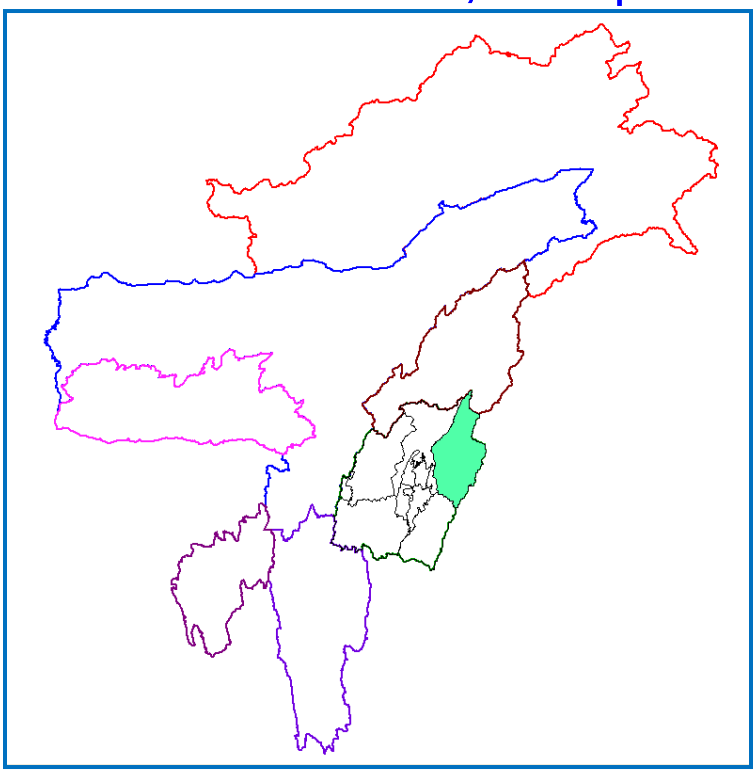
Technical Report Series: D

No:

Ground Water Information Booklet

Ukhrul District, Manipur



Central Ground Water Board

North Eastern Region

Ministry of Water Resources

Guwahati

September 2013

GROUND WATER INFORMATION BOOKLET OF UKHRUL DISTRICT, MANIPUR

UKHRUL DISTRICT AT A GLANCE

Sl. No.	ITEMS	STATISTICS
1	GENERAL INFORMATION	
	i) Geographical Area (in sq.km)	4544 sq.km
	ii) Administrative Division (as on 31 March 2013) Number of Tehsil/CD Block Number of Panchayat/Villages	 230
	iii) Population (as per 2011 Census)	1,09,275
	iv) Average Annual Rainfall (mm)	1600 mm to 2100mm
2	GEOMORPHOLOGY i) Major Physiographic Units ii) Major Drainages	 i) Medium to high altitudes hilly terrain ii) Maklang, Tuyeng, Thoubal and Chammu and chingai rivers are major drainage
3	LAND USE (sq.km) i) Forest Area ii) Net Area Sown iii) Cultivable Area	 NA
4	MAJOR SOIL TYPES	NA
5	AREA UNDER PRINCIPAL CROPS in sq.km (as on March 2011)	22,000Ha
6	IRRIGATION BY DIFFERENT SOURCES (sq.km) i) Dug Wells ii) Tube /Bore Wells iii) Tanks/Ponds iv) Canals (SLI+SFI) v) Other Sources, MIS vi) Net Irrigated Area vii) Gross Irrigated Area	 NA
7	NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (as on 31-03-2013) –Dug wells	Nil
8	PREDOMINANT GEOLOGICAL FORMATIONS	Disang, Barail, Surma and Tipam groups of rock of Upper Cretaceous to Miocene age.
9	HYDROGEOLOGY	i. Semi-consolidated to

