Chapter 3

THE STUDY AREA

GEOGRAPHICAL BACKGROUND

3.1 Physical Setting

The Himalayas are amongst one of the youngest folded mountain ranges of the world. It extends from west to east, from the Pamir Knot in the north-west to the valley of the Brahmaputra in the east. The range passes through Afghanistan, Pakistan, India, China, Nepal, Bhutan and Myanmar. Being the world's highest mountain chain, the Himalayas are characterized by a complex geologic structure, snow-capped peaks, large valley glaciers, deep gorges, river valleys and a variety of natural landscapes. The average width of this mountain range is from 100 to 400 km. In Nepal, the ranges are characterized by different heights from south to north and are known as Chure range (Siwaliks in India), midlands, main Himalaya, inner Himalayan valley and Tibetan border Himalayan ranges (Gurung, 2003). The midlands and the lower slopes of the main Himalayas are the major human inhabited areas in Nepal. The Arun valley lies within the midlands and the lower slopes of the main Himalayas.

3.1.1 Location

The Arun valley, which lies in Eastern Nepal, covers most of the areas of three districts namely Dhankuta, Bhojpur and Sankhuwasabha. The valley has a total area of 5,028 sq. km. (Dunsmore, 1988). There are altogether 110 Village Development Committees (VDC, lowest administrative unit) containing all the 36 VDCs of Sankhuwasabha, 57 VDCs of Bhojpur and 17 VDCs of Dhankuta district in the Arun valley. This valley area contains as many as 1,515 rural settlements and only one urban centre. The study area comprises Jitpur, Murtidhunga and Parewadin VDCs of southern Arun valley (Figure 3.1 and 3.2).
The study area lies in the north-western part of Dhankuta district (Photograph 2). It is located between 27°01'30" to 27°07'30" north latitude and 87°18'15" to 87°26'15" east longitude. It extends from north-west to south-east covering an area of 54.26 sq. km.

Figure 3.1: Location of the study area

Jitpur VDC covers an area of 15.05 sq. km. with a central ridge covered by community forests. The ridge where a market centre has developed was initially a wrestling place for the people of the neighboring areas. The man who used to win was supposed to gain higher prestige and respect in the traditional societies. The name Jitpur came from the word Jit meaning a win in wrestling. Latter the inclusion of Arkhaule, a settlement of wealthier people, let to renaming the VDC as Arkhaule Jitpur.
Murtidhunga VDC covers an area of 12.86 sq. km. predominately having south facing slope. There is an interesting mythological account on the naming of this VDC. It says - a farmer found a stone (Dhunga) while he was ploughing, which he lifted to put outside the agricultural field. The next day he was surprised to see the same stone at its original place which he again put outside. The repetition of the same event in the next morning made him believe that the Dhunga could be the Murti (statue) of god. Subsequently, a temple was built by the villagers at the place and the village came to be known as Murtidhunga.

Parewadin VDC covers an area of 26.35 sq. km. and spreads to both the sides of a ridge. According to the VDC report (2004), the availability of pigeon’s egg (Parewa Dhing in Limbu dialect) due to the presence of a large number of pigeons around the cliffs
and steep slopes of Teliya khola near the Limbu settlements led to naming of the place as *Parewa Dhing* which subsequently deformed to Parewadin.

### 3.1.2 Physiography

The Arun valley is one of the typical areas of Nepal in terms of topography. The major landform features are deep river valleys and *tars* (river terraces) in the lower parts, undulating hill slopes including a series of terraces in the middle part and hill ridges along with snow-covered mountains in the higher parts. The northern part covers mountainous areas (Mt. Makalu, 8474 m) above 2500 m elevation with slope of mostly above 40°. Makalu Barun National Park was established in the western part of the northern Arun valley. On other hand, the southern part mainly covers the middle mountainous areas.

Jitpur and Murtidhunga VDC lie in a ridge between Laxmi and Mangmaya rivers (*khola*). Jitpur covers both the south and north facing slopes whereas Murtidhunga lies completely in the south facing slopes. Parewadin VDC occupies a small portion of the northern slope and largely the south facing areas between Teliya and Chhawa khola.

