CHAPTER II

GEOGRAPHICAL SETTING OF THE STUDY AREA

2.1: Location

Kamrup district, the capital district of Assam is situated between 25°43' and 26°51' N latitude and between 90°36' and 92°12' E longitude. The district is bounded by foothills of Bhutan and Nalbari District in the north and Meghalaya state in the south. The eastern boundary is covered by Nagaon and Darrang Districts. To the west there lies Goalpara and Barpeta Districts (Fig. 1).

The Kamrup district has two sub-divisions namely, Guwahati and Rangia. Under Guwahati sub-division there are 13 Revenue Circles while Rangia sub-division has 4 Revenue Circles. Moreover, the district is divided into 17 Development Blocks with a break-up of 13 under Guwahati sub-division and 4 under Rangia sub-division. These blocks include as many as 178 Gaon Panchayats with a total number of 1422 villages. The Kamrup district occupies a total area of 4345 sq. km representing about 5.5 per cent of the total geographical area of Assam. It supports 25,15,030 number of population (according to 2001 Census) of which 13,27,717 are male and 11,87,313 are female.

2.2: Physiography

The relief of the study area is generally characterized by occasional hillocks of Pre Cambrian gneisses and granites (Bora, 2001). Topographically the district can be divided into three parts (i) the Bhutan foothills in the north, (ii) the vast alluvial plains of the Brahmaputra with a few scattered inselbergs of...
gneiss and granite and (iii) few scattered hillocks which are extended parts of Shillong Plateau that forms the southern boundary of the district.

In the north the Himalayan foothill zone has summit heights rising up to 1300 meters. The middle portion of the district, being a part of the Brahmaputra Valley is characterized by almost plain topography. The general gradient of the Brahmaputra river is from east to west. The appearance of few inselbergs (e.g., Sualkuchi hill, Borlah and Hajo) with their summits ranging from 160 to 230 meters above mean sea level in the northern part of the plain represents the outliers of the Meghalaya Plateau of the south. In the southern part of the district the denudational hills which form the northern fringe of the Shillong Plateau rise up to 600 meters above mean sea level. The inselbergs near Boko and Dhupdhara attain their heights about 200 meters above the mean sea level. In contrast to the rugged topography of the hilly terrain, the alluvial tract has rather subdued relief with heights ranging from 30 to 80 meters above mean sea level. The alluvial plain located on the southern bank of the river Brahmaputra slopes northward while the alluvial plain on the northern bank has a south-westerly slope.

2.3 : Geology

Geologically the Kamrup District belongs to the Archaean Age excepting the recent soils and alluvium. The area is closely linked with the Himalayan Geology in the northern part and Pre-Cambrian rockmass of the Gondwanaland in the southern part. The major part of the area has been built up by alluvial deposits on the Pre-Cambrian base that slopes down from the Meghalaya Plateau towards the Himalayas. The oldest formations in the region
is confined to the south and consist of gneisses which were extensively intruded by granites. Both the gneisses and granites are intruded by pegmatites and quartz veins. The Geological Succession of the area is given in table 2.1.

Table 2.1: Geological Succession of the Kamrup District

<table>
<thead>
<tr>
<th>Age group</th>
<th>Formation</th>
<th>Description of the litho units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent</td>
<td>Newer</td>
<td>Coarse sands, silts, clays and shingle</td>
</tr>
<tr>
<td></td>
<td>Alluvium</td>
<td>Inconformity</td>
</tr>
<tr>
<td>Pleistocene</td>
<td>Older</td>
<td>Boulders, cobbles, pebbles, coarse sands, silts and clays</td>
</tr>
<tr>
<td></td>
<td>Alluvium</td>
<td>Unconformity</td>
</tr>
<tr>
<td>Archaean</td>
<td>Gneissic</td>
<td>Quartz veins, pegmatites, granites, metadolerites, hornblende-biolite schists and gneisess, granitic gneisses, pyroxene-hornblende granulites etc.</td>
</tr>
</tbody>
</table>

The most widely distributed members of Archaean gneissic complex are fine to coarse grained, compact and thin banded granite, gneisses, pegmatites, aplites and quartz veins intruded either along or across the foliation planes. Coarse grained granitoid gneisses greyish, whitish and pinkish in colour occur widespread among the gneisses and grade into medium grained biotite-granite gneisses. These granitoid gneisscs could be seen in the Malaita hill, Dakhala hill, in the ridges east of Bamunigaon and in the ridges east of Digaru river near Sonapur. These granitoid gneisses are later intruded by granites, pegmatites and quartz veins. Veins of pegmatites, pink granites, aplites are found frequently in
gneisses. They occur in abundance southwest of Morigaon and in Malaita hill south of Palasbari. Porphyritic granites that intruded into older gneisses occur extensively in Kamakhya hill, Jalukbari ridge and some scattered hillocks along the north bank of the Brahmaputra river.

