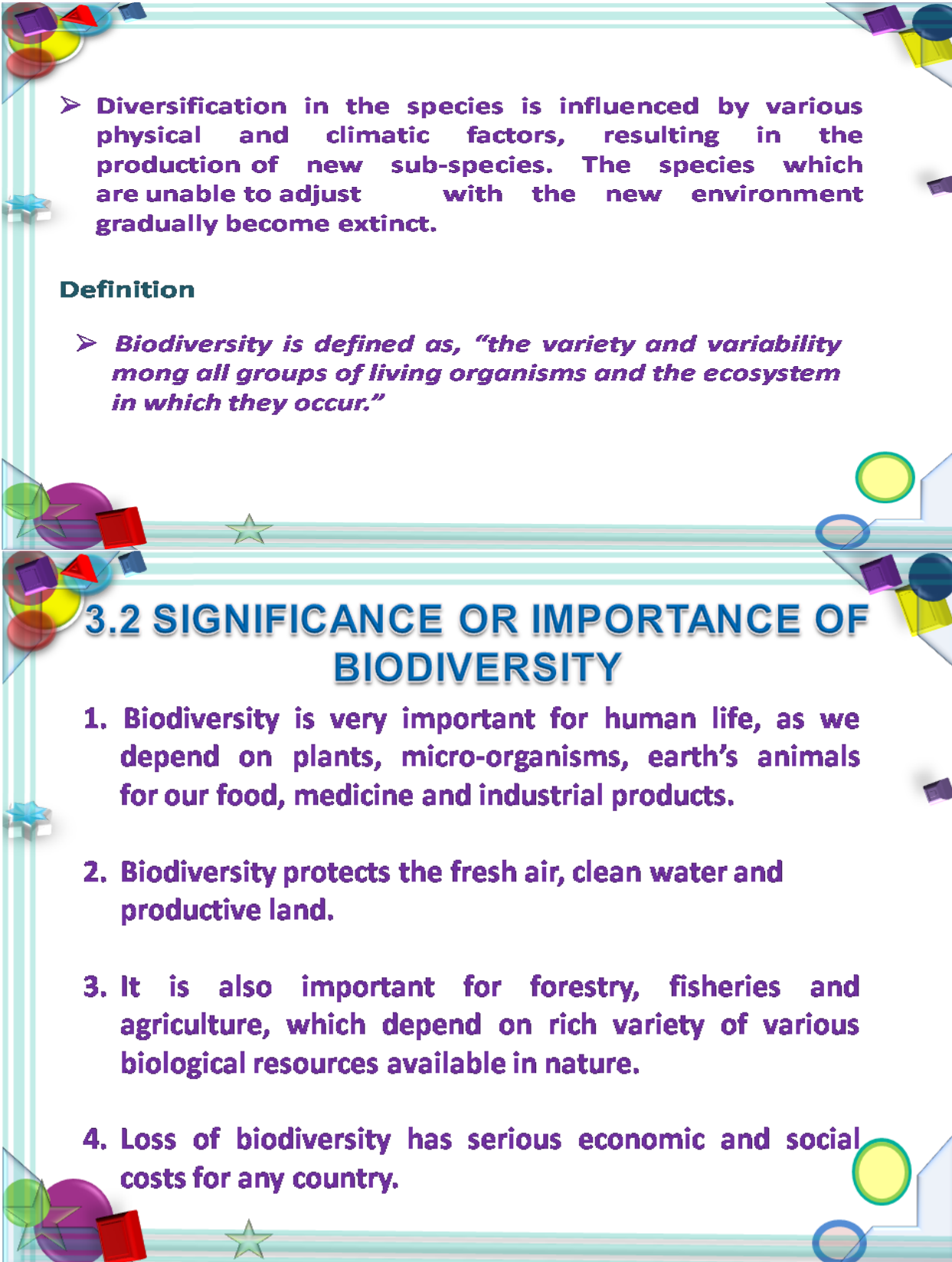




Introduction to biodiversity & Values of biodiversity

3.1 INTRODUCTION

- ❖ Bio means 'life' and diversity means 'variety', hence, biodiversity refers wide variety of life on the earth.
- ❖ Our planet-earth (biosphere) contains more than 20 million species of organisms. But, of which only 1.4 million species have been identified so far.
- ❖ These species differ widely from one another. This variation in living organisms is called biodiversity.

