A GEOGRAPHICAL PERSPECTIVE ON WILD LIFE RESERVES AND NATIONAL PARKS IN SOUTH ASIA

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Certified that the dissertation entitled '" A GEOGRAPHICAL PERSPECTIVE ON WILD LIFE RESERVES AND NATIONAL PARKS IN SOUTH ASIA" submitted by RAVI BHUSHAN KUMAR in fulfilment of nine credits out of total requirements of twenty-four credits for the award of the dgree of MASTER OF PHILOSOPHY (M.Phil) of this University, is his original work and may be placed before the examiners for evaluation. This dissertation has not been submitted for the award of any other degree of this university or of any other University.

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First of all it is a great privilege for me to express my sincere thanks to Professor R.C. Sharma, my supervisor. His inspiration, encouragement and valuable guidance led me to complete this dissertation, without which this work could never have come in this form and shape.

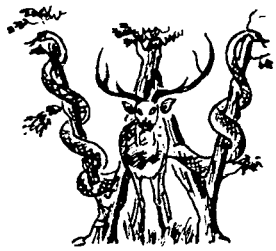
I owe my gratitude to the Ministry of Environment and Forests, Government of India. I am also indebted to nmy friends whose valuable suggestions made it in present form.

The wild animals, enjoying a carefree life in nature, have attracted me. The beautiful forests of Chotanagpur plateau and their inhabitants have always encouraged my artist. They are the inspiration behind selecting this topic for my dissertation. I would like to express my sincere love to them.

Date: 19/7/89 Ravi Bhushan Kumar

- Ravi Bhushan Kumar

INTRODUCTION



Wild life reserves and National Parks are now getting great concerns from ecological point of view. According to the environmentalists there should be at least 33% area of forest in a country. For ecological balance there should be 60% forests on the hilly-mountaineous terrain and 20% forest cover on plains. In India, as the data show we have 22.8% area under forest, but the recent satellite pictures show that we have hardly 10% to 11% forest area. In Pakistan due to poor rainfall except for north-west mountaineous region having coniferous trees, large areas have poor scrub forests and grasslands. But the recent insurgency of Afghan refugees have deforested this area badly. In Bangladesh about 16% land is under forests located in Chittagong hills, south Khulna, Sylhet and Madhupur region of eastern highlands' some delta forests. The warm climate and heavy rainfall reflects in luxuriant dense forests in Sri Lanka. The southern border and Terai region of Nepal is also densely forested. Bhutan and Maldives also have good forest cover.

These forests are natural habitat for the wild animals. So the number and variety of wild life is affected

by the expansion and shrinking of natural habitat.

The term 'wild life' in general denotes all living organisms which are not domesticated by man and living in their own natural surroundings. Wild life includes both vertebrate and invertebrate, which are further divided into mammals, amphibians, reptiles etc. All these organisms form an important part of this world and in the words of Jawahar Lal Nehru 'life would become very dull and coulourless if we did not have these magnificient animals and birds to look at and to play with'.[1] India has a long tradition of appreciating the value of all living creatures, which is reflected in our epics, theory of non-violence and our life style. Our late PM, J.L.Nehru has pointed out it as 'In no country is life valued in theory so much as in India, and many people would even hesitate to destroy the meanest or the most harmful of animals. But in practice we ignore the animal world'.[2]

South Asia is synonym to Indian subcontinent. It is a single geographical identity, but politically divided

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1. Quoted from Gee,E.P; The Wild Life of India,(London: Collins, St James Palace, 1964), p.1.

2. Ibid, p.1.

into separate countries; India, Pakistan, Bangladesh, Nepal, Bhutan, Sri Lanka and Maldives. In other words they are SAARC countries. If we ignore the recent history of post 1940s, they have always been closely tied in a socio-religious-cultural thread. So they are very well known to each other and many things are common in all. The Lofty Himalayas separate this subcontinent from other parts of Asia. There are lots of diversities in terms of physical characteristics, i.e., altitude, temperature, rainfall, topography, soil and vegetation etc, but we can label all them under monsoon regime which has shaped some kind of similarity in way of life of people. It is very difficult to separate or regionalize them with sharp boundary because there are many transition zones and overlaps.

Similar is the case with wild life of South Asia. India being the largest country, it is the country where all representative animals are found. There is no single species which is found in neighbourhood, but not in India. There are transition zones, e.g., the desert fauna of Indian Thar marusthal is common in Pakistan. The animals of dry Himalayas (Ladakh) are common in India and Nepal. Other Himalayan and Terai animals are common in India, Nepal, Bhutan. The wild animals of Ganga Brahmaputra plain-delta are common in India as well as Bangladesh. Similar is the case with peninsula and Sri Lanka.

Indian subcontinent has very important place on the wildlife map of the world. There are about five hundred species of mammals, more than two thousand species of birds, many species of fish, reptiles, amphibians and more than 30,000 forms of insects found in this subcontinent.[3] The Asiatic lion, the armoured one horned great Indian Rhinoceros, the magnificient Royal Bengal tiger, the massive Indian Elephant and the large Indian gaur are the big five of our forests. They are comparable only with their counterpart animals of Africa where heavy Ethiopian lion, big eared Elephant, two horned Rhinoceros etc are found. India is the only country in the world where Lion and Tiger both are found. The three species of cats including the spotted, marbled, fishing, desert, golden, jungle, pallas, the caracal types of cats and the Lynx are found. The white tiger is very unique to India.

India has twelve species of bats including the Flying fox or Fruit bat. The Flying Lemur, which is neither a lemur nor a bat, but which bears the same relationship to the shrews as the Flying Squirrel does to the Squirrels.

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3. Stracy, P.D. ; Wild Life in India, Its Conservation and Control, (New Delhi: Ministry of Food & Agriculture, Department of Agriculture, Government of India, 1963), p.18.

There are four species of apes in the world, among them mighty Gorilla and intelligent Chimpanjee are found in Africa, Orang Utan and Gibbon are found in Asia. India has the most noisy ape - the Hoolock. There are 5 specie of monkeys; the Rhesus, the Bonnet, the Lion-tailed, the Assamese and the Pig tailed. There are two species of Lemures - the slow Loris and the slender Loris found in Sikkim and Bhutan. The long tailed monkeys - Hanuman, the Golden Langur, the Capped and Nilgiri Langur are peculiar features of peninsula.

Hare and Rabbits are widely distributed in subcontinent. They are found from desert to snow capped hills and from open to thick forests. (Rabbits born naked while Hares are covered with hair).

There are about 1729 species of rodents in the world, they are also widely distributed in South Asian countries. They are Squirrels, Antelopes-rats, Rats etc.

There are many animals which are comparable with their counterparts in the world.

Among the carnivorous animals, the Indian wolf is smaller than those of Europeans and North American

The stripped Indian Hyena is comparable with spotted Hyena of Africa. The wild dogs of India are as notorious as the African spotted wild dogs. African and Indian Jackals are similar.

Various types of Bear are found in India, they are the Brown bear, the Himalayan black bear, the Sun bear and the Sloth bear. They are smaller than those of temperate and frigid zones; Alaskan - Polar or Grizzly of North America.

There are only two rare species of Panda in the world, the Giant Panda which is found in China and the lesser Panda in North Bengal and Sikkim. Elephants have also two kinds, one is the African type with flapping ears, a slanting forehead, and a concave back, while the Indian and South East Asian type has flat forehead, convex back, smaller ears and smaller size.

There are six species of Rhinoceros in Asia and Africa. The African black, the rare white of the south and north subspecies have two horns and their bodies are smooth. The great Indian Rhinoceros has only one horn and armour plated body. The Sumatran and Javan Rhinoceros have a smaller horn, hairy body and smaller size.

There are many species of wild pigs in the world; the Pigmy hog of India, the Wart hog of Africa, the Crowned boar of South East Asia, the Bush Pig, the Madagaskar pig, the Giant forest hog of Europe etc. The Pigmy hog is found only in East Indian and East Bangladesh forests while the wild boar is well distributed in the subcontinent from scrubland to evergreen forests.

The Deer species of India can be compared with the Deer family of any temperate country of Europe, America and Asia. Out of about twenty species of deer in the world, eight species are found in India. They are; the Hangul, the Samber, the Chital, the Musk deer, the Hog deer, the Swamp deer, the Thamin and the Barking deer.

There are many kinds of Antelopes found in Africa, but in India we have four types; Chinkara, Nilgai, the four horned antelopes and the Black buck. Among wild mountain goat and sheep, the Ibex, the Serow, the Markhor, the Goral, the Bharal, the Nayan, the Takin, the Himalayan large Tahr and the Nilgiri Tahr can be compared with the wild goats and sheep of world, e.g., the big harned sheep of the Rocky mountains of North America, the Markhor of maountaineous Iran, Afghanistan, the Marco Polo sheep of Central Asia etc.

The Gaur, wild buffalo, the African buffalo - Banteng, the Bisom are found in forests. While the Yak is comparable with Llama of Andean highlands though both differ in shape. We don't have the Zebras of Africa and wild horses of China, but we have wild Ass in hot deserts of Little Rann of Kutch and the Kiang in cold deserts of Laddakh.

Among Acquatic lives, Dolphins are found in Ganga, Brahmaputra and near Lakshadweep. The whales are found in the Bay of Bengal and Arabian Sea. The distribution of other animals will be described latter on.

Water in Gangas has not flown much when the wild animals were widely distributed in Indian subcontinent. Upto Moghul period wild flora as well as fauna were abundant. But after the arrival of Britishers, due to expansion of their various economic and commercial activities like mining, plantation, roads - railways construction etc and later on the world wars, a large sum of forests were swept away and the wild animals were killed on very massive amount. In this century many species which were abundant, cameon the verge of extinction. So the need of some law to protect them was felt. It was also thought that there whould be some areas where the animals can refuge themselves in their natural environment. So the concepts of many

categories of forests developed such as National Parks, Sanctuary, Protected area, reserves etc. The Indian Board of Wild Life which is responsible for the management, preservation and development of wild fauna and flora, has defined four areas where wild life receives some kind of protection. Under the provision of Wild Life(Protection) Act, 1972, any area can be declared by the State government as a sanctuary or national park in case the concerned area needs protection and conservation for its ecological, faunal, floral, geomorphological and zoological singnificance. The Central government can establish a sanctuary or national park with the consent of concerned State governments.[4]

NATIONAL PARK: According to the Indian Board for Wild Life, 'A National Park is an area dedicated by statute for all time to conserve the scenery, natural and historical objects, to conserve the wild life there in and to provide for enjoyment of the same in such manner and by such means, that will leave them unimpared for the enjoyment of future generations with such modification as local conditions may demand'.[5]

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4. Annual Report of Ministry of Wildlife and Environment, Govt of India,(New Delhi: 1988), p.1.

5. Stracy, P.D. ; op cit., p.117.

According to E.P.Gee, one of the authentic scholar on the wild life of India, "In most countries of the world, a National Park can only be created by the national, central or federal government of the country. But in India a State government can constitute a National Park in its State Legislature - preferably subject to certain standards which are now being drawn by the Indian Board of wild life.[6]

The history of National Parks in India begins in 1936 when the Hailey (now Corbett) national parks of United Provinces (now Uttar Pradesh) was created. The definition of national parks evolved in 1933 at the London conference on African fauna, according to which a national park is an area placed under public control, the boundaries of which shall not be altered except by competent legislative authority. The area is declared for the protection and preservation for all time of wild animal life and wild vegetation for the benefit and advantage and enjoyment of the general public. In this area hunting of fauna or collection of flora is prohibited except under the direction of park authority.[7]

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6. Seshadri, Balakrishna ; The Twilight of India's Wild Life, (London: James Baber Publishers, 1969), p. 187.

7. Stracy, P.D. ; op cit., p.116.

In England, national parks are mostly areas or sites of great natural beauty or of historical-archaelogical importance. In Europe they are preserves of natural wild life, while in America they are mainly areas of outstanding scenic beauty and remarkable natural phenomena. In Africa they are almost entirely faunal in character.

In India, the predominant character of national park is faunal, but gradually the emphasis is going on to beautiful scenary. Because most of Indian parks are located in beautiful surroundings with varied types of vegetation with an adequacy of wild life, so it is difficult to separate both from each other.

SANCTUARY : The Indian Board for Wild Life has defined a sanctuary as, 'An area where killing, hunting, shooting or capturing of any species of bird or animal is prohibited except by or under the control of highest authority in the department responsible for the management of the sancuary and whose boundaries and character should be sacrosanct as far as possible'.[8] The Board has further clarified the position by stating that while the management of sanctuaries does not involve suspension or restriction of normal forest operation,

8. Stracy, P.D. ; op cit., p.117.

it is desirable to aside a completely sacrosanct area within a sanctuary to be known as 'Abhyaranya'. It has also indicated that sanctuaries should be made accessible to the public.

The famous scholar E.P.Gee has thrown light on sanctuary as that in India sanctuary is usually created by an order or gazette notification of State government. So the weakness of a sancturay is that it can be desanctuarized merely by another order or gazette notification of a State government because it is not safeguarded by any proper legislation.

The idea behind a wild life sanctuary and a national park is same, ie, maximum protection, preservation and conservation of wild animals. But the fundamental difference between the two is that a sanctuary is created by order of a competent authority, who may be the chief conservator of forests or minister of a State, while a national park can be formed, abolished or changed only by the legislation of a State. Therefore, the status and degree of permanency and protection is much higher in a national park than in a sanctuary. In a wild life sanctuary private ownership rights may continue and forestry and other usages also may continue so long as wild life conservation is not adversely affected. However, in

a national park all private ownership rights are extinguished and all forestry and other usages are prohibited.[9] Every national park should have the minimum requisites of fauna, flora and scenery etc. There should be sufficient means of management and protection in a sanctuary to be upgraded as national park. Before declaring any forest as a national park, it must be confirmed that the area is of sufficient importance and status to deserve the appellation. Administration of such area must be improved and illegalities such as poaching and unauthorised grazing should be eliminated. The size of the park must be adequate, the boundaries should be well chosen and buffer zones should be provided against shooting, grazing and cultivation. Both sanctuaries and national parks may be formed out of reserved or protected forests and wherever forest products extraction is unavoidable, there must be an inner sanctuary or Abhyaranya, where no disturbances should be allowed. Central government provides assistance to the State governments for sanctuaries as well as for national parks.

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9. Annual Report of Ministry of Wildlife and Environment, Govt of India, (New Delhi: 1988), p.1.

A PROTECTED AREA : The Indian Board for wild life describes describes a protected area as, 'In many States there may be areas where it may be considered expedient,(i) to afford special protection to wild life, in order to enable species of wild life which are on the verge of extinction to reestablish themselves, (ii) to afford protection to wild life attracted to water impounded in river valley projects and to other irrigation works, (iii) to afford protection to wild life in and around large towns and sacred place.' [10]

Such areas may be constituted as protected area by an order of the government who may also fix the degree of protection and period of protection (may be temporary or permanent).

Elaborating this definition Gee has clarified that protection of wild life does not necessarily imply the protection of vermin. Those wild animals and birds etc which are injurious to other animals, or to the man in short or long term, can be kept under the control or even destroyed altogether in extreme case in certain places.

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10. Seshadri, Balakrishna ; op cit., p. 188.

A wild life reserve is a forest or an area in which wild life is protected by being so constituted under the Indian forest act or other forest law.

In November 1972 the Indian Wild Life Board chose the tiger as the national animal of India. A national scheme called the 'Project Tiger' was launched to protect the tiger population. At present there are 16 tiger reserves in India, of these 4 are wild life sanctuaries and 12 are national parks.[11]

Sri Lanka is also one of the most advanced Asian countries in these matters. There are four categories of forests. Sanctuaries where restriction is only on killing or capturing of animals and birds and which may cover both private and government's lands. Strict Natural Reserves are areas where everything is left undisturbed as far as possible and where public entry is prohibited except for scientific purposes. Interdediate Zones are neither sanctuaries nor strict natural reserves and which generally adjoin national parks and natural

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11. Annual Report of Ministry of Wildlife and Environment, Govt of India, (New Delhi: 1988), p.4.

reserves, where controlled shooting is permitted during certain months of the year and which serve as buffer zones.
National Parks which are areas where shooting is prohibited, but the public are freely encouraged. All these types can be modified or altered by government notification. Being a Buddhist country there is an empahsis on the protection of animals.[12]

After defining all types of faunal habitats, all appear very confusing, because uniformity in nomenclature is so lacking that same area is described with all categories, ie, national parks, sanctuaries or reserves. In India there were 63 national parks and 363 wildlife sanctuaries in 1987.[13] We can say that it is not the name which is important, but the protection offered to wild life within the area is important.

The categorization and the spirit behind the categorization is almost same, may be different terms used in some countries. Indian subcontinent has grown with British legacy. The formation of many of national parks and sanctuaries

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12. Stracy,P.D. ; op cit., p.119.

13. Annual Report of Ministry of Wildlife and Environment, Govt of India, (New Delhi: 1988), p.1.

were done by them. After independence all South Asian countries have different political set up. India is a socialist, secular, democratic republic. Democracy has returned after eleven years in Pakistan. Bangladesh has a military rule under the clad of democracy. Nepal has constitutional monarchy, while Bhutan has monarchy. Sri Lanka and Maldives are also democratic republics. But except for secular India others are religion based countries. So the role of religion and political set up is important in the regulation, management and protection of flora and fauna of these countries. Political as well as social factors are also important in the prevailing conditions of flora and fauna, e.g., the jhuming cultivation has swept away many dense forests into barren eroded plateaus in north east India, while the Afghan refugees/ rebels have destructed forests on large sclae on North West border provinces of Pakistan.

In this dissertation I have tried to show these facts with special reference to India which outnumbers other countries in national parks, sanctuaries and variety of animals. The dissertation is divided into six sections, in which I have tried to touch different issues and facts regarding the wild animals.

CHAPTER -I

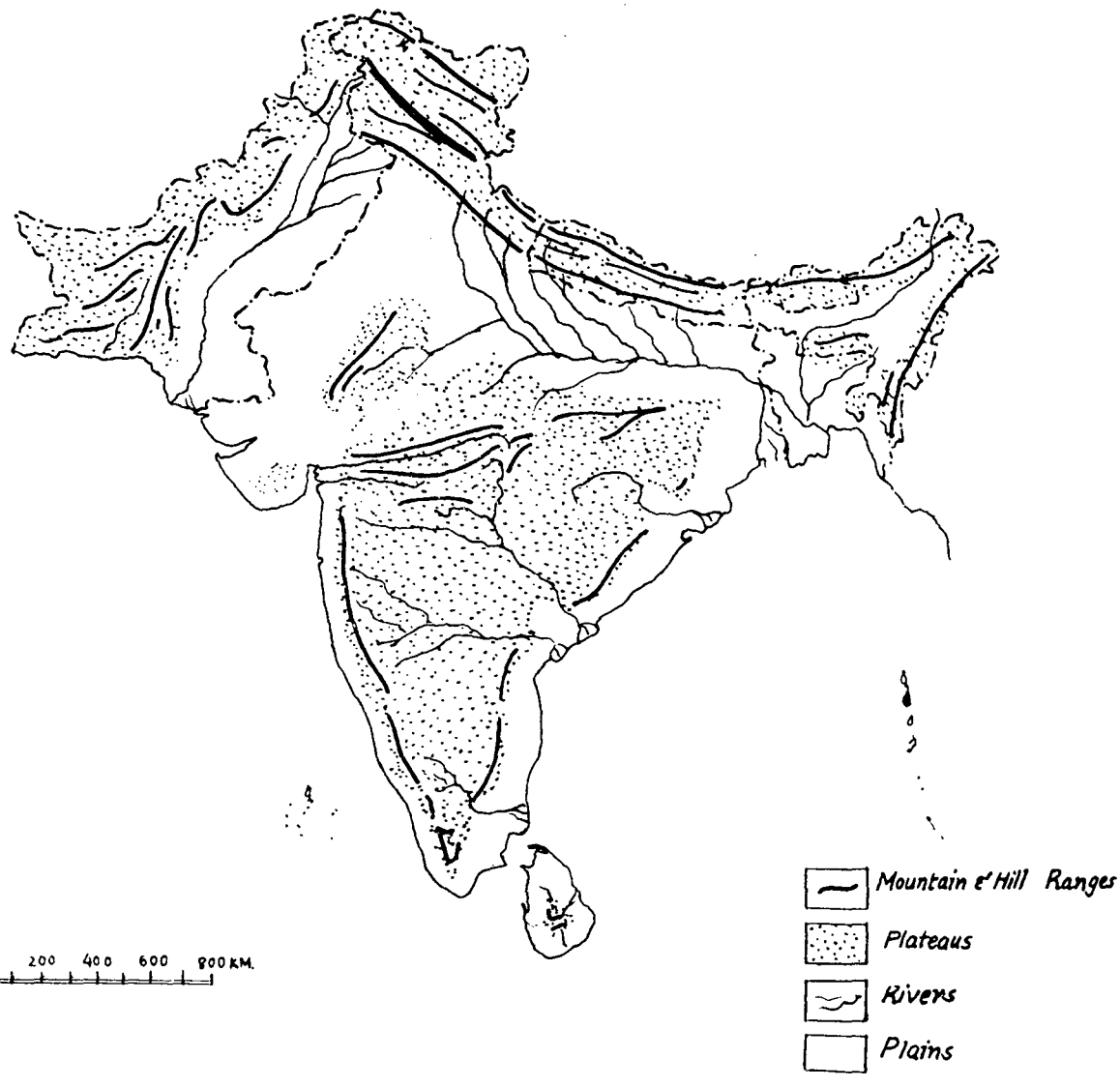
GEOGRAPHICAL DIMENSION OF SOUTH ASIA

n this chapter the general geography of South Asian countries is being attempted as it is substantially relevant in understanding the spatiality of wild life. It is the geographical environment which gives exclusivity to certain species being confined to a particular geographical niche. In South Asia, India has a dominant size and accounts for large area as well as population of South Asia. Further, India is the only country in the region which has made serious efforts in the conservation of national parks and wild life, although other countries of the region have also taken some steps in this direction.

ndia extending between 8°4′ and 37° 6′ N latitude and between 68°7′ and 97°25′ East longitude with its stretch of 3214 km from north to south and 2933 km from east to west, having an area of 32,87,782 sq km, India is seventh largest country in the world. Due to its vastness, India is a land of great physical contrasts. The Peninsular Plateau constitues one of the stable and ancient land blocks on the earth surface, the Himalayan and other

SOUTH ASIA

PHYSICAL FEATURES



Map No. 1

northern mountains and great plains on their south represent the most recent and unstable zones. The northern mountains have a very youthful topography with sharp pinnacled peaks and ridges and steep sided valleys in contrast to the open senile relief of peninsula. Climate varies from one of the coldest place (Drass) to some of the hottest places and regions of heaviest rainfall (Cherapunjee) to very dry places. Vegetation also varies from Alpine coniferous to tropical evergreen dense forests to dry thorny bushes.

PHYSIOGRAPHY

India can be divided into four major physiographical units; the northern mountains, the great plains, the peninsular plateaus, the coasts and Islands.

1. The Northern Mountains: It can be divided into (a) the Himalayas, (b) the Trans-Himalayas and, (c) the Purvachal.

(a) The Himalayas extended in an east west arcuate curve for about 2400 km between the gorges of Indus and Brahmaputra. Their width varies from 500 km in Kashmir to 200 km in Arunachal Pradesh covering an area of five lakh square km.[2] They comprise

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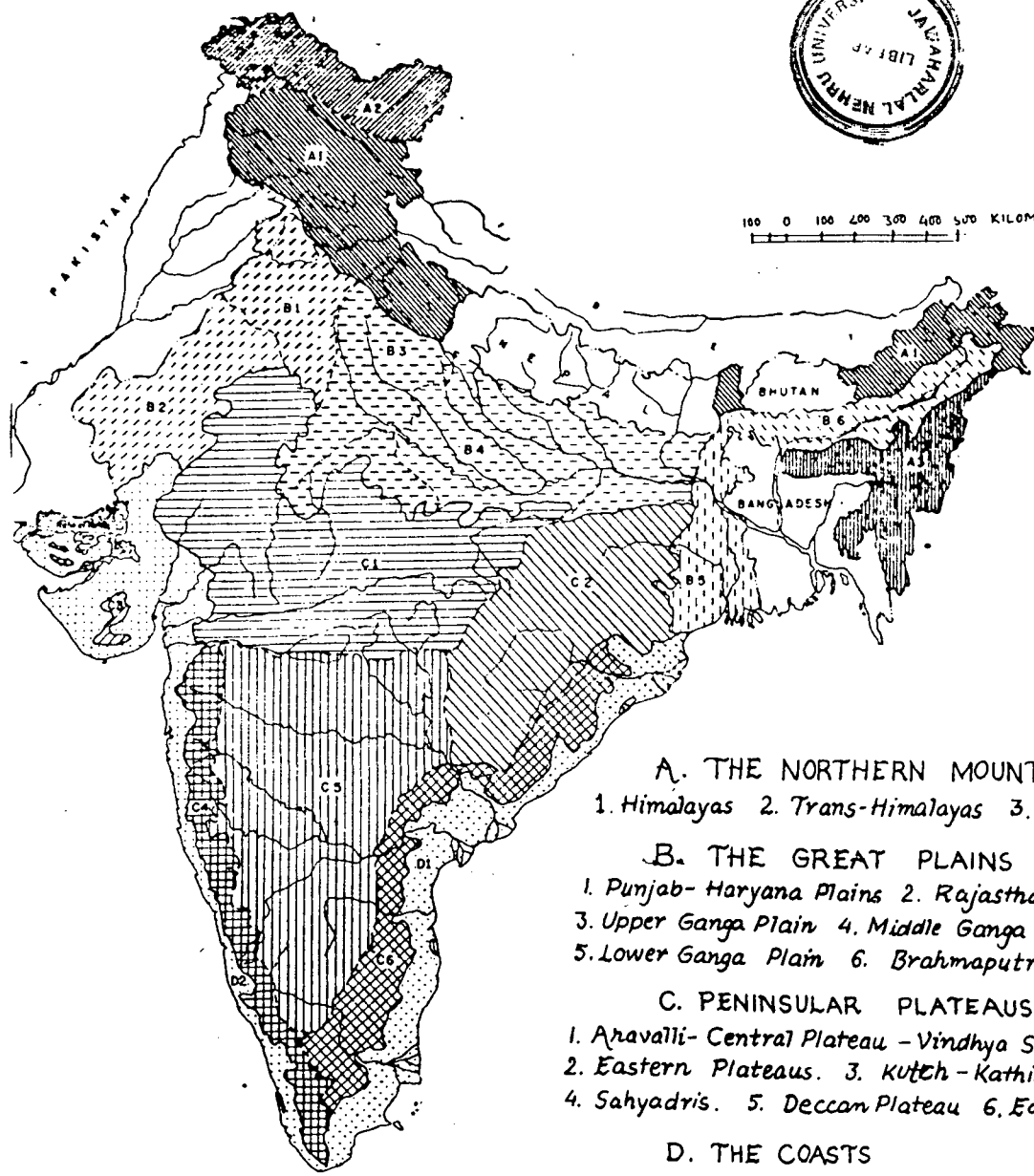
2. Ibid, p.1.

INDIA

PHYSIOGRAPHIC DIVISIONS



A. THE NORTHERN MOUNTAINS
1. Himalayas 2. Trans-Himalayas 3. Purvachal

B. THE GREAT PLAINS
1. Punjab- Haryana Plains 2. Rajasthan Plains
3. Upper Ganga Plain 4. Middle Ganga Plain
5. Lower Ganga Plain 6. Brahmaputra Valley

C. PENINSULAR PLATEAUS
1. Aravalli- Central Plateau - Vindhya Satpura
2. Eastern Plateaus. 3. Kutch - Kathiawar
4. Sahyadris. 5. Deccan Plateau 6. Eastern Ghats

D. THE COASTS
1. EAST COAST 2. WEST COAST

three almost parallel fold ranges interspersed with deep valleys and extensive plateaus.

The Siwaliks are outermost range of Himalayas, composed of mostly tertiary sediments, formed during the mid-Miocene to lower Pliestocene times (the latest phase of Himalayan Orogeny). These hills form almost a continuous chain, with a width varying from 50km in Himachal Pradesh to less than 15km in Arunachal Pradesh, with a height between 600 to 1500 mts. There are some flat bottomed strike valleys, e.g., Dehradun, Udhampur and Kotli.

The Himachal (lesser Himalayas) lying to the north of Siwalik range, form an intricate and rugged mountain system, 60 to 80 km wide, 1000 to 4,500 m high with several peaks rising above 5,000 m. The ranges are composed of highly compressed and altered rocks of Algonkian to Eocene times.[3]

The Himadri (great Himalayas) is the innermost, loftiest, snow capped and most continuous range. It has a granitic core flanked by metamorphosed sediments which are folded asymmetrically. The average height of the range is 6,100 m where many peaks exceed 8,000 m.

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3. Ibid, p.4.

