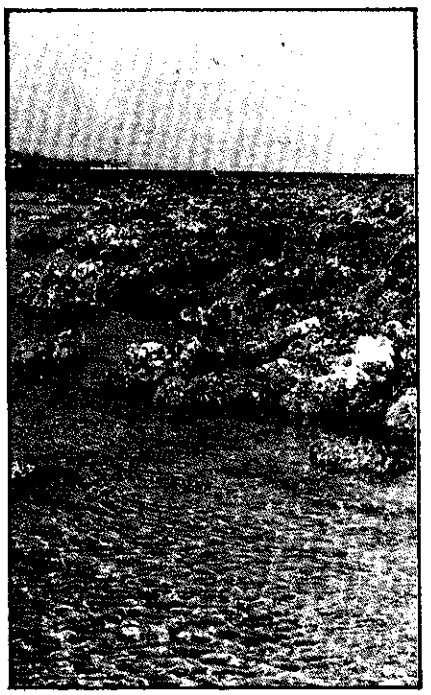
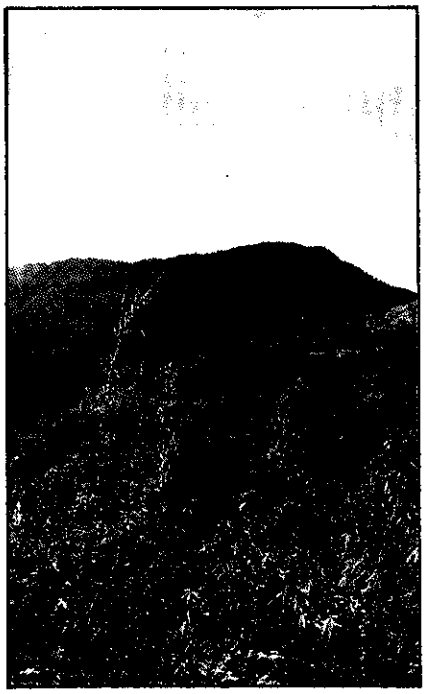




CHAPTER 3

BIODIVERSITY IN INDIA

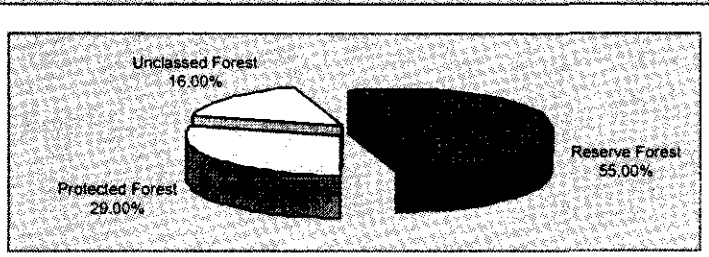
India is located in the south of Asia, between latitudes 6° and 38°N, and longitudes 69° and 97°E. The Indian land mass, extending over a total geographical area of about 329 million hectares, is bounded by the Himalaya in the North, the Bay of Bengal in the East, the Arabian Sea in the West, and Indian Ocean in the South. In terms of landmass, it is the seventh largest country in the world. Its coastline of about 7,500 km extends over 200 nautical miles in the off-shore forming an Exclusive Economic Zone (EEZ) of two million square kilometers. India has a tropical monsoon climate. The South-West monsoons and North-East monsoons bring rain into India. Rainfall is uneven and ill distributed, it varies both temporally and spatially. Western Ghats, along the States of Goa, Maharashtra, Karnataka and Kerala, West Bengal, and Assam receive an annual rainfall of 2000 mm. Maharashtra, Bihar, and Madhya Pradesh along the Vindhyan Mountains receive annual average rainfall of 1000 - 2000 mm. South coastal plains and North Western Deccan and upper Gangetic plains receive an annual rainfall of 500 - 1000 mm. Hot desert areas of Rajasthan and Gujarat and the cold desert areas of Ladakh in Jammu and Kashmir and Lahul-Spiti in Himachal Pradesh receive an annual rainfall of 100 mm.

3.1 ECOSYSTEM DIVERSITY

The wide variety in physical features and climate situations have resulted in a diversity of ecological habitats like forests, grasslands, wetlands, coastal and marine ecosystems and desert ecosystems, which harbour and sustain the immense biodiversity. India is one of the 12 megabiodiversity countries in the world.

