भूजल सूचना पुस्तिका

गुमला जिला, झारखंड

Ground Water Information Booklet

Gumla District, Jharkhand State

Weathered Granite Gneiss near Palkot, Gumla District

केन्द्रीय भूमिजल बोर्ड

जल संसाधन मंत्रालय

(भारत सरकार)

राज्य एकक कार्यालय, राँची

मध्य-पूर्वी क्षेत्र

पटना

Central Ground water Board

Ministry of Water Resources

(Govt. of India)

State Unit Office,Ranchi

Mid-Eastern Region

Patna

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September 2013

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GROUND WATER INFORMATION OF GUMLA DISTRICT, JHARKHAND STATE

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GUMLA – DISTRICT AT A GLANCE

Sl No.	ITEMS	Statistics	
1.	GENERAL INFORMATION		
	i) Geographical Area (Sq km.)	5320. 94 Sq. km.	
	(16) Administrative Divisions (As on 2011) Number of Block Number of Panchyat / Villages	 12 136/ 953	
	(ii) Population (As on 2011 Census)-	1025213	
	(iii) Average Annual Rainfall (mm)	1487 mm	
2.	GEOMORPHOLOGY		
	Major Physiographic units	Chotanagpur plateau	
	Major Drainages	South Koel, North Koel and Sankh	
3.	LAND USE (Sq Km.)		
	a) Forest area:	811.4	
	b) Net area sown:	1617.5	
	c) Cultivable area:	1693	
4.	MAJOR SOIL TYPES	Ultisols (Lateritic soil, red and yellow soils) Alfisoils (Older alluvial soil) Light textured Acidic to Neutral Very poor fertility	
5.	AREA UNDER PRINCIPAL CROPS	Pulses – 159.6 Oilseeds – 79.91 Paddy – 1276.41 Maise – 31.32	
6.	IRRIGATION BY DIFFERENT SOURCES (Areas and Number of Structures)	Nos.	Area (in Ha)
	Dugwell	22941	6220
	Tube wells /Bore wells	Nil	Nil
	Tanks / Ponds	82	55
	Canals	32	16
	Other Sources	147	114
	Net irrigated area	6405 Ha.	
	Gross irrigated area	10334 Ha.	
7.	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-03-07) No of Dugwell No. of Piezometers	 15 Nil	
10.	PREDOMINANT GEOLOGICAL FORMATIONS	Chotanagpur Granite Gneiss, Laterites	
11			
	➢ Major Water bearing formation ➢ (Pre-monsoon Depth to water level during 2012) ➢ Post-monsoon Depth to water level during 2012) ➢ Long term water level trend in 10 yrs (2003-2012) in m / yr. (Pre – monsoon)	Granite gneiss 2.28 to 11.87 mbgl 3.10 to 6.25 mbgl Rise: 0.018 – 0.172 Fall: 0.026 – 0. 323	

12.	GROUND WATER EXPLORATION BY CGWB (As on 31-03-07)	
	No. of wells drilled (EW, OW, PZ, SH, Total	EW – 20, OW – 4
	Depth Range (m)	55. 91– 199.92 mbgl
	Discharge (m^3/hr.)	0.50 – 36.00
	Storativity (S)	3.9×10^{-5}
	Transmissivity (m^2/day)	0.90 – 66 m^2/day
13.	GROUND WATER QUALITY	Good
	Presence of Chemical constituents more than permissible limit (e.g. EC, F, As, Fe)	EC 71 o 1363 micro mhos/cm at 25^0 C.
	Type of Water	Potable
14.	DYNAMIC GROUND WATER RESOURCES (2009) in mcm.	
	Net Annual Ground Water Resources	36519.79
	Net Annual Ground Water Draft	9540.64
	Projected Demand for Domestic and Industrial uses up to 2034	1669.80
	Stage of Ground Water Development	26.12 %
15.	AWARENESSS AND TRAINING ACTIVITY	
	Mass Awareness Programmes Organized Date Place No. of Participants	 30^{th} January 2006 Gumla 100 peoples
16.	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	
	Projects completed by CGWB (No & Amount spent)	Nil
	Projects under technical guidance of CGWB (Numbers)	Nil
17	GROUND WATER CONTROL AND REGULATION	
	Number Of OE Blocks	Nil
	No. of Critical Block	Nil
	No. of Blocks notified	Nil
18.	MAJOR GROUND WATER PROBLEMS AND ISSUES	60% of NHNS showing declining trend of water level for pre monsoon and post monsoon period

Ground Water Information Booklet
Gumla district, Jharkhand state

1.0 Introduction

1.1 Administration: - Gumla district of Jharkhand state is located in the western part of the state. It covers an area of about 5320.94 Sq. Km. This district was carved out of old Ranchi district under in 1984. The district is bounded in the north by the Lohardaga and Latehar districts, in the east by Ranchi district, in the south by Simdega district and in the west by the Chhatisgarh state. The district is situated between 22^0 42' 45" and 23^0 36' 30" N latitude and 84^0 02' 00" and 85^0 01' 00" E longitude. The district is covering Survey of India toposheet nos. 73 B/ 02, 03, 05, 06, 07, 09, 10, 11, 13, 14, 15, 73 F/ 01, 02 and 03. The Gumla district comes under the south Chhotanagpur division. It has one sub – division i.e. Gumla Sadar sub – division. Further, the sub – division is devided into 11 blocks namely – Gumla, Palkot, Chainpur, Dumri, Bishunpur, Raidih, Ghaghra, Sisai, Basia Bharno and Kamdara (Fig. 1). 12^{th} block as Albert Ekka (Jari) has been created during 2011 census.As per census of 2011, the total population of the district is 1025213 persons. Population density of Gumla district for 2011 is 191 people per sq. km. There was change of 23.16 % in the population compared to population as per 2001. Average literacy rate of Gumla in 2011 were 65.73 compared to 50.94 of 2001 With regards to Sex Ratio in Gumla, it stood at 993 per 1000 male compared to 2001 census figure of 988. Graphical representation of population is given in Fig 1A.The administrative division and population of the district is given in table – 1.