### 3.1.3 Geology and Relief

On the basis of lithology, grade of metamorphism and tectonic studies, three main litho-tectonic groups were identified within the Arun valley areas. The Nuwakot nappes are the lowermost tectonic units, consisting of least metamorphosed and youngest sedimentary rocks. They are exposed in a tectonic window and rocks of these nappes include phyllites, argillaceous quartzite and limestone, interbedded with each other. They get weathered and eroded easily. The alternating phylite and quartzite sequence of Nuwakot nappes are susceptible to earth slump and earth flow (Kansakar, 1988).
The elevation of the area ranges from 640 m to 2700 m. It increases from Laxmi khola in north to Mangmaya khola in south and Teliya khola in the eastern part and finally reaching the highest along the Parewadin ridge (Figure 3.3). This ridge has a peak of 2700 m altitude which is the highest in the Dhankuta district. The proportion of area under different elevation zones are as follows: 6.9% in less than 1000 m, 40.7% in 1000 – 1500 m, 37.2% in 1500 – 2000 m, 14.3% in 2000 – 2500 m and 0.9% in the zone higher than 2500 m. The figure shows more than three-fourths of the areas lying within 1000 – 2000 m range.
Because of the mountainous character, there is very little area in gentle slope zone (Figure 3.4). One-third of the study area has slopes greater than 30° which is vulnerable for any use other than forestry. Only 10% area is in 5° slope zone. The rest of the area (55.6%) has moderate slope (5 - 30°).

The analysis of the slope aspect shows almost equal area in all the four categories (Figure 3.5). The proportion of area in north, east, south and west facing slopes are 23.8%, 25.8%, 25.3% and 25.1% respectively.
3.1.4 Drainage Pattern

Originating from Tibet the Arun river crosses the lofty mountain ranges and flows almost in a north-south direction in Nepal before it joins the other tributaries of Saptakoshi system. The river Arun gets water from hundreds of its tributaries. Laxmi khola, Mangmaya khola, Teliya khola and Chhawa khola are the major rivers of the study area. However, numerous smaller streams are there flowing from the ridges which become prominent during the rainy season (Figure 3.6). The Arun river system basically displays a dendritic drainage pattern.
3.1.5 Climatic Conditions

Nepal has a great variety of topography, which is reflected in the diversity of weather and climatic pattern. The country experiences subtropical, warm temperate, cool temperate, Taiga and Tundra types of climate from south to north with the increasing altitude. The study area in the Arun valley also experiences similar climatic pattern. The lower slope experiences warm temperate climate, the higher areas above 2000 m are characterized by cool temperate climate and the hill tops above 2500 m have cool and dry climate suitable for the growth of grasslands.

Usually the area experiences four distinct climatic seasons: dry summer, rainy monsoon, dry autumn and winter. However, temperature is modified by the altitude as well as slope aspects. The records of the Department of Hydrology and Meteorology, Nepal show that the nearby area of Dhankuta had 70 - 100 cm of annual rainfall and a
temperature range of 3 - 30° Celsius. Monsoon is the major source of rainfall although small amount of rainfall occurs during winter season due to the influences of western winds. The higher areas experience occasional winter snowfalls. The variation of climate even within a smaller area is also significant which favors different agricultural activities.

3.1.6 Biodiversity

The Arun valley is one of the rich areas of Nepal in terms of biodiversity. The study area has almost 39% of its area under vegetation covering community forestry, personal forestry and grasslands. Although the area is not rich in large fauna, it is rich in flora and micro organisms. In the forest area, varieties of Pine (Sallo) and Rhododendron species (Gurans) are available along with other prominent species such as Anthocephaulus indicus (Kadam), Castanopsis indica (Katus), Schima wallichii (Chilaune), Ficus lacor (Kabro). Similarly other species such as Alnus nepalensis (Uttis), Melia azedarach (Bakaino), Lithsea monopetala (Kutmiro), Dendrocallamus homiltonii (Baans), Morus alba (Kimbu) and Bauhinia purpurea (Taanki) are found widely in the household lands. These species are grown for timber as well as fodder for livestock. Similarly varieties of grasses with algae and fungi have made the area favorable for micro organisms. Therefore, the area serves as the home for different varieties of avifauna and mammals like foxes (Siyal), porcupines (Dumsi) and bears (Bhalu).

There is an increasing trend of biodiversity within the area although it faced a severe pressure during the period of governmental forest management (1956 - 1978). The forest management practices were through the traditional Kipat system before the nationalization of forests in 1956. Similarly, a local community-based forestry system was initiated in 1978 by the government of Nepal which eventually contributed to the most successful present-day community forestry.
3.1.7 Soil Characteristics

The observation of soil characteristics shows variation in color, depth, texture or stoniness. However, the only basis to evaluate the soil characteristics of the area was through LRMP. It defined land capability as the inherent capacity of land to be productive, and sustain under specific management methods. The maps of LRMP show three land capability classes within the area.

Almost 70% of the area is under category III with a soil depth of 50 - 100 cm and good drainage characteristics (Figure 3.7). The better soil (category II) accounts for less than 1% of the total area. The rest of the areas is in the category IV with imperfectly drained soil and low soil depth (20 cm).
3.1.8 Natural Hazards

Earthquakes are a great threat to environmental stability and life in the Himalayan mountain zone as almost the entire region is prone to high seismic activity. The region has been hit by earthquakes of varying intensities in the past and similar threats remain imminent. The recent experience of a strong earthquake in the eastern Nepal Himalayan region was in 1987 (epicenter at Udaypur, southwest of the area) with the intensity of 7.0 in Richter scale. It affected the study area also.

