

BIODIVERSITY: DEFINITION & CONCEPT, CAUSES OF LOSS OF BIODIVERSITY & ITS ECONOMIC IMPLICATIONS & SIGNIFICANCE OF BIODIVERSITY

MBOTCC-8

M.Sc. Sem-II
(2018-20)

Unit-III Definition & Concept:

(i) Biodiversity refers to the occurrence of diverse kinds of living organisms, including all forms of plants, animals and microbes, in any geographical locality or area or habitat.

(ii) Significance of this kind of study could be realised by the world community of biologists or life scientists only during early 1980's in view of observed climate changes.

(iii) Biological diversity was combined as a portmanteau word 'Biodiversity' by Rosen in 1985 (as reported by Wilson, 1985).

(iv) Biodiversity is typically a measure of variation at the genetic, species and ecosystem level.

(v) Biodiversity of terrestrial and aquatic habitats in different regions of the world having variable climatic conditions is not uniform, and it is not evenly distributed on the earth.

(vi) There may also be latitudinal gradients in species diversity, though it tends to cluster in hotspots.

(vii) Rapid industrialization, unprecedented population growth (of humans) and consequent environmental changes have come to affect biodiversity quite adversely. Loss of biodiversity may lead to unforeseen disturbances in the biosphere leading to severe dangers for the entire world.

Loss of Biodiversity:

— Major cause of biodiversity loss is habitat destruction resulting due to overpopulation, deforestation, pollution and global warming.

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- Physically large species and those dwelling in forests or oceans are usually more affected on account of habitat destruction.

- To arrest this biodiversity loss and promote its conservation, United Nations declared 2011-2020 as "UN Decade on Biodiversity".

- Biodiversity at all levels - genetic, ecosystem and species including the newly added 'molecular diversity', has been found to deplete globally.

Major Causes of Loss of Biodiversity:

(a) Habitat Loss

(i) Caused by deforestation, overpopulation, pollution and global warming

(ii) Physically large species inhabiting forests or oceans more affected by habitat destruction

(iii) As per IUCN estimates, around one third of globally known species are threatened with extinction.

(iv) 25% of all mammals are estimated to be extinct within 20 years.

(v) Freshwater ecosystems most threatened

(vi) Those species that would normally remain constrained because of the presence of natural barriers in the ecosystem are called invasive species. They destroy the native species.

(vii) Uncontrolled hybridization and gene swamping (interbreeding with rare species) are the categories of genetic pollution that result in the loss of native species.

(viii) Overexploitation activities like fishing, hunting (poaching), excessive logging (wood cutting) and illegal trade of wildlife are also prominent causes.

(ix) Overfishing unsustainably cause loss of over 25% of global fisheries.

(b) Global warming & climate change

(i) A major cause of the loss of biodiversity

(ii) If the present rate of global warming continues, biodiversity hotspots of coral reefs will disappear within 20-40 years.

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- (iii) ⁽³⁾ ~~More~~ Action is urgently needed to conserve the magnificent biodiversity of our planet.
- (iv) Suitable economic policies must be fostered to maintain earth's biodiversity.

(c) Pollution

Escalating pollution due to unrestrained human activities influence the natural environment and alter the flow of energy and chemical constitution of the environment impacting loss of species.

(d) Overexploitation of resources

(i) Ruthless exploitation of natural resources lead to ecological imbalance resulting in the loss of biota.

(ii) Natural resources may include water resources, forest resources, energy resources (fossil fuel & oil) and biotic resources. Their overexploitation results in the loss of native flora and fauna.

(iii) Forests, wetlands and grasslands are also being overexploited.

Economic Implications of Biodiversity Loss:

Biodiversity loss damages the functioning of ecosystems and leads to a decline in essential services, which may have serious economic implications.

Human driven accelerated global changes including changes in land use patterns, biogeochemical cycles, overexploitation of resources and expansion of invasive species are having drastic impacts on ecosystems and biodiversity.

Following points are to be noted with regard to the economic implications of biodiversity loss:

(i) Economy and society are highly dependent on ecosystems and the biodiversity they contain. Ecosystems provide the sinks needed to absorb and process the pollution and waste generated by human society. This is a kind of 'economic metabolism'.

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(ii) Loss of biodiversity influences supply of raw materials, food and energy whose economics becomes unquestionable. Economic benefits from the biodiversity are very subtle, and require serious thought. Microeconomic accounting system is needed to appreciate economic losses to the society and nation.

(iii) Ecological and environmental economics has developed tools to quantify ecosystem services in monetary terms.

- In 2005 ^{Stern} review on the economics of climate change due to biodiversity loss concluded that an investment of 1% of global GDP would be needed to mitigate the effects of climate change. Failure to make this investment will expose the world to a risk of recession that could reach 20% of global GDP.

- The 'economism' that permeates new conservationist discourse has been justified by the need to influence decision making in the short term.

(iv) There is an urgent need to develop and appreciate economic conceptualization of ecosystems and biodiversity in terms of Natural Capital.

Significance of Biodiversity:

Biosphere is a life supporting system for the human population, and each species in the biosphere has its own significance. Biodiversity is vital for a healthy biosphere.

Biodiversity is important in terms of its consumptive value, productive value, social value, ethical value and aesthetic value.

Consumptive value - Biodiversity provides several ^{and animals} materials for the consumption and use of many such as food, building materials, fodder, medicines, and several others.

Productive value - This refers to marketable use of biodiversity components. Genetic diversity can be

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⑤ used profitably by genetic engineers and biotechnologists to develop high value traits and profitable bioproducts.

Ethical and aesthetic value - Biodiversity richness adds to the beauty of landscape and provides aesthetic pleasure to humans. Diversity of floral and faunal species in any area becomes an enjoyable treasure for the public/people and relieves them of their anxiety and worries.

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