

DISTRICT GROUND WATER BROCHURE KASHIRAM NAGAR DISTRICT, U.P.

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

By

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DISTRICT AT GLANCE, KASHIRAMNAGAR DISTRICT, U.P.

1. GENERAL INFORMATION

i. Geographical Area (Sq. Km.)	: 1993.08
ii. Administrative Divisions	
Number of Tehsil	: 3 (Kasganj, Patiyali & Sahawar)
Number of Block	: 7
	1. Sahawar,
	2. Kasganj,
	3. Amanpur,
	4. Soron,
	5. Sidhpura,
	6. Ganj Dundwara,
	7. Patiyal
Nagar Palikas	: 3
Nagar Panchayat	: 7
Nyay Panchayat	: 79
Gram Panchayat	: 389
Number of Villages	: 718
Assembly Areas	: 03
iii. Population (as on 2011 census)	: 1438156
Female	: 672627
Male	: 765529
Density	: 736 person/sq.km.
iv. Climatological Data	
Average Annual Rainfall (mm)	: 722.40
Rainfall for 2011 (mm)	: 482.60
Mean Maximum Temperature (⁰ C)	: 32
Mean Minimum Temperature (⁰ C)	: 26
Relative Humidity (Morning) (%)	: 60
Relative Humidity (Evening) (%)	: 41
Average Number of Rainy Days	: 40
Wind Velocity (Km/Hr)	: 4.5
Potential Evapotranspiration (mm)	: 1467.20

2. GEOMORPHOLOGY

	: Ganga Yamuna Doab in Central Indo-Gangetic Alluvial Plains
Major Physiographic Units	: a) Flood Plain b) Younger Alluvial Plain c) Older Alluvial Plain
Major Drainages	: Ganga and its tributaries namely Kali Nadi & Burhi Ganga

3. LAND USE (Sq. Km.)

a) Total reported area	: 1956.01
b) Total forest area	: 29.14

c)	Uncultivable land	:	35.64
d)	Land under miscellaneous use other than agriculture	:	247.06
e)	Culturable waste land	:	107.08
f)	Pasture	:	8.44
g)	Current & other fallow land	:	83.31
h)	Net area sown	:	1453.90
4.	MAJOR SOIL TYPES	:	a) Dumat or loam b) Matiyar or clay c) Bhur or sand
5.	AREA UNDER PRINCIPAL CROPS	:	Rabi – 54.48% Kharif – 38.94% Zayed – 6.56%
6.	IRRIGATION BY DIFFERENT SOURCES (Area in Hect) 2009-10		<u>Area Irrigated (sq.km.)</u>
a)	Canal - 484 Kms.	:	141.22
b)	Govt. Tubewells – 293 Nos.	:	23.61
c)	Private tubewells – 76918 Nos.	:	769.18
d)	Through other sources	:	432.70
e)	Net Irrigated Area	:	1366.71
7.	NUMBER OF GROUND WATER MONITORING WELLS OF CGWB		
a)	No. of Dugwells	:	1
b)	No. of Piezometers of GWD	:	7
c)	total	:	8
8.	PREDOMINANT GEOLOGICAL FORMATIONS	:	Alluvium (Alluvial sediments of Quaternary age)
9.	HYDROGEOLOGY	:	
a)	Major water bearing formation	:	Sand of various grades, clay, silt & kankar
b)	Premonsoon depth to water level	:	3.11 to 10.24 mbgl
c)	Postmonsoon depth to water level	:	2.58 to 9.79 mbgl
d)	Long term of water level in 10 years (cm/year)	:	Pre Rise ----- Fall (-)0.0000 to 0.0016 Post : Rise 0.0000 to 0.0102 Fall ----- Annual : Rise 0.0466 Fall
10.	GROUND WATER EXPLORATION BY CGWB		
	Number of wells drilled (EW, OW, PZ, SH, Total)	:	EW = Nil, OW = Nil, SH = 1 (Amanpur) Total = 1

Depth Range (mbgl) : 393 – 428
 Discharge (litres per second) : –
 Storativity (S) : –
 Transmissivity (m²/day) : –

11. GROUND WATER QUALITY

Quality of formation water is good in shallow aquifers except in Soron block (at places) where EC, Cl, F, Total Hardness etc. are more than permissible limits. Quality of deeper aquifers also is not suitable for drinking purposes at places.

