Chapter 3

TOPOGRAPHY OF THE STUDY AREA
For any hydro-chemical study of an area and further modeling of groundwater chemistry and its movements, large amounts of data pertaining to geology, hydrogeology, rainfall, groundwater and surface water chemistry are required. The geological and hydrogeological data have been collected from the Department of Mines and Geology, Chikmagalur, Karnataka. The population data have been collected from the District Statistical Officer and Additional District Registrar of births and deaths, Chikmagalur. The rainfall data and soil properties data have been collected from meteorological department and agricultural department of Chikmagalur. The details of small scale industries located in and around Chikmagalur has been obtained from the office of the Assistant Director for small and large scale industries, Chikmagalur. This chapter describes an overview of the study area which includes location and physiography, meteorology, population and geology of the study area, landuse and drainage. These particulars are presented as below.

Study Area

Chikmagalur is one of the district headquarters, situated about 256 km from Bangalore, Karnataka state (South India). The taluk shares its boundaries with Tarikere taluk towards north, on the east by Kadur and Birur taluks, on the south by Belur and Mudigere taluks and on the west by Shringeri and Narasimha Raja Pura taluks. The highest peak point of Karnataka, Mullaiananagiri, which rises to 1926 mts above mean sea level is existing in this taluk. The major portion of the taluk consists of mountain regions of the Western Ghats. Bababudan range, which is the loftiest range of Karnataka table land is situated in the Chikmagalur taluk.

Chikmagalur taluk has some small scale industrial units like rice mills, oil mills, cement pipes, cement bricks, mosaic tiles, poultry farms etc., and some of the coffee estates have coffee processing units.
Physiography

The geological location of Chikmagalur taluk lies between the latitude of 13° 25' 45" to 13° 47' 30" North and longitude of 75° 45' 27" to 75° 52' 30" East. As a whole, the region has hilly areas and flat plain land with an average elevation of 592.85 m above mean sea level. It comprises 8 Hobis and 285 villages with a total population of 2,95,565 as per 2001 census. Chikmagalur taluk has a geographical area of 1,63,052 hectares. Out of which, the total cultivable land is about 64,601 hectares, barren land 18,905 hectares and non-agricultural land of 7,430 hectares. It has a forest area of about 47,455 hectares.

Land use

In the study area, the agricultural activity is dominated. It comprises 50 to 60% of the total land area. The existing type of soil in the taluk is suitable for growing crops like coffee, cardamom, arecanut, pepper, coconut, paddy, jowar and ragi. The common fertilizers used in the study area are NPK complex, urea, copper sulphate, ammonium sulphate and di-ammonium sulphate. Insecticides and pesticides such as carbaryl, carbofuran, dialdrin, aldrin and BHC are extensively used to control insects and pests. About 28 to 30% of the total area is being used for non-agricultural activities consequent to urbanization and industrialization.

Land use pattern of Chikmagalur taluk

<table>
<thead>
<tr>
<th>Description</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total geographical area</td>
<td>1,63,052 hectares</td>
</tr>
<tr>
<td>Forest area</td>
<td>47,455 hectares</td>
</tr>
<tr>
<td>Total cultivable land</td>
<td>64,601 hectares</td>
</tr>
<tr>
<td>Barren land</td>
<td>18,905 hectares</td>
</tr>
<tr>
<td>Non-agricultural land</td>
<td>17,431 hectares</td>
</tr>
<tr>
<td>Non-cultivable land</td>
<td>7,230 hectares</td>
</tr>
<tr>
<td>Non-agricultural (Urban)</td>
<td>7,430 hectares</td>
</tr>
<tr>
<td>Tanks</td>
<td>2,713 Nos</td>
</tr>
<tr>
<td>Open wells</td>
<td>170 Nos</td>
</tr>
<tr>
<td>Tube wells</td>
<td>2,465 Nos</td>
</tr>
</tbody>
</table>
Meteorology

Climate

The climate of Chikmagalur taluk is semi arid and enjoys three well defined seasons.

a) Summer season: February to May and the hottest months being April and May.

b) Rainy season: June to September

c) Winter season: October to January

Temperature

Temperature varies from 13 to 32°C. The maximum temperature recorded so far is 32°C during the month of April. The lowest minimum temperature was recorded in the city is 13°C during the month of December.

Humidity

The percentage of humidity varies from 40 to 86%. The relative humidity in the early morning throughout the year generally exceeds 76%. Similarly in the afternoon relative humidity generally exceeds 60%. While in the monsoon months, the relative humidity shows high and comparatively less in the other months. The driest part of the year recorded from February to April.

Rainfall

The average rainfall of the area is 1990 mm. The region receives rainfall mainly from south west monsoon and partly from Northeast monsoon with an annual rainfall season spreading over a period of 4 to 5 months. The south west
monsoon occurs from June to September amounting to about 68% and Northeast monsoon during October to November contributing about 32% of the rainfall.

**Geology of the study area**

Stratigraphically the study area comes under Bababudan belt of Dharwar super group. Bababudan belt is well known for its iron ore (Horse shoe shape) with tapering tail to the South West is interpreted as a synclinorium plunging gently towards Northwest and west in the Central part of the belt and Southwest in the southern part containing hills rimming with densely wooded Jagar valley and thick succession of metabolic lava interbedded with current-bedded and ripple marked quartzite and phyllite leading to the main volcanic pile. The ultramaphic shows, acid to intermediate lava and maphic sediments form part of the maphic plate form. It has basal quartz-pebble conglomerates and granite in the south. It is bounded on other sites by steep faults in contact with the peninsular gneiss basements. The basement of peninsular gneiss represented by granite varieties (Trondhemitic to Granodiorite) (Ramkrishnan *et al.*, 1984 and Taylor *et al.*, 1984).

The lower formation varying in thickness from a few meters upto 2000 m MSL are dominated by amygdular and massive (locally pillowed) metal-basalts with local cross-bedded and ripple marked quartz arenites and minor phyllites. The basal quartz, pebble conglomerates uncomfortably over lies the peninsular gneiss basement. The overlying formations have basal arenites and quartzites, banded iron formation (BIF) with associated phyllites and minor maphic, ultramaphic rocks. The laterally equivalent jagar formation consists of metabasalts and associated phyllites. The metabasalts are normal with associated dacitic volcanics, komatites and Magnesium rich basalts are rather rare. The formation thickens from west to east due to greater subsidence in east. Sedimentary facies suggest shallow intertidal two marine environments (Chadwick *et al.*, 1985).
However, this belt predominantly consists of variably deformed, dark green metabasites. Mineral assemblages are dominated by quartz, epidote, green metabasites, variably altered plagioclase and carbonates. Carbonate and muscovite are locally abundant, as post tectonic poikiloblasts, amygdules with secondary quartz and chlorides are indicative of shallow intrusive and extrusive volcanism. Concerning to the soil characteristics of the study area having clayey, clayey mixed, rocky land types of soil.
Fig. 1. Soil characteristics of Chikmagalur taluk.
Fig. 3. Drainage map of Chikmagalur taluk.