	i) Major water Bearing Formations ii) Pre-monsoon Depth to Water Level iii) Post-monsoon Depth to Water iv) Long term Water Level Trend in 10 yrs (1997 –2006) in m/yr	consolidated ii. Nil iii. Nil
10	GROUND WATER EXPLORATION BY CGWB (as on 31-03-2013)	Nil
11	GROUND WATER QUALITY i) Presence of Chemical Constituents more than Permissible Limit (e.g. EC, F, Fe, As) ii) Type of Water	
12	DYANMIC GROUND WATER RESOURCES (as on March 2009) in mcm i) Annual Replenishable Ground Water Resources ii) Net Annual Ground Water Draft iii) Projected demand for Domestic and Industrial Use upto 2025 iv) Stage of Ground Water Development	GEC'97 could not be adopted and ground water resources of the district could not be calculated because hill slopes are more than 20% as per GEC'97.
13	AWARENESS AND TRAINING ACTIVITY i)MassAwarenessProgrammes Organized ii) Date iv) Place v) No of Participants	Nil
14	EFFORTS OF ARTIFICIAL RECHARGE AN RAINWATER HARVESTING i) Projects Completed by CGWB (No & amount spent) ii) Projects Under technical Guidance of CGWB (Numbers)	Nil
15	GROUND WATER CONTROL AND REGULATION i) Number of OE Blocks ii) Number of Critical Blocks iii) Number of Blocks Notified	Nil
16	MAJOR GROUND WATER PROBLEMS AND ISSUES	

1.0 Introduction

Ukhrul District, the land of the colorful Tangkhuls was marked out first a Sub-division in 1919 during the British period. It was upgraded to a full-fledged district in November 1969, bearing the nomenclature of Manipur East District. The area of the district was 8.200 Sq.Km according to the CSI Publication 1976. Later Tengnoupal District, now called Chandel District was carved out from this district on 15th July, 1983 and the area of the then Manipur East District was sliced down to 4,544 Sq.km and the title of the district was changed into Ukhrul District in 1983.

Ukhrul District is bounded by Myanmar in the East, Chandel district in the South, Imphal East and Senapati districts in the West and Nagaland State in the North. The district is generally hilly terrain with varying heights of 913 m to 3114 m, above mean sea level. The district headquarter Ukkhrul is linked with Imphal, the state capital by a NH-150 about 84 Km. It takes about 3 hours by ordinary passenger bus.

The climate of the district is of temperate nature with a minimum and maximum degree of 3o C to 33o C. The average annual rainfall is 1,763.7 mm. The exact location of the district as per survey of India Top sheet is 24 O north to 25 O 4l north latitude and 94 O east to 94 O 47 east longitude. The rainy season in the district is from May to beginning of October broadly but winter is chilly.

The highest peak is the Khayang peak of 3114 m, though the more popularly know peak is the Shirui Kashung Peak which is 2,835. Ukhrul, the district HQ, is 2,020 m, above mean sea level. Most of the major rivers originate from the crevices and slopes of this Shirui Peak.

The district shows rippled terrain with small ranges and striped by few rivers, viz.a. Somrah - Angkoching range, striped by Sanalok and Namba Lok; b. Shangshak - Phungyar range adjacent to which is the Shokvao - Mapithel - Kasom range striped by Tuyungbi and Taret Lok in the middle and Thoubal river in the West and Kachai - Hoome - Tampak Ngashan (Mahadev) range, striped by the tributaries of Thoubal river in Eastern side and Iril River in the Western side.

1.1 Administrative Set up

The district has 5 Sub-Divisions and 9 S.D.C circles. The sub divisions are Chingai, Ukhrul, Kamjong, Phungyar, and Kasom Khullen. As per the Census 2001, the district has an area of 4,544 sq. km with population density of 31 per sq. km. The total population is 1, 40,778 having 73,465 male and 67,313 female populations.

1.2 Climate and Rainfall

The district headquarters experiences very cold throughout the year as it lies on the top of the high hills. It is always covered by the clouds. Regarding district Headquarter, the sudden changes of the position of cloud are openly seen within a few moments, but in other places outside the district Headquarter, it is hot in summer and very cold in winter.

