

NAMDAPHA BIOSPHERE RESERVE : AN OVERVIEW

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INTRODUCTION

The concept of Biosphere Reserves was initiated by UNESCO in 1973-74 under the Man and Biosphere (MAB) Programme on a global context. It is aimed at conservation for present and future use, the diversity and integrity of biotic communities of plants and animals within natural ecosystem and to safeguard the genetic diversity of species on which their continuing evolution depends. The concept also includes provision of areas for ecological and environmental research including baseline studies. Selection of biosphere reserve will be dependent on representative examples of natural biomes or on unique communities or areas with unusual natural features of exceptional interest.

The Namdapha National Park and Tiger Reserve Area has been selected as one of the proposed biosphere Reserves in India by Department of Environment, Government of India. The area is at the confluence of three biotic provinces viz. Himalayan Highlands, Bengal Rain Forest and Burma Monsoon Forest leading to a great richness of biological resources, offering all the potential to meet the demand of a biosphere reserve.

Three expeditions have been conducted in the area results of which amply support the selection. In the present volume, works so far completed on these survey-material, have been presented in 26 papers and a brief overview of relevant aspects, location, biogeography and geology, topography, climate and rainfall, vegetation and fauna, presented in this paper is intended to act as general introduction to all the contributions that follow.

LOCATION

The Namdapha National Park and Tiger Project area lies within 27° 39' N latitudes and 96° 15' E and 96° and 58' E longitudes, covering an area of 1886.82 sq. km, in the Tirap District of Arunachal

Pradesh. The boundary, as demarcated, has inter district boundary of Lohit in the North, international boundary with Burma in the east and south and western part is confluent with Diyun and Miao Reserve Forest of Tirap district.

The Namdapha Biosphere Reserve Project Document (No. 2 Published in October 1981) envisages, however, a much larger area extending over Lohit and Tirap districts with core area of 2500 sq. km, a buffer area of 2000 sq. km and a command area of approximately 2500 sq. km, details of which have been dealt (p. 20-21, op. cit) in the document.

BIOGEOGRAPHY AND GEOLOGY

Biogeographically, the area falls within a single natural unit, "Indo-chinese subregion" (Mani, M. S. 1974). Further, following Dasman's (1973) classification of natural region, the area has adjoining it in the palaeartic subregion, biotic provinces of Himalayan-Karakoram and Szechwan in the oriental subregion, biotic provinces of Bengal rain Forest, Burma Monsoon Forest and Burma Rain Forest.

The geological formations include Tertiary and Quarternary sequences. The oldest of Tertiary sequence termed "*Dibang Group*" dates back to Eocene and is comprised of grey to black splintery shales with thin sandstone interbeds. The overlying 'Barail Group' dates to Oligocene and includes assemblage of sandstones, clay, shells and carbonaceous shales with coal and its underbed contains about 8 coal seams, estimated at 12 million tons of coal at depth of 120 m. by Geological Survey of India, only in 11 km long area of Namchik Reserve Forest.

The next rocklayer is termed '*Tipan Group*' dating back to 'Miocene', composed of coarse ferruginous sandstone and sandy clay with occasional thin parting of shale, grit and conglomerate and fragments of silicified and semicarboniferous fossil wood. Oil sequence of the area is associated with Tipan sandstone. The youngest of the Tertiary sequence is comprised of pebbles beds alternating with clay and soft sandstone termed '*Dihing Group*' and become exposed along the course of major drainage system, *Noa Dihing River* near Miao-Deban area, within the National Park.

The Tertiary sequence as such can be distinctively divided into 4 groups viz. (1) Dibang (2) Borail (3) Tipan (4) Dihing and contain two major resources viz. coal and oil,

The Quarternary sequence is mostly composed of clays, loose coarse sand, gravel and boulder deposit covering tertiary rock, as older alluvium.

The area is earthquake prone and consequently the rivers tend to change their course abruptly.

TOPOGRAPHY

The area is wedged between Dapha Bum Ridge of Mismi Hills and northern limit of Patkai Hills. The Dapha Bum Ridge ends at east on Homekharn Bam, with extensive tableland and high peaks over 4000 m. the highest being Dapha Bum (4571 m). The highest peak within the present sanctuary, and a part of Dapha Bum Ridge system, is Champai Bum (2513 m). The major rivers, Namdapha River and Deban River drain the entire south face of the ridge and the region is well known as heavy landslip prone area. All these ridge, bum and river lie north of Diyun valley, while south of Diyun valley has Miao Bum (1198 m), Nanon Bum (1717 m) and Teng Bum (1680 m) forming natural boundary of existing National Park, running parallel to Patkai range, which has the highest peak along international boundary, in Yapwp Bum (2276 m).