- 
- Diversification in the species is influenced by various physical and climatic factors, resulting in the production of new sub-species. The species which are unable to adjust with the new environment gradually become extinct.

Definition

- *Biodiversity is defined as, “the variety and variability among all groups of living organisms and the ecosystem in which they occur.”*

3.2 SIGNIFICANCE OR IMPORTANCE OF BIODIVERSITY

1. Biodiversity is very important for human life, as we depend on plants, micro-organisms, earth’s animals for our food, medicine and industrial products.
2. Biodiversity protects the fresh air, clean water and productive land.
3. It is also important for forestry, fisheries and agriculture, which depend on rich variety of various biological resources available in nature.
4. Loss of biodiversity has serious economic and social costs for any country.

3.2.1 Impact of biodiversity loss

1. The farmers prefer hybrid seeds, as a result, many plant species become extinct.
2. For the production of drugs the pharmaceutical companies collect wild plants, so several medicinal plants now become extinct.
3. Tropical forest is the main sources of world's medicine. Every year these forests are disappearing due to agriculture, mining, logging.

Example

Taxus baccate, a tree growing in sub - Himalayan regions, once believed to be of no value is now found to be effective against cancer. However, this plant has become an endangered species now.

3.3 CLASSIFICATION OR LEVELS OF BIODIVERSITY

- Biodiversity is generally classified into three types
 1. Genetic diversity.
 2. Species diversity.
 3. Community (or) Ecosystem diversity.

3.3.1. Genetic diversity

Genetic: A species with different genetic Characteristics is known as sub-species or “genera”.

- *Genetic diversity is the diversity within species ie., variation of genes within the species*
- Within individual species, there are number of varieties, which are slightly different from one another.
- These differences are due to differences in the combination of genes. Genes are the basic units of hereditary information transmitted from one generation to other.

Examples →

1. **Rice varieties:** All rice varieties belong to the species “oryzasativa”. But there are thousands of rice varieties, which show variation at the genetic level differ in their size, shape, colour and nutrient content.
2. **Teak wood varieties:** There are number of teak wood varieties found available.

Example → *Indian teak, burma teak, malasian teak etc.*

3.3.2 Species diversity

Species: A discrete group of organisms of the same kind is known as species.

- *Species diversity is the diversity between different species. The sum of varieties of all the living organisms at the species level is known as species diversity.*
- The biotic component is composed of a large number of species of plants, animals and micro organisms, which interact with each other and with the abiotic component of the environment.

Example ➤

1. *Total number of living species in the earth are about more than 20 million. But, of which only about 1.5 million living organisms are found and given scientific names.*
2. *Plant species: Apple, mango, grapes, wheat, rice, etc.,*
3. *Animal species: Lion, tiger, elephant, deer, etc.,*

3.3.3 Community (or) Ecosystem diversity

Ecosystem

- It is a set of biotic components (plants, animals and micro organisms) interacting with one another and with abiotic components (soil, air, water, etc).
- *The diversity at the ecological or habitat level is known as ecosystem diversity. A large region with different ecosystems can be considered as ecosystem diversity.*

Example ➤ River ecosystem.

- The river which includes the fish, aquatic insects, mussels and variety of plants that have adapted.
- Thus the ecosystem diversity is the aggregate of different environmental types in a region.
- It explains the interaction between living organisms and physical environment in an ecosystem.

3.4 BIOGEOGRAPHICAL CLASSIFICATION OF INDIA

- India is a mega diversity country having different types of climate and topography in different parts of the country.

➤ These variations have induced much variability in flora and fauna. India occupies 10th position among the plant rich countries of the world.

➤ It is very important to know and study the distribution, evolution and environmental relationship of plants and animals in time and space.

