



**Practical
handbook
Biodiversity
management
in the
food
industry**

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Prologue



At a time when ecological challenges are becoming ever more present and the protection of the natural environment is gaining in importance, companies have a great responsibility to align their business models with sustainability and to implement this consistently. The preservation of biodiversity - that fascinating variety of life on our planet - must be at the heart of these efforts. Companies in the food industry play a key role here, as the production of food largely depends on the integrity and functionality of ecosystems. At the same time, companies in this sector have a major impact on biodiversity, as the production of food takes up a lot of land and resources and unsustainable practices have a negative impact on ecosystems, species, and habitats.



Ulrike Eberle



Verena Timmer

This biodiversity management handbook has been designed to help companies in the food industry to see biodiversity not only as a challenge, but above all as an opportunity for the sustainable orientation of the company. It guides the reader through the different steps of comprehensive biodiversity management and helps to identify the specific risks and opportunities for companies regarding biodiversity and to find ways to mitigate them. **It provides comprehensive guidance on how to integrate biodiversity protection into business processes, from planning and implementation to monitoring and reporting.** Regardless of size, sub-sector of the food industry or geographical location, and based on best management practices, the handbook guides companies to establish biodiversity conservation as an integral part of business operations.

This Biodiversity Management Handbook is based on the results of the BioVal research project. BioVal stands for ‚Biodiversity Valuing and Valuation‘. As part of the transdisciplinary project, scientists from various disciplines collaborated with practitioners from the companies Alfred Ritter GmbH & Co KG, Seeberger Group and FRoSTA AG to develop methods and tools that companies can use to integrate the protection and promotion of biodiversity into their management. These methods can be used, among other things, to



Vorwort

sensitize their own employees and suppliers to biodiversity and to assess their own biodiversity risks. In addition, the BVI method, which was advanced in the context of BioVal and tested by the practice partners, can be used to calculate the biodiversity footprint of raw materials or products. The results can then be incorporated into business decisions and serve as the basis for scenario analyses to evaluate improvement actions in primary production. The BVI method also allows to generate information for sustainability reporting. Other tools and practical examples mentioned in the handbook can be used to anchor biodiversity in management systems and communicate biodiversity to consumers.

The contents of this handbook are not only shaped by scientific findings and global sustainability goals, but also by the conviction that **companies can function as drivers of change.**

By implementing effective strategies for biodiversity management, companies can not only counteract negative impacts, but also achieve positive effects for biodiversity. In addition, economic benefits can be realized - be it through improved procurement practices, functioning risk management and an enhanced reputation among customers.

We hope that this handbook will help you to deepen your understanding of biodiversity, recognize the opportunities of systematic biodiversity management and inspire you to protect biodiversity.

Ulrike Eberle and Verena Timmer
and the entire BioVal team

Instructions for use of the practice handbook

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Management requires a targeted, systematic approach to the topic in question - including the protection and promotion of biodiversity, often also referred to as biological diversity. This is exactly what this handbook is about: Why is it so important for companies in the food industry to deal with biodiversity? How can they assess their impact on biodiversity? How can they derive targets and actions? How can they integrate the protection of biodiversity into their management? How can they communicate the protection of biodiversity effectively?

The contents of the handbook were developed in cooperation between science and practice for practical application. The instruments and approaches presented were tested for practical suitability by the companies involved in the research project and examples and experiences from their practice were shared.

The handbook is particularly aimed at sustainability managers, but also at the senior management of food companies and representatives from specialist departments such as purchasing, sales or marketing.

Systematic biodiversity management requires that biodiversity is considered where decisions are made regarding the selection and use of raw materials (e.g. research and development, quality assurance) and their procurement (e.g. purchasing).

The handbook is divided into several chapters that are self-contained. The contents of the handbook are structured along the process of integrating biodiversity requirements into business practice and therefore build on each other (Figure 1). It includes chapters on raising awareness of biodiversity, as well as fundamental questions on biodiversity management, risk identification, measuring biodiversity impacts, deriving targets and actions, anchoring biodiversity in the company and communicating biodiversity to consumers.

Each chapter opens with the questions that it is specifically designed to address. Short information texts for each chapter offer the fundamental knowledge required to

Instructions for use of the practice handbook

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gradually implement a biodiversity management system in the company. Practical examples are used to illustrate how this knowledge can be put into practice.

A core element of the handbook is the so-called BVI method - a method for quantitatively assessing biodiversity impacts. BVI stands for 'Biodiversity Value Increment'. Building blocks of the method can be found in several chapters of the handbook, as the method can not only be used for determining the biodiversity footprint but can also support the management of biodiversity in other areas. For example, the ecoregion map (Chapter 6) can be used to make an initial assessment of biodiversity risks. The management parameters (Chapter 6), which must be collected to calculate the specific biodiversity impacts, are useful for evaluating suppliers or deriving actions. However, the focus is on the integration of biodiversity into management and the anchoring of biodiversity management in the company.

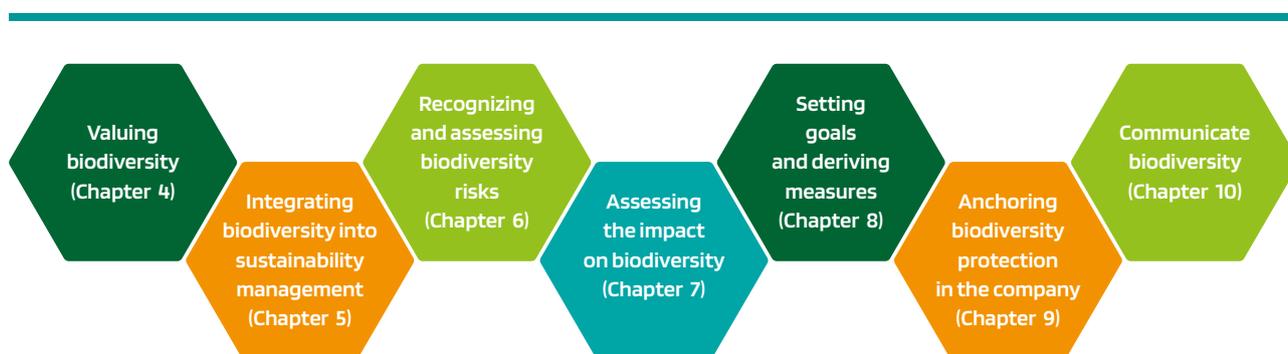


Figure 1: Structure of the handbook

This practical handbook guides you through the steps of comprehensive biodiversity management. It helps food companies to identify their specific risks and opportunities regarding biodiversity and to find ways of reducing negative impacts and achieving positive effects for biodiversity.

Quotes from the field

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Together with companies in the food industry, the BioVal research project has developed tools and support for the integration of biodiversity into sustainability management. Here you can read the assessments of company management and sustainability management of the three BioVal practice partners on the practical importance of implementing biodiversity protection in the food industry, the need to be able to measure biodiversity impacts and the experiences with the tools developed in BioVal.



Protecting biodiversity and counteracting damage where possible must be one of our primary goals for a secure food supply, and not just as chocolate manufacturers.

The challenge lies in creating a uniform and comparable basis for assessing the corporate biodiversity impact on agricultural land. BioVal has reached a milestone here, enabling all parties in the supply chain to measure and evaluate their impact on biodiversity and to act.

Asmus Wolff, Managing Director Supply Chain, Chief Operating Officer
of Alfred Ritter GmbH & Co. KG



The BioVal project will enable us to talk to the farmers who produce agricultural raw materials for us about their opportunities to have a positive impact on biodiversity on their land and to do so with scientifically sound, measurable data.



Georg Hoffmann, Sustainability Manager at Alfred Ritter GmbH & Co. KG

Quotes from the field

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As a company that specializes in natural products from sustainable agriculture, we consider biodiversity to be an integral part of our supplier management. We firmly believe that the protection and conservation of biodiversity is not only a moral obligation, but also a business necessity. Through long-term partnerships that often last for decades, we can promote and protect biodiversity together with our global partners in agriculture and food production. In this way, we combine ecological responsibility with economic success."

Ralph Beranek, Managing Director of the Seeberger Group



The BioVal project has helped us to find and understand starting points for anchoring biodiversity in supplier management. This provides us with the basis for having good discussions about biodiversity protection during our supplier visits.

BioVal has provided us with tools to further advance biodiversity protection in our supply chains. This helps us to make our supply chains more resilient to biodiversity risks and to further strengthen our commitment to origin, which has always been geared towards the long term.

Nadine Kellner, Sustainability in Purchasing Seeberger Group

We have integrated biodiversity as an integral part of our supplier questionnaire and have even gone one step further and are testing the biodiversity assessment for some of our products. BioVal has enabled us to further expand our sustainability management.

Isabell Schäfer, Sustainability Manager at the Seeberger Group



Quotes from the field

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Our declared aim is to be able to incorporate biodiversity into our decisions. We are therefore currently integrating the calculation of biodiversity impacts into our production. This enables us to identify biodiversity-related risks and opportunities and make informed decisions. This enables us to minimize negative impacts, maximize positive contributions to biodiversity and make our progress measurable. In this way, we strengthen our commitment to sustainability and demonstrate responsibility for our environment.

