CHAPTER-3

BIODIVERSITY AND ITS CONSERVATION

Biodiversity

- Coined by Edward O. Wilson in 1986.
- The variety and variability of all animals, plants and micro-organisms and the ecological complexes of which they are a part.
- It is virtually synonymous with "Life on earth".
- "totality of genes, species, and ecosystems of a region".

Levels of Biodiversity

1) Genetic diversity:

It is a level of biodiversity that refers to the total number of genetic characteristics in the genetic makeup of a species.

2) Species diversity:

It refers to the variety of species within a region.

3) Community and Ecosystem diversity:

Ecosystem diversity refers to the diversity of a place at the level of ecosystems. This has 3 perspective:

- **Alpha Diversity**: Within community diversity. Alpha diversity refers to the diversity of organisms sharing the same Community/Habitat.
- **Beta Diversity**: Between community diversity. It refers to the diversity of organisms sharing two habitat.
- **Gamma Diversity** : Diversity of the habitat over the total landscape or geographical area is called gamma diversity

Importance or Values of Biodiversity:

- 1. Consumptive use value
- 2. Productive use value
- 3. Scientific value
- 4. Aesthetic value
- 5. Cultural value
- 6. Ecological balance value
- 7. Optional value

Why India is called mega diversity centre

- Huge diversity found in India is mainly due to favourable environmental conditions. Every type of climate prevails in India i.e. cold temperate conditions in Himalayan region, Hot and dry Conditions in deserts of Rajasthan, warm and humid condition in Western Ghats. Biodiversity in India has significant place in the world. India shares only 2.4 % land area of the world but it contributes to global diversity approximately 7% of world's flora and 6.4% of world's fauna.

Hot Spots of Biodiversity

- Area which exhibits high species richness as well as high species endemism are termed as hot spots of biodiversity.

Species richness-Total no. of species in any area.

Species endemic-Those which are restricted to small or specific area.

- The concept of Hot Spots was developed by **Norman Myers** in 1988.

Hot Spots of Biodiversity

- **The qualifying criteria for Hot Spots.**

1. - Must support over 1500 endemic plant species.
2. - Must have lost over 70% of original habitat.
3. - Constitute 35% of terrestrial vertebrates.

25 hot spots had been identified (upto 2000) and now 34 hot spots have been identified (upto 2005) all over the world, out of which two are present in India.

- These are:
  - Indo- Burma (earlier The Eastern Himalayas) and
  - The western Ghats

List of hot spots

- Tropical Andes
- Meso American forest
- Caribbean
- Brazil's Atlantic Forest
- California Floristic Province
- Madagascar
- Western African forests
- Succulent Karoo
- Mediterranean basin
- Sundal land
- Philippines
- South Central China
- South western Australia
- Polynesia
- Central chile
- Cape floristic province

Threats to Biodiversity:

Habitat loss, degradation, fragmentation:

- The main causes of habitat destruction are agriculture expansion, Mining, pollution, deforestation, over grazing, urbanization, forest fires etc.
- Habitats are fragmented by constructing roads, towns, canals etc.

Poaching of Wildlife:

- killing of prohibited wild animals for illegal trading of wildlife products called poaching
- Poaching is another threat that has emerged in recent decades as one of the primary reason for decline in number of species.
- Wildlife is sold and traded in many countries for live specimens, folk medicines, furs, Skin, and other products such as Ivory, horns etc amounting to millions of dollars.

Threats to Biodiversity:

Over exploitation of selected species.

- Plants of scientific and medicinal importance are also being used recklessly. Rare plants like Nepanthes, Prosera, Gnetum sps. Are carelessly used for collection, teaching and research purposes.

Introduction of Exotic species:

- Organisms introduced into habitats where they are not native are termed as exotics.
- They can be thought of as Biological Pollutants and are considered to be among the most damaging agents of habitat alteration and degradation the world.
- Examples- Water Hycinth, Congress grass etc.

Threats to Biodiversity:

Natural Calamities

- Such as forest fire, floods, droughts, earth-quakes, volcanic erruptions etc.

Diseases

- Human activities may increase the incidence of disease in wild species. The extent of the disease increases when animals are confined to a natural reserve rather than being able to disperse over large area.

IUCN Red Data List

- IUCN is maintaing a red data book which contain a record of animals which are known to be in danger or facing the risk of extinction .
- Eight categories:

1. Extinct
2. Extinct in wild
3. Critically Endangered
4. Endangered
5. Vulnerable
6. Lower risk
7. Data deficient
8. Not evaluated

Conservation of Biodiversity:

- It is the protection, uplift and scientific management of Biodiversity so as to maintain it at its optimum level and derive sustainable benefits for the present as well as for the future.
- The two basic approaches to wildlife conservation in protected habitats are:

1) In- situ conservation and

2) Ex- situ conservation.

Conservation of Biodiversity:

In- situ conservation	Ex- situ conservation
Conservation of species in their natural habitats.	Conservation of species in suitable environment outside their natural habitat.

In- situ conservation

- Conservation of species in their natural habitats.

1. Wildlife sanctuary
2. National park
3. Biosphere Reserve

In- situ conservation

National parks	Wild Life Sanctuaries
National park is a protected area strictly for the betterment of both wild flora and fauna and no human activity like hunting, Agriculture and grazing is allowed.	Sanctuaries are protected area for the betterment of animals only and humans activities like harvesting of timber, collection of minor forest products, private ownership rights are allowed untill it interfere with the wild life.

In- situ conservation

National parks	Wild Life Sanctuaries
1. Corbette national park	1. Ghana Bird sanctuary
2. Kaziranga national park	2. Hazaribagh sanctuary
3. Gir national park	3. Abohar wild life sanctuary
4. Kanha national park	4. Bir moti bagh wild life sanctuary
5. Ranthambor national park	5. Mudamalai wild life sanctuary
6. Sunderban national park	6. Sultanpur Bird sanctuary
7. Hazaribagh national park	7. Periyar sanctuary
8. Bandipur national park	8. Chilka lake bird sanctuary

In- situ conservation

Biosphere reserve

- It has 4 main objectives:

1. Conservation
2. Research
3. Education
4. Local involvement

EXAMPLES –

1. Nilgiri biosphere reserve
2. Nanda devi biosphere reserve
3. Great Nicobar
4. Kanchanjanga
5. Nokrerk

Zonation of biosphere reserve

- **Core zone** – it is the central area where no human interference is allowed
- **Buffer zone** – it is also restricted zone, the human activities for research purpose are allowed.
- **Transition zone** – human interference is allowed untill it interfere with wild life.

Ex- situ conservation

- Conservation of species in suitable environment outside their natural habitat.

1. Botanical gardens
2. Seed bank
3. Pollen storage
4. Tissue culture
5. Cryopreservation
6. Genetic engineering
7. Zoological gardens