GROUND WATER BROCHURE
DEORIA DISTRICT, U.P.

By
S. MARWAHA
Superintending Hydrogeologist

CONTENTS

DEORIA DISTRICT AT GLANCE

1. GENERAL INFORMATION

i.	Geographical Area (Sq. Km.)	:	2538
ii.	**Administrative Division (as on 2011)**		
	a) Number of Tehsil (Deoria Sadar, Rudrapur, Berhaj, Salempur & Bhatpar Rani)	:	5
	b) Number of Block (Gauri Bazar, Baitalpur, Desai Deoria, Pathardeva, Rampur Karkhana, Deoria Sadar, Rudrapur, Bhalauni, Barhaj, Bhatni, Bhatpar Rani, Bankata, Salempur, Bhagalpur, Lar, Tarkulwa.	:	16
	c) Number of Village	:	2162 (2009 – Inhabited; 153-uninhabited)
iii.	Population (as on 2011 census)	:	30,98,637

2. GEOMORPHOLOGY

Major Physiographic Units	:	Newer Alluvium Older Alluvium
Major Drainages	:	The Ghaghra & its tributaries

3. LAND USE (As on 2010-11)

a)	Forest area	:	0.1 %
b)	Net area sown	:	79.5 %
c)	Net irrigated area (of Net sown area)	:	85.9 %
d)	Cropping intensity	:	158 %

4. AREA UNDER CROPS (Ha)

Total Food grains	:	285389 (Rice – 130044; Wheat – 147605; Others- 7740)
Pulses	:	7796
Oilseeds	:	3418
Sugarcane	:	10091
Vegetables	:	5022
Others	:	296

5. IRRIGATION BY DIFFERENT SOURCES (as on 2011-12) (ha)

Dugwells	:	629
Tubewells / Borewells	:	145454
Ponds	:	Nil

	Canals	:	24178
	Other Sources	:	Nil
	Net Irrigated Area	:	170261
	Gross Irrigated Area	:	269012
6.	**NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-3-2012)**	:	11
	No. of Dugwells	:	11
	No. of Piezometers	:	Nil
7.	**PREDOMINANT GEOLOGICAL FORMATIONS**	:	Alluvium
8.	**HYDROGEOLOGY**		
	Major Water Bearing Formation	:	Alluvium
	Pre-monsoon Water Level During 2012	:	3.47 m to 6.67 mbgl
	Post-monsoon Water Level During 2012	:	0.99 m to 4.04 mbgl
	Long Term of Water Level Trend Pre-monsoon Period	:	Fall (7 wells)- 0.05 to 0.18 m/yr. Rise(4 wells) - 0.02 to 0.17 m/yr
	Post-monsoon	:	Rise(5 wells)-0.03 to 0.31 m/yr Fall (6 wells)- 0.03 to 0.32 m/yr
9.	**GROUND WATER EXPLORATION BY CGWB (As on 31-3-2012)**		
	No. of Wells Drilled EW, OW, SH & PZ	:	11
	Depth Range of Depth Drilled	:	200 to 325.65
	Discharge litre per second	:	26.6 to 50.46
	Storativity	:	-
	Transmissivity	:	801 to 4830 m^2/day
10.	**GROUND WATER QUALITY** Presence of chemical constituents less than permissible limit		
	pH	:	Nil
	Chloride	:	1
11.	**DYNAMIC GROUND WATER RESOURCES (2009)-in HAM**		
	Annual Replenishable Ground Water Resources	:	90677.60
	Net Annual Ground Water Draft	:	66488.54
	Projected Demand for Domestic & Industrial Uses Upto 2025	:	8537.69
	Stage of Ground Water Development	:	73.32%

GROUND WATER SCENARIO OF DEORIA DISTRICT, U.P.

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I. INTRODUCTION

The district Deoria is located in the northeastern corner of U.P covering an area of 2538 sq. km. Administratively the district is divided into 5 tehsils and 16 blocks. Total population of the district as per 2011 census is 3098637. District is drained by river the Ghaghra & its tributaries namely little Gandak and Rapti rivers. The irrigation in district is mainly from ground water. The net area irrigated by ground water structures is 145454 ha (85.8% of total irrigated area) and net area irrigated by canals & other sources is 24178 ha. The net area sown is 79.5% of the total area of district and cropping intensity is 158 %. Area under irrigation as per various sources is given in table-1.

Table-1:- Source-wise area under irrigation (Ha), Deoria, UP

	Canal	Tubewells		Open wells	Ponds	Others	Total
		Govt	Private				
BAITALPUR	3194	1377	7974	52	0	0	12597
BANKATA	3154	1266	8506	51	0	0	12977
BARHAJ	4987	165	3694	7	0	0	8853
BHAGALPUR	4622	175	7412	6	0	0	12215
BHATANI	4777	129	5580	6	0	0	10492
BHATPAR RANI	1268	699	10854	36	0	0	12857
BHALUWANI	0	590	13332	85	0	0	14007
DEORIA SADAR	0	978	9899	63	0	0	10940
DESAHI DEORIA	0	802	7765	45	0	0	8612
GAURI BAZAR	72	958	8182	7	0	0	9219
LAR	0	918	6848	44	0	0	7810
PATHER DEWA	0	881	7516	121	0	0	8518
RAMPUR KARKHANA	0	1064	10716	8	0	0	11788
RUDRAPUR	0	1171	9207	53	0	0	10431
SALEMPUR	0	1218	9322	37	0	0	10577
TARKULWA	2054	100	5006	8	0	0	7168
Total-Rural	*24128*	*12491*	*131813*	*629*	*0*	*0*	*169061*
Total-Urban	*50*	*500*	*650*	*0*	*0*	*0*	*1200*
Total -District	**24178**	**12991**	**132463**	**629**	**0**	**0**	**170261**

Source—District Statistical diary

II. CLIMATE & RAINFALL

The climate of the district is characterised as sub humid with hot summer and cold winter along with well distributed rainfall during southwest monsoon season. The normal annual rainfall of Deoria district is 1128.10 mm. About 88% rainfall is recorded during monsoon and the rest 12% is generally recorded during non-monsoon period. The general trend of isohyets indicates that in central part of the area the rainfall is 1100 mm. The district receives more rainfall towards east.Winds are generally light and increase in speed from the beginning of summer and continues to have higher speed upto June.