Felix Ahlers, Chairperson of the Executive Board FRoSTA AG



At FRoSTA, we attach great importance to transparency in food production. The measurability of biodiversity impacts is crucial to hold fact-based discussions with our contract farmers and suppliers and derive concrete actions. The BVI method helps us here. As part of BioVal, the method was further developed so that we can now integrate it into our merchandise management system. This will still require a lot of effort, but we now know that it is possible. We can now also gradually integrate the effects on marine biodiversity with the newly developed method and thus cover our entire product portfolio. This also helps us to communicate clearly internally and achieve our sustainability goals together.

Tomke Hinrichs, Sustainability Manager at FRoSTA AG



Valuing biodiversity

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Experts consider the protection of biodiversity to be at least as important as the mitigation of climate change. Nevertheless, the protection and promotion of biodiversity has so far hardly been addressed in corporate sustainability management.

This chapter addresses the following questions:

- What does the term biodiversity mean and why is biodiversity important?
- What are the threats to biodiversity?

Biodiversity – what is it and why is it important?

Biodiversity encompasses the diversity of ecosystems, the diversity of animal and plant species and the diversity within these species. Although biodiversity should not only be viewed from a benefits perspective, the functional significance of ecosystems is often used to emphasize the importance of protecting biodiversity. Ecosystems provide services globally that serve as the foundation for human development and sustainable prosperity. Biodiversity is therefore of considerable importance to human life, but also to individual economic sectors, above all the food industry.

Biodiversity plays a crucial role in the **provision of food**. The great diversity of species has produced a wide range of plant and animal foods that are used for human nutrition.

Pollination should also be mentioned in this context as an essential ecosystem service for nutrition. For example, many plants depend on pollination by animals such as bees, butterflies, birds, and bats to reproduce and spread. Biodiversity also makes an important contribution to **soil fertility** by maintaining nutrient cycles and the water cycle. Many soil organisms, such as earthworms and microorganisms, decompose organic substances, aerate the soil, and improve its water storage capacity. Ecosystems also play an important role in **carbon fixation**. Through photosynthesis, plants absorb carbon dioxide from the atmosphere and bind it in biomass, e.g. wood. Forests are among the world's most diverse ecosystems, which - just like grassland and moors - act

as important carbon sinks. If their functionality is maintained, they therefore make an important contribution to mitigating the greenhouse effect. Biodiversity is also crucial for **water storage and purification in ecosystems**. Forests, wetlands, and other habitats function as natural sponges and help to store water, reduce flooding, and regulate the flow of water. Plants, microorganisms, and mussels, for example, filter pollutants and nutrients from the water. Natural habitats also protect against natural disasters. Forests, for example, provide a natural barrier against storm surges and erosion and protect against avalanches. Figure 2 below shows the most important ecosystem services and the main drivers of biodiversity loss.

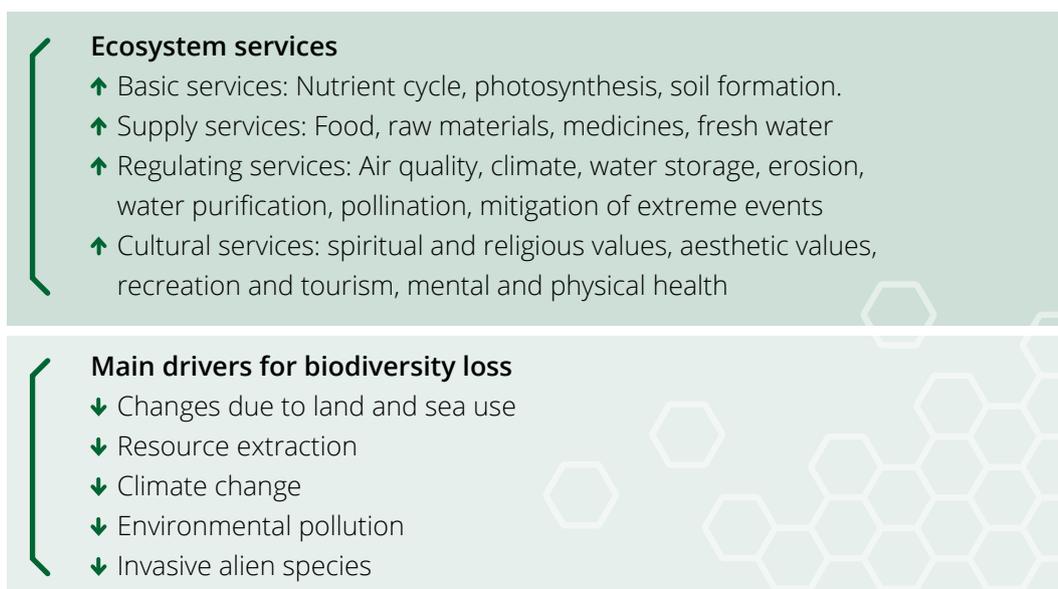


Figure 2: Ecosystem services and main drivers of biodiversity loss

Other ecosystem services include the **aesthetic and cultural value** of biodiversity. In many societies, biodiversity also has a cultural significance, as it serves the identity of communities or simply provides the basis for recreational opportunities.

The Joint Research Centre of the European Union estimated the economic value of these ecosystem services for the EU at 124 billion euros per year. However, the use of these services is generally free of charge. A recent study shows that none of the world's leading industries would be profitable if they had to pay for the natural capital they use.¹¹¹

What threatens biodiversity?

Despite the crucial services biodiversity provides, the way it is actually managed stands in sharp contrast. Biodiversity is increasingly threatened by the industrialization and intensification of agriculture, but also by the increasing limitation and degradation of habitats due to settlement activities, road construction and the extraction of raw materials. Scientific estimates indicate that natural ecosystems have already declined by around 47 % based on the estimated natural baseline, 25 % of species are seriously threatened with extinction and the biomass of wild mammals has already decreased by 82 % globally.^{vi}

The loss of biodiversity also poses a considerable risk to the economy. The World Economic Forum's economic experts rate the decline in biodiversity as one of the three greatest risks to humanity.^v Changes due to land and sea use, resource extraction, climate change, pollution and invasive alien species are considered to be the five main drivers of biodiversity loss.^{vi} Due to these human activities, the decline in biodiversity today is many times greater than under natural conditions. Scientific estimates suggest that of the estimated eight million species worldwide, one in eight is at risk of extinction.^{vii} However, the extinction of species is only the tip of the iceberg. The interplay between biodiversity and climate change outlined above is also critical. An intact biosphere stabilizes a functioning carbon cycle. This is important to counteract climate change. Climate change, in turn, is a key driver of biodiversity loss. However, the more biodiversity is threatened, the less it can help to counteract climate change. Climate change and biodiversity are therefore directly linked as major global and social challenges.^{viii}

The food industry has a particularly big role to play in protecting biodiversity. The following figures illustrate this for Germany: 216 million tons of greenhouse gases are emitted annually through food consumption in Germany. These are higher emissions than the total greenhouse gas emissions from transportation in Germany. In addition, 16.6 million hectares of land are used globally every year. This corresponds to about half the land area of Germany. 75 % of this area alone is used to produce animal foodstuffs (including the cultivation of animal feed). In addition, 2.4 billion m³ of water - or the amount of water in Lake Chiemsee in Bavaria - is used annually to irrigate agricultural crops. The biodiversity footprint calculated using the BVI method presented in this handbook (Chapter 7) shows that food consumption in Germany alone has a global biodiversity impact of 12.3 million BVI*m²*a. This corresponds approximately to the same biodiversity footprint of 3.7 million m² of completely sealed surface area.^{ix}

Valuing biodiversity

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Food cultivation is largely responsible for the loss of biodiversity and is also the sector most affected by it. This is because food production is highly dependent on many of the ecosystem services described above. To more effectively protect biodiversity and prevent its decline, solutions must begin in agricultural practices or fishing activities. This makes it clear why it is essential for companies in the food industry to engage in the protection and promotion of biodiversity.

However, it is not only companies that are called upon to do so; agricultural policy must also be clearly geared towards promoting biodiversity. The appropriate course must be set as quickly as possible and implemented consistently. This also includes ensuring that biodiversity-promoting practices in agriculture are adequately rewarded in monetary terms. It is the task of politicians to set the respective framework.

The preservation of biodiversity is crucial for the continued existence of human civilization. The loss of biodiversity is at least as significant a global challenge as climate change. The solution to both challenges will determine what livelihoods will be available to current and future generations.^x However, while companies have already learned to manage their impact on climate change by recording their greenhouse gas emissions, formulating climate protection strategies, deriving actions and continuously monitoring their success to initiate a continuous improvement process, this has hardly ever been the case with biodiversity.

For example, a recent survey of companies in the German food industry shows that they have not yet systematically addressed their impact on biodiversity.^{xi} Although biodiversity is a relevant topic for the companies surveyed, they are often unaware, for instance, of the primary impacts their business activities have on it. However, it is precisely this information that forms the basis for targeted action.