However, the whole district is having a moderate temperature. The hill range that lies in the district Headquarter Ukhrul Central sub-division has got very cold climate in winter while other parts of the vast hilly areas of the district have got moderate climate throughout the year. The coldest months of the district are December and January. During this period, the temperature at the Ukhrul district head-quarter uses to come down 3oC and even 0oC.

1.3 Physiography and Drainage.

The highest peak is the Khayang peak (3114 m above MSL), though the more popularly known peak is the Shiroi Kashung Peak (2,835 m above MSL). Most of the major rivers originate from the crevices and slopes of this Shiroi Peak. The terrain of the district is rippled with small ranges and striped by few rivers, i.e. ***Somrah – Angkoching range, striped by Sanalok and Namba Lok; Shangshak - Phungtar range***, adjacent to which is the Shokvao - Mapithel - Kasom range, striped by Tulungbi and Taret Lok in the middle and Thoubal river in the West and Kachai - Hoome - Tampak Ngashan (Mahadev) range, striped by the tributaries of Thoubal river n Eastern side and Iril River inthe Westem side.

Maklang and Tuyeng are the important rivers for Kasom Khullen and Kamjong Subdivision. The Thoubal river starts from the district and run through the Ukhrul North and Ukhrul central sub-divisions. It is the longest and biggest river in the district. Chammu and chingai rivers are running through Ukhrul North Sub-division. These rivers are not useful for transportation as the current of the rivers are very strong and wild during the rainy season and very thin during winter. They are useful for fishing and irrigation.

1.4 Agriculture

An Area of 22,000 hectares of the district is under cultivation. Rice, Maize, Potato, Pulse, Cabbage, Leafy vegetable, chilies, Groundnuts etc are the main agricultural products. Banana, sugarcane, fruits like lemon and orange are also planted. Plantation of cotton is also done for their domestic consumption.

2.0 Geological set up

Since the knowledge of geology of the state is still too incomplete, mineral prospecting remains awaited. Poor communication facilities, inaccessibility and

inclement climate have been the constraints in mineral explorations. However, the first attempt of systematic geological survey in Ukhru1 district in the recent years have located quite a number of minerals whose mining potential needs be assessed after a detailed study. As it is clear from the Mineral Map, more occurrences of the minerals of whatever indication it is met with in the eastern longitudinal half of the state where the rocks are comparatively of Older Disang formations. A part of the 220 lm long ophiolite belt running north-south is also extended into the eastern border areas. These metamorphose rocks have more possibilities to undergo greater mineralization. Investigations have revealed the occurrence of the following minerals.

i. Limestone

A substantial deposit of good quality limestone suitable for use in the manufacture of cement has been located during the recent years by the Geological Survey of India near Ukhrul. Limestone has also been located at a number of other areas e.g. Hundung, Mova, Khonggoi, Lambui and Paoyi. In the Ukhrul area, limestone occurs in two bands. A reserve of 579 M tonnes has been proved by drilling to a depth of 105 meters. Other deposits are 0.26 M tonnes at Khonggoi and 1.88 M tonnes at Hundung. All these deposits taken together are expected to be able to feed a cement plant of modest capacity of 200 tonnes per day for about 45 years. But the present installed capacity is only 50 TPD (tonne per day).

ii. Evaporities

Evaporities are the mineralized salt sediments from the evaporation of saline waters specially the seawaters. These are used in fertilizer, chemical, drug and building industries. Minor ccurrences of magnesium and other salts in Kongai area of Chingai sub-division of Ukhrul District have been located.

i. Mineral Water

A number of brine wells occur at Chingai, Challao, Nameri, Luchai-Khullen, Mariem and Kharawam in Ukhrul District. The spring water is locally used in making salt cakes.

ii. Clay

The alluvial soils and some of the residual soils in the valley contain clay. The character of the clay is clay is such that it cannot be used in the manufacture of whiteware.Bricks, sanitary and channel pipes can be manufactured from it. The rest are fit for brick industry.

