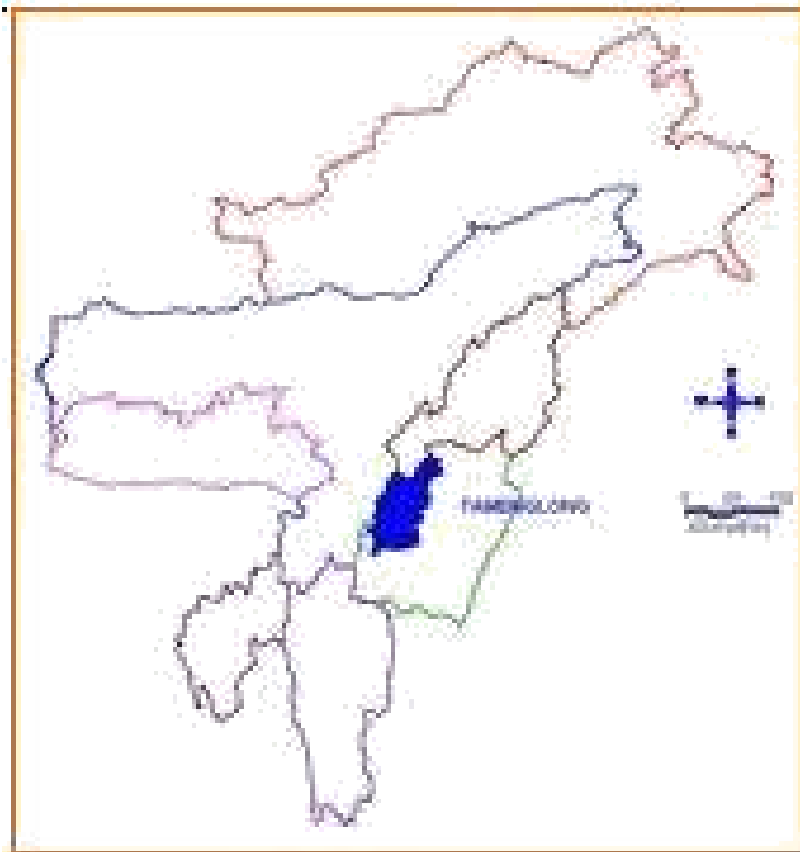


Technical Report Series: D

No: 27/2013-14



# Ground Water Information Booklet Tamenglong District, Manipur



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

**GROUND WATER INFORMATION BOOKLET**  
**TAMENGLONG DISTRICT, MANIPUR**  
**DISTRICT AT A GLANCE**

| Sl. No | Items   | Statistics   |
|--------|---|--|
| 1.     | <b>General information</b><br>i) Geographical area (sq. km.)<br>ii) Administrative Divisions as on March 2013<br>Number of Tehsils/CD Blocks<br>Number of Panchayat/Village<br>iii) Population as on 2011 census<br>iv) Average annual rainfall in mm | 4391<br>4 : Tamenglong, Tamei, Tousem, Nungba<br>2<br>1/117<br>1,40,143<br>1509.2  |
| 2.     | <b>Geomorphology</b><br>i) Major physiographic units<br>ii) Major drainages   | The district is mostly covered by hills and narrow valleys<br>Barak, Makru, Iyei, Irang Rivers   |
| 3.     | <b>Land use in sq. km.</b><br>i) Forest area<br>ii) Net area sown<br>iii) Cultivable area   | Data not available   |
| 4.     | <b>Major soil types</b>   | Alluvium and Laterite Soils  |
| 5.     | <b>Area under principal crops in sq. km as on 2011</b>  | 10.64 thousands hectare (Rice)   |
| 6.     | <b>Irrigation by different sources</b><br>a) surface water<br>b) ground water   | Data not available   |
| 7.     | <b>Numbers of monitoring wells of CGWB as on 31.03.13</b>   | Nil (No NHS of CGWB in the district due to prevailing law & order in the area)   |
| 8.     | <b>Predominant geological formations</b>  | Small veneer of Quaternary Formation followed by Surma and Barail Formation of Tertiary age  |
| 9.     | <b>Hydrogeology</b><br>i) Major water bearing formations<br>ii) Pre-monsoon water level<br>iii) Post monsoon water level<br>iv) Long term water level trend   | Small Intermontane alluvial formation of river borne deposit and secondary porosity of Tertiary groups of rocks<br>3.0 to 5.0 m bgl<br>1.0 to 3.0 mbgl<br>Data not available |
| 10.    | <b>Ground water exploration by CGW B as on 31.03.2013</b><br>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(<math>m^2/day</math>)</li> </ul>  | <p>20.3 to 250.00</p> <p>2.4 to 36 m<sup>3</sup>/hr for draw down of 28 to 37 m</p> <p>38.5 to 263.7</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(2009)</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> | Due to paucity of data and poor ground water development, computation could not be carried out  |
| 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>  | Construction of groundwater structures are problematic due to limited thickness of alluvial formation and compact rock types having rugged topography, small hilly roads with sharp bending, which do not permit easy movement of rigs. |

