Chapter 3

Study area

3.1 Background

The Eastern Himalayas and the hills of north-east India are recognized as a global biodiversity hotspot. While north-east region occupies 8% of the country’s area, it harbours 56% of its faunal diversity. Within this region, arguably the most biodiversity rich state (the largest among the seven in north-east India, covering 83743 km²) is the state of Arunachal Pradesh (26° 28'-29° 30'N and 91° 30'-97° 30'E). Arunachal is considered among the least developed and most remote state. Lying in the Eastern Himalayan region, Arunachal Pradesh has remained isolated from the rest of India by virtue of its geographical position and inaccessible terrain. It is situated in the north eastern most part of India and is surrounded by international boundaries of Bhutan to the west, Tibet to the north and Myanmar to the east. About 82% of the geographical area is actually forested compared to the national average of 21%, albeit the recorded forest area is 62% of the total area reported (Forest Survey of India, 2009). The state harbours the northern most tropical rainforests of the world and an estimated 7000-8000 species of flowering plants occur here (nearly 50% of the total flowering plants in India). The wide altitudinal range (100 to 6000 m) has resulted in a great diversity of forest types. Of the recorded forest area, 9722 km² (12%) is classified as reserve forest. Protected forests, Anchal reserve forests, village reserve forests and unclassed state forests constitute the remaining forests. The later, where tribal people have customary rights, comprise the largest area of 30965 km² (37% of the geographical area). Ten wildlife sanctuaries (7114 km²) and two national parks (2468 km²) (of which two are Tiger Reserves) covering an area of 9582 km² (11.44 % of the geographical area of Arunachal Pradesh) have been established.

Namdapha Tiger Reserve is situated in the Changlang district of Arunachal Pradesh and has common boundary with Kamlang wildlife sanctuary in the north, Miao reserve forest (RF), Nampong RF, Diyun RF etc. in the west, forest areas of Kachin
Province of Myanmar in the south and unclassed state forest areas of Gandhigram in the east. The total landscape with the RFs and USFs surrounding the Namdapha (i.e. forest areas in Myanmar) makes a continuous patch of approximately 20,000 km² forest areas, which becomes wide and large home range and ideal for the conservation of animals.

3.2 Name and location

The name Namdapha Tiger Reserve is based on the name of Namdapha national park. Namdapha infect is the name of a river which originates from Dapha Bum (Dapha is the name of hill and Bum means peak of a hill). This river flows right across in an east-west direction of the national park and meets the Noadihing river. In local Singpho language, ‘Nam’ means water or river and ‘Dapha’ is the name of Singpho tribes. The local information reveals that the Singphos fought with British during mid nineteenth century but lost the battle and they left the river bank some of them fled away to the interior areas of the present national park and settled in the foot hills near the present farm base at the confluence of Namdapha and Noa-Dihing.

The reserve is located in the Changlang district of Arunachal Pradesh in the north eastern part of India, between 27° 15’ N and 27° 39’ N Latitude and 96° 15’ E and 96° 58’ E longitude (Map 1).

3.3 Legal provisions

The administration and management of the Namdapha Tiger Reserve is guided by the provisions of the Wildlife (Protection) Act of 1972 (as amended up to 2006), Indian Penal Code, Criminal Procedure Code, Arunachal Pradesh Wildlife Rules of 1976, Indian Forest Act (1927), Assam Forest Regulation of 1891 etc, being followed in vogue while dealing with the protection and anti-poaching activities in the protected area and surrounding areas.
3.4 Delineation of the reservation

The Tiger Reserve has been delineated in to the core zone, encompassing over whole area having status of national park (1808 km²) and the buffer zone (177 km²), added to the Tiger Reserve subsequently but still having the status of reserve forest. Both the areas are completely protected and can be treated as same for protection and conservation purpose. A proposal to add ten kilometre radius on north-western boundary of the present reserve comprising of 245 km² as true buffer to act as protective cushion to park was submitted to the government under provision of section 38V(4) (ii) of Wildlife (Protection) Amendment Act, 2006. Five hundred meters all around the protected area boundary considered as the zone of impact, and has been proposed for notification of eco-fragile zone in view of implementation of Wildlife Conservation Strategy 2002, decision taken as per the proceedings of the XXI meeting of Indian Board of Wildlife and also as per the directive Ministry of Environment and Forest.

