DISTRICT BROCHURE OF MATHURA DISTRICT, U.P.

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

By

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Scientist-'B'

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PLATES:

DISTRICT GROUND WATER PROFILE OF
MATHURA DISTRICT, UTTAR PRADESH

1.	GENERAL INFORMATION :		
	Geographical Area (Sq km)	:	3340
	Administrative Divisions (As on 31.3.2005) Number of Tehsils/Blocks Number of Panchayat/Villages	 : :	 Tehsil 4/Block 10 Panchayat 479/ Villages 880
	Population (As on 2011 Census)	:	25.41 Lacs
	Average Annual Rainfall (mm)	:	826
2.	GEOMORPHOLOGY		
	Major Physiographic units	:	Ganga Alluvial Plain which is sub-divided in Older and Newer Alluvial Plains (Flood Plains)
	Major Drainages	:	Yamuna river
3.	LAND USE (Sq Km), (2009-10) Of 2013 Statistics:		
	Forest area (in hectares)	:	15.92
	Net area sown (in hectares)	:	2691.78
	Gross area sown (in hectares)	:	3963.23
4.	MAJOR SOIL TYPES	:	Silty Soil, Sandy Soil and Loamy Soil.
5.	Area under principal crops (As on 2010–11)	:	3963.23 (in hectares)
6.	IRRIGATION BY DIFFERENT SOURCES (Number of structures/Area (Sq Km)) 2010-11 /2008-09		
	Dugwells		422 /0.0 hectare
	Tubewells and Borewells	:	61456 / 161342 hectares
	Canals		1309 km lengths/106408 hectares
	Other sources	:	Nil

	Net Irrigated area	:	2614.45 sq. km.
	Gross irrigated area	:	3274.09 sq. km.
7.	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-3-2012) No of Dug Wells No of Piezometers	 : :	 13 Nil
8.	PREDOMINANT GEOLOGICAL FORMATIONS	:	Quaternary Alluvium consisting of mainly sands of various grade, silt, clay and kankar.
9.	HYDROGEOLOGY AND AQUIFER GROUP	:	Multiple aquifer groups (two) upto 258.47 m. depth.
	Major Water bearing formation	:	Gravel, Sand and silt intercalations
	Pre-monsoon Depth to water level (m. bgl) during 2012)	:	2.65 to 14.34
	Post-monsoon Depth to water level (m. bgl) during 2012)	:	1.33 to 14.0
	Long term water level trend in 10 yrs (2003-2012) in m/yr	:	Post-Monsoon: Rise 0.0300 – 0.3684 m/year (Jachonda-Vrindavan) Post- Monsoon: Fall 0.0077– 4.2387 m (Saunkh - Raya)
10	GROUND WATER EXPLORATION BY CGWB		
	No of wells drilled (EW, OW, PZ, SH, Total)	:	9 (EW)
	Depth Range (mbgl)	:	85.0 – 278.90
	Discharge (lpm)	:	764 – 810
	Storativity (S)	:	---
	Transmissivity (m^2/day)	:	95 - 1228
11.	GROUND WATER QUALITY		

	Presence of Chemical constituents more than permissible limit (e.g. EC, Cl, F, As, Fe)	:	E.C. 857 to 6090 micro Siemens/cm at 25^0 C, Cl-1595 mg/l at Farah, F - 0.37 to 1.0 mg/l, As & Fe – Nd.
	Type of Water	:	Moderate to Good
12.	DYNAMIC GROUND WATER RESOURCES (2009) (MCM)		
	Annual Replenishable Ground Water Resources	:	937.81
	Gross Annual Ground Water Draft	:	781.53
	Projected Demand for Domestic / Industrial Uses upto 2025	:	44.28
	Stage of Ground Water Development	:	(83.33%), Only 5 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	:	3
	No of Critical Blocks	:	Nil
	No of blocks notified	:	Nil
16.	MAJOR GROUND WATER PROBLEMS AND ISSUES	:	Gradual depletion of ground water levels due to over exploitation may increase the construction cost of the tubewells in such areas wherever ground water levels have been depleted to greater extent.

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1.0 INTRODUCTION

Mathura district is a north –western segment of Agra district, is bordered by Gurgaon district of Haryana state in the North and Bharatpur district of Rajasthan state in the North- west . In the north – eastern and eastern sides it is bounded by Aligarh and on the south by the district of Agra. The district lies between latitudes 27°13' and 27°57' N and longitudes 77°15' and 77°58'east. It falls in survey of India Toposheet No. 54E and 54I. Total geographical areas of the district is 3303 sq.km.

The district is named after its chief city Mathura, which is classified among the seven holy city of India and one of the most anciently in habited city of Uttar Pradesh. Headquarter is at Mathura and there are three number of tehsils namely Chhata, Mathura and Mat. There are ten number of blocks in the district. As per census 2011 district has population of 25.41 Lacs of which 53.84 % is males and 46.16 % females. Density of population is 770 person/Sq.km.

