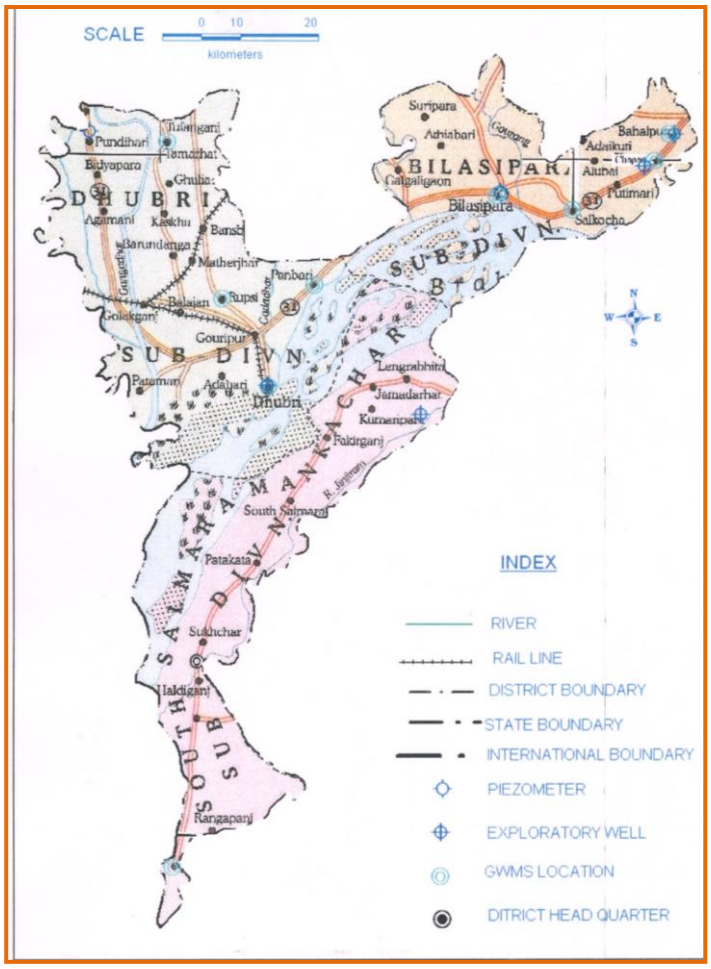
Technical Report Series: D **No:**

Ground Water Information Booklet
Dhubri District, Assam



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

GROUND WATER INFORMATION BOOKLET
DHUBRI DISTRICT, ASSAM

DISTRICT AT A GLANCE

SI. No.	ITEMS	STATISTICS
1	GENERAL INFORMATION	
	i) Geographical Area (sq.km.)	1,664.10
	ii) Population (as per 2011 Census)	19,48,632
	iii) Average Annual Rainfall (mm)	2,363
2	GEOMORPHOLOGY	
	i) Major Physiographic Units	Flood plain & alluvial terrace, inselberg, swamp.
	ii) Major Drainages	Gadadhar, Sankosh, Silai, Gouranga Rivers
3	LAND USE (sq. km.)	
	i) Forest Area	291.55
	ii) Net Area Sown	1343.49
	iii) Total cropped area	1725.81
	iv) Area sown more than once	382.32
4	MAJOR SOIL TYPES	Sandy, silty or clayey loam
5	AREA UNDER PRINCIPAL CROPS in sq km	Not available
6	IRRIGATION BY DIFFERENT SOURCES (sq. km)	68.61
7	NUMBERS OF GROUNDWATER MONITORING WELLS OF CGWB (as on March 2013)	19
8	PREDOMINANT GEOLOGICAL FORMATIONS	Alluvial formation
9	HYDROGEOLOGY	
	i) Major water bearing formations	Alluvial sediment of Quaternary age
	ii) Pre-monsoon Depth to Water level	1.22 to 16.77 mbgl
	iii) Post-monsoon Depth to Water level	1.21 to 15.49 mbgl Rise/Fall during Pre-monsoon (0.003-0.096 / 0.001-0.099) m/yr, Rise/Fall during Post-monsoon (0.004-0.138 / 0.004-0.067) m/yr
	iv) Long term Water level trend in 10 yrs	

