

**DISTRICT GROUND WATER BROCHURE OF
MAHAMAYA NAGAR, U.P.**

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

By

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MAHAMAYA NAGAR DISTRICT AT GLANCE

1. GENERAL INFORMATION

i. Geographical Area (Sq. Km.)	:	1840
ii. Location		
	Latitudes :	27 ⁰ 16'12" - 27 ⁰ 51'0"N
	Longitudes :	77 ⁰ 52'30" - 78 ⁰ 31'54"E
	Toposheet No. :	54E & I
iii. Administrative Divisions (as on 31.03.2012)		
	Number of Tehsils :	4
	Number of Blocks :	7
iv. District of H.Q. Hathras (town as on 2012)		
Number of Villages	:	672
Nayaya Panchayat	:	64
Gram Sabha	:	430
Town / Group of town	:	9
Village Palika	:	2
Village Panchayat	:	7
Vidhan Sabha	:	4
Lok Sabha	:	1
	:	
v. Population (as on 2011 census)		
Total	:	1564708
Male	:	836127 (53.44%)
Female	:	728581 (46.54%)
Rural	:	1232051
Urban	:	332657
Density	:	851 person / Km ²

2. GEOMORPHOLOGY

Major Physiographic Units	:	Older and Younger alluvium plain, flood plain, salt encrustation and ravines
Major Drainages	:	Yamuna & Arind, Isan and Kali Nadi of Ganga and Jhirna, Segar Nadi of Yamuna

3. LAND USE (Ha.) (Year 2011-12)

Total area	:	180155
Total forest area	:	1770
Barren fallow land	:	1431
Present fallow land	:	1910
Other fallow land	:	2588
Barren and uncultivable land	:	3611
Land put to nonagricultural use	:	18924
Pasture	:	1035

Land under miscellaneous trees and grove	:	211
Net area sown	:	148675
Area cultivable	:	240686
4. MAJOR SOIL TYPES	:	Bhur (sandy) Matiar (clay rich soil) Domat or Loam (clay & sandy clay) Along Canal Reh (alkaline soils)
5. AREA UNDER PRINCIPAL CROPS (as on 2011-2012)	:	240686 ha.
Rabi	:	140296 Ha
Kharif	:	81881
Jayad	:	18509
6. IRRIGATION BY DIFFERENT SOURCES (Areas / Number of Structures) 2011- 12 (ha)		
Dugwells	:	0
Tubewells (Govt. & Private)/Borewells	:	132427/ 41914
Tanks/ponds	:	Nil
Canals	:	11524/589
Net Irrigated Area	:	143951
Gross Irrigated Area	:	202217
7. NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-3-2012)		
No. of Dugwells	:	11
8. PREDOMINANT GEOLOGICAL FORMATIONS	:	Quaternary sediments (thickness varies from 83m to more than 450m) comprising of silt, clay, sands of various grades, gravels and kankars in varying proportion are generally abundant. The sediments are unconformably overlying the basement of the rocks of Vindhyan Super Group.
9. HYDROGEOLOGY	:	3-tier aquifer system exist down to bedrock. <u>Aquifer Group-I</u> Depth range 00.00-90.00 mbgl. <u>Aquifer Group-II</u> Depth range 115.00-200.0 mbgl <u>Aquifer Group-III</u> Depth range 230.00-to bedrock

	Major water bearing formation	:	Sand, silt and gravel.
	Pre-monsoon Depth to water level during May'2012 (NHS)	:	3.54 to 17.03 mbgl
	Post-monsoon Depth to water level during Nov'2012(NHS)	:	1.85 to 17.70 mbgl
	Long term water level trend in years (2003-2012) in m/yr	:	Rise : 0.1881& 0.0275 at Bhatikra & Rattika Nagla during pre-monsoon Fall : 0.0771 to 1.2982 during post-monsoon
10.	GROUND WATER EXPLORATION BY CGWB		
	No of wells drilled (EW, OW, PZ, SH, Total)	:	7
	Depth range (mbgl)	:	94.0 - 331.0
	Discharge (lpm)	:	613-2453
	Storativity (S)	:	$2.65 \times 10^{-4} - 6.5 \times 10^{-3}$
	Transmissivity (m ² /day)	:	131.6 - 133.7
11.	GROUND WATER QUALITY		
	Presence of Chemical constituents more than permissible limit (e.g. EC, F, As, Fe)	:	In Hathras town NO ₃ and SO ₄ elements in ground water more than 100mg/l and 400mg/l respectively in many location.
12.	DYNAMIC GROUND WATER RESOURCES (2009)-in HAM		
	Annual Ground Water Recharge	:	63411.18
	Net Annual Ground Water Availability	:	57070.06
	Existing Gross Ground Water Draft for all uses	:	50928.66
	Net Ground Water Availability for future irrigation development	:	5344.06
	Stage of Ground Water Development (%)	:	89.24
	Projected demand for domestic and industrial uses upto 2025	:	4020.51
13.	AWARENESS AND TRAINING ACTIVITY	:	Nil
14.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	:	Nil
15.	GROUND WATER CONTROL AND REGULATION		
	Number of OE Blocks	:	3 Hathras, Mursan, Sasni
	No of Critical Blocks	:	1 Sadabad
	No of blocks notified	:	Nil
16.	MAJOR GROUND WATER PROBLEMS AND ISSUES	:	1- NO ₃ & SO ₄ in Hathras town in H.P. (II) water beyond permissible limit reported. 2- Over exploited in the Sadabad, Saphau and Sasni blocks. 3- Critical in Hathras block

