INTRODUCTION TO THE STUDY REGION

3.1 Situation of the study regions

The study region covers the Kamrup district of Assam and Kasaragod district of Kerala. The state of Assam situated in the northeastern part of India extends from 24°8'N to 27°56'N latitude and 89°42'E to 96°E longitude. It is surrounded by Bhutan and Arunachal Pradesh on the north, Arunachal Pradesh and Nagaland on the east and southeast. Manipur, Mizoram and Meghalaya on the south and Bangladesh and west Bengal on the west. Assam has a total geographical area of 78.523 sq. km. and total population of 26,638,407 (2001).

The state of Kerala lies between 8°18'N and 12°48'N latitude and 74°52'E and 77°22'E longitude as a long narrow strip of land (32 to 130 km wide) between the Western Ghat on the east and the Arabian Sea on the west. It has a total geographical area of 38.863 sq. km. with a coast line of 580 km. and a total population of 31,838,619 (2001).
Kamarup district is situated between 25°43'N and 26°51'N latitude and 90°36'E and 92°12'E longitude with the Brahmaputra river dissecting the district in the middle. The district is bordered by Golpara district and Nalbari district on the west, Darrang district on the east, Arunachal Pradesh on the north and Meghalaya on the south. It has a total geographical area of 4345 sq.km. (Fig.-3.4a)

Kasaragod is the northern most district of Kerala situated between 11°30'N and 12°48'N latitude and 74°56'E and 76°30' E longitude, bordered on the north and east by the Dakshin Kanada district of Karnataka; on the south by the Kannur district of Kerala and on the west by the Arabian Sea. The district has a total geographical area of 1961 sq km. (Fig.-3.4a)

3.2. Geographical Parameters

3.2.1 Physiography

Physiographically the northern and southern parts of the Kamrup district are characterized by extensive alluvial plains interspersed with small isolated hillocks which are the extensions of the Meghalaya plateau. The alluvial river plains are formed by the Brahmaputtra river and its tributaries. The drainage system of the district is represented by
the river Brahmaputra and its tributaries in the north, namely-Barnadi, Puthimari, Sessa, Baralia and Nona. All these rivers originate from Bhutan Hills. In the south the rivers originating from the Khasi hills of Meghalaya. They are Kalang, Digaru, Kulsi, Boko and Singra. The district is bounded by the foothills of Bhutan in the north. In the south there are large number of hillocks standing in the midst of the plains. Flood occurs generally in the low lying areas of the district during May to August every year. Late flood during the later part of September and October also occurs occasionally. The occurrence of flood in the district is due to the overflowing of water in the Brahmaputra and its tributaries when there is heavy rainfall.

The Kasaragod district has water, forest and mineral resources. It is flanked by the forest covered western ghats in the east and the Arabian Sea in the west. Demarcating the north and the south are two rivers – the Talapadi and the Trikaripur. Grey rocks and barren land admix dense vegetation as well as calm lagoons are visible through the coconut palms along the coastal belt. Numerous small lakes and backwater run through this narrow coastal district of Kasaragod drained by Chandragiri, Kuppam, Kariamcod, and Manjeshwar rivers.
3.2.2 Climate

Climatologically and geographically Assam is a humid subtropical region with an annual average rainfall of 300 cm with sub tropical rainforest ecosystem. Kerala is a humid tropical region with an annual average rainfall of 305 cm. The ecosystem of Kerala is mixed with both tropical rainforest as well as coastal landscape.

Kamrup district’s climate is sub-tropical with moist, rainy summer and dry cold winter. Maximum temperature in summer is 38.5°C and that in winter is 10°C, with an average humidity of 75%. The rainfall data for the last 10 years (1990-1999) are given in the Table 3.1 and Fig 3.1 and 3.2, which show the comparative rainfall in Kamrup and Kasaragod. In Kamrup the annual rainfall ranges between 1500 mm to 2600mm. But it has four distinct seasons, pre-monsoon (March-May), monsoon (June-August), post monsoon (Sept-Nov.) and winter (Dec-Feb). The Kasaragod district comes under humid tropical climate with an annual rainfall ranging from 3000 mm to3500 mm. which is more than that of Kamrup, but the total rain is concentrated mainly in five months (May to September) whereas the period from November to March is totally dry.
From the graph (Fig. 3.1 & 3.2) it is evident that though Kamrup has a very heavy rainfall but it is distributed almost evenly throughout the year except during November, December and January when it is very less but not totally dry. Though both the districts are showing identical trend in the case of rainfall, Kasaragod experiences almost 1000mm rain from July to August whereas in Kamrup it never exceeds 300mm. This can be one of the reasons where without proper irrigation also Kamrup has better production potential of coconut than Kasaragod.