10	GROUND WATER EXPLORATION BY CGWB (as on 28.02.2013) i) Number of wells drilled ii) Depth range (m) iii) Discharge (m^3/hr) iv) Transmissivity (m^2/day)	 14 (9 EW & 5 OW) 25.4-152 27 - 270.24 9,147
11	GROUND WATER QUALITY i) Chemical constituents above permissible limit ii) Type of water	 Fe Good, potable
12	DYNAMIC GROUND WATER RESOURCE (2009) in mcm i) Annual replenishable ground water resource ii) Net annual ground water draft iii) Projected demand for Domestic & Industrial use up to 2025 iv) Stage of ground water development	 1817.34 181.12 65.35 11%
13	AWARENESS AND TRAINING ACTIVITY i) Mass Awareness programmes organized ii) Date iii) Place iv) Number of participants	 Nil
14	EFFORTS OF ARTIFICIAL RECHARGE AND RAINWATER HARVESTING i) Projects completed by CGWB (no. & amount spent) ii) Projects under technical guidance of CGWB (nos.)	 Nil Nil
15	GROUND WATER CONTROL AND REGULATION i) Number of over exploited block ii) Number of critical block iii) Number of blocks notified	 Nil Nil Nil
16	MAJOR GROUND WATER PROBLEMS AND ISSUES	Higher concentration of Fe in ground water

GROUND WATER INFORMATION BOOKLET
DHUBRI DISTRICT, ASSAM

1.0 Introduction

Dhubri district covers an area of 1664.10 sq. km. It is situated in the extreme south-west corner of the state and has an international boundary with Bangladesh on west and south-west and is bounded by Kokrajhar district in the north, Goalpara district on the east and north-east, Garo Hills district of Meghalaya on the south and Kochbehar and Jalpaiguri districts of West Bengal on the north-west. The district spreads on both sides of the River Brahmaputra.

As per 2011 census, population of the district is 19,48,632 . Density of population is 1171 persons/sq. km. As per the land use pattern, the forest area is 291.55 sq. km, culturable waste is 38.72 sq. km.

Number of perennial streams flow through the district from north to south and join the Brahmaputra River. The major streams that drain the area are Gadadhar, Sankosh, Silai and Gouranga Rivers.

There are no major irrigation systems in the district. However, minor irrigation schemes, such as lift irrigation schemes are mostly confined to the selected areas.

2.0 Rainfall and Climate

The district enjoys a subtropical humid climate with temperature ranging between 10.5° C (minimum, in December/January) and 30° C (maximum, in July/August).

South west monsoon activates from May and continues up to September-October. The average annual rainfall of the district, as recorded at Dhubri is 2,363 mm with about 65% rainfall occurring during the monsoon. The monthly evapo-transpiration is about 40% of the rainfall, the highest in August and lowest in January.

3.0 Geomorphology and Soil

Physiographically, the district constitutes the vast alluvial plains of Brahmaputra River system. The monotony of the flat alluvial tract is interrupted by the presence of Archaean inliers in the form of disconnected hillocks referred to as inselbergs and these occur specially in the eastern and southern parts of the district. These hillocks are joined by the offshoots of Shillong plateau and are found on the north bank near Diple beel, Sitdanga beel and east of Bilasipara and on the south bank of the foothill portion of Garo Hills along the district boundary. The level difference between the valley and the peaks of the inselbergs ranges from 25 to 455 m. These hillocks are covered by a thick lateritic mante and are occupied by evergreen mixed forest. Terraced alluvial deposits occupy 80% of the district with conspicuous occurrence of buried channels, back swamps, etc.

Soils in greater part of the district are sandy and silty loam, or clayey loam. It is found to be highly acidic to slightly alkaline in nature and is moderately permeable and characterised by the presence of low organic carbon and low soluble salts. Soils restricted to inselberg areas are more clayey, lateritic and less permeable and are highly acidic in nature. From agriculture point of view, the soils in major part of the area are suitable for all sorts of crops cultivation.

