

EMAS and BIODIVERSITY

Guidance 2023 – How to address biodiversity protection through environmental management systems

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The publication of this guide is one of the activities within the framework of the initiative “Unternehmen Biologische Vielfalt (UBi)”. UBi is a long-term dialogue and action platform of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) in conjunction with other ministries, authorities, business associations, and nature conservation organisations to reverse the trend of biodiversity loss. It provides a joint forum for business and sectoral associations to contribute their perspectives, and develop strategies and activities that motivate companies to engage with biodiversity as well as support these companies in improving their biodiversity management.

Additional information on UBi: <https://www.unternehmen-biologische-vielfalt.de/>

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“There can be no Plan B, because there is no Planet B.”

Former UN Secretary-General Ban Ki-moon



PERFORMANCE
CREDIBILITY
TRANSPARENCY



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FOREWORD of the Federal Minister for the Environment

Protecting biodiversity is essential to secure our livelihoods. This insight is increasingly publicly accepted. A healthy environment is the basis of our food systems and it provides us with clean water. Sound ecosystems provide flood protection by absorbing and storing water, but also for compensation in times of drought. Intact nature is the basis for health and quality of life.

The World Economic Forum lists the global biodiversity crisis as one of the largest economic risk factors. This means that the protection and restoration of damaged nature must obviously also be in the interest of our economy. Until now, mainly climate protection has been in the focus of corporate environmental measures, but now the protection of biodiversity is increasingly becoming an important field of action.

With the Global Agreement for Nature, all states that have signed the International Convention on Biological Diversity, decided in December 2022 in Montreal on a new era towards the restoration of nature. By 2030, at least 30 percent of the world's land and marine area shall be officially protected.

This Montreal Agreement is also linked to the expectation that companies integrate the issue of biodiversity into their corporate strategies. For example, by designing company premises close to nature or by reducing the use of pesticides. The consequences of corporate actions for nature should not only be considered at the company's own location, but along the entire supply chain.

It is encouraging that more and more companies are taking targeted measures to preserve biodiversity. In order to promote such initiatives and provide further information on the topic, the Federal Ministry for the Environment of Germany launched a dialogue and action platform called "Unternehmen Biologische Vielfalt (UBi - Business & Biodiversity)" back in 2013. The platform facilitates networking between businesses, nature conservation organisations and the public sector. It offers biodiversity checks and other support services for businesses.

I am very pleased that we can now present an updated guideline "EMAS and Biodiversity", which was developed within the framework of this UBi-project. The guideline is intended to help systematically integrate the issue of biodiversity into business decisions and sustainability and environmental management.

The guideline covers a wide range of topics: from company premises, purchase and extraction of raw materials and product development to transport & logistics. Marketing and communication are included, as well as legal frameworks related to biodiversity. It targets companies of all sizes and sectors with an environmental or sustainability management system, especially EMAS-validated companies.

I would highly appreciate if other companies and organisations that want to contribute substantially to the protection of biodiversity would also use the guideline as a stimulus and assistance. It is obvious that we need much more active engagement of the business community in order to ensure the conservation of the fundament of our livelihoods.



Steffi Lemke

**Federal Minister for the Environment,
Nature Conservation, Nuclear Safety and
Consumer Protection**

FOREWORD of the European Commission, DG Environment

Nature is the foundation of life, of our society, of our economy. This is why the protection of biodiversity is a matter that concerns all of us. The triple planetary crisis of climate change, biodiversity loss and pollution is getting worse by the day, and already affects hundreds of millions of people. A healthy environment is not a luxury for the good times. The health of our planet forms the essential foundation of our society – and EU business and industry have an essential role to play.

The Kunming-Montreal Global Biodiversity Framework adopted at the 15th Conference of the Parties to the Convention on Biological Diversity is a historic achievement for the conservation and restoration of biodiversity. The Kunming-Montreal Framework together with the Paris Agreement represent a clear global roadmap towards a truly sustainable economy and truly sustainable development. Both require transformative change of our society and economy within a very short time. The ambition of the EU Biodiversity Strategy for 2030, and the systematic implementation effort in the EU, have borne witness to our own commitment and enabled the EU and the Member States to show leadership in the negotiations.

With the Green Deal, the EU's growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy, and the EU Biodiversity Strategy for 2030, a comprehensive, systemic and ambitious long-term plan for protecting nature and reversing the degradation of ecosystems, the EU has a good starting point for implementing the Global Framework. The task now is to ensure that the implementation of the Global Framework is equally ambitious. That will take the active engagement of all government, all society, all economy.

As the 2030 Biodiversity Strategy states, businesses have an impact on nature, but they also produce the important innovations, partnerships and expertise that can help address biodiversity loss.

The EU Eco-Management and Audit Scheme (EMAS) has the potential to help any organisation improve its performances related to biodiversity. By integrating references to biodiversity in the initial environmental review and in the final reporting of registered organisations, EMAS clearly demonstrates the ambition to address biodiversity aspects in an inclusive manner.

However, identifying and addressing these environmental aspects related to biodiversity can be complex for an organisation. This is on the one hand due to the broad diversity of potential aspects and on the other hand to the difficulty in identifying the correct indicators to measure them.

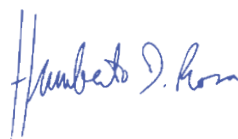
This guidance contributes to making the best out of the potential of EMAS to assure better management of issues related to biodiversity. It complements EMAS overall management and reporting features by identifying key issues and related indicators for most of the core activities that can impact on biodiversity. These specific and actionable elements will undoubtedly help organisations to identify and better manage such impacts.

For this reason, the Directorate General for Environment of the European Commission welcomes the work undertaken by Lake Constance Foundation and Global Nature Fund that has resulted in the publication of this guidance, the revised edition of the guidance issued in 2016. This is a very positive contribution that should encourage any organisation to contribute to a more effective protection of our biodiversity through the implementation of EMAS.



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1

INTRODUCTION

Biological diversity, also referred to as biodiversity, comprises the diversity of species, genes and ecosystems—in short, the diversity of life on our planet. Only intact ecosystems and abundant biodiversity will enable present and future generations to enjoy a high quality of life and guarantee “ecosystem services” (i.e., the natural processes on which we and the economy depend, including clean water, food, renewable resources, a microclimate that mitigates the most extreme impacts of climate change, and intact landscapes).

Experts worldwide agree that biodiversity loss is one of the greatest challenges facing our society and our planet, along with climate change. The 2019 Global Assessment Report of the World Biodiversity Council (IPBES) once again highlighted the dramatic loss of biodiversity by citing the following figures: (1)

- Up to one million species are threatened with extinction, many of them in the next few decades.
- The current rate of species extinction is at least 10 to 100 times larger than the average over the last 10 million years.
- Half of the world’s coral reefs have disappeared since 1870.
- Global forest cover is only 68% of what it was in the pre-industrial era. Currently, the annual rate of deforestation is 10.2 million hectares.
- 75% of land area and 66% of marine area have been altered by human influence.
- Over 85% of wetlands have been lost in the last 300 years.

Our planet is currently experiencing the sixth mass extinction—which has been precipitated by humans. The causes are known: In the last 50 years, the global population has doubled, the world economy has almost quadrupled, and trade has increased tenfold. The demand for energy and raw materials has increased enormously. Over 70% of the

biodiversity footprint of the economy of the European Union (EU) is outside of Europe. Germany and the EU import raw materials and energy, thus using land outside of Europe. Between 2005 and 2017, EU agricultural commodity imports alone were responsible for using 3.5 million hectares of land and causing 16% of all global deforestation.

At the global level, as well as in Germany and Europe, we are still far from a circular economy and the decoupling of economic growth from the consumption of natural resources. In its Biodiversity Strategy for 2030 and Green Deal, the EU emphasizes the following: “In relaunching the economy, it is crucial to avoid falling behind and falling into harmful old habits. The European Green Deal—the EU’s growth strategy—will be the compass for our recovery, ensuring that the economy serves people and society, and gives back more to nature than it takes away”.

The results of the COP15 of the Convention of Biological Diversity (CBD) in December 2022 should herald a change in the trend—from the destruction to the restoration of nature. A new global agreement for biodiversity, the “Global Biodiversity Framework” (GBF), was adopted as conference’s final declaration. The new GBF also sends a strong signal to businesses around the world. Risks, dependencies, and impacts on biodiversity are to be monitored, assessed, and transparently disclosed (see Chapter 3: Background).

The ongoing loss of biodiversity is not only an environmental issue but also has serious economic consequences. Approximately \$44 trillion dollars of global value added is moderately or heavily dependent on nature and ecosystem services (IPBES, 2019). The EU Green Deal refers to the economic

importance of biodiversity. Businesses benefit from biodiversity and ecosystem services in a variety of ways, often relying on these services, which have a serious impact on the natural balance. Businesses are partly responsible for the loss of biodiversity and are already feeling the negative consequences. In some economic sectors—such as the food industry, which relies on agriculture as a supplier of agricultural materials, or in the extraction of raw materials—the connection is obvious. In other sectors, the relevant negative impacts are embedded in the supply chain or linked to product usage.

There are gaps in knowledge and methodologies: Ecosystem services cannot be fully recorded as classic common goods, nor can their price be reflected in the market in real terms. Moreover, biodiversity is characterised by complex interrelationships and can often only be protected by refraining from interventions. In complex food chains, for example, the consequences of the absence of certain elements cannot yet be estimated, or can only be estimated in part.

But gaps in knowledge and a lack of long-term practical experience are not a justification for doing nothing. The main negative impacts on biodiversity are known, as are measures to avoid or, at least, reduce these impacts. Sustainable business practices include biodiversity protection targets, prudent management and monitoring of biodiversity, and meaningful, data-backed information in corporate reporting.

The aim of the guide is to motivate companies and organisations to integrate biodiversity protection step by step into their corporate environmental management in order to reduce negative impacts on biodiversity in a structured and continuous way.

Reporting on an organisation's impact on biodiversity is one of the key areas of EMAS III, which is why the EMAS environmental management system is particularly suited to improving biodiversity performance. However, other environmental management systems (EMS) can also be used. The information and recommendations in this guide are useful for all organizations with an EMS and can be used simultaneously for future due diligence and sustainability reporting requirements.

This publication is practice-oriented and does not seek to “reinvent the wheel”, referring instead to available tools and expertise. More institutions are dealing with economic impacts on and the economic relevance of biodiversity, and new studies, tools, and practical examples are frequently being published. It is, therefore, worthwhile to stay informed.

This guide's team of authors looks forward to receiving feedback and practical insights from its users, which will be taken into account when revising the guide in a few years' time.

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SCOPE OF APPLICATION

The main target group for this guide are companies of all sizes and economic sectors applying an environmental or sustainability management system. The guide specifically addresses EMAS-validated companies and other organisations, but also provides guidance for companies with other environmental or sustainability management systems, and companies wishing to establish an EMS.

This guide is process-oriented and provides information on goals, measures, and indicators that can be applied to all sectors. Therefore, the descriptions and recommendations cannot go into great depth on a sector-specific basis. The tips compiled here are to be understood as first steps that must be concretized through sector-specific analyses and activities. Practical examples illustrate how to apply the guide. The website of the “Unternehmen Biologische Vielfalt (UBi)” initiative provides further information (e.g., sector-specific Biodiversity Checks). [\(1\)](#)

Risks and opportunities are discussed in the context of biodiversity. Avoiding negative impacts on biodiversity also reduces risk for a company, so this is a focus of this guide. Measures that promote biodiversity often lead to additional positive effects, such as climate protection, climate change adaptation, cost savings, and improved public reputation.

All contributions to the protection of biodiversity and ecosystem services improve a company's chances of having a good economic and business foundation in the future.

A majority of companies have structured the (environmental) management system according to functional areas (departments). This guide looks at the most common “departments” in a company and their impact on biodiversity.

The economic importance of biodiversity protection is primarily linked to preserving ecosystems, because only intact ecosystems can provide important services in the long term. But biodiversity and its elements also have an intrinsic value that often cannot and should not be valued in monetary terms.

Biodiversity is characterised by a complex interplay of ecosystems, animal and plant species, and genetic diversity. Not all interrelationships have been scientifically researched, and

there are still important gaps in our knowledge, particularly with regard to the delimitation and measurability of ecosystem services. However, scientists worldwide agree on the main causes of biodiversity loss (MEA 2005):

- Conversion, degradation, and destruction of ecosystems
- Over-exploitation of natural resources
- The spread of invasive alien species
- Climate change
- Pollution/ Emissions

The following chapters provide recommendations regarding a company's direct or indirect options for reducing these main causes of biodiversity loss.

EMAS and other environmental management systems traditionally cover the key areas of climate protection (energy consumption, transport, greenhouse gas emissions, etc.), as well as environmental pollution (waste, wastewater, soil/air pollution, etc.). Therefore, the guide focuses primarily on the degradation and destruction of ecosystems, the overexploitation of natural resources, and the spread of invasive alien species. The authors emphasise, however, that all climate protection and pollution-prevention measures also help to protect biodiversity.

3

BACKGROUND

To stop the loss of biological diversity by 2020, 168 countries, including Germany, signed the “Convention on Biological Diversity (CBD 2010)”. Unfortunately, the 2020 targets were not achieved. In December 2022, the Parties met in Montreal for the 15th follow-up conference (COP15) to adopt new targets for 2030.

The EU’s Biodiversity Strategy for 2030 already included ambitious targets for 2020. To implement the new international and European post-2020 biodiversity targets, the German government will relaunch its previous National Biodiversity Strategy (NBS), which dates back to 2007.

All strategies emphasise the special role of business, and assert that the 2030 targets can only be achieved if businesses integrate biodiversity conservation into their business activities.

The United Nations Sustainable Development Goals (SDGs), published in September 2015, also emphasise the importance of biodiversity:

- Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 6: Ensure availability and sustainable management of water and sanitation for all
- Goal 12: Ensure sustainable consumption and production patterns

- Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss

The SDGs combine environmental, social, and economic goals. Each goal has specific targets that must be achieved within the next 15 years, but this will only be possible if everyone—i.e., governments, the private sector, and civil society—assumes their responsibilities.

The Conference of the Parties to the UN Convention on Biological Diversity (CBD COP15)

At this world conference on nature, held in Montreal in December 2022, the international community of states reached a new global agreement on the protection of biodiversity, known as the “Kunming-Montreal Global Biodiversity Framework”.

The aim is to halt and even reverse the loss of biodiversity by 2030. To achieve this end, the international community agreed to work toward four long-term goals by 2050 and 23 medium-term goals by 2030.

A key goal of the new agreement is to place at least 30% of the world’s land and marine area under effective protection by 2030. In addition, risks from pesticides are to be halved by 2030. The goals also include halving food waste and the spread of invasive species by 2030.

Signatory countries committed their large and transnational corporations and financial institutions to monitoring, assessing and transparently disclosing their risks, interdependencies, and impacts on biodiversity in the context of their operations, supply and value chains, and portfolios.

To assess how nature is doing worldwide and whether these goals are being achieved, this was the first time that uniform indicators were included in a monitoring framework. Likewise, the framework addresses opportunities for improvements if countries do not achieve the goals. In addition, countries in the global South are to be supported in their implementation of the new agreement with US\$20 billion dollars annually until 2025 and US\$30 billion dollars from 2025–2030.

National Strategy on Biological Diversity (NBS)

In the NBS, the COP global goals—and also the goals of the EU Biodiversity Strategy for 2030—are rendered as national goals and measures. To improve the state of biodiversity, work has already begun at the national level in Germany to revise and update the NBS. For this reason, all groups of stakeholders are involved – including actors of the economy. In Germany, large areas of land and sea are already protected. The federal and state governments are working together to ensure that protected habitats and their important contributions to natural climate protection are safeguarded or strengthened and, if necessary, restored. Toward this end, a “Protected Areas Action Plan” will be launched, with a clear focus on a sound quality of the further development of existing protected areas.

For several years, the terms “ecosystem services” and “natural capital” have been used in the context of the biodiversity debate. These linked terms (which are briefly explained below), are aligned with a business mindset and are intended to emphasise the importance of biodiversity for entrepreneurial activity.

3.1 Ecosystem services

Safeguarding biodiversity and the ecosystem services it provides are of fundamental importance for human life: potable drinking water, fertile soils, and protection from natural hazards all help to support our lives, while the availability of raw natural materials is the foundation for many economic sectors. Against this background, the concept of ecosystem services assumes that functioning ecosystems provide numerous essential “services”.

The authoritative international definition, which was developed as part of the Millennium Ecosystem Assessment project (MEA 2005), explains that ecosystem services are “goods and services” provided by nature that bring benefits or advantages to humans, but the term also includes services that are necessary for survival, such as the provision of good quality food and drinking water. Ecosystem services are usually divided into the following categories:

1. Providing services, such as food, genetic resources, water, timber, fibre
2. Regulatory services, such as protection against natural hazards, climate regulation, and the safeguarding of water quality
3. Cultural services, such as recreation and aesthetics
4. Supporting services, such as maintenance of the nutrient cycle and soil formation as well as inspiration for technical developments

The preservation of ecosystem services is a basic prerequisite for industrial processes, services, and the business environment. The protection of biodiversity is thus also a central issue for companies and their management decisions.

When biodiversity is lost, the quality of goods and services provided by nature decreases. Almost all economic sectors are affected when this happens. Therefore, the preservation of ecosystem services as a business goal is a crucial prerequisite to future success. This particularly applies to those management decisions that cannot be reversed, as is often the case when it comes to using natural resources. The following measures are recommended:

- Examine the business risks and opportunities related to impacts and interdependencies with biodiversity and ecosystem services.
- Set so-called SMART targets (Specific, Measurable, Appropriate, Realistic, and Time-bound) with a view to protecting ecosystem services.

3.2 Natural capital

The term “natural capital” is often used when discussing the conservation of natural resources. In a narrow sense, it is understood to mean biodiversity and ecosystems (capital stock) and ecosystem services (dividend), which together form natural capital. In a broader sense, however, abiotic resources such as oil and minerals are also considered natural capital. Economically sustainable companies strive to preserve capital stock in order to secure their business foundations over the long term (ACCA, KPMG, FFI, 2012).

In general, natural capital is available only to a limited extent, but within the economy it is mostly still seen as a freely available public good. Companies influence the state and functioning of nature through direct and indirect environmental impacts—so-called externalities. Currently, however, neither the use of nor damage to natural capital is adequately reflected in corporate decision-making and finances (e.g., in balance sheets, profit and loss accounts). Therefore, the discussion about an economic valuation of natural capital and the ongoing externalisation of costs arising from the activities of companies has been taking place for some time. There are some initiatives and guidance for ways that companies can capture the value of natural capital. The Global Nature provides an overview of the different methods. (1)

It should be noted, however, that natural capital cannot represent or encompass social and cultural values of biodiversity.

In July 2016, the Natural Capital Protocol was published with the aim of harmonising the various methodologies. The protocol is a standardised framework for identifying, measuring, and valuing direct and indirect impacts of and/or dependencies on natural capital. For further information on natural capital assessment, see Chapter 10: Purchasing and supply chains.

4

WHY SHOULD COMPANIES CONSIDER BIODIVERSITY?

Numerous studies and publications (Dasgupta (2021) (1), WEF (2023) (2), The Club of Rome (2022) (3)) point to the business risks of biodiversity loss, ecosystem degradation, and the decline of ecosystem services.

Table 1 - Direct and indirect business risks associated with biodiversity loss and reduced ecosystem integrity

Operational risks	• Limited availability of raw plant and animal materials, including genetic resources • Limited availability of ecosystem-based production factors, (e.g., clean water, fertile soils) • Price increases for natural resources due to scarcity • Less innovation (due to the absence of new products and business processes driven by nature)
Reputational risks	• Damage to the reputational image of sectors or individual companies due to negative impacts on biodiversity
Market risks	• Change in consumer and B2B sourcing behaviour (e.g., greater awareness of biodiversity in consumption practices)
Regulatory risks	• Requirements for the extraction and use of natural resources (e.g., catch quotas, emission limits, taxation of resources, deforestation-free supply chains) • Requirements for access and benefit-sharing when using genetic resources (e.g., implementation of the Nagoya Protocol in national legislation) • Requirements for interventions in nature (e.g., compensation payments and measures) • Requirements for access to species-rich (protected) areas (e.g., mining bans)
Legal/liability risks	• Lawsuits due to the involvement of industries or companies in the loss of biodiversity (e.g., Environmental Damage Act)
Financial market risks	• Consideration of biodiversity criteria by financial institutions in their lending and investment activities • Biodiversity as an assessment criterion in sustainability ratings

Ultimately, all businesses are affected directly or indirectly, in the short or long term, by biodiversity loss. The impacts on biodiversity by the food or cosmetics industry, in the extraction of gravel, or by the wood or paper industry are obvious, but tourism also thrives with intact landscapes and nature. In the metal-processing or electronics industries, the decisive impacts are mostly linked to the extraction of raw materials (upstream supply chains). For example, the mining of metallic raw materials such as gold or tantalum—which are used in electronic devices like mobile phones—takes place primarily in countries with high biodiversity levels. In the service sector, too, a lot can be done to protect biodiversity through effective management. An overview of sector-specific risks and impacts can be obtained from the ENCORE tool provided by the Natural Capital Finance Alliance and UNEP-WCMC [\(4\)](#).

Yet, as research by McKinsey shows, many companies are still unaware of their dependence on biodiversity—including some of the world's largest who have staffed their own sustainability departments: While 83% of Fortune Global 500 companies have climate-related goals, or at least recognise climate change (another 15 %), far fewer acknowledge or have set goals for other dimensions of the environment. Although 51% of these companies recognise biodiversity loss in some form, only 5% have set quantified targets. [\(5\)](#)

4.1 Availability and safeguarding of natural raw materials

Biodiversity ensures stable ecosystems that provide not only food, wood, and medicinal agents, but also clean water, healthy soil, and cultural value such as the aesthetics of a landscape. But nature can hardly provide its goods and services at the scale that they are being consumed by today's economy.

For companies, scarcity implies an increase in prices or the complete loss of necessary resources (disruption)—for example, declining sales or rising prices for fish species whose stocks are being reduced by overfishing, such as cod in the 1990s. A survey of corporate decision-makers from global companies found that among the 10 risks ranked as worst for the world, six were directly related to biodiversity conservation, including the lack of mitigation and adaptation to climate change (ranked 1 and 2), natural disasters and extreme weather and biodiversity loss and ecosystem collapse [\(4\)](#) (WEF 2023).

4.2 Corporate reputation and increased awareness of biodiversity among consumers

Numerous surveys and studies show a slow but steady increase in consumer interest in biodiversity. The Union for Ethical_Biotrade (UEBT) surveyed over 84,000 consumers in 16 countries from 2009 to 2022. The published Biodiversity Barometer 2022 impressively proves that concern for biodiversity and interest in biodiversity protection have strongly increased. Biodiversity is considered the most relevant environmental issue after climate protection. In Germany, 77% of the consumers know the correct definition of biodiversity (up from 29% in 2008). Awareness of biodiversity's importance is even greater in the "future" markets of South America and Asia. "Biodiversity is the new normal", according to UEBT. [\(6\)](#)

Among survey respondents, 54% would like to see concrete information on the impacts products have on biodiversity, while 52% would like to see precise information about product origins. Consumers also have higher expectations of companies: over half of respondents believe that companies have an ethical obligation to ensure positive impacts on people and biodiversity. [\(7\)](#)

As part of **Germany's 2020 Nature Awareness Study** (8) by the Federal Ministry for the Environment and the Federal Agency for Nature Conservation, young people aged 14 to 17 were surveyed on their awareness of nature and key related conservation issues such as biodiversity, energy transition, and protected areas. Some results:

Almost all young people (90%) are angered by carelessness toward nature; 88% believe that resources should be used sustainably and 87% see a positive correlation between the protection of nature and the ability to cope with the consequences of climate change. Of the young people surveyed, 91% believe that it is humans' duty to protect nature and thus ascribe a clear responsibility to society.

The high value placed on nature by young people is particularly evident in the prioritisation of nature conservation over the economy. Only a minority of young people (19%) prioritise economic development over nature, while a clear majority of 70% do not share this view. Furthermore, 53% of young people are of the opinion that funding for nature protection should not be reduced even in times of economic crisis. The issue of biodiversity—especially its global decline—is a topic with significant media coverage, and 72 % of young people are convinced that biodiversity is declining worldwide.