1.2 Sub – basin/ Basin, Drainage: - The district is forming two sub basins i.e. the Son sub – basin of Ganga basin and the Sankh sub basin of Brahmni basin. The entire district is highly dissected by rivers of varying magnitudes, new drainage basins were formed when the region was elevated during recent past. The nucleous of the drainage area is located on an elevated tract for Ranchi plateau. (Fig. 1)

The south koel originates from a place called Piska near Ranchi and has its course traverses in the Ranchi, Gumla and Simdega districts. Several feeders of South Koel river have their source on the western side of the north – south up-

wrap. It flows from north to south having meandering coarse excavating even straight valleys in the western part of the areas whereas in the northern part south-koel meanders from west to east. The entire catchment basin of the South- koel is wide and extensive which incorporates the most populous region. In the lower reaches of the river sand banks are formed due to large amount of silt

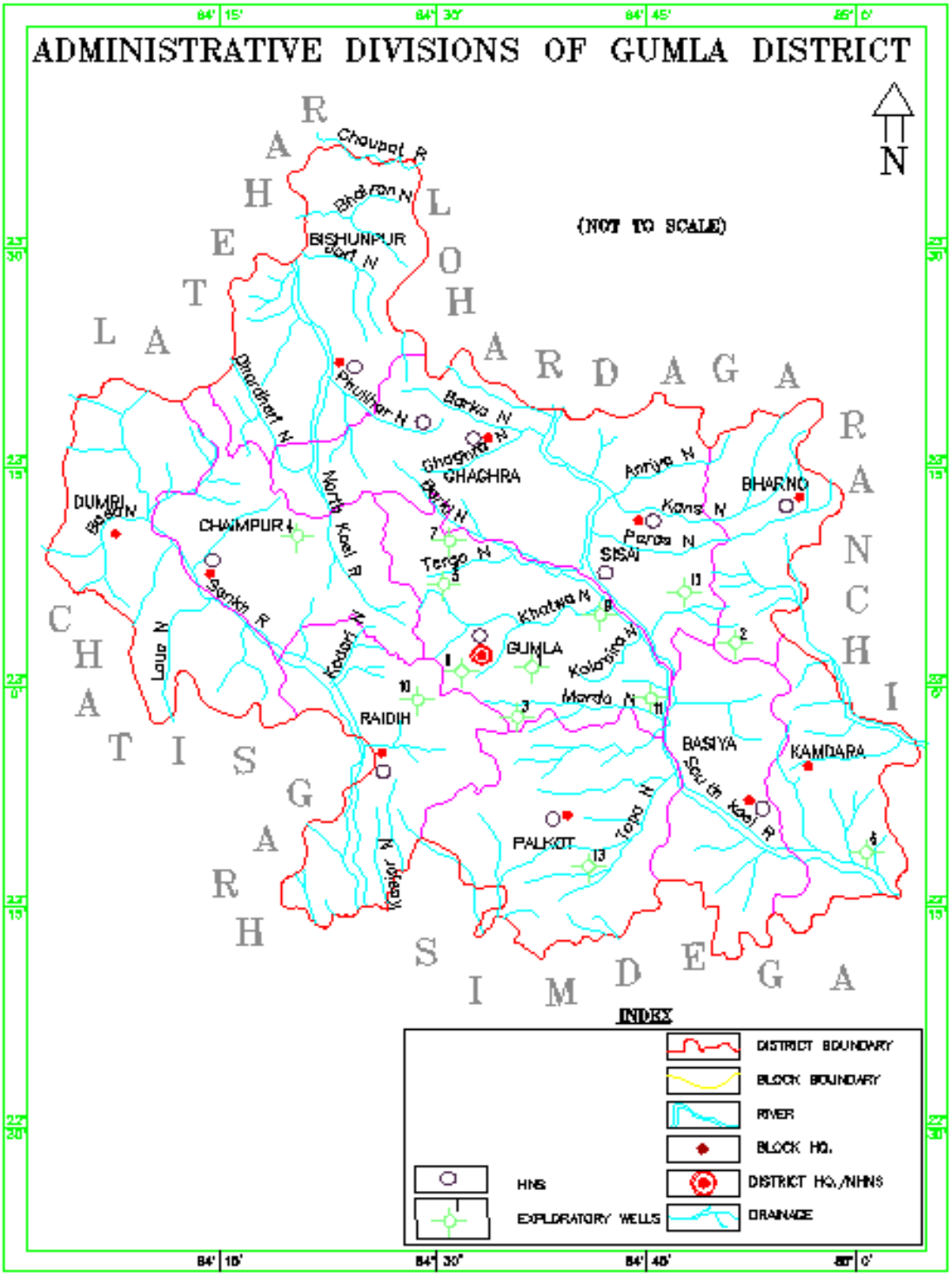
TABLE 1: ADMINISTRATIVE DIVISION AND POPULATION OF GUMLA DISTRICT (2011)

Sr. No.	Block	Area (Sq. km) (2001)	Rural population			Urban population		
			Male	Female	Total	Male	Female	Total
1	Chainpur	471.45	28397	28194	56591	--	--	--
2	Ghaghra	534.94	52853	52966	105819	4294	4286	8580
3	Dumri	581.95	24885	24249	49134	--	--	--
4	Gumla	540.29	78956	78163	157119	28961	27540	56501
5	Basia	399.03	40321	40410	80731	--	--	--
6	Palkot	579.02	40215	40644	80859	--	--	--
7	Raidih	514.13	35748	35695	71443	--	--	--
8	Kamdara	365.48	31686	32089	63775	--	--	--
9	Sisai	425.44	58427	58417	116844	--	--	--
10	Bharno	299.77	42355	42217	84572	--	--	--
11	Bishunpur	609.44	31506	30813	62319	--	--	--
12	Albert Ekka (Jari)	NA	15786	15140	30926	--	--	--
	Total	5,320.94	481135	478997	960132	33255	31826	65081

brought down by the rivers Dendritic drainage pattern, a typical of hard rock terrain is developed over the area. However redial drainage pattern is developed locally in

some areas where streams and tributaries emanated from the local mounds and raised ground. All these drainage is characterized by rapid surface run – off.

FIG—1



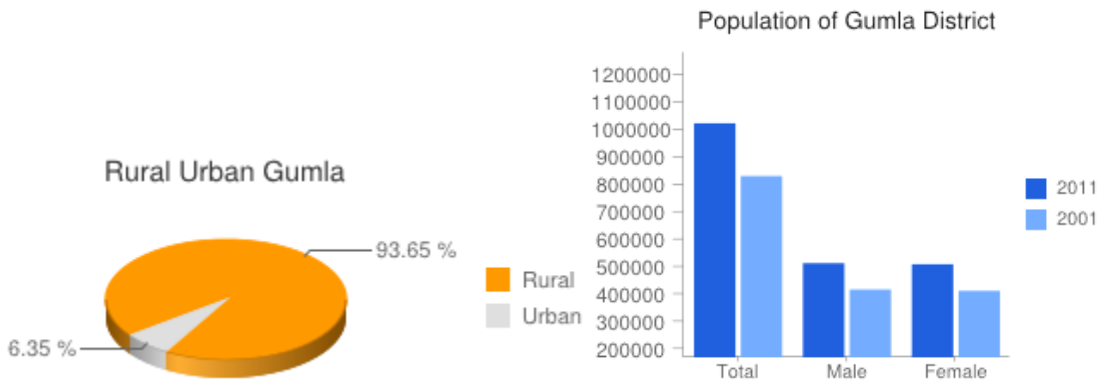


Fig 1A- Graphical representation of population

1.3 Irrigation: -Water is the main requisite for irrigation which must be timely and adequently available to maintain the soil water balance to ensure maximum productivity. In Gumla district surface water infrastructure is most inadequate, which is evident from the list of the major and medium surface water irrigation projects, Ultimate, irrigation potential to be created, and irrigation potential created.