4.0 Ground Water Scenario

4.1 Hydrogeology

Ground water conditions in the district can be described under two distinct hydrogeological units, i.e. conditions prevailing in the consolidated formations and the conditions prevailing in the unconsolidated formations.

Pre-Cambrian gneiss-schist complex projecting abruptly above the vast stretch of alluvium as isolated hills forms the consolidated formation in the district. These rock formations had been subjected to faulting and fracturing at several places through which water percolates to facilitate weathering. Weathered zone forms as such are restricted to about 10 m thickness and is often lateritic in character. Occurrence of ground water is limited in these formations and is confined to topographic lows and weathered residuum. The movement of ground water is controlled by the presence of fractures and fissures. Extraction of ground water in these zones is possible through large diameter dug wells and bore wells in hydrogeologically suitable areas. Ground water occurs under water table conditions in the weathered zone.

The unconsolidated formation is represented by the alluvial deposits of the recent age. This formation is found spreading on either side of the River Brahmaputra and comprises medium to coarse grained sand, gravel, pebbles, cobbles, etc., with intercalation of silt and clay. It is characterised by the presence of hard compact lateritic clay (Chapar formation) followed by coarse sand with pebbles and cobbles. Ground water occurs under water table and semi-confined conditions.

The water table contour follows the topography of the area and lies more or less parallel to the Brahmaputra River. The movement of ground water is from north to south in the north bank and south to north in the south bank of Brahmaputra. An artesian belt also exists around Mancachar in the southern part of the district.

Detailed hydrogeological surveys aided by exploratory drilling revealed the existence of promising aquifer zones down to the depth of maximum 200 m bgl in the northern bank of the River Brahmaputra and more than 100 m in the southern bank. Aquifer displays various degree of lateral and vertical variation of aquifer indicating various degree of depositional environment both in space and time.

4.2 Ground Water Resource

Methodology adopted for ground water resource estimation of Dhubri District of Assam is as per GEC 1997 Report, i.e. Ground Water Level Fluctuation and Rainfall infiltration factor Method.

The net ground water availability estimated in the year 2009 is 1635.61 mcm. The existing gross ground water draft 181.12 mcm and the stages of development are 11% only. Future provision for domestic and Industrial use is 65.35mcm and for Irrigation use is 1432.85 mcm.

Assessment unit can be categorized into 4 categories as SAFE, SEMI-CRITICAL, CRITICAL, and OVER-EXPLOITED. In Dhubri district stage of ground water development is 11%, which shows under the SAFE category. As long-term water level trend does not show any major change so the whole district may be considered as SAFE.

CHART OF GROUND WATER RESOURCE ESTIMATION

Net Ground Water Availability	= 1635.61 mcm
Gross Ground Water Draft	= 181.12 mcm
Stage of Ground Water Development	= 11%
Future provision for Domestic & Industrial Use	= 65.35 mcm
Future Provision for Irrigation Use	= 1432.85 mcm

4.3 Ground Water Quality

The concentration of major, minor and trace element in the district is generally within the limited range except iron. The iron distribution is abruptly high in and around Tamarhat and Chapar area where it has exceeded the permissible limit of drinking.

The ground water is suitable for agricultural and industrial usages.

4.4 Status of Ground Water Development

Development of ground water in the district is still in a nascent stage. It is used primarily for drinking and irrigation purpose in the district. As there is no major industry, ground water utilisation for the same is negligible.

5.0 Ground Water Management Strategy

Shallow ground water structures are congenial for construction in the district, as water level and aquifer material are laterally persistent throughout the district. Dug wells and dug-cum-bore wells especially near the inselberg zone are very beneficial. Deep tube wells can be constructed preferably below the depth of
50 m tapping aquifer zone with a discharge varying from 100 - 200 m^3/hr maintaining a spacing of about 1 km.

Considering the vast surface water as well as ground water resources in the district, it is recommended that conjunctive use of both these resources may be judiciously done.

6.0 Ground Water Related Issues and Problems

Frequent floods devastate the district every year during the monsoon months from May to September. Flood accompanied with soil erosion and sand deposition cause maximum damage to standing crops to the agricultural lands.