(b) The Trans Himalayas: -

A range branches off from the Himadri near 80°E longitude in Tibet, running north west is called Zanskar range. Its average height is 6000 m. Beyond Zanskar range lies the gorge of the Indus, about 560 km long, 10 km wide and 5,200 m deep near Bunji where river cuts through the Laddakh range. Laddakh range is parallel to the Zanskar with average height of 5,800 m high and more than 300 km long.[4] North of it is Karakoram range. There are many famous glaciers like Hispar and Batura of Hunza valley, Siachen of Nubra valley. All these ranges merge into Pamir knot in west.

(c) The Purvachal: -

The Himalayas move southward from Dihang gorge (Brahmaputra Valley) forming a series of hills with a north-south trend. They are composed of sedimentary rocks, they run as parallel ranges and valleys and are covered with dese forests. Their heights vary from 500 to 3000 m. Their names from north to south are Patkai Bum, Naga, Manipur, Barail, Kohima , Lushai etc.

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4. Ibid, p.5.

2. The Great Plains: The great plains of India are extended east-west between the Himalayas in the north and Peninsular plateau in the south. Their width vary from 500 km in Punjab Rajasthan to less than 200 km in Bihar, covering an area of over seven lakh square km.[5] The great plains comprise the Punjab Haryana plain, the Marusthali and Bager areas of Rajasthan, the Ganga plains of UP, Bihar and West Bengal and Brahmaputra valley of Assam. They merge into Thar desert in south west. The Delhi-Haryana watershed area is about 278 m high separates Punjab Haryana plains and the Ganga plains. These aggradational plains formed after Himalayan orogeny with average depth of 1300 to 1400 m. The nature of detrial deposits is uniform from the top to the bottom. The Himalayan rivers have deposited gravel and unassorted sediments of 10 - 15 km wide along the foothills, called bhabar. The rivers disappear in this zone and reappear in southern 15 -30 km wide marshy tract called terai. Farther south the plains are composed of old alluvium deposited during the mid-Pliestocene and recent periods called bhanger, whereas the newer alluvium is called khadar. There are irregular limey concentration called Kankar, the saline soils are called reh or kallar.

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5. Ibid, p.6.

The Punjab Haryana plains cover an area of 1.75 lakh km^2. [6] There are many mesopotamian regions called 'doab', e.g., Upper Bari doab, Bist doab, Malwa plain etc.

The Rajasthan plain includes Marusthali and adjoining Bagar areas to the west of the Aravalli covering an area of 1.75 lakh km^2. Seifs, barkhans and various types of sand dines cover a large part of plain. There are some salty lake basins.

The Ganga basin occupies an area of 3.57 km^2. Its height in west is 278 m to sea level, so the average height is very gentle which causes regular flood in plain area. This plain is subdivided into Upper, Middle and Lower sub parts.

The Brahmaputra valley is 80 km broad and 720 km long. The general level varies from 130 m in the east to 30 m in west with a fall of 12 cm/km [7] so it is a flood prone area.

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6. Ibid, p.7.
7. Ibid, p.8.

3. The Peninsular Plateau : They are ancient block composed of the Archaean gneisses and schists with eastward tilt. The average height of west is 900 to 1,200 m to 600 m in east. They cover an area of 16 lakh km^2. [8]

The Aravalli range runs in a northeast to southwest direction for 760 km between Delhi and Palanpur (Gujarat). The range is composed of quartzites, gneisses and schists of pre-cambrian age. Its height varies from 900 to 400 m which ends north of Delhi. Gurushikhar is the highest peak[9] in Abu Hills.

The central plateau consists of Malwa plateau, Bundelkhand region with average height varying between 500 to 600 m. The plateau is very rugged.

The Vindhyan range is a great escarpment running in east-west direction on the north of Narmada - Son rift. It is formed of sandstones. The Satpura range is a lava formation extending between Narmada in north and the Tapti on the south. The area has a radial drainage. The Satpura range's highest point is near Pachmarhi. The eastern part of

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8. Ibid, p.9.

9. Ibid.

the range is known as Maikala Plateau. East of Maikala lies the Baghelkhand plateau which comprises anticlinal hills and synclinal valleys carved out of sandstones and limestones in west and granitic plateau in east. South of Baghelkhand is the upper basin of Mahanadi, which is a saucer shaped depression, known as Chhatisgarh basin. To the east of Baghelkhand is Chhotanagpur plateau composed of granite-gniesse. Its average height is 600 m. It has a radial drainage. The Damodar river flows through a rift valley. This plateau is very rich in all kinds of minerals.

The Kathiawar peninsula in Gujarat is composed of Deccan Lavas while Tertiary rocks dominate in Kutch. To the north of Kutch is the great Rann which is a subsided surface covered with mud flats and salt marshes.

The Western Ghats extends from south of Tapti valley to Kanyakumari a length of 1600 km.[10] Upto Goa they are composed of lava, while in south they are

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10. Ibid, p.11.

granite-gneissic formation. In north their average height is 920 m, in south average height is 1220 m. The Nilgiri hills rise over 2000 m (Dodabetta 2637 m). To the south of Palghat gap (24 km wide) are Annamalai, Palani and Cardamom hills.[11] The Western Ghat presents a very youthful topography with steep scarp face to west which was formed due to downfaulting of a strip on their west in the Arabian Sea as geologists and geographers believe.

The Deccan plateau is surrounded by Satpura-Mahadeo-Maikala range in north, the eastern ghats and the Sahyadris on the west. They are tilted towards south east. The height vary from 900 m in the west to 300 m in the east. They are formed of horizontal lava sheet in north, while in south they are formed of Archaean gneisses. The Eastern Ghats are irregular hills, much dissected and are covered with forests.

4. The Coasts and Islands : India has a coastline of more than 6100 km from the Raun of Kutch to Ganga-Brahmaputra delta.

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11. Ibid.

The eastern coast stretches from mouth of Subarnrekha to Kanyakumari. It is wide and contains many prominent deltas of Ganga, Brahmaputra, Mahanadi, Krishna, Godavari and Kaveri. Chilka and Pulicut lakes are lagoon formation.

The western coast stretches from Kutch to Kanyakumari. They are narrower than eastern coasts with undulating surface, cliffs, coves and embayments. However, the continental shelf along the western coast is relatively wider than east.

India has 247 islands, of which 204 lie in the bay of Bengal and remaining in Arabian sea and gulf of Mannar.

akistan has an area of 796,095 sq km with a population of 9.8 crores.[12] It is bordered by Afghanistan, Iran, India and China. The country falls into four broad natural regions.

1. The Northern and Western Hills Region comprises north western part, with Hindukush and Sulaiman and Kirther range as

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12. Manorama Year Book, 1988.

backbone. These mountains are not as high as Himalayas. There are three important plains Peshawar, the Bannu plain and Dera Ismail Khan plain.

2. The Plateau region comprises an arid plateau 300 to 900 m high, surrounded by a ring of mountains reaching over 1,800 m. This plateau is very liable to earthquakes. The climate is continental extreme.

3. The Punjab plain is a broad alluvial plain formed by the Indus and its tributaries. It is most prosperous region due to good network of irrigation canal and fertile land. The south eastern part is part of Thar desert with low rainfall, full of sand dunes and scattered scrub vegetation.

4. The Lower Indus Valley is a broad, flat, alluvial plain stretching from the edge of Kirther range in the west to the Thar desert on the east. Delta region is flood prone area but other parts are dry and irrigation system provides good agricultural products.[13]

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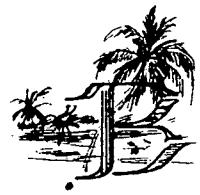
13. Farro, Charles ; Certificate Physical and Human Geography, Oxford University Press, 1978, pp. 396 - 399.



angladesh covers an area of 143,998 km^2 with a population of 9.8 crore.[14] It has three broad physical divisions:[15]

1. The Eastern and North Eastern regions consists of hills and mountains of which Lushai hills stretch as far south as Chittagong.

2. The Delta region consists of the deltaic lowlands formed by the Ganga (known as Padma) and the lower Brahmaputra (the Jamuna) and the Meghna which bring enormous quantities of silt. The delta covers an area of about 48,000 sq km , one of the largest in the world. There are many lakes, swamps and marshes.

3. The coastal region is very lowland and is subjected to frequent cyclones and tidal bores.

ri Lanka is 35 km from India, separated by gulf of mannar and Palk strait. The physical features of country consists of (1) a central mass of mountains (2) the northern plain, and (3) the broad sandy coastal plains.

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14. Manorama Year Book, 1988.

15. Farro, Charles ; op cit., p.405.

The central mountains are covering about 10,000 sq km. They form a series of ridges and valleys. Adam's peak is 2130 m. Nuwara Eliya is a beautiful hill station. The longest river Mahaweli Ganga is 330 km in length, other rivers are Kalu Ganga and Kelani Ganga. They are perennial.

The northern plain covers the whole of northern Sri Lanka. The Jaffna Peninsula is in the extreme north. It is a fertile alluvial land with good irrigation facilities.

The coastal palins are broad with many sand banks and interrupted by lagoons. The east coast is more rugged.[16]

epal has an area of 86,400 sq km lies between Tibet and India. It is a hilly country. The crest of Great Himalayas form its northern boundary which contains some of world's highest peaks such as Mt. Everest (8828 m), Kanchenjangha (8578 m). The southern border runs south of Siwaliks through Terai region. The principal rivers are the Kosi, Gandak, Rapti and Karnali. The most important

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16. Ibid, pp. 412-14.

region is the valley of Nepal which is only large plain tract. The middle Himalaya is known as Mahabharat Lokh extended between Mahakali to Koshi, its ridges and steep esparpments are seen in southern type.[17]

Bhutan has an area of 47,000 sq km with a population of 1.4 million. It is a mountaineous state.

Maldives is an archipelago consisting 12 coral atolls and about 2000 small islands. It extends for about 400 km from north to south, covering an area of 298 sq km with a population of 1.7 lakh persons.

CLIMATE

South Asia is also known as monsoon land because they experience monsoonic type of climate. Following factors affect the climate of the region: -

The tropic of cancer passes through the middle part of the region and except for few parts of Pakistan and India other regions lie within tropical climatic zone. So temperature is high in this region.

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17. Prasad, S. ; Bhugol, Bharati Bhavan, Patna, 1974.

The altitude affects the air pressure and temperature of the region. The central mountains of Sri Lanka, Nilgiris - Annamalai of Peninsula, the Himalayas, Hindukush etc have comparatively cooler temperature in summer months. On the other hand the Indo-Ganga-Brahmaputra plains, the coastal plains and Sri Lankan plains are very hot in summer.

The distance from sea also affects the climate. As we go far from the sea the temperature become extreme and lacks moisture, ie, the climate becomes continental with high diurnal and annual range of temperature. As the region lies near to sea the climate becomes equable.

The direction of prevailing winds is a big determining factor. In late summer the southwest monsoonic winds blow from Indian ocean, they are moisture ladden and bring heavy showers. As the distance from sea increases, rainfall decreases. In winter the winds blow from continent, so they are very cold and dry. Sometimes they bring cyclonic showers.

The vegetation cover also affects the temperature and moisture. The plants absorb insolation and transpirate the moisture, so the weather is equable. But in barren land, which absorbs and release the heat rapidly, there is large range of diurnal/annual temperature.

The direction or orientation of mountains also affect the temperature and rainfall depending on their lee and onward to sunrays and moist air. The nature of soil is also important.

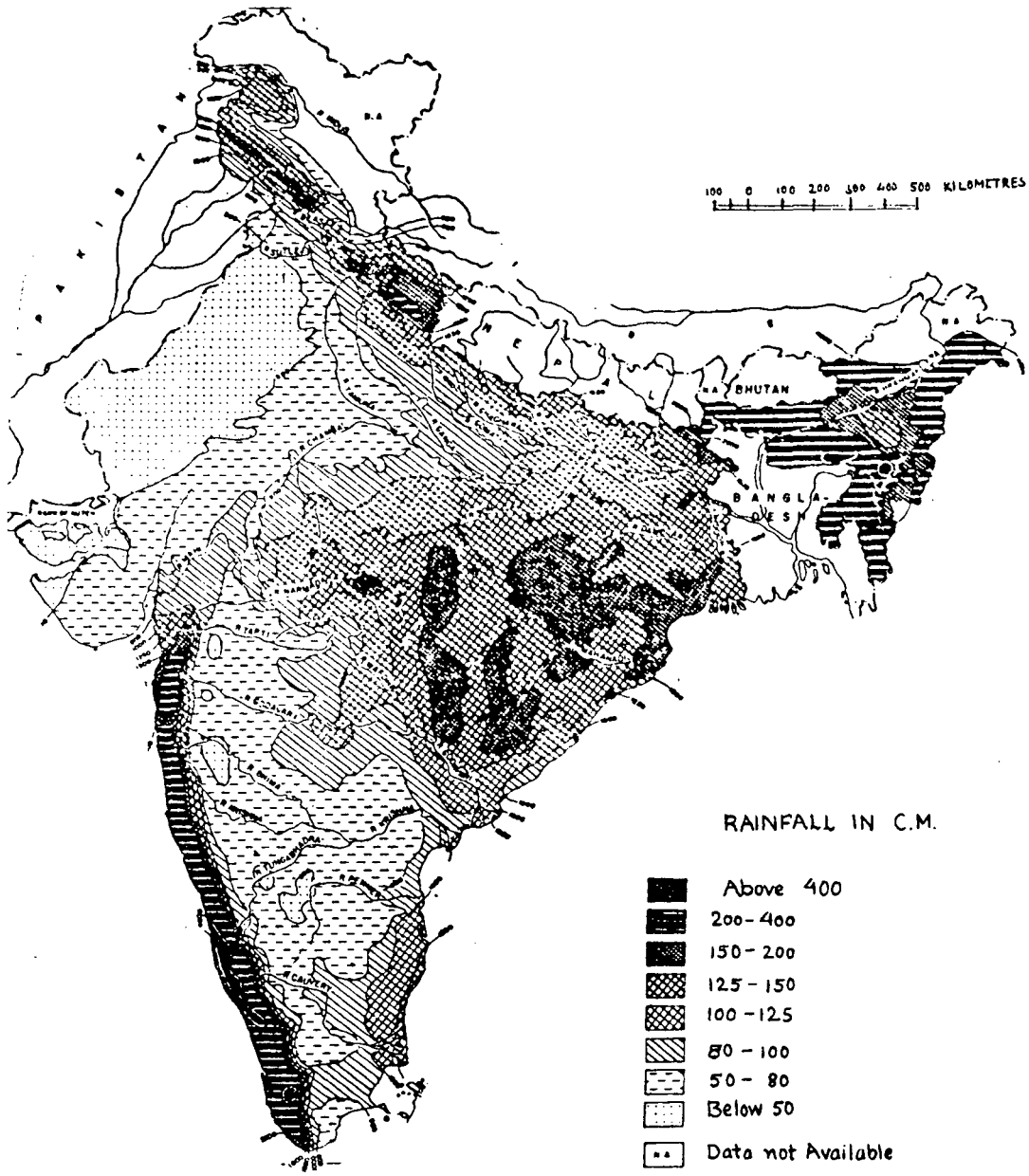
Indian subcontinent has four distinghishable weathers:

1. The hot dry weather is experienced between mid march to mid june. At this time the sun is verical over subcontinent and the intense heat is experienced in continental interior, i.e, in Northwest India and Pakistan. The higher places have some cooler weather. In northern plain area the hot wind 'loo' is experienced. The coastal areas have not much range of temperature as it is found in interior region.

2. The hot wet weather is a peculiar type of weather. The moist airmass carried by south-west monsoonic winds, drived by Tropical Easterly Jet Streams bring heavy rainfall to the region. The duration of this period is from mid June to mid September. Eastern, North-eastern, South-western parts of India, southern Bhutan, Bangladesh, Nepal's plain and terai regions, Sri Lanka and Maldives receive heavy rainfall. The interior part of Peninsula, north-west India, Pakistan gets less rain or no rainfall at many places.

INDIA

NORMAL ANNUAL RAINFALL



Map No.3

3. From mid September to mid December the retreating monsoon winds are blowing which are dry in north India , but bring good amount of rainfall in Eastern Tamil Nadu and Eastern Sri Lanka. It is a transition period between rainy and cold weathers.

4. From mid December to mid March is the period of cold dry weather. The peninsular regions, especially coastal regions, Sri Lanka and Maldives have weather, but in interior continent, i.e., Punjab, Sindh, Rajasthan, Baluchisthan regions including all highlands are very cold.

Many attempts have been made by various authorities to classify the climate of the subcontinent. Climate is such a complex phenomena that no single index can be assigned to it. However, despite its complexity precipitation and temperature are the basic elements.

Koppen was the first climatologist who studied the climates of whole world thoroughly and made classification of the world climates. He has proposed the use of biotic factors, because of the nature and type of vegetation

is determined by temperature and rainfall. Koppen[18] divided South Asia into following seven climatic regions.

1. The Himalayan west (Et type of climate) having the warmest month between 0° to 10° C.

2. The North-Eastern tract. (Dfc type), having the cold humid winter with shorter summer.

3. CWg type of climate is experienced in the plain of Indus - Ganga and Brahmaputra river.

4. B hw or semi arid steppe region lies in the north-western part of subcontinent where rainfall is between 10 to 20 m.m annually.

5. Aw or tropical Savana type of climate is experienced in whole of Gujarat, Maharashtra, Madhya Pradesh, Orissa, Andhra Pradesh and some parts of Eastern Karnataka. These areas experience intense heat in summer.

6. Amw - The rainfall in this tract of Malabar coast, Sri Lanka and Maldives is about 300 cm or more

7. As or region of winter rainfall. They are south-eastern coast of India and eastern Sri Lanka, where rainfall is due to depressions and retreating monsoon.

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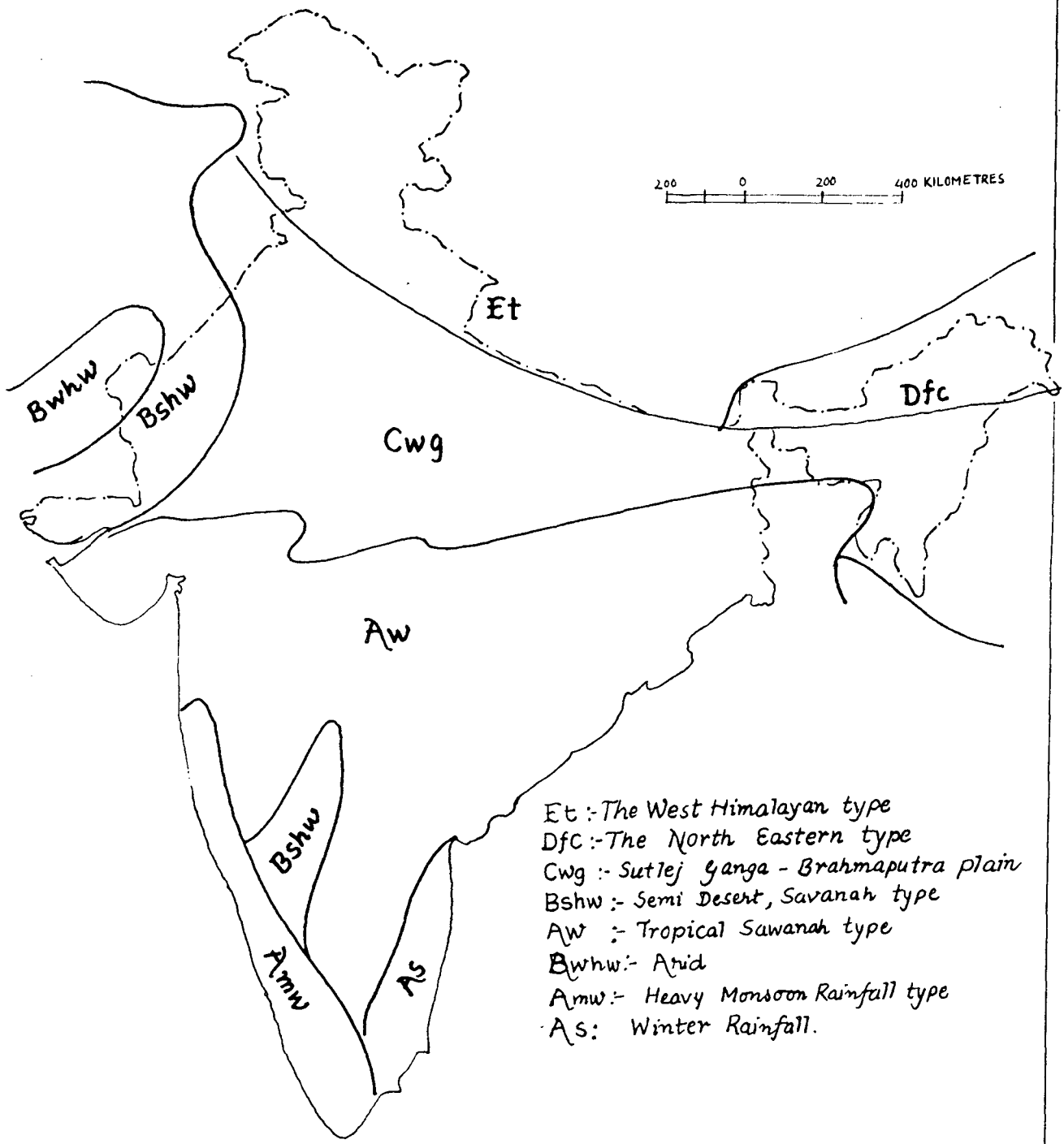
18. Negi,B.S & Dubey,R.N ; Economic Geography of India,(Allahabad, Kitab Mahal, 1975), pp. 52-53.

INDIA

CLIMATIC CLASSIFICATION BY KOPPEN



Map No.4

Kendrews[19] classified Indian subcontinent into eight regions based upon seasonal changes of rainfall and temperature: -

1. Very heavy rainfall region covering half of Bangladesh, whole of north eastern States and Kerala.
2. West Bangladesh, West Bengal and Orissa have more rain than rest of India. The rainfall decreases with increasing distance from the Bay of Bengal.
3. Upper and Middle Ganga plain having mean january temperature 13° - 18°c and very hot and dry in early summer.
4. Arid low land, with a mean annual rainfall less than 25 cm includes west Rajasthan, south west of Haryana and eastern part of Pakistan.
5. Central and Southern parts of Peninsula having 18°C to 24° C temperature in January, hot summer and moderate rainfall (between 50 to 76 cm) in summer.
6. Hot humid Western Ghat.
7. The winter rainfall region of Eastern Ghats, east Tamil Nadu and Sri Lanka. The daily range is samll.

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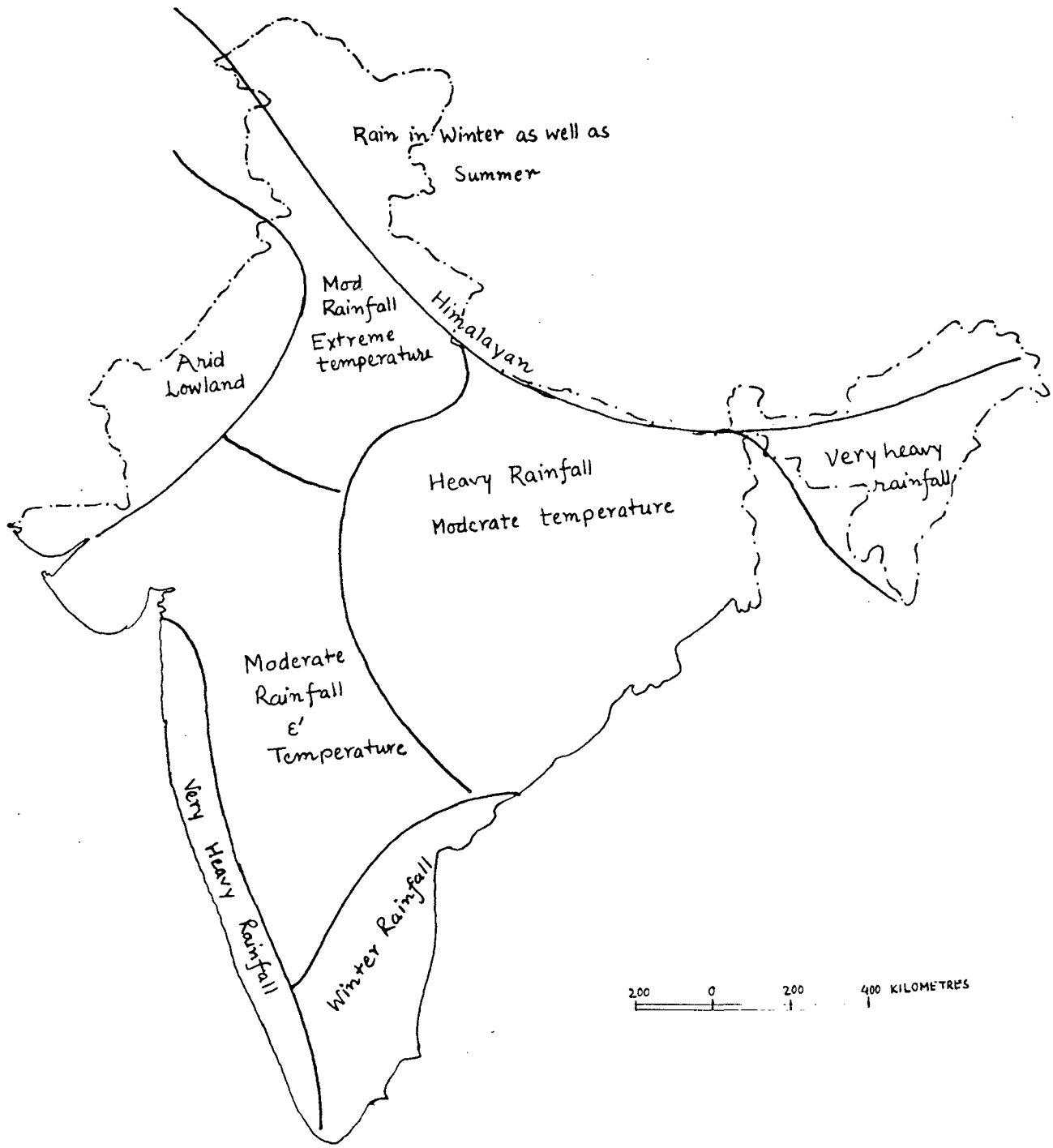
19. Ibid, pp. 53-55.

INDIA

CLIMATIC CLASSIFICATION BY KENDREW



Map No. 5

8. Himalayan region having very cold winter and moderate summer. The region extends along Himalayas and embraces Kashmir, Himachal Pradesh, Nepal, Bhutan and Arucachal Pradesh.

CLIMATIC REGIONS

Amongst all the climatic classifications attempted so far, the scheme put forward by Trewartha, which is a modified form of Koppen's classification, is found to apply to India more satisfactorily as it closely corresponds with the vegetative, agricultural, soils and geographical divisions of the country. The broad outlines of the various types of climates found in the country discussed here, therefore, are based on Trewartha's Scheme.

Tropical Rain Forest (Am) - This type of climate is found on the West Coastal Plain and Sahyadris and in parts of Bangladesh and Assam. The temperatures are high, not falling below 18.2°C even during winter and rising to 29°C in April and May, the hottest months. Because of heavy rainfall and squally winds, the period of south-west monsoon is quite cool. The average annual rainfall exceeds 200 cm. Dense forests and plantation agriculture with crops like tea,coffee and spices are the characteristic vegetation in the area.

Tropical Savanna (Aw) - Most of the Peninsula, except the semi-arid zone in the leeside of the Sahyadris, experiences this

type of climate. A long dry weather lasting through winter and early summer and high tempe ature remaining above 18.2°C even during the winter season and rising as high as 32°C in summer are the chief characteristics of this climate. Tamil Nadu and East Sri Lanka experiences a more equable temperature regime than the areas farther north. The State also receives more rainfall during winter season in October-December months. It is, therefore, sometimes put under a subtype of the Aw called Tamil Nadu Aw.

The annual rainfall in the area varies from 76 cm in the west to 152 cm in the east, wheras most of it is ceceived during the south-west monsoon season in the north, over half comes during October-December period in Tamil Nadu. The natural vegetation all over the area is savanna. A variety of crops with or without irrigation are raised in the area.

Tropical Semi-arid Steppe Climate (BS) - The rain shadow belt, running southward from central Maharashtra to Tamil Nadu, in the leeside of the Sahyadris and Cardamom Hills come under this type of climate of low and uncertain rainfall varying from 38.1 to 76.2 cm and high temperatures varying from 20° to 23.8°C for December and 32.8°C for May which are the coldest and hottest months respectively in the year. As the rainfall amount is not only low but it is also very erratic failing to reach the

average in many years, crop failures and droughts are a common feature in the area. Agriculturally, the climate is suitable only for dry farming and livestock rearing.

Tropical and Sub-Tropical Steppe (BSh) - This type of climate occurs over a broad crescent from parts of Pakistan, Punjab to Kutch between the Thar Desert to its west and the more humid climates of the Ganga Plain and the Peninsula to its east and south respectively. The climate is, therefore, transitional between these two areas. The annual rainfall varies from 30.5 to 63.5 cm and the temperature varies from 12°C for January to 35°C in June, these being the coldest and hottest months respectively of the year. The maximum temperature has risen up to 49°C.

