

# Introduction to Ecosystem and Biodiversity

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**Subject: Basic Environmental  
Engineering**

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# Introduction to Basic Environmental Engineering

- **Environment** : Environment is the physical and biotic habitat which surrounds us; that which we can see, hear, touch, smell, and taste.

When the goal of improving environmental quality is taken to be improving human well-being, the word environment broadens to include all kinds of social, economic, and cultural aspects

- **System**: It can be defined as set of arrangement of things so related or connected to form a unit or organic whole; as, a solar system, irrigation system, supply system, the world or universe

# Interaction to Ecosystems

- Ecosystem is a collection of biotic (living) and non living (abiotic) entities in a space, connected by a complex web of interactions.
- Each eco system has two main components

(i) Abiotic

(ii) Biotic

## **(i) Abiotic components**

The non living factors or the physical environment prevailing in an ecosystem form the abiotic componetns.

## **(ii) Biotic components**

The living organisms including plants, animals and micro-organisms (bacteria and fungi) that are present in an ecosystem form the biotic components

Ecosystem is a functional system in a balanced condition, is self-sufficient and self regulating. A balanced ecosystem is essential for the survival of all living organisms.

### **Characteristic of an Ideal Ecosystem**

- i. The population of any species is limited to the available food resource potential
- ii. The species diversity is adequate for sufficient recycling of materials in the ecosystem
- iii. The pollution loads do not exceed the self purification capacity of the system

v. The energy consumption of the system is minimized and is also dependent on renewable resources

vi. The system is capable of continuing indefinitely without heading up towards a dead end

The system dynamics proceeds towards new revolutionary trends without losing stability.

### **Impact of humans on ecosystem**

The most obvious impact of humans on ecosystem is the loss of biodiversity. The frequency of species extinctions is correlated to the size of human population, which is directly related to resource consumption, land use change, and environmental degradation.

# Introduction to Biodiversity and its conservation

- **Biodiversity:** It refers to the variety and variability among living organism and ecological complexes in which they occur.

Major components in biodiversity are: ecosystem diversity, species diversity and genetic diversity

## **Ecosystem Diversity**

It relates to variety of habitats, biotic communities and ecological processes in the biosphere, and is considered as complex level of diversity

# Introduction to Biodiversity and its conservation

Biodiversity is the variety of different forms of life on earth, including the different plants, animals, micro-organisms, the genes they contain and the ecosystem they form. It refers to genetic variation, ecosystem variation, species variation (number of species) within an area, biome or planet. Relative to the range of habitats, biotic communities and ecological processes in the biosphere, biodiversity is vital in a number of ways including promoting the aesthetic value of the natural environment, contribution to our material well-being through utilitarian values by providing food, fodder, fuel, timber and medicine. Biodiversity is the life support system. Organisms depend on it for the air to breathe, the food to

# Introduction to Biodiversity and its conservation

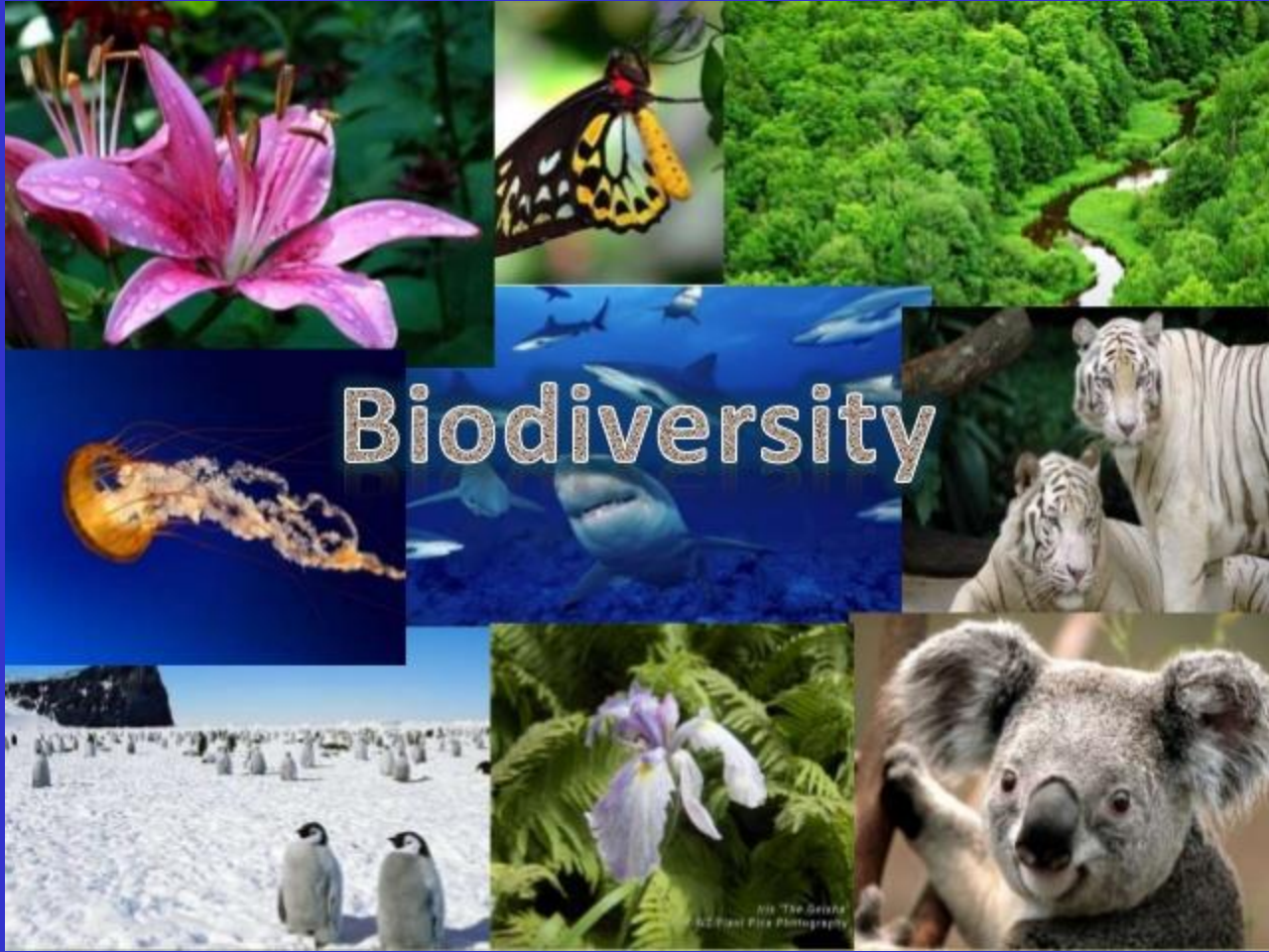
eat, and the water to drink. Wetlands filter pollutants from water, trees and plants reduce global warming by absorbing carbon, and bacteria and fungi break down organic material and fertilize the soil. It has been empirically shown that native species richness is linked to the health of ecosystems, as is the quality of life for humans. The ecosystem services of biodiversity is maintained through formation and protection of soil, conservation and purification of water, maintaining hydrological cycles, regulation of biochemical cycles, absorption and breakdown of pollutants and waste materials through decomposition, determination and regulation of the natural world climate. Despite the benefits from biodiversity



