

BIODIVERSITY AND HUMAN WELL-BEING

G L O B A L E N V I R O N M E N T O U T L O O K

The fourth *Global Environment Outlook – environment for development (GEO-4)* assessment report is published in 2007, exactly two decades since the World Commission on Environment and Development (WCED) published its seminal report – *Our Common Future* – which placed sustainable development on the agenda of governments and other stakeholders. *GEO-4* is the most comprehensive UN report on the environment prepared by about 390 experts and reviewed by more than 1 000 others across the world.

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Biodiversity is the variety of life on Earth. It includes diversity at the genetic level, the diversity of species, and the diversity of ecosystems and habitats.

Ecosystems vary greatly in size and composition, ranging from a small community of microbes in a drop of water, to the entire Amazon rain forest. The very existence of people, and that of the millions of species with which the planet is shared, is dependent on the health of our ecosystems. Trends in biodiversity over the next few decades will largely depend on human actions, especially those related to land-use changes, energy production and conservation.

Status of species

Fewer than 10 per cent of the world's described species have thus far been assessed to determine their conservation status. Of these, over 16 000 species have been identified as threatened with extinction.

- Rates of species extinction are 100 times higher than the baseline rate shown in fossil records.
- Tropical moist forests contain by far the highest number of threatened species, followed by tropical dry forests, mountain grasslands and dry shrublands.
- The distribution of threatened species in freshwater habitats is poorly known, but in general, at much greater risk of extinction than terrestrial ones.
- The number of species inhabiting the deep sea is yet to be understood but is estimated to be as high as 10 million.

Pressures and impacts on biodiversity loss

Further pressure on biodiversity is directly linked to the continuing increase in global human population, predicted to reach 8 billion by 2025.

The world's terrestrial and aquatic ecosystems are being modified in extent and composition by human activity at an unprecedented rate, with little understanding of the implications this will have in terms of the ability of these ecosystems to function and provide services in the future. The following are some recent impacts on biodiversity related to human population pressures:

- 20-50 per cent of more than half of the world's 14 biomes surface areas have already been converted to croplands.
- Some 60 per cent of the world's major rivers have been fragmented by dams and diversions, as a result of flooding of habitats, disruption of flow patterns and blocking of migration routes.
- Of some 270 000 known species of higher plants about 10 000 to 15 000 are edible and about 7 000 of them are used in agriculture. Loss of genetic diversity of major agricultural crops in the last 2 decades may have major implications on food security.

Challenges and opportunities

Meeting global food needs poses increasing challenges, which will require either intensification or extensification to increase agricultural productivity. In Brazil, for example, the area of land used to grow soybeans (most of which are exported to China) has increased from 117 000 km² in 1994 to 210 000 km² in 2003.

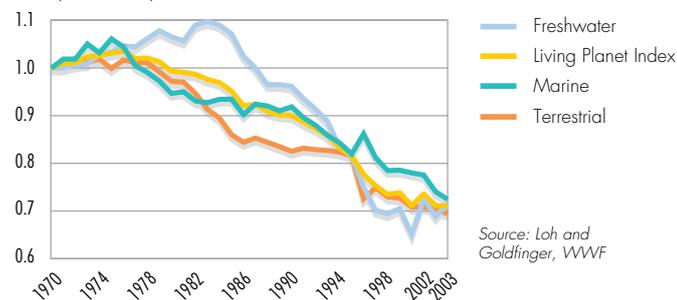
The rapid increase in demand for energy has profound impacts on biodiversity. Exploration for hydrocarbons, pipeline construction, uranium and coal mining, hydroelectric dam construction, harvesting for fuelwood and, increasingly, bio-fuel plantations can all lead to significant biodiversity loss, both on land and at sea.