The annual rainfall is not only low (30.65 cm) but it is also highly erratic, the monsoons failing in several years. Droughts and scarcity conditions have, therefore, been a common feature of this area. Even in the years of good rains, only dry farming crops like jowar and bajra are grown. Cattle and sheep rearing is also important.

Tropical Desert (BWh) - The Sindh, Punjab and other parts of Pakistan, the western parts of Barmer, Jaisalmer and Bikaner districts of Rajasthan and a good part of Kutch form the sandy

wastes of the Thar which experiences a typical desert climate. The rainfall is scanty with an annual average of 30.5 cm but some parts receiving as low as 12.7 cm. Further, it is also very erratic being too low in most years and being too much above the average in some years. Whenever it rains, it is in the form of cloud-bursts, taking place mostly in July-September when the south-west monsoon may penetrate the region.

During the summer season, days are very hot and uncomfortable; there are sandstorms in the afternoons and hot and dry winds blow practically throughout the day from 10 am onwards. May and June are the hottest months with average temperatures above 34.5°C. Temperatures below free ing point have been recorded several times at the time of cold waves. The annual range of temperature is over 20°C.

The Thar Desert has a very scanty and stunted vegetation confined to few scattered pockets or dry river beds. Dry farming is practised in the area but successful crops are raised only in few years. Sheep raising is common.

Humid Sub-tropical with Dry Winter(CWa) - A large area to the south of the Himalayas, east of the tropical and sub-tropical steppe and north of the tropical savanna running in a long belt

from Punjab to Assam with a south-westward extension into Rajasthan east of the Aravalli Range, has this type of climate. The annual rainfall in the area varies from 63.5 cm to more than 254 cm, most of it received during the south-west monsoon season. The amount increases towards east and north where the atmosphere also remains more humid throughout the year. Winters are dry except for a little rain received from the westerly depressions, more amount of which is received in the western part.

Winters are mildly to severely cold and summers extremely hot in the western part but quite mild in the east. The eastern area has, therefore, a more equable climate. As a result of differences in rainfall and temperatures, the two areas often have a great difference in soil types, crops etc.

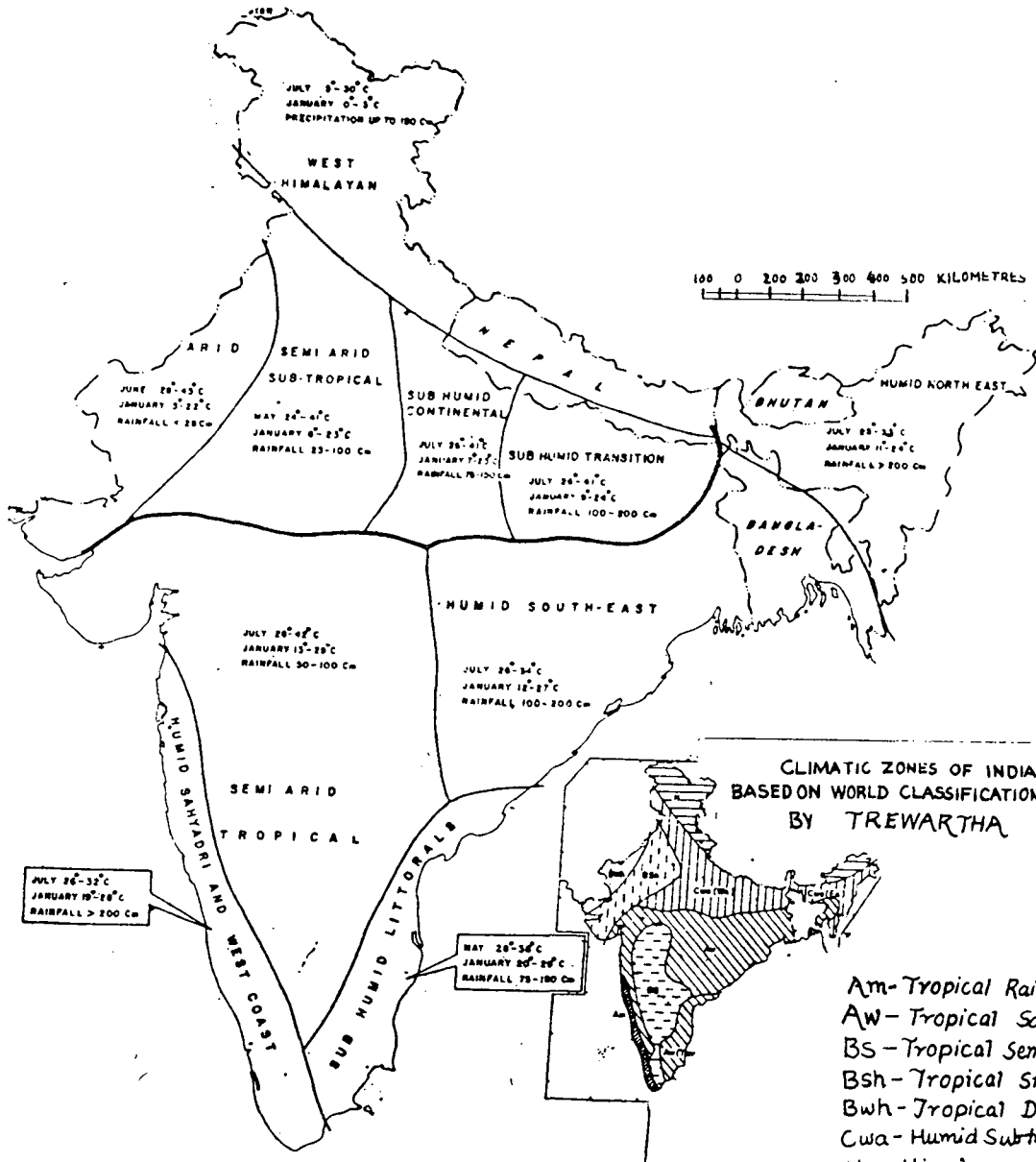
Mountain Climate (H) - The Himalayan and Karakoram ranges, some of which rise to more than 6,000 m above mean sea-level and remain snow covered throughout the year, experience this type of climate with sharp contrasts between the temperatures of the sunny and shady slopes, high diurnal range of temperature and high variability of rainfall. Differences in altitude and slope result in these contrasts.

The trans-Himalayan region, Ladakh, where the south-west monsoon fails to reach, has a dry and cold climate

INDIA

CLIMATIC ZONES

BY TREWARTHA



Map No. 6

and a sparse and stunted vegetation. Leh, situated at 3,522 m height in the Indus Valley, has a mean temperature of -7.4°C for January, the lowest record for the month is -28.3°C. Its mean temperature for July, the warmest month, is 17.2°C. The station gets a rainfall of only 8.1 cm. Many streams even in summer flow for only a few hours a day when the ice metls.

In the Himalayas where the southern slopes are protected from cold northerly winds and accessible to the south-west monsoon, the climate is slightly better. Heavier rainfall is received on the slopes with a good exposure to the south and at a height of 1,067 - 2,286 m above sea level. Sheltered valleys and higher slopes receive less rainfall.

The amount of rainfall also increases towards east, Srinagar receives 66 cm, Simla 155 cm, Mussoorie 222.5 cm and Darjeeling 321 cm. Lower slopes of the Himachal ranges and the Siwaliks are covered with dense forests, particularly in the east.

FLORA OF SOUTH ASIA

B. Cressey, a famous geographer has rightly said, 'Natural vegetation is the single summery of physical environment of any place, because it reflects the temperature, rainfall, humidity, height and soil of that place.' The

plant growth of any place depends on the temperature, precipitation, humidity etc factors.

As far the South Asia is concerned, there is great diversity in terms of temperature, rainfall, humidity, soil, height and topography etc physical factors. All these physical characteristics are reflected on the type, intensity and distribution of natural vegetation. In Maldives, almost all Sri Lanka, Western Ghats and north eastern India have thick forest of evergreen type of trees. These dense forests have many kinds of hard-tall trees. But as we go westward in India the forests are dominated with decidaous trees which gradually changes into Acasias like thorny trees and thorny scrubs. In Himalayas the Terai zone has marshy and dense evergreen forest, but as the height increase the type and variety of trees changes from broad leaved trees to coniferous tress to grasslands upto permanent iceline. There is lack of vegetation in rainshadow area. After this brief introduction some schemes of floral regionalisation are presented here.

Hooker in 'The Imperial Gazetteer of India' (1907) divided Indian subcontinent into nine botanical regions, using the number of species of ten largest families in each region as the most important criterion for his classification.

These regions are: -

1. The Eastern Himalayas from Sikkim to Mishmi hills in Upper Assam,
2. The Western Himalayas (from Kumaon to Chitral),
3. The Indus Plain including the Punjab, Sindh, Rajastan, west of Aravalli and Yamuna, Kutch and Northern Gujarat,
4. The Ganga Plain from Aravalli hills and Yamuna to Bengal (Bangladesh), the Sunderbans, plain of Assam and plains of Orissa (Mahanadi basin),
5. Malabar, the humid belt of hilly tract along the Western Ghat including south Gujarat, Konkan and Maldives and Laccadives islands,
6. The Deccan, the comparatively dry elevated tableland of the Peninsula, east of Western Ghat, south of Great Plains,
7. Ceylon (Sri Lanka) and Maldives,
8. Burma,
9. Malaya Peninsula.[20]

Hooker was not sure about where to place Andman and Nicobar islands. However, the delimitation of sharp botanical boundaries in these different political states

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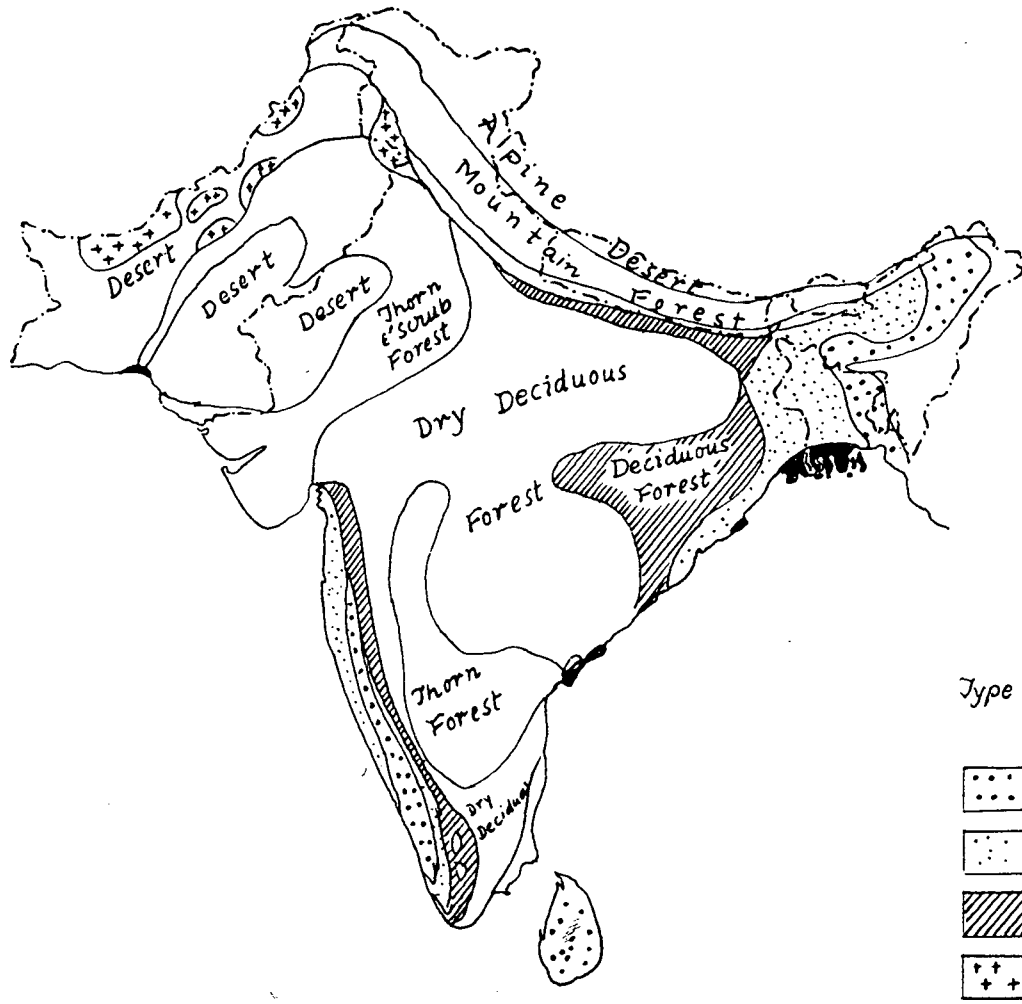
20. Maheshwari, p, Dr. Sengupta, J.C, Dr. Venktesh, C.S ; from The Gazetteer of India, Vol. I, Publication Division, Ministry of Information and Broadcasting, New Delhi, 1965.

SOUTH ASIA

NATURAL VEGETATION

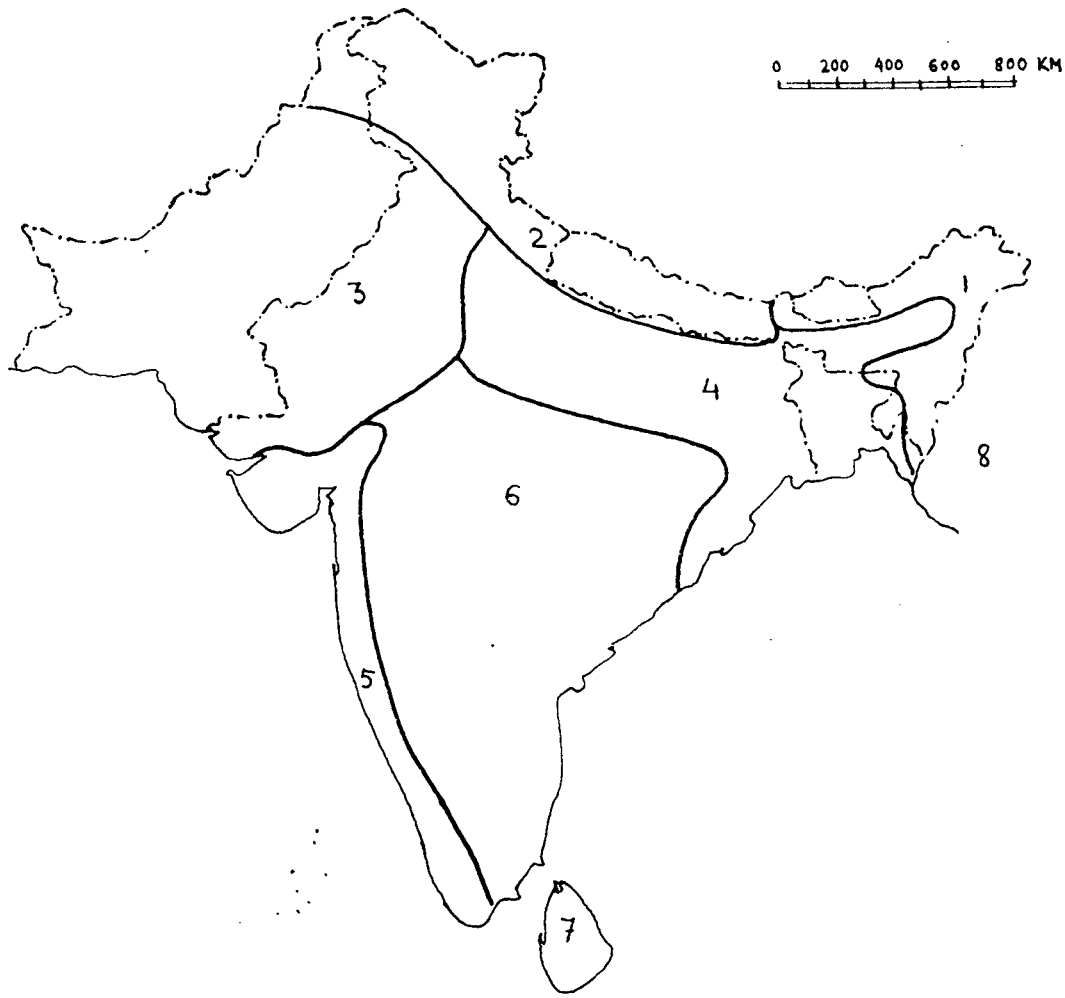


Source: Stamp, L.D : Asia : 1958 p. 228
(This map is based on the work of H. G. Champion, published in Indian Forest Records, New Series, Vol. 1, 1936.)

INDIAN SUBCONTINENT

Botanical Regions

(After Hooker)



1. The Eastern Himalayas - From Sikkim to Assam
2. The Western Himalayas.
3. The Indus Plain
4. The Ganga Plain including plains of Brahmputra & Mahanadi
5. Malabar including Southern Gujrat to Cape Comorin
6. The Decan & Rest areas
7. Ceylon (Sri Lanka) & Maldives
8. Burma
9. Malaya Peninsula.

This scheme was published in 'The Imperial Gazetteer of India' 1907.

is very difficult due to many coincidences, overlaps and transitions.

Calder (1937) recognised only six main botanical divisions of Indian subcontinent.[21]

1. The North West Himalayas,
2. The Eastern Himalayas,
3. The Indus Plain,
4. The Ganga Plain,
5. The Deccan,
6. The Malabar.

Chatterjee (1937) divided India into eight regions excluding Nepal and Pakistan.[22]

1. Deccan, 2. Malabar, 3. Indus Plain, 4. Ganga Plain, 5. Assam, 6. Eastern Himalayas, 7. Western Himalayas, 8. Andaman and Nicobar islands.

The most acceptable schema is presented by the Gazetteer of India (1965) in which India is divided into eight botanical regions. Since there is no sharp demarcation, so we can apply it into adjacent areas also. The regions are

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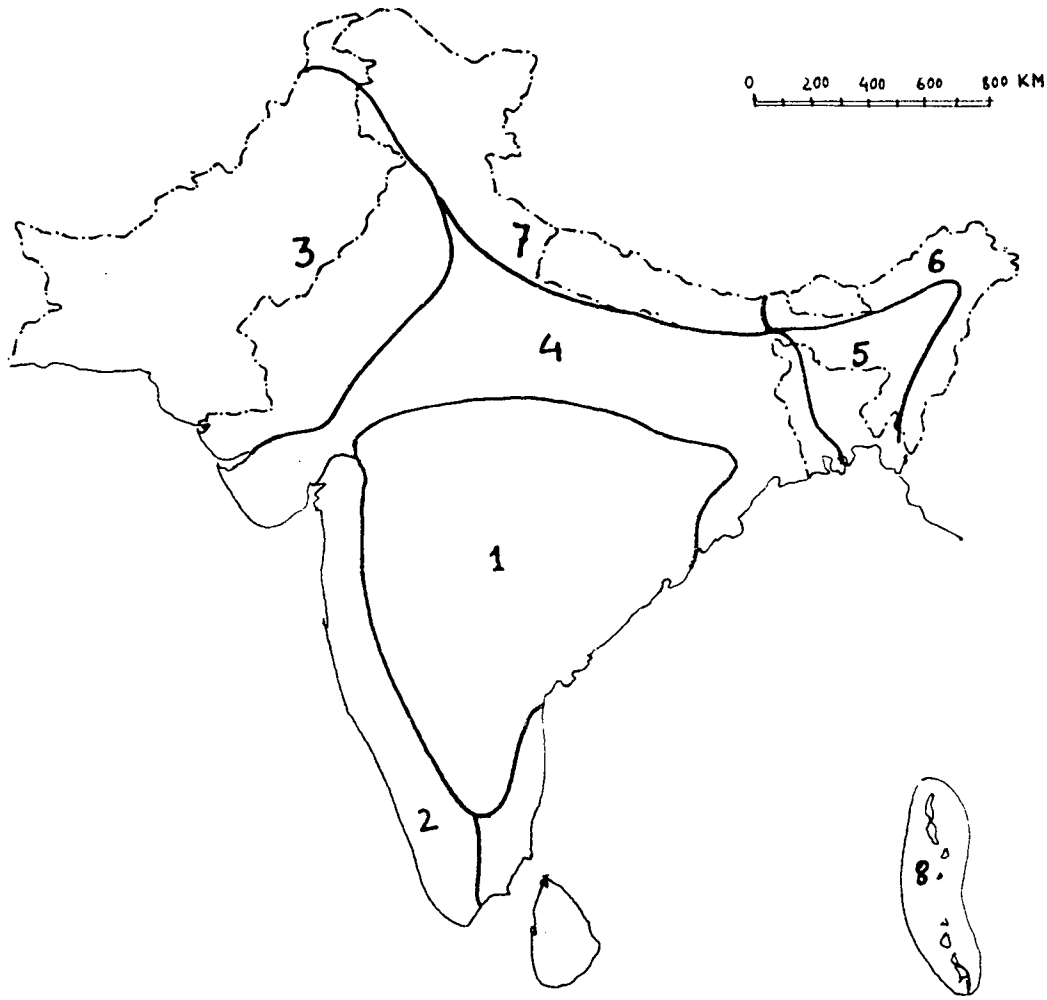
21. Ibid, p. 215.
22. Ibid, p. 215.

INDIAN SUBCONTINENT

Botanical Regions



1. The Deccan Region
2. Malabar Region
3. The Indus plain Region
4. Ganga Plain
5. Assam Region
6. Eastern Himalayan Region
7. Western Himalayan Region
8. Andman & Nicobar Region

Source: The Gazetteer of India, Vol 1. p.p. 216-219 (1965)

described briefly as follows:[23]

1. The Deccan region: It comprises the entire comparatively dry, elevated tableland of the Peninsula, east of Malabar and south of Indo-Ganga plain. The hills of the Vindhya and Eastern Ghats fall in this region. The Coromandal Coast (Orissa) may be considered as a sub region which receives more precipitation than the rest of region. Over the greater part of the Deccan region, the rainfall is less than 100 cm and this amount is exceeded only in certain elevated parts which intercept the monsoon currents. Various kinds of plants including palms, casuarina, broad leaf trees and thorny accassia are found here. The density of plants varies from dense forests to grasslands.

2. Malabar region: It comprises the excessively humid belt of mountain country running parallel to the west coast of the Peninsula. It is mostly a hilly country and except in the north, the mountains often rise abruptly from the flat coasts of Arabian Sea. Its abrupt western face is clothed with luxuriant evergreen forest merging towards the drier north into the elements of Deccan and the Indus plain floras. The eastern facing slopes gradually merges into Deccan plateau, but there

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23. Ibid, pp. 216 - 19.

are many spurs and valleys extended far into Deccan plateau with Malabar flora.

The plants include evergreen hardwooded, broad leaved trees, palms, betelnut, coconut, palmyra, pepper, coffee, tea, rubber, cashewnut etc.

3. The Indus Plain region comprises the plains of Punjab, Rajasthan, Sindhu, west of Aravalli and Yamuna, Kutch and northern Gujarat and whole plain in Pakistan. It receives less than 75 cm of precipitation and gradually becomes dry (less than 12 cm per year). The main plants include palms, accassias, cactus and various types of thorny bushes. The region is poor in endemic flora.

4. The Ganga Plain stretches from Yamuna and Aravalli to Bengal (and Bangladesh) including the Sunderbans and the low country of Orissa, north of Mahanadi river. The bulk of this tract has been under cultivation from very early times. The forests, wherever they exists, are of widely different types. This region can be subdivided into Upper, Middle, Lower and Delta regions on the basis of rainfall, where the variety of vegetation also changes according to rainfall.

5. Assam region comprises Brahmaputra and Surma valleys together with the intervening hill ranges - the Garo, Khasi, Jaintia, Nowgong, Naga, Patkai, Manipur and Lushai hills. The rainfall is very high (above 200 cm with extemely high in Cherapunjee area). The vegetation is luxuriant where they are not under tea or agricultural cropes, are clothed with expanses of tall Savanah grass or with dense evergreen or semi evergreen types of forest.

The hill forests of Assam regions approximate in types to those of the Eastern Himalayan region except that there is no Alpine zone. These hill forests can be subdivided as evergreen broadleaved and pine forests and bamboo forests. Shifting cultivation (jhum) has destroyed much of the natural forest growth of these hills and converted into barren wasteland and grassland.

6. Eastern Himalayan Zone extends from east of Sikkim to Bhutan and Arunachal Pradesh. This is the most of humid portion of Himalayan range. They are relatively lower, warmer, more humid than west Himalayas and have higher snow and alpine line. It has been estimated that there are about 4,000 species of flowering plants found in this region of which 20 are palms. The main plants are laurel, mapeles, alder, birch, conifers etc. The confifers occur above 2742 m and alpine zone from

3657 m to 4876 m.

7. Western Himalayan Zone: They are colder, drier, higher than eastern. The rainfall varies from 100 - 200 cm. The Inner Himalayas are dry. The submontane zone upto 1524 m contain an almost continuous belt of Sal forest with breakage of Savanah grasses. The termperate zone extending from 1524 m to 3657 m contains extensive forests of conifer and broad leaved temperate trees; Deodar, Bluepine, Spruce, Silver fir, Cypress, Popler, Elm, Alder, Birch, Cornus etc. The Alpine zone extends from the upper limits of the temperate zone to about 4572 m or sometimes higher. The main trees are Silver fir, Silver birch, Juniper etc.

8. Andaman and Nicobar Islands are regions of heavy rainfall and high temperature. The islands are lush green. The trees are evergreen, semi evergreen and some of deciduous varieties. There is dominance of mangrove trees.

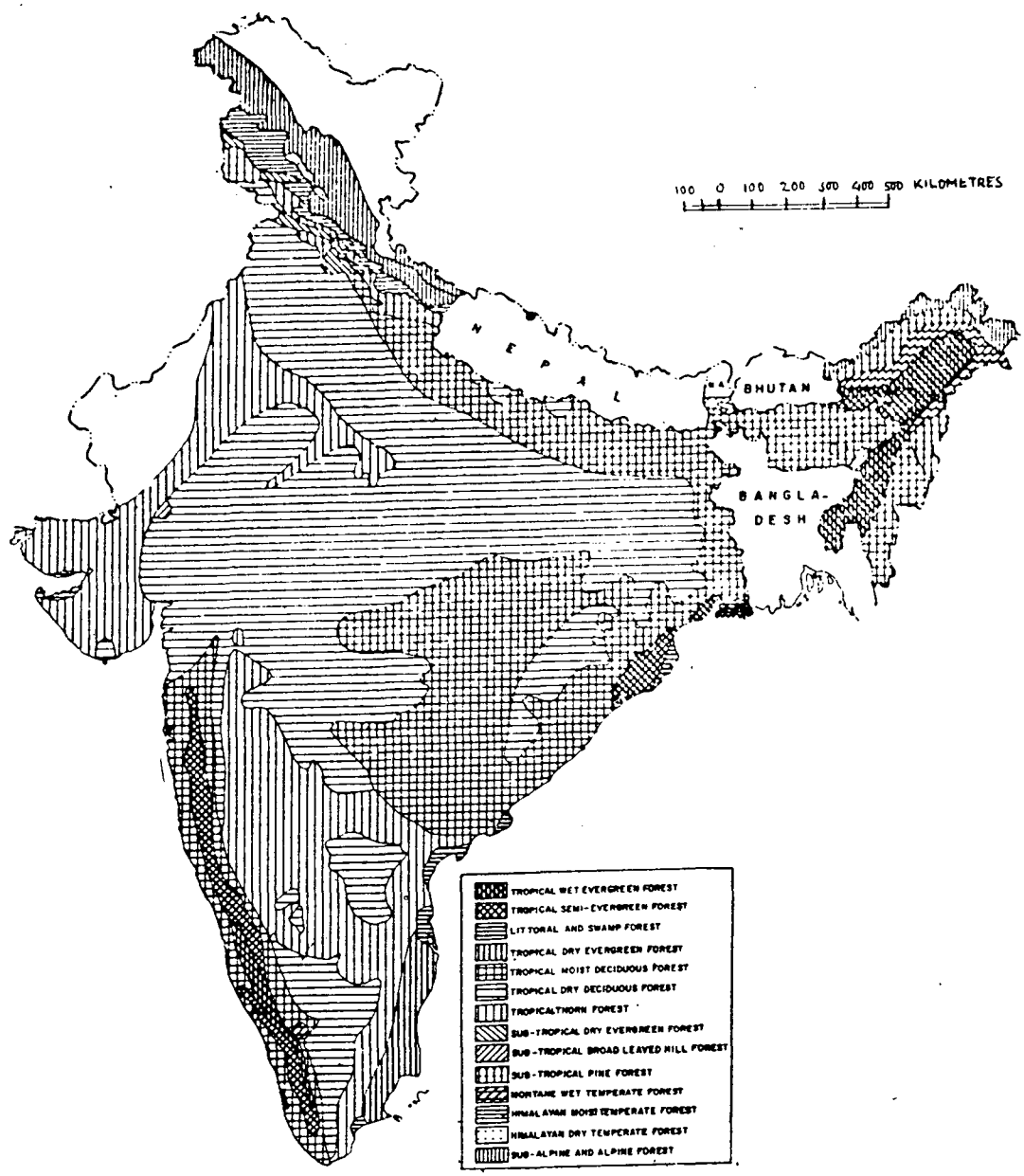
Broadly, we can say that the physical, climate and floral characteristics of India vary enormously and many different kinds of habitats are found here.