Physiographically district occupies a part of Yamuna sub- basin, in which Yamuna river traverses through the Geophysical control of the district in the direction from north to south and divides it into two physical units – the eastern or trans Yamuna and the western or cis- Yamuna tract except few scattered low hills, occurring near the Bharatpur border, the entire area is fairly flat, generally sloping towards south. The length of canal in the area is 1309 kms. by which 106408 hectare area is irrigated. There are 2 no. of government tube wells by which none of the area is irrigated du to might be not in operation. Irrigation by private tubewells is 161342 hectare. Hence 60.26 % area is irrigated by ground water. Net sown area is 269178 hectare and net irrigated area is 261445 hectares. Net irrigated area to net sown area is 97.13%. There are 511 India Mark II, handpumps for providing safe drinking water to the people.

Systematic Hydrogeological surveys in the district was carried out by Shri S.P.C. Sinha of GSI during field season 1963-64 and 1964-65. Reappraisal

Hydrogeological surveys by sri V. Sharma, Jr.Hydrogeologist 1981-82. Reappraisal Hydrogeological surveys in parts of Mathura district were again carried out during field season 1988-89 by S/Shri R.C.Verma and R.K. Rajpoot , Asstt. Hydrogeologists. District Ground Water Management studies was also carried out during field season Programme 1999-2000 by shri Sanjiv Kudesia, Asstt. Hydrogeologist. Under the ground water exploration programme of CGWB, six shallow tube wells (about 40.0 mbgl) were constructed, namely,in Milk diary Agriculture form, Pt. Deen Dayal Upadhyay agriculture , University, Mathura, Bhimpur in Raya block, Naga's temple in Mat block, Karab in Raya block, Khaira and Umaria village in Chhata block during the year 2009-10 and 2010-11, to delineate the pocket of fresh water aquifer system and their hydrogeological characteristics in the area.

2.0 CLIMATE AND RAINFALL

The average annual rainfall is 620 mm. The climate is sub-tropical humid and it is characterised by a hot dry summer and a pleasant cold season. About 88% of rainfall takes place from June to September. During the monsoon surplus water is available for deep percolation to ground water.

As there is no observatory in Mathura district area, the representative meterological observatory at Agra, the record of which may be taken as representative meteorological condition. January is the coldest month. With the mean daily minimum temperature at about 7^0C and May is the hottest month with mean daily maximum temperature 42^0C and mean daily minimum temperature at 26^0C. With the onset of the monsoon, day temperature dropdown appreciably.

The relative humidity of the district varies from month to month being maximum upto 80% to 90% during the month of July and August due to monsoon rainfall. The lowest relative humidity i.e. 20% to 40% observed during the month of Janury to April. The driest period of the year is Summer with the humidity as low as 20%. Winds are generally low to moderate, then the mean wind velocity is 5.8 km/ hr. The potential evapotranspiration is 1467.2 mm.

3.0 GEOMORPHOLOGY

The area is part of the western fringe of Ganga alluvial plain and slopes gently towards east and along the drainage lines. The following geomorphological units have been delineated. The study is based on the visual interpretation of LAND SAT data and IRS IA DATA (Rai and Sinha 1992). The main three geomorphic units identified in the district are :

1. Younger Alluvium Plain
2. Older Alluvium Plain
3. Relict Mountains , Hills and Ridges

3.1 Younger Alluvium Plain:

Younger alluvium plain is mainly restricted to present river course and mainly represented by sand and loam. It is further divided into (a) Present flood plain and (b) Old flood Plain.

The present flood plain has two main land forms i.e. present river course and sand plain sand bar. Similar the old flood plain is characterized by flowing land forms which are represented by loamy sand.

The land forms are :

i. Abandoned Channel
ii. Meandering Scar
iii. Black- swamp

3.2 Older Alluvium Plain :

This unit is mainly characterized by yellow clay , kankar and Reh. It is represented by following land forms.

i. Alluvium plain
ii. Salt affected plain
iii. Water logged plain

The maximum area of the district falls under these land forms.

3.3 Relict Mountains, Hills and Ridges :

These relict mountains are present at Goverdhan , Barsana etc. and belong to Delhi Super group. Here slopes are very high and they form mostly run off zone.

Besides these mentioned land forms, these are some wind blown Aeolian land forms i.e. sand dunes and sand sheets at reported by Mukherjee, A. Etal (1988).

3.4 Drainage :

The drainage of the district is controlled by river Yamuna and its tributary i. e. Patwaha which become flooded and torrential during monsoon.

Yamuna:

It is perennial river which enter in the district at village chaundras (in tehsil Chhata) and follows a meandering course from north to south forming the boundary between eastern tehsil Mat and western tehsil of Chhata and Mathura . Its banks are sandy and low but as the river advances south wards they become steeper and ravinious and sand hills begin to inter mingle with the sandy slopes. The cultivation on the banks bordering the ravines is poor, the ravines themselves being devoid of vegetation and pitted with modular limestone.

4.0 SOILS

The soils of the district which forms a part of the Indo- Gangetic alluvium (consisting of sand , clay, kankar and reh) have remarkable diversities in different areas.

(i) In the Bangar in uplands the soils varies from ‘Dumat’ (rich loam) to ‘Bhur’ which is constituted of deposits of blown sand and fine silt. The occurrence of Dumat soils are generally limited to the parts of Mat tehsil and in the northern tract of Chhata .

(ii) In Behar area i.e. in the ravines of the Yamuna , the soil (which is largely mixed with kankar) becomes impoverished by drainage, resulting in very poor harvests.

(iii) The general soils around the Jhils and ponds are basically clays and are known as Chiknot or 'Bhabra'. During the rainy season, due to the action of running water and flooding of these soils are mixed with sand and other foreign materials and turn into a fertile loam which is richest along the edges of the river.