➤ In order to know about the distribution and environmental interactions of flora and fauna of our country, biogeographers classified our country into ten biogeographic zones.

➤ Each of the zone has its own characteristic climate, soil and biodiversity.

Table 3.1 India's major biogeographic habitats

| Sl. No | Biogeographic Zone | Biotic Province | Total area | Biomass |
|--------|------------------------|--|------------|-----------------------------------|
| 1. | Trans-Himalayan region | Upper Regions | 5.7% | 186200 |
| 2. | Himalayan mountain | North-West Himalayas West Himalayas Central Himalayas East Himalayas | 17% | 6900 720000 123000 83000 |
| 3. | Desert (Arid area) | Kutch Thar Ladakh | 6.9% | 45000 18000 NA |
| 4. | Semi-Arid | Central India Gujarat-Rajwara | 15. 6% | 107600 404400 |

| Sl. No | Biogeographic Zone | Biotic Province | Total area | Biomass |
|--------|--------------------|---|------------|-----------------------------------|
| 5. | Western Ghats | Malabar Coast Western Ghat Mountains | 5.8% | 59700 99300 |
| 6. | Deccan Peninsula | Deccan Plateau South Central Plateau Eastern Plateau Chhota Nagpur Central Highlands | 4.3% | 6900 720000 123000 83000 |
| 7. | Gangetic Plain | Upper Gangetic Plain Lower Gangetic Plain | 11% | 206400 153000 |

3.5 VALUE OF BIODIVERSITY

- Biosphere is a life supporting system to the human beings. It is the combination of different organisms. Each organisms in the biosphere has its own significance.
- Biodiversity is vital for healthy biosphere. Biodiversity is must for the stability and proper functioning of the biosphere.
- We get benefits from other organisms in number of ways. Sometimes we realize the real value of the organism only after it is lost in this earth.

CLASSIFICATION AND IMPORTANCE OF VALUES OF BIODIVERSITY

- Various uses of biodiversity are classified as follows

3.5.1 Consumptive use value

- These are direct use values, where the biodiversity products are harvested and consumed directly.

Examples → Food, drug, fuel, etc.,

1. Food

A large number of wild plants are consumed by human beings as food. Nearly 80 - 90% of our food crops have been domesticated only from the tropical wild plants. A large number of wild animals are also consumed as food.

Examples →

- Ceropegia bulbosa*: in central India and Western Ghats.
- Codonopsis*: in Himalayan region.
- Cicer microphyllum*: in Kashmir
- Insects: molluscs, spiders, and wild herbivores* are consumed by many tribal and non-tribal communities in India.

2. Drugs

- ❖ Around 70% of modern medicines are derived from plant and plant extracts. 20,000 plant species are believed to be used medicinally, particularly in the traditional system of Unani, Ayurveda and Siddha.

Examples →

1. Germany alone uses more than 2,500 Species of plants for medicinal purposes in Homeopathy and other systems of medicines.
2. India uses 3000 Species of plants in Ayurveda, Homeopathy and Unani system of medicines.
3. According to research about 85% of global community use plants for primary health care.
4. According to latest medical sciences, bee-sting venom is used for treating arthritis.
5. Life saving drugs like quinine (Malaria), reserpine (hypertension), pencillin (antibiotic) and morphine (pain kill) are all of plant origin.
6. The peepal tree leaves, trunk and roots are used as effective medicines for curing disease like fever, cough, stomach and skin diseases.
7. About 30 medicines have been prepared from neem tree which have been proved to be very effective for stomach oilments, eye irritations, skin eruptions and diabetics.
8. Maxican yarn has been proved as a versatile boon to produce birth control in human beings.