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1. INTRODUCTION

The Hathras and Sikandra Rao tehsil of Aligarh district and Sadabad tehsil of Mathura district were carved out from their respective district (vide State Govt. notification no. CM.70/1-5/97-85/97-R-5 dated 6th May 1997) and merged together to form the present district of Mahamaya Nagar with its headquarter at Hathras town. The district is named after the name of Gautam Budh's mother Mata Mahamaya.

1.1 LOCATION AND EXTENT:

The district has been divided into four tehsils and seven blocks (As per statistical booklet 2012). The district is spread over in an of 1840 sq.km. lying between latitude 27°16'12" to 27°51'00" N and longitude 77°52'30" to 78°31'54" E under Survey of India toposheet no. 54E and 54I (Plate-1).

1.2 POPULATION:

The total population of the district is 1564708 (as per census 2011) of which 836127 (53.44%) are male and 728581 (46.56%) are female. The population density is 851 persons/sq.km. in the district.

1.3 LAND USE PATTERN, AGRICULTURE AND IRRIGATION PRACTICES:

The land use pattern of district (UP Statistical Diary 2011-12) is as under –

Table-1

Block-wise Land Use in Hathras District, UP (All Areas in ha)

Block	Total area	Area other than agriculture use*	Net Area sown	% Net Area Sown	Net Area Irrigated	% Net Irrigated to net sown
Sasani	26975	4607	22368	82.92	21059	94.1478898
Harhras	25484	4702	20782	81.55	20439	98.3495332
Mursan	23657	3754	19903	84.13	18930	95.1112898
Sadabad	29330	4784	24546	83.69	22045	89.8109672
Sahpau	17879	2775	15104	84.48	14768	97.7754237
Sikandramau	26577	4630	21947	82.58	21851	99.5625826
Hasayan	30253	6228	24025	79.41	24859	103.471384

*includes area of forest, barren cultivable waste, present fallow land, other fallow land, barren uncultivable land, land put to non-agriculture use, pastures and area under bush, forest & garden

2.0 RAINFALL & CLIMATE

The average normal annual rainfall in the area is 627.6mm. The climate of the district is sub-tropical which is characterised by four seasons vis-a-vis winter (Mid-November to February), summer (Mid-March to Mid-June), rainy season (Mid-June to Mid-October) and autumn (October and November).

The mean maximum monthly temperature (40.5⁰C) has been recorded during the month of May and minimum (7.04⁰C) in the January.

The mean monthly relative humidity is 65% and mean monthly morning relative humidity is 45%.

The average annual wind speed in the district is 6.3 Km./hr.

3.0 GEOMORPHOLOGY & SOIL TYPES

3.1 GEOMORPHOLOGY:

The area exhibits more or less a flat topography with gentle undulation at places. The elevation of land surface varies from 172 to 180m. above mean seas level. The master slop is from NW to SE, with an average gradient of about 0.24 m/km. About 90% of district area, geomorphologically, occupies the extensive tract of older alluvial plain.

3.2 DRAINAGE:

Drainage is controlled by the tributaries of Yamuna (Kanvan or Jhirna, Sengar & Aligarh Drain) and Ganga (Arind, Isan and Kali) rivers.

3.3 SOIL TYPES:

The Mahamaya Nagar district, whose major area (about 80%) falls under Yamuna sub-basin, is covered by older alluvial soils comprising broadly of Bhur (Sandy) occupying at high mounds 'Matiar' (clay rich soil) in the depressions and Dumat or Loam (clay and sandy clay) in the plains. Along canal, Reh (Alkaline soils) are formed in the district area.