Young people perceive nature conservation as a task for society as a whole: 14- to 17-year-olds feel that they can achieve much more as a “we” than as individuals (with 59% believing this “fully”, and another 25% “some-what”). More than half (52%) of adolescents and young adults spend much more time (20%) or at least somewhat more time (32%) outside in nature than they did before the Covid-19 crisis. Nature often plays an important role in relieving stress and providing distraction, but also as a space for sports and exercise.

In 2020 and 2021, severe pandemic restrictions increased appreciation for nature. In another survey, 70% of the respondents said they were outdoors and on foot more often, while 64% discovered wildlife watching, and 54% took up nature photography or painting in nature as an activity. For 60%, the peace and quiet they found from being outdoors improved their mental health and well-being. (9)

An authentic communication on biodiversity can be an important element when positioning a company in the market, as we will discuss in Chapter 14. However, greenwashing still dominates, as is evident in the extent of scandals and a growing number of consumer protests. Environmental organisations are increasingly working hand in hand with consumer protection organisations to expose companies and products that are contributing to the extinction of animal and plant species, and the destruction of ecosystems.

4.3 Following (consumer) trends: responsible purchasing decisions

The success of organic and fair-trade products, as well as the upswing in ecotourism, are all indications that survey results and concrete actions are becoming increasingly aligned. In

a survey by the Zentrum für Technologie und Gesellschaft (ZTG, 2022), almost three-quarters of respondents (71%) were willing to look at labels when buying food and give preference to biodiversity-friendly products. The majority (64%) were willing to pay more for food whose production did not harm biodiversity. However, respondents still lack information on the biodiversity impacts of products. These surveys by UEBT and the ZTG also show that consumers prefer to see sustainability claims that have been verified by independent third parties. (10)

Furthermore, public and voluntary sustainability standards are playing an important role in differentiating products. Some standards already include demanding criteria for the protection of biodiversity and provide consumers with guidance when shopping. For food standards, the Global Nature Fund and the Lake Constance Foundation investigated which biodiversity criteria applied in 2017 and again in 2022. (11)

The food standards Fairtrade, Rainforest Alliance, 4C Code of Conduct (for coffee), Naturland, Biodiversity Grow (for citrus), and GlobalG.A.P. are members of the Food for Biodiversity industry initiative and have committed to continuously improving their biodiversity requirements. With the support of Lidl, GlobalG.A.P. launched the Biodiversity add-on to its standard in April 2022.

4.4 Supply Chain Requirements

In the business-to-business (B2B) sector, producers make demands of their suppliers that have a direct or indirect impacts on biodiversity (e.g., procurement standards, raw material policies). Legal requirements—such as those in the German Supply Chain Due Diligence Act (in force since January 1, 2023); the EU Regulation on deforestation free products; the planned EU Supply Chain Act; and the future EU Corporate Sustainability Reporting Directive with more detailed reporting requirements (also on biodiversity)—are contributing to increased company demands for transparency and due diligence from their suppliers (see Chapter 16: Legal Compliance).

For example, there is increased demand for proof of origin and ecological certification of raw materials and ingredients that are biotic, such as palm oil, or abiotic, such as aluminium. The Initiative for Responsible Carnauba—which is used in the food and cosmetics industries, in medicines and as

an ingredient in car waxes and polishes—requires suppliers to implement biodiversity action plans. The Aluminium Stewardship Initiative (ASI) assesses risks and impacts on biodiversity for companies that apply for the “Performance Standard”. This standard has been regularly renewed since 2015. Members of the German corporate initiative “Biodiversity in Good Company” have committed to informing their suppliers about the importance they attach to biodiversity conservation. Other companies define exclusion criteria (e.g., the fashion company Burberry no longer buys leather from the Amazon as a way of contributing to deforestation-free supply chains).

Some companies also implement initiatives designed to make supply chains more “biodiversity-friendly”—for example, Nestlé with its “Sustainably sourced vegetables and herbs” programme, or the REWE Group with its PRO PLANET bananas, apples, and vegetables, whose cultivation aims to protect biodiversity. [\(12\)](#)

Food for Biodiversity sector initiative

The Food for Biodiversity Association was founded in 2021 to improve biodiversity performance across the food industry. Members are companies and associations within the food industry, standard-setting organisations, suppliers, NGOs, and scientific institutions. Among other things, they work toward the inclusion of a basic set of biodiversity criteria in their standards and supplier requirements. Furthermore, the voluntary commitment and work plans that are part of this initiative include training, a fair assumption of costs and incentives for farmers, changes in the political framework in favour of biodiversity, and increased communications outreach to consumers.

4.5 Biodiversity in public procurement

The public sector is Europe’s largest consumer. National and regional authorities as well as cities and municipalities can use their enormous purchasing power to buy more environmentally friendly products and services, thus making an important contribution to the goal of sustainable production and consumption. Article 67 of the EU Public Procurement Directive allows the “inclusion of qualitative, environmental and/or social aspects” in public procurement criteria. For 21

product groups, the EU has adopted so-called “Green Public Procurement” criteria for awarding contracts. Up to now, criteria for the protection of biodiversity have only been taken into account within a few product groups, such as the requirement that paper and other products made from wood have FSC certification, and the requirement of an MSC label for fish. As part of its “Farm to Fork Strategy”, the EU wants to implement more sustainable food-procurement policies for public institutions, such as schools or daycare centres, by promoting organic food, among other changes.

In 2021, Germany's Federal Cabinet decided to further develop the programme "Implementing sustainability concretely in administrative action". The programme applies to all authorities and institutions of the federal administration and covers a total of 10 action areas. Biodiversity aspects are integrated into the procurement of paper products and food.

4.6 Increasing requirements for voluntary reporting

Since sporting goods manufacturer Puma published the first ecological profit and loss statement in 2011, the discussion about internalising environmental costs and natural capital has intensified.

In 2013, the International Integrated Reporting Council (the IIRC, which today is known as the IFRS Foundation) has standards committees for accounting and sustainability reporting, and has published a framework for integrated reporting (IR). Among other things, this framework deals with reporting on natural capital, with explicit mentions of biodiversity and ecosystem services: "Natural capital: All renewable and non-renewable environmental resources and processes that provide goods or services that support the past, current or future prosperity of an organisation. It includes air, water, land, minerals, forest and biodiversity and ecosystem health" (IIRC, 2013). In 2022, the IFRS Sustainability Reporting Standards Board (ISSB) announced that it would develop stronger standards for biodiversity and also improve ESG (environmental, social, and governance) reporting. (13) ESG criteria now play a major role in the classification of financial products and company valuations, especially in the international financial sector (see Chapter 4.7).

The voluntary reporting standard of the Global Reporting Initiative (GRI), which is described in greater detail in Chapter 14.5, is one of the mostly used standards. It contains detailed criteria for biodiversity reporting.

In addition to voluntary disclosure standards, legally binding standards for biodiversity reporting are also gaining strong momentum. Thanks to sustainability reporting legislation aimed at large companies and financial actors (and, ultimately, smaller ones as well, at a simplified level)—such as the Corporate Sustainability Reporting Directive (CSRD, 2022) and the Sustainable Finance Disclosure Regulation (SFDR, 2019), as well as the EU Taxonomy—companies and financial institutions will need to commit to more transparent and detailed disclosures of biodiversity impacts and biodiversity-related risks (see also Chapter 16).

4.7 Increased demands from the financial sector and investors

Banks, insurance companies, and investors are under increasing regulatory pressure to reflect natural resource scarcity and biodiversity loss as both risk and opportunity in their portfolios.

At the EU level in particular, the above-mentioned legal EU regulations (taxonomy, SFDR) already require financial actors to know and disclose biodiversity risks in their portfolios, at least to some extent.

It is expected that other countries will follow suit, as at the COP 15 global conservation conference (2022), where it was agreed under international law that large and transnational financial institutions should regularly disclose their risks, impacts, and dependencies on biodiversity (although this agreement still needs to be translated into national legislation). This also means that financial institutions will likely increase their demand for information and data on biodiversity when investing in or loaning to companies.

Due to numerous voluntary initiatives, international pressure on the financial sector is also high:

- Rating agencies are increasingly taking biodiversity criteria into account when assessing corporate sustainability. For example, Standard & Poor's (S&P) added biodiversity criteria to its ratings of 32 industries in 2022 and uses them to compose the Dow Jones Sustainability™ World Index.
- The Taskforce on Nature-related Financial Disclosures (TNFD) aims to develop a framework—similar to the one for climate risk reporting (TCFD)—for financial reporting and possible measures to counter biodiversity loss. In doing so, the TNFD builds on and continues many years of work on natural capital accounting.
- It various initiatives around biodiversity and the financial sector, such as the Finance for Biodiversity Foundation (14), the EU's Finance@Biodiversity Community (which regularly shares good practices), and the Partnership for Biodiversity Accounting Financials (15).

As of 2023, a total of 126 financial institutions from 21 countries with assets of more than €18.8 trillion have signed the Finance for Biodiversity Pledge. The pledge was initiated by a group of 26 financial institutions that are committing to protect and restore biodiversity through their financial activities and investments and urging the world's leading companies to do the same.

Inspired by the developments described above, the biodiversity issue is now gaining importance in the German financial sector as well as in the German government and its Sustainable Finance Advisory Committee. Germany's Association for Green and Sustainable Finance Cluster (VfU) had already developed biodiversity principles for the financial sector in 2011.

5

BIODIVERSITY AND THE EMAS MANAGEMENT SYSTEM

EMAS is the first environmental management system validated by an accredited environmental auditing organisation that explicitly identifies biodiversity as a key area.

The EMAS environmental verification requirements (Annex I of the EMAS Regulation) state: “All organisations shall verify the direct aspects of their operations, including impacts on biodiversity”. It also mentions the “use of natural resources and raw materials (including energy)”. Furthermore, EMAS requires organisations to demonstrate that they have identified significant environmental aspects related to their procurement processes, and that any significant environmental impacts arising from these aspects have been addressed within the management system (Annex I - Indirect Environmental Aspects).

As part of the environmental assessment process, organisations are required to:

- Take biodiversity into account when evaluating the organisation’s context
- Take biodiversity into account when assessing the significance of all direct and indirect environmental aspects

In addition, when preparing an environmental statement, organisations shall take into account any legal requirements relating to the protection of nature and biodiversity that affect its activities, products, or services.

Core indicators

Furthermore, as part of an environmental statement, EMAS requires registered organisations to report on core indicators for the following key areas: i) energy, ii) materials, iii) water, iv) waste, v) land use in relation to biodiversity, and vi) emissions (Annex IV of the Regulation).

For the “land use in relation to biodiversity” core indicator, organisations must report on the following indicators (m² or ha), which are explained below:

- Total land consumption
- Total sealed area
- Total semi-natural area at the site
- Entire semi-natural area apart from the premises or real estate of the organisation

A “semi-natural area” is an area that primarily serves to conserve or restore nature. The premises or real estate of the organization may include semi-natural areas as well as roofs, facades, water drainage systems, or other elements that are designed, adapted, or managed to promote biodiversity. Semi-natural areas may also be located offsite from the organisation, provided that they are owned or managed by the organisation and are primarily used to promote biodiversity. Jointly managed areas that promote biodiversity can also be described, provided that the scope of joint management is clearly outlined.

A “sealed area” is an area where the original soil has been covered (e.g., roads) to make it impermeable. On these impermeable surfaces, the exchange of substances and other biological activities are no longer possible.

However, organisations should not limit their reporting to the core indicator for land use; they should also select other key figures and indicators according to their direct and indirect environmental aspects, to map their impacts on biodiversity and demonstrate continuous improvement in their performance.

If an environmental assessment reveals that the organisation has (potential) direct or indirect negative impacts on biodiversity, then it should set measurable mitigation

measures and targets within the environmental programme to the greatest extent possible.

To begin with, most organisations will realise how little they know about the relevance of biodiversity to their business, their dependencies on ecosystem services, and the impacts of their activities on biodiversity. The next logical step would be implementing measures to fill information gaps so that appropriate priorities can be set.

In this guide, EMAS organisations—especially companies—will find information, suggestions, and key figures/indicators to help them close information gaps and adequately consider impacts on biodiversity in their environmental management system. These are cross-sectoral recommendations that should be adapted to their respective economic sectors and augmented by sector-specific measures.

The EMAS Sectoral Reference Documents (SRDs) explain benchmarks and concrete measures for best environmental management practices in different economic sectors [\(1\)](#). Biodiversity is also addressed. Currently, there are EMAS reference documents available for retail trade, tourism, food and beverage production, agriculture (crop and livestock production), public administration, electronic and electrical equipment manufacturing, motor vehicle and motor vehicle parts manufacturing, waste management, ICT services, metal products manufacturing. Documents for other sectors are in progress or planned.

6

BIODIVERSITY AND ISO 14001

ISO 14001 is the standard that is used worldwide by environmental management systems. The standard was published by the International Organization for Standardization (ISO) in 1996 and last amended in 2015. ISO 14001 is integrated into EMAS as part of Annex II, which covers the requirements for an environmental management system under EMAS. However, EMAS requirements go beyond those of ISO 14001—including those that address the key area of biodiversity.

While EMAS identifies this key area with four indicators for land use and requires corresponding reporting, ISO 14001 does not go as far. It includes references to “Wildlife” and “Biodiversity” in:

- The introduction (non-normative)
- The explanation on the definition of the term “environment” (informative)
- The explanation of potential aspects of environmental policy (example)
- In the Annex (informative)

Whether an organisation with an ISO 14001 environmental management system addresses the issue of biodiversity and to what extent, depend on whether the organisation and the external consultant come to the conclusion that biodiversity is a relevant aspect and are pursuing continuous improvement in this area, or whether these changes are being urged by the environmental verifier. Regardless, the topic of biodiversity is gaining importance in the context of ISO 14001.

EMAS and ISO 14001 are ideally suited to improving an organisation’s biodiversity performance. After assessing the relevance of biodiversity (see chapter 8, “Consideration in strategy and management”), the organisation should analyse its current status (environmental assessment) and ensure that all legal requirements for the protection of nature and biodiversity are being met. The environmental programme

should include targets and measures to reduce negative impacts on biodiversity, and implementation progress should be reviewed regularly. In contrast to EMAS, however, ISO 14001 does not require published reporting and environmental statements, making it less transparent.

In 2015, “The ISO management system and the protection of biodiversity” was published. It explains both the integration of biodiversity into the ISO 14001 environmental management system and how to manage biodiversity aspects within the framework of ISO 50001 energy management or the ISO 37000 series for sustainability management by local authorities. ⁽¹⁾

Other ISO guides and standards also relate to biodiversity and provide guidance on the management of biodiversity aspects:

- ISO 26000 Guidance on social responsibility
- ISO/FDIS 14002-2 Environmental management systems—Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area—Part 2: Water
- ISO 14007 Guidance for determining environmental costs and benefits
- ISO 14008 Monetary valuation of environmental impacts and related aspects

ISO 331 Biodiversity

The International Organization for Standardization (ISO) has also recognised biodiversity as a relevant business topic. In 2021, ISO established Technical Committee 331 on Biodiversity with the aim of developing standards and technical specifications for various areas of biodiversity. As part of this international process, four working groups have been established to develop standards and tools in the areas of definitions, ecosystem restoration, ecosystem and species monitoring, and the management and sustainable use of biodiversity. The first standards are expected to be published by the end of 2023. [\(2\)](#)

7

GENERAL CONSIDERATIONS FOR BIODIVERSITY MANAGEMENT

In the context of the EU Green Deal, the European Commission refers to the particular importance of biodiversity protection and has described standards as important instruments for improving biodiversity performance: “Biodiversity considerations need to be better integrated into public and corporate decision-making at all levels”.

The environmental management systems EMAS III and ISO 14001 are best suited to avoiding or reducing negative impacts on biodiversity. Traditionally, both systems cover important drivers of climate change such as energy consumption and transport as well as pollution/emissions. Therefore, this guide focuses primarily on the other drivers of biodiversity loss: the degradation and destruction of ecosystems, the overexploitation of natural resources, and the spread of invasive alien species.

For coordinators of environmental management, however, it is important to emphasise the connections that exist among these systems. Corporate climate protection measures also contribute to the protection of biodiversity, and vice versa. So-called “nature-based solutions” are usually based on elements of biodiversity and contribute to climate protection and/or adaptation to climate change. Highlighting these links often makes it easier to raise awareness of biodiversity and put the issue on the priority list.

When it comes to the environmental aspects of waste, water use, and emissions, companies have often already achieved a high degree of improvement at their sites in Germany or elsewhere within the EU. In these instances, however, compliance with national or European standards to prevent air, water, or soil pollution at sites and in supply chains outside the EU is an important contribution to stopping biodiversity loss.

The indicators mentioned in the following chapters were selected in the framework of the European Business and Biodiversity Campaign, in exchange with other initiatives, and are applicable to all business sectors. These process and performance indicators are intended as a starting point and should be complemented by sector-specific indicators. For some sectors, such as the food industry, sector-specific indicators have already been developed. Where these are publicly available, we refer to them in this guide.

Moreover, there are currently numerous activities in the field of biodiversity measurability. It is therefore recommended that organisations conduct research at regular intervals to incorporate new developments into their decisions and action planning. A very important detail: Management decisions that cannot be reversed must be made with special care. When in doubt, the precautionary principle should always take precedence!

Examples of economic sectors with relevance to biodiversity and ecosystem services

Oil and gas industry

Significant biodiversity-related environmental impacts

Intervention in the natural balance through exploration and resource use. Increasing demand for oil and gas is driving the industry into regions that are more ecologically sensitive (e.g., oil sands mining, deep-sea extraction).

Ecosystem services that are important for the industry

Natural oil and gas deposits form the industry’s “natural capital”. An intact natural environment with oil and gas deposits is an increasingly important assessment criterion for authorities, particularly when it comes to granting production permits.

Extraction of raw materials and mining

Significant biodiversity-related environmental impacts

Intervention in the natural balance through exploration and resource use. The extraction of raw materials is usually associated with land consumption and intervention in ecosystems (e.g., deforestation). Mining activities threaten to deplete groundwater reserves through above-average water consumption, especially in arid regions.

This guide focuses on:

- The avoidance and reduction of negative impacts on biodiversity
- Direct and indirect effects
- Functional areas of a company
- The main causes of biodiversity loss: degradation/destruction of ecosystems, overexploitation of natural resources, and the spread of invasive alien species
- Exemplary key figures and indicators that are applicable across sectors

Ecosystem services that are important for the industry

Natural raw material deposits form the “natural capital” of the industry.

Cosmetics and pharmaceuticals (medicinal and healing plants)

Significant biodiversity-related environmental impacts

More than 25,000 plant species are used for medicinal purposes worldwide but this use can also promote the extinction of species. In Central Europe, more than 150 plant species are threatened by intensive collection.

Ecosystem services that are important for the industry

In industrialised countries, a wide variety of plant species are used for medicinal purposes. Natural plant resources form the basis for the production of active pharmaceutical ingredients.

Tourism

Significant biodiversity-related environmental impacts

Tourism endangers biodiversity through: habitat destruction (land use); overuse of ecosystems (water, energy); pollution (wastewater, waste, emissions); disturbances caused by recreational activities in sensitive ecosystems.

Ecosystem services that are important for the industry

Nature is a central component of the tourism experience. Landscapes, mountains, coasts, beaches, dunes, moors, seas, forests and meadows, flora and fauna—in other words, ecosystems—offer spaces for recreation and leisure activities. Animal watching has also become an increasingly offered activity.

Fishing and fish-processing industries

Significant biodiversity-related environmental impacts

Overfishing of stocks has led to drastic declines. When compared to the numbers at the onset of industrial fishing

methods (trawls), fish stocks have already been depleted by more than 80 %. (Climate) changes in the marine ecosystem are altering both regional and qualitative supplies of fish. The fish-processing industry is also being adversely affected.

Ecosystem services that are important for the industry

Fish stocks have always been a major source of food for humans, and provide employment and economic benefits to those working in fisheries. Maintaining an intact marine ecosystem is a prerequisite for these ecosystem services.

Forestry and forest products (furniture, wood, paper and building materials)

Significant biodiversity-related environmental impacts

Forestry interventions that exceed the natural rate of regrowth endanger existing forest stocks. Rapid deforestation affects biodiversity, making it difficult to maintain ecosystem services such as watershed protection and soil conservation, and causing losses and quality degradation for the timber, furniture, and building materials industries. Non-natural sustainable forestry with non-native trees also provides key services such as CO₂ storage, wood, water recharge/purification, and air filtration.

Ecosystem services that are important for the industry

The forest industry is entirely dependent on natural resources, and natural forest growth provides a key service for the furniture, timber, paper, and building materials industries. In addition, intact forestry and sustainable forest management provide further ecosystem services such as CO₂ storage, water protection, the provision of genetic material, and local recreational value.

Further sector-specific dependencies and impacts on biodiversity can be found in the English-language ENCORE tool. [\(1\)](#)

8

CONSIDERATION IN STRATEGY AND MANAGEMENT

Management sets the course for continuous improvement of an organisation's performance in the area of biodiversity. Due to the complex interrelationships and challenges—especially when it comes to reducing the negative impacts produced by indirect influences—biodiversity protection should be addressed in a structured and continuous manner. It is important that the highest decision-making bodies (e.g., executive board, supervisory board) or managing directors deal with the business risks and opportunities associated with biodiversity. Given the new CSRD, supervisory bodies also have a duty to monitor impacts.

Strategically, it is not advisable to introduce biodiversity management in tandem with other systems but rather to integrate biodiversity into an already implemented manage-

ment system (e.g., EMAS III, ISO 14001). There are also web-links to other environmental and sustainability management instruments, such as Ökoprofit.

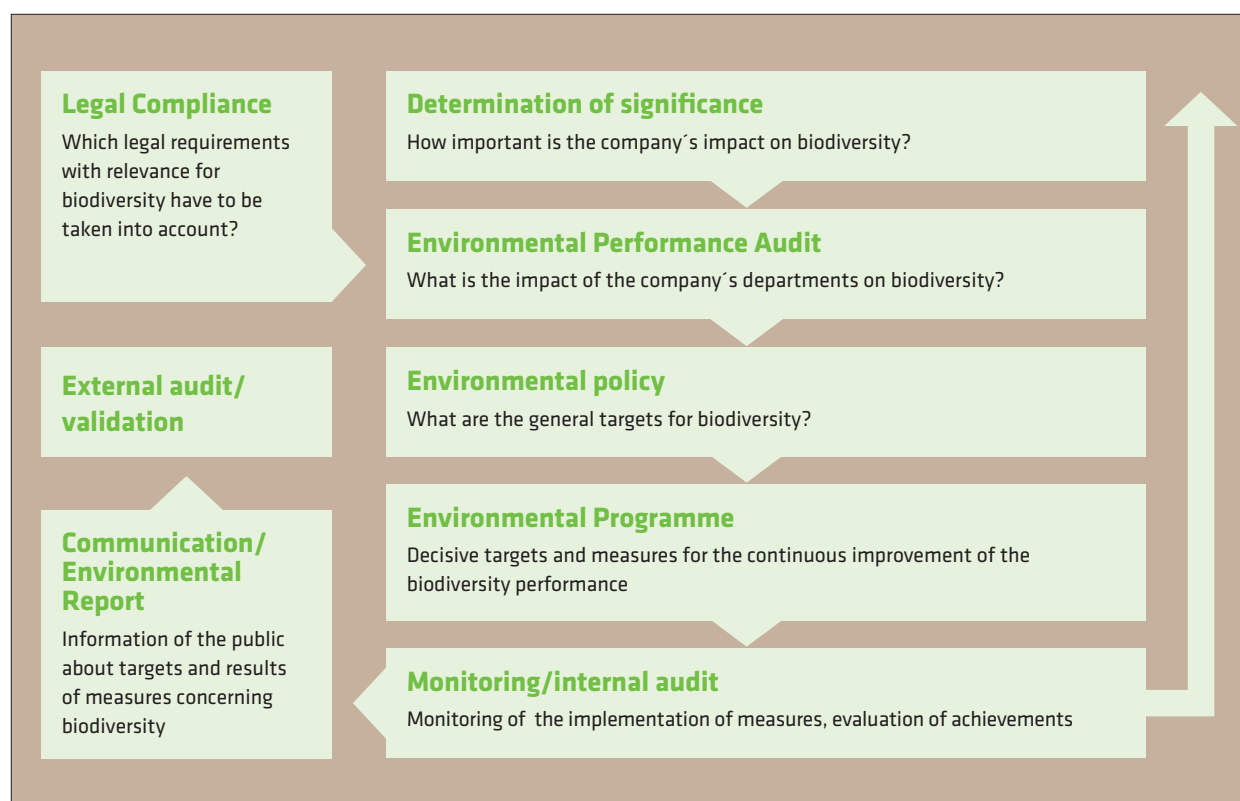


Figure 1: Integration of biodiversity into an environmental management system (EBBC, 2014)

8.1 Determining your baseline

A description of the initial situation (your baseline) should always be the first step in the management process. This step is all the more important for the biodiversity sector, where most companies are just starting out and lack much experience on which to build.