# **GROUND WATER INFORMATION BOOKLET**

## **TAMENGLONG DISTRICT, MANIPUR**

### **1.0 INTRODUCTION**

Lying on the western boundary of the state of Manipur, the district of Tamenglong located within East Longitudes  $93^{\circ} 09'$  &  $93^{\circ} 57'$  and North Latitudes  $24^{\circ} 00'$  &  $25^{\circ} 30'$ , plays an important role in socio-economic development of the state and covers an area of 4,391 sq. km. It is bounded in the south by Churachandpur district, in the west by Assam and Nagaland states and in the east and north east by Senapati district. It has four Sub-divisions at Tamei, Tousem, Tamenglong with head offices at Nunoba. As per 2001 census, the total population of the district is 86,278 and is mostly comprised of Zeliangrong, Kuki, Chiru, Hmar and Khasi tribes. The district has four Sub-divisions, namely, Tamenglong, Tamei, Tousem and Nungba. The headquarters of Tamenglong district can be reached by roadways from Imphal (Plate I).

### **2.0 CLIMATE AND RAINFALL**

The climate of the district is classified as meso thermal wet climate with forest type of vegetation. January is the coldest month with temperature of  $4.0^{\circ}$  C. July and August are the hottest months with average monthly temperature of about  $31^{\circ}$  C. The average minimum relative humidity of the district is 76 per cent and maximum is 92 percent.. The average annual rainfall is recorded as 1509 mm.

### **3.0 GEOMORPHOLOGIC FEATURES AND LANDFORMS**

Tamenglong district is mainly represented by hills and narrow valleys. Three morphological units are discernible in Tamenglong district,

- (i) the thin alluvial veneer of river borne deposits along the river courses
- (ii) the low altitude hills
- (iii) the high altitude undulating structural hills. The general trend of the hills is towards NE-SW and at places towards N-S.

Major rivers namely, Iyei, Irang, Barak, Makru, Lanka, Jiri, Iuhuki, Ahu, Dambulvapi, Tullang, Leimatak, Ladu and Tuighaiadung drain the district. These rivers are highly meandering in nature and almost at right angles which give rise to sub-parallel type of drainage pattern. These tributaries retain only meager base flow during the dry winter months.

Land forms of the district are mainly weathered soil derived from the parent rocks except thin veneer of alluvial soil along the river courses at relatively lower altitudes. Jhum cultivation is practised in the district. Main crops of the district are rice.

