

# GROUND WATER BROCHURE OF BIJNOR DISTRICT, U.P.

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

By

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## BIJNOR DISTRICT AT GLANCE

### 1. GENERAL INFORMATION

i. Geographical Area (Sq. Km.)	:	4561
ii. Administrative Divisions (as on 31.03.2006)	:	
Number of Tehsil/Block		5/11
Number of Panchayat/Villages		2989
iii. Population (as on 2001 census)	:	
Male		1651908
Female		1479711
Total		3131619
Schedule Caste		655806
Schedule Tribe		2427
Population Density (persons/sq.km.)		687
iv. Average Annual Rainfall (mm)	:	1118.3

### 2. GEOMORPHOLOGY

Major Physiographic Units	:	5 (Sand bars, Flood plain alluvium, Younger alluvial plain, Older alluvial plain & piedmont plain)
Major Drainages	:	Ganga, Ram Ganga & its tributaries

### 3. LAND USE (Hectares)

a) Forest area	:	54927
b) Net area sown	:	339349
c) Gross Sown Area	:	448626

### 4. MAJOR SOIL TYPES

:	4 (i) Bhur or Sandy Soil
	(ii) Bhur Sawai or Sandy Loam Soil
	(iii) Sawai or Loam Soil
	(iv) Matiyar or Clayey Soil

5. AREA UNDER PRINCIPAL CROPS (hectares)	:	Paddy – 55645 Wheat – 114543
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### 6. IRRIGATION BY DIFFERENT SOURCES

(Areas and Number of Structures) (ha)

By Canal      Length: 397 Km. / Irrigated Area: 11699 (ha)

State Govt. T/W    Nos.: 397 Km. / Irrigated Area: 3660 ha.

	Private T/ W Nos.: 86894 Km. / Irrigated Area: 200208 ha.	
	Net Irrigated Area	: 297677 ha.
	Gross Irrigated Area	: 387139 ha.
<b>7.</b>	<b>NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-3-2012)</b>	
	No. of Dugwells	: 09
	No. of Piezometers	: 02
<b>8.</b>	<b>PREDOMINANT GEOLOGICAL FORMATIONS</b>	: Alluvium
<b>9.</b>	<b>HYDROGEOLOGY</b>	
	Major water bearing formation	: Sand of various grades clay gravel & kankar.
	Pre-monsoon Depth to water level during 2012	: 3.33-17.92 mbgl
	Post-monsoon Depth to water level during 2012	: 2.46-18.10 mbgl
	Pre monsoon Long term water level trend in 10 years (2003-2012) in m/yr	: Rise in 4 wells( 0.03-0.16) Fall : Nil
	Post Monsoon long term water level trend in 10 years(2003-2012) in m/yr	: Rise in 3 wells (0.05-0.18) Fall in1 well (0.08)
<b>10.</b>	<b>GROUND WATER EXPLORATION BY CGWB (As on 31-3-2012)</b>	
	No of wells drilled	: EW-20, PZ-2, SH-1
	Depth range (m)	: 79-402 mbgl
	Discharge (litres per second)	: 10-62
	Storativity (S)	: $1.30 \times 10^{-4}$ to $7.09 \times 10^{-4}$
	Transmissivity (m <sup>2</sup> /day)	: 10 to 4280 m <sup>2</sup> /day
<b>11.</b>	<b>GROUND WATER QUALITY</b>	
	(a) Shallow Aquifers:	
	Electrical Conductivity EC (microsiemens/cm) at 25 <sup>0</sup> C	: 330-1250
	Chloride Cl (mg/l)	: 4-170
	Bicarbonate HCO <sub>3</sub> (mg/l)	: 159-305
	Fluoride F (mg/l)	: 0.03-0.54
	Nitrate NO <sub>3</sub> ( mg/l)	: 0.0-77
	(b) Deeper Aquifer:	
	Electrical Conductivity EC (microsiemens/cm) at 25 <sup>0</sup> C	: 195-740
	Chloride Cl (mg/l)	: 7-64
	Bicarbonate HCO <sub>3</sub> (mg/l)	: 110-360
	Fluoride F (mg/l)	: 0.1-0.8
	<i>All constituents within permissible limits</i>	
<b>12.</b>	<b>DYNAMIC GROUND WATER RESOURCES (ham)</b>	

<b>as on 31/03/2009</b>		
	Annual Ground Water Recharge	: 148898.05
	Net Ground Water Availability	: 136487.68
	Existing Ground Water Draft	: 85161.82
	Net Ground Water Availability For Future Use	: 48346.34
	Stage of Ground Water Development	: 60.40 %
<b>13.</b>	<b>AWARENESS AND TRAINING ACTIVITY</b>	: Nil
<b>14.</b>	<b>EFFORTS OF ARTIFICIAL RECHARGE &amp; RAINWATER HARVESTING</b>	: Technical guidance rendered to state govt. as and when required.
<b>15.</b>	<b>GROUND WATER CONTROL AND REGULATION</b>	:
	Number of OE Blocks	: Nil
	No of Critical Blocks	: 1 Noorpur
	No of Semi Critical Blocks:	2 Jalilpur&Seohara
	No of blocks notified	: Nil
<b>16.</b>	<b>MAJOR GROUND WATER PROBLEMS AND ISSUES</b>	: - Heavy exploitation ground water in Noorpur, Jalilpur, & Seohara Blocks Water Level Decline in Noorpur,Jalilpur,& Seohara Blocks

# **GROUND WATER BROCHURE OF BIJNOR DISTRICT, U.P.**

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

*By*

**A.K.Budhaliya**

Scientist'D'

## **1.0 INTRODUCTION**

Bijnor district covers an area of 4561 sq. km. & forms a part of Central Ganga Plain and is underlain by quaternary sediments. The district is administratively divided into 5 tehsils namely Najeebabad, Bijnor, Nagina, Dhampur & Chandpur and further subdivided into 11 development blocks (Plate-I) vis a vis Najeebabad, Kiratpur, Mohmadpur Deomal, Haldaur, Khari Jhalu, Kotwali, Afzalgarh, Nehtaur, Allahepur, Burhanpur, Seohara, Jalilpur & Noorpur, There are 2989 villages in district out of which 2148 villages are habitated.

The total population of the district is 3131619 as per 2001 census. Out of which 1651908 (52.7%) are male and 1479711 (47.3%) are female. Total population of schedule caste is 655806 (21%). Population density is 687 persons / sq. km. The decennial population growth is 28.82%.

The Bijnor district forms a part of Indogangetic alluvium sloping towards south. The drainage system of the district is controlled by the Ganga, Ramganga & its tributaries viz. Malin River, Choyyia Nadi, Khoh River, Phika Nadi, Ban & Gangan Nadi.

