

GROUND WATER SCENARIO OF KANNAUJ DISTRICT, U.P.

(A.A.P.:2012-13)

By

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CONTENTS

Chapter	Title	Page No.
	DISTRICT AT A GLANCE2
I.	INTRODUCTION5
II.	CLIMATE & RAINFALL5
III.	GEOMORPHOLOGY & SOIL TYPES6
IV.	GROUND WATER SCENARIO7
V.	GROUND WATER MANAGEMENT STRATEGY9
VI.	GROUND WATER RELATED ISSUE AND PROBLEMS10
VII.	MASS AWARENESS PROGRAMME10
VIII.	RECOMMENDATIONS11

PLATES:

- I. INDEX MAP OF KANNAUJ DISTRICT, U.P.
- II. PRE-MONSOON DEPTH TO WATER LEVEL MAP (MAY, 2007) OF KANNAUJ DISTRICT, U.P.
- III. POST-MONSOON DEPTH TO WATER LEVEL MAP (NOV. 2007) OF KANNAUJ DISTRICT, U.P.
- IV. BAR DIAGRAM FOR KANNAUJ DISTRICT, U.P.
- V. GROUND WATER USER MAP, KANNAUJ DISTRICT, U.P.

DISTRICT AT GLANCE

1. GENERAL INFORMATION

i. Geographical Area (Sq. Km.)	: 2097.00
ii. Administrative Divisions (as on 31.3.2005)	
Number of Tehsil / Blocks	: 3/17
Number of Panchayat Villages	:
iii. Population (as on 2001 census)	: 13,85,227
iv. Average Annual Rainfall (mm)	: 810 mm

2. GEOMORPHOLOGY

Major Physiographic Units	: Older & Younger Alluvium
Major Drainages	: Ganga and Isan

3. LAND USE (Sq. Km.)

a) Forest area (Sq. Km.)	: 134.14
b) Net area sown (Sq. Km.)	: 1447.55
c) Cultivable area (Sq. Km.)	: 1447.55

4. MAJOR SOIL TYPES : Sandy Loam

5. AREA UNDER PRINCIPAL CROPS (as on 2005-06) :

6. IRRIGATION BY DIFFERENT SOURCES

(Areas and Number of Structures) (Sq.Km.)

Dugwells	: 409
Tubewells / Borewells	: 4347 Government 110508 Private
Tanks / Ponds	: 10
Canals	: 162.88
Other sources	: 1.10
Net Irrigated Area	: 1316.72
Gross Irrigated Area	: 1316.72

7. NUMBER OF GROUND WATER MONITORING

WELLS OF CGWB (As on 31-3-2007)

No. of Dugwells	: 11
No. of Piezometers	: Nil

8. PREDOMINANT GEOLOGICAL FORMATIONS :

9. HYDROGEOLOGY

Major water bearing formation	:	Quaternary & Alluvium
Pre-monsoon Depth to water level during 2006 (mbgl)	:	4.00 to 17.68
Post-monsoon Depth to water level during 2006 (mbgl)	:	3.70 to 12.60
Long term water level trend in 10 years (1997-2006) in m/yr	:	0.05 – 1.68

10. GROUND WATER EXPLORATION BY CGWB

(As on 31-3-2007)

No of wells drilled (EW, OW, PZ, SH, Total)	:	EW-3
Depth range (m)	:	160 – 452
Discharge (litres per second)	:	12.66
Storativity (S)	:	9.36×10^{-4}
Transmissivity (m^2/day)	:	1503

11. GROUND WATER QUALITY

Presence of chemical constituents more than : F = 2.05
permissible limit (e.g. EC, F, As, Fe)

12. DYNAMIC GROUND WATER RESOURCES

(2004)-in HAM

Annual Replenishable Ground Water Resources	:	78232.05
Net Annual Ground Water Draft	:	46018.80
Projected Demand for Domestic Industrial uses upto 2025	:	N/A
Stage of Ground Water Development	:	64.76%

13. AWARENESS AND TRAINING ACTIVITY : Nil

Mass Awareness Programmes organized

Date

Place

No. of participants

Water Management Training Programme organized : Nil

Date

Place

No. of participants

- 14. EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING** : Nil
- 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 : Nil
- No of Critical Blocks (semi) : 3
- No of blocks notified : Nil
- 16. MAJOR GROUND WATER PROBLEMS AND ISSUES** : Decline trend in 3 blocks viz. Phagua, Harharpur and Ram Ashram
- Note : Latest available data may be incorporated**

GROUND WATER SCENARIO OF KANNAUJ DISTRICT, U.P.