3.0 Ground Water Scenario

3.1 Hydrogeolory

Ground water is restricted to secondary porosity in joints, fissures, fractures and weathered residuum of consolidated and semi-consolidated rocks and inter-granular pore spaces of alluvial deposits.

The semi-consolidated and consolidated rocks ranging in age from Pre-Mesozoic to Miocene forms the main hydrogeological units of the area. The semi-consolidated formation, which covers almost the entire area, comprises shale, siltstone, sand stone and conglomerate. These formations belong to Disang, Barail, Surma and Tipam Group of rocks.

The district has 5 Sub-Divisions and 9 S.D.C circles. The sub divisions are Chingai, Ukhrul, Kamjong, Phungyar, and Kasom Khullen. As per the Census 2001, the district has an area of 4,544 sq. km with population density of 31 per sq. km. The total population is 40,778 having 73,465 male and 67,313 female populations.

3.2 Aquifer System and Ground Water Occurrences

No ground water exploration work is carried out till date by CGWB in the district. But in view and facts by the study of geology and hydrogeology in the district, the area shows feasibility for the exploration of ground water though construction of dug well, dug cum bore wells and some tube wells through Manual, DTH-rig and Direct Rotary – rigs respectively. Fracture formations and aquifer zones may be encountered in the district. In fact there is great variation in both vertical and lateral lithology, even over small distances. Sand and gravel layers have indefinite and largely undefined boundaries.

Rainwater harvesting, construction of check dams are also suitable artificial recharge structures for the augmentation water in the district. Spring water is also one of the main sources of water supply in the population of the district.

3.3 Yield Potential of Aquifers

By the detailed studies and investigation of the local geology and hydrogeology in the district the following types of structures for the exploitation of ground water can be deciphered.

i) Tube wells up to a depth range of 30 to 70 m with low to moderate discharge are suitable in the district.

ii) Dug wells of l0 to 15 metre depth cans be constructed in the total western region of the district with expected discharge of 5 to 10 litres per minute.

iii) Dug wells and dug cum bore well structures up to a depth of 20 to 65 metre is suitable in the district. The discharge range to be measured is more than 8 litres
per minute.

The fluvial depositional system in the valley area has been of a complex nature in an otherwise gradual sinking lake in an episodic step like manner. Depending upon the degree of differential weathering between hilltops and valley floors, depression was formed and sediments were deposited, as channels and meander belts etc.

4.0 Ground Water Resources

The district is totally covered by hills with slopes more than 20%. So, the methodology of GEC'97 could not be adopted for the computation of dynamic ground water resources in the district. Since the poor quality ground water is only a localized phenomenon, the block-wise poor quality area has been taken as nil. The sub-unit demarcation into command and non- command has not been carried out since the data for the same are not available

5.0 Ground Water Quality

Water qualities as well as quantity are major concerns in the rural sector of the hill district. Biological contamination of drinking water supply combined with scanty quantity has been a major cause of most of the ill health. Because of the shortage of safe drinking water many people use the available surface water for drinking and domestic purposes from any source. The people illegally break the water pipe and tap inviting another problem of the hazard.

6.0 Status of Ground Water Development

Ground water augmented through springs and streams are used for drinking and irrigation purpose only in the district. As there is no sources of ground water supply in the district, ground water utilization for the same may be considered as negligible. The development of ground water in the district negligible.

7.0 Ground Water Management Strategy

Rainwater harvesting for the augmentation and recharge of rainwater in a scientific manner by constructing recharge structures in individual and community level are suitable in the district. Construction of check dams are also suitable artificial recharge structures for the augmentation of surface water. Spring water is also one of the main sources of water supply in the population of the district. Ponds are the most prevalent traditional water harvesting structures in the State. Hence, even today, a large majority of the population depends on ponds to meet their water requirements. Rainwater harvesting is suitable for meeting the domestic water requirements of the area. This is due to the –

i. Heavy rainfall and widespread precipitation
ii. Many houses already have GI sheet-covered slopping roofs.
iii. Most of the residential houses are small, owner-occupied houses.
iv. People are familiar with this concepts, and
v. The relatively pollution free atmosphere.

