
16.	MAJOR GROUND WATER PROBLEMS AND ISSUES		
		:	Declining trend of ground water level.

DISTRICT GROUND WATER BROCHURE OF JALAUN DISTRICT, U.P.

(A.A.P.: 2012-2013)

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1.0 INTRODUCTION

The Jalaun district encompasses a geographical area of 4544 sq.km. It forms the northern most part of the trans-Yamuna tract of the state. The area is bounded in the north by Yamuna river, in the south by Betwa river and its western boundary follows Phuja river. The eastern border is shared with Hamirpur district. The area lies between Latitude 26° 26' to 25° 45' North and Longitude 79° 57' to 78° 00' East, falling in the survey of India Toposheet No. 54 N and O.

Administratively it has been divided into 4 Tehsils with its district headquarter at Orai and 9 (Nine) developmental blocks as given below:

Tehsil	Block	Area (sq.Km)
1. Jalaun	1.Jalaun	430.40
	2.Kuthaund	331.39
2. Madhogarh	3.Madhogarh	337.48
	4. Rampur	337.48
3. Orai	5.Dakore	886.64
4. Kalpi	6.Mahewa	519.81
	7.Kadoura	669.49
5. Konch	8.Konch	411.39
	9.Nadigaon	635.80

Basin/Sub Basin:

The district is surrounded by 3 sub basins of rivers e.g. Yamuna in the north flows from west to east, in the south Betwa river also flowing from west to east direction and Pahuja river in the west meet in the Yamuna, flowing from south west to north. Topographically, the area is almost an open plain, nevertheless encircled by a narrow rim of higher ground which breakup in a network of ravines along the river banks giving rise a bad land topography.

Drainage:

The area is chiefly drained by three perennial rivers namely, Yamuna, Betwa, and Phuja. There are many minor ephemeral tributaries, viz. Non Nadi, Kunchamalanga Nadi which drains central parts of the district area. Jamuna and Betwa are flowing towards east and Pahuja from south to north. The overall drainage of the area forms dendritic pattern. Besides, there is good network of canal system draining from Betwa river through Kuthaund and Hamirpur branches.

Irrigation Practices etc:

In spite of the existence of three major perennial rivers i.e. Yamuna, Betwa and Pahuja in the area, only Betwa river is harnessed through 1227 km. long network of Betwa canal system. All the 9 blocks are covered by a good canal network of Kathaund and Hamirpur branches of Betwa canal system, barring Mahewa block which falls in the tail ends of the different canals. The blockwise irrigation through different sources and status of irrigation sources are shown in Table-I and II.

2.0 RAINFALL AND CLIMATE

The average annual normal rainfall in the district is 862 mm. The climate is sub humid and it is characterised by hot summer, humid monsoon and cold winter seasons. About 90% of rainfall takes place during monsoon period from the month June to September. During the monsoon surplus water is available for the deep percolation to ground water.

After February temperatures begin to increase rapidly. May and early June is hottest part of the year. The mean daily maximum temperature in May is 42.6⁰ C, mean daily minimum temperature is 27.1⁰C and on individual days the maximum temperature sometimes reaches over 47⁰C. with the onset of the monsoon in June, the day temperature drop appreciably but nights continue to be warm as in summer season, January is the coldest month with mean daily minimum temperature is 8.4⁰C The mean monthly maximum temperature is 32.4⁰C and mean monthly minimum temperature is 18.8⁰C.

Air is very humid in monsoon season and the humidity decreases in the cold season. The mean monthly morning relative humidity is 57% and mean monthly evening relative humidity 42%. The mean wind velocity is 703 Kmph. The potential evapotranspiration is 1603.3 mm.

3.0 GEOMORPHOLOGY AND SOIL TYPES

The district forms a part of marginal Ganga, alluvial plains. Geomorphology bears tremendous control on the ground water regime. The relief, slope, depth of weathering, type material, nature of deposits and thickness and overall assemblage of different land forms plays an important role in the ground water regime in hard rock as well as in the unconsolidated sediments. Various geomorphic units identified in the area are grouped into four major categories, (Rajeev Mohan et al 91) these are (1) Pediment zone (2) Alluvial plain (3) Ravines land and (4) Flood plains.

Soil of the area can be grouped into four types that commonly occur in Bundelkhand region, These are Mar, Kabar, Parwa, and Rakar. Mar is a dark coloured clay soil mixed with calcareous nodules (Kankar) with swelling and shrinking character. The soil is friable in dry state, moisture retentive and highly fertile. Kabar is also a fertile soil but contains less amount of clay and lighter in colour than Mar. Kabar and Mar soils are commonly known as black cotton soil and occur in the area of central parts. Parwa generally occurs in the northern parts

of area. This is a loamy soil, usually having grey colour. Rakar soil is a coarse grained red soil, strewn with Kankar. It has less fertility and occurs on ravine slopes.

4.0 GROUND WATER SCENARIO

4.1 HYDROGEOLOGY:

The entire area of Jalaun district is underlain by quaternary alluvium, comprising mainly clay, Kankar, sand, and gravel over the basement of Bundelkhand granites. The thickness of alluvium increases towards north which has good potential. Ground water potential in granites is poor as they have little porosity. The weathered zone in the granite rock usually hold good quantity of water.

The ground water in the alluvium occurs under water table conditions in phreatic zones and under semi confined to confined conditions in the lower zone.

Exploratory wells constructed by CGWB in part of Jalaun district upto a depth of 150 mbgl and potential zones were tapped i.e. (1) 40 – 60 mbgl (2) 70 – 76 mbgl (3) 80 – 90 mbgl and (4) 110-145 mbgl. Table VI.

Depth to water level ranges from 2.38 mbgl in Babina (minor canal command area) to 31.32 mbgl in Jagmanpur on the bank of Yamuna river and 0.56 mbgl in Gopalpur area where artesian flowing conditions springs are available along the river Pahuja.

Rest of the area falls between 2.45 m to 23.73 mbgl depth to water level during pre monsoon and from 1.48 m to 29.65 mbgl during post monsoon period of 2012. Seasonal fluctuation during this period ranges from (-0.07) m to (-2.58) m showing the declining trend during post monsoon period and rising trend of water level ranges from 0.50 m to 3.80 m (Ata).

The long term water level trend since 2003 to year 2012 shows the pre monsoon water level rise of 0.0279 m to 0.4377 m/year and fall of 0.0256 m to 1.2952 m/year.

