CHAPTER 4

STUDY AREA

4.1 GENERAL

Kateri watershed is in the Nilgiri hills of Western Ghats mountains system. It is situated at 6 km from Ooty on the Ooty-Coimbatore Road, Tamil Nadu, India. It falls between latitudes 11°16’19”N ~ 11°24’40”N and longitudes 76°40’40”E ~ 76°49’25”E (Figure 4.1). The watershed comes in the Survey of India top sheets 58 A/11 and A/15 published on 1: 50,000 scale. The watershed has a maximum elevation of 2480 m above mean sea level and is characterized with moderate to steep slope, lateritic soils and fairly good drainage network. Forests, cultivation of potato and other vegetables on inwardly graded bench terraces was widely adopted earlier and thus problems of erosion and sedimentation down below were largely seen (Leopold et al 1964). However, tea plantation has become popular for the past two decades. Most of the terraces were defaced to plant tea along the slope. Therefore, erosion got accelerated and silted up the Kateri Reservoir that caters to the needs of Defense Cordite factory at Aravankadu. In 1984-85, the reservoir was delisted at a huge cost (Leopold et al 1964). The Western Ghats of Nilgiri and Coimbatore districts are well connected by highway roads and railway lines.
Figure 4.1 Study area map
4.2 CLIMATE AND RAINFALL

Landslide can cause extensive damage to life and property in hilly terrains during and after heavy rainfall (Dai & Lee 2002). The study area receives rainfall from both southwest and northeast monsoons. The southwest monsoon is more active contributing nearly 46% and the northeast monsoon is moderate, contributing nearly 38%. The average annual rainfall of this region is about 1850 mm. The climate of Nilgiri district is temperate and salubrious throughout the year. Mornings in general are more humid than the afternoons, with the humidity exceeding 90%. In the period of June to November the afternoon humidity exceeds 85% on an average. In the rest of the year the afternoons are low, the summer afternoons being the lowest. The day temperature in the district varies from 22.1°C in summer to 5.1°C in winter. The night temperature drops to 0°C in some areas. The summer begins early in March, the highest temperature being reached in April and May.

4.3 DRAINAGE PATTERN

Most of the drainages flow from northwest to southeast direction in the study area (Figure 4.2). The drainage patterns observed in this region are mainly denticic, sub-denticic and sub-parallel. Most of the study area is drained with denticic and sub-denticic drainage patterns. Sub-parallel drainage pattern is also noticed in some areas.
Figure 4.2 Drainage map of the study area
4.4 GEOLOGY

The assessment of quantitative occurrence and landslides distribution of hard rock terrain may be almost impossible without an understanding of the lithology, stratigraphy and structural characteristics of various geological units. The study area is comprised of Archaean metamorphic rocks which mainly include charnockites. More or less the entire study area is occupied with the charnockite rock. A small patch of the study area is occupied by dolerite dykes, which show linear structure. Charnockite forms the bulk of the rock units in the Nilgiri district. This hypersthenes-bearing bluish grey rock forms the basement in high grade metamorphic terrain.

4.5 GEOMORPHOLOGY

Geomorphology which deals with the scientific study of landforms provides a sound basis for evaluating and integrating the natural resources such as soil, vegetation; surface and groundwater, and land use (Abichandani & Ghosh 1968, Nossin 1970, Singh 1982). Landforms act as an environment where the soils develop, vegetation grows, surface and groundwater circulate and man practice agriculture.

The Nilgiri hills rise abruptly from the surrounding plains to an elevation of 1370m amsl and it is surrounded by the Coimbatore plains in the southeast, Bhavani plains in the northeast, Moyar valley in the north and Gudalur Plateau in the northwest. The prominent hills are Ooty hills, Dodabetta, Kodaibetta, Bhavani Betta and Devabetta. Dodabetta is the highest peak in Tamil Nadu (GSI 2000).

Two different types of landforms have been identified in the Nilgiri plateau. One type contains high peaks and rocky escarpments and is marked
by radial drainage patterns. These landforms are termed as Doddabetta landforms (Parthasaradhi & Vaidhyanathan, 1974). The other landforms include the plateau with gentle topography with thick soil development and meandering streams, which are locally termed as Ootacamund landforms (Sehsagiri et al. 1982).

In the present study, IRS Resourcesat satellite data was used to study various landforms in the study area. The important landforms identified in the study area include moderately dissected plateau, infilled valleys, Ootacamund surface and high dissected deflection slope.

4.6 SLOPE

Slope is an important parameter in any landslide vulnerability zonation mapping. Shuttle Radar Topographic Mission (SRTM) satellite data has been used for the preparation of slope map. Using the Arc-view 3D analyst, the slope has been classified into various categories. It shows that slope varies from 0° to more than 65° in the study area.

4.7 SOIL

The soils of the study area are mainly lateritic in origin with shallow to deep soil. The soils are porous but the infiltration is not so high as to cope up with the high intensities of rainfall that occur sometimes. The major portion of the study area is occupied by the red soil (104.66 km²). Brown soil occurs mainly in the southwestern portion of the study area (32.34 km²).