Integrating biodiversity into sustainability management

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This chapter deals with the question of how companies in the food industry can manage biodiversity and how biodiversity can be integrated into sustainability management. As described above (Chapter 4), the production of food has a major impact on biodiversity. In particular, the use of land in agriculture or the extraction of marine resources such as fish and seafood are among the main causes of biodiversity loss. All actions that a company implements to counteract these causes - whether at its own site or along its supply chains - contribute to biodiversity conservation. In contrast to climate protection, where it does not matter where greenhouse gas emissions are reduced, management actions for biodiversity must have an impact where biodiversity needs to be protected and promoted. And that is primarily in the country of origin of the raw materials. This means that biodiversity management particularly requires the consideration of supply chains of raw materials. This is not always easy for a food processing company, which often does not produce its raw materials itself.

To identify the best starting points for the protection and promotion of biodiversity, it is therefore essential to know or become familiar with the sources within the supply chains. However, it can make sense - especially with a large variety of raw materials - to first set priorities for biodiversity management.

The chapter answers the following questions:

- How can biodiversity be integrated into corporate sustainability management?
- How can I prioritize?
- How can supply chain transparency be maintained right back to the origin of the raw materials?

Sustainability management and biodiversity

Companies are confronted with a variety of sustainability-related requirements, such as climate protection, environmentally friendly packaging, animal welfare, biodiversity,

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demographic change, and diversity. These requirements are formulated by internal and external stakeholders and require learning processes within the company.

To ensure that these **learning processes** are continuous, it is necessary to establish a holistic sustainability management system that systematically and strategically integrates the sustainability-related requirements and issues into the business strategy.

To systematically promote sustainability throughout the entire company, it is first important for companies to **identify, analyse** and **prioritize the sustainability risks** that are relevant to them. This is usually done in a materiality analysis, which should be based on double materiality¹ In the case of biodiversity, it is therefore necessary to analyse the impact of one's own business activities on biodiversity and how one's own business activities are influenced by biodiversity. Due to the global challenge of biodiversity loss outlined above and its significance for food production, biodiversity is a particularly relevant topic for the food industry (Chapter 6).

To successfully integrate biodiversity protection into companies, a process-based management of sustainability and an **organizational framework** are required. As a crucial step, the systematic management of biodiversity protection necessitates the establishment of goals. Here, companies should consider what they want to achieve in the long term regarding the protection and promotion of biodiversity and what steps are required along the way. Respective **goals** as well as suitable budgets are then defined (Chapter 8).

In line with the motto "You cannot manage what you cannot measure", it is also necessary to define indicators that can be used to **measure** and continuously **monitor** and **evaluate** the achievement of objectives to make progress visible and, if necessary, adjust the planning of objectives and actions.

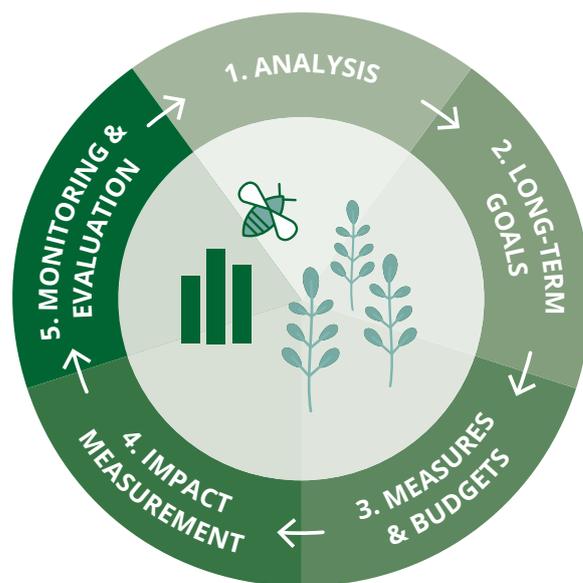


Figure 3: Biodiversity management

¹ The principle of dual materiality encompasses two perspectives: the impact of a company on the environment and society (inside-out) and the impact of the environment and society on the company (outside-in). It analyzes how corporate activities influence environmental and social aspects and which external factors represent a risk or an opportunity for business activities. The principle is used in the materiality analysis to identify and prioritize relevant sustainability issues

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Prioritization of suppliers and raw materials

Before companies break down their supply chains, it may make sense, depending on the quantity and variety of raw materials used and the number of suppliers, to focus on certain raw materials and/or suppliers first (see “Ritter Sport - Prioritization of raw materials”). This may become necessary, as not everything can be tackled at the same time. Prioritization is required simply because of the limited time and financial resources available. The following considerations may be helpful for prioritization:

Companies commonly use parameters such as monetary procurement volume and procurement quantity (e.g., in tons) to categorize their raw material portfolio. When considering biodiversity risks, the quantity of a raw material procured is more decisive, as a larger quantity of the product generally requires more land or more natural resources (as is the case with fishing, for example). However, the yield per area of the product in question also has an important influence. This is due to the fact that when the yield per unit area of the raw material is high, less land is required, whereas lower yields per unit area result in the need for more land.

Another prioritization criterion may be the consideration of raw materials that originate from regions with a high ecological value (Chapter 6). In these regions, major negative impacts on biodiversity can be caused. At the same time, significant progress can be made in protecting biodiversity through biodiversity-friendly land management or careful fishing practices. Ecoregion maps can be used to obtain a first overview of regions with a high biodiversity potential that are affected by a company's business activities - including the activities of suppliers (Chapter 6).

The substitutability of raw materials can also be a criterion for setting priorities. Substitution can take place with raw materials from other regions of origin (e.g. soy from Brazil is replaced by soy from the EU). However, raw materials can also be replaced by raw materials with similar properties (e.g. chia seeds are replaced by linseed). A combination of the two is also possible - i.e. choosing a different region of origin and sourcing a different raw material with similar properties (e.g. replacing soy from Brazil with lupins from Europe).

Another approach to prioritizing raw materials is to start with those sourced from suppliers with whom strong relationships already exist. If suppliers are also committed to promoting biodiversity protection in the supply chain, thanks to the strong communication and collaboration, the implementation of measures becomes more promising.

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When prioritizing, it can also be helpful to focus particularly on high-risk raw materials that have been proven to cause major biodiversity risks, such as palm oil or spiny dogfish, which could also cause damage to the company's image.

Ritter Sport – Prioritization of raw materials



The 100-gram bar range from RITTER SPORT, a brand of Alfred Ritter GmbH & Co. KG, currently includes twenty standard varieties in the „colourful variety“ category, six nut-based variants, four in the cocoa class, two lactose-free options, and five vegan chocolates, along with numerous seasonal varieties. The range of raw materials used for the chocolate bars is correspondingly broad. While some raw materials are purchased by the ton, others are only sourced in small quantities. Sustainable procurement is the goal for all raw materials.

To avoid getting lost in the minutiae, the company developed a concept for prioritizing raw materials back in 2012., which specifically filters out raw materials where sustainable improvements can be achieved in the medium to long term. 96 % of raw materials in terms of tonnage and purchasing volumes were examined - which corresponds to around 24 raw materials - to identify potential sustainability hotspots. Their classification within a matrix allows for a clear organization based on significance for Alfred Ritter GmbH & Co. KG. As a result, four raw materials were targeted for a more in-depth analysis. Cocoa and hazelnuts as the most important raw materials for Ritter Sport, followed by palm fat and milk powder, because the latter entails risks.

For each of these four raw materials, a so-called target system was developed and clustered into the three sustainability pillars. The target systems define different issues and goals that the company would like to tackle and reach. Accordingly, the company derived strategies to achieve the best possible impact with the available time and financial resources:

- For cocoa, innovative strategies for sustainable procurement have been developed and implemented. Respective measures have the highest priority in implementation. The strategies are continuously refined. To this end, the

Integrating biodiversity into sustainability management

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company has intensified its cooperation with partners in the cocoa sourcing countries (Côte d'Ivoire, Ghana, Nigeria, Nicaragua, and Peru) and defined ecological, social, and economic implementation strategies via cocoa programs. This contributes to improving the livelihoods of farmers and cultivation conditions to make cocoa cultivation more resilient for the future.

- Hazelnuts, palm fat and milk powder are based on existing external sustainability standards. In addition, the company collaborates with standard setters to further advance the respective standards as well as with suppliers to implement them.
- Based on the results, solutions for all other raw materials are successively developed and implemented.

By prioritizing raw materials, it is possible to focus on the areas in which the medium-sized company can actively shape and make a difference.

The strategy for success: Alfred Ritter GmbH & Co. KG has established a long-standing, fundamental understanding of sustainability in its business activities. This intrinsic conviction was crucial for establishing clear criteria for quality and cultivation practices, developing in-depth knowledge of the individual raw materials, setting targets, and continuously evaluating these. "To this end, we have introduced cross-departmental working groups for sustainable raw and packaging materials at Ritter," says Georg Hoffmann, Sustainability Manager at Ritter Sport. "The raw materials cocoa, hazelnuts and milk powder are scrutinized in the meetings. Although palm fat is only purchased in small quantities, it causes major biodiversity risks in cultivation and is therefore also associated with image risks," says Georg Hoffmann. "This is why palm fat is also a raw material that Alfred Ritter GmbH & Co. KG prioritizes, even though palm fat is not very important in terms of quantity."

