GROUNDWATER BROUCHER OF PRATAPGARH DISTRICT, U.P.

(A.A.P:2012-13)

By

Dr.H.K.Pandey, Scientist C

CONTENTS

PLATE:

PRATAPGARH DISTRICT AT A GLANCE

GENERAL INFORMATION

District	: Pratapgarh
Geographical Area (Sq Km)	:3717
Sub Division	
a) Number of Tehsil	:05
b) Number of Block	:17

CLIMATOLOGICAL DATA

Normal Rainfall (mm)	: 997.40
Mean Maximum temperature	44.0^{C}
Mean Minimum temperature	5.20^{C}
Average R. Humidity	56%
No of Rainy Days	58
Wind Speed Maximum	4.5Km/hr

LNAD USE (Ha)

Total area	: 361595
Total Forest area	: 569
Barren Land	: 7661
Present Fallow Land	: 55023
Pasture	: 682
Garden	: 15900

IRRIGATION

Net Cultivated Area	: 313865
Net Irrigated Area	:112477
By Canal	: 67434
Groundwater	:39250
Others	: 238

HYDRAULIC STRUCTUES

Dugwells	: 4867
Shallow tubewells	: 2488

Deep Tubewells	: 434
Exploratory Tubewells of CGWB	: 14

GROUNWATER RESOURCE POTENTIAL
(as on 31.03.09)

Net Groundwater Availability	: 101946
Gross Groundwater Draft	: 23184.88
Balance Groundwater Available (Ham)	: 78761.12
Stage of Groundwater Development	:
No of Critical Blocks	: None
No of Semi critical Blocks	: 02

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1.0 INTRODUCTION

Pratapgarh district covers an area of 3717 sq.km in the eastern portion of Central Ganga plain of U.P. is characterized by Quaternary alluvium. The district is administratively divided in 05 tehsils namely Kunda,Lalganj, Pratapgarh, Patti and Raniganj which are further divided into 17 development blocks.The density of population is person per sq km and decadal growth rate is 26.0%.

2.0 PHYSIOGRAPHY

The district area in general is more or less flat. Along the course of stream and rivers, ravenous topography has been developed. In southwestern part of district particularly along Sangramgarh-Jethwara road is dotted with numerous physical manifestation like oxbow lakes formed due to breaking of river Bakulahi. Prominent depressions observed in southern part of district reflects that either due to stoppage of water supply or meandering of streams are responsible for their generations. The average elevation of the land surface is about 100-115mamsl. The general slope of the tract is from NW to SW. The topography is influenced or modified by the existing rivers and streams.

3.0 GEOLOGY

The district occupies a part of Indo- Ganga plain and is underlain by Quartenary sediments consisting of clays, silt, kankar and sands of different grade. The thickness of these quaternary sediments over the district increases gradually towards north.

3.1 Sub-Surface Geology:

Subsurface geology of the district has been inferred on the basis of 16 borehole data. Thickness of quaternary alluvium varies on regional scale. Lithological logs indicate that the sediments upto 250.00mbgl has been deposited under fluvitile condition. The basement occurs at about 400.00mbgl in the eastern part of the district and gradually diminishes towards western part in the district.

4.0 HYDROMETROLOGY

The average annual rainfall is 997.00 mm. Climate is sub humid and is characterized by hot summer and pleasant monsoon and cold season. About 90% of rainfall takes place from June to September. During monsoon surplus water flows into rivers and streams un-arrested due to hilly topographic features in Northern part of the district.

In February there is increase in temperature, May is the hottest month with the mean daily maximum temperature is 43.5°C and mean daily minimum temperature is 28.0°C. The Average temperature ranges from 16.15 to 34.80 C. The average temperature from March to June do not fluctuate much.

The average relative humidity ranges from 25 to 81%. The average monthly relative humidity of the district is 55.96 %. Winds are generally high with some increase in force during summer and southwest monsoon season. The mean wind velocity is 5.4Km/hr. and potential evapo-transpisration rate is 1456.7 mm.