Likewise during the post monsoon period the water level rising trend ranges from 0.0686 m to 0.4453 m/year and in the same falling trend from 0.0203 m to 0.6585 m/year. Based on borehole data two types of aquifer systems exist in the district of which the depth ranges are as follows.

S. No.	Aquifer	Zones tapped (mbgl)	Yield (lpm)	Granular Materials
1.	I st	1. 40.00 – 60.0 2. 70.0 - 76.0	2645	Fine to medium sand and gravels.
2.	II nd	1. 80.0 – 90.0 2. 110.0 -145.0	3474	Fine to medium sand and gravel

Ground water occurs under unconfined and semi-confined to confined conditions.

4.2 DEPTH TO WATER LEVEL :

As per depth to water level data of ground water monitoring stations of year 2012, premonsoon water level varies from 0.56 to 31.20 mbgl. (Table -IV). In postmonsoon period depth to water varies from 1.48 to 29.65 mbgl. Seasonal water level fluctuation varies from - 2.58 to 3.80 m.

4.3 LONG TERM WATER LEVEL TREND :

The long term water level trend for ten years (2003-2012) of 24 ground water monitoring wells have shown that only two wells have rising trend i.e. Gohan (0.0279 m/year) and Gopalpur (0.4377 m/year) and 19 wells have declining trend from 0.0256 to 1.2952 m/year during pre-monsoon season. During post monsoon 5 wells have shown the rising trend from 0.0686 to 0.4453 m/year and 13 wells have shown falling trend from 0.0203 to 0.6585 m/year. Out of 24 monitoring wells only 4 wells showing annual rise from 0.0757 to 0.2717 m/year and 16 wells have shown annual fall of ground water level from 0.0057 to 0.6719 m/year. (Table-V).

4.4 GROUND WATER RESOURCES:

As per the report on Dynamic Ground Water Resources of Uttar Pradesh as on 31.3.2009, the net annual ground water availability of the district is 121062.53 ham. The existing gross ground water draft for all uses is 46953.01 ham. The average of the stage of ground water development for the district is 38.78 %. As per the estimation, all blocks of the district fall under 'Safe' category , but the stage of ground water development varies from 23.54 to 51.46 %. (Table-III).

4.5 STATUS OF GROUND WATER DEVELOPMENT

Agriculture is the main source of populace of the district. To meet the requirement of the irrigation, ground water and surface water are being utilized. Ground water irrigation is under operation through 592 state government tube wells, 3014 dug wells(permanent well), 10738 diesel pumpsets, 139 electricity run pumpsets, 2287 ground pumpsets and 1518 persian wheals in the entire district. Table-II.

The blockwise irrigation through different sources is shown in table –I, A perusal of the table shows that 30.14 % of the area under irrigation is covered by ground water and 68.24 % area is irrigated by canals water and 0.68 % area is irrigated by other sources. Out of the net sown area of 343574 ha, only 209609 ha area has been brought under irrigation and leaving 133965 ha (38.99 %) land unirrigated. Table - VII.

**BLOCKWISE IRRIGATION THROUGH DIFFERENT SOURCES IN JALAUN
DISTRICT, U.P.**

UNIT: AREA (Ha), 2008-09

Table-I

Year/ Block	Canal	Govt. Tubewell	Private Tubewell	Wells	<u>Ponds</u>	Others	Total
1	2	3	4	5	6	7	8
<u>Blockwise Year 2008-09.</u>							
1.Rampur	4833	378	3665	273	40	91	9280
2.Kuthaund	9530	846	3727	1073	0	29	15205
3.Madhogarh	13225	436	3463	2072	269	131	19596
4.Jalaun	22164	1025	6565	1817	205	145	31921
5.Nadigaon	23661	930	4616	4441	39	285	33972
6.Konch	23868	1072	5206	5657	562	317	36682
7.Dekore	29096	1732	197	1718	763	288	33794
8.Mahewa	8538	4699	4279	1307	8	120	18951
9.Kadaura	13052	2028	2138	94	64	58	17434
Total Rural	147967	13146	33856	18452	1950	1464	216835
Total Urban	899	46	323	28	0	24	1320
Total District	148866	13192	34179	18480	1950	1488	218155

**BLOCKWISE STATUS OF SOURCES OF IRRIGATION IN JALAUN
DISTRICT, U. P. (YEAR 2010-11) , Table - II**

Year/ Block	Canal Length (km)	Govt. Tubewell (no.)	Permanent Wells (no.)	Rahat (no.)	<u>Electricity Run Pumpset (no.)</u>	Diesel Run Pumpset (no.)	Other (no)	Total (no)	Groud Pumpset (no.)
1	2	3	4	5	6	7	8	9	10
<u>Blockwise</u>									
1.Rampura	176	29	237	154	22	1143	3	1168	73
2.Kuthaund	75	69	268	170	32	945	6	983	204
3.Madhogarh	78	18	315	259	6	2117	7	2130	110
4.Jalaun	303	46	197	181	20	2048	5	2073	249
5.Nadigaon	221	51	376	229	12	683	4	699	322
6.Konch	184	42	307	219	6	1835	5	1846	300
7.Dekore	372	78	462	120	11	1011	6	1028	437
8.Mahewa	128	157	430	100	25	504	4	533	313
9.Kadaura	292	102	422	86	5	452	1	458	279
Total Rural	1829	592	3014	1518	139	10738	41	10918	2287
Total Urban	87	0	0	0	0	0	0	0	0
Total District	1916	592	3014	1518	139	10738	41	10918	2287

ASSESSMENT OF DYNAMIC GROUND WATER RESOURCES OF THE JALAUN DISTRICT, UTTAR PRADESH .