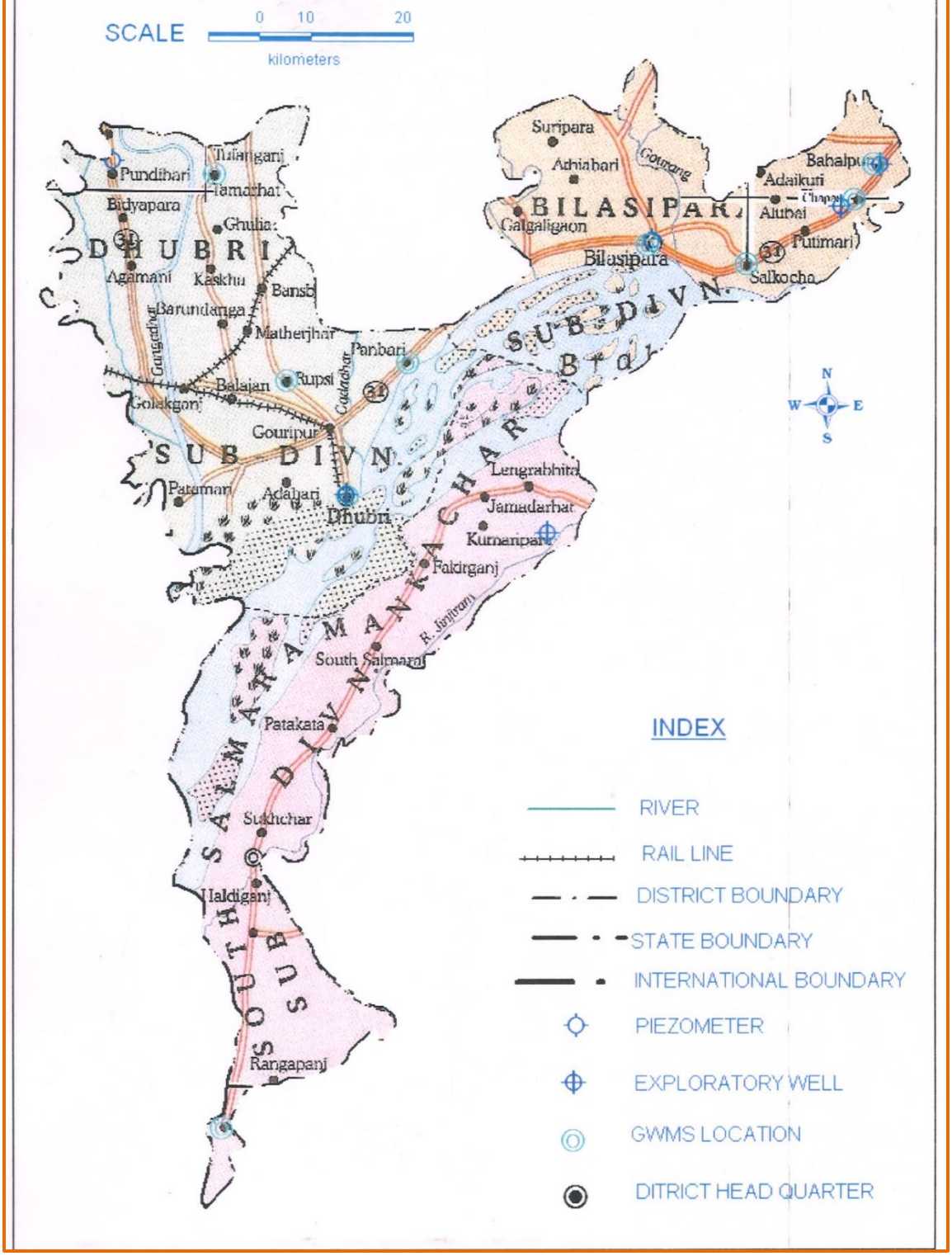
Other than high iron content, most of the chemical constituents are within the permissible limit.

