CHAPTER - III

STUDY AREA

LOCATION AND BOUNDARIES

Study was carried out in Baghmara Buffer Zone Community Forest, the part of the buffer zone of Chitwan National Park. Baghmara Buffer Zone Community Forest (BBZCF) is located in Bachauli Village Development Committee of Chitwan District, Nepal, covers 215 ha area (Fig. 1). It is situated in between 27°34.78’-27°35.53’ northern latitude and 84°28.43’-84°29.40’ eastern longitude in subtropical region of central lowland at an elevation of 170 to 250 meters above sea level. This forest borders cultivated land to east, Budhi Rapti River to west and north and Bodreni village and Rapti River to south (Tamrakar and Sharma, 2002, KMTNC, 1997, Pant, 2003).

Baghmara Buffer Zone Community Forest has approximately 90 km aerial distance from Kathmandu, the capital city of Nepal. One commercial airport, at Bharatpur is connected by road (18 km), from the area. It can also be reached by road from Kathmandu-Mugling-Narayanganhat highway with approximate distance of 160 km. Tandi is one of the market place of Highway from where a south directed side road passage which will lead to Sauraha village. The west part of that village connected with the Baghmara Buffer zone community forest. A graveled road seems to be as demarcation line between forest and village area. Seasonal motorable road runs inside the community forest for the purpose of community utilization and touristic purposes. Electricity and telephone services are available in the users’ group community.

The entire community forest is common property under the jurisdiction of the National Parks and Wildlife Conservation Act and Buffer Zone Community Forest Regulations of Nepal. The forest is one community managed buffer zone forest area inside the administrative boundary of Mrigakunj Buffer Zone Users’ Committee (BZUC), one among 15 BZUCs of Chitwan National Park. The area was managed by the Baghmara Buffer Zone Community Forest Users’ Group. The implementation of the management is carried by 11 members Users’ Group Committee formed by incorporating people from the users’ group. The Buffer Zone Community Forest office is located inside the boundary of the forest.
Figure 1 – Location map of the study area, BBZCF.
TOPOGRAPHY

The study area lies in the lowland of inner-Tarai at an elevation of 170 to 200 meter above sea level. The area is situated in the flood-plain of Rapti River, few oxbow lakes and swamps are also present. Few of them retain water during the dry season too. Rapti River and Budhi Rapti River are the two main river systems in the area. These rivers can be crossed by foot or four-wheel vehicle during dry season. In the monsoon season the water level rises up several more times than their normal flow and difficult to cross even from boats and elephants. About half portion of the forest area remains water logged during the monsoon and ground remains soggy from June to August months after the monsoon rain.

Range of Siwalik which extends throughout the length of the country incorporated the outwash deposits from the northern Mahabharat range. The floodplains are deposition of alluvial terraces laid down by Himalayan uplift. These terraces incorporated the boulders and gravels set in the silty matrix (Mishra, 1982). The brown or grey color soil having sandy to silty loam texture is the characteristics of flood plain, including the study area.

CLIMATE

BBZCF is under the sub-tropical zone of climate zone of Nepal. The summer months are hottest with up to 43°C and the winter months are warm during the day while heart chilling cold in early morning and at night. The pleasant months are October and March when the temperature is around 30°C at noon but feels pleasant in morning and evening with around 20°C (Fig 2). Temperature reached maximum 43°C and minimum around 7°C during the study period with monsoon having relatively high humidity. Annual average rainfall (2000 – 2010) of the area is 2212.3 mm. Average maximum and minimum temperature of the area is 30.9°C and 18.2°C respectively. The area included three main climatic seasons namely, summer, monsoon, winter; however there is a sharp difference of six seasonal patterns.

Summer season

Summer season starts in February and ends with May. Average day time temperature of this season is 36.4°C. The average maximum and minimum temperature (2000 – 2010) of summer season is 32.2°C and 16.5°C respectively with the average rainfall of 82.6 mm per month. Relative humidity of the area is lowest in March. Sporadic storms associated with
strong wind, hail, and rains occur from April to May. Some years scattered rain with storm and some year intense shower indicating the forthcoming monsoon starts from May.

**Monsoon season**

Monsoon season prevails from June to September. The south-easterly winds carry intense rainfall resulting heavy flooding in streams and rivers. The average maximum rainfall receives at July while it peaks up from June and slows down in September. There is sometime westerly scattered winter rain with 25.3 mm rainfall per month. However, average rainfall occurred of 445.1 mm per month. By the end of September frequency of rain begin to decline so as of temperature.

![Figure 2 - Mean annual maximum and minimum temperatures and rainfall during 2000-2010 at Rampur (GoN, 2012).](image)

**Winter season**

Cool and dry winter starts from October and ends in January. The average day and night time temperatures reduced to 26.8°C and 13°C. Night time is damp and cold having heavy fog ends up in the late morning. There is not or very few rainfall in this season (Fig. 2).

