



Bhagalpur National College, Bhagalpur

(A Constituent unit of Tilka Manjhi Bhagalpur University, Bhagalpur)

PPT Presentation for B.Sc. III- Biodiversity and its Conservation

BIODIVERSITY AND ITS CONSERVATION

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BIODIVERSITY - INTRODUCTION

Bio – **Life**



Diversity – **Variety**

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



LEVELS OF BIODIVERSITY:

- **Genetic Diversity**
- **Species Diversity**
- **Community or Ecosystem Diversity**



GENETIC DIVERSITY:

- Species of different **Genetic Characteristics**
- Diversity within species i.e. **Variations in genes** species.
- **Slight different** between species
- Difference due to **combination of genes**
- Basic units of **Hereditary transformed** from one **generatio** to another.

Eg.: Rice varieties, teak wood varieties, etc.,



○ Species Diversity:

- **Discrete group** of organisms of the **same kind**
- Diversity between **species**
- **Sum of varieties of living organisms at species level**

Eg.:

- ✓ **Plant Species:** Apple, mango, grapes, rice, wheat, etc.
- ✓ **Animal Species:** Lion, tiger, deer, etc.

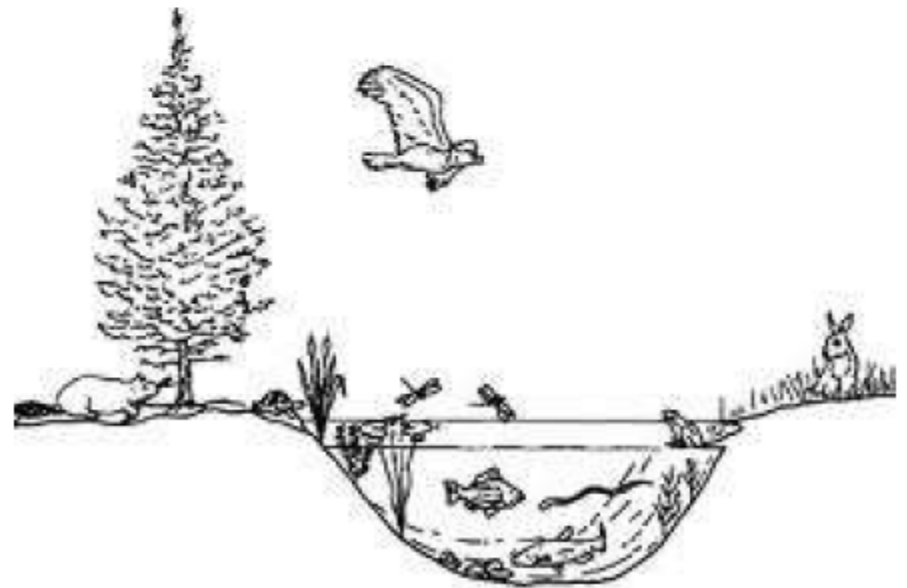


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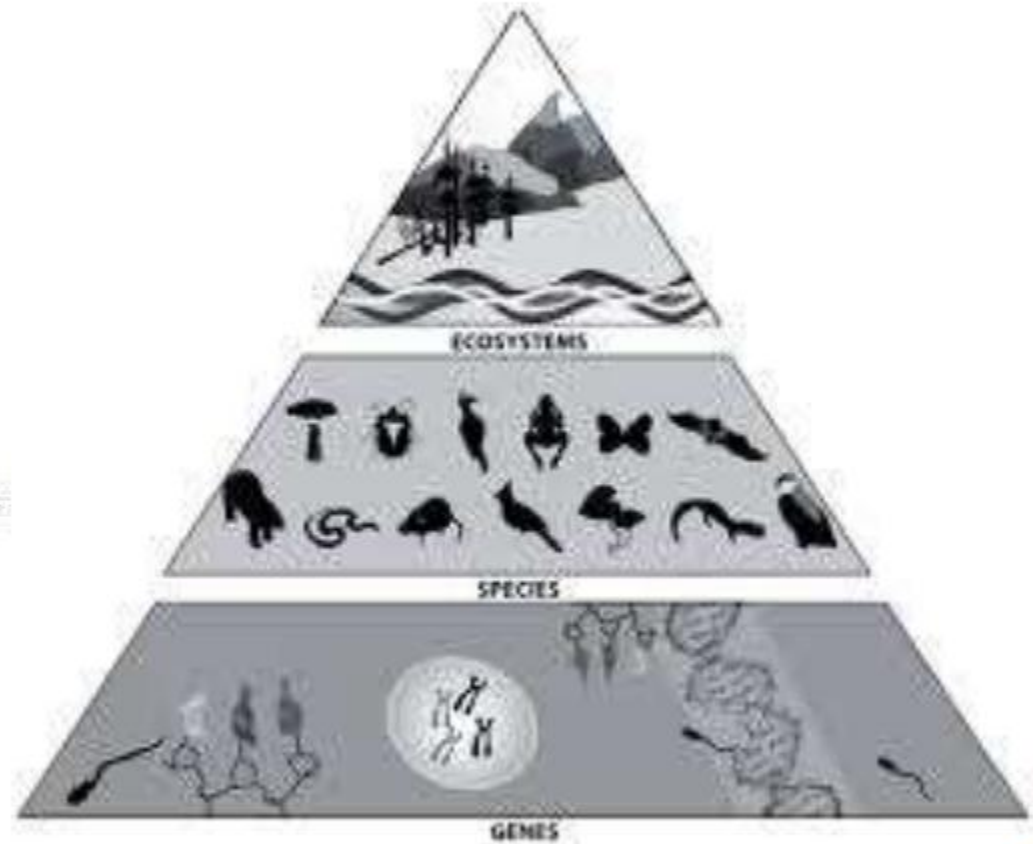
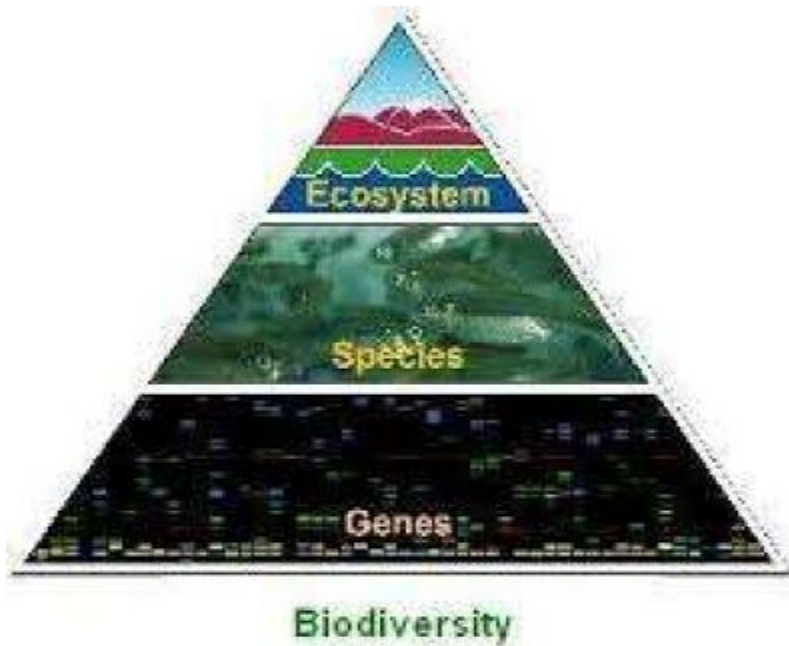
○ Community or Ecosystem Diversity:

- Diversity at ecological or habitat level
- Biotic components i.e. plants, animals and micro organisms interact with Abiotic components i.e. environment – soil, air, water, etc.,
- Difference in environmental type.
- Interaction between living organisms and physical environment in an ecosystem.


