

Technical Report Series: D

No: 28/2009-10



# Ground Water Information Booklet

## Imphal West District, Manipur



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

**GROUND WATER INFORMATION BOOKLET**  
**IMPHAL WEST DISTRICT, MANIPUR**

**DISTRICT AT A GLANCE**

Sl. No	Items	Statistics
1.	<b>General information</b> i) Geographical area (sq. km.) ii) Administrative Divisions as on 2006 Number of Tehsils/CD Blocks Number of Panchayat/Village iii) Population as on 2001 census iv) Average annual rainfall in mm	558 3 2 1/117 4,39,532 1259.50
2.	<b>Geomorphology</b> i) Major physiographic units ii) Major drainages	i)Imphal west plain, marshy land and low to high altitude structural hills. ii)Imphal, Nambul Rivers and its tributaries.
3.	<b>Land use in sq. km.</b> i) Forest area ii) Net area sown iii) Cultivable area	Data not available
4.	<b>Major soil types</b>	Alluvial soil
5.	<b>Area under principal crops in sq. km as on 2006</b>	Data not available
6.	<b>Irrigation by different sources</b> a) surface water b) ground water	Data not available
7.	<b>Numbers of monitoring wells of CGWB as on 31.03.09</b>	Nil
8.	<b>Predominant geological formations</b>	Quaternary formation followed by Tertiary deposits.
9.	<b>Hydrogeology</b> i) Major water bearing formations  ii) Pre-monsoon water level during 2007 iii) Post monsoon water level during 2007 iv) Long term water level trend in 10 years(1997-2007) in m/year	Intermontane alluvial formation of river borne deposit along the rivers followed by Tertiary formation (structurally weak zones).
10.	<b>Ground water exploration by CGWB as on 31.03.2009</b> i) No of wells drilled	3

	<ul style="list-style-type: none"> <li>ii) Depth range in meters</li> <li>iii) Discharge in lps</li> <li>iv) Transmissivity(m<sup>2</sup>/day)</li> </ul>	<p>91.50 to173.66</p> <p>1.66</p> <p>17.86</p>
11.	<p><b>Ground water quality</b></p> <p>i) Presence of chemical constituents more than permissible limit (i.e. EC, F, Fe, As)</p>	Ground water is fresh and potable.
12.	<p><b>Dynamic ground water resources in mcm(2004)</b></p> <ul style="list-style-type: none"> <li>i) annual replenish able ground water resources</li> <li>ii) Gross annual ground water draft</li> <li>iii) Projected demand for domestic and industrial use up to 2025</li> <li>iv) Stage of ground water development</li> </ul>	<p>87.26</p> <p>1.35</p> <p>7.13</p> <p>1.72</p>
13.	<p><b>Awareness and training activity</b></p> <ul style="list-style-type: none"> <li>i) Mass awareness programmes organized</li> <li>ii) Date</li> <li>iii) Place</li> </ul>	Nil
14.	<p><b>Efforts of artificial recharge and rainwater harvesting</b></p> <ul style="list-style-type: none"> <li>i) Projects completed by CGWB( no and amount spent)</li> <li>ii) Projects under technical guidance of CGWB(numbers)</li> </ul>	Not applicable. No such project taken up. -do-
15.	<p><b>Ground water control and regulation</b></p> <ul style="list-style-type: none"> <li>i) Numbers of OE blocks</li> <li>iii) Numbers of critical blocks</li> <li>iv) Numbers of blocks notified</li> </ul>	<p>Nil</p> <p>Nil</p> <p>Nil</p>
16.	<p><b>Major ground water problems and issues</b></p>	As the district is underlain by approximately 30 to 50 m of clayey formation, construction of shallow tube wells is problematic. The construction of deep tube wells in the Disang formation covering extreme parts and parts of central Imphal may create problem but in the rest of the areas, construction will not be a problem due to existence of alluvial formation followed by Tertiary group of rock.

# **GROUND WATER INFORMATION BOOKLET**

## **IMPHAL WEST, MANIPUR**

### **1.0 INTRODUCTION**

Imphal West district of Manipur bifurcated from old Imphal district forms a part of the small intermontane valleys of Manipur state and covers an area of 558 sq. km within the North Latitudes  $24^{\circ} 30'$  &  $25^{\circ} 00'$  and East Longitudes  $93^{\circ} 45'$  &  $94^{\circ} 15'$ . The district is bounded on the north by the Senapati district, on the south by Thoubal and Bishnupur districts, on the east by Imphal East and in the west by Senapati and Bishnupur districts. The district with its headquarters at Imphal city has 3 sub-divisions, 2 development blocks, 10 towns and 117 villages.

As per 2001 census, the total population of the district is 4,39,532, out of which 2,18,947 are male and 2,20,585 are female population.