Maximum Values (More than permissible limits)

	EC (microsiemens/cm at 25 ⁰ C)	Cl (mg/l)	F (mg/l)	Ca (mg/l)	Total Hardness as CaCO ₃ (mg/l)
1. Soron (Near railway crossing) Soron block	3100	533	0.5	120	750

**12. DYNAMIC GROUND WATER RESOURCES
(2009)-in HAM**

i) Net Ground Water Availability : 55932.40
 Existing Gross Ground Water Draft for All Uses : 42860.01
 Projected Demand for Domestic and Industrial Uses : 2889.91
 upto 2025

13. AWARENESS AND TRAINING ACTIVITY

Mass Awareness Programmes Organized : Nil
 Date
 Place
 Number of Participants
 Tier - 3 Training Programmes Organized : 1
 Date : 21st – 22nd of March, 2013
 Place : Soron
 Number of Participants

**14. EFFORTS OF ARTIFICIAL RECHARGE &
RAINWATER HARVESTING**

Projects Completed by CGWB (No & Amount Spent) : -
 Projects Under Technical Guidance of CGWB (Numbers) : -

15. GROUND WATER CONTROL AND REGULATION :

Number of OE Blocks : 1 (Kasganj)

Number of Safe Blocks : 6

Number of Blocks Notified : Nil

**16. MAJOR GROUND WATER PROBLEMS AND : -
ISSUES**

Over exploitation of ground water & quality

DISTRICT GROUND WATER BROCHURE KASHIRAMNAGAR DISTRICT, U.P.

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

By

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Scientist 'B'

1.0 INTRODUCTION

District Kashiramnagar was established as 71st 15th April, 2008 by separating Kasganj, Patiyali & Sahawar tehsils from Etah district. The district lies between 27^o18' latitude N and 78^o4'42" longitude E 27^o5' located in the Doab, the area between the holy rivers Ganga & Yamuna and the alluvium soil makes the land one of the most fertile region.

The district is situated in the western part of the state. It lies in the central portion of the Ganga and Yamuna doab and is bounded on the north-east side by the river Ganga, which separates it from the Budaun district. For administrative convenience & proper extension of development activities the district has been further divided into two tehsils and these tehsils have been further divided into seven blocks. The district headquarters Kasganj is very well connected by G.T. road and also connected by rail broad gauge line of Northern Eastern Railway with Tundla junction (on Delhi – Howrah main line). The drainage system of the district is controlled by the river Ganga & its tributaries, namely Kali Nadi & Burhi Ganga. The Kali Nadi is perennial and the remaining tributaries are ephemeral.

Table-1

Sl. No.	Tehsil	Blocks	No. of Tehsils
1.	Kasganj	Kasganj	104
		Soron	141
2.	Sahawar	Sahawar	83
		Amanpur	97
3.	Patiyali	Patiyali	82
		Ganj Dundwara	114
		Sidhpura	97

The district fall under the category of agricultural dominated district, occupying mainly the areas between the Ganga and Kali river. The surface water irrigation is mainly through the network of the Lower Ganga Canal.

Systematic Hydrogeological surveys in one part of the district was carried out in 1966-67 (GSI) and remaining part was covered by CGWB in 1978-79. The Reappraisal Hydrogeological Surveys were carried out by CGWB in 1988-89, 1989-90 and in 1998-99. One slim hole has been drilled during 1991-97 to study aquifer characteristics and quality of formation water in the entire district at different levels.

2.0 RAINFALL & CLIMATE

The average annual rainfall is 722.4 mm. The climate is sub-humid and it is characterized by a pleasant cold season and a hot day summer. About 88% of rainfall takes place from June to September. During monsoon surplus water is available for deep percolation to ground water.

There is a meteorological observatory at Mainpuri, the records of which may be taken as representative meteorological conditions. After February there is continuous increase in the temperature. May is generally the hottest month of the year. The mean daily maximum temperature in May is about 41⁰C, mean daily minimum temperature is about 27⁰C and maximum temperature reaches up to over 46⁰C with the onset of the monsoon there is a rapid decrease in the day temperature. January is the coldest month with the mean daily maximum temperature is about 22⁰C and mean daily minimum temperature is 8⁰C. The mean monthly maximum temperature is 32.8⁰C and mean monthly minimum temperature is 16.5⁰C

Except during the monsoon season humidity is high and air is dry. The mean monthly morning relative humidity is 67% and mean monthly evening relative humidity is 50%.