4.0 GROUND WATER SCENARIO

4.1 HYDROGEOLOGY:

The area of district constitutes a part of Central Indo-Gangetic Plain and lies in the interfluvial tracts of the rivers Ganga and Yamuna. The available geological data indicate that the entire area of the district is underlain by moderately thick pile of quaternary sediments comprising of silt, clay, sands of various grades, gravels and kankars in varying propotion. The kankars are generally abundant in the entire district.(Table-3) The sediments are

unconformable overlying the basement of rocks of Vindhyan Super Group. General stratigraphic sequence of formation in the area is as follows:

Table-2

GEOLOGICAL SEQUENCE

Group	Age	Formation	Lithology
Quaternary	Recent to Upper	Newer/Younger	Fine sand, silt clay admixed with gravels
	Pleistocene	Alluvium	Clay with kankar and sand of various grades.
	Upper Pleistocene		
-----Unconformity-----			
	Upper Vindhyan Group		Red sand stones & Shales

Results of exploratory boreholes drilled by C.G.W.B. at Chandappa (367.50mbgl), Hathras (178.00mbgl), Sadabad (202.70mbgl), Bhintar (331.60mbgl) and Sikandra Rao (196.60mbgl) show that the thick pile of the sediments, constituting alternate clay and sand bed down to bedrock occur in the district having variations in their physical characteristics areal extent and quality of formation water. There are broadly three tier aquifer system exist down to bedrock.

Table-3

HYDROLOGICAL DATA OF EXISTING TUBEWELLS IN MAHAMAYA NAGAR DISTRICT, U.P.

Sl. No.	Location	Depth drilled	Granular zones encountered (mbgl)	Granular zones tapped (mbgl)	Static water level (mbgl)	Discharge (lps)	Draw-down (m)	Specific capacity (lps/m)	Transmissivity 'T' (m ² /day)	Storage coefficient 'S'	Remarks
		Depth of tubewell (mbgl)									
1	2	3	4	5	6	7	8	9	10	11	12
1.	Hathras (water works comp.) 54I/12 27°36' : 78°03'	<u>178.00</u> <u>70.00</u> (C.G.W.B.)	3.05-18.29 21.34-53.00 56.00-66.00 81.00-86.00 93.00-108.00 118.87-161.54	43.07-51.07 57.17-65.17	13.37	10.22	6.63	1.54	131.56	-	EC - 2840
2.	Bhintar 54I/6	<u>331.60</u> <u>118.00</u> (C.G.W.B.)	20.00-32.00 40.00-49.00 77.00-82.00 87.00-93.00 116.70-205.20 241.00-261.70 277.60-323.20	41.00-49.00 77.00-82.00 87.00-93.00 107.00-112.00	-	-	-	-	-	-	Bedrock (Vindhyan sandstone) at 329.70m depth
3.	Bhuria 54I/5	<u>94.48</u> <u>88.00</u> (Irrig. Deptt)	12.20-21.35 26.82-30.50 35.50-41.46 48.17-82.92	49.50-81.60	10.36	40.89	4.87	8.39	-	-	-
4.	Sikandra Rao 54I/6 27°41' : 78°23''	<u>196.60</u> <u>149.00</u>	3.05-30.00 34.00-46.00 56.00-69.00 105.00-130.00 134.00-143.00	58.27-70.27 106.87-122.87 135.07-143.07	6.24	33.80	3.40	9.94	798.18	-	EC - 1540

Sl. No.	Location	Depth drilled	Granular zones encountered (mbgl)	Granular zones tapped (mbgl)	Static water level (mbgl)	Discharge (lps)	Draw-down (m)	Specific capacity (lps/m)	Transmissivity 'T' (m ² /day)	Storage coefficient 'S'	Remarks
		Depth of tubewell (mbgl)									
1	2	3	4	5	6	7	8	9	10	11	12
			150.00-155.00								
5.	Naugawan 54E/15	<u>188.97</u> <u>47.00</u> C.G.W.B.	9.14-24.38 30.48-42.05 73.15-91.44 131.06-188.97	30.15-42.21	16.34	11.78	3.15	3.74	338.94	-	EC – 2690
6.	Chandappa 54I/2	<u>367.50</u> <u>95.00</u> C.G.W.B.	7.54-39.63 55.00-65.00 73.00-90.00 135.80-141.65 208.22-241.07 251.07-256.00 261.00-302.04	55.00-59.00 73.00-90.00	12.49	18.33	13.13	1.43	252.30	2.65×10 ⁻⁴	Bedrock shale at 365.00m depth EC-2436 permeability 34.26 m/day
7.	Sadabad (Pragatipuram) 54I/3	<u>202.70</u> <u>59.00</u> C.G.W.B.	12.19-37.00 41.00-47.00 49.00-52.00 55.00-64.00 70.00-97.00 122.00-136.00 144.00-147.00 157.00-160.00 185.00-202.70	40.83-52.83	14.65	13.33	6.20	2.15	-	-	EC – 3240

