

# **DISTRICT GROUND WATER BROCHURE**

## ***BUDAUN DISTRICT***

**Uttar Pradesh**

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**Northern Region**

**Lucknow**

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# DISTRICT GROUND WATER BROCHURE

## *BUDAUN DISTRICT, U.P.*

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### *DISTRICT AT A GLANCE*

<b>1.</b>	<b>GENERAL INFORMATION</b>		
i.	Geographical Area (Sq. Km.)	:	5168
ii.	Administrative Divisions		
	Number of Tehsil / Block	:	6 /18
		:	One Tahsil- Gunnaur and Three blocks- Gunnaur, Rajpura & Junawai are presently Part of Sambhal district.
	Number of Nyaya Panchayat / Gram Sabha / Villages	:	136/885/1699
iii.	Population (as on 2001 census)	:	30,69,245
iv.	Average Annual Rainfall (2004 to 2012)	:	639.8 mm
	Actual Annual Rainfall in 2012	:	474.7 mm
<b>2.</b>	<b>GEOMORPHOLOGY</b>		Central Ganga Plain
	Major Physiographic Units	:	Older Alluvium, Younger Alluvium & Flood Plain
	Major Drainages	:	Ganga, Ram Ganga & Mahawa
<b>3.</b>	<b>LAND USE (Sq. Km.) (2008-09)</b>		
a)	Forest area	:	69

	b)	Net area sown	:	4162
	c)	Area sown more than once	:	2868
	d)	Gross area sown	:	7030(Rabi:3643,Kharif:2887; Jayad:500)
<b>4.</b>		<b>MAJOR SOIL TYPES</b>	:	Loamy, Silty soil
<b>5.</b>		<b>AREA IRRIGATED BY DIFFERENT SOURCES : 2008-09 (Ha)</b>		
		Dugwells	:	42525
		Tubewells	:	Public:3799 Private: 315658
		Canals	:	34
		Other Sources	:	5926
		Net Irrigated Area	:	367941
		Gross Irrigated Area	:	524848
<b>6.</b>		<b>NUMBER OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-3-2013)</b>		
		No. of Dugwells	:	5
		No. of Piezometers	:	14(G.W.D.)
<b>7.</b>		<b>PREDOMINANT GEOLOGICAL FORMATIONS</b>	:	Alluvial deposits of Quaternary period brought by river systems of Ganga and Ram-Ganga. These comprise sand, silt and clays in various proportions.
<b>8.</b>		<b>HYDROGEOLOGY</b>		
		Major water bearing formation	:	Sand, Gravel
		Pre-monsoon Depth to water level during May'2012	:	3.38-13.50 mbgl
		Post-monsoon Depth to water level during Nov'2012	:	2.5-14.10 mbgl
		Long term water level trend(average) in 10 years (2001-10)	:	

		Premonsoon :	Fall: 0.76 to 56.25 cm/year
		Postmonsoon :	Fall: 4.12 to 50.51 cm /year
<b>9.</b>	<b>GROUND WATER EXPLORATION BY CGWB (As on 31-10-2013)</b>		
	No of wells drilled (EW, OW, PZ, SH, Total)	:	EW-9, OW-3,Pz-2, SH-1
	Depth range (m)	:	35-751.5, 118-283
	Discharge (litre per minute)	:	1000-2250
<b>10.</b>	<b>DYNAMIC GROUND WATER RESOURCES AS ON 31.3.2009 (MCM)</b>		
	Annual Replenishable Ground Water Resources/Total Ground Water Recharge	:	1360
	Gross Annual Ground Water Draft	:	1190
	Projected Demand for Domestic Industrial Uses upto 2025	:	75
	Stage of Ground Water Development	:	95.76%
<b>11.</b>	<b>AWARENESS AND TRAINING ACTIVITY</b>		
	Mass Awareness Programmes organized	:	1
	Date	:	05.3.2008
	Place	:	Salarpur
	No. of participants	:	300
	Water Management Training Programme organized	:	1 (Village level Tier III Training Programme )
	Date	:	19.3.2013 to 20.3.2013
	Place	:	Sahaswan
	No. of participants	:	200
<b>12.</b>	<b>EFFORTS OF ARTIFICIAL RECHARGE &amp; RAINWATER HARVESTING</b>		
		:	NIL

	Projects completed by CGWB (No & Amount spent)		
	Projects under technical guidance of CGWB (Numbers)		
<b>13.</b>	<b>GROUND WATER CONTROL AND REGULATION</b>	:	-
	Number of OE Blocks	:	7
	No of Critical Blocks	:	-
	No of blocks notified	:	-
<b>14.</b>	<b>MAJOR GROUND WATER PROBLEMS AND ISSUES</b>	:	Seven blocks are Over-exploited. Decline in water level trend both in premonsoon & postmonsoon period.

# **DISTRICT GROUND WATER BROCHURE**

## ***BUDAUN DISTRICT, U.P.***

### **1. Introduction :**

The district of undivided Budaun spreads over an area of 5168 Sq. Km in the Central Ganga Plain and is underlain by Quaternary sediments . It lies between latitudes 27<sup>0</sup>37' and 28<sup>0</sup>28'30" North and between longitudes 78<sup>0</sup> 16' and 79<sup>0</sup> 30' East, falls in survey of India Degree sheet no. 53 L, 53P and 54 I, 54M. The district is on an average 169 meters above mean sea level. Length of the district is 144 km and width is 60 km.

The district forms a natural boundary in South-west by river Ganga whereby meeting with the districts of Aligarh, Bulandshahar and Etah. In the North, the district borders with Moradabad and Rampur districts. In the North- east lies Bareilly district. In the east, the district has its boundary with Shahjahanpur and in South-east with Farrukhabad district. The population of the district is 30,69,245 as per 2001 census. The density of population is 594 persons per Sq.km.

### **1.1 Administration :**

Administratively initially the district comprises of six Tehsils (Badaun, Bisauli, Sahaswan, Gunnaur, Dataganj and Bisauli), 18 Blocks (Ambiapur, Asafpur, Bisauli, Dahgawan, Dataganj, Gunnaur, Islam Nagar, Jagat, Junawai, Miaon, Qadar Chowk, Rajpura, Sahaswan, Salarpur/ Binawar, Samrer , UJhani, Usawan , Wazirganj), 164 Nyaya Panchayat, 1064 Gram Sabha and 2081 villages.

Presently, Gunnaur tahsil and three blocks i.e. Rajpura, Gunnaur and Junawai are part of newly created Sambhal District. At present Budaun district has five tehsils and 15 blocks. This brochure deals the area of undivided Budaun district.

### **1.2 Drainage :**

The area is drained by the river Ganga and its tributaries. Ram Ganga is the principle tributary in the eastern part of the district. The other tributaries which control drainage system in the district are Sot, Mahawa, Tikta, Burdwar. Chhoya, & Aril river. All these tributaries are seasonal and at places become perennial depending upon the position of water table with respect to land elevation.

