Chapter 1

Management and Rural Development of Pranmati Watershed

1.1 Introduction

The watershed is an extremely important unit of natural resource management for sustainable development in the Himalayas. The basic objective of this study was to illustrate how integration of various types of data, such as remote-sensing data, census data, records from different administrative bodies, topographical data, and field observations using GIS can assist researchers, planners, project officers, and decision-makers in resource management. Creation of a spatial database is the first step in micro-level planning. This is followed by spatial analysis to help identify problem areas and, finally, the steps towards planning to mitigate problems are taken by marking out action areas. Taking a watershed as the spatial unit of study, appropriate physiographic and morphometric parameters were also taken into account to enable proper micro-watershed management.

1.2 Description of the Study Area

Pranmati Watershed (30°4′N and 30°13′N latitude and 79°28′E and 79°36′E longitude) (Plate 1) within the Pindar watershed is part of the Ganges River catchment area and situated in Chamoli District of Uttar Pradesh, India (see inset in Map 1, only the approximate geographical location is shown). Physiographically it is a part of the Garhwal Himalayas (part of the Central Himalayas). The planimetric area of the watershed covers 94.05 square kilometres, whereas the actual surface area of the sloping mountainous terrain is about 106 square kilometres.

Plate 1: A general view of the watershed landscape of Pranmati at mid-elevations

Administratively the area is in the Tharali Development Block of Chamoli District. There are 21 revenue villages within this watershed, of which four (location code numbers 649, 650, 666,

and 669) are only partly covered within the watershed (Map 2), as they are spread across the drainage divide. The important villages are Dungri, Gerur, Bunga, Ratgaon, and Kurar. The watershed comes under the jurisdiction of the 'West Pindar Range' of Garhwal Division. The entire watershed is a rural area with scattered villages with 10 to 90 households. The houses are made of stone, wood, and mud, with little use of cement. The sloping roofs are made of wood and covered with slate. The ground floor is usually for cattle, storage, and cooking. The upper floor has bedrooms and may also serve as a grain store (Plate 2). The people of the area speak *Garhwali* (a dialect of *Pahari*); although Hindi and English are used for educational and official purposes. The people are Hindu by religion and belong to different castes. Caste-wise segregation is prominent. The scheduled castes tend to own lands on the periphery of the villages.

Plate 2: A household in the watershed — the residential quarters are on the first floor and the ground floor is used as a store and cattleshed

The watershed is characterised by rich biodiversity, remoteness from motorable roads and the urban market, and vulnerability to rapid changes. Its natural environment makes it ecologically fragile. Lack of a motorable road and electricity in the watershed area indicate the level of seclusion. However, during the past 30 years, the area has been undergoing rapid changes in land use and, with the prospective new motorable road, the pace of change is likely to accelerate.

1.3 Approach

The approach adopted in the study was based on the following components.

1) The use of the topographic map of 1963 (RF 1:50000) as the base map for registration of geographical location, topography, and land-use status

2) The use of the 1993 IRS-1B image (RF 1:50000) supported by intensive ground truthing for mapping the present land cover-land use

3) The use of the Census of India's abstract data for demographic criteria.

4) The use of data from different government authorities to define administrative boundaries, planned roads, and others

5) The use of climatic data (1993-94) recorded during the study

6) The use of field observations for soil, crop, and livestock and phyto-sociological studies of vegetation

7) Various aspects of spatial data were automated by digitising them as separate coverages and defining attributes as required

8) The coverages were topologically corrected, intersection of different coverages and other spatial operations was carried out as necessary.

9) SML programmes and mathematical and statistical operations in 'tables' and dbase were used to derive the final statistics.

The following chapters analyse various aspects of natural resource and development dynamics.