By and large, mainly three types of soils, namely **Silty soil**, **Sandy soil** and **Loamy soil** are found in the area. The clay, kankar (calcareous concretion) and Reh (saline efflorescence) are also predominate in the blocks of Chhata, Nandgaon, Goverdhan, Mathura and Farah.

5.0 GROUND WATER SCENARIO

5.1 HYDROGEOLOGY : The area is underlain by unconsolidated sediments which are deposited uncomfortably over the Pre-Cambrian basement Delhi System. The shallow aquifer group occur down to depth of 50.0 mbgl where as deep aquifers group exist between the depth range of 135 - 185 mbgl. The aquifer material is generally composed of fine to medium grained sand. Kankars are invariably associated with sand and clay in older alluvium plain.

Ground water occurs under unconfined to semi-confined conditions in the shallow aquifer group and semiconfined to confined condition in the deep aquifer group.

5.2 DEPTH TO WATER LEVEL:

As per depth to water level data of ground water monitoring stations for the year 2012, premonsoon water level varies from 2.65 to 14.34 mbgl. (Annexure-IA) In postmonsoon period depth to water varies from 1.33 to 14.00 mbgl. Seasonal water level fluctuation varies from -0.15 to 3.85 m.

5.3 LONG TERM WATER LEVEL TREND:

The long term water level trend for ten years (2003-2012) of 18 ground water monitoring wells have shown that nine wells have rising trend between 0.0176 to

0.3819 m per year and 6 nos. of ground water monitoring wells are showing fall between 0.0542 - 0.7724 m /year during pre-monsoon. During post monsoon nine wells are showing rising trend from 0.0300 to 0.3684 m/year and six wells have falling trend between 0.0077 to 4.2387 m/year . Annual rising trend varies from 0. 0038 to 0.3511 m/year and falling trend is between 0.0177 to 0.5534 m/year. (Annexure-I)

THE BLOCKWISE IRRIGATION THROUGH DIFFERENT SOURCES IN MATHURA DISTRICT, U.P.

UNIT: AREA (Ham), year 2008-09 **Table-I**

Year/ Block	**Canal**	**Govt. Tubewell**	**Private Tubewell**	**Wells**	**Ponds**	**Others**	**Total**
1	2	3	4	5	6	7	8
1.Nandgaon	19349	0	8156	0	0	0	27505
2.Chhata	17737	0	14908	0	0	0	32645
3.Chaumuha	13208	0	12393	0	0	0	25605
4.Goverdhan	17219	0	14053	0	0	0	31272
5.Mathura	9888	0	19117	0	0	0	29005
6.Farah	7045	0	14381	0	0	0	21426
7.Nohjhil	4906	0	25884	0	0	0	30790
8.Mat	8527	0	13642	0	0	0	22169
9.Raya	6243	0	14507	0	0	0	20750
10.Baldeo	2286	0	24293	0	0	0	26579
Total Rural	106408	0	161334	0	0	0	267742
Total Urban	0	0	8	0	0	0	8
Total District	**106408**	**0**	**161342**	**0**	**0**	**0**	**267750**

BLOCKWISE STATUS OF SOURCES OF IRRIGATION IN MATHURA DISTRICT, U. P. YEAR-2010-11.

Table- II

Block	**Canal Length (km)**	**Govt. Tubewell (no.)**	**Permanent Wells (no.)**	**Rahat (no.)**	**Electricity Run Pumpset (no.)**	**Diesel Run Pumpset (no.)**	**Other (no)**	**Total (no)**	**Ground Pumpset (no.)**
1	2	3	4	5	6	7	8	9	10
1.Nandgaon	169	0	0	0	50	4922	172	5144	0
2. Chhata	204	0	326	0	640	7043	200	7883	0
3. Chaumuha	126	0	0	0	583	4404	460	5447	0
4. Goverdhan	138	0	96	0	243	4635	125	5003	0
5. Mathura	112	2	0	0	849	6720	49	7618	2
6. Farah	156	0	0	0	187	6527	1110	7824	0
7. Nohjhil	96	0	0	0	895	5704	681	7280	0
8. Mat	104	0	0	0	388	3464	406	4258	0
9. Raya	112	0	0	0	743	5750	336	6829	0
10 Baldeo	94	0	0	0	1282	2864	24	4170	37
Total Rural	1309	2	422	0	5860	52033	3563	61456	39
Total Urban	-	-	-	-	-	-	-	-	-
Total District	**1309**	**2**	**422**	**0**	**5860**	**52033**	**3563**	**61456**	**39**

5.4 GROUND WATER RESOURCES:

As per the report on Dynamic Ground Water Resources of Uttar Pradesh as on 31.3.2009, the annual ground water availability of Mathura district is 93781.47 ham. The gross ground water draft for all uses is 78152.75 ham. The stage of ground water development is 83.33 %. As per the estimate , Farah and Mat blocks are under semi- critical where ground water development is 98.58% , 75.14 % respectively.Three blocks i.e.Baldeo , Raya and Nohjhil falls under over exploited, where ground water developments are 108.19% , 119.52 % and 124.49 % respectively. Chhata ,Chaumuha , Goverdhan , and Nandgaon blocks of the district fall under 'Safe' category of ground water development. (Annexure-II).