The different regions have some certain specialized fauna, because the animals in particular environment have developed special adoptions. Thus we have cave

fauna, desert - torential stream - mangrove swamp - estuarine - backwaters - ponds - lake - littoral or beach - hot springs and relict fauna. As Roonwal (1959) has pointed out, 'The fauna of India extemely varies. It comprises all the major groups of the animal kingdom. Nearly 76,000 species of animals have been listed here and they form 8.2% of known world species'.

INDIA

NATURAL VEGETATION



Map No. 10

(Table: 1 State-Wise Details Of Area Under Forest Cover (1981-83) As Assessed By Forest Survey Of India.

Name Of State/UT	Geographical area(km^2)	Forest Cover (Km^2)	Percentage Area Under Forest Cover to Geographical Area
1. Andhra Pradesh	276020	50194	10.13
2. Arunachal Pradesh	83580	60500	72.30
3.Assam	78580	26386	33.57
4.Bihar	173880	28748	16.53
5.Goa (Including Daman& Diu)	3810	1285	33.72
6.Gujarat	195980	13570	6.92
7.Haryana	44220	644	1.46
8.Himachal Pradesh	55670	12382	23.14
9.Jammu& Kashmir	222240	20880	9.39
10.Karnataka	191770	32264	16.82
11.Kerala	38870	10402	26.76
12.Madhya Pradesh	442840	127749	28.85
13.Maharashtra	307760	47416	16.41
14.Manipur	22360	17679	79.06
15.Meghalaya	22490	16511	73.41
16.Mizoram	21090	19092	90.52
17.Nagaland	16530	14351	86.82
18.Orissa	155780	53163	34.13

(Table:1)
(Continued from previous page)

Name Of State/UT	Geographical area(km2)	Forest cover (km2)	Percentage Area Under Forest Cover to Geographical Area
19. Punjab	50360	760	1.50
20. Rajasthan	312210	12478	3.64
21. Sikkim	7300	2839	38.89
22. Tamil Nadu	130070	18380	14.13
23. Tripura	10480	5743	54.79
24. Uttar Pradesh	294411	31443	10.67
25. West Bengal	87850	8811	10.03
26. A & N Islands	8290	7603	91.71
27. Chandigarh	114	2	1.75
28.Dadra & Nagar Haveli	490	237	40.36
29. Delhi	1490	15	1.01
30. Lakshadweep	30	-	-
31. Pondichery	492	18	1.62
Total	32,87,797	642041	
Percentage of geographical area			19.52 %

Table: 2 Statement Showing State/UT-Wise Forest Area 1984-85

S. No.	States/Uts	Geographical area (000 ha.)	Forest area ('000 ha.)	% of forest area to geographical area
1	2	3	4	5
1.	Andhra Pradesh	27507	6377.1	23.18
2.	Assam	7844	3070.8	39.15
3.	Arunachal Pradesh	8374	5154.0	61.54
4.	Bihar	17388	2922.3	16.81
5.	Goa, Daman & Diu	381	125.0	32.81
6.	Gujarat	19602	1881.9	10.42
7.	Haryana	4421	168.5	3.81
8.	Himachal Pradesh	5567	2132.5	30.30
9.	Jammu & Kashmir	22224	2089.2	9.40
10.	Karnataka	19179	3864.4	20.15
11.	Kerala	3886	1122.2	28.88
12.	Madhya Pradesh	44345	15541.4	35.05
13.	Maharashtra	30769	6405.5	20.82
14.	Manipur	2233	1515.4	87.86
15.	Meghalaya	2243	851.4	37.96
16.	Mizoram	2108	1593.5	75.59
17.	Nagaland	1658	289.9	17.48
18.	Orissa	15571	5955.6	38.25

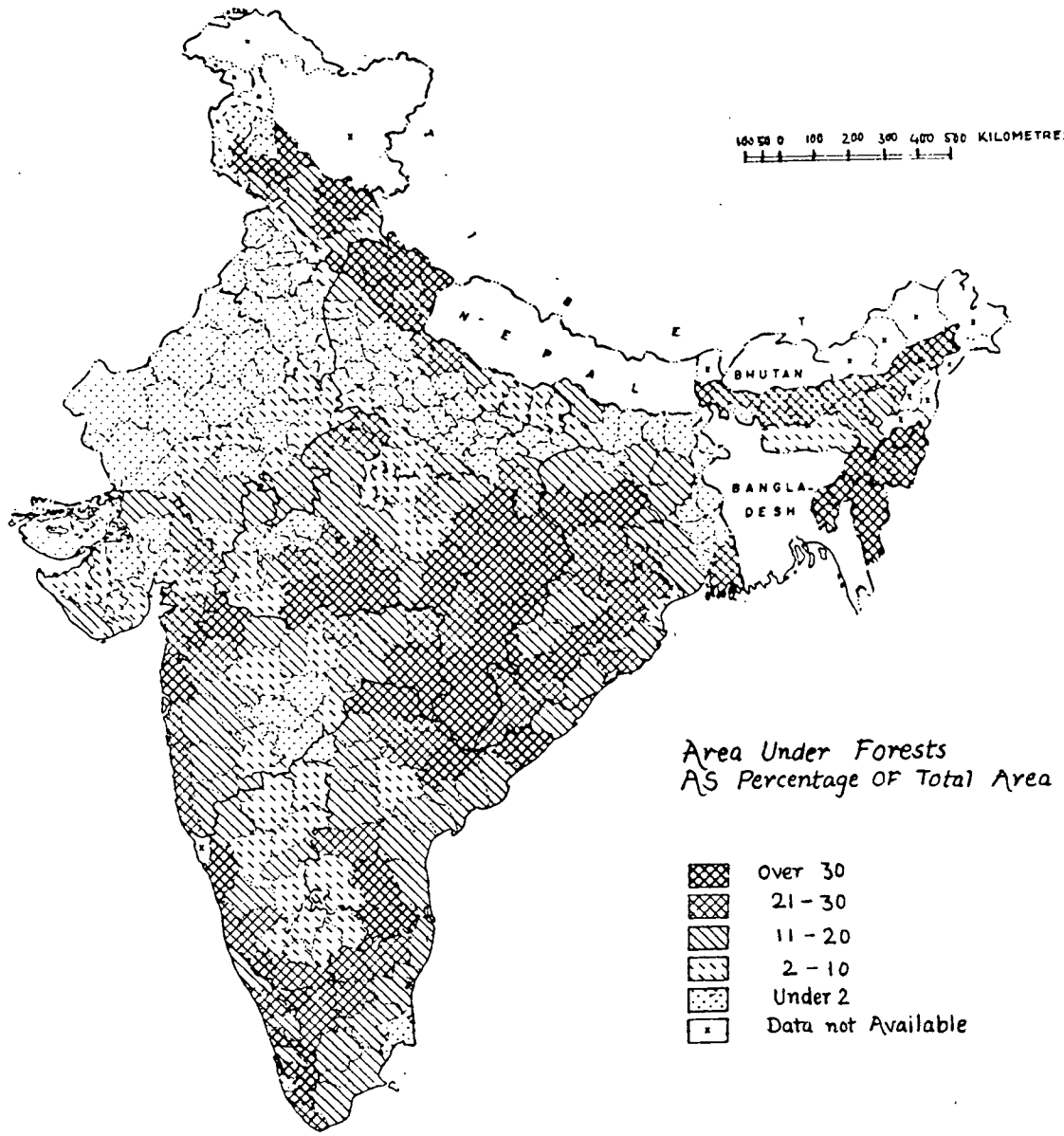
Tabe: 2

(Continued from Previous page)

19. Punjab	5036	280.3	5.57
20. Rajasthan	34224	3129.0	9.14
21. Sikkim	710	265.0	37.32
22. Tamil Nadu	13006	2231.6	17.16
23. Tripura	1049	630.9	60.14
24. Uttar Pradesh	29441	5121.3	17.40
25. West Bengal	8875	1187.9	13.38
Union Territories			
26. A & N Islands	825	714.4	86.59
27. Chandigarh	11	-	-
28. Dadra & Nagar Haveli	49	20.3	41.43
29. Delhi	148	-	-
30. Lakshadweep	3	-	-
31. Pondichery	49	-	-
Total	328726	74641.2	22.71

INDIA

AREA UNDER FORESTS



Map No. 11

CHAPTER II

HISTORICAL PERSPECTIVE ON WILD LIFE

eologically India (the Peninsula) is one of the most ancient blocks of the world. It has evidence of advents of all kinds of flora and fauna. The Himalayas and Plains also have evidences of origin, development (and extinction also) of various kinds of plants and animal life. In this chapter the historicity of animal kingdom is described. The flora of ancient life are also relevant to know, before knowing the historicity of animal life.

FLORA OF ANCIENT PERIODS

eninsular India is one of the most ancient shield of world. Except for few small places like Talcher, the landmass always enjoyed warm climate, even during the glacial period of Pliestocene epoch. So the warm humid climate provided sufficient opportunity for growth of a variety of vegetation. The rift valleys of Godavari-Verdha, Damodar and Son rivers show the luxuriant vegetative growth during Permo-Carboniferous period, which were transformed into thick layers of coal in these valleys.

Indian subcontinent has been one of the important cradle of river valley civilization. The ancient Indus Valley Civilization and later on Ganga and other river valleys also paved path of Indian civilization. All types of world's races - Negritoes, Australoids, Mediterraneans, Caucasoids, Nordics and Mongaloids all have lived here. In Indus valley civilization many tablets and other evidences show that rice, wheat, barley, cotton, sugarcane etc were well known and cultivated there. Many plants yielding food, wood and fibres were known to the ancient Hindus. Several others were recognised due to their real or imaginary properties in the treatment of the diseases of man. Even today, amongst the primitive people the tribal ojhas are better acquained with wild plants of the neighbourhood.

Early Hindu scriptures like Vedas, particularly Ayurvedas, Charak Samhita, Sushrut Samhita, Aranya Purana etc deal with the plants mainly in relation to their use in medicine, agriculture and horticulture. Many vaidyas, doctors and physicians are still known in history, e.g., Bhiksu Atreya, his disciple Jivak (physician of Bimkisar of Magadha), Dhanwantri, Nagarjuna etc.

The science of Arboriculture, Horticulture and Silviculture were highly developed in Ancient India. Methods of plant propagation by seed, cutting, layering, grafting and budding

were prevalent and are mentioned in Vedas, Arthsastra and Brihat Samhita.

Since the population was less and land was prosperous, so famines were few. People were growing adequate quantities of wheat, barley, rice, sugarcane, legumes like pea, gram, mung, masur and fruits like mango, jack, date, banana, apple, water-melon, orange etc. Among spices ginger, black pepper, cardamom, tamarind, onion, garlic etc were well known with their properties. India was far ahead in clothing and even Indian clothes have been found on the mumy of Egyptian pyramid. It clearly shows that people were well known of cotton, sunhemp, semal etc. For colouring and beautification Mehandi, Camphor, Sandlewood, various flowers and plants etc were used.

The historic evidences show that due to extreme exploitation of Indus valley, the region ruined into deserts. Many places, for example Delhi, for example Delhi was densely forested during Mughals who were hunting lion and tiger etc, which appears unbelievable today. The names of many places denotes forests, e.g., Arrah in Bihar was Aranya (forest), Champaran was Champa-aranya (Champa forest), Saran was Sarang aranya. But ironically there is no forest at all in these places. However, upto Mughal period the forests were almost in status quo,

but the Britishers, who introduced various modes of transportation like railways, roadways, who developed many urban places and who began plantation agriculture especially tea and coffe in Assam, Darjeeling and Nilgiris, Apple and fruits plantation in UP and Himachal Pradesh, Himalayas ruined forests on large scale and many forest clad landscapes became naked today.

FAUNA OF PAST

Prehistoric Period : -

ince a large part of India is geologically old and the advent of flora took place in early times, so it is also but natural that the primitive biotic creatures like amphibolites, fishes etc born in this land - watermass. Geologically the peninsular landmass was almost stable and the sea transgression was restricted to few parts. On the other hand the present plains and parts of Himalayas were shallow seas, and a region of sedimentation, so the animal kingdom flourished in relative areas according to environment, and their development was also almost undisputed.

The remains of many extinct creatures have been discovered in the upper layers of Siwalik range and in other parts of the country, prove that there was a wonderful wealth of animal life during the tertiary period. Mastadona and

the great herds of elephants of many species were wandering in swamps and reedy forests of this region. Various kinds of Hippopotamous, Rhinoceros, four horned ruminant of Sivatherium were also living with them. There were troops of giraffes, large and pygmy horses, camels, herds of wild oxen, buffaloes, bison deer, many kinds of antelopes, wild pig and pig like creatures. Further the fossil beds reveal the existence of Chimpanzees, Orang-Utans, Baboons - Langurs and Macaques. The beasts of prey included a type of Cheetah, Sabre toothed tigers and various large and small felines, wolves, jackals, foxes, civets, martens, ratels and others. The bears were represented by a species similar to our sloth beer. The rodents were of various genera including bamboo rats, mole rats, porcupines and hares.[2]

Thus the fact emerges that there was a wonderful variety of species in remote past. Though our records are incomplete, yet it is told by the paleantologists that there were eleven species of elephants and mastadons lived in various epochs in the Siwaliks as compared to single form we have now. There were six different species of rhinoceros and several representatives of wild boar, some of gigantic dimensions. the beasts of prey were also more numerous than those now living in that region.

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2. Prater, S.H ; The Book of Indian Animals, (Bombay: Bombay Natural History Society,1971), pp.13-14.

However, the phenomena of extinction is not only the case with India, but of all parts of the world and countries.

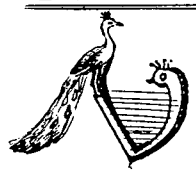
Prior to pliestocene period, as geologists believe that the northern countries and continents enjoyed almost warm or tropical climate, but due to a change in climate and other causes, all those forms of life which were unable to adapt themselves to changing conditions perished or migrated southwards.

During pliestocene period the climate of Europe turned cooler into ice age which brought Arctic climate in northern countries. It also produced glacial conditions in Himalayan region. Perhaps peninsula was not affected much, so the cold climatic conditions compelled the animals to adapt themselves to changing conditions to migrate or to perish. Some were able to react to the new conditions, many were exterminated, while others migrated southwards to colonize warmer tropical countries. Thus this explains the disappearance of numerous forms of animals of the northern hemisphere and the Himalayas. It also explains survival of their descendents in India and Africa.

Thus, the wild life of India is derived not only from the Indigenous species, but also from the descendents of ancestors that migrated into India from other places. Thus,

the present stock of animals in Indian subcontinent is composed of an admixture of Indian, South-East Asian, Ethiopean-African and European elements.

Wild Life : From Past to Present



edas which are considered as the most ancient scriptures of world, reflect the socio-economic, as well as animal life of that period. There are about 30 different mammals mentioned in Vedas. Other religious books like Aranya Puranas, Samhitas, Brahmanas etc described about various animals related to gods-goddesses. Kautilya's 'Arth Shastra' refers to the 'Abhyaranya' or forest sanctuaries where animals could roam about without fear.

The oldest record we have, is the Fifth pillar edict of Great Ashoka by which game and fishery laws were introduced in Northern India in third century B.C. In this inscription the emperor had carved on enduring stone a list of birds, beasts, fishes and possibly even insect which were to be strictly preserved. The preserved mammals were bats, monkeys, rhinoceros, porcupines, tree squirrels, barasingha stags, brabiminy bulls and all four footed animals which were not utilized or eaten. The edict further ordains that forest were not to be

burned, either for mischief or to destroy living creature.[3]

Later on the Hindu and Buddhist rulers kept on the policy of non-violence and kindness to living creatures at varying level. Their love for nature and wild beasts can be seen in the great frescoes and murals of Ajanta-Ellora caves, where the elephants, horses, ducks and other animals have been depicted, as well as Lotus, many kinds of flowers, plants and creepers have been used for decorating the caves. Upto Harshawardhan (606 A.D), who was very kind person, the wild life and nature were treated kindly.

But after Harshawardhan, the Rajput rulers came into power, who were famous for their valour. Then the game became an important recreation of that time. However, their hunting did not influenced much the enormous quantity of wild life in Rajput period.

Turko-Afghan period was a period of unstability, so there is no clear evidence regarding forest and wild life. However, we get one reference about Shershah, who earned this

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3. The Edicts of Ashoka in Front of National Museum, New Delhi.

name from 'Farid' due to killing of a tiger.

Later on the Moghul emperors, who were also good sportsmen, displayed great interest in animal life of the country. Their writings, biographies are full of descriptions, some in detains of the animals, plants and flowers of the country over which they ruled.[4]

Abul Fazl in Ain-i-Akbari has thrown light on hunting of animals. He had linked hunting as a means of knowledge, as he described, 'Superficially, worldly observers see in killing an animal a sort of pleasure .... But deep inquirers see in hunting a means of acquisition of knowledge. This is the case with His Majesty.* He always makes hunting a means of increasing his knowledge, and besides, uses hunting parties as occasion to inquire, without having first given notice of his coming, into the conditions of the people and the army'. For tiger hunting a large cage of iron rods was made and was put in places where tigers were frequent. The door was left open in such manner that a slightest shaking could close it. Within the cage they put a goat. As soon as the tiger was entering he was caught. The

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4. Prater,S.H ; op cit., pp. xvi - xvii.
* (Akbar)

poisoned arrow was also used. Many other methods were also described in this book. Elephants were being catched by 'Kheda or Chor Kheda' method, or was caught in deep ditches. Leopards were trained for hunting and about two hundred keepers were in charge of leopards. Abul Fazl has also thrown light on the hunting of deer, buffalo and many birds.[5]

While Babar, Humayun, Akbar and Aurangzeb have shown their love in nature in their writings, Jehangir was a born naturalist. He himself got built many parks in his kingdom including famous Shalimar-Nishat in Kashmir. It is said of him that had be been the head of a great National History Museum instead of being the emporor of India, he would have been a better and happier man. His profuse and engrossing memoirs are a real natural history of the animal life of India.

The Britishers brought about great changes in the status of wild life. The population began to increase. Economic exploitation of land, forest and water began to increase. The population pressure demanded more land. The frontiers of wild life began to recede rapidly. The animals and birds were plenty in India during the Moghul period and in early days of British

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5. Allami, Abu-L-Fazl (Trans. by H.Plochmann) ; Ain-i-Akbari, (Delhi: Aadiesh Book Dept, 1871), pp.292-297.

rule in India. After the advent of Britishers the decline in number of wild life started. This rate increased rapidly from about the middle of the 19th century with the increase in the number of sporting weapons and lare bore rifles in 1840, and the express rifle in 1860. The early British army officers, tea planters and civil servants were, in many cases, heavy despoilers of game. The records prove it. Eighty lions were shot by one cavalry officer in Kathiawar in those days, today there is no lion in that region. Fourteen lions were once shot in the Gir forest in one day. In Central India and Hyderabad two hundred and twentyseven tiger were killed by a British sportsman upto 1903 and one hundred forty seven by another in the Central Provinces during his service life. In the Oriental Sporting Magazine of 1976 it is recorded that a sportsman in the Bengal Doars fired about one hundred shots at rhinoceros in one day, killing five and wounding more than twentyfive. F.B.Simson, author of 'Sport in East Bengal' shot five to six hundred tigers in twentyone years in India, towards the end of last century.

This infection of brutality also spread to then ruling princes. Maharaja Nripendra Narayan of Cooch Bihar shot down more than 370 tigers, 208 rhinoceroses, 430 buffaloes, 324 barasingha deer and many other animals between 1871 and 1907. The Maharaja of Rewa shot 616 tigers during his life-

time while Maharaja of Surguja holds the record with 1116 tigers.

The destruction was not confined to mammals and to tigers in particular but other creatures also. In Kashmir, one sportsman accounted for 58,613 wild fowl between 1907 to 1917. In 1938 Shoot at the Keoladeo Ghana Sanctuary at Bharatpur for then Viceroy Lord Linlithgow, 4273 ducks and geese were killed, the viceroy himself fired 1900 shots.[6]

The Asiatic Lion (Panthera leo) is seen only in the Gir forest in Saurashtra, Gujarat. In olden times the Asiatic Lion was quite common in the Middle East, from Asia Minor and Arabia through Persia to India. A century ago it ranged from western to eastern India. At the turn of the century, it was extinct from all its range, and only a dozen animals were left in Sasan Gir. The rulers of Junagadh discouraged shooting of the animal, and rigorous protection saved the Asiatic Lion from total extinction. The first census in 1937 revealed 237 lions in Gir forest. Consequent censuses in 1950, 1955 and 1963 revealed 219 to 277, 290 and 285 animals, respectively. In June 1968 a sharp decline in the population was noticed, which came to only

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6. Stracy, P.D ; Wild Life in India, Its Conservation and Control, (New Delhi: Ministry of Food and Agriculture, Department of Agriculture, Govt. of India, 1963).

162. The present population is estimated to be 205. The Cheetah or Hunting Leopard (Acinonyx jubatus) extended to greater part of Africa through the arid countries of southwestern Asia to India, but is now extinct in India. About a century ago, it was common in the arid tracts of western Asia, but is now extinct from this area. In India it occured in low hills and plains of northern, central and southern India, south to Karnataka. The last known Cheetah in India was taken in 1952. The destruction of habitat and consequent decline of its prey species, together with its snaring for use in hunting and high mortality among cubs, contibuted to its extermination in India.

The Clouded Leopard (Neofelis nebulosa) ranges from eastern Nepal through eastern Himalayas to Burma. It is more elusive than rare due to its nocturnal and arboreal habits. It has been subjected to great persecution for its decorated pelt. Widespread deforestation and opening up of the forests have done little to help the clouded leopard.

The Leopard Cat (Felis bengalensis) ranges in the forested regions of India from Kashmir and the Himalayas to Cape Comorin. It has of late become scarce, chiefly due to destruction of its habitat and persecution by man for its poultry-killing habit. The Musk Deer (Moschus moschiferus) occurs in

the wooded slopes and alpine zones of the Indian regions of the Himalayas. Exploitation for commercially important 'musk'has caused decline in its population in its entire range.

The Blackbuck or Indian Antelope (Antilope cervicapra) occurs in the plains from Gujarat to West Bengal and Punjab to the extreme south of India, but not in the western coast region nor in the forests and hilly areas. About a century back herds of 50 to 1000 animals could be seen in the countryside. But they have been ruthlessly hunted rsulting in greatly reduced number. Since the introduction of the Wildlife Protection Act, 1972, the population of this antelope has been increasing. Herds of the blackbuck can now be seen at the Velavadar National Park in Gujarat.

The Indian Wild Ass or Ghor-khar (Equus hemionus) is restricted in the Rann of Kutch in India. About 150 years ago, it used to roam about in thousands in the greater part of southwest Asia, from Iran to northwestern India. It was exterminated in Iran about 100 years ago, and, with the turn of century, from Jaisalmer and Bikaner (Rajasthan), Sind and Baluchistan(Pakistan). Its number estimated to be 5000 in 1946 declined to 860 in 1962 due to "surra" disease, and the present population is around 720.

The Golden Langur (Presbytis geei) occurs in the foothills along Assam-Bhutan border between Sankosh river in the west and Manas river in the east, extending north into Bhutan between these two rivers. Considered rare since its discovery, it is now believed to be thriving well in its small range of habitat. Latest census puts the figure at 20 troops consisting of 180 animals in Assam, and 67 troops comprising 1200 animals in Bhutan.

The Lion-tailed Macaque (Macaca silenus) is more or less confined to the Nilgiri, Annamalai, Cardamom Hills and to the Periyar Lake. The population has been gradually decreasing for the last 50 to 60 years. In 1967 it was estimated to be less than a thousand. In 1978 it was estimated to be 555 troops comprising 800 animals in Western Ghats. Since its distribution is localised within evergreen forests, loss of habitat to agriculture, coffee and tea plantation, replacement of forest trees by Eucalyptus and other trees are the major factors responsbile for the reduction in their number. Hunting the animal for fur, for food and the supposed aphrodisiac properties of its meat add up to the decline in its population.

Endangered animals are those which are in danger of disappearing from the face of the earth forever. They have been hunted in excess by man, and their habitats have been wantonly

destroyed by cutting the trees, draining the swamps, burning the grass, poisoning the environment and so on. Man hunts animals for sport, for feathers, fur, leather and food. Throughout the world he shoots, traps and poisons wildlife without a thought for the future.

During world wars especially during the Second World War the military control was expanded due to interior rebel and outer aggression. The military in frontier provinces and police in interior remove all kinds of obstacles. The result was that they killed the animals and birds indiscriminately for the sake of food, pleasure or removal of fearness. This was the period when wild life was swept away and many genera were extincted by people.[7]

When India became independent, our prime objective in first Five Year Plan was to grow more food to get self-sufficiency in food grains. In action vast areas of jungles, wherever it was possible, cleared to provide new food producing areas. Government also provided guns liberally for crop protection against animals and birds. On the name of crop protection the guns were handed to wrong hands. This period of

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7. Sankhala, Kailash ; Wild Beauty, (New Delhi: National Book Trust, 1973), pp. 18 -22.

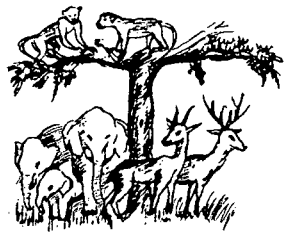
'grow more food' caused heavy depletion of wild life stocks in many parts of India. In this period it appeared to be a major clash between wild life use and human use of land for cultivation. In early days of Independence the cultivators were merely given the right to protect their crops and livestock from wildlife. But gradually the number of 'pseudo' crop protecter gun holder or 'meat-hunter' and the Shikari increased. So it became essential for government to formulate more dynamic policy of management in the forests. Including other laws, the Wildlife (Protection) Act, 1972 is important instrument of government to control poaching and illegal trade in wildlife.

No matter what brilliant achievements future gererations may attain in the realm of science and technology, man will never be able to recreate the extinct animals. His ignorance and greed is threatening the very survival of several animal species. Many great man-made changes in the environment have been ill advised or have been accomplished without regard for long term consequences. We must realise that every form of life has its unique role to play and the disruption of the delicate environmental balance produces a chain reaction, the damage becoming accelerated and getting out of control, until it threatens

the health and happiness of man himself. Conservation of our forests and wildlife is not a luxury but a vital investment for our own survival.

CHAPTER III

SPATIAL PATTERN OF WILD LIFE



There are about 500 different species of mammals, more than 2000 species of birds and many species of fish, reptiles and amphibians in Indian subcontinent. There are, in addition, more than 30,000 forms of insects.[1] All these species play their important part in maintaining the biological cycle of subcontinent.

There are various schemes developed by scholars for classifying the wild life. Some scholars have classified them according to class and family, e.g., Mammals, Reptiles, Amphibians etc which are further divided into subclasses and genera, then their locations over space. Such classification can be proceeded on in many steps.

The first is the grouping of all individual animals together which are similar in some respects into species and genera, e.g., the domestic cat, wild cat, leopard, tiger and lion are closely allied to each other and so are

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1. Stracy, P.D ; Wild Life in India, Its Conservation and Control, (New Delhi : Ministry of Food and Agriculture, Department of Agriculture, Govt. of India, 1963), p.18.

considered separate species of genus 'Cats' and they are given both a generic and species names.[2]

In the second step the members of a species are divided into groups distinguished by certain family characters, e.g., domestic cats may be of Persian breed, or Manx, Siamese, Tortoise breed etc. These are called varieties of single species.[3]

Other criteria may be on the basis of morphology (external form and structure), anatomy (internal form and structure), histology (minute and microscopic structure), embroyology (the change in the organism from the egg to the adult stage) and systematic zoological manner which is based on natural classification of animals, e.g., the grouping of bats and whales which is based on the anatomy, histology and embroyology under Mammalia. This last type is like a geneological tree, in which Darwinian doctrine of organic evolution is accepted. In this doctrine it is believed that the present form of species descends from some pre-existing species.

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2. Ibid, p.32.

3. Ibid, p.33.

Some Bio-scientists have divided the earth into six zoo-geographic regions.[4] India with Southeast Asia forms part of oriental region. The Indian subcontinent has been divided into various zones, each with its characteristic types though the wild life of one zone merges imperceptibly into another and many widespread species cover more than one zone. They have divided this area into two main zones - the Himalaya and the Peninsula. The Himalayas have been further subdivided into Western Himalayas, Eastern Himalayas, Central Himalayas. The North-west portion of Indo-Pakistan, higher Himalayas of Nepal and Bhutan above tree line bolong to the Palæo-arctic region in the character of their fauna.