The proposal submitted to the Government for creating true buffer area of 10 km wide around north-western boundary of the protected area would function as Miao buffer, covering an area of 245 km² including Miao reserve forest lying in the ordinates 96° 08′48.5″ E to 96° 25′ 02.5″ E longitude and 27°39′15″ N to 27°24′51.5″ N latitude comprising 17 villages located on southern and northern bank of Noadihing river. These villages are Pisi, Khamuk, Lewang, Phup, Khagam Singpho, Khagam Mossang, M’Pen, Bodhisatta, Anandapuri - I, Ananadapuri - II, Kamalpuri, Nandan Kanan, Punyabhumi, Pakhand, Deban village, Lama Camp and Khatan villages (Map 2).

3.5 Constitution

Prior to the constitution of Arunachal Pradesh, the entire union territory was known as North East Frontier Agency (NEFA). Past history reveals that scheme for the constitution of a national park in NEFA was prepared by Sri W. Meiklijohn, the then forest adviser to the governor of Assam in the year 1947. The area chosen for the purpose fell in the valley of the Diyun or Noa-Dihing river and its catchments areas
have elevation above mean sea level varying between 200 msl at the then Miao village to 4571msl on Daphabum offering a great diversity of flora and fauna. The scheme aimed at the establishment of a national park for public recreation, research and study of wildlife in natural surrounding over an area of 802.9 square miles. The notification was issued by the Governor of Assam as Namdapha reserve forest in the year 1970.

As the area of the proposed reserve forest extending up to Patkai range and Daphabum is situated just on the inter district boundary between Tirap and Lohit, it can be suitably named as Namdapha reserve forest instead of Daphabum reserve forest as the river Namdapha flows through the area. Subsequently the whole reserve was declared as a wildlife sanctuary in the year 1972 under the Assam Forest Regulation 1891 and in June, 1983 only, the whole area of the sanctuary was declared as a national park under the Wildlife (Protection Act 1972).

### 3.6 Area statement and legal status

The total area of the reserve is 1985.25 km² (1807.82 km² core and 177.43 km² reserve forest area as buffer), delineated on the north south and south east by the international boundary between Myanmar and India, on the north and west the reserve area is surrounded by contiguous patch of reserve forests of Lohit and Changlang district with the exception of Deban, M’Pen and Gandhigram settlement areas, there is no other village in the periphery of the reserve. The entire notified national park area was neither having revenue nor forest village, however five encroachments developed subsequently within notified core area only.

The total area of the is 2200.25 km². The core area of 1807.82 km² is having the status of national park, but the present buffer of 177.425 km² area has been added during 1986 and still having the status of reserve forests. The surrounding area can be categorized as reserve forests, unclassed state forest and international boundary. The reserve forests in Changlang district were formerly managed by Arunachal Pradesh Forest Corporation for all purposes, but ownership vested with the government. Now the Corporation is defunct and these reserve forests are with the forest department,
where local people have the right of way and collection of non timber forest product for household use and their other rights have been ceased. The forestry operation in the unclassed state forests are regulated by the state forest department, but the land of unclassed area is dealt with by the administration of the state government. New areas from unclassed state forest are classed every year for various purposes. The Tiger Reserve is facing problems of movement of the lease holders or contractors of various forest produce from the unclassed forests through the national park or within its boundary in the absence of any alternative road to Miao, because while passing through the national park, it is apprehended that the contractors may resort to some illegal activity. This is the most important handicap for the management of the reserve. Similar is the case with the other forestry operations in Deban area, for which one is required to pass through the protected area.