Table 1 : State-wise Geographical Area and Actual Forest Cover

State/Union Territory	Geographical area	Recorded forest		Forest cover	
		Area	Per cent	Area	Per cent
Andhra Pradesh	275,068	63,814	23.20	43,290	15.7
Arunachal	83,743	51,540	61.54	68,602	81.9
Assam	78,438	30,708	39.15	23,824	30.4
Bihar	173,877	29,226	16.81	26,524	15.3
Delhi	1,483	42	2.83	26	1.7
Goa	3,702	1,424	38.46	1,252	32.8
Gujarat	196,024	19,393	9.89	12,578	6.4
Haryana	44,212	1,673	3.78	604	1.4
Himachal Pradesh	55,673	35,407	63.60	12,521	22.5
Jammu & Kashmir	222,235	20,182	9.08	20,440	9.2
Karnataka	191,791	38,724	20.19	32,403	16.9
Kerala	38,863	11,221	28.87	10,334	29.6
Madhya Pradesh	443,446	154,497	34.84	131,195	29.6
Maharashtra	307,690	63,842	20.75	46,143	15.0
Manipur	22,327	15,154	67.87	17,418	78.0
Meghalaya	22,429	9,496	42.34	15,657	69.8
Mizoram	21,081	15,95	75.59	18,775	89.1
Nagaland	16,579	8,629	52.04	14,221	85.8
Orissa	155,707	57,184	36.73	46,941	30.1
Punjab	50,362	2,901	5.76	1,387	2.8
Rajasthan	342,239	31,700	9.26	13,353	3.9
Sikkim	7,096	2,650	37.34	3,129	44.1
Tamil Nadu	130,058	22,628	17.40	17,064	13.1
Tripura	10,486	6,292	60.01	5,546	52.9
Uttar Pradesh	294,411	51,663	17.54	33,994	11.5
West Bengal	88,752	11,879	13.38	8,349	9.4
Andaman & Nicobar Islands	8,249	7,171	86.93	7,613	92.3
Chandigarh	114	31	27.19	7	6.1
Dadra & Nagar Haveli	491	203	41.34	204	41.5
Daman & Diu	112	N.A	N.A	3	2.7
Lakshadweep	32	N.A	N.A	-	-
Pondicherry	493	N.A	N.A	-	-
Total	**3,287,263**	**765,201**	**23.28**	**6,33,397**	**19.27**



Status of Recorded Forest Area

Source : Forest Survey of India, 1997

3.1.1 Forest Ecosystems

The forest cover of the country is placed at 633,397 sq. km. according to the Forest Survey of India assessment (1997). This presents 19.27% of India's total geographical area. The state-wise area and forest cover are tabulated in Table 1.

India is endowed with diverse forest types ranging from the Tropical wet evergreen forests in North-East to the Tropical thorn forests in the Central and Western India. The forests of the country can be divided into 16 major groups comprising 221 types. The distribution of these groups, and the percentage of total forest area covered by each are given in Table 2.

Forests provide several essential services to mankind. Forests are the source of a number of food items, fuelwood, fodder and timber. Other economic uses include providing raw material for forest based industries. Some of the minor forest produce include gums, resins, honey, etc. Forests perform important ecological functions such as maintaining delicate ecological balance, conserving soil, controlling floods, drought and pollution. Forests provide habitats for innumerable plants, animals and microorganisms. Forests are a source of recreation and religious inspiration.

Forests face threats on account of diversion of forest land for agriculture, industry, human settlements, other developmental projects. Construction of roads and canals, quarrying, shifting cultivation and encroachments are other threats. Degradation of forests results from illicit felling, excess removal of forest products, fodder, fuelwood, forest floor litter, overgrazing and forest fires.

Table 2 : Forest Types - distribution and percentage

Forest Type	Distribution	% of forest area
Tropical forests		
1. Tropical wet evergreen	North East & South, Andaman & Nicobar island	5.8
2. Tropical semi evergreen	South & East	2.5
3. Tropical moist deciduous	Central & East	30.3
4. Tropical littoral & swamp	Along the coast	0.9
5. Tropical dry deciduous	West & Central	38.2
6. Tropical thorn	West & Central	6.7
7. Tropical dry evergreen	Central & South	0.1
Subtropical forests		
8. Subtropical broad leaved hill forests	South	0.4
9. Subtropical pine	Sub-Himalayan tract	5.0
10. Subtropical dry evergreen	North-East & South	0.2
Temperate forests		
11. Montane wet temperate	Himalaya & Nilgiris (in Western Ghats)	2.0
12. Himalayan moist temperate	Temperate areas of Himalaya	3.4
13. Himalayan dry temperate	Dry temperate areas of Himalaya	0.2
Sub-alpine and alpine forests		
14. Sub-alpine	Himalaya	4.3
15. Moist alpine shrub	Himalaya	
16. Dry alpine shrub	Himalaya	

3.1.2 Grasslands

Grasslands, which are also known as steppes, prairies, pampas and savannas in various parts of the world, are vegetation types with predominance of grass and grass-like species. In India, the total area under grasslands is about 3.9% or 12 million ha. Grasslands in the country also exhibit a diversity ranging from semi-arid pastures in Deccan peninsula, humid semi water-logged grasslands of Terai belt, rolling shola grasslands on the hilltops of Western Ghats, and the high altitude alpine pastures of Himalaya. Box 1 gives the details of five distinct types of grasslands recognised in India.