5.0 HYDROGEOLOGY

Hydrogeological Set-up:

Exploratory drilling data of CGWB and state tubewell department show that there are three tier aquifer system in the district. The Ganga alluvial plain in the district comprises of an aquifer system that forms good repository of groundwater. The details of aquifers are below:

a)Shallow Aquifer (I^{st} Aquifer):

It consist of silt and fine sand. It runs upto 150mbgl in most of the area except southernmost part of the district where it runs upto 225mbgl. It is fresh in nature.

b) Middle Aquifer (II^{nd} Aquifer):

It is saline in nature and ranging in thickness from 90 to 225m in most of the area but this depth is variable in space. The salinity of this aquifer is regional in nature.

c) **Deeper Aquifer (III^{rd}Aquifer)**

Underlies the intermediate brackish aquifer and is separated from the letter by thick clay layer. The maximum depth of this aquifer has not yet been estimated which however exceeds 608m at places.

6.0 Ground Water Condition:

Ground water is mainly controlled by drainage, topography and lithological behavior, it occurs under phreatic condition at shallow depths and under confined condition at deeper depth. Depth to water in pre-monsoon ranges between 2.85 to 15.00 mbgl. Postmonsoon water level varies between 1.50 to 11.50 mbgl. Average water level fluctuation is 3.50m. After the study of long term water level trend, it is inferred that 75% of well show the decline trend and 25% show rising trend during pre-monsoon period. The yield of the wells vary from 947 to 3700 lpm. The data of the State tubewells indicate that the discharge ranges from 700 to 2000 lpm.

6.1 Ground Water Resources:

To facilitate the ground water development the ground water resources of the district have been worked out and are as follows. (Table-II):

Table-II

BLOCK WISE GROUND WATER RESOURCES OF

Pratapgarh District, *U.P.* (as on 01-04-2009)

Sl. No.	Assessment unit (Blocks)	Ground availability (Ham)	Ground water draft (Ham)	Level of development (%)	Category as on 31.03.09	Balance ground water (Ham)
1	Sangipur	7412.24	5703.02	76.94	Safe	1082.31
2	Sandawa Chandrika	5711.33	5620.63	98.41	Critical	0.00
3	Magraura	8615.17	5742.44	66.65	Safe	2228.88
4	Aspur Deoasara	7652.74	5207.93	68.05	Safe	1896.77
5	Rampur Khas	8835.47	4821.00	54.56	Safe	3518.09
6	Laxman	6482.86	4514.91	75.23	Safe	1048.30
7	Sadar	4759.23	5184.92	108.94	Overexploited	0.00
8	Shivgarh	7412.24	5703.02	94.89	Critical	1082.31
9	Patti	6663.14	5190.36	77.90	Semi critical	1018.47
10	Belkharnath	4660.00	3913.38	83.98	Semi-critical	1896.77
11	Kalakankar	8139.42	5126.42	62.98	Safe	2524.06
12	Kunda	10298.87	7490.03	72.73	Safe	1879.29
13	Bihar	9629.45	5460.61	56.71	Safe	3304.43
14	Babaganj	11280.22	5698.31	50.52	Safe	4926.18
15	Mandhata	6684.48	5996.72	89.71	Safe	0.01
16	Gaura	8532.82	5659.03	66.39	Safe	2317.47
17	Lalganj	6234.86	4085.28	65.52	Safe	1700.70
Total		126236.34	90192.50	71.45		27255.26

7.0 GROUND WATER QUALITY

7.1 Quality of Shallow Ground Water:

The chemical analysis of shallow ground water consists of pH, E.C., Na, K, Ca, Mg, HCO_3, CL, SO4, NO_3, F and TH as $CaCO_3$. The result reflects that the ground water is safe and potable except at few locations Viz: Renbir, Pratapgarh city and villages adjacent to the river Sai where Chloride, SAR and SSP are high than prescribed limit. The study consist of comparision of different constituents for lat five years(2006/2011). It reflects that the E.C. has increased alongwith Ph values.