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I. INTRODUCTION

Kannauj is a newly carved district which came in existence in 1997. This is bounded in the north by Farrukhabad district. On the north-east and east by Hardoi district. On the south by Kanpur and Auraiya district and on the west by Mainpuri district. The river Ganga bounds this district on north-east and east direction and thus separates it from Hardoi district. Kannauj, the historic town is the district headquarters of the present district spread over an area of 2097 sq. km. Co-ordinates are $26^{\circ}45'00''$ to $27^{\circ}15'00''$ and $79^{\circ}27'20''$ to $79^{\circ}57'30''$.

In pursuance of the notification, three tehsils namely Kannauj, Chhibramau and Tirwa were taken out from the then existing Farrukhabad district to form the present new district.

The drainage system of this district is controlled by river Ganga and its tributaries like Ram Ganga, Sot, Kali, Isan, Burhi Ganga, Bagar, Pandu and Arind. The first four tributaries are perennial and the next being ephemeral.

II. CLIMATE & RAINFALL

The average annual rainfall is 799.11 mm. The climate is sub-humid and is characterized by a hot summer and general dryness except in the south-west monsoon. About 90% of rainfall taken place from June to September. During monsoon surplus runoff is available for artificial recharge. May is the hottest month of the year. The mean daily maximum temperature in May is 41.7%, mean daily minimum

temperature is 27.2⁰C. January is the coldest month with mean daily maximum temperature at 22.8⁰C and the mean daily minimum as 8.6⁰C.

During monsoon season, the relative humidity is high and in summer season it is less. The mean monthly relative humidity is 69%. Winds are generally light winds, straightly force during summer and early monsoon season. The mean wind velocity is 9.6 km/hr.

Potential evapotranspiration is 1660.90 mm.

III. GEOMORPHOLOGY & SOIL TYPES

Kannauj district forms a central part of Indo-Gangetic alluvial plain. The cis-Ganga area exhibits a flat topography with a few gentle undulation and slopes. The elevation of plain, in general ranges between 138 and 155 meters also mean sea level. The gradient of the plain is very gentle and its slope is in south-east direction. Following geomorphic units have been identified.

1. Meander Flood Plain
2. New Alluvial Plain
3. Older Alluvial Plain

SOIL CHARACTERISTICS:

The soils of the district are typical of those found in Ganga alluvial plain and can be grouped in to three main classes depending on their compositional characteristics.

1. Dumat or Loam
2. Matiyar or Clay
3. Bhur or Sand

IV. GROUND WATER SCENARIO

4.1 Hydrogeology:

The district is occupied by the Ganga alluvium of the Quaternary age, which consist of mainly fine to coarse sands, gravels, silt, clay and kankars. The granular zones consisting of different grades of sands and gravels form the multi aquifer system in the area. Shallower aquifers are generally of unconfined nature where as the deeper aquifers are of semi-confined to confined nature. The clay beds are generally acting as the confining layers.

Depth to Water Level:

In phreatic aquifer, the depth to water level mainly depends on the local geomorphology, sub surface geological configuration, rainfall and recharge from surface water bodies / irrigation water. In general, the depth to water level in the entire district varies from 4 mbgl to 17.68 mbgl in premonsoon season. In postmonsoon season it varies from 3.70 to 12.60 mbgl. Along Kanpur branch canal the water level have been observed shallow 3 to 4 mbgl during postmonsoon. In Talgram area deepest water level 18.47 mbgl have been observed. At the bank of Ganga the depth to water level 6.83 to 12.60 mbgl have been observed.

Long Term Water Level Trend:

The long term water level trend for 10 years (1998-2007) shows a slight declining trend of water level in almost all the blocks except Talgram and Umarda blocks. At present the depletion of water level is although not much significant varying from 0.0805 to 0.2745 m/year. This is certainly a caution for planners to be vigilant in future planning of the ground water development.

