



Conserving and protecting biological diversity

Biological diversity (biodiversity) refers to the vast wealth of living beings – plants, animals, fungi and bacteria – on our planet. The term covers both biodiversity between species and the genetic variability within species. It also includes the whole spectrum of natural habitats or ecosystems worldwide.

Over millions of years, specific species and species communities have developed in different habitats on land, in the oceans and in freshwater ecosystems. The various species are adapted to the prevailing environmental conditions and interact with each other in finely balanced relationships. Because of the close links between species, the loss of one species can lead to the extinction of others.

The complex interactions are far from being fully understood. However, it is clear that protecting and conserving biological diversity on Earth is crucial for human life and survival, for prosperity and wellbeing.

Historically unprecedented extinction of species

The extinction of species is a natural ecological development, and mass extinctions have been a feature of Earth's history – the dinosaurs are just one example. However, over the past centuries the loss of biodiversity has increased to such an extent that the current extinction rate – for which humans are partly responsible – is between 100 and 1,000 times higher than in pre-human times.

Many of the biodiversity hotspots, such as the tropical rainforests, have already lost up to 90 per cent of their natural vegetation – with numerous animal species disappearing at the same time. In agriculture, too, the picture is similar: agrobiodiversity – the diversity of farm animals and crops – is falling dramatically.

The degradation of natural and agricultural ecosystems is accompanied by a loss of ecosystem services. These are the nature-based services from which humans benefit: clean air and water, food and firewood, flood protection, climate regulation and genetic adaptability to future needs. For example, species-rich natural forests and peatlands are important for water storage, the removal of CO₂ from the atmosphere and more besides.

Drivers of biodiversity loss

The ways in which we use land, rivers, lakes and oceans and their resources have a direct bearing on the loss of biodiversity and ecosystem services. According to the [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services \(IPBES\)](#), more than 50 per cent of the loss of species diversity is directly attributable to changes in our use of land and sea and to the overuse of resources. Other direct drivers are climate change, environmental pollution and invasive species.

Prevalent technologies and our economic and financial systems also contribute indirectly to the destruction of nature and its functions. For example, the financial system exerts significant influence on investment decisions, as is illustrated by the fact that German pension funds invest in Indonesian palm oil plantations whose creation involves the destruction of tropical rainforests.

Demographics and social culture also play an important part, as do conflicts and epidemics. For instance, poaching and deforestation are more widespread in conflict regions, since they generate revenue that can be used to finance the aggression. And finally, social and governmental institutions and governance systems have a major impact on the state of biodiversity.

Solutions at UN and EU level

Policymakers have long been aware of the biodiversity issue, but effective action has not yet been taken. In 1992 the Convention on Biological Diversity was adopted – the culmination of earlier efforts by various countries, with Germany's first steps dating back to the 1920s. The UN Framework Convention on Climate Change and the Convention to Combat Desertification also contribute to the conservation of biodiversity and ecosystem services. Following on from the UN Decade on Biodiversity, the United Nations has recently designated the period from 2021 to 2030 as the UN Decade on Ecosystem Restoration.

In the draft of the Post-2020 Global Biodiversity Framework, which was published in July 2021, the states parties to the Convention on Biological Diversity set out a new framework of goals which is the result of many years of preparatory work. The words must lead to action – the conservation and sustainable use of nature needs to be accorded a new importance in national policymaking.

Building on the global goals, the EU has drawn up its own biodiversity strategy under which at least 30 per cent of terrestrial and marine areas in the EU are to be converted into sustainably managed protected areas by 2030, with 10 per cent of EU land and sea areas – especially all the EU's remaining primary and old-growth forests – being placed under strict protection.

Another important target of the EU Biodiversity Strategy is the restoration of habitats that are severely degraded or in a poor state. This applies, for example, to many peatlands that have been drained for agricultural use. Three billion trees are to be planted, in full respect of ecological principles. At least 25,000 kilometres of free-flowing rivers are to be restored, and the use of agricultural pesticides must be significantly reduced, partly to protect insect populations.

Nature-based solutions: joined-up thinking on climate change and species protection

Nature-based solutions – i.e. measures to ensure the conservation, restoration and sustainable use of nature – are often also part of the solution to other problems faced by our society, including climate change.

The restoration of ecosystems provides a particularly vivid illustration of the links between climate change mitigation and biological diversity. Forests, wetlands and mangroves are important global carbon sinks – and at the same time the most species-rich ecosystems on the planet. Changes in land use, such as slash-and-burn clearance practices in tropical rainforests, emit large quantities of greenhouse gases and cause irrevocable destruction of natural habitats. But if damaged ecosystems are restored, they can absorb more carbon dioxide and thus help mitigate climate change.

Exploratory analysis of EU carbon sink and restoration targets

Natural carbon sinks arise when plants absorb carbon dioxide from the atmosphere and store it in their biomass. Formulation of the European climate targets involves consideration of the Land Use, Land Use Change and Forestry (LULUCF) sector. In a public consultation in early 2021, the EU sought stakeholder input on the revision of the LULUCF Regulation.

In a study commissioned by Greenpeace Germany, Oeko-Institut researchers investigated how the carbon sequestration function of natural sinks in the land-use sector can be enhanced. The study defines a realistic net sequestration potential within the EU and rules to incentivise achievement of the targets. The aim was to harmonise climate change mitigation, adaptation to climate change and the EU Biodiversity Strategy.