### **1.3 Land use and Cropping pattern:**

The block-wise land usage in the district is as follows:

**Table: Land usage in Budaun district (In Hectares)(2008-09)**

<b>Block</b>	<b>Total area</b>	<b>Forest</b>	<b>Barren cult. waste</b>	<b>Present fallow land</b>	<b>Other fallow land</b>	<b>Barren &amp; uncult. land</b>	<b>Land put to non-agri. use</b>	<b>Pastures</b>	<b>Area under bush, forest &amp; garden</b>
1. Rajpura	33381	708	1031	1791	1098	527	2982	18	291
2. Gunnaur	30126	106	220	764	291	412	3664	22	589
3. Janawai	29755	31	186	865	551	280	5946	16	355
4. Asafpur	24452	5	85	839	132	251	2260	11	383
5. Islamnagar	23021	22	82	702	186	352	1751	15	505
6. Bisauli	24185	45	52	652	199	249	2038	21	432
7. Wazirganj	19998	4	43	669	190	231	1489	16	252
8. Dahgavan	35572	1605	255	697	953	652	2311	14	429
9. Sahaswan	41482	699	672	862	634	461	3518	79	761
10. Ambiapur	30050	20	25	697	204	293	2276	17	291
11. Salarpur	25101	18	129	885	339	228	1884	17	229
12. Jagat	28620	169	104	634	495	451	2104	14	135
13. Ujhani	32376	1755	452	854	611	674	3745	17	271
14. Qadar Chowk	28049	680	401	1213	604	816	1947	18	260
15. Samrer	22006	19	175	744	369	1234	1520	5	194
16. Dataganj	24863	354	297	637	979	939	2140	30	564
17. Mion	29435	583	236	836	592	714	2086	7	681
18. Usawan	31852	76	163	1507	1885	1727	3194	6	347
<b>Total Rural</b>	<b>514324</b>	<b>6899</b>	<b>4608</b>	<b>15848</b>	<b>10312</b>	<b>10491</b>	<b>46855</b>	<b>343</b>	<b>6969</b>
<b>Total Forest</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



<b>Total Urban</b>	5755	0	0	150	78	76	1132	0	122
<b>Total District</b>	520079	6899	4608	15998	10390	10567	47987	343	7091

**Table: Land usage in Budaun district (In Hectares)(2008-09) (Cont.)**

Year / Block	Net area sown	Area sown more than once	Gross area sown				Land prepared for sugarcane	Net irrigated area	Gross irrigated area
			Total	Rabi	Kharif	Jayad			
1. Rajpura	24935	17998	42933	20366	19549	3016	2	22633	28288
2. Gunnaur	24058	18832	42890	22114	17931	2843	2	21697	27063
3. Janawai	21525	16234	37759	19285	15826	2648	0	22980	27503
4. Asafpur	20486	13414	33900	16948	14446	2506	0	20134	29973
5. Islamnagar	19406	12767	32173	16422	13391	2360	0	20256	24955
6. Bisauli	20497	14189	34686	16841	15186	2657	2	20512	29045
7. Wazirganj	17104	8435	25539	13124	9903	2509	3	21811	28103
8. Dahgavan	28656	20800	49456	24249	22024	3183	0	16330	32090
9. Sahaswan	33796	23083	56879	31155	22364	3356	4	31692	41605
10. Ambiapur	26227	21393	47620	24625	19967	3028	0	20679	35135
11. Salarpur	21372	16275	37647	20551	14625	2471	0	18557	30085
12. Jagat	24514	16607	41121	22059	16212	2850	0	21051	30624
13. Ujhani	23997	16202	40199	20851	16204	3144	0	19774	30359
14. QadarChowk	22110	13515	35625	19159	13893	2572	1	18418	25343
15. Samrer	17746	14137	31883	17882	11794	2207	0	16670	22151
16. Dataganj	18923	14164	33087	17680	12949	2458	0	15740	26045
17. Mion	23700	14150	37850	20260	14647	2943	0	18907	25212
18. Usawan	22947	12566	35513	17670	15323	2520	0	17328	26859
<b>Total Rural</b>	411999	284761	696760	361241	286234	49271	14	365169	520438
<b>Total Forest</b>	0	0	0	0	0	0	0	0	0

<b>Total Urban</b>	4197	2099	6296	3045	2458	793	0	2772	4410
<b>Total District</b>	416196	286860	703056	364286	288692	50064	14	367941	524848

The forest area in the district is 6899 Ha. The net area sown in the district is 416196 Ha. The area sown more than once in the district is 286860 Ha. The Gross area sown in Rabi season is 3642286 Hq, in Kharif is 288692 Ha and in Jayad is 50064 Ha and Gross irrigated area is 524848 Ha.

#### 1.4 Irrigation Practices :

The block-wise total area irrigated by different sources in the district is as follows

**Table: Blockwise total area (hect.) irrigated by different sources in Budaun district,(2008-09)**

Year / Block	Canals	Tubewell		Wells	Ponds	Others	Total
		Public	Private				
1. Rajpura	0	44	19907	2370	0	312	22633
2. Gunnaur	0	107	18956	2324	0	310	21697
3. Janawai	0	61	18359	4150	0	410	22980
4. Asafpur	0	349	16071	3436	0	278	20134
5. Islamnagar	0	224	15915	3843	0	274	20256
6. Bisauli	0	258	16308	3562	0	384	20512
7. Wazirganj	0	261	18750	2465	0	335	21811
8. Dahgavan	0	75	13078	2889	0	288	16330
9. Sahaswan	0	300	25889	5220	0	283	31692
10. Ambiapur	0	417	18406	1521	0	335	20679
11. Salarpur	34	326	16467	1383	0	347	18557
12. Jagat	0	324	18335	2033	0	359	21051
13. Ujhani	0	330	17938	1150	0	356	19774
14. Qadar Chowk	0	235	16627	1211	0	345	18418
15. Samrer	0	71	14060	2194	0	345	16670

16. Dataganj	0	70	14477	795	0	398	15740
17. Mion	0	249	17402	995	0	261	18907
18. Usawan	0	78	15961	983	0	306	17328
<b>Total Rural</b>	34	3779	312906	42524	0	5926	365169
<b>Total Urban</b>	0	20	2752	0	0	0	2772
<b>Total District</b>	34	3799	315658	42524	0	5926	367941

The total area irrigated by different sources in the district is 367941 Ha. 98% of the area is irrigated by ground water and only 34 Ha is irrigated by Canals, having a length of only 10 Km in Salarpur block in the district. Out of the total ground water irrigation, 12% (42524 Ha) is through Dug wells and 88% (319457 Ha) is through Tube wells.

## 2.0 Climate & Rainfall

The climate is sub humid and it is characterized by hot dry summer and winter. The average annual rainfall of the district is 639.8 mm (2004 to 2012) and Normal rainfall is 860.8 mm The actual rainfall in 2012 was 474.7 mm. About 85% of the rainfall is received during June to September.

May is the hottest month of the year with mean daily maximum temperature at 40.5<sup>0</sup>C. With the advance of the SW monsoon the day temp drops appreciably but the night continue to be warm. January is the coldest month with the mean daily min temp at 8.6<sup>0</sup>C and max at 22<sup>0</sup>C.

Air is very humid in monsoon season and humidity decreases in cold season. The mean monthly morning relative humidity is 69% and mean monthly evening humidity is 51%.The mean wind speed is 5.1 Kmph. The potential evapotranspiration is 1402.8m.

## 3. Physiography & Geomorphology

### 3.1 Physiography

Budaun district forms a part of Central Ganga Plain and lies within the doab region of river Ganga and Ramganga. The average elevation is 165 masl. The slop is from NW to SE. The slope of the area confirm the course of the streams. Physiographically, the area can be divided into three natural category which are known as Khadar , Bhur and Katchar or upland.

#### **Khadar :**

The Khadar, low lying area ,occupies a narrow belt along SW stretch adjacent to river Ganga. This area is characterized by low land areas having shallow water table, O xbow lakes & hillocks. The Khadar terrain is generally formed by sand soil mixed with clay.