Winds are generally light with slight increase in force during summer and early monsoon months. The mean wind velocity is 3.5 Km./hr.

The potential evapotranspiration is 1431.7 mm

3.0 GEOMORPHOLOGY & SOIL TYPES

3.1 GEOMORPHOLOGY:

In general the district exhibits a flat topography with a few gentle undulations. Geomorphologically the area is not fully matured. The district may be divided into following geomorphic units.

- (i) Flood Plain
- (ii) Younger Alluvial Plain
- (iii) Older Alluvial Plain

3.2 MAJOR DRAINAGES:

Ganga and its tributaries.

3.3 SOIL TYPES:

The soils in the district can be grouped into the following three main conventional classes depending upon their textural and compositional character:

- a. Dumat or Loam :*
Fertile soil which is soft to touch when powdered.
- b. Matiyar Clay :*
Stiff clay and becomes as hard as baked brick on drying.
- c. Bhur or Sand :*
Sandy soil and less fertile.

4.0 GROUND WATER SCENARIO

4.1 HYDROGEOLOGY:

4.1.1 Water Bearing Formation:

Major water bearing formations are sand of various grades, silt & kankar.

4.1.2 Occurrence of Ground Water:

The ground water occurs in the pore spaces of unconsolidated alluvial sediments in the zone of sedimentation. The top silty / sandy clay beds mixed with kankar support the dugwells where ground water occurs under water table conditions. The ground water in the deeper aquifers occur in semi confined to confined conditions.

4.1.3 Nature and Depth of Aquifer Systems Encountered:

The Ist aquifer group, occurring just below the top clay layer is regionally extensive with variable thickness attaining the maximum thickness of 80 metres. The granular material of this group comprise fine to medium sand occasionally admixed with kankar and sandy clay.

The IInd aquifer group occurring generally between the depth range of 110-160 mbgl consist of fine to coarse sand admixed with kankar and gravels.

Occurrence of clay lenses within this aquifer group is a common features in the major part of the area.

The IIIrd aquifer group, lying generally in the depth range of 240 (± 20) m, to 290 (± 20) comprises fine to coarse sand admixed occasionally with kankar and gravels.

The lithological logs of the one slim hole indicate that occurrence of clay lenses at depths in this aquifer too is making it regionally less extensive.

The depth drilled at Amanpur is 393.00 mbgl. The IVth aquifer group, occurring generally below 340 m, (± 20 m), consist of fine to coarse sand with occasional gravels. The thickness of this aquifers group, though not fully ascertained due to limited drilling depth, appears to vary between 20 and 50 m, with intervening clay lenses of 10 to 20 m thickness. The thickness of aquifer group decreases towards west.

4.1.4 Depth to Water Level (Pre-Monsoon) :

During the pre-monsoon period i.e. in May & June (2012), the water levels were monitored in the Ground Water Monitoring Stations (GWMS) established in the entire district. On the basis of these data (Table-2) a depth to water level map was prepared (Plate-II). The depth to water level ranges from 3.11 mbgl (at Amanpur) to 10.24 mbgl (at Soron).

Table-2

**WATER LEVEL FLUCTUATION (PRE AND POST) FOR THE SELECTED
YEAR 2012 FOR KASHIRAMNAGAR DISTRICT, U.P.**

Sl. No.	Location	Premonsoon (mbgl)	Postmonsoon (mbgl)	Fluctuation (m)
1.	Kasganj	7.70	7.53	0.17
2.	Sidhpura (Pz)	5.33	3.83	1.50
3.	Ganj Durwara (Pz)	4.92	5.05	(-) 0.13
4.	Sahawar (Pz)	8.24	8.34	(-) 0.10
5.	Paityali (Pz)	9.33	9.59	(-) 0.26
6.	Soron (Pz)	10.24	9.79	0.45
7.	Amanpur (Pz)	3.11	2.58	0.53

4.1.5 Depth to Water Level (Postmonsoon):

During postmonsoon water levels were monitored on the same GWM Station (Table-1) on the basis of data, a depth to water level. (Postmonsoon) map was prepared (Plate-III). The depth to water level ranges from 2.58 mbgl (at Amanpur) to 9.79 mbgl (at Soron). At places Patiyali, Sahawar and Ganj Dundwara depth to water level is declining in post monsoon.