Landslides are another major environmental hazard in the Himalayas, which affect the entire mountain belt. They normally occur during the rainy season in the areas where the mountain slopes are extremely unstable and vegetation cover is scanty. However, the area is comparatively safe so far other natural hazards are concerned. Gullies and landslide prone areas are maintained through afforestation, a shelf-developed method practised by the local people. Not a single imprint of landslide of considerable size could be seen in the land use map of both 1992 and 2004 because of positive local management. However, certain cases of very small landslides can be seen in the upper Mangmaya area. As the study area lies in higher elevation, there is limited chance for flood hazard to occur.

3.2 Socio-Economic Setting

The Arun valley comprises not only diverse physiography but also diverse caste and ethnic groups of different economic and social backgrounds. It is the corridor between historical Majh Kirat and Upallo Kirat region. Hence the region is characterized by Rai and Limbu settlements (Koirala and Rai, 2002). However, other communities such as Sherpa, Magar, Brahmin/Chetri, Dalits and Newar are also found in large number. Before the unification of smaller Kingdoms known as Baise and Chaubise Rajya into larger Nepal by late King Prithivinarayan Shah (the founder of present Shah Dynasty), the areas of Majh Kirat and Upallo Kirat were under Rai and Limbu dynasty.
3.2.1 Social Characteristics

There are altogether 66 rural settlements including three market centers within the study area (Figure 3.8). These are distributed as 27 in Jitpur, 19 in Murtidhunga and 20 in Parewadin.

Jitpur VDC covers 940 households and a total population of 4,691 (2001 census). The population density is 313 per sq km and average family size is 4.9. The composition of communities (VDC report, 2003) in percent is: Brahmin/Chetri (31), Magar (27), Newar (15) and Dalit (7). The average family size of the sample population is minimum (4.6) in the case of Dalit, medium (5.5) in Brahmin/Chetri and Newar and maximum (5.9) in Magar community. The percentage of literacy ranges from 65 among the Dalit, 77 among the Magar and 84 among the Brahmin/Chetri and Newar communities.

Murtidhunga VDC covers 761 households and a total population of 4,085 (2001 census). The population density is 318 per sq km. and the average family size is 5.4. The composition of communities (VDC report, 2003) in percent is: Brahmin/Chetri (58), Magar (7), Newar (4) and Dalit (5). The average family size is minimum (5.9) among the Newar and maximum (6.6) among the Brahmin/Chetri community.

Parewadin VDC covers 1329 households and a population of 6,908 (2001 census). The population density is 262 per sq km. and average family size is 5.2. The proportion of population community wise (VDC report, 2003) are: 39% Brahmin/Chetri, 34% Limbu, 4.5% Sherpa and 2.5% Rai. The average family size is 5.5 among the Rai, 5.8 among the Limbu, 6.5 and 7.0 respectively among the Sherpa and Brahmin/Chetri community.
3.2.1 Economic Activities

The people of the area are engaged in a range of economic activities to maintain their life and livings (discussed in detail in chapter 5). Cultivation of cereal crops is the main activity. However, recently people in certain pockets shifted to dairy, cash crops farming and horticultural activities. In the same way, now-a-days the role of remittance is also becoming important in the region.
3.3 Basic Services

Accessibility by means of road transport networks plays a key role in the development of the mountain areas. There is a blacktopped road from the eastern plain through Dharan city to Hile market centre in the eastern mountain region. A gravel road is there towards Tehrathum and Sankhuwasabha district through the middle ridges of Parewadin VDC joining Hile (Figure 3.7). Therefore, Parewadin VDC enjoys the direct benefit of road transport towards the southern plains. Although road construction process is going on to link Murtidhunga and Jitpur VDC with Siduwa market center, still these areas are inaccessible in terms of motor transport.

Siduwa market centre in Parewadin VDC has 102 commercial units with various functions (Photograph 4). In the service sector, there are sub-health centre, post office and VDC office. There are also eight lines of telephone services. Except ward number 1, 2, 3 and 9, all others have electricity facility. The VDC is good enough in education facilities and has one high school and ten primary schools.

Similarly, Murtidhunga VDC has the Netachowk market centre with 7 commercial units of different functions. In the service sector, there are sub-health centre and post office. There are also two lines of telephone services. Ward number 1, 2, 5 and 9 enjoy electricity facility. All the settlements have their own community forestry. The VDC is good to provide education facilities and has one high school and eight primary schools.

On the other hand, Jitpur market centre has 30 commercial units. In the service sector, there are primary health centre, post office, veterinary centre, and VDC office. There are also two lines of telephone services. Except ward number 6 and 9, all others have electricity facility. All the settlements have their own community forestry except for Yanglabun which possesses personal forestry of all the households where cardamom farming is practiced. The VDC has one 10+2 school and eight primary schools.
References