Although the rainfall in the district is successfully high (1500 mm / year) but there is no arrangement to conserve the rain fall, which due to undulating totpography goes waste as a run off.

The South Koel, the Sankh and the North Koel rivers drains the area of this district, but on account of the steep gradient rivers drain off quickly. The flow in these rivers diminishes during the critical period of crop as and when rainfall is deficient because the are all rain fed rivers. However base flow is present. So, there is acute shortage of water resources in this district causing severe drought. Even the drinking water becomes scarce because of the depletion of ground water level during pre – monsoon period.

1.4 Studies

Central Ground Water Board has established a network of observation wells under National Hydrograph Network programme to study the behavior of ground water level and quality of ground water in the district. The ground water management study has been carried out during the year 2002 – 03 in part of the district and field data was collected for the study of ground water conditions in respect of quality and quantity. The board has also carried out exploratory drilling in the district under the AAP 1977 – 79 and 2005 – 06. Twenty bore wells have been drilled to know the sub – surface geology, depth and thickness of water

bearing formation with their yield and determine the different aquifer parameters which are presented in table - 2.

TABLE 2: DETAILS OF EXPLORATORY WELLS IN GUMLA DISTRICT.

Sl No	Location/ Block	Depth drilled (mbgl)	Static Water Level (mbgl)	Dis-charge (m^3/hr)	Draw-down (m)	Transmissi-vity (m^2/day)	Storavity
1	Nimtoli	90.00	8.00	10.80	14.00	28.97	--
2	Natapole	60.40	5.10	36.00	13.78	66.00	--
3	Hansala	90.00	7.70	3.60	14.95	2.84	--
4	Choha	91.00	4.75	1.80	14.55	2.90	--
	OW	--	--	--	--	--	--
5	Chuglu	90.70	7.50	1.80	16.55	0.90	--
6	Salegutu	55.91	8.21	9.00	10.00	11.30	--
	OW	--	--	--	--	--	--
7	Kasitola			10.7			
8	Toto	161.82	5.64	25.56	--	--	--
	OW – I	138.96	--	--	--	--	--
	OW – II	138.96	--	16.20	--	--	--
9	Karaundi	199.92	5.85	4.3	--	--	--
10	Silaphari	199.92	6.1	0.92	--	--	--
11	Bhalmunda	199.92	5.65	6.48	--	--	--
12	Murkunda	199.92	--	3.60	--	--	--
13	Korekera	199.92	7.1	5.40	--	--	--
14	Kend Toli	184.68	--	0.50	--	--	--
15	Basia	--	--	2.6	--	--	--
16	Bharno EW 1	--	--	2.1	20.16	0.13	3.9*10-5
17	Bharno EW 2	--	--	5.4	7.87	0.27	
	EXPLORATORY WELLS DRILLED BY OUTSOURCED RIGS						
18	Kasir	150	4.95	5.08	4.95	--	--
19	Murgu	132.39	5.6	24	6.1	--	--
20	Toto	150	7.9	--	--	--	--

2.0 Climate and rainfall: -

The Gumla district enjoys a healthy climate through out the year. Normal atmospheric temperature in the area often goes up to 42^0 c in summer and it goes down to about 4^0 c during winter.

The climate of the area could be divided in to three district season. The winter commences from November and extends of to middle of March, December being the coldest month. The winter season is characterized by heavy dew thick fog and cold wave. The rainy season last up to middle of October. The area is free from hot winds and dust storm. The monsoon sets in by the middle of June and continues till the middle of October. The area receives rain fall mainly by North-west monsoon during rainy season and from retreating monsoon during inter-monsoon period, which originates in the bay of Bengal. The average annual rainfall varies between 1400-1600 mm. Rainfall is the only sources of replenishment of ground water in the district.

3.0 Geomorphology and soil types

3. 1 Geomorphology: The Chottanagpur plateau is a region of large physical inequalities and presents a rich panorama of topographical features. The general configuration of region varies from valley fills, pedeplains, to structural ridges. In Gumla district three well marked erosion surfaces are clearly discernible.

The large difference relief brings about strong, contrast climate, natural vegetation, surface drainage, under ground water and soil profile. In the pat region the rivers are long deep and with terrace but in pedeplain area they are wide with gentle slopes.

3.2 Soils: All the river channels in the area are covered with alluvial soil recent of origin deposited over consolidated rocks. Alluvial fills are also found in patches away from the river channels. Thickness of these fills depends upon the topographical control. The alluvial sediments are comprised of coarse sand and gravel mixed with silt and clay, silt materials predominates over clayey materials. This covers almost the entire are as a thin capping over granitic rocks. The red calcareous soils are found in the western part mainly in the intermontance valley. They are mostly sandy loam mixed with kankar. A thick of pellety, modular, ferruginous, red laterites of Pleistocene age are found to occur as extensive

capping over gneissic rocks. It consists of ferruginous and aluminous materials. Forest soil is confined to the reserve forest area and have surface layer of organic matter. Agriculture and forestry are the two main occupations of the local population in the district. But the land available for the cultivation is limited because of the hilly and rigged topography. The absence of proper and the assured source of the irrigation has impeded the growth of agriculture.