Eg. River Ecosystem



LEVELS OF BIODIVERSITY



BIOGEOGRAPHICAL CLASSIFICATION OF INDIA:

- India is **mega diversity** country with different types of **climate and topography** in different parts
 - Variations due to the **variability in flora and fauna**
 - It is important to study and know the **distribution, evolution and environmental relationship** of plants and animals.
 - To know about the relationship of flora and fauna, biogeographers **classified India into ten biogeographic zones**
 - Each zone has its own **climate, soil and biodiversity**.
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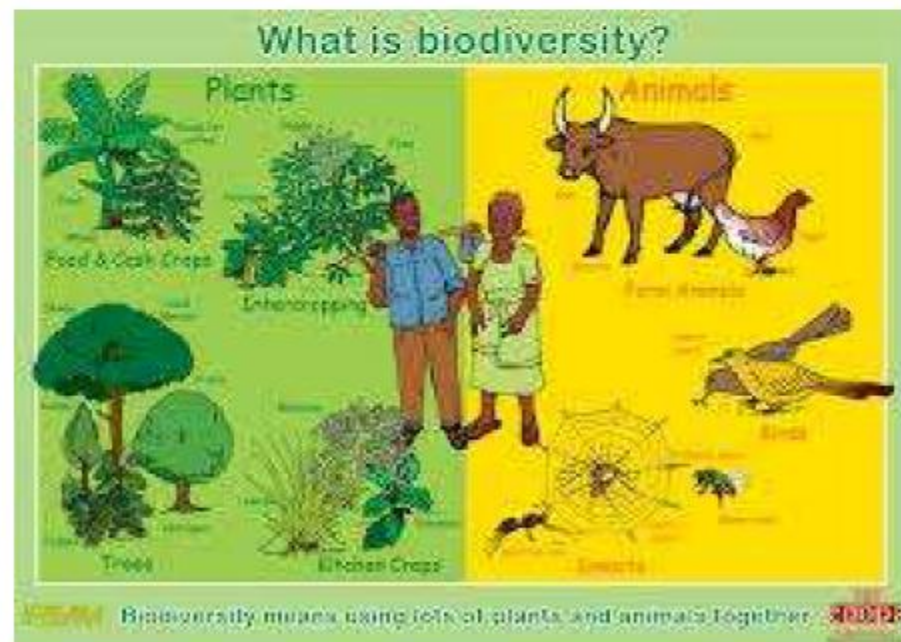
INDIA'S MAJOR BIOGEOGRAPHICAL HABITATS:

- Trans – Himalayan region
- Himalayan mountain
- Desert
- Semi – Arid
- Western Ghats
- Deccan Peninsula
- Gangetic Plain
- North East
- Coasts
- Islands