Aquifer Group I	-	depth ranges 0.00 to 90.0 mbgl
Aquifer Group II	-	depth ranges 115.0 to 200 mbgl
Aquifer Group III	-	depth ranges 230 to bedrock

The bedrock (Vindhyan Sandstone) has been encountered at 329.70 mbgl at Bhintar exploratory borehole. The granular material constituting these aquifer groups are generally fine to medium sand, clay and kankar. The details of exploratory boreholes drilled by C.G.W.B. are given in Table-3 location shown in Plate-1

Thickness of the sediments varies from about 100 m (in NW corner of the area) to more than 450 m (in NE parts). About 90% of the district area occupies the upland and is underlain by the sediments of the older alluvium. The newer alluvium occupies the lowland, in the very narrow strips along the course of river Yamuna and its tributaries which are prone to inundation during the annual floods. In addition, the newer alluvium is also found as land fills in the paleo-channels of Kali river in Ganga sub-basin. These newer alluvium deposits are composed of generally fine to medium sand with alternating layers of clays.

4.2 MODE OF OCCURRENCE OF GROUND WATER:

The top silty/ sandy beds mixed with kankar are the top most parts of the Aquifer Group – I, down to depth to about 30 mbgl generally supports the dugwells. The ground water in the zone occurs under water table unconfined conditions. In II and III Aquifer Groups the ground water occurs under semi-unconfined, semi-confined to confined conditions.

4.3 WATER LEVELS (PRE-MONSOON & POST-MONSOON):

Central Ground Water Board has established number of ground water monitoring wells in Mahamaya Nagar district to monitor the water level behaviour in space and time. The depth to water levels recorded during the year 2012 are given in Table-3. The depth to water level during pre-monsoon period varies from 3.54 to 17.03 mbgl while during post-monsoon ranges between 1.82 and 17.70 mbgl.

The depth to water level map for both pre-monsoon and post-monsoon periods of 2012 were prepared (Plate-II and III).

Perusal of Plate-II (D.T.W. in pre-monsoon period) reveals that shallow water levels (less than 5 mbgl) are recorded in the southern part of Sikandra Rao block which is lying in canal command. The major part lying in eastern part also records shallow water levels between 5 and 6 mbgl. In the Central Western parts the water levels are relatively deeper i.e. between 12 and 15 mbgl and 15 mbgl and 18 mbgl since the level of ground water development is on higher side. The deepest water levels i.e. more than 15 mbgl are observed

in Sadabad and Sasni blocks due to excessive ground water development with the result these blocks fall in over-exploited categories.

Perusal of Plate-III reveals almost the same water level behaviour.

Table-4

WATER LEVEL FLUCTUATION (PRE AND POST) FOR THE SELECTED YEAR 2012

Sl. No.	Well Name	Pre-Monsoon (mbgl)	Post-Monsoon (mbgl)	Fluctuation (m)
1.	Agsauli	5.69	5.58	0.11
2.	Bhatikra	6.7	-	-
3.	Hasyan	3.92	2.9	1.02
4.	Hathras Jn	15.36	15.42	-0.06
5.	Hathras (new)	17.03	17.7	-0.67
6.	Iglas	7.08	6.80	0.28
7.	Mitai	16.02	16.35	-0.33
8.	Mursan	15.5	-	-
9	Purdil Nagar	4.38	4.77	-0.39
10	Rattika Nagla	3.54	1.85	1.69
11	Thulai	12.23	8.55	3.68

4.4 LONG TERM WATER LEVEL TREND:

This provides a more realistic scenario in the water levels of any particular period depending upon occurrence of rainfall and ground water utilisation. It is given in Table-4.

Table-5

LONG TERM WATER LEVEL TREND (2003 - 2012)

Sl. No.	N.H.S. Station	Rise / Fall (m/y)				Period
		<i>Pre-Monsoon</i>		<i>Post-monsoon</i>		
1.	Bhatikia	0.1881		0.2136		2003-2012
2.	Hathras	-	0.4418	-	0.5504	2003-2012
3.	Thulai	-	0.1052	-	0.2132	2003-2012
4.	Mursan	-	0.5804	-	0.6642	2003-2012
5.	Hathras Jn.	-	0.5152	-	0.4885	2003-2012
6.	Biswan	-	1.5671	-	1.2982	2003-2012
7.	Ratti Ka Nagla	0.0275	-	-	0.0771	2003-2012
8.	Hasyan	-	-	0.0678	-	2003-2012
9.	Iglas	-	0.3519	-	0.4332	2003-2012

The table -5 indicates declining trend of ground water level in the entire district except Bhatikia & Ratti Ka Nagla (Hasayan block) which is lying in canal command.