4.1.6 Seasonal Fluctuation:

The fluctuation in water level varies from 0.17 m to 1.50 m. The maximum fluctuation is observed at Sidhpura (1.5 m). The data is presented in Table-1

4.1.7 Long Term Water Level Trend:

The long term water level trend from year 2003-2012 is give in Table-3 which shows at Nagla Khanji ground water monitoring station, where it shows rising trend of water level is observed in the district.

Table-3

**LONGTERM WATER LEVEL TREND IN
KASHIRAMNAGAR DISTRICT, U.P.
(From 2003 – 2012)**

Sl. No.	Location	Premonsoon			Postmonsoon			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.	Nagla Khanji	7	-	0.0016	6	0.0102	-	26	0.0466	-

4.2 GROUND WATER RESOURCES:

Precipitation is the main source of ground water recharge in the district. The quantity of recharge depends upon the intensity and duration of rainfall, nature and texture of soil, vegetation cover and land use pattern of the area.

The other sources which replenish the ground water are as under

1. Seepage from canal system
2. Return flow from applied irrigation
3. Sub surface in flow from adjoining area
4. Influent recharge from the river system

The dynamic ground water resources are given in (Table-4). Out of 7 blocks of the district 6 blocks falls under the safe category, whereas rest 1 block falls under over exploited category i.e. at Kasganj where stage of ground water development is more than 100%. The overall stage of ground water development in the district is 76.63%.

Table-4

DYNAMIC GROUND WATER RESOURCES OF KASHIRAMNAGAR DISTRICT, U.P. (As on 31.03.2009)

Sl. No.	Assessment Units – Blocks	Net Annual Ground Water Availability (in ham)	Existing Gross Ground Water Draft for All Uses (in ham)	Net Ground Water Availability for Future Irrigation Development (in ham)	Stage of Ground Water Development (in %)	Category of Block
1	2	4	5	6	7	8
1.	Amanpur	7908.30	6119.10	1687.68	77.38	Safe
2.	Ganjdundwara	9568.03	7086.16	2296.25	74.06	Safe
3.	Kasganj	7178.81	7728.00	-	107.65	Over Exploited
4.	Patiyali	7437.31	4861.27	2470.48	65.36	Safe
5.	Sahawar	7355.33	5554.61	1692.54	75.52	Safe
6.	Sidhpura	5989.13	4655.63	1222.47	77.73	Safe
7.	Soron	10495.49	6855.24	3428.59	65.32	Safe
	Total	55932.40	42860.01	12545.30	76.63	

STATUS OF GROUND WATER DEVELOPMENT (BLOCKWISE):

The status of ground water development (blockwise) is given in the district (Table-5).

The blockwise proposal of ground water development for irrigation purpose in the district is given in Table-5. The categorization of blocks is presented in Plate-IV.

Table-5

**BLOCKWISE PROPOSAL OF GROUND WATER DEVELOPMENT FOR IRRIGATION PURPOSE IN
KASHIRAMNAGAR DISTRICT, U.P.**

Sl. No.	Block	Net ground water availability for future irrigation development (ham)	Ground water available for irrigation (85% of col. 3 in ham)	Ground water proposed to be utilized for irrigational development (70% of col.4 in ham)	Proposed Structure		Additional irrigation potential may be created (ha.) (Average depth of irrigation water adopted 0.50m) (Col. 5/0.50)
					<i>No. of state tubewells (taking 50% of Col. 5 unit draft 12.8 ham)</i>	<i>Private tubewell borings with pumping sets (taking 50% of col. 5 unit draft 1.8 ham)</i>	
1	2	3	4	5	6	7	8
1.	Amanpur	77908.39	6722.13	4705.49	183.00	1307	9410.98
2.	Ganjdundwara	9568.03	8132.82	5692.97	222.38	1581	1581
3.	Kasganj	7178.81	6101.98	4271.38	167.00	1186	8542.76
4.	Patiyali	7437.31	6321.71	4425.19	172.00	1229	8850.38
5.	Sahawar	7355.33	6252.03	4376.42	170.00	1215	8752.84
6.	Sidhpura	5989.13	5090.76	3565.53	139.00	989	7127.06
7.	Soron	10495.49	8921.16	6244.81	243.00	1734	12489.62

4.3 GROUND WATER QUALITY:

The quality of ground water is good in shallow aquifers except in Soron block (at places) where EC, Th, are more than permissible limits. The quality of deeper aquifer is not suitable for drinking purposes at places.

