GROUND WATER BROCHURE OF MAHOBA DISTRICT, U.P.

By

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DISTRICT AT GLANCE

1.	**GENERAL INFORMATION**		
i.	Geographical Area (Sq. Km.)	:	2884
ii.	**Administrative Division** (as on 31.3.2008)		
	a) Number of Tehsil	:	3
	b) Number of Block	:	4
	c) Number of Panchayat	:	39
	d) Number of Village	:	521
iii.	Population (as on 2001 census)	:	75,838
iv.	Average Annual Rainfall (mm)	:	864
2.	**GEOMORPHOLOGY**		
	Major Physiographic Units	:	Southern part having high relief with hillocks Northern part relatively low relief with lower hillocks
	Major Drainages	:	Dhasan, Urmil Birma and Arjun
3.	**LAND USE (Ha.)**		
a)	Forest area	:	16219
b)	Net area sown	:	186963
c)	Cultivable area	:	
4.	**MAJOR SOIL TYPES**	:	Clayey and loamy and dumat type
5.	**AREA UNDER PRINCIPAL CROPS (As on 2009) Ha.**	:	Rabi : 213537 Kharif : 64178 Zaid : 108
6.	**IRRIGATION BY DIFFERENT SOURCES** (Areas in ha. and Number of Structures)		
	Dugwells	:	35805
	Tubewells / Borewells 3 Nos.	:	3241
	Tanks / Ponds	:	2168
	Canals (Length = 455 Km)	:	190
	Other sources	:	157
	Net Irrigated Area	:	41561
	Gross Irrigated Area	:	44717

7.	**NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 2009)**		
	No. of Dugwells	:	12
	No. of Piezometers	:	Nil
8.	**PREDOMINANT GEOLOGICAL FORMATIONS**	:	Precambrian, Bundelkhand massive dolerite, quartz reef, granite overlain unconfirmably by Quaternary Alluvium.
9.	**HYDROGEOLOGY AND AQUIFER GROUP**	:	
	Major water bearing formation	:	Fractured Bundelkhand Granites
	(Pre-monsoon Depth to water level during May' 2009)		3.58 to 12.26 mbgl
	(Post-monsoon Depth to water level during Nov' 2009)	:	2.90-12.02 mbgl
	Long term of water level trend in 10 years (1999-2009) in m/year		Rise = 0.4922 Fall = 0.0390 to 0.6396
10.	**GROUND WATER EXPLORATION BY CGWB (As on 2009)**		
	No. of wells drilled (EW, OW, PZ, SH, Total)	:	EW-44, OW-02
	Depth Range (m)	:	28.00-200.00 mbgl
	Discharge (litres per second)	:	Negligible to 15.00
	Storativity (S)	:	N.A.
	Transmissivity (m^2/day)	:	N.A.
11.	**GROUND WATER QUALITY**		
	Presence of Chemical constituents more than permissible limit (e.g. EC, F, NO_3, As, Fe)	:	NO3, Ca more than permissible limits at some places.
	Type of water		Good water quality zone
12.	**DYNAMIC GROUND WATER RESOURCES (2004)-in HAM**		
	Annual Replenishable Ground Water Resources	:	47046.58
	Gross Annual Ground Water Draft	:	20978.59
	Projected Demand for Domestic Industrial Uses upto 2029	:	20863.84
	Stage of Ground Water Development	:	49.55%
13.	**AWARENESS AND TRAINING ACTIVITY**	:	
	Mass Awareness Programmes organized	:	Nil
	Date		
	Place		
	No. of Participants		

	Water Management Training Programme (Artificial Recharge) organized		
	Date	:	
	Place	:	
	No. of Participants	:	
14.	**EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING**		
	Projects completed by CGWB (No of Amount Spent)	:	NA
	Projects under technical guidance of CGWB (Numbers)	:	NA
15.	**GROUND WATER CONTROL AND REGULATION**	:	
	Number of OE blocks	:	Nil
	Number of critical blocks	:	Nil
	Number of blocks notified	:	Nil
16.	**MAJOR GROUND WATER PROBLEMS AND ISSUES**	:	Subsurface flow of many streams in the district is fed with ground water resulting decline of ground water level.