7.2 Quality of Deeper Aquifers:

Data of water samples collected from deeper aquifers reveals that the water is safe and potable from upper and lower aquifer while middle aquifer is saline in nature at regional scale. The depth of brackish aquifer ranges from 152-172mbgl at Agai,200-250mbgl at Laxmanpur and at 233-448mbgl at Delhupur.

8.0 GROUND WATER PROBLEMS ENCOUNTERED

After study, it is inferred that the following groundwater problems have been encountered in the district.

8.1 Water Logged/ Water Table Depleted Area:

. It is well known fact that when water level is less than 2.00mbgl in the area, it is called waterlogged and process for rising water level is called water logging. In Pratapgarh District, three blocks namely Babaganj, Bihar and Mandhata are under waterlogged category.

Babganj:145.00 Sq Km

Bihar: 105.0Sq Km

Mandhata: 65.0 Sq Km

Water level data of NHS for the last ten years show that 40% of the district show minor rising trend like in Bihar,Babaganj, Rampur, Gaura and Mandhata blocks. Area under prone to waterlogging has been calculated as below:

Name of Blocks:	Area under prone to Water Logging
Bihar	150.00
Babganj	85.00
Rampur	54.00
Gaura	110.0
Mandhata	85.00

8.2 Artificial Recharge Area.

It is observed that over the years Pratapgarh Sadar block has gone into overexploited category and other five blocks have gone to Critical and Semicritical Category. It is therefore, the attempts should be immediately taken place regarding the implementation for groundwater augmentation.

9.0 CONCLUSIONS&RECOMMENDATIONS

Pratpgarh district covers an area of 3717 Sq. km. and falls in the Central Ganga plain. Thickness of alluvium reaches upto 600.00mbgl. Exploratory drilling data reveals that there are three horizonse in the district vary from

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Yield of well varies from 500 to 3500 lpm in the District. Depth to water level in pre-monsoon ranges between 1.90 to 14.00 mbgl. Post-monsoon water level varies between 1.50 to 16.00 mbgl. Water level data of all NHS falling in the district were analyzed from 2001 to 2011 which clearly show that the long term fluctuation ranges between 0.79 to 4.00 m corroborating insignificant base flow of ground water in the area. The chemical analysis of ground water samples of the district show that the water quality is fresh and potable except few pockets where high salinity and chloride problems are encountered.