#### 4.0 GROUND WATER SCENARIO

##### 4.1 Hydrogeology

The district is underlain by thin negligible unconsolidated alluvial sediments of the Quaternary age along the river courses in intermontane valleys like Jiribam and Dhalakhal located in the extreme south western part of the district covering an area about 10 sq. km. and the major parts are covered by Tertiary group of rocks comprising shale, siltstone, sandstone and conglomerate, Geological sequences of the district is as given below.

| <u>Age</u>    | <u>Formation</u> | <u>Lithology</u>                                   |
|---------------|------------------|--|
| Quaternary    | Recent alluvium  | Sand, gravel, pebble, silt and clay                |
| Lower Miocene | Surma            | Shale, siltstone, sandstone and conglomerate       |
| Oligocene     | Barail           | Bedded sandstone, hard shale and massive Sandstone |

The rock formation pertaining to Surma and Barail formations are semi-consolidated in nature and at places, very hard and massive (Plate II). These are highly fragile in nature and are criss-crossed by faults, fissures, joints and lineaments of high intensity developed due to various tectonic activities experienced by the district in geologic time scales. Secondary porosity developed thus act as ground water repository in case of hard formations. Loose Recent alluvial formations have thickness varying from 10 to 15 m and ground water occurs under water table conditions. In the semi-consolidated formations, ground water occurs under water table to semi-confined conditions. Depth to water level in the water table zone varies from 3 to 5 m in the pre-monsoon period and 1.0 to 3.0 m during post-monsoon period. Exploratory drilling carried out by Central Ground Water Board at three sites in Jiribam valley down to depth span of 250 m below ground level has proved to bear low to moderate

ground water potentiality. Thickness of water bearing formations varies from 10 to 20 m within 100 m and 25 to 50 m within 100 to 250 m depth span. Piezometric water level in these constructed deep tube wells varies from 2.74 to 6.31 m. Discharge of tube wells varies from 57.92 to 882.72 m<sup>3</sup>/day for variable draw down varying from 6.21 to 37.58 m. Transmissivity of these wells varies from 38.50 to 263.70 m<sup>2</sup>/day. Hydraulic parameters show that the valley is having low potentiality from ground water point of view. This valley forms an up slope part of adjacent Barak valley of Assam. In the hilly areas, ground water can be developed by constructing bore wells at feasible points by way of deploying DTH rigs.

Hydrogeological Data of Exploratory Wells Constructed in the District

| Sl No | Locations | Depth of drilling/ construction/r | Aquifer thickness tapped(m) | SWL (m) | Discharge (lpm) | Draw Down (m) | T m <sup>2</sup> /d |
|-------|-----------|-----------------------------------|-----------------------------|---------|-----------------|---------------|---------------------|
| 1.    | Ahmedabad | 250/228.08                        | 44.08                       | 2.74    | 235.00          | 37.58         | 41.75               |
| 2.    | Goakhal   | 250/214.62                        | 60.13                       | 6.31    | 613.00          | 28.61         | 38.50               |
| 3.    | Kamrenga  | 20.30/18.00                       | 6.00                        | 3.65    | 40.22           | 6.21          | -                   |

## 5.0 GROUND WATER RESOURCES

The dynamic ground water resource potential of the district could not be computed due to paucity of data.

## 6.0 GROUND WATER QUALITY

The chemical analysis data of water samples collected from deep tubewells constructed by CGWB reveals that type of water is slightly alkaline type and other constituents are well within permissible limit.

## 7.0 STATUS OF GROUND WATER DEVELOPMENT

Ground water development in the district is still in nascent stage as construction of ground water structures are not yet geared up due to various reasons and most of the inhabitants of the district depend upon spring water.



## **8.0 GROUND WATER MANAGEMENT STRATEGY**

The district is a hilly terrain covered by thin veneer of alluvial thickness in the inter-montane valleys followed by Tertiary formation at shallow depth, as such ground water prospects in the district as a whole is not that promising and restricted to the river valleys where CGWB deep tube wells gave discharge varying from less than 15 to 35 cum/hr. In view of this, ground water development in the district can be restricted to the valley portions by way of constructing deep tube wells using Rotary Rigs and in the hilly areas, ground water can be developed in structurally weak zones by deploying DTH Rigs.