It is estimated that the Indian grasslands harbour about 1256 species belonging to 245 genera.

Box 1 : Five distinct types of grasslands

1. **Sehima-Dicanthium type** : Spread over peninsular India, the key species include *Sehima nervosum, Heteropogon contortus, Dicanthium annulatum and Themeda quadrivalvis.*

2. **Dicanthium-Cenchrus-Lasiurus type** : Spread over northern parts of Gujarat, Rajasthan, western Uttar Pradesh, Delhi and semi-arid Punjab, this type has *Dicanthium annulatum, Cenchrus ciliaris, C. biflorus, Lasiurus indicus and Atylosia scarabaeoides* (a legume) as key species.

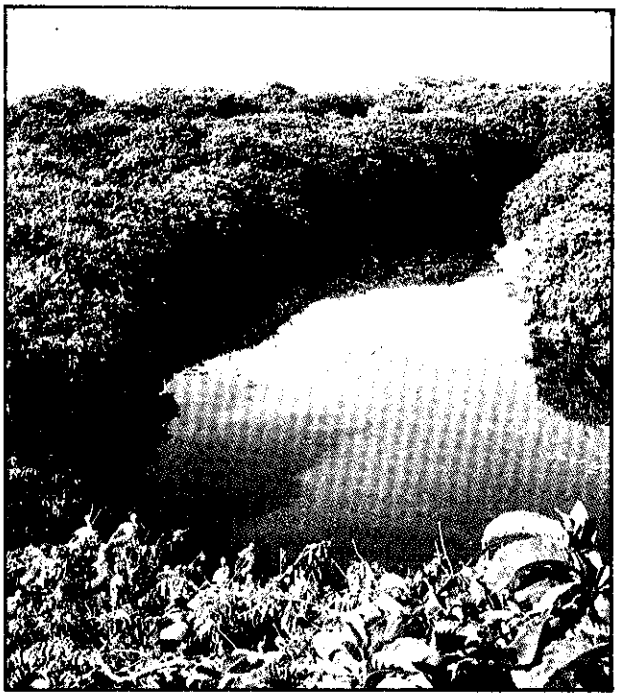
3. **Phragmites-Saccharum-Imperata type** : Covering the alluvial plains of the Ganga and the delta plains of West Bengal, the key species in this type are *Phragmites australis, Saccharum spontaneum, Imperata cylindrica and Desmostachya bipinnata.*

4. **Themeda-Arundinella type**: Spread over the northern plains to the outer humid mountains and hills in Assam, Manipur, West Bengal, Uttar Pradesh, Punjab, Himachal Pradesh and Jammu and Kashmir, this type has key species like *Themeda anaethera, Arundinella bengalensis, Bothriochloa intermdia, B. pertusa, Heteropogon contortus and Cassia tora* (a legume).

5. **Temperate-Alpine type** : covering the higher altitudes of Jammu and Kashmir, Uttar Pradesh, Himachal Pradesh, West Bengal, Sikkim and Arunachal Pradesh, the key species in this type are *Dactyis glomerata, Bromus inermis, Festuca pratensis* and *Themeda anathera.*

3.1.3 Wetlands

Wetlands are transitional zones that occupy intermediate position between dry land and open water. These ecosystems are dominated by the influence of water, they encompass diverse and



heterogeneous habitats ranging from rivers, fold plains and rainfed lakes to swamps, estuaries and salt marshes.

India by virtue of its extensive geographical stretch and varied terrain and climate, supports a rich diversity of inland and coastal wetland habitats. It is estimated that India has about 4.1 million ha. of wetlands (excluding paddy fields and mangroves), of which 1.5 million ha. are natural and 2.6 million ha. are man-made. The predominant wetland types in India can be seen in Box 2.

Wetlands in India harbour enormous diversity of floral and faunal species, many of which are endangered. Some of these have been tabulated in Tables 3 and 4.

Box 2 : Predominant wetland types

- Tanks, Reservoirs and other water bodies of the Deccan peninsula
- Backwaters and estuaries of west coast of the peninsula
- Saline expanses of Rajasthan and Gujarat
- Freshwater lakes and reservoirs of Gujarat, Rajasthan and Madhya Pradesh
- Deltas wetlands, lagoons and salt swamps of East coast
- Marshes, jheels, terrai swamps and chaur lands of the Gangetic plains
- Flood plains of Brahmaputra, marshes and swamps in the hills of North-eastern India
- Lakes and rivers of the montane regions in Jammu & Kashmir, Uttar Pradesh and Himachal Pradesh
- Wetlands in Islands of Bay of Bengal and Arabian Sea
- Coastal brackish water wetlands in West Bengal, Andhra Pradesh, Tamil Nadu and Kerala