The temperature curve (fig-3.3) shows that the temperature of Kamrup district varies seasonally. While in Kasaragod (fig-3.4) the minimum temperature is never below 20°C. In Kamrup, during summer months (June to Sept.) the minimum temperature is around 20°C. (table-3.2) The coconut growing countries around the world except Bangladesh have the climate similar to Kerala. The coconut has evolved itself to adapt to cool winters of Assam where it is under cultivation for centuries.
Table 3.1 Monthly rainfall (Mean of 10 years, 1990-2000) in mm.

<table>
<thead>
<tr>
<th>Months</th>
<th>Kamrup</th>
<th>Kasaragod</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>15.12</td>
<td>0.28</td>
</tr>
<tr>
<td>February</td>
<td>20.50</td>
<td>0.60</td>
</tr>
<tr>
<td>March</td>
<td>73.03</td>
<td>6.38</td>
</tr>
<tr>
<td>April</td>
<td>122.84</td>
<td>25.39</td>
</tr>
<tr>
<td>May</td>
<td>271.00</td>
<td>235.00</td>
</tr>
<tr>
<td>June</td>
<td>295.80</td>
<td>894.76</td>
</tr>
<tr>
<td>July</td>
<td>281.00</td>
<td>1058.14</td>
</tr>
<tr>
<td>August</td>
<td>299.00</td>
<td>645.90</td>
</tr>
<tr>
<td>September</td>
<td>172.07</td>
<td>214.50</td>
</tr>
<tr>
<td>October</td>
<td>118.30</td>
<td>232.73</td>
</tr>
<tr>
<td>November</td>
<td>11.61</td>
<td>80.39</td>
</tr>
<tr>
<td>December</td>
<td>3.31</td>
<td>14.53</td>
</tr>
<tr>
<td>Total</td>
<td>1682.72</td>
<td>3408.60</td>
</tr>
</tbody>
</table>

Source: Division of statistics: CPCRI (Kasaragod & Kahikuchi)

Table 3.2 Monthly minimum and maximum temperatures (mean 10 years)

<table>
<thead>
<tr>
<th>Months</th>
<th>Kamrup Max.temp. (°C)</th>
<th>Min.temp. (°C)</th>
<th>Kasaragod Max.temp. (°C)</th>
<th>Min. temp.(°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>20.7</td>
<td>6.0</td>
<td>31.9</td>
<td>19.8</td>
</tr>
<tr>
<td>February</td>
<td>26.8</td>
<td>6.5</td>
<td>31.3</td>
<td>20.6</td>
</tr>
<tr>
<td>March</td>
<td>31.2</td>
<td>6.7</td>
<td>32.3</td>
<td>21.8</td>
</tr>
<tr>
<td>April</td>
<td>31.4</td>
<td>8.7</td>
<td>33.2</td>
<td>24.4</td>
</tr>
<tr>
<td>May</td>
<td>32.8</td>
<td>14.5</td>
<td>32.4</td>
<td>24.2</td>
</tr>
<tr>
<td>June</td>
<td>33.7</td>
<td>19.2</td>
<td>29.9</td>
<td>23.6</td>
</tr>
<tr>
<td>July</td>
<td>33.4</td>
<td>19.5</td>
<td>28.3</td>
<td>24.9</td>
</tr>
<tr>
<td>August</td>
<td>34.2</td>
<td>21.4</td>
<td>28.7</td>
<td>22.7</td>
</tr>
<tr>
<td>September</td>
<td>32.9</td>
<td>20.5</td>
<td>29.5</td>
<td>22.4</td>
</tr>
<tr>
<td>October</td>
<td>32.7</td>
<td>12.5</td>
<td>30.6</td>
<td>22.3</td>
</tr>
<tr>
<td>November</td>
<td>30.3</td>
<td>9.6</td>
<td>31.9</td>
<td>21.5</td>
</tr>
<tr>
<td>December</td>
<td>26.8</td>
<td>6.2</td>
<td>32.4</td>
<td>19.8</td>
</tr>
</tbody>
</table>