Table 3.2: Medicinal products from Natural Resources

| Product | Source | Use |
|--------------|---------------|--------------------|
| Penicillin | Fungus | Antibiotic |
| Streptomycin | Actinomycete | Antibiotic |
| Tetracycline | Bacterium | Antibiotic |
| Digitalis | Foxglove | Heart stimulant |
| Quinine | Cinchona Bark | Malaria treatment |
| Diosgenin | Mexican yam | Birth control drug |
| Cytarabine | Sponge | Leukemia cure |
| Reserpine | Rauwolfia | Hypertension drug |
| Bee venom | Bee | Arthritis relief |
| Morphine | Poppy | Analgesic |

3. Fuel

- ❖ Firewoods are directly consumed by villagers, tribals. The fossil fuels like coal, petroleum and natural gas are also the products of fossilized biodiversity.

3.5.2 Productive use values

- ❖ Biodiversity products have obtained a commercial value. These products are marketed and sold. These products may be derived from the animals and plants.

Table 3.3: Animal products

| Animal product | Animal |
|----------------|-------------------|
| Silk | Silk - worm. |
| Wool | Sheep. |
| Musk | Musk deer. |
| Tusk | Elephants. |
| Leather | All animals. |
| Food | Fish and animals. |

Many industries are dependent upon the productive use values of biodiversity.

Table 3.4: Plant and animal products for various industries

| Plant product | Industry |
|--------------------|---|
| Wood | Paper and pulp industry, plywood industry railway sleeper industry. |
| Cotton | Textile industry. |
| Fruits, vegetables | Food industry. |
| Leather | Leather industry. |
| Ivory | Ivory - works. |
| Pearl | Pearls industry. |

A. Rice accounts for 22% of the cropped area and Cereals accounts for 39% of the cropped area.

B. Oil seed production also helped in saving large amount of foreign exchange spent on importing edible oils.

3.5.3 Social Values

- Social value of the biodiversity refers to the manner in which the bio-resources are used to the society. These values are associated with the social life, religion and spiritual aspects of the people.

Examples ➔

1. Holy plants

- Many plants are considered as the holy plants in our country.

Examples ➔ *Tulsi, peepal, lotus, bael, etc.,*

- The leaves, fruits of these plants are used in worship

2. Holy animals

Many animals are also considered as holy animals in our country.

Examples ➔ *Cow, snake, bull, peacock, rat, etc.,*

3.5.4 Ethical values (or) Existence value

- It involves ethical issues like “all life must be preserved.”
- In India and in other countries biodiversity is considered to have great value on religious and cultural basis.

- Our rich heritage teaches us to worship plants, animals, rivers and mountains. The ethical value means that a species may or may not be used, but its existence in nature gives us pleasure.

Examples →

- 1. The river Ganga is considered as holy river.*
- 2. Vembu, Tulsi, Vengai are same of the trees, worshipped by the Tamilians.*
- 3. We are not deriving anything directly from Kangaroo, Zebra or Giraffe, but we feel that these should exist in nature.*

- Thus, there is an ethical value or existence value attached to each species.

3.5.5 Aesthetic value

The beautiful nature of plants and animals insist us to protect the biodiversity. The most important aesthetic value of biodiversity is eco-tourism.

Examples →

- 1. Eco - tourism: People from far place spend a lot of time and money to visit the beautiful areas, where they can enjoy the aesthetic value of biodiversity. This type of tourism is known as eco - tourism.*
- 2. The pleasant music of wild birds, colour of butterfly, colour of flowers, colour of peacocks are very important for their aesthetic value.*

3.5.6 Optional values

- ❖ The optional values are the potentials of biodiversity that are presently unknown and need to be known. The optional values of biodiversity suggests that any species may be proved to be a valuable species after someday.

Examples →

1. *The growing biotechnology field is searching a species for causing the diseases of cancer and AIDS.*
2. *Medicinal plants and herbs play a very important role in our indian economic growth.*

3.6 GLOBAL BIODIVERSITY

- Total number of living species in the world are about 20 million. But, of which only about 1.5 million species are found and given scientific names. Tropical deforestation alone is reducing the biodiversity by 0.5% every year.

3.6.1 Terrestrial biodiversity (or) Biomass

- It is the largest ecological units present in different geographic areas and are named in different ways.