The district is having two National Highways, namely NH-39 (Indo-Burma/Myanmar Road) and NH-53 (New Cachar Road). Air-ways and other road communication are also connecting other parts of the state.

### **2.0 CLIMATE AND RAINFALL**

The district enjoys sub-tropical humid climate. Average annual rainfall in the district is 1,259.5 mm. About 60 to 65 % of the annual precipitation is received during south-west monsoon from June to September. Annual average temperature of the district is recorded to be  $20.4^{\circ} \text{C}$  and the temperature ranges from  $0^{\circ} \text{C}$  to  $36^{\circ} \text{C}$ . The relative humidity is high.

### **3.0 GEOMORPHOLOGY AND DRAINAGE**

#### **3.1 Geomorphology**

Physiographically, the district shows three prominent units i.e. a tiny plain topography, hilly areas in the extreme north, central parts and marshy land in the southern

parts of the district. The general elevation of the elevated area is around 790 m above mean sea level.

## 3.2 Drainage

The rivers Imphal, Nambul, Thoubal and their tributaries mainly drain the district. The Nambul River is made up of number of small streams on its upper course and flows through the Imphal town dividing the town almost into two equal halves. The course of the rivers is short and falls in the Loktak Lake.

### 4.0 LAND USE AND SOIL TYPE

The valley area of the Imphal West district is found to be very fertile and is mainly underlain by alluvial soil of Recent origin. This valley was once full of swamps and marshy land represented by the places having the word PAT meaning lake, like Lamphelphet, Takyelpat, Sangaipat, Kakwapat and Poiroupat.

### 5.0 GROUND WATER SCENARIO

#### 5.1 Hydrogeology

Geologically the district is underlain by Quaternary formation comprising Recent alluvium followed by Tertiary group of rocks represented by Disang formation. Quaternary formation comprising younger and older alluvial deposits consisting sand of different grades, pebbles, cobbles, gravel, clay dominate the area. Major parts of the district is underlain by the Recent formation followed by Tertiary formation, while the Tertiary formation alone restricts to the denudation hill ranges comprising hard and compact sandstone, shale and limestone.

Sub-surface geology as evidenced from available data infers that the potential aquifer pertaining to Quaternary formation exists down to explored depth of 50 to 100 m followed by Tertiary deposits. The cumulative thickness of aquifer zones has the tendency to increase towards north and in the southeastern part, the thickness reverses considerably.

Hydrogeologically the district is proved to be moderately potential where ground water occurs under water table to confined conditions. Depth to water level in major parts of the district varies from 2 to 5 m bgl. In the extreme southern and southwestern parts close to hills, the water level is found to be deeper and generally rests within 5 to 7 m. The movement of ground water is from south to north. The water level shows that there is gradual rising of water level in the district (Plate II).

Central Ground Water Board has so far constructed three exploratory tube wells in the district. The details of the deep tube wells are presented in Table1.

**Table-1** Details of the Deep Tube Wells constructed in Imphal West district

Sl no	Location	Depth drilled/constructed	Aquifer Thickness tapped	SWL	Discharge in m <sup>3</sup> /hr	T m <sup>2</sup> /day	Geology	Remarks
1.	Lamsang	127.27	-	-	-	-	Alluvium followed by Tertiary	Abandoned due to poor discharge
2.	Lamphelpat	173.66 /81.00	15	-	6	-	-do-	-do-
3.	Sangaipur	91.50 /50.00	11	0.50 agl	-	17.86	-	-

## 6.0 GROUND WATER RESOURCES

The district possesses moderate potentiality for ground water development. As per 1997 methodology, the dynamic resource potential of the district has been computed to be 87.26 mcm. After deducting unaccounted natural discharge, the net resource potential has been worked out to be 78.53 mcm. From this net resource, irrigation, domestic and industrial requirement of water has been computed to be 70.34 mcm, 7.13 mcm respectively. The draft created so far computed to be 1.35 mcm and development is found to be 1.72 % as such scope exists for development of ground water in the district.

## **7.0 GROUND WATER QUALITY**

Chemical quality of ground water samples collected from Exploratory Wells reveals that by and large the ground water is suitable for domestic, irrigation and industrial purposes.

## **8.0 STATUS OF GROUND WATER DEVELOPMENT**

The district in general is proved to be moderately potential from ground water point of view by the studies carried out by CGWB. Exploratory wells constructed down to 174 m bgl shows presence of one to two aquifer systems in the area. No major, medium and small irrigation schemes are implemented so far in the district for irrigational purposes.