TREND OF WATER LEVEL – ALL

From Year 2003 to Year 2012

Annexer - I

District : Mathura

Sl. No.	Location	Premonsoon			Post Monsoon			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.	Chhata New	9		0.1710	10	0.0333		39	0.0065	
2.	Nagra Chhitarsingh	9		0.0542	9	0.0917		38		0.0177
3.	Mat	10		0.0761	10		0.1972	39		0.0447
4	Raya	5			6		4.2387	21		
5	Nohjhil	0			0			0		
6	Baldeo	8		0.7724	10		0.7793	70		0.5534
7	Surir (new)	10	0.3819		10	0.2103		40		
8	Vrindavan	6	0.1166		8	0.3684		32	0.3018	
9	Paintha(goverdhan)	10	0.2520		10	0.2794		40	0.3511	
10	Farah	0			0	0.1158		0	0.2968	
11	Barsana	10	0.1142		9	0.0332		39	0.0839	
12	Jhingla Nagla	10	0.1210		10			40	0.1464	
13	Chaumuha	7		0.4562	6		0.1732	25		0.3204
14	Palsongaon	6		0.0987	5			21		
15	Koshi	10	0.0176		10		0.0215	40	0.0038	
16	Jachonda	10	0.0472		9	0.0300		38	0.0412	
17	Sahar-1	10	0.0274		9	0.0498	0.0077	39	0.0379	
18	Saunkh	10	0.1291	0.1291	10			38	0.0751	

Water Level Fluctuation (Pre and Post monsoon) for the year 2012 of Mathura District , U. P.

Table - III

Sl. No.	Location of GWM WELLS	Premonsoon Water Level (mbgl)	Postmonsoon Water Level (mbgl)	Fluctuation (m)
1.	Baldeo	9.85	6.70	3.15
2.	Barsana	5.87	-	-
3.	Chhata New	6.29	2.44	3.85
4.	Jachonda	2.66	1.33	1.33
5.	Jhinga nagla	3.81	2.38	1.43
6.	Koshi	3.96	3.20	0.76
7.	Mat	14.34	14.00	0.34
8	Nagra Chhitar Singh	3.98	2.80	1.18
9	Paintha (Goverdhan)	3.30	2.53	0.77
10	Sahar-I	2.65	1.45	1.20
11	Saunkh	4.14	4.93	-0.79
12	Surir New	6.99	7.14	-0.15
13	Vrindavan	10.87	7.02	3.84

ASSESSMENT OF DYNAMIC GROUND WATER RESOURCES OF THE MATHURA DISTRICT , UTTAR PRADESH. (As on 31.3.2009)

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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
1	*2*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*
1	Baldeo	6970.01	7185.88	354.86	7540.74	354.86	- 570.74	108.19	Over expl
2	Chaumuha	10721.03	6407.24	258.80	6666.04	303.06	4010.73	62.18	Safe
3	Chhata	11124.36	7873.80	355.41	8229.21	438.53	2812.03	73.97	Safe
4.	Farah	8821.91	8389.03	307.76	8696.79	420.50	12.38	98.58	Semi critical
5	Goverdh N	10473.92	6359.80	364.53	6724.33	456.16	3657.96	64.20	Safe
6.	Mat	6836.54	4818.00	339.08	5157.08	459.60	1585.94	75.1	Semi critical
7.	Mathura	10935.27	9124.88	528.05	9652.93	741.02	1069.37	88.27	safe
8	Nandgaon	12540.68	6397.54	388.84	6786.38	489.72	5653.42	54.11	Safe
9	Nohjhil	7577.51	9063.90	368.96	9432.86	368.96	0.00	124.49	Over expl
10	Raya	7753.26	8870.90	395.49	9266.39	395.49	0.00	119.52	Over expl
	Total	**93781.47**	**74490.97**	**3661.78**	**78152.75**	**4427.90**	**14862.60**	**83.33**	
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5.5 GROUND WATER QUALITY:

The mineralization of ground water depends upon lithology, texture and nature of soil and hydrogeological property of zone through which water moves. The water samples collected from ground water monitoring wells during May 2012 from GWM WELLS were analysed in chemical laboratory, Central Ground Water Board, Northern Region, Lucknow. The major constituents are within permissible limits as per drinking water norms. The electrical conductivity on an average is between 857 to 6090 micro mhos/cm.

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

Location	E.C. in micromhos/ cm at 25^0C	pH	Chemical Constituents											
			CO_3	HCO_3	Cl	NO_3	SO_4	F	Ca	Mg	TH	Na	K	PO_4
Naujhil	5812	8.01	Nd	610	904	1330	648	1.0	20	264	1150	690	5.6	Nd
Mant	1960	8.06	Nd	579	213	122	72	0.7	20	82	390	241	26	Nd
Raya	1368	8.01	Nd	317	291	41	58	0.9	36	96	96	84	6.3	Nd
Chaumuha	1810	8.1	Nd	464	312	64	48	0.78	24	136	625	117	5.5	Nd
Chhata	3040	8.0	Nd	756	404	85	296	0.95	40	137	670	181	394	Nd
Nandgaon	2010	7.98	Nd	610	354	5.2	58	0.82	36	120	590	240	4.0	Nd
Goverdhan	1360	7.97	Nd	366	227	15	29	0.85	32	67	360	140	4.0	Nd
Farah	6090	7.82	Nd	525	1595	27	58	0.88	336	67	1123	690	3.7	Nd
Mathura	1380	8.0	Nd	354	266	15	38	0.95	72	53	403	135	3.2	Nd
Baldeo	857	8.02	Nd	512	14	4.1	19	0.97	8.0	82	360	48	19	Nd

5.6 STATUS OF GROUND WATER DEVELOPMENT:

Agriculture is the main sourse 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 2no. of state government tube wells, 422 dug wells (permanent well), 52033 diesel pumpsets, 5860 electricity run pumpsets, 39 ground pumpsets and 3563 other pumpsets in the entire district. Table-II.