The following questions can only be answered with “yes”, “no”, or “in preparation”, so therefore they are not indicators. A “yes” answer also provides no insight into the quality of the strategy or measure. Nevertheless, this survey is an important first step that demonstrates how a company is positioned in terms of biodiversity and where there is the need for action.

Questions for the company management:

- Is biodiversity taken into account in the company's environmental management system or other management systems?
- Has the company's investigated its direct and indirect effects on biodiversity?
- Does the company know its main business risks associated with biodiversity?
- Has the company analysed the most important raw materials to determine their risks to biodiversity?
- Does the company apply the mitigation hierarchy (avoid, mitigate, restore, compensate) to reduce its negative impacts on biodiversity?
- Does the environmental or sustainability programme include targets and measures to safeguard biodiversity?
- Are (most) objectives and measures measurable and verifiable?
- Has the company selected meaningful key figures and indicators for monitoring?
- Does the staff training programme cover biodiversity?
- Is the company involved in a national or European initiative that addresses business and biodiversity?
- Does the company cooperate with other actors (e.g., scientific institutions, nature conservation authorities, environmental protection organisations) on the topic of biodiversity?
- Does the company have a strategy or programme to ensure fair and equitable benefit-sharing in its use of genetic resources?
- Does the company take biodiversity into account in its investments or shareholdings in other companies?
- Does the company report on biodiversity impacts and issues?

8.2 Determine the significance of biodiversity for the company/organisation.

All certifiable environmental management systems require companies to determine the materiality or significance of an environmental issue. How can this be done for biodiversity issues without having to begin by conducting extensive studies?

Below is a proposal to determine the degree of significance of these biodiversity issues, with a few relevant and cross-sectoral questions, and a simple evaluation of the answers. This proposal can (and should) be supplemented with sector-specific questions.

As explained in chapter 2, this guideline deliberately does not address climate change and pollution/emissions. The author team assumes that these aspects are already being addressed continuously within the framework of environmental management. Therefore, they are not taken into account when determining the significance of biodiversity, although they play a natural—and major—role in the loss of biodiversity.

It is certainly helpful if the company not only tasks its environmental officer with determining the significance of biodiversity internally, but also involves managers from all company branches as well as its external stakeholders (e.g., scientific institutions, nature conservation authorities, NGOs) in this step, either via an open dialogue or by comparing assessments.

A risk assessment can also help determine the significance of biodiversity for the company. Much work is currently being done in this area, and progress is ongoing. However, practical experience with the available tools over a longer

period of time is still lacking (see Chapter 18, “Practical tools”). Therefore, it is advisable to ascertain the latest status on a regular basis.

Table 2 - Determine the significance of biodiversity for the company

Effect on	Entrepreneurial activity
Ecosystems / Biodiversity	Does the business activity of the company involve land use? No = 0 points. Insignificant = 1 point. Significant = 3 points.
	Does the company, or do its direct or indirect suppliers, operate in or near legally protected areas, or in non-protected areas of high biodiversity value? No = 0 points. Yes = 3 points. Don't know: 3 points.
	Does the company, or do its direct or indirect suppliers, operate in areas with water scarcity? No = 0 points. Yes = 3 points. Don't know: 3 points.
	Is business activity directly or indirectly dependent on ecosystem services? No = 0 points. Direct and/or indirect dependencies = 3 points. No information = 3 points.
	Does the company process raw mineral materials or intermediary products derived from them? No = 0 points. Insignificant: 1 point. Important basis for production: 3 points.
	Does the company process agricultural or raw animal materials, or intermediary products derived from them? No = 0 points. Insignificant: 1 point. Important basis for production: 3 points.
	Does the company trade in protected species or components thereof (as defined by the “Convention on International Trade in Endangered Species of Wild Fauna and Flora” CITES)? No = 0 points. Yes = 3 points.
	Does the company use agro-genetic engineering or process corresponding products? No = 0 points. Yes = 3 points.
	Does the company, or do its first-tier suppliers (i.e., direct suppliers to the producer), have premises/properties with outdoor areas? No outdoor areas = 0 points. Small outdoor areas = 1 point. Larger outdoor areas = 2 points. Large external surfaces = 3 points
	Are there any semi-natural areas or other ecologically valuable structures (biotopes) on company premises or properties? None = 0 points. One biotope = 2 points. Several biotopes = 3 points.

	Has the company restored habitats and/or created compensatory areas for its interventions in nature and landscapes? Not relevant, as no interventions = 0 points. Yes = 1 point. No = 3 points.
Overexploitation of natural resources	Does the company process raw plant or animal materials, or intermediary products derived from them? No = 0 points. Insignificant = 1 point. Important basis for production = 3 points.
	Is water an essential production factor for the economic activity of the company or its suppliers? Insignificant = 1 point. Substantial = 2 points. Very essential = 3 points.
	Does the company, or do its suppliers, operate in regions with water scarcity? No = 0 points. Yes = 3 points. Don't know: 3 points.
Invasive alien species (IA)	Does the company carry out or commission international deliveries of goods? No = 0 points. Insignificant = 1 point. Significantly = 2 points.
	Does the company use invasive species as a raw material? No = 0 points. Yes = 1 point. Don't know: 1 point.
	Is the company aware of the presence of invasive alien species on its own premises/properties? No, no occurrences = 0 points. Yes, there are invasive alien species = 1 point. Not known = 1 point.
● 0 - 7 points = insignificant significance ● 8 - 13 points = medium significance ● Above 13 points = high significance	

8.3 Knowledge and coordination

Biodiversity is complex, as are the different influences a company might have on it. In terms of expertise, all companies are positioned differently. For example, those in the food industry, (agro)chemical industry, or the extraction of raw materials often have entire departments dedicated to the topic. In other companies, however, the environmental or sustainability officers are supposed to coordinate issues and actions related to biodiversity in addition to emissions and climate. That is a challenge!

Biodiversity management requires knowledge at both the local and global level. Therefore, it is advisable to seek expertise. Conservation authorities and environmental organisations usually know the situation on the ground and can provide valuable input when it comes to analysing the current situation and identifying goals and measures (see chapter 15, "Cross-cutting: Engaging stakeholders"). National business and biodiversity initiatives organise, among other things, the sharing of experiences among companies and provide an overview of studies, instruments, and positive examples. Companies can get involved with the European Business & Biodiversity Platform [\(1\)](#) or become a member of

one of an international initiative, such as Business for Nature (2) or WBCSD/One Planet Business for Biodiversity (3)

In Germany, there is also the “Unternehmen Biologische Vielfalt (UBi)” initiative, which is aimed at business and industry associations with the goal of informing them and their members about the topic of biodiversity. Companies can ask their sectoral association to become involved in UBi if they are not yet members. (4)

8.4 Support from expert advisors

Most companies lack experience in the field of biodiversity. A knowledgeable expert can show management the importance of ecosystem services to the organisation and where there are potential biodiversity impacts due to business activities.

EMAS and ISO 14001 consultants, as well as environmental organisations, can provide valuable assistance. With EMAS, it is important to observe the principle of independence. Those who have taken on advisory roles for an organisation may not carry out certification or validation activities for that organisation.

In EMAS, biodiversity is one of the key areas that is taken into account in mandatory reporting. Accredited environmental verifiers have the task of checking whether the environmental management system that was submitted to them meets EMAS requirements, and that includes the area of biodiversity. The company should be prepared to answer corresponding questions from the environmental verifier or—even better—actively incorporate the key area of biodiversity.

Possible biodiversity-related questions that may come up during the validation process

- Has the organization analysed the significance of biodiversity?
- What influence do the various corporate divisions have on biodiversity?
- What influence do the company’s supply chains have on biodiversity?
- Which raw materials or materials sourced from upstream suppliers? What effects does the cultivation or extraction of these raw materials have on biodiversity?
- What general biodiversity objectives have been included in the environmental policy?
- With regard to biodiversity as a significant environmental aspect, what concrete targets and measures have been established to protect biodiversity?
- How is the achievement of these objectives verified? How is continuous improvement demonstrated?

8.5 Environmental or sustainability policy of the company

A company’s environmental or sustainability policy should address the company’s direct and indirect impacts on biodiversity, and clearly identify priorities for improvement.

Among other things, it is important to employ internationally recognised and used terms. If proprietary definitions for certain biodiversity aspects are required, these must be explained clearly and comprehensibly.

The relevance of accepted definitions

In 2011, the World Conservation Monitoring Centre (UNEP-WCMC) published the results of an analysis of biodiversity mapping among 36 standards in eight different economic sectors. Among other things, the WCMC found that the standards used different terms and definitions, and rarely adhered to internationally recognised terms and definitions (for example, protected areas, endangered species, and biodiversity hotspots). Inconsistent terms and missing citations are problematic as they do not provide a clear reference and instead allow for different interpretations. Internationally recognised definitions: [\(5\)](#)

A company's overarching goals should address its key biodiversity-related challenges and not deal with minor ones. They should also be **SMART**:

- **Specific:** As concrete and measurable as possible and based on the baseline
- **Measurable:** Using key quantitative figures and qualitative indicators (See the suggestions in this guide.)
- **Attractive:** Motivating for staff and involved actors, and easy to communicate, but the main aspects must not be neglected
- **Realistic:** Achieving a balance of feasible and ambitious, taking into account that big steps are necessary to stopping biodiversity loss
- **Time-bound:** Including defined timetables and responsibilities (Targets for reducing negative impacts and fostering greater biodiversity can often be achieved within the framework of a three-year environmental programme, but establishing real and measurable improvements within ecosystems or species populations, planning must be done over longer periods of time.)

There are some companies that have made “no net loss” or even “net gain of biodiversity” their overarching goal. These are very ambitious goals! To stop biodiversity loss, however, ambitious conservation measures are necessary, in concert with more sustainable production systems and consumption patterns that change land use.

On the other hand, a company should not make this type of commitment lightly; it requires concrete information about the initial situation, as well as an action plan with measures to prevent or reduce negative impacts as much as possible, and sensible projects that compensate for those impacts that cannot be prevented.

Among the goals being discussed at European and international levels is “nature positive business”, which is supported by commitments from heads of state and governments (e.g., the Leaders' Pledge for Nature, the G7 2030 Nature Compact, the communiqué of the G20 heads of state and government, and the Kunming Declaration).

The World Business Council for Sustainable Development (WBCSD) has published a “Roadmap to Nature Positive”, which was designed to help companies set and report against science-based targets for nature (e.g., Taskforce for Nature-related Financial Disclosures).

From the publishers of this guidance point of view, it is important to define “nature positive” as a pathway and act on the basis of a mitigation hierarchy, i.e., avoiding and reducing negative impacts, and participating fully in the restoration and protection of biodiversity elements.

Heineken España—Excerpt from its sustainability strategy

Goal: Protect our water sources

Neutral hydrological balance by 2025 through water recycling, reductions in water consumption, and other initiatives to protect wetlands in watersheds where factories are located (figure 2).



Example: Laguna Albufera, Valencia

Returning more than 400 million litres of water per year to La Albufera.

With projects in La Albufera, Doñana, and the Jarama River, the Spanish division of the Heineken brewing company returns a total of 1.9 billion litres of water to the environment every year. This is equivalent to more than 100% of the water contained in all the beers Heineken brews in Spain. In this way, Heineken España has achieved a water-neutral balance in its four breweries, almost a decade ahead of the deadline that its parent company set for itself at global level.

The intervention in La Albufera, in which Heineken has invested approximately 400,000 Euros since 2017, consisted of removing reed—an invasive plant that had spread significantly, and that consumes 10 times more water than native plant species. By controlling this invasive species and regenerating the area with native flora and fauna, both soil quality and the water cycle were improved, and biodiversity was nurtured. The measure also made an important contribution to climate protection.

Winner of the 2020/2021 European Business Award for the Environment, Biodiversity category.

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BahnLog GmbH—Excerpt from its environmental policy

BahnLog is aware of its responsibility to nature and the environment, and has employed a qualified nature and species conservation officer since 2009. The company aims to achieve an optimal coexistence of ecology and economy.

In close cooperation with the authorities and experts on nature and species conservation, BahnLog redevelops historic industrial sites and ensures that these sites do a better job of protecting fauna and flora in the future.

Winner of the 2020/2021 European Business Award for the Environment, Biodiversity category.

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HiPP Sustainability Guidelines

HiPP is committed to striving for a balance between nature and man. Its focus is on preserving the foundations of life through the careful use of natural resources. In addition to complying with all relevant laws and regulations, HiPP is committed to setting itself goals that even more far-reaching. In this sense, the company's environmental management is developed continuously and improved through appropriate measures, while simultaneously reducing the negative effects of the company's actions on the environment. Group-wide guidelines have been established for this purpose and are constantly improved. Among other things, these guidelines include a strong ecological standard that is achieved by applying internationally valid environmental management systems (ISO 14001 and EMAS).

Within this framework, HiPP is developing measures to combat climate change, the depletion of natural resources, and the extinction of species. Its goals are to reduce emissions, avoid the use of raw fossil-fuel materials, and reduce the consumption of other resources. HiPP promotes biodiversity through the avoidance of green genetic engineering and by conducting and applying research on semi-natural agricultural methods.

HiPP is active in "Biodiversity in Good Company" and has been recognized multiple times by the European Business Award for the Environment, Biodiversity category.

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9

COMPANY PREMISES AND REAL ESTATE

According to the European Environment Agency, Europe is one of the most intensively used continents. Up to 80% of its land is used for settlement, production (including agriculture and forestry), or infrastructure. Around 30% of its land is highly fragmented, which exerts great pressure on biodiversity, and reduces the land's potential to provide ecosystem services. (1)

9.1 Why is there a need for action?

Company premises have a responsibility to reduce land fragmentation wherever possible, by increasing the permeability of a site, through proper planning and the creation of green spaces. So these sites can serve as a refuge for animal and plant species.

On many company premises, it is relatively easy to provide space for native flora and fauna without restricting the site's operations or development opportunities. The flower bed in the entrance area, green strips along a property's boundary, or in the parking area, or the green island that forms the turning ramp are just a few examples of ways to use semi-natural design at many sites. In addition, there are often areas that, for technical or regulatory reasons, cannot be used for operational expansion or infrastructure; steep slopes, for example, can be designed as high-quality biotopes, and watercourse margins can often be upgraded through appropriate maintenance.

If biodiversity is taken into account in the early planning stages, and if holistic care and maintenance concepts are developed, these changes can be achieved in a cost-effective manner and with the greatest positive effect.

Semi-natural design options can also offer tangible benefits:

- Perennial flowering areas and meadows are mown less frequently than, for example, ornamental lawns, which often need to be mown, fertilised, and scarified.

- Natural design of infiltration troughs and infiltration trenches can increase seepage capacity through better root penetration.
- Green roofs and façade greening reduce the energy that's required for air conditioning, which is vital for the health and performance of employees, and for meeting production-quality needs.
- Green roofs also provide increased resilience to hail and reduce the risk of flash flooding by delaying the release of rainwater into the environment.
- Locations that are close to nature promote the well-being of employees and boost the attractiveness of a workplace—an increasingly important factor, especially in view of demographic changes and the shortage of skilled workers.
- A biodiversity-promoting design offers numerous opportunities to involve employees and thus strengthen their identification with the company.

Employees can already be involved in this initiative. It also makes sense for them to participate in monitoring—in cooperation with a local nature conservation organisation; one or two indicator species can be selected and their population development can be checked every few years. In this way, the health of these habitats and the long-term development of the flora and fauna on site can be assessed with little effort, and the ecological development of these areas can be more readily controlled.

9.2 Challenges

The semi-natural design of company premises is not yet “the norm”, but it is no longer a niche topic either: within the framework of regional, national, and Europe-wide initiatives, hundreds of companies have been able to gain experience with semi-natural design on their sites, allowing this practice to be described as a proven alternative. To access extensive information and materials, good examples, and lists of regional initiatives and service providers that are involved in nature-oriented company sites, see the following link [\(2\)](#).

Nevertheless, there are still challenges and questions that remain: Companies are often concerned that nature-based design will allow protected species to become established on these sites, thereby restricting the future use of an area (see Section 12 ff of the Habitats Directive; Section 5 of the Birds Directive; and § 44 of the Germany’s Federal Nature Conservation Act). [\(3\)](#)

However, problems like these can be avoided through prudent planning. For example, particularly high-quality habitats should only be established on land that is available for the long term. Areas that are subject to use restrictions are a good starting point: if a company knows that an area will not be usable over the long term, it can make sense to design it as a high-quality biotope. For areas that will only remain unused temporarily, semi-natural designs that cannot last without (extensive) regular maintenance or that are only sustainable for a limited period of time offer a good alternative.

Regardless of whether a semi-natural design has been implemented at a site, it is important to deal with the legal protection of species at an early stage of the construction process: If protected species are found on a site, it’s often sufficient to plan the timing of construction work accordingly. Dealing with the issue from the outset can often help to avoid additional work, while waiting until a construction site is set up can cause delays and incur costs.

In this respect, nature-oriented design should be understood as part of construction “risk management”: A company acquires knowledge about the status of biodiversity on site, which can considerably simplify the construction planning process, by incorporating the protection of legal species (and not overlooking the latter). A regular review of animal and plant species development at the site gives a company the opportunity to intervene in time, simultaneously protecting biodiversity and realising its own site objectives.

An important element of semi-natural design is the introduction and implementation of an extensive maintenance approach in which fertilisers and chemical pesticides are avoided as much as possible. On a semi-natural company site, maintenance serves to carefully moderate and control development of the areas, taking natural conditions into account. This does not mean that maintenance is eschewed—but it does mean doing less, doing it more wisely and with greater deliberation, and allowing a certain amount of “wildness”. For example, shrubs in semi-natural areas are not usually cut into strict shapes, grass areas are allowed to grow taller, and, ideally, a little old grass is left in place over the winter. The use of machines—such as leaf blowers—should also be reconsidered. Therefore, customary procedures for the maintenance of green spaces must be changed and the staff that’s in charge of maintenance needs to be trained. There is (still) no “biodiversity certificate of competence” that companies can use as a guide when choosing a service company. In principle, however, committed landscape gardeners and landscape architects should be able to familiarise themselves with the topic. Service providers who already work in a biodiversity-friendly way can also reach out to companies via one of the initiatives promoting nature-friendly company grounds. The above-mentioned website is a good starting point.

Semi-natural design and maintenance also produce a site that looks different from what staff and guests may expect. Particularly at the beginning of a conversion from “normal” to “semi-natural” design, there will be a transitional phase during which these areas look “wilder” but have not yet achieved the planned aesthetics and the desired abundance of flowers. Even long after these semi-natural areas have been established, change is a constant part of their development.

This can pose challenges to the acceptance of these new designs. Companies should inform employees and guests about the reason for nature-oriented design, the measures they are implementing and the ecological interrelationships. Concerns, such as the fear of bee stings, must be taken seriously and defused through education.

Additionally, promoting biodiversity beyond the company premises is desirable and necessary. The challenge is to support environmental and conservation initiatives appropriately and transparently, without being accused of greenwashing. Another challenge is making a long-term commitment: Conservation initiatives often take several years to produce results, which means that companies may need to bridge a longer lean period without results. This can be particularly difficult for a communications department, which often wants to communicate implemented measures as quickly as

possible. Biodiversity and nature are exciting and emotional topics; a company's communications should present not only its goals but also the results and possible difficulties, in a transparent and balanced way (see Chapter 14, "Marketing and communications").

9.3 Nature-oriented design of company premises: Goals and measures

The aim should be to increase the proportion of semi-natural areas on the premises as much as possible. In the future, it will also be possible to have semi-natural company grounds certified: The German Sustainable Building Council (DGNB) and the Lake Constance Foundation are working on a certification that is expected to launch in 2023. This certification would be an attractive environmental goal for any company, especially within the framework of EMAS.

Nature conservation authorities and private nature conservation organisations can support companies in their development of meaningful measures, or in the creation of a roadmap for the introduction of nature-oriented design. For the actual implementation, a company should seek a nature-oriented gardener or planner that has the knowledge and experience to bring together the ideas behind nature-oriented design with the company's aesthetic, practical, and legal requirements for its area design.

In many European countries, there are professional associations for nature-oriented design that provide contacts to corresponding experts.

The use of native species is of great importance for biodiversity. Over centuries, the flora and fauna of a region have adapted to each other, and there are numerous interrelationships among the various ecological players. This does not mean, however, that non-native plants are always ecologically worthless; even introduced plants can, for example, provide nectar and pollen for insects in their new location. The ecological value of a non-native species often requires lengthy study. In addition, there is a risk that non-native species will turn out to be "invasive" and displace other species; invasive species are one of the top five drivers of biodiversity loss worldwide. Therefore, the use of non-native species should be done with caution.

In addition to the use of plants, there are other biodiversity-friendly design elements, such as:

- Native shrubs and trees (orchards, hedges, which can be presented as part of a "Tree of The Year" campaign)
- Flower or herb meadows, flower edges, semi-natural grassland (which only require one to two mows per year, and no fertilisation, irrigation, or clearing of mown material)
- Ruderal sites, gravel lawns
- Dry stone walls, cairns, piles of deadwood
- Standing or flowing water, alternating wet locations (e.g., semi-natural infiltration trenches and seepage troughs), retention basins with high ecological functionality (relief with shallow and deep areas, shallow banks to allow access for amphibians)
- Green facades, green roofs, but without "living walls", which are dependent on irrigation and fertilisation
- Traffic areas with permeable pavements
- Nesting aids for birds, insects, bats
- Outdoor lighting provided by insect-friendly LEDs (which reduce light emissions as much as possible)

The lighthouse initiative "Mainstreaming semi-natural company grounds" is part of the project "Unternehmen Biologische Vielfalt (UBi)". Among other things, the Lake Constance Foundation and the German Sustainable Building Council are developing a certification that will be available in Germany starting in 2023. In addition, a monitoring system for semi-natural company grounds will be available in mid-2023.

9.4 Examples of indicators

The common performance indicator for land use (in square metres of built-up area) is usually very static—i.e., it remains unchanged for years and does not differentiate between different area designs. EMAS III has differentiated its land-use indicator, among other elements, to include reporting on semi-natural areas (see Chapter 5).

Table 3 - Examples of key figures/indicators: Company locations and properties

Areas of impact	Key figures/indicators
Does the company/organisation rent, own, or use properties that area directly adjacent to nature conservation areas with high biodiversity? Yes -> see indicator No	Proportion of land managed under a nature conservation concept: <i>Size of the area covered by a nature conservation approach (m² or ha)</i> <i>Share of total area (%)</i>
Does the company/organisation know the level of intensity with which operating sites and properties are managed? Yes -> see indicator No	<i>Size of:</i> ● Sealed area ● Unsealed area ● Natural or semi-natural areas <i>Share of these areas relative to total area (%)</i>
Does the company/organisation have a management plan for the protection and ecological development of the semi-natural areas on the properties it uses? Yes -> see indicator No	Proportion of areas designed close to nature: <i>Size of the semi-natural areas (m² or ha)</i> <i>Share of total area (%)</i>
Has the staff that is responsible for land maintenance (internal or external) been informed and instructed to implement an extensive biodiversity-friendly maintenance approach? Yes -> see indicator No	Internal job descriptions or contracts for services to maintain the areas, with corresponding instructions
Do the buildings have a green roof or green facades? Ja -> siehe Indikator Nein	Proportion of roofs and façades with vegetation: <i>Size of the green spaces in m²</i> <i>Share of total area (in %)</i>
Has the company/organisation established a monitoring system to assess the biodiversity of its sites/properties? Yes -> see indicator No	Meaningful monitoring is implemented Yes /No <i>Number of habitat types and/or indicator species whose development is monitored</i>
Are there areas that have been renaturalised to compensate for the company's negative impacts on biodiversity, beyond legally required compensatory measures? Yes -> see indicator No	Share of habitats and/or compensatory measures that go beyond legal obligations <i>Size of the habitat area or compensatory areas (m²/ha)</i> <i>Share of these areas relative to the total area used by the company (in %)</i>
Are there areas that have been renaturalised to compensate for the negative impacts of the company's supply chain on biodiversity? Yes -> see indicator No	Renaturalised area or areas to offset negative supply chain impacts <i>Size in m² or ha</i> <i>Share of these areas relative to the total area used by the supply chain (in %)</i>

10 PURCHASING AND SUPPLY CHAINS

Globally, nearly 60 billion tonnes of raw materials are currently consumed annually each year—an increase of 50% in the past 30 years (1). By 2030, this figure could reach 100 billion tonnes, and this trend shows no signs of being reversed. The 2019 IPBES Report underscores the link between biodiversity and biotic raw materials, as well as the former's economic importance: biodiversity is the basis for soil fertility, pest control, and pollination.