(As on 31.3.2009)

Table -III

Sl. No.	Assessment Units Blocks/District	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for Irrigation	Existing Gross Ground Water Draft for Domestic & Industrial Water Supply	Existing Gross Ground Water Draft for All Uses (11+12)	Provision for Domestic and Industrial Requirement Supply for 2025	Net Ground Water Availability for Future Irrigation Development (10-11-14)	Stage of Ground Water Development (13/10)×100 (%)	Category
<i>1</i>	<i>2</i>	<i>10</i>	<i>11</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>	<i>17</i>
1.	DAKORE	26154.05	69.87.48	647.78	7635.26	994.99	18171.58	29.19	Safe
2.	JALAUN	13711.38	6602.23	453.82	7056.05	639.99	6469.16	51.46	Safe
3.	KADAURA	20088.07	4232.25	495.50	4727.75	915.68	14940.14	23.54	Safe
4.	KONCH	13116.35	5860.14	474.12	6334.26	669.08	6587.13	48.29	Safe
5.	KUTHAUND	6765.05	2773.43	465.05	3238.48	728.98	3262.64	47.87	Safe
6.	MADHOGARH	7969.31	3635.06	383.62	4018.68	617.82	3716.43	50.43	Safe
7.	MAHEWA	13091.25	5626.21	493.56	6119.77	675.78	6789.26	46.75	Safe
8	NADIGAON	13481.45	4220.62	536.54	4757.16	616.22	8644.61	35.29	safe
9	RAMPURA	6685.62	2707.47	358.13	3065.60	474.29	3503.86	45.85	Safe
	TOTAL	121062.53	42644.89	4308.12	46953.01	6332.83	72084.81	38.78	

5.0 GROUND WATER MANAGEMENT STRATEGY

5.1 GROUND WATER DEVELOPMENT:

The average of the stage of ground water development for the district is 38.78 %. The maximum stage of ground water development is in Jalaun block i.e. 51.46 % and minimum in Kadaura block i.e. 23.54 %. Other Seven blocks have the stage of ground water development i.e. Dakore 29.19 %, Konch 48.29 %, Kuthond 47.87 %, Madhogarh 50.43% and Mahewa 46.75%, Nadigaon 35.29% and Rampur 45.85%. Therefore all the 9 blocks are in safe category. So that all blocks having good scope to further develop ground water through shallow and moderately deep tubewells.

6.0 GROUND WATER RELATED ISSUES AND PROBLEMS :

Out of 27 GWM wells 6 stations are showing seasonal decline of ground water level during year 2012, table IV. Water level decline ranges from 0.07 m (Rajpura) to 2.58 m (kanasi). Normal rising fluctuation ranges from 0.50 m to 3.80 m. (Table- IV). In Kuthaund block net ground water availability for future irrigation development is 3262.64 ham, which is comparatively very less than other 8 blocks. However all nine blocks are in safe category, Table III.

During long term water level trend from the year 2003 - 2012, most of the wells in all the blocks are showing decline of ground water during pre and post monsoon seasons, which indicate insufficient rainfall in the areas, and needs artificial recharge and water conservation techniques for arresting the decline in water levels.

6.1 WATER QUALITY PROBLEMS:

As per the chemical analysis result of ground water monitoring wells for the year 2012, there is no quality problem in ground water. All the constituents are in permissible limit. The range of E.C. is 450 to 950 micromhos/cm at 25⁰C in all the ground water samples of monitoring wells in the district. Table –A.

Chemical analysis result of ground water monitoring wells for the year 2012 of Jalaun district, U.P. , Table – A.

Location	E.C. in micromhos/cm at 25°C	pH	Chemical Constituents											
			CO ₃	HCO ₃	Cl	NO ₃	SO ₄	F	Ca	Mg	TH	Na	K	PO ₄
Mahewa	800	8.06	0	427	28	17	7	0.61	20	34	190	102	1	-
Kuthaund	600	8.01	0	354	14	8	5	0.68	40	22	190	60	2	-
Rampura	530	7.96	0	293	14	9	12	0.62	28	36	220	27	2	-
Madhogarh	450	8.66	24	183	21	4	20	0.82	16	32	170	34	1	-
Jalaun	640	8.10	0	366	14	11	5	0.89	32	36	230	48	1	-
Konch	900	7.75	0	293	85	83	24	0.62	48	46	310	65	2	-
Nadigaon	720	8.00	0	403	25	7	12	0.73	24	29	180	93	2	-
Dakore	570	8.70	24	232	46	13	8	0.98	4	58	250	30	3	-
Kadoura	950	7.83	0	439	60	8	25	0.95	32	54	300	83	1	-

6.2 DRILLING PROBLEMS:

In the district 3 numbers of exploratory tubewells and 3 numbers of slim holes have been constructed by CGWB, NR, Lucknow down to a depth of 83.0 mbgl.to 149.80 mbgl. But there was no caving problems due to the sand mixed with clay and a few kankar and gravels and no finer silt.

6.3 GROUND WATER CONTROL AND REGULATION:

Since the stage of ground water development in all seven blocks is less than 90% and there is no significant fall in long term water level during pre and post monsoon season. And all blocks are in safe category. Hence none of these blocks come under notified area.

7.0 CONCLUSIONS :

Ground water occurs in the area under water table conditions and confined conditions. Artesian flowing conditions were reported in North- western parts area of the district (Gopalpur village) along Pahuja river. Depth to water level during the year 2012 in pre monsoon ranges from 0.56 to 31.20 mbgl. and water level fluctuation rise from 0.50 m to 3.80 m . out of 27 GWMW stations 6 stations are showing the decline of ground water level

which ranges from 0.07 m to 2.58 m. The deeper water levels are recorded along the banks of rivers Yamuna and Betwa. Long term water level data of GWM Wells (year 2003 to 2012 indicate rising trend only at two places ranging from 0.0279 m to 0.4377 m in pre monsoon and 0.0686 m to 0.4453 m during post monsoon season and at five places where as in other areas water level shows declining trend ranging from 0.0489 m to 1.2952 m in premonsoon and 0.0203 m to 0.6585 m during post monsoon season. The long term annual fluctuation shows fall in water level from 0.0090 to 0.6719 m which indicates less rainfall in the area.

Hydrogeological details of tube wells constructed by CGWB (Table-VI) in the area shows that the static water level varies from 3.60 m to 22.86 m bgl. and yield varies from 2645 lpm to 3474 lpm for drawdown of 5.30 m to 6.10 m. Depth of the constructed tubewells varies from 83.60 m to 150.0 mbgl.

Geologically the area comprises Bundelkhand granite which is overlain by thick pile of recent alluvium. Major parts of the area is covered by recent alluvial deposits, which develop along the rivers mainly derived from Yamuna river and its tributaries. Alluvium is composed of medium to coarse grained sand and gravel admixed with clay and kankar. A large tract of the area is occupied by residual soil of varying thickness, formed due to disintegration of parent rocks beneath. The soil is essentially argillaceous and high in calcium and magnesium content.

