

# CHAPTER 13

# BIODIVERSITY AND CONSERVATION

VEDA  
ACADEMY

CLASS 12<sup>TH</sup>

## NCERT EXERCISE AND SOLUTIONS - BIOLOGY

**Q. 1.** Name the three important components of biodiversity.

**ANSWER:-**

Biodiversity refers to the range of living organisms found in different ecosystems. It encompasses the variability of life forms across all environments, including land, air, and water. The three key components of biodiversity are:

- Genetic diversity
- Species diversity
- Ecosystem diversity

**Q. 2.** How do ecologists estimate the total number of species present in the world?

**ANSWER:-**

The variety of living organisms on Earth is immense, with researchers estimating the total number to be around seven million. Ecologists determine the total species count by statistically comparing the species richness of a well-studied group of insects from temperate and tropical regions. These ratios are then applied to other groups of plants and animals to estimate the overall species richness on Earth.

**Q. 3.** Give three hypotheses for explaining why tropics show greatest levels of species richness.

**ANSWER:-**

Scientists have proposed three hypotheses to explain the high species richness in tropical regions:

- Tropical latitudes receive more solar energy than temperate regions, leading to higher productivity and greater species diversity.
- Tropical regions experience less seasonal variation, offering a more stable environment that promotes niche specialization and contributes to high species richness.
- During the ice age, temperate regions were affected by glaciations, whereas tropical regions remained undisturbed, which facilitated an increase in species diversity in the tropics.



**Q. 4. What is the significance of the slope of regression in a species – area relationship?**

**ANSWER:-**

The slope of regression ( $z$ ) plays a crucial role in determining the species-area relationship. It has been observed that in smaller areas (where the species-area relationship is studied), the slope values are consistent across different taxonomic groups and regions. However, when the analysis is extended to larger areas, the regression slope becomes significantly steeper.

**Q. 5. What are the major causes of species losses in a geographical region?**

**ANSWER:-**

Biodiversity refers to the variety of living organisms present in different ecosystems, encompassing life forms from land, air, and water. Unfortunately, biodiversity is rapidly declining worldwide. The primary causes for this loss are as follows:

- **Habitat Loss and Fragmentation:** Human activities such as deforestation, slash-and-burn agriculture, mining, and urbanization lead to the destruction or alteration of habitats. This results in fragmented habitats, which disrupt the movement of migratory species and reduce genetic exchange between populations, ultimately causing species decline.
- **Over-exploitation:** Over-hunting and excessive harvesting of plants and animals by humans have caused many species, such as the tiger and the passenger pigeon, to become endangered or extinct.
- **Alien Species Invasions:** The introduction of non-native species into new habitats, whether accidental or intentional, has led to the decline or extinction of native species. For instance, the introduction of the Nile perch in Lake Victoria, Kenya, caused the extinction of over 200 native fish species.
- **Co-extinction:** In native ecosystems, species are intricately linked. The extinction of one species often triggers the extinction of other species that rely on it. For example, the extinction of a host species can lead to the extinction of its associated parasites.

**Q. 6. How is biodiversity important for ecosystem functioning?**

**ANSWER:-**

Ecosystems with high species diversity are far more stable than those with low species diversity. High biodiversity enhances the stability of an ecosystem's productivity and increases its resilience to disturbances such as invasions by alien species and natural disasters like floods.

When an ecosystem is rich in biodiversity, its ecological balance is less likely to be disrupted. As food chains link various trophic levels, the loss of any organism or group at a specific level can destabilize the entire system. For instance, if plants in a food chain are eliminated, deer would perish due to a lack of food. This, in turn, would lead to the death of tigers that rely on deer for sustenance. However, in a biodiversity-rich ecosystem, alternative food sources at each trophic level would ensure that no organism is left without food.

Thus, biodiversity is essential for maintaining the health and ecological balance of an ecosystem.



**Q. 7. What are sacred groves? What is their role in conservation?**

**ANSWER:-**

Sacred groves are areas of forest that are preserved around places of worship. These groves are commonly found in regions like Rajasthan, the Western Ghats of Karnataka and Maharashtra, Meghalaya, and Madhya Pradesh. Sacred groves play a vital role in protecting many rare, endangered, and endemic species of plants and animals within the region. Deforestation is strictly prohibited in these areas by local tribal communities, making sacred groves biodiversity hotspots.

**Q. 8. Among the ecosystem services are control of floods and soil erosion. How is this achieved by the biotic components of the ecosystem?**

**ANSWER:-**

The biotic components of an ecosystem consist of living organisms, including plants and animals. Plants are crucial in controlling floods and preventing soil erosion. Their roots bind soil particles together, which helps prevent the topsoil from being washed away by wind or water. Additionally, plant roots create soil porosity, allowing for groundwater infiltration, which reduces the risk of floods. Thus, plants play a key role in mitigating soil erosion and natural disasters like floods and droughts. They also enhance soil fertility and promote biodiversity.

**Q. 9. The species diversity of plants (22 per cent) is much less than that of animals (72 per cent). What could be the explanations to how animals achieved greater diversification?**

**ANSWER:-**

Animals have achieved greater diversification than plants due to factors like mobility, which allows them to colonize diverse habitats; complex behaviours that create ecological niches; varied reproductive strategies; and diverse ecological interactions like predation and competition. Additionally, animals have faced unique evolutionary pressures over long periods, promoting speciation. In contrast, plants are more stationary and have fewer methods of rapid diversification.

**Q. 10. Can you think of a situation where we deliberately want to make a species extinct? How would you justify it?**

**ANSWER:-**

Indeed, there are various parasites and disease-causing microorganisms that we aim to eradicate from the Earth. As these microorganisms pose a threat to human health, scientists are actively working to combat them. For example, the smallpox virus has been eradicated globally through vaccination efforts, demonstrating humanity's intent to make certain species extinct. Additionally, other eradication programs, such as polio and Hepatitis B vaccination campaigns, are designed to eliminate these harmful microbes.