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1.0 INTRODUCTION

Mahoba district lies between $25^0$01'30" and $25^0$39'40" north latitude and $79^0$15'00" and $80^0$10'30" east longitude. Total geographical area of the district is 2884 sq. km. District headquarter is at Mahoba having 3 (three) number of tehsils and 4 (four) number of blocks. As per the 2001 census the district has population of 758380 of which 406790 males and 351590 females. Scheduled caste population is 196040 and scheduled tribe population is 60. Literacy rate of the district is 53.2%. Geographically the area comprises Precambrian Bundelkhand massif dolerites, granites and quartz reefs unconfirmavely overlain by quaternary alluvium. The main and major rivers of the district are Dhasan, Urmil, Birma and Arjun.

Physiographically the area can be divided into two units –

(1) Southern parts having high reliefs with hillocks.

(2) Northern part having relatively low relief with low hillocks.

Agriculture is the main source of economy of the district. Both surface and ground water are used for irrigation. The net irrigated area is 41561 Ha and the net area sown is 186963 Ha, which shows that 22% area is irrigated and the rest area depends on rainfall. Length of canal in the district is 455 Km. and the number of government tubewells is 03.

Mahoba district is drained by Dhasan, Urmil, Birna and Arjun rivers. Dhasan emanating from Vindhyachal flows through Charkhari tehsil forming the western boundry of the district.

The river Urmil separates Charkhari and Mahoba tehsil and flows through out to the east. The Birna a perinial stream nearby divides the district into two equal

halves, east and west. These rivers and streams constitute the natural drainage lines of the district.

The district was covered under hydrogeology and ground water potential study by Dr. R.P. Agarwal Senior Hydrologist, CGWB and Shri S.N. Sinha in the year 1992. Feasibility study for construction of subsurface dykes was carried out by Shri K. Mahmood Sr. Hydrogeologist in 1999 and the district ground water management study was carried out by Dr. H.K. Pandey Scientist 'B' in the year 2001.

2.0 RAINFALL & CLIMATE

The average annual rainfall is 864 mm. The climate is typical subtropical punctuated by long and intense summer. About 87% of the annual rainfall is received from south-west monsoon. May is the hottest month with temperature shooting upto 47.5^0C. With the advance of monsoon by about mid June, tempeature starts decreasing. January is usually the coldest month with the temperature going upto 8.3^0C.

The relative humidity is highest during south-west monsoon ranging between 80% to 85% with its lowest around 30% during peak summer months of April and May.

3.0 GEOMORPHOLOGY & SOIL

3.1 Geomorphology:

The district is characterised by presence of Bundelkhand massif terrains. The master slope of the area is mainly towards northeast. The district can be boradly classified into two physiographic units. Southern part having high relief and northern part having relatively low relief with low hillocks.

3.2 Soil:

In Mahoba district soil has been produced by the weathering of granites. Well known Bundelkhand varieties are Mar, Kafur, Parana and Rakar. Clayey and loamy soil is dominant in the district.

4.0 GROUND WATER SCENARIO

Mahoba district mainly comprises of hard rock formation of Bundelkhand massif. The rainfall does not percolate and store subsurface since the rocks are of massive & compact nature. However secondary porosity in the form of joints and fissures allow some water to percolate.

4.1 HYDROGEOLOGY:

On the basis of hydrogeological information ground water occurs in two forms

(i) Shallow zone, the phreatic conditions is only limited to the overburden the depth of which is maximum upto 35-40 m

(ii) Deeper fracture zones, the ground water occurs in fractures and joints, the potential fractures are encountered from around 35 m to 96 m in some places. Being the hilly and rugged terrain the occurrence of ground water in this terrain is highly uncertain.

Depth To Water Level:

As per the depth to water level data of 12 permanent ground water monitoring stations in the year 2009, pre monsoon water level ranges from 3.58 mbgl (Kulpaher I) to 12.26 mbgl (Panwari). In the post monsoon period, depth to water level varies from 2.90 mbgl to 12.02 mbgl. Water level fluctuation varies from 0.0 in Srinagar to 4.50 m at Kulpahar II. Observation say that the area has low recharge except few pockets where alluvial cover is significantly higher.

