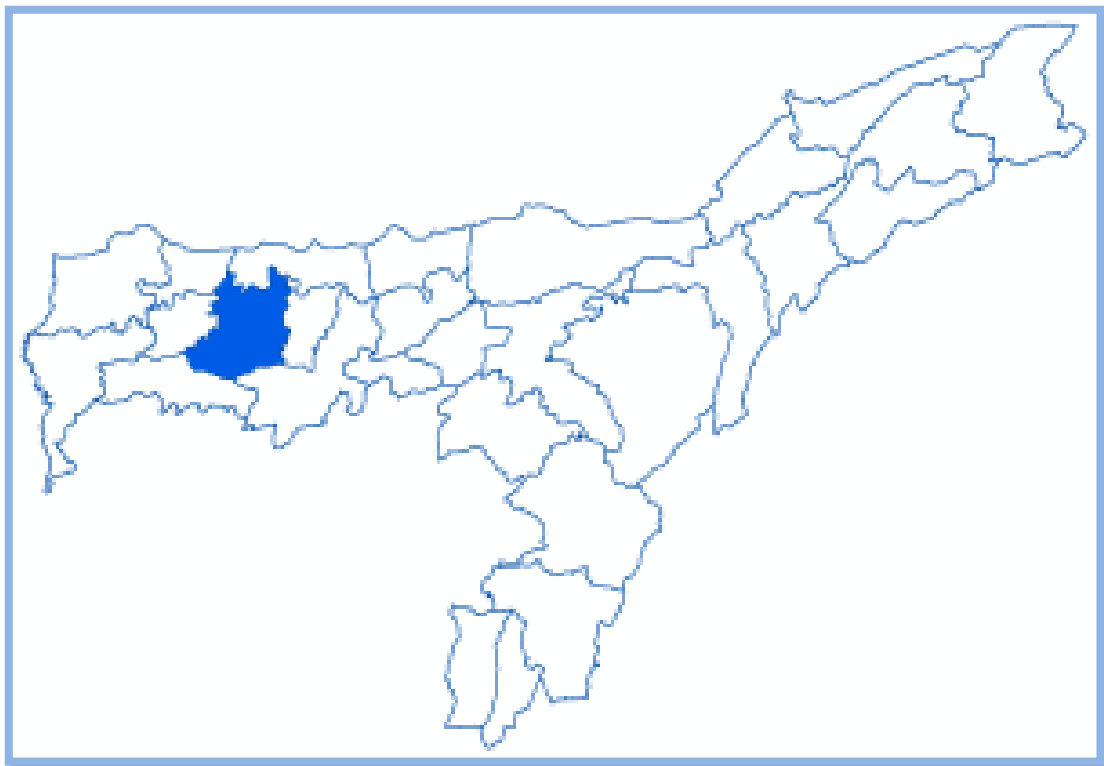


Technical Report Series: D

No:



Ground Water Information Booklet Barpeta District, Assam



Central Ground Water Board
North Eastern Region
Ministry of Water Resources
Guwahati
November 2013

**GROUND WATER INFORMATION BOOKLET
BARPETA DISTRICT, ASSAM**

AT A GLANCE

Sl.No.	Items	Statistics
1.	GENERAL INFORMATION	
	i) Geographical AREA (Sq.Km.)	2,677
	ii) Administrative Divisions	
	Number of Block	12
	Number of Villages/Panchayats	150/1673
	iii) Population (as on 2011 Census)	1,69,319
	iv) Average Annual Rainfall (mm)	2,051
2.	GEOMORPHOLOGY	
	Major Physiographic Units	Alluvial plain
	Major Drainages	Brahmaputra, Manas,Kaldia, Pahumara
3.	LAND USE (Sq.Km.)	
	a) Forest Area	867.35
	b) Net area sown	1,805.69
	c) Cultivable area	2,826.1
4.	MAJOR SOIL TYPES	Newer and Old Alluvial Soil,red loamy and laterite soil
5.	AREA UNDER PRINCIPAL CROPS (as on 2011)	800.2
6.	IRRIGATED BY DIFFERENT SOURCES (in ha) (Areas and Numbers of Structures) March 2011	
	Dug Wells	-
	Tube Wells/Bore Wells	249/12
	Tanks/Ponds	-
	Canals	20,211
	Other Sources Surface flow, lift	4,054/28
	Net Irrigated Area	-
	Gross Irrigated area	24,514
7.	NUMBERS OF GROUND WATER MONITORING STATIONS OF CGWB (as on 31.03.2013)	
	No. of Dug Wells	16
	No. of Piezometers	1
8.	PREDOMINANT GEOLOGICAL FORMATIONS	Alluvial Formation, piedmont plains