4.0 Ground Water Scenario

4.1 Hydrogeology: - Gumla district is mainly a dissected upland of ancient crystalline rocks which covers the major parts of the district. Ground water availability in crystalline rocks is considered to be poor because of the absence of primary porosity which is essential for the free occurrence and movement of ground water. The secondary porosity in the form of fractures, fissures, joints etc. develop due to orogenic movements aided by weathering, making the crystalline rocks potential repository for the occurrence and movement of ground water. The ground water in the district is controlled primarily by the thickness of weathered zone, extent, size opennes and interconnection of fractures, geological and topographical setting. Major part of the district fractured and weathered crystalline hard rock form the aquifer. Ground water in the district characterized by the hard rocks is located in the weathered residuum in the shallow depth under unconfined condition and circulates through the under lying fracture system extending to deeper horizon under semi – confined to confined conditions. (Fig-2)

4.1.1 Exploratory wells: To understand the sub – surface geology, identify the various water bearing horizons including their depth location and thickness and compute the hydraulic characteristics such as Transmissivity and Storativity of the aquifers, exploratory drilling programme was carried out under AAP 1977– 79 & 2006 - 07. There are 20 exploratory wells and 04 observtion wells were drilled in the district. The depth of exploratory wells ranges between 55.91 to 199.92 mbgl. The static water level of these exploratory wells varies from 4.75 magl to 8.21 mbgl. The Transmissivity value varies from 0.90 to 66.00 m^2/ day.

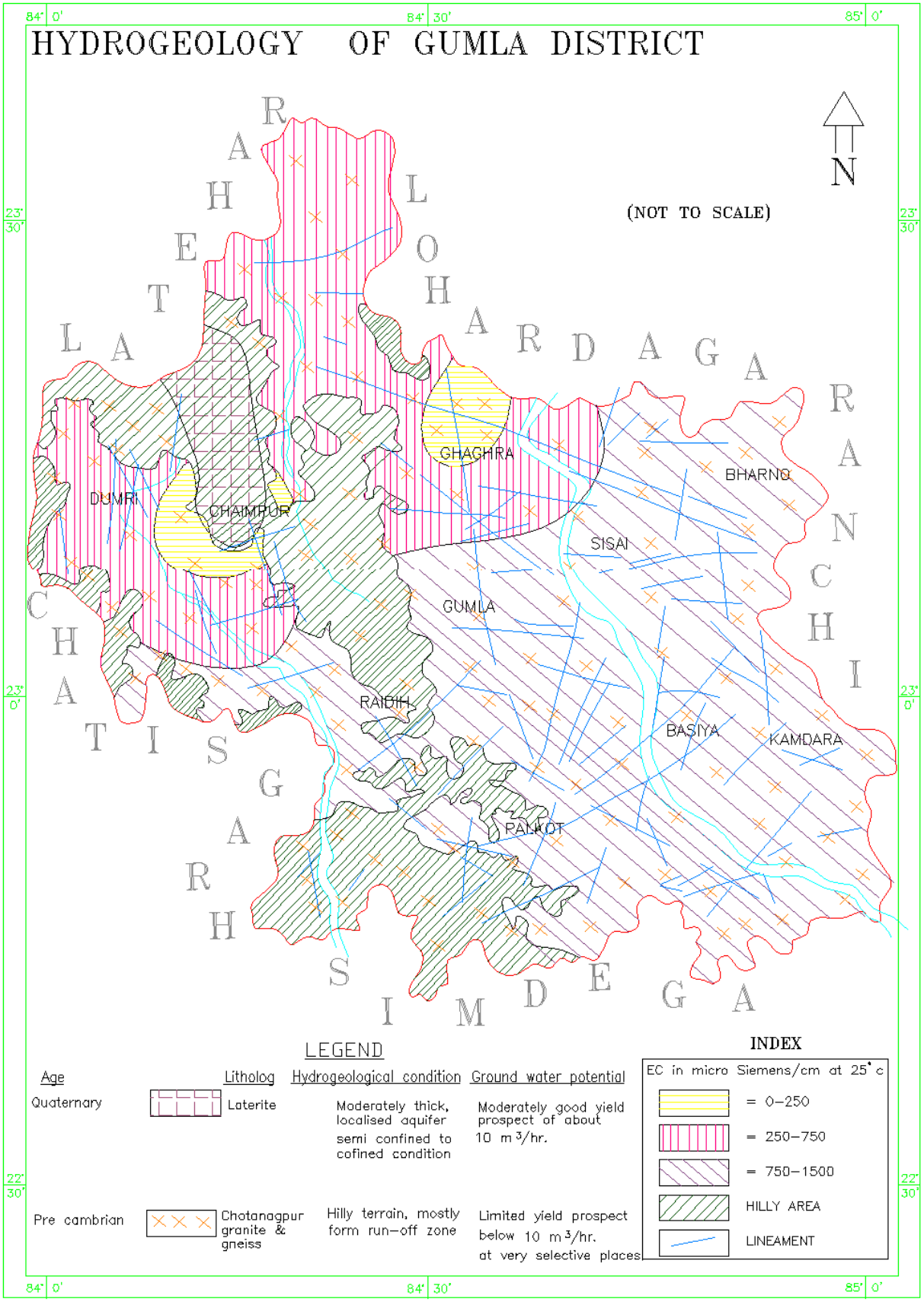
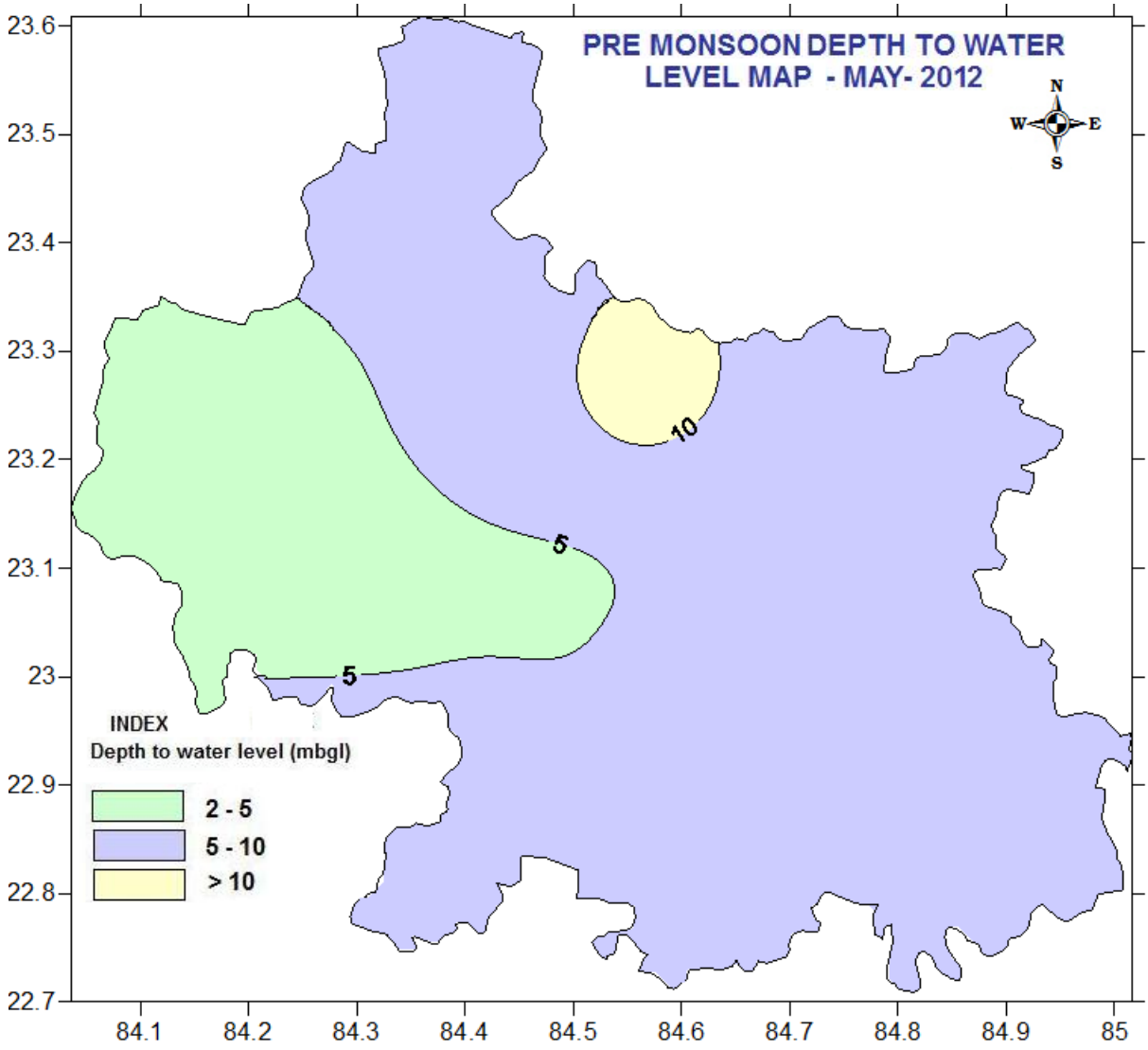