Ground water is the main source of irrigation in the district as 96% of net sown area is irrigated through ground water resources by means of shallow / deep tubewells. Rest 4% net area sown is irrigated through surface water resources by means of canals. The reported area is 464578 ha. out of which net sown area is 339349 (73%). The total forest area is 54927 ha (11.8%). The maximum utilization of land for cultivation is in Noorpur (89.5%) block and minimum is in Najeebabad block (44.2%). The area sown more than once is 109277 ha & total gross sown area is 448626 ha. The cropping intensity is 132.12% in the district. The Rabi & Kharif are

the main harvest. The principal Rabi crop is wheat followed by Paddy, Barley, Maize & Millet. Kharif crops are Paddy, Maize, Millet, Sugarcane & Pulses.

Systematic hydrogeological surveys were carried out by Shri S.K. Bansal Assistant Hydrogeologist in the A.A.P. 1980-81 & 1981-82. After that reappraisal surveys were carried out by S/Shri Sunil Kumar Scientist 'B' & R.K. Rajput Assistant Hydrogeologist during A.A.P. 1991-92 ground water management studies were carried out S/Shri Arun Kumar Scientist 'B' & Sant Lal Scientist 'B' in the A.A.P. 2007-08. Ground water exploration was carried out in phases in the year 1992-93, 1993-94, 2002-03 & 2005-06. Total number of 24 exploratory wells were constructed during the above period.

## **2.0 RAINFALL & CLIMATE**

The annual normal rainfall (1951-1980) of the district is 901.00 mm. The maximum rainfall occurs during monsoon period is June to September having normal value of 763.10 mm which is 84.6% of the annual rainfall. August is the wettest month having the normal rainfall of 332.20 mm followed by July with normal rainfall of 248.00 mm. Average number of rainy days is 38.

Climate of the district is subhumid and characteristic vegetation is grassland. The monthly Precipitation Index (P.E.) is 43.074. The hottest month is June with average mean temperature of 32.85<sup>0</sup>C. The coldest month is January with average mean temperature of 14.2<sup>0</sup>C. The average annual humidity is 66.7%. The normal annual wind speed is 6.7 Km/hr.

## **3.0 GEOMORPHOLOGY & SOIL TYPES**

Being a part of Indogangetic alluvial plain, the area is almost flat alluvial plain with master slope towards south. The maximum elevation is 306 mamsl in the north and minimum elevation is 210 mamsl in the south. The main feature that dissects the flat alluvial tracts are the rivers. The river valleys are of varying width and are at lower levels than the main uplands. Due area can be divided into 5 units namely, sand

bars, flood plain alluvium, younger alluvial plain, older alluvial plain & piedmont plain.

Soils are essentially a mixture of organic matter called hums and inorganic particles derived from weathering of rocks. Soils of Bijnor area is of 4 types namely (i) Bhur or Sandy soil (ii) Bur Sewai or Sandy loam soil (iii) Sawai or loam soil & (iv) Matiyar or clayey soil. In general or high grounds of upland areas, the soil is of sandy loam soil type and often it is pure sand. On level stretches it is a mixture of sand and clay i.e. from sandy loam to loam. In low areas Khadar/depression it is silty loam to silty clay. Here the sand disappears leaving argillaceous clay locally known as Matiyar.

#### 4.0 GROUND WATER SCENARIO

##### 4.1 GEOLOGY:

The major part of the district is underlain by alluvial sediments of quaternary period deposited by drainage system of river Ramganga & Ganga. The Siwalik system of formation belonging to tertiary period are exposed in the extreme north-western part of the district in the Najeebabad block. The general stratigraphic sequence of the area is given as under:

Period	Formation	Lithology	Age
Quaternary	Alluvium	Sand of various grades clays & kankar.	Recent
	Terai	Alternate bands of sand & clays.	
	Bhabhar	Boulder, pebbles, sand & thin clays intercalation	
-----Disconformity-----			
Tertiary	Upper Siwaliks	Greywaeke & conglomerates	Lower Pleistocene to Lower Pliocene
	Middle Siwaliks	Shale sand & greywaeke	Lower Pliocene to upper miocene

##### 4.2 SUBSURFACE GEOLOGY:

To study the subsurface geology and layout of the aquifers, lithological logs, electrical logs of exploratory tubewells of CGWB and state departments have been



studies & fence diagram has been prepared which reveals the aquifer geometry down to 450 meters depth. Fence diagram reveals two major clay layers one occurring at a depth of 80-90 metres and other at 250 metres. Thickness of first clay layer is 8-10 metres while the second clay layer is of 25 metres. Three tier aquifer system exists in the area. The formation encountered are sands of various grades clay & kankar. The aquifer material is sand fine to coarse grained with occasional gravels. The aquifer group are as follows (Table-1)

Table-1

**AQUIFER GROUP & ITS DEPTH RANGE**

<b>Sl. No.</b>	<b>Aquifer Group</b>	<b>Depth Range</b>
1.	First Aquifer (Top)	00.00-110.00
2.	Second Aquifer (Middle)	120.00-250.00
3.	Third Aquifer (Bottom)	270.00-450.00

First and second aquifers are most productive and most of the state government tubewells has been constructed in the first aquifer which are yielding 1500-2000 lpm at a reasonable drawdown. The second and third aquifer are also productive and discharge upto 3000 lpm can be obtained at moderate drawdown from these aquifers. The occurrence of thin clay lenses within these aquifers are quite common. In the central part of the district frequent occurrence of clay within the second and third aquifer has been observed. This may be due to the migration of two important drainage system, the Ganga & Ramganga which are responsible for deposition of alluvial sediments. The Ganga System has deposited coarser sediments in the western part of the district. Hydrogeological details of the tubewells constructed by CGWB are enclosed as Annexure-I.

**4.3 OCCURRENCE & MOVEMENT OF GROUND WATER:**

The ground water over the district occurs under unconfined state in shallow aquifers while in deeper it is under semiconfined to confined state. To study the movement of ground water over the district, water table contour map draw based on observation of shallow wells ranging in depth between 5 and more than 30 metres indicate regional ground water flow to the south. The slope of water table is steeper in the northern part of the district (4.5 m/km.) while further south it is much flatter

(0.62 m/km.). The highest elevation of water table is over 300 mamsl in the northern part while around 210 mamsl in the southern part .

#### **4.4 DEPTH TO WATER LEVEL:**

The Central Ground Water Board as well as state ground water department have established number of permanent hydrograph stations in Bijnor district to monitor the water level behavior in space and time. All these wells are periodically measured. Based on the available data depth to water level map has been prepared (Plate-II). A perusal of the map indicate that the water level in the district varies between 3.33 to 17.92 mbgl during premonsoon period. Deepest water level ( more than 15 mbgl ) occurs in the eastern part of Ganga river and in Muhammadpur block. The water level between 10 to 15 mbgl occurs in parts of Jalilpur, Haldaur, Mohamadpur Deomal Kiratpur and Njibabad blocks. Water level between 5 to 10 mbgl occurs in parts of Noorpur, Nehtaur and Kotwali blocks. Shallow water level less than 5 metres has been observed in parts of Seohara, Dhampur, Afjalgarh and Kotwali blocks.

