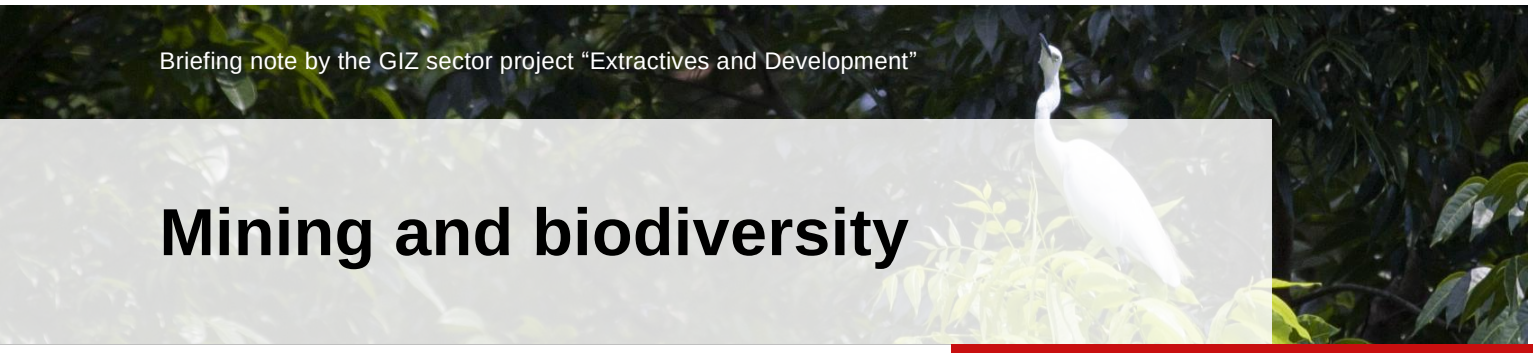

Mining and biodiversity

What influence does raw material extraction have on biodiversity?

Ecosystems provide clean water, clean air and food and are thus the basis for survival. The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) estimates that of about eight million plant and animal species, one million species are endangered. At the same time, economic activities such as mining can pose a threat to ecosystems.
By now, humans extract 60 billion tonnes of resources from nature every year, more than ever before. Germany supports measures to protect biodiversity through the Federal Ministry for Economic Cooperation and Development (BMZ) and the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV). This includes bilateral support for partner countries of German development cooperation (DC) and cooperation with multilateral organisations.

What is biodiversity?

Biodiversity is the variety of all life forms on earth. This includes plants, animals and microorganisms, their genetic diversity, and the ecosystems in which they live. Habitats range from deserts to forests, mountains, and wetlands to aquatic habitats such as rivers, lakes and oceans. According to scientific estimates, around **80 per cent of the biological and genetic resources available on Earth today are in developing countries.**

Biodiversity is valuable…

Ecosystems and their biodiversity are the **livelihoods of all people**, but especially of local communities and indigenous people. An estimated **300-700 million indigenous people worldwide depend on forests** and the biodiversity they contain. In addition, people around the world - consciously or unconsciously - use so-called **ecosystem services** every day. These include drinking water, food, energy sources, plant raw materials, recreation, climate regulation and the absorption and storage of carbon.
The study "The Economics of Ecosystems and Biodiversity" (TEEB) shows that the economic value of ecosystem services to society is higher than experts from economics and science had previously assumed. **Nature provides $170 trillion worth of goods and services for human well-being each year** - twice the world's gross domestic product. However, our demand for goods and services far exceeds nature's ability to provide them, as the 2021 Dasgupta Report showed. As a result, **natural capital - the stock of natural ecosystems and thus the basis of ecosystem services - shrank by 40% between 1992 and 2014**. This threatens the prosperity of current and future generations. It is therefore necessary to embed our economies in natural cycles.

…but threatened by increasing demand for raw materials, among other things.

Biodiversity is negatively affected by **habitat loss**, **fragmentation**, and **degradation**. One cause of this is unregulated and irresponsible mining. Extraction of raw materials is often accompanied by **deforestation** or fragmentation of habitats, directly through the mines and indirectly through the associated infrastructure.
Risks also exist regarding possible chemical reactions, e. g. pyrite-containing tailings can form acidic mine drainage that contribute to the acidification of ecosystems. In artisanal and small-scale mining (ASM), **mercury is often used for gold mining**. This enters the ecological cycle and harms its organisms, the photosynthetic capacity and water uptake of plants and, finally, the people who eat mercury-contaminated fish or inhale the toxic fumes.
The indirect impacts of mining include the **emission of greenhouse gases**, as well as the clearing of forests as

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carbon storage. This increases climate change, which in turn accelerates the decline of biodiversity. The influx of people working in mining also contributes to the creation of agricultural and settlement land and infrastructure, which often destroy, fragment, or degrade habitats, thereby threatening biodiversity.

The degree of impact is different for each mine and varies depending on, among other things, the climate zone, ecosystem, geological formation, technologies used and the quality and capacity of oversight by regulators. Due to the strong demand for technologies, e. g. for the **energy and transport transition**, the **demand for raw materials will change significantly and increase in the coming years**.