Fig 2 Hydrogeological Map of Gumla district

4.1.2 Depth to Water Level: -

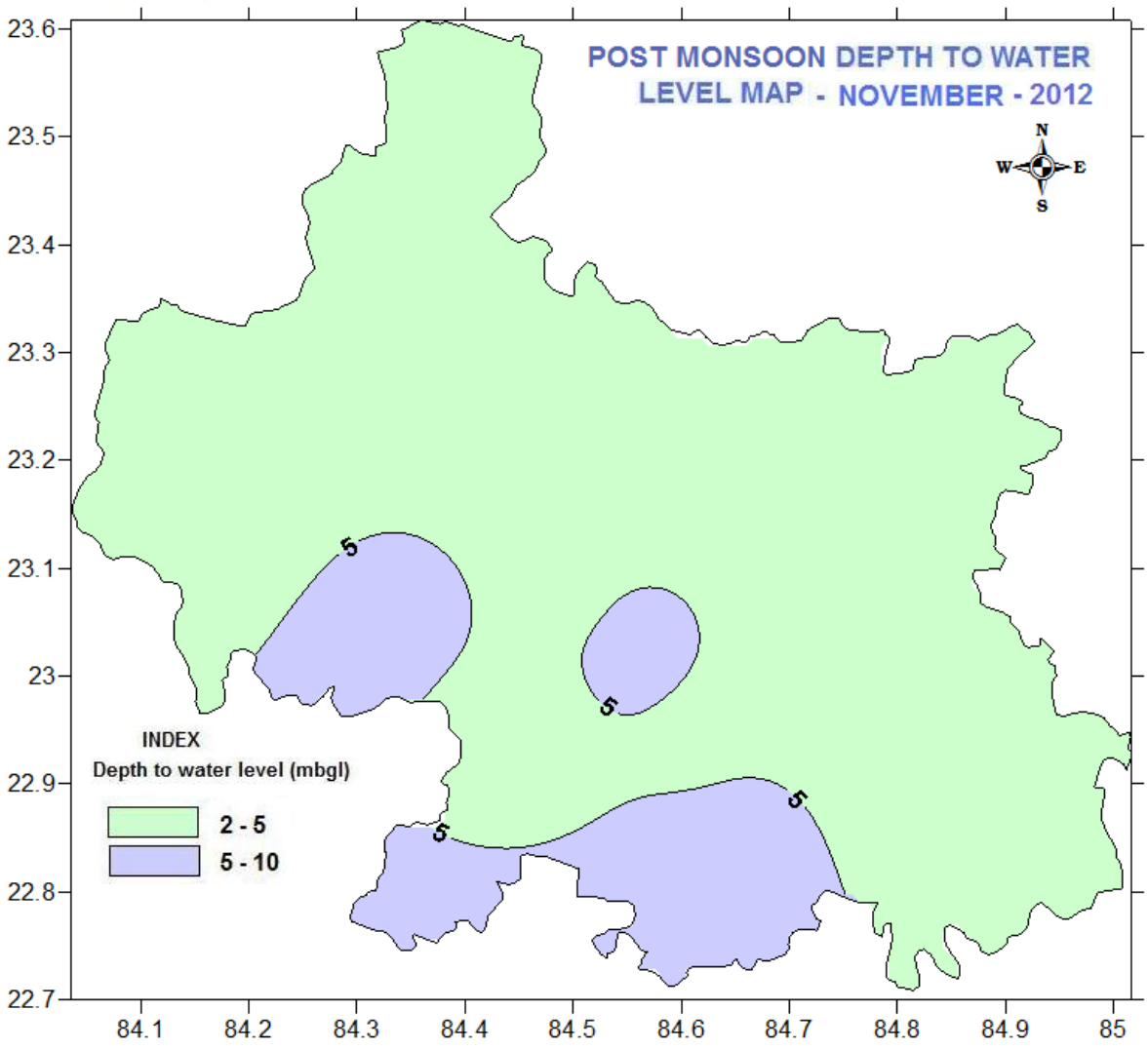
There are 15 National Hydrograph Stations (NHS) have been established by Central Ground Water Board for the study of behavior of the water level and their fluctuation.

Pre monsoon depth to water level: - On the basis of the depth to water level of the year 2012 (Table – 2), the pre monsoon depth to water level was monitored between 2.28 to 11.87 mbgl. Majority of the wells (85%) fall in the water level range of 5– 10 mbgl. About 10% wells fall in the water level range from 2 – 5 mbgl . Pre monsoon depth to water level map is shown in fig.-3.