# Introduction to Biodiversity and its conservation

today's threats to species and ecosystems are increasing day by day with alarming rate and virtually all of them are caused by human mismanagement of biological resources often stimulated by imprudent economic policies, pollution and faulty institutions in-addition to climate change. To ensure intra and intergenerational equity, it is important to conserve biodiversity. Some of the existing measures of biodiversity conservation include; reforestation, zoological gardens, botanical gardens, national parks, biosphere reserves, germplasm banks and adoption of breeding techniques, tissue culture techniques, social forestry to minimize stress on the exploitation of forest resources

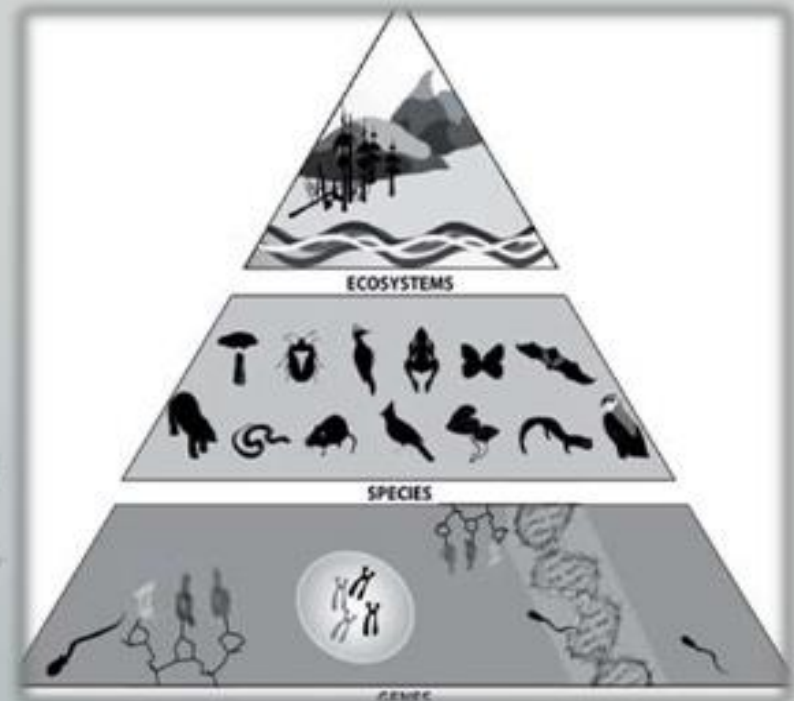
# Introduction to Biodiversity and its conservation



# Introduction to Biodiversity and its conservation

## Types of Biodiversity

- There are three types of biodiversity:-
  - Genetic Biodiversity
  - Species Biodiversity
  - Ecosystem Biodiversity



## **Species Diversity**

It is the most common level of diversity, and comprises the number of different level of diversity

## **Genetic Diversity**

Refers to total information in the genes of individuals of plants, animals and microorganisms. Genetic diversity is comparatively less obvious level of diversity as it represents variations within species

## **Biodiversity at Global, National and Local levels**

Conservative approach of existing biodiversity is ten million species, if insects are considered, this number is approx. thirty million. However, known number of species still are approx. 1.4 million.

## **Biodiversity at National and Local levels**

## Biodiversity at National and Local levels

India has over 108,276 species of bacteria, fungi, plants and animals already identified. Out of these, 84% species constitute fungi (21.2 %), flowering plants (13.9%), and insect (49.3%)

### Biodiversity in India

Categories	No. of Indian Species	% of Indian Species Evaluated	Species Threatened in India
Mammals	386	59	41%
Birds	1219	-	7%
Reptiles	495	73	46%
Amphibians	207	79	57%
Freshwater Fish	700	46	70%



# Thank You