10.1 Why the need for action?

When pollination is reduced, annual production drops by an estimated \$577 billion. Approximately 23% of global land area has seen its productivity reduced by degradation. Agriculture both requires water and pollutes it at the same time; almost three-quarters of global freshwater supplies are used for irrigation and livestock production. Fertiliser runoff into water bodies has resulted in 400 dead zones in freshwater and coastal waterways. Ten million hectares of forest were lost annually between 2015 and 2020 (for comparison: Germany covers an area of 36 million ha), and 25% of greenhouse gas emissions are caused by land conversion, arable farming, livestock breeding, and fertilisation.

But supply chains that use raw abiotic materials—such as minerals, petroleum, and diamonds—can also have a major negative impact on biodiversity.

However, the provision of raw materials is associated not only with a greater consumption of natural resources, but also with the production of emissions and waste, which in turn threaten nature. In 71% of EU regions (115 out of 162), more than half of the land-based biodiversity footprint is felt outside their region. This was also confirmed by a study published in *Nature*, which concluded that, as the result of international trade, Germany's biodiversity footprint was predominantly felt abroad. For several hundred species, the study proved a direct connection between Germany's foreign trade and the loss of these species (Lenzen et al., 2012), and the actual impacts are likely to far exceed the figures mentioned.

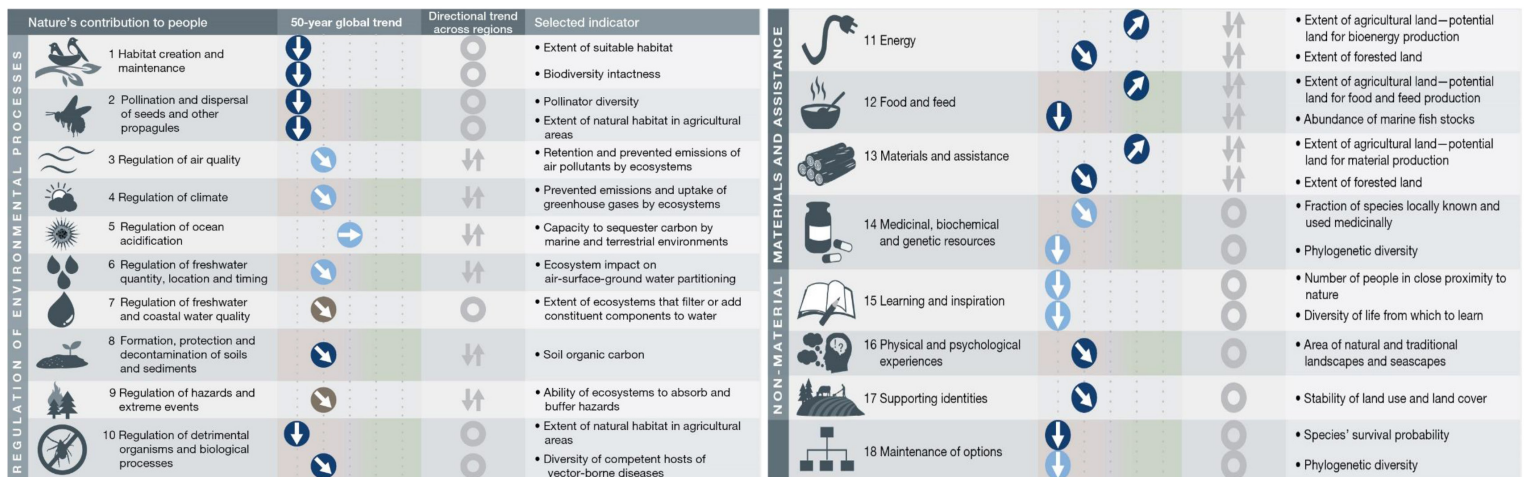


Figure 3: Global assessment report on biodiversity and ecosystem services, by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (Source: IPBES, 2019)

The main negative impacts by companies on biodiversity are usually found in their supply chains—whether it is the clearing of forests to convert land for agriculture, the overfishing of certain species, the destruction of ecosystems through the extraction of raw mineral materials, the construction of hotels in protected areas, the planting of forest monocultures to produce paper and furniture, or the collection of wild plants to extract their active ingredients for medicinal use. Almost all of the raw materials and (preliminary) products that a company's purchasing department procures are associated with biodiversity impacts. Because of these serious impacts, sustainable procurement strategies and practices are an essential part of corporate prevention measures to minimize environmental and human-rights risks, which is why they have been explicitly included in the German Supply Chain Due Diligence Act.

A company's procurement department is a crucial player in improving environmental performance in the area of biodiversity, and it can also achieve other positive impacts—first and foremost, the preservation of livelihoods and economic well-being for local communities. When it comes to the extraction of raw materials, local populations must be involved in value-creation processes. With regard to the use

of genetic resources, there are international legally binding provisions that require the consent and participation of local groups (UN CBD - Nagoya Protocol), but these requirements apply only to countries that have ratified the protocol (132 countries, as of October 2021). The EU's Access and Benefit-Sharing (ABS) regulation was adopted on October 12, 2014 (see Chapter 16), while a corresponding German law came into force in July 2016.

10.2 Challenges

A key challenge for companies/organizations is understanding the biodiversity risks within their supply chains and taking effective measures to reduce these risks. Therefore, when it comes to managing biodiversity in purchasing and supply chains, the starting point would be to obtain a good overview of the potential impacts posed by the main raw materials, products, or services procured, as well as the traceability of these goods and services.

First, purchasing needs an overview of the type and quantity of resources that are required by company processes. It also needs enough information to assess the relevance of biodi-

versity to these resources. In the case of unprocessed raw biological or mineral materials, their origin is an important piece of information, but it can also be a challenge to obtain because the traceability of raw materials is a major problem in many sectors of the economy. The composition of complex inputs would need to be checked and screened for the presence of critical raw materials.

Most companies will be unable to carry out a biodiversity risk analysis for all essential materials, raw or proceeds. Therefore, it is advisable to start with the most important and riskiest raw materials. Furthermore, a company should find out if corresponding studies have already been carried out within its industry. Sometimes, it is also worthwhile to reach out to an industry association, or to suggest that the association commission such a risk analysis. The results of any risk analysis should also be discussed with those responsible for product design and development, to identify alternative raw materials that could be used to replace those that pose a high risk.

Beyond the type and quantity of inputs, information on specific on-site production conditions is of particular importance when assessing possible biodiversity impacts. Furthermore, the “biodiversity environment” plays a central role. The greater the diversity level of ecosystems and species in the region where raw materials originate, the higher the risk of

negative impacts that may result from their extraction or cultivation. Global or regional biodiversity-overview maps can be used to carry out an initial assessment. It is also important to ask whether raw biotic materials are being sourced from regions with water scarcity or high soil erosion.

When assessing the biodiversity richness of areas and regions that are not necessarily subject to protection status, there are a variety of available approaches that have been developed by nature conservation organisations in cooperation with scientific institutions. Some examples are High Conservation Value Areas (HCVA; Forest Stewardship Council, or FSC) and the Key Biodiversity Areas (KBA; International Union for Conservation of Nature, or IUCN). Additional information and classification concepts are available via the portal A-Z Areas of Biodiversity Importance [\(2\)](#) and the fee-based portal IBAT for business [\(3\)](#)

A company can also contact national/international conservation institutions. Once regions of origin have been identified, it would be useful to check determine if they are located in or near protected areas. This information can be obtained from environmental authorities or environmental organisations as well as from relevant web portals. [\(4\)](#)

Financial risks for financial institutions from biodiversity loss

By working with clients whose economic activities rely on biodiversity, financial institutions are also exposed to direct and indirect risks from biodiversity loss, in the form of transition risks and physical risks. Transition risks include new laws and regulations to ensure a more sustainable future, since these could lead to restrictions on certain economic activities. Such restrictions could significantly increase costs for customers, or losses for the business, which would lead to reduced profitability; for example, biodiversity is firmly embedded in some new disclosure requirements, such as the SFDR and the EU taxonomy. The growing interest in green products could also lead to reduced profitability and thus increase risk for financial institutions.

Physical risks, on the other hand, occur when clients depend on ecosystem services. For these clients, the loss of biodiversity is accompanied by a loss of profitability, which in turn could lead to the reduced ability to meet their financial obligations, such as loan repayments. This means that banks would experience higher rates of default and write-offs, higher capital requirements, and ultimately a decrease in new business start-ups. Therefore, it is important that banks factor biodiversity and specific transition and physical risks into their financial risk management system. Assessing these risks can pose a number of challenges for banks, including strategic alignment issues, risk quantification, and the collection of data to assess potential impacts.

Strategic considerations include linking biodiversity protection to corporate strategy and philosophy, defining risk appetite, and formulating practical and measurable KPIs to help clients transition to a more sustainable and bio-diverse economy. The TCFD (Task Force on Climate-related Financial Disclosures) and the new TNFD (Task Force on Nature-related Financial Disclosures) can provide guidance to financial institutions. (5)

Growing numbers of companies in the food and cosmetics industries are establishing their own supply chains with direct access to the production and processing of natural raw materials, while companies from other sectors are participating in sustainable procurement databases to ensure the traceability of their materials. Both the German Supply Chain Due Diligence Act, which will take effect in 2023, as well as

the EU's Corporate Sustainability Due Diligence Directive (CSDDD), which is currently in development, will greatly increase pressure on large companies to achieve transparency in their supply chains, and will also affect small- and medium-sized enterprises that serve as suppliers to the large companies.

HIPP - Biodiversity in the supply chain

Several years ago, the sustainability team at HIPP developed a methodology for measuring the biodiversity performance of its suppliers. This approach is based on the biodiversity management guidelines of Biodiversity in Good Company, the GRI standard, and impact criteria that were developed in conjunction with LBV Bayern, NABU, the Leibniz University Hannover, and the Technical University of Munich.

HIPP's producer and supplier questionnaire gathers information on the status quo in agricultural production, and management software links this information to the company's master data, as well as its quality and release data. Using the EMAS III framework, HIPP defined specific procurement goals. All of its agreements and contracts contain a code of conduct that specifies requirements for environmental protection, social responsibility, and ethics, and its suppliers and other business partners must commit to this code. In this way, HIPP emphasises that environmental and biodiversity protection are as indispensable as the quality and availability of raw materials, when it comes to building a trusting and long-lasting business relationship.

When it comes to essential raw materials that are produced in tropical regions, HIPP has established direct collaboration with some of its producers. For example, HIPP initiated a banana project in Costa Rica more than 20 years ago, with the aim of promoting organic farming and protecting biodiversity; since then, HIPP and the operators of a family plantation have developed a solid partnership based on trust. A fair price guarantees that these small farmers earn a decent living, and by promoting organic farming, the company helps protect natural habitats and biodiversity that relies on these habitats. By planting banana trees at generous intervals, pesticides use can be eliminated. In case of plant diseases, infested shrubs are quickly removed, thus protecting the rest of the plantation. Organic farming guarantees good quality fruit and a healthy ecosystem for fauna and flora.

Beyond its procurement requirements, HIPP motivates its suppliers in Germany to participate actively in biodiversity protection beyond the boundaries of their farms—particularly, the protection of pollinating insects. HIPP works with Mellifera, a bee-protection association that focuses on sustainable and ecological beekeeping. Mellifera has developed several initiatives, including Bienen machen Schule (which translates to “bees form a precedent”) and the Netzwerk Blühende Landschaft (Blooming Landscape Network). HIPP has also become a sponsor of Blooming Landscapes, and invited its suppliers in Germany to do the same.

10.3 Standards and biodiversity

Standards and labels play a major role in some sectors when it comes to ensuring certain qualities of the raw material and its production or extraction. In recent years, some food standards have improved their requirements for the protection of biodiversity (e.g., Rainforest Alliance, Fairtrade, GlobalG.A.P., Biodiversity Grow, Bioland, and e.g. the 4C Standard for coffee). The EU “Food and Biodiversity” project provided significant stimulus for this by analysing 54 standards, labels, and procurement requirements, and presenting recommendations for effective criteria for the protection of biodiversity (6). These recommendations also provide good guidance for food companies that want to improve their procurement.

For tourism industry standards and labels, the EU also developed a comprehensive catalogue, with recommendations for the improvement of existing criteria and the development of additional criteria. (7) These recommendations can also be used by companies in the tourism sector to establish their own action plans or supplier requirements.

Standards with biodiversity criteria also include the MSC standard for marine fisheries, as well as the FSC standard for wood and paper, which includes criteria for the protection of “High Conservation Value Forests (HCVF)”, i.e., the protecti-

on of forests that are particularly valuable from an ecological and social perspective.

The Concrete Sustainability Council is responsible for the CSC standard (8). Companies in the ready-mixed concrete and precast concrete industries can be certified by the CSC in four categories: economy, ecology, the social aspects of sustainability, and management. The certification covers both the concrete company or plant, and its supply chain.

The CSC standard contains various requirements, which correspond to the categories Platinum, Gold, Silver, or Bronze. The higher-level categories also address the extraction of raw materials and include criteria for the protection of water resources and protected ecosystems; biodiversity management at the extraction site; restoration, avoidance, and reduction of emissions and waste; and reductions in energy consumption.

Europe is experiencing a flood of standards and labels, which are becoming increasingly confusing, not only for the end consumer but also for businesses. Some portals provide information and an overview of them (e.g., the online label portal of Germany’s federal ministries for the environment and agriculture (9) and Destinet, which focuses on tourism industry standards and labels).

Examples of standards that excel at covering biodiversity

UEBT standard

The goal of this standard by the nonprofit organisation Union for Ethical BiTrade (UEBT) is to respectfully procure raw materials in harmony with people and the environment while also preserving biodiversity. UEBT certification, which has been available since 2018, is based on seven principles:

- Conservation of biodiversity
- Sustainable use of biodiversity
- Fair and equitable sharing of benefits from the use of biodiversity
- Socio-economic sustainability (productive, financial, and market management)
- Compliance with national and international legislation
- Respect for the rights of all actors involved in ethical trade
- Clarity on land ownership, use rights, and access to natural resources

The UEBT standard considers a company’s entire supply chain for all natural ingredients, back to their origin, and also includes continuous monitoring. It is applicable to a wide range of agricultural and agroforestry production systems, including cultivation and wild collection. The standard applies to plant components, such as flowers, leaves, and roots, as well as to plant compounds like as oils, waxes, and extracts. It also covers microorganisms, algae, and beeswax.

So far, the UEBT standard has mainly been used by companies involved in the cosmetics, food, and natural-medicine trade sectors. Currently, the UEBT website lists 78 members, from Latin America, Europe, Africa, North America and Oceania, including the following companies, which are headquartered in Germany: Drom Fragrances GmbH & Co KG; Martin Bauer Group; Symrise AG; Wollenhaupt Tee GmbH; and Worlée NaturProdukte GmbH.w

GlobalG.A.P. Biodiversity Add-on

Launched in April 2022, this add-on was jointly developed by GlobalG.A.P. and Lidl. This module refers partly to the GlobalG.A.P. IFA Standard 6.0 and includes additional criteria, such as:

- Biodiversity management on farms (recording a baseline and conducting a risk analysis)
- Protection and restoration measures
- Integrated Pest Management
- Soil and nutrient management
- Wastewater management and water-source protection
- Off-farm activities to protect biodiversity
- Access to training and the exchange of knowledge on biodiversity

Currently, only fruit and vegetable producers in Europe can be certified according to the biodiversity Add-on, but GlobalG.A.P. is planning a rapid expansion to all growing regions and product groups. (10)

Natural Capital Protocol: Identifying natural capital hotspots within supply chains.

The Natural Capital Protocol (NCP) provides a standardised framework for identifying, measuring, and assessing direct and indirect impacts (positive and negative), and dependencies on, natural capital. The framework gives four interactive phases: set the framework; define the scope; measure and evaluate; and implement. Biodiversity is included in the NCP as part of natural capital and the basis for ecosystem services.

With the help of the NCP, a company can carry out a risk analysis along its supply chain, which can include the identification and assessment of dependencies and risks associated with these natural resources.

Furthermore, NCP's structure helps to inform management and allows the results of the risk analysis to be into account when making decisions such as purchasing raw materials and supplies.

The Kering Group supported the development of the NCP

In 2014, Kering used an environmental profit and loss statement to assess and monetise the environmental impact of its own business operations (7%, €52.4m), as well as those in its supply chain (93%, €740.4m). Kering applied the NCP to identify the raw material groups with the highest negative impacts on the environment (leather and textiles made of natural, synthetic, or animal fibres) and to determine which negative impacts were the most important (land use and greenhouse gas emissions). Two important steps were the mapping of its supply chain and the collection of data from Tier-1 and Tier-2 suppliers. On this basis, the company identified its risks and dependencies on natural capital. Kering also collected data from life-cycle assessments and supplier surveys.

By breaking down the environmental impacts, Kering was able to develop measures for the creation of each type of animal fibre. Among other things, Kering developed a smart sourcing strategy for leather as one of the company's key raw materials. Suppliers that had a lower negative environmental impact were identified and communicated as positive examples to the complete supply chain (Kering, 2015).

10.4 Other products besides raw and processed materials

Purchasing is often also responsible for the procurement of office supplies, food and beverages for the company cafeteria, cleaning agents, etc. Here, too, biodiversity should be considered an important purchasing criterion. Standards and labels provide helpful direction—from the Blue Angel, for telephones, and the EU Ecolabel, for cleaning agents, to labels for organic farming and fair-trade standards, for coffee, tea, bananas, or work clothes. All products labelled with an environmental standard and/or fair-trade label have been produced in a more environmentally friendly way (e.g., reducing emissions, improving climate protection.). Some standards, such as Fairtrade and Rainforest Alliance, have significantly improved their biodiversity criteria.

10.5 Meaningful goals and measures

To begin, purchasing should obtain information—as described—that allows it to take meaningful measures to improve a company's performance. Biodiversity protection should be part of a company's understanding of quality. This means following biodiversity-related criteria that have been developed in close cooperation with strategic management, suppliers, and stakeholders (e.g., NGOs).

With regard to supplier cooperation, the following measures can be implemented in a step-by-step process:

- Inform all suppliers that biodiversity protection is important to the company.
- Ask suppliers about which measures, instruments, and systems they are using for environmental and biodiversity protection (e.g., through corresponding questionnaires).
- Incorporate biodiversity-related criteria into procurement specifications and/or contracts.
- Train suppliers on biodiversity issues.
- Conduct audits (if necessary, external ones) of “risk suppliers”, recording their strengths and weaknesses, and identifying potential improvement.
- Measure success using appropriate indicators (see below).
- If necessary, make changes in product design to replace raw and processed materials that cannot be sourced sustainably.

Of course, labels and standards that guarantee a certain level of environmental performance in the areas of energy, water, waste, or cleaning help to contribute to the protection of biodiversity, since these products or services were produced in a manner that is climate-friendly or that conserves resources. Therefore, the indicator “share of certified suppliers or products” is also relevant to the area of biodiversity. The medium-term goal should be to integrate biodiversity criteria into purchasing specifications for all product groups.

Where a particular standard fails to guarantee the desired performance in the area of biodiversity protection, companies can look for their own ways to achieve this outcome. One such example is the Roundtable on Sustainable Palm Oil, which has received critical public attention. Some organisations see this standard as insufficient. As a result, Werner & Mertz GmbH, the manufacturer of the Frosch cleaning-product brand, procures surfactants made with palm kernel oil from alternative sources (11). Voluntary commitments and membership in initiatives that focus on the conservation and the sustainable use of biodiversity can also provide buyers with information about a supplier's commitment and willingness to cooperate on biodiversity issues (see Chapter 4.8 “Business initiatives”).

Cafeterias can offer biodiversity-friendly dishes (e.g., vegetarian options, those made with organic and/or Fairtrade products, MSC-certified fish). Applying agro-biodiversity—such as serving dishes made with heritage crops (e.g., cereals) and offering heritage varieties of fruit varieties—can also raise awareness. A cafeteria is also a good place to inform employees about a company's activities to protect biodiversity (e.g., via an exhibition, brochures, or a menu listing).

Small- and medium-sized enterprises (SMEs) and their supply chains

Even small companies have opportunities to influence their supply chains. A positive example is the company **SCHELL** Schokoladenmanufaktur from Gundelsheim, near Heilbronn: Originating as a confectionery, owner Eberhard Schell has made it his business to follow his products throughout their entire lifecycle, from cocoa bean to finished product (bean to bar). His organic certified chocolates come are the result of fair trade and direct contact with cocoa producers. Schell regularly visits suppliers to evaluate their cultivation methods, bean-processing, and employee working conditions. Packaging is made from fibres derived from cocoa pods, and the company also supports a rainforest reforestation project in Kalimantan that's run by the NGO Fairventures. [\(12\)](#)

The **TOPAS** company from Mössingen is a pioneer in the production and processing of tofu and seitan. Using methods he learned from visits to Asia, founder Klaus Gaiser adapted his products to European tastes and markets them under the Wheaty and Veggyness brands. These vegan meat-substitute products are all produced according to these objectives: "no destruction of natural areas, no human rights violations, short transport routes, climate-friendly, organic, no animal suffering".

The quality assurance team works to ensure that regional suppliers are engaging in the environmentally friendly production of raw materials, such as spices, wheat, and soya, and the company does not use of palm oil. These steps help to ensure the environmental friendliness of Topas' supply chains. [\(13\)](#)

Table 4: Examples of key figures/indicators: Purchasing/supply chains

Areas of impact	Key figures/indicators
Are risk analyses being carried out for the company's most frequently used and/or most important raw materials, with regard to the potential biodiversity impacts of their extraction and use? Yes -> see key figure No	Number of raw materials/products/services that have been assessed for their impacts on biodiversity: <i>Number of raw materials, products, and services assessed</i> <i>Percentage of total assessed for biodiversity impact</i>
Are suppliers/service providers informed about biodiversity management? Yes -> see key figure No	Number of suppliers who have been informed about the importance of the company's biodiversity management: <i>Number</i> <i>Percentage of the total number of suppliers</i>
Are suppliers trained in biodiversity? Yes -> see key figure No	Regular training courses: Yes/No Suppliers/service providers who have received biodiversity-related training: <i>Number</i> <i>Percentage of the total number of suppliers</i>
Do company/organisation procurement guidelines include biodiversity criteria? Yes -> see key figure No	Number of products/services for which biodiversity-related procurement criteria exist: <i>Number</i> <i>Percentage of the total number of products</i>
Are products/services with a sustainability, organic, or fair-trade label given preferential purchasing consideration? Yes -> see key figure No	Number of certified products: <i>Number</i> <i>Purchasing volume</i> <i>Percentage of the total number of products</i>

11 EXTRACTION OF RAW MATERIALS

This chapter is aimed at companies working in the extraction of raw materials. As already described in chapter 10 (“Purchasing and supply chains”), however, every EMAS-certified organisation should record the origins of its raw materials and assess any biodiversity risks when determining its environmental aspects, using a life-cycle perspective.

11.1 Why action is necessary

Raw abiotic materials

The extractive industry is central to a modern society. Most economic sectors depend on metals, minerals, and stones. While ores and building materials are valuable resources, however, so too is the natural environment from which these raw materials are extracted.

In a densely populated country like Germany, careful planning is necessary when developing, expanding, and restoring mining sites. Even outside of Germany, deposits of minerals and ores are often located in very species-rich regions. According to the MSCI World Metals and Mining Index, more than 20% of the world's mines are located in biodiversity

hotspots (MSCI ESG Research 2020) ⁽¹⁾. Another 13% of mines are located in areas with highly intact ecosystems. Therefore, it is essential that responsible resource extraction ensures the protection and promotion of local biodiversity.