Post monsoon depth to water level: - The post monsoon depth to water level ranges between 3.10 to 6.25 mbgl. About 69% of the wells fall in the water level ranges between 2 – 5 mbgl and 31% of the wells fall in the depth to

water level ranges between 5 -10 mbgl. Post monsoon depth to water level map is shown in figure 4.



4.1.3 Seasonal Fluctuation:- From the pre monsoon and post monsoon depth to water level data collected during May 2012 and November 2012 respectively, water level fluctuation were computed for all NHS of the district. The water level fluctuation between pre monsoon and post monsoon period of the district varies from – 0.30 to 7.89 m. About 80% wells are showing water level fluctuation between 0 – 4 m and while 20% wells show fluctuation > 4.0 m. The pre monsoon, post monsoon and seasonal fluctuation water level data has been given in table 3.

TABLE 3: DEPTH TO WATER LEVEL OF HYDROGRAPH NETWORK STATIONS LOCATED IN GUMLA DISTRICT (2012-13)

Sl No.	Location	May 2012	August 2012	November 2012	January 2013
1	Gumla	7.47	3.43	6.25	6.80
2	Sisai	6.90	4.21	3.10	4.60
3	Bharno bdo	6.11	2.19	3.90	5.35
4	Ghagra	11.87	4.84	3.98	7.20
5	Bishnupur	8.86	4.70	5.65	6.30
6	Palkot	8.44	2.36	5.76	6.85
7	Baisia	8.30	1.09	3.95	5.80
8	Raidih	7.03	1.11	4.08	4.40
9	Chainpur	4.10	1.3	4.40	3.95
10	Nagfeni	8.57	2.44	4.15	5.50
11	Adar	5.75	1.98	4.20	4.45
12	Anjam gram	2.28	1.2	4.02	2.10
13	Bhagma	-	-	4.05	5.65
14	Kasir	-	-	5.80	0.55
15	Kharka	-	-	3.95	6.90

4.1.4 Long term water level trend: - Water level depends upon the storage of ground water development and variation in rainfall over a long period. The water level data of each station has been analysed. The pre monsoon and post monsoon long term water level trend has been calculated for the period of 2003 – 2012 (Table 4). The long term water level trend is showing declining trend between 0.026 – 0.323, 0.013 – 0.267 and 0.009 – 2.088 m/ year for pre monsoon, post monsoon and all period respectively.

TABLE 4: LONG TERM WATER LEVEL TREND FOR EXISTING HYDROGRAPH NETWORK STATIONS IN GUMLA DISTRICT (2003 – 2012)

Sl No.	Location	Pre monsoon trend (m/year)		Post monsoon trend (m/year)		All period (m/year)	
		Rise	Fall	Rise	Fall	Rise	Fall
1	Gumla	0.088	-	-	0.11	0.083	-
2	Sisai	0.022	-	0.113	-	0.141	-
3	Bharno bdo	0.172	-	0.094	-	0.12	-
4	Ghagra	-	0.274	0.076	-	-	0.018
5	Bishnupur	0.116	-	-	0.1	0.097	-
6	Palkot	0.069	-	-	0.018	0.058	-
7	Basia	-	0.323	-	0.171	-	0.147
8	Raidih	-	0.026	-	0.013	-	0.009
9	Chainpur	0	-	-	0.109	0.001	-
10	Nagfeni	0.036	-	0.193	-	2.088	-
11	Adar	0.018	-	-	0.267	-	0.058
12	Anjam gram	-	0.13	-	0.238	-	0.08

4.2 Ground Water Resources

Based on the recommendation of the Ground Water Estimation Committee – 1997 (GEC – 1997), Block wise the ground water resource assessment has been evaluated. The net annual ground water availability of the district is 36519.79 ham. The gross ground water draft for all uses of the district is 9540.64 ham. The net ground water availability for future irrigation development for the district is 26679.65 ham. All blocks of the district falling under “Safe” category. The stage of ground water development varies from 12.85% to 42% (Table – 5). Block wise stage of ground water development is shown in figure- 5.

TABLE 5: DETAILS OF GROUND WATER RESOURCES AND STAGE OF GROUND WATER DEVELOPMENT IN GUMLA DISTRICT AS ON 31ST MARCH 2009 (in hectare meters)

Sl. No.	Assessment Unit/ District	Net Annual Ground Water Availability	Gross Ground Water Draft for Irrigation	Gross Ground Water Draft for Domestic and Industrial water Supply	Gross Ground Water Draft for all Uses (4+5)	Allocation for Domestic and Industrial Requirement supply upto next 25 years	Net Ground Water Availability for future irrigation development (3 – 4 – 7)	Stage of Ground Water Development (6/3)*100 (%)	Categorisation for future ground water development (safe/ critical/ over - exploited)
1	2	3	4	5	6	7	8	9	10
1	**Basia**	3029.14	916.28	116.35	1032.64	140.90	1971.96	34.09	Safe
2	**Bharno**	2659.62	553.32	104.70	658.02	126.78	1979.52	24.74	Safe
3	**Bishunpur**	3571.21	511.91	84.08	595.99	101.82	2957.48	16.69	Safe
4	**Chainpur**	2953.75	620.83	85.71	706.54	103.79	2229.13	23.92	Safe
5	**Dumri**	3990.96	826.85	116.76	943.60	141.39	3022.72	23.64	Safe
6	**Ghaghra**	3861.68	546.01	147.20	693.21	178.26	3137.41	17.95	Safe
7	**Gumla**	3275.23	1129.61	245.86	1375.47	308.14	1837.48	42.00	Safe
8	**Kamdara**	2461.00	776.04	90.98	867.02	110.18	1574.78	35.23	Safe
9	**Palkot**	3863.48	377.23	119.10	496.34	144.23	3342.02	12.85	Safe
10	**Raidih**	3796.92	817.80	104.74	922.54	126.83	2852.29	24.30	Safe
11	**Sisai**	3056.79	1094.46	154.82	1249.28	187.48	1774.86	40.87	Safe
	TOTAL	**36519.79**	**8170.34**	**1370.30**	**9540.64**	**1669.80**	**26679.65**	**26.12**	**Safe**