Long Term Water Level Trend:

Long term water level trend records in the area from 12 national hydrographic stations (1999-2009) ten years show that (except Kashipur) all other stations are showing declining trend. The falling trend ranges from 0.0390 m/yr (Charkhari) to 0.6396 m/yr at Mahoba.

4.2 Ground Water Resource:

As per report on dynamic ground water resource of Mahoba district as on 31.2.2004. The annual ground water recharge of the district is 47046.58 Ham, the net annual ground water availability is 42341.92 ham. The existing gross ground water

draft for all uses is 20978.59 ham. The net ground water availability for future irrigation development is 20863.84 ham. The stage of ground water development is 49.55%. As per the estimates worked out, all the blocks of the district are in 'Safe Category'.

4.3 Ground Water Quality:

The electrical conductance is in the ranges of 350 to 2462 μm/cm at 25^0C. Total hardness is from 150 to 1050 mg/l. Fluoride is in the range of 0.15 to 1.10 mg/l and Nitrate is upto 228 mg/l and Ca upto 240 mg/l which is high. Phosphate is absent.

4.4 Status Of Ground Water Development:

The district being hilly and rocky has little scope for ground water development. The ground water worthy area is very limited (30-35%). Due to uncertainty of ground water availability the ground water development in the district is very low 49.50%. There are 15698 number of private tubewells. The maximum number of private tubewells are found in Jaitpur block (6640) and minimum in Charkhari block (2686). The canal length is 455 Km. in the district irrigating 190 Ha area, indicates that irrigation through surface water has reduced considerably.

CGWB has constructed 44 number of tubewells under the exploratory programme. The yield of the tubewell range from negligible to 150 lpm with average drawdown of 18.0 metres. A total number of 441 handpumps have been constructed in the district, benefiting a population of 603484.

DYNAMIC GROUND WATER RESOURCES OF MAHOBA DISTRICT, U.P.
(As on 31.03.2004)

Sl. No.	Assessment Units-Blocks	Annual Ground Water Recharge (in ham)	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.	Charkhari	9342.62	8408.36	4760.11	3534.91	56.61	Safe
2.	Jaitpur	9423.32	8480.99	6851.51	1466.35	80.79	Safe
3.	Kabrai	15813.31	14231.98	4825.50	9291.59	33.91	Safe
4.	Panwari	12467.32	11220.59	4541.47	6570.99	40.47	Safe
	TOTAL	**47046.58**	**42341.92**	**20978.59**	**20863.84**	**49.55**	

5.0 GROUND WATER MANAGEMENT STRATEGY

5.1 Ground Water Development:

The stage of ground water development in the district is 49.55%. Leaving net ground water availability for future irrigation 20863.84 ham. The maximum stage of ground water development is in Jaitpur block 80.79% and minimum in Kabrai block 33.91%. All the 4 blocks are in the safe category.

5.2 Water Conservation Structure & Artificial Recharge:

Construction of sub-surface dyke cum check dams is feasible at many places in Charkhari block and Jaitpur block to arrest the subsurface flow.

6.0 GROUND WATER RELATED ISSUES AND PROBLEMS

Ground water draft is highest in Jaitpur block, to enhance the ground water resource artificial recharge schemes should be implemented.

7.0 AWARENESS & TRAINING ACTIVITY

Nil.

8.0 AREA NOTIFIED BY CGWB

Not notified.