The post monsoon water level data of same stations shows that water level varies between 2.46 to 18.10 mbgl (Plate-III). During this period shallowest water level less than 5 metres occur in eastern part, both sides of river Khoh & in the central part of the district in parts of Seohara, Dhampur, Afjalgarah and eastern part of Njibabad blocks.

#### **4.5 SEASONAL & LONG TERM FLUCTUATIONS:**

The water level data of Ground Water Monitoring Wells of CGWB in year 2012 reveals that during premonsoon period depth to water level varies between 3.33 to 17.92 mbgl and during post monsoon period it varies between 2.46 to 18.10 mbgl. The seasonal fluctuation varies between -1.82 to 1.08 metres. The data of of Ground Water Monitoring Wells of CGWB are given below in table 3.

Table-3

**SEASONAL FLUCTUATION IN THE YEAR 2012**

<b>Sl. No.</b>	<b>Well Name</b>	<b>Premonsoon (mbgl)</b>	<b>Postmonsoon (mbgl)</b>	<b>Fluctuation (m)</b>
1.	Bijnor Pz GWD	12.15	11.75	0.40
2.	Chandok	17.92	18.10	-0.18
3.	Dhampur	3.86	3.15	0.71
4	Kaziwala	3.33	2.46	0.87
5.	Milak Beniram	4.96	3.88	1.08
6.	Najeebabad New	4.22	3.18	1.04
7.	Ratanpur Riyaya Pz GWD	10.85	11.22	-0.37
8.	Saratkhal	4.62	4.98	-0.36
9.	Shahzadpur or Nagal	16.18	18.00	-1.82
10..	Snel Road Railway Stn.	9.13	8.30	0.83
11.	Swaheri Khurd	8.00	9.80	-1.80

For long term water level trends, the existing Ground Water Monitoring Wells of CGWB were analyzed from the year 2003 to 2012. Out of 11 Ground Water Monitoring Wells only 4 wells have required data points for long term trend analysis. During pre-monsoon all these wells showing rising trends from 0.03 to 0.16 m/year period while during the post monsoon period three wells are showing rising trend 0.05 to 0.18 m/year and one well Sheh Road Railway Station showing falling trend 0.08 m/year.

**4.6 GROUND WATER RESOURCES:**

To facilitate the ground water development, the ground water development, the ground water resources have been estimated by CGWB considering the norms of ground water estimation committee in consultation with state ground water department and are as follows:

Table-4

**DYNAMIC GROUND WATER RESOURCES OF BIJNOR DISTRICT**  
As on 31.03.2009

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	2	3	4	5	6	7	8
1.	Afzalgarh	20578.08	19549.18	8346.28	10955.59	42.69	Safe
2.	Dhampur (Allehpur)	9998.66	8998.79	5416.44	3340.64	60.19	Safe
3.	Haldaur (Khari Jha)	12345.24	11110.72	7354.99	3517.81	66.20	Safe
4.	Jalilpur	13021.22	11719.10	10751.16	718.01	91.74	Semi Critical
5.	Kiratpur	6603.71	5943.34	4284.35	1457.45	72.09	Safe
6.	Kotwali	29010.56	27560.03	11002.28	16109.71	39.92	Safe
7.	Mohd. Pur Deomal	14359.78	12923.80	8192.99	4457.80	63.39	Safe
8.	Najibabad	15258.84	13732.96	6889.69	6456.43	50.17	Safe
9.	Nehtaur (Aku)	6856.60	6170.94	5224.04	790.40	84.66	Safe
10.	Noorpur	11699.70	10529.73	9847.85	313.60	93.52	Critical
11.	Seohara (Budhanpur)	9165.66	8249.09	7851.75	228.90	95.18	Semi Critical
	<b>Total</b>	<b>148898.05</b>	<b>136487.68</b>	<b>85161.82</b>	<b>48346.34</b>	<b>62.40</b>	

Categorization of blocks has been shown in Plate-IV.

#### 4.7 GROUND WATER QUALITY:

Ground water in phreatic aquifers, in general, is colourless, odourless and slightly alkaline in nature. The specific electrical conductance ranges from 330 to 1250  $\mu\text{s}/\text{cm}$  at 25<sup>0</sup>C.

It is observed that the ground water is suitable for drinking and domestic uses in respect of all constituents except nitrate. The value of nitrate ranges from 0.00 to 77 mg/l. The high concentration of nitrate is recorded in Bijnor BDO Office. The high content of nitrate may be due to use of excess fertilizers in agriculture fields and other improper waste disposal. Phosphate is not detectable in analysed water sample. Fluoride is within the permissible limit 1.5 mg/l.

The Arsenic content ranges from ND to 19 micro gm/l in the ground water of the district. The trace metals are within the limit of permissibility of BIS in the ground water of the district.

#### **4.8 STATUS OF GROUND WATER DEVELOPMENT:**

Overall status of ground water development in Bijnor district is 62.40%. One block Noorpur falling in the Critical category which has stage of ground water development 93.52%. Two Blocks namely Seohara( Budhanpur) & Jalilpur falls under Semi Critical Category which have stage of ground water development 91.74% & 95.18% respectively. Rest Eight Blocks are in Safe category.

Most of the tubewells by the state departments & other user agencies have been constructed in the first aquifer & their depth ranges between 54-112 mbgl. The discharge of these wells ranges between 1500-2000 lpm for a drawdown of 4-7 metres. CGWB has constructed 23 tubewells down to depth of 450 metres and discharge varies between 2000-3000 lpm for a drawdown of 8-10 metres. In Bhabhar area drawdown ranges between 20-30 metres. Hydrogeological map is enclosed as Plate-V.

#### **5.0 GROUND WATER MANAGEMENT STRATEGY**

Based upon the studies carried out it is observed that water level is declining very fast in the district and it is strongly recommended that exploitation of ground water through private and state shallow tube wells be minimized in the critical block Noorpur and Semicritical blocks Jalilpur & Seohara. The declining water level have caused adverse effect on the ecological balance as minor drainage ways which used to have water are now almost dry. This obviously is the result of massive ground water exploitation for irrigation as well as for industries need in these three blocks. Dug wells have become defunct due to lowering of water table. It is therefore suggested that piezometers should be constructed down to 40 metres depth to monitor water levels where the dugwells are defunct. Exploitation of deeper aquifers be made in systematic manner which are capable of yielding good water at moderate drawdowns.

Rainwater harvesting techniques be adopted in the areas where the depth to water level is more than 8 metres. In the rural areas rainwater harvesting through Gally Plug, Gabion Structures, Percobtion Tanks, Check Dam / Cement Plug / Nala Bund, Recharge shaft, Dugwell Recharge and Ground Water Dams / Subsurface Dykes can be taken up. In these areas rainwater harvesting be taken up considering water shed as a unit. In addition to above techniques surface spreading techniques are quite common in this areas.