The research team identified significant synergies in the three areas. Protecting ancient forests and restoring peatlands binds large quantities of carbon. These areas also provide habitats for many rare plant and animal species while also helping to regulate the climate and water balance and to conserve soils.

Economisation of the environment and its protection

The Oeko-Institut also focuses on policy strategies and instruments that can be used to conserve biodiversity and maintain ecosystem services. One option is to assign a monetary value to ecosystem services that nature has until now provided free of charge. The study “Economisation of the environment and its protection” produced by Oeko-Institut researchers on behalf of the German Federal Environment Agency (UBA) discussed various approaches to this economisation and whether it promotes or inhibits sustainable development.

Some of the key findings are followed up in the article “On the value of the grasshopper and the price of land take”, which explores the opportunities and risks of economisation in the concrete context of nature conservation. It considers various economisation instruments and practices, such as

- the monetarisation of nature (i.e. the assignment of monetary values) and valuation methods that can be used by policymakers and planners to assess the economic impacts of interventions in nature,
- positive and negative financial incentives, such as taxes and payments for ecosystem services,
- the assignment of new, exclusive usage and ownership rights,
- and the creation of new markets, such as markets for biodiversity offsets.

The impact research makes clear that economisation practices and instruments do not in principle protect nature any more effectively than planning and regulatory measures. In each situation it is a case of evaluating the effectiveness, cost-efficiency, fairness and social acceptability of the instruments. Important considerations are the concrete design of the methods used and the setting and stringent implementation of ambitious nature conservation targets.

[Article “Vom Wert des Grashüpfers und dem Preis des Flächenverbrauchs. Chancen und Risiken der Ökonomisierung im Naturschutz”](#)

[On the value of the grasshopper and the price of land take. Opportunities and risks of the economisation of nature conservation] for the Federal Agency for Civic Education (BPB)

[Study “Ökonomisierung der Umwelt und ihres Schutzes: Unterschiedliche Praktiken, ihre theoretische Bewertung und empirische Wirkungen”](#)

[Economisation of the environment and its protection: Different practices, their theoretical evaluation and empirical effects] by the Oeko-Institut, commissioned by the German Environment Agency (UBA)

Working together for consumption patterns benign to the natural environment

Consumption patterns can have major impacts on biological diversity worldwide – depending on how sustainable they are. Transparent information for consumers is therefore important in order to make them aware of the issue. The United Nations has established the One Planet Network to provide information and to advance communication and international cooperation in connection with consumption patterns benign to the natural environment.

On behalf of the German Federal Agency for Nature Conservation (BfN), researchers from the Oeko-Institut and Adelphi have been working together on aspects of this programme. They first produced a status-quo report on the current state of information, communication and cooperation in the field of low-impact consumption. An online tool brings together available studies and information materials on the impacts of consumption on biological diversity and ecosystems. It also contains examples of successful campaigns together with guidelines on target-group-specific communication on the subject.

The new communication toolkit and the results of the project are due to be discussed with international experts in the field at a closing conference.

[Project “Gemeinsam für naturverträglichen Konsum” \[Working together for consumption patterns benign to the natural environment\] by the Oeko-Institut and Adelphi on behalf of the Federal Agency for Nature Conservation \(BfN\)](#)

Further information sorted according to the work of the Institute’s divisions:

Environmental Law & Governance

[Book “Umsetzung des Nagoya Protokolls in EU- und nationales Recht” \[Transposition of the Nagoya Protocol into EU and national law\] published by Nomos in its series of studies of environmental law](#)

[Study “Improving international soil governance - Analysis and recommendations” by the Ecologic Institute, the Oeko-Institut and the Institute for European Studies on behalf of the Federal Environment Agency \(UBA\)](#)

[Project “Marktbasierte Instrumente für Ökosystemleistungen – Triebkräfte, Wirkungen und Gestaltungsmöglichkeiten am Beispiel von Klima- und Naturschutz in mitteleuropäischen Kulturlandschaften” \[Market-based instruments for ecosystem services – driving forces, impacts and governance options, exemplified by climate change mitigation and nature protection in Central European cultural landscapes\] by the Berlin-Brandenburg Academy of Sciences and Humanities, the Ecologic Institut, Berlin, the Oeko-Institut e.V. and the Faculty of Environment and Natural Resources at the University of Freiburg](#)

Sustainable Products & Material Flows

[Project “Biodiversitätsschutz in der Beschaffung des Bundes – Praktische Konkretisierungen in den Produktgruppen Lebensmittel und Papier” \[Biodiversity in the federal government’s procurement – Practical steps in the product groups of food and paper\] by the Oeko-Institut, the Institute for Ecological Economy Research \(IÖW\) and Kanzlei Dagförde on behalf of the Federal Agency for Nature Conservation \(BfN\)](#)

[Research project “Biodiversitätskriterien in der Beschaffung II – Weiterentwicklung und praxisbezogene Konkretisierung von Biodiversitätskriterien in ausgewählten Produktgruppen der öffentlichen Beschaffung des Bundes” \[Biodiversity criteria in procurement II – Further development and practice-based substantiation of biodiversity criteria in selected product groups of public procurement on the part of the German federal government\] by the Oeko-Institut on behalf of the Federal Environment Agency \(BMU\)](#)

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