RECOMMENDATIONS

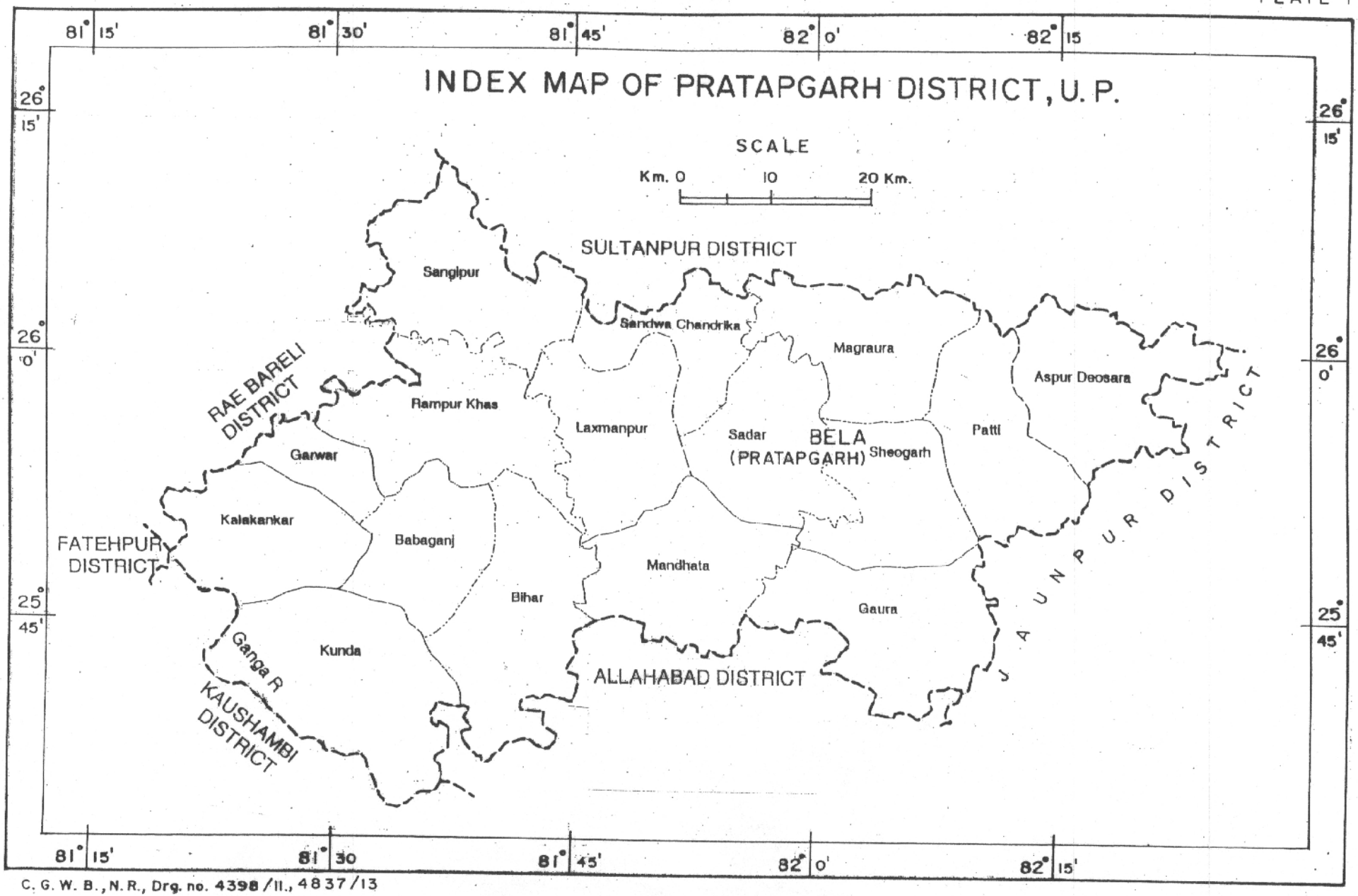
i) Delineation of buried and paleo-channels for potable ground water may be searched out.

ii) To counter the declining water level trend in the district the artificial recharge practices and water-shed management (from hill to valley approach) should be adopted at large scale.

iii) There is urgent need of Quality assessment of shallow and deeper groundwater and its relationship with the litho logical behavior.

iv) Exploration of potential sites for ground water withdrawl should be carried out through the help of Remote Sensing, Study of Satellite Imageries and Resistivity surveys.

PLATE-I



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DEPTH TO WATER MAP OF PRATAPGARH DISTRICT, U.P.

(PRE-MONSOON – 2011)