4.5 AQUIFER PARAMETERS:

The upper parts of Aquifer Group-I, generally cater ground water to open wells and shallow borings whereas its middle and lower parts to shallow and moderately deep private / state tubewells. Shallow borings of 20 to moderately deep tubewells, 45 to 150 m deep, on tapping 12 to 36 m thickness of saturated granular zones, yield 11 lps (660 lpm) to 36 lps (2160 lpm) at drawdowns ranging between 3 and 7 m. The different hydraulic parameters are given in Table-3. The specific capacity varies from 1.43 to 9.94 lps/m. drawdown. The transmissivity computed ranged between 131.56 and 798.18 m²/day.

4.6 GROUND WATER RESOURCES:

To facilitate the ground water development; the ground water resources have been jointly estimated by G.W.D., U.P. and considering the norms of Ground Water Estimation Committee. These estimates are given in Table-6 and graphically depicted in Plate-IV.

Table-6

DYNAMIC GROUND WATER RESOURCES AS ON 31.03.2009

Sl. No.	Assessment units-blocks	Annual ground water recharge (ham)	Net annual ground water availability (ham)	Existing gross ground water draft for all uses (ham)	Allocation for domestic and industrial requirement supply upto next 25 years (year 2029)	Net ground water availability for future irrigation development (ham)	Stage of ground water development (%)	Category of block
1	2	3	4	5	6	7	8	9
1.	Hassain	13916.6	12524.94	8561.84	590.92	3746.78	68.36	Safe
2.	Hathras	7311.15	6580.04	7874.89	769.33	0.00	119.68	Over Exploited
3.	Mursan	7030.01	6327.01	7387.40	399.53	0.00	116.76	Over Exploited
4.	Sadabad	9708.01	8737.21	7916.38	746.11	547.70	90.61	Critical
5.	Sahpau	5431.6	4888.44	4312.59	312.59	538.69	88.22	Semi Critical
6.	Sasni	7103.09	6392.78	7092.82	462.48	0.00	110.95	Over exploited
7.	Sikandra Rao	12910.72	11619	7782.74	739.55	3566.18	66.98	Safe
	Total	63411.18	57070.06	50928.66	4020.51	5344.06	89.24	-

The ground water development in major part of the block is on higher side thereby putting 3 blocks under OE category, one block in 'critical' and one block in 'semi-critical' category. Only two blocks fall under 'safe' category as per estimates of 31.3.2009.

4.7 GROUND WATER QUALITY:

The EC (specific conductance) in phreatic zone ranges from 384 to 2950 $\mu\text{s}/\text{cm}$ at 25°C . In the major part of the district EC is in between 384 and 2950 micro-Siemens/cm at 25°C . The ground water quality of aquifer group I is generally good and suitable for various uses. The formation water of aquifer group II and III is brackish to highly saline and thus is not fit for any use. During the recent pollution studies the high concentration of Nitrate (NO_3) and Sulphate (SO_4) have been detected in shallow ground water samples collected from the number of localities in urban area and its environ.

Table – 7

GROUND WATER QUALITY OF MAHAMAYA NAGAR DISTRICT

Sr. No.	Block	pH	EC m S/cm at 25°C	HCO_3	Cl	F	NO_3	SO_4	TH	Ca	Mg	Na	K
				in mg/l									
1.	Hassain	7.92	1940	403	284	0.95	269	nd	715	24	157	122	17
2.	Hathras	7.91	2840	1147	206	0.79	40	48	420	36	79	424	17
3.	Mursan	7.99	2950	1098	241	0.96	29	84	970	60	197	152	36
4.	Sadabad	8.01	2130	793	276	0.96	9	94	300	28	55	360	17
5.	Sahpau	8.00	2470	470	475	0.97	41	58	280	40	43	400	24
6.	Sasni	7.93	1270	732	71	0.8	13	77	310	24	60	182	6
7.	Sikandra Rao	7.98	384	207	14	0.92	nd	nd	150	24	22	18	6.1

4.8 STATUS OF GROUND WATER DEVELOPMENT:

The district statistical data (Economic & Statistics Deptt. Lucknow 2011 - 12) show that 148675 ha land, which constitutes about 80.79 % of total area, is under cultivation. Out of the net cultivated land, 143951 ha area is irrigated through the available water resource of the area. The ground water is the main contributor since 130427 ha (90.60 %) is being irrigated by tubewells (government and private tubewells). The ground water development in the district mainly takes place through shallow / minor irrigation wells to cater requirement of irrigation. The depth of these wells ranges generally between 20 and 150 mbgl. The yield of these wells varies generally from 613 to 2453 lpm.