The annual potential evapotranspiration in the district is of order of 1425 m. The maximum PET occurs in the month of April & May with 177.2 mm and 207.2 mm respectively.

III. HYDROGEOLOGY

The ground water occurrence and availability generally depends upon the water bearing properties of water bearing formation which is alluvium. The alluvium comprises of alternating layers of sand, silt, clay and its admixture. Kankar is occasionally associated with clay. The ground water occurs under water table condition in shallow aquifer whereas the ground water in deeper aquifer occurs under semi confined to confined condition.

The shallow aquifer, which is being tapped by dug wells/ tubewells, occur upto the depth of 80 meter. The aquifer material is fine to medium sand. The kankar associated with clay also occurs occasionally.

Depth To Water Level:

Ground water level indicates the elevation of atmospheric pressure of the unconfined aquifer. Based on pre-monsoon water level data of May 2012, a depth to water level map has been prepared. The depth to water level in the district ranges from 3.47 mbgl to 6.67 mbgl (Table-2) and major part of the district falls in the range of 4 to

6.00 mbgl. In the western part of the district the depth to water level is observed to be deeper.

During monsoon period the ground water recharge takes place and depth to water level becomes shallower. To study the distribution of water level during post-monsoon period the depth to water map of November 2012 has been prepared. The depth to water during post-monsoon period ranges from 0.99 to 4.04 mbgl (Table-2). In major part of the area the depth to water in post-monsoon ranges between 2.00 & 4.00 mbgl.

Water Level Fluctuation:

The water level fluctuations in shallow aquifer based on data of national hydrograph monitoring stations is summerised in Table-2.

Table 2 - Depth to water levels (CGWB NHS wells)– Deoria district

Name of station	Block	Depth to water level Pre-monsoon (mbgl) May 2012	Depth to water level Post-monsoon (mbgl) Nov 2012	Fluctuation (m)
Ratasia Kothi	Bankata	5.63	2.64	2.99
Baitalpur	Deoria Sadar	4.37	1.56	2.81
Deoria2	Deoria Sadar	3.50	2.94	0.56
Desai Deoria	Desai Deoria	3.92	2.01	1.91
Gauri Bazar	Gauri Bazar	4.42	2.25	2.17
Sirsia	Gauri Bazar	5.23	1.67	3.56
Lar	Lar Road	4.08	2.28	1.80
Pathar Deva (Narayanpur Kothi)	Pathar Deva	5.16	3.15	2.01
Rampur Garh	Rampur Karkhana	3.47	0.99	2.48
Rudrapur1	Rudrapur	6.67	4.04	2.63

As it is evident from table -2 the seasonal water level fluctuations range from 0.56m to 3.56m during 2012. This indicates that aquifers get recharged during monsoon period and water levels during post-monsoon are at shallowest levels. The average block wise water level data of state government observation wells as used in ground water resource estimation as on 31.3.2009, is presented in table -3.

Table-3: Average water level data of state Govt. observation wells, Deoria

		Average Pre-monsoon water level (m bgl)	Average Post-monsoon water level (m bgl)	Fluctuation (m)
1	BAITALPUR	3.51	2.33	1.18
2	BANKATA	4.36	1.35	3.01
3	BARHAJ	6.57	4.11	2.46
4	BHAGALPUR	4.90	3.67	1.23
5	BHALUWANI	3.38	2.69	0.69
6	BHATANI	5.30	1.50	3.80
7	BHATPARANI	3.20	1.88	1.32
8	DEORIA SADAR	3.23	1.73	1.50
9	DESAHI DEORIA	3.83	2.80	1.03
10	GAURI BAZAR	3.33	2.04	1.29
11	LAR	4.06	2.27	1.79
12	PATHER DEWA	2.97	2.01	0.96
13	RAMPUR KARKHANA	3.10	2.22	0.88
14	RUDRAPUR	5.92	3.47	2.45
15	SALEMPUR	4.43	2.56	1.87
16	TARKULWA	4.71	3.50	1.21

On perusal of table 2 and 3 indicate that data of both the monitoring agencies i.e CGWB and /state government correspond to each other and does not vary.

Long Term Water Level Trend:

Changes in storage resulting from differences between supply of withdrawal causes levels to very in time. Based on water level data of several years a long term water level trend for pre & post monsoon period has been worked out & summerised below (Table-4):

Table-4 :-Water Level Trend Of Hydrograph Stations Of Deoria District, U.P.