Table 3 : Some rare and threatened plant species in Wetlands

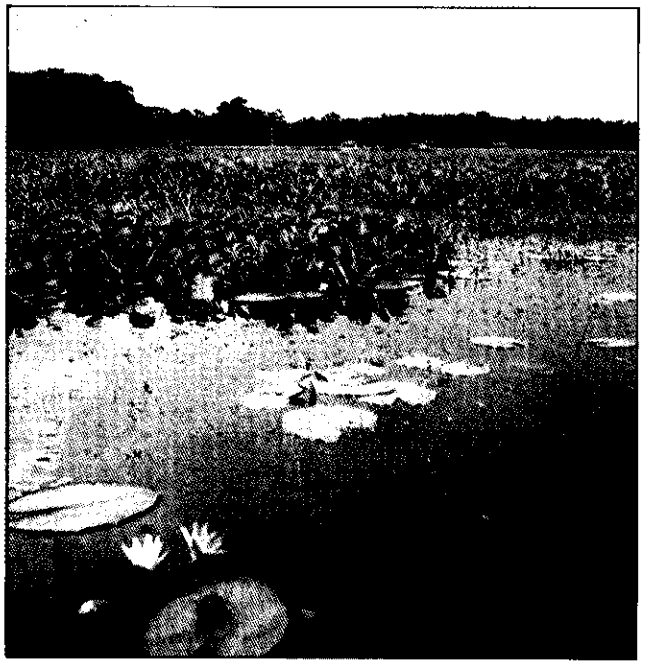
Species	Family
Aldrovanda vesiculosa	Droseraceae
Hubbardia heptaneuron	Poaceae
Hydrilla polysperma	Hydrocharitaceae
Limnopoa meeboldii	Poaceae
Nymphaea tetragona	Nymphaeaceae
Podostemon subulatus	Podostemaceae
Cryptocoryne torulosa	Araceae
Cryptocoryne consobrina	Araceae
Cryptocoryne cognata	Araceae
Vallisneria triandra	Hydrocharitaceae
Hydrobryopsis sessilis	Podostemaceae
Amorphophalus longistalus	Araceae
Amorphophalus onchophilum	Araceae
Cyperus dwarkensis	Cyperaceae
Utricularia minor	Lentibulariaceae
Calamus nagbeti	Areaceae
Aponogeton appendiculatus	Aponogetonaceae
Aponogeton satarensis	Aponogetonaceae
Halophila stipularea	Hydrocharitaceae
Hydrophila pinnatifida	Acanthaceae
Dicrea acuminata	Podostemaceae
Hydrocera triflora	Balsaminaceae
Euryale ferox	Nymphaeceae
Aeschynomene aspera	Leguminosae
Nelumbo nucifera	Nelumbonaceae
Callitriche verna	Callitrichaceae
Eriocaulon humile	Eriocaulaceae

Table 4 : Some endangered animal species in Wetlands

Species	Common name	Wetland
1. *Cervus eldii eldii*	Manipur brow-antlered deer or Sangai	Kaibul lamjao National Park
2. *Dugong dugon*	Dugong	Gulf of Mannar Andaman & Nicobar Islands
3. *Cervus duvaucelii*	Swamp-deer or barasingha	Wetlands in terai Assam
4. *Prionailurus viverrinus*	Fishing cat	Swamps of Terai Himalayas, Sunderbans
5. *Platanisia gangetica*	Gangetic dolphin	Ganges, Chambal and Brahmaputra rivers
6. *Rhinoceros unicornis*	Indian one-horned rhinoceros	Kaziranga National Park, Manas
7. *Bubalus bubalis*	Water buffalo	Kaziranga National Park
8. *Panthera tigris*	Bengal tiger	Sunderban National Park
9. *Anser indicus*	Bar-headed goose	Wetlands of Ladakh
10. *Grus leucogeranus*	Siberian crane	Keroladeo Ghana National Park
11. *Houbaropsis bengalensis*	Bengal florican	Wetlands of
12. *Francolinus gularis*	Swamp Partridge	Manas National Park
13. *Ceryle lugubris*	Crested Kingfisher	
14. *Leptoptilos dubius*	Greater adjutant stork	
15. *Leptoptilos javanicus*	Lesser adjutant stork	
16. *Ardea insignis*	White-bellied heron	Rivers of Assam and Arunachal Pradesh
17. *Phoeniconaias minor*	Asian lesser flemingo	Rann of Kutch, Sundarbans
18. *Cairina scutulata*	While-winged wood duck	Assam & Arunachal Pradesh
19. *Megapodius nicobarensis*	Megapode	Nicobar Islands
20. *Anas gibberifrons albogularis*	Andaman grey teal	Andaman Islands
21. *Crocodylus palustris*	Marsh crocodile or Mugger	Hiran lake in Gir National Park
22. *Gavialis gangeticus*	Gharial	National Chambal Wildlife sanctuary
23. *Crocodylus porosus*	Estuarine crocodile	Bhitarkanika Wildlife Sanctuary
24. *Lepidochelys olivacea*	Olive ridley turtle	
25. *Dermochelys coriacea*	Leatherback Turtle	Andaman & Nicobar Islands
26. *Eretmochelys imbricata*	Hawksbill Turtle	

Wetlands are a highly productive ecosystem which serve as habitat for a variety of plants and animals. Wetlands perform essential functions including flood control, natural sewage treatment, stabilisation of shorelines against wave erosion, recharging of aquifers and supporting rich biodiversity. Many wetlands serve as the winter habitats for migratory birds.