3.7 Biological values

3.7.1 Flora

The flora of is unique, rich, dense and diverse in species composition. It supports several endemic species that have evolved locally or have survived only because of protective natural barriers against the invaders. In the phyto-geographical relationships and affinities, the flora of shows greater affinities with Indo-Malayan flora, although it also harbours the plants of other parts of India, neighbouring as well as far off places along with its own flora.

On the basis of survey carried out by the Botanical Survey of India in two third parts of this protected area, it is observed that there are 73 species of lichens, 59 species of Bryophytes, 112 species of Pteridophytes, 5 species of Gymnosperms and 801 species of Angiosperms by (Sharma et al., 1990). All these species have been listed in the (Table 1)
Table 1: Group of plants identified in Namdapha Tiger Reserve.

<table>
<thead>
<tr>
<th>Group of plants</th>
<th>No. of families</th>
<th>Genera</th>
<th>No. of species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lichens</td>
<td>18</td>
<td>35</td>
<td>73</td>
</tr>
<tr>
<td>Bryophys</td>
<td>21</td>
<td>34</td>
<td>59</td>
</tr>
<tr>
<td>Pteridops</td>
<td>35</td>
<td>53</td>
<td>112</td>
</tr>
<tr>
<td>Gymnosps</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Angiosperm</td>
<td>41</td>
<td>277</td>
<td>801</td>
</tr>
</tbody>
</table>

This survey does not include the floral elements of temperate and alpine regions as the same has not been explored due to inaccessibility and lack of infrastructure. Recently during February and March 2009, survey on expedition mode conducted by the park officials up to 1871m altitude revealed that the tree species found were of the tropical rain forest region and also the presence of *Rhododendron* species, but no conifer was recorded.

According to the estimates of the Hooker (1904), the Indian subcontinent showed the proportion of monocots to dicots as 1:0.3 and genera to species as 1:7, whereas Namdapha protected area showed these ratios as 1:3 and 1:6.6 respectively. Sharma *et al.* (1990) revealed the uniqueness and richness of the vegetation in Namdapha. As per the Botanical Survey of India report of 1990, many taxa reported as rare and endemic in other parts of the north-east region were found in this protected area, and some of them growing profusely in this area, are *Achyanthes superba*, *Angiopeteris erecta*, *Bruinsmia polysperma*, *Cheirestylis pusilla*, *Cyathea giganteum*, *Arundina graminifolia*, *Gnetum ula*, *Glyeosmis cymosa*, *Lycopodium phegmaria*, *Magnolia griffithii*. Apart from these, many primitive species of the Annonaceae, Lawraceae, Myrsinaceae and Piperaceae etc. are found in this protected area. However, many taxa of nearby region i.e. Sino-Himalayan, Bhutan, Myanmar, Malaysia and to some extent, taxa of peninsular Indian affinity have been found in this protected area,
exhibiting the richness and genetic diversity of the floral elements of this area. In view of number of rare, endangered and threatened taxa, two new genera, four new species, three new records for India and fourteen new distributional records have been reported so far (Sharma et al., 1990).

Many plants having medicinal properties are widely used by the indigenous tribes for treatment of different ailments. Each of the tribe has its own way of treatment. These medicinal plants have lot of scope for inventorisation and confirmation by proper tests for the benefit of mankind. Out of 186 ethno-botanical plants in use, 81 plants have some medicinal values. Some of these plants are *Abroma angusta*, *Achyrarthes aspera*, *Aquillaria spp.*, *Barleria cristata*, *Canabis Centella*, *Citrus spp.*, *Clerodendron spp.*, *Cyathea spp.*, *Dillenia spp.*, *Dioscorea spp.*, *Elaeocarpus spp.*, *Equisetum spp.*, *Musa spp.*, *Piper spp.*, *Schima spp.*, *Solanum spp.*, *Syzigium* and *Terminalia spp.*