The entire area is underlain by quarternary alluvium comprising mainly clay, kankar, sand and gravel over the basement of Bundelkhand granites. Ground water potential in granites is poor as they have little primary porosity. The availability of ground water in these rocks generally depend on the density of secondary porosity developed due to fracturing and weathering. The weathered zone in the granitic rock usually hold good quality of water. The ground water in the alluvium occurs under water table conditions in phreatic zones and under semi confined to confined conditions in the lower zones.

As per the report on Dynamic Ground Water Resources of Uttar Pradesh as on 31.3.2009 the annual ground water availability of the district is 121062.53 ham. The existing gross ground water draft for all uses is 46953.01 ham. The average of the stage of ground water development for the district is 38.78 % . As per the estimation, all blocks of the district fall under 'Safe' category, but the stage of ground water development varies from 23.54 to 51.46 %.

To meet the requirement of the irrigation, ground water and surface water are being utilized . Ground water irrigation is under operation through 592 state government tube wells, 3014

dug wells, 10738 diesel pumpsets, 139 electricity run pumpsets, 2287 ground pumpsets and 1518 persian wheals in the entire district.

Aperusal of the table-I shows that 30.14 % of the area under irrigation is covered by ground water and 68.24 % area is irrigated by canals water and 0.68 % area is irrigated by other sources. Out of the net sown area of 343574 ha, only 209609 ha area has been brought under irrigation and leaving 13395 ha (38.99 %) land unirrigated.

8.0 RECOMMENDATIONS :

Rainfall is the main source of recharge to ground water reservoirs other than seepage from canals. The area has ample ground water balance of about 721 MCM leaving a lot of scope for judicious ground water development on a large scale as all the blocks in the district fall in safe category. However, care should be taken so that this dose not adversely affect ground water scenario.

The quality of ground water in the area is generally good, potable and suitable for irrigation purposes. However the quality of ground water is under permissible limit for all purposes.

In conformity with the above the following recommendations are made :

1. Since long term water level data indicate declining trend in some pockets, a regular monitoring of water levels at close interval is desirable and suitable artificial recharge measures should be taken to recharge and conserve monsoon runoff.
2. Regular monitoring of water level is imperative in the area identified prone to water logging particularly along the major canals where excessive seepage has created such conditions. More and more utilization of ground water could be encouraged in such areas.
3. The quality of ground water should be monitored on regular intervals particularly in the high salinity areas.
4. To monitor the quality test well sites should be selected in the areas of high salinity to assess the quality of ground water in deeper aquifer.

**WATER LEVEL FLUCTUATION (PRE AND POST) FOR THE YEAR- 2012,
OF JALAUN DISTRICT, U.P.**

Table - IV

Sl. No.	Well name	Pre-monsoon (mbgl)	Post monsoon (mbgl)	Fluctuation (m)
1	Ait 2	6.35	-	-
2	Ata	8.05	4.25	3.80
3	Babina New	2.38	1.48	0.90
4	Chhota Rampur	15.85	16.40	-0.55
5	Churkhi	8.37	6.85	1.52
6	Damras	22.15	22.50	-0.35
7	Dekore	6.20	4.90	1.30
8	Gohan	3.55	2.10	1.45
9	Gopalpur I	0.56	-	-
10	Hadrukhi	8.85	9.75	-0.90
11	HardoiGujar	6.10	-	-
12	Itaura	18.25	17.30	0.95
13	Jagmanpur	31.20	29.65	1.55
14	Jalaun	5.85	2.80	3.05
15	Kailaiya	6.65	5.50	1.15
16	Kalpi	23.73	23.15	0.58
17	Kanasi	6.39	8.97	-2.58
18	Keolari New	5.30	2.72	2.58
19	Khutahaund	22.55	-	-
20	Kishora Mauza	9.35	-	-
21	Konch New	8.89	7.39	1.50
22	Madhogarh	3.50	-	-
23	Mahewa	14.62	14.80	-0.18
24	Marora	3.65	-	-
25	Musaria	15.15	14.65	0.50
26	Orai	2.45	1.60	0.85
27	Rajpura	1.98	2.05	-0.07

**TREND OF WATER LEVEL - FROM YEAR 2003 TO YEAR 2012 OF
JALAUN DISTRICT, UTTAR PRADESH Table- V**

Sl. No.	Location	Premonsoon			Post			Annual		
		Data points	Rise (m/year)	Fall (m/year)	Data points	Rise (m/year)	Fall (m/year)	Data points	Rise (m/year)	Fall (m/year)
1	Konch	5			5			20		
2	Konch(new)	5			5			19		0.0884
3	Babina-new	5			5			18		0.3511
4	Kalpi	8		0.5232	10		0.5677	36		0.5230
5	Jalaun	10		0.2283	10		0.0203	39		0.0636
6	Orai	10		0.0489	10		0.0333	66		0.0090
7	Bangar	6		1.1280	5			21		
8	Gohan	10	0.0279		9	0.0686		36	0.0757	
9	Chota Rampur	5			3			16		
10	Ata	10		0.0535	10	0.1660		39	0.1644	
11	Hadrukh	10		0.6615	10		0.6344	39		0.6719
12	Damras	10		0.3807	9		0.6585	38		0.4662
13	Musaria	10		0.7762	9		0.6368	37		0.5429
14	Churkhi	8		0.0256	9	0.0842		35	0.1066	
15	Rajpura	10		0.0889	10		0.0455	64		0.0057
16	Kanasi	10		0.2251	10		0.1876	52		0.1899
17	Dekore	10		0.2202	10		0.1179	63		0.2060
18	Kailaiya	10		0.1439	10		0.0260	39		0.1167
19	Hardoi	6		1.2952	5			22		
20	Mahewa	6		0.3436	7		0.1996	26		0.1640
21	Itaura	10		0.3447	10		0.3162	39		0.3139
22	Jagmanpur	10		0.2412	9		0.0878	38		0.1160
23	Kishora mauza	9		0.0515	9	0.2459		36		0.0109
24	Nadigaon	6		0.4761	5			21		
25	Gopalpura	10	0.4377		9	0.4453		35	0.2717	

DETAILS OF EXPLORATORY WELLS CONSTRUCTED BY CGWB IN PART OF JALAUN DISTRICT, UP.