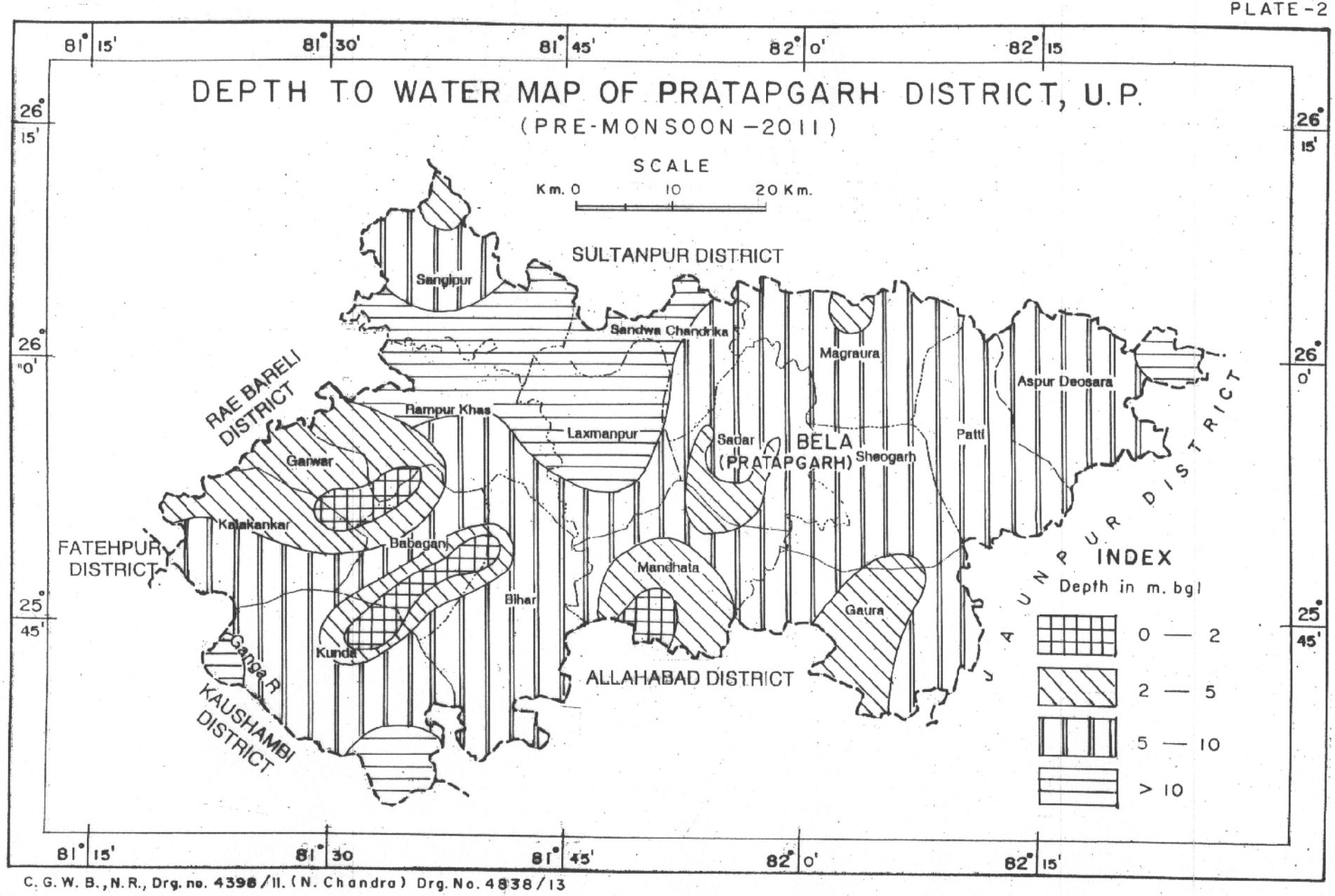

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PLATE -3

DEPTH TO WATER MAP OF PRATAPGARH DISTRICT, U.P.