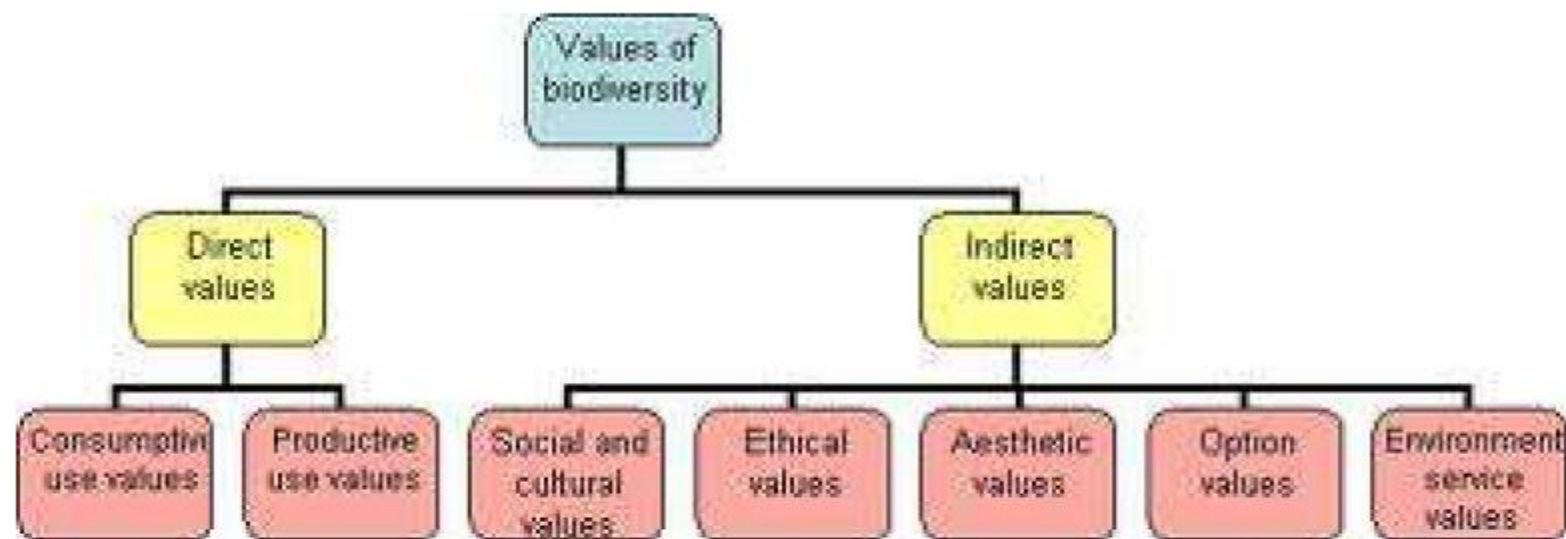


VALUE OF BIODIVERSITY:

- **Biosphere** is supporting **combination** of different **organisms** with its own **significance**.
- **Biodiversity** is **stability** and proper **functioning** of the **Biosphere**.
- We get **benefit** from each organisms in biosphere.



CLASSIFICATION AND IMPORTANCE OF VALUE OF BIODIVERSITY:



- ❑ **Consumptive Use Value**
- ❑ **Productive Use Value**
- ❑ **Social Use Value**
- ❑ **Ethical Values**
- ❑ **Aesthetic Values**
- ❑ **Option Values**

□ CONSUMPTIVE USE VALUE:

- Direct use values
- Harvested and consumed directly
 - **Food** – 80 – 90% tropical wild plants
 - Cerropegia bulbosa
 - Codonopsis
 - Cicer microphyllum
 - **Drugs** – 70% of modern medicines from plants
 - Traditional systems – Ayurvedha and Sidha.
 - **Fuel** – firewoods – fossil fuels like coal, petroleum and natural gases

□ PRODUCTIVE USE VALUE:

- Obtain commercial value
- Products are marketed and sold
- Derived from animal and plants

Animal	Animal Products
Silk - worm	Silk
Sheep	Wool
Elephants	Tusk
Fish and animal	Food

Plant & Animal Product	Industry
Wood	Paper and pulp industry
Cotton	Textile industry
Fruits, vegetables	Food industry
Leather	Leather industry

□ SOCIAL USE VALUE:

- Bio – resources are **used to society**
- Value associated with **social life, religion and spiritual aspects.**
 - **Holy Plants:** Tulsi, lotus, etc.
 - **Holy animals:** Cow, snake, bull, peacock, rat, etc.,.

□ ETHICAL VALUES:

- Ethical issues must be preserved
- India has great cultural and religious basis
- May or may not be used but gives pleasure
 - River Ganga
 - Vembu, tulsi, etc,
 - Kangaroo, zebra, giraffe, etc.,.

□ AESTHETIC VALUES:

- Beautiful nature of plants and animals is the most important value of biodiversity is eco – tourism.

□ OPTION VALUES:

- Biodiversity that are unknown and need to be known
- Suggested that any species maybe proved valuable

GLOBAL BIODIVERSITY:

- Total number of **living species** in the world are about **20 million** but only **1.5 million species** are found and given names.
- **Tropical deforestation** alone is **reducing** the biodiversity by **0.5% every year**.
- Terrestrial biodiversity or Biomass
 - Tropical rainforests
 - Temperate forests
- Marine diversity

□ TERRESTRIAL BIODIVERSITY OR BIOMASS:

- Largest ecological units present in different geographic areas.

1. Tropical rain forests:

- **Earth's largest storehouse** of biodiversity
- Inhabited of millions of **plants, insects, birds, amphibians and mammals.**
- About **50 – 70% of global diversity**
 - **Medicinal plants:** **25% of world drug** is extracted here
 - **Flowering plants:** nearly **1,30,000 flowering plants** are found and 1 – 3% is known.