Worldwide, there are measures to protect biodiversity...

The protection and restoration of biodiversity is enshrined in international agreements such as the **Convention on Biological Diversity**, which has been ratified by 196 countries. In 2018, the parties to the convention decided that biodiversity should be considered in mining.

As **demand for raw materials increases**, so will mining activity and the associated **threats to biodiversity**. In the mining sector, there are increasing efforts to **protect biodiversity** and to **mine in regions with low biodiversity**. Together with the United Nations Environment Programme, for example, various mining companies are working on **providing biodiversity data** for business decisions that affect biodiversity.

Mining associations such as the International Council on Mining and Metals (ICMM) have set themselves the goal of preserving ecosystems. To this end, **areas with high or special biodiversity are to be avoided,** impacts minimised, ecosystems restored, and compensatory areas created. This corresponds to the principle of **mitigation hierarchies**, which is based on the four steps

(1) avoid,
(2) minimise,
(3) restore and
(4) compensate.

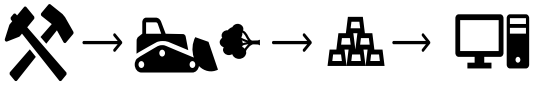
The aim is to avoid a net loss of biodiversity.

Mitigation hierarchies are increasingly applied in the mining sector. The Cross-Sector Biodiversity Initiative (CSBI) is a partnership between the International Petroleum Industry Environmental Conservation Association (IPIECA), ICMM and the Equator Principles Association to develop and share best practices related to biodiversity in the extractive industries. Members include the European Bank for Reconstruction and Development (EBRD), the International Finance Corporation (IFC) and the Inter-American Development Bank (IDB).

The example of the Llurimagua mine in Ecuador:

Despite its relatively small land area is **Ecuador** one of the countries with the **highest biodiversity**. 27 % of the ecuadorian species are endemic.

The region of the mining project Llurimagua is considered a **biodiversity hotspot**. NGOs [1] und research [2] suggest that the continuation of the project would lead to a severe **fragmenation** of the area with impacts for the local ecosystem.



279 endangered species are threatened by the project, induding the **brown-headed spider monkey** and the **longnose harlequin frog**.

The companies are taking measures such as **reforesting** degraded areas, protecting river courses, monitoring water quality, removing waste and training employees not to hunt/collect animals and plants.

It is questionable whether these measures are sufficient to protect the habitat of endangered species.

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...German development cooperation also works to conserve ecosystems

- The conservation of biodiversity is taken into account in all German development cooperation projects and is at the same time a development policy field of work on its own.
- The German development cooperation supports renaturation and recultivation measures. Mine closure plans are obligatory in many countries, licences and contracts. In most cases, these are included in the environmental impact assessments. For many resource-rich developing and emerging countries, monitoring implementation is a challenge. There are often difficulties in sanctioning investors.
- With the project "Green Value - Natural Capital in Africa", the German development cooperation supports the sensitisation of politics and the public to the value of natural capital and protected areas in Africa.
- The BMZ has supported the World Bank in establishing the Climate Smart Mining Strategy through the sector programme "Extractives and Development". This includes approaches such as forest smart mining, which particularly advocates for mining that is compatible with forest and climate protection, which has a direct and indirect impact on biodiversity. More information on forest smart mining can be found in the factsheet on mining and forests on our website.
- In the area of commodities, GIZ supports standards and initiatives that strengthen biodiversity conservation in the mining sector.
- GIZ supports partner countries in the design and initial implementation steps of global biodiversity frameworks (e. g. integration of biodiversity content in economic plans).
- At EU level, a regulation for deforestation-free agricultural supply chains is in the works. Such a regulation could also be envisaged for raw materials. A first step in this direction is the BMUV-funded project "Deforestation-free supply chains - An online atlas for corporate sustainability (ELAN)" by the Global Nature Fund and OroVerde. The project supports German companies in implementing deforestation-free supply chains and thus contributing to climate and biodiversity protection.
- As part of the Federal Government's new Raw Materials Strategy 2020, the BMUV has committed to initiating an international process to develop an international practice tool on ecological due diligence in mineral supply chains. UBA and BGR are helping to drive this initiative forward.

Recultivation: Regreening of the tailings resulting in rapid revegetation, which, however, represents a non-natural habitat with low biodiversity.

Ecological restoration: The area is left to a natural colonisation process. This has the advantage of a habitat as close to nature as possible with higher biodiversity but can take several decades.

- After the closure of a mine, new ecosystems are created. These provide habitats for plants and animals that are adapted to the changed conditions. However, the original condition cannot be restored.
- **Restoration measures can generate hundreds of jobs**, as shown for example in the Queensland region (AUS) with over 15,000 abandoned mines, where many workers are now employed for the restoration.

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1) Germanwatch e.V. 2021: Der Fall der geplanten Kupfermine in LLurimagua, Ecuador
2) Roy et al. 2018: New Mining Concessions Could Severely Decrease Biodiversity and Ecosystem Services in Ecuador

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