However, the available storage structures are small in capacity. This is an area that NGOs are best suited to address.

7.1 Water Conservation and Artificial Recharge

Individual and community pond with the practice of roof top rain water harvesting ***(old age method)*** are also very common in the area for water conservation through artificial recharge. As per earlier reports and present study, following design criteria is recommended

7.2 Shallow Domestic Wells

Open wells and filter point wells are feasible in all area of the district. In unconsolidated sediments ring well may be constructed by excavating down to the saturated horizon. Cement or earthen rings placed one above another with weep holes in the bottom rings are likely to hold sufficient quantity of water. Depth may be range from 10 to 15 m depending upon the topographic elevation. Expected discharge will be 0.5 to 3.0 cubic meters per day.

Bamboo as pipe and screen are very much within the reach of small and marginal farmers, as bamboo is locally available in the district. This type of well will be low cost and long lasting. Expected discharge will be 3 to 5 cubic meters per day.

8.0 Ground Water Related issues and problems

Safe drinking water supply and human health and efficiency in rural sector have remained as primitive as ever in the district. A close monitoring of affected area is also essential to restrict further spreading of quality affected ground water to such rural dominated poor state.

The development of ground water for water supply is highly recommended with strong attention to be paid to the water quality, availability and recharge rate in such hilly terrain.

9.0 Recommendations

Ground water is, important in the rural areas for irrigation and domestic supply. Existing hydrogeological set up indicate that there is some few scope for the development of ground water by way of constructing ground water abstraction structures in a planned way for profitable ground water development in the district.

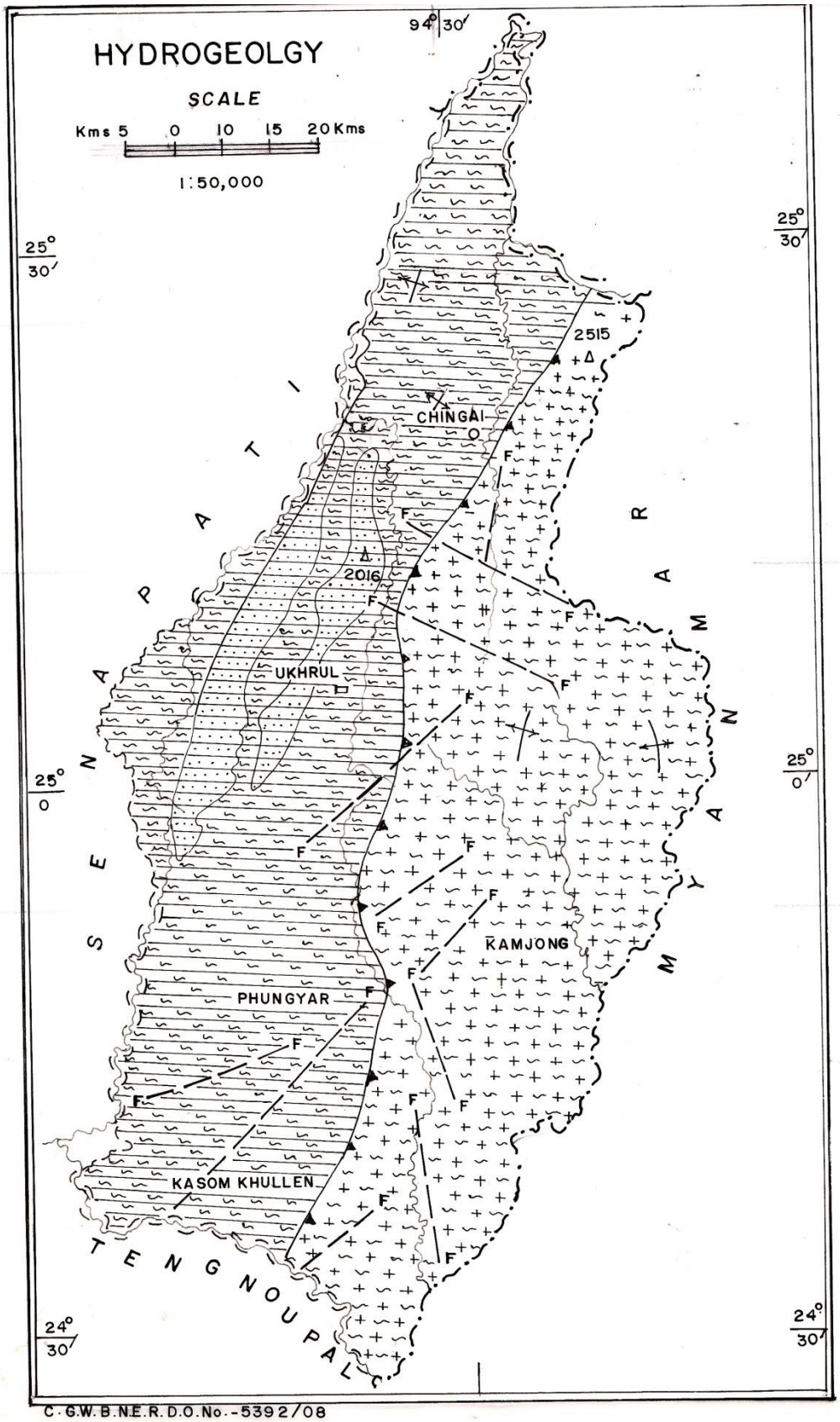
The following steps are important for regulating the inflow of rivers, streams etc. with sedimentation and siltation check in such hilly terrains