9.0 RECOMMENDATIONS

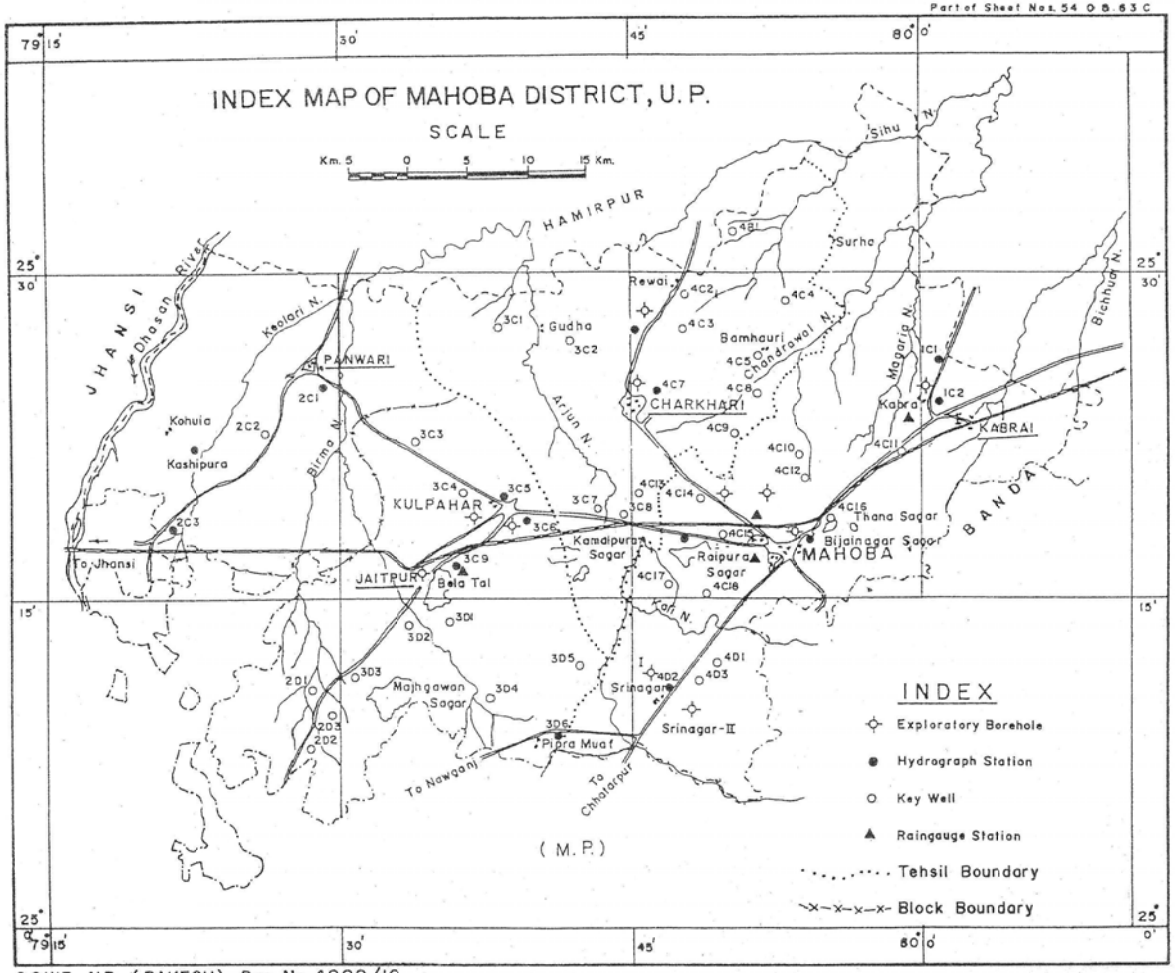
(i) Monitoring of ground water regime should be done not only with dugwells but with piezometers as well.

(ii) Percolation tanks & check dams are suitable methods for water conservation and artificial recharge.

(iii) Renovation and restoration of existing tanks is required.

(iv) Construction of large dia dugwells should be encouraged in the district for drinking and irrigation purpose.