» **Read more:** [Sustainability reports from Alfred Ritter GmbH & Co. KG.](#)

When prioritizing, it is not only important to analyse how one's own business activities influence biodiversity, but also how business activities are influenced by biodiversity. The question here is: How is the production or sourcing of the respective raw material or semi-finished product affected by (the decline in) biodiversity? This can be highly relevant, for example, if pollination services are required but may be jeopardized by the

Integrating biodiversity into sustainability management

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decline of pollinating insects or if certain fish species are no longer available because the stocks are on the verge of collapse. This consideration corresponds to the dual materiality that is also required in the context of sustainability reporting.

Transparency in the supply chain

To be able to implement meaningful steps to protect and promote biodiversity, it is necessary to know one's own supply chains. This is due to the fact that impacts on biodiversity arise primarily in the country of origin of the raw food products: through the cultivation of the fields, the planting and maintenance of permanent crops, the use of grassland, fishing and the management of aquaculture. It is therefore essential to first trace the supply chains of a company's products back to the origins of the raw materials used. This will be easier for some sourced raw materials or semi-finished products and more difficult for others. Traceability can be particularly complex if the purchased product or semi-finished product has already undergone several processing steps. It is therefore essential to approach this in a structured manner:

1. In the first step, the product composition is determined (recipe)
2. In the second step, the direct suppliers of the purchased raw materials and semi-finished products are identified (tier 1).
3. In the next steps, the indirect suppliers (tier 2 to tier n) are identified - down to the origin of the respective raw materials.

The information for the first and second steps is available to every company. After all, the direct suppliers are the company's own contractual partners. However, the third step - identifying the other suppliers in the chain - can be more challenging. Particularly in the case of semi-finished products, the countries of origin of individual components may not be known. It may even be difficult to identify the origin of individual raw materials, as the supply chain structures are highly complex (multi-tier), or the products are traded on the world market in such a way that their regions of origin are difficult to trace for the corresponding delivery.

Even if such gaps in knowledge exist, they still do not justify stopping to trace the supply chains. Rather, the relevant data gaps should be documented and, if necessary, addressed by researching key production countries for the raw materials. In some cases, these gaps can be closed using generic data from databases. However, it is important to at

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least identify the country (or countries) of origin of the raw materials in question (and to supplement this with statistical information if necessary). Existing gaps in knowledge should then be successively addressed in subsequent years. This is particularly relevant for raw materials and semi-finished products that are crucial to the company's operations or that are associated with a high biodiversity risk.

The results are recorded in a supplier map and can also be used for sustainability reporting (see "Knowledge of the suppliers").

Seeberger Gruppe – Knowledge of the suppliers



Nuts, dried fruit and coffee are the core business of the Seeberger Group. The company processes more than 130 raw materials into snacks and sources coffee specialties from more than 300 suppliers in over 50 countries worldwide. Most of the raw materials rely on the biodiversity services provided by nature, ranging from nutrient-rich soil to pollinating insects. Additionally, they depend on suppliers who produce the raw materials to a high-quality standard.

The Seeberger Group has consistently maintained direct relationships with many of its suppliers and has a high level of transparency in the supply chains for 73 % of its coffee. This is particularly remarkable as most of the coffee trade is conducted via the stock exchange and supply chain transparency is often lacking in this sector. In the case of dried fruit and nuts, the Seeberger Group can trace the supply chain of over 75 % of its suppliers back to the source. The family business has defined a clear goal: Despite the wide variety of raw materials, Seeberger is actively working towards complete transparency regarding the origin of its products. Areas where there is a need for action are identified and addressed. After all, the company is convinced that knowing its suppliers serves as the basis for sustainability and biodiversity management in supply chains. "Direct contact not only helps us to discuss actions to protect biodiversity and other areas of sustainability, but also makes it easier for us to fulfil our sustainability reporting obligations," emphasizes Isabell Schäfer, Sustainability Manager at the Seeberger Group. The regular visits, the joint discussions about improving product quality and sustainability, but above all the many years of reliable cooperation are a great advantage.

»» **Read more:** [Sustainability reports from Seeberger Group](#)

Recognizing and assessing biodiversity risks

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To effectively manage biodiversity, it is essential to assess the risks arising from one's own business activities that impact biodiversity, as well as the risks to the business itself resulting from biodiversity loss. Biodiversity is distributed very differently around the world and is assigned a different value from region to region. This value - the so-called biodiversity potential - can be used to make an initial assessment of biodiversity risks.

This chapter therefore answers the following questions:

- Which risks exist for a company's business activities?
- How should the biodiversity risks in the different sourcing regions be assessed?
- How can this information be used to manage suppliers and raw materials?

Risks due to loss of biodiversity

As already shown, the food sector is particularly affected by the loss of biodiversity. In this regard, the sector is crucially dependent on so called ecosystem services provided by nature (Chapter 4). First and foremost, these include the **provision of food**. Cultivated plants are all derived from wild plants, fish are often taken directly from ecosystems and diverse ecosystem services are used to grow crops, provide animal feed, or operate aquacultures. However, humanity only uses a small part of the diversity provided: just three plants (maize, rice, wheat) provide half of the globally required food energy, while nine plants (potatoes, maize, cassava, oil palms, rice, soybeans, wheat, sugar cane, sugar beet) account for 67 % of the global harvest - and that's with over 6,000 crops, each with countless varieties. The situation is similar for livestock. Of the over 8,500 local livestock breeds, 26 % are at risk of extinction, while the population status of 67 % remains unknown. Global livestock farming is based on roughly 40 animal species, only a handful of which provide most of the globally produced meat, milk and eggs. This concentration on a few plants and livestock poses high risks, especially with the increasing pressure on ecosystems from climate change, growing populations, pollution, and overexploitation, amongst others.^{xii}

Recognizing and assessing biodiversity risks

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Another important service is **pollination**, which is provided by animals, especially insects, and is essential for the fruiting of numerous crops. 35 % of global plant production relies on species that are at least partially pollinated by animals. The most important pollination services are for fruit, vegetables, and nuts. The economic value of the global contribution of pollination services to the annual harvest is estimated at 235-577 billion US dollars.^{xiii}

Soil fertility, which in turn depends largely on soil organisms, is also essential to produce food. Natural material cycles, such as the nitrogen, phosphorus, and carbon cycles, build up and maintain fertile soil layers that are used to produce food. At the same time, 1.4 to 3.2 tons of humus-containing topsoil per hectare are irretrievably lost in Germany every year due to soil erosion (see "Undergrowth against soil erosion"). Regionally, annual losses of up to 50 tons per hectare are possible.^{xiv}

Water storage and purification is also an important function of the soil, which is essential for food production. The droughts, which have become more frequent in Germany in recent years and have caused soils to dry out, have had a major impact on crop yields in many places. The storage capacity of dry soils is severely limited during heavy rainfall, meaning that some fertile soils are washed away as the soils cannot absorb the water.

In line with the principle of double materiality, these examples clearly show how much the preservation and promotion of biodiversity must be in the self-interest of food companies and how important it is for these companies to address the risks to which they are exposed through the loss of biodiversity.

Undergrowth against soil erosion

A supplier of Ritter Sport and Seeberger has specialized in the cultivation of high-quality almonds in California. The company attaches great importance to sustainable agriculture and the protection of biodiversity. Key aspects of implementing biodiversity in almond cultivation are the planting of hedge strips, leaving green strips between the rows of trees, more careful soil cultivation to counteract soil compaction and the conversion of partial areas into



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natural areas. These actions have helped to promote biodiversity on the permanent almond cultivation area.

This commitment to biodiversity has not only paid off for biodiversity, but also for the company and its customers: In 2021, California was surprised by a heavy rainfall event. Other almond growers had to contend with severe and prolonged flooding on their land, resulting in significant crop losses. Thanks to the measures adopted to protect biodiversity and prevent soil compaction, the almond fields of the mentioned company were spared. The main reason for this was that the measures allowed water to seep into the soil. The habitats created in the context of the biodiversity measures served as buffer zones and helped to absorb the excess water. The roots of the plants growing on the green strips between the rows of trees also helped to protect the soil from erosion.

Risk assessment for procurement regions

If the regions of origin are known, it becomes possible to assess the biodiversity value of each region. This assessment can be made using the ecoregion map, which was further advanced in the course of the BioVal project. The ecoregion map shows the different ecological regions on earth and their respective value in terms of biodiversity, the so-called biodiversity potential.

The following factors are considered when calculating the biodiversity potential:

- proportion of roadless regions,
- proportion of forest and grasslands,
- protected wetlands and proportion of wetlands, and
- the sum of the global extinction probability of species in the region.

A region's biodiversity potential is calculated based on the average values of the influencing factors in the region (Figure 4). The value shows in which regions there are high or low risks of causing negative impacts on biodiversity or in which regions significant progress can be made in protecting and promoting biodiversity. Regions with high biodiversity potential, for instance, offer the opportunity to significantly advance the protection and promotion of biodiversity. However, this circumstance does not imply that in regions with a lower value, no attention should be paid to the protection of biodiversity.

