Biodiversity: What is it and why is it important?

Biodiversity is the variety of all living things; the different plants, animals and microorganisms, the genetic information they contain and the ecosystems they form. Biodiversity is usually explored at three levels - genetic diversity, species diversity and ecosystem diversity. These three levels work together to create the complexity of life on Earth.

Biodiversity collectively describes the vast array of approximately 9 million species (including *Homo sapiens*) that inhabit the earth, together with the interactions amongst them. Without these organisms, ecosystems and ecological processes, human societies could not exist. They supply us with oxygen and clean water. They cycle carbon and fix nutrients. They enable plants to grow and therefore to feed us. These benefits are known as **ecosystem services**.

So biodiversity keeps us alive, but there are other less tangible benefits. Recreation such as fishing or hiking, the aesthetic beauty of the natural world and our spiritual connection with nature; the cultural values we place on plants and animals - these are all benefits of biodiversity.

Four categories of ecosystem services[U1]

Provisioning services, or the supply of goods of direct benefit to people, and often with a clear monetary value, such as timber from forests, medicinal plants, and fish from the oceans, rivers and lakes.

Regulating services, the range of functions carried out by ecosystems which are often of great value but generally not given a monetary value in conventional markets. They include regulation of climate through the storing of carbon and control of local rainfall and the removal of pollutants by filtering the air and water.

Cultural services, not providing direct material benefits, but contributing to wider needs and desires of society, and therefore to people's willingness to pay for conservation. They include the spiritual value attached to particular ecosystems and the aesthetic beauty of landscapes or coastal formations that attract tourists.

Supporting services, not of direct benefit to people but essential to the functioning of ecosystems and therefore indirectly responsible for all other services. Examples are the formation of soils and the processes of plant growth.

The loss of biodiversity and its causes

Globally, biodiversity is in rapid decline. The explosion of the human population from 2 to 7 billion in just 100 years has caused the extinction of many species. Loss of species could compromise the ecosystem services we rely on.

Scientists agree that the earth is experiencing its first anthropogenic global extinction event. They also agree that this is happening at a rate too fast for species to adapt. The extinction rate of species is now thought to be about 1,000 times higher than before humans dominated the planet. According to the International Union for Conservation of Nature (IUCN), globally about one third of all known species are threatened with extinction.

The continuous failure to recognize the enormous value of biodiversity is rapidly pushing the world toward critical tipping points, to where many of the planet's ecosystems will shift into unprecedented states in which the capacity to provide for the needs of present and future generations is highly uncertain.

The **main cause of the loss of biodiversity** can be attributed to the influence of human beings on the world's ecosystem. The threats to biodiversity can be summarized in the following main points:

Alteration, fragmentation and loss of habitats: The natural habitat may be destroyed by settlements, intensive agriculture, mining, industries, highway construction, dam building etc. As a consequence, the species must adapt to the changes in the environment, move elsewhere or may succumb to predation, starvation or disease and eventually die.

Introduction of exotic species and genetically modified organisms: Any species which is not a natural inhabitant of the locality but is deliberately or accidentally introduced into the system may be designated as an exotic species. Native species are subjected to competition for food and space due to the introduction of exotic species.

Pollution: All forms of pollution (pesticides, industrial chemicals, etc.) pose a serious threat to biodiversity, but in particular nutrient loading, primarily of nitrogen and phosphorus from intensive agricultural practices, is a major and increasing cause of biodiversity loss and ecosystem dysfunction.

Climate change: Climate change affects biodiversity because it endangers all the species that adapted to the cold due to the latitude (the Polar species) or the altitude (mountain species).

Overexploitation of resources: When the activities connected with capturing and harvesting (hunting, fishing, farming) a renewable natural resource in a particular area is excessively intense, the resource itself may become exhausted, as for example is the case of tuna and many other species that man captures without leaving enough time for the organisms to reproduce.

Currently, the reversal of biodiversity loss and ecosystem services degradation is not recognized by development strategies, sectoral and intersectoral policies and budgetary processes. Actions taken (or not taken) over the next two decades will determine whether the relatively stable environmental conditions on which human civilization depend will continue beyond this century. Biodiversity must be recognized as the foundation of economic productivity, prosperity and sustainable development.

International agreements on biodiversity conservation

The Convention on Biological Diversity (CBD) is an international legally-binding treaty with three main goals: conservation of biodiversity; sustainable use of biodiversity; and the fair and equitable sharing of the benefits arising from the use of genetic resources. The Convention on Biological Diversity was opened for signature at the Earth Summit in Rio de Janeiro on 5 June 1992 and entered into force in 1993. To date, there are 193 Parties.

In 2010, Parties to the CBD adopted the Strategic Plan for Biodiversity 2011–2020, a ten-year framework for action by all countries and stakeholders to safeguard biodiversity and the benefits it provides to people. As part of the Strategic Plan 20 ambitious but realistic targets, known as the Aichi Biodiversity Targets, were adopted. Governments have committed to establishing national targets in support of the Aichi Biodiversity Targets.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora CITES is a multilateral treaty to protect endangered plants and animals. The convention was opened for signature in 1973 and CITES entered into force in 1975. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species in the wild, and it accords varying degrees of protection to more than 35,000 species of animals and plants.

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) aims to conserve terrestrial, marine and avian migratory species throughout their range. It is an international treaty concerned with the conservation of wildlife and habitats on a global scale. Since the Convention's entry into force, its membership has grown steadily to include over 120. The Convention was signed in 1979 and entered into force in 1983.

The Sustainable Development Goals (SDG)
The Sustainable Development Goals (SDGs), also known as the "Global Goals" or the "2030 Agenda", define the follow-up framework of the UN Millennium Development Goals. The agenda consists of 17 global development goals "to end poverty, protect the planet and ensure that all people enjoy peace and prosperity" and should be implemented from 2016 onwards. The unification process led by the UN Development Program (UNDP) involved all 193 member states and the civil society. The goals and its 169 subtargets are strongly interconnected. Three of them directly address biodiversity conservation - 12: Responsible Consumption and Production; 14: Life Below Water and 15: Life on Land.

Indicators and scientific expertise on biodiversity

The IUCN Red List of Threatened Species[U2] founded in 1964, has evolved to become the world's most comprehensive inventory of the global conservation status of biological species. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. With its strong scientific base, the IUCN Red List is recognized as the most authoritative guide to the status of biological diversity. A series of Regional Red Lists are produced by countries or organizations, which assess the risk of extinction to species within a political management unit.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). The IPBES is an independent international body, founded in 2012, in charge of providing policymakers with scientific assessments of current knowledge on biodiversity, as well as policy and communication support. It issues regional assessment reports on the state of biodiversity, as well as specific themes (such as pollination and food production or land degradation).

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