Examples →

Tropical rain forests, Savannas, desert, tundra, etc.,

1. Tropical rain forests

- These are the earth's largest storehouse of biodiversity. They are inhabited by millions of species of plants, insects, birds, amphibians and mammals. About 50 to 75% of global biodiversity lies in these tropical rain forests.

(a) Medicinal plants: More than 25% of the world's prescription drugs are extracted from plants growing in tropical forest.

Examples →

(i) Of about 3000 plants identified by National Cancer Research Institute as source of cancer fighting chemicals, 70% is derived only from tropical rain forests.

(ii) Extracts from one of the creeping vines in the rain forests at cameroon have proved effective in the inhibition of replication of AIDS virus.

(b) Flowering plant: It has been estimated that nearly 1,30,000 flowering plant species are found available. But, till now we know only 1-3% of these plant species.

Protection of tropical rain forest: Thus, it is essential to protect our tropical rain forests.

Examples →

- ❑ The Silent Valley in Kerala is the only place in India, where tropical rain forests available. In order to protect our only tropical rain forest biodiversity, Silent Valley Hydroelectric Project was abandoned.

2. Temperate forests

- These have much less biodiversity. Globally, they have nearly,
 - (a) 1,70,000 flowering plants.
 - (b) 30,000 vertebrates.
 - (c) 2,50,000 other group of species.

3.6.2 Marine diversity

- Marine diversity is much higher than terrestrial biodiversity, but it is less known and described.
- Estuaries, coastal waters and oceans are biologically diverse but the diversity is very low. Sea is the cradle of every known phylum.
- Out of 35 existing phyla of multicellular animals, 34 are marine.

**Table 3.5 Living species estimates
(World Resource Institute, 1999)**

| Taxonomic group | Number |
|---|-----------------|
| Protozoans (Single called animals) | 31,000 |
| Bacteria and Cyanobacteria | 5,000 |
| Algae | 27,000 |
| Fungi (Mushrooms) | 45,000 |
| Higher Plants | 2,50,000 |
| Jelly fish, Corals etc. | 10,000 |

| Taxonomic group | Number |
|------------------------------|------------------|
| Sponges | 5,000 |
| Flatworms, earthworms | 36,000 |
| Insects | 7,50,000 |
| Snails, Slugs etc | 70,000 |
| Fish | 22,000 |
| Amphibians | 4,000 |
| Reptiles | 5,000 |
| Mammals | 4,000 |
| Birds | 9,000 |
| Total | 1,400,000 |

3.7 BIODIVERSITY AT NATIONAL LEVEL (INDIA)

- ❖ India is second largest nation containing 5% of world's biodiversity and 2% of the earth surface.

Rank of India in biodiversity

It has been estimated that India gets.

1. 10th rank among the plant rich countries of the world.
2. 11th rank among the endemic species of higher vertebrates.
3. 6th rank among the centers of diversity and origin of agricultural crops.

- ❖ India is an agricultural country and its economic growth depends on the production of many crops.

- ❖ Among several developing nations, India is considered as “mega - diversity” nation because it is rich in both fauna and flora. There is high demand for Indian species in abroad.

Medicinal value

More than 2000 medicinal plants are cultivated in India, which can cure many disease.

Examples

1. *Tulsi and Neem is well known plant for its medicinal values.*
2. *Turmeric in India was proved to be an anticarcinogen, but Germanians patented this in their land.*

Commercial value

1. **Indian sandal wood has high commercial value, if it is sold in abroad.**
2. **Indian tobacco has high nicotine content, when compared to other tobacco.**
3. **Several species of non - wild edible mushrooms cultivated and exported to advanced countries.**
4. **The demand for ornamental plants, flowers and fruits are increasing from decade to decade.**
5. **More than 100 species of microorganisms were collected from Indian soils and cultured, developed and formulated in the abroad laboratories.**

Table 3.6 Number of plant and animal species in India

| Group | Number of species |
|-------------------------------|-------------------|
| Flowering plants | 20,000 |
| Insects | 67,000 |
| Fishes | 1460 |
| Birds | 1200 |
| Reptiles | 420 |
| Mammals | 340 |
| Domesticated animals & plants | 170 |

3.8 BIODIVERSITY AT LOCAL LEVEL (OR) MEASUREMENT OF BIODIVERSITY

➤ Based on their spatial distribution, biodiversity at local level is categorized into four types.