The world output of biofuels is projected to increase almost fivefold, from 20 million tonnes of oil equivalent in 2005 to 92 million tonnes in 2030. Biofuels, currently produced on 1 per cent of the world's arable land and support 1 per cent of

Examples of state, pressure and response indicators that have been adopted by the Convention on Biological Diversity to measure progress towards the 2010 target

a) Living Planet Index

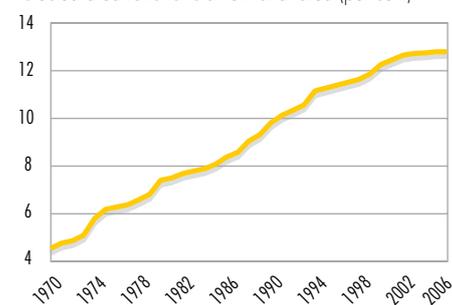
Index (1970=1.0)



Source: Loh and Goldfinger, WWF

b) Total area under protected status

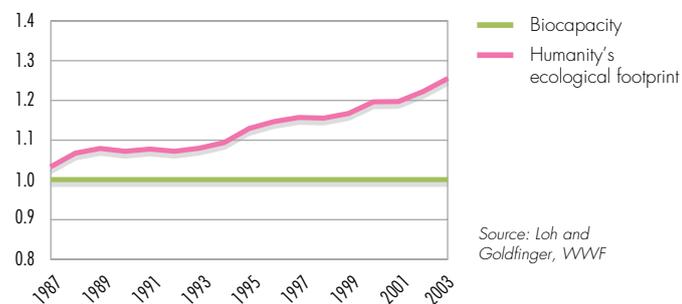
Protected area ratio to total territorial area (per cent)



Source: GEO Data Portal compiled from UNEP-WCMC

c) Humanity's ecological footprint

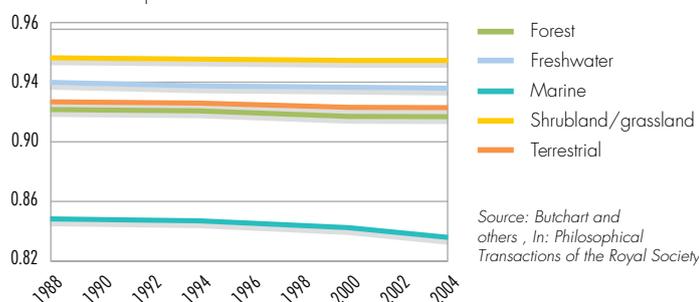
Number of Earths



Source: Loh and Goldfinger, WWF

d) IUCN Red List for selected ecosystems

Red list index of species survival



Source: Butchart and others, In: Philosophical Transactions of the Royal Society

road transport demand, is projected to increase to 4 per cent by 2030, with the biggest increase taking place in the United States and Europe.

Widespread anthropogenic changes to the environment have altered patterns of human disease, and increased pressures on human well-being. The loss of genetic diversity, overcrowding and habitat fragmentation all increase susceptibility to disease outbreaks. Biodiversity is the source for many cures. It is speculated that some 80 per cent of people in developing countries rely on traditional medicines. For example, in 2002-2003, 80 per cent of new chemicals introduced globally as medical drugs could be traced to or were inspired by natural products.

Loss of cultural and spiritual values, languages, and traditional knowledge and practice, is a driver that can cause increasing pressures on biodiversity, including over-harvesting, widespread land-use conversion, overuse of fertilizers, reliance on monocultures that replace wild foods and traditional cultivation practices. The value of ecosystem services is generally ignored or underestimated at decision and policy making levels. Examples of global values of biodiversity ecosystem services include, annual world fish catch worth US\$58 billion and anti-cancer agents from marine organisms up to US\$1 billion/year.

Biodiversity information gaps and research needs

Filling the gaps in biodiversity, research and knowledge will help improve understanding and decision-making. Some significant questions include:

- **What exists on Earth and where?** Some key groups, such as invertebrates and micro-organisms, are poorly understood.
- **How does the system interact?** Questions about ecology range from the very local (how soil microbes support plant growth) to global (how forest and ocean organisms sequester carbon and regulate climate systems).
- **How do people use and understand biodiversity?** Increased understanding of how people relate to biodiversity and how to move towards greater stewardship of biodiversity may be the biggest question the world still must answer.
- **How can biodiversity be valued?** The contributions of biodiversity-dependent ecosystem services to national economies are substantial.

Sources and credits for the information presented here are available and fully referenced in the **Fourth Global Environment Outlook - environment for development** report.



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