7.0 Recommendation

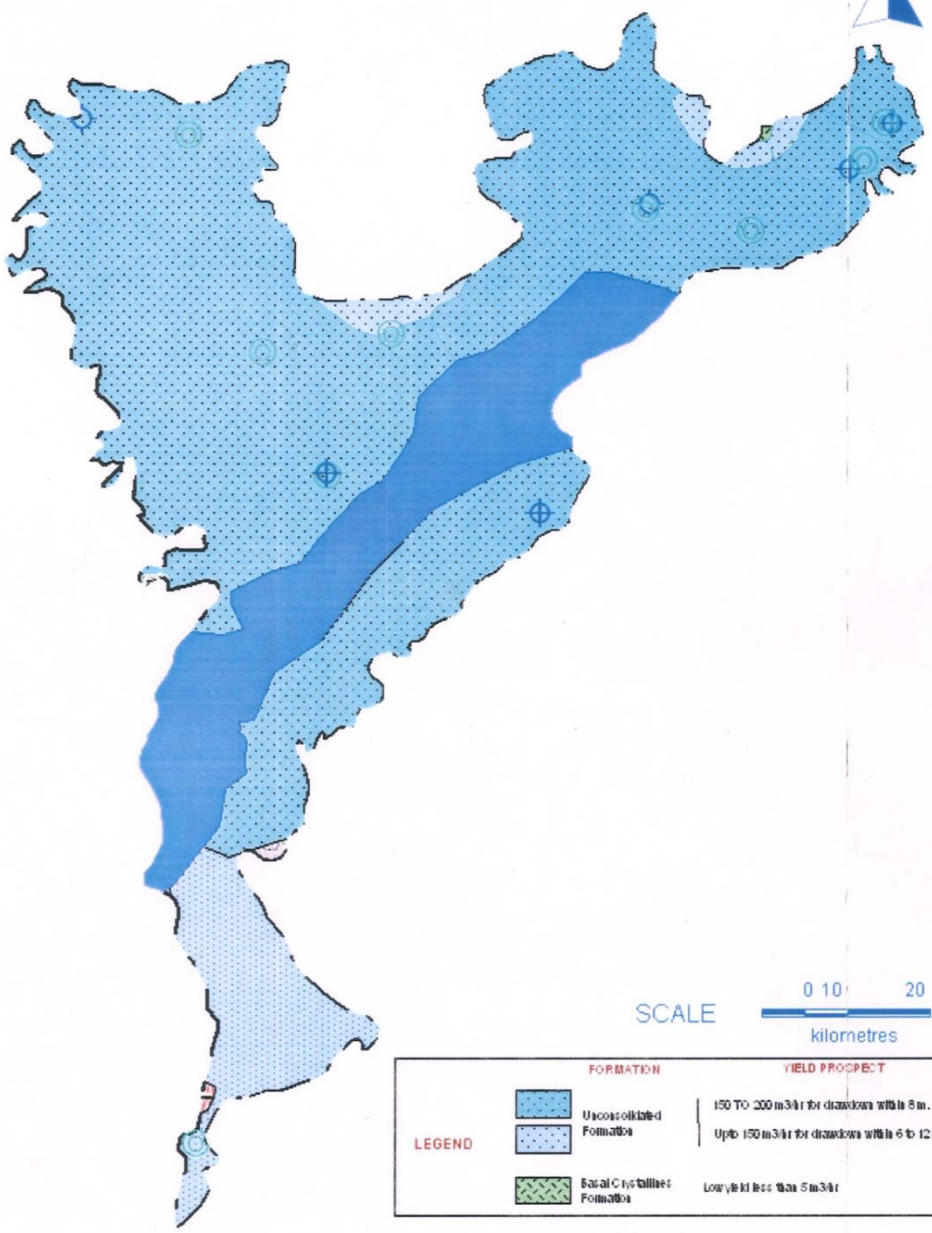
Existing hydrogeological set up and availability of huge ground water resources indicate that there is much scope for the development of ground water with the construction of abstraction structures in a planned and systematic way.

Iron treatment plants need to be installed with PHED water supply schemes before using for drinking purpose.