2. Temperate Forest:

- Much less biodiversity
 - 1,70,000 flowering plants
 - 30,000 vertebrates
 - 2,50,000 other group of species

Tropical Rainforest



Temperate Forest



□ MARINE DIVERSITY:

- It is much **higher than terrestrial biodiversity** but it is **less** known and **described**.
- **Estuaries, coastal waters and oceans** are biologically diverse.
- Sea is a cradle of every known animal **phylum**
- **35 existing phylum** of multicellular animals
- **34 marine**
- **16 exclusively marine**




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:**
 - **10th rank** among the **plant rich**
 - **11th rank** among the **endemic species of higher vertebrates**
 - **6th rank** among **the centers of diversity** and origin of **agricultural crops**.
- India's is an **agricultural country** and **economic depends** on the **production of crops**
- India is considered as **mega – diversity** nation because of **rich** in **flora and fauna**
- **High demand** in **abroad** for Indian species

○ **Medicinal Value:**

- More than 2000 medicinal plants – cure many diseases
- Eg. Tulsi, neem, turmeric, etc.

○ **Commercial Value:**

- Indian sandal wood
 - Tobacco – nicotine
 - Wild edible mushroom – exported
 - Demand for ornamental plants, flowers and fruits
 - More than 100 species developed and formulated in abroad.
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BIODIVERSITY AT LOCAL LEVEL:

- Based on the spatial distribution the biodiversity at local level is classified as follows,

1. Point richness

- Species found in single point in a given place

2. Alpha richness or Alpha diversity

- Number of species found in small homogeneous area

3. Beta richness or Beta diversity

- Rate of change of species increase as more heterogeneous habitats

4. Gamma richness or Gamma diversity

- Changes across large landscape

INDIA AS A MEGA – DIVERSITY NATION:

- Nearly 170 countries in this world and 12 of them contain 70% of the earth's biodiversity
- India is one among the 12 mega biodiversity countries
- The Ministry of Environment and Forests, Government of India records
 - 47,000 species of plants
 - 81,000 species of animals
 - Which is about the 7% and 6.5% of global flora and fauna respectively

ENDEMISM OR ENDEMIC SPECIES:

- Species which are confined to a **particular area** are called as Endemic Species.
- India is **rich in endemic flora and fauna**
 - **33% of flowering plants**
 - **53% of fresh water fishes**
 - **60% of amphibians**
 - **36% of reptiles**
 - **10% mammalians**

- **Plant Diversity:** Nearly 5000 flowering plants and 166 crop plant species.
- **Marine Diversity:** More than 340 coral species, several species of mangrove plants and sea grasses are found.
- **Agro – Biodiversity:** 167 crop species and India is considered to be the centre of origin of 30,000 to 50,000 varieties of rice, mango, turmeric, ginger, sugarcane, etc.,.
- **Animal Biodiversity:** 75,000 animal species including 5,000 insects. India is a home of nearly 2,00,000 living organisms.

HOT SPOTS OF BIODIVERSITY:

- Areas which exhibit **high species richness** as well as high species endemism are termed as **Hot spots of Biodiversity**.
- There are **36 hot spots of biodiversity** on a global level and *four* are present **in India i.e. Himalayas, Western Ghats, Indo-Burma, & Sundaland**.
- At global level, these are the areas of **high conservation** priority, if these species lost, they can never be **replaced or regenerated**.
- Hotspot covering less than 2% of world's land are found to have 50% of terrestrial biodiversity.
- About 40% of terrestrial plants and 25% of vertebrate species are endemic and found in hotspot.



Biodiversity Hotspots

- Four regions that satisfy these two criteria exist in India viz.


The Western Ghats
& Sri Lanka

- The Eastern Himalayas
- Indo Burma

Sundaland



THREATS TO BIODIVERSITY:

- **Extinction or elimination** of the species is a natural process of evolution
 - During evolution, species have **died** and been **replaced** by others
 - The process of extinction has become particularly **fast** in the recent years of **human civilization**
 - Extinction of **10,000 species per year or 27 per day**
 - The waste generated due to the **increase in human population and industrialization, spoils the environment and lead to more diversity** in biological species
 - Any change in the system leads to a **major imbalance** and **threatens** the normal ecological cycle.
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CAUSES AND ISSUES RELATED TO THREATS TO BIODIVERSITY:

○ Loss of Habitat:

- **Destruction and loss of natural habitat** is the single largest cause of biodiversity loss

○ Poaching (over harvesting):


- **Illegal trading** of wildlife products by **killing** prohibited endangered species

○ Man – Wildlife Conflicts:

- It arises when **wildlife starts causing immense damage and danger** to man.