1. Point richness

➤ It refers to the number of species that can be found at a single point in a given space.

2. Alpha (α) richness (or) Alpha diversity

It refers to the number of species found in a small homogeneous area. It is strongly correlated with physical variables.

Examples

- *There are 100 species of tunicates in arctic waters, 400 species in temperate waters and 600 in tropical seas. Thus, temperature is the most important factor affecting richness of tunicates.*

3. Beta (β) richness (or) Beta diversity

- *It refers to the rate of change in species composition across different habitats. It means that the number of species increases as more heterogeneous habitats are taken into consideration.*

Examples

- *The ant species found in local regions of north pole is merely 10. As we move towards the equator the number of species of ants is going on increasing as high as 2000 on the equatorial region.*

4. Gamma (γ) richness (or) Gamma diversity

It refers to the rate of change across large landscape.

3.8.1 Biodiversity a Tamilnadu

- The distribution of plants and animals among different districts of Tamil Nadu is uneven.

Examples →

1. There are some dense forests in Salem district.
2. Western Ghats has 1500 species of plants, 50 species of mammals and 90 reptiles.
3. Birds of several species is coming to Vedanthangal from far off places.
4. The elephant sanctuaries at Anaimalai.
5. Tiger sanctuary at Mundanthurai.

3.9 MEGA - DIVERSITY

- There are nearly 170 countries in the world and 12 of them contain 70% of our planet's biodiversity.

3.9.1 Mega diversity regions

- The following 12 countries, Australia, Brazil, China, Colombia, Ecuador, the United States, India, Indonesia, Madagascar, Mexico, Peru and emocratic Republic of the Congo regions are known as mega diversity regions.
- These countries have the world's selected few rich floral land and faunal zones.

3.9.2 India as a Mega-Diversity Nation

India is one among the 12 mega-diversity countries in the world. It has 89,450 animal species accounting for 7.31% of the global faunal species and 47,000 plant species which accounts for 10.8% of the world floral species. The loss of biodiversity or endemism is about 33%.

Table 3.7. Distribution of species in some groups of flora and fauna in India

| Group-wise species Distribution | | | |
|---------------------------------|--------|--------------|--------|
| Plants | Number | Animals | Number |
| Fungi | 23,000 | Mollusca | 5042 |
| Bacteria | 850 | Lower groups | 9979 |
| Algae | 2500 | Arthropoda | 57,525 |
| Bryophytes | 2564 | Amphibia | 2546 |
| Gymnosperms | 64 | Birds | 1228 |
| Pteridophytes | 1022 | Reptiles | 428 |
| Angiosperms | 15,000 | Mammals | 372 |

Endemism (or) Endemic species

□ The species which are confined to a particular area are called endemic species. Our country has a rich endemic flora and fauna. About 33% of the flowering plants, 53% of fresh water fishes, 60% amphibians, 36% reptiles and 10% mammalian are endemic species.

1. Plant diversity

□ Nearly 5000 flowering plants and 166 crop plant species have their origin in India.

2. Marine diversity

➤ More than 340 coral species of the world are found here. Several species of mangrove plants and seagrasses are also found in our country.

3. Agro-biodiversity

➤ There are 167 crop species and wild relatives. India is considered to be the centre of origin of 30,000 to 50,000 varieties of rice, mango, turmeric, ginger, sugarcane, etc.

4. Animal biodiversity

- There are 75,000 animal species including 5,000 insects. India is a home to about nearly 2,00,000 living organisms.

3.9.3 'RED' Data book (or) Red list

- Red book is a catalogue of taxa facing risk of extinction. The purpose of preparation of red list is to
 1. provide awareness to the degree of threat to biodiversity.
 2. provide global index on already decline of biodiversity.
 3. identification of species at high risk of extinction.
 4. help in conservation action.
 5. information about international agreements.
- India's biodiversity is threatened due to habitat destruction, degradation, fragmentation and over exploitation of resources.