However, most of scholars have supported geographical classification than biological classification. They have described them according to the regions where they are found. S.H.Prater, former curator of Bombay Natural History Society had divided India into three regions; i) The Himalayas, ii) the Peninsula and iii) the Deserts. He subdivided the Himalayas into the forest zone, the western zone including Ladda-kh, the transition zone and the Assam and Northeast zone.

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4. Ibid, p.35.

Mr. Kailash Sankhla, a famous and authentic authority over wild life study has divided India into four regions - i) The Himalayas, ii) The Plains, iii) The Peninsula, and iv) The Deserts. His schema of wildlife distribution is more satisfactory and is also adopted in present description of distribution of wild life in India,[5] and adjacent areas of neighbouring countries.

WILD LIFE OF HIMALAYAS

he Himalayas extend in east-west arc shape curve for about 2400 km between gorges of Indus and Brahmaputra. Their width varies from 500 km in Kashmir to 200 km in Arunachal Pradesh, covering about five lakh sq kms. They have three clear ranges, the Siwaliks or outermost range with an average height varying from 600 to 1500 m, the Himachal or Lesser Himalaya with 1000 m to 4,500 m height and the Great Himalaya with average height 6,100 m. In northeast they more southward known as Purvachal. The trans Himalayan zone is cold desert due to its location in rain shadow. The variety and number of animals vary according to height which also affects temperature,

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5. Sankhala, Kailash ; Wild Beauty, (New Delhi: National Book Trust, 1973), pp. 29 - 31.

rainfall and vegetation of that particular place.

There is practically no vegetation above the permanent snowline. There are many green meadows and valleys between the snow-line or tree line which is called as 'Marg' in Kashmir such as Gulmarg and Sonmarg. In winter these meadows and valleys are covered with white blanket of snow, but as they melt, the beautiful green flowery meadows emerge out. These meadows are mixed with trees and small bushes like juniper and rhododendron and birch etc. On low altitudes the conifer forests exist with pines, spruce, fir, silver fir in some moist localities and favourable areas oaks, laurels, chestnuts and magnolias are common, while chir-pines are common in both wet as well as drier slopes.

In such environment the main animals are the Snow leopard, the Ibex, the Bharal, the Hangul, the Musk deer, the Marmot, the Goral, the Hare, the Red fox, the Himalayan Black deer, the Wolf, the Himalayan Weasel, the Common Otter, the Smooth Indian Otter, the Clawless Otter, the Martin, the Yellow throated and Pine Martin, the Himalayan Palm Civet and the Himalayan mouse. The Kiang , the Asiatic Wild Ass, the Marmot, the Yak (now domesticated) are mostly found in cold deserts of Laddakh.

The Lesser Panda is confined to the higher elevation of North Bengal and Sikkim.

All above mentioned animals migrate down from the mountains to avoid harsh snowy winter and go up in summer months.

The birds found here are Tragopan, the Moral, the Chir and Kalij Pheasants, along with Magpie both green and blue, the Crow and a host of colourful singing birds break the monotony of the valleys with their melodius calls.

The foothills region has undulating topography formed of earliest debris broght by the Himalayan rivers and deposited at the foot of the mountains. The vegetation changes from evergreen conifers to deciduous broad leaved forests of Sal, Shorea Robusta, Sain, Siris and other various species with climbers like Bauhinia Vahlii and Mimosa Himalayana. There are some flat lands, open grasslands where tall and coarse grasses grow wildly. Many times fire sweeps them. Some hardy trees like Semal, Siris, Amaltas grow in grasslands. The flat aggradational valleys are known as 'duns', such as 'Dehradun'. These valleys support rich Sal forests on the hills and other broad leaved forests in the bottom of valleys. The riverine islands, marshes and terai region have dense grasses (Sabai), Khair and Sissu trees. The region becomes very hot and

dry in summer in spite of heavy rainfall ranging 150 cm to 300 cm.

Since the region is formed of gravels, pebbles and sands, so the rain water quickly seeps into the ground as quickly as it falls. So, the wild life of area faces the problem of shortage of water and the animals take long walks along river beds in search of water pools.

The foothill zone has special importance for large mammals. The Samber, the Barking deer, the Chital, the Hog deer, the Wild boar are found hiding in tall grasses and forest growth during day and coming out in late evening or at night into the open grass. Their predators, the tiger and the common leopard hunt near water holes and open grazing grounds during the night. Elephants too are found in the western foothills in Lansdown, Ramnagar, Kalagarh and Bijnor forest of U.P., Cooch Bihar, Jalpalguri forests of West Bengal, Southern parts of Bhutan and the entire belt of north Assam and Arunachal Pradesh. The Gaur appears in these eastern forests and the wild Buffalo becomes common in the Manas sanctuary. The Rhinoceroses occur in the Jaldapara and Manas sanctuaries. The arborial mammals are the Martins, Bats and Primates. The Rhesus monkey is common near habitation and the Common Langur lives on tall trees in forest areas. Assamese monkeys have a stout appearance and a short tail, the rare Golden

langur are found in the eastern Himalayan forests of Upper Assam.

The north-eastern region of India is actually the junction of Indo-Chinese, Indo-Malayan, Peninsular and European fauna and supports the flora and fauna of three diverse geographical regions. The Indo-Chinese forms are represented by the Raccoon, the Hog Badger, the Crestless Porocupine and the Tragopan Pheasant. The Indo-Malayan forms are represented by the Tiger, the Clouded leopard, the Elephant, the Rhinoceros, the Hoolock, the Sun bear, the Binturong, and the Thamin deer. The oriental squirrel, the Gaur, the Sloth bear, the wild buffaloes, the Common langur, the Chital, the Barking deer, the Samber and a variety of cats including the common leopard and the jungle cats are the peninsular form. The European forms are represented by the black beer and a variety of birds.

Nearly 70% of mammals of Himalayas are found in Assam Valleys. The Jaintia, Garo, Khasi hills of Meghalaya are known for Black leopard, the Clouded leopard, the Marbled Cat, the Fishing cat, the Golden cat, a large variety of monkeys including the Stump taul, the Assamese monkey, the Capped langur, the Spectacled langur and the lower primates - the Slow loris. Tigers are found in tall grasslands, moist deciduous and sometimes even in evergreen forests. The Red jungle fowl, the Peacock, the Tree pie,

There are three clear levels of these three uplifted surfaces. The highest part is on the south-western part, an average height of 900 m, is called 'pat region'. The next level has a height of 600 m, which is divided by Damodar river, the northern part is known as Hazaribagh plateau and southern part is known as Ranchi plateau. The next outer surface has an average of 300 m which gradually decreases in east and north. The average height of Betla forest is varying from 240 m to 160 m.[7]

The main river of this system is North Koel river which originates in central Chotanagpur plateau at Gumla. It drains northward, met with 'Son' river, at a tributary of 'Ganga' at Garhwa (north of Daltongonj). Its tributaries are Aurenga (where coal seams are found), Kechaki, Amanat and Kanhar, which flow through the Betla reserve. These are rainfed rivers and generally get dry in summer. (Daltonganj is a region which experiences always severe drought).

However, these rivers provide excellent habitat for a large variety of wildlife. Since the topography is undulating, so the river basins are also undulating and full of rocks and

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7. Ahmad, Enayat ; Bihar : A Physical, Economic and Regional Geography, (Ranchi, 1965), pp.22-24.

stones, but after Betla forest it makes wide plain surface with sluggish water for long distance upto 'Son' river. One can enjoy the enchanting beauty of these streams, because railway line goes parallel to north Koel river for long distance.

CLIMATE AND NATURAL VEGETATION

The southern areas of Betla have a height above 600 m. They experience cool summer. The famous hill resort Netarhat has a height of about 900 m, and Ranchi, which was known as summer capital of Bihar has an average height of 610 m. But this is not the case with Betla. The altitude is around 150 to 250 m. It is surrounded by high hills in south and south-west, open towards north and north-east. So it experiences a hot summer and very cold winter. The Daltonganj which is only 25 km away, always experience loo, cold wave and severe drought due ot its position in rainshadow area. However, the hot wind from north west is modified in the forest, though day temperature is not less than 35°C in June. The nights are pleasant and temperature falls down substantially. Winters are severe and the region lies under the influence of cold westerlies. The monsoon brings good showers and average rainfall is about 125 cm annually. However, few patches are lying in rainshadow region and Daltonganj is

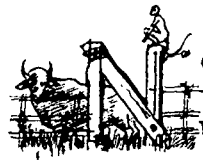
one of them. The winters are almost dry except for few cyclonic showers. To face the water problem in park, natural springs have been deepened, wells have been dug and other artificial sources have been provided.

Under such climate the natural vegetation developes is deciduous monsoon type. The forests are dry deciduous with park like appearance at many places. The main trees are Sal. Other trees are Bamboo, Semal, Shisham, Mahua, Bel, Karam, Teak, Khair, Kendu, Palas, Jamun, Koinar etc. All are deciduous in nature, they shed their leaves in late winter and during spring the new pinkish - violet - light green saplings, buds and leaves present an enchanting beauty.

The forests are open, not very dense with bush and scrubs undergrowth. At some spaces these are 'khas' grasses. But in summer the grasses also are shrinked to wet-shaded places and other places remain barren and dry.

'Bel' and 'Mahua' are popular among tribals as well as animals, especially the Sloth Bear. Mahua is distilled for liquor by tribals. Bamboo thickets are found more in south than in north. The tribal people use the seeds of 'Karanj' and 'Sal' for oil. The woods of 'Sal' and 'Teak' are well known for their durability.

WILD LIFE IN THE NATIONAL PARK



Not only Palamu, but whole Chotanagpur plateau was rich in wildlife, even the now extinct Cheetah lived there once. A.Mervyn Smith wrote in his 'Sport and Adventures in the Indian Jungle(1904)' : 'It is generally believed that the Cheetah is only found in the more open parts of the scrub jungle of central India, but I have killed them in the dense forest of Saranda in Chotanagpur. [8]

There are all the links of sound ecological food chain from herbivores to carnivores at the top. There is plenty of wildlife - wild elephants, rhesus monkeys, various species of deer, wild pigs, sloth beer, panthers and of course the tigers. According to the tiger enumeration of 1987, there were 54 tigers in Palamau reserve which was around half of total tigers of Bihar.[9] There is hope of increasing their number, because it is in contiguous to the forest of Ranchi and Hazaribagh. Elsewhere the tigers are found in isolated pockets in Bihar where seems no long term future. In Betla, especially

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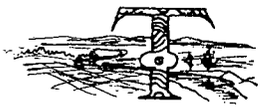
8. Quoted from Seshadri, Balakrishna ; India's Wildlife and Wildlife Reserves ,(New Delhi : Sterling Publishers Private Limited).

9. Annual Report of Ministry of Wildlife and Environment, Govt. of India, (New Delhi, 1988).

the Koel, the Cuckoo, the Oriole, the Hill myna, the Parrot, the Choloropsis, the Tit, the Painted partridge and the Green pigeon are the common colourful birds of the hills.[6]

WILD INHABITANTS OF THE GREAT PLAINS AND DELTA



he Indo-Ganga-Brahmaputra plains are extended parallel to Himalayas, in a length of about 2400 km and width varying between 500 km in Punjab-Rajasthan to around 200 km in Bihar. Bangladesh is almost totally deltaic formation. The height varies from 278 m in Delhi to sea level in Bangladesh. The average depth of these aggradational plains is 1300 - 1400 m. There is a 10 -15 km wide piedmont plains of gravel and unassorted sediments called 'Bhabar', 15 -30 km wide marshy tract of 'Terai', older alluvium deposited during the mid-Pliestocene and recent geological times called 'Bhanger' and newer alluvium called 'Khader'.[7]

The whole of great plains, especially the middle and western parts remained craddle of civilization since time immemorial. So much of original forests have been swept and turned

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6. Sankhala, Kailash ; Wild Beauty, (New Delhi: National Book Trust, 1973).

7. Sharma, T.C and Coutinho, O ; Economic and Commercial Geography of India, (New Delhi: Vikas Publishing House Pvt. Ltd., 1981).

into cultivated land. There are some remnants of the Sal and miscellaneous forests in parts of UP, Bihar, West Bengal and Assam. In Terai marshy land, the elephant grasses, cane and other grasses present Savanna landscape. Some evergreen species of trees also grow like Jamun, Siris etc. where cultivation has been not extended.

Common wild life found here are Chital, Samber, Hog deer, Wild boar, Swamp deer, Nilgai, Common leopards and Tigers. But the population of these animals has thinned in recent years.

On the west marshy Savannas on the bank of Brahmaputra are found the famous Great one horned Indian Rhinoceros, the Hog deer, the Swamp deer, the Wild boar, the Wild buffalo, the Python, the Kaziranga, Orang, Laokhawa and Manas sanctuaries. Even elephants and tigers are found in these sanctuaries and parks.

In Ganga and its tributaries the Dolphin and the Gavial live. The Crocodiles and Gharyals are found in the Jamuna and its tributaries, Gantak, Kosi, Narayani etc rivers. The Sunderban delta is famous habitat for estuarine Crocodiles and Dolphins, is also famous for Royal Bengal tiger.

In west great plains are dotted with natural vegetation of Accacia and Cappars and open grasslands, but most of them have been brought under cultivation. Due to over use, faulty methods of cultivation, overgrazing and lack of rain-water the wasteland is formed. The riverines with enormous gullies have turned the lands into bad lands. These lands are useless for agriculture and developed into tropical dry deciduous thorn forests in the central and western plains. Time has not gone much far when the Mughals hunted Lions, Speared wild boars, Black bucks and Chinkara near Agra and surrounding regions. However, Stripped hynas, Jackals, Palm civets, Small Indian civets and Porcupines are still common,even in the eroded ravines they live in burrows during the day and visit the outskirts of cities like Lucknow, Allahabad, Agra, Kanpur and Delhi in search of Kichen waste and poultry. These ravines were also the home of Indian wolf, their population has also declined. A small patch of forests near Bharatpur and Sariska still show the typical wild-life of western plains. Both are declared as sancturay where thousands of migratory Ducks, Teals and Cranes including Siberian cranes and other birds visit the plain every year.

There are many birds of Avifauna[8] which includes national bird Peacock, Cranes, Myna, Parrot etc. The reptiles are including various kinds of snakes, Crocodiles and Ghariyals etc.

WILD ANIMALS OF PENINSULA

The Peninsula plateau is the most ancient tabular block composed of Archaean gneisses and schists. It has an area of about 16 lakh sq km.[9] It is tilted eastward. The topography of this region comprises a series of large and small plateau and hillranges with many basins and valleys. The central part of Deccan plateau lies in the rainshadow area off Western Ghat and Nilgiris. So it has Savanna grasslands with Acacias, Babools and various types of thorny shrubs. The quantum of vegetation depends on the protection, e.g., dense evergreen forest on Western Ghat, deciduous monsoon forest of Sal, Mahogany and Abnoos in Bihar, Orissa, M.P., and Maharashtra. In farther south except in depressions where soil depth improves, the tree growth is stunted and consists of thorny Acacias, Zizyphyhus and Euphorbia bushes. In Southern rainshadow zone

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8. Sankhala, Kailash ; op cit., pp.34 -35.

9. Sharma,T.C and Coutinho, O ; op cit.

wherever soil and moisture conditions are sufficient for plant growth, dry deciduous thorny forests have developed.

In mixed forests the Nilgiri, the Samber, the Chital, the Chinkara, the Wild boar and their predators, the common leopards, even tigers are found. Other animals - Sloth bear, the Ratel, the Jungle cat and the Spotted cat etc. - enrich the fauna of forests.

The Gir forest of Junagadh district of Gujarat is the last shelter of the Asiatic lion which is now confined to about 140 sq km. Other animals of this forest are the Samber, Nilgai, Chital, Wild boar and four horned Antelope. The over-grazing by domestic animals has affected adversely the population of wild animals. This is why many times the lions either attack on domestic cattle or man.

The Central and Deccan plateau is a triangular tableland dissected by rivers to senile valleys. According to rainfall the vegetation changes from dry deciduous mixed miscellaneous forest to teak forest of southern Rajasthan, Gujarat - M.P. to evergreen multitiered forests of western ghats. The main animals roaming in these forests are the Samber, the Nilgai, the Chinkara, the four horned Antelope, the Barking deer, Hares, Porcupine, Wild boar, Tiger, Leopards, Jungle cats and Caracals.

Sloth bears are found in almost all the forests of south region. Rewa forest is famous for tigers. The present generation of white tigers are originated from the Rewa forests of M.P.

Elephants are found in Bihar, Orissa, Karnataka, Tamil Nadu and Kerala, but not in Andhra Pradesh, Madhya Pradesh and Maharashtra. The 'Gaur' has still wider distribution in these States. The Chital, Samber, Barking deer are common deer of these forests. The Swamp deer is now confined to small areas in Bastar and Mandla. The predators like Tigers, Leopards are very few.

The Rhesus monkeys are found in the north of Narmada, while south is dominated by Bonnet monkey. The common langur is widely found in forest. In western ghat they have darker complexion than north Indians. The Nilgiri langur and Lion-tailed monkeys are living on high branches of tall trees of western ghat. The long tailed Malabar quirrels and Flying squirrels are found in Malabar hills to Mudumalai.

As far the Avifauna is concerned, they are fewer than those of Himalayas and plains. However, there are various types of small and medium size birds are found in forsts. Various types of sea-birds and cranes are found on the Sea Coasts of Tamil Nadu and Trivandrum. Various types of Reptiles are

found here which include Lizards, Pythons, Crocodiles in lakes and rivers of parks and sanctuaries, various snakes - poisonous or non-poisonous[10] etc.

WILD LIFE IN DESERTS

The Indian desert plains include Marusthali and adjoining Bager areas to the west of Aravalli covering an area of 1.75 lakh sq km. In south and western parts have mostly 'Longitudinal dunes', whereas in the eastern and southern parts 'barkhans' and 'transverse dunes' are common.[11] The grasslands of Bager lies in north east to south west direction along Aravalli bounded by 25 cm isohyets. Though on south and south eastern part of Aravalli deciduous forests are found, because the rainfall is sufficient. But in transition zone, where the rainfall is scarce and uncertain, only scrubs and thorny bushes are found. As a whole the desert region is very poor in vegetation.

But the wild life potential is very rich. Wherever the protection is given, they survive faster than

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10. Sankhala, Kailash ; op cit., pp. 37-39.

11. Sharma, T.C and Coutinho, O ; op cit.

other area. The best example is seen in Barmer, where Bishnoi tribe give full protection to deer as their tradition. Many years ago Bhimajee of this tribe started protecting the deer and now the deer survive in large numbers.[12]

The Blackbucks, Nilgai, Chinkara, Wild boars are in protected pockets of Bikaner, Jodhpur, Churu in Rajasthan, parts of Kutch and Bhavnagar in Gujarat. The Wild Ass which is in danger of extinction, is found in the Kutch of Rann. In sandy areas the Wolves, Hynas, Jackals, Porcupines, Desert cats, Desert fox, Hare and Rats are found in sandy burrows.

This area is also rich in avifauna. Thousands of migratory birds including Ducks, Imperial sand grouse, Demoselle cranes, Lesser bustards come here during winter period. The local birds include Sparrows, Pigeons, Doves and Peacocks etc. The large Flamingoes are found in Rann of Kutch. Among reptiles various types of lizards and snakes are common in deserts.

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12. Sankhala, Kailash ; op cit., p.42.

INDIA

WILD LIFE

WILD LIFE SANCTUARIES/ NATIONAL PARKS

This map is a reproduction of the map 'WILD LIFE - INDIA' published by Government of India 1979.

Table: 3 NUMBER & AREA OF NATIONAL PARKS & SANCTUARIES IN STATES / U.T.S.

Name of State/U.T.	No. of Sanctuaries	Area Sq. Km.	Area in percentage to state / UT area	No. of National Parks	Area in Sq. Km	Area in percentage to State/U.T. area	Total No. of National Parks & Sanctuaries	Total Area of N.P. & S.	Total area in % to State/U.T.'s area
Andman & Nicobar	94	455.98	5.48	6	361.57	4.35	100	817.5	9.86
Andhra Pradesh	15	9668.49	3.49	—	—	—	15	9668.5	3.49
Arunachal P.	4	1474.2	1.76	2	2307.8	2.76	6	3782.0	4.52
Assam	9	942.0	1.19	1	430.0	0.55	10	1371.9	1.74
Bihar	14	3085.1	1.77	1	979.2	0.56	13	4064.4	2.33
Chandigarh	1	25.4	21.92	—	—	—	1	25.4	21.92
Delhi	1	13.2	0.88	—	—	—	4	13.2	0.89
Goa	3	368.5	9.65	1	107.0	2.8	4	425.5	11.15
Gujrat	12	11921.1	6.0	4	580.4	2.9	16	12501.6	6.34
Haryana	4	8.9	0.02	—	—	—	4	8.9	0.02
Himachal P.	28	2380.6	4.27	2	2411.0	4.3	30	4791.6	8.6
Jammu & Kashmir	12	4757.1	2.14	3	3801.0	1.7	15	8558.2	3.85
Karnataka	18	3785.6	1.97	5	2400.4	1.3	23	6186.0	3.22
Kerala	11	1271.4	3.26	3	963.5	2.5	14	2235.0	5.74
Madhya Pradesh	31	22475.3	5.07	11	6283.6	1.4	42	28759.	6.5
Maharashtra	12	14303.4	4.64	4	602.3	0.2	16	14906.0	4.8
Manipur	—	—	—	2	81.3	0.08	2	81.3	0.4
Meghalaya	3	29.2	0.12	2	288.0	1.28	5	317.2	1.40
Mizoram	11	681.0	3.22	—	—	—	1	681.0	3.22
Nagaland	4	217.5	1.31	—	—	—	4	217.5	1.31
Orissa	16	3711.0	2.38	1	303.0	0.2	17	7614.0	4.88
Punjab	5	253.2	0.50	—	—	—	5	253.2	0.5
Rajasthan	21	5509.8	1.76	4	3856.5	1.23	25	9366.3	2.99
Sikkim	3	19.0	0.26	1	850.0	11.64	4	869.0	11.9
Tamil Nadu	10	2654.4	2.04	2	2.7	—	12	5657.0	4.34
Tripura	2	189.0	1.81	—	—	—	2	189.0	1.8
Uttar Pradesh	13	6739.6	2.28	5	2560.5	0.9	18	9300.1	3.2
West Bengal	16	1476.0	1.68	3	2751.2	3.1	19	4227.2	4.81
Total	363	102016.5	3.10	63	31,921.0	0.97	426	133937.6	4.07

Source; Annual Report 1988, Ministry of Environment & Wild Life.

AREA OF SANCTUARY & NATIONAL PARKS IN STATE / UT (in percentage to the area of State /UT)

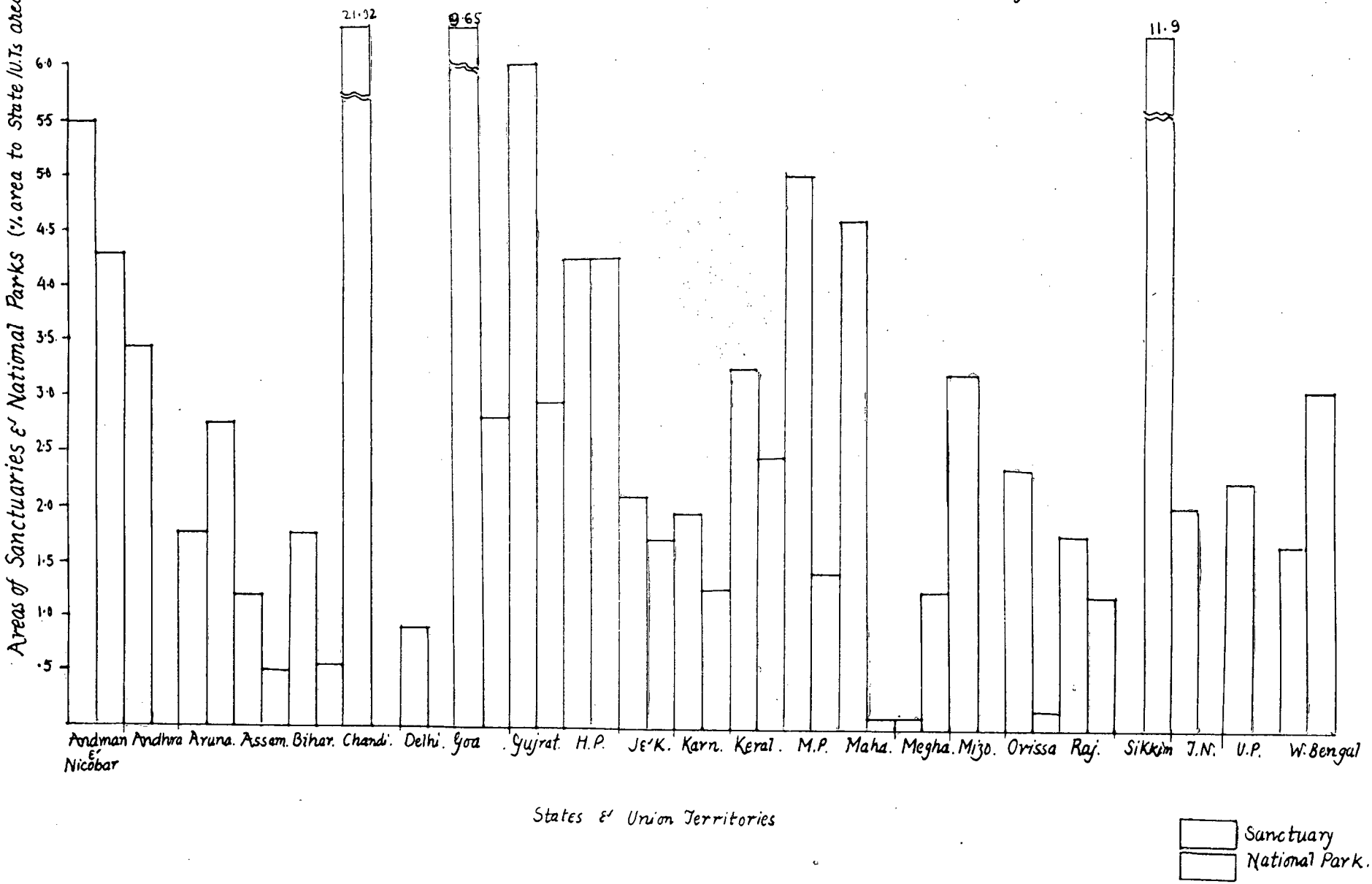

Fig 13

Table - 4.
National Praks and Sanctuaries

Name & Disrict*	Areas sq.km.	Species found	Good visiting time
Pakhal, Warngal	860	Tiger, panther, sambar, chital, nilgai etc.	Dec-March.
Tadwai, Warangal	803	Tiger, panther, gaur, jungle cat, sambar, black buck.	"
Pocharam, Medak	129.5	Panther, chital, chinkara, pea fowl and water bird	"
Kawal, Adilabad	616	Tiger, panther, gaur, sambar, chital, black buck, wild bear, sloth bear.	"
Kolleru Pelicanary, Elleru	673	Pelicans, flamingo, heron, painted storks, avocet, teals and terns.	"
Melapattu Bird Sanctuary, Nellore	16	Gray pelican, heron, cormorants, teals, duck etc.	Nov-Mar.
Kinnersani, Khammam	635.40	Tiger, panther, wolf, chital, sambar, nilgai, sloth bear, gaur.	Dec-Mar.
Papikonda, E.Godavari W.Godawari, Khammam	591.00	Tiger, panther, wild dog, hyena, jackals, wolves, gaur, four horned antelope, chital, sambar and nilgai.	Nov-Jun.
Coringa, E.Godavari	235.00	Estuarine crocodile, otter, fishing cat, jackal, seagull, pelican, stork, heron, flamingo.	Oct-May
Nagarjunasagar, srisailam, Guntur, Prakasam, Kurnool, Mahabubnagar, and Nalgonda	3568.00	Tiger, panther, sloth bear, wild boar, chital, sambar, nilgai, black buck, jackal, foxes, wolves and mugger crocodile	Oct-Jun

* The names of the more important national parks and specialised sanctuaries are given in full. Others are indicated by their distinguishing names. District or districts where they are located are given along with the names.

Pulicat, Nellore	500.00	Flamingos, pelicans, ducks teals, stork, crane, heron.	Oct-Mar.
<u>Arunachal Pradesh</u>			
Namdafa, Tirap	1807.82	Tiger, panther, snow leopard, clouded leopard, golden cat, binturang, wild buffalo, wild dog, gaur, Iranian bison, sambar, hog.deer, barking deer, elephant, sloth bear, python, king cobra, Indian cobra, monitor, lizard and birds of many kinds.	Nov-Mar.
Pakkui, Kameng	861.95	Elephant, gaur, Indian sambar, hog deer, barking deer, python.	Nov-Apri
<u>Assam</u>			
Garampani, Diphu	430.00	Elephant, wild buffalo, leopard, common langur, hoolock.	Feb-May
Kaziranga National Park, Jorhat	430	Great Indian one-horned rhinoceros, wild buffalo, elephant, gaur, leopard cat, wild boar, civet cat, otter, swamp deer, hog deer, sambar, tiger, python, pelican, partridge, floricans.	"
Lakhawa, Nawgang	70	Rhinoceros, wild buffalo, swamp deer, hog deer, water ducks, cormorants.	January
Manas, Barpeta (Tiger Sanctuary)	80	Elephant, tiger, panther, gaur, wild buffalo, great Indian one horned rhinoceros, golden langur, civet cat, otter, swamp deer, hog deer, sambar, pigmy hog, water monitor, wild boar, great pied hornbill, florican.	Feb.