## **9.0 GROUND WATER ISSUES/PROBLEM OF THE AREA**

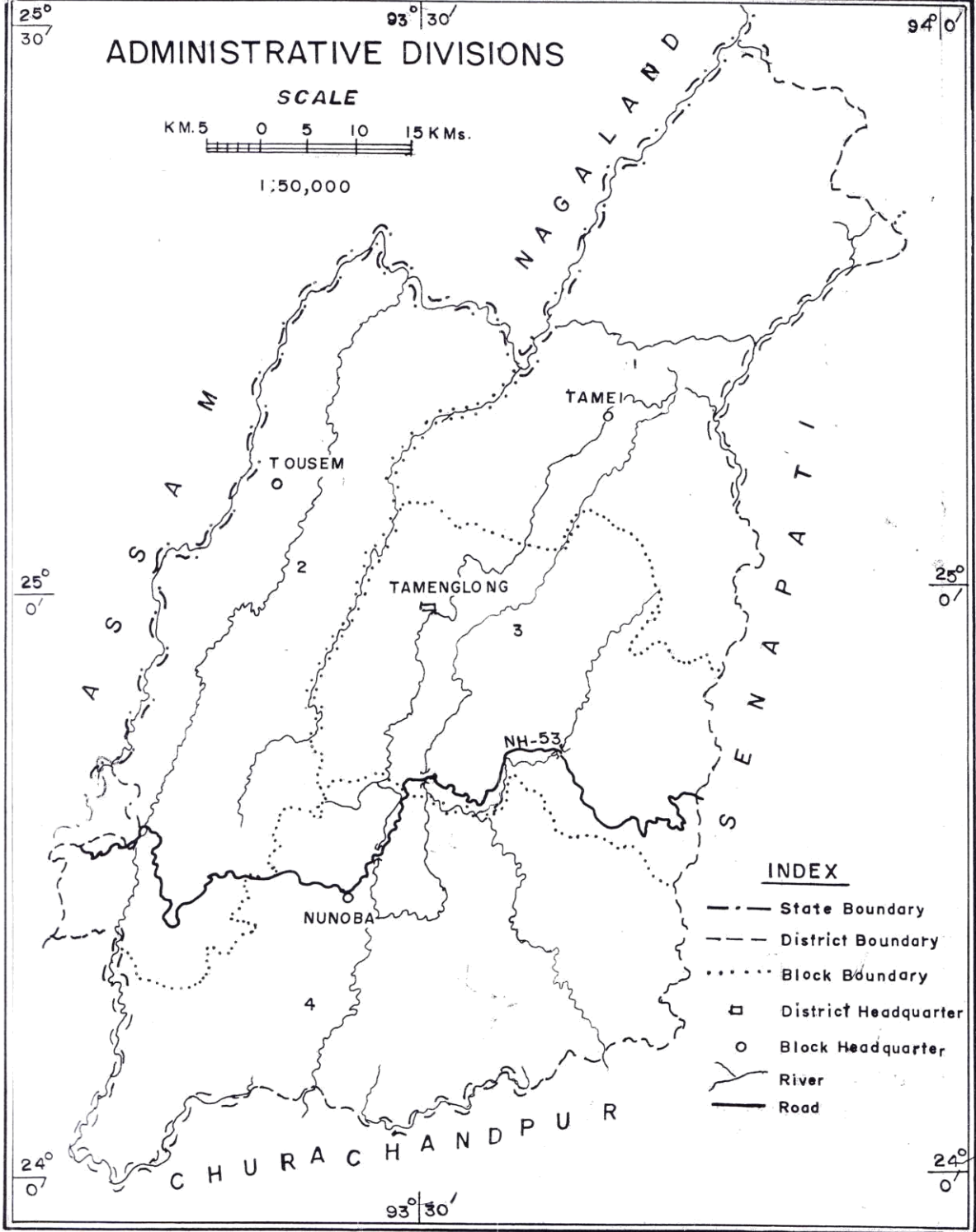
The district does not possess promising ground water potentials due to its strategic location. It is mostly covered by high hills having geological formation pertaining to Tertiary group of semi-consolidated rock and thin veneer of alluvial formations along the rivers where ground water structures can be constructed for low duty discharges by installing Rotary Rigs. But in the hilly areas, construction of deep bore wells in the feasible sites may face problem due to sharp road bending, where negotiations of Rig movement will not be possible. In these areas, rain water harvesting from roof tops and as well as from other convenient surfaces as hill slopes, roads and fields can be attempted. Spring water is fresh and potable.