Sl. No.	Location	Block	Period	Pre-monsoon		Post-monsoon	
				Rise (m/year)	*Fall (m/year)*	*Rise (m/year)*	*Fall (m/year)*
1.	Ratasia Kothi	Bankata	2002-11	-	0.05	0.04	-
2.	Barhaj	Barhaj	2002-11	0.17	-	-	0.32
3.	Baitalpur	Deoria Sadar	2002-11	0.10	-	0.12	-
4.	Deoria2	Deoria Sadar	2002-11	-	0.08	-	0.12
5.	Desai	Desai Deoria	2002-11	-	0.13	-	0.09

6.	Gauri Bazar	Gauri Bazar	2002-11	0.02	-	-	0.00
7.	Sirsia	Gauri Bazar	2002-11	-	0.09	-	0.03
8.	Lar Road	Lar	2002-11	0.05	-	0.11	-
9.	Pather Dewa	Pathar Dewa	2002-11	0.17	-	0.31	-
10.	Rampur garh	Rampur Karkhana	2002-11	0.14	-	0.03	-
11.	Rudrapur1	Rudrapur	2002-11	0.07	-	-	0.27

Ground Water Movement:

Water level contour map has been prepared during the ground water management survey. The perusal map shows value attitude of water table in the district ranges from 60 to 76 m above m.s.l. The ground water flow is towards the major river Ghaghra & its tributaries i.e. Rapti, Little Gandak and Kanuan Nadi. On the basis of ground water flow direction it can be said that rivers of district are gaining steams (effluent steams). The steam channels are in direct contact with shallow aquifer and the rivers receive discharge from the ground water.

Ground Water Exploration:

Ten exploratory / piezometers / SH have been drilled in past by Central Ground Water Board and state agencies. The depth drilled of these wells ranges between 200 & 325.65 mbgl. The specific capacity of wells ranges from 191 to 4362 lpm/m of drawdown. The transmissivity ranges from 801 (at Lar) to 5649 (at Barhaj) m^2/day.

In addition to these wells number of tubewells have been constructed by State irrigation department. The depth of these wells generally range for 60 to 100 mbgl. These wells are constructed to meet the irrigation water requirement.

IV. GROUND WATER QUALITY

In general the quality of ground water is good. The quality of water from drinking water point of view and irrigation point of view is discussed as follows:

Ground Water Suitability For Drinking Purposes:

51 water samples were collected during ground water management survey and got analysed. The summerised result falling in desirable limit / permissible limit and the undesirable effect out side permissible limit are shown in Table-5.

Table-5:-Constituent Desirable Limit, Permissible Limit Number Of Samples Beyond Permissible Limit & Undesirable Effect

Sl. No.	Constituent	Desirable limit	Permissible limit	No. of samples beyond permissible limit	Undesirable limit beyond permissible limit
Essential Characteristic					
1.	pH	6.5-8.5	No relaxation	Nil	Beyond this range the water will affect the mucus membrane & water supply system.
2.	Total Hardness as $CaCO_3$	300	600	Nil	Encrustation in water supply structure and adverse effects on domestic use.
3.	Iron	0.3	1.00	Nil	Precipitation after exposure to air, causes turbidity stains plumbing fixtures laundry & cooking utensils.
4.	Chloride	250	1000	Nil	Beyond this limit corrosion and palatability are affected.
5.	Fluoride	1.00	1.5	Nil	Fluoride may be kept low as for as possible high fluoride leads to Fluorosis.
Desirable Characteristics					
6.	Total dissolved solid	500	2000	Nil	May cause gastro - intestinal irritation.
7.	Calcium	75	200	Nil	Encrustation in water supply structure and adverse effect on domestic use.
8.	Magnesium	30	100	Nil	Encrustation in water supply structure and adverse effect on domestic use.
9.	Sulphate	200	400	Nil	Beyond this causes gastro - intestinal irritation when Mg & Na are present.
10.	Nitrate	45	No relaxation	Nil	Beyond this limit may cause methaglobomenia.

From the Table-5 it is observed that all the samples fall within permissible limit. The variation in different constituent at different places is due to variation in leaching from the soil mantle and other material decomposed from plants and animals and variation in the use of fertilizer both in space & time.

On the basis of analytical results of ground water samples collected from exploratory tubewells and borewells constructed under accelerated exploratory programme. Water of deeper aquifer is of very good type as all the parameter are well within desirable limit for drinking standards except Mg content at Deoria Bhujauli where Mg is 39 ppm which is very close to desirable limit & within the permissible limit.

Suitability Of Ground Water For Irrigation Purpose:

As per Wilcox classification based on percentage of Sodium and EC of ground water can be grouped into 5 categories as given below (Table-6):

Table-6 :- Irrigation Water Class & Number Of Samples

Sl. No.	Water Class	Percentage Sodium	EC in micromhos/cm at 25^0C	Number of Sample/Total Samples	
				As per Na %	*As per EC value*
1.	Excellent	<20	<250	-	4
2.	Good	20-40	250-750	30	39
3.	Permissible	40-60	750-2000	16	7
4.	Doubtful	60-80	2000-3000	2	1
5.	Unsuitable	>80	>3000	3	-

As per Na percentage out of 51 samples 30 samples fall in good category and 16 samples fall in permissible category. 2 samples falls under doubtful category & 3 samples in unsuitable category. From the EC value point of view only one sample around Kanchanpur in Rampur Karkhana block falls under doubtful category. The occurrence of high value is of local nature. Overall it can be inferred that in general the quality of water both in shallow & deep aquifer is suitable both for drinking and irrigation purposes.

V. GROUND WATER DEVELOPMENT & MANAGEMENT

The ground water in Deoria district is being developed by state tubewells, private shallow tubewells, open wells and handpumps. State tubewells, open wells & private shallow tubewells generally water irrigation requirements whereas water from handpumps is drawn for domestic and drinking needs. Block wise details of ground water abstraction structure for irrigation is as follows (Table-7):

Table-7:- Block Wise Details Of Ground Water Abstraction Structures for Irrigation

Sl. No.	Name of Block	State tubewells	Masonry Well	Total Shallow Tube wells	Deep Tube wells
1.	Gauri Bazar	70	0	4657	1
2.	Baitalpur	62	27	4660	1
3.	Desai Deoria	11	0	4320	0
4.	Pathar Dewa	19	0	4183	0
5.	Rampur Karkhana	13	0	3732	1
6.	Deoria Sadar	70	0	4753	0
7.	Rudrapur	30	0	4833	0
8.	Bhaluani	109	0	5700	0
9.	Barhaj	52	0	4055	0
10.	Bhatni	42	0	4460	0
11.	Bhatpar Rani	69	0	4430	0
12.	Bankata	55	0	5503	0
13.	Salempur	103	0	3570*	0
14.	Bhagalpur	80	0	3738	0
15.	Lar	55	0	5002	0
16.	Tarkulwa	16	0	2336	0
	TOTAL	**856**	**27**	**66362**	**3**

*Source-District Statistical Diary : *--- Figure as mentioned needs to be reconciled*

There are 2009 villages fitted with hand pumps (India Mark-2). These hand pumps are being used for domestic & drinking needs. Through these hand pumps a population of about 2445874 is benefited. The details are provided in Table-8.

