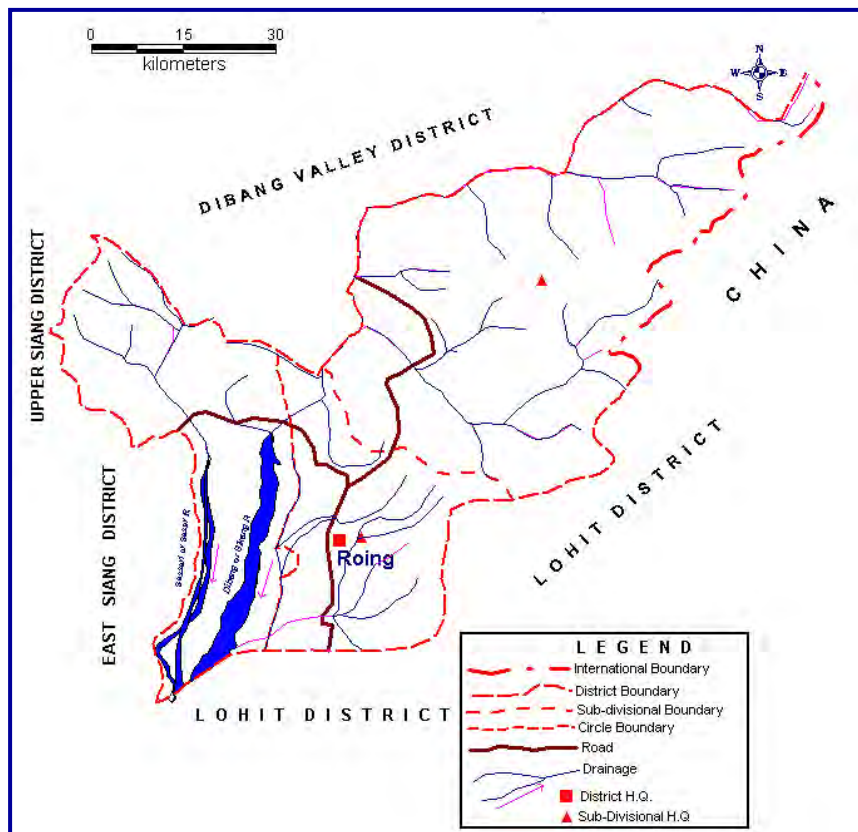




# Ground Water Information Booklet

## Lower Dibang Valley District, Arunachal Pradesh



**Central Ground Water Board**  
North Eastern Region  
**Ministry of Water Resources**  
Guwahati  
August 2009

GROUND WATER INFORMATION BOOKLET  
LOWER DIBANG VALLEY DISTRICT, ARUNACHAL PRADESH

AT A GLANCE

Sl No.	ITEMS	STATISTICS
1.	<b>GENERAL INFORMATION</b>	
	i) Geographical area (sq.km)	3,900
	ii) Administrative divisions (Sub-division) (As on 2006)	3
	Number of blocks	3
	Number of circles	8
	iii) Population (As on 2001 Census)	50,448
	iv) Average annual rainfall (mm)	3,889
2.	<b>GEOMORPHOLOGY</b>	
	Major physiographic units	Denudation hills comprised of phyllite, schist, quartzite, granodiorite, gneiss and alluvial plains
	Major drainages	Dibang River and Sesseri River
3.	<b>LAND USE (sq.km)</b>	
	a) Net area sown	14,015 ha
	b) Cultivable area :	18,055 ha
4.	<b>MAJOR SOIL TYPES</b>	Alluvial and loamy
5.	<b>AREA UNDER PRINCIPAL CROPS (As on 2005-06)</b>	17,315 ha
6.	<b>IRRIGATION BY DIFFERENT SOURCES</b>	
	Net irrigated area	3,529 ha
	Gross irrigated area	2,558 ha
7.	<b>NUMBERS OF GROUND WATER MONITORING WELLS OF CGWB (As on 31-03-2009)</b> No. of Dug Wells No. of Piezometers	Nil Nil
8.	<b>PREDOMINANT GEOLOGICAL FORMATIONS</b>	Schistose and gneissic rocks with phyllite and quartzite
9.	<b>HYDROGEOLOGY</b>	
	Major water bearing formation	Alluvium
10.	<b>GROUND WATER EXPLORATION BY CGWB (As on 31-03-2007)</b>	
	No. of wells drilled (EW< PZ< SH< Total)	Nil
	Presence of chemical constituents in more than permissible limit	
	Type of water	Fresh and potable
11.	<b>DYNAMIC GROUND WATER RESOURCES (2004) IN MCM(as per old district)</b>	