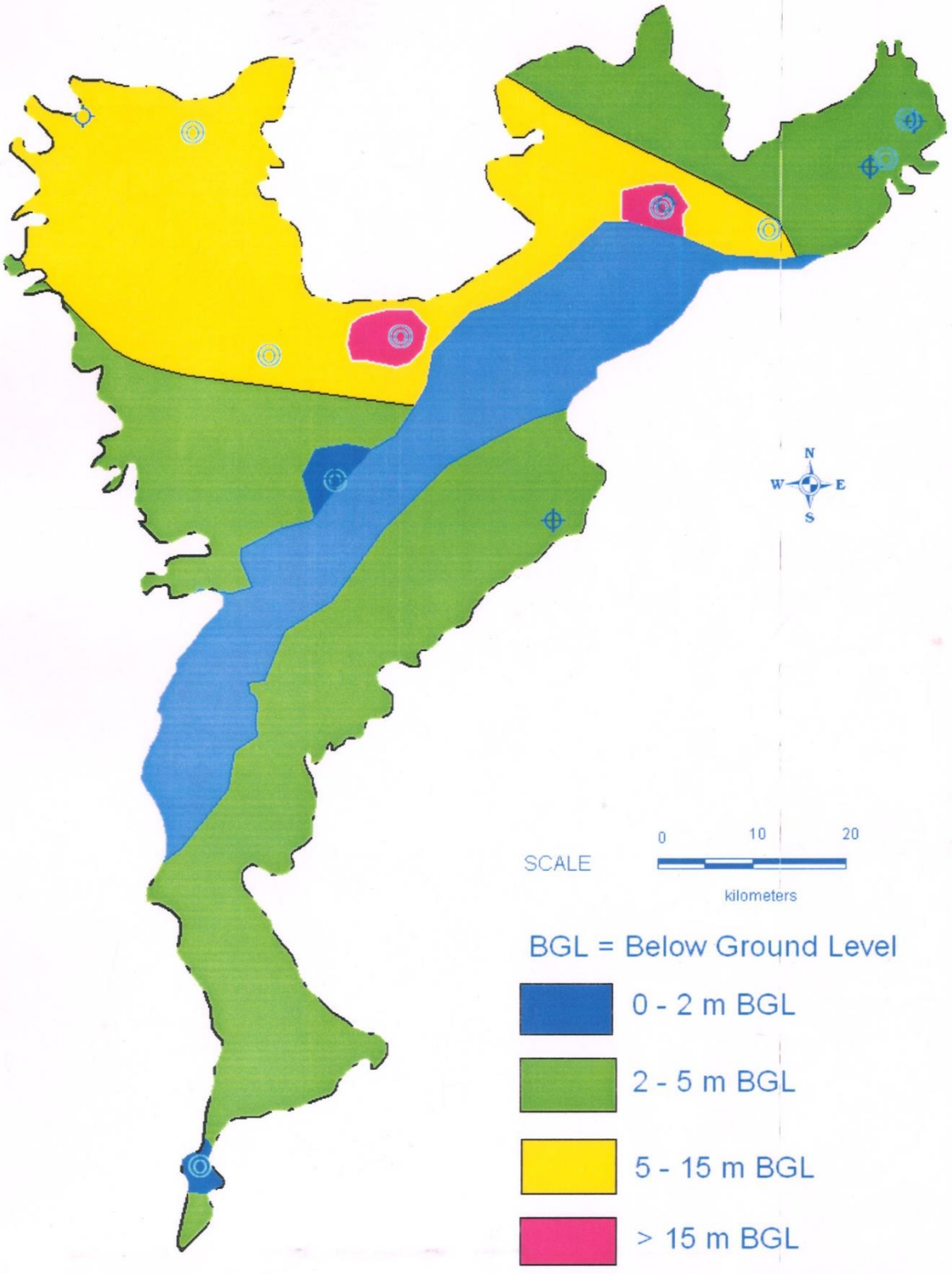
LOCATION MAP OF DHUBRI DISTRICT, ASSAM



HYDROGEOLOGICAL MAP OF DHUBRI DISTRICT



PRE -MONSOON WATER LEVEL OF DHUBRI DISTICT



POST MONSOON WATER LEVEL OF DHUBRI DISTRICT