### **Bhur :-**

To the North-east of Khadar, Bhur occupies the place with a width range of 2 to 8 Km. It is comparatively higher in elevation compared to Khadar. In this Sandy soil, natural grasses and weeds are in abundance.

### **Katchar:**

To the North-east of Bhur tract lies the broad plain of the Katchar, a levelled and perfectly homogeneous expanse of good fertile loam. The Katchar consists of loam soil and is highly cultivated. This comprises of entire Bisauli tehsil except western part of Islamnagar.

## **3.2 Geomorphology**

The district of Budaun can be divided into two broad units :-

1. Younger Alluvium
2. Older Alluvium

## **3.3. Soil :**

The development of soil in the area can be correlated to the different morphological subdivisions. There are only three types of soils in the area namely (i) Silty soil (ii) Sandy soil and (iii) Loamy soil. The soil along the Ganga river and its tributaries are mainly silty which become hard and dry.

## **3.4 GEOLOGICAL FRAME WORK:**

Geologically the area is underlain by Quaternary alluvial sediments of Central Ganga Plain. These deposits are fluvial in nature and have been deposited by the drainage system of the Ganga river and its tributaries. General stratigraphic sequence of the formation in the area is as follows: -

**Table : Geological Sequence in Budaun District**

<b>Group</b>	<b>Formation</b>	<b>Sediment type</b>	<b>Age</b>
Quaternary	Newer Alluvium	Sand, Silt & Clays	Recent
	Older Alluvium	Sand, Gravel, Clay & Kankar	Holocene
	Upper Siwaliks	Sandstone, Shale and Limestone	Pleistocene to Pliocene

The thickness of alluvium is yet to be established within the area. Maximum thickness of alluvium in ONGC & CGWB boreholes was found to be 750 meters. The Newer alluvium sediments which are deposited at the lower elevations are confined to the flood plains of Ganga, Ramganga and its tributaries. These newer alluvium deposits are composed of generally fine to medium sand with alternating layers of clays. The older alluvial sediments

are confined at higher elevation along the present day surface water divide. The prominence of sand is well marked in this unit and the sand is coarser in nature.

#### **4. Ground Water Scenario :**

##### **4.1 Hydrogeology:**

Ground water occurs in the pore spaces of the unconsolidated alluvial sediments in the zone of saturation. The near surface sediments are dominantly sandy clays and clays which grade into sediments having varied proportions of sand and clays. These sediments occur as inter layered sequence and pockets. Kankar is generally present in clay in the form of lenses and layers as well as interspersed. These mixed sediments occur down to 20 m and support large number of dug wells. The depth of dug wells range between 6 to 20 m.

Below the top 4 to 10 m silty clays and clays, there occurs the sand formations which form a part of aquifer system. This aquifer is largely unconfined to semi-confined and supports a large number of cavity/shallow tube wells.

##### **Depth to water level**

Depth to water level(DWL) data collected from Ground Water Monitoring Wells in May' 2012(Pre-monsoon) and Nov' 2012(Post-monsoon) have been utilized to prepare depth to water level contour maps.

<b>SI No.</b>	<b>Well Name</b>	<b>Block</b>	<b>Pre-Monsoon DWL (mbgl)</b>	<b>Post-Monsoon DWL (mbgl)</b>	<b>Fluctuation (m)</b>
1	Asafpur Pz GWD	Asafpur	9.55	9.7	-0.15
2	Budaun Pz GWD	Jagat	13.5	14.1	-0.6
3	Bisauli Pz GWD	Bisauli	11	11.2	-0.2
4	Dabthara Shyam Pz GWD	Junawai	4.8	4.75	0.05
5	Daharpur Pz GWD	Dataganj	6.5	6.5	0
6	Deora Pz GWD	Islamnagar	9.6	10.88	-1.28
7	Dhanari Railway Station Pz GWD	Gunnaur	3.38	4.55	-1.17
8	Dudhauni	Ambiapur	12.11	11.7	0.41
9	Gunnaur1	Gunnaur	4.82	4.72	0.1

10	Kachla	Ujhani	-	2.5	-
11	Kolhai Pz GWD	Sahaswan	9	8.97	0.03
12	Mansa Nagla Pz GWD	Miaon	13.5	13.7	-0.2
13	Parhali bajhara	Samrer	5.6	5.38	0.22
14	Pupupur	Usawan	9.21	9.35	-0.14
15	Qadar Chowk Pz GWD	Qadar Chowk	7.3	7.25	0.05
16	Sarauriya Pz GWD	Wazirganj	12.3	12	0.3
17	Silhari Pz GWD	Dahgawan	5.21	4.8	0.41
18	Ujhani Pz GWD	Ujhani	12.5	12.4	0.1
19	Wazirganj Pz GWD	Wazirganj	12.13	13.05	-0.92

The water level during May' 2012(Pre-monsoon) varies from 3.38 mbgl as seen at Dhanari in Gunnaur Block to 13.50 mbgl at Budaun in Jagat block. In whole of Rajpura ,Gunnaur and most parts of Junawai block water level generally ranges between 3 to 5 mbgl. In most parts of Islamnagar, Dahgawan, Sahaswan, Asafpur, Quadar Chowk, Jagat, Ujhani, Samrer, Dataganj blocks water level generally ranges between 5 to 10 mbgl. The water level between 10 to 13.5 mbgl is generally observed in Bisauli, Ambiapur, Wazirganj, blocks and in parts of Salarpur, Ujhani ,Usawan and Miaon blocks.

The water level during November'2012(Post-monsoon) varies from 2.5 mbgl as seen at Kachla in Ujhani Block to 14.10 mbgl at Budaun in Jagat block. In the western part of the district covering Rajpura and most parts of Gunnaur & Junawai blocks water level generally ranges between 2 to 5 mbgl. In Samrer, Dataganj, Jagat blocks covering eastern part and parts of Quadar chowk, Dahgawan blocks water level ranges between 5 and 10 mbgl. The water level between 10 to 14.10 mbgl is generally observed in Bisauli, Ambiapur, Wazirganj, blocks and in parts of Salarpur, Ujhani ,Asafpur, Islamnagar, Usawan and Miaon blocks.

Ground water flows from NNW to SSE following the general drainage pattern.

### **Seasonal Water Level Fluctuation :**

Water Level fluctuates in response to recharge to the aquifer and withdrawal from the aquifer. The quantum of fluctuation is a direct function of the above. Recharge takes place mainly during rainy season. The minimum depth to water level in an area is expected sometime at the close of monsoon or in the middle of monsoon period depending upon the intensity and duration of rainfall as well as soil characteristics and maximum depth to water level is expected to be just before the rainfall. The part of the rainfall in the initial period goes towards meeting the soil moisture deficiency as well as to saturate the Evaportranspiration losses.

Seasonal fluctuation of water level has been determined from the Pre-monsoon (May'2012) and Post-monsoon (Nov'2012) water level data of Ground Water monitoring wells. Since there was deficient monsoon rainfall in the district in 2012 therefore the recharge due to rainfall was also less which has resulted in deeper water level in Nov'12 than in May'12 in most of the wells. The fluctuation varies from rise of 41 cm to fall of 1.28 m.