## **6.0 GROUND WATER RELATED ISSUES AND PROBLEMS**

As such no water logged area exist in the district shallow water level occurs less than 5 metres occurs on the both side of Khoh river, in the northern part of Najeebabad block & eastern part of Afzalgarh blocks along the canals.

In the Noorpur Block level of development is 93.52% and most of dugwells have become dry. The withdrawal of ground water is through different types of hydraulic structures. Large number of shallow and deep tubewells within 100 metres depth are responsible for the withdrawal. Ground water levels are very deep in the flood plain areas in this block.

In addition to Nooorpur block, water level decline has been reported in Seohara & Jalilpur blocks.

## **7.0 AWARENESS & TRAINING ACTIVITY**

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

Nil.

### **7.2 PARTICIPATION IN EXHIBITION, MELA, FAIR ETC.:**

Nil.

### **7.3 PRESENTATION & LECTURES DELIVERED IN PUBLIC FORUM:**

Nil.

## **8.0 AREA NOTIFIED BY CGWA/SGWA**

Nil.

## **9.0 RECOMMENDATIONS**

Keeping in view, the present hydrogeological setup it is strongly recommended that further ground water development through private works in the blocks Noorpur, Jalilpur, and Seohara must be cut down and stress on surface water irrigation should be given. However, exploitation of ground water tapping second aquifer (120-150 mbgl) be made. A close monitoring on the hydrogeological regime in the blocks of Noorpur, Jalilpur and Seohara should be done and further development of ground water in these blocks should be restricted/stopped till such time, the monitoring results allows for exploitation of ground water from first and second aquifer system without having any adverse effect on the ecology. The blocks of Kotwali, Afzalgarh & Najeebabad have still enough scope for further exploitation of ground water from upper & middle aquifer. Scientific approach should be made while executing the future ground water development plan.

In areas where ground water levels are beyond & metres round the year, the scope of artificial recharge to shallow aquifers by various methods be explored and adopted. There are number of sugar mills and their effluent be monitor regularly to avoid any contamination in the ground water. Roof top rainwater harvesting measures be adopted I the rural as well as in the urban areas.

## HYDROGEOLOGICAL DETAILS OF TUBEWELLS CONSTRUCTED BY CGWB

S. No.	Location /Coordinates	Type of well	Geology	Depth drilled (mbgl)	Depth of construction (mbgl)	Zones tapped (mbgl)	Water level (m)	Discharge (lpm)	Draw down (m)	Sp. Capacity (lpm/m)	Transm-issivity T (m <sup>2</sup> /day)	Storativity S	Permeability K (m/day)	Electrical conductivity (micromhos/cm at 25°C)	Chloride (mg/l)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Bhikawala 29°28'00" 78°45'40" 53K/15	EW	Bhabhar	128.00	97.0	i) 58-70 ii) 73-79 iii) 85-94	36.46	1310	3.62	361	864	-	32	1550	28	-
2.	Ganga Ram Wala (Kranti Farm) 29°35'05" 78°33'50" 63K/10	Pz	Alluvium	362.66	193.0	i) 80-96 ii) 93-96 iii) 111-114 iv) 130-136 v) 143-149 vi) 178-181 vii) 184-190										-
3.	Halluwali 29°40'40" 78°28'15" 53K/6	EW	Bhabhar	92.05	79.00	i) 59-62 ii) 64-76	1.65	560	23.76	24	10.22	-	0.68	400	12	-
4.	Karauli 29°40'00" 78°15'05" 53K/6	EW	Alluvium	369.00	303.00	i) 120-132 ii) 138-150 iii) 190-196 iv) 202-226 v) 232-238 vi) 244-250 vii) 285-297	20.65	3266	13.63	240	1557	2.065× 10 <sup>-4</sup>	37	634	7	-

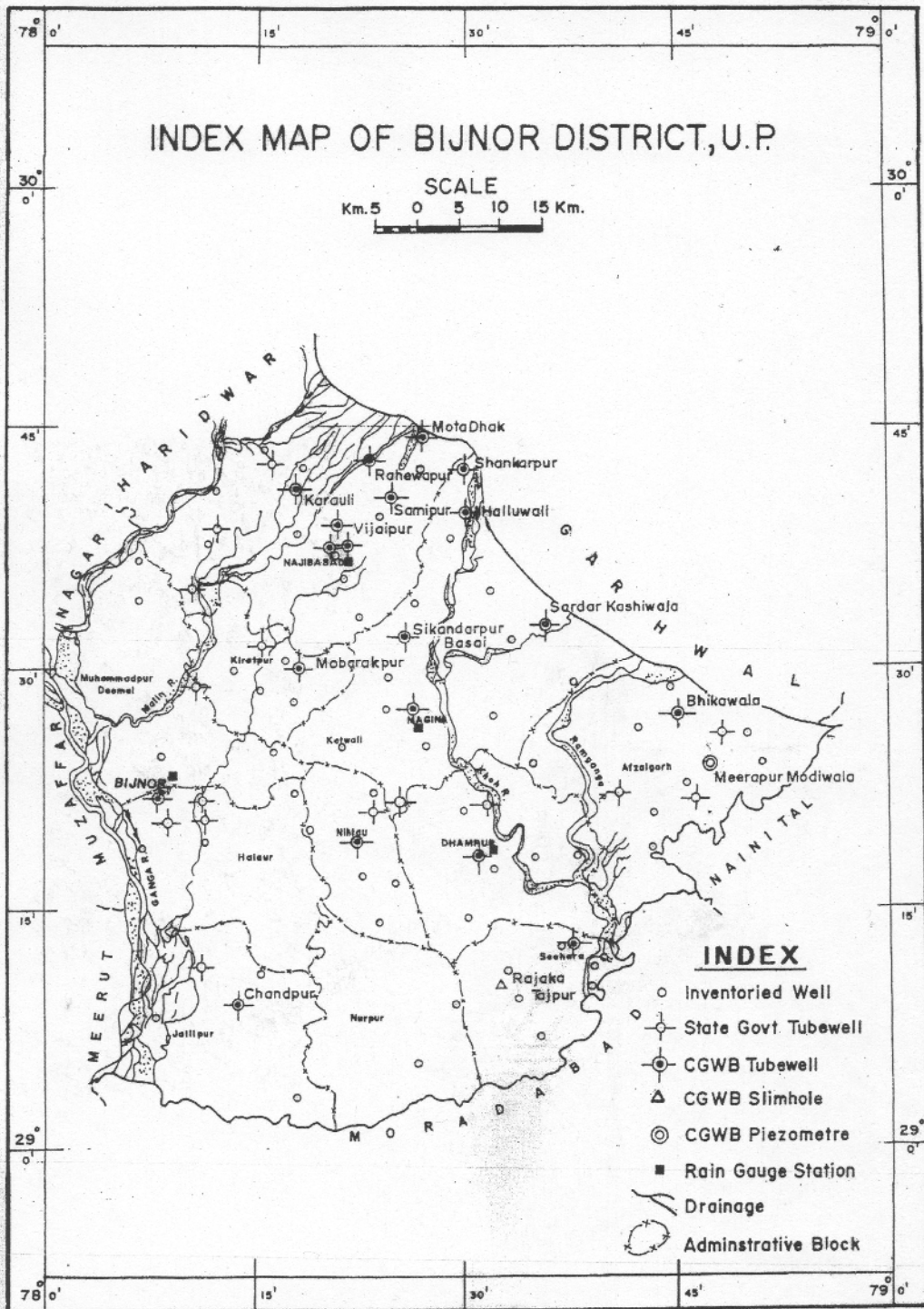
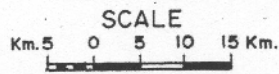