	Net annual ground water resources	612.96 mcm
	Net annual ground water draft	12 mcm
	Projected Demand for Domestic and industrial uses up to 2025	0.47 mcm
	Stage of Ground Water Development	<b>Safe</b>
12.	<b>AWARENESS AND TRAINING ACTIVITY</b>	
	Mass Awareness Programmes organized	Nil
	Water Management Training Programmes organized	Nil
13.	<b>EFFORTS OF ARTIFICIAL RECHARGE AND RAIN WATER HARVESTING</b>	
	Projects completed by CGWB	Nil
	Projects under technical guidance of CGWB	Nil
14.	<b>GROUND WATER CONTROL AND REGULATION</b>	
	No. of OE blocks	Nil
	No. of critical blocks	Nil
	No. of blocks notified	Nil
15.	<b>MAJOR GROUND WATER PROBLEMS AND ISSUES</b>	Nil

GROUND WATER INFORMATION BOOKLET  
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## 1.0 INTRODUCTION

Lower Dibang Valley district lies between North latitudes  $27^{\circ} 45'$  and  $28^{\circ} 04'$  and East longitudes between  $95^{\circ} 10'$  and  $96^{\circ} 40'$ . The district is bounded by Dibang Valley district in the north, Lohit district and Assam state in the south, Myanmar in the east and East Siang district in the west.

The district is divided into three sub-divisions, three blocks and eight circles. The district Headquarters is situated at Roing. The district is a predominantly mountainous terrain, with vast plains of Assam on the south. The river system of the district is a part of the Brahmaputra River basin. The main river of the district is the Dibang River. The confluence of Matum River is in the west and Dri River is on the east. Both the rivers originating in the Tibetan Plateau take the name of Dibang River. There are numerous southerly flowing small rivers and streams, tributaries to the Dibang River, except the Iphi Pani River which flows from west to east at the base of hill, north of Roing. Another small river, the Difu River flows from north to south in the eastern part of the district. The overall drainage pattern of the district is dendritic to sub-parallel. In the northern mountainous part, it is mostly of dendritic nature. In the valleys of the foothill area, it is sub-parallel flowing from north to south. The streams and nallas are of losing nature in the piedmont zone and the reappearance of these rivers is observed towards southern part of the district.

Agriculture is the mainstay of the people. The agriculture of the district mainly depends on monsoon rainfall. However, the Government of Arunachal Pradesh is actively engaged in developing permanent cultivation in the low lying areas along the valleys patches of hill slopes and intermontane valleys. The main field of cultivation of paddy lies on the foothills from Roing to Shanitpur in the southern part. It is observed that agriculture is basically mono-cropped and the farmers depend upon rainfall. However, minor and medium irrigation projects have been implemented in the district in certain areas.

Irrigation potential has been created for changing 'shifting' cultivation into permanent cultivation in the available land of foothills and valleys. Nos. of minor irrigation projects have been implemented in the district.

## 2.0 RAINFALL AND CLIMATE

Annual rainfall in the district varies from 3500 to 5000 mm. The normal annual rainfall in Roing area is 3990 mm. Most of the rainfall is received during the monsoon period (June to September). Heavy rainfall is received during summer and occasional rainfall during winter and pre-monsoon period. January and February are the driest months. The rainfall received during summer is under the spell of South-West monsoon. The onset of South-West monsoon occurs by the end of May or the first week of June and withdraws by late September or early October.

The climate of the district is mainly influenced by topography. It is sub tropical, wet and highly humid in the foothills and cold in higher elevations. The temperature falls below freezing point during extremely cold period.

## 3.0 GEOMORPHOLOGY AND SOIL TYPE

### 3.1. Geomorphology

About 70% of the district constitutes hilly mountainous comprising parts of the Lesser and Higher Himalayas. The topography is rather abrupt at the base of the foothills on south at the junction of the Assam plains indicating some geotectonic movements. The plain area is found in the southern part of the District. The Mountains gradually increases in height towards the north. Geomorphologically the district may be divided into units, namely denudation hill and alluvial plain

#### a) Denudation Hills:

These hills comprise quartzite, phyllite, slate etc. of Precambrian age. The hills are highly eroded, fractured and with a weathered zone of 5 to 50 m thickness. The regional trend of the hills is NW-SE and the hills alternate with deep gorges.

#### b) Alluvial Plains:

The plain area occupies an area of 1200 sq. km. It is bounded on south from Roing to Santipur, to Dibang River bank on west and up to Korona on east. The gradient of the plain is towards south, and it merges with alluvial plains of Brahmaputra River.