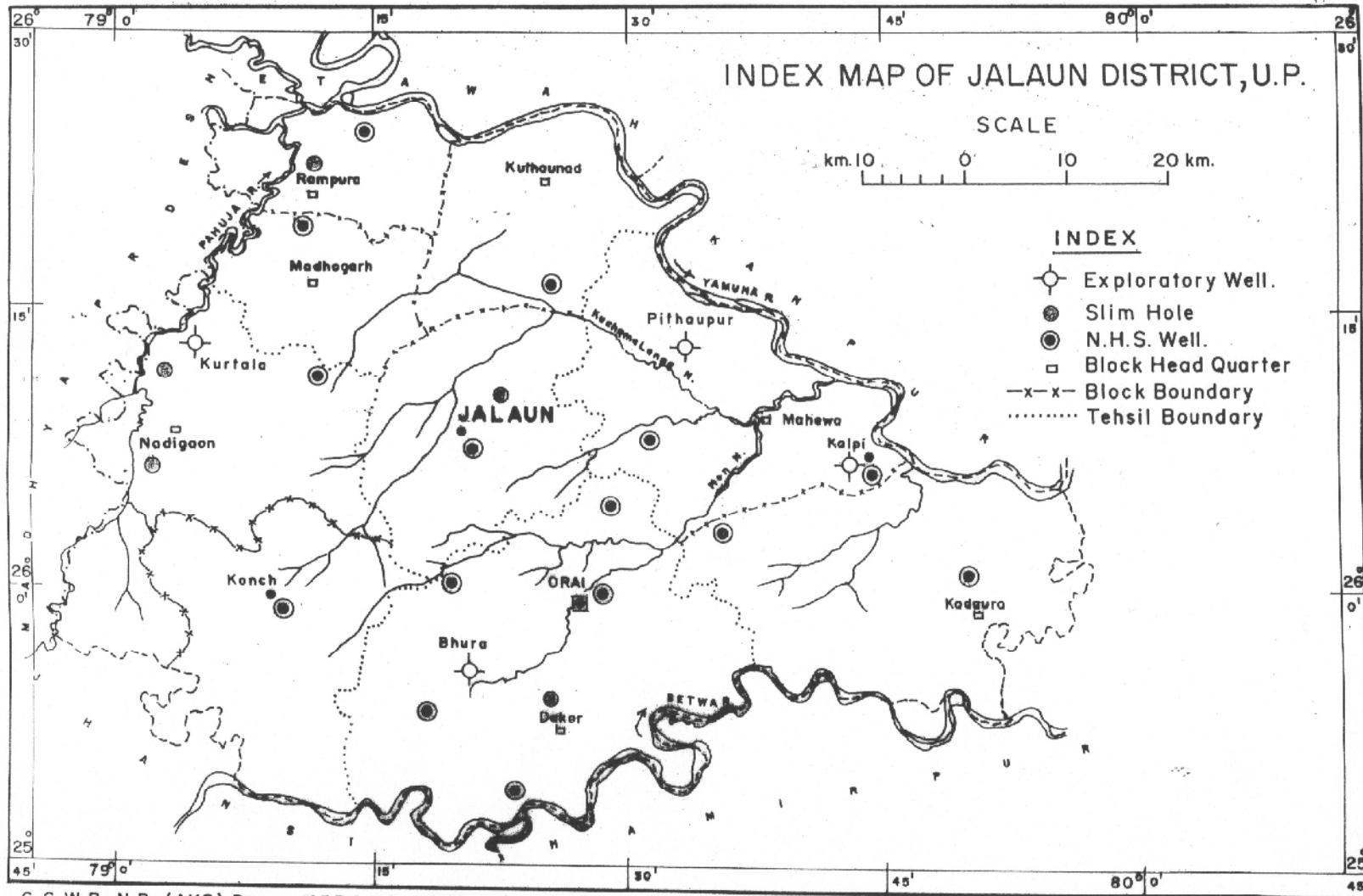
Table - VI

Sl.n o.	Lat.,Long.,Toposheet no. , (year)	Type of Well	Drilled depth/ Bedrock (mbgl)	Zones tapped (mbgl)	Water level (mbgl)	Yield (lpm)	Drawdown (m)	Transmissivity (m ² /day)	Geology
1	Bhua 25°56'20" : 79° 21' 00" 54 O, 1971	E.W.	83.60/83.0	1.40.0-60.0 2.70.0-76.0	11.84	2645	5.86	1390	Alluvium / hard- rock
2	Pithaupur 26°14'20" : 79° 30' 50" 54N, 1971	E.W.	150.0/149.80	1.80.0-90.0 110.0-145.0	20.12	3474	5.30	5755	Alluvium/ hard- rock
3	Kalpi 26° 07' 40" : 79° 44' 30" , 54N	E.W.	139.69/139.69	1.40.0-60.0	22.86	3473	6.10	-	Alluvium / hard- rock
4	Dakore , 26° 08' 15" : 79° 07' 00" , 54 O, 1971	SH	84.35/83.35	-	3.60	-	-	-	Alluvium/ hard rock
5	Rampura 26° 20' 45" : 79° 01' 20" 54N	SH	138.50/138.25	-	-	-	-	-	Alluvium/ hard rock
6	Jalaun 26° 10' 40" : 79° 20' 00" 54N	SH	135.15/134.50	-	-	-	-	-	Alluvium/ hard- rock


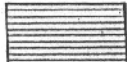

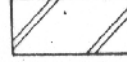
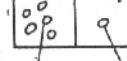
BLOCKWISE LAND UTILIZATION IN JALAUN DISTRICT , U.P
(YEAR 2011-12 , Unit : Hectare)