**Long term water level trend**

The block-wise long term average Pre-monsoon(May) and average Post-monsoon(Nov.) trend of water level of monitoring wells of G.W.D.,U.P. for ten years period-2001 to 2010 is as follows:

**Table: Block-wise long term average Pre-monsoon and average Post-monsoon trend of water level for the period- 2001 to 2010**

Sl.no.	Blocks	Average Pre-monsoon Trend (cm/year)		Average Post-monsoon Trend (cm/year)	
		Rise	Fall	Rise	Fall
1	AMBIAPUR		56.25		50.51
2	ASAFPUR		36.54		20.14
3	BISAUJI		29.86		19.07
4	DAHGAWAN		0.76	7.13	
5	DATAGANJ		14.32		14.03
6	ISLAMNAGAR		28.88		29.69
7	JAGAT	38.97			12.93
8	MIAON		11.00		7.14
9	QUADAR CHOWK		6.11		4.12
10	SAHASWAN		31.90		23.63
11	SALARPUR		18.97		10.95
12	SAMRER		17.65		12.54
13	UJHANI		20.04		19.24
14	USAWAN	3.55		12.58	
15	WAJIRGANJ		12.07		9.82
16	GUNNAUR		25.14		34.21
17	JUNAWAI		21.35		26.13

18	RAJPURA		13.58		12.31
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Source: G.W.D,U.P.

### **Pre-monsoon water level trend**

There is falling trend in almost all the blocks during Pre-monsoon period except at Jagat and Usawan . The range of average decline is 0.76cm/year at Dahgawan to 56.25 cm/year at Ambiapur. The range of average rise is 3.55 at Usawan to 38.97 cm/year at Jagat.

**Table – DWL Trend during Pre-monsoon period (2001 to 2010)**

<b>Blocks showing average decline of water level &lt; 20 cm/year</b>	<b>Blocks showing average decline of water level &gt; 20 cm/year</b>
DAHGAWAN	UJHANI
QUADAR CHOWK	JUNAWAI
MIAON	GUNNAUR
WAJIRGANJ	ISLAMNAGAR
RAJPURA	BISAULI
DATAGANJ	SAHASWAN
SAMRER	ASAFPUR
SALARPUR	AMBIAPUR

### **Post-monsoon water level trend**

There is falling trend in almost all the blocks during Post-monsoon period except in Dahgawan and Usawan . The range of average decline is 4.12 cm/year at Quadar chowk to 50.51 cm/year at Ambiapur. The range of average rise is 7.13 cm/year at Dahgawan to 12.58 cm/year at Usawan.

**Table – DWL Trend during Post-monsoon period (2001 to 2010)**

<b>Blocks showing average decline of water level &lt; 20 cm/year</b>	<b>Blocks showing average decline of water level &gt; 20 cm/year</b>
QUADAR CHOWK	JUNAWAI
MIAON	GUNNAUR
WAJIRGANJ	ISLAMNAGAR
SALARPUR	SAHASWAN
RAJPURA	ASAFPUR
SAMRER	AMBIAPUR
JAGAT	
DATAGANJ	
BISAULI	
UJHANI	



### **Ground Water Exploration:**

Central Ground Water Board has constructed nine deep Exploratory wells, three Observation wells, two piezometers and one Slim Hole in the district to delineate the sub-surface lithology of the area. The hydrogeological details are shown in the table and location of exploratory wells in Plate-1.

### **Aquifer Systems:**

The regional subsurface disposition of aquifer system based on lithological logs and electrical logs is as follows:

<b>Aquifer Group</b>	<b>Depth (m bgl)</b>	<b>Static water Level (m bgl)</b>	<b>Discharge (lpm)</b>	<b>Drawdown (m)</b>	<b>Quality</b>
I	Upto 180	5-15	2000-2250	5	Good
II	200-380	10-20	1000-1500	5-10	Doubtful at places
III	400-600	8-12	1500-2000	7-12	Good

On the regional scale, I<sup>st</sup> Aquifer extends down to depth of 180 mbgl. The aquifer in general behaves as semi-confined to confined. The discharge varies from 2000 to 2250 lpm with drawdown of generally 5 m. The quality is generally good.

The depth range of II<sup>nd</sup> Aquifer varies from 200 to 380 m. The aquifer is confined in nature. The discharge varies from 1000 to 1500 lpm with drawdown of generally 5 to 10 m. The quality is doubtful at places.

The depth range of III<sup>rd</sup> Aquifer varies from 400 to 600 m. The aquifer is confined in nature. The discharge varies from 1500 to 2000 lpm with drawdown of generally 7 to 12 m. The quality is generally good.

**Hydrogeological Details based on Exploration Carried out by C.G.W.B in Budaun District, U.P. as on 31.10.2013**

Sl.No.	Location	Longitude	Latitude	Year	Drilled/Construction Depth (mbgl)	Lithology	Tapped Granular zones (mbgl)	SWL (mbgl)	Discharge (in lpm)	Drawdown (m)	Specific capacity (lpm/m) of dd	T (m <sup>2</sup> / day)	S
1	BISAULI -Slim Hole	28 18 32	78 50 30		449.92	ALLUVIUM			-	-		-	-
2	SAMRER-Piezometer			1998-99	751.5/715.00	ALLUVIAL	440-452,468-480	0.6 m agl	Free Flow	-	0	-	-
3	UJHANI -EW (Gaddi Tola)			1998-99	657.2/602	ALLUVIUM	479-485,495-507,510-522,543-549,565-571,583-589,592-598	8.06	-	-	0	-	-
4	BUDAUN- Pz				453	ALLUVIUM	390-396,399-405,408-418						
5	BADAUN-I EW (AECPR) ( Bus Station)	79 7 40	28 2 15	2002-03	200/185.22	ALLUVIUM	64.91-72.91,78.86-86.86,98.99-106.99,115.47-123.47,129.50-137.50,167.70-179.70	12.32	2250	3.95	569.62	0	0
6	BADAUN-II EW (AECPR) (Meera Ki Chauki)			2002-03	201.17/167.64	ALLUVIUM	65.50-81.50,99.80-111.80,117.89-129.89,142.07-146.07,155.14-163.14	12.87	2000	3.91	511.51	1470	0
7	SAHSWAN EW (Panna Lal Inter College)	78.749	28.075	2004-05	356.10/147.00	ALLUVIUM	50-56,65-69,78-86,92-100,106-114,120-122,134-142	4.92	2301	4.12	558.5	1835	3.92 *10 <sup>-4</sup>

8	SIRSA-I EW Block: Rajpura, In the campus of Poorva Madhyamik Vidyalaya	28 26 15	78 26 49	2012-13	132/115	ALLUVIUM	49-61,63-75,88-100						
9	SIRSA-II EW Block: Rajpura, In the campus of Poorva Madhyamik Vidyalaya	28 26 15	78 26 49	2012-13	38/33	ALLUVIUM	18-30						
10	KANNAUA-EW (Shallow), Block:Rajpura, 53L/7(B2)			2013-14	300.75/124	ALLUVIUM	42-54,61-67,81-87,92-98,112-118	5.5	1500 (Air Compressor)				
11	KANNAUA-EW (Deep), Block:Rajpura, 53L/7(B2)			2013-14	294/288	ALLUVIUM	252-264,272-284	3.5	1000 (Air Compressor)				
12	KANNAUA-OW (Shallow), Block:Rajpura, 53L/7(B2)			2013-14	Const. Depth:118	ALLUVIUM	42-48,61-64,81-84,92-98,115-115		1500 (Air Compressor)				
13	KANNAUA-OW (Deep), Block:Rajpura, 53L/7(B2)			2013-14	286/283	ALLUVIUM	252-258,274-280	3	1000 (Air Compressor)				
14	RUNAIYA-EW Block:Ujhani, Infront Primary School;	27.980	78.910	2013-14	414/147	ALLUVIUM	55-67,81-87,115-121,135-141	5.1	1500 (Air Compressor)				