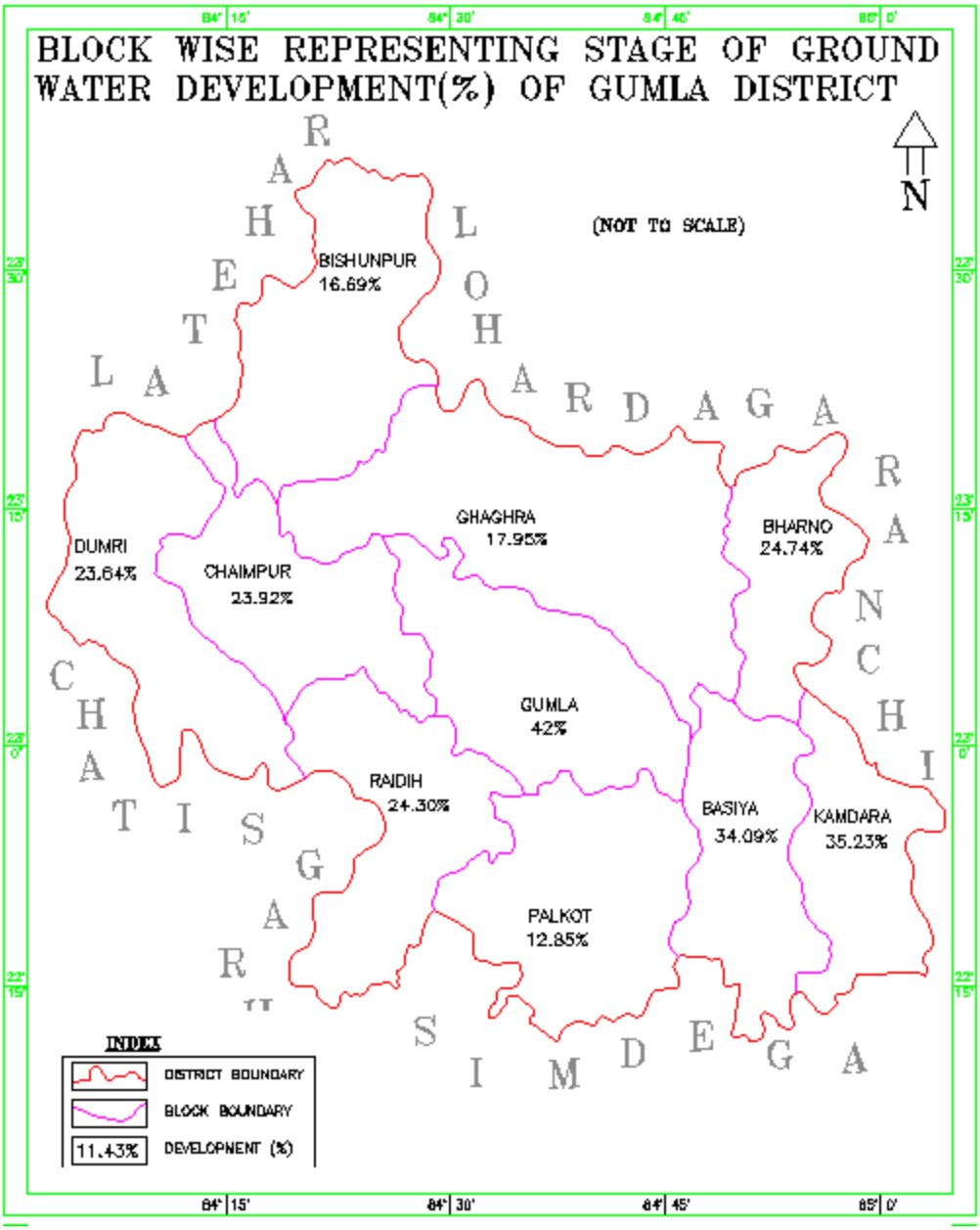


Figure 5: Block wise stage of ground water development

4.3 Ground Water Quality

To evaluate the quality of ground water, samples have been collected from representative NHS (dug wells) during the month of May 2011.. These samples have been considered to assess the chemical quality of ground water and its suitability for drinking and irrigation purposes. The samples represent the quality of phreatic zone or the shallow zone. The ground water samples were analysed for

major chemical constituents by using standard procedure at chemical laboratory in CGWB, MER, Patna. Analysed results are given in table 6.

The results of ground water samples were evaluated in accordance with the standard (ISI – 1993) for drinking purpose. In general the quality of ground water in the phreatic aquifer is acceptable except few samples. The EC value ranges from 71 – 1363 micro Siemens/cm at 25^0c. The EC contour map is shown in Figure 6.

TABLE 6: RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES COLLECTED FROM HYDROGRAPH NETWORK STATIONS OF GUMLA DISTRICT(May 2011)

Sl No.	Location	E.C. micro	pH	CO_3	HCO_3	Cl	Ca	Mg	TH as	Na	K
		Siemens/cm							$CaCO_3$		
		at 25^o C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
1	Gumla	1027	8.37	6	128	170	56	32	270	110	3.3
2	Sisai	1167	8.49	12	79	202	80	18	275	132	7.3
3	Bharno	230	8.5	12	37	46	16	2.4	50	26	3.3
4	Ghagra	157	8.36	6	61	11	18	1.2	50	13	1.3
5	Bishunpur	824	8.67	18	213	85	80	23	295	40	1.9
6	Palkot	71	8.5	12	12	3.5	6	1.2	20	8	0.9
7	Baisia	1363	8.53	24	396	156	96	34	380	102	68
8	Raidih	466	8.61	30	140	43	42	12	155	30	10
9	Chainpur	368	8.46	24	43	35	40	8.5	135	18	7
10	Nagfeni	542	8.67	30	116	71	66	11	210	28	2.9
11	Adhor	444	8.54	30	122	46	46	12	165	25	2.8
12	Anjan Gram	500	8.32	0	98	60	32	7.3	110	73	1.2

4.4 Status of Ground Water Development

There is sufficient scope for shallow as wells deep bore wells. State Govt. Agency has been constructed a large number of bore wells to minimize the drinking water problem in the district. Central Ground Water Board has been drilled 20 exploratory bore wells and 4 observation bore wells in the district. The depth of bore wells ranges between 55.91 – 199.92 mbgl. The yield of bore wells ranges from 0.50 to 36.00 m^3/hr. The Transmissivity value ranges from 0.90 to 66.00 m^2/day. The detail of exploratory bore wells drilled by Central Ground Water Board is given in table -2.