The specific electrical conductance of ground water in phreatic zone ranges from 460 to 3100 $\mu\text{s}/\text{cm}$ at 25°C . Conductance below 750 $\mu\text{s}/\text{cm}$ at 25°C has been observed in 85% of the samples analysed (Table-6).

It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except fluoride and nitrate. Fluoride is found in excess of permissible limit (1.5 mg/l) in all the samples analysed and nitrate is also found in permissible limit (>45 mg/l) in the samples analysed.

Table-6

RESULTS OF CHEMICAL ANALYSIS WATER SAMPLES COLLECTED IN NHS DURING MAY, 2012

Sl. No.	District	Location	pH	EC in $\mu\text{s}/\text{cm}$	Values in mg/l											
					CO_3	HCO_3	Cl	F	NO_3	SO_4	TH	Ca	Mg	Na	K	TDS
1.	Kashiramnagar	Panchyat Patiali block	7.88	590	0	183	36	0.48	20	53	200	40	24	35	4.3	354
2.	Kashiramnagar	Ganjdundwara	7.54	460	0	220	14	0.35	nd	nd	180	32	24	14	6.2	276
3.	Kashiramnagar	BDO Sidhpura block	7.77	1060	0	305	121	0.66	18	67	280	36	46	100	15.0	636
4.	Kashiramnagar	BDO office Amanpur	7.35	510	0	195	28	0.56	nd	19	160	12	32	33	5.8	306
5.	Kashiramnagar	BDO at Sahawar block	7.44	500	0	183	7.1	0.3	nd	53	180	32	24	22	4.3	300
6.	Kashiramnagar	Gak Soron block	7.45	3100	0	244	533	0.47	36	448	750	120	109	345	27.0	1860
7.	Kashiramnagar	Kasganj block	7.28	590	0	220	36	0.3	23	14	200	28	32	32	5.0	354

5.0 GROUND WATER MANAGEMENT STRATEGY

5.1 GROUND WATER DEVELOPMENT:

Ground water development should take place in those blocks only where the stage of ground water development falls under safe category (Table-7).

Table-7

BLOCKS FALLING UNDER SAFE CATEGORY, KASHIRAMNAGAR DISTRICT, U.P.

Sl. No.	Name of Block	Category of Block
1.	Amanpur	Safe
2.	Ganjdundwara	Safe
3.	Patiyali	Safe
4.	Sahawar	Safe
5.	Sidhapura	Safe
6.	Soron	Safe
7.	Kasganj	Over Exploited

However further development of ground water should be done judiciously in Kasganj block as it falls under over exploited category and the ground water development should be completely restricted / regulated in the Kasganj.

5.2 WATER CONSERVATION & ARTIFICIAL RECHARGE:

Artificial recharge structures may be developed in Kasganj block to recharge the aquifer for improving the ground water scenario in the block and also for improving the category of the block.

6.0 GROUND WATER RELATED ISSUES AND PROBLEMS

Over Exploitation and Quality:

1. In one over exploited block which is Kasganj, further ground water development should be checked judiciously.

2. At places in Soron block the EC, & Total Hardness is found in more than desirable limits. The quality of deeper aquifer is not suitable for drinking purposes at places.

Sl. No.	Block name	EC (microsiemens/cm at 25 ⁰ C)	Cl (mg/l)	F (mg/l)	Ca (mg/l)	Th As CaCO ₃ (mg/l)
1.	Sahawar	2600	824	2.0	202	825

7.0 AWARENESS AND TRAINING ACTIVITY

7.1 MASS AWARENESS PROGRAMME (MAP) & WATER MANAGEMENT TRAINING PROGRAMME (WMTP) BY CGWB:

So far neither any MAP nor any WMTP has been conducted in the district.

7.2 PARTICIPATION IN EXHIBITION, MELA, FAIR ETC.:

Nil.