	54I/13(B-1)												
15	RUNAIYA-OW Block:Ujhani, Infront Primary School; 54I/13(B-1)	27.980	78.910	2013- 14	144/142	ALLUVIU M	60-66,82-85,116- 119,136-139	5					

EW: Exploratory Well ; OW: Observation Well ; PZ : Piezometer

### **Hydrogeological characteristics of Aquifer System:**

Exploratory drilling carried out by C.G.W.B. in the district reveals the presence of granular horizon down to depth of 750m. Deepest bore hole was drilled down to a depth of 751.5 m bgl. at Samrer and zones tapped were 440-452 and 468-480mbgl. The well proved to be an artesian well with a head of 0.6 meter above ground level. shallow aquifer exists down to depth of 180 meters. Tubewells constructed in this aquifer group yields 2000-2250 lpm with a reasonable drawdown of 5 meters only. Tubewells tapping the deeper aquifer below 400 meters yields 2000 lpm at a reasonably higher drawdown. The aquifer material in the shallow aquifer is sand of various grades, clays and kankar, while in the deeper aquifer, the aquifer material is relatively coarser. The extension of individual zone is variable over the district. A gradual decrease of granular zone has been observed at various places in the district.

The depth of Tubewells varies from 200 to 751.50 mbgl and they screen 24 to 54 m of saturated granular zones. The average yield varies from 2000 to 2250lpm for economic drawdowns.

#### **4.2 Ground Water Resources:**

The dynamic ground water resources of the district as on 31.3.2009 is given in the following table:

#### **DYNAMIC GROUND WATER RESOURCES OF BULANSHAHAR DISTRICT AS ON 31.03.2009**

Sl. No.	Blocks	Net Annual Ground Water Availability	Existing Gross Ground Water Draft for All Uses	Net Ground Water Availability for future Irrigation development	Stage of Ground Water Development (%)	Category
1-	AMBIAPUR	6870.47	7130.68	0.00	103.79	OVER EXPLOITED
2-	ASAFPUR	7334.50	7339.78	0.00	100.07	OVER EXPLOITED
3-	BISAU LI	5570.96	6626.98	0.00	118.96	OVER EXPLOITED
4-	DAHEGAWA	7571.17	9317.82	0.00	123.07	SAFE*
5-	DATAGANJ	6208.30	4502.44	1736.05	72.52	SAFE
6-	GUNNAUR	7029.62	8762.28	0.00	124.65	OVER EXPLOITED
7-	ISLAMNAGAR	5908.69	8436.19	0.00	142.78	OVER EXPLOITED

8-	JAGAT	6075.42	5321.79	633.85	87.60	SEMI-CRITICAL
9-	JUNAWAI	7607.61	8802.84	0.00	115.71	OVER EXPLOITED
10-	MIAON	7043.66	4966.52	1903.80	70.51	SAFE
11-	QUADAR CHOWK	5921.74	4879.68	1018.09	82.40	SAFE
12-	RAJPURA	7054.42	6917.84	86.65	98.06	SAFE*
13-	SAHASWAN	9473.27	9534.18	0.00	100.64	OVER EXPLOITED
14-	SALARPUR	5499.82	5257.24	71.93	95.59	SEMI-CRITICAL
15-	SUMRER	5799.41	5141.32	657.01	88.65	SAFE
16-	UJHANI	9385.06	6355.01	2842.07	67.71	SAFE
17-	USAWAN	7778.10	4898.90	2800.54	62.98	SAFE
18-	WAJIRGANJ	6154.64	4820.12	1219.00	78.32	SAFE
	<b>TOTAL</b>	<b>124286.84</b>	<b>119011.61</b>	<b>12968.99</b>	<b>95.76</b>	

\* Since the blocks have significant shallow water level area (potential resource) hence they are not categorised and hence treated as SAFE.

The net annual ground water availability in the district ranges from 5499.82 Ham in Salarpur block to 9473.27 in Sahaswan block. Gross Ground Water Draft ranges from 4502.44 Ham in Dataganj block to 9534.18 Ham in Sahasawn block. Stage of Ground water development in the district is minimum in Usawan block (62.98%) and maximum in Islamnagar block (142.78%). Stage of ground water development of the district as a whole is 95.76%.

Ambiapur, Asafpur, Bisauli, Gunnaur, Islamnagar, Junawai Sahaswan blocks fall under Over-exploited category and Jagat & Salarpur fall in Semi-critical category. All other blocks fall in Safe category.

#### **4.3 Ground Water Quality:**

As per data of chemical analysis of samples collected from shallow zone at various locations in the district during the pre-monsoon water level measurement of the year 2012, the range of different parameters are shown in following table .

**TABLE : Summary of Ground Water Quality, Badaun district,**

S. No.	Constituents	Minimum	Maximum
1.	pH	7.53	8.54
2.	EC $\mu\text{S}/\text{cm}$ at 25 °C	400	1100
3.	HCO <sub>3</sub> mg/l	171	366
4.	Cl mg/l	7.1	107
5.	F mg/l	0.38	2.0
6.	NO <sub>3</sub> mg/l	0.2	60
7.	SO <sub>4</sub> mg/l	67	96
8.	TH (as CaCO <sub>3</sub> ) mg/l	80	350
9.	Ca mg/l	12	64
10.	Mg mg/l	12	51
11.	Na mg/l	7.8	99
12.	K mg/l	1.9	47

By and large, the groundwater of shallow aquifer is found to be suitable for both drinking and irrigation purposes.

The groundwater is mildly alkaline in nature. The maximum conductivity value 1100  $\mu\text{S}/\text{cm}$  at 25 °C was observed at Rajpura block. The quality of water in terms of Total Hardness as CaCO<sub>3</sub> was mainly found to be hard over most of the area with 72% samples registering hardness ranges from 151-300 mg/l. Very hard water (>301 mg/l) comprise 17% of the samples. The chloride concentration was found to be within the desirable limit for drinking purpose. (BIS, 2012). The level of nitrate was recorded more than the permissible limit of 45 mg/l at Rajpura block and Gunnar block. Fluoride concentration was found to be within the permissible limit (1.5mg/l) in majority of the samples. The concentration of Fluoride was found to be more than 1.5 mg/l at Islamnagar block. The Arsenic content ranges

from nd to 0.55mg/l in the ground water of the district. The high value of Arsenic 0.55 mg/l was found at Harpalpur. Iron concentration was found to be more than 1.0 mg/l at Chatuiya (1.015), Naukhera (1.363), Khajurara (1.28), Pipraul (1.411,) Harpalpur (1.262), Runiya

Sl.No,	Wells feasible	Rig suitable	Depth of well (m)	Discharge (lpm)
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(1.228). The manganese content varies from 0.001at Nauhara to 0.925mg/l at Papparganj.

#### **4.4 Status of Ground Water Development:**

Development of ground water in the district is mainly through dug wells, Hand Pumps – India Mark-II and Tubewells. The gross ground water draft for irrigation in the district as on 31.3.2009 is 1124 MCM whereas the ground water draft for domestic and industrial use is 66 MCM. Hence the existing gross ground water draft for all uses in the district is 1190 MCM. Net Ground Water Availability for future irrigation development in the district is 129.69 MCM. A quantum of 75 MCM has been allocated for domestic and industrial requirement for year 2025. Net available ground water availability in the district is 1243 MCM. The stage of ground water development for the district is 95.76%.

### **5 Ground Water Management Strategy:**

#### **5.1 Ground Water Development**

In this block where level of development is less than 70%,there is scope of ground water development with proper management and control.