Sonai-Rupa, Tezpur	195	The great Indian one-horned rhinoceros, elephant, wild buffalo, sloth bear, wild dog, wild boar, sambar, barking deer, swamp deer, leopard, tiger, hornbill, imperial pigeon etc.	Jan-April.
<u>Bihar</u>			
Hazaribagh, Hazaribagh	186.25	Tiger, leopard,sambar, chital, nilgai, wild boar, wild cat, peafowl etc.	Oct-Jun
Bhimbandh, Monghyr	681.90	Tiger, leopard,sambar, chital, wild boar, wolf, water birds.	"
Mahudaur,Daltongung	63.25	Tiger, leopard, wolf, chital, barking deer, wild boar etc.	Nov-Jun
Dalma, Singhbhum	193.22	Elephant,leopard, wild boar, mouse-deer, barking deer, sloth bear.	Oct-Jun
Palamau,Daltongung	979.27	Elephant,panther,leopard, wild boar, barking deer, gaur, chital, sambar, peal-fowl etc.	whole year
Gautam Budha, Gaya	259.50	Tiger, leopard,sambar, chital,barking deer, pea-fowl etc.	Oct-Jun
Kaimur,Rohtas	1342.22	Tiger, leopard chinkara, sambar, nilgai and crocodiles.	Oct-Jun
Bamiaburu,Singhbhum	129.50	Tiger,panther,sambar,elephant, wild boar etc.	"
Kodaram, Hazaribagh	176.12	Tiger, leopard, sloth bear, sambar, chital, four-horned antelope.	"

Goa, Daman and Diu			
Mollem, Goa	240	Gaur, sambar, mouse deer, barking deer, panther, flying squirrel, porcupine, civet, cats, ant-eaters, slender loris, grey jungle fowl.	Nov-May
Gujarat			
Gir National Park, Junagar	140.40	Asiatic lion, panther, stripped kyeena, sambar, nilgai, chital, four-horned antelope, chinkara, wild boar, crocodiles.	Dec-Jun
Valavadar National Park, Bhavnagar	17.83	Black buck, wolf.	Oct-jun
Gir, Junagarh	1412.13	Asiatic lion, panther, stripped hyena, sambar, nilgai, chital, four-horned antelope, chinkara, wild boar, crocodiles.	Dec-Jun
Nal Sarovar Bird Sanctuary, Ahmedabad	115.00	Water birds	Nov-Feb.
Wild Ass Sanctuary, Little Rann of Kutvh	4840.89	Wild ass, nilgai, wolf, chinkara.	Jan-Jun
Surendranagar, Purna, Dangs	299.43	Tiger, panther, leopard cat, jungle cat, jackal, fox, four horned antelope, wild pig, chital, sambar, bonnet macaque	"
Haryana			
Sultanpur Lake Birds Sanctuary, Gurgaon	1.2	Sarus crane, spot-bills, ruddy shel drakes etc.	Oct-Mar.
Jammu and Kashmir			
Dachigam, Srinagar	55 sq miles	Leopard, black bear, brown bear, baboons, serow, musk deer, hangul.	Apr-Nov.

Raj Parian Anantnag	20.50 sq. miles	Brown bear, black bear, musk deer, serow, hangul.	Apr-Nov
<u>Himachal Pradesh</u>			
Rohia National Park, Kulu	178.8	Ibex, musk deer, tahr, serow, lynx, Himalayan brown bear, snow leopard, tragopan, snow pigeon, snow cock etc.	Apr-Jun
Tundah, Chamba	64.2	Tahr, brown bear, black bear, musk deer, goral, serow, ibex, monal, tragopan, snow cock, Kalij, chakor and chir, snow leopard, panther, weasel, martens, civets, fox, flying fox.	Apr-Jun, Sept-Oct.
Kugti, Chamba	118.3	Tahr, brown bear, black bear, musk deer, goral, serow, ibex, monal, tragopan, snow cock, kalij, chakor, chir, snow leopard, panther, weasel, martens, civets, fox, flying fox.	"
Nargu&Winch, Mandi	278.4	Goral, black bear, serow, musk deer, monal, kalij, koklash and chir, panther, snow leopard, martens, civent, fox, flying fox.	Apr-Jun Dec-Jan.
Shikari Devi, Mandi	213.5	Black bear, goral, barking deer, serow, musk deer, monal, kalij, chir, chakor, partridge, panther, snow leopard, martens, civet, fox, flying fox.	"
Gobind sagar, Lilaspur	100.4	Duck, teal, goose, crane	Whole year

Sri Naina,Lilaspur	163.4	Sambar,barking deer, black bear,wild boar, nilgai,kalij,red jungle fowl, partridges,panther, snow leopard, martens,civet, fox, flying fox.	Whole year
Derang Kinnaur	167.4	Goral,Black bear,serow, monal,kalij,koklash, chakor,panther,civets, martens, fying foxes.	Apr-Jun. Sept-Oct.
Talra, Simla	72.2	Goral,black bear,sambar, musk deer, kalij, koklash, chakor, monal,panther,flying fox, civet, martens.	"
Raksham and Chitkul,	138.3	Bharat, goral,black bear, brown bear, monal,koklash, snow cock, chakor, panther, fox,martens,flying fox.	"
Lipa Asrang,Kinnaur	109.1	Ibex,bharal,goral,monal, koklash,snow cocks,chakor, panther, fox,martens,flying fox.	"
Simbalbara,Sirmur	55.4	Sambar, goral,barking deer, wild boar, kalij, pea fowl, red jungle fowl, partridge, panther, fox, martens, civet, flying fox, chital, and monal.	whole year
Kanswar, Kulu	54.3	Tahr, serow,goral,black bear, kalij,koklash,chakor,partridges, chir,panther,civets,martens, flying fox.	Apr-Jun. Sept -Oct.
<u>Karnataka</u>			
Bandipur National Park, Mysore, (Tiger Sanctuary)	874.20	Indian elephant, tiger, sambar,chital,barking deer, wild dog, wild boar, jackal, sloth bear,panther, four-horned antelopes, malabar squirrel,Jungle fowl, partridge, green pigeon,bush quail,etc.	Mar-Aug.

Bannarghatta National Park, Bangalore	104.20	Elephants, sloth bear, chital, barking deer, gray partridges, bush quail, jungle fowl, etc.	whole year
Nagerhole National Park, Coorg	571.55	Elephant, tiger, panther, chital, sambar, sloth bear, jungle fowl, partridge etc.	Oct-Mar.
Someshwara, South Kanara	844.8	Chital, gaur, sambar, panther, tiger, sloth bear, wild dog, etc.	"
Brahmagiri, Coorg	181.29	Tiger, panther, sambar, chital, barking deer, sloth bear, cobra, flying squirrel, malabar squirrel, civet cat, mouse deer.	"
Malkote, Mandya	49.82	Panther, wolves, sloth bear black bucks, hare, porcupines, wild boar.	"
Ghataprabha Bird Sanctuary, Belgaum	29.785	Egret, cormorant, heron, etc.	
Tungabhadra, Bellary	224.22	Black-buck, chinkara, panther, chital, pig, four-horned antelope, and fox, sand grouse, florican, great Indian bustard, sloth bear, sambar etc.	
Ransbennur Black Buck Sanctuary, Dharwar	119.00	Black buck, chital, wolf, hare, great Indian bustard.	whole year
Mukambika, South Kanara	247.00	Panther, Sambar, elephant, wild boar, porcupine.	
Sharawathy Valley Shimoga	348.00	Indian elephant, tiger, panther, gaur, sambar, chital, barking deer, wild boar, sloth bear, four horned antelope, partridges, green pigeon, bush quail, lion tailed monkey, tortoise, crocodile, python, cobra, krait, viper, green snake etc.	Feb-May

Biligiri Rangaswamy, Mysore	324.4	Elephant,gaur,chital, barking deer,sambar, panther, sloth bear.	Feb-May.
Bhadra,Chikmagalur	492.00	Gaur,elephant,panther, wild bear,sambar,chital, barking deer, sloth bear.	Jan-Jun.
Shettimalli, Shimoga	395.60	''	Feb-May.
Ranganthitto Bird Sanctuary,Mysore	26.70	Open hill stork, white ibis, little egret,cattle egret, darter,cormorant, pond heron, river tern, spoon bill,crocodile etc.	July-Aug.
Dandeli, Dharwar	874.20	Tiger,panther,elephant, gaur, sloth bear, sambar, chital, wild bear etc.	Feb-May.
<u>Kerala</u>			
Eravikulam Rajmallay	97	Elephant, gaur,sambar, barking deer,tiger,panther, civet, jungle cat, nilgai, langur, wild boar,lion tailed macaque, malabar squirrel, wild dogs, nilgiri tiger, imperial pigeon,grey jungle fowl.	Oct-Apr
Periyar, Idukki	777	Elephants, Tiger,panther, wild dog, gaur, sloth bear, nilgai,wild boar,sambar and barking deer.	''
Parambikulam,Palghat	285	Elephant, gaur,leopard,tiger, sloth bear,nilgai, chital, sambar, wild boar, crocodiles.	''
Wynad, Cannanore and Kozhikode	844	Elephant, gaur, sambar, wild boar, chital, barking deer, etc.	''

Madhya Pradesh

Kanha National Park, Mandla and Balghat	940	Tiger, panther, gaur, barasingha, chital, sambar, black buck, chowsingha, barking deer, mouse deer, nilgai, wild dog, boar.	Mar-Jun
Bandhavgarh National Park, Shahdol	105	Tiger, panther, gaur, sambar, nilgai, chinkara, barking deer, bear, wild boar, and a variety of upland birds.	Nov-Jun
Shivpuri National Park, Shivpuri	156	Tiger, panther, sloth bear, hyena, sambar, spotted deer, four horned antelope, black buck, nilgai, chinkara, wild boar, crocodiles etc.	Jan-Jun.
Bori, Hoshangbad	802.89	Tiger, panther, bison, sambar, chital, nilgai, barking deer, chinkara, wild boar, bear.	"
Kutri Wild Buffaloes Gane Sanctuary, Bastar	2273.58	Wild buffalo, tiger, panther, sloth bear, nilgai, chital, sambar, wild pigs, barking deer, bison, wild dogs, chowsingha etc.	May-Apr.
Tamor-pigle, Sorguja	608.52	Tiger, panther, gaur, chital, sambar etc.	Dec-Mar.
Samarsot, Sorguja	430.361	-do-	"
Sitanadi, Raipur	1500	Tiger, panther, samber, Chinkara, Chital, bison, wild boar, barking deer, peacock etc.	Mar-Jun.
Nordehi, Sagar, Damoh and Narsinghgart	1500	Tiger, Panther, Sambar, chinkara, chital, nilgai, bear, etc.	Dec-Mar.
Bagdara, Sidhi	478.900	Panther, black buck, chinkara, sambar, nigai, wild pig, etc.	Nov-Jun.

Pachmarhi, Hosangabad	654.49	Tiger,panther, bear,bison, spotted deer, sambar, barking deer, nilgai etc.	Mar-Jun.
Achankmar,Bilaspur	551.52	Tiger,bison,sambar,chital,boar, peacock etc.	Nov-Jun.
Ratapani,Raisen	530.36	Tiger,panther,sambar,chital, blue bull, chinkara, etc.	Feb-Jun.
Panch, Chindwara& Saoni	449.39	Tiger,panther,gaur,chital, sambar, nilgai, etc.	Nov-Jun.
Gandi Sagar, Mandsaur	224.65	Water birds,Chital,sambar, chinkara, barking deer.	"
<u>Maharashtra</u>			
Todoba National Park, Chandrapur	116.55	Tiger,panther,sloth bear, gaur,sambar,chital,nilgai, chinkara, jungle fowl and pea-fowl.	"
Nawegaon National Park, Bhandara	133.884	Tiger,panther,sloth bear,gaur, sambar, chital,barking deer, nilgai and migratory birds.	May
Borivli National Park, Bombay Suburban	67.977	Panther, sambar,four-horned antelope,mouse deer, wild boar and langurs.	Jan-Mar.
Melghat, Amraya (Tiger Sanctuary)	381.58	Tiger,panther,gaur,sloth bear, sambar, barking deer, four horned antelope, wild boar,chital, and plentiful birds.	Apr. and May.
Yawal,Jalgaon	177.52	Panther, jungle cat,nilgai, bonnet macaque and common langur, wild dog, sambar, hyena, tiger,chital and chinkara, pea-fowl, green pigeon,sand grouse and partridge, grey jungle fowl.	"

Radhanagari(Bison), Kolhapur	2072	Gaur,panther,sambar and wild boar. Bird life is fairly lavish.	May-Sept.
Barnala(Bird),Kolba	4.48	Ashy minivet, paradise fly-catchers, shama, malabar whistling thrush, racket-tailed drongo, wood-pecker etc. Other life seen are the panther, four horned antelope and common langur.	Jan-Apr.
Tansa, Thane	216.75	Panther,four-horned antelope, chital, sambar and wild boar. Bird population is diverse and colourful around the Tansa lake.	May
Manipur			
Reibul Lamjao National Park,Central	25	Brow antlered deer, wild goat and water birds.	
Meghalaya			
Balpakram* Garo Hills	85	Elephants, gaur, chital,sambar, wild boar.	Winter
Mizoram			
Dampa,Aizawl	180.00	Elephant,tiger, leopard,sambar, barking deer, Himalayan bear, wild boar, wild dogs,wild-cat, gaur,leopard cat,king cobra, python, hornbill pheasant etc.	Nov.-Feb.
Nagaland			
Intangki, Kohima	202.00	Gaur, boar, elephant, barking deer, wild boar, clouded-leopard, panther, tiger,pangolin and various kinds of birds and reptiles.	Nov-Mar.

* Proposed Sanctuary

Orissa			
Satkosia Gorge. Dhenknal, Puri, Cuttack and Phulbani.	750	Gharial and muggar, tiger, leopard, jungle cat, civet, gaur,ratel, sloth bear, sambar, chital, nilgai, four horned antelope, elephants, hornbill, pea-fowl, jungle-fowl and other birds	Summer and Winter
Bhittar Kanika, Cuttack	170	Salt-water crocodile, leopard, hyena, jungle cat, leopard cat, wild boar, chital, sambar, giant squirrel, water monitor, sea turtle, king cobra, python, painted stork, adjutant storks, openbilled stork, white ibis, black ibis etc.	Winter
Chilka, Ganjam and Puri.	900	Black duck, chital, sea cow, carnes, ibis,cormorant, egret, flamingo and pelican.	Winter
Karlapat, Kalahandi	145	Tiger, leopard, gaur,chital, sambar etc.	Winter
Ushakothi,Sambalpur	192	Elephant,gaur,tiger, leopard, sambar, chital and barking deer.	Winter
Similipal, Mayurbhanj (Tiger Sanctuary)	303	Tiger,elephant, gaur,chital, leopard, mouse deer, flying squirrel and mugger.	Winter
Punjab			
Abohar, Ferozepur	228	Black buck, hare,partridge, grey and black pigeon & doves.	1st,Oct. 1st,Mar.
Rajasthan			
Ranthambor Sawai-Madhopur (Tiger Sanctuary)	392.20	Tiger,panther,hyena,jungle cat,civet,sambar,chital, nilgai, bear, wild boar, partridge,green pigeon,red spur fowl etc.	All year except Jul. Aug. Sept.

Sariska Alwar	195	Tiger, panther, hyena, jungle cat, civets, sambar, chinkara, nilgai, four horned antelope, partridge, green pigeon, red spur fowl.	All year except Jul. Aug. and Sep.
Ghana Bird Sanctuary, Bharatpur	29	Siberian crane, cormorants, storks, spoon bill, quails coot, heron, teal, terns etc, and sambar, chital, black duck, wild boar, civet etc.	1st Oct. -end of Feb.
Darrah, Kota	201	Tiger, panther, sambar, chital, nilgai, wild boar, hare, partridge, grouse.	All Year except July, Sep.
Mount Abu, Sirohi	112.60	Sambar, nilgai, hare, jungle fowl, partridges etc	"
Kumbhalgarh-Ranakpur Udaipur, Jodhpur dists	500	Wild bear, sambar, panther, nilgai, wild boar, jungle fowl, red spur fowl.	"
<u>Sikkim</u>			
Khangchandzenda National Park, Gangtok	850	Snow leopard, clouded leopard, marbled cat, civet, binturone, Himalayan black bear, red panda, Tibetan wild ass, blue sheep, serow, takin, musk deer, pheasant, partridge, green pigeon etc.	
<u>Tamil Nadu</u>			
Guindy National Park, Madras	2.8	Chitaf, black buck & a snake park.	whole year
Mudumalai, The Nilgiris	321	Elephant, gaur, chital, sambar, tiger, panther, sloth bear, wild dogs etc.	Feb.-June.
Amarmalai, Coimbatore	958	-do-	"
Tirunelveli Tiger Sanctuary	520	Tiger, chital, sambar, wild boar, lion tailed macaque	Sept-Nov

Kalakad, Tirunelveli	223.58	Lion-tailed macaque	whole year
Uttar Pradesh			
Corbett National Park, Nainital, Garhwal (Tiger Sanctuary)	525	Elephant,tiger,panther, sloth bear, nilgai,sambar, chital, wild boar, porcupine, peafowl, red Indian jungle fowl, partridge and both the species of Indian inland crocodiles, goral and four-horned antelope.	Nov-May.
Dudwa National Park, Lakhimpur,Kheri	500	Tiger, panther,sloth bear, sambar, swamp deer, chital, hog deer, barking deer, nilgai, peafowl, and jungle fowl, partridge etc.	"
Govind Pashu Vihar Uttar Kashi	953	Brown and black Himalayan bear, snow leaopard, bharal, musk deer, tahr, serow, goral, panther, sambar, wild boar, monal, pheasant, snow pigeon, green pigeon.	Sept.-Oct. May - June.
Nanda Devi,Chamoli	324	-do-	"
Rajaji, Sharanpur	247	Elephant, tiger,panther, sloth bear,nilgai, sambar, chital, kakar, wild bear, porcupine, pea fowl, red Indian jungle fowl and partridges etc.	Nov-May.
Kishanpur, Lakhimpur Kheri	227.12	Brown and Black Himalayan bear, snow leopard, bharal, musk xdeer, tahr, serow, goral, panther,sambar, wild boar, pheasant, snow pigeon, kokla, green pigeon,monals etc.	"
Kedarnath,Chamoli	957	-do-	Sept.-Oct., May-June.
Chandraprabha,Varanasi (2nd home for Gir lions)	78	Tiger,panther,sambar, Indian gazelle, sloth bear, nilgai,pea fowl, partridges,sand grouse etc.	Sept.-May

Katarniaghat,Bahraich	400	Tiger,panther,sambar, bear,chital, black buck.	Nov.-May
Ranipur, Benda	230	Tiger,panther,wild cat, sambar,hyena, fox,jackal, chital, chinkara,black buck, etc.	"
Chila, Garhwal	249	Tiger,panther, bear,elephant, chital, sambar, nilgai, etc.	"
<u>West Bengal</u>			
Lothian Island, 24-Parganas	38.00	Wild pigs, Chital,otter, estuarine crocodiles, gangetic dolphin, water birds, etc.	Dec.-Feb.
Halliday Island, 24-Parganas	5.95	Royal Bengal Tiger, chital, water birds etc.	"
Sajnakhali,24-Parganas	362.40	Tiger, wild boar,chital, cormorant,open-bill,storks, snake bird,white ibis, purple heron, grey heron, green bitter, pelican, etc.	July-Dec.
Gorumara, Jalpaiguri	8.52	Rhino,elephant,gaur,tiger, sambar, hog deer, wild boar, varieties of birds.	Oct.-Apr.
Jaldapara,Jalpaiguri	115.53	Rhino,elephant,tiger,leopard,wild boar,gaur,barking deer, hog deer,sambar&variety of birds.	Dec.-May
Mahanadi,Darjeeling	127.22	Tiger,elephant,gaur,sambar, hog,wild boar,gibbons and a variety of birds.	Nov.-Apr.
Sunderbans, 24-Parganas(Tiger Sanctuary)	2585.00	Tiger, different species of deer, wild boar, estuarine crocodile, Gangetic dolphin.	Sept.-May

Table: 5. Tiger Enumeration 1984

Statewise Breakup Of Population

S.No.	Name of State	Male	Female	Cubs	Sex Uuknown	Total
1.	Andhra Pradesh	60	61	20	23	164
2.	Aunachal Pradesh	85	96	37	1	219
3.	Assam	141	182	44	9	376
4.	Bihar	54	63	21	-	130
5.	Gao	-	-	-	-	Nil
6.	Gujarat	4	2	3	-	1
7.	Haryana	1	-	-	-	1
8.	Himachal Pradesh	-	-	-	-	Nil
9.	Jammu & Kashmir	-	-	-	-	Nil
10.	Karnataka	73	94	35	-	202
11.	Kerala	39	39	11	-	89
12.	Madhya Pradesh	255	364	130	37	786
13.	Maharashtra	140	102	42	17	301
14.	Manipur	-	-	-	6	6
15.	Meghalaya	57	55	10	3	125
16.	Mizoram	12	5	7	9	33
17.	Nagaland	27	27	6	44	104
18.	Orissa	74	107	21	-	202
19.	Punjab	-	-	-	-	Nil

Table:5.
(Continued from Previous Page)

S.No.	Name of State	Male	Female	Cubs	Sex Unknown	Total
2						
20.	Rajasthan	50	33	13	-	96
21.	Sikkim	1	-	-	1	2
22.	Tamil Nadu	31	29	8	29	97
23.	Tripura	2	3	-	-	5
24.	Uttar Pradesh	298	336	64	-	598
25.	West Bengal	175	149	19	9	352
	Name of Union Territories					
1.	Andaman & Nicobar Islands	-	-	-	-	Nil
2.	Chandigarh	-	-	-	-	Nil
3.	Dadar & Nagar Haveli	-	-	-	-	Nil
4.	Daman & Diu	-	-	-	-	Nil
5.	Delhi	-	-	-	-	Nil
6.	Lakshadweep	-	-	-	-	Nil
7.	Pondichery	-	-	-	-	Nil
	Total	1579	1747	491	188	4005

Table: 6. Population of Tiger in Tiger Reserves
Tiger Population in 1987

	Name of Tiger Reserves	
1.	Bandipur (Karnataka)	53
2.	Buxa (West Bengal)	15
3.	Corbett (Uttar Pradesh)	90
4.	Dudhwa(Uttar Pradesh)	80
5.	Indravati (Madhya Pradesh)	25
6.	Kanha (Madhya Pradesh)	94
7.	Manas(Assam)	123
8.	Melghat(Maharashtra)	81
9.	Nagarjuna Sagar(Andhra Pradesh)	83
10.	Namdapha(Arunachal Pradesh)	43
11.	Palamau(Bihar)	54
12.	Periyar (Kerala)	44
13.	Ranthambore(rajasthan)	40
14.	Sariska(Rajasthan)	43
15.	Simipal (Orissa)	89
16.	Sunderbans(West Bengal)	264
	Total	1221

POPULATION OF TIGERS

STATEWISE ENUMERATION

1984

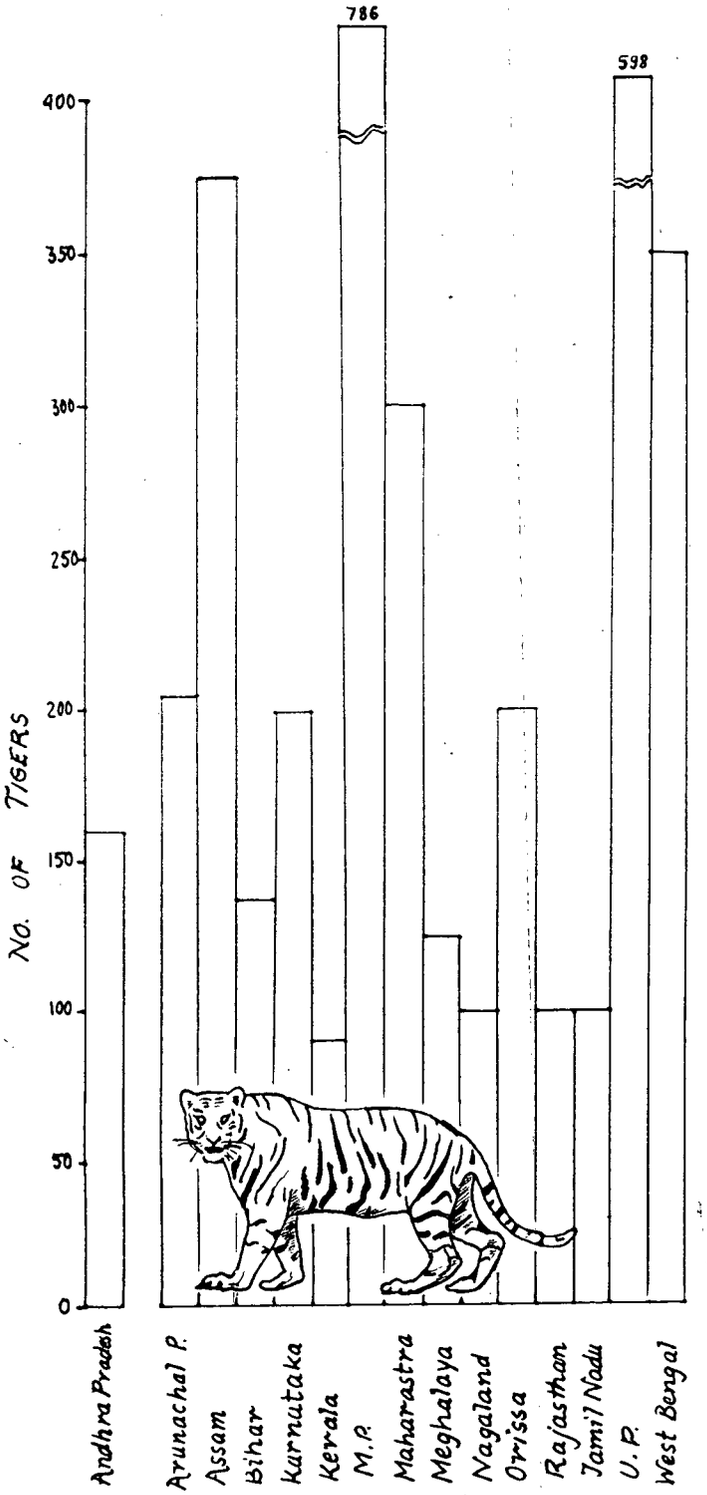

Fig 14

CHAPTER IV

BETLA NATIONAL PARK

A CASE STUDY

Palamau tiger reserve is one of the 13 wildlife sanctuaries of Bihar. A part of this sanctuary was elevated to the status of national park and renamed as Betla national park. It is lying in the mid-west of Bihar and north-western part of Chotanagpur plateau.Its original area was 150 sq km.[1] It was declared as a wildlife sanctuary in 1959 and its area was extended to 249 sq km.[2] Today as a tiger reserve it has an area of 979 sq km[3], of which 200 sq km area constitutes the core area. The tourist zone comprises only 35 sq km.[4] The original sanctuary area at Betla in the north of reserve is still the most visible part. The southern part of forest was added later on and is also important.

The park is 180 km far from Ranchi and 25 km from Deltonganj.[5] Both towns are well connected with large cities and towns by roads, railways (and airport at Ranchi). It is situated

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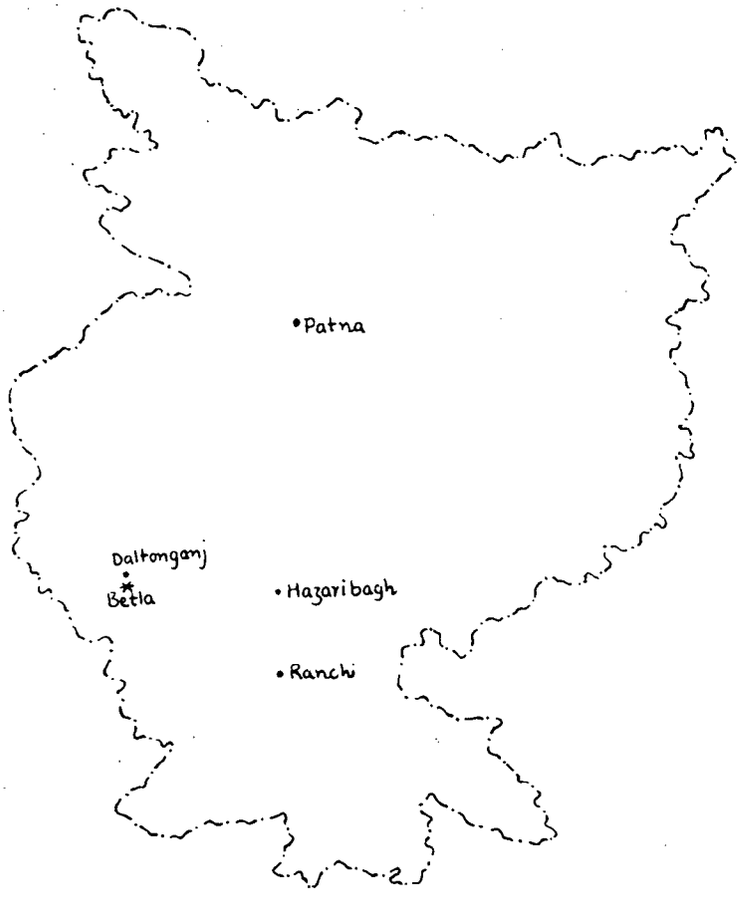
1. Times of India, (January, 1988).
2. Ibid.
3. Annual Report of Ministry of Wildlife and Environment, Govt. of India, (New Delhi : 1988).
4. Times of India, (January, 1988).
5. Rani, Varsha ; 'Palamau - A Different Bihar', The Times of India,(Friday, August 29, 1986).