Table-8:- Block wise details of Hand pumps, Deoria district

Sl. No.	Name of Block	Number of villages fitted with hand pumps	Population Benefited
1.	Gauri Bazar	115	207321
2.	Baitalpur	128	195599
3.	Desai Deoria	75	116743
4.	Pathar-Dewa	105	151226
5.	Rampur Karkhana	105	134735

6.	Deoria Sadar	157	199683
7.	Rudrapur	162	159748
8.	Bhaluani	170	169746
9.	Barhaj	094	117585
10.	Bhatni	106	149503
11.	Bhatpar Rani	117	147652
12.	Bankata	148	156549
13.	Salempur	207	177293
14.	Bhagalpur	127	126096
15.	Lar	127	144562
16.	Tarkulwa	66	101833
	Total	**2009**	**2445874**

Source—District Statistical diary

The block wise ground water resources as on 31.3.2009 have been computed as per Ground water Resource Estimation committee -1997 norms and salient results are summerised in the Table-9:

Table-9:- Block Wise Ground Water Resources As On 31.3.2009, Deoria District

Sl. No.	Name of block	Net annual ground water availability (ham)	Existing ground water draft for irrigation (ham)	Draft for industrial & domestic use (ham)	Existing gross ground water draft for all uses (ham)	Allocation for domestic and industrial requirement supply upto 2025	Net ground water availability for future irrigation (ham)	Stage of ground water development	Category
1.	BAITALPUR	7012.16	4878.24	397.49	5275.73	526.51	1607.41	75.24	Safe
2.	BANKATA	4578.31	3372.66	487.85	3860.51	626.70	578.95	84.32	Safe
3.	BARHAJ	4644.27	3099.80	339.16	3438.96	391.86	1152.61	74.05	Safe
4.	BHAGALPUR	4870.72	3650.07	428.20	4078.27	403.46	817.19	83.73	Safe
5.	BHATANI	4978.44	3339.76	433.38	3773.14	634.73	1003.95	75.79	Safe
6.	BHATPAR RANI	4640.19	3370.06	489.97	3860.03	498.92	771.21	83.19	Safe
7.	BHALUWANI	7761.11	5534.56	518.19	6052.75	555.55	1671.00	77.99	Safe
8.	DEORIA SADAR	7370.19	4181.34	557.79	4739.13	698.18	2490.67	64.30	Safe
9.	DESAHI DEORIA	5182.80	1801.34	436.89	2238.23	389.13	2992.33	43.19	Safe
10.	GAURI BAZAR	7202.29	5405.37	618.78	6024.15	742.90	1054.02	83.64	Safe
11.	LAR	4481.76	3110.94	358.78	3469.72	470.16	900.66	77.42	Safe
12.	PATHER DEWA	6311.13	2992.50	460.48	3452.98	565.76	2752.87	54.71	Safe

Sl. No.	Name of block	Net annual ground water availability (ham)	Existing ground water draft for irrigation (ham)	Draft for industrial & domestic use (ham)	Existing gross ground water draft for all uses (ham)	Allocation for domestic and industrial requirement supply upto 2025	Net ground water availability for future irrigation (ham)	Stage of ground water development	Category
13.	RAMPUR KARKHANA	5297.78	2977.65	589.75	3567.40	494.96	1825.17	67.34	Safe
14.	RUDRAPUR	6664.06	4937.57	472.88	5410.45	560.02	1166.47	81.19	Safe
15.	SALEMPUR	5424.77	4247.62	413.42	4661.04	610.49	566.66	85.92	Safe
	TARKULWA	4257.62	2280.77	305.28	2586.05	368.36	1608.49	60.74	Safe

As per Ground water resource estimation, all the blocks of the district fall under Safe category of ground water development. However in some of the blocks namely Salempur, Gauri Bazar, Bankata, Bhagalpur, Rudrapur and Bhatpar Rani stage of ground water development is more than 80%.

GROUND WATER MANAGEMENT STRATEGY:

The Deoria district comprises of alluvial areas. The farmers of the district are having small land holding. The fragmented nature of land holding creates hardship to an individual farmer to develop the ground water resource economically. Moreover 170261 ha area is under net irrigation. With available ground water resources additional area can be brought under irrigation. Therefore to increase the augmentation to ground water, surface water resources should be enhanced to bring more area under irrigation and agricultural productivity. Following strategy may be adopted:

1. Ground water in the area should be developed for irrigating kharif crop thereby increasing cropping intensity which is present languishing at 158% only. All efforts should be made to increase it to at least 200%.
2. More Area should be brought to cultivable one.
3. The ponds, which are State owned, have been used as a source of water for different use. Many of these structures are in disuse on account of poor maintenance and increasing population pressure & lack of controlled and sound management of water for productive agriculture. The farmers in the vicinity of such ponds can be organised on a group basis with a right to use & maintain through appropriate legislation.