Blockwise irrigation through different sources is shown in table –I, A perusal of the table shows that 60.26 % of the area under irrigation is covered by ground water and 39.74 % area is irrigated by canals water. In Baldeo and Nohjhil blocks where the canal network is limited , 18.74 % of the total irrigation area is covered by ground water in these two blocks only. Table-II. In. Out of the net sown area of 269178 ha, only 261445 ha area has been brought under irrigation and leaving 7733 ha land unirrigated. Table –I and VII. Maximum numbers of diesel pumpsets are in Chhata block i.e. 7043 and minimum are in Baldeo block i.e. 2864. Maximum number of electric pumpsets are in Baldeo block i.e. 1282 and minimum are in Nandgaon block i.e. 50. Only two number of government tubewells are available in Mathura block . Maximum area is irrigated through canal is in Nandgaon block i.e. 19349 hectare and minimum in Baldeo block i.e. 2286 hectare. Under water supply by taps / handpump India Mark II 736 numbers have been constructed for drinking water.

6.0 GROUND WATER MANAGEMENT STRATEGY

6.1 GROUND WATER DEVELOPMENT:

The stage of ground water development in the district is 83.33 %. The maximum stage of ground water development is in Nohjhil block i.e. 124.49 % and minimum in Nandgaon block i.e. 54.11 %. Other 8 blocks have the stage of ground water developments i.e. Baldeo 108.19 %, Chaumuha 62.18 %, Chhata 73.97 %, Farah 98.58 %,Goverdhan 64.20 % , Mat 75.14 % , Mathura 88.27 % , and Raya 119.52 % .

Therefore only 5 blocks are in safe category.

Since five blocks are under dark category so that these blocks need to recharge ground water through artificial recharge structure schemes. Artificial recharge

structure may be constructed in the area where water levels are more than 10.0 mbgl having good scope of ground water development through shallow and moderate deep tube wells. Baldeo , Raya and Nohjhil blocks are under over exploited category because ground water development of these blocks are 108.19 %, 119.52 % and 124.49 % respectively.

6.2 WATER CONSERVATION STRUCTURE AND ARTIFICIAL RECHARGE:

The annual long term water level trend is also declining i.e. Mathura (0.5534 m/year) and Chaumuha (0.3204 m/year). Hence the artificial recharge schemes may be taken up in Mat , Vrindavan and Baldeo blocks to check the declining water level trend.

7.0 GROUND WATER RELATED ISSUES AND PROBLEMS

7.1 WATER LOGGED AREAS:

None of the area is affected by flood water of Yamuna river in the district**.**

7.2 WATER QUALITY PROBLEMS:

As per the chemical analysis result of ground water monitoring wells for the year 2012. There is no problem in ground water quality except few localities. All the constituents are in normal range. Only the E.C. of Naujhil, chhata and Farah blocks are excess in permissible limit. Average range of E.C. is 857 to 6090 micromhos/cm at 25^0C.

7.3 DRILLING PROBLEMS:

In the district 5 numbers of exploratory tubewells have been constructed by CGWB, NR, Lucknow in shallow depth range of 31.50 to 45.0 m bgl. i.e. Bhimpur, Mant in Mant block, Karab in Raya block , Khaira and Umaria in Chhata block. Below 40.0 m depth ground water is saline down to drilled depth 150.0 mbgl. But there was no caving problems due to the sand mixed with clay with occasional kankar and gravel .

7.4 GROUND WATER CONTROL AND REGULATION:

Since the stage of ground water development in 5 blocks is less than 90% and there is no significant fall in long term water level during pre and post monsoon season. Hence these 5 blocks are in safe category. Two blocks i.e. Mant and Farah are under Semi- critical position. Three blocks i.e. Baldeo , Nohjhil and Raya where stage of ground water development is more than 100 %. So that none of the block is under notified area in the district .

8.0 RECOMMENDATIONS

The harnessing of ground water for irrigation has seriously affected the overall hydrogeological regime of the district. The steep situation has been developed due to continuous decline of water table in many blocks. In order to improve the present scenario the following recommendations are suggested.

1. Management of water resources and conservation of ground water should be under taken after detail study.

2. Artificial recharge to ground water required to be under taken in the areas where water levels are more than 10.0 m. deep and ground water over exploitation is noticed, to recharge the aquifer for ensuring their sustainability. Roof top rain water harvesting is the best method for recharging ground water for urban areas and check dams across rivers, recharge trenches along channels, recharge shaft, revival of ponds etc. are recommended artificial recharge techniques for rural areas.

3. In a few blocks i.e. Mant , Mathura , Baldeo , Nohjhil , and Raya areas have the deep water level more than 10.0 m.bgl in the district. Hence a regular monitoring of water level at close interval is essential by constructing Piezometer wells in the district.