Table-8

BLOCKWISE AREA (Hectare) IRRIGATED THROUGH GROUND WATER

Block	Govt. Tubewell	Private Tubewell	Well	Other	Total
Hathras	0	20278	0	0	20278
Sasni	246	20813	0	0	21059
Mursan	0	18930	0	0	18930
Sikandra Rao	676	16203	0	0	16879
Hasayan	53	19001	0	0	19054
Sadabad	0	21938	0	0	21938
Sahapao	0	14289	0	0	14289
Total District	975	131452	0	0	132427

5.0 GROUNDWATER MANAGEMENT STRATEGY**5.1 Ground Water Development**

Stage of ground water development of the Mahamaya Nagar district is 89.24 %. Hassain and Sikandra Rao blocks fall in 'Safe' category. Sahpau block falls in 'Semi-critical' category. Sadabad falls in 'Critical' and 3 blocks namely Hathras, Mursan and Sasni fall in 'Over-exploited' category.

5.2 Water Conservation & Artificial Recharge:

The district has long term declining trend in the blocks Sadabad, Sahpau, Sasni, Hathras area. The area, where the ground level exists beyond 7 metre below ground level round the years is feasible for rain water harvesting and artificial recharge of the first aquifer. On the prevailing hydrogeological conditions the following measures should be taken to arrest the depletion.

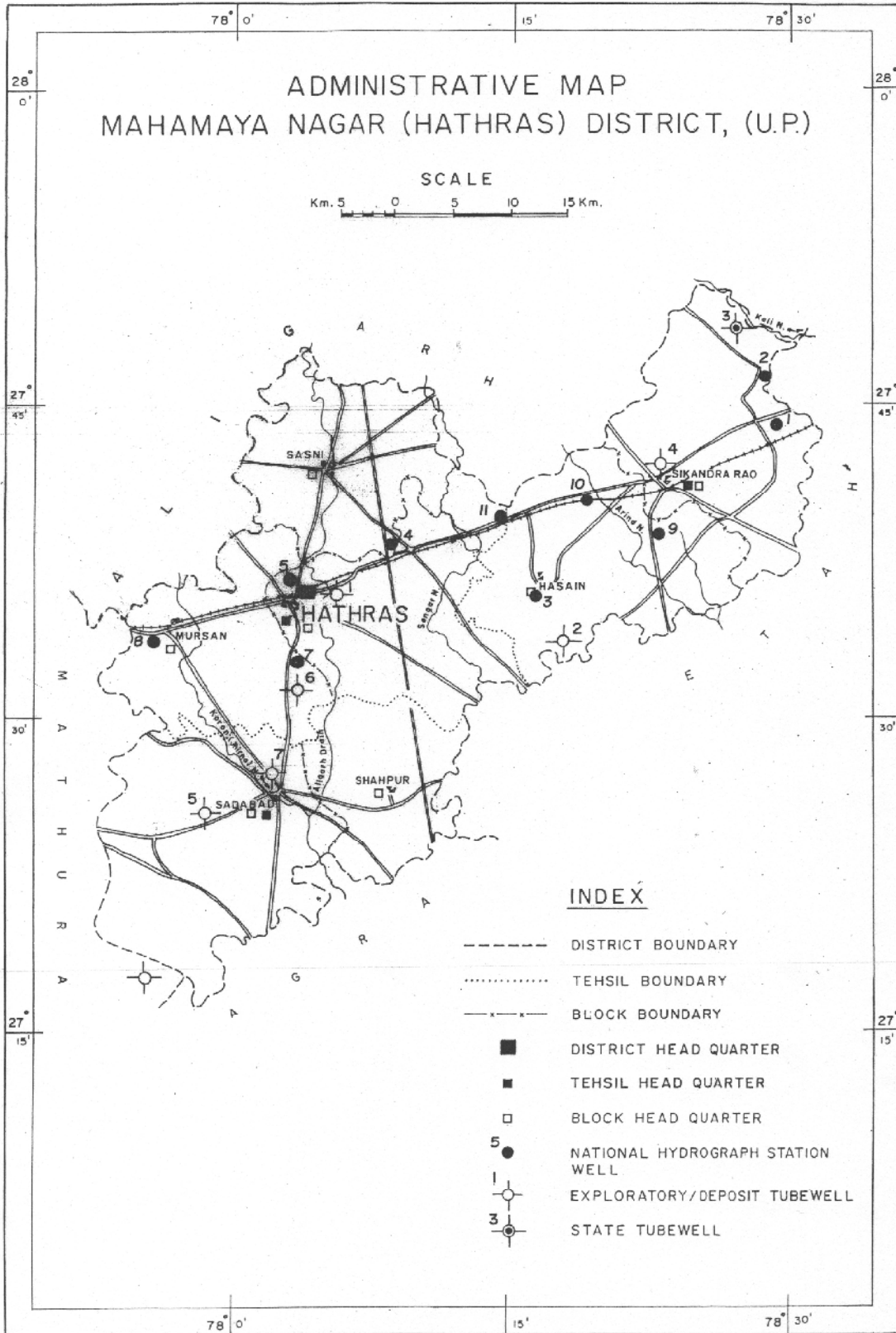
1. Persistent decline suggests the need for taking up rain water and artificial recharge measures on emergent basis and on large scale. Roof top rain water harvesting should necessarily be implemented in government buildings / housing schemes and industrial establishments / infrastructures having area of more then 200 sq. metres.
2. The conservation of rain water in abandoned channels for irrigation.
3. The renovation of water bodies may be done.