(POST-MONSOON - 2011)

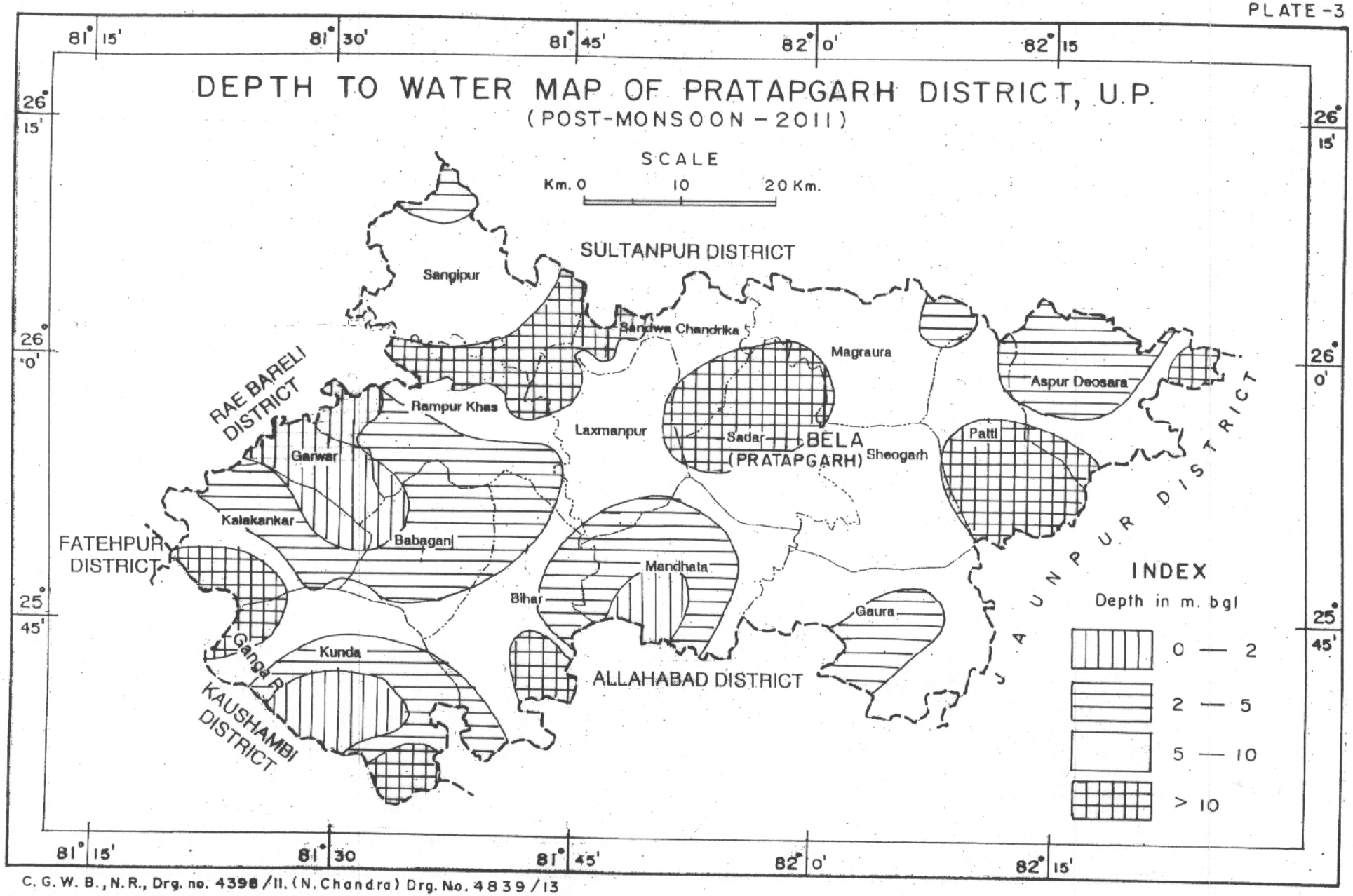

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PLATE-4

HYDROGEOLOGICAL MAP OF PRATAPGARH DISTRICT, U.P.