### 3.7.2 Fauna

Tiger Reserve is located at the junction of the Indian sub-continent biogeographic region and the Indo-China biogeographic region (Dinerstein et al., 1997) and hence faunal diversity exists. Moreover according to Kurup (1974), this belt acted as a faunal gateway through which the Indo-Chinese elements of the Oriental as well as Palaearctic fauna could spread to India and colonized when the Indian Peninsula and Asiatic mass were linked through land bridge. Most of the faunal dispersal took place through this gateway due to the natural barriers of the Thar desert in the west, the great oceans in the south and the high Himalayas in the north because of which extensive diversity of fauna resulted. Due to this fact, in every group along the evolutionary pathway, large and diverse species complexes existed in the protected area and its surrounding areas. The comprised of diverse pattern in vegetation and it was found rich in autotrophic components which led to a richness of heterotrophic organisms. The faunal group inhabiting forests, soil, ground, litter, under stone, decaying woods and grasslands comprised 1285 species, and they are listed below as per checklist prepared during 1999-2000 (Table 2).
Namdapha is known for its diverse faunal assemblage. Carnivores present are tiger, leopard, snow leopard and clouded leopard. It is also the habitat of the endangered mammalian species like slow loris and hollock gibbon, the only ape species of India. A variety of other threatened mammals recorded here include golden cat, marbled cat, dhole, Asiatic black bear, red panda, musk deer, takin, gaur, wild Asiatic water buffalo, flying squirrel and various reptiles viz. cobra, viper, krait, python etc. The rare and most endangered leaf deer (*Muntiacus putaoensis*) and black barking deer (*Muntiacus crinifron*) found only in China and Myanmar has been discovered in Namdapha. Birds are indicative of the unique faunal diversity of Namdapha. Notable species of birds include lesser fishing eagle, mountain hawk eagle, grey peacock pheasant, imperial pigeon, pin-tailed green pigeon, oriental bay owl, rufous-necked hornbill, great Indian hornbill, red-headed trogon, Hodgson's frogmouth, lesser shortwing, scarlet-backed flower pecker, rufous-necked and crimson-winged laughing thrush, white-hooded shrike babbler, sultan tit, beautiful nuthatch and Temminck's tragopan. Namdapha Tiger Reserve having different forest type i.e. mixed forest, Tropical wet-ever green forest, Tropical semi-ever green forest, Semi-ever green forest, Temperate forest and Bamboo forest.

**Table 2: Faunal group and number of species in Namdapha Tiger Reserve.**

<table>
<thead>
<tr>
<th>Faunal group</th>
<th>No. of species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthworm</td>
<td>10</td>
</tr>
<tr>
<td>Leeches</td>
<td>5</td>
</tr>
<tr>
<td>Insects except Lepidopteron</td>
<td>430</td>
</tr>
<tr>
<td>Butterflies and Moths</td>
<td>300</td>
</tr>
<tr>
<td>Fishes</td>
<td>76</td>
</tr>
<tr>
<td>Amphibian</td>
<td>25</td>
</tr>
<tr>
<td>Reptiles</td>
<td>50</td>
</tr>
<tr>
<td>Birds</td>
<td>453</td>
</tr>
<tr>
<td>Mammals</td>
<td>97</td>
</tr>
</tbody>
</table>
Out of the total 135 genera of land mammals available in India, 75 genera are represented in Namdapha protected area, whereas among 9 orders, Carnivora is richest with 22 genera, as mentioned in the following table including tiger, leopard, clouded leopard and snow leopard existing in the same area in different niches (Table 3).

Table 3: Order, genera and specie of animal in Namdapha Tiger Reserve.