The Diyun valley forms the most significant area within the National Park and is proposed to be included as the core area of Biosphere Reserve. The major river of the entire region, Noa Dihing or Diyun from Patkai Range runs in an east west direction along the valley and is fed by numerous small streams and at least 4 rivers eg. Namchik River, Khaisang River, Namdapha River and Deban River. The valley starting east of Miao is less than 150 meter above sea level and extend 175 km in an exactly east west direction with uppermost reaches less than 1500 meter, after curving southeast near Tapawa Bum (2276 m) of Patkai Hills. Tropical climate and vegetation offer ideal ecological condition for rich biological resources. The level along north bank of Diyun, below Deban river and Namdapha river offer dense evergreen vegetation on flat tops on river sediment or galcier morain, attaining a length of about 100 meter and streching over 8-10 km.

In the upper reaches of mountains, around the National Park specially in high land areas connecting Dapha Bum Ridge with Patkai, perennial snow is recorded. The valley below the snow clad mountains is termed Tushar (Snow) valley and composed the nival zone, followed

by alpine and sub-alpine zones and ending at the Tropical Rain Forest around Diyun or Noa-Dihing valley.

The National Park area as such is composed of forested hills with moderate to precipitous slopes and drained by numerous stream (*Hka* or *Wa* in local term); which remain dry during winter months, and flat land of varying depth stretching over Namphuk, Korapani, western part of Miao and southwestern part of Diyun Reserve Forest.

CLIMATE AND RAINFALL

The region is well known for prolonged monsoon and excessive rainfall which may extend over 8 months from March-November and interrupted only by a brief winter season between November to February. However winter rain is not uncommon and can cause major disruption in any exploratory field work as evidenced by earlier surveys of Z. S. I. and Forest Official Patrol in the area. Average temperature during winter ranges between 15°-21°C, while during March to October, varies between 22°-30°C maximum being in the months of June-August when weather becomes oppressive.

Southwest monsoon from May to October account for seventy five percent of total annual rainfall while northeast monsoon during December to March account for only fifteen percent. Premonsoon showers are common during end of April and May and help afforestation programme. Total average rainfall is recorded at 6300 mm, according to Forest Department source.

VEGETATION

The climatic conditions offering favourable rainfall, temperature gradients and humidity have caused a rich assemblage of floral resources with characteristics of Tropical Evergreen Forest, although the region is located north of geographical tropics. The forest survey record classifies the vegetation, following manual of Champion and Seth, into these principal categories.

Type I IB / CI —Northern Tropical Evergreen Forest or Assam Valley Tropical Wet Evergreen Forest. This is dominated by *Diptioarpus* (*Hollong* loc. name).

Type II Sc / 1S₂ (b)x —North Indian Tropical moist deciduous Forest. This is dominated by *Terminalia* (*Hollock* local name) *Duabanga* (*Khokon* loc. name).

Type III Miscellaneous Forest : No single species is particularly dominant. This includes open understocked inferior forest trees e.g. *Dillania indica* (Cutenga loc.), *Erythrina suberosa* (Madar loc.), *Bischofia jayanica* (Uriam loc.), *Kydia calicina* (Pichola loc.) and grasses e.g. *Imperata arundinaceum* (Thatch), *Saccharum spontaneus* (Khagri), *Phragmites kirka* (Nol loc.), *Alpinia* (Tara loc.), *Erianthus rovanaceae* (Ekra, loc.).

Type I forest is known to be a three storied forest with *Dipterocarpus* (Hollong loc.) *Shorea assamica* (Mekai, loc.) presenting the most dominant layer. *Dipterocarpus* occurring in large belt on the well drained areas at high elevation and *Shorea* grows in patches in the drier and gravelly soil. Other trees in the top story include *Artocarpus chaplasi* (Sam loc) *Cinnamum cecidodapha* (Gonosoroi loc.), *Terminalia myriocarpa* (Hollock loc.), *Toona ciliata* (Puma loc.).

The Middle storey consists predominantly of *Mesua. ferrea* (Nahor loc.) in some areas while in other Nahor may be poor or non existant. Middle storey, as such is not dominated by a single species, that can be noted but *Castaonopsis indica* (Hingari loc.). *Canarium resiniferum* (Dhuma loc.), *Duabanga grandiflora* (Khokon loc.) *Disoxylon hamiltoni* (Gendheli Poma loc.), *Cryptomeria peniculata* (Gorumara loc.), *Eleocarpus genitrus* (Rudrakh loc.), *Dillengnia indica* (Cutenga loc.), *Magnolia griffithi* (Sopa loc.) and *Michelia* spp. etc. can be pointed out as primary components.