## **10.0 RECOMMENDATIONS**

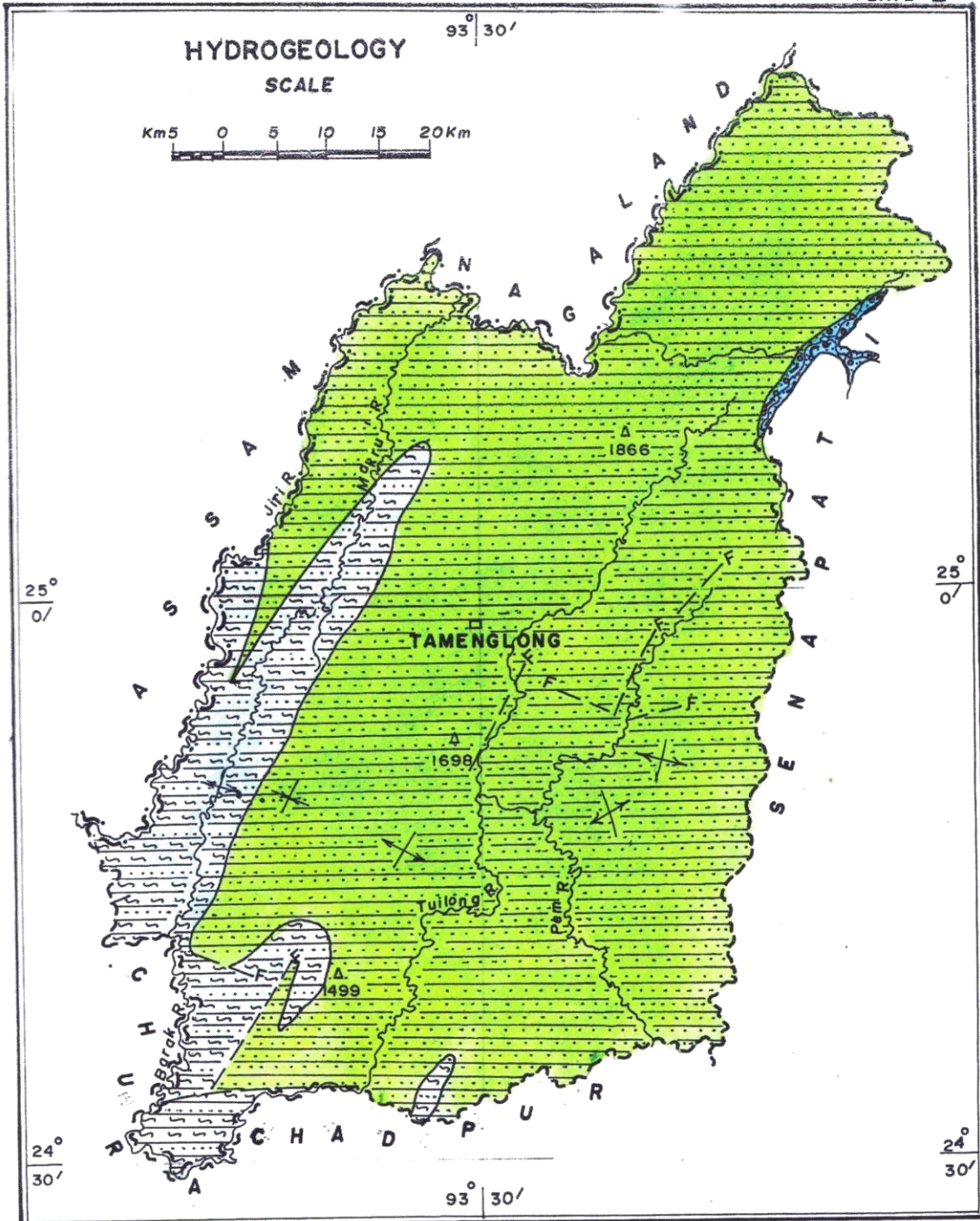
Ground water development in the district is still in nascent stage. Available data on ground water reveals that Central Ground Water Board has only constructed three deep tube wells in the south western part of the district in the Ziribam valleys. Here, ground water prospects is observed to be negligible to poorly potential having discharge range within 2.4 to 36 cum/hr for heavy draw down within 28 to 37 m. Feasible numbers of deep tube wells can be constructed for ground water withdrawal. In the hilly areas, attempt can be made in structurally weak zones for bore wells. In the other areas, rain water harvesting can be practised from roof tops, hill slopes, fields and roads and it can be stored for future use during lean period of the year.