9	HYDROLOGY	
	Major Water bearing Formation	Alluvium
	(Pre-monsoon depth to water level during 2011)	2 - 6 m bgl
	(Post -monsoon depth to water level during 2011)	1 – 2 m bgl
	Long term water level trend in 10 years (2001-2011) in m/yr.	No significant change
10	GROUND WATER EXPLORATION BY CGWB (as on 31.03.2013)	
	No. of wells drilled (EW,OW,PZ,SH,Total)	EW-14, OW-12, Pz- 2, SH-Nil Total = 28 Nos.
	Depth of Range (m)	41 – 300
	Discharge (litres per second)	36-124 m ³ /hr
	Storativity (S)	$1.05 \times 10^{-2} - 1.82 \times 10^{-1}$
	Transmissivity (m ² /day)	4,591-12,224
11	GROUND WATER QUALITY	
	Presence of Chemical constituents more than permissible limit (e.g. EC, F,As,Fe)	Fe.
	Type of Water	Fresh and potable
12	DYNAMIC GROUND WATER RESOURCES (2009) in MCM	
	Annual Replenishable Ground Water Resources	1025.75
	Net Annual Ground Water Draft	381.67
	Projected demand for domestic and industrial uses up to 2025	59.59
	Stage of Ground Water Development	48%
13	AWARENESS AND TRAINING ACTIVITY	
	Mass Awareness Programmes organised	Nil
	Date	
	Place	
	No. of Participants	
	Water Management Training Programmes organised	Nil
	Date	
	Place	
No. of Participants		
14	EFFORTS OF ARTIFICIAL RECHARGE & RAINWATER HARVESTING	
	Projects completed by CGWB (No. & amount spent)	Nil
	Project under technical guidance of CGWB (No.)	Nil
15	GROUND WATER CONTROL AND REGULATION	
	Number of OE Blocks	Nil
	No. of Critical Blocks	Nil
	No. of Blocks notified	Nil
16	MAJOR GROUND WATER PROBLEMS AND ISSUES	
	Sporadic occurrence of higher concentration of Iron	

GROUND WATER INFORMATION BOOKLET

TINSUKIA DISTRICT, ASSAM

1.0 INTRODUCTION

Barpeta district was a sub-division of Greater Kamrup district. It was formed as a separate district in 1983. It is located in lower Assam on north of River Brahmaputra covering an area of 3,245 sq.km. For administrative convenience, the district has been divided into two sub-divisions, 12 blocks and 8 revenue circles.

The district occupies part of greater Brahmaputra basin and the mighty river Brahmaputra is flowing westerly direction through the southern boundary. The district is also drained by perennial rivers flowing from the north and joining river Brahmaputra.

The irrigation facilities mostly confined to a few lift and flow surface water schemes. However, farmers are utilising ground water for multiple cropping through shallow tube wells and as such the district is famous for its vegetable production and other Rabi crops.

The detailed hydrogeological surveys aided by exploratory drilling have been carried out in the area by Central Ground Water Board. In addition, C.G.W.B. is monitoring Ground Water Monitoring Stations and the resources prospect of the district has been assessed for future planning and development of ground water.

2.0. RAINFALL AND CLIMATE

The climate of the district is sub-tropical and humid. The average temperature ranges from 15^o to 30^oC. The winter season starts by November and continues till February. December/January is the coldest and July/August is the hottest period. The air is highly humid through out the year and during rainy season, the relative humidity is about 90 percent.

The area receives heavy rainfall every year and out of 2,051 mm of annual normal rainfall, 60 to 65% is received during June to September from south west monsoon. The district also receives rainfall during pre-monsoon period from March/April to May in the form of thunder showers and hail storms.