PLATE - I

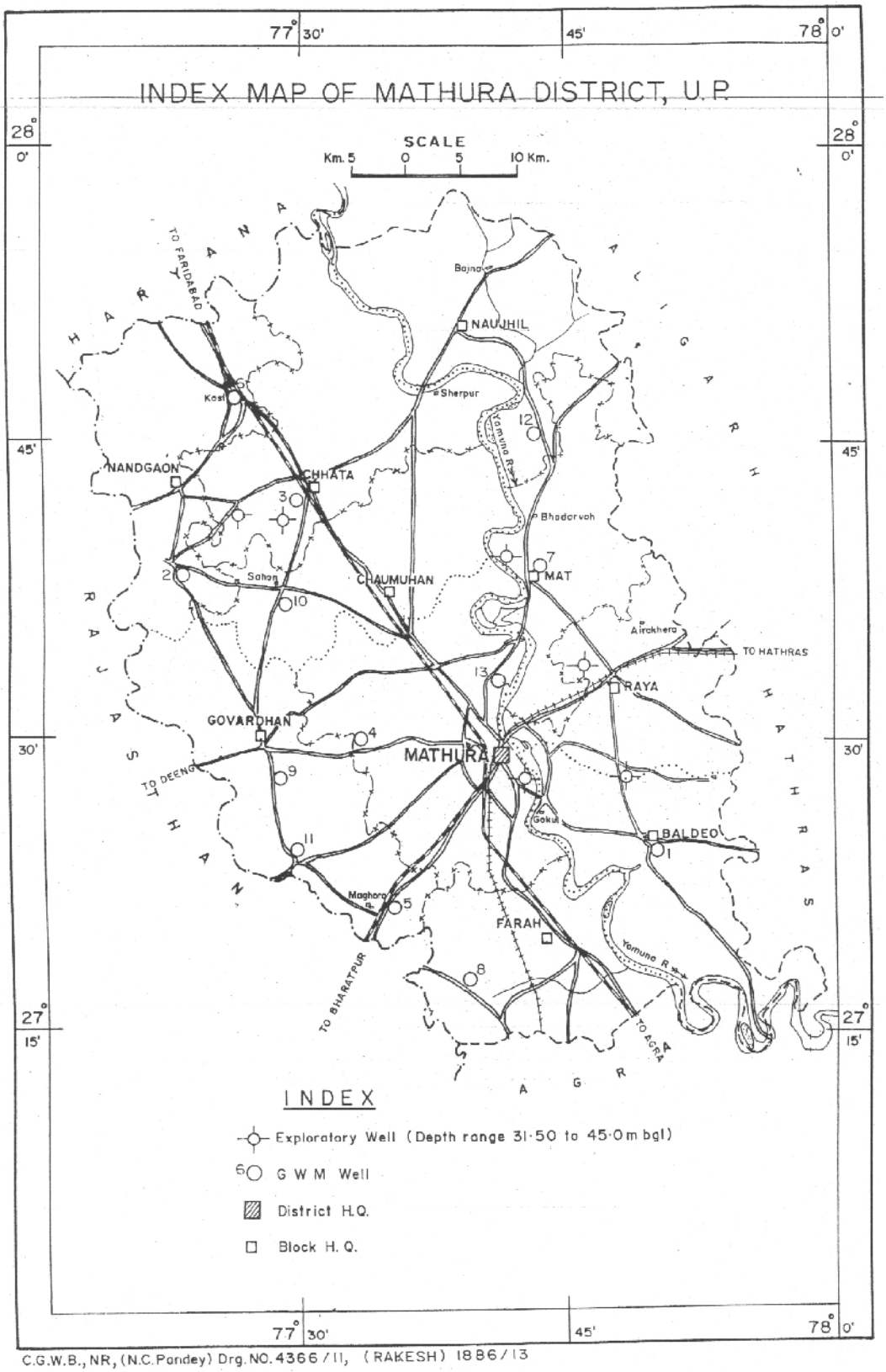

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PLATE - II

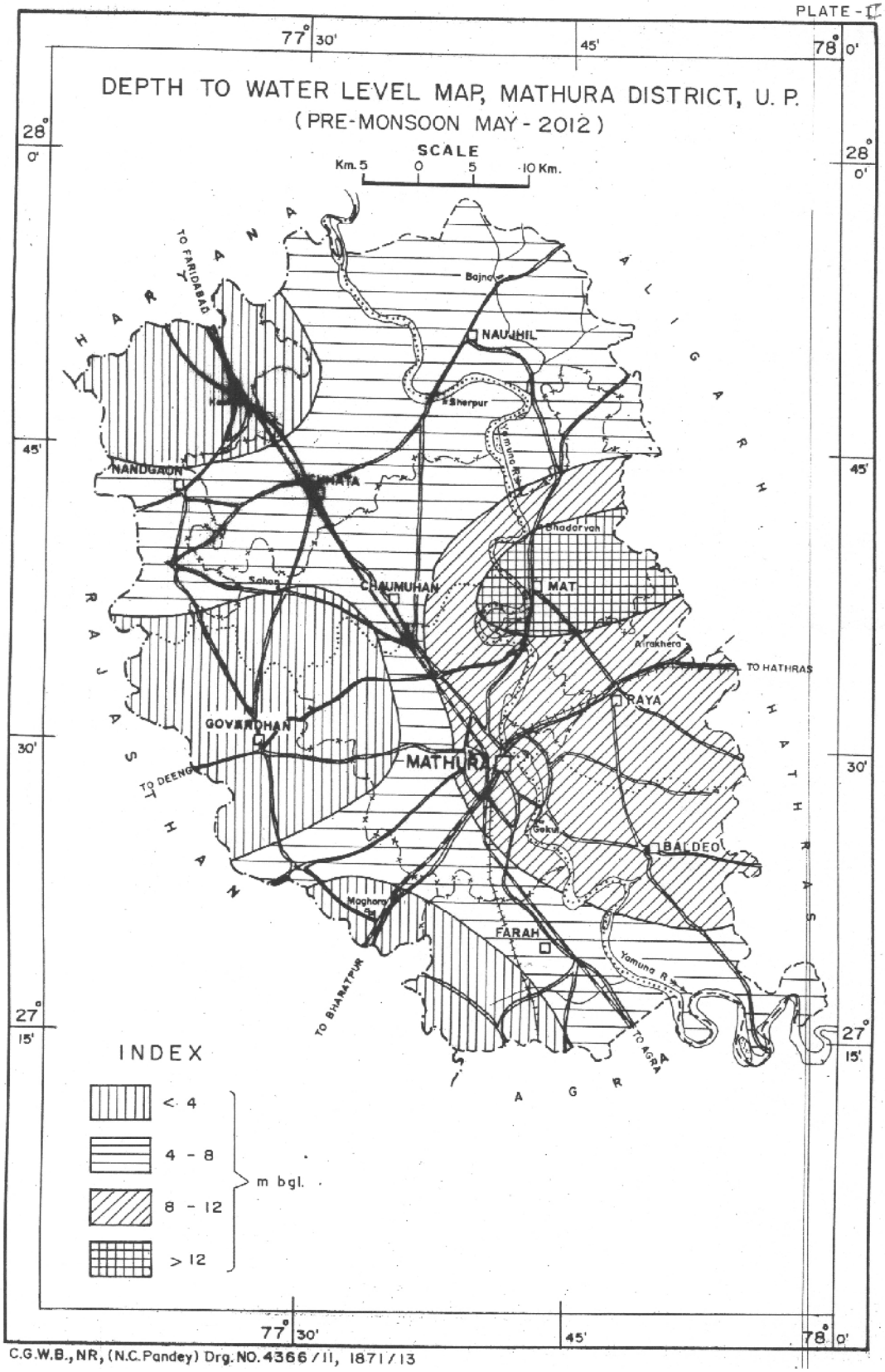