Many of the wetland areas have been drained and reclaimed for agricultural and urban expansion. Siltation is a problem particularly in shallow lakes such as Chilka in Orissa and Kolleru in Andhra Pradesh. Some other wetlands, such as Srinagar's Dal Lake, are threatened by eutrophication. Wetlands are also subjected to the stresses such as agriculture runoffs, pesticides, construction of dams and barrages.



The Convention on Wetlands of International Importance, especially as Waterfowl Habitat, better known as the Ramsar Convention after the name of the place where it was adopted in 1971, is an international treaty which provides the framework for conservation of wetland habitats. Under this Convention, the Parties are required to interalia designate wetland sites for inclusion in a 'List of Wetlands of international significance' or commonly known as Ramsar sites. India acceded to the Convention in 1981. Six wetland sites have so far been designated as Ramsar sites. These are : Chilka lake in Orissa, Keoladeo Ghana National park in Rajasthan, Wular Lake in Jammu & Kashmir, Harike lake in Punjab, Loktak lake in Manipur and Sambhar lake in Rajasthan.

3.1.4 Coastal and Marine Ecosystem

The coastline of India including those of Andaman & Nicobar Islands and Lakshadweep islands extend over 7500 km. The marine ecosystem in India covers 2.1 million sq. km. area. The marine biodiversity specially from the deep sea region remains little explored. However, the available data on marine faunal biodiversity reveals that it represents more than 15% of the total fauna of the country. It is also noteworthy that 13 groups of animals are purely marine.

3.1.4.1 Mangroves

Mangroves are salt-tolerant ecosystems in tropical and subtropical regions. These ecosystems are largely characterised by assemblage of unrelated tree genera that share the common ability to grow in saline tidal zones. The evergreen broad leaved trees of mangrove forests are highly adapted to the stresses of flooding and salinity. The mangrove species adapt to their stressful environment through : (i) elaborate tube-like breathing structures called pneumatophores which grow vertically upwards from the roots, (ii) specialised root cell membrane that reduces the entry of salts and (iii) viviparous seedlings where the seed germinates on the parent plant itself thereby decreasing their morality in this unfavourable environment.

India harbours some of the best mangrove swamps in the world, located in the alluvial deltas of Ganga, Mahanadi, Godavari, Krishna and Cauvery rivers, and on the Andaman & Nicobar group of Islands. The total area covered by mangroves in India is estimated at about 6700 sq.

km. amounting to about 7% of the world's mangroves.

The largest stretch of mangroves in the country lies in the Sunderbans in West Bengal covering an area of about 4200 sq. km. The predominant mangrove species are *Avicennia officinalis, Excoecaria agallocha, Heritiera fomes, Bruguiera parviflora, Ceriops decandra, Rhizophora mucronata* and *Xylocarpus granatum*. Mangroves also harbour a number of molluscs, polychaetes and honeybees.

The Andaman & Nicobar group of Islands account for about 1200 sq. km. of mangroves with a preponderance of woody species. The dominant mangrove species are : *Rhizophora mucronata, R. stylosa, Bruguiera gymnorrhiza, Avicennia marina, Ceriops tagal, Nypa fruticans, Phoenix paludosa* and the brackish water marsh fern *Acrostichum aureum*, usually associated with *Acanthus ilicifolius*.

Small patches of mangroves are found on the west coast in the states of Gujarat, Maharashtra, Goa, Karnataka and Kerala. The main species found are *Avicennia marina, A. officinalis, Ceriops tagal, Salvadora persica, Rhizophora mucronata, Sonneratia alba, Kandelia candel, Acanthus ilicifolius* and *Heritiera littoralis*.