The deep tubewells have been constructed upto 445 m. depth by C.G.W.B. The yield have been observed 2595 lpm to 3705 lpm. The drawdown varies from 8.78 to 24.35 m. The transmissivity of the tubewell varies 735 to 6845 m²/day. The storativity varies from 1.10×10^{-4} to 9.36×10^{-4} .

4.2 Ground Water Resources:

As per report on dynamic ground water resources of Uttar Pradesh as on 31-03-2009, annual ground water availability of the district is 64125.17 ham. The gross ground water draft for all uses is 43926.59 ham. Net ground water availability for future irrigation development is 19536.60 ham. The stage of ground water development is 68.50%. As per the estimates worked out all the blocks are in safe category except three viz. JBaragaon, Kannauj and Chirgaon blocks which are in semi critical category and one block Jalalabad is in overexploited category.

4.3 Ground Water Quality:

The ground water in phreatic aquifers in general is colourless and odourless. Electrical conductance ranges from 470 to 1648 $\mu\text{s}/\text{cm}$ at 25⁰C. 33.3% of samples have high fluoride exceeding permissible limit of 1.5 mg/l and 33.3% of water samples analysed have high nitrate more than 45 mg/l, which is the permissible limit.

High fluoride is due to micaceous flakes, which are associated with soil, where as nitrate pollution is due to the use of fertilizers for agriculture and improper waste disposal. It is observed that ground water is suitable for all purposes. Phosphate is found nil in ground water. The trace elements Cu, Fe, Zn, Mn, Ni, Pb and Cr are within the permissible limit.

4.4 Status of Ground Water Development:

In all blocks of the district ground water development takes place through dug wells, bore wells and state tubewells. The relevant details are as below:

Sl. No.	Type of Structure	Number	Depth Range (mbgl)	Yield (lpm)
1.	Dugwells	409	5.50 – 25.00	-
2.	State Tubewells	4337	100 – 150	1300 – 1500
3.	Private Tubewells	110508	50 – 100	200 - 600

The shallow dug wells are found in canal command area and the deeper one are located along the Ganga river. The wells generally meet out the domestic and irrigation requirements. Maximum number of state tubewells are in Talgram block i.e. 1644 and the minimum numbers are in Umarda block that is zero. It can irrigate 445

to 218 hectare land. Three blocks namely Kannauj, Gugarpur and Saurikh where the ground water is the only source of irrigation. Maximum area irrigated through canal is in Hasenan block that is 5345 hectare and the minimum in Jalalabad block that is 102 hectare.

Drinking water tubewells have been constructed by Central Ground Water Board under exploration programme in urban / rural areas. Depth of drinking water tubewells varies from 160 to 450 mbgl. The total four no. of tubewells have been constructed in this district. The yield of these tubewells varies from 2500-3700 lpm and the drawdown ranges from 9-24 m. The transmissivity varies from 735-6845m²/day.

V. GROUND WATER MANAGEMENT STRATEGY

5.1 Ground Water Development:

The stage of ground water development in the district is 68.50%. The maximum stage of ground water development is in Tal Gram Block (122.08%) and minimum storage is in Saurikhblock(48.79%). All four blocks namely Chhibramau, Hasenan, Umarda and Saurikh are in safe category. Hence, these blocks have good scope for further ground water development through tubewells in marginal alluvial plain.

Three blocks namely Jalalabad, Kannauj and Talgram are in semi critical stage where ground water development have reached upto 122.08% which warns for judicious use of ground water by adopting proper artificial recharge techniques.

5.2 Water Conservation Structure and Artificial Recharge:

The district has wide scope for artificial recharge due to occurrence of deep water level conditions (> 6 mbgl) in about 50% of the total district area. Even during premonsoon period mostly the dugwells dries in Talgram, Chhibramau and Jalalabad blocks.

The construction of sub surface dyke com check dams is feasible at Isan Nadi at different places of Talgram blocks and adjacent areas.

The construction of dyke may be made by using polythene sheet filled up with local material. The place for sub surface dykes may be chosen very carefully so that the purpose of arresting the base flow is achieved with low cost.