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In addition, it must always be borne in mind that the value does not reflect the specific situation of the suppliers themselves but represents an average value for an ecoregion.

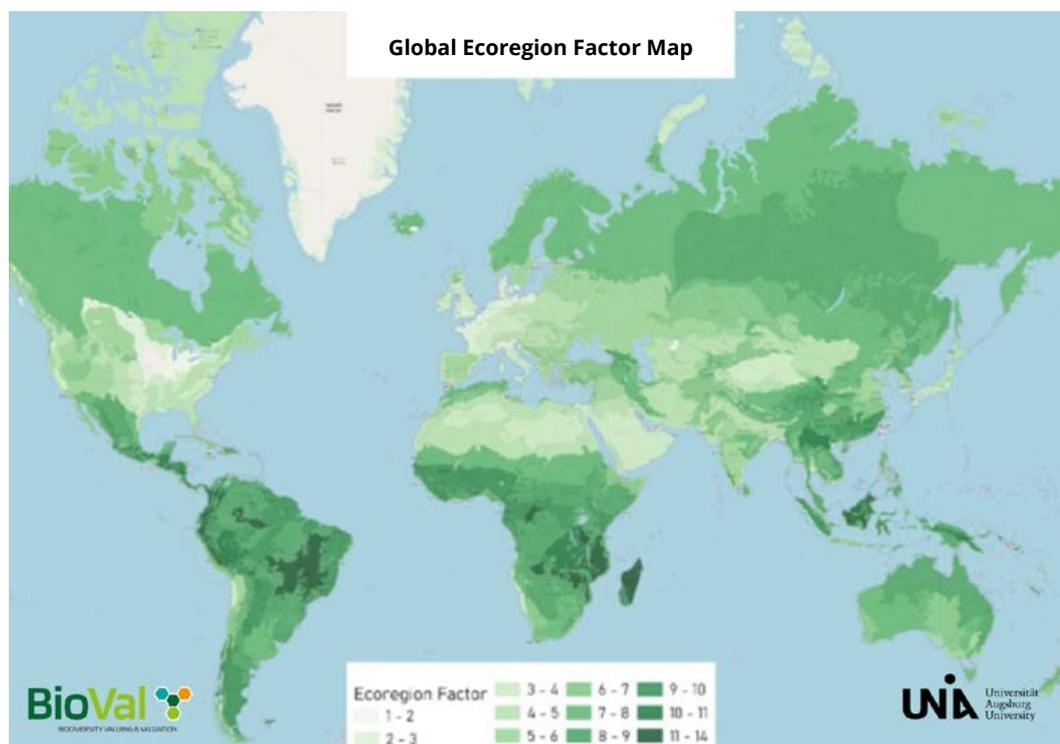


Figure 4: ecoregion map of the earth

The different shades of green on the ecoregion map show the different biodiversity potentials of the world's ecoregions. A higher factor (darker shade of green) indicates a higher biodiversity potential, while a lower factor (lighter shade of green) indicates a lower biodiversity potential. For example, the biodiversity potential in the ecoregions in which Germany is located has an ecoregion factor of between 2.8 and 4.4. These ecoregions therefore have a lower biodiversity potential than, for example, most tropical regions (e.g. the ecoregions in Nicaragua), which have values above 8. The average value for Germany is 3.38 and can be seen in the digitally available [ecoregion map](#), that was developed in the BioVal project.

The ecoregion map was developed during the assessment of potential biodiversity impacts (Chapter 7). Based on the information from the ecoregion map, companies can comparatively assess biodiversity risks for certain supply regions as part of their risk assessment. This information can then also be used for the classification of new and

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existing suppliers. In principle, two different approaches can be pursued here:

- (1) to source the raw material(s) primarily from regions with a lower biodiversity potential or
- (2) to impose (or develop together with suppliers and/or producers) and implement stricter requirements for suppliers and/or producers who source raw materials from or produce in a region with a higher biodiversity potential.

The card can also be used if a replacement for a stock supplier needs to be found quickly. This may become necessary if, for example, the harvest has failed due to weather events such as droughts or floods. In this case, the map can be used to identify regions where the risk of causing a negative impact on biodiversity is lower.

It is essential to also consider the biodiversity potential of ecoregions and the resulting implications for the company's own procurement to anchor the protection and promotion of biodiversity in the company's sustainability strategy. The options presented are not mutually exclusive but depend on the respective application. The following example of Alfred Ritter GmbH & Co. KG (see "Sustainable cultivation in a region with high biodiversity value") shows how the second option was successfully implemented in a region with high biodiversity potential. The practical example of the Seeberger Group in the chapter (see "Supplier evaluation") illustrates how the value of different ecoregions can be used in the risk assessment of suppliers.

Sustainable cultivation in a region with high biodiversity value



For a chocolate manufacturer like Alfred Ritter GmbH & Co. KG, cocoa is the most important raw material. At the same time, the sustainability challenges in cocoa cultivation are huge and range from human rights issues to environmental and biodiversity issues. Today, most of the world's cocoa is grown in West Africa, including Côte d'Ivoire, Ghana, and Nigeria. However, the plant, which is native to the tropics, originally comes from South America.

Alfred Ritter GmbH & Co. KG has focused on establishing its own farm in Nicaragua for its most important raw material, cocoa, to produce the raw material sustainably.

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“Even though we faced a lot of headwinds at the beginning, we are all the prouder that we have succeeded in establishing a functioning agroforestry system in this region, which is very valuable from a biodiversity perspective,” says Georg Hoffmann, Sustainability Manager at Ritter. “Through our own farm, but also through long-term partnerships with cocoa farmers in the region, we have gained direct influence on cultivation.” This enables the family business to produce cocoa in a much more sustainable way, which benefits biodiversity as well as the farmers and workers. The plantation employs 450 people. In addition to around one million cocoa trees, there are more than 30,000 shade trees on the farm’s 2,500 hectares. The state of biodiversity in the farm area has been monitored for many years. It has become apparent that many species that are native to the region, but were previously no longer found, have returned to the area. More than 220 different species have been identified so far. “It is a great success for us that big cats have returned to the farm’s agroforestry system,” emphasizes Hoffmann.

Once the farm has reached full productivity, it will cover 20 to 25 % of Ritter’s cocoa requirements and play a key role in protecting biodiversity in the region. It is hoped that this example will set a precedent and spread far beyond the region. The company has therefore hired ‘Don Schoko’, a friendly sloth, to publicize the project (see “Don Schoko for species protection in cocoa cultivation”).

Management parameters for assessing biodiversity risks

The information from the ecoregion map can also be used to carry out an assessment of biodiversity risks for the entire product range for all suppliers and raw materials (see “Supplier evaluation”). For this purpose, the biodiversity potential of the ecoregion map is assigned to the suppliers and/or the sourced raw materials. This then shows numerically which suppliers, or raw materials have potentially higher or lower risks regarding the conservation of biodiversity - or conversely - lower or higher potential for the protection and promotion of biodiversity.

The generic information can be successively supplemented by specific information (see “Specific and generic data”) on the suppliers or raw materials regarding the biodiversity-relevant parameters in the management of the area or in fishing. It is advisable to base

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the specific information on the management parameters presented below (Table 1). The parameters are differentiated according to land use and marine management; land use is further differentiated according to arable farming, permanent crops, and grassland. They include activities that have an impact on biodiversity, such as fertilization, the use of pesticides or the proportion of structural elements, and which can be influenced by those who cultivate the land or fish. They can therefore also be used as a basis for discussing biodiversity measures (Chapter 8). In addition, some of the parameters were also used to develop a supplier questionnaire, which was tested by the practice partners and other companies. (Download: [📄 supplier questionnaire](#)).