### 3.2 Soil Types

The nature and properties of soil vary according to topography and elevation of the area. The soils of the foothills are generally loamy or sandy loam mixed with pebbles and gravels. In the valleys, it is clayey in nature and rich in organic matter. Soils of the hills and mountains contain high humus and nitrogen. The nature of the soil is mainly acidic.

In major part of the district, the soil is sandy but sometimes clayey in nature. The soils in the district can broadly be divided into 1) plain alluvial soil and 2) hilly soil. The plain alluvial soil may be further divided into

- i) Older alluvium type: It is the soil of higher level terrace of foothill areas, which consist mainly of coarse sand and organic matter
- ii) Silt type: The silt type soil contain high silt content It composes the flood plains characterized by shallow surface layer of silt with sub-soil of coarse sand, sometimes mixed with pebbles and boulders. The soil of the valleys is favourable for cultivation of Kharif and Rabi crops. The soils of the hills are suitable for shifting cultivation of paddy, maize etc.

#### 4.0 GROUND WATER SCENARIO

##### 4.1 Hydrogeology

The water table of the foot hill belt is related to the topography and type of aquifer materials. The slope of the ground surface is towards south and the aquifer materials gradually become finer towards south. The depth to water level is higher in north in the piedmont zone and shallower in the south. Due to highly bouldery nature of the piedmont zone, streams and nallas disappear at the base of the hills and reappear further in the south, marked by a spring line. This spring line separates the younger and older alluvial sediments.

##### 4.2 Ground Water Resources

The entire district is occupied by hill ranges with very steep slopes that are more than 20%. Moreover, no details about the recharge potential in these hills are available. As per GEC, '97 these hilly areas are not taken into account for resource computation. Due to lack of data especially on population, number of ground water structures, draft and other important parameters on watershed basis, the smallest administrative unit, i.e. the R.D. Block has been taken as the unit of computation. Water level trend is also not available due to lack of ground water abstraction structures, hence the annual ground water recharges of all the assessment unit have been computed by the Rainfall Infiltration Factor method.

The estimated gross annual dynamic groundwater resource (including Dibang Valley district) is 612.96 mcm while net annual ground water draft is 0.12 mcm. Future provision for

domestic and industrial use is 0.47 mcm. Stage of ground water development in the district is 0.02%.

Lower Dibang Valley district is under the **SAFE** category.

#### 4.3 Ground Water Quality

As per earlier field investigation reports, the results of the analysis of the water samples collected from springs and dug wells are as follows.

**Table 1.** Ranges of chemical constituents

Sl No.	Constituent	Source – Dug wells	Source – Springs
		Range of parameters	
1	pH	6.27-6.97	6.94-7.48
2	E.C. (micromhos/cm)	70-195	20-59
3	TDS	50-140	10-40
4	Total Hardness	25-115	20
5	Calcium	6-24	
6	Magnesium	2-13	8
7	Sodium	1-4	1-5
8	Bicarbonate	24-55	18-24
9	Chloride	5-18	7-11

(All constituents expressed in mg/l, except pH and EC)

It is seen that quality of water both from springs and dug wells are fresh and suitable for all uses. In general, the chemical quality of ground water in the district is fresh and potable and can safely be used for domestic and industrial purposes.

#### 4.4 Status of Ground Water Development

The water requirement for drinking and domestic purposes in the district is mainly met with from the surface water sources like streams and nallas. Most of the population is being benefited from water supply schemes. In the plain area, in Roing sub-division, dug wells and hand pumps are available and lift water supply schemes are also prevalent.

### 5.0 GROUND WATER MANAGEMENT STRATEGY

#### 5.1 Ground Water Development

Major part of the district is covered by hills of consolidated rocks. In the absence of any ground water structure at present in the mountainous areas, springs constitutes an important source of water supply. However, mostly the springs are choked due to dirt, or are covered with vegetation. It is worthwhile to develop these springs. The foothill zone is suitable for the development of ground water through structures like dug wells, hand pumps and shallow tube wells and the piedmont zone is suitable for dug wells, generally 15 m deep.

The younger alluvium is suitable for all the shallow ground water abstraction structures. Dug wells down to the depth of 10 to 20 m having diameter 2 to 3 m are expected to yield 12 to 15 m<sup>3</sup>/day. Shallow tube wells with depth of 25 m are likely to yield 30 to 35 m<sup>3</sup>/hr. Towards the southern part of the district, bordering Assam state, the depth of alluvium increases and deep tube wells down to 150 m may be constructed in this area. Expected yield is 40 to 60 m<sup>3</sup>/hr.