In addition to so-called no-go areas, where the extraction of raw materials is completely prohibited, an avoidance hierarchy should be the goal for all interventions, regardless of whether it is legally required or not. Interventions in nature and landscapes must be avoided, mitigated as much as possible, and any areas of residual damage must be compensated or replaced in a similar or equivalent manner. The Business and Biodiversity Offsets Programme (BBOP) has developed a comprehensive set of guidelines for this purpose that is applicable worldwide. ⁽²⁾

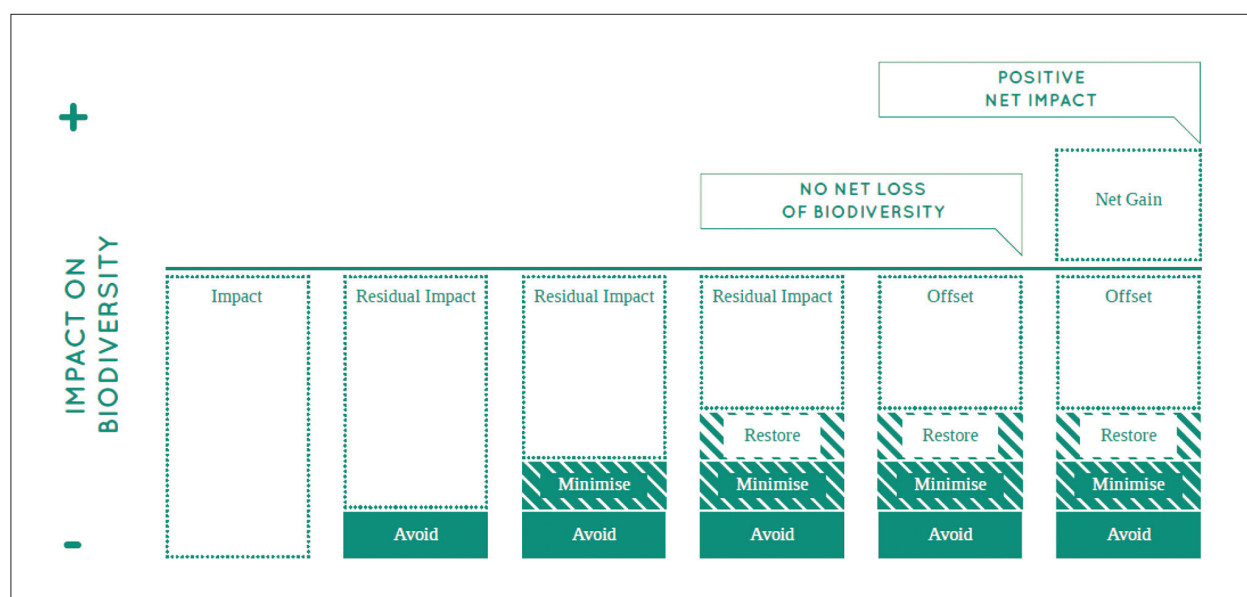


Figure 4: Options for offsetting impacts on biodiversity (Source: Global Nature Fund)

Raw renewable materials

Raw renewable materials largely originate from conventional cultivation and animal husbandry (arable crops, animal products), or directly from original ecosystems (tropical rainforests, boreal primary forests, oceans). Original habitats are cleared for cultivation, grazing areas, or timber extraction. Entire ecosystems disappear—and often with them their endemic species. This result is often associated with a change in the local microclimate, water balance (flowing waters, groundwater), and the loss of carbon storage in an ecosystem.

With land cultivation of the land, soils and the adjacent habitats face additional burdens, in the form of pesticide and fertiliser inputs, as well as emissions. Studies have shown that the flora and fauna in areas adjacent to arable land are similarly polluted by pesticides and/or their number of individual species is reduced.

Marine fishing is unsustainable and pushes entire populations to the brink of extinction. Fishing methods such as trawling destroy seabed ecosystems, some of which take centuries to regenerate. Aquaculture contributes large amounts of oxygen-consuming organic substances (feed residues, fish excreta), as well as pharmaceutical residues.

11.2 Challenges

Due to the growing global demand for raw materials, the pressure to develop ecologically valuable areas is expected to

increase. In particular, conflicts between nature conservation and extraction of its resources center on the question of whether sustainable extraction is feasible in a species-rich area, or whether certain regions should be protected from any encroachment. In this context, a number of companies in the extractive industries have committed themselves to excluding the extraction of raw materials from UNESCO World Heritage Sites. Within the EU, the extraction of raw materials from Natura 2000 protected areas continues to generate conflict. Industry demands the ability to mine as long as precautions are taken to preserve valuable ecosystems, while nature conservation groups demand a complete ban on raw material extraction in these protected areas because of their important contribution to biodiversity preservation in the EU.

The extractive industry emphasises that nature conservation already plays an important role during the extraction phase and in the subsequent use of extraction sites, and that renaturalised extraction sites become valuable biotopes and refuges for endangered animal and plant species. While new high-quality habitats may be created during subsequent use, they do not usually match original levels of biodiversity, which may have been higher. In addition, once these landscapes have been used to extract materials, they rarely resemble the idea of “home” that local residents would like to recover. Companies should always try to achieve a net gain in biodiversity once their intervention in a landscape has come to an end (BBOP 2012).

Baden-Württemberg Stone and Earth Industry Association (ISTE)

ISTE and its more than 600 member companies—predominantly SMEs—have been active in the area of biodiversity for years and have set ambitious goals for themselves. In 2000, for example, ISTE issued a joint declaration with the NABU regional association in Baden-Württemberg on the extraction of raw materials, and continues to abide by it. Together with NGOs, ISTE has produced so-called “fact sheets” describing in detail various measures to increase biodiversity during and after various types of extractions—for example, in quarries, as well as using wet and dry methods to extract gravel (3).

In addition, ISTE has developed a biodiversity database into which it regularly feeds data from the monitoring of quarrying sites. The database has since been adopted by the German Federal Association of Building Materials - Stone and Earth (BBS).

Biodiversity monitoring database

Since November 2021, the BBS has been in charge of the stone and earth industry's biodiversity database (4). This database is being used to document the aggregate industry's contribution to the conservation and fostering of biodiversity, and also make it visible (internally, at the outset). To create a solid repository of information, the database brings together biodiversity data from the approval procedure with monitoring data from its operational phase, as well as from extraction areas that have been restored or recultivated.

Initially, the information that was entered came from various local, regional, and national projects focused on nature conservation and species protection as well as best practice examples. The database includes significant informational materials from the stone and earth industry, and individual data uploads have been allowed since September 2021. As more companies and planning offices participate in data collection, they increase visibility of the high-biodiversity impact of extraction sites.

With systematic long-term monitoring, companies in the quarrying industry can demonstrate a positive contribution to biodiversity conservation while safeguarding the foundation of their businesses. This provides advantages with getting approval for extraction sites, improving a company's reputation, and obtaining the backing of the local population within the extraction region. Biodiversity-friendly extraction of raw materials is still not sufficiently factored into decision-making when public authorities award contracts. Thus far, corresponding criteria have not been included in the EU's catalogue of environmentally oriented public-procurement policies, due to the lack of a label or standard that could be used to demonstrate biodiversity-friendly extraction. In the meantime, the Concrete Sustainability Council's standard covers an important building material, but the development and recognition of additional standards with strong biodiversity criteria would enable procurement officials in municipalities and public authorities to give preference to raw materials from companies that are committed to biodiversity conservation.

In most industrialised countries, legislation to promote environmental and nature conservation has led to the creation of appropriate legal, administrative, and planning instruments; it is possible to link an extraction process with an intervention, and determine how significant that intervention may be. Some examples of these instruments include environmental impact assessments (EIAs); plan EIA; FFH and SPA assessments, throughout Europe; and, in Germany, plan approvals and mining and recultivation planning. Biodiversity-related interventions can be offset, for example, through prescribed measures in corresponding areas. Another possibility is applying a positive compensatory measure that serves as a qualitative or quantitative replacement. In Germany, for example,

compensatory measures could include a landscape conservation plan that's approved by planning laws or—in the case of larger measures—a mining and recultivation plan that is developed within a regional or procedural planning framework.

11.3 Meaningful goals and measures

Abiotic raw materials

It is recommended that every company develop a biodiversity strategy and pursue it over the long term. This strategy and its associated goals should define, among other things, areas where the company will avoid carrying out any extraction projects (so-called “no-go” areas). For globally active companies, no-go areas should include UNESCO World Heritage Sites and High Conservation Value Areas. To determine if existing and planned mining sites are located within ecologically valuable regions, companies can use the IBAT database of the World Conservation Monitoring Centre, which contains extensive maps and information on the conservation status and ecological value of landscapes and ecosystems (5).

An important long-term goal for companies would be to achieve a net gain in biodiversity and apply an avoidance and compensation hierarchy at all extraction sites. Biodiversity protection is always rooted locally, so if extractive companies connect with local authorities or NGOs, they can benefit from the experience of these partners to preserve and support local ecosystems. These local partners can also help in the development of biodiversity management plans for mining activities and restoration plans for mining sites after operations have ended.

Former mining sites offer numerous opportunities to create new habitats and thus promote biodiversity, by working toward these goals:

- Creating opportunities for the spontaneous settlement of animal and plant species
- Promoting natural development processes

- Allow native species to repopulate the area by reducing planting and seeding

The first step toward successful biodiversity management is to involve and train the company's employees. Long-term monitoring makes it possible to assess the effects of measures taken and make any necessary adjustments.

Positive example: Heidelberg Materials

In conjunction with its subsidiaries, Heidelberg Materials has made a commitment to fostering biodiversity during and after the quarrying phase at its more than 600 quarrying sites worldwide (6).

Since 2012, Heidelberg Materials has organised the Quarry Life Award, an international science and education competition to raise awareness of the ecological value of quarrying sites and increase their biodiversity. The six award categories include:

- Biodiversity management
Goal: Promote biodiversity at quarrying sites, during and after quarrying
- Habitat and species research
Goal: Increase scientific knowledge about biodiversity at quarrying sites to improve management decisions at the site level
- Beyond quarry boundaries
Goal: Improve understanding of, and promote the connection between, quarrying sites and their immediate surroundings
- Biodiversity and education
Goal: Raise awareness about biodiversity through the development of new educational tools and activities
- Connecting quarries and communities
Goal: Involve local stakeholders in biodiversity-related actions that benefit both the extraction site and the local community
- Nature-based solutions
Goal: Combine economic benefits for local communities with biodiversity conservation and ecosystem enhancement

In 2021, the competition's fifth edition, prizes were awarded to 200 participating individuals and teams.

Renewable raw materials

Companies should give preference to raw materials from farms whose biodiversity performance has been certified by a recognised standard (e.g., GlobalG.A.P., Rainforest Alliance, Fairtrade, or organic farming standards). Mandatory criteria for farms include the protection of primary and semi-natural ecosystems, and ecological structures and biotope

corridors; ensuring wide buffer zones along water bodies; avoiding pesticides that have negative effects on biodiversity; optimising fertiliser management; preserving soil fertility; eschewing genetically modified crops; promoting varietal diversity; using water sources sustainably; preventing the spread of alien species; and monitoring indicator species over the long term. But companies can also formulate their own requirements, independently of or in addition to these

standards. See also the basic biodiversity criteria of the industry initiative “Food for Biodiversity” (7).

Global Nature Fund and the Lake Constance Foundation engaged in the EU project Food & Biodiversity with the aim of raising awareness about biodiversity-protection standards among food-industry companies and launching a corresponding industry initiative. The project, which was successfully completed in 2020 (8), improved numerous standards with regard to the consideration of biodiversity, and trained more than 1,200 advisors and certifiers. In addition, the project developed the Biodiversity Performance Tool (BPT) (9), which helps farms to record and assess their baseline, which is an important input for a farm’s Biodiversity Action Plan. By regularly monitoring changes relative to the baseline, the BPT shows where a farm has improved. The BPT structures and

reviews a farm’s biodiversity management, making it easier for auditors from standards organisations to assess each farm’s performance.

The Biodiversity Monitoring System (BMS) enables the monitoring of indicators relevant to biodiversity through the processing of aggregated data sets. Target groups include standards, food businesses, and producer communities that want to monitor the the potential for biodiversity on their certified farms, or among those of their suppliers or members (10).

Table 5: Examples of key figures/indicators: Raw materials

Areas of Impact	Key figure/indicators
Has the company defined no-go areas? Yes / No	Definition of no-go areas:
Has the company examined its extraction sites with regard to their location in or adjacent to valuable ecosystems and prepared a risk analysis? Yes-> see key figure No	Proportion of extraction sites that are in or adjacent to valuable ecosystems compared to total number of extraction sites: Results of risk analysis:
Production context that’s relevant to biodiversity and the environment.(GRI EN 11): Are cultivation or extraction areas, or production sites, located within or near protected areas or non-protected areas of high-biodiversity value? Yes-> see key figure No	The company has integrated procedures and measures for the conservation of protected areas, or non-protected areas with high-biodiversity value, into its management systems. These procedures/measures were developed together with experts and are reviewed and adapted regularly.
Does the company act according to the Mitigation Hierarchy? Yes / No	- Measures to avoid negative effects: - Measures to reduce negative effects:

Does the company compensate for the use of natural resources/ecosystem services? Yes-> see key figure No	<i>Size of restored areas and/or compensatory areas that go beyond legal requirements (in hectares):</i> <i>Size of restored areas and/or compensatory areas that go beyond legal requirements relative to the area controlled by the company (in %)</i>
Ecological environment: Are cultivation or extraction areas, or production sites, located within a water-catchment area and/or near water bodies? Yes-> see key figure No	The company has implemented procedures/criteria for the protection and sustainable use of water resources, e.g. : ● <i>Monitoring of water consumption in its production processes</i> ● <i>Monitoring of the effects of mining on groundwater and surface waters</i> ● <i>Precautions to ensure that groundwater and surface waters are not polluted, including regular checks of water quality</i>
Has the company developed an action plan for biodiversity management at its extraction sites? Yes-> see key figure No	Percentage of extraction sites with a biodiversity management plan compared to the total number of extraction sites (in %)
Does the company define implementation measures in its action plan, and does it regularly review and published the impacts of these measures? Yes-> see key figure No	Monitoring is implemented and results are published in an environmental or sustainability report.
Has the company set up a system to monitor the development of the variety and populations of species at its extraction sites? Yes-> see key figure No	Number of species at the extraction site compared to areas outside the site (over 500 m distance)
Has the company committed to achieving a net gain in biodiversity at the end of its intervention (Net Positive Impact)? Yes-> see key figure No	The initial situation is recorded. Monitoring takes place. Monitoring results are analysed regularly.
Has an additional biodiversity-training programme been set up for employees? Yes-> see key figure No	Regular training takes place. Number of staff members who have received training: <i>Total number of staff members:</i> <i>Percentage of trained staff relative to the total number of employees:</i>
Does the extraction site offer an informational programme on biodiversity for the local population? Yes-> see key figure No	Type of programme (Open day, guided tours, etc.): <i>Total number of participants:</i>

12

PRODUCT DEVELOPMENT

Product design and development are strategic tools and starting points for new value-creation processes. For this reason, they are explicitly mentioned as one of the elements that EMAS-registered organisations should consider when defining their environmental aspects.

12.1 Why action is necessary

Product development controls the entire life cycle of a product and its impact on biodiversity, including the selection and composition of materials, production technologies, use and disposal properties, etc. This position, at the beginning of the development pipeline, position creates important levers that control numerous biodiversity-relevant environmental aspects.

Product-development decisions have an impact on:

- raw materials, which are addressed in detail in chapters 10 and 11
- emissions along the entire life cycle
- the potential for waste and its management

It is important to consider biodiversity impacts in different phases of the product-development process.

In addition, recommendations are also included in the technical report ISO/TR 14062:2002 on “Environmental management—Integrating environmental aspects into product design and development”. Product group-related recommendations can also be derived from EU Eco-label criteria. These criteria—which were developed by environmental experts in consultation with stakeholders—aim to reduce the main environmental impacts throughout a product’s life cycle, and examine biodiversity impacts from a range of perspectives including emissions, water, and land use.

EMAS Sectoral Reference Documents (SRDs) for 11 priority economic sectors also contain recommendations for reducing the environmental impacts of product development. In

addition to these reference documents, there are detailed Best Environmental Management Practice (BEMP) documents for each of the 11 sectors. These describe practices such as improving or selecting food packaging, integrating environmentally friendly drainage systems into building design, opting for certified wood when choosing building materials, and designing EEE products or automobiles with reparability, reuse, and recycling in mind [\(1\)](#).

Life-cycle assessment is the classic tool for incorporating environmental aspects into product development; it provides a vehicle for evaluating the selected environmental impacts of all processes over the entire life cycle of a product and mapping these impacts into indicators. There are several initiatives that are working to improve how life-cycle assessments capture biodiversity. In 2012, the “Biodiversity in Life Cycle Assessments” project by Stuttgart’s Fraunhofer Institute for Building Physics was funded by the German Federal Ministry for the Environment. A biodiversity impact assessment would calculate the damage to biodiversity caused by land-use processes and correlate it to the respective units in the production process [\(2\)](#). In 2023, the EU Horizon Project CircHive will start working with 24 organisations—including the Lake Constance Foundation—to further develop and harmonise methods of assessing a biodiversity footprint.

Basically, our industrial system extracts all raw mineral and fossil materials from the earth, and biotic ones from forests, waterways, and agricultural cultivation, with a few additional materials from air and water. During the extraction of these materials, species-rich natural areas are often destroyed, and soils and waters are polluted with harmful substances. Existing cultural landscapes—animal and plant species, and their habitats—are also impoverished due to intensification of use. For these reasons, every product-de-

development process must carefully examine the material- and location-related properties of its planned raw materials (see Chapter 11).

12.2 Challenges

Due to the far-reaching impacts of company product design and development and their interaction with many other activities (e.g., purchasing, transport, disposal), there is a considerable need for early consultation and internal coordination, to resolve conflicts between economic and ecological goals.

The goals of ecological design include material efficiency (lightweight construction), material-appropriate design (preference for sustainable materials), energy efficiency (reduction of consumption, preference for renewable fuels), low levels of pollutants, recyclability (reduction of waste streams and material diversity), and disposability (biodegradable materials).

Consistent consideration of these goals in product design usually also benefits biodiversity, in line with the general principle of “less is more”. If, for example, electricity consumption is reduced overall, this will also influence the demand for mining or extractive raw materials such as coal, uranium, oil, and gas.

At the same time, however, conflicts of interest can arise if one principle, such as the preference for renewable fuels, is given increased consideration, without regard to agro-ecological principles, triggering an increase in demand for monocultures of certain energy crops and leading to their corresponding overuse, or increasing the demand for wood (as a fuel and a substitute for mineral building materials), which can result in unsustainable forest management. Look no further than current discussions about where to locate wind and photovoltaic power plants for additional examples of conflicts of interest between regenerative energy production on the one hand, and nature and species conservation, and the desire for tranquility and undisturbed landscapes on the other hand.

Chapter 10 covers the necessary steps for obtaining raw materials from the supply chain. Smaller companies are not often in a position to influence raw-material suppliers. For these companies, which are mostly processors of these materials, the biggest challenges are:

- Developing innovative methods and processes to improve resource efficiency and/or to avoid and reduce waste
- Safe handling of hazardous substances or genetically modified organisms, and the prevention of environmentally relevant incidents
- Developing processes and technologies for the substitution of critical materials, both raw and processed.

Examples of substitution approaches can be found in sectors that deal with problematic products such as palm oil, rubber, leather, and meat. Due to its many useful properties, palm oil is used in countless foods and cosmetics, but growth in palm oil use over the past few decades has driven extreme demand, which has led to the clearing of large areas of tropical rainforest—particularly in Indonesia and Malaysia—to establish palm oil plantations. Possible alternatives to palm oil include shea butter and olive oil (in cosmetics) as well as sunflower and coconut oil, but careful consideration must be paid, as many substitute oils require even larger cultivation areas because of their lower yields. Innovative approaches include oils made from residues with the help of microorganisms such as yeasts, or from agricultural residues and food waste (such as stale bread) (3).

The extraction of natural rubber can lead to the clearing of rainforest, for their conversion into rubber plantations, but synthetic rubber comes into question when it produced from petroleum-based raw materials. In instances such as this, a balancing of interests must take place.

Leather is largely a byproduct of meat production, which must be viewed critically due to its biodiversity- and climate-related impacts, but there are numerous alternatives to leather, including agricultural residues such as pineapple leaves (4a), apple or grape pomace (4b), cactus fibres (4c), teak leaves (4d), and mushroom mycelium (4e), all of which can be used to produce imitations that are comparable to real leather in terms of their properties.

Meat consumption has come under heavy criticism because it has led to the clearing of large areas of tropical rainforest, especially in South America, to make room for grazing and the cultivation of animal feed. Globally, an estimated 60 to 80% of land area is used for animal husbandry and feed production, and ruminants also contribute significantly to the greenhouse effect through their methane emissions. More than half of Germany's methane emissions come from agriculture (5).

Over the years, a number of start-ups (particularly in industrialised western countries) have tested possible alternative sources to protein, taking into account people's eating habits and preferences. Already, numerous products can be found in organic food shops and supermarkets. Most of these products are based on legumes, such as soybeans, lentils, or peas, or gluten, the protein found in wheat grains. Others have taken the approach of growing muscle tissue in vitro using animal stem cells, making it possible to produce real meat without the negative effects on climate and biodiversity—or animal suffering. Production

costs for these foods are not yet competitive, and they still have to get a permission as tradable food. In 2013, Dutch scientist Professor Mark Post presented the world's first burger produced in vitro. He expects that production of this new type of burger will reduce both water consumption and emissions by more than 90% compared to conventional meat production [\(6\)](#).

The company **MOSA MEAT** in Maastricht, in the Netherlands, is the spinoff of a research project at Maastricht University led by physiologist Mark Post and biotechnologist Peter Verstrate, who were looking to produce meat biotechnologically. Muscle cells taken from cows through a biopsy are stimulated to multiply in nutrient media. Up to 10 tons of meat can be produced from a single biopsy. The first burger patty created this way was presented to the public in 2013. In the interim, the company has developed an alternative to fetal-calf serum, whose growth factors were necessary for cell multiplication. Biopsies can also be further reduced with the help of immortalised cell lines. Work is underway to scale up production to an industrial, price-competitive scale. This process improves every current aspect of meat production. It generates almost no climate-damaging emissions, consumes extremely low quantities of water and land (as it requires no feed production or pasture), does not employ agrochemicals and pharmaceuticals (which would otherwise end up in our environment and food), and eliminates the need for billions of animals to be bred, raised, and killed [\(7\)](#).

12.3 Meaningful goals and measures

In order to proactively avoid harmful environmental and biodiversity impacts in the future, it's critical to assess raw materials and the processes used to manufacture projects with them:

Raw materials that require the clearing or degradation of forests to establish plantations or pastures, the destruction of nature through open-cast mines, or the use of environmentally harmful chemicals during their extraction should be replaced with materials that avoid these harms.

In the case of raw materials produced by agriculture or forestry activities, attention should be paid not only to a biodiversity-supporting environment in production areas, but also to the promotion of biodiversity (see Food for Biodiversity's basic set of biodiversity criteria).

Companies should choose suppliers that produce raw materials more sustainably—e.g., palm oil produced on certified forest plantations (RSPO), recycled metals. Numerous

certifications can help support the selection of raw materials that have been produced as sustainably as possible, and that take biodiversity into account.

Do not use any raw materials that come from protected species. Information on protected species can be obtained from lists compiled by the CITES Convention and the IUCN (here: Red List) [\(8a\)](#) [\(8b\)](#).

The potential impacts of products during their use and disposal should be carefully assessed. For example, micro- and nano-plastic particles, as well as liquid plastics, are added to many personal-care products, to stabilize, preserve, color, or perform abrasive tasks (e.g., exfoliants, toothpaste). They consist of plastic polymers that take extremely long periods of time to degrade, which means that they accumulate in ecosystems with foreseeable consequences. These particles are found widely in all lakes and soils, and enter organisms via the food chain, as pollutants accumulate on lipophilic surfaces. Harmless and biodegradable alternatives are urgently needed [\(9\)](#).

Feedstocks of animal origin are almost always associated with climate- and biodiversity-damaging effects and animal suffering. Plant-based and abiotic source materials should be given preference.