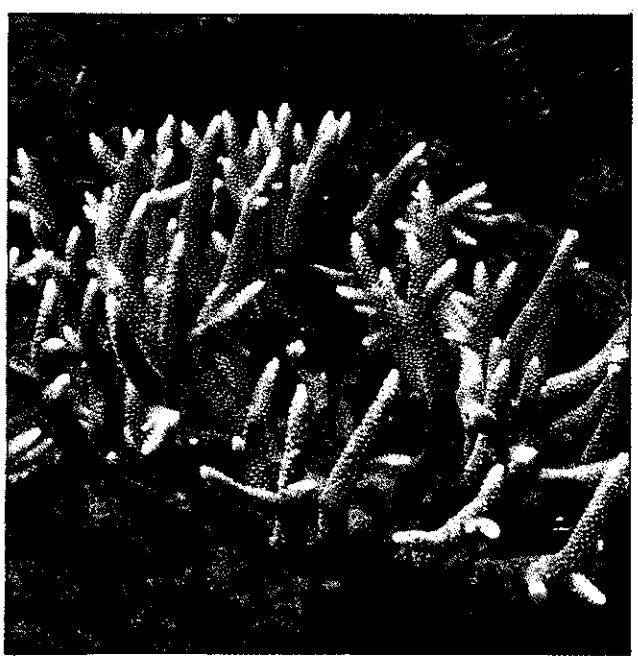
Mangroves also occur in the states of Orissa, Andhra Pradesh and Tamil Nadu on the eastern coast. The dominant species in this region include : *Bruguiera cylindrica, B. parviflora, Heretiera fomes, Rhizophora mucronata, Phoenix paludosa, Avicennia officinalis, A. marina* and *Ceriops tagal*.

Mangroves constitute an important economic resource providing fodder, fuelwood, tanbarks, edible fish, hides, honey, wax, various chemicals and medicines which are important sources of livelihood for people. Mangroves play an important role in stabilising shorelines, and protecting these from cyclones. Mangroves also harbour a variety of plants and animals including rare and endangered ones. Because of the value of their wood, many mangrove areas have been felled. Some areas have been drained and logged completely for reclamation of land, particularly in Mumbai and Cochin. Over-exploitation of fisheries, turtles, crocodiles and other fauna also has adverse impact on mangrove biota.

Increase in sewage and industrial effluents has deleterious impact on the biodiversity harboured by mangroves. Aquaculture with its high inputs of organic matter, fish feed etc. accelerates eutrophication of mangrove areas.

3.1.4.2 Coral reefs

Coral reefs are shallow-water tropical marine ecosystems which are characterised by a remarkably high biomass production due to upwelling of water. These are areas of high biodiversity on account of rich availability of nutrients. Large variety of fauna specially corals and coral reef fishes occur in these ecosystems.



Coral reefs are restricted to the seas between the latitudes of 30°N and 30°S, and are formed by the calcareous skeletons of stony coral polyps. They house the corals that are soft-bodied and radially symmetrical marine invertebrates belonging to the phylum Cnidaria. Individuals of a colony are called polyps. Millions of coral skeletons cemented together over a period ranging from a few thousand to millions of years form such reefs. These reefs can reach great depths and run continuously for hundreds of kilometers.

Coral reefs are divided into three major types :

- Fringing reefs which are the most common type, project seawards directly from the shore. They surround islands and continental land masses.
- Barrier reefs, though similar to fringing reefs, are separated from the landmass by a shallow lagoon.
- Atolls, which are most common in the Indo-Pacific region, rest on the summits of submerged volcanoes. They are usually oval or circular with a central lagoon.

In India, coral reefs occur in Andaman and Nicobar Islands, Lakshadweep Islands, Gulf of Kutch and Gulf of Mannar.

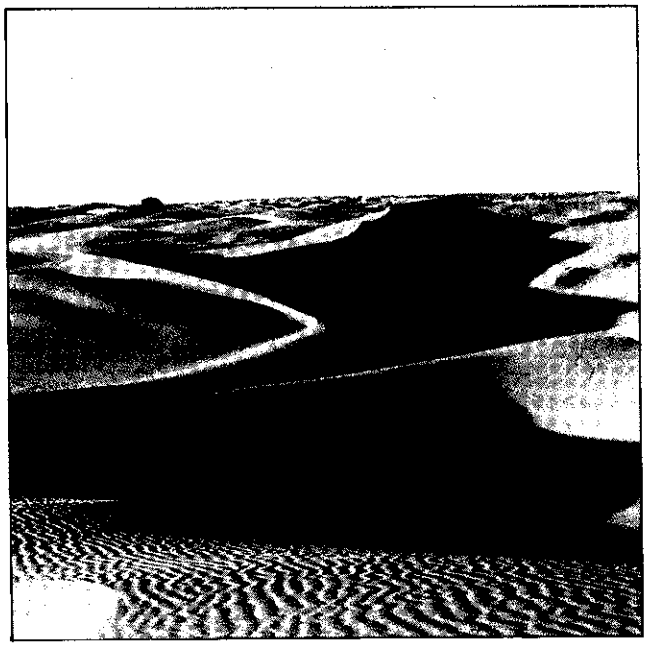
Coral reefs are the most productive marine ecosystems. They are also extremely sensitive and susceptible to environmental stress. Coral reefs have been subjected to stresses because of increase in industrialisation in coastal areas, offshore mining, dredging, construction, shell and coral collection and oil transport. The more serious threat however comes from quarrying of corals — the indiscriminate and excessive exploitation of corals and coral debris for cement industry.