In the blocks of Over-exploited, Critical and Semi-critical categories covering major parts of the district it is necessary to exercise caution while planning further development of available ground water resources in the district.

In the areas of low ground water development the wells suitable for extraction of ground water, suitability of rigs, depth range and discharge in the district can be summarized as follows:-



1.	Hand Pump	Manual/ Hand Boring set	20-40	50-100
2.	Shallow Tubewell	Rotary Rigs (Direct/Reverse)	100-180	1000-1500
3.	Deep Tubewell	Rotary (Direct)Rig	200-500	2000-3000

## **5.2 Water Conservation & Artificial Recharge**

In the areas where post-monsoon depth to water level is more than 9 mbgl and rate of decline during post-monsoon period is >20 cm/year, there is immediate need to adopt techniques of water conservation and artificial recharge.

In such urban area, roof top rain water harvesting should be made mandatory for all government buildings, schools etc. Recharge Pits/shafts/trenches of suitable design are ideal structures for rain water harvesting in such areas.

In rural areas check dams, Cement Plug should be constructed as per local hydrogeological conditions to recharge the area. Revival, Renovation and Restoration of Ponds should be encouraged to arrest the decline of water level.

## **6. Ground Water Related Issues and Problems:**

The trend analysis of historical ground water level data indicate fall both in Pre and Post-monsoon period in the major parts of the district. This will impact in:-

- (i) further decline of ground water level
- (ii) drying up of dug wells/shallow wells
- (iii) decrease in yield of shallow wells, and
- (iv) increased expenditure and power consumption for drawing water from progressively deeper depths.

As canal network in the district is very less, the draft of water is mainly through ground water. Excessive use of fertilizers and pesticides in agriculture, improper waste disposal have resulted in high content of nitrate in the phreatic zone in the district.

### **Awareness & Training Activity:**

Central Ground Water Board has organized one Mass Awareness Programme at Salarpur on 05.3.2008 to make the people aware about the proper development and management of ground water.

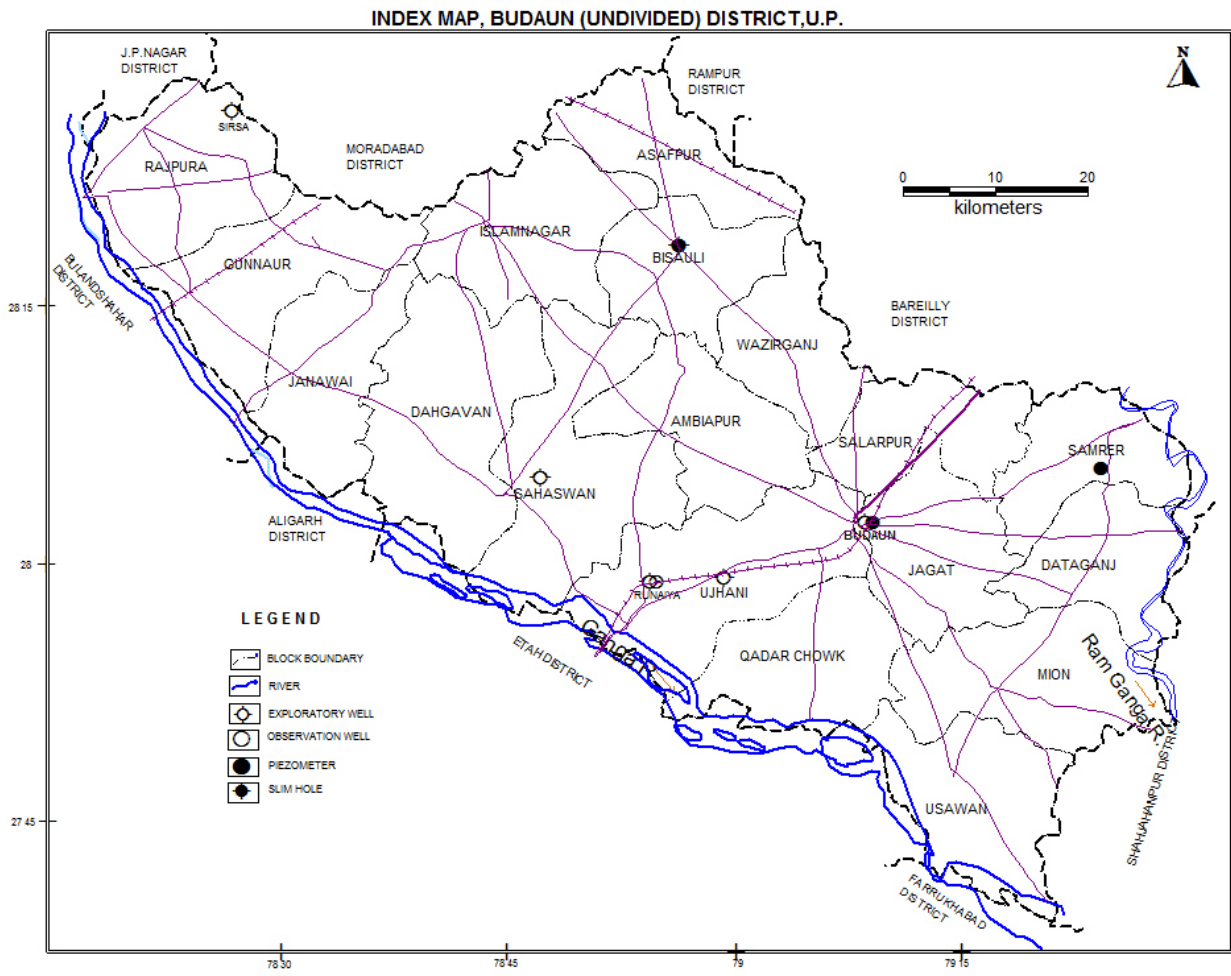
Central Ground Water Board has also organized one Village level Tier III Training Programme for two days in the Block office at Sahaswan on 19.3.2013 and 20.3.2013. Members of various Gram Panchayat, rural mass and stakeholders participated in the training programme. The objective was to make the people aware about the proper development and management of ground water.

### **Areas Notified by Central Ground Water Authority:**

Central Ground Water Authority has not notified any area/block in the district.

## **7. Recommendations:**

1. As level of development in many blocks of the district is high and many blocks fall in Over-exploited category, further development of ground water in these areas should be done with extreme caution.
2. To minimize the overstress in Aquifer Group I, it is recommended to plan water supply tubewell tapping deeper aquifer groups in future for drinking water.
3. Artificial recharge technique should be adopted to arrest the decline of water level. In urban areas, roof top rain water harvesting, with structures such as Recharge pits/shafts/trenches of suitable design, should be made mandatory for all government buildings, schools etc. having large roof top area.
4. In rural areas, Check dams, Cement Plugs should be constructed as per local hydrogeological conditions to recharge the area. Revival, Renovation and Restoration of Ponds should be encouraged.
5. Further, operation and maintenance of artificial recharge structures are essential to make them efficient and priority may be given to this activity so as to make these structures effective.
6. Excessive use of fertilizers by the farmers should be discouraged.
7. Mass Awareness Programmes and Water Management Training programmes should be conducted in blocks which fall in Over-exploited, Critical and Semi-critical categories for efficient development and management of ground water.
8. Water use efficiency measures should be adopted to reduce ground water demand for agriculture.