3.0 GEOMORPHOLOGY AND SOIL TYPE

Physiographically almost the entire district is occupied by an alluvial deposit with flat topography and there is a very gentle slope towards the Brahmaputra river, which makes the southern boundary of the district. The northern parts extends up to the foothills of the Bhutan Himalayas, where high level terrace exists, commonly referred to as piedmont plain of “Bhabar Belt”, similar to the Ganga valley exhibits high slope towards south.

The district has soil cover of younger and older alluvial soil which has undergone diversified pedological changes. The soils are characterised by medium to high organic carbon and low to medium phosphorous and potash contents. Deep red coloured soil is developed in forested and foothill areas in the extreme northern region and the texture of these soils ranges from clay to sandy loam.

The alluvial soils are light yellow to light grey in colour of Recent age. The texture of the soil ranges from sandy loam to silty loam in nature.

4.0 GROUND WATER SCENARIO

4.1 Hydrogeology

Hydrogeologically, the entire area of the is occupied by alluvial sediments of Quaternary age. Piedmont deposits comprising of coarse clastic sediments like boulder, pebble, gravel associated with sand and silt from the ground water bearing formation in the northern part of the district.

Ground water occurs under unconfined condition in shallow aquifer and under semi-confined to confined condition in deeper aquifer. The aquifer is consisting of sand of various grades with little gravel in the southern part, with a very good yield prospect for both shallow and deep tube wells. The water level rests at shallow depth ranging from 2 to 4 m bgl during pre-monsoon period. The post-monsoon ground water level rests between 1 and 2 m bgl. The size of the aquifer materials gradually increases from south to north and the depth of water level is also high. The long term water level trend study shows no significant change of water level in the last 10 years.

The shallow tube wells tapping aquifers at the depth of 50 m bgl are capable of yielding 20 – 100 m³/hr at drawdown of less than 3 m. Medium to heavy duty tube wells constructed down to 100 to 150 m bgl tapping about 25 – 40 m granular zones yield more than 100m³/hr. The summarised results of the exploration work carried out by Central Ground Water Board in the district are given below in table – 1.

Table – 1 Hydrogeological data of Exploratory Wells in Barpeta district, Assam

Year of construction	Location	Depth drilled (m)	Aquifer zones tapped (m)	Swl (m bgl)	Discharge m ³ /hr DD (m)	Transmissivity m ² /day	Hydraulic Conductivity (m/d)	Specific capacity (lpm/m)	Storage Co-efficient (S)	Geology	Sub Basin Sub-basin
1	2	3	4	5	6	7	8	9	10	11	12
1981-82	Keotkuchi EW 26°16'15" 91°05'30"	<u>299.92</u> 169	43-52, 56-62 73-88 88-100 120-126 154-166	3.98	<u>124.44</u> 3.26	9941.8	174.41	636.20	-	Alluvial deep sand f to c gravel, pebble, cobble	Pohumara
1981-82	Pathsala EW+OW 26°29'25" 91°13'00"	<u>40.99</u> 38	22-25 28-37	1.68	<u>35.64</u> 0.75	5223.8	435.31	792	1.05x 10 ⁻²	-do-	-do-
1993-94	Bagana EW 26°27'05" 91°01'30"	<u>201.3</u> 140	52-65 68-75 82-90 98-103 110-118 128-136	3.06	<u>43.33</u> 4.38	-	-	164.88	-		-do-
1994-95	Bhawanipur Pz 26°26'30" 91°07'30"	<u>28.9</u> 28	21-27	1.92	<u>28</u>	-	-	-	-	-do-	-do-
2001-02	Mairamara EW	<u>48.1</u> 46.5	26-32 41-45	1.10	<u>52.33</u> 1.90	4591.21	109	458.18	-	-do-	-do-
2001-02	Gajja EW/OW 26°16'30" 91°03'30"	<u>57.9</u> 57	24-31 36-41 48-55	2.86	<u>47.70</u> 0.04	12,229	612	19,875	-	-do-	-do-
2001-02	Namsala EW+OW 26°19'00" 91°15'00"	<u>202</u> 111	45-65 66-72 102-108	1.55	<u>46.56</u> 0.87	16,071	276.6	892	1.82x 10 ⁻¹	-do-	-do-
2006-07	M.K.College Chenga EW+OW	<u>200</u> 121	67-85 100-118	4.14	<u>46.5</u> 1.87	-	-	-	-	-do-	-do-
2006-07	Mandia	<u>203.25</u> 176.70	107-119 149-155 163-175	2.39	<u>46.5</u> 1.27	-	-	-	-	-do-	-do-
2008-09	Nagaon 26°17'42" 91°06'47"	<u>68.10</u> 64.0	43-61	3.20	28	-	-	-	-	-do-	-do-
	Daulasal	<u>204.15</u> 130.00	45-57 63-75 79-91 109-129	2.15	<u>53</u> 2.15	4238	38	-	7.9 x 10 ⁻³	-	-
	Bhawanipur 26°28'00" 91°04'25"	<u>40.9</u> 38.0	28-35	-	28	-	-	-	-	-	-
	Pata-charkuchi 26°30'20" 91°14'51"	<u>200.75</u> 78.0	45-57 63-75	3.30	28	-	-	-	-	-	-
	Nityanada 26°33'07" 91°12'52"	<u>152.95</u> 7	48-60 72-90 102-114	-	-	-	-	-	-	-	-