i) Construction of check dams throughout the catchment and ridge at suitable places in the area

ii) Development of suitable plantations over the denuded and barren hill slopes at the maximum possible scale and speed.

ii) Encouraging terrace cultivation in the hill slopes and proper guidance of Jhum cultivation. Construction of contour canals, subsurface dykes, gully plugging, terracing etc should be taken up. This step should be taken up urgently as the ratio of settled land in proportion to Jhum land under rice in the hill districts has been deteriorating over times, resulting in rapid land degradation in the hills and floods in the valley areas

iii) Local irrigation practices should be encouraged so that the plentiful water resources can be harnessed. Lifting water by pumping along river levees for irrigation purposes should also be encouraged.



C.G.W.B.N.E.R.D.O.No.-5392/08

UKHRUL DISTRICT, MANIPUR.

L E G E N D

	AGE	FORMATION	LITHOLOGY		HYDROGEOLOGICAL CONDITIONS	GROUND WATER PROSPECTS	
SEMI-CONSOLIDATED	OLIGOCENE	BARAIL	Bedded sandstone intercolated with hard shale and massive sandstone		Ground water restricted to secondary porosity in weathered residuum, joints, fractures and fissures.	Mostly run-off zone. Low yield prospects restricted to intermontane valleys.	
	EOCENE	DISANG	Hard and compact sandstone, shale and limestone.				
CONSOLIDATED	EARLY EOCENE TO PRE-MESOZOIC	PELAGIC SEDIMENTS AND METAMORMIC COMPLEX	Shale, mart, chert, limestone, serpentinite, pyroxenite, quartzite schist and phyllite.		Ground water restricted to secondary porosity.	High run-off zone, occassional seapage and springs, occur along fractures / joints etc.	

TECTONIC FEATURES

Fault — F

Anticlinal Axis

Synclinal Axis

Over-Thrust

MORPHOMETRIC FEATURE

Triangulation points (in m) Δ 2016

HYDROLOGICAL FEATURE

River / St