In the northern margin the region is characterized by a thin strip of Upper Tertiary sandstone known as the Siwaliks. Being associated with clay alteration, this group occurs all along the Bhutan foot hills. The Siwaliks are composed of sandstone layers dipping usually towards the general mass of the mountain at low angles.

A major part of the study area is composed of alluvium deposited during two geological phases, namely Pleistocene (older alluvium, gravel) and Recent (newer alluvium, river gravel). The older alluvium deposited during or at the end of Pleistocene period consists of reddish to brownish sandy alluvium with coarse particles of impure sands along with irregularly distributed pockets of unsorted pebbles. Considerable areas in the northern part of the district and a few places in the southern part are covered by these deposits. The newer alluvium consists of fresh shingles, sands, silts and clays and covers the alluvial plains of the study area.

2.4 : Drainage

The drainage system of the district is represented by the river Brahmaputra and its tributaries. The rivers like Barnadi, Puthimari, Sessa, Baralia and Nona are the major northern bank tributaries which originate from the Bhutan hills (Fig.2). After flowing through the northern part of the district in a south westerly direction all these tributaries fall into the Brahmaputra river. The south
Figure 2: Drainage Map of Kamrup District
bank tributaries, namely Kalang, Digaru, Kulsi, Kukurmara, Boko and Singra originating from the Khasi Hills in the south flow through the southern part of the district and pour into the Brahmaputra. Most of the north bank and south bank tributaries cause flood hazards during the rainy season. Besides, there are a number of small streams, paleochannels, channel cut off, wetlands and marshy lands in the district. Rangagara, Dighali, Hathichala, Salmar, Buradoba, Digjhar, Khorkhori, Kuleli, Barka, Barol, Rahumari, Naga and Dipar beel are the notable wetlands of the district.

2.5 : Climate

Location and physiographic factors have greatly influenced the climatic characteristics of the district. The study area falls under humid subtropical region. Rhythm is the key-note of the monsoonal climate. The two seasons, the summer and winter roughly corresponding with culmination of the Sun from southern to northern hemisphere and vice-versa and their associated climatic characteristics are prevalent during the year. The summer is characterized by warm humid with heavy rainfall while the winter season is characterized by lower temperature, lower humidity and scanty rainfall. Winter, pre-monsoon, monsoon and retreating monsoon are the four distinct seasons experienced here in a year. The winter season starts from December and ends in February. In this period cool and dry weather prevails with frequent morning fog. Cold spells are frequent but of short duration. Pre-monsoon season continues from March to May with rains and thunderstorms. This period records gradual rise of temperature. The monsoon season starts from June and continues till September. It is the longest season in the area characterized by high atmospheric humidity, low temperature variation and prolonged rainy days. The region receives an average
rainfall of 400 mm to 900 mm in the months of April-May. These rains are accompanied by thunder and lightening and hailstorms. They are locally known as 'Bordoi Sila' and occur mainly due to the meeting cold front and warm front. After the withdrawal of the monsoon from the area usually in the last week of September or first week of October, the season of retreating monsoon sets in. The season is short and characterized by fair weather and morning fogs of short duration. With the advance of the season, the weather progressively clears up and fair, sunny days prevail till the end of November. During the monsoon season, the average annual rainfall ranges between 1500 mm and 2600 mm. Due to heavy rainfall, flood occurs generally in the low lying areas of the district during May to August. Late flood occurs during the later part of September and October. The flood in the district is caused by the river Brahmaputra and its tributaries. The average maximum and minimum temperature recorded are 32°C and 10°C respectively with a relative humidity of more than 86 percent.

2.6 : Soil

Soils consist of mechanical mixtures and chemical compounds of the materials found on the surface of the earth. They contain both inorganic and organic materials. The process of soil formation is influenced by the physical and chemical characters of the parent rock, physiography, altitude, climatic condition and plants and animals of the surrounding region.

The major soil groups identified in the Kamrup district of Assam include Recent Riverine Alluvial Soils (Entisols), Old Riverine Alluvial Soils (Inceptisols), Old Mountain Valley Soils (Alfisols) and Laterised Red Soils (Ultisols).
The floodplain of Brahmaputra is built up with Recent riverine alluvial soils which are light textured in nature. The old riverine alluvial soils which are not subjected to flood are found in the valley portion and their texture ranges from sandy loam to clay. The northern part of the district lying in the foot hills of Bhutan, is built up of old mountain valley alluvial soils which are heavily textured in nature. The laterised red soils rich in iron and aluminium are found along the southern hilly areas of the district. They are fairly well drained coarse textured soils. The pH value of the soils generally varies from 4.5 to 6.2 i.e., acidic to near neutral.