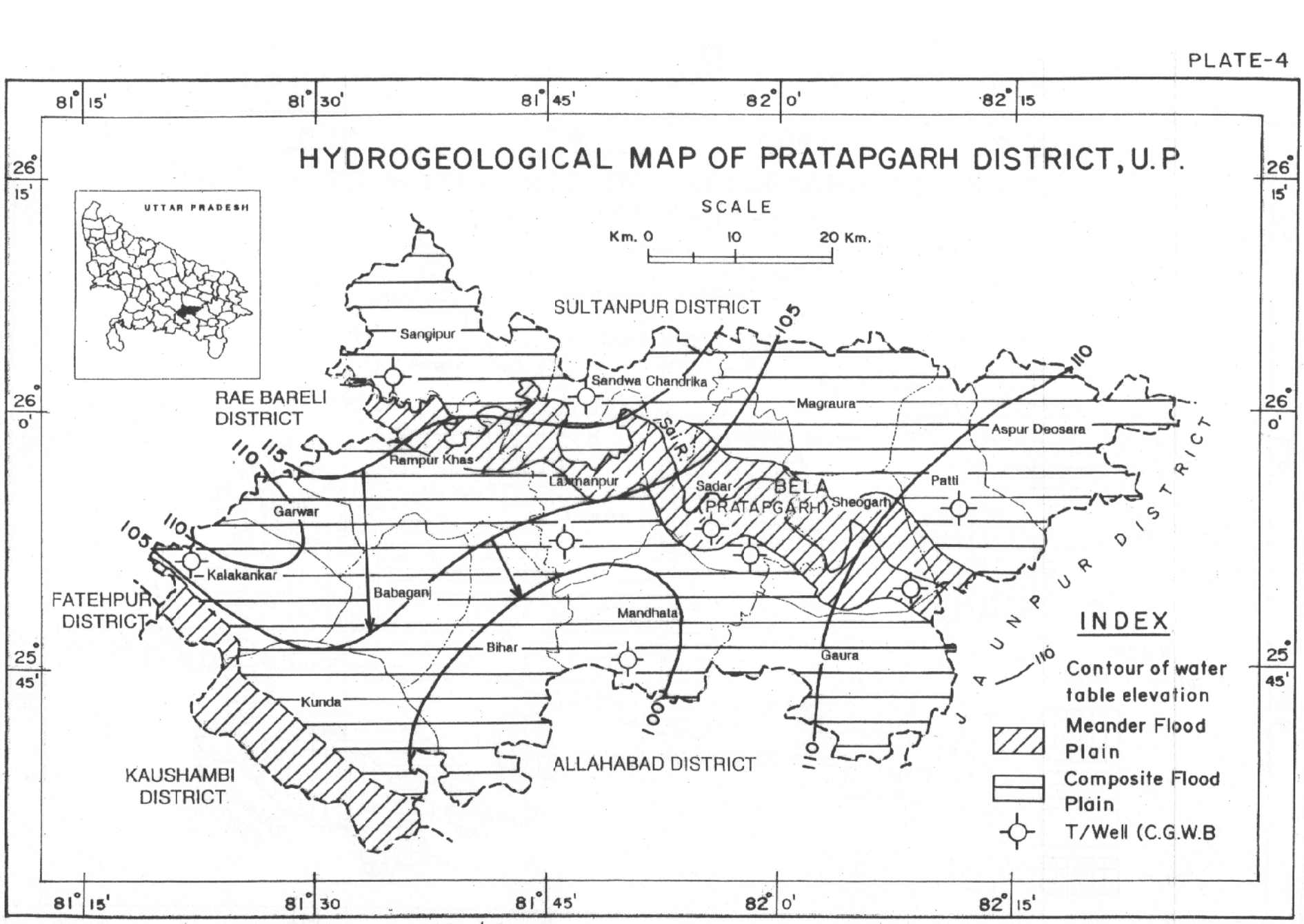

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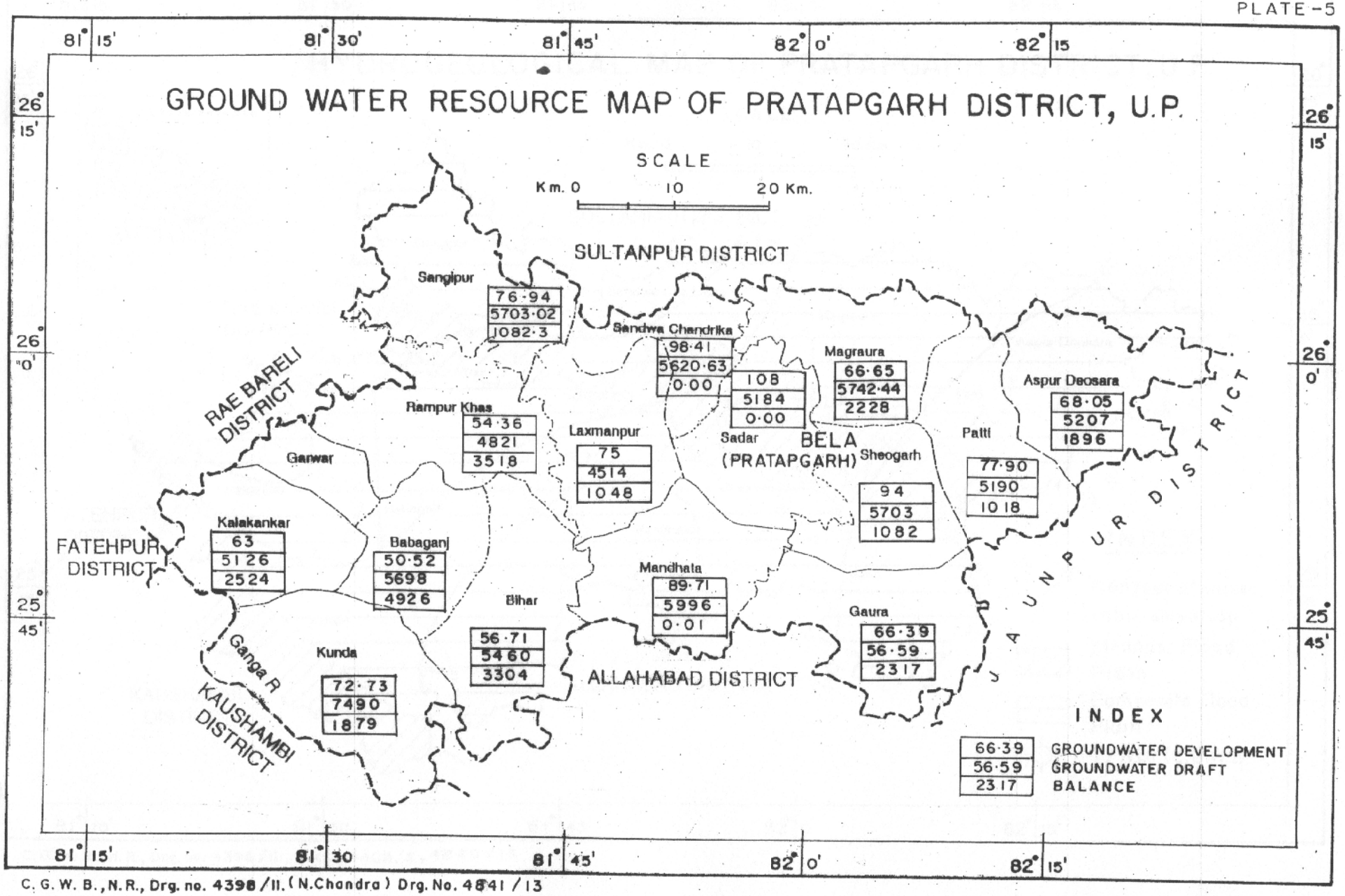
PLATE-5

GROUND WATER RESOURCE MAP OF PRATAPGARH DISTRICT, U.P.



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