UPSC Civil Services Examination

UPSC Notes GS-III [Biodiversity]

Topic: Biodiversity- Types of Biodiversity, Importance and Causes of Loss of Biodiversity

What is Biodiversity?

Biodiversity can be defined as a community of all the living organisms on the earth and the diversity among them from all the ecosystems. Biodiversity is thus the variability between the species, within the species and between the ecosystems.

The term biodiversity was coined by Walter G. Rosen in the year 1986.

Biodiversity holds ecological and economic significance. It provides us with nourishment, housing, fuel, clothing and several other resources. It also extracts monetary benefits through tourism. Therefore, it is very important to have a good knowledge of biodiversity for a sustainable livelihood.

Importance of Biodiversity

Biodiversity plays a major role in maintaining the ecological balance of the ecosystem. It refers to the number of different species belonging to a particular region. In biodiversity, each individual species has a major role to play in the ecosystem.

Ecological Role of Biodiversity

Apart from providing ecological balance to the environment, each individual species of biodiversity has a major function to play in the ecosystem. They play a major role in the production and decomposition of organic wastes, fixing atmospheric gases and regulation of water and nutrients throughout the ecosystem. The stability of the ecosystem increases with the diversity of the species.

Economical Role of Biodiversity

Biodiversity acts as a source of energy and has a major role in providing raw materials for industrial products such as oils, lubricants, perfumes, dyes, paper, waxes, rubber, etc.

Importance of plant species for various medicinal use has been known since ages. According to reports, more than 70 % of the anti-cancer drugs are derived from plants in the tropical rainforests.

Scientific Role of Biodiversity

Each species of the ecosystem contributes to providing enough evidence as to how life evolved on this planet and the role of each species in maintaining the sustainability of the ecosystem.

Types of Biodiversity

Biodiversity can be categorised into three main types:

1. Genetic Diversity (Diversity within species)
2. Species Diversity (Diversity between species)
3. Ecosystem Diversity (Diversity between ecosystem)

Genetic Diversity

Every individual of a particular species differs from each other in its genetic makeup. This genetic variability among the members of any plant or animal species is known as genetic diversity. When two individuals are closely related, they share more genetic information among each other and hence, are more similar.

Species Diversity

Species diversity can be defined as the variety of species within a particular region or habitat. This type of diversity can be found in both the natural ecosystem and agricultural ecosystem.

There are more than 85,000 flowering plant species in tropical North and South America, tropical and subtropical Asia has more than 50,000 flowering plants whereas, there are only 35,000 flowering plant species in tropical and subtropical Africa. But, Europe has around 11,300 vascular plants. Also, other areas, such as salt flats or a polluted stream, have fewer species.

Ecosystem Diversity

There are a large diversity of different ecosystems which have their own distinctive species. This ecosystem varies with each other as per their habitats and the difference in their species. This ecosystem diversity can be found within a specific geographical region or within a country or a state. This type of diversity also includes forests, grasslands, deserts and mountains.

Loss of Biodiversity

Loss of biodiversity is the decrease in the number of a particular species in a certain habitat. Loss of biodiversity also leads to the extinction of the plant and animal species and this loss can be either reversible or permanent.

The human activities have been the major cause for the loss of biodiversity which has led to sudden changes in climate causing a big threat to the biodiversity. There has also been an increased demand for the natural resources along with the growing population leading to greater waste generation.

Causes of Loss of Biodiversity

Some of the major causes that have resulted in the loss of biodiversity are mentioned below:

1. The natural habitat of the ecosystem plays a major role in maintaining the ecological balance. Several trees are cut down every year for the construction of industries, highways, settlement and so on to fulfill the human demands. As a result, the species become the target to predation and eventually die.
2. Hunting of the wild animals for commercialisation of their products has been a major reason for the loss of biodiversity. Since the year 2013, more than 90 rhinos were killed by the poachers for their horns and as per the records of 2016, 9 Indian Rhinos have been killed in Kaziranga National Park of Assam.
3. The exploitation of the medicinal plants for several laboratory purposes has resulted in the extinction of these species. Also, several animals are sacrificed for the purpose of various research in science and medicine.
4. Natural calamities like floods, earthquakes, forest fires also lead to the loss of biodiversity.
5. Air pollution has a major role in the loss of biodiversity. Rapid cutting down of the trees has resulted in the increase of carbon dioxide in the atmosphere leading to climate change. As a result, there has been an increase in the land and ocean temperature leaving an inimical impact on species.