PLATE - I



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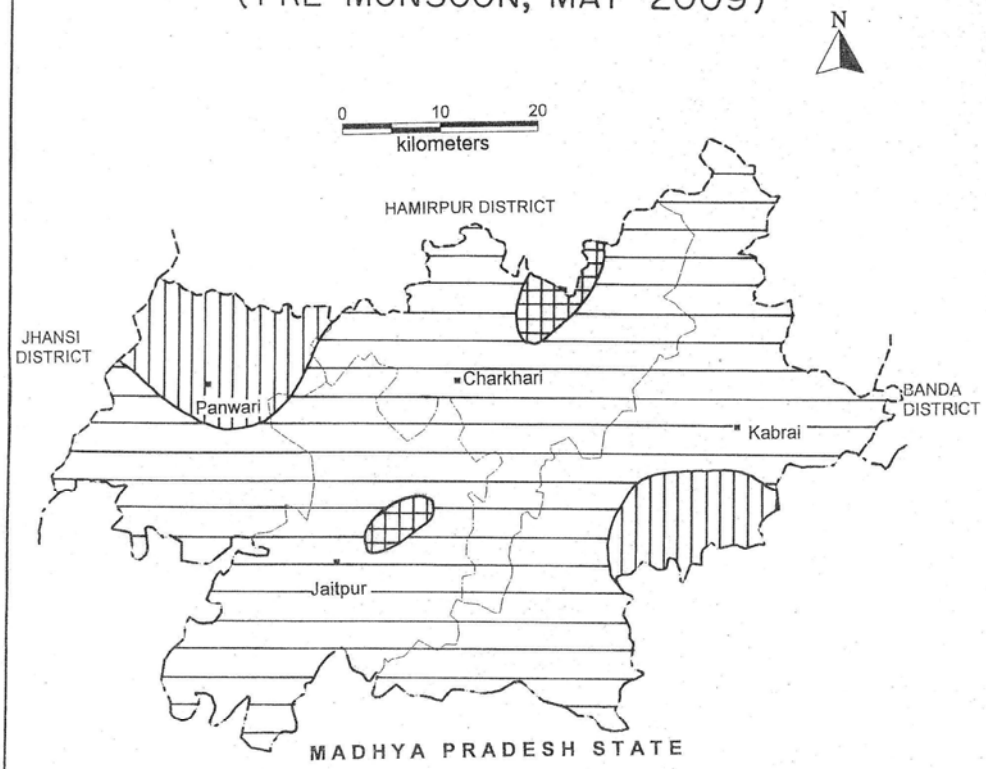
CGWB, NR, (RAKESH), Drg. No. 4228/10

PLATE - II

DEPTH TO WATER LEVEL MAP
MAHOBA DISTRICT, U.P.
(PRE-MONSOON, MAY-2009)



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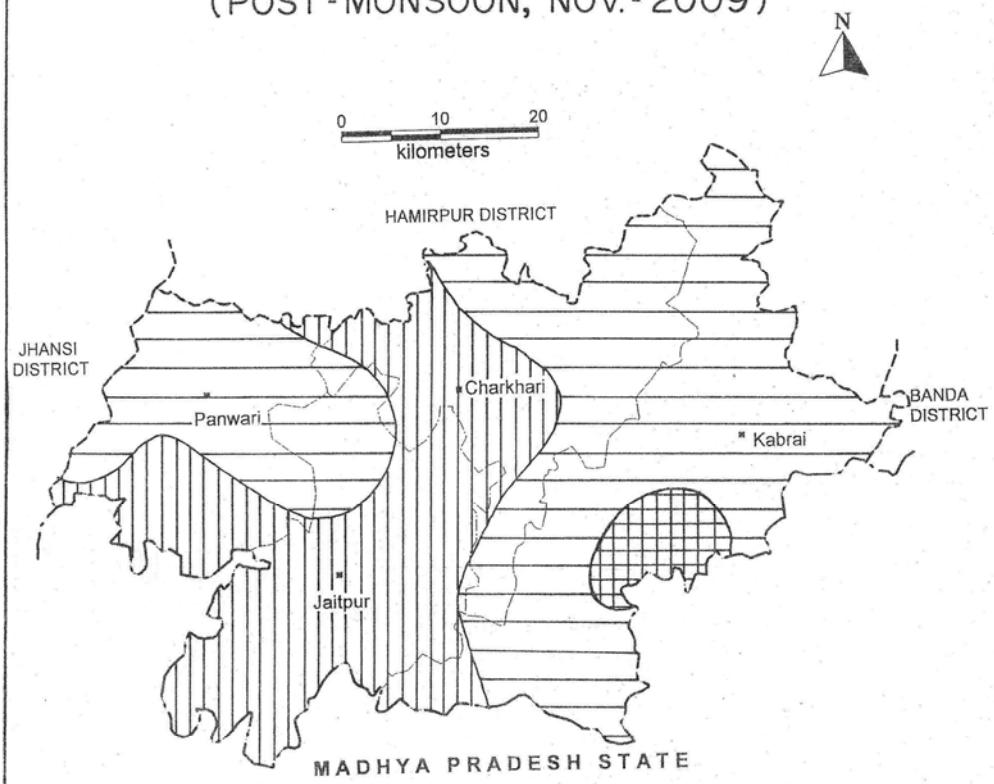
2 – 5	Depth to water in m bgl.
5 – 10	
10 – 20	