#### **5.1 Rainwater harvesting structures constructed under centrally sponsored scheme**

Nil.

### **6.0 AWARENESS AND TRAINING ACTIVITY**

#### **6.1 Mass Awareness Training Programme**

Nil.

### **7.0 RECOMMENDATIONS**

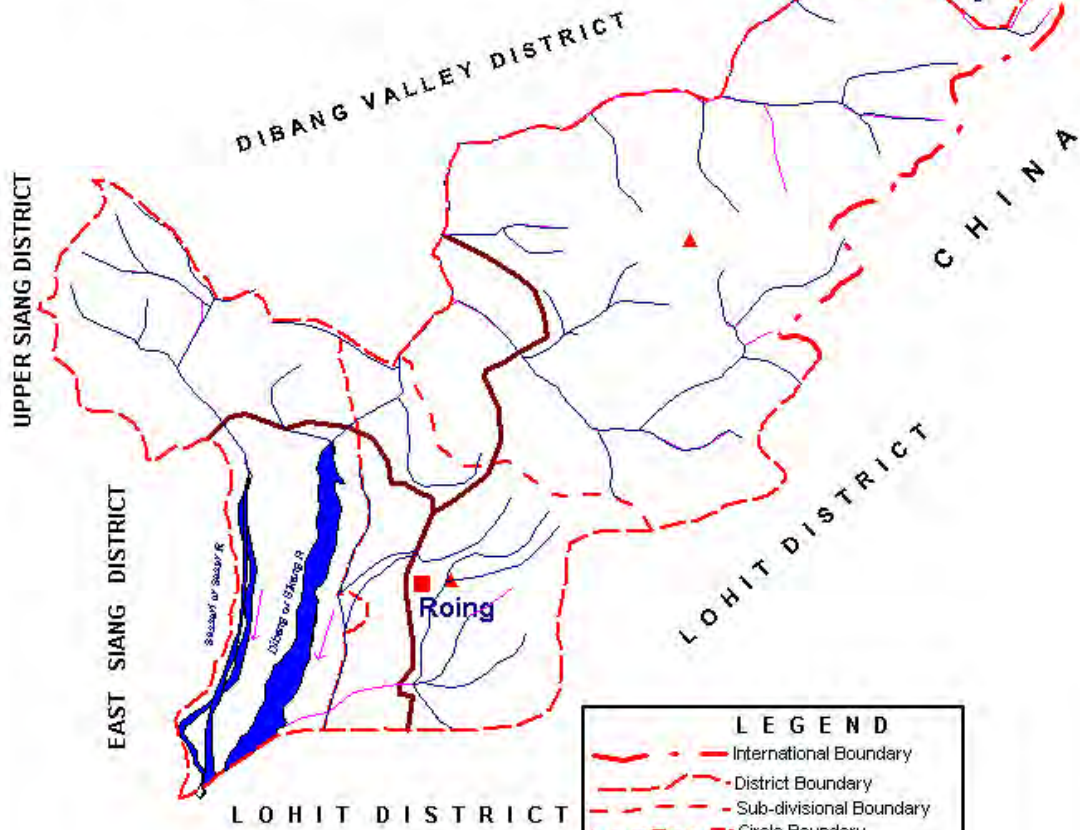
Existing hydrogeological set up indicates limited ground water development prospect in the mountainous area. This area is occupied by consolidated formation, ground water is confined mainly to secondary porosities developed due to joints, fractures etc. In this unit, the only source of development of ground water is through springs. The perennial springs may be developed at some places. However, rain water harvesting technique may be adopted in the district for adequate water supply.

Dug wells, hand pumps and shallow tube wells are feasible throughout the area of alluvial plains. Dug wells with 2-3 m in diameter and 10-20 m deep, are suggested for construction in older alluvium. In the younger alluvium, depth to water table is shallow and ground water can be extracted through dug wells, with expected yield of 15 m<sup>3</sup>/day. Shallow tube wells of 25-30 m depth have yield prospect of 30-35 m<sup>3</sup>/hr, while deep tube wells with

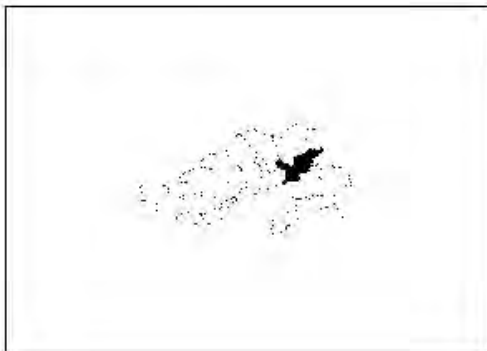
depth of 150 m, may yield 40-60 m<sup>3</sup>/hr. The deep tube wells are feasible only in the southern part bordering Assam.