4. The Kharif crops still remain dependent on rainfall only. Thus the efforts should be made for maximisation of rainwater use efficiency, through water harvesting system.

The first priority should be given to absorbing as much water in the soil as it can hold for adopting a remunerative and efficient system of agriculture aiming at enhancing productivity. Each village / cultivator / farmer / private individual should be encouraged to take up charging pits or trenches.

There are two basic types of water harvesting system. One is direct application where runoff water is collected and stored in the soil profile during the precipitation. The second one is the supplemented water system where the collected water is stored off, set in some reservoir or storage structure and applied later to the crop area with some form of irrigation system.

VI. AWARENESS & TRAINING ACTIVITY

Mass awareness programme & water management training programme by CGWB has not been taken place in the district so for.

VII. AREAS NOTIFIED BY CGWA/SGWA

None of the area has been notified in the district so far.

VIII. RECOMMENDATIONS

At present irrigation for cultivation is available in 74% of gross sown area. Thus the irrigation facility needs improvement. With available resource only about 19400 ha land may be irrigated considering 60 cm as crop water requirement. Thus in order to increase the irrigation facility following recommendation are suggested:

(i) Ground water should be developed more especially in those blocks where stage of ground water development as on 31.3. 2009 is less than 70%. .these blocks area Deoria Sadar, Desai Deoria, Pather Dewa and Rampur Karkhana.

(ii) The ponds, which are in disuse on account of poor maintenance, may be rejuvenated.

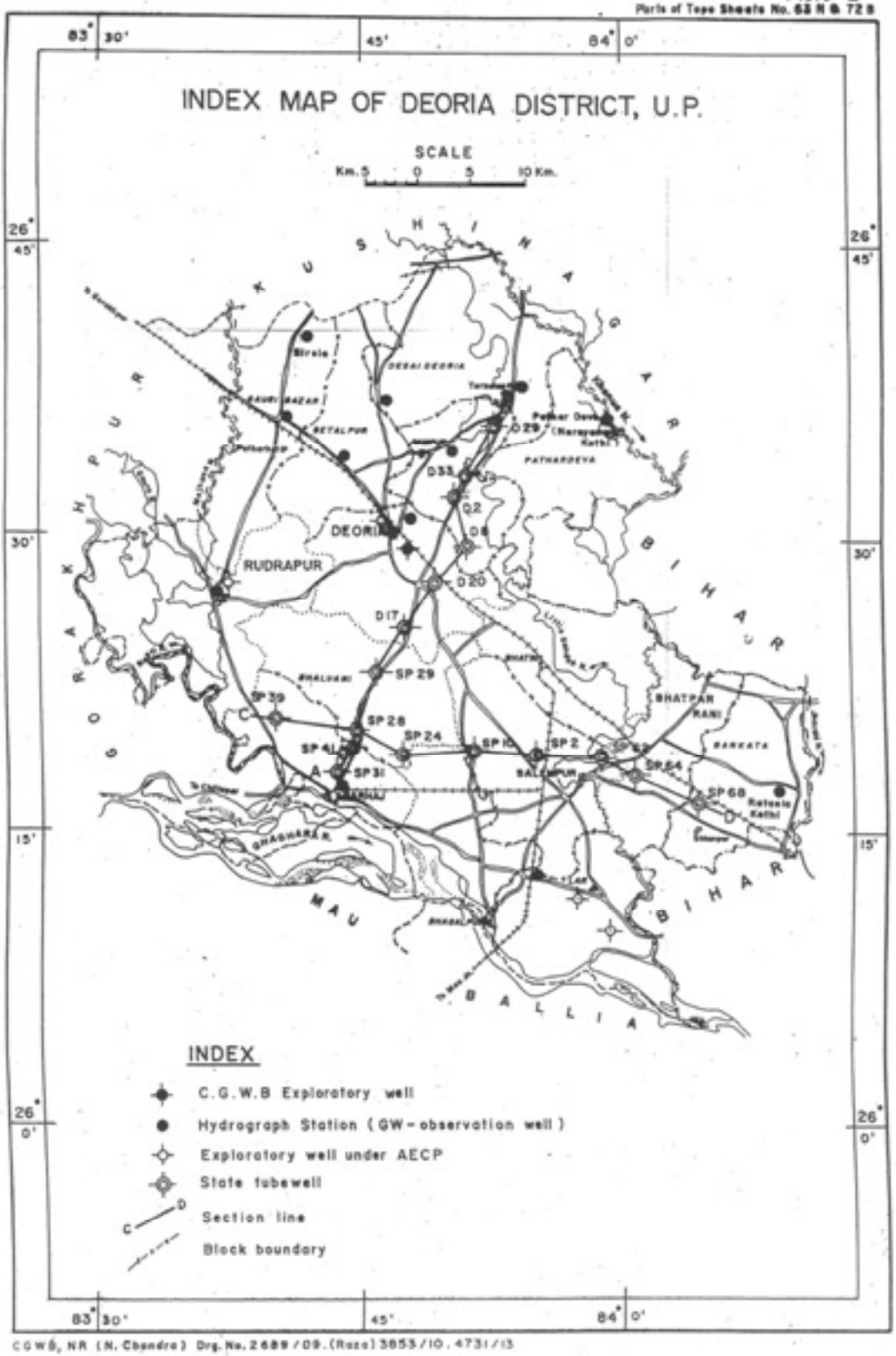
(iii) Fragmented and small land holding discourage farmers to adopt scientific water management. Further uncertainty in the time and amount of canal water supply influences the farmer's decision regarding choice of crops and he applies higher irrigation then the depth actually needed.

(iv) Awareness programme should be launched by agriculture / irrigation department regarding the crop water requirement for different crops and adoption of different methodologies like contour bunding , peripheral bunding in which the water is used most economically for growing the crops and more water can seep through recharging the aquifers in areas where water levels are relatively deep.