<table>
<thead>
<tr>
<th>Order</th>
<th>Total in India</th>
<th>Total in Namdapha</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insectivora</td>
<td>11</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Chiroptera</td>
<td>28</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Primata</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Pholidota</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Carnivora</td>
<td>26</td>
<td>22</td>
<td>29</td>
</tr>
<tr>
<td>Proboscidea</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pterissodactyla</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Artiodactyla</td>
<td>21</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Logomorpha</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rodentia</td>
<td>38</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

Besides, 14 species of beetles, 4 species of land mollusc, 5 species of fishes, 3 species of amphibians including the only Indian salamander (*Tylolototriton verrucosa*), rare turtle (*Cycloms mouhati*) and 3 species of snakes belonging to the genus *Natrix* have been reported. New species of flying squirrel, namely, Namdapha flying squirrel (*Biswaomyepterus biswasi*), leaf deer (*Muntiacus putaoensis*) black barking deer and Chinese goral are noteworthy reports from Namdapha. During recent survey of butterflies conducted during 2008 to 2009, 242 and 300 + species were recorded from Deban and surrounding areas alone respectively. Peculiar feature of the survey was variation of species found during post monsoon and spring season.
3.8 Park values

3.8.1 Functional values

The exhibits lush green landscape which is acting as carbon sink for the industrial areas of Kharsang coal mines and petroleum wells. Though large sized mother trees are almost nil in surrounding area due to commercial extraction but Namdapha is the only refuge of these tree species and seed stand for future.

3.8.2 Physical attributes

The topographical and geological variation in the Tiger Reserve provides a scenic beauty; with gentle rocky hills to steep rocky cliffs on roadside and Chiriapoong area. In addition, other lakes are source of aesthetic values to the people.

3.8.3 Conceptual values

Harbours a number of endemic and interesting flora and fauna due to which the reserve is considered as complete ecological unit. The endemism nature has the following features:

i. Amongst the animals of higher groups, five species of fishes are new to science and endemic to Namdapha. They are *Danio horai* and *Barilius jayarami* of the family Ciprinidae; *Aborichthys tikadari* and *Neomacheilus arunachalensis* representing family Cobitidae and *Kryptopterus indicus* belongs to the family Siluridae.

ii. Out of the 25 species of amphibian recorded from Namdapha, three species belonging to family Rhacophoridae (*Rhacophorus namdaphaensis, Philautus namdaphaensis* and *Philautus shyamarupus*) are new to science. The only salamander found in India *Tylototriton verrucossus* (*Pleurodeles verrucossus*) has been recorded by Zoological survey of India.

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iii. The bird, Namdapha shortwing (*Brachyopteryx criptica*) has been recorded by Zoological survey of India.

iv. Presence of Leaf deer (*Muntiacus putaoensis*) and black barking deer (*Muntiacus crinifrons*) was reported by the Nature Conservation Foundation, Mysore. Besides these, four species of land Mollusc, rare turtle (*Cycloms mouhati*), three species of snakes belonging to the genus *Natrix*, new species of flying squirrel, namely, Namdapha flying squirrel (*Biswomoyeepterus biswasi*) and 14 new species of beetle are noteworthy from Namdapha. Probably many more species of plants and animals may be present in this Tiger Reserve.

### 3.8.4 Recreational values

The Tiger Reserve has a great richness of flora and fauna and thus has a great scope for the people to enjoy the aesthetic values of its wilderness. Bird watching on existing trails and water bodies, viewing wildlife such as butterflies and moths in different seasons and habitats is the source of recreation. In recent survey of butterflies, more than 300 species were recorded, out of which, three were very rare and the first record in India and one species is yet to be identified. In addition, Namdapha has an immense potential for nature camp, hitch hiking, adventure tourism etc. Moreover the waterfalls and lakes inside the reserve add beauty to the protected area.

### 3.8.5 Scientific values

The provides ample scope for the scientists to study in different disciplines right from geology for the variety of rocks and other geological formations, for chemistry of the water of Bulbulia lake and its chemical nature having an immense value to the local tribes as they believe that sprinkling of water of this lake acts as disease controller and thus requiring study of the chemicals present there in the water. Botanists can study
the varieties of plant species at least of high hills not explored yet and zoologists as well as wildlife’s can study the different groups of animals.