3.1.5 Desert Ecosystems

Desert ecosystem is characterised by low precipitation, arid lands, with expanse of sands, rock or salt, which are largely barren except for sparse or seasonal vegetal cover. Species in this habitat are adapted to an extremely harsh, water-scarce environment.

Covering 2% of the landmass, deserts in India are classified into three distinct types:

- the sandy Thar desert of western Rajasthan and adjoining areas of other States
- the vast salt desert of Kutch in Gujarat
- the high altitude cold desert of Jammu & Kashmir and Himachal Pradesh.



The sandy Thar desert in India covers about 2,78,330 sq. km. of which 1,96,150 sq. km. is in Rajasthan, 62,180 sq. km. in Gujarat and 20,000 sq km. in Punjab and Haryana. This desert is characterised by various landforms composing shifting and fixed sand dunes, interdunal lands, rocky outcrops, flatlands and occasional clumps of trees. The sparse seasonal vegetatioin is mainly of the thorn forest type, with species like *Prosopis cineraria, Capparis decidua, Zizyphus nummularia, Acacia nilotica, Calotropis procera. Prosopis juliflora*, an exotic, is now well established in this region. Major faunal species found in these areas include desert fox, desert cat, Houbora bustard, chinkara, blackbuck, wolf and Great Indian bustard.

The salt desert of the Rann of Kutch is distinguished from the Thar by its exceptional salinity, caused by seasonal ingression of sea. The Rann meaning salt desert in local language, is spread over 9,000 sq. km. extending from 22^0 - 25^0N and 68^0 - 73^0E. It is characterised by a typical salt-marsh salt-bush plant community of halophytes and is the only nesting ground of Asian lesser flamingo in India. This is the only habitat of the rare Asiatic wild ass, *Equus hemionus* Rhur. Other animals found here include banded gecko, bullfrog, crow pheasant, little brown dove, hedgehog, bush rat etc.

Extending over the north of the Himalayan ranges, the cold desert characterised by extremely low temperatures going down below -45°C and low rainfall ranging from 500-800 mm annually, forms a plateau that extends from 4500 to 6000 m altitude in Western Himalayas. The cold deserts cover an area of 1,09,990 sq. km., of which 87,780 sq. km. lies in Ladakh region of Jammu & Kashmir and 22,210 sq. km. in Lahul-Spiti of Himachal Pradesh. Throughout this region, the precipitation is mostly in the form of snow. Floral and faunal diversity of these areas has been surveyed only recently. The vegetation, which is a sparse alpine steppe, has mostly herbaceous or shrubby species. Some of the most common species are *Salix daphnoides, Myricaria elegans, Cicer micorphyllum, Polygonum affine, Potentilla bifurca, and Pedicularis siphonantha.* A common adaptation of plants here to protect themselves from cold dry winds is the cushion habit, that is the plant species do not grow tall and assume stunted growth to avoid frost bite. The high altitude insect life exhibits very high endemism. The area has one of the richest wild sheep and goat community in the world, with eight distinct species and sub-species. Also found here are snow leopard, yak, urial, bharal commonly known as blue sheep, ibex commonly known as wild goat, and Keong commonly known as Tibetan wild ass.

3.2 SPECIES DIVERSITY

Biogeographically, India is situated at the trijunction of three realms namely Afro-tropical, Indo-Malayan and Paleo-Arctic realms, and therefore has characteristic elements from each of them. This assemblage of three distinct realms makes the country rich and unique in biological diversity. Based on the available data, India ranks tenth in the world and fourth in Asia in plant diversity, and ranks tenth in the number of mammalian species and eleventh in the number of endemic species of higher vertebrates in the world.

3.2.1 Status of Surveys

At present, 1.7 million species have been recorded so far in the world (Global Biodiversity Assessment, 1995). India's contribution to this record stands at 7%. Surveys conducted so far have inventorised over 47,000 species of plants and over 89,000 species of animals. As of now, only 70% of the area has been surveyed. It is estimated that the flora and fauna already identified are only part of what actually occur in India. The list is being constantly added to, especially in the case of lower plants and invertebrate animals. Survey and inventorisation of India's biodiversity is still far from complete especially the lower groups of plants and invertebrate animals.

3.2.1.1 Flora

As noted earlier, 47,000 species of flowering and non-flowering plants representing about 12% of the recorded world's flora have already been identified. Significant diversity has been recorded in Pteridophytes with 1022 species and Orchidaceae with 1082 species. Comparative statement of recorded number of plant species in India and the world is given in Table 5.