7.3 PRESENTATION & LECTURE DELIVERED IN PUBLIC FORUM / RADIO / T.V. / INSTITUTION OF REPUTE / GROSS ROOT ASSOCIATION / NGO / ACADEMIC INSTITUTION ETC.:

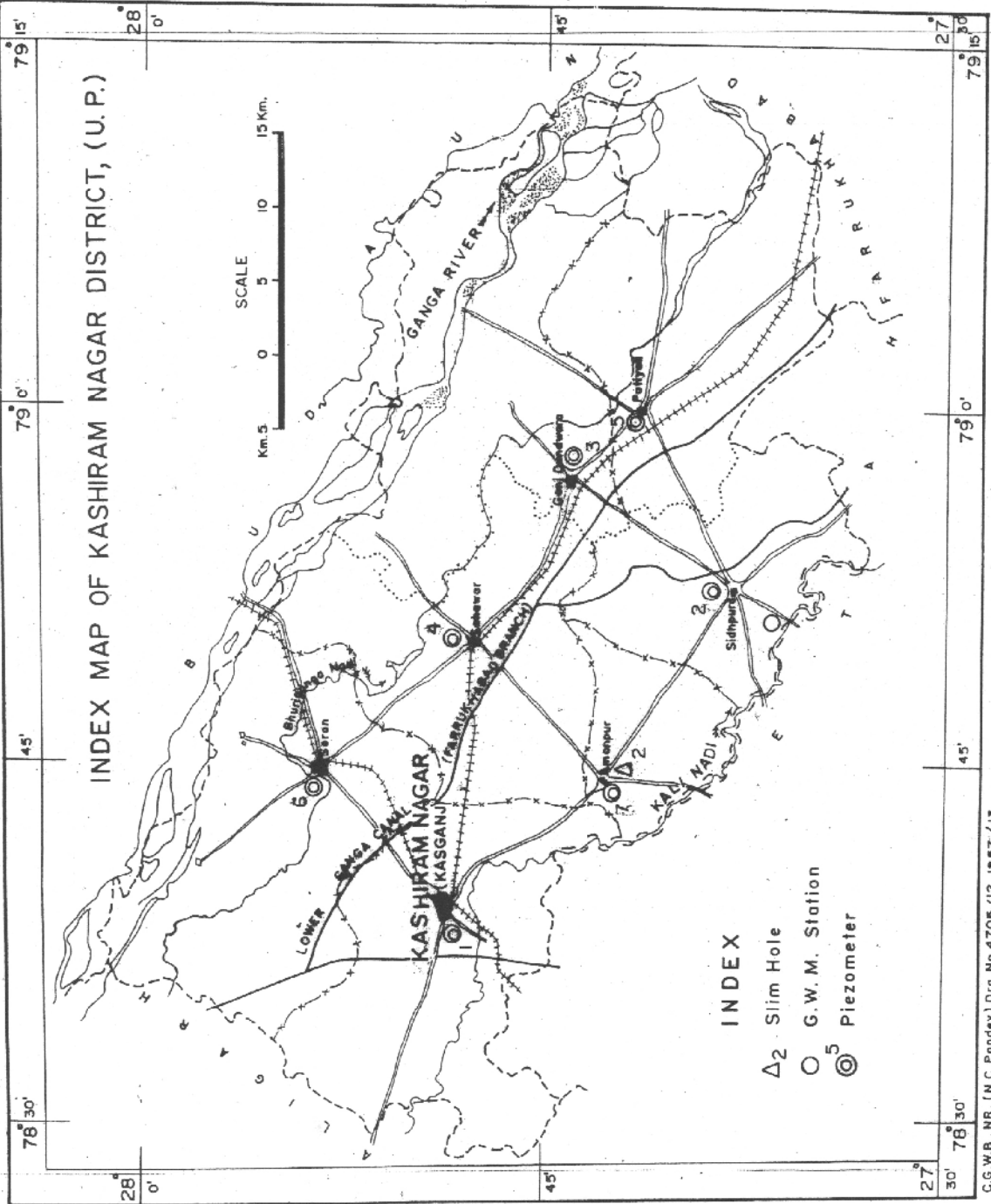
Nil.