CGWB, NR, (RAKESH), Drg. No. 4229/10

PLATE - III

DEPTH TO WATER LEVEL MAP
MAHOBA DISTRICT, U. P.
(POST-MONSOON, NOV.- 2009)



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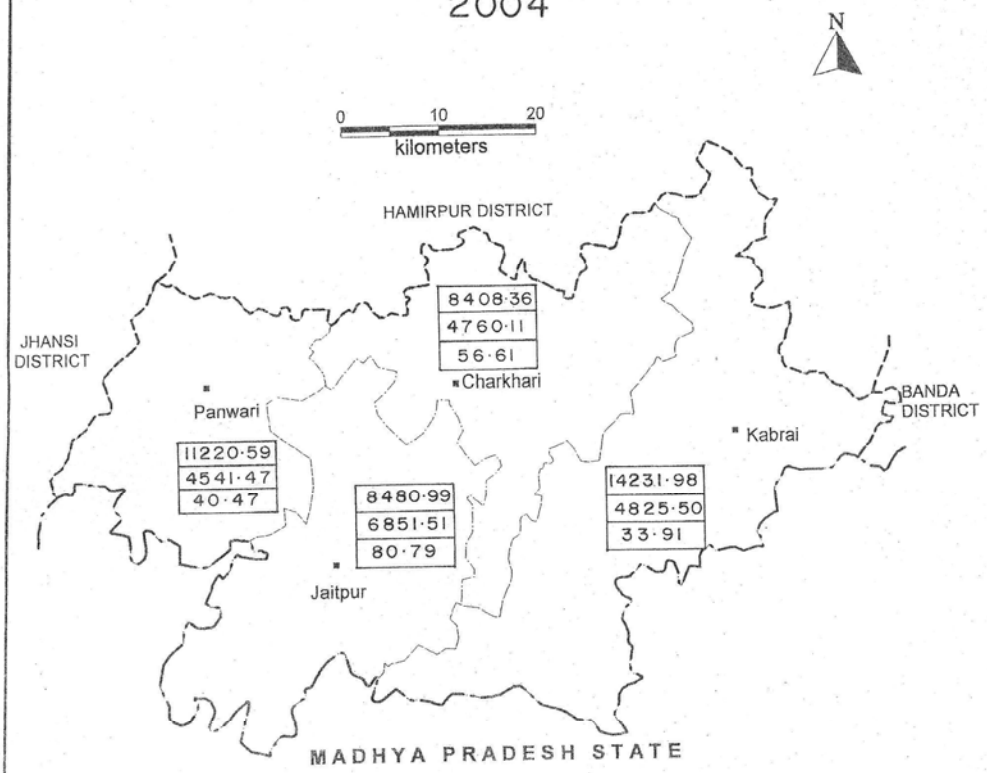
2 - 5	Depth to water in m bgl.
5 - 10	
10 - 20	

CGWB, NR, (RAKESH), Drg. No. 4230/10

PLATE - IV

GROUND WATER RESOURCE AND DRAFT MAHOBA DISTRICT, U.P. 2004



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14231·98	Net groundwater availibility
4825·50	Existing groundwater draft
33·91	Stage of groundwater development

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