VI. GROUND WATER RELATED ISSUE AND PROBLEMS

In canal command area where water level rest within 4 mbgl round the year, conjunctive use of ground water with surface water should be promoted by exploiting ground water through shallow borings at the tail end area where canal water does not reach. It will help in lowering the ground water levels and ultimately checking the salt infestation and formation of 'Reh'.

6.1 Drilling Problems:

During exploratory drilling in this area tubewells have been constructed up to 450 m depth. In some areas quality problem have been encountered in IInd aquifer zone. By techniques of cement sealing fresh water have been provided to the inhabitant of the area. The deep aquifers are productive and yield good discharge.

6.2 Risk to Natural Disaster:

The district lies in the belt of drought prone regions of Uttar Pradesh. The life of the inhabitants becomes miserable when the water supply sources like dugwells, tanks, ponds etc. get dry due to failure of monsoon.

VII. MASS AWARENESS PROGRAMME

Nil.

VIII. RECOMMENDATIONS

- (a) Construction of tubewell with the help of land-sat imageries and hydrogeological investigation.
- (b) Construction of sub surface dams in selected area to check the discharge into major and minor rivers.
- (c) Construction of small tanks and reservoirs at suitable sites particularly in run-off zones.
- (d) Construction of small check dams and bunds in major and minor nalas to check flow and to recharge the ground water body.
- (e) Planned development of surface water irrigation system e.g. canals and lift canals etc. Promotion of such schemes will facilitate the local farmers in agriculture and also recharge ground water body.
- (f) Promotion of modern techniques of drip irrigation and sprinkler irrigation for cash and high input crops in the undulating agriculture areas with the basic aim of judicious scientific utilization of irrigation water.
- (g) The conjunctive use of available surface water and ground water resources needs to be intensified in the area.

INDEX MAP OF KANNAUJ DISTRICT, U. P.

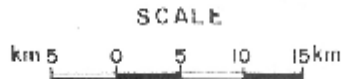
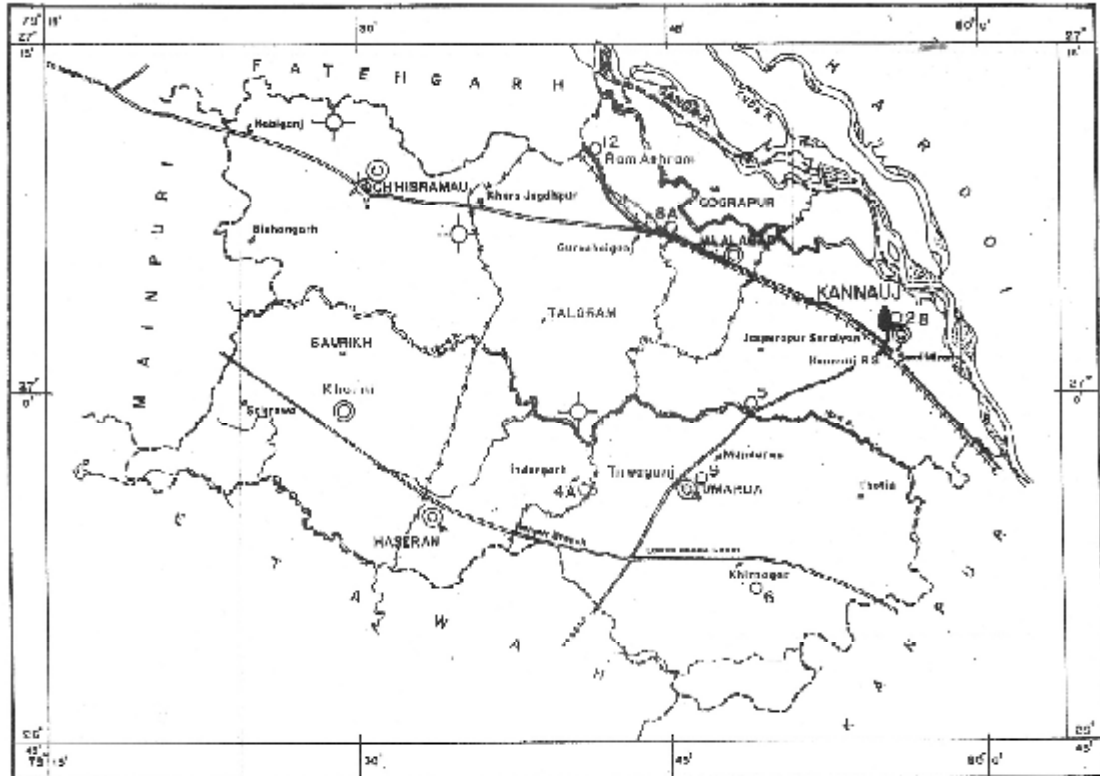