8.0 AREAS NOTIFIED BY CGWA/SGWA

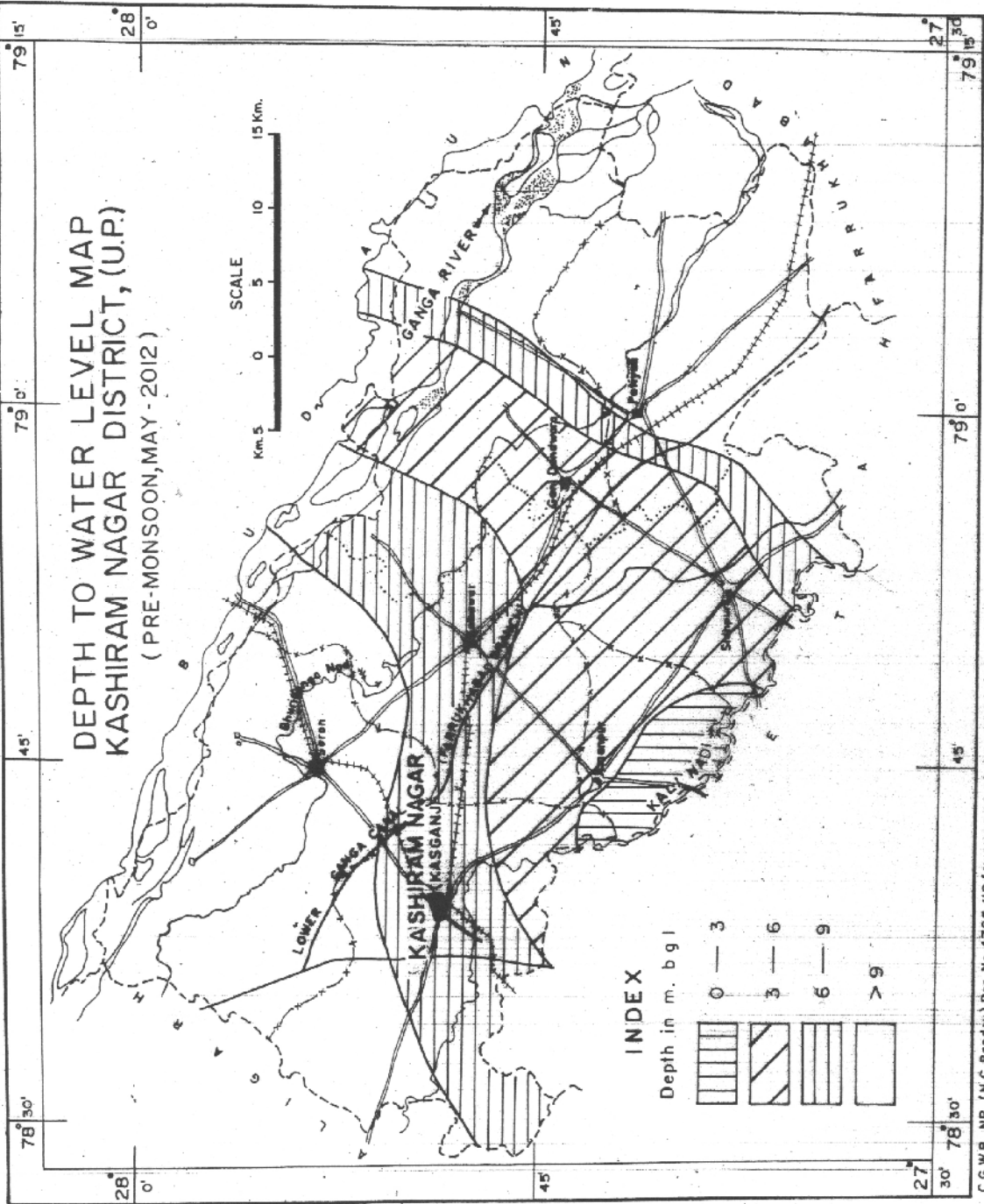
Nil.

9.0 RECOMMENDATIONS

- (1) The assessment of ground water in the district indicates that the future development of ground water should be regulated in Kasganj block as it comes under the category of over exploited category. Proper intervention of ground water management and adoption of conservation measures are urgently required.
- (2) Artificial recharge structures should be developed in Kasganj block to recharge the aquifer for increasing their ground water scenario.
- (3) The further development of ground water in Amanpur, Ganjdundwara, Patiyali, Sahawar, Sidhpura & Soron blocks should be done judiciously & through proper management, as these block falls under the safe category.
- (4) In other 'Safe' category blocks where the ground water levels are more or less stable or showing rising trend to a limited extent the ground water can systematically be developed to boost the agriculture economy of the district.
- (5) Possibilities for introducing lift irrigation scheme for the blocks having inadequate ground water resources to meet out the total irrigational demand need to be explored.
- (6) In the area showing a declining trend regular and periodical monitoring of ground water levels is essential for which a network of shallow piezometers are to be established at suitable location.
- (7) Only one slim hole i.e. Amanpur has been drilled so far in the Southern part of the district. The remaining area is to be explored in order to assess the potentiality and suitability of formation water available in deeper aquifer down to 450 m depth to the bedrock which ever to meet earlier.

