



Biodiversity

Biodiversity occurs at the genetic, species, ecosystem and landscape levels. Biodiversity at all of these levels is the very basis for sustainable development, providing goods such as foods and medicines and services such as clean water and air. Biodiversity guarantees the effective functioning of ecosystems and contributes to poverty reduction, food security, and human health. Yet biodiversity is declining at an unprecedented rate - making communities more vulnerable as options for change are diminished. Leading up to the 2002 World Summit on Sustainable Development (WSSD), UN Secretary General Kofi Annan proposed the WEHAB Initiative, highlighting Water and sanitation, Energy, Health, Agriculture and Biodiversity and ecosystem management as five key areas where concrete results are both necessary and attainable¹.

Species Diversity

The extent of the world's species biodiversity - fewer than two million of an estimated 10-15 million species have been scientifically described - and the role of biodiversity in ecosystem functioning remain largely unknown. But the fact that species and habitat are disappearing is quite certain. Current rates of extinction among mammals and birds are estimated to be more than 100 times those expected in the absence of human activities, while ecosystems such as coral reefs, freshwater wetlands and tropical forests face a rate that is roughly 1,000 to 10,000 times that expected without human interference. In recent decades, approximately 20 percent of the world's freshwater fish have become extinct, threatened or endangered, while roughly 75 percent of the major marine fish stocks are either depleted, overexploited or being fished to capacity. The depletion of the gene pool has serious implications as a substantial proportion (about 40 percent) of the global economy is based on biological products and processes. Loss of species also has a direct impact at the local level - particularly on the 900 million people living in extreme poverty in rural areas who are highly dependent on the direct use of biodiversity for their food and livelihoods.

Habitat Diversity

Habitat modification and destruction pose the greatest threat to biodiversity around the globe. Growing human populations lead to increasing resource demands (food, fuel wood, shelter, land, etc.) and pressure to convert habitat to other uses, such as agriculture and livestock-raising. Threatened ecosystems include:

- **Tropical Forests:** Tropical forests have the greatest species biodiversity of any terrestrial ecosystem, and serve as important sources of food, medicine and fuel for surrounding communities. Pressure on forest resources has led to deforestation at an increasing pace - nearly half of the tropical rainforests and mangroves have already been cleared.² As forests are destroyed or degraded, many valuable species of animals and plants that are harvested for food, fibres, medicines and other products are threatened or lost forever.
- **Wetlands:** Wetlands play a key role in water purification, waste filtration and detoxification. Wetlands also stabilize soil and prevent erosion. More than half of the world's wetlands have been drained and populations of inland water and wetland species have declined by 50 percent between 1970 and 1990.³ The loss of wetlands has negative effects on water quality and increases the likelihood of water-borne diseases. Wetland loss also reduces the land's ability to absorb and hold precipitation, thereby increasing people's vulnerability to natural disasters such as droughts, landslides, and floods.
- **Coral Reefs:** Coral reefs are home to some of the earth's most diverse living ecosystems, fish and animals. Reefs act as protection to shorelines from erosion, wave damage and storms, they are sources of income and food for many coastal communities, and provide biomedical resources. Pollution, coastal development, fishing, tourism, siltation and agriculture are currently damaging the fragile ecosystems - roughly one-third of the world's coral reef systems have been destroyed or are considered to be threatened. The recent phenomenon of widespread coral bleaching through sea warming during El Niño events is a longer-term threat, probably caused by industrial human activities.

¹ UN Secretary General, "Towards a Sustainable Future" 14/05/2002.

² WEHAB Working Group, A Framework for Action on Biodiversity and Ecosystem Management, Geneva: UN, 2002.

³ UN, Water for People, Water for Life: the United Nations World Water Development Report Geneva: UN.

Human Health

Biodiversity is essential for human health, contributing to disease and illness prevention, and the provision of raw materials for medicines. Eighty percent of people in developing countries rely on medicines based largely on plants and animals and more than half of the world's modern drugs are derived from biological resources. Biodiversity also makes a significant contribution to disease prevention, as well-functioning ecosystems help protect human health. The poor are hit most by diminishing biodiversity, as they suffer most from scarce or polluted water and air and from diseases associated with disrupted ecosystems.

Food Security

Biodiversity is critical to food production, providing services such as air and water purification, waste detoxification and decomposition, flood and drought moderation, seed dispersal and plant pollination, soil fertility renewal and nutrient recycling. Biodiversity is also a source of alternative food products during periods of scarcity. Yet many of the natural resources required to increase food production conflict with the conservation of biodiversity. Recent scientific work also calls attention to the importance of other levels of biodiversity, for example genetic diversity (economic and non-economic species), the impact of introduced invasive species, the vital role of landscape biodiversity, and the recognition of 'emerging ecosystems' resulting from human intervention. A key challenge of sustainable development is to increase the production of food to meet the needs of growing populations while minimizing the reduction of all levels of biodiversity.

International Commitments

One of the key agreements that was opened for signature at the 1992 UN Conference on Environment and Development in Rio de Janeiro was the Convention on Biological Diversity (CBD). The Convention has been ratified by 187 countries, and recognises three main objectives: conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of the benefits arising from the utilisation of genetic resources. In 2002, Governments, NGOs, intergovernmental organisations and businesses reaffirmed these commitments in the WSSD Plan of Implementation. The Plan contains targets and timetables to spur action on a wide range of issues including a commitment to reverse the trend of biodiversity loss by 2010, and to biodiversity conservation (Chap. 42). The Plan also recognizes the Millennium Development Goal (MDG) to "Ensure Environmental Sustainability" and the importance of biodiversity to achieving all eight of the MDGs.

UNESCO's Role: Biodiversity and Education for Sustainable Development

Despite the international consensus that habitat conservation is the key to biodiversity conservation, agreements have done little to conserve loss of habitat and species. Biodiversity conservation and ecosystem management must therefore be integrated into local and national economies and joint management partnerships formed between local communities, non-governmental organizations and the private sector. Though the number and extent of protected areas (national parks, protected landscapes, etc.) have increased dramatically since the 1980s, they as yet, cover only some ten percent of land area and some one percent of marine area. Efforts are required to conserve the biodiversity both inside and outside of protected areas. UNESCO's World Heritage Convention seeks to protect outstanding areas of natural heritage, including areas of special importance for their biodiversity, which are 'flagships' of best-protected area practice. UNESCO's Man and the Biosphere (MAB) Programme, through its World Network of Biosphere Reserves, seeks ways to integrate conservation through innovative institutional mechanisms and partnerships amongst all stakeholders.

Education for Sustainable Development (ESD) addresses biodiversity by focusing attention to the interlinking issues of biodiversity and, livelihoods, agriculture, livestock, forestry production and fisheries. ESD also works to develop a better understanding of how consumption can affect global biodiversity. Through ESD, people realise that the products that they consume can have an impact on the biodiversity in their own communities and in those of far-off lands.

UNESCO has a dual role in relation to ESD. First, as a substantive implementer of ESD - accelerating education reforms and coordinating activities of multiple stakeholders to implement ESD at international, regional, and country levels. Second, UNESCO also acts as the lead agency in the promotion of the Decade on Education for Sustainable Development (2005-2014). The Decade offers an opportunity for UNESCO and its partners to advance progress made in human resource development, education and training to prevent habitat loss and degradation, species loss, and pollution.

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