PLATE - 1
Part of Topo Sheet No. 24 M 52



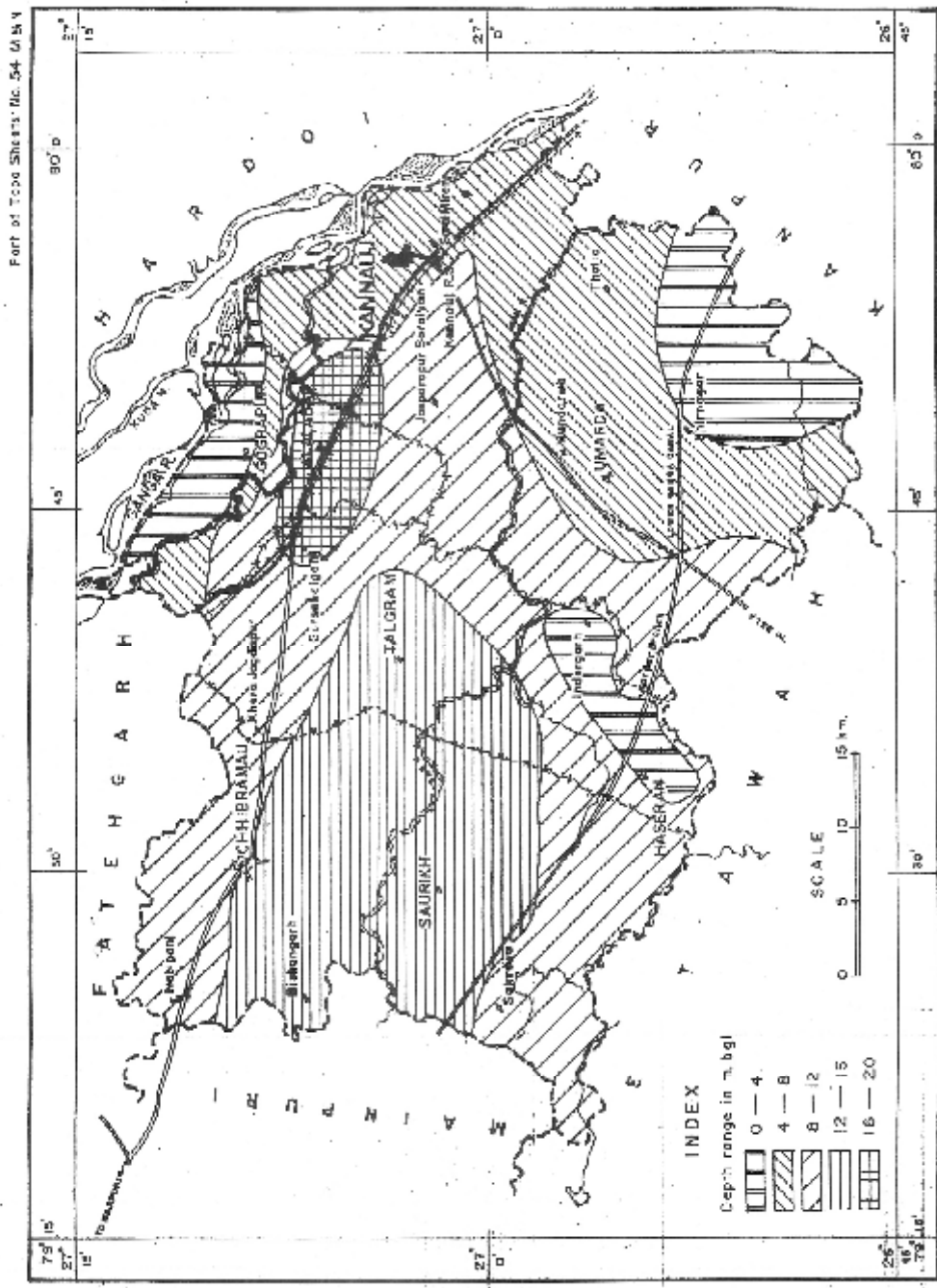
CCWB, NR, (RAKESH), Drg. No. 4069/10, 4755/13