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
5.	Samipur 29°37'30" 78°23'15" 53K/6	EW	Alluvium	304.80	198.00	i) 80-86 ii) 160-180 iii) 188-195	393	-	-	-	-	-	-	Abandoned	-	-
6.	Mubarakpur Harbullah 29°29'15" 78°20'36" 53K/7	EW	Alluvium	450.24	382.00	i) 58-64 ii) 79-91 iii) 118-136 iv) 157-163 v) 172-190 vi) 208-220 vii) 277-286 viii) 295-301 ix) 319-325 x) 337-343 xi) 370-376	15.59	3240	5.86	553	1700	7.04× 10 <sup>-4</sup>	16.2	465	14	--
7.	Rahemapur 29°39'27" 78°18'39" 53K/6	EW	Alluvium	450.49	402.00	i) 144-150 ii) 166-170 iii) 260-263 iv) 272-277 v) 318-324 vi) 338-342 vii) 351-354 viii) 390-396	12.13	700	22.70	31	945	2.75× 10 <sup>-4</sup>	12.5	495	10	-
8.	Shankarpur 29°42'00" 78°28'10" 53K/6	EW	Bhabhar	95.00	84.00	68-81	18.86	379	19.63	19.3	-	-	-	-	-	-
9.	Raja Ka Tajpur 29°09'42" 78°28'22" 53K/8	SH	Alluvium	395.18	-											-

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
10.	Meerapur Modiwala 29°28'10" 78°47'40"	Pz	Bhabhar	134.99	122.00	110.5-119.5	-	-	-	-	-	-	-	-	-	-
11.	Nagina 29°26'00" 78°26'00" 53K/7	EW	Alluvium	351.00	184.50	i) 108-114 ii) 120-132 iii) 136-148 iv) 168-180	9.72	2074	5.12	405	-	-	-	-	-	-
12.	Nehtaur 29°19'30" 78°22'45" 53K/7	EW	Alluvium	351.75	170.00	i) 84-90 ii) 99-105 iii) 117-123 iv) 135-147 v) 153-165	10.08	2210	4.10	536	2186	4.038× 10 <sup>-4</sup>	44.57	361	7	-
13.	Vijaipur (Shanpur) 29°37'00" 78°20'30" 53K/6	EW	Alluvium	356.00	206.00	i) 91-100 ii) 122-134 iii) 142-151 iv) 194-203	12.57	1983	7.77	255	-	-	-	-	-	-
14.	Bijnor (Gandhi Park) 29°07'00" 78°08'00" 53K/3	EW	Alluvium	200.00	157.22	i) 62-74 ii) 122-142 iii) 145-153	11.45	2713	3.21	845	7015	-	77	590	50	-
15.	Dhampur (Teachers colony) 29°18'00" 78°31'00" 53K/11	EW	Alluvium	152.00	136.72	i) 62.5-82.5 ii) 102-114 iii) 127-131	10.85	2385	4.30	554	900	-	13.13	650	21	-
16.	Seohara (Tarai Mohalla) 29°21'00" 78°36'00" 53K/2	EW	Alluvium	170.00	160.62	i) 66-74 ii) 85-101 iii) 113-117 iv) 141-157	4.43	2713	4.43	612	-	-	-	492	11	-

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
17.	Najeebabad (Tehsil compound) 29°36'30" 78°22'00" 53K/6	EW	Alluvium	183.00	173.59	i) 82-90 ii) 117-125 iii) 130-142 iv) 152-168	12.77	2033	6.25	325	-	-	-	489	11	-
18.	Sardar Kashiwala (Badhapur)	EW	Alluvium	200.00	175.92	i) 113-125 ii) 136-156 iii) 160-172	-	-	-	-	-	-	-	-	-	-
19.	Chandpur (Mufti Sarai) 29°07'30" 78°16'30" 53K/8	EW	Alluvium	200.00	193.00	i) 100-112 ii) 150-166 iii) 170-174 iv) 180-188	10.30	1835	1.32	790	4279	-	48	-	-	-
20.	Mota Dhak 29°44'48" 78°27'04" 53K/6	EW	Bhabhar	159.00	147.00	i) 90-96 ii) 105-110 iii) 116-124 iv) 127-155	-	-	-	-	-	-	-	-	-	-
21.	Jalalabad (Water works compound)	EW	Alluvium	200.00	191.50	i) 105-117 ii) 121-127 iii) 142-158 iv) 184-188	11.60	1814	1.42	1277	999	-	7.56	740	64	-
22.	Najeebabad (Mehndi Bagh) (Water works compound) 29°37'00" 78°20'00" 53K/6	EW	Alluvium	357.00	230.5	i) 132-141 ii) 150-156 iii) 160-166 iv) 172-178 v) 187-191 vi) 201-204 vii) 210-217.5 viii) 223-227	12.20	1154	2.71	425	-	-	-	-	-	-
23.	Sikandarpur Basai 29°34'36" 78°22'00" 53K/6	EW	Alluvium	351.00	204.00	i) 132-144 ii) 159-165 iii) 170-179 iv) 190-199	13.46	2028	9.80	-	3243	1.30× 10 <sup>-4</sup>	90	380	7	-