HABITAT LOSS:

FACTORS INFLUENCING HABITAT LOSS:

- Deforestation
 - Destruction of wetlands
 - Habitat fragmentation
 - Raw materials
 - Production of drugs
 - Illegal trade
 - Developmental activities
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- With the current rate of loss of forest habitat, it is estimated that 20 – 25% of the global flora and fauna would be lost within few years.
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POACHING:

1. **Subsistence poaching** – killing animal to provide enough **food for survival**
2. **Commercial poaching** – hunting and killing animals to **sell their products**

Factors influencing Poaching:

- Human population
- Commercial activities

Remedial Measures:


- Illegal hunting and trading should be stopped
- Not purchase fur coat, purse or bag made of crocodile or python skin
- Bio – diversity laws should be strengthened

MAN – WILDLIFE CONFLICTS:

FACTORS INFLUENCING MAN – WILDLIFE CONFLICTS:

- Shrinking of forest cover
- Human encroachment
- Injured animals
- Cultivations of food and elephants search for food
- Electric wiring injure elephant and start violence
- Compensation is not enough and farmers kill wild animals
- Garbage near human settlement or food crops near forest area attracts wild animals

REMEDIAL MEASURES FOR MAN – WILDLIFE CONFLICTS:

- Crop and cattle compensation scheme must be started
 - Solar powered fencing with electric current proof trenches must be provided to prevent animals
 - Crop patterns must be changed
 - Adequate food and water should be available for wild animal in the forest
 - Developmental and construction work around the forest must be stopped
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ENDANGERED AND ENDEMIC SPECIES OF INDIA:

- According to International Union Conservation of Nature and Natural Resources – IUCN the species are classified as follows,
 - **Extinct Species** – No longer found
 - **Endangered Species** – Number of species has been reduced to critical level
 - **Vulnerable Species** – Continuous decline due to habitat destruction
 - **Rare Species** – Species located within a restricted area or thinly scattered over a more extensive area.


ENDANGERED SPECIES OF INDIA:

- When the **number of species** has been **reduced** to a critical level
- Unless it is **protected and conserved**, it is in immediate danger of extinction
- In India the following species are endangered
 - **450 plant species**
 - **100 mammals species**
 - **150 birds species**
- India's biodiversity **is threatened** due to habitat **destruction, degradation and over exploitation of resources.**

IMPORTANT ENDANGERED SPECIES:

- **Reptiles** – tortoise, green sea turtle, python, etc.
- **Birds** – peacock, Siberian white crane, etc.
- **Mammals** – Indian wolf, tiger, Indian lion, etc.
- **Primates** – capped monkey, golden monkey, etc.
- **Plants** – medicinal plants, sandal wood tree, etc.

FACTORS AFFECTING ENDANGERED SPECIES:

- Pollution
 - Over – exploitation
 - Climatic changes
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ENDEMIC SPECIES:

- Species found only in particular region
- In India 47,000 species and 7000 plants are endemic
- 62% of our endemic species are found in Himalayas and Western Ghats

1. Fauna – Animals present in a particular region

1. 81,000 species of animals
2. Western Ghats is rich in 62% amphibians and 50% reptiles

2. Flora – Plants present in a particular region

FACTOR AFFECTING ENDEMIC SPECIES:

- Habitat loss and fragmentation
- Pollution

CONSERVATION OF BIODIVERSITY:

- Biodiversity is important for **sustainable development**
- Value of biodiversity is due to the **commercial, medicinal, genetic, aesthetic and ecological importance**
- The management of biosphere for greater sustainable benefits to the present and future generation