Table - VII

Sl. No	Name of the block (2010-11)	Total area (hect.)	Forest	Cultivable waste land (Barren land)	Present fallow land	Other Fallow land	Barren uncultivable land	Land put to nonagricultural uses	Pasture land	Area, under Bushes, Forest, garden	Net area sown	Area sown more than once	Total gross area sown	Gross area sown under crops			Net Irrigated Area	Gross Irrigated Area
														Rabi	Kharif	Jayed		
1	Rampura	29455	1869	219	1235	708	2221	5068	6	35	18094	3962	22056	14469	7571	0	13982	14024
2	Kuthaund	33139	1842	173	1419	357	1078	5168	3	19	23080	8954	32034	21963	10085	16	16724	18069
3	Madhogarh	33748	1607	166	1545	524	958	4486	21	398	24043	9167	33210	22611	10388	196	18339	19261
4	Jalaun	43040	590	165	551	393	340	4379	3	0	36619	9705	46324	35779	9064	1481	31602	31775
5	Nadigaon	63580	3806	240	1281	956	796	2592	17	98	53794	3260	57054	42328	12596	2128	31617	33737
6	Konch	41139	2938	188	292	189	388	2889	8	55	34192	16766	50958	37930	7991	5037	23333	26757
7	Dakore	88664	7286	299	5733	1984	2040	7393	47	762	63120	5938	69058	52904	15590	564	35449	36134
8	Mahewa	51981	3852	293	4584	740	2149	2838	5	86	37434	5365	42799	31080	11616	103	13923	16168
9	Kadaura	66949	4321	220	5390	227	1303	3369	42	180	51897	6331	58228	46643	11514	71	23605	24248
	Total rural	451695	28111	1963	22030	6078	11273	38182	152	1633	342273	69448	411721	305677	96417	9596	208574	220173
	Total forest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total urban	2739	67	182	163	229	25	772	0	0	1301	8019	9320	8740	331	249	1035	1080
	Total District	454434	28178	2145	22193	6307	11298	38954	152	1633	343574	77467	421041	314417	96748	9845	209609	221253

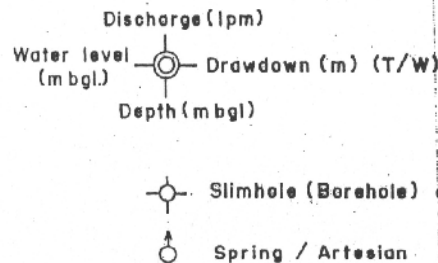


L E G E N D

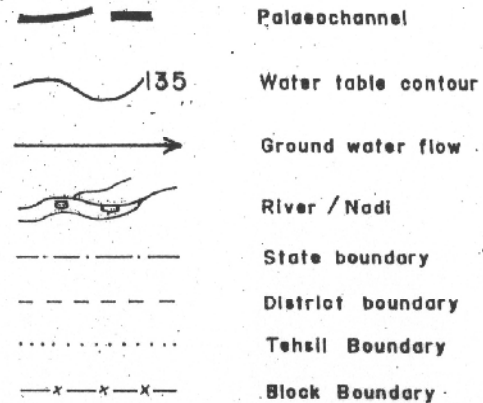
GEOLOGICAL UNIT	LITHOLOGY	GROUP	AGE	GROUNDWATER PROSPECT	
 CHANNEL ALLUVIUM	Sand, grey micaceous, with silt and clay (Yamuna), red and quartzofelspathic (Betwa and Pahuj)	NEWER ALLUVIUM	HOLOCENE	QUATERNARY	Moderate to good
 TERRACE ALLUVIUM	Sand, silt and clay grey (Yamuna), red quartzo-felspathic (Betwa and Pahuj)				Moderate to good
 VARANASI ALLUVIUM	Brownish yellow silt and clay with kankar, brownish sand.	OLDER ALLUVIUM	MIDDLE TO LATE PLEISTOCENE	QUATERNARY	Excellent
 BANDA ALLUVIUM	Clay, silt with kankar, red sand with gravel lenses.				Excellent
 BUNDEL KHAND GRANITIC COMPLEX	Inselbergs of granitic gneiss (Grgn) and detorite (D1)		MIDDLE PROTEROZOIC	ARCHAIC	Moderate to good