- ❖ According to 'RED' Data book 44 plant species are critically endangered, 54 endangered and 143 are vulnerable (exposed to damage).
- ❖ India ranks 2nd in terms of the number of threatened mammals and 6th among the countries with the most threatened birds.

Examples →

1. Pitcher plant has become endemic in Eastern Himalayas.
2. *Taxus wallichiana* has come under red data category due to its over exploitation.

3.10 HOT-SPOTS OF BIODIVERSITY

➤ The most remarkable and threatened areas, where many of them have been reduced to less than 10% of their original vegetation. These areas are called hotspots of biodiversity.

(or)

- *Hot spots are the geographic areas which possess high endemic species.*
- At global level, these are the areas of high conservation priority, if these species lost, they can never be replaced (or) regenerated.

3.10.1 Criteria for recognising hot spots

1. The richness of the endemic species is the primary criterion for recognising hot spots.
2. The hot spots should have a significant percentage of specialised species.
3. The site is under threat.
4. It should contain important gene pools of plants of potentially useful plants.

3.10.2 Reason for rich biodiversity in the tropics

- ❖ Followings are the reasons for rich biodiversity in the tropics.
1. The tropics have a more stable climate.
 2. Warm temperatures and high humidity in the tropical areas provide favorable conditions.
 3. No single species can dominate and thus there is an opportunity for many species to coexist.
 4. Among plants, rate of out-crossing appear to be higher in tropics.

3.10.3 Area of hot spot

- These hot spots covering less than 2% of the world's land are found to contain 50,000 endemic species. According to myersetal (2000), an area is designated as a hot spot when it contains atleast 0.5% of the endemic plant species.
- About 40% of terrestrial plants and 25% of vertebrate species are endemic and are found in these hot spots. These are the areas of high diversity, endemism and are also threatened by many human activities.

Table 3.8. Global hotspots of biodiversity

| Hotspots | Plant Species | Endemic Plants | % of Global Plants | Vertebrate Species | Endemic Vertebrates | % of Global Vertebrates |
|---|---------------|----------------|--------------------|--------------------|---------------------|-------------------------|
| 1. Tropical Andes | 45000 | 20000 | 6.7 | 3389 | 1567 | 5.7 |
| 2. Mesoamerican forests | 24000 | 5000 | 1.7 | 2859 | 1159 | 4.2 |
| 3. Caribbean | 12000 | 7000 | 2.3 | 1518 | 779 | 2.9 |
| 4. Brazil's Atlantic Forest | 20000 | 8000 | 2.7 | 1361 | 567 | 2.1 |
| 5. Panama Western Ecuador | 9000 | 2250 | 0.8 | 1625 | 418 | 1.5 |
| 6. Brazil's Cerrado | 10000 | 4400 | 1.5 | 1268 | 117 | 0.4 |
| 7. Central Chile | 3429 | 1605 | 0.5 | 335 | 61 | 0.2 |
| 8. California Floristic | 4426 | 2125 | 0.7 | 584 | 71 | 2.8 |
| 9. Madagascar | 12000 | 9704 | 3.2 | 987 | 771 | 2.8 |
| 10. Eastern Arc and Coastal Forest of Kenya | 4000 | 1500 | 0.5 | 1019 | 121 | 0.4 |
| 11. Western African Forests | 9000 | 2250 | 0.8 | 1320 | 270 | 1.0 |