4.2 Ground Water Resources

Dynamic Ground Water Resources are estimated based on the methodology adopted as per GEC 97 following water level fluctuation and rainfall infiltration factor methods.

The annual dynamic ground water resources are estimated to be 1025.75 mcm while the net annual ground water draft is 381.67 mcm. The present stage of ground water development is only 41 per cent and district is still under 'safe' category.

The projected demand of ground water for domestic and industrial uses up to 2025 is estimated to be about 59.59 mcm and 524.05 mcm of water is still available for future irrigation development.

4.3 Ground Water Quality

To study the quality of ground water, samples were collected from GWMSs and EWs constructed in the district and were analysed in the Chemical Laboratory of C.G.W.B., NER, Guwahati. The interpretation of the results of the analysis shows that ground water is fresh and suitable for both domestic and irrigation purposes except higher content of iron which requires treatment before being used for drinking purposes.

4.4 Status of Ground Water Development

Ground water development is at low key at present and it is estimated to be 36 mcm for domestic and industrial use and only 309 mcm for irrigation purposes.

Ground water is mainly used for domestic and irrigation purposes and the industrial use is negligible. The water supply scheme for drinking purpose is executed by Assam Public Health Engineering Department through groundwater structures like dug well, hand pump and deep tube wells. For irrigation, the use of ground water is mainly through shallow tube wells implemented by Agriculture Department through the farmers.

5.0 GROUND WATER MANAGEMENT STRATEGY

Thick and extensive alluvial deposits with rich aquifer system covering the almost entire district is very much suitable for ground water development through ground water structures like open wells, shallow and deep tube wells. For drinking purpose and other requirements of limited quantities of individual households, open wells and filter point wells are feasible in almost all over the district. Ring wells of 0.80 m to 1.20 m diameters with depth of 5 to 10 m bgl except the extreme northern part where water level is deep, are

likely to hold sufficient quantities of water to meet the domestic requirement. Filter point wells down to depth of about 15 to 20 m bgl are also suitable for extraction of ground water.

For irrigation purpose, shallow tube wells down to depth of about 30 to 50 m bgl may be constructed. A Centrifugal pump may be used to irrigate about 2 to 3 ha of land at an average annual draft of 0.03 mcm.

6.0 GROUND WATER RELATED ISSUES AND PROBLEMS

The southern part of the district is suffering from floods every year during monsoon. Also major part of the area of the district is under water logging condition. As such full utilisation of potential resources are essential for lowering of water table, which may be done through construction of shallow tube wells for irrigation purposes.

The ground water contains excess iron content which requires suitable treatment before consumption.

7.0 RECOMMENDATIONS

Detailed hydrogeological surveys aided by exploratory drilling carried out by Central Ground Water Board have revealed the existence and persistence of rich aquifer system down to the depth of 300 m. The area consists of unconsolidated alluvial formation of Quaternary age, laid down by river Brahmaputra and its tributaries.