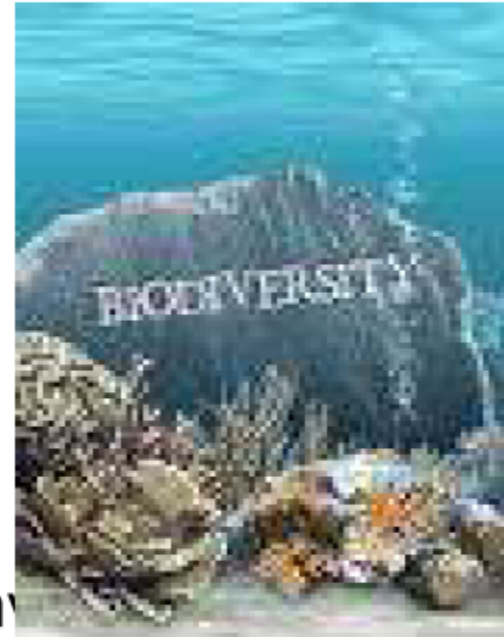
FACTORS AFFECTING BIODIVERSITY:

- **Disturbed by human activities** such as construction of dams in forest, release industrial waste, using pesticides and insecticides in crop fields, urbanization, etc.
- **Poaching, over – exploitation and degradation**
- Marine ecosystem is disturbed by **oils spills and effluents**
- **Global warming, ozone layer depletion and acid rain**



ADVANTAGES OR NEED OF BIODIVERSITY CONSERVATION:

- Immediate benefits to society such as recreation and tourism
- Availability of raw materials
- Preserves genetic diversity
- Ensures sustainable utilization
- Conservation of ecological diversity
- Biodiversity loss result in ecological and environmental deterioration, so it is essential to conserve biodiversity.



○ **Biosphere Reserves:**

- Gulf of Mannar
- Nilgiri
- Nanda Devi

○ **National Park:**

- Kaziranga – Assam
- Gir National Park – Gujarat
- Periyar – Kerala
- Bandipur - Karnataka

○ **Wildlife Sanctuaries:**

- Mudumalai Wildlife Sanctuary – Tamil Nadu
- Vedanthangal Bird Sanctuary – Tamil Nadu

○ **Gene Sanctuaries or Botanical Gardens:**

- Gene sanctuary for citrus
- Gene sanctuary for pitcher plant

TYPES OF BIODIVERSITY CONSERVATION:

- **In – situ Conservation** : Involves **protection of fauna and flora within its natural habitat.**


In – situ Conservation Methods	Numbers available in india
Biosphere Reserves	18
National Parks	104
Wild – life Sanctuaries	543
Botanical Gardens	30



MERITS OF IN – SITU CONSERVATION:

- Very cheap and convenient method
- Adjusted to natural disasters like drought, floods, forest fires, etc.


LIMITATIONS OF IN – SITU CONSERVATION:

- Large surface area is required for preservation
 - Maintenance is not proper due to shortage of staff and pollution
- 

EX – SITU CONSERVATION:

- Protection of **flora and fauna outside the natural habitat**
- Involves in maintenance and breeding of species in controlled conditions
- Identify the species of risk and extinction
- Prefers the species which are more important to man future
 - **Botanical gardens**
 - **Seed banks**
 - **Microbial culture collections, tissue and cell cultures**
 - **Museums**
 - **Zoological gardens**


METHODS OF EX – SITU CONSERVATION:

- **National Bureau of Plant Genetic Resources (NBPGR)** – preserves agricultural and horticultural crops
 - **National Bureau of Animal Genetic Resources (NBAGR)** – preserves the semen of domesticated bovine animals
 - **National Facility for Plant Tissue Culture Repository (NFPTCR)** – conservation of varieties of crop plants or tree by tissue culture
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MERITS OF EX – SITU CONSERVATION:

- Survival increase due to special care and attention
- Longer life span due to assured food, water, shelter and security
- It is carried in case of endangered species

LIMITATIONS OF EX – SITU CONSERVATION:

- Expensive method
 - Freedom of wildlife is lost
 - Animal cannot survive in natural environment
 - Adopted only for few selected species
- 



**THANK
YOU!!!!**



**BIODIVERSITY
IS LIFE • IS OUR LIFE**

**SAVE OUR EARTH FOR
THE NEXT GENERATION
TO KNOW ATLEAST OF
WHAT IS THE PLEASURE
OF NATURE!!!!!!**