Next Sites Table 1: Management parameters of the different usage classes

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Criteria	Management parameters	Description
Arable crops		
A1: Structural diversity	A1.1: Average field size	Average size of all fields considered in hectares
	A1.2: Structural elements	Percentage of area with structural elements
A2: Soil protection	A2.1: Intensity of tillage	Liters of diesel used per hectare and year for tillage
	A2.2: Soil cover	Percentage of area and time of uncovered soil
	A2.3: Crop rotation	Points based on the diversity in the crop rotation
A3: Material input	A3.1: Fertilization intensity	Kilograms of nitrogen input per hectare and year
A4: Plant protection	A4.1: Pesticide use	Application of pesticides per hectare and year
Permanent Crops		
D1: Biodiversity	D1.1: Diversity of crops	Number of different crops grown
D2: Structural diversity	D2.1: Average field size	Average size of all fields considered in hectares
	D2.2: Rotation cycle	Number of years the crop is used before before it is replanted in years
	D2.3: Age distribution	Number of different age classes in the plantation
	D2.4: Maintenance actions	Percentage of the area on which maintenance actions are conducted
D3: Soil protection	D3.1: Intensity of tillage	Liters of diesel used per hectare and year for tillage
	D3.2: Soil Cover	Percentage of area and time of uncovered soil
	D3.3: Removal of biomass	Percentage of biomass removed from the ecosystem
D4: Material input	D4.1: Fertilization intensity	Kilograms of nitrogen input per hectare per year
D5: Biodiversity	D5.1: Pesticide use	Application of pesticides as CTUe (Comparative Toxic Unit ecological) per hectare and year

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Criteria	Management parameters	Description
Grassland		
P1: Structure diversity	P1.1: Average field size	Average size of all fields considered in hectares
	P1.2: Structure elements	Percentage of area with structural elements
P2: Soil protection	P2.1: Intensity of tillage	Liters of diesel used for tillage per hectare and year
	P2.2: Soil cover	Percentage of area and time of uncovered soil
	P2.3: Grazing	Frequency of mowing or stocking rate
P3: Material input	P3.1: Fertilization intensity	Kilogram nitrogen input per hectare and year
P4: Plant protection	P4.1: Pesticide use	Application of pesticides as CTUe (Comparative Toxic Unit ecological) per hectare and year
Fishing		
F1: Direct exploitation	F1.1: Target species	Annual quantity of target species caught, including discards
	F1.2: Bycatch	Annual amount of bycatch caught, including discards
F2: Soil protection	F2.1: Intensive damage to the seabed	Area and frequency of intensive damage to the seabed per year
	F2.2: Moderate damage to the seabed	Area and frequency of moderate damage to the seabed per year
	F2.3: Slight damage to the seabed	Area and frequency of slight damage to the seabed per year
F3: Climate change	F3.1: Diesel consumption	Annual diesel consumption
F4: Pollutant emissions	F4.1: Antifouling	Annual emissions of antifouling agent
	F4.2: Oil	Annual oil emissions
Aquaculture		
Q1: Nutrient input	Q1.1: Nitrogen	Annual emissions of nitrogen
Q2: Pollutants	Q2.1: Antibiotics	Annual emissions of antibiotics
Q3: Culture	Q3.1: Stocking density	Average stocking density of cultivated species
	Q3.2: Species diversity	Number of species in aquaculture
Q4: Structure diversity	Q4.1: Natural habitats	Proportion of area of natural habitats

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Seeberger Gruppe – Supplier evaluation



As part of the implementation of its sustainability strategy, the Seeberger Group has conducted a sustainability assessment of suppliers. As part of the BioVal project, this evaluation approach and the underlying supplier questionnaire were reviewed and further developed to include biodiversity.

“For us, an integrated approach is particularly important,” emphasizes Verena Schädler, Sustainability Manager at the Seeberger Group. “Sustainability is a holistic approach, and biodiversity is an important aspect that we want to reflect appropriately, especially as all of our products are linked to land use.”

On the one hand, the biodiversity assessment of the suppliers includes identifying the biodiversity potential of the various regions of origin from which the Seeberger Group sources its agricultural raw materials. On the other hand, the assessment includes collecting various parameters that influence biodiversity using a questionnaire. These parameters are based on the so-called management parameters of the quantitative assessment method for biodiversity (BVI method) (Chapter 7) and enable an assessment of the suppliers regarding to their commitment to the protection of biodiversity. For this purpose, the supplier questionnaires, buyer assessments and generic data are mapped in numerical values. These values are used to determine the overall risk. “It is also important for us to use these values to be able to discuss measures for protecting and promoting biodiversity jointly with suppliers and also to be able to see the development over time,” says Nadine Kellner, responsible for sustainability in Purchasing. By adding few additional information, a quantitative assessment could also be conducted at product level in the future. “How and whether we will integrate this into our sustainability management in the future has not yet been decided. Above all, this depends on which measures we can implement to achieve the greatest benefit for biodiversity as part of our strategy,” says Sustainability Manager Isabell Schäfer, highlighting the possibility of interlinking management tools.



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To manage biodiversity along the supply chain, it must be possible to assess the potential biodiversity impacts caused by cultivation, animal husbandry, fishing and the processing of the various raw materials and semi-finished products. This is best done using the life cycle assessment methodology according to ISO 14040/44 in the form of a biodiversity footprint. In the BioVal project, a method for estimating the impact on biodiversity, the BVI method, was further developed for this purpose. The BVI method is used to calculate the so-called Biodiversity Value Increment (BVI). The procedure is comparable to the methods used for quantifying other environmental impacts, such as impacts on climate change and the impact of climate change on the planet. In the following, the procedure for estimating impacts on biodiversity will be described.

This chapter helps to answer the following questions:

- For what can the biodiversity footprint be used?
- What does the biodiversity footprint show?
- How are the impacts on biodiversity assessed?
- How do specific or general, average (generic) data influence the validity of the biodiversity assessment?

Benefits of the biodiversity footprint

To begin with, the biodiversity footprint offers multiple applications, making it valuable for companies to explore it more closely.

- One possibility is to use biodiversity footprints to compare different origins of the same product in terms of their biodiversity impact. For instance, it would be possible to determine whether lentils from Canada have a higher or lower impact on biodiversity than lentils from the Swabian Alb.
- Another option is to compare different products with the same product benefit (how high is the biodiversity footprint of milk compared to an oat drink,



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a soy drink or a pea drink?) or compare the impact of different farming practices (organic cucumbers versus conventional cucumbers) or fishing methods (trawling versus longlining).

- Furthermore, complete product portfolios can be evaluated in terms of their impact on biodiversity. This evaluation can facilitate decision making in product development, for example regarding recipes or sourcing of raw materials (see “Integration of the biodiversity footprint into the merchandise management system”).
- Lastly, by calculating the footprint for several scenarios with varying yield, use of fertilizers or fishing method, starting points for reducing negative impacts on biodiversity can be identified (Chapter 8).

What does the biodiversity footprint show?

Biodiversity is influenced by human activities in different ways, so-called impact pathways. For example, diverse structures on the utilized area (hedges, groups of trees, watercourses, etc.) have a direct influence on the biodiversity of the utilized area, as they represent diverse habitats, which in turn enable a higher diversity of species. Similarly, ploughing the field has a direct impact on biodiversity on the piece of land that is being ploughed. At the same time, the greenhouse gases emitted by the tractor during ploughing have an indirect impact on global biodiversity by contributing to climate change, which in turn affects biodiversity. The direct influence of greenhouse gases on the land used, on the other hand, is low. The effect of individual greenhouse gas emissions on global biodiversity is part of an overall significant effect. The situation is different with the use of water, such as for example for the irrigation of agricultural land. In this case, the impact on biodiversity is typically confined to a specific region, for example along the watercourse from which the water was taken for irrigation. Here, an impact on the global water cycle is rather unlikely. Lastly, a general, omnipresent pollution is caused by environmental influences or pollutants without a specific identifiable source. Pollution may arise from air pollutants such as particulate matter, nitrogen oxides and ozone, atmospheric deposition of (harmful) substances such as nitrogen or contaminated sites in soils and waters that have already been introduced by previous activities. Ecosystems are continuously exposed to this so-called background pollution. Knowledge of background pollution is important to be able to assess the additional pollution from specific sources and to plan suitable measures to protect biodiversity.

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To include these various effects, the biodiversity footprint maps the direct and indirect effects on biodiversity:

- **Direct impacts:** This includes the impacts that occur directly on the managed piece of land or in the managed coastal area. Existing background pressures that already have an impact on biodiversity are also considered.
- **Indirect impacts:** This includes regional and global biodiversity impacts that can arise from resource use and emissions from the local product system. The existing background pollution is also taken into account here, as it plays a significant role in indirect impacts relative to the product system.

The direct and indirect effects are initially balanced separately and then added together to form the biodiversity footprint.

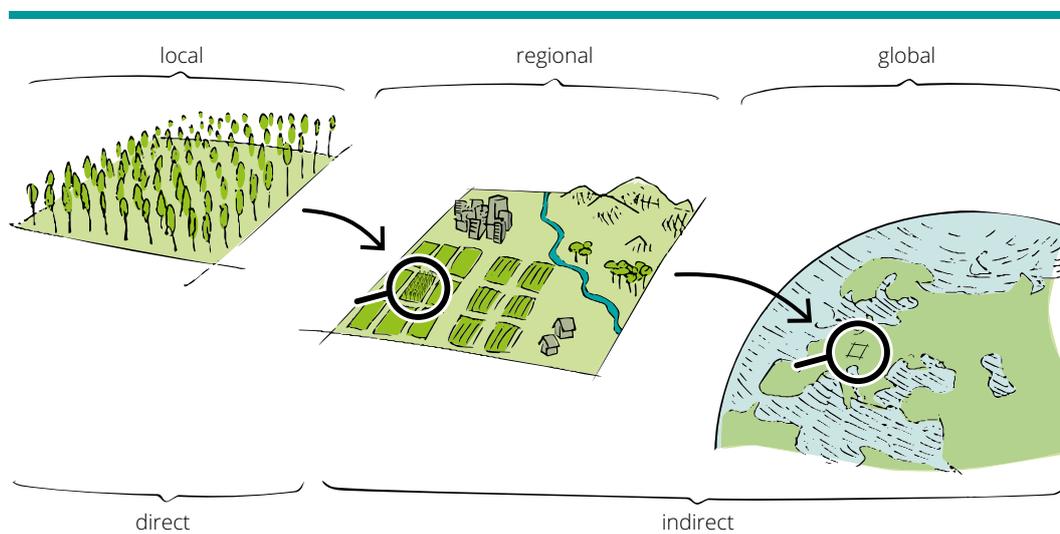


Figure 5: The biodiversity footprint



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Calculation of the biodiversity footprint

Just like the climate footprint of products, the calculation of the biodiversity footprint follows the International Standard for Life Cycle Assessment (ISO 14040/44). In contrast to the climate footprint, however, it is not the impact on the climate that is calculated, but the impact on biodiversity.