INDEX

- 6A National Hydrograph Station
- Exploratory well
- Piezometer
- Road
- Railway line

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

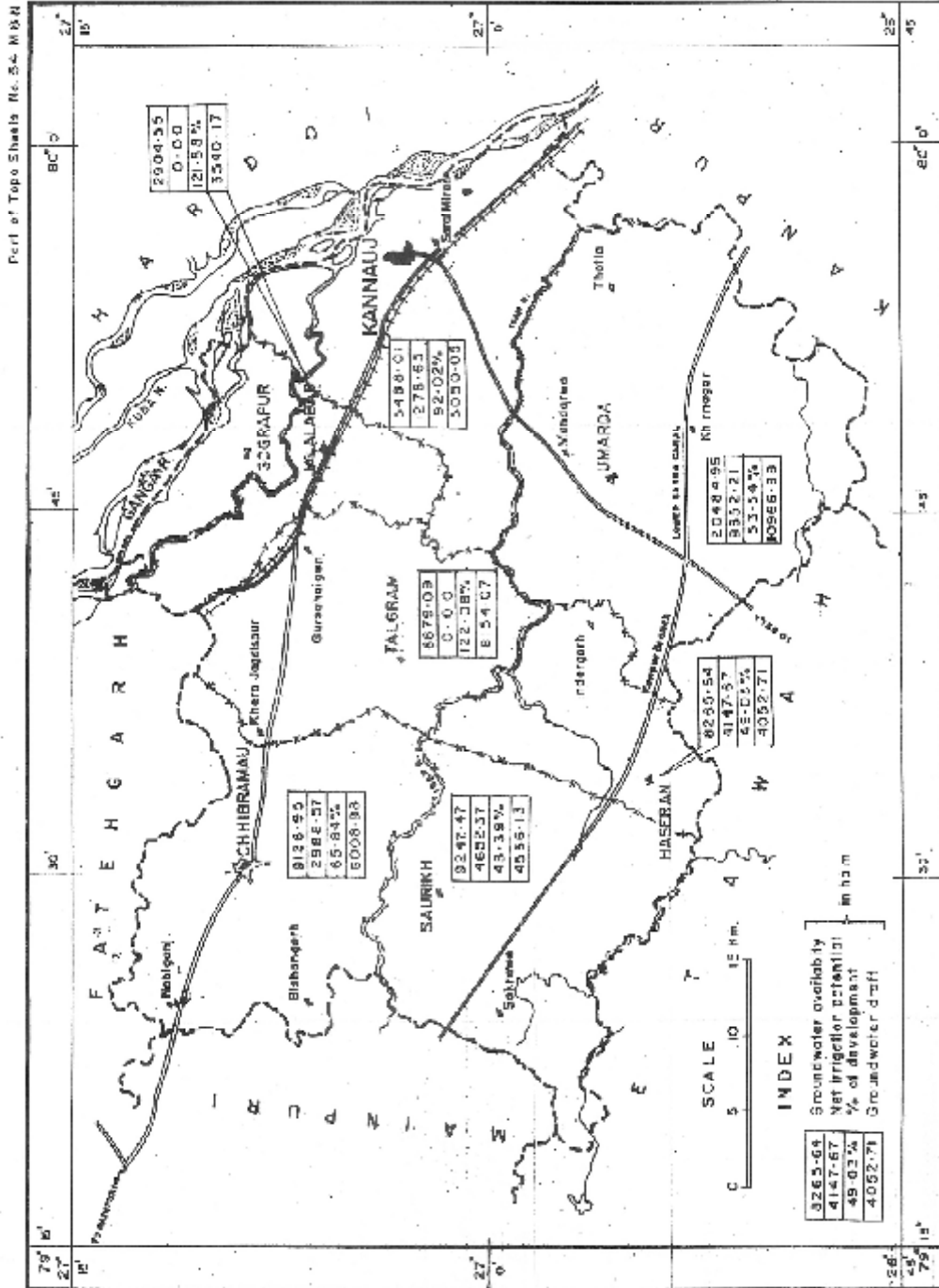
(POST MONSOON, NOV - 2012)