## **9.0 GROUND WATER MANAGEMENT STRATEGY**

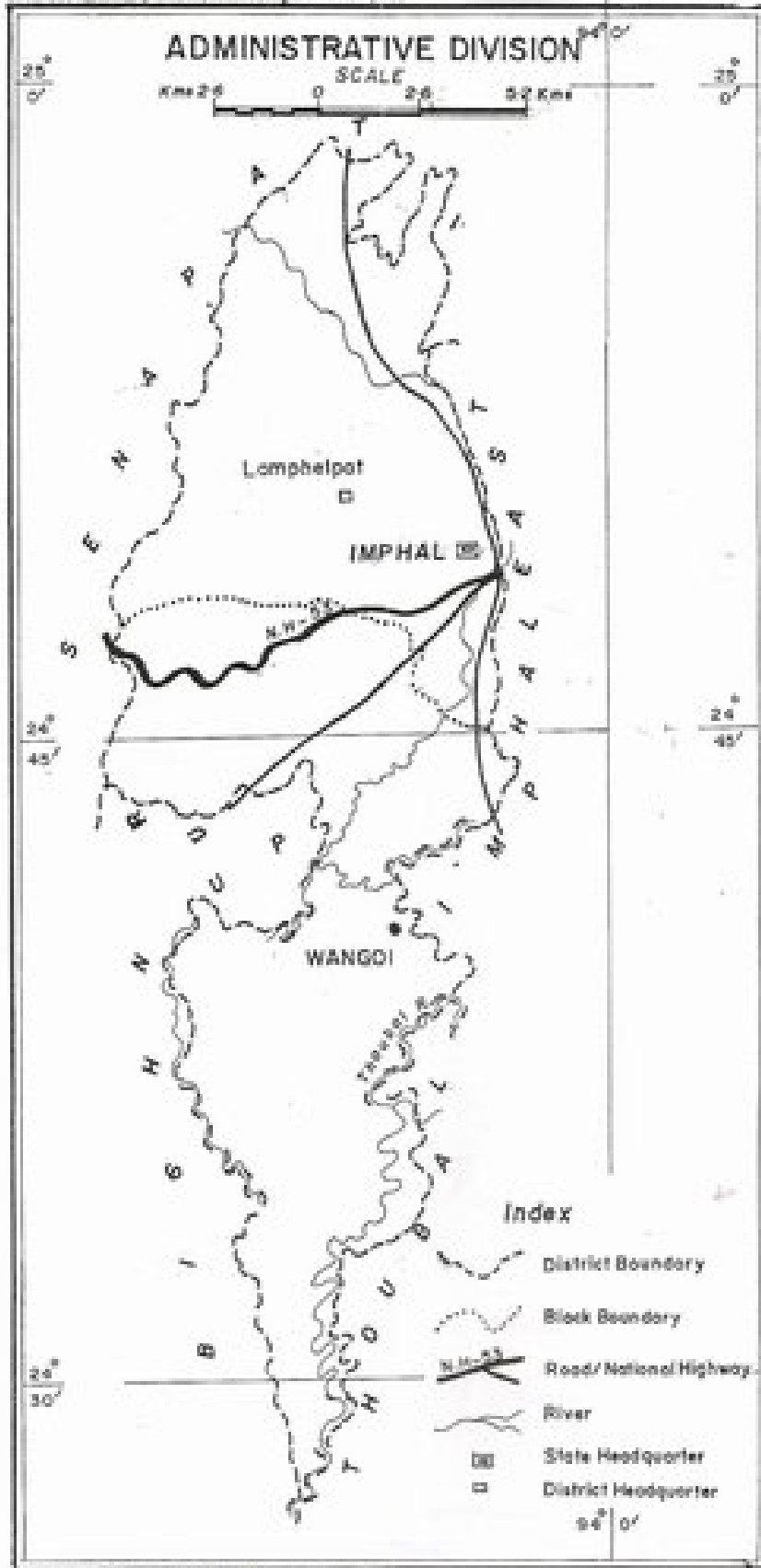
The district has suitable geological formation having one to two aquifer systems down to explored depth of 176 m where deep tube wells in the loose formation and bore wells in the hard massive can be constructed by way of deploying suitable rigs. The yield of deep tube wells varies from place to place depending on availability of potential aquifers.