**FLORA AND FAUNA**

Basically, the dominant species of the forest are Semul (*Bombax ceiba*), Vellor (*Trewia nudiflora*), and Padke (*Albizia lucidior*). Other tree species available in the forest are
Mallotus phillippensis, Ehertia laevis, Premna interrupta, Litsea monopetala, Acacia catechu, Dalbergia sissoo and Cordia dichotoma. The shrub land is absent inside the forest. Some shrub species are associated in the forest as understory layer. The common shrub species in the understory vegetation are Litsea lancifolia, Ardisia macrocarpa, Callicarpa microphylla, and Calamus tenuis. There are some patches of grasslands in the community forest and the major plant species available in the grassland are Ageratum conyzoides, Peperoxia pellucida, Cyanodon dactylon, Imperata cylindrica, Saccharum spontaneum and Themeda villosa. Pant (2003) reported 104 species of plants (including endangered Butea monosperma and Rauwolfia serpentina) in the forest. Based on vegetation composition four types of habitats are identified:

**Natural forest**

The naturally regenerated forest incorporates diverse genera and dominated by Vellor (Trewia nudiflora), Padke (Albizia lucidior), Semul (Bombax ceiba) and Kutmiro (Litsea monopetala) with densely covered prickle-bearing climber Arari Kanda or Kande Lahara (Caesalpinia decapetala). In the natural regeneration area the forest includes typical subtropical forest (Stainton, 1972).

**Plantation forest**

Plantation in BBZCF was started during 1989 by planting 80,000 saplings in 52 ha grazing ground which was also used as airstrip for small aircraft. The major planted species during this period were Dalbergia sissoo, Acacia catechu, Tectona grandis, and Bombax ceiba.

**Grassland**

Patches of grasslands are distributed inside BBZCF. The major plant species in the grassland are Cyanodon dactylon, Imperata cylindrica and Saccharum spontaneum. The area mostly includes short grassland, dominated by Siru (Imperata cylindrica). Some grassland area in this forest incorporated scattered trees, and looks like the savanna. In this savanna type grassland common tree species are Semul (Bombax ceiba) and Datrung (Ehertia laevis).

**Wetland**

Both lentic and lotic wetlands are found in the area. Some lotic wetlands are renovated (Gohi Tal and Musahar Tal) in 1996 with aim to provide water sources for wildlife and create new
habitat for aquatic life (KMTNC, 1998). During monsoon season some area of BBZCF are inundated. The two rivers, namely Rapti and Budhi Rapti are the permanent sources of water in this forest.

In this context the Baghmara Community Forest provides a diverse habitat for the wildlife. It harbors carnivores such as the tiger (*Panthera tigris*) and leopard (*Panthera pardus*) as frequent visitor. The other main wildlife species recorded in the forests is rhino (*Rhinoceros unicornis*), sambar deer (*Cervus unicolor*), spotted deer (*Axis axis*), hog deer (*Axis porcinus*), wild boar (*Sus scrofa*), barking deer (*Muntiacus muntjak*), rhesus monkey (*Macaca mulatta*) and mugger crocodile (*Crocodylus palustris*) (Sharma et. al, 2011).

The area is also famous for the bird assemblage with 211 species of birds. The recorded species incorporated 35 species as water birds and 176 species as forest birds. Among these birds 36 species are listed as threatened species from Bird Life International. From the naturally regenerated forest of the study area 29 threatened bird species are recorded. Similarly, the numbers of threatened bird species in the plantation forest are 25 species (KMTNC, 1997) (Annex 15 and 16).

**LAND USES**

The first users’ group of the Baghmara Community Forest (BCF) was formed in 1988, which initially included the local residence of Bachhuauli Village Development Committee (VDC) ward number 2 and 3. Later residence of Bachhuauli VDC ward number 3 and 4 were also included. Now, the users of the BBZCF are local residents of ward number 1, 2, 3, and 4 of Bachhuauli VDC with 780 households, 49.68% male and 50.32% female (Tamrakar and Sharma, 2002).

The agriculture and land use pattern around the BBZCF is similar with most of Tarai and inner-Tarai. Paddy (*Oryza sativa*) is the principal crops grown in the area. The rice plantation is done during July-August and harvesting during November-December. In the areas with permanent sources of water (eg. canal) paddy is planted earlier. Same land utilized for growing pulses (*Lens culinaris* and *Cajanus cajan*), mustard (*Brassica nigra*), and wheat (*Triticum aestivum*) are planted when rice is harvested. Some fruit species like banana (*Musa paradisiaca*), mangoes (*Mangifera indica*), litchi (*Litchi chinensis*), papaya (*Carica papaya*),...
and guava (*Psidium guajava*) are planted near the settlement. Cattles are reared by farmers through intensive and semi-intensive grazing system.

The primary objective of the community forest is the sustainable utilization and management of forest. So, the users’ are regularly collecting forest products, mainly grass, from the community forest. Beside grass other forest products, like fuel wood and timber, are provided only on demand basis following the terms and conditions provided by the community forest’s legislation and operational plan. The practiced ruminant production system among the users’ of community forest required them to collect fodder and grazed their livestock. Wildlife tourism was started in 1995 and the community has been earning more than US$ 50,000 per annum as eco-tourism revenue. The uniqueness of the BBZCF is the starter of community forest managed ecotourism. This sub-tropical forest of the area is less dependent on the forest product selling for revenue generation.