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PLATE - III

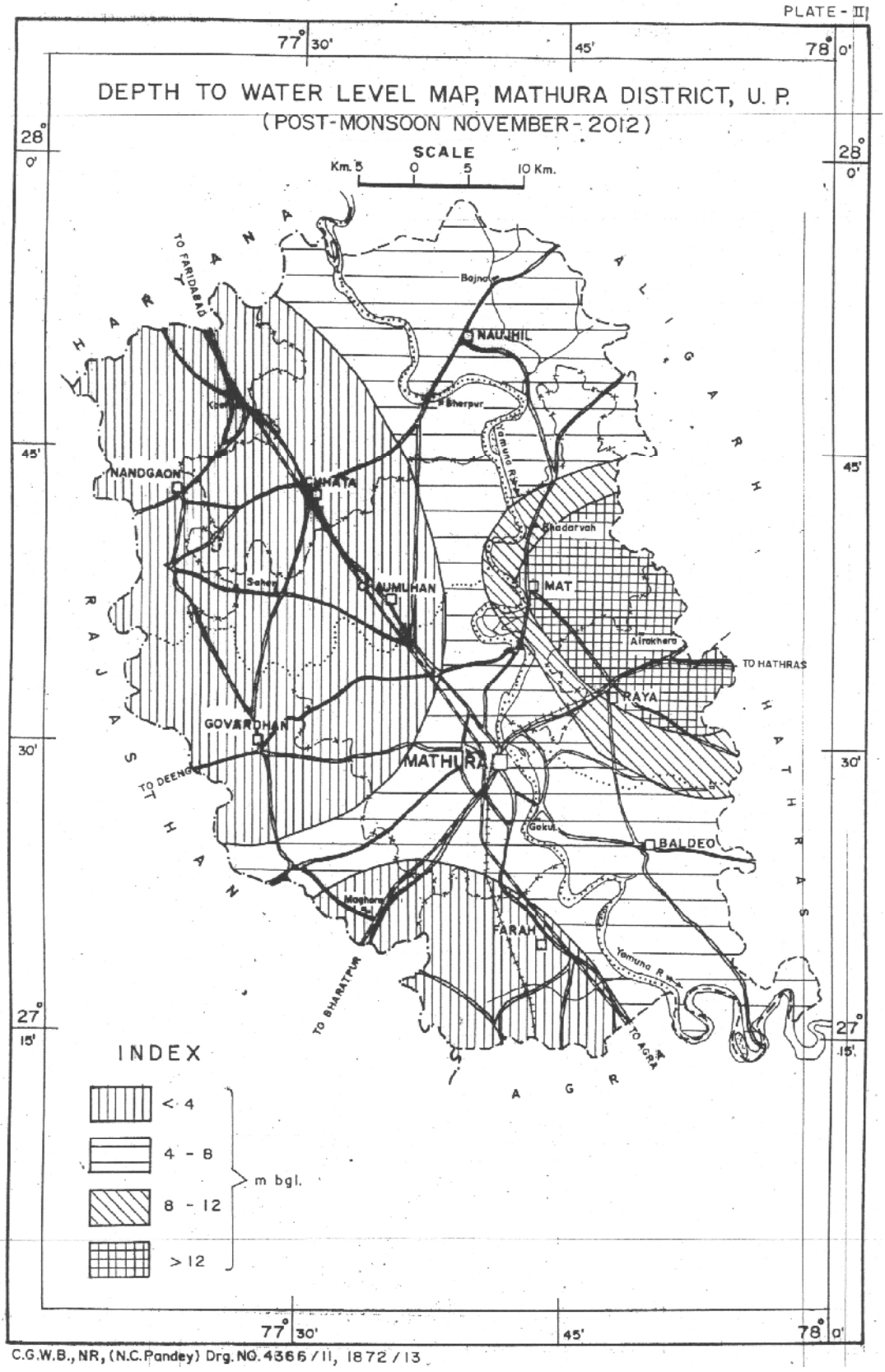