| Hotspots | Plant Species | Endemic Plants | % of Global Plants | Vertebrate Species | Endemic Vertebrates | % of Global Vertebrates |
|----------------------------------|---------------|----------------|--------------------|--------------------|---------------------|-------------------------|
| 12. Cape Floristic Province | 8200 | 5682 | 1.9 | 562 | 53 | 0.2 |
| 13. Succulent Karoo | 4849 | 1940 | 0.6 | 472 | 45 | 0.2 |
| 14. Mediterranean Basin | 25000 | 13000 | 4.3 | 770 | 235 | 0.9 |
| 15. Caucasus | 6300 | 1600 | 0.5 | 632 | 59 | 0.2 |
| 16. Sundaland | 25000 | 15000 | 5.0 | 1800 | 701 | 2.6 |
| 17. Wallacea | 10000 | 1500 | 0.5 | 1142 | 529 | 1.9 |
| 18. Philippines | 7620 | 5832 | 1.9 | 1093 | 518 | 1.9 |
| 19. Indo-Burma Eastern Himalayas | 13500 | 7000 | 2.3 | 2185 | 528 | 1.9 |
| 20. South-Central China | 12000 | 3500 | 1.2 | 1141 | 178 | 0.7 |
| 21. Western-Ghats Sri Lanka | 4780 | 2180 | 0.7 | 1073 | 355 | 1.3 |
| 22. South-western Australia | 5469 | 4331 | 1.4 | 456 | 100 | 0.4 |
| 23. New Caledonia | 3332 | 2551 | 0.9 | 190 | 84 | 0.3 |
| 24. New Zealand | 2300 | 1865 | 0.6 | 217 | 136 | 0.5 |
| 25. Polynesia/Micronesia | 6557 | 3334 | 1.1 | 342 | 223 | 0.8 |
| Total | - | 133,149 | 44.4 | - | 9645 | 35.3 |

3.11 HOT SPOT OF BIODIVERSITY IN INDIA

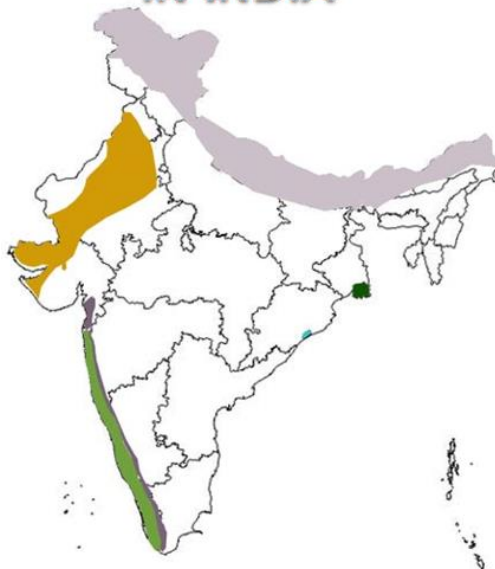


Fig. 3.1 Hot spots of biodiversity in India

Myers et al recognized 25 hot spots in the world as shown in table 3.8. Two of which are found in India. (Table 3.9)

Table 3.9 Biodiversity hot spots in India

| | | |
|----|-------------------|----------------------|
| 1. | Eastern Himalayas | Indo - Burma region. |
| 2. | Western Ghats | Sri Lanka region. |

3.11.1 Eastern Himalayas

- Geographically these area comprises Nepal, Bhutan and neighboring states of Northern India. There are 35,000 plant species found in the Himalayas, of which 30% are endemic.

- The Eastern Himalayas are also rich in wild plants of economic value.

Examples → *Rice, banana, citrus, ginger, chilli, jute and sugarcane.*

- The taxol yielding plant is also sparsely distributed in the region.

(a) 63% mammals are from Eastern Himalayas, and

(b) 60% of the Indian Birds are from North East.

(c) Huge wealth of fungi, insect, mammals, birds have been found in this region.

3.11.2 Western ghats

- ❖ The area comprises Maharashtra, Karnataka, Tamilnadu and Kerala. Nearly 1500 endemic, dicotyledone plant species are found from Western ghats. 62% amphibians and 50% lizards are endemic in western Ghats.
- ❖ It is reported that only 6.8% of the original forests are existing today while the rest has been deforested or degraded.
- ❖ *Some common plants: Ternstroemia Japonica, Rhododendron and Hypericum.*
- ❖ *Some common animals: Blue bird, lizard, hawk.*