The lower storey of the forest is composed of mainly shade trees e.g. *Baceaurea sapinda* (Leleka loc.), *Dillenia indica* (Cutenga loc.), *Atica lanceaetolia* (Morhalla) etc. and density of canopy of this stratum is corelated with the density of upper canopies but in case of mixed forest canopy in upper strata, shade trees in lower storey is replaced by deciduous trees e.g. *Albizia* spp. (Sires loc.), *Molia azodarech* (Ghora neem loc.), *Mallotus albus* (Morolia loc.) and bamboo, specially *Dendrocalamus hamiltoni* (Koko bans loc.).

The undergrowth is composed of woody shrubs and scitaniinous shrubs ; woody shrubs ; include *Leea indica* (Kukurathaniga loc.), *Leea acuminata* (Charathaniga), *Melastoma malabarica* (Phutka loc.) etc. and other shrubs in moist area include *Alpinia* spp. (Tara, Bogitora loc.) *Phyrnium* spp. (Kaupat loc.) *Musa* spp. (Kolgach loc.). In dry areas, Canes and Palms, specially *Pinanga gracilus* (Baruga tamul loc.) occur in

abundance besides *Calamus* spp. (*Houkabet*, *Lesaiabet*, *Raidung* loc.) *Livistonia jenkinsii* (*Tekopat* loc.) may occur occasionally.

The ground offer thick humus on forest floor and different species of ferns, a number of species of beonia and large number of shrubs and herbs form a thin ground cover. Ferns may be Polypoda-ceous or tree fern *Cyathea* spp. and *Angiopteris* orchids are mostly *Dendrobium* and *Cymbidium*.

Type II. Two distinct storeys can be distinguished in this type of forest. Top storey being composed of *Terminalia myriocarpa* (*Hollock* Loc.), *Duabanga grandiflora* (*Khokan* Loc.), *Amoora wallichii* (*Anari* loc.), *Sterculia alata* (*Udal* loc.), *Terminalia ceitrina* (*Hilika* loc.), *Terminalia belerica* (*Bohera* loc.) etc.

The middle storey is composed of *Bischia jayanica* (*Urium* loc.), *Gynocardium odonata* (*Dalmurga* loc.), *Vatica lanceaefolia* (*Morhal* loc.) and Bamboo.

This type of forest also shows profuse climbers like *Acacia pinnata* (*Kuchai* loc.), *Tinospora cordifolia* (*Hegum lota* loc.), *Mikania cerdata*, *Vitis latifolia* (*Gowalia lota* loc.)

Type III. The composition of miscellaneous Forests has been mentioned under classification ; one of the major Weed which invades this forest in abandoned Jhoom land or other areas, in *Mikania cordata* which along with *Eupatorium* form the major weed problem all over the northeastern region.

6. FAUNAL RESOURCES

The proposed biosphere reserve includes areas, earlier marked as 'Namdapha Wildlife Reserve, then a wildlife sanctuary (Ali & Ripley, 1979) and now a National Park and Tiger Reserve and contains elements of three biotic provinces e.g. Himalayan highland, Bengalian Rain Forest, Burma Monsoon Forest and this has opens up possibility of existence of rich, varied fauna and flora. The vertebrate-faunal components listed in the documents (Nair, 1981, Anon, 1983), includes Hoolock Gibbon, Slow Loris, Tiger, Clouded Leopard, Snow Leopard, Golden Cat, Red Panda, Musk Deer., The great Indian Horbill, Blyths Tragopan, Golden Eagle, Black Eagle and number of other species considered endangered and threatned under Indian Wild Life (Protection) Act. In order to investigate the detalis of the faunal elements, a team of scientists from Zoological Survey of India undertook a

preliminary survey during 1981-82 at the behest of Department of Environment, Government of India. The team returned with an wealth of collections of fauna revealing enormous possibility of existence of a rich gene-pool of primitive, rare, endangered components along with recent forms, undergoing a dynamic process of evolution. In order to investigate further into the faunal resources of the proposed biosphere reserve which encompasses a much larger area, a separate project was submitted to MAB-India Committee and on getting the same approved, further surveys were conducted during 1982-83 and 1983-84. The material collected during these surveys from most difficult and unexplored areas are now being worked out. The present document forms the first volume of publication on Faunal resources of the region.

In this volume, all vertebrate groups have been included ; besides, a number of orders of Insects, metastigmatic ixodid ticks and molluscs have been dealt. It will be evident from the papers presented in this work that in every group of animals, an assemblage of diverse faunal elements occur in the region. A number of new taxa, including a new genus and species of Mammals, two new species of Amphibia, four new species of Fishes and 19 new species of different Insect, groups, are reported. Earlier a new species and a new subspecies of Bird has been reported by Ripley (1980) from the same area. A large number of taxa are reported here for the first time from the area and some for the first time from India. The richness of faunal components, revealed through the surveys conducted so far, is established beyond doubt.

In a second and final volume to follow the present one, additional informations collected subsequently (upto 1985), will be presented with a complete qualitative analysis of the faunal resources of the proposed biosphere reserve from one of the most interesting biogeographical region of the country.

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