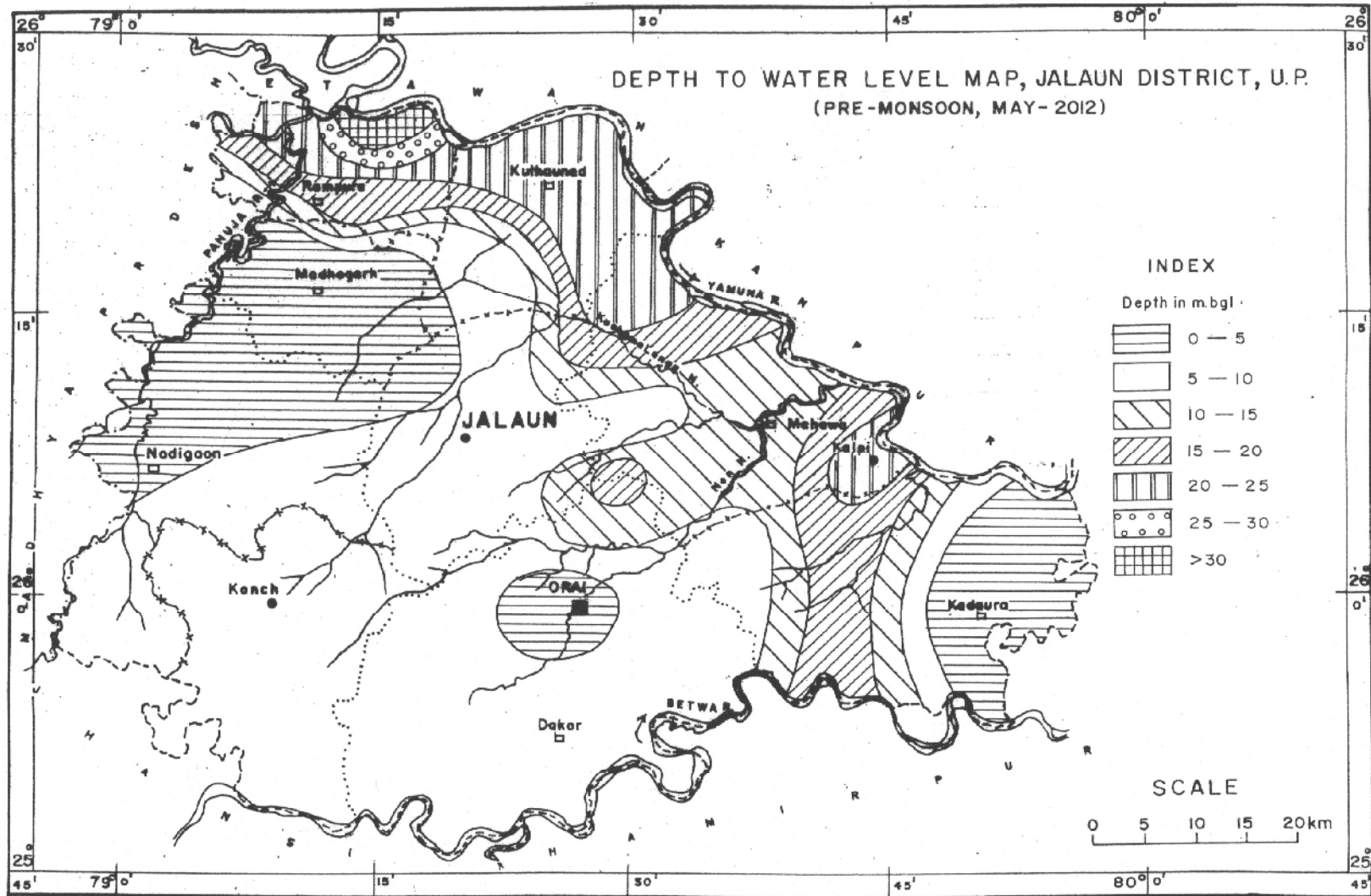
Boulder (Grgn) D1

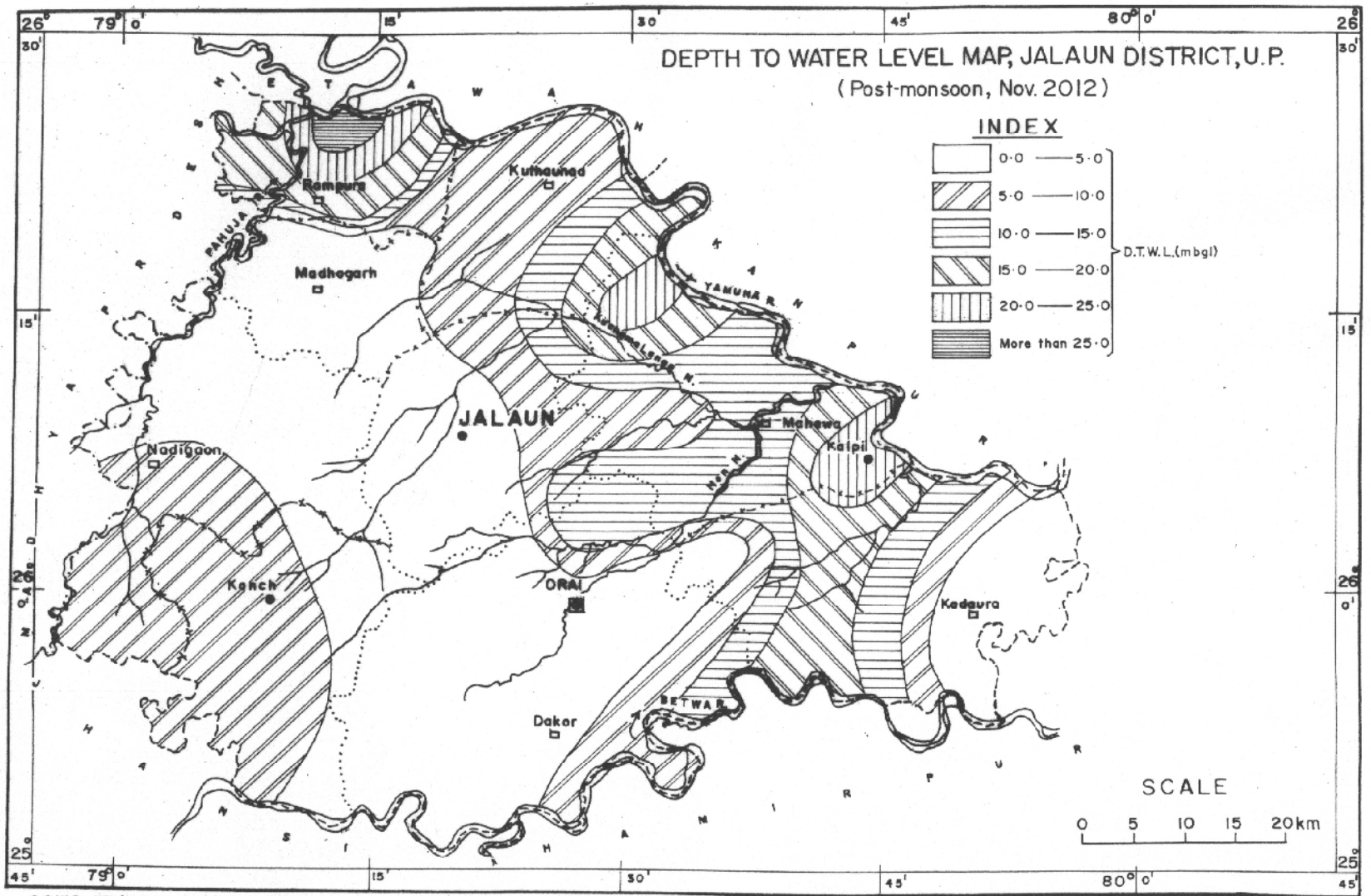
INFRASTRUCTURE AND OTHER FEATURES

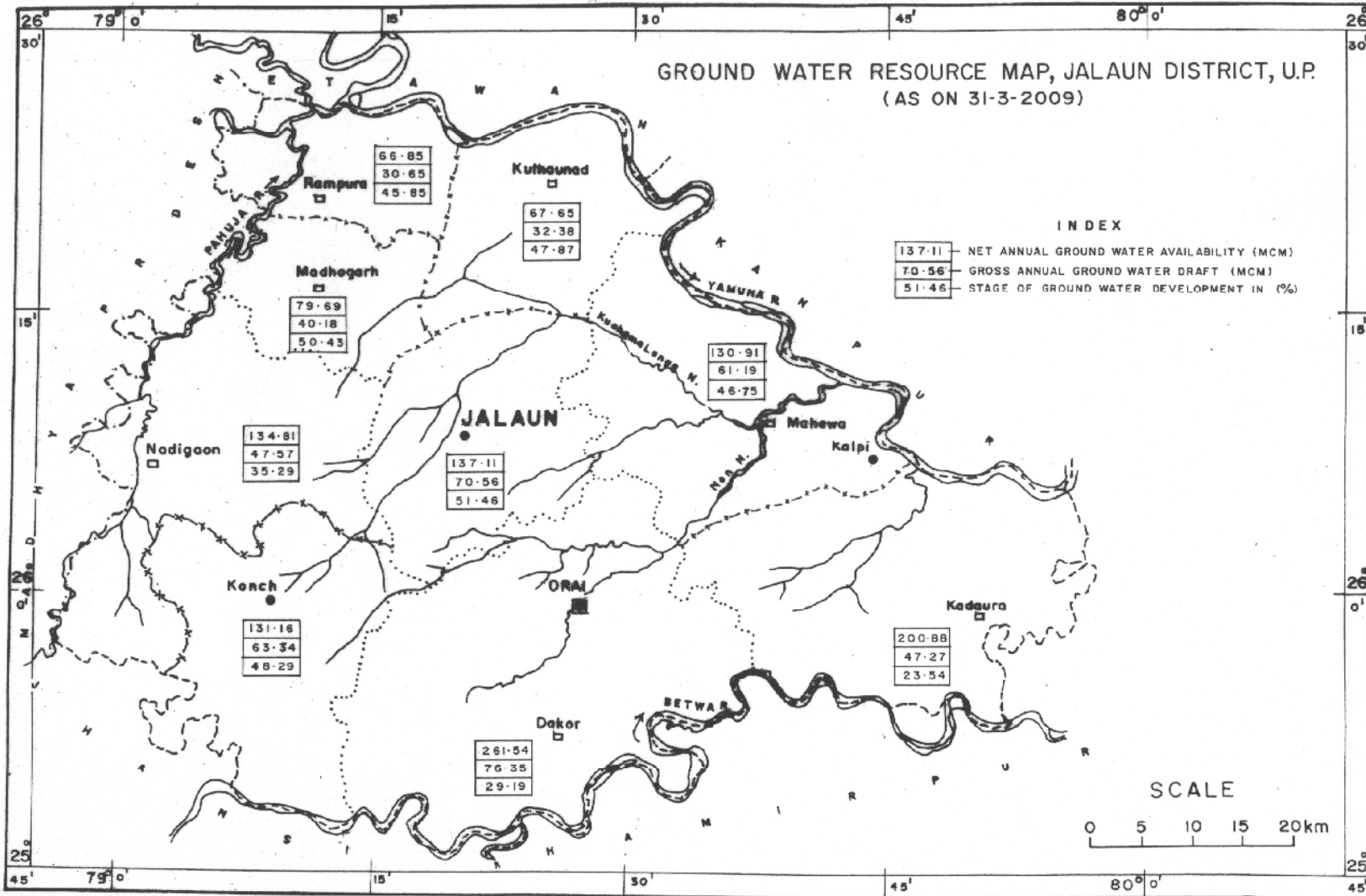