BIHAR

LOCATION OF BETLA NATIONAL PARK



Map No.

on the National highway no. 33 and has a network of good roads around it, connecting it to important places within the State and outside the State.

The entry point to Belta is Dubia Khar, 160 km far from Ranchi from where Betla is only 15 km away.[6]

GEOGRAPHICAL ACCOUNT OF BETLA NATIONAL PARK

eologically it is a part of Chotanagpur plateau, which is an extension of Dharwar system. This region is is very famous for minerals, especiall metallic minerals. At Daltonganj the lower gondwana deposits are also found in the form of coal deposits in Auranga river valley. The Dharwar system is one of the most ancient system of not only the India, but of world also. The topography is senile. Chotanagpur plateau has rejuvenated (uplifted) three times during Himalayan orogeny - in Oligocene, mid - Miocene and Plio-pliestocene periods. These different upliftments separate each other with scarps. The surface is almost peneplain, i.e., though undulating surface but not very steep and sharp.

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6. Ibid.

after its status as tiger project in 1974, more attention is paid on tiger. Alike other tiger reserves, it will be maintained in its optimum conditions in its entirety. The core area is protected from any kind of exploitation and in the rest of the reserve human activities are allowed only under strict control.

Besides the tigers, there are leopards which, according to census of 1984, were 30 in number.[10] Other animals are elephant, gaur, mouse deer, sloth bear, rhesus macaque, common langur, samber, chital, barking deer, common and small mangoose, hyena, wild dog, porcupine, hare and wild boar etc. The elephant population is around 60, but more migrated into Betla from the Baresand forest (in south) in about October and stay there till the following April. Untill about fifteen years ago, all elephants were living mostly in the denser forests of Baresand, but after the building of the storage dam at Betla, some have begun to live there and others visit it regularly. Though they are great attraction in the reserves, they are creating problems by destroying the vegetation and raiding the paddy fields outside it. There is dominance of makhnas or tuskless male elephants which are usually massive. Sometimes

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10. Seshadri, Balakrishna ; op cit., p.125.

they become aggressive and create problems.

Gaur are living in herd. They are not shy and may be seen with elephants. Samber, Chital, Barking deer and Wild boar are numerous and laways live in flocks. In day time they move for grazing, but in night they are alert. Nilgai are few. Sometimes hyena or wolf can be seen. Fox are very common in south and in marginal areas, where they move towards villages in night for poultry and waste food. Many times there are encounters of tribals with Sloth bear, especially in the spring season when 'Mahua' blossoms. Though the Wild boar are living in the interior areas, but their encouter is likely to be very dangerous, because they are aggressive in nature.

The common langur and monkeys are wandering tree to tree, but they are more common at old fort area and near the entrance of park.

Bird life is abundant in Palamau. There are over 200 species of avifauna that nestle or migrate to the forest environment. The main types are kingfishers, purple-sunbirds, tickell's flower pickers, golden backed wood peckers, scarlet minivets, paradise flycatchers, blossom headed parakeets, sparrow

hawks, king vultures, lagger fulcons, brown fish owls, reef herons, ibis, black patridge, quails, red jungle fawl, pea-fawl, many water birds and above all the national bird peacock.

HISTORY AND PEOPLE

An additional attraction in this reserve is the runins of two 16th - 17th century forts built by the local 'Chero' chieftains of that time. The Cheros were most powerful rulers in south Bihar in the 16th and 17th centuries.[11] They offered tough resistance to Mughal expansion, carrying depredations into their territory, charging levies, octorai duty and pastoral taxes independently. The ruins of two old forts - 'Naya' and 'Purana' quila (new and old) - are situated on the north-eastern boundary of the park. The forts are very imposing, built of yellow-red sandstones and granite are now covered with moss and grasses . The walls are weathered and broken at many places. They are testimony to the strength and valour of the Cheros. Thick walls, loopholed battlements, watch towers and strong entrance gates which still stand, must have saved it from the enemy's attack. The old fort is said to be favourite haunt of tigers whose pug marks are often visible. There are many Hindu

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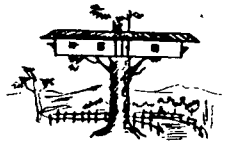
11. The Times of India, August 29, 1986.

and Muslim structures. There are four storeyed houses with brightly coloured frescoes, a mosque, a well with a vaulted tunnel which is believed to be a secret escape route from new fort are the main attractions as well as characteristics of new fort. New fort is built over a conical hill, surrounded by double walls. It has multi storeyed galleries meant for the garrison and in the centre is a large three storeyed hall, which provides a panoramic view of the countryside. The Nagpuri gate to the south is sculptured beautifully with floral motifs and creepers and is more than 50 feet high. In the countryside lie broken pillars, capitals, brackets etc. The new fort dates back to the 17th century and was probably built by the Chero Raja Medini Roy, the most courageous and powerful of all the monarchs as mentioned in Sanskrit and Persain inscription on the door.

The local people are tribals as well as non-tribals. Tribals are living in the villages normally situated in forests, while non tribals are more towards Daltonganj town. The tribals are mainly Oraon, Munda, Hos and Birhors. Population is very sparse in this area. Within core area and reserve boundary there is no village. Along the road some villages are located.

TOURISM IN BETLA NATIONAL PARK



The nearest airport at Ranchi (180 km) is connected with all large cities. Nearest Railhead Daltonganj (25 km) is connected with Delhi, Patna, Calcutta, Tata and Rourkela. It is situated on the National highway no.33. It has a network of good roads around it, connecting it to important places within the State and outside the State. There are regular State transport services from Ranchi to Daltonganj and to Betla. Department of Tourism, Bihar also operates conducted tours to most of these sites.

The park is open to visitors from October to May, after which the monsoon sets in. The best time is March when many waterholes dry up. Then the animals have perforce to queue up at the limited waterholes available, where hides and watch-towers have been constructed. There are two favourite spots to watch the wildlife, one is Haathi Bajwa and other is Madhuchuwan hide. The herds of elephants can be seen in Kamaldah lake.[12]

The normal procedure to see all the animals is an early morning ride through the park, which lasts till about 9 a.m.

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12. Seshadri, Balakrishna ; op cit., p.125.

Table :7.

Number of Tourists in Five Important National Parks.

Name of National Park	Number of Tourists				
	1982-83	1983-84	Percentage Growth	1984-85	Percentage Growth
Periyar, Dist. Idukki, Kerala.	1,04,512	1,39,260	33	1,84,712	33
Corbett, Districts, Garhwal and Nainital, Uttar Pradesh	18,092	19,621	8	15,015	-24
Kanha, Dist. Mandla and Balaghat, Madhya Pradesh	13,683	27,570	101	27,012	-2
Palamau, Bihar	22,812	24,077	5	22,924	-5
Sariska, Dist.Alwar, Rajasthan	14,599	18,611	27	23,269	25

Source: Ministry of Environment and Forests, Govt. of India. Growth rates calculated.

The second round is in evening and most of vehicles book spot-lights for the night, when the animals' movement is at a low ebb. The park has no government or forest guides but few of local residents act as guides with the permission of the forest officials and normally take the tourists in four or five well known paths.

The glimpse of a tiger or a panther is rare phenomena. There is the chance of coming across wild elephants which have been known to chase jeeps and other vehicles, so all vehicles drivers are instructed to stop immediately whenever they spot an elephant and thus avoid the risk of attracting undesirable attention.

A large part of tourists are composed of Bengalis, who are famous for tourism, because this park is near, cheaper, very peaceful and natural. Rest are generally from Bihar, especially from Ranchi and adjacent districts and from Uttar Pradesh. The figure shown by Ministry of Environment and Forest shows that the number of tourists in 1982-83 was 22,812, in 1983-84 it was 24,077 (an increase of merely 5%) and in 1984-85 it was 22,924 (a decline of 5%). However, this fluctuation does not show any trend. But we can say that the development is not very satisfactory (Table. 7).

There are many factors responsible for the poor performance of tourism development. The basic defect lies in the lack of enthusiasm in the Department of Bihar's Tourism. There is no certainty of buses, especially from Ranchi and even from Daltonganj. Though the park is along the national highway, roads are in pitiable condition. During rainfall the metallic part washes away at many places. There are few tourist banglows, lodges and hotels, insufficient for tourists. So immediate need is to improve the basic infrastructure, that is road, vehicles and hotel accomodations.

Other problem is political and law and order. Many times the robbers have looted the vehicles going Daltonganj in forest. So people feel insecure and hesitate to go to such remote places. The political movement, 'Jharkhand Movement', has also hampered tourism. There are many factions of Jharkhandites who time to time call for strikes and blockade of roadways and railways. Sometimes such movements led to violence. So, in such weather of unstability and uncertainty no outsider (especially non-Biharis) will dare to enjoy the wild beauty.

The tourism, whatever has developed, has bettered the economy and living style of the places along the roadside. Many line hotels - motels, dhabas have sprang up. The local people

are working as guides and labourers. Their life-style has also changed with the contact of outsiders. Some defects due to tourism cannot be ruled out. Smoking is strictly prohibited, but the careless smokers have created havoc by inviting forest fire which many times spread tremendously and becomes very dangerous for wild as well as human life. So, a proper awareness is needed by the civil people in the regime of jungle.

CHAPTER V

LEGISLATION, DEVELOPMENT & IMPACT of WILD LIFE

After Independence Government of India made some plans for the development of forests and their natural habitats. National forest policy was the first step in this direction in which one third of geographic area was aimed to achieve as forest areas (60% in plains and 20% in hill areas) for ecological balance and preservation of wild life. Government of India is conscious for the preservation and development of wild life and has taken many steps in this direction. Among these steps the most important is the financial assistance to States for the development of sanctuaries and national parks, covering the following:[1]

1. For improving management capacity which includes increase in the number of additional staff for protection, enforcement and management, development of communication equipments like walkie-talkie and wireless sets, purchase of vehicles, elephants, horses, mules - mechanical boats, construction of staff quarters.

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1. Annual Report of Ministry of Wildlife and Environment, Govt. of India, (New Delhi: 1988).

2. Habitat development comprises water conservation and development work, eradication of weeds, pasture development etc.

3. Introduction of nature education through establishment of nature education centres and an interpretation system for the sanctuary.

4. Establishment of research facilities and promotion of field study including periodic census of wild animals in active collaboration with scientific institutions, universities and non-governmental organisation.

5. Various steps are taken to lessen the preserves on the reservers, e.g., to provide fuel and fodder alternatives, water supply and biogas development, protection from and compensation against wildlife depredations etc.

PLAN ALLOCATION FOR WILD LIFE SANCTUARIES

There is a total outlay of Rs.360 lakh for the seventh plan period under the centrally sponsored schemes 'Assistance to States for development of sanctuaries'.[2] Financial assistance is given to the States after scrutiny of their proposals on 100% basis for items on non-recurring expenditure and on the

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2. Ibid.

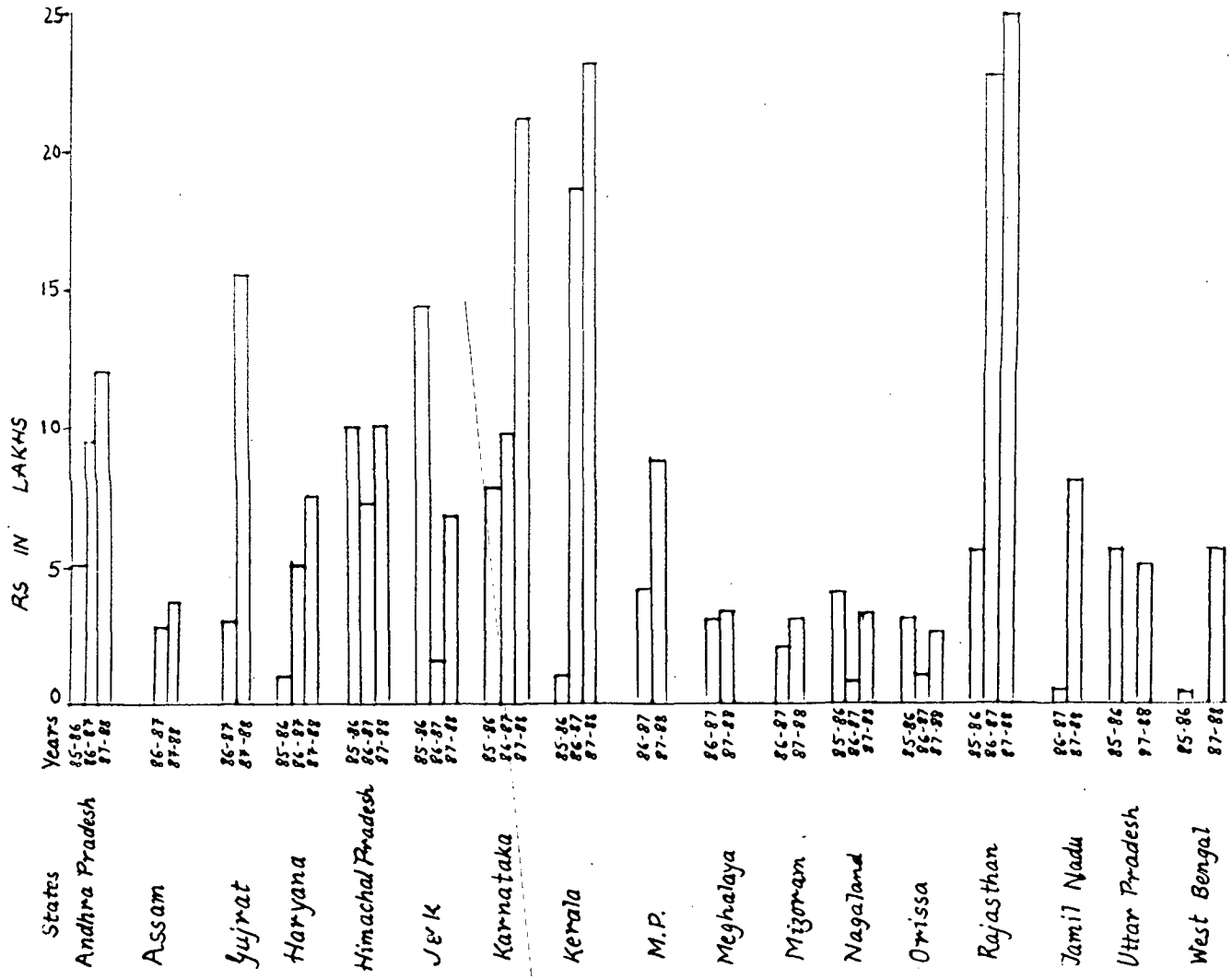
Table: 8. Central Assistance to the States under 'Sanctuaries Scheme' during Seventh Plan

(Rs. in lakhs)

S.No.	Name of State	1985-86	1986-87	1987-88 (Upto 15.2.88)
1.	Andhra Pradesh	5.32	8.95	12.00
2.	Arunachal Pradesh	-	10.75	-
3.	Assam	-	3.25	4.50
4.	Gujarat	-	2.92	15.84
5.	Haryana	1.25	5.17	7.50
6.	Himachal Pradesh	10.08	7.21	10.05
7.	Jammu & Kashmir	14.34	1.50	6.85
8.	Karnataka	7.65	9.78	21.30
9.	Kerala	1.05	18.33	23.16
10.	Madhya Pradesh	-	3.93	8.87
11.	Meghalaya	-	3.09	3.20
12.	Mizoram	-	2.10	2.79
13.	Nagaland	3.88	0.92	3.30
14.	Orissa	2.92	0.87	2.50
15.	Tamil Nadu	-	0.55	7.90
16.	Tripura	-	-	-
17.	Uttar Pradesh	5.49	-	4.97
18.	West Bengal	0.02	-	5.40
		61.57	103.95	173.98

CENTRAL ASSISTANCE TO STATES UNDER 'SANCTUARIES SCHEME' DURING SEVENTH PLAN

(UP TO 15.2.88)



(No assistance was given to Union Territories. Other states have very small figure)

Fig 16

condition that the wildlife sanctuary being financed is under the complete control of that State's wildlife wing. The budget provision for the development of 105 sanctuaries in 1987-88 was Rs. 200 lakhs, which increased upto Rs. 275 lakh for the year 1988-89. The list no. shows the Central assistance to States/Union territories under 'Sanctuaries Scheme' during seventh plan. The data for assistance were available upto 15. 2. 1988. The data show that maximum fund is allocated to Rajasthan in 1986-87 and 1987-88. Kerala was second in both consecutive years. Gujarat, Andhra Pradesh, Himachal Pradesh, Tripura, Haryana etc are other States which got higher position in priority list. However, Arunachal Pradesh, Bihar, Goa, Manipur, Punjab, Sikkim and all Union Territories were not assisted under this scheme. (Table 8 & Fig.16).

PLAN ALLOCATION FOR NATIONAL PARKS

During Sixth plan there was an allocation of only Rs.99 lakh for the development of national parks, which was raised to Rs. 260 lakhs in Seventh plan period. Under the central scheme of 'assistance to States for development of national parks'[3] given to States after scrutiny of their proposal, on 100% basis for items of recurring expenditure and on 50% basis for items of recurring expenditure. The conditions that the national

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3. Ibid.

park being financed is under the complete control of that State's wildlife wing.

The Statewise break-up of Central assistance during Sixth and Seventh five year plan period is shown in the table no. The budget provision for the development of 32 national parks in 1987-88 was Rs. 199 lakh and during 1988-'89 it is Rs. 192 lakh. (Table. 9 & Fig. 17).

In Seventh plan the maximum amount is allocated to Himachal Pradesh and UP. Other States who are seriously undertaken in this scheme are Rajasthan, Gujarat, Madhya Pradesh, Andaman and Nicobar, Karnataka and Meghalaya.

In Novermber 1972 the Indian Wildlife Board chose the tiger as the national animal of India. A national scheme called the 'Project Tiger' was launched to protect the dangerously depleting species. There are 16 tiger projects in India, of which four are wildlife sanctuaries and 12 are national parks. These tiger reserves get special attention and allocation from centre. The Table no. 10 shows the funds allocated to tiger reserves in different years of sixth and seventh plan. In present plan Namdapha, Manas, Palamu, Nagarjun Sagar etc are important reserves who have got special attention.

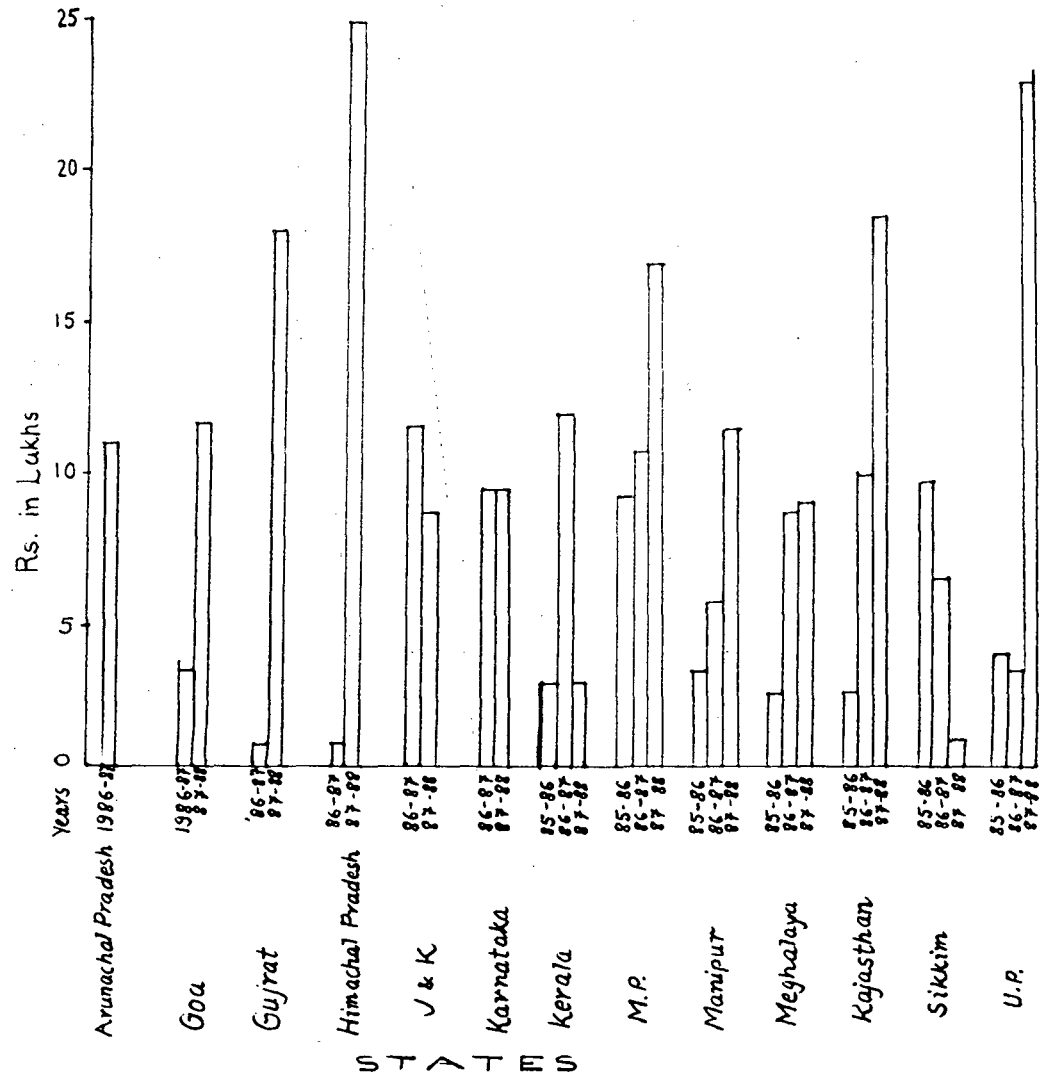
Table: 9. State-wise Release of Funds Under National Parks Scheme during Seventh Fiver Year Plan Period

(Rs. in lakhs)

S.No.	Name of States	1985-86	1986-87	1987-88 (upto 15.2.88)
1.	Andhra Pradesh	-	-	-
2.	Arunachal Pradesh	-	11.0	-
3.	Assam	-	0.50	-
4.	Bihar	-	-	-
5.	Goa	-	3.60	11.80
6.	Gujarat	0.05	0.90	18.35
7.	Himachal Pradesh	-	1.20	25.19
8.	Jammu & Kashmir	-	11.45	8.08
9.	Karnataka	-	9.64	9.60
10.	Kerala	2.94	12.10	3.02
11.	Madhya Pradesh	9.24	10.92	17.06
12.	Manipur	3.42	5.73	11.69
13.	Meghalaya	2.86	8.74	9.00
14.	Rajasthan	2.89	10.00	18.50
15.	Sikkim	9.79	6.63	1.31
16.	Uttar Pradesh	4.07	3.50	23.00
17.	West Bengal	-	6.63	-

CENTRAL ASSISTANCE TO STATES UNDER NATIONAL PARKS SCHEME DURING SEVENTH FIVE YEAR PLAN

(UP TO 15.2.88)



(Other figures are insignificant)

Fig 17

Table: 10. Statement Showing Release of Funds to the Tiger Reserves for the Years From 1985-86 to 1987-88 (upto 15.2.88) VII Plan

Name of the Reserve	1985-86	1986-87	1987-88	Total Rs.in Lakhs
Corbett	10.80	13.12	13.15	37.07
Palamau	11.45	16.10	17.52	45.07
Similipal	9.93	11.40	17.00	38.33
Kanha	10.49	5.02	15.50	31.01
Manas	20.42	17.61	13.50	51.53
Sariska	8.39	8.79	15.40	32.58
Ranthambore	7.67	8.51	12.52	28.70
Bandipur	12.35	13.02	14.77	40.14
Sunderbans	8.57	10.77	19.55	38.89
Melghat	12.98	14.55	19.00	43.59
Periyar	9.30	14.69	19.00	43.59
Indravati	9.42	13.16	11.30	33.88
Nagarjunasagar	12.56	15.66	17.13	45.35
Buxa	2.10	0.03	21.01	31.14
Namdapha	24.96	24.57	6.93	56.46
Dudhwa	-	-	18.76	18.76
	171.99	195.00	233.04	601.03

FUNDS ALLOCATION TO THE TIGER - RESERVES

From 1985-86 to 1987-88 (Upto 15.2.88)

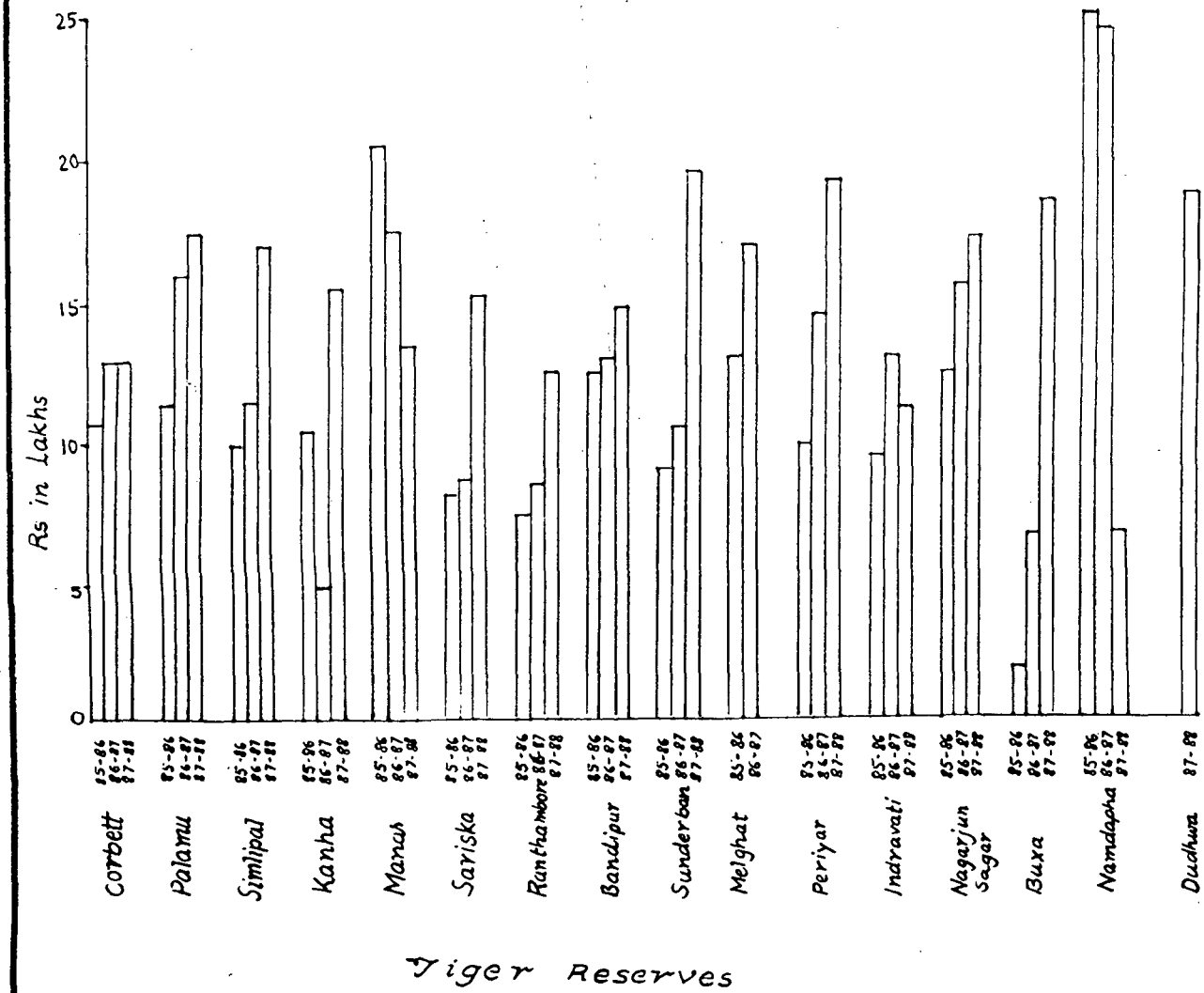


Fig 18

he Directorate of Wildlife under the Ministry of Environment and Forest was set up in pursuance of guidelines given by the National Wildlife Action Plan to assist the State government in the proper management of the national parks and sanctuaries. The Directorate is also responsible for assigning the assistance to States. Its efforts to enlarge the network of wildlife protected areas to adequately represent country's biological diversity were continued during 1988. By the end of 1988 there were 68 national parks and 366 sanctuaries in the country.[4]

The wild life institute of India has completed a project for preparation of the bio-geographic classification suitable for conservation, planning and has submitted a report entitled 'Planning a Wildlife Protected Area Network in India'. The report recommended that at least 4.6% of geographic area of the country should be under national parks/sanctuaries. At present it is 4.07%. It is hoped that target would be achieved in next few years. (Table. 3 & Fig. 13).