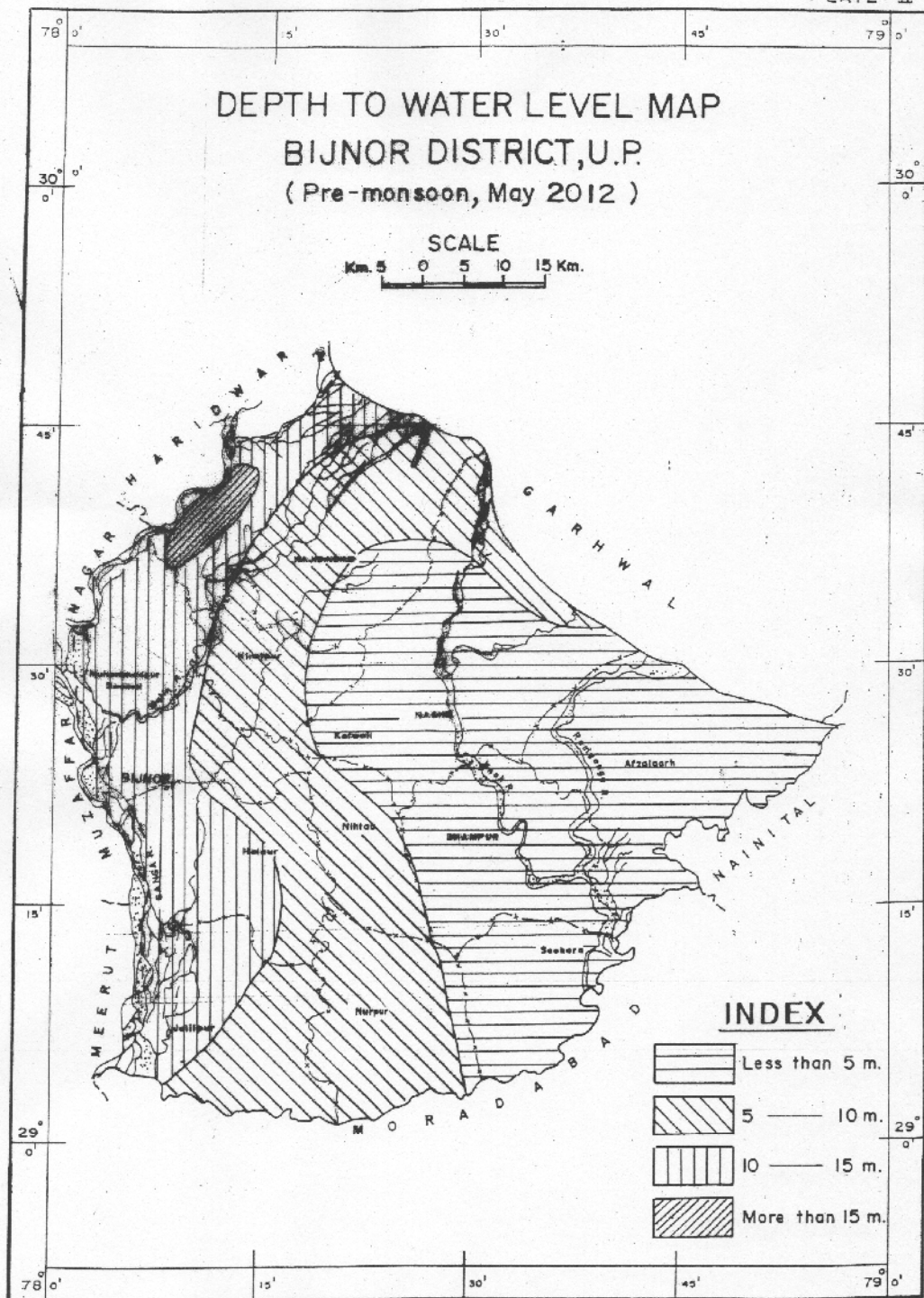
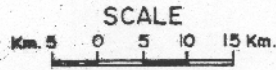
# INDEX MAP OF BIJNOR DISTRICT, U.P.



## INDEX

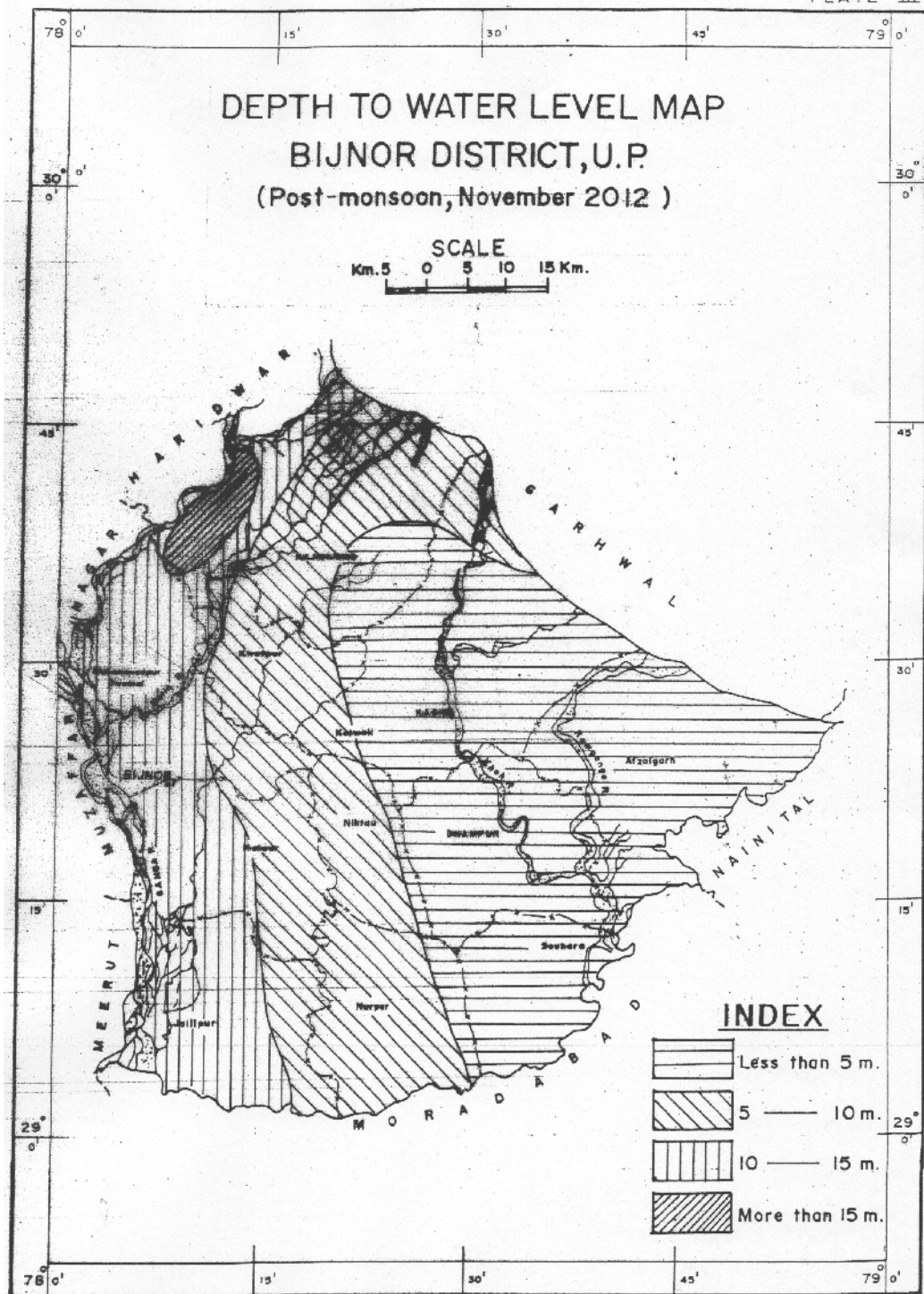
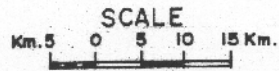
- Inventoried Well
- ⊕ State Govt. Tubewell
- ⊙ CGWB Tubewell
- △ CGWB Sliimhole
- ⊙ CGWB Piezometre
- Rain Gauge Station
- Drainage
- ⬡ Adminstrative Block