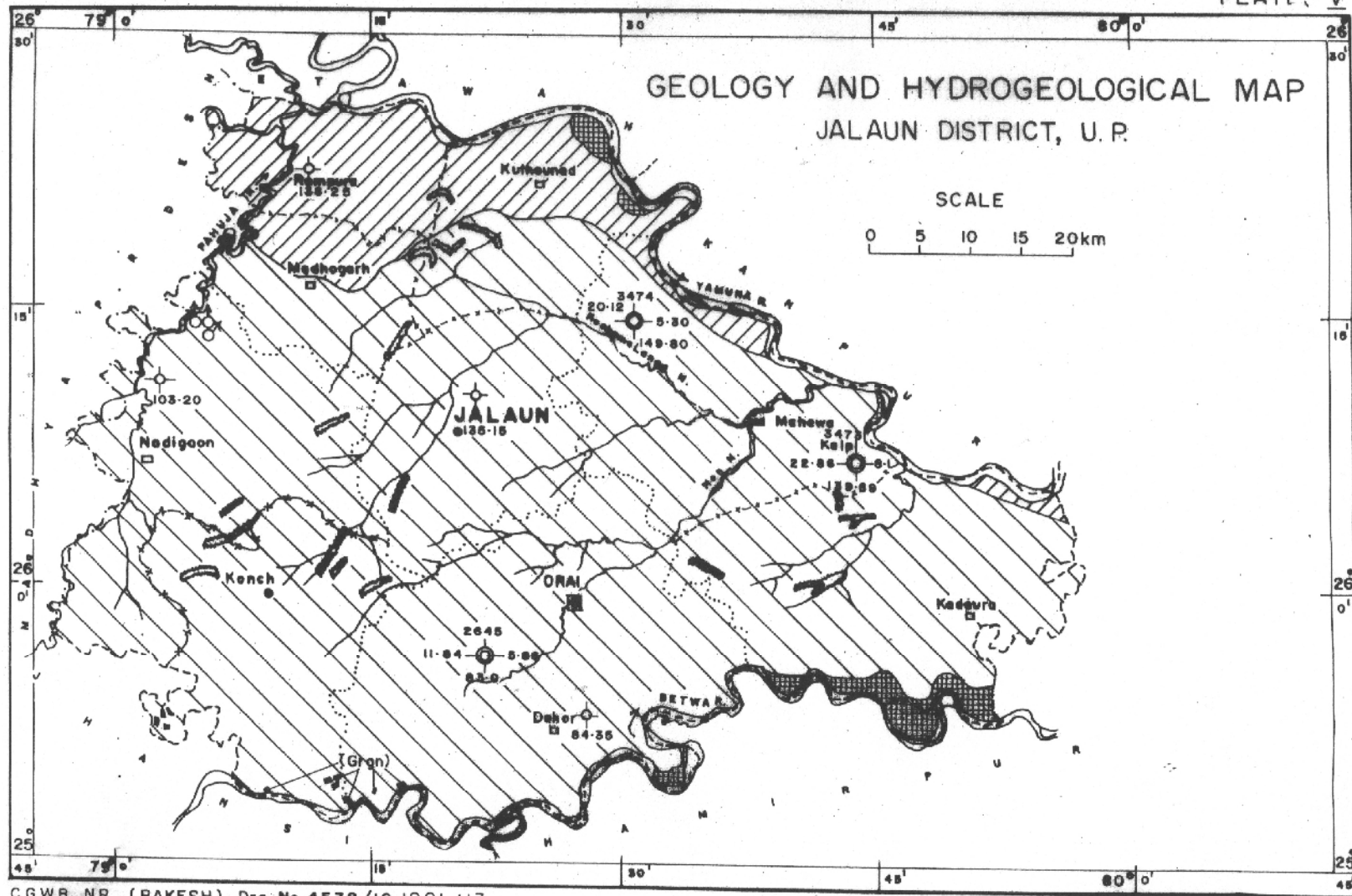
Borehole data (Basement depth and rock type) of CGWB well.











CGWB, NR, (RAKESH), Drg. No. 4538/12,1901/13