Rain water harvesting should be done for increasing the water availability for augmentation to ground water & for creating additional irrigation facility for increasing the irrigation for Rabi crops in the areas where depth to water level is below 3 m and more during post-monsoon period.

Plate - I

Parts of Toposheets No. 63 N & 72 B

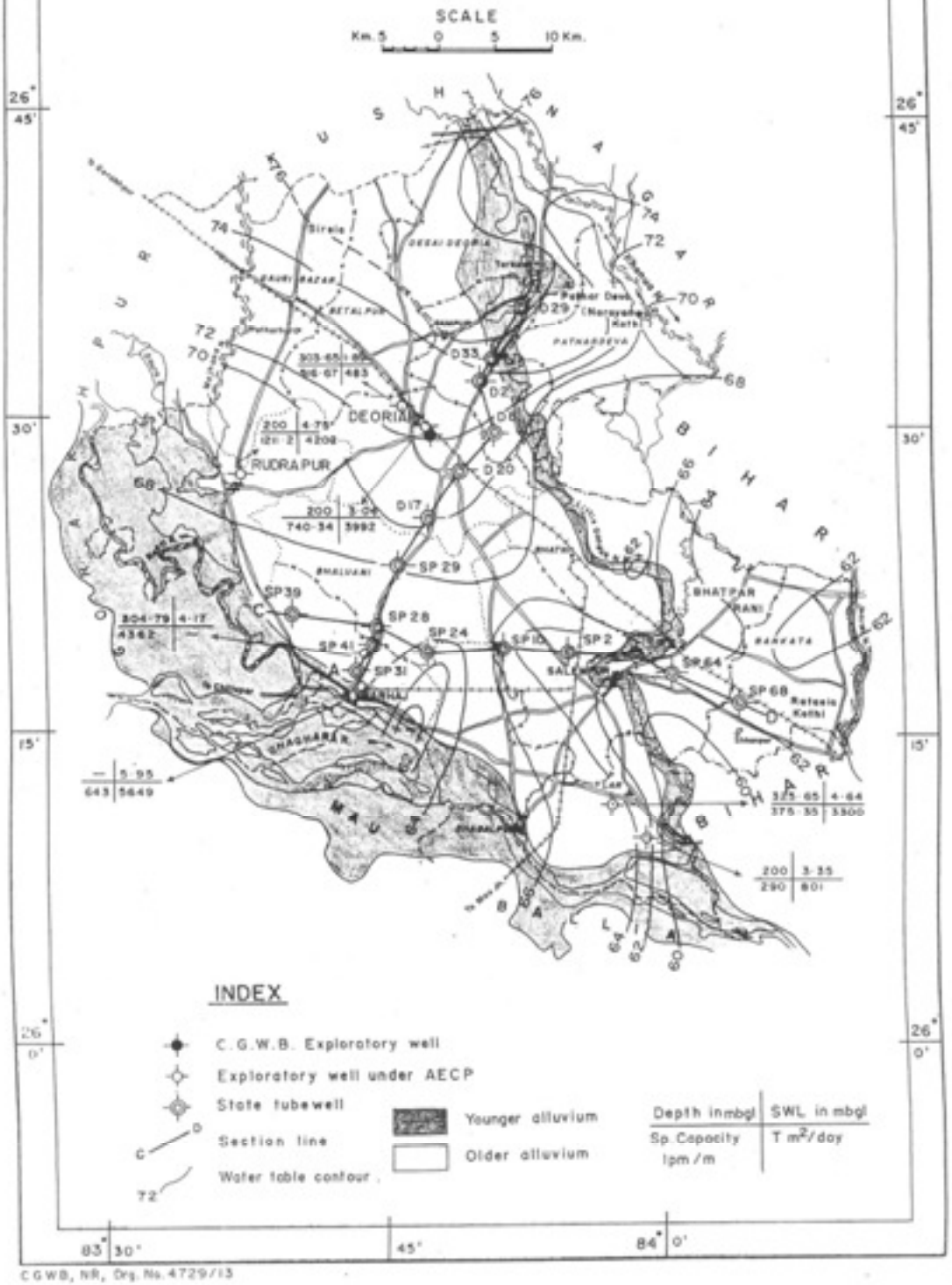


CGWB, NR (N. Chandra) Drg. No. 2689/09. (Raza) 3853/10. 4731/13

Plate - II

Parts of Toposheets No. 63 N & 72 B

HYDROGEOLOGICAL MAP OF DEORIA DISTRICT, U.P.



CGWB, NR, Drg. No. 4729/13

PLATE - III

Parts of Topo Sheets No. 63 N & 72 B

DEPTH TO WATER LEVEL MAP DEORIA DISTRICT, U.P.

(PRE MONSOON - 2012)