6.0 AWARENESS & TRAINING ACTIVITY

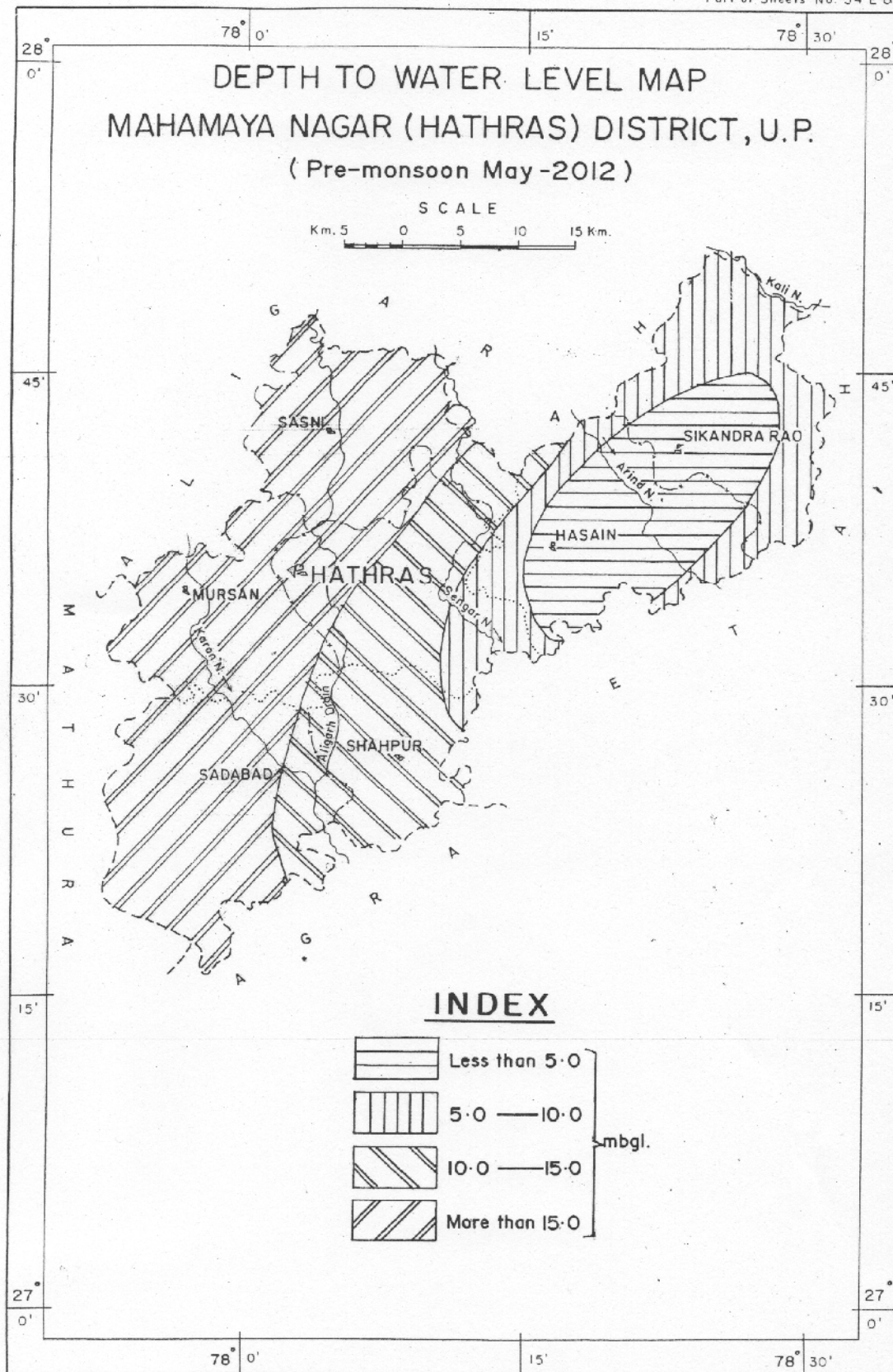
Nil

7.0 AREA NOTIFIED BY CGWA/SGWA

None of the areas has been notified in the district by either of the organisations.