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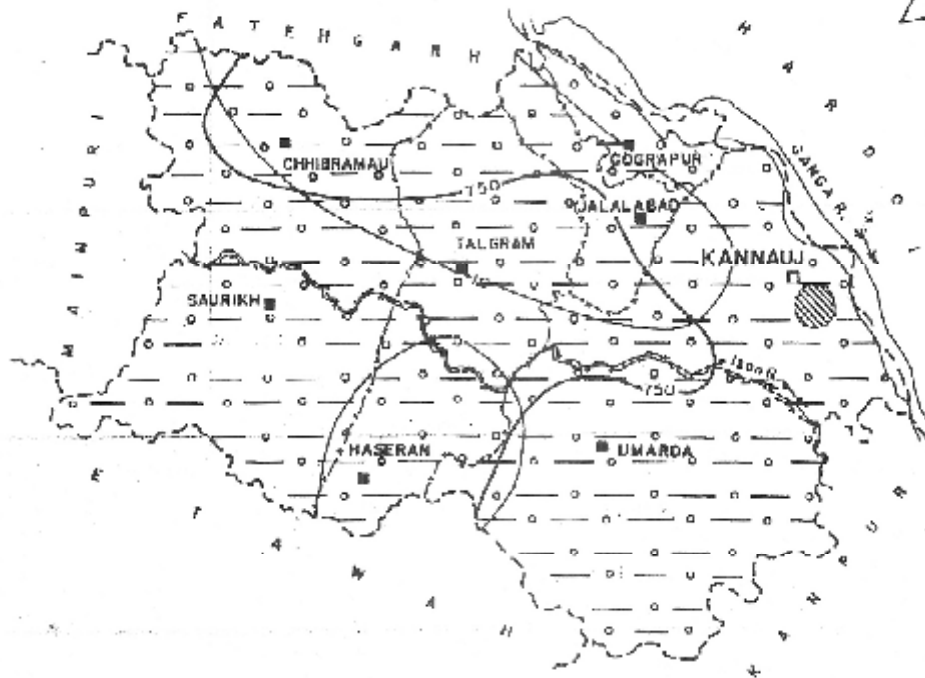
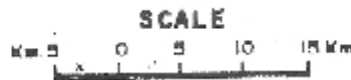
C. G. W. B. (P. R.), (KMS), Drg. No. 1012/2002, IN. 2-hancrsl Drg. No. 4757/12

DYNAMIC GROUNDWATER RESOURCES MAP, KANNAUJ DISTRICT, U.P.



S. K. B., M. R., (A&S), D. 3-11-2002, IN Chandra | Cr. No. 4758 / 13

GROUND WATER USER MAP KANNAUJ DISTRICT, U.P. (Freshwater Year-2008)



LEGEND

	WELLS FEASIBLE	RIGS SUITABLE	DEPTH OF WELL (M)	DISCHARGE (LPM)	SUITABLE ARTIFICIAL RECHARGE STRUCTURES*
Soft Rock Aquifer		Manual / Hand boring set	10 - 30	50 - 100	Recharge Shaft, Recharge Pit, Abandoned Hand-pumps / Tubewells, Roof Top Rain Water Harvesting Structures in urban areas.
		Rotary Rigs (Direct/Reverse)	30 - 100	1000 - 2000	
		Rotary (Direct)	100 - 450**	2000 - 3000	
Depth to Water level in m (Pre-monsoon decadal mean, 1993-2002)		Electrical Conductivity (Micromhos/cm at 25° C)		Nitrate > Permissible limit (100 ppb)	

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* Applicable in alluvial area where depth to water level is > 8 m
** Limited upto depth explored i.e. deeper prospects yet to be found.