The park management is carrying out research on the regeneration of major tree species and its impact on the regeneration of some species of plants, rhizome formation and flowering in bamboos, regeneration pattern and availability of animals in grassland areas by dung count methods. The protected area also provides scope for studies in taxonomy of rare and endangered plants and animals, insects, fishes, amphibians etc.

There is a great scope in this Tiger Reserve to study the alternate prey potential for tiger in view of low density of ungulates presumed to be inadequate to support large number of tiger population. The archaeologists need to study the old temples and monuments to find the history of these constructions as their age is totally unknown. The palaeontologists have immense scope of studies of the fossils generally found in the stratified rocks.

3.8.6 Educational values

The Tiger Reserve provides a great scope for nature education, conservation education etc. The diverse plant and animal kingdom provides ample scope for the study of botany, zoology, ecology, entomology, geology and almost all spectrums of life sciences to compare the situations in protected area and nearby reserve forests.

3.8.7 Ethological values

The temples in the fringe areas of and wisdom stones have got an immense mythological value to the local people. Even the Bulbulia lake is regarded as a holy place, and people believe that the water of the lake has got a disease immunity power in the human and animal bodies. The hollow stone situated on the uphill side at 13th mile is regarded as holy place by the Tibetan buddhists for paying offerings during festivals. Many people visit the place on specific occasions.
3.8.8 Historical values

The Tiger Reserve has got a very important role to play in the history of the state especially with regard to the old ruined temples and the old stone pillars at 13th mile which are being worshipped by the Tibetan refugees. The stone idols now kept at Parbateswar temple on the side of the road towards Deban and also the beautiful old forest rest house are worth preserving from religious point of view. These stone idols were found in the debris of landslides.

3.8.9 Real or economic values

In view of ban on exploitation of timber and non-timber forest produce which are not permitted under the provisions of Wildlife (Protection) Act of 1972, the protected area has got notional value of excellent stocking of valuable timber like hollong, mekai, hollock etc, and other non-timber forest produce like varieties of bamboo, cane, and other produces like agar, dhuna (resin) and honey produced by the honey bees of high quality. Besides, there are plenty of mineral resources in the protected area such as coal, lime stone etc. which are not allowed to be removed.

Therefore, it is a very significant conservation unit whose statements of significance are as follows:

i. Diverse geological formations, diverse habitats supporting biodiversity of plants and animals.

ii. The acts as catchment of important rivers, viz. Namdapha, Karwai Hka, M’Pen etc. whereas its forests act as carbon sink for industrial pollutants and effluents.

iii. Namdapha Tiger Reserve is a beautiful landscape with high hills, meadows, lakes, riparian zones etc. is an excellent physical attribute for public.

iv. It provides ample scope for the visitors to experience wilderness besides trekking, bird watching and wildlife viewing.
v. This provides ample scope for scientific studies and research for scientists such as botanists, zoologists, geologists, palaeontologists, archaeologists, entomologists, orchidologists, soil scientists, chemists etc.

vi. The protected area provides scope for education in nature and conservation also.

vii. This has large significance related to religious, cultural, historical and ethological aspects.

viii. Lastly the conservation unit can be considered as forest wealth or green gold for future generations which would be used as carbon credit.

3.9 Geology and soil

3.9.1 Geology

During the period from late fifties to early eighties, Geological Survey of India had conducted surveys in the and collected various geological information which so far could lead to the deciphering of geological aspects structural, tectonic and geomorphic in broad patterns and confined to some extent in establishing the mineral resources of the park. The Area is bounded on the north by Daphabum range and in the south by Patkai range. Noa-Dihing river forms the main drainage system in the area.