**Plate-II : Depth to Water Level, May'2012 , Budaun district, U.P.**

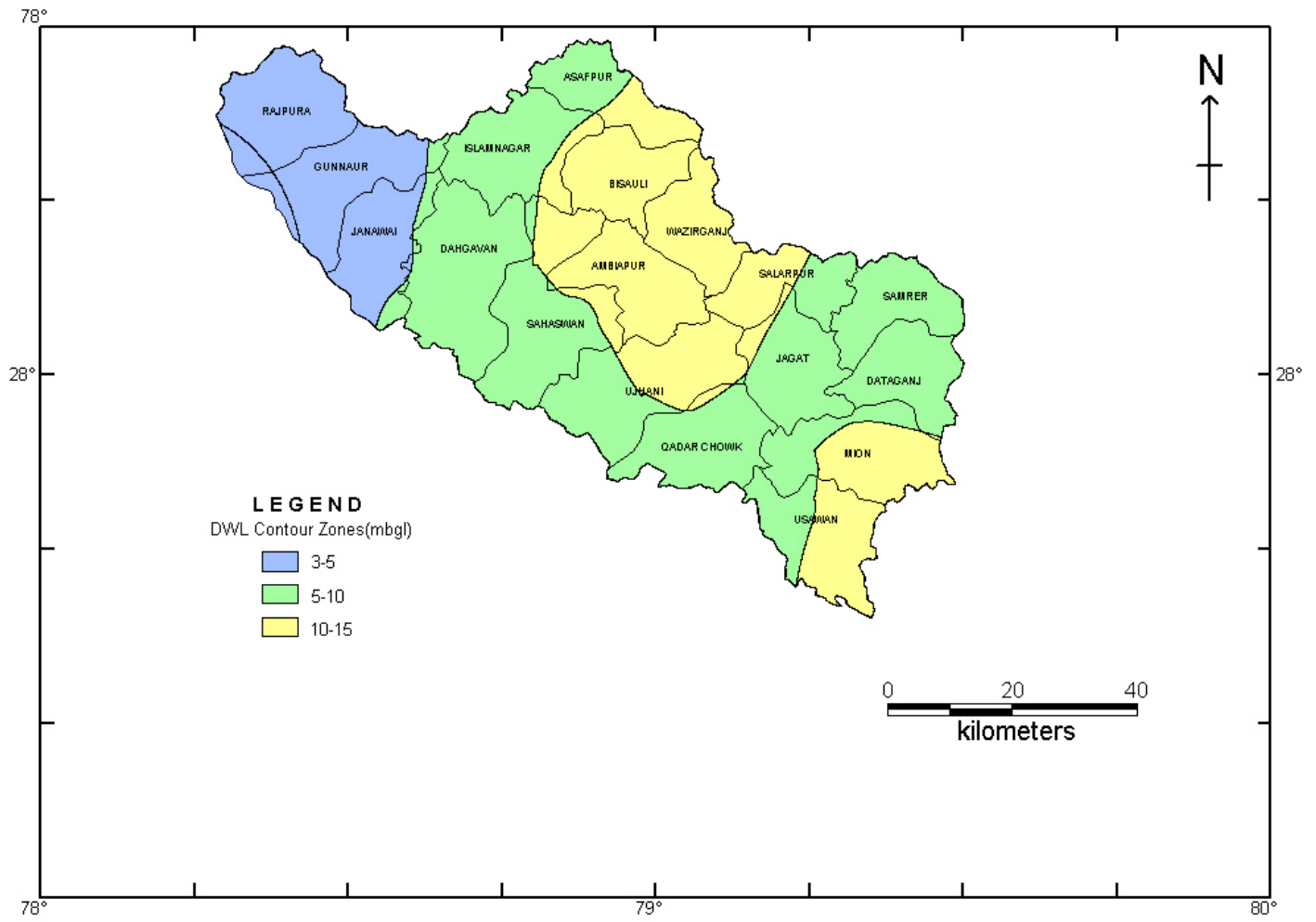
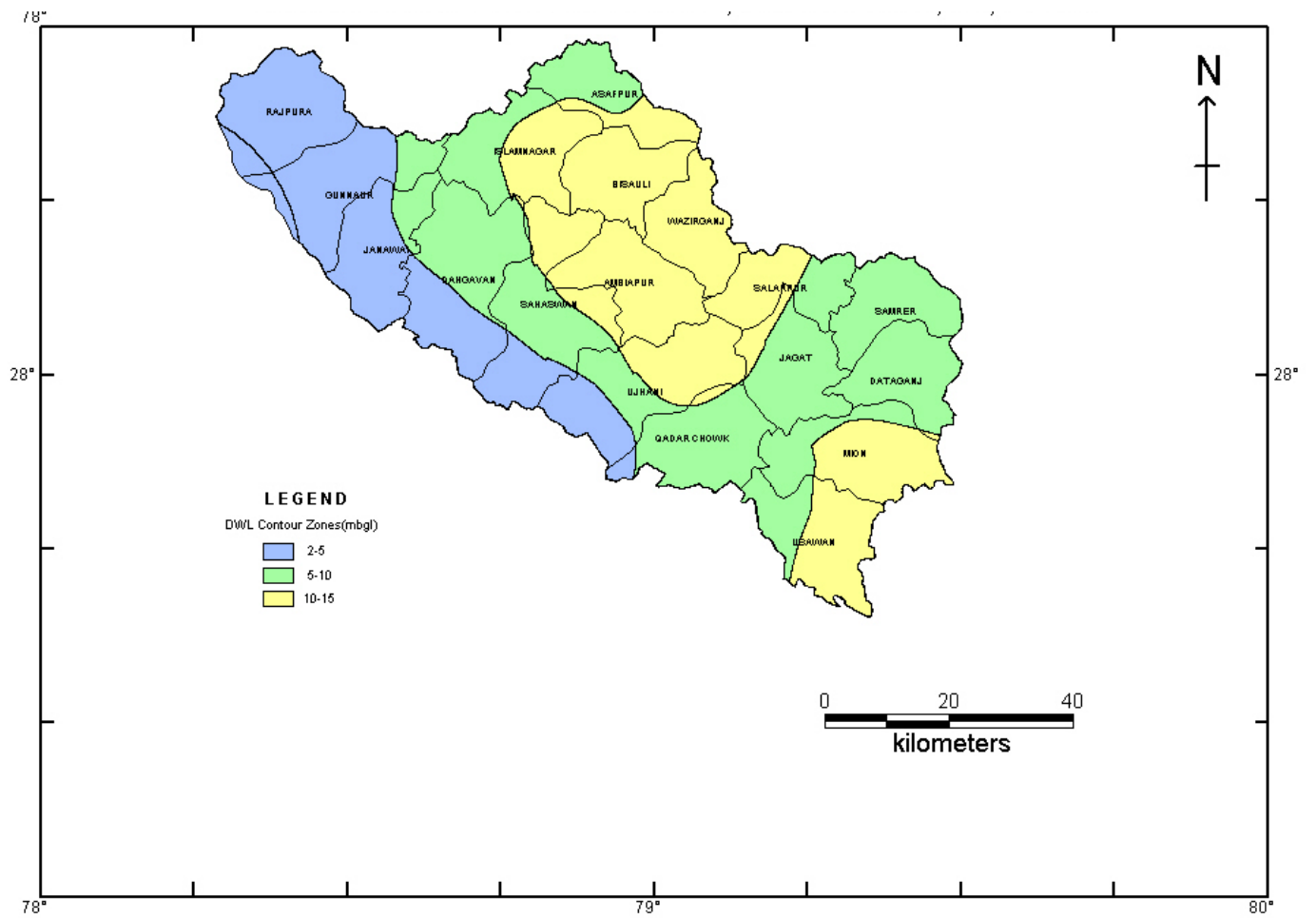
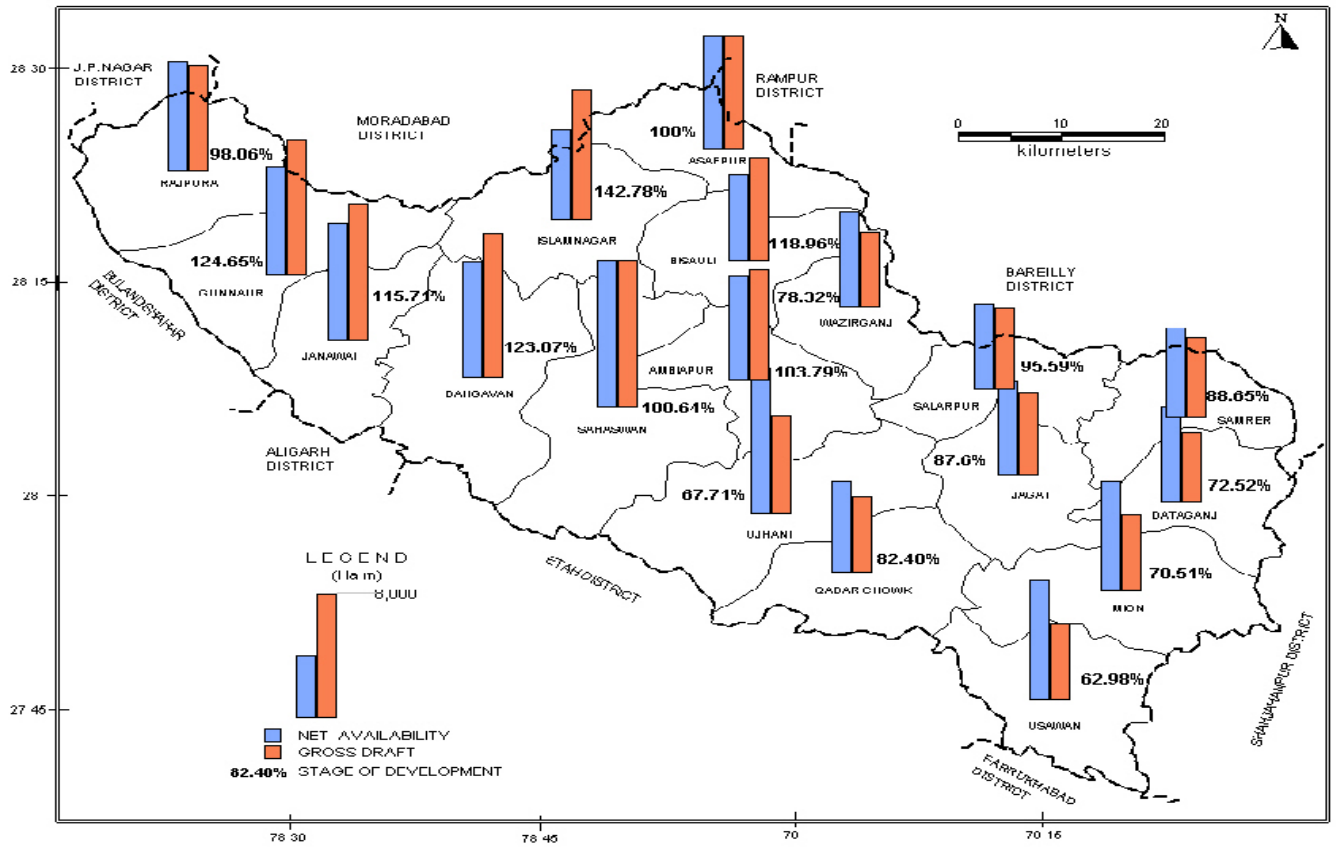
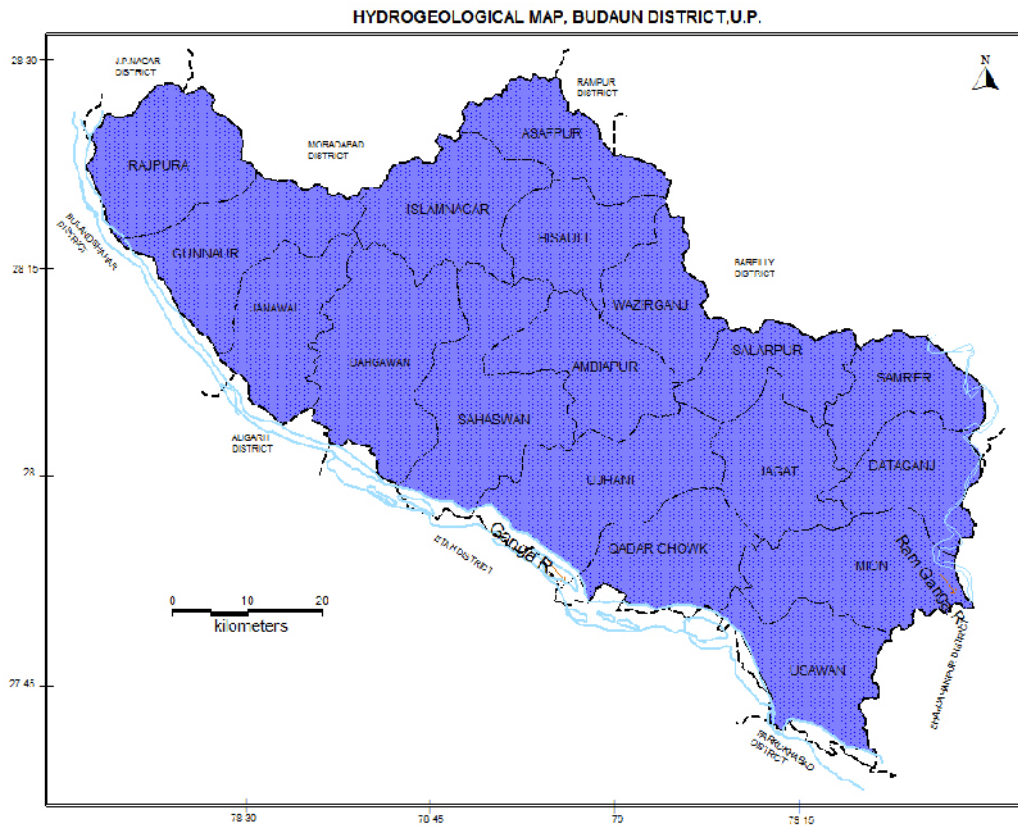


Plate-III : Depth to Water Level, Nov'2012 , Budaun district, U.P.




DYNAMIC GROUND WATER RESOURCES(2009),BUDAUN DISTRICT, U.P.





**LEGEND**

	<b>WELLS FEASIBLE</b>	<b>RIGS SUITABLE</b>	<b>DEPTH OF WELL (M)</b>	<b>DISCHARGE (LPM)</b>	<b>SUITABLE ARTIFICIAL RECHARGE STRUCTURES*</b>
 Soft Rock Aquifer	Dug Wells / Hand Pump	Manual / Hand boring set	20 – 40	50 - 100	Recharge Shaft, Recharge Pit, Abandoned Hand-pumps / Tubewells, Roof Top Rain Water Harvesting Structures in urban areas.
	Shallow Tube Well	Rotary Rigs (Direct / Reverse)	50 - 100	1000 - 1500	
	Deep Tube Well	Rotary (Direct)	100 – 450**	2000 – 3000	

\* Applicable in alluvial area where depth to water level is > 8 m.

\*\* Limited upto depth explored i.e. deeper prospects yet to be found.