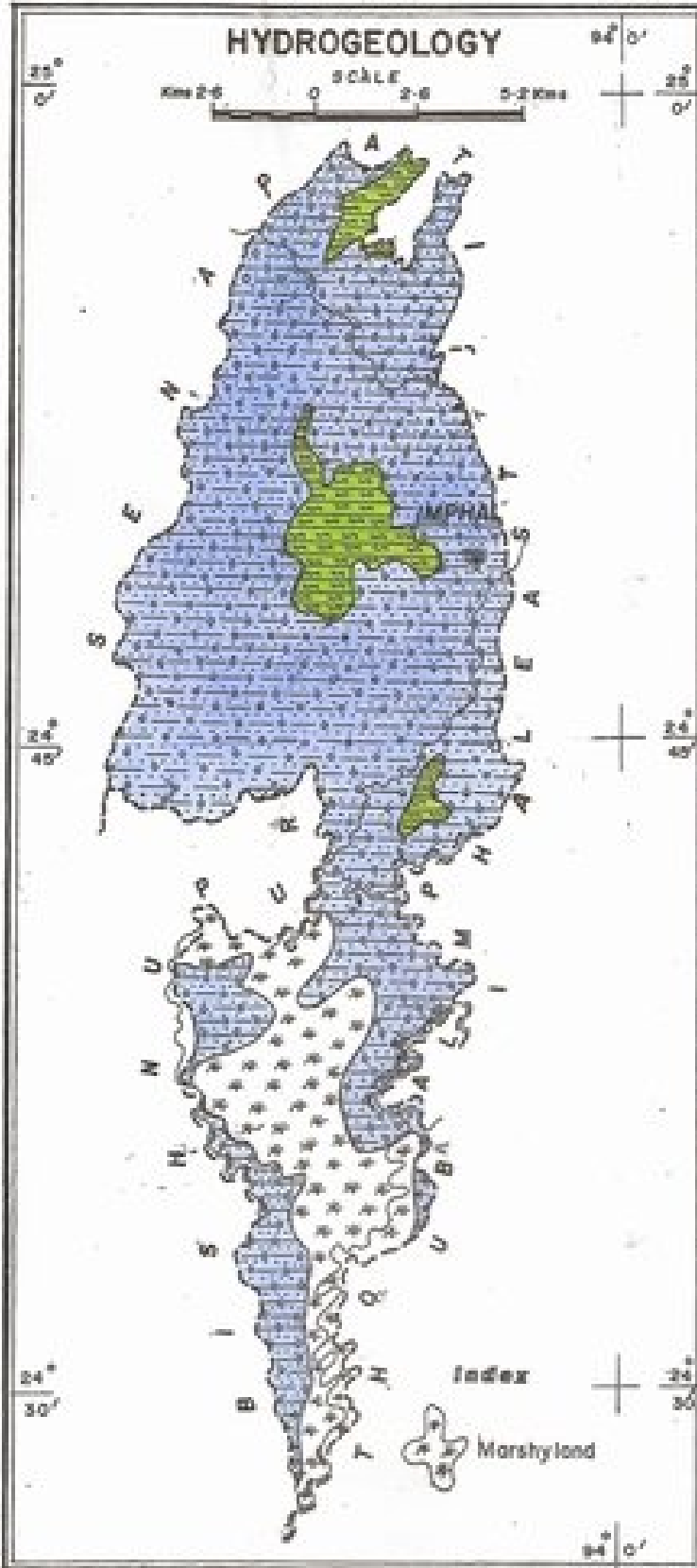
## **10.0 GROUND WATER RELATED ISSUES AND PROBLEMS**

Ground water related problems in the district has so far been identified as emanation of gas while constructing deep tube wells in some places and existence of clayey deposit down to depth range of 30 to 65 m bgl which invites problem for construction of shallow tube wells. As such utmost care has to be taken during construction of deep tube wells so that any untoward incident can be averted. The development of ground water is less than 1.72 % as on March 2004. As such, development of ground water by way of constructing deep tube wells for irrigation and as well as drinking water by the state Organization is need of the hour. Iron concentration above permissible limit poses problem, which can be lowered by filtration and as well as aeration method.

## **11.0 RECOMMENDATIONS**



The district possesses moderate ground water potential to the tune of 87.26 mcm and net resource of 78.53 mcm. This moderate resource can be developed for irrigation and other purposes. The draft created by existing tube-wells has been computed to be 1.35 mcm and development is found to be 1.72 %, as such scope exists for development of ground water in the district. Based on the irrigation water requirement, additional medium duty tube well to the tune of 3527 may be constructed, which will be able to generate irrigation potential of 8792 ha. The conjunctive use of surface and ground water may be done for better ecological conditions of the district. As the district is blessed with good amount of rainfall, rain water harvesting structures may also be constructed for storing and artificial recharge of ground water.





**IMPHAL WEST DISTRICT, MANIPUR**

**Legend**

AGE	FORMATION	LITHOLOGY	HYDROGEOLOGICAL CONDITION	GROUND WATER PROSPECTS
Quaternary	RECENT ALLUVIUM	Sand, gravel, pebbles, silt and clay.	 Moderately thick unconfined to semi-confined multi-layered aquifer system within the depth of 100m.	Moderately yield prospects of 10-30 cu ft/hr. at 10-15 m.
	DISANG	Hard and compact sandstone, shale and limestone.	 Ground water restricted to secondary porosity in weathered residuum, joints, fractures, fissures etc.	Mostly run-off zone. Low yield prospects restricted to intermontane valleys and weather zone.
Miocene				