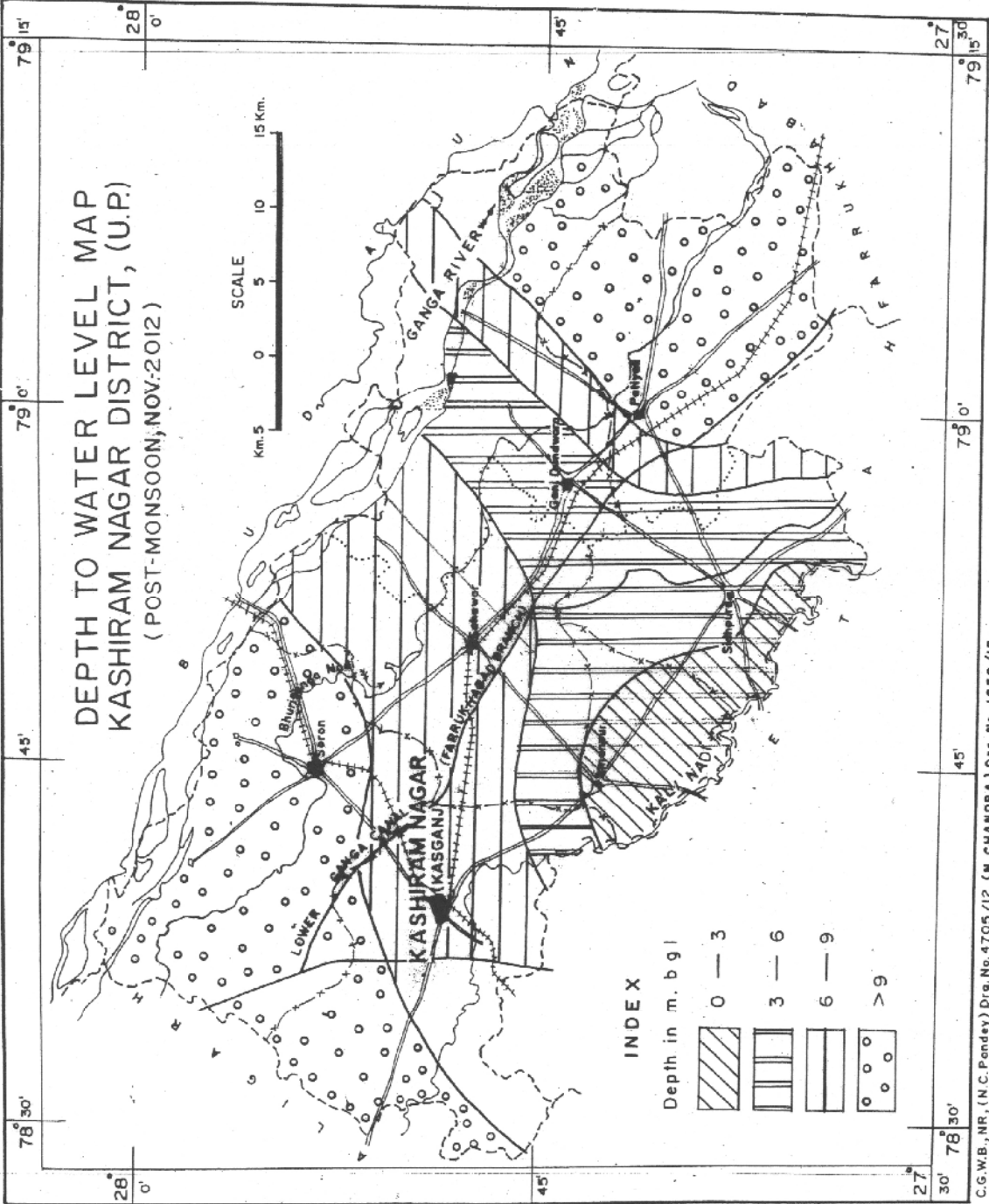


C.G.W.B., NR, (N.C. Pandey) Drg. No. 4705/12, 1857/13



Part of Topo Sheet No. 53 L & 54 I, M

DEPTH TO WATER LEVEL MAP
KASHIRAM NAGAR DISTRICT, (U.P.)
(POST-MONSOON, NOV:2012)



C.G.W.B., NR., (N.C. Pandey) Drg. No. 4705/12 (N. CHANDRA) Drg. No. 1859/13