As with any assessment, data is required to calculate the biodiversity footprint. The more specific this data is, the more meaningful the result and the more targeted the identification of concrete options for action (see “Specific and generic data”). However, it will not always be possible to collect specific data. For example, if the raw materials are only sourced in small quantities or if the supply chain comprises many stages, it may be difficult to obtain complete data. Also, not all suppliers will always be willing to share the required information - at the level of their own company or about the produced goods - or the information may actually not be available.

In these cases, but also to familiarize oneself with the biodiversity assessment, it is possible to use so-called generic data (vgl. “Specific and generic data”). Generic data is usually based on average data for a product, a region, or a production system. As these are average figures, they do not allow for the derivation of customized measures for the respective suppliers or producers. However, they do allow for the identification of regions with different biodiversity potential and can result in discussions with suppliers about their cultivation practices or fishing methods. The latter may help to identify needs for action and potentials to protect and promote biodiversity.

Databases such as the French [Agribalyse](#) database offer the possibility of calculating the biodiversity footprint using generic data. In case of doubt, it is therefore always possible to use generic data to obtain at least an initial assessment of the biodiversity footprints of different products, product origins or production method (e.g. pasture or livestock farming). This initial assessment also allows balancing ingredients for a complex product for which no specific data can be determined. Generic data can also be used as a supplement to obtain a comprehensive picture of the impact on biodiversity if some specific data is available but not complete.



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Specific and generic data

Specific data

It is obvious that conclusions about required measures for the suppliers or raw materials in question can best be drawn based on specific data. Specific data is **more accurate** than generic data, as it describes the situation for the raw material or production facility in question. They therefore provide insights into specific circumstances, based on which **tailored measures** for the protection and promotion of biodiversity can be derived. Collecting specific data comes with the disadvantage that it is typically associated with some **effort** and that it may only reflect a specific local situation. The results therefore cannot be easily transferred, for example, to the entire region in which the corresponding supplier company operates, or the corresponding raw material is produced.

Generic data

Generic data - if it is made available in corresponding databases or biodiversity maps (e.g. the ecoregion map, Figure 4) - has the great advantage that the data collection effort for the company is low. They are usually based on **average data** for a country, a region, or a production method for a specific raw material. They are very valuable for gaining an initial insight into the biodiversity risks associated with certain raw materials or in certain regions. They can also be used to fill in missing specific data, for example if specific information is lacking for a few ingredients in a more complex product. Even if a region is to be newly developed as a supplier region for a product, they provide valuable information on what needs to be considered for the protection and promotion of biodiversity. However, it is difficult to derive tailor-made measures on this basis.

Calculation of direct impact

The direct impacts are calculated via the influence that the various management parameters (see Table 1) have on the land or sea area as well as the yield that is achieved on the area in question (e.g. kilograms of potatoes per hectare or kilograms of herring per square meter). The biodiversity potential of the region in which production takes place is also considered (Figure 4).



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In concrete terms, the following information is required to determine the direct effects of the biodiversity footprint based on **specific** data:

- The specification of the **food commodity**, for which the biodiversity footprint is to be calculated.
- Information on the **region** in which the product in question was produced or taken from the sea.
- The **year** for which the biodiversity footprint is to be calculated, including the specific information on the management parameters and yield for the corresponding year.
- A classification of the production process under consideration into the appropriate usage class (see Table 1). A distinction is made between raw materials produced on land and at sea. The products are divided into different use classes depending on their production or sourcing, each of which is characterized by its own management parameters. Land-based products are divided into arable farming, grassland use and permanent crops, while marine products are divided into fishing and aquaculture.
- Information on the **yield per area** (e.g. kilograms per hectare for agricultural products or kilograms per square meter for marine products) for the food commodity in question.
- The information on the respective **management parameters** that are relevant for the food raw materials under consideration (see Table 1).

As already mentioned, the biodiversity footprint can also be determined entirely based on **generic** data. If this is the case, the following information is required::

- The specification of the **food commodity** for which the biodiversity footprint is to be calculated.
- Information on the **region** in which the product in question was produced or taken from the sea. If this information is not available or is only vague, e.g. only "Latin America" and not "Peru" or "Cuzco in Peru", then this information can also be used. However, the significance of the result is correspondingly less specific.

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- A classification of the production process under consideration into the appropriate **usage class** analogous to the calculation based on specific data.
- The **year** for which the biodiversity footprint is to be determined, including the required information on the yield for the corresponding year from the database.
- Information on the **yield per area** for the food commodity in question. This information can be taken from the [FAO database](#), for example.
- An assessment of how the area is managed (**intensively, extensively, or in between**) or which fishing method was used (e.g. bycatch rate).

A dashboard has been developed to calculate the on-site impacts of agricultural products, in which the individual calculation steps are explained. The dashboard can be downloaded [here](#) free of charge.

Calculation of indirect impact

In most cases, it can be assumed that the product system under consideration (e.g. an agricultural area or a fishing vessel) only has a marginal impact on biodiversity in a regional and global spatial context. The effects of the product system are therefore either part of the overall impact or marginally increase the background impact. Example: The nitrogen washed out after fertilization of a field in Lower Saxony is only a small part of the total nitrogen pollution (and the associated eutrophication) of the North Sea. Consequently, regional, and global effects are initially calculated based on existing data on background pollution. This is done in a similar way to the direct effects: The biodiversity value of a section of the earth's surface is impaired for a certain period of time by the impact of anthropogenic drivers. This is the damage or indirect effect. The contribution of the product system under consideration to these effects is determined, or the effect of a marginal change.

To calculate the indirect effects, the same information is required as for the direct effects.

A more detailed description of the calculation of the biodiversity footprint can be found on the [BVI-method](#) website.

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FROSTA AG –

Integration of the biodiversity footprint into the merchandise management system



At FROSTA AG, the biodiversity calculation according to the BVI method is being successively integrated into the merchandise management system. Other environmental impacts, such as effects on the climate or the use of water, have already been considered in the merchandise management system for several years.

FROSTA AG combines specific and generic data from databases to calculate the biodiversity footprint. For the agricultural raw materials produced in-house, the calculation is based almost entirely on specific data. For purchased food raw materials, the company uses partly specific data and partly generic data. “The BVI method is particularly suitable for us, as it allows us to combine specific and generic data,” says Helene Eulenstein, Sustainability Manager at FROSTA AG. “This is important for us as we try to be as specific as possible, but unfortunately not all specific data is always available for all the raw materials in our products.” The biodiversity footprint for raw food products is currently being integrated into the system. In the future, it will also be added for packaging materials.

The system is not only used to calculate the environmental impact of FROSTA products as a basis for providing consumers with transparent information, for example on the carbon footprint. It is also used for the development of new recipes and for the calculation of the environmental footprint of the entire product portfolio. Additionally, it is anchored in the corporate strategy. As the calculations are largely automated, different scenarios can be calculated and compared with little effort. Thanks to the simultaneous integration of data on climate, water, and biodiversity, FROSTA AG can then use a single evaluation to anticipate the impact of a recipe change on greenhouse gas emissions, the amount of water used or, in future, on biodiversity. On this basis, it can be continuously checked whether the product portfolio has become more ecological.

» **Read more:** [Sustainability report from FROSTA AG](#)

Setting goals and deriving measures

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To be able to act, the results of the analyses must be translated into long-term goals, which must then be backed up with operational goals, measures and budgets (Chapter 5).

This chapter answers the following questions:

- Which aspects should long-term goals for the protection and promotion of biodiversity be based on?
- How can the analyses be used to derive measures for the protection and promotion of biodiversity?
- What are examples of measures?

Setting goals

Long-term goals for the protection of biodiversity must be aligned with the current and future positioning of the company and integrated into the company's sustainability strategy (see "Long-term goals for the protection of biodiversity"). This also determines, for example, how ambitious the targets can be. It is also advisable to examine the vision and mission of the company to determine whether the protection and promotion of biodiversity are adequately reflected in the company's orientation (Chapter 9).

FROSTA AG – Long-term goals for the protection of biodiversity



FROSTA AG has been aligning its corporate strategy with sustainability for many years and was one of the first medium-sized companies to integrate the calculation of product carbon footprints into its merchandise management system. Over the years, these activities have been expanded and further environmental impacts have been



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integrated into the calculations. This information is used, for example, to take ecological aspects into account when developing new or improving existing recipes and when making investment decisions. One prerequisite was that the calculations could be conducted with little effort. FRoSTA based its approach on the life cycle assessment formulated in ISO 14040/44.