A fundamental question must also be asked: Is a new product really necessary? Many things are produced because

extensive marketing creates a previously non-existent market for them. The resulting damage to the environment is borne by the general public or is being left unrestored. Responsible product design should not look to “sell at any price”. In keeping with the EU’s Green Deal, new products should lead to an improvement while also avoiding harm to and nurturing the climate and biodiversity.

The company **PUREMETRICS** from Isernhagen develops cosmetics and body-care products that produced exclusively from raw natural materials. Microplastics are consistently avoided as an ingredient, and the packaging and shipping are also plastic-free. In addition to considering the function of each product, the company also thinks about packaging during its product-development phase, ensuring that products containing fat or liquids are stored in leak-proof containers. Even the shipping process uses packaging that does not require adhesive tape, plastic fillers, or tear tapes. The goal of avoiding from plastic is pursued consistently across every stage of development and production. In addition, puremetrics has pledged its support for the Clean Hub organisation, removing one kilogram of plastic from marine regions with each order (10).

SUEZ, a provider of supply and disposal services provides another example of a product improvement that also promotes biodiversity. The has combined the principle of trickle fields with modern sewage-treatment technology. In earlier times, wastewater was channelled into shallow basins that featured reed beds or other aquatic vegetation, and purification took place through microbial decomposition, plant uptake, or sedimentation. (Sugar refineries still use this same principle today.) Today, high volumes and loads of wastewater from cities can be processed, and components that were previously difficult or impossible to degrade can be filtered out, by placing modern sewage-treatment plants, upstream of basins that contain various plant species. The result is an improvement in purification efficiency, with the additional benefit of constructed wetlands—which represent a kind of man-made wetland biotope in which the population of animal and plant species increases (in the case of existing wetlands) or is newly established (in the case of new wetlands) (11).

Bionics is an innovative approach to product development that uses the principles of nature as a model. The idea behind bionics is to copy nature’s answer to certain problems because these solutions often have millions of years of optimisation behind them. For example, looking and applying the principles that help trees or insect wings achieve maximum stability with the least amount of material can be of great help in constructing buildings, bridges, vehicles, and machines. Less material means less resource consumption, reducing the previously mentioned negative side effects.

The special properties of sharkskin—reduced flow resistance and protection against stains and grime generated by aquatic organisms—have been applied to the development of a special boat coating. The silicone-based coating mimics sharkskin and reduces fouling by 70 percent. Less staining and resistance reduce fuel consumption, and obviate the need for ecotoxic paints. (12).

To store electricity, it is possible to use large batteries as well as converting it into positional energy in pumped-storage power plants or generating hydrogen. The last two options have had various disadvantages, requiring conflict metals (like lithium), allowing only partial recycling, posing a fire risk, and limiting service life. Now, however, the company **CMBLue** has developed an alternative—so-called organic solid-flow batteries. Instead of metal ions, organic molecules are used as charge carriers, and critical minerals (such as lithium, cobalt, nickel, and graphite) are unnecessary. Since the electrical charges in living beings are moved via organic molecules, this battery can also be regarded as a bionic innovation (13).

The **HYDRO-FISCHLIFT** is another example of how a technical solution can compensate for human disturbances of nature. A disadvantage of sluices and hydroelectric power plants—the way they impede the permeability of flowing water for fish and other river dwellers—can be remedied by installing a kind of hydraulic lift through which all river dwellers can access the upper reaches of a watercourse without much effort. In this way, renewable electricity from hydropower can compensate for a negative impact (14).

Table 6: Examples of key figures and indicators: Product development

Areas of impact	Key figures/indicators
Does the product-development department consider biodiversity aspects? Yes-> see indicators No	• The company works to protect and promote biodiversity in its product-development processes (through environmental policies, and environmental programme, sustainability reports). • The company uses product-development tools that take biodiversity aspects into account at all stages of a product's design (life-cycle analysis, biodiversity footprint). • The company is involved in research projects and initiatives that promote biodiversity-friendly design.
Are indirect impacts of production or processing on biodiversity considered in the project design? Yes-> see indicators No	As part of product development, analyses are carried out on the direct and indirect impacts of the production processes (e.g., a new process additive could lead to biodiversity-damaging demand for this substance). <i>Proportion of analysed production process steps compared to total number of process steps</i> <i>Total number of products analysed.</i> <i>Share of analysed products in the total product range (in %)</i>
Are suppliers increasingly selected according to ecological criteria? Yes-> see indicators No	Proportion of suppliers who already comply with the company's requirements for the protection of biodiversity (number and percentage of the total number of suppliers).

Emissions that affect biodiversity (e.g., acidification, eutrophication) are excluded. The consumption of natural resources (e.g., water, land use) is continuously reduced. Yes-> see indicators No	Indicators of the environmental programme are monitored by the environmental management system.
Does the company compensate for the use of natural resources/ecosystem services? Yes-> see indicators No	<i>Size of renatured ecosystems and/or compensation areas exceeding legal requirements (in hectares)</i> <i>Size of renatured ecosystems and/or compensation areas in relation to the areas used in the supply chains (in %)</i>
Is the company successful in taking biodiversity aspects into account in product design? Yes-> see indicators No	<i>Number/proportion of products for which impacts on biodiversity were considered for their production, raw material sourcing, use and disposal.</i> <i>Proportion of components of a new product for which a biodiversity-friendly raw material supply could be implemented.</i>

13 TRANSPORT AND LOGISTICS

Transport processes are very energy- and resource-intensive. Their negative effects—including the emission of CO₂ and other greenhouse gases, and the fragmentation of habitats—are well known. Experts agree that the current level of mobility of goods, services, information, and people is ecologically unsustainable. At the top of the priority list is the avoidance of transport—for example, by better utilising existing capacity, reducing empty runs, and shifting the transport of goods from roads to rails and waterways. However, the expansion of rail and shipping infrastructure has also been associated with land consumption and negative impacts on natural habitats (1).

13.1 Why action is necessary

The negative biodiversity impacts of transport (here with a focus on rail and truck transport) and logistics are listed below:

- Land use: In the case of sealing, the construction and use of infrastructure translates to a complete loss of natural soil functions (soil fertility, oxygen production, habitat, decomposition), as well as a partial loss of habitat functions in adjacent areas (buffer zones and road areas).
- Collisions and mortality: Every year, about 194 million birds and 29 million mammals fall victim to road traffic across Europe (2). Populations of species that are already threatened are additionally endangered in by traffic mortalities. Statistically, one wildcat per year dies on every third kilometre of road in Germany. During the observation period from 2021 to 2022, 102 wolves died in traffic accidents in Germany (Zeit online 28.11.22).
- Habitat fragmentation: Species' ability to access resources, (seasonal) habitats and mates, among other issues, is impeded by transport infrastructure. Restricted freedom of movement due to destruction of biotopes leads to reduced genetic variability, which can contribute to inbreeding and the extinction of species over the long term.
- Invasive alien species: These can be spread by transport. Without appropriate precautions, invasive aquatic species can be introduced during ship transport via the fouling of their hulls and in ballast water, displacing native species. It's estimated that harmful impacts from invasive species that have been introduced in ballast water total €2 billion euros annually in Europe alone.
- Erosion: Road debris or road material itself can be detached by weather or mechanical abrasion, and set in motion (desertification) and carried elsewhere (sedimentation). This can adversely affect sensitive ecosystems such as water bodies.
- Emissions: These can include particulate matter, ozone, carbon monoxide, nitrogen oxides, greenhouse gases, sulphur dioxide, and tire and brake abrasion, as well as light, noise, heat, and vibrations damage to protected goods (humans, animals, soil, air, ecosystems).
- Energy consumption (e.g., conveyor and storage technology, lighting, temperature regulation)
- Life-cycle effects of machines, buildings, and packaging materials (resources, energy, recycling)

13.2 Challenges

Initially, individual companies can only directly influence negative effects on biodiversity to a small extent. This is due to frequent outsourcing of transport activities and the realisation that even environmentally friendly means of transport contribute to increased land and resource consumption above a certain volume. But a company can make positive contributions through a targeted selection of transport and logistics service providers that are already implementing measures to promote biodiversity and reduce emissions.

13.3 Meaningful goals and measures

The most difficult measure—but in all respects the most effective one—would be to reduce transport distances by, for example, adjusting product range and trips, optimising the utilization of existing capacity, and/or increasing regional sourcing and sales overall. The use of more environmentally friendly means of transport is generally preferable; due to time constraints, cooperation with production planning and purchasing should be sought on this point.

To reduce pollutants and fuel consumption, it can make sense to replace the vehicle fleet, taking into account a life-cycle balance.

To avoid collisions with animals, traffic signs (such as “Attention: Game Crossing”) and driving speeds must be carefully observed. At dusk and at night in particular, transport providers must drive with foresight and be prepared to brake. If an animal is sighted, slow down and switch to dipped headlights (no high beams, no flashing lights) as to avoid or reduce the possibility of blinding them. If the animals are on the road, sound the horn to encourage them to move.

Upstream suppliers and downstream freight-forwarders should be informed by the company that the protection of biodiversity is an important company concern. It is also important to ask what measures suppliers and freight-forwarders are taking to protect biodiversity.

Companies that give preference to suppliers and freight-forwarders that have earned an eco-label or operate under a certified environmental management system reduce risks to the environment and biodiversity.

For ship cargo, shipping-company requirements should provide for the operation of a ballast-water purification plant, which at minimum must meet the requirements of the D-2 Ballast-Water Performance Standard of the International Convention for the Control and Management of Ships’ Bal-

last Water and Sediments. The byproducts of disinfectants that are also used to treat ballast water can cause multiple toxicities in aquatic organisms, which means that advanced treatment should be carried out (3).

Companies should also consider the International Maritime Organization (IMO) Guidelines for the Control and Management of Ships’ Biofouling to minimize the transfer of Invasive Aquatic Species (MEPC.207(62)). In addition to non-stick coatings, there are biocide-free self-polishing coatings, mechanical cleaning systems, and electrochemical methods and systems that use ultrasound to counteract fouling (4). Furthermore, various biocide-free methods—such as ultrasounds, silicone-based anti-adhesive coatings, cleaning methods on special hard coatings, and films that can be pulled around a hull at berth—have been tested as part of the international research project CHANGE, and these methods should be considered alternatives to environmentally harmful antifouling agents.

Before and after inter-regional journeys, cleaning vehicles can counteract the effects of transport and the spread of non-native organisms.

As with all buildings, new warehouses should be built on brownfield sites rather than greenfields; these sites should attain a high energy-saving standard and be designed in a natural way (see Chapter 9, “Company sites and properties”). One basic considerations for development plans is that customer and employee parking should be designed as multi decks parking instead of parking only at ground level. Roofs of supermarkets, i.e., can be used to add office floors on them.

Employees in the transport and logistics sector should receive further training on the topic of biodiversity.

Table 7: Examples of key figures and indicators: Transport and logistics

Areas of impact	Key figures/indicators
Has the company considered and analysed the environmental impact of transport processes? Yes / No Did this analysis go beyond CO2 emissions? Yes / No	
Does the company have key internal figures on the comparability of product-transport distances for different transport modes? Yes / No	
Is there an estimate of accident risks that are categorized according to frequency, degree, and type of danger? Yes / No	
Is there a management plan in place to reduce accidents involving environmental damage? Yes-> see indicators No	Accidents with environmental damage: <i>Total number:</i> <i>Percentage share compared to the total number of transports:</i> <i>Percentage of irreversible/highly damaging environmental impacts relative to the total number of environmental damaging incidents:</i>
Has the company set itself the goal of sourcing more products and services regionally (≤ 50 km)? Yes-> see indicators No	<i>Proportion of regional/local suppliers:</i> <i>Total number:</i> <i>Percentage share relative to the total number of suppliers:</i>
Are transport and logistics service providers involved in the company's goal of protecting biodiversity? Yes-> see indicators No	<i>Regular communication with providers:</i> Yes / No <i>Transport and logistics service providers who have been informed about the company's goal to protect biodiversity:</i> <i>Total number:</i> <i>Percentage share relative to the total number of transport and logistics service providers:</i>

Are measures to prevent the introduction of invasive alien species being demanded from shipping companies? Yes-> see indicators No	Shipping companies with ships that meet the requirements of the Ballast-Water Convention: <i>Total number:</i> <i>Percentage share relative to the total number of transport and logistics service providers:</i>
Does the company expect suppliers, forwarders, and logistics providers to have a certified environmental management system in place? Yes-> see indicators No	Upstream suppliers, and downstream forwarders and logistics providers, with a certified environmental management system: <i>Total number:</i> <i>Percentage share relative to the total number of suppliers, and transport and logistics service providers:</i>
Are company employees in the transport/logistics departments informed/trained on the topic of biodiversity? Yes-> see indicators No	Employees in the transport/logistics departments who have received further training on the topic of biodiversity: <i>Total number:</i> <i>Percentage relative to the total number of employees in these departments:</i> <i>Quality/outcome of continuing education (results from feedback form/survey):</i>
Does the company select freight-forwarders and logistics companies that have designed their company sites in a near-nature manner? Yes-> see indicators No	Freight-forwarders and logistics companies with company premises that have been designed with nature in mind (see Chapter 9). <i>Total number:</i> <i>Percentage share relative to the total number of haulers:</i>

14

MARKETING AND COMMUNICATIONS

14.1 Why action is necessary

► Target-group consumers

Biodiversity-related communications is increasingly becoming a selling point for companies that wish to address the continuously growing numbers of customers who are interested in more sustainable products, as well as a way to differentiate themselves from competitors (see also Chapter 4). Substantive and credible communications can strengthen a company's reputation and attract new customer groups. While customers are less interested in extensive environmental or sustainability reports, a company's EMAS environmental statement, with its data-based information, can provide a good basis for customer communications.

Good and transparent communications on biodiversity also helps to prevent negative impacts on nature caused by the misuse or disposal of products. There are many examples, but these negative impacts are most often caused by carelessness or a lack of information among consumers (e.g., the incorrect use of agrochemical products, such as pesticides and herbicides) in the garden).

► Target-group stakeholders

The environmental statement required by EMAS or other environmental or sustainability reports is usually written for representatives of interest groups, such as environmental and consumer-protection organisations, business associations, public authorities, etc., and these reports are also important for business customers, especially because biodiversity is increasingly becoming a risk factor. They are also important for business clients, especially because biodiversity is increasingly being classified as a risk factor. Companies that can demonstrate good management and continuous improvement of their biodiversity performance can use meaningful reports to differentiate themselves from competitors.

Today, companies and other organisations often integrate their EMAS environmental statement into their sustainability report. Compliance with the criteria of the Global Reporting Initiative or the Integrated Reporting Framework helps to ensure the quality of a sustainability report. In the future, the sustainability reports of larger companies will also have to take into account the guidance outlined by the European Corporate Sustainability Reporting Directive (CSRD). Sustainability reports are available to a wider public, and they are now read by investors, supervisory board members,

employees, and the press. But consumers also increasingly consult sustainability reports and expect transparent information on biodiversity, as demonstrated in a 2022 study by BioVal (1).

14.2 Biodiversity in reporting standards

Biodiversity is becoming increasingly important in reporting, as investors consult this information when making decisions. An EMAS report can be a qualified basis for reporting, and internationally recognised reporting standards also include, for example, those of the Global Reporting Initiative (GRI) or the Carbon Disclosure Project (CDP). At the EU level, a draft reporting standard on biodiversity is available under the CSRD's framework (<https://www.efrag.org/lab6>).

► Global Reporting Initiative (GRI)

As of January 2023, the GRI standards are currently being revised, and an update is scheduled to be published this year. Currently, the following biodiversity requirements apply (2):

- G4 - EN 11: Owned or leased sites, operations in or adjacent to protected area(s) and area(s) of high biodiversity value that are outside of protected areas
- G4 - EN 12: Description of significant impacts caused by operations, products, and services on biodiversity in protected areas and areas of high biodiversity value that are outside of protected areas
- G4 - EN 13: Protected or restored habitats
- G4 - EN 14: Total number of endangered species on the International Union for Conservation (IUCN) Red List and on national lists of protected species whose habitat is located in areas affected by an organisation's business activities
- GR4 - EN 9: Water sources significantly impaired by water withdrawal

The GRI Guidelines and Guidance Document also provide information on the relevance, sources of information, and definitions of terms related to its indicators (3).

► CDP (Carbon Disclosure Project)

Developed by a nonprofit organisation that collects and discloses environmental data from companies, municipalities, regions, and countries, CDP is an environmental reporting system that now covers water, forests, and biodiversity, in addition to climate change—thus capturing important

ecosystem services. The CDP system supports companies that are looking to assess and improve their environmental performance. When it comes to biodiversity, questions are asked about a company's strategy, impacts, and dependencies related to biodiversity or, for example, whether the company monitors biodiversity indicators. Currently (as of December 2022), the methodology is being revised [\(4\)](#).

Integrated Reporting Framework (IFRS, formerly IIRC)

The IIRC has also provided guidance for reporting on aspects of natural capital (including biodiversity and ecosystem health) and requires organisations to report on natural capital, as well as other aspects of sustainability, in an integrated manner within the context of management, analysis, and decision-making. Reporting is required for the following (among other things):

- An analysis of resources and future investments needed to achieve targets
- Information on adjustments to an organisation's strategy when new risks and opportunities are identified or performance fails to meet expectations.
- Information on adjustments to the strategy and business model in response to changes in the external environment (such as technological advancements), changing societal demands, or resource constraints due to planetary boundaries. [\(5\)](#)

TASKFORCE ON NATURE-RELATED FINANCIAL DISCLOSURES (TNFD)

Die Taskforce on Nature-Related Financial Disclosures (TNFD) entwickelt ein Rahmenwerk für Unternehmen zur Offenlegung der Natur-bezogenen Risiken, das auf einer bereits etablierten Klima-Risiko-Berichterstattung (TCFD) aufbaut. Mit der Zeit sollen sich die beiden Rahmenwerke ergänzen. TNFD fokussiert dabei auf die Treiber von Biodiversität, sowie die Abhängigkeiten von Ökosystemleistungen, die Unternehmen mit dem Ansatz darstellen sollen. Der umfassende Guide ist aktuell in der letzten Phase der Entwicklung und Testung. Hauptsächliche Zielgruppe ist der Finanzsektor, TNFD entwickelt allerdings auch branchenspezifische Orientierungen. [\(6\)](#)

14.3 Challenges

Consumers are not yet sufficiently aware of the biodiversity issue. Although studies such as the 2022 UEBT Biodiversity Barometer show that the term “biodiversity” is becoming more familiar and the concept better understood, the risks of biodiversity loss are still not as known or understood by the public as, for example, the negative effects of climate change. Extensive communication is still needed to change this—and companies should also be communicating about the topic.

Biodiversity involves the complex interplay between ecosystems, species, and genetic diversity, and it cannot be explained in one or two sentences. Those responsible for marketing and communications often argue that it is far too complex—and therefore not suitable for customer communications—but there are numerous examples that show that

consumers have no problem understanding complex inter-relationships. For example, consumers understand healthy soils and pollination as a prerequisite for the production of food. Biological diversity has the advantage of being emotional, colourful, diverse, and vivid—all of which are qualities that one could only wish to feature in successful communications.

As with all other environmental and social issues, communications on biodiversity must be credible. The danger of being accused of greenwashing can be avoided if communication is transparent and fact-based, and if the relationship between the core business and the activity being communicated is correct. Credible communication also includes the reporting of problems or goals that have not yet been achieved. Furthermore, according to studies by UEBT and BioVal, consumers particularly appreciate information that has been

validated by external parties, such as government-approved quality seals or in collaboration with science organisations or other established (environmental) entities.

At this point, it is strongly advised that companies and organisations plan and implement biodiversity measures in a professionally sound manner, using accurate descriptions and, where appropriate, technical terms in their communications. For example, it's nice to look at flowering meadows filled with non-native plant species, but they hardly serve biodiversity and should not be portrayed as insect-protection measures. A technically incorrect description of facts and measures will quickly cause knowledgeable readers (e.g., representatives of environmental associations) to doubt the company's competence and good will when it comes to fostering biodiversity.

14.4 Meaningful goals and measures

- Stakeholders and the general public are provided with substantive information on biodiversity as an area of impact. While EMAS environmental statements are verified by EMAS verifiers, the other parts of an environmental or sustainability report, as well as general corporate communications, should also be based on facts and contain all of the relevant information.
- The company/organisation reports on all significant direct and indirect impacts, as well as measures implemented to reduce negative impacts. If possible, targets, actions, and results should be measurable (see key figures and indicators in this guide). Ideally, all information in a (sustainability) report has been certified by an independent third party.
- CSR activities, such as the financial support of a nature conservation project (sponsoring), are important contributions to the protection of biodiversity. However, they should not be the main activity or replace the reduction of negative impacts generated by the core business.
- Environmental organisations and/or scientific institutions with expertise on certain aspects are involved, and help to ensure that a company's content is presented transparently and that its communications are appropriate. This includes communicating about failures and unsolved problems as well as sharing positive news.
- GRI criteria for reporting on biodiversity are taken into account.
- The company uses its communication channels to report on the importance of biodiversity and threats to it.
- Stakeholders and customers are regularly asked to rate the company's communications on biodiversity.
- The company appoints a responsible person to handle feedback from stakeholders, customers, and the public.

Empty shelves in the Penny store

Customers of the Penny supermarket in Hannover-Langenhagen thought it was a great move: All of the store's items that depend on insect pollination—1,606 products, which are about 60 percent of the store's inventory—suddenly disappeared. The company took this step to draw attention to the danger of insect extinction. Customers who wanted to stock up for the Pentecost holiday were faced with empty freezers and shelves, and found only a few sweets, and no chocolate, coffee or ready-made meals. There were even gaps in the cosmetics section, because of the additives found in these products. Consumers were impressed by how many products would vanish without the pollination services of insects. "You can't eat anything anymore," said one young mother.

The campaign was part of the REWE Group's sustainability strategy, which has focused on biodiversity protection for about 10 years. Since 2010, for example, over 300 farmers in more than 20 apple-grown growing regions in German and Austria have committed to protecting biodiversity—especially pollinating insects.

"Biodiversity bears fruit"

In 2022, this is one of the claims that appeared in the social media of Kaufland and other stores, to draw attention to biodiversity protection in the cultivation of bananas and pineapples. This communications campaign was initiated by the Global Nature Fund, with the support of Fairtrade and Rainforest Alliance.

Over the last century, many tropical rainforests were cleared to establish cultivation areas, eliminating the habitats of sloths, macaws, and toucans. Also, intensive pesticide use, soil erosion, and habitat fragmentation continue to make life difficult for many species.

Customers are being informed that they can help to protect biodiversity by buying bananas and pineapples from biodiversity-friendly farms. The campaign was launched as part of the “Del Campo al Plato” project and will be continued in 2023 [\(7\)](#).

Table 8: Examples of key figures/indicators: Marketing and communications

Areas of impact	Key figures/indicators
A stakeholder mapping was carried out. All relevant stakeholders are included in biodiversity reporting. Yes -> see key figures No	Number of stakeholders who are actively involved: <i>Total number</i> <i>Share of total included in the stakeholder mapping (%)</i>
The company/organisation reports on all of the core business' direct and indirect impacts on biodiversity, as well as the measures taken to reduce negative impacts. Yes -> see key figures No	Targets, measures, and their results are reported as the basis of meaningful key figures and indicators
Customers and the general public readily receive information on the topic of biodiversity (such as production processes, use, disposal of the product), via the website and other sources. Yes -> see key figures No	<i>Number of clients/people reached:</i> <i>Circulation of magazines that have published an article/advertisement:</i> <i>Number of visitors to the website:</i> <i>Qualitative:</i> <i>Results of an online survey:</i>
Products contain information aimed at the end customer about the biodiversity effects of using and disposing of these products. Yes -> see key figures No	Number of products containing information: <i>Total number:</i> <i>Percentage of products containing information relative to the total number of products</i>
(Product) information is verified by independent third parties. Yes -> see key figures No	Number of products with information verified by third parties: <i>Total number:</i> <i>Percentage of verified products relative to total number of products</i>
Stakeholders, customers, and the public are regularly asked about the content and quality of the information they receive. Yes -> see key figures No	Number of stakeholders, customers, and others who rate the information positively: <i>Percentage of those who rate the information positively relative to the total number of persons interviewed:</i>

15

INVOLVING STAKEHOLDERS IN DECISION-MAKING PROCESSES

15.1 Why action is necessary

Biodiversity is a complex subject, and the concept of ecosystem services does not simplify the challenge for companies that wish to analyse and address their baseline situation and influences. A company can find expert support from scientific institutions, nature conservation authorities, or environmental and nature conservation organisations to determine the significance of biodiversity, set targets and measures, and monitor the company's biodiversity performance.