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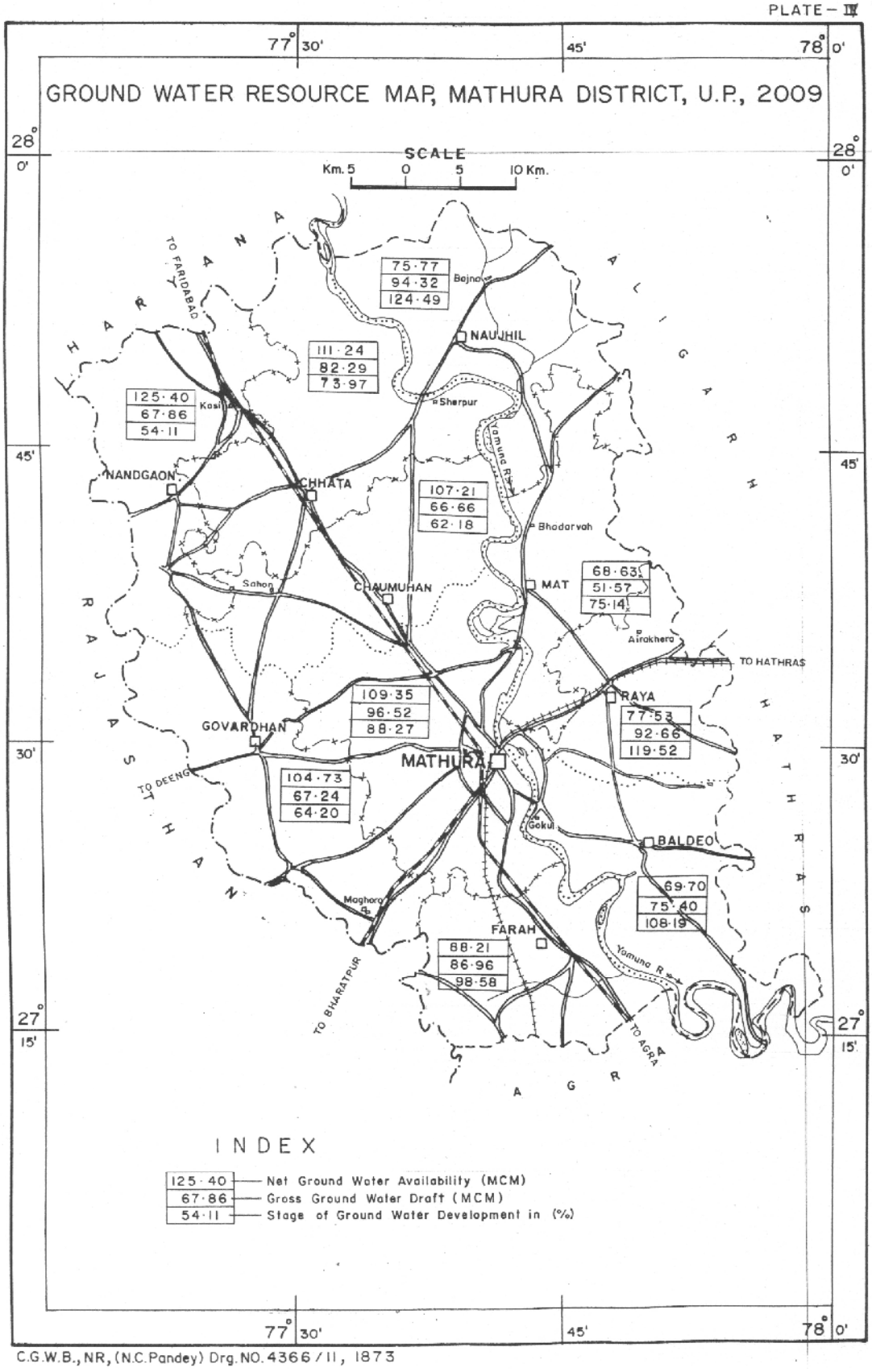
PLATE – IV



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