2.7 : Vegetation

Kamrup district is rich in various types of natural vegetation. There are twenty-three reserve forests in this district. The type of vegetation found in this region is according to the climate, topographical situation in respect of altitude, slope and soil.

In the flat alluvial plains where the average annual rainfall is around 2000 mm and average temperature is 25°C the dominant tree species are of moist mixed deciduous type. While the lofty woody trees of the deciduous group are common in hill slopes and river banks. The Bhabar zone supports three storied forests with tall trees, intermediate shrubs and the undergrowth of weeds and grasses. The marshes in the riverine and Tarai tracts have the luxuriant growth of tall marshy grasses, reeds etc.

In the southern part of the Kamrup district the dominant tree species are Sagoon (*Tectona grandis*), Sonaru (*Cassiu fistula*), Som (*Artocarpus arborea*), Ajhar (*Lagerstroemia speciosa*), Gamari (*Gmelina arborea*),
Kanchan (*Bauhinia* spp.), Madar (*Erythrina suberesa*), Ghora neem (*Melia azedericta*), Bamboo (*Dendrocalamus strictus*). The planted species in homestead areas are Tamul (*Areca catechu*), Kathal (*Artocarpus heterophallus*), *Aum* (*Mangifera india*), *Kal* (*Musa spp.*), *Bagori* (*Zizyplus jujuba*), *Bah* (*Bambusa spp.*). The shrubs and undergrowth consist of *Kher* (Thatch), *Lajuki lata* (*Mimosa pudicha*), *Germaniban* (*Eupatorium spp.*) and *Nal* (*Phragmites Karka*).

2.8 : Socio-Economic Profile

2.8.1 : Demographic features

The Kamrup district has a total population of 2515030 as per 2001 census with 1327717 i.e., 52.79 percent male and 1187313 i.e., 47.21 percent female population. The present population of the district constitutes 9.44 percent of the state of Assam. The density of population of the district is 579 persons per sq.km as against 340 persons per sq. km of the state of Assam. The decadal growth of population during 1991-2001 witnesses 25.75 percent, whereas it is 18.85 percent in the case of Assam. The sex ratio of the district is 894 female per thousand male.

According to 1991 Census it is observed that out of the total population urban population constitutes 32.76 percent and rural 67.24 percent. From the data it appears that of the urban populations, 55.85 percent are male and 44.15 are female. In the case of rural population 51.95 percent are male and 48.05 percent are female. It also seen that in the district 74.32 percent population are Hindus, 23.38 percent Muslims, 1.59 percent Christians, 0.17 percent Sikhs, 0.05 percent Buddhist, 0.28 percent Jains and 0.21 percent of other religions.
The percentage share of population in caste composition reveals that in Rangia sub-division of the district 7.54 percent are scheduled Caste and 10.72 percent are scheduled tribe population. In Guwahati sub-division the percentage share of scheduled caste population is 8.10 percent and scheduled tribe population is 3.43 percent.

2.8.2 : Occupation

According to 1991 Census, out of the total population of Kamrup district main workers constitute 28.70 percent of which 89.57 percent are male and 10.43 percent are female. Accordingly the percentage share of cultivators, agricultural labourers, other workers, marginal workers and non-workers of the district constitute 10.06, 2.36, 5.84, 3.75, 45.55 percent respectively. In respect of sector-wise percentage of workers to total main workers the share in Primary sector is 45.65 percent, Secondary 11.94 percent and Tertiary 42.41 percent.

2.8.3 : Level of Education

According to 1991 Census the literacy percent of the study area is 65.04 of which 73.67 percent for male and 55.01 percent for female as against state's figure 61.87 percent for male and 43.03 percent for female. In fact, the rate of literacy of Kamrup district witnesses a satisfactory growth, which can be observed from the provisional data of 2001 as 74.69 percent according to the Directorate of Census Operations.

2.8.4 : Socio-economic well-being

The level of socio-economic well-being is, in fact, the result of the cumulative performance of a number of related population attributes. The
population attributes like crude birth rate, infant mortality rate, literacy rate, urbanisation level, work participation in non-primary sectors etc. are indicative of the overall development process in an area. It is observed that in respect of percentage of population in the age group 0-6, sex ratio, adjusted crude birth rate, infant mortality rate, female literacy rate, percentage of non-primary workers are 17.4, 879, 28.3, 77, 18.4, 73.7, 55.0, 32.8, 28.7 and 54.4 percent respectively. It is found that Kamrup district with a composite Z-score value of 10.50 (Kar, 2001) is positioned second in respect of socio-economic well-being in the state.