Geological formation includes tertiary and quaternary sequence which is the extension from Nagaland and upper Assam. Geologically the area is bounded tectonic lineaments which remained active in various geological periods between upper cretaceous and pleistocene times. They were The ENE-WSU trending mega Patkai range which constitutes imbricate thrust, and the NW-SE trending mishmi thrust along the Lohit foot hills.
3.9.2 Soil

The soil is characterized by a surface layer of considerable depth and loamy texture with colour varying from yellowish to reddish. It is acidic in nature. Deep layer of sandy loam soil rich in vegetative matter is also found in the lower gentle slopes of the hills which support the best fully stocked dipterocarps forests. On the river banks and precipitous slopes, the soil depth becomes shallow while on the areas near the river banks liable to be frequent inundation, the soil tends to be sandy on the sloping grounds and loamy on the plains. Zoological survey of India had carried out a detailed analysis of the soil and water in various sites inside the protected areas as well as in the surrounding areas during 1981 to 1987. The findings are shown graphically below (Figure 1).

Figure 1: Soil characteristics in various sites in Namdapha Tiger Reserve.
3.9.3 Climate

The area falls within the geographical sub-tropical region and has sub-tropical climate with a distinct short cold weather from November to February in the lower reaches. This is most pleasant period when humidity in the air is least, cold season is for longer period at higher altitudes as on other Himalayan mountains. With the onset of south west monsoon, the humidity rises in the month of May. This along with the rise of temperature makes the weather oppressive especially during the month of June, July and August. The tract is highly malarious.

Because of the altitudinal variation from 200 m to 4500 m and area under zone of heavy rainfall, the climate varies at different heights. Since the interior high altitudinal areas have not been explored much, climatologically classification for these zones is not possible at the moment. On the other hand, there is no meteorological observatory in the areas. However, on the basis of experience and available information, seasons can be classified as the cold season i.e. from December to February, the pre-monsoon season of thunder storms i.e. March to May, the south west monsoon mainly till September, and the post monsoon season and is a period of transition i.e. from October to December. The varied topography has a profound influence on the climate which varies according to elevation and locations. The mountainous parts of the territory have mountain types of climate while the low lying narrow peripheral plains and the valleys experience tropical climate.

The mountain type of climate is characterized by the unique influence of mountainous terrain on air temperature and its variation, which in turn cause other weather phenomena like occurrence of fog, thunderstorm etc. There is large diurnal variation of temperature particularly in the valley.

3.9.4 Rainfall

High rainfall during the monsoon is an important feature of this state. The territory receives winter rainfall particularly in the northern parts from western disturbances. Narrow peripheral strip of land below the elevation of 1000 m surrounding the
Brahmaputra valley is the rainiest part of the territory receiving more than 250 cm of rain annually. In this region, the rainfall increases to 400 cm towards east. The number of rainy days i.e. days with more than 2.5 mm of rains averages from 125 to 150 cm annually. The variations in the amount of precipitation received from year to year are not significant. This territory rarely suffers from droughts but floods on the other hand are frequent in some parts.

3.9.5 Temperature

In December and January are generally the coldest months when the mean maximum temperature in the plains (below 900 m) is of the order of 200° C and the mean minimum temperature is about 50° - 200° C respectively. Much lower temperature is experienced at higher elevations above 3000 m. The mean daily temperature is below freezing point. Temperature begins to rise in March and continues to rise till July and August which are normally the warmest months when the mean daily temperature of 27° C prevails at place below 900 m. At 3000 m elevation, the mean daily temperature is about 25° C.

3.9.6 Relative humidity

Relative humidity is always high except in the winter months. Clear or lightly clouded skies are common during the post monsoon season. During the winter season, sky becomes obscure in the morning owing to fog, which generally clears with the advancement of the day. During the southwest monsoon, the skies remain heavily clouded.
Map 1: Namdapha Tiger Reserve, the study area.
Map 2: Village locations in Namdapha Tiger Reserve.