TAMENGLONG DISTRICT

Plate-1









TAMENGLONG DISTRICT, MANIPUR.

LEGEND

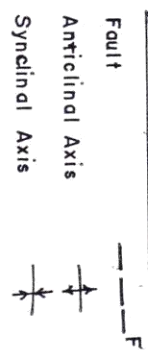
| AGE | FORMATION | LITHOLOGY | HYDROGEOLOGICAL CONDITIONS | GROUND WATER PROSPECTS |
|-----|-----------|-----------|----------------------------|------------------------|
|-----|-----------|-----------|----------------------------|------------------------|

|                |            |                 |                                      |   |                          |
|----------------|------------|-----------------|--------------------------------------|---|--------------------------|
| UNCONSOLIDATED | QUATERNARY | RECENT ALLUVIUM | Sand, gravel, pebbles, Silt and clay |  <p>Moderately thick unconfined to semi-confined multi-layered aquifer system within the drilled</p> <p>Moderate yield prospects of <math>10-30 \text{ m}^3/\text{hour}</math> at <math>10-15 \text{ m}</math> drawdown.</p> | <input type="checkbox"/> |
|----------------|------------|-----------------|--------------------------------------|---|--------------------------|

|                   |               |       |   |   |                          |
|-------------------|---------------|-------|---|---|--------------------------|
| SEMI-CONSOLIDATED | LOWER MIOCENE | SURMA | Shale, siltstone, sandstone and conglomerate. |  <p>Moderately thick but discontinuous confined to semi-confined aquifers within the drilled</p> <p>Moderate to poor yield prospects of <math>15 \text{ to } 35 \text{ m}^3/\text{hr}</math> at <math>25-35 \text{ m}</math> drawdown.</p> | <input type="checkbox"/> |
|-------------------|---------------|-------|---|---|--------------------------|

|            |        |  |   |                          |
|------------|--------|--|---|--------------------------|
| OLLIGOCENE | BARAIL | Bedded sandstone intercalated with hard shale and massive sandstone. |  <p>Ground water restricted to secondary porosity in weathered residuum, joints, fractures and fissures</p> <p>Mostly run-off zone Low yield prospects restricted to intermontane valleys.</p> | <input type="checkbox"/> |
|------------|--------|--|---|--------------------------|

TECTONIC FEATURES



MORPHOMETRIC FEATURE

Triangulation points (in m)  $\Delta$  1866

HYDROLOGICAL FEATURE

River / Stream 