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BIODIVERSITY CONSERVATION

BIO DIVERSITY CONSERVATION

The 1992 UN Earth Summit defined Biodiversity as the variability among living organisms from all sources, including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part. This includes diversity within species, between species and ecosystems of a region. It reflects the number of different organisms and their relative frequencies in an ecological system and constitutes the most important functional component of a natural ecosystem. It helps to maintain ecological processes, create soil, recycle nutrients, influence climate, degrade waste and control diseases. It provides an index of health of an ecosystem. The survival of human race depends on the existence and wellbeing of all life forms (plants and animals) in the biosphere.

Concept of biodiversity

The term biodiversity was introduced by Walter Rosen (1986). Biodiversity is the assemblage of different life forms. Each species is adapted to live in its specific environments. The changes in climatic conditions are reflected in the distribution and pattern of biodiversity on our planet. The number of species per unit area declines as we move from tropics towards the poles. The Tundra and Taiga of northern Canada, Alaska, northern Europe and Russia possess less than 12 species of trees. The temperate forests of the United states have 20-35 species of trees, while the tropical forests of Panama have over 110 species of trees in a relatively small area.

Magnitude of biodiversity

Biodiversity is often quantified as the number of species in a region at a given time. The current estimate of different species on earth is around 8-9 million. However, we really don't know the exact magnitude of our natural wealth. This is called the 'The Taxonomic impediment'. So far about 1.5 million species of microorganisms, animals and plants have been described. Each year about 10-15 thousand new species are

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identified and published worldwide, of which 75% are invertebrates. The number of undescribed species is undoubtedly much higher. India is very rich in terms of biological diversity due to its unique bio-geographical location, diversified climatic conditions and enormous eco-diversity and geo-diversity. According to world biogeographic classification, India represents two of the major realms (The Palearctic and Indo-Malayan) and three biomes (Tropical humid forests, Tropical Dry/Deciduous forests and Warm Deserts/Semi deserts). With only about 2.4% of the world's total land surface, India is known to have over 8 % of the species of animals that the world holds and this percentage accounts for about 92,000 known species.

India is the seventh largest country in the world in terms of area. India has a variety of ecosystems, biomes with its varied habitats like, hills, valleys, plateaus, sea shores, mangroves, estuaries, glaciers, grasslands and river basins. It also reflects different kinds of climates, precipitation, temperature distribution, river flow and soil. India is one of the 17 mega biodiversity countries of the world and has ten biogeographic zones with characteristic habitat and biota.

TYPES OF BIODIVERSITY

The term 'Biodiversity' to describe diversity at all levels of biological organization from populations to biomes. There are three levels of biodiversity – Genetic diversity, Species diversity and Community/Ecosystem diversity

1.Genetic Diversity

Genetic diversity refers to the differences in genetic make-up (number and types of genes) between distinct species and to the genetic variation within a single species; also covers genetic variation between distinct populations of the same species. Genetic diversity can be measured using a variety of molecular techniques.

India has more than 50,000 genetic variants of Paddy and 1000 variants of Mango. Variation of genes of a species increases with diversity in size and habitat. It results in the formation of different races, varieties and subspecies. Rauvolfia vomitoria, a medicinal plant growing in different ranges of the Himalayas shows differences in the potency and concentration of the active ingredient reserpine due to genetic diversity.

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Genetic diversity helps in developing adaptations to changing environmental conditions.

2.Species Diversity

Species diversity refers to the variety in number of different species of plants and animals and richness of the species in any habitat. A community with more number of species enjoys species richness. Naturally undisturbed forests have greater species richness than reforested areas or plantations.

There are three types of Species:

a. Endemic species - is one whose habitat is restricted only to a particular area because of which it is often endangered. It differs from “indigenous,” or “native,” which although it occurs naturally in an area, is also found in other areas.

b. Exotic Species - is any species intentionally or accidentally transported and released by man into an environment outside its original range. These are often the most severe agents of habitat alteration and degradation, and a major cause of the continuing loss of biological diversity throughout the world.

c. Cosmopolitan Species – It is a species that is found to be distributed over most regions of the earth example: cats, dogs, human beings. The killer whale is considered as the most cosmopolitan species in the world.

Measurement of Biodiversity:

1.Species Richness:

The number of species per unit area at a specific time is called species richness, which denotes the measure of species diversity. The Western Ghats have greater amphibian species diversity than the Eastern Ghats. The more the number of species in an area the more is the species richness. The three indices of diversity are - Alpha, Beta and Gamma diversity

- i. Alpha diversity: It is measured by counting the number of taxa (usually species) within a particular area, community or ecosystem.

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- ii. Beta diversity: It is species diversity between two adjacent ecosystems and is obtained by comparing the number of species unique to each of the ecosystem.
 - iii. Gamma diversity refers to the diversity of the habitats over the total landscape or geographical area.

2.Species Evenness:

To make an ecosystem healthy and balanced ecosystem.

3.Community/Ecosystem Diversity

Species biodiversity is the variety of habitats, biotic communities, and ecological processes in the biosphere. It is the diversity at ecosystem level due to diversity of niches, trophic levels and ecological processes like nutrient cycles, food webs, energy flow and several biotic interactions. India with its alpine meadows, rain forests, mangroves, coral reefs, grass lands and deserts has one of the greatest ecosystem diversities on earth.

Patterns of Biodiversity Distribution

The distribution of plants and animals is not uniform around the world. Organisms require different sets of conditions for their optimum metabolism and growth. Within this optimal range (habitat) a large number and type of organisms are likely to occur, grow and multiply. The habitat conditions are determined by their latitudes and altitudes.

Latitudinal and Altitudinal Gradients:

Temperature, precipitation, distance from the equator (latitudinal gradient), altitude from sea level (altitudinal gradient) are some of the factors that determine biodiversity distribution patterns. The most important pattern of biodiversity is latitudinal gradient in diversity. This means that there is an increasing diversity from the poles to equator. Diversity increases as one moves towards the temperate zones and reaches the maximum at the tropics. Decrease in species diversity occurs as one ascends a high mountain due to drop in temperature (temperature decreases @ 6.5°C per Km above mean sea level)



The Reasons for The Richness of Biodiversity In The Tropics Area:

1. Warm tropical regions between the tropic of Cancer and Capricorn on either side of equator possess congenial habitats for living organisms.
2. Environmental conditions of the tropics are favourable not only for speciation but also for supporting both variety and number of organisms.
3. The temperatures vary between 25°C to 35°C, a range in which most metabolic activities of living organisms occur with ease and efficiency.
4. The average rainfall is often more than 200 mm per year.
5. Climate, seasons, temperature, humidity, photoperiods are more or less stable and encourage both variety and numbers. Rich resource and nutrient availability.

Question:

1. Explain the significance and threads associated with biodiversity Conservation.