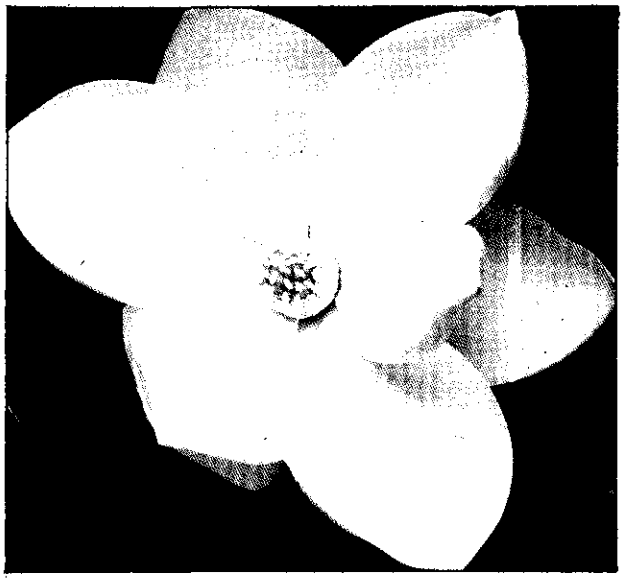
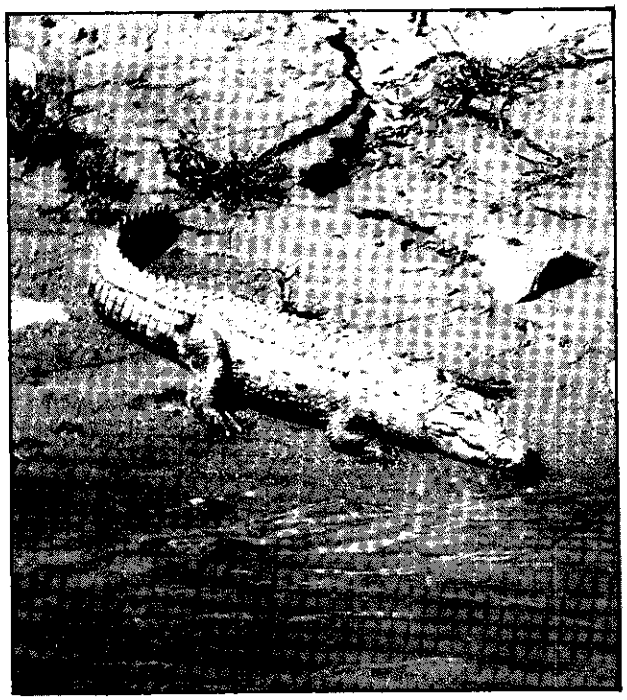


Table 5 : Comparative statement of recorded number of plant species in India and the world.

Taxa	Species		Percentage of India to the world
	India	World	
Bacteria	850	4,000	21.25
Viruses	unknown	4,000	-
Algae	6,500	40,000	16.25
Fungi	14,500	72,000	20.14
Lichens	2,000	17,000	11.80
Bryophyta	2,850	16,000	17.80
Pteridophyta	1,100	13,000	8.46
Gymnosperms	64	750	8.53
Angiosperms	17,500	250,000	7.00

3.2.1.2 Fauna

A total of 89,451 animal species have been recorded in India which represents 7.28% of the faunal species recorded in the world. Of these, the vast majority are insects with over 59,000 species. The vertebrate fauna, is also diverse and varied. A comparative statement of recorded number of animal species in India and the world is given in Table 6.



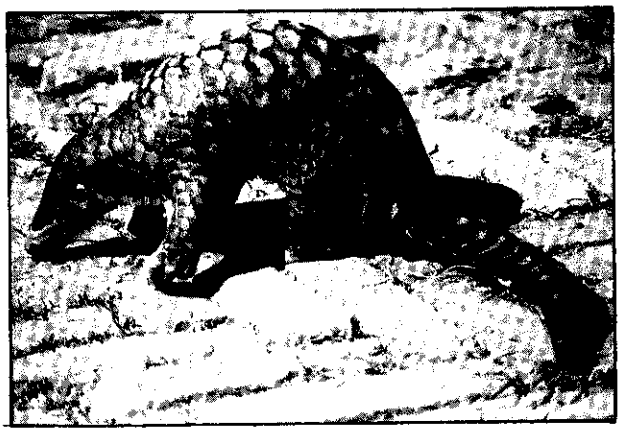


Table 6 : A comparative statement of recorded number of animal species in India and the World.

Taxa	Species		Percentage of India to the world
	India	World	
Protista	2,577	31,259	8.24
Mollusca	5,070	66,535	7.62
Arthropoda (Insecta, Crustacea etc.)	68,380	9,87,949	6.90
Other Invertebrates	8,329	87,121	9.56
Protochordata	119	2,106	5.65
Pisces	2,546	21,723	11.72
Amphibia	209	5,150	4.06
Reptilia	456	5,817	7.84
Aves	1,232	9,026	13.66
Mammalia	390	4,629	8.42