The latest annual report of the World Business Council for Sustainable Development (WBCSD) once again calls on companies to enter into strategic partnerships—with governments, NGOs, and the scientific community, for example—because these can help companies achieve desired goals more quickly and effectively [\(1\)](#).

The continuous improvement of environmental performance in the area of biodiversity is one of a company's mandatory tasks. In addition, it can get involved in biodiversity protection by supporting corresponding projects and other activities, but this commitment must go beyond legal requirements to do more.

Strategic partnerships with NGOs

In line with the WBCSD's recommendation, companies can choose to collaborate with institutions such as municipalities, research and teaching institutions, and NGOs. Conversely, NGOs can actively approach companies that are interested in solving certain problems due to economic interest or public pressure.

Examples of strategic partnerships:

The **Marine Stewardship Council (MSC)** is an organisation founded in 1997 by Unilever and the World Wildlife Fund for Nature (WWF). MSC awards a seal of quality for sustainable fishing that meets with its standard, and to date it has certified about 500 fishing companies, which are responsible for about 15% of the global annual catch. The aim of this long-term cooperation is to protect fish stocks from overfishing and thus protect the oceans as well as the species that live there [\(2\)](#).

NABU-Landesverband Baden-Württemberg, Industrieverband Steine und Erden Baden-Württemberg (ISTE), and Industriegewerkschaft Bauen-Agrar-Umwelt have published a joint declaration on the „**Sustainable Use of Raw Materials in Baden-Württemberg**“ (NABU/ISTE/IG BAU 2012) [\(3\)](#).

The Lake Constance Fruit-Producers' Association, the REWE Group, and the Lake Constance Foundation have cooperated on **PRO PLANET Apples** since 2010, with the aim of significantly improving biodiversity protection in intensive fruit growing. NABU is the NGO partner that coordinates the PRO PLANET initiative in other fruit-growing regions of Germany and Austria [\(4\)](#).

In Germany, representatives from standards, food companies, the agricultural industry, NGOs, and scientific institutions founded the association **Food for Biodiversity (Biodiversität in der Lebensmittelbranche)** in summer 2021. Its goals include the implementation of a basic set of biodiversity criteria across all supply chains that have biodiversity risks, incentives for farms to go beyond legal requirements, and improved policy frameworks for biodiversity-friendly production. Via instruments such as the Biodiversity Performance Tool, farmers are supported in the implementation of criteria and corresponding measures, and the development of biodiversity potential on farms is recorded via a monitoring system. Additional training for company managers, farmers, and others complement these measures [\(5\)](#).

Nationale Naturlandschaften e. V. is the umbrella organisation for national parks, biosphere reserves, nature parks, and certified wilderness areas, and it is responsible for the umbrella brand National Natural Landscapes. This nonprofit association specifically seeks partners and sponsors who support the preservation, development, and

promotion of protected areas. These partnerships can involve the provision of funds and the active participation of company employees in the maintenance of protected areas (6).

The **Enterprise Forest Foundation** enables companies to financially sponsor the planting of trees throughout Germany, or to have their employees participate in tree-planting campaigns. The aim is to create new semi-natural forests using native tree species that are appropriate to a specific location, or to convert monocultures into such forests. In addition, the foundation also promotes the creation of orchards and flowering areas (7).

Kaufland, REWE, and Nestlé support the EU LIFE project **“Insect-Responsible Sourcing Regions”**, which is coordinated by the Lake Constance Foundation. In insect-friendly regions, biodiversity action plans are coordinated and implemented at the regional level in collaboration with farmers and other land users. In this way, measures for the protection of insects and biodiversity are taken beyond individual farms and into the broader countryside. The companies motivate their suppliers to participate and assume implementation costs. The added value of food that’s produced in an insect-friendly way is remunerated and consumers are made aware of the value of biodiversity (8).

AgoraNatura is an online market place where NGOs or private individuals can present and advertise nature conservation projects. Investors can finance these projects via crowdfunding, acquiring nature conservation certificates in the process (9).

In view of the dramatic loss of biodiversity and increasingly scarce financial resources for nature and biodiversity conservation, projects that focus purely on attracting sponsorships also play an important role. In addition to NGOs, public authorities are also looking for sponsors to support the maintenance of protected areas and species-protection initiatives (for example, the state of Baden-Württemberg’s “111 species basket”) (10).

15.2 Challenges

Biodiversity protection must be anchored in business processes and relationships as well as locally at company sites, which means that companies must identify and involve relevant stakeholders at both levels. Biodiversity management is a long-term task and not all related challenges can be solved in an average management cycle of three years. Accordingly, companies should also plan for long-term involvement with stakeholders.

For interactions with stakeholders to be considered constructive on both sides transparency and clear rules are required—both generally and specifically related to biodiversity issues; this means clear responsibilities within the company, an adequate process to enable a critical-constructive relationships, and feedback from the company on how to best respond to input or criticism.

Habitat restoration and species protection usually require long-term plans and activities, which means that the company’s promotion of this work should also be long term in nature. Appropriate communication avoids accusations of greenwashing (see Chapter 14).

15.3 Meaningful goals and measures

- Conduct stakeholder mapping, i.e., analyse relevant stakeholders and their potential contribution to a company’s progress on biodiversity protection.
- Establish transparent structures for stakeholder dialogue and participation.
- Engage in strategic cooperation with international, national, and local organisations working in the field of biodiversity.
- Collaborate with stakeholders on environmental or sustainability reporting.
- Involve stakeholders in the training of employees and suppliers.
- Establish corporate volunteering projects in cooperation with NGOs or nature conservation authorities.

- Promote projects in the field of nature and biodiversity conservation.
- Make voluntary payment(s) for ecosystem services, i.e., compensation for ecosystem services that help to promote the restoration of these ecosystems.

Table 9: Examples of key figures/indicators: Stakeholder engagement

Areas of impact	Key figures/indicators
Has the company identified relevant stakeholders at the local, national and international level (stakeholder mapping)? Yes -> see key figures No	<i>Number of stakeholders involved:</i> <i>Qualitative: A representative range of stakeholders is involved (e.g., geographical, interests, expertise, etc.)</i>
Has the company set up a structure for stakeholder participation and created transparent rules? Yes -> see key figures No	<i>Qualitative:</i> <i>Stakeholder survey results assessing the participation structure and process</i>
Does the company cooperate with NGOs and/or scientific institutions in the development of its biodiversity strategy, action plan, or similar elements? Yes -> see key figures No	<i>Qualitative:</i> <i>Assessment from involved stakeholders regarding the ambition of the strategy/action plan</i>
Does the company support projects to protect biodiversity Yes -> see key figures No	<i>Number of projects and percentage of targets achieved:</i> <i>Area of restored ecosystems (ha)</i>

The number of organisations or projects with which a company is involved does not say anything about the quality of the company's participation, dialogues with stakeholders, or projects. To assess the quality of these interactions, the company should use qualitative indicators, such as the

degree to which projects help achieve biodiversity goals, or the degree to which stakeholder recommendations are implemented.

Positive example: The REWE Group's stakeholder forum: Going beyond the niche - animal and plant world

Under the rubric "Going beyond the niche", the REWE Group organised a forum in August 2013 to focus on the protection of flora and fauna, which garnered the participation of more than 200 people representing businesses, authorities, and NGOs. Biodiversity was one of the four workshop topics. Discussions covered biodiversity-related communication with stakeholders and customers, as well as biodiversity as a criterion in food-industry labels and standards. The Lake Constance Foundation and Global Nature Fund presented their initiative to improve biodiversity integration in labels and standards—an important industry lever. As part of the REWE Groups's project, which was jointly funded by the company and Germany's Federal Agency for Nature Conservation, 20 standards were analysed for their relevance to biodiversity. The results and conclusions were published in a baseline report, and recommendations were made to improve biodiversity criteria and requirements. [\(11\)](#)

16

LEGAL COMPLIANCE: LAWS AND REGULATIONS RELEVANT TO BIODIVERSITY

The EMAS Regulation requires EMAS-validated organisations to ensure legal compliance with environmental criteria. Legal compliance must be verified by an auditor and also confirmed by the authorities. ISO 14001-certified organisations also need to prove that they are aware of and comply with all legal requirements (e.g., laws, regulations, permits). In this chapter, the most important legal requirements related to biodiversity are presented in brief.

16.1 National German law (1)

► Federal Nature Conservation Act (Bundesnaturschutzgesetz, or BNatSchG)

The Federal Nature Conservation Act provides the legal basis for protecting nature and landscapes in ways that safeguard biological diversity, the performance and functionality of natural balance, and the diversity, character, beauty and recreational value of nature and landscapes. Toward this end, this act specifies the objectives of nature conservation and landscape management, sets out ways to achieve these objectives, and defines related responsibilities, tasks, and powers.

► Environmental Damage Act (Umweltschadengesetz, or USchadG)

The Environmental Damage Act regulates the prevention and remediation of damage to soils, waters, and protected species and habitats. All species and habitats listed in Annexes II and IV of the EU's Habitats Directive (92/43/EEC) and Annex I of the EU's Birds Directive (2009/147/EC) are considered protected. If environmental damage is imminent or has already occurred as the result of a business activity, the person responsible bears the cost of measures to limit and remediate this damage. In addition to liability, the law also includes a preventive element, because it also obliges responsible persons to take preventive measures if environmental damage is imminent.

► Environmental Impact Assessment Act (Umweltverträglichkeitsprüfungsgesetz, or UVPG)

The UVPG ensures that, for certain public and private projects as well as for plans and programmes (e.g., the construction of buildings), the environmental effects are determined, described, and assessed comprehensively at an early stage, using the framework of an environmental assessment. The results of these environmental assessments are to be taken into account as early as possible in all official decisions on the permissibility of projects as well as in the preparation or amendment of plans and programmes.

► Genetic Engineering Act (Gentechnikgesetz, or GenTG)

The purpose of the Genetic Engineering Act is to protect humans, animals, and the environment from the harmful effects of genetic-engineering processes and products, and to take precautions to ensure that such dangers do not arise. It also provides the legal framework for research, development, and promotion of genetic engineering, and ensures that conventional, organic, and genetically modified agricultural systems can coexist.

► Act on the Protection of Insect Diversity in Germany and on the Amendment of Other Provisions

The Article Law, which came into force on March 1, 2022, contains amendments to the Federal Nature Conservation Act and the Plant Protection Act with the aim of protecting insects by reducing the negative effects of plant-protection

products and outdoor lighting. It also establishes a ban on the use of insect traps in outdoor areas, as well as a restriction on the use of aerial spotlights.

► **Supply Chain Due Diligence Act (Lieferketten-sorgfaltspflichtengesetz, or LkSG)**

The Supply Chain Due Diligence Act came into force on January 1, 2023. This act is the first to regulate corporate responsibility with regard to human rights compliance and (partially) environmental protection in supply chains. It addresses companies at their head offices, principal places of business, administrative headquarters, statutory seats, or branch offices in Germany, and includes risk management as a core element in identifying, avoiding, or minimising the risk of human rights violations and damage to the environment. In this context, environmental damage is relevant if it leads or could lead to human rights violations (e.g., soil or water contamination, water deprivation). In addition, companies' due diligence obligations also include **environment-related obligations arising from the Minamata Convention** (risks associated with the production and disposal of mercury-containing products), the Stockholm Convention on POPs Convention (risks associated with the production or use of certain persistent organic pollutants), and the Basel Convention (risks associated with the import and export of waste). The Supply Chain Due Diligence Act provides guidance on necessary preventive and remedial measures, obliges companies to have complaint procedures and engage in regular reporting to the public.

16.2 European law

► **EU Taxonomy Regulation**

In 2020, as part of the EU's Green Deal, the EU Taxonomy Regulation came into force as a central building block, establishing an EU-wide classification of sustainability criteria. It aims to channel capital flows into green, sustainable economic activities as part of the EU Action Plan for Financing Sustainable Growth, and establishes a set of rules for classifying climate- and environmentally friendly activities and investments. The regulation focuses on the following six environmental objectives:

- Combating climate change
- Adapting to climate change
- Using and protecting water and marine resources sustainably

- Transitioning to a circular economy
- Preventing and controlling pollution
- Protecting and restoring biodiversity and ecosystems

An activity is considered to be in compliance with this ordinance if it makes a significant contribution to achieving at least one of these objectives and does not significantly harm any of the other objectives. Activities must also comply with international standards—in relation to human rights and social issues, for example. For the two climate objectives, companies have had to indicate whether they are Taxonomy-compliant since 2022. For the other four Taxonomy objectives, including number six on biodiversity/ecosystems, EU criteria will be published as delegated acts by the EU Commission as early as the second quarter of 2023 (2).

► **EU Corporate Sustainability Due Diligence Directive (CSDDD) (under negotiation)**

The CSDDD, also referred to as the EU's "supply chain law", aims to initiate, promote, and ensure sustainable corporate behaviour so that companies take into account human rights and environmental standards in their operations and general corporate governance. The overarching objectives of the CSDDD and a proposed Deforestation-Free Regulation are mutually supportive; the CSDDD also introduces value-chain due diligence for activities not covered by the Regulation. It establishes company obligations relative to actual and potential negative impacts on human rights and the environment that arise from their own operations, those of their subsidiaries, throughout the entire value chain. Currently, there is a proposal for an EU Commission directive, on which the Council and the EU Parliament have commented. When and in what form the CSDDD will come into force has yet to be determined as of January 2023.

► **EU Regulation on Sustainability-related Disclosure in the Financial Services Sector (Sustainable Finance Disclosure Regulation, or SFDR)**

The SFDR was published on November 27, 2019, and entered into force on March 10, 2021. Together with the EU Taxonomy and the CSRD (see below), it was designed to contribute to corporate transparency. The SFDR affects financial products marketed in the EU, and therefore "financial market participants" as well, including insurance companies, investment firms, credit institutions (e.g., banks), and capital management companies (e.g., issuers of funds and ETFs) in the EU's 27 member states. The SFDR stipulates that these financial companies must disclose to their clients the extent to which they incorporate sustainability

factors into the decision-making process for their financial products, and what material negative sustainability impacts these financial products cause. This is particularly important for ESG financial products that either advertise ESG features (Article 8 products) or financial products with the explicit objective of “sustainable investment” (Article 9 products). Also, Article 6 means that no ESG criteria or only minimal sustainability standards have been implemented.

The SFDR is concretized by “Delegated Regulations”, which in turn build on “Regulatory Technical Standards” of the European Supervisory Authorities (ESA). These lay down more precise details on the content and format of the disclosures that financial institutions must make. For example, these delegated acts set out certain mandatory indicators for material negative sustainability impacts that need to be reported. These include greenhouse gas emissions (Scope 1 to 3) from investments as well as activities that have a negative impact on biodiversity-sensitive areas. Financial companies must determine and disclose these indicators for their financial products, i.e., the share of investments in companies with locations/businesses in or near biodiversity-sensitive areas, if the activities of these investees negatively impact these areas.

“Biodiversity-sensitive areas” include Natura 2000 network sites, UNESCO World Heritage Sites, and Key Biodiversity Areas (KBAs), as well as other protected areas listed in Annex II, Appendix D of Commission Delegated Regulation (EU) 2021/2139.

In the case of investments in real estate, financial companies must also disclose the share of non-greened areas (on the ground as well as on roofs, terraces, and walls) relative to the total land area of all installations.

Furthermore, at least one additional sustainability criterion, out of a total of 15, must be reported for all financial products. For biodiversity, this can be one of the following:

- Proportion of investments in companies whose activities affect endangered species
- Proportion of investments in companies that are located in or adjacent to a protected area, or an area of high biodiversity value (including owned, leased, or managed operations), and that do not have a biodiversity-protection policy

- Proportion of investments in companies without policies to combat deforestation

Starting in January 2023, all these informations must be disclosed; some of these requirements has been introduced gradually before this date [\(3\)](#).

► EU Corporate Sustainability Reporting Directive (CSRD)

The new CSRD was adopted in November 2022. Starting in fiscal year 2024 (i.e., calendar year 2025), large companies that are already subject to reporting requirements will have to follow this new reporting format for the first time; in subsequent years, other large companies and, eventually, smaller listed companies will face the same requirement. This directive expands reporting requirements under the existing Non-financial Reporting Directive (NFRD), with respect to sustainability information on a variety of environmental, social, and governance (ESG) topics, as well as other issues. Companies must provide both forward-looking and retrospective plans and information that is consistent with the Paris Agreement's 1.5-degree Celsius target. These reporting requirements are supplemented by European Sustainability Reporting Standards (ESRS), which incorporate existing frameworks—such as GRI, SASB, and TCFD—and also set new standards for mandatory reporting (e.g., dual materiality), so that the impact of a company's activities on the environment as well as the impact of environmental conditions on the company must be examined. Companies must disclose intangible assets, including information on intellectual, human, social, and relational capital. In addition to so-called “cross-cutting standards” (general requirements), there are five standards relating to the EU's environmental objectives of the (climate change; pollution; water and marine resources; biodiversity and ecosystems; and the use of natural resources and circular economy—which are identical to the environmental topics in the Taxonomy regulation), four standards on social aspects, and one governance standard.

ESRS E4 Standard: Biodiversity and Ecosystems

Among other elements, the current November 2022 draft includes the following:

- Presentation of the company's impact on biodiversity and ecosystems
- Description of measures and contributions to the Green Deal, EU Biodiversity Strategy, SDGs, and CBD
- Plans to achieve the targets of "no net loss by 2030", net gains starting in 2030, and full restoration of nature by 2050
- Measurable targets and biodiversity action plans
- Potential financial implications of impacts, risks, and opportunities related to biodiversity [\(4\)](#)

► EU Deforestation Regulation (EUDR)

With this regulation, which was adopted in 2022 and is expected to enter into force at the end of 2024, the European Commission aims to minimise the EU's contribution to global deforestation because existing voluntary and market-based measures at the national and regional levels within the EU have not been sufficient to regulate EU consumption of products linked to deforestation. Given the worldwide destruction of forests to create arable land or pastures, the regulation focuses on seven commodities—beef, cocoa, coffee, palm oil, soy, rubber, and timber—as well as certain derived products. After a two-year review, it is expected that the regulation will be extended to cover other ecosystems and forest-risk products. The regulation may cover only products traded in the EU market or also exports from the EU to third countries if:

1. they are deforestation-free in accordance with Article 2(8), i.e., they have been grown or produced on land that has not been (legally or illegally) deforested after December 31, 2020. This date is in line with UN SDG Target 15 for 2030 and the New York Declaration on Forests;
2. they have been produced in accordance with the relevant legislation of the country of production,
3. operators and traders (except SMEs) submit a due diligence declaration to customs authorities when distributing their products to (or exporting them from) the EU market. Fulfilment of due diligence includes recording and reporting the geo-coordinates of all land on which these products were produced, and the date or period of production, as well as carrying out a risk assessment and, where appropriate, taking risk-mitigation measures.

Member states are obliged to have their competent authorities carry out annual inspections. The sanctions established by member states should include, at minimum: fines, confiscation of materials, and temporary exclusion from public contracts.

Formal adoption by the Environment Council and the European Parliament is expected in 2023 [\(5\)](#).

► Fauna-Flora-Habitat Directive (FFH) and Birds Directive

In 1992, the European Union decided to permanently preserve habitats and species of European-wide importance. Toward this end, the EU decided, among other things, to establish a network of protected areas (Natura 2000) for the conservation of wild plant and animal species and their natural habitats. The Natura 2000 network consists of areas covered in the Fauna-Flora-Habitat Directive (also known as the Habitats Directive, 92/43/EEC, dated May 21, 1992) and the Birds Directive (79/409/EEC, dated April 2, 1979, and is now 2009/147/EU).

FFH areas are also called Sites of Community Importance (SCIs) or Special Areas of Conservation (SACs). Bird-protection areas are designated as Special Protection Areas (SPAs), and are selected and placed under protection according to uniform EU-wide standards. Various annexes to these directives list species and habitat types that are particularly worthy of protection and whose conservation is to be ensured by the system of protected areas. However, both the Habitats and Birds directives provide a significantly higher proportion of species protection than the network of protected areas [\(6\)](#).

► EU Water Framework Directive (EU-WFD)

The EU Water Framework Directive harmonises water policy and legislation in Europe. It was designed to achieve good ecological and chemical status for surface waters, along with good ecological potential and good chemical status for heavily modified or artificial waters by the year 2015, with any exceptions lasting until 2027. For groundwater, the directive will achieve good quantitative and chemical status; the goal is systematic improvement and no additional deterioration of the status of all waters. It also applies to those terrestrial ecosystems and wetlands that are directly dependent on water bodies.

A central element of the directive is the creation of river-basin management plans, including a programme of measures that involve the public and stakeholders. The management plans and measures programmes are to be revised every six years. (The third management period began in 2021 and will end in 2027.) According to a recent study, 86% of surface waters are impaired by structural measures (e.g., straightening, bank obstruction.). Pollutants impact 42% of the groundwater and 98% of the surface waters. The number of surface waters with good ecological status has improved slightly (9% compared to 8% in 2015). In contrast, no surface water has good chemical status, but 67% of groundwater does. Therefore, EU-WFD targets have not yet been achieved. Currently, restoration measures are planned or in progress for 80% of surface waters, and pollutant loads will also be significantly reduced (7).

► EU Regulation implementing the Nagoya Protocol ((EU) No 511/2014)

This May 2014 regulation governs compliance with the provisions of the Nagoya Protocol, an international agreement on access to genetic resources and the fair and equitable sharing of benefits arising from their utilization. This issue is also a key concern of the UN Convention on Biological Diversity (CBD).

For example, cosmetics companies that make use of genetic resources and associated local knowledge in the research and development of new cosmetic ingredients will have to demonstrate that their activities are in line with the requirements of the CBD and the Nagoya Protocol. In specific terms, this means that companies should follow these steps:

- Consider the equitable benefit-sharing criteria of the UN Convention on Biological Diversity (CBD) as they prepare to engage in bioprospecting.
- Identify the providers of a genetic resource (competent government agencies or local/indigenous groups that hold the relevant property rights).
- Obtain the consent of these providers in advance of research and development measures regarding access to genetic resources and their planned use (prior informed consent, or PIC).
- Mutually agreed terms (MAT) on access and equitable benefit-sharing between providers and users of a genetic resource (Access and Benefit-Sharing, or ABS).

Even for companies whose business model is not based on the use of genetic resources, the principles of Access and Benefit-Sharing can serve as a template for fair behaviour when operating in countries where their natural resources originate (for example, by involving local stakeholder groups at an early stage of project planning, or by supporting local environmental and social projects).

In Germany, a law has been in force since July 1, 2016, that defines the enforcement of the Nagoya Regulation and the implementation of the EU Regulation by the Federal Agency for Nature Conservation (Nagoya Regulation, in German abbreviation: NagProtUmsG).

► EU Timber Regulation (EUTR)

Regulation (EU) No 995/2010 sets out the obligations of those who trade timber and timber products. It concerns timber that is harvested in the EU or imported into the EU (for processing or sale to professional and non-professional consumers, or for use in a trader's business). Whether based in the EU or not, all companies must exercise due diligence and comply with the ban on trading illegally harvested timber. Traders must collect information on the timber and timber products they sell, and on their suppliers in order to carry out a comprehensive risk assessment. Under Article 6 of the regulation, the information that's required for this assessment can be divided into two categories:

- Article 6(1)(a): Information about the specific timber or timber product, including a description, country of harvest (and, if applicable, the region where the timber was harvested and the logging concession was located), suppliers, traders, and documentation showing compliance with all applicable legislation
- Article 6(1)(b): General background information for the assessment of product-specific information, including the prevalence of illegal logging of specific tree species and illegal logging practices at the place of harvest, as well as information on the complexity of the supply chain

Key questions to be asked: Where was the timber harvested? Does the regulatory framework of that location give cause for concern? Do all of the documents provided by the supplier demonstrate compliance with the applicable legislation, and are these documents verifiable? Is there evidence that a company in the supply chain is involved in illegal logging practices? Is it a complex supply chain? (8) The EUTR will expire once the EU Regulation on Deforestation-Free Products takes effect.