The foot hill plain has sufficient ground water resources for development. However, since major part of the district is occupied by consolidated formation where immediate ground water development is remote and limited, tapping of surface water is advocated. Rain water harvesting may also be adopted.

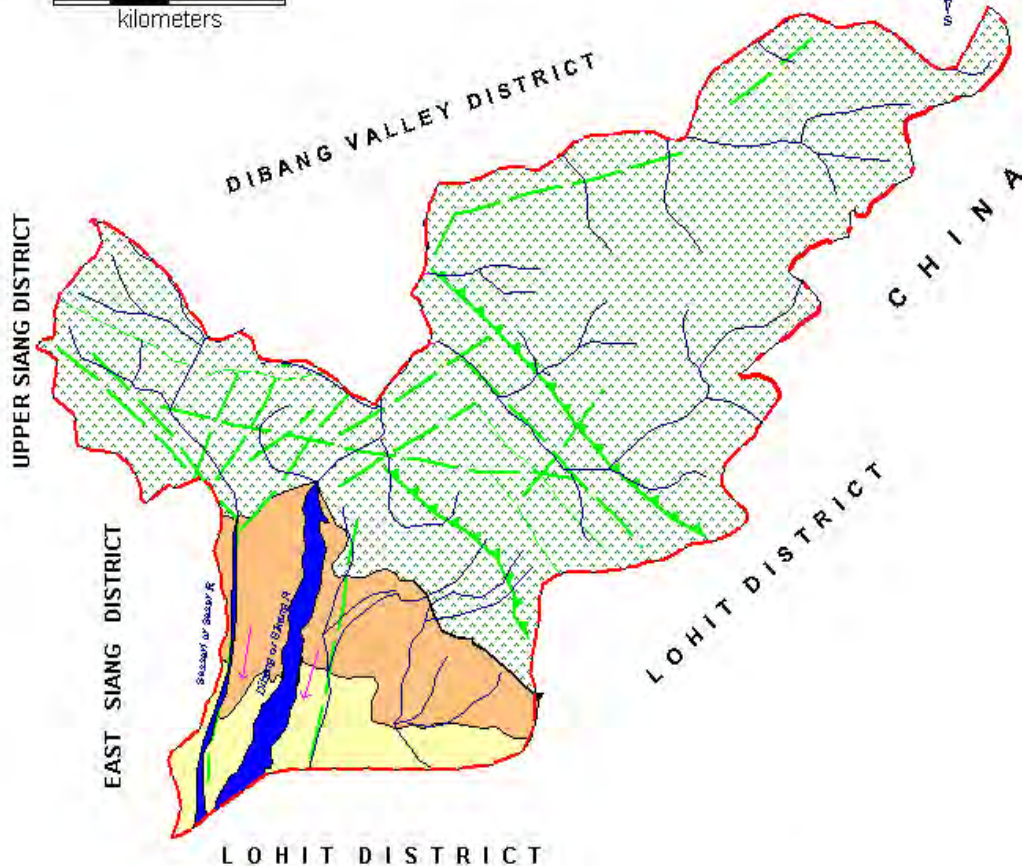
ADMINISTRATIVE MAP OF LOWER DIBANG VALLEY DISTRICT, ARUNACHAL PRADESH



LEGEND	
	International Boundary
	District Boundary
	Sub-divisional Boundary
	Circle Boundary
	Road
	Drainage
	District H.Q.
	Sub-Divisional H.Q.



## HYDROGEOLOGY OF LOWER DIBANG VALLEY DISTRICT, ARUNACHAL PRADESH



LOHIT DISTRICT

### L E G E N D

Annotation	Formation/Group	Age	Lithology	Ground Water Potential
	Newer Alluvium	RECENT	Unconsolidated deposits of boulders, pebbles, sand and silt covering the river bed and foothills	Moderate Yield, 30-50m <sup>3</sup> /hr Drawdown within 10 to 15 m
	Older Alluvium/ Piedmont Zone	SUB-RECENT	Boulders, pebbles and sand with clay pockets often forming terraces	Moderate Yield, 30-50m <sup>3</sup> /hr Drawdown within 10 to 15 m
	Miri Formation, Tenga Formation, Buxa Group, Tidding Group	LOWER TO MIDDLE PALAEOZOIC	Quartzites, Schists, Phyllite with bands of Granodiorite and gneiss, granulites and amphibolites	Low Yield, 5 to 15m <sup>3</sup> /hr
	Thrust			
	Lineament			