CHAPTER 2. PHYSICAL FEATURES OF THE HABITAT
2.1 LOCATION

The study area lies within the limits of the Ranikhet cantonment in Pali sub-division of Almora district. Ranikhet (29° 29' 50'' North, 79° 26' East) is situated on one of the ridges of the Kumaon Himalayas, which stretches half way across the district west to east and forms the northern boundary of the Kosi basin.

2.2 TOPOGRAPHY

The cantonment comprises three distinct areas, Ranikhet or Alma Barracks 1818 m, Deolikhet 1823 m and Chaubatia 2125 m. Most of the area around Ranikhet is reserved forest and is more or less protected. The cantonment forest, where the intensive studies were carried out, are bounded practically on all sides by the forest of the Ranikhet range of West Almora Forest Division. Of all these three areas, Chaubatia has the best forest. This is because of two factors: relative lower human density and minimal forest exploitation due to the presence of military establishments in this area.

The forest is spread over a tract of rounded or flat ridges with subsidiary spurs and slopes of gentle-to-moderate gradient. The moderate slopes have given rise to deep and well drained-soils.

2.3 SOIL AND STRATIGRAPHY

Four broad soil groups have been identified by Ghildyal (1981) in the area. They are red loams, brown forest soils, podzolic soils
and meadow soils. His detailed study of a bisequal (of two sequences) profile of a grey brown podzol at the Chaubatia fruit research station at Ranikhet shows that the upper soil is silty clay and the lower silty clay loam. The soil is characterized by the presence of clayey horizons and is acidic. This acidity of the soil increases with depth. Surface horizons are rich in organic matter. The organic matter content of the soil decreases with depth. The brown forest soil of the same area is medium-to-heavy textured, deep and moderately well drained, with organic matter and rich surface horizons. A horizon of clay illuviation (accumulation) is observed. This soil is acidic in nature with base saturation ranging from 36.7 to 47.2%. In moist ravines and in places, generally north facing slopes, there is a good leaf-mold layer making the soil well suited to the growth of oak. On some of the ridges and southerly aspects in the chir zone, more especially where grazing has been heavy in the past, the soil is poorer, shallow and dry. In general, mica, chlorite and allophane are the dominant materials in the clay and silt fraction in addition to several other primary and secondary minerals.

In the sand fraction of the brown forest soils, quartz is found to be the most abundant light mineral followed by felspars. Since zircon, a resistance mineral, is present in a greater amount the soils appear to be in an advanced stage of weathering (Ghildyal 1981).

The underlying rocks are mainly schistose with mica. Bands of quartzite are quite frequently found among the schists. Gneiss
extends in a strip through Chaubatia and is also found elsewhere. Both schists and gneiss are regarded as good-quality building stone.

2.4 CLIMATE

The basic pattern of weather and climate over the Himalayas is governed by the summer and winter monsoon system of Asia (Mani 1981). In addition, the Himalayas are affected by the extra tropical weather system (Krishnan 1982) that moves in winter over the north of the sub-continent from west to east. There are two periods of wet weather in the region. The winter rains are brought by the western disturbances and the summer rains by the monsoon winds.

For all the seasonal regularity of the monsoon winds and rainfall, the local climate along the Himalayas is quite variable. Weather changes are unpredictable and erratic. Unusually heavy rainfall is followed by disastrous floods and frequent land slips as was experienced in September 1993. Total rainfall in that year was 589.7 mm (Figure 5).

The winter season commences in November and continues through February. During winter a high-pressure belt extends over the greater part of Asia from Siberia to the outer fringes of the Himalayan massif. But because of its height and extent, the mountains prevent the spread of extremely cold air from the Central Asian regions into north India. There are exceptions though and these are associated with the passage of low-pressure systems from
the west along the southern periphery of the Himalayas. On an average six to seven "western disturbances" move across the region every month in winter. The onset of the western disturbances is heralded by dense thunder clouds accompanied by heavy rain or snow. This normally occurs between the end of December and middle of January (Mani 1981). Similar weather may sometimes continue in February also, as was experienced in 1992 and 1994. In 1992 snowfall was 3 cm and in 1994 only 2 cm (Figure 6). Whenever it happens, cold winds blow and sometimes low clouds or thick fog cover the valley. This brings a considerable fall in temperature. The temperature drops to sub-zero level between -0.3 °C to 6.4 °C (Figure 2 & 3). The average maximum temperature recorded during such a disturbance was 17.14 °C (Figure 2) in February 1992. In February 1994 the average minimum temperature recorded was -0.3 °C (Figure 4). In the winter, wind speed reaches 200 km/hour or more (Mani 1981). Winds, after striking the Himalayas, cause severe turbulence. This is generally at its greatest in the afternoon.

The summer season extends from March to mid-June. During this season, the subtropical high pressure belt begins to rise rapidly over Central Asia. The maximum and minimum temperatures in March range between 25 °C and -3 °C, respectively. In March and April western disturbances still occur but their frequency falls to three or four per month and they are relatively mild. The temperature in the region reaches its maximum of 28.9 °C in May (Figure 3). The highest relative humidity recorded in the months of May and June is 100. Thunder storms with occasional hail, particularly in the
afternoons, are a common feature during the later part of April to May-end. The month of March 1993 also experienced heavy hail and thunder storms. The duration of these spells is generally three to four days (Figure 8).

The monsoon sets in the middle of June and persists till the end of September. The monsoon is not usually a period of continuous rain. Intense rainfall and spells of dry weather alternate intermittently. The maximum and minimum temperatures in the month of June range from 28.2 °C to 7.8 °C and in July from 26.4 °C to 8.9 °C. The Relative humidity increases from 91 in June to 100 in July (Figure 7). With the onset of the monsoon the air becomes damp and often saturated. Clouds hang low over the lower ranges, much lower than in winter. Ranikhet is often covered with clouds during the monsoon. The rains cease in the middle of September and the sky gets clear. The weather becomes mild and stable till the beginning of November.

The post-monsoon period is usually one of fair weather except for rare depressions or cyclones that occur in October and November.
Fig 1. Map of the study area showing transects and trails route.
Fig. 2 Mean monthly temperature recorded in the study area during 1991-92

- Mean Max.
- Mean min.
- Max.
- Min.
Fig. 3 Mean monthly temperature recorded in the study area during 1992-93
Fig. 4 Mean monthly temperature recorded in the study area during 1993-94
Fig. 5 Monthly rainfall recorded in the study area during 1991-94
Fig. 6 Pattern of snow fall in the study area during 1991-94

Snow in cm

- 1991-92
- 1992-93
- 1993-94
Fig. 7 Relative humidity recorded in the study area during 1991-94

Percent humidity

Fig. 8 Hailstorm recorded in the study area during 1991-94

Diameter in cm

- 1991-92
- 1992-93
- 1993-94