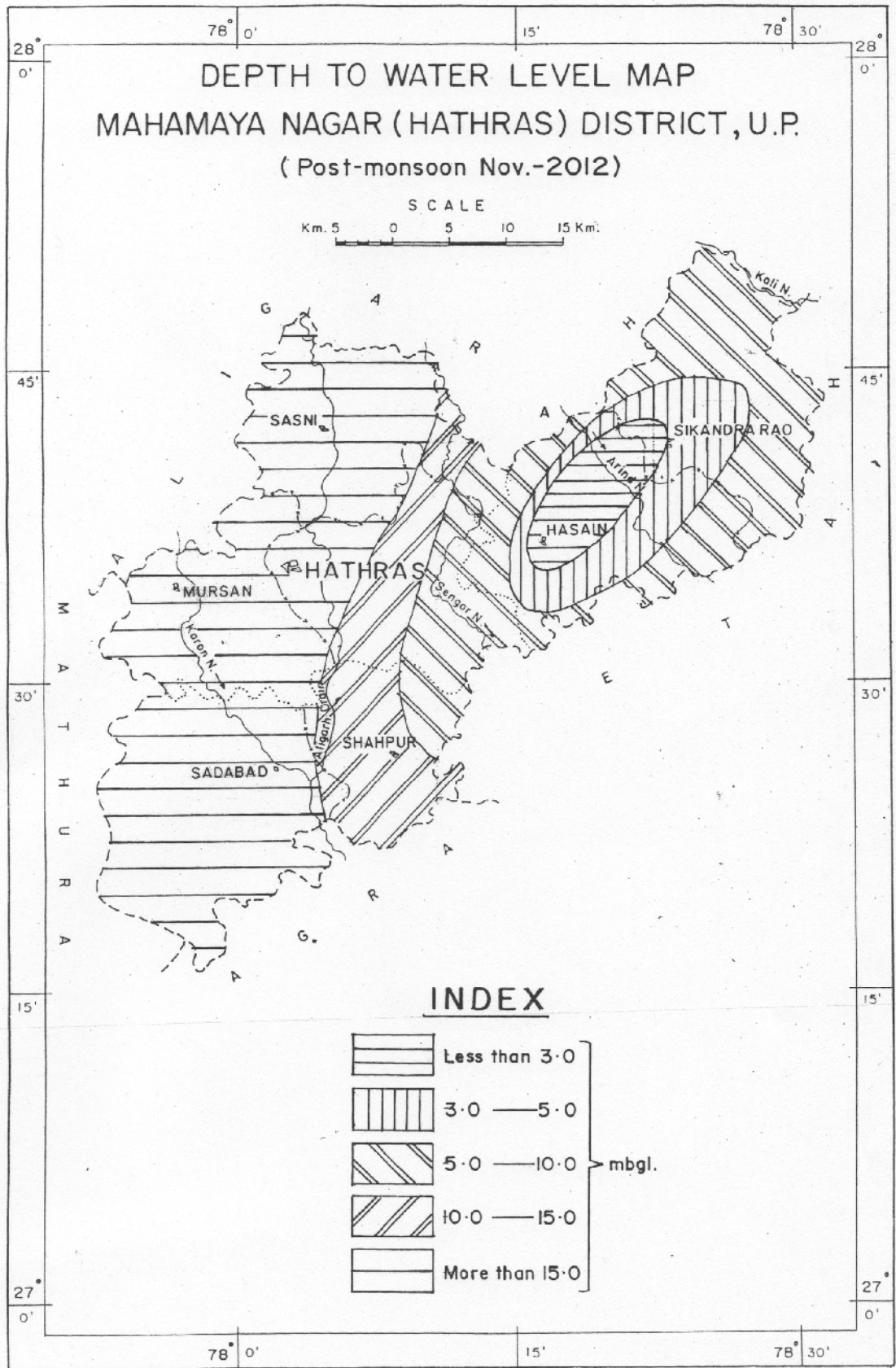
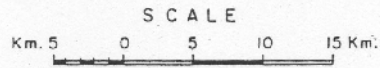


C G W B, NR (N. Chandra) Drg. No. 2747/09 (N.C. Pandey) Drg. No. 4923/13



CGWB, NR (N. Chandra) Drg. No. 2746/09, (N.C. Pandey) Drg. No. 4924/13

DEPTH TO WATER LEVEL MAP
MAHAMAYA NAGAR (HATHRAS) DISTRICT, U.P.
(Post-monsoon Nov.-2012)



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