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4. Ibid.

The Indian Board for Wildlife, the apex statutory advisory body for formulating policies on wildlife, met under the chairmanship of Prime Minister Mr. Rajiv Gandhi in June '88[5] and took important decisions regarding the conservation of wild life resources of country. The management of various national parks had been evaluated by a committee appointed by the Board and Dachigham national park was adjudged the best national park for the year 1981-'84. In this meeting special attention was paid to the protection of the rare and endangered species like the tiger, rhinoceros, snow leopard, brow antlerd deer, Indian elephant, cranes and bustards.

The Indian Board for Wildlife has played an important role in encouraging and growing consciousness among the people for wild life. It organises various programmes, functions, seminars and workshops for conservation of wildlife during wildlife week which is celebrated in first week of October.

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5. Employment News (Saturday, Jan 28, 1989), pp. 3 -4.

DIFFERENT ACTS AND LAWS REGARDING WILD LIFE

he British were responsible for the large scale deforestation and mass destruction of the wild life. But they were also the people who became aware of their preservation and tried to regulate various laws. The greatest drawback was that at that time the political boundaries were so divided into British and Princely states, that the enactment of laws, which were different in different states became difficult at many times. The prohibited animals for game at one state might be free for hunting in adjacent states. The nature of penalties were also different.

During that period various acts were passed by British administraters. The Indian Forest Act (1879, 1927, 1950) and its adaptations in States was administered by the forest departments and gave basic protection to wildlife in reserved and protected forests as follows: - [6]

Prohibition of shooting, fishing and poisoning water, setting of traps and snares; Section 26(i) Reserved forests, Section 32(j) Protected forests.

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6. Stracy,P.D ; Wild Life in India, Its Conservation and Control, (New Delhi: Ministry of Food and Agriculture, Department of Agriculture, Govt of India, 1963).

Prohibition of killing or capturing of elephants in areas where the Elephant Preservation Act of 1879 is not in force. Section 26(j) Reserved forests, Section 33(j) Protected forests.

In addition to the Indian forest act, there was the 1887 act for the preservation of wild birds and game, or the 'Wild Birds & Animals Protection Act' as it became in 1912. This act was applicable to all types of areas and in areas outside the reserves which was administered by the civil and police departments of the States to which it has been extended, though in reality it was a dead letter. The act was applied to few specified wild birds and animals from time to time. Close reasons were declared for them. At that time the penalties were fine upto Rs. 50 and for every subsequent conviction, imprisonment upto one month or fine upto Rs. 100 or both.

Besides these acts, certain legislations applicable to certain places and time were also in existence, such as the Elephant Preservation Act of 1879, the Indian Fisheries Act 1897, the Assam Rhinoceros Preservation Act and the Bengal Rhinoceros Protection Act.

After Independence the Indian Board of Wildlife was formed and many States also overhauled their wildlife legislations. The Bombay State (Maharashtra) Wild Birds and Animals Protection Act of 1951 was first step[7] and was also recommended as a model for other States. This Act brought all types of areas, whether government forests or waste lands under the same law and the same set of rules, and this undoubtedly makes for simplicity of administration and control. The conservator of forests was empowered as special wildlife preservation officer, assisted by Game wardens (Divisional forest officers or Deputy collectors). The main machinery of enforcement is the forest department itself or revenue patel in the absence of forest staff. All forms of shooting and trapping of wildlife were licenced. Penalty and imprisonment for offence was also fixed. Many other States also modified their acts in more or less same line.

However, the game rules were diverse in nature. Some States had the shooting permit system. While others do not, in some States there were bag limits while in others there were none, the netting of birds was permitted in some States, but not in others. The same contradiction were also on the close reasons,

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7. Stracy, P.D ; Wildlife in India, Its Conservation and Control, Ministry of Food and Agriculture, Dept. of Agriculture, Govt. of India, N. Delhi, 1963.

on vermin limit, though the similar condition was prevailing in neighbouring States.

So the need for unanimous laws was felt. Wildlife (Protection) Act 1972 is the recent and most scientific protection measures taken to preserve the vanishing species. Under the provision of this act, any area can be declared as a wild life sanctuary or a national park in case the area concerned needs protection and conservation for its ecological, faunal, floral, geomorphological and zoological significance. The Central government can establish a wild life sanctuary or national park with the consent of the concerned State government.

Efforts to control poaching and illegal trade in wild life by strict implementation of this act were stepped up through the four regional offices. Financial assistance to twelve States to the tune of Rs. 30 lakh is being provided to tackle the problem of illegal killing of wild animals, particularly elephant in the southern States and has had a marked impact. To gather timely and correct intelligence about poachers and illegal traders, a system of cash awards both under the central sector and centrally sponsored schemes was introduced.

Any person who contravenes any of the provision of the act or any rule made thereunder, or who commits a breach of

any of the conditions of a licenced granted under the act, shall be liable for punishment for a term which may extend for two years, or a fine which may extend to Rs. 2000, or both simultaneously.

In the cases of offences relating to species included in Schedule I and Schedule II - Part II[8] of the act, or to hunting in national parks or sanctuary, the offender shall be liable for punishment for a term which shall not be less than six months, can be extended to six years and also with fine which shall not be less than five hundred rupees. In case of a subsequent offence the term of imprisonment shall not be less than one year and the fine shall not be less than one thousand rupees. (Table. 11).

The cases are compundable. Officers not below the rank of Deputy Conservator of forests are empowered to accept a sum upto Rs. 2000/- by way of compensation of such offences.

In this act it is also mentioned that the wild animals, meat trophy, uncured trophy, animal article in respect to which an offence has been committed under this act shall be property of the government.

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8. Annual Report of Ministry of Wildlife and Environment, Govt of India, (New Delhi, 1988).

Table: 11. List of Representative Animals of Various Schedules

Schedule I	Schedule-II	Schedule-III	Schedule-IV	Schedule-V
	Part- I			
1. Black Buck	1.Assamese macaque	1.Barking Deer	1. Ducks	1. Common Crow
2. Brow-antlered deer	2.Bonnet macaque	2.Chital	2. Geese	2. Fruit Bats
3. Chinkara	3.Pig-tailed macaque	3.Hog deer	3. Partridges	3. Mice
		4.Nilgai	4. Quail	4. Rats
4. Clouded leopard		5.Samber	5. Doves	
5. Four horned antelope		6.Wild Pig		
6. Golden langur	Part- II			
7. Indian elephant				
8. Indian lion	4. Common Fox			
9. Indian wild ass	5. Giant Squirrel			
10.Indian wolf	6. Himalayan Black Bear			
11.Kashmir stag	7. Jackal			
12.Malabar civet	8. Otters			
13.Musk deer	9. Red Fox			
14. Rhinoceros	10. King Cobra			
15.Sloth Bear	11. Varanus species			
16.Snow leopard				
17.Wild Buffallo				
18.Python				
19.Gharial				
20.Crocodile				
21.Peacock				
22.Great Indian bustard				
23.Oerdon's courser				
24.Great Indian Hornbill				

Thus, with the help of Wildlife (protection) act 1972, the government has tried to get stringent powers to forest officers to avoid hunting of wild animals. But even then the poachers are active. The fine is very small sum in comparison to the value of skin, hide and other products of animals. The gangue of national/international poachers are active in accessible places, especially at national boundary zones where legal complexity hampers the forest officers to enact any action against the offenders. The showrooms in cities where such skins and skin-made goods are sold should be banned or tightly regulated. The consciousness among the people is also necessary, so that they can realise the value of such invaluable life.

After a brief introduction of various forest/wild life laws, it is worthwhile to know about the impact of various forest/wildlife laws on the inhabitants of forests , ie, the tribal people.

IMPACT OF FOREST/WILD LIFE LAW ON TRIBAL PEOPLE

ccording to the famous sociologist, D.N.Majumdar (1978), 'A tribe is a social group with territorial affiliation endogamous with no specialization of functions, ruled by tribal officers -hereditary or otherwise, united in language or dialect....'. In India they are located in forest and hilly terrain of northeast, central or middle and southern India. Though the waves of modernity has penetrated at some places to these people, but, by and large, still they are dependent on the nature or forest. Forests have been sufficiently sustaining their inhabitants. The tribal people get food, fruits, edible roots, herbs, honey, meat, skin and various other wild products from forests. In other words, the traditional economy of tribals is built in and around the forests. Even their religion and magical beliefs also rotate around the forests. They achieved a harmony between their lives and nature through the forests. They enjoyed the freedom as 'natives of forests' until about the mid of 19th century. In 1894 the first forest policy was inunciated by Britishers to limit and regulate the tribal rights. From this juncture onward the governments either British or Indian extended their powers. In first forest policy the forests were classified into four categories -

(1) Forests important for climatic and physical environment,
(2) Forests important for timber and commercial purposes,
(3) Minor forests and (4) Pasture lands.

After Independence the policy of 1894 was reassessed and modified according to changing environment, growing population and importance of ecological impacts. The new policy was laid down in 1952 in which tribals' right on forest were controlled. Even in many cases, for example in Chotanagpur region about 50 lakh acres land was taken by government on the ground of scientific mismanagement by tribals (as stated by Ram Dayal Singh Munda, President of Jharkhand Coordination Committe). They have now no statutory rights but certain privileges to take water for agriculture, to dig wells and canals for agriculture. They can graze cattle in open forests (under passes). They can remove stones and earth for domestic and agriculture use. They can remove timber, bamboo, reeds and canes for housing purposes. They can collect dead woods and grass. They can fish and hunt unprotected fauna.

But these concessions vary from State to State and and there is no uniformity. Many times forest boundaries run close to, or coincides the tribal people. Such situation raises conflict between tribals and forest department. In such situation

the tribals are in disadvantageous position because forest acts have provided more power to forest officers like Chief Conservators, District Forest Officer, Ranger etc. They have legal powers to arrest without any warning any person against whom a reasonable suspicion exists. They can seize forest produce, cattle, tools, carts etc if they believe that a forest offence has been committed. They (forest officers) are bound to prevent and interfere in preventing an offence, to warn people against taking axes, saws etc.

Since the forest officers have to function in extremely difficult physical areas, they are given legal protection of far reaching character; No suit will be against a public servant for any act done in good faith. They cannot be criminally prosecuted for offence done by mistakes of facts, but not of law. They cannot be prosecuted without the approval of government or otherwise, according to status of officer.

Thus, we can see that under such conditions the poor, illiterate and ignorant tribal people are placed at the mercy of forest officers. These laws have encouraged exploitation at many places. They (tribals) have been alienated from their forests and lands. Their means of economy has shattered down. In the name of various projects, plants and industries their

ancestral lands have been seized without proper compensation and rehabilitation. The result is that the tribal unrest, their violent movement (e.g. Jharkhand movement) and ruthless deforestation, because due to lack of job and land they sell woods in market. So there is a need to chose a mid-way, that is to encourage the tribals to grow forest in their lands to develop the fauna and flora as well as their economy.

TOURISM: ITS IMPACT ON TRIBALS AND WILD LIFE

our is a short-term travel to any place with any purpose like education, entertainment, pilgrimage, trade and commerce etc. The sanctuary and parks provide various objectives at the same time. It entertains, educates, create love for nature and wild life and generate consciousness about nature and its inhabitants, its preservation and conservation etc.

Till 1970s no serious attempt was made to exploit tourism potentialities in national parks and sanctuaries. But the enactment of Wildlife (Protection) Act, 1972 was a significant step in the encouragement of tourism. Before this law wildlife tourism was disorganised and haphazard. The tourists were not enthusiastic to visit the forest knowing that poachers and other elements might have wiped out or driven away the wild animals. After enforcement of the new measures; the strict restriction on hunting and building of infrastructures through financial aid by central

government the tourism began to develop. They were not only encourages for seeing wild animals, but natural flora also. Wildlife tourism has made people more conscious of nature conservation. Though, it has also been alleged that tourism has led to the degradation of fauna of sanctuaries and parks. But guided wild life tourism can never lead to degradation of wild life sanctuaries and parks.

However, the wildlife tourism could not grow substantially in India. In the case of some of national parks the number of visitors has declined or remained static, e.g., in Corbett, Kanha and Palamu. Only in the case of Sariska and Periyar a marginal growth is recorded. Though the given list no. 7 does not show any trend,[9] but one can draw inference that the position of tourism is not very satisfactory. Our wild life tourism constitues hardly 5 to 10 % of foreign tourists. There are many reasons behind this state, lack of infrastructure like all season roads - hotel accomodations - vehicles and lack of properly trained guides. Public consciousness and enthusiasm about wild life and nature has not grown so much which can boost wildlife tourism. The text books in schools,

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9. Indian Institute of Tourism and Travel Management ; Report of Seminar on Tourism and the Conservation of Wildlife Reserves, (New Delhi : May 11, 1988).

travel agencies, tourism department and other mass media are now doing well in growing the interest of people for wild flora and fauna.

There are two types of impact, one is positive, other is negative. On positive side tourism is beneficial for tribals. It is a good source of income. They sale fruit, poultry, local handicraft and artisary, vegetables and forest collection to tourists. They also get money by services they render as guide, cook or other way. Thus, they earn money in such places, where previously there was no other income sources except for their primitive occupations such as wild product collections, subsistance agriculture etc which are seasonal and variable or fluctuating in nature. So tourism provides better economy to the tribals.

Apart from these economic aspects, tourism plays an important social role. The primitive people come under the influence of new culture. This contact changes their living style, food, clothing and other behaviours. Tourism provides some infrastructure like roads, electricity, post and telegraph, medical facilities in remote areas, which helps them a lot. They visit the outer world for various purposes like medical, education and job. Thus, tourism brings socio-economic changes in remote

areas and grows awareness among the primitive people.

There are dark aspects of tourism too. Tourism increases the prices of local products because tourists have better purchasing power than local poor people. Thus the local products like food articles, chicken, handicrafts, fruits etc become inaccessible for local people. Tourism brings about changes in social values and sometimes eliminates the local cultural identity. The outer or new culture which is generally more powerful, try to superimpose over the local culture. many times the money brings various corruptions, e.g., crimes, prostitutions, adultary and other social evils.

However, the wildlife tourism is not uniformly developed in India and is concentrated in few zones and places. Especially those parks and sanctuaries are well developed, which lie near important city, towns or along national highways, e.g., Sariska, Corbett, Sundarban, Gir, Mudumalai and Kodaikanal etc. Other parks and sanctuaries which are far from important places, have yet to do a lot for development. So, the impact of tourism on tribal community is also not countrywide but limited to few places.

The tourism has also affected the wild life. Previously they were not conscious of man, vehicles and other things,

but now these are common for them. These things including contact with man has changed their behaviour. They are disturbed by man. Even the guided tourism, which is done in night or early morning with search light, vehicles by group of people, disturbs them. Many times reserve forest fire takes place by cigaratte piece by tourists, which takes a large toll of wild lives. In 1987 a blaze in Bharatpur bird sanctuary killed many species of animals and birds. So the tourist should be guided under strict disciplined supervision. In a seminar held in India International Centre, New Delhi (May 11, 1988)[10] on Tourism and the Conservation of Wildlife Reserves, organised by Indian Institute of Tourism and Travel Management, many issues of tourism were discussed. It was suggested that number of tourists should be regulated, i.e., there should be ceiling of number of tourists. The tourists must know Do's and Don't's. The officer in charge should be given authority for the regulation of the area, time period of visit and number of visitors. Various other issues were also discussed in this regard to develop the tourism in forest areas. Despite of different opinions, they were unanimous on the intricacy and delicacy of the relation between the tourism and

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10. Ibid.

wild life, so they must not be disturbed beyond the limit. It was also suggested that a core area should be declared within parks and sanctuaries where no human activity or tourism should be permitted, so that the animals can lead a natural way of life.

WILD LIFE CONSERVATION MOVEMENTS IN INDIA

n India the first step for preservation of wild life was the 1887 act for the preservation of wild birds and game, followed by the similar act of 1912.* In 1935 'Society for the Preservation of Wildlife' in UP forced the government of India to call for a conference on wildlife in Delhi. This gave an impetus to the movement which resulted in the formation of Hailey National Park in UP (now Corbett national park). But with the Second World War the enthusiasm soon died down.

After Independence largely through the efforts of Lt. Col. R.W.Burton and of Bombay Natural History Society, the wild life conservation movement gained a new impetus. The advisory committee for coordinating scientific work in India

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* At the same time sanctuaries for Asiatic lion in its last refuge in Asia (Gir forest in Gujarat) and Rhinoceros in Assam were formed.

in 1951[11] appointed a sub-committee of leading sportsmen and wild life enthusiasts to examine and suggest ways and means of setting up national parks and sanctuaries for the conservation of rich and varied fauna in India. This committee felt that no substantial or lasting progress in protecting wildlife could be achieved in the absence of a 'permanent control organisation' assisted by an advisory committee to co-ordinated wildlife. The government of India therefore decided to form a Board and the Central (later Indian) Board of Wildlife was inaugurated at Mysore in December 1952.

The functions of Indian Board of Wildlife are as follows:[12]

1. To device ways and means for the conservation and control of wildlife through co-ordinated legislative and practical measures with particular reference to seasonal and regional closures and declaration of certain species of animals as protected animals and prevention of indiscriminate killing.
2. To sponsor the setting up of national parks, sanctuaries and zoological gardens.

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11. Stracy, P.D ; op cit.
12. Ibid.

3. To promote public interest in wild life and need for its preservation in harmony with natural and human environment.

4. To advise government on policy in respect of export of living animals, trophies, skins, furs, leathers and other wildlife products.*

5. To prevent cruelty to birds and beasts caught alive with or without injury.

6. To perform other functions which will be helpful for the development of wildlife.

The board has discharged its responsibilities very creditably and has made many important recommendations on wildlife. It has been mainly responsible for bringing about a considerable degree of consciousness of the need to preserve wildlife in the country. The government of India has also responded positively. The 'Van Mahotsava' or festival of forest has begun since 1952 to emphasise the importance of tree plantation. Similarly since 1956, the government of India celebrates the first week of October as the wildlife week. The Prime Minister of India is the ex-officio chairman of the wildlife board. India is also an active participant of world

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* Under the trade control order the export from India of following animals or their part is totally banned: Asiatic Lion, Cheetah or Leopard, Indian Rhinoceros, Brown Antler Deer, Hangul, Crocodiles etc.

wildlife fund. In India itself a wildlife fund has been constituted to finance the mechinary of protection.

The centre has sponsored many conservation projects. The tiger projects are part of it. Centre has sponsored the scheme of Rhinoceros conservation in Assam with a fund of Rs. 175 lakh for providing[13] the State governments with funds for staff, building, communication, equipment and vehicles for effective and intensive management of Rhinoceros' habitats. Financial assistance was also provided to the 13 Snow leopard reserves in Himalayan region which are the critical habitats of this endangered species.

In India, the non-governmental organisations are also active,* but their voice is still low. There are many groups of environmentalists, conservationists who have opposed time to time the threat of mass extinction of flora and fauna by man or gaverrment. Such destruction becomes very frequent due to large multipurpose hydel projects and establishment of hydel projects. The environmentalist, ecologists and various social organisations have opposed/are opposing the Ram Ganga project, Narmada Sagar project, Sardar Sarovar project, Koelkaro

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13. Employment News, (Saturday, Jan 28, 1989), pp. 3-4.

* e.g., Bombay Natural History Society, Zoological Society of India, etc.

project etc. which will submerge not only the large population settlement but forests as well as their wildlife, which are irreplacable. Now, consciousness among people is growing and they begin to raise voices against such destruction. Mass media is playing a good role in this direction. The postponement of silent-valley project in Kerala is a victory of environmentalist-ecologists and wildlife lovers. Instead of large-scale projects which do irrepairable damage and takes long construction and gestation period, government should concentrate on medium and small size project, so that the silent creatures and beautiful nature cannot be extinguished in the name of development.

CONCLUSION
PROBLEMS & PROSPECTS

The geographical features of Indian subcontinent is too diverse in every aspect; topography, soil, natural vegetations and climate. All these diversity reflect in the distribution and variety of wild life. However, after all diversity the subcontinent can be kept under the umbrella of region of monsoon climate. As described earlier all physical features are common to neighbouring countries, there is no sharp demarcation. This is the case with wild animals also. They are found on the either sides of political boundaries. So, wherever they are described in Indian context, they are also relevant to other side of political boundary.

It is easier to study the distribution of animals over space. As we have seen in the third chapter, they are widely distributed in the regions of Himalayas, Plains, Peninsula and deserts. There are many differences as well as commonalities too. Many animals are space bound, for example, the Murmot and Yak are found in Ladakh, Slow Loris in north east Himalayas, Rhinoceros in Assam, Lion in Gir. But there are many animals which are

found almost everywhere in this subcontinent, e.g., the Tigers, the Elephants, the Monkeys and Common Langurs, etc.

The history of Indian subcontinent is very old in all respects. Its geology, fauna, flora and human civilization all are very old. So the relation between man and animal is very old. Even then both were co-existed for long period. In ancient time the old Hindu religious tradition encouraged non-violence, kindness to all creatures. Man was not hostile to animals. But after the invasion of foreign rulers, especially the Britishers this relation of co-existence disturbed. Till the end of last century there was no serious problem for wild animals as well as for their habitat. The expansion of rail and road network, various development projects and rampant cutting of vegetation as a result of increasing human population caused the area under forests to shrink tremendously and the wild inhabitants came under many troubles and their life precariously got endangered. Many of them either swept away from the forest ambience or came on the verge of extinction. The two horned rhinoceros of Sunderhans has disappeared. Once common Indian Cheetah has gone for ever. The black buck, the chinkara, the Indian wolf and the stripped hyena, the wild ass of Kutch, the snow leopard - clouded leopard of north-east India, the Kashmir stag, musk deer, pigmy hog are almost doomed unless prompt

conservation measures are taken.

Until 1947 there was no organised shikar companies in the country. The law of sports was varying from place to place and from time to time. After 1947 around 27 companies were registered, and hunting was offered to tourists.

The decade of 1970s was most favourable for wild animals, when these silent creatures were protected under the umbrella of various laws and acts, plans and projects. In 1970 tiger hunting was banned when Mr. Kailash Sankla, a forest officer and former director of Project Tiger, drew attention to the plight of tigers in International Union for Conservation of Nature and Natural Resources Congress (New Delhi, 1969).[1] Tiger was included in Red data book. The result was the setting up of the Project Tiger. The next important step was the wild life (Protection) Act of 1972. Thereafter, the state - central governments tried to pay proper attention on the preservation of wild life. Due to such efforts many species revived, for example tiger, black buck, crocodile , various types of monkeys etc. Though many cases of offences have also been reported where wild creatures were hunted by poachers, for instance, since

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1. 'Problems of Project Tiger', The Statesman, Jan 21, 1989.

1982 four tigers and many dozens black bucks were killed in Sariska alone .

There is other face of wild life problem too . A new problem has emerged now , that is the increasing/ increased number of many species of animals have created problems to the people living in nearby villages . This problem was highlighted in the Conference of State forest ministers (May'89, New Delhi) . S.N Medhi, the forest - minister of Assam was too annoyed bacause the elephants have killed hundreds of people . They raid the crops and killed people if they come in the way. At present Assam has largest elephant population, around 5,000 elephants in 5,000 sq km.

Other headache is created by crocodiles. In 1975 Project crocodiles was launched to save this reptile from extinction. The Project was successful and they grew three times. One third of them were released into rivers, but there are still above 7,000 in 32 farms of the country. The fishermen of those areas where these crocodiles were released, opposed this programme, because the crocodiles attacked them and absorbed the fish population. In desperation, many States proposed that they will sell crocodile skins in lucrative prices abroad. Initially the Environment Ministry agreed for it and even set up a Pilot Project for

'farming crocodiles' in Tamil Nadu, but the ecologists opposed it and the government was compelled to stop this project.

Similar was the case with other well known projects. The Project Tiger succeeded in increasing the population of tigers. But now they have become dangerous for man. It is reported that more than 450 people have been killed by tigers since 1978 in Dudhwa (U.P).* Cattle lifting is a common phenomena. The people of Sundarbans, Ranthambhor and other reserves are always afraid of these animal terrorists. The Lions, though not much in number, are also wandering out of reserve area.

The most unfortunate situation is that the people who traditionally protected these animals are turning against them. The Bishnoi community around Jodhpur has protected black buck population for centuries. Now they are in large numbers (around 12,000) and damage their crops.

Similar is the case of Nilgai of Rajasthan who became abundant and always raided the crops of villagers. Such incidents have caused the people around sanctuaries and parks to be 'anti-conservationists'. For instance, in Dudhwa, five tiegers were poisoned by villagers who were fed up with their

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* Jansatta, Dec 4, 1988.

cattle being lifted regularly. Similar case of poisoning the lion in Gir has also come into light. The Director of the Project Tiger, Dr. R.L.Singh, has admitted that around 40,50 people becamee victims of tigers annually.* The local people are raising their voices against this project because they are threatened with tigers and feel that their land is encroached by tiger reserves where they are deprived of fuelwood and fodder.

Such dilemma has triggered of a nationwide debate about what to do with excessive numbers. Some are advocating for hunting also. Bur Dr. Ranjit Singh(Additional Secretary, Ministry of Environment and Wildlife), a well known conservationist, disagrees on this idea, because if once their killing is allowed it would be very difficult to regulate it. It would lead to misuse and destruction of wild life. Mr. H.S.Pawar, Director, Wildlife Institute of India, Dehradun, has rightly pointed out that local abundance of a species does not mean that it is out danger. It means that its present habitat is insufficient.

Real problem does not lie in the protection and conservation, but in the management and planning of reserves. The

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* The Statesman, Jan 21, 1989.

original Project Tiger plan envisaged buffer zones around protected core, meant to take care of any pillover of tigers while allowing people from adjoining villages to forage. But so far the project officials have totally failed in preserving the buffer zones.

The reality is that most of India's wild animals are pushed into 363 plus 63 sanctuaries and parks which account for barely 4% of country's geographical area. These forest areas have also been encroached by villagers. Traditional corridors, which enabled the animals to move from one forest to next have been cut off. That has led to very little gene mixing, a vital part of natural regeneration. The Gir lions are living in an isolated small patch. They can be wiped out by just one epidemic. Even the protected parks and sanctuaries are not free from human intrusion and cattle grazing. A study done by Indian Institute of Public Administration found that about 50% of parks and 70% of the sanctuaries, the people are living inside the core zones. Most of buffer zones have disappered and the fringes of these sanctuaries have turned into major battle-ground between men and animals.

Many ecologists also pointed out that wildlife conservation programme too has been lopsided. More attention was given on tigers, elephants, lions and rhinoceros but other

animals like wolves, panthers, snow leopards, jackals, wild dogs and hyenas etc got no proper attention. In such a process the delicate ecological balance has been totally upset, e.g., the predators of black bucks like wolves and many wild cats have been wiped out, so they increased tremendously.

Now the Ministry of Environment has taken vital steps of identifying corridors between forests to enable movements of animals. The Wildlife Institute of India, Dehradun has already submitted a blue print for developing corridors in all geographic regions in the country, which will provide an additional 42 thousand sq km protected area to animals. But it seems a difficult task to acquire land from villagers from these corridors and rehabilitating them elsewhere. The ecologists are also concentrating on the development of buffer zones. In the buffer zones areas for human use would be clearly demarcated. Here, with the help of villagers in surrounding areas, fuel and fodder would be grown to meet their needs and the remaining parts would be developed for animals to roam around freely.

The ideas of developing corridors and buffer zones are praiseworthy. The corridors can help a lot in the intermixing of species and their growth, for instance upto 1950s the forests of Chotanagpur were extensive and dense, so the animals of Ranchi, Palamau and Hazaribagh were wandering here and there. But later on

with the increase of human population and development of various projects, mines and factories the links were disturbed, now they have been cut off from each other. The establishment of buffer zone is also necessary, so that animals can live without human interference and disturbance.

All these plans raise optimism and one can expect in next coming years Homo Sapiens, the wisest creature, will learn to live with these silent creatures. He will not only think about himself, but about the irreplaceable and irrepairable nature and nature's inhabitants.

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