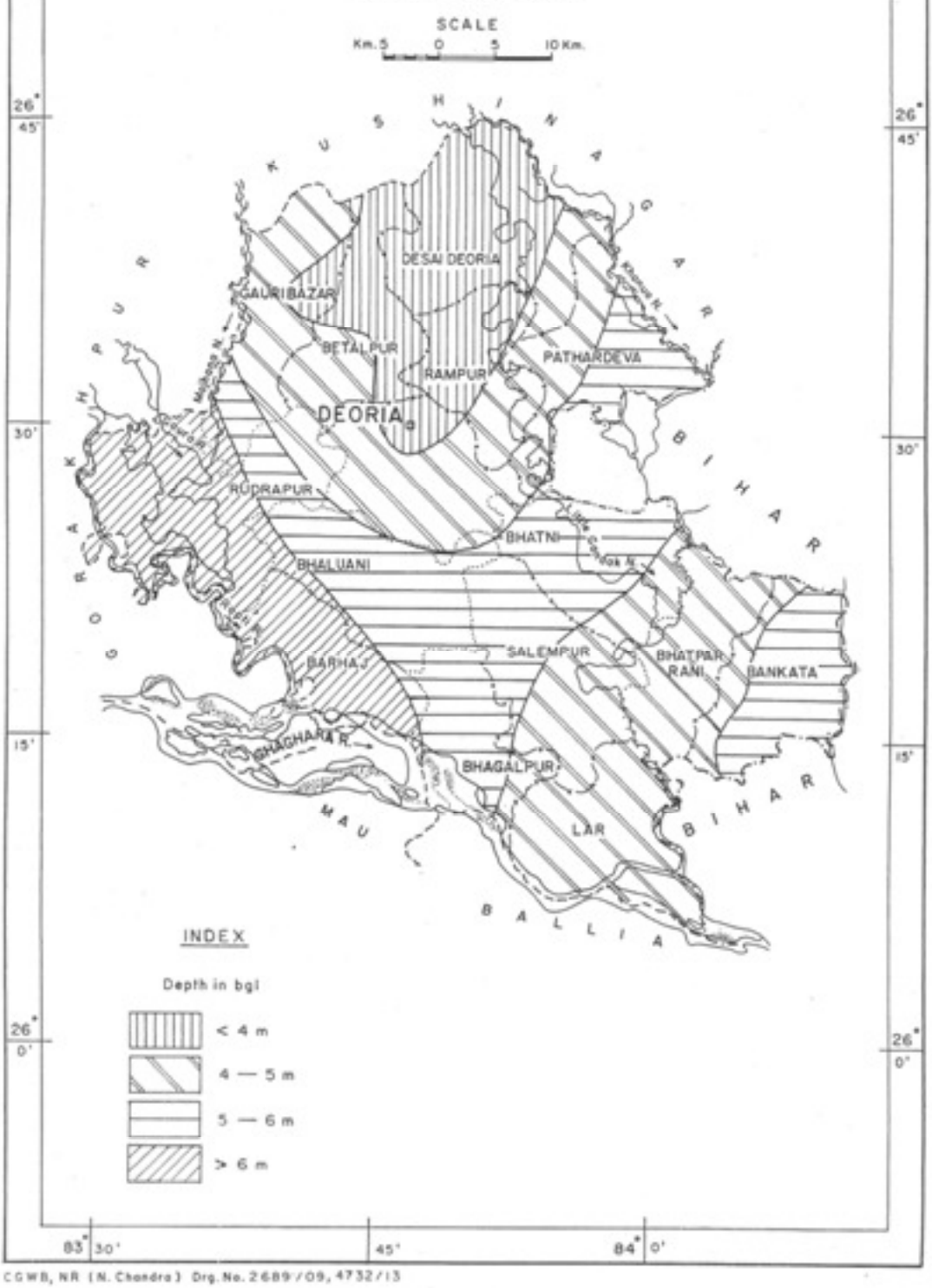


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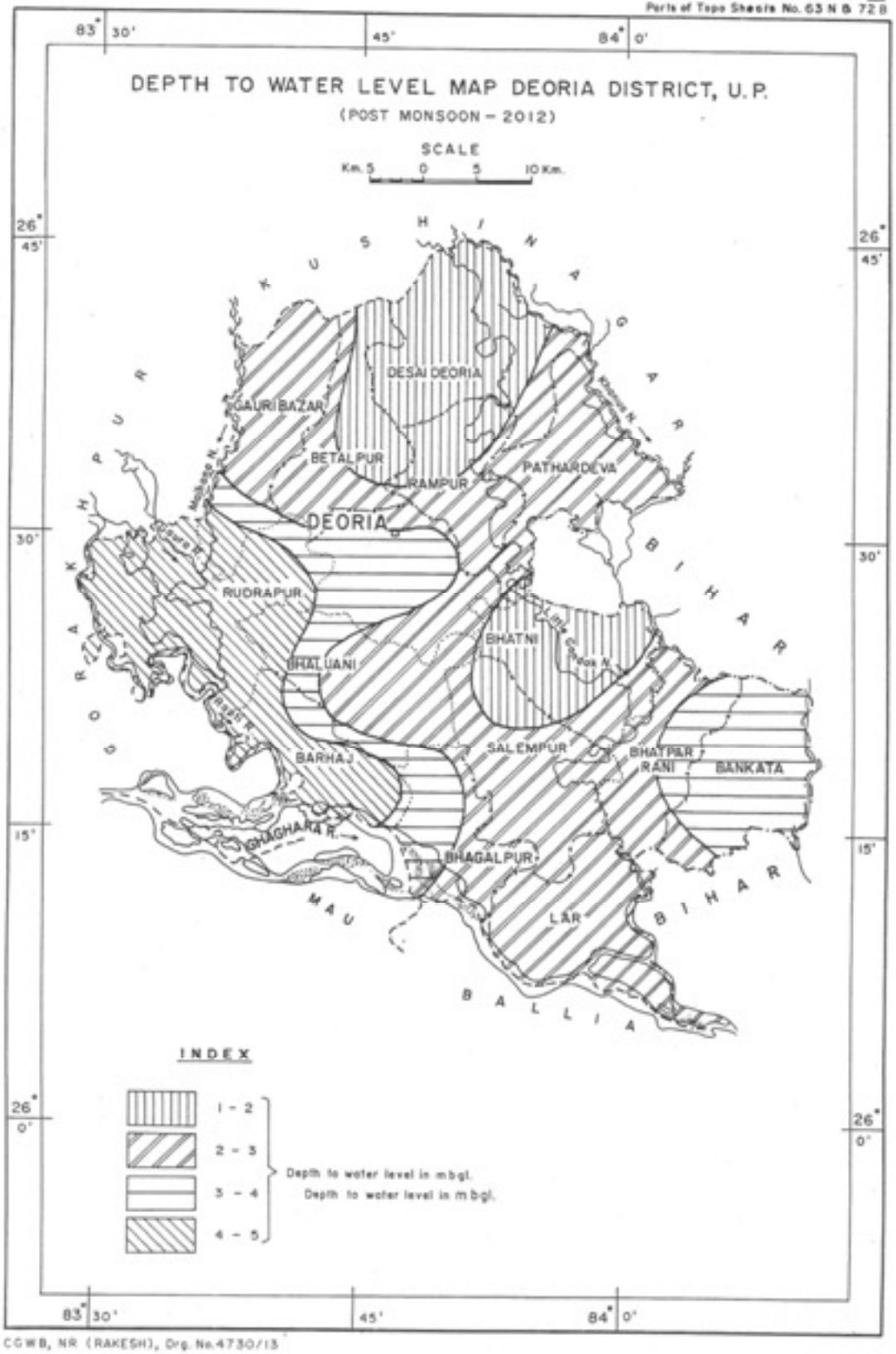
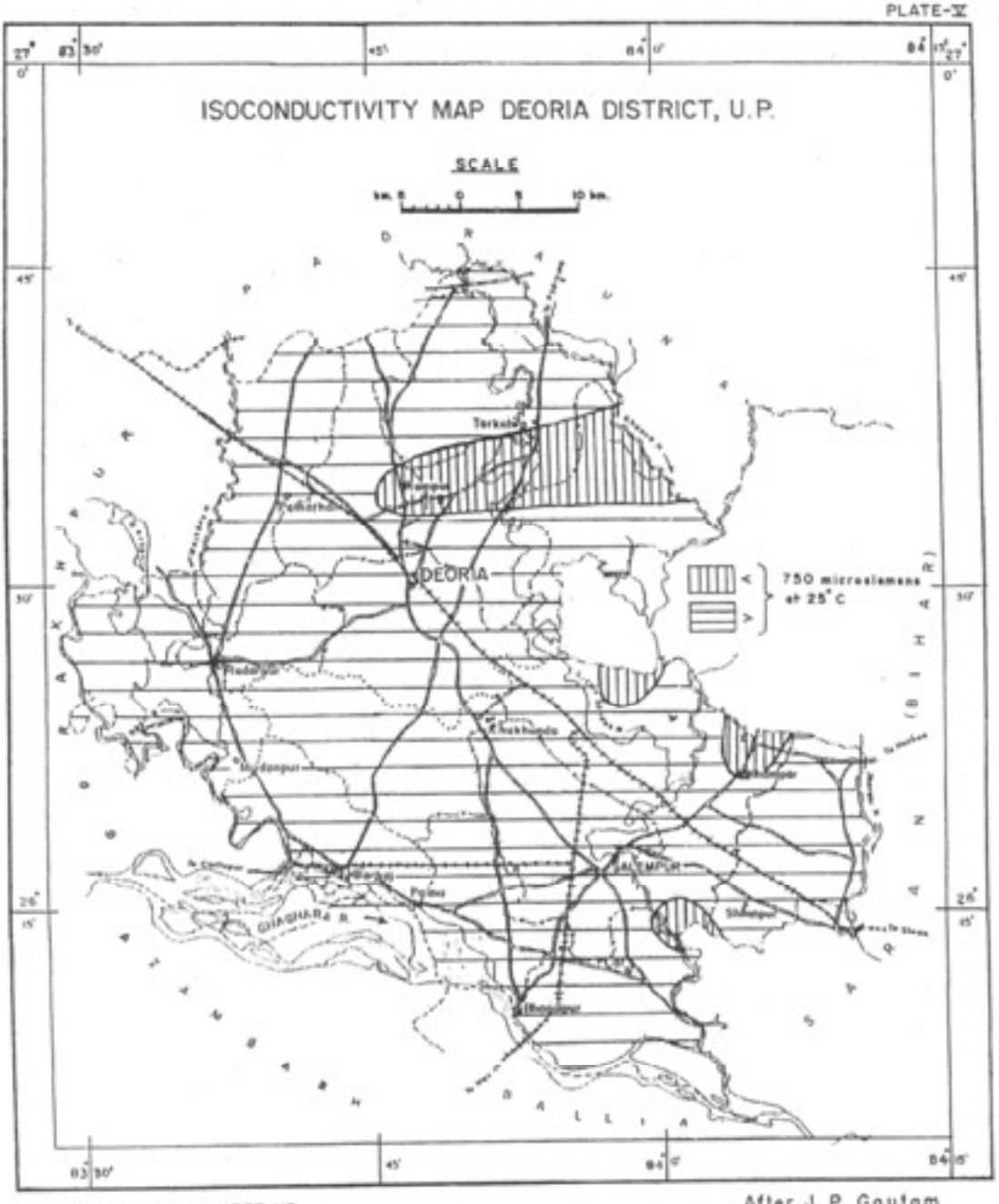
PLATE - IV

Parts of Toposheets No. 63 N & 72 B



CGWB, NR (RAKESH), Drg. No. 4730/13

PLATE-X



C.G.W.B., NR, Drg. No. 4727/13

After J. P. Gautam

PLATE-VI

Parts of Toposheets No. 63 N & 72 B

GROUND WATER RESOURCES, DEORIA DISTRICT, U.P.

(As on 31-03-2009)

INDEX

Net Ground Water availability (Ham)	Gross Ground Water draft (Ham)
State of Ground Water development(%)	Category

CGWB, NR (N.C.Pandey) Drg. No. 4728/13

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