Source: Division of statistics: CPCRI (Kasaragod & KahiKuchi)
Fig. 3.1  Bar diagram showing comparative rain fall in Kamrup and Kasaragod district

Fig. 3.2  Rainfall curve of the two districts
Fig 3.3 Curve showing mean Maximum and Minimum temperature of Kamrup

Fig. 3.4 Curve showing mean Maximum and Minimum temperature of Kasaragod
3.2.3 Soil

The soil of Kamrup district is mostly alluvial and only laterite soil is found in the southern foot hill regions. But the soil of Kasaragod district can be divided into three divisions. In the highland region it is laterite. In the midland, the soil is a red ferruginous loam of laterite origin with an admixture of clay and sand and the coastal strip is sandy. The types of soil that are found in these divisions are shown in fig 3.5, while the types of soil found in Kamrup district are shown in fig 3.6. In both the districts, coconut plants thrive well in well-drained soils, as water logging is not good for this plant.

3.3 Natural Disasters

In Kamrup district, flood is a common occurrence in the low lying areas during May to August every year. In some years, flood during the later part of September-October also occurs. The occurrence of flood in the district is due to the inundation by the river Brahmaputra and its tributaries. Due to poor drainage system Guwahati city also witnesses localized flood in rainy days, where as in Kasaragod, drainage system is very good with no water logging and no floods as all the rivers drain into Arabian Sea or the backwater within short courses from the Western Ghat hills. Natural calamity like cyclone sometimes occurs as a result of low pressure developed over the landmass.
Figure: 3.4 a, Boundary map of Kasaragod and Kamrup districts
Source: NATMO
Fig. 3.5 soil of Kasaragod district showing four different types.

Source: Survey of India Map.

1. Deep well drained gravelly clay soils with moderate surface and ironstone layer at 100 to 150 cm on gently sloping midland laterites with moderate erosion, associated with laterite outcrops.
2. Laterite sandy clay soils of the Northern valleys of Kerala ironstones layer at 100 to 150 cm on nearly level lands slightly eroded.
3. Very deep well drained forest clay soils of isolated hillocks with moderate erosion and well drained.
4. Moderately shallow, well-drained sandy loam soils with coherent material at 50-75 cm associated with rock outcrops.
Fig 3.6. Soil of Kamrup district showing four different types of soils.

*Source: Survey of India Map.*

**Legend**

1. Very deep imperfectly drained, fine alluvial loamy soil having coarse loamy surface with slight erosion.
2. Deep imperfectly drain fine loamy soils, moderately flooding ground water table between one to two meters below the surface and with slight erosion.
3. Deep well drained fine laterite soils on moderately steep slopes of hill having clayey surface with slight erosion. Associated with loamy skeletal soils
4. Very deep well drained fine loamy soils on undulating upland with moderate erosion.
3.4 Vegetation

The Kamrup district is rich in forest cover, having 10,7750 hectares of land under forest which is 24.77% of its total geographical area. The forest area is dominated by the deciduous species of trees, like Sal (*Shorea robusta*), Sida (*Lagerstromia parviflora*) and Sisoo (*Dalbergia sisoo*) and Teak (*Tectona grandis*). Other than this the district has plantation forest with *Michelia* (champa) and *Syzygium* (jamun). It has rice as main agriculture and bamboo, coconut, areca nut as home seated crops (Fig. 3.7 & 3.8). On the other hand forest area is very insignificant in Kasaragod. The forest coverage has been cleared for coconut and other plantation crops. The coconut plantation occupies almost 70% of the plantation crops. The photographs of the vegetation surveyed in the two districts are given which will give a clear idea of the vegetation type of the two districts (Fig. 3.9 & 3.10).
VEGETATION OF KAMRUP

Teak forest

Sal forest

Mixed forest

Mixed forest on Brahmaputra valley

Fig. 3.7 Different vegetation types of Kamrup
KAMRUP HOME STEAD AGRICULTURE

Coconut & Areca nut

Bamboo

Rice

Mixed

Coconut plantation

Bamboo & Rice

Fig. 3.8. Paddy and other agriculture of Kamrup district
VEGETATION OF KASARAGOD

Cashew

Rubber, coconut & cashew

Rubber

Coconut in hill slope

Drygrass & barren land

Mixed forest

Fig. 3.9 Different vegetation types of Kasaragod
AGRICULTURE OF KASARAGOD

Fig. 3.10. Coconut and other agriculture of Kasaragod district