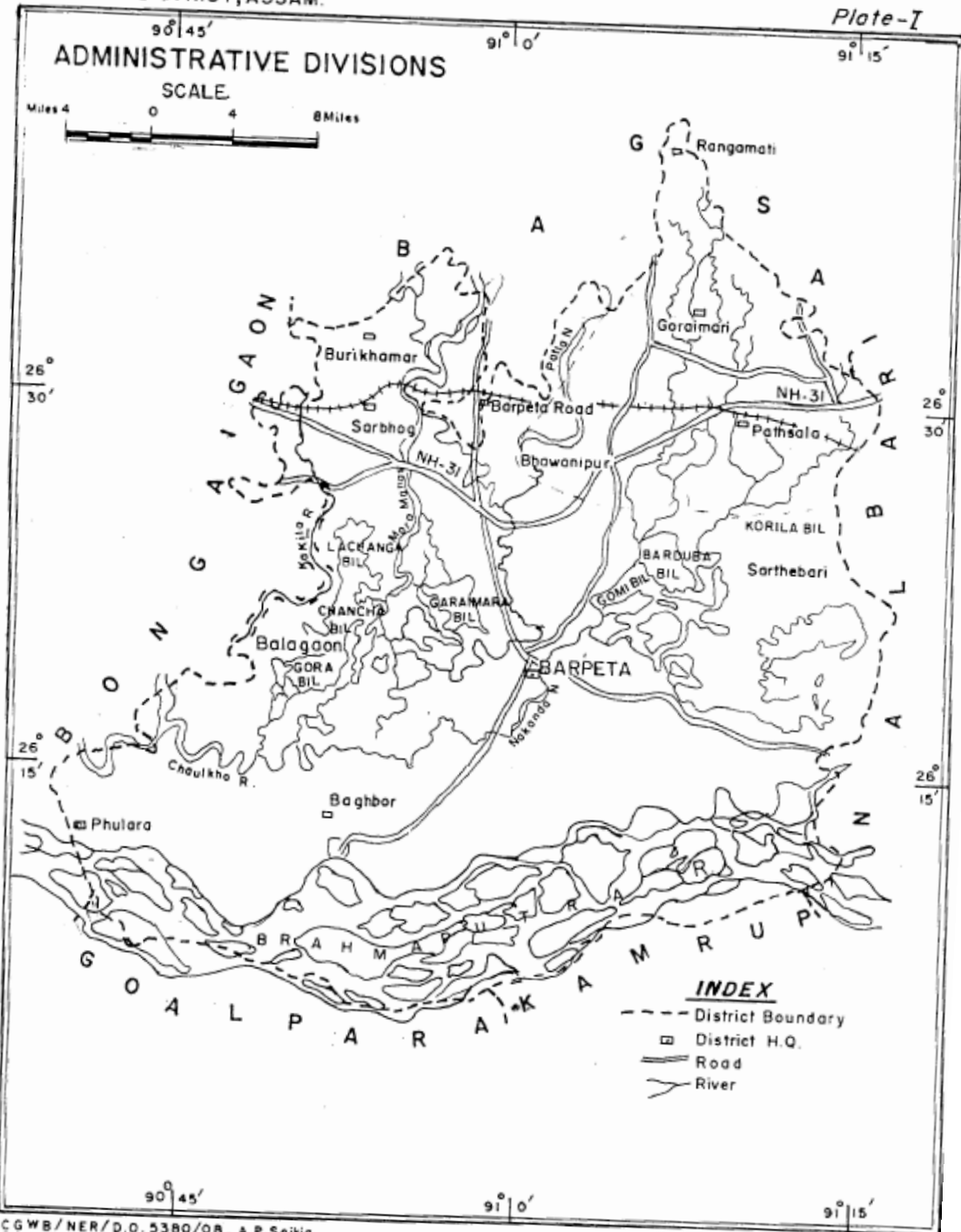
The hydrogeological set up and availability of huge ground water resources and the present stage of ground water draft, it can be concluded that the district has an ample scope for the development of ground water through construction of different ground water structures in a planned way.

BARPETA DISTRICT, ASSAM.