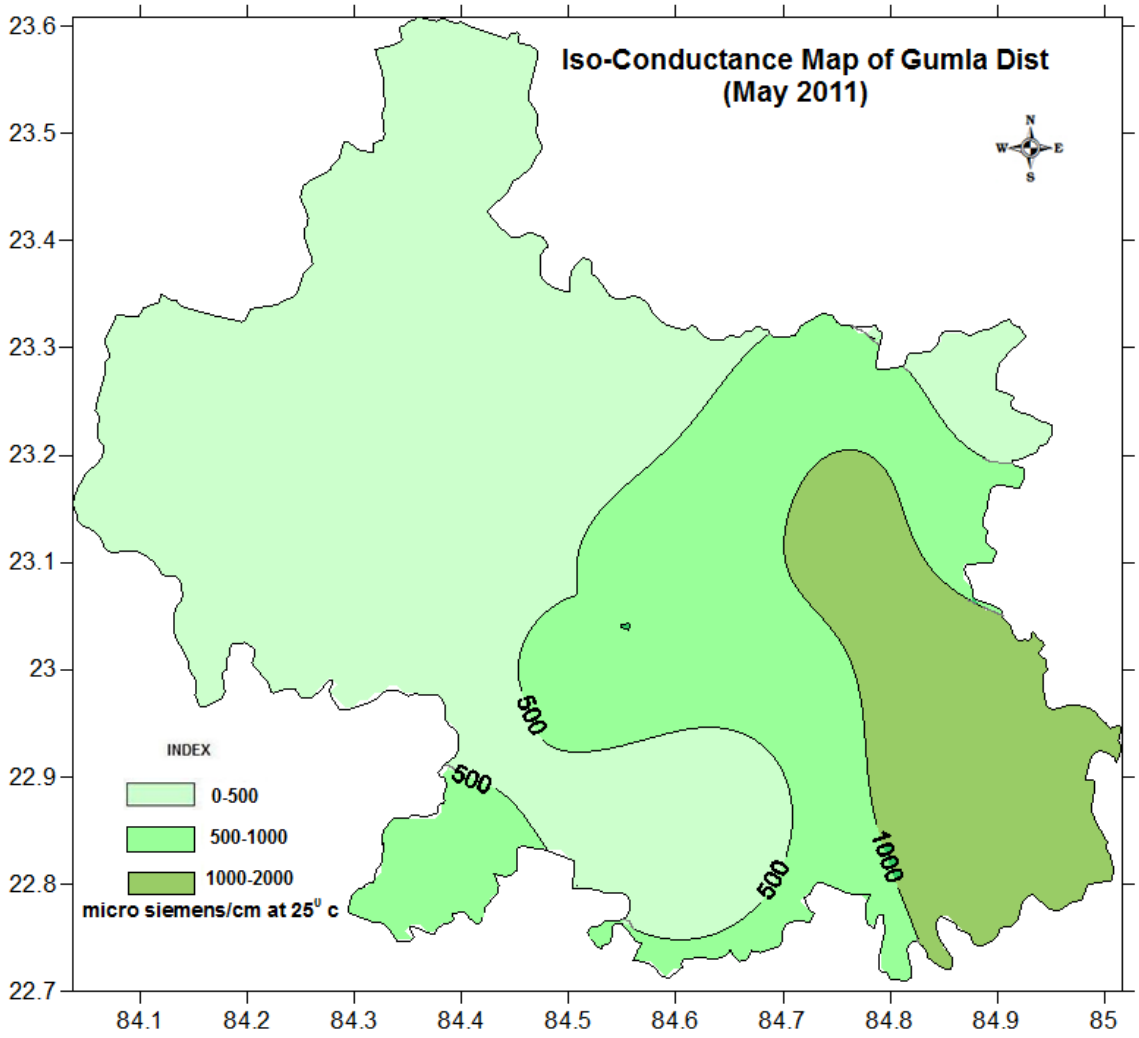


Figure 6: EC contour map of Gumla district

5.0. Ground Water Management Strategy

5.1. Ground Water Development

Dug wells and shallow to medium depth (upto 50 m) bore wells are the main ground water extraction structures in the area to meet the increasing demand of domestic water supply and ground water irrigation. The overall ground water development stage of the district is 26.12% only. Thus, there is sufficient scope for development of ground water through dug wells, shallow and medium depth bore wells.

Construction of dug cum bore well structure is also suitable for enhance the yield of dug wells in respect of cost beneficial and economical. The ground

water development varies in different places depending on the availability of favorable locations. For the construction of ground water structures, knowledge of the local as well as regional hydrogeological condition of the area is necessary.

For potential available for the ground water development considering the ground water draft has been worked out as per norms of Ground Water Estimation Committee – 1997 (GEC – 1997) and the details of ground water recharge, net annual ground water availability, annual draft, net ground water balance and stage of ground water development has been assessed and presented in table -5.

5.2. Water Conservation and Artificial Recharge

In view of the increasing thrust on development of ground water resources, there is urgent need to augment the depleting ground water resources. This gets augmented through natural recharge and can be augmented in an increased scale through artificial recharge. From hydrogeological point of view, rain water conservation is needed to arrest decline in ground water levels and to improve ground water quality by dilution. The construction of water conservation structures and artificial recharge structures depends on the topographic features, hydrological and hydrogeological conditions of the area. The roof top rain water harvesting and artificial recharge is required in Gumla urban area and block headquarters of Ghaghra, Palkot, Bharno and Bishunpur. The rural of these blocks is suitable for artificial recharge through ckeck dam, percolation tank and nala bandhara.

6.0 Ground Water Related Issue and Problems

The long term water level trend of NHS is showing declining trend in 33% wells for pre monsoon and 67% for post monsoon period and in 42% well for all period.

7.0. Awareness and Training Activity

7.1. The Mass Awareness Programme (MAP) by CGWB

Central Ground Water Board has organized a mass awareness programme at Gumla on 30th January 2006, on the topic of “Rain Water Harvesting

and Artificial Recharge". About 100 peoples from different organizations participated in the programme including representatives of NGO'S.

7.2 Participation in Exhibition, Mela, Fair etc. - Nil

7.3 Presentation and Lecture deliver in public forum / Radio / T.V / Institution of repute / Grassroots association / NGO / Academic institution etc. – Nil

8.0 Area Notified by CGWA / CGWA

As per the ground water resource assessment evaluated, all blocks of the district falling under the safe category. Thus, the authority has not been notified any blocks.

9.0 Recommendation

1. Rooftop rainfall harvesting and artificial recharge practice may be implemented in the Ghaghra, Gumla, Palkot, Bharno and Bishunpur block headquarters where the post monsoon depth to water level (NHS) was monitored between 3.10 to 6.25 mbgl.
2. In order to conserve run – off water during monsoon, it is suggested to construct the water conservation structures at suitable places to facilitate the ground water recharge around the water scarcity villages through check dam, percolation tank and nala bandhara.
3. The drilling data of the district is showing the poor percentage of successful bore wells. Thus, it is suggested that bore wells should be drilled after proper study of lineaments and geophysical survey.