# DEPTH TO WATER LEVEL MAP BIJNOR DISTRICT, U.P. ( Pre-monsoon, May 2012 )







C.G.W.B., NR (N.Chandra) Drg No. 6583/93 (N.C.Pandey) 4920/13

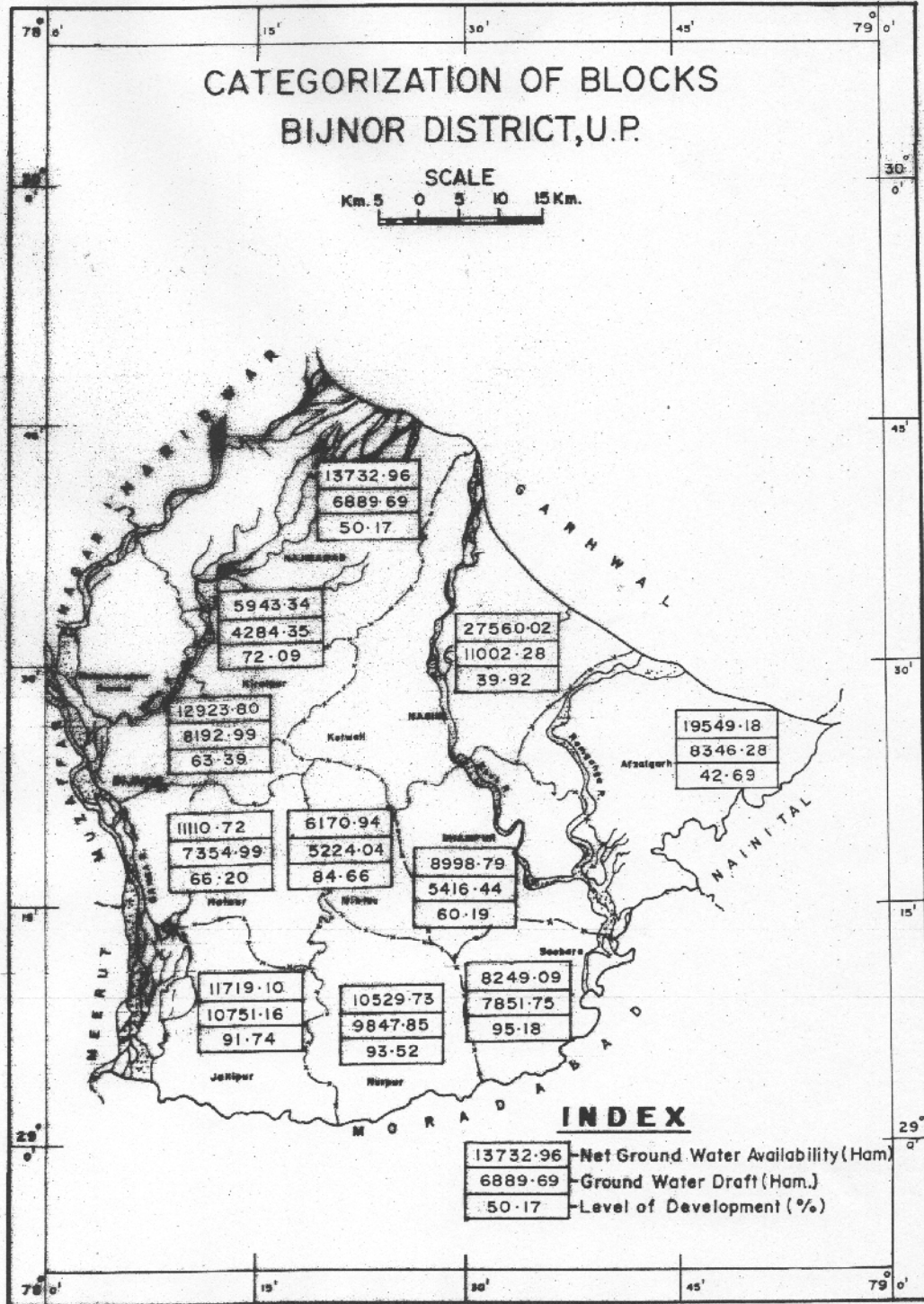
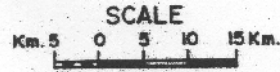
# DEPTH TO WATER LEVEL MAP BIJNOR DISTRICT, U.P. (Post-monsoon, November 2012 )



### INDEX

-  Less than 5 m.
-  5 — 10 m.
-  10 — 15 m.
-  More than 15 m.

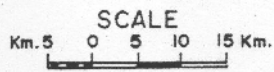
# CATEGORIZATION OF BLOCKS BIJNOR DISTRICT, U.P.



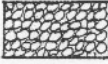
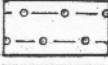
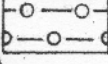
## INDEX


13732-96	Net Ground Water Availability (Ham.)
6889-69	Ground Water Draft (Ham.)
50-17	Level of Development (%)