Plate-I

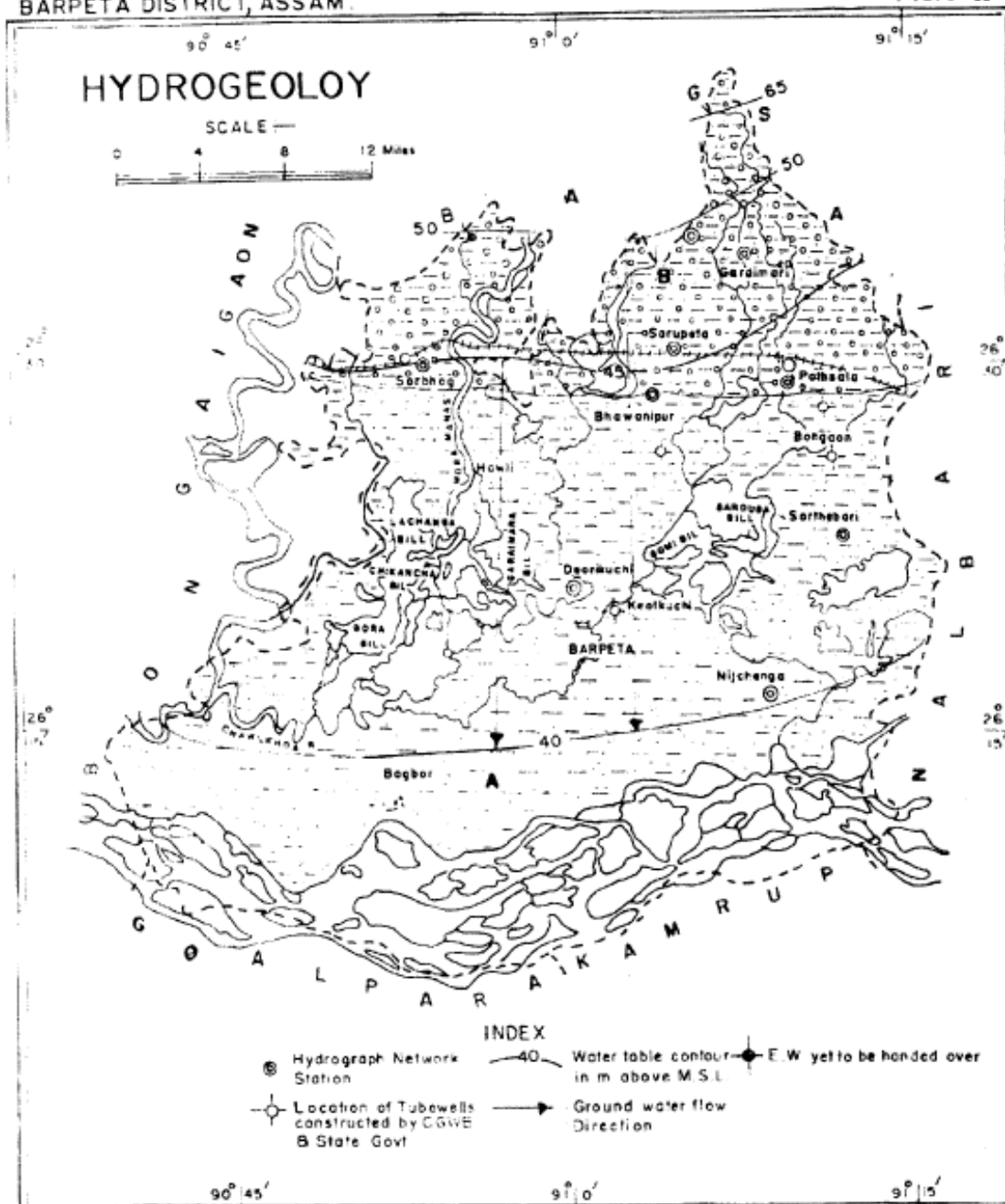
ADMINISTRATIVE DIVISIONS

SCALE



INDEX

- - - District Boundary
- District H.Q.
- Road
- ~ River



Legend

SECTOR	FORMATION/AGE	LITHOLOGY	AQUIFER CHARACTER	GROUND WATER POTENTIAL
A	UNCONSOLIDATED YOUNGER ALLUVIUM (RECENT)	Sand, gravel, clay etc.	Fairly thick and regionally extensive unconfined to semi-confined aquifer down to 40 to 300m. bg.	Area feasible for and deep tubewells yield capacity for shallow well ranges from 35m ³ /hr. and deep tube wells with 150-250m ³ /hr. for drawdown less than 6m.
	UNCONSOLIDATED	Sand, gravel, clay with pebbles	Fairly thick and regionally	Area feasible for shallow