► EU Regulation on Invasive Species

At the EU level, Regulation (EU) No 1143/2014—on the prevention and management of the introduction and spread of invasive alien species—was adopted in 2014. The purpose of this regulation is to prevent the adverse impact of invasive species on biodiversity within the European Union. Invasive species listed in this regulation are subject to EU-wide bans (in particular, bans on trading, breeding, keeping, and releasing them into the wild). In Germany, some of these species are already widespread, including the Chinese mitten crab and the raccoon. Other species—such as the large-flowered hayweed, the Asian hornet, or the Chinese muntjac—have only rarely been found in the wild in Germany. Depending on a species' degree of spread, the ordinance provides for a tiered system of prevention, early detection, and immediate removal as well as the management of already widespread invasive species (9).

► EU Restoration Law (under negotiation)

In June 2022, the European Commission proposed the first piece of legislation explicitly aimed at restoring nature in Europe. It is a core element of the EU Biodiversity Strategy. Given that 80% of habitats in Europe are in poor condition, the aim of this regulation is to restore ecosystems with a focus on those that can strongly contribute to CO₂ sequestration or mitigate the effects of natural disasters. In particular, the restoration of wetlands, rivers, forests, and marine ecosystems contributes to biodiversity enhancement, ecosystem services, the achievement of the 1.5°C target, and the security of agricultural supply chains. This legislative proposal would set legally binding targets for the restoration of different ecosystems in for each member state, complementing existing legislation. The aim is to apply restoration measures to at least 20% of the EU's natural terrestrial and marine areas by 2030 and to extend these measures to all degraded ecosystems by 2050. At this stage, the impact on businesses is not clear, and the law would still need to be approved by the EU Parliament and Council (10).

17

EU TARGETS, STRATEGIES, INTERNATIONAL CONVENTIONS, AND VOLUNTARY COMMITMENTS

17.1 EU strategies and programmes

With the 2019 **EU Green Deal**, the European Commission has created a policy framework with ambitious targets aimed at achieving the transition to a competitive and resource-efficient economy. The key targets include:

- No net greenhouse gases emitted by the EU economy by 2050
- The decoupling of growth and resource use
- Biodiversity that is safeguarded and increased by expanding marine and terrestrial protected areas and reducing the use of pesticides
- Supply chain requirements that prevent EU business activities from destroying ecosystems in other parts of the world

Investment programmes, EU legal standards, and the strategies listed below should help to achieve these goals.

EU Farm-to-Fork Strategy

Established in 2020, this strategy aims to make the European food system more sustainable and reduce its impact on other countries. Its main 2030 targets:

- Reduce the use of chemical pesticides by 50%.
- Reduce nutrient losses by at least 50%, while ensuring that there is no degradation of soil fertility. This step should reduce the use of fertilisers by at least 20%.
- Reduce overall sales of antibiotics used in EU livestock production and aquaculture in by 50%.
- Farm organically on 25% of the EU's agricultural land.

In this way, the EU Farm-to-Fork Strategy provides significant support to the EU Biodiversity Strategy for 2030 and has a direct impact on all sectors that sell or process raw agricultural materials.

EU Biodiversity Strategy for 2030

In May 2020, the European Commission presented the EU Biodiversity Strategy for 2030, which aims to halt the loss of species, habitats, and ecosystem services in Europe by 2030, and to reverse current trends by increasing biodiversity. The strategy's central goals and measures concern protected areas, the restoration of degraded ecosystems, the reduction of pesticide use, and other related topics. With regard to the economy, the EU announced new sustainability regulations ("Initiative on sustainable corporate governance") and the revision of its Sustainable Finance Strategy, which underscores that more than half of the global gross domestic product (GDP) depends on nature and the services it provides. This is particularly true for the construction, agriculture, and food and drink sectors. The biodiversity strategy contains specific goals that concern the above-mentioned sectors in particular, as well as other economic sectors [\(1\)](#).

EU Code of Conduct on Responsible Food Business and Marketing Practices

This code, developed as part of the EU Farm-to-Fork Strategy, was adopted by the EU Commission in June 2021. It sets out seven targets to which actors in the food sector can voluntarily commit, to tangibly improve and communicate their sustainability performance. The following target was set for biodiversity:

Shift towards commodity supply chains that do not contribute to deforestation, forest degradation, or the destruction of natural habitats, and that conserve and protect high-value ecosystems and biodiversity.

Measures to achieve this target:

- Promote sustainable procurement of materials from (direct) suppliers inside or outside the EU;
- Promote the introduction of science-based sustainability certification schemes for food (including fish and fishery products).
- Identify and contribute to appropriate solutions and strategies that:
 - > Support, conserve, or protect natural habitats and biodiversity

- > Prevent, reduce, or eliminate the negative impacts of activities on air, land, soil, water, and forests,
- > Build deforestation- and transformation-free food supply chains (2)

17.2 International conventions

The Convention on Biological Diversity (CBD) was adopted in 1992, at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro. The CBD is a treaty negotiated by sovereign states under international law. Since the UNCED, the Convention has been signed by 196 Parties (as of November 2022). UN member states have set for themselves the goal of protecting and conserving the Earth's biological diversity and organising its sustainable use to allow as many people as possible to live off it, today and in the future.

Two protocols have been developed under the CBD: the Nagoya Protocol on Access and Benefit-Sharing and the Cartagena Protocol, which ensures an adequate level of protection when transferring, handling, and using modified organisms

that are produced using biotechnology and that may have adverse effects on the conservation and sustainable use of biodiversity (3).

At the 15th Conference of the Parties (COP15) in December 2022, a new global agreement was adopted for the protection, sustainable use, and restoration of nature ("Kunming-Montreal Global Biodiversity Framework"). Among other things, it calls for placing at least 30% of the world's land and marine area under effective protection, and a 50% reduction in the risks posed by pesticides—both by 2030. To monitor how nature is doing worldwide and determine whether these goals are being achieved, COP15 produced the first-ever uniform indicators in a monitoring framework. The countries of the Global South will be supported in the implementation of this new agreement with US\$20 billion annually up to 2025 and US\$30 billion up to 2030. The new global biodiversity framework adopted at COP15 sends a strong signal to businesses around the world. Target 15 declares that states should take action "...to encourage and enable business and in particular to ensure that large and transnational corporations and financial institutions regularly monitor, assess, and transparently disclose their risks, dependencies, and impacts on biodiversity..." (4).

In the National Biodiversity Strategy (NBS)

The global goals - and also the goals of the EU Biodiversity Strategy 2030 - are fleshed out with concrete national goals and measures. In order to improve the state of biodiversity, work has already begun at national level in Germany to revise and update the NBS (8). The various stakeholders, e.g. from the economy, are involved in this process. In Germany, large areas of land and sea are already protected. The Federal Government and the Länder are working together to ensure that the protected habitats, as well as the important contributions of these areas to natural climate protection, are safeguarded or strengthened and, if necessary, restored. To this end, a "Protected Areas Action Plan" is to be launched. A clear focus is to be placed on the qualitative further development of the existing protected areas.

The RAMSAR Convention or the Convention on the Protection of Wetlands of International Importance has been signed by 172 "Contracting Parties" as of October 2021. These parties have declared a total of 2,455 wetlands of international importance, with a total area of approximately 255.9 million hectares (5).

The **Bonn Convention or CMS** (the Convention on the Conservation of Migratory Species of Wild Animals) is a set of rules for the worldwide protection and conservation of wild migratory animal species, and also addresses their sustainable use (6).

CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) is both a binding agreement and an international organisation that aims to control the international trade of wildlife and plants to the extent that the survival of these species is not threatened (7).

18

PRACTICAL TOOLS AND INITIATIVES

Since the publication of the TEEB study (The Economics of Ecosystems and Biodiversity), numerous organisations have worked continuously on the development of instruments to support companies in avoiding or reducing their negative impacts on biodiversity. Now, many additional tools have been put into practice.

18.1 Approaches and tools to assess impacts and dependence on biodiversity and ecosystems

Despite the tools mentioned above, no tools yet exist that provide consistent, cross-sectoral, quantifiable, and comparable results on a company's impact on biodiversity. Numerous initiatives are underway to better reflect biodiversity in life-cycle assessments, and some organisations are working to develop a Biodiversity Footprint (for an overview, see IEEP brochure) [\(1\)](#).

The European Business & Biodiversity Platform has compiled a comprehensive overview of tools that support businesses in the measurement and valuation of biodiversity and ecosystem services, and it regularly updates the publication "Assessment of Biodiversity Measurement Approaches for Businesses and Financial Institutions". The most recent report was published in 2021; it contains a description of various methods and tools, and information about where they can be applied. In addition, the possibilities of their application are illustrated by various case studies [\(2\)](#).

Most of the tools are used to identify or assess biodiversity risks. To date, they have been used almost exclusively by large companies.

Tools from the project Business & Biodiversity (Unternehmen Biologische Vielfalt, or UBi)

The initiative "Unternehmen Biologische Vielfalt (UBi)" has been developing various pragmatic tools that are also suitable for small- and medium-sized enterprises:

UBi is creating an online tool for companies that want to get started with biodiversity management. It's designed to help them approach the topic and assess its importance to their companies. This self-assessment is cross-sectoral and will be available in German and English starting in May 2023.

The [Biodiversity Check tool](#) helps assess biodiversity impacts within a company's various functional units. The "Check" corresponds to an EMAS environmental audit for the area of biodiversity, and provides recommendations for goals and measures that can improve biodiversity protection. In addition, it offers key figures and indicators to help implement monitoring. With a general Biodiversity Check, presented in this guide are put into practice, so to speak, and the tool offers a good place to start for companies that want to integrate biodiversity into operational (environmental) management. Five sector-specific biodiversity checks will be developed under the UBi framework by the end of 2024 [\(3\)](#).

[Nature InCorporate](#) is a monitoring system for semi-natural company grounds. This database-supported system enables companies to track the development of semi-natural areas on their premises and properties, and their associated biodiversity potential. This information provides companies with a good basis for further planning and maintenance of semi-natural areas. The monitoring results

also provide input for reporting (e.g., an EMAS environmental statement) and communication with businesses and end-customers. Further positive effects of semi-natural design on company grounds are recorded:

- Social impacts: Raising awareness about the value of biodiversity among employees, neighbours, suppliers, customers, and other stakeholders; improving the work atmosphere
- Biodiversity in operational management: Considering measures to protect biodiversity in the different areas of the company; raising awareness among other companies and the wider industry

Companies with nature-oriented premises are recorded on a map—as are nature conservation areas and green infrastructure such as biotope corridors. Using this map, companies can readily determine whether or not they have, for example, a biotope corridor nearby to which the company's nature-oriented site could be linked. In addition to individual company evaluations, site data are aggregated and summarised in regular national monitoring reports (4).

Biodiversity Monitoring System (BMS) for the food industry. The BMS is designed for food companies, standards organisations, cooperatives, and producer groups—any organisation that wants to monitor the biodiversity performance of a group of farmers. The BMS collects 107 key figures from farms and aggregates the individual data sets. Users of the BMS only have access to the results of “their” group of farms. The monitoring results are organised in a dashboard, in nine clusters, and presented in the form of graphs and tables. The system shows the development of indicators over a period of time (5).

WBCSD Roadmaps to Nature Positive

The World Business Council for Sustainable Development (WBCSD) has published its Roadmaps to Nature Positive—a framework to help companies set science-based targets for nature conservation and report on them through the Taskforce on Nature-related Financial Disclosures (TNFD). In doing so, companies contribute to national, European, and international goals for biodiversity conservation (6).

Natural Capital Protocol

The Natural Capital Protocol provides a framework for organisations to identify, measure, and assess their direct and indirect impacts, and dependencies on natural capital. With the help of the protocol, organisations can assess and incorporate the following risks and opportunities into their decision-making (7):

- Operational: Reducing the cost of raw materials and the risk of supply interruptions due to extreme weather conditions, floods, etc.; realising efficiency gains
- Legal compliance: Anticipating future legislation; reducing compliance costs and the risk of fines and penalties
- Financial: Reducing financing costs and increasing margins; improving access to finance; increasing attractiveness to investors
- Reputational and market: Identifying new revenue streams and differentiating products; improving the chances of attracting and retaining employees
- Social: Identifying benefits and negative impacts on local communities through improved natural capital (e.g., water quality); improving farms' social reputation.

WWF Biodiversity Risk Filter (BRF)

Identifying biodiversity risks throughout supply chains is a major challenge for companies and financial institutions. The BRF tool, which WWF presented at the World Economic Forum in Davos, helps companies and financial institutions identify risks related to biodiversity in their in-house sites, value chains, and investments, and reduce them step by step. The BRF is based on 33 datasets that include information on the status of local biodiversity, including ecosystem services and protected areas, as well as the greatest risks to this biodiversity (8).

18.2 Business and biodiversity Initiatives

The increasing number of initiatives focused on the intersection of business and biodiversity (B+B) is an impressive indicator of biodiversity's growing relevance to the economy. Involvement in such initiatives helps companies establish biodiversity management, exchange information and experiences, and achieve improvements within their industries. Here are some examples:

At the national level:

The German initiative Biodiversity in Good Company was the first national B+B initiative. Members sign a "Leadership Declaration", a commitment to continuous improvements in the protection of biodiversity. The association's other services include training, information exchange, and practical handouts. Member companies publish regular reports on their progress with protecting biodiversity (9).

Unternehmen Biologische Vielfalt (UBi) is a platform that was initiated and funded by the German Federal Ministry for the Environment (BMU) in 2013 with the aim of educating the business community about biodiversity; promoting networking and dialogue with authorities and nature conservation organizations; and initiating contributions from companies for the implementation of the National Biodiversity Strategy and for stemming the loss of biodiversity. UBi provides a forum for business and industry associations to contribute their perspectives, and develop strategies and activities to motivate and assist companies in better managing biodiversity (10).

National B+B initiatives have also become increasingly established in other countries, including Spain, Portugal, Scandinavia, Austria, Canada, Brazil, Thailand, and several Central American nations. These initiatives provide support to companies across sectors for improving the management of biodiversity issues.

At the EU level:

The European Business and Biodiversity Campaign (EBBC) was founded by a consortium of European companies and non-governmental organisations (NGOs) and is led by the environmental foundation Global Nature Fund (GNF). The campaign supports companies with practical tools such as the Biodiversity Check and provides information on its portal about current developments on the field of business and biodiversity (11).

On the EU Business & Biodiversity Platform, both companies and sector associations from EU member states engage with various EU Commission units. The platform regularly publishes studies and, among other things, an overview of the various instruments for improved management, reporting, and assessment of biodiversity (12).

At the international level:

The Global Partnership for Business and Biodiversity of the Convention on Biological Diversity (CBD) coordinates national B+B initiatives and provides an overview of studies, instruments, policies, and programmes at the international level (13).

Business for Nature is an association of about 70 pioneering international organisations and companies that jointly postulates needs for the protection of biodiversity, with the primary aim of shaping political dialogue. The association forges joint commitments and organizes workshops and campaigns (14).

The World Business Council for Sustainable Development (WBCSD) is a think tank composed of more than 200 international companies (or their CEOs) that has been working intensively on the subject of biodiversity since 2007. The WBCSD supports solutions such as the Tropical Forest Alliance, a public-private partnership that seeks to reduce the destruction of tropical rainforests, and One Planet Business for Biodiversity (OP2B), a coalition that works to transform agriculture. The WBCSD also advocates for a "net positive" balance with nature by 2030 via its Global Goal for Nature programme. Additionally, the think tank regularly publishes reports on biodiversity issues and provides guidance on tools for companies (15).

Science Based Targets Network (SBTN) and measurable targets for corporate biodiversity protection

The SBTN has already developed measurable, science-based targets and indicators for companies that want to reduce their greenhouse gas emissions. As of November 2022, this globally recognised group of scientists and environmental NGOs is still developing approaches that companies can use to measure biodiversity and implement targets to improve their “footprint” on biodiversity. The SBTN’s guide to measuring biodiversity, setting methodological goals, and formulating activities along the avoidance hierarchy provides a good orientation for all who want to implement a strategy for biodiversity management and associated measurable activities. The network’s approach can be easily linked to EMAS management [\(16\)](#).

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Appendix 1: Terms and abbreviations

Explanation of terms

Access and Benefit-Sharing

Objective of the UN Convention on Biological Diversity and mechanism providing for the equitable sharing of benefits that arise from the utilization of genetic resources.

Biodiversity hotspot

Regions with high biodiversity and a high proportion of endemic (found only in that region) animal and plant species that are particularly threatened and require priority protection. To be considered a biodiversity hotspot, a region must be home to at least 1,500 endemic plant species (which represent 0.5% of all plant species on Earth), and the plant species in that region must have already lost over 70% of their original habitat (according to Conservation International).

Biodiversity

Diversity of life, diversity within and among species, genetic diversity, and diversity of ecosystems (according to CBD).

Brownfield

Typically, a site that previously had an industrial use, or an industrial wasteland that can be put to use again after redevelopment.

Genetic resources

Genetic material of actual or potential value.

Greenfield

Unlike a brownfield, land that has agricultural use or hasn't even used before, but is being considered for (industrial) development.

High Conservation Value Area

Natural area with high aesthetic, biodiversity, or ecological value.

Indicator

Quantitative or qualitative parameter for the evaluation of a criterion (DIN EN 16214 1:2012 11, term 2.45).

Invasive species

Alien species that has undesirable effects on other species, biotic communities, or biotopes (Federal Agency for Nature Conservation: www.bfn.de/0302_neobiota.html).

Key figure

Measurable representation of the state or status of performance, management, or conditions (DIN EN ISO 14031:2012-01, term 3.15).

Key Performance Indicator

Critical success factor that is mapped in metrics, which can be used to determine progress against key objectives, or critical success factors within an organisation.

Logistics

Logistics describes the organisation, control, and optimisation of goods and information flows in and between companies. Within the logistics of merchandise management, the three central service areas are transport, warehousing, and transshipment, along with associated activities such as packaging and commissioning.

Sustainable use

The use of biological diversity components in a manner and at a rate that do not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (according to CBD).

Ecosystem

A dynamic network of plant, animal and microorganism communities, and their non-living environment, all of which interact as a functional unit (according to CBD).

Resilience

The ability of a system to recover from changes brought about by an exogenous disturbance and return to its initial state.

Protected area

A geographically defined area that is designated or regulated and managed for the achievement of specific conservation objectives (under the CBD).

Transport

Transport is the intentional or unintentional spatial movement of objects, whereby the objects typically undergo only insignificant changes in their properties. In general, these objects can be goods, information, animals, or people. They are moved by carriers or transmitters, such as people, animals, or vehicles (which are also referred to as means of transport or traffic), after the creation of structural or technological conditions (so-called infrastructure), and with the help of infrastructure and carriers that move them through air, space, and pipelines; via cables; over railways and roads; across waterways; and on paths.

Environmental performance

Measurable result of the management of an organisation's environmental aspects (DIN EN ISO 14031:2012-01, term 3.9).

UN Convention on Biological Diversity

Adopted in 1992 and signed by more than 165 countries around the world, the UN Convention on Biological Diversity (CBD) is the central international legal framework for biodiversity. The Convention essentially pursues three equally important goals: 1. The protection of biological diversity; 2. The sustainable use of its components; and 3. Fair and equitable sharing of the benefits arising from the utilisation of genetic resources, combined with access and benefit-sharing.

UN Sustainable Development Goals (SDGs)

Led by the United Nations, 193 member states and civil-society organisations developed global SDGs, which were approved by the UN General Assembly in December 2014. The 17 goals cover a broad range of sustainable-development objectives such as the sample themes: Ending poverty and hunger, improving health and education, making cities more sustainable, combating climate change, and protecting oceans and forests.

Abbreviations

ABS	Access and Benefit-Sharing
ACCA	Association of Chartered Certified Accountants
ASI	Aluminium Stewardship Initiative
BBOP	Business and Biodiversity Offsets Programme
BBS	Federal Association of Building Materials - Stones and Soil
BEMPs	Best Environmental Management Practices
BMS	Biodiversity monitoring system
BMUV	Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection
BNatG	Federal Nature Conservation Act
BooGI-BOP	Boosting Green Infrastructure through Biodiversity-Oriented Design of Business Premises
BPT	Biodiversity Performance Tool
BUMP	Best environmental management practices (German abbreviation)
CBD	Convention on Biological Diversity
CDP	Disclosure Project
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CSDDD	Corporate Sustainability Due Diligence Directive

CSPO	Center for Sustainable Palm Oil Studies
CSR	Corporate Social Responsibility
CSRD	Corporate Social Responsibility Directive
DGNB	German Sustainable Building Council
EBBC	European Business and Biodiversity Campaign
EEE	Electrical and electronics engineering
EMAS	Eco-Management and Audit Scheme
ENCORE	Exploring Natural Capital Opportunities, Risks and Exposure
ESG	Environmental, social, and governance
ESRS	European Sustainability Reporting Standards
FFH	Fauna-Flora-Habitat Directive
FONAP	Forum for Sustainable Palm Oil
FSC	Forest Stewardship Council
GenTG	Law regulating genetic engineering
GGB	Sites of Community Importance
GlobalG.A.P.	Global Good Agricultural Practice
GNF	Global Nature Fund
GPP	Green Public Procurement
GPSNR	Global Platform for Sustainable Natural Rubber
GRI	Global Reporting Initiative
HCV	High Conservation Value
HCVA	High Conservation Value Area
HCVF	High Conservation Value Forest
IEEP	Institute for European Environmental Policy
IFA	Integrated Farm Assurance
IFRS	International Financial Reporting Standards
IIRC	International Integrated Reporting Council
IMO	International Maritime Organization
IPBES	Intergovernmental Panel on Biodiversity and Ecosystems Services
ISSB	International Sustainability Standards Board

ISTE	Baden-Württemberg Stone and Earth Industry Association
ITC	International Trade Centre
IUCN	International Union for Conservation of Nature
KBAs	Key Biodiversity Areas
KNU	Coordination Office for Standardisation Work of Environmental Associations
KPMG	Klynveld Peat Marwick Goerdeler
LBV	Landesbund für Vogelschutz (Bavaria)
LCA	Life-cycle Assessment
LkSG	Supply Chain Due Diligence Act
LLF	Legacy Landscapes Fund
MACH	Media Analysis Confoederatio Helvetica
MAT	mutually agreed terms
MEA	Millennium Ecosystem Assessment
MSC	Marine Stewardship Council
MSCI	Morgan Stanley Capital International
NABU	Nature and Biodiversity Conservation Union, Germany
NagProtUmsG	Law on the implementation of the Nagoya Protocol
NCD	Natural Capital Declaration
NCFA	Natural Capital Finance Alliance
NCP	Natural Capital Protocol
NFRD	Non-Financial Reporting Directive
NGO	Non-Governmental Organisation
NP	Nagoya Protocol
OECD	Organisation for Economic Co-operation and Development
OP2B	One Planet Business for Biodiversity
PIC	Prior informed consent
POIG	Palm Oil Innovation Group
PwC	PricewaterhouseCoopers
RSPO	Roundtable on Sustainable Palm Oil
SACs	Special Areas of Conservation

SASB	Sustainability Accounting Standards Board
SBTN	Science Based Targets Network
SDG	Sustainable Development Goals
SFDR	Sustainable Finance Disclosure Regulation
SMART	specific/measurable/attractive/realistic/time-bound
SMEs	Small- and medium-sized enterprises
SPAs	Special Protected Areas
SRD	Sectoral Reference Document
TEEB	The Economics of Ecosystems and Biodiversity
TCFD	Task Force on Climate-related Financial Disclosures
TNFD	Taskforce on Nature-related Financial Disclosures
UBi	Business & Biodiversity
UEBT	Union for Ethical Biotrader
UMS	Environmental management system (German abbreviation)
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
USchadG	Environmental Damage Act
UVP	Environmental impact assessment
UVPG	Environmental Impact Assessment Act
VfU	Association for Environmental Management and Sustainability in Financial Institutions
WBCSD	World Business Council for Sustainable Development
WCMC	World Conservation Monitoring Centre
WEF	World Economic Forum
WFD	Water Framework Directive

Further information and a pdf version of this guidance available in German and English:

www.unternehmen-biologische-vielfalt.de

www.unternehmen-biologische-vielfalt.de/standards/#emas

www.business-biodiversity.eu/de/emas-leitfaden

www.business-biodiversity.eu/en/emas-guidance

www.emas.eu

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