# HYDROGEOLOGICAL MAP OF BIJNOR DISTRICT, U.P.

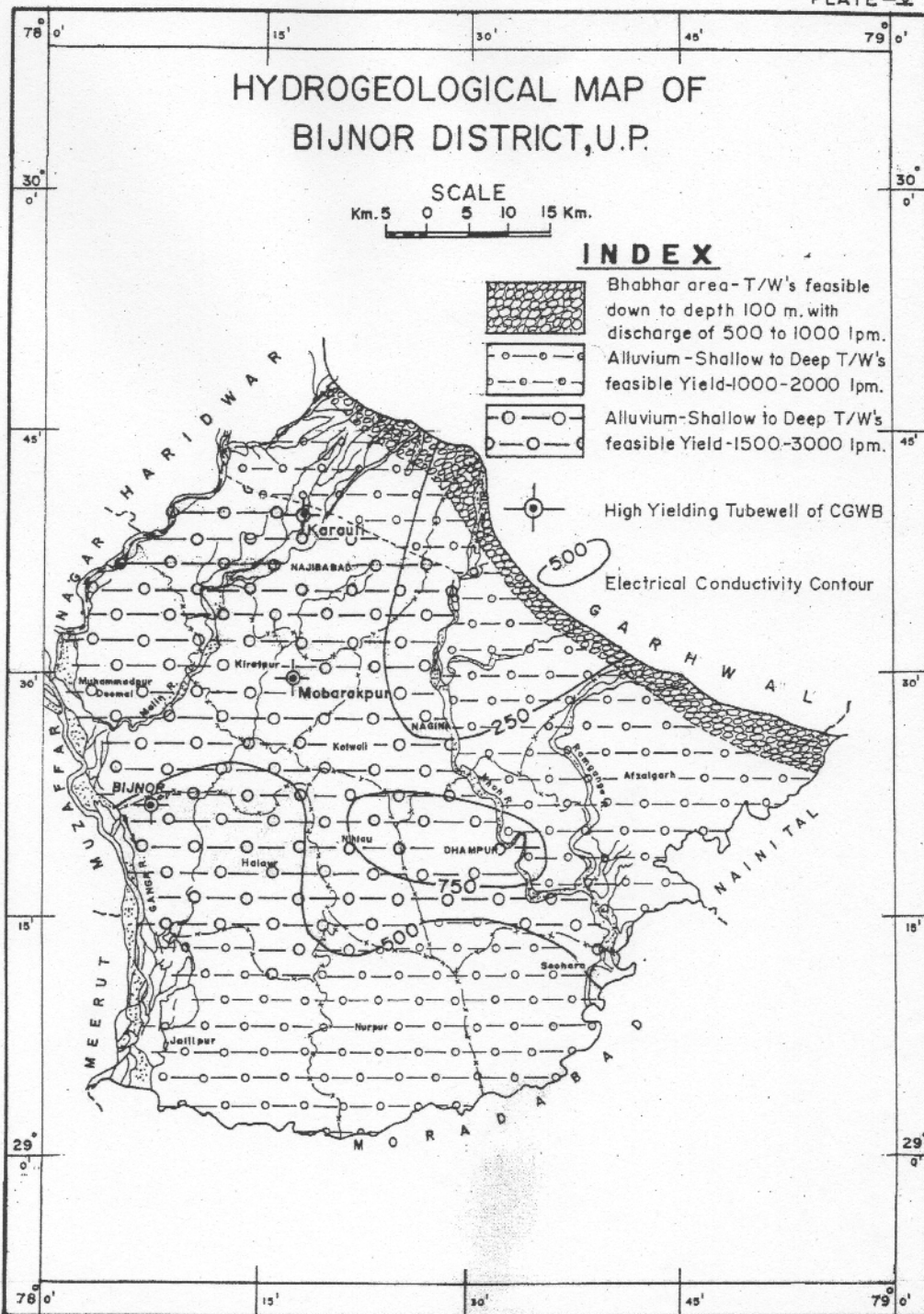


## INDEX

-  Bhabhar area - T/W's feasible down to depth 100 m. with discharge of 500 to 1000 lpm.
-  Alluvium - Shallow to Deep T/W's feasible Yield - 1000 - 2000 lpm.
-  Alluvium - Shallow to Deep T/W's feasible Yield - 1500 - 3000 lpm.

 High Yielding Tubewell of CGWB

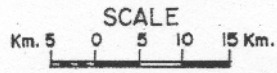
 Electrical Conductivity Contour






C.G.W.B., NR (N.Chandra) Drg.No.6583/93 (N.C.Pandey) 2694/09

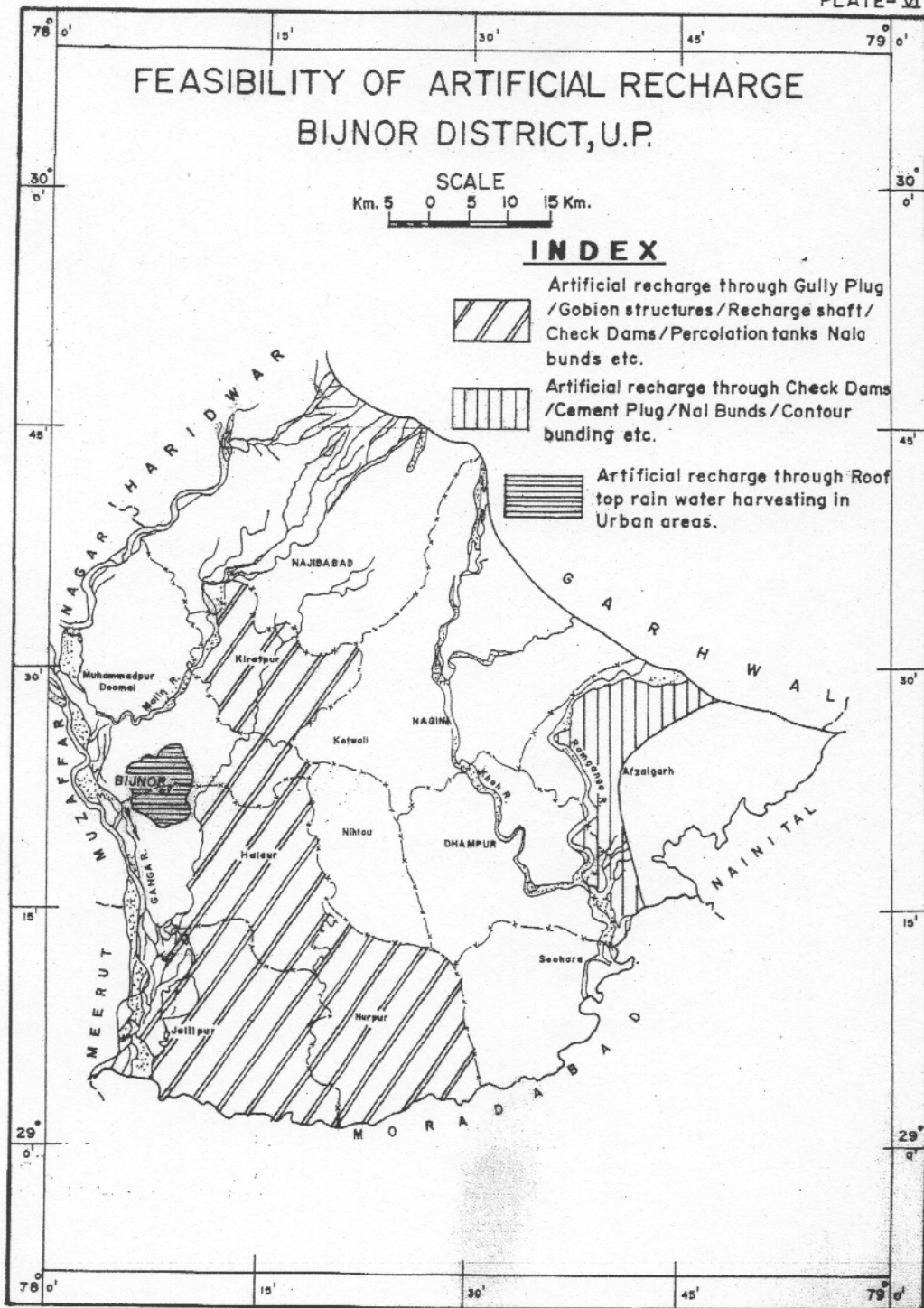


# FEASIBILITY OF ARTIFICIAL RECHARGE BIJNOR DISTRICT, U.P.



## INDEX

-  Artificial recharge through Gully Plug / Gobion structures / Recharge shaft / Check Dams / Percolation tanks Nala bunds etc.
-  Artificial recharge through Check Dams / Cement Plug / Nal Bunds / Contour bunding etc.
-  Artificial recharge through Roof top rain water harvesting in Urban areas.



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