The frozen food company processes countless raw food products for its ready meals, gourmet fillets, herb cubes and vegetable mixes and therefore knows very well how important biodiversity is for its own business activities. For this reason, the company has taken part in the BioVal research project: "The research project offers us the opportunity to determine how to integrate the calculation of biodiversity impacts into our merchandise management system," emphasizes Tomke Hinrichs, Sustainability Manager at FRoSTA AG. "One of the goals we have set ourselves in our sustainability strategy is to measurably improve the ecological footprint of our product portfolio every year. To achieve this, it is necessary to integrate the calculation of the impact on biodiversity into our life cycle assessment."

The long-term goal of continuously and measurably improving the ecological footprint of the product portfolio was broken down into operational goals, which were then backed up with measures. The first operational objective was to determine whether the calculation could be included in the merchandise management system. The corresponding measure was to participate in the BioVal project. Once it has been clarified that integration is possible, the next goal is to implement this by the end of 2026 so that an overall ecological score of the product portfolio can be calculated. The corresponding measures therefore include the integration in the merchandise management system, the development and implementation of the concept for the overall score and the integration into product development.

"Implementation requires a lot of persuasion," says the sustainability manager, "because we have to adapt processes, integrate additional information into the system and, last but not least, impart knowledge internally on how the information can be used in product development, for example."

To protect and promote biodiversity, companies in the food industry should also set themselves targets that specifically aim to reduce the direct impact on biodiversity. This can be approached in different ways. Companies that own agricultural land or fishing vessels have different opportunities to exert influence than those that can only imple-

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ment actions at the origin of raw materials through their suppliers (see “Sustainable cultivation in a region with high biodiversity value”). This shows once again how important it is to know the suppliers right down to the origin of the raw materials when managing biodiversity (Chapter 5).

Once the goals have been formulated, it is necessary to develop corresponding measures. As the objectives of the individual companies will differ, the following section provides insights on how the BVI method (Chapter 7) can be used to derive actions for more biodiversity-friendly raw material sourcing. The particular focus here are the management parameters that influence biodiversity (Table 1). The actions are therefore broken down below into measures for agriculture (arable crops, permanent crops, and grassland), fishing and aquaculture.

Deriving measures for agriculture

At the agricultural level, it is clear that pesticides² reduce some of the biodiversity on the land used, for example by eliminating undesirable plants on the field or certain insects that affect the desired crop. This means that the use of pesticides and the protection of biodiversity usually represent conflicting goals. It is therefore obvious that any measure that helps to reduce the negative effects of the pesticides used is positive for the conservation of biodiversity. This may include, for example, the use of pesticides with less ecotoxic properties or the overall reduction of the use of pesticides.

The same applies to fertilization. Areas with a very high nutrient content - especially nitrogen - are generally poorer in species. In addition, the leaching of nutrients has negative effects elsewhere. This occurs, for example, through the accumulation of nutrients (eutrophication) in bodies of water. The nutrients promote algae growth which in turn reduces the oxygen content of the water and impairs the incidence of light, with corresponding negative effects on fish and other organisms living in the water. Thus, an adapted and targeted use of fertilizers that does not lead to over-fertilization makes a clear contribution to the protection of biodiversity.

It has also been proven that smaller structures provide more habitats for species and



² Pesticides, also known as plant protection products, are used in agriculture to protect the desired crop from so-called “pests” - i.e. natural biodiversity. Pesticide is a generic term for all types of plant protection products, such as herbicides, insecticides, acaricides, fungicides and rodenticides

Setting goals and deriving measures

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are beneficial for biodiversity. The management parameters of field size and structural diversity can therefore also be used to derive specific measures.

For example, reducing the field size, subdividing the field with flower strips, growing different crops on the field, planting hedges, or maintaining groups of trees can help to protect and promote biodiversity.

The same applies to the parameters of tillage and soil cover. Soil cultivation impairs biodiversity in the soil. Thus, a lower cultivation frequency and depth are beneficial for biodiversity. Soil cover, e.g. through green manure, on the other hand, provides additional habitat and can also offer protection during climate-related heavy rainfall events. It can also be beneficial for biodiversity to leave unused plant parts in arable crops on the field or, in the case of permanent crops, to keep biomass such as cut branches resulting from maintenance measures on the field. Both approaches enrich the soil with organic matter or create additional habitats, e.g. for beneficial insects.

Finally, crop rotation is a crucial component of biodiversity conservation on agricultural land to create more varied habitats, but also to preserve the genetic diversity of crops. Besides crop rotation, the use of a variety of different animal breeds is also beneficial.

In the case of permanent crops such as almonds or cocoa trees, where crop rotation only plays a role for crops between the rows, a relevant measure can be establishing permanent crops with different age distributions. This is best achieved through smaller, staggered areas with the same age distribution. For biodiversity, this has the advantage that once the crop has reached the end of its yield, not the entire permanent crop but only smaller areas have to be replanted.

When managing grassland with the goal of conserving biodiversity, one should consider choosing the time of mowing or the start of grazing according to local conditions. In doing so, for instance, birds that breed on the ground can be protected. The mowing frequency should also be well thought out to preserve habitats for insects. One approach could be not mowing individual areas with each mowing but alternating these areas throughout the year so that flowering plants are always present.

Deriving measures for fishing

In fishing, living creatures are taken directly from the ecosystem. This means that

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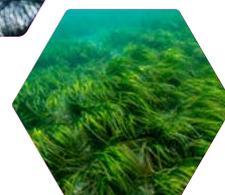
measures must start right here: First of all, it is important to check how the population of the desired species is classified in the intended fishing area. Here, labels such as the MSC label (Marine Stewardship Council) or classifications by environmental organizations such as the WWF (World Wide Fund for Nature) or Greenpeace can help. This is due to the fact that overfishing of stocks is a major problem for biodiversity. It is equally important to select fishing methods that minimize bycatch and do not damage the seabed. Here, too, it is necessary to take local conditions (e.g. coral reefs, seagrass beds, etc.) into account.

The protective coatings, which are applied to fishing vessels to prevent algae and mussel infestation can also have a negative impact on biodiversity, if antifouling agents containing biocides are used. In the interest of biodiversity protection, equally effective biocide-free antifouling agents should be used.



Deriving measures for aquaculture

In the case of aquaculture, measures should be particularly geared towards ensuring that aquaculture does not have a negative impact on the surrounding ecosystem. Therefore, implemented measures should aim at minimizing nutrient emissions which are caused, for example, by feed or by the excrement of the animals. An excessive input of nutrients is associated with negative effects on other organisms living in the water. The same applies to inputs of medicines, especially antibiotics, which are associated with negative effects on species naturally living in the ecosystem. The adoption of measures that reduce the use of medicines are therefore crucial.



Both nutrient emissions and the use of medicines are closely linked to the stocking density of aquaculture. The more individuals in a confined space, the greater the risk of disease with the corresponding use of medication and the higher the nutrient emissions from aquaculture with the negative effects on biodiversity outlined above. In addition, the risk of individuals escaping from aquaculture generally increases with the increase in stocking density. These escaped individuals, however, can pose a threat to the natural ecosystem. The associated risks can vary greatly. For example, individuals of the aquaculture are usually larger than naturally occurring individuals and are therefore a food competitor. At the same time, they are often no longer able to reproduce in the natural ecosystem and are usually more susceptible to disease. They therefore threaten the survival of the natural population. Another risk is that the escaped individuals occupy



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the ecological niche of the naturally occurring species, thereby endangering their continued existence (invasive species). Measures that target the stocking density are therefore key to reducing the risks to biodiversity posed by aquaculture. They become all the more important as stocking density is increasingly attracting public attention in terms of animal welfare issues.

Anchoring biodiversity protection in the company

Overcoming challenges in corporate biodiversity management requires not only the consideration of processes, ranging from risk assessment to the measurement of biodiversity impacts, but also the intra-organizational anchoring of biodiversity. Managing the skills of employees, responsibilities, suitable organizational structures, and incentive systems play a decisive role here.

This chapter answers the following questions:

- How can the protection and promotion of biodiversity be anchored in the company?
- How are the protection and promotion of biodiversity integrated into corporate processes?
- How can employees be sensitized and motivated to protect and promote biodiversity?
- How can the protection and promotion of biodiversity be carried into the supply chain?

Central responsibility

Ideally, the company's senior management is already convinced of the goal of protecting and promoting biodiversity or can be convinced of its relevance. If this is the case, it is more likely that time capacities, guidelines and financial resources will be created within the company.

Corporate management plays a central role, as this is the only way to anchor biodiversity in the company through, for example, the corporate vision and mission as well as long-term goals (Chapter 8).

The anchoring of biodiversity in the management has a particularly strong impact, as a company's clear commitment to the protection and importance of biodiversity (see "Quotes from the field") emphasizes the urgency of implementing biodiversity-promoting measures in and by the company.

Anchoring biodiversity protection in the company

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To adequately anchor the protection and promotion of biodiversity in the company's organization, it can be helpful to clearly define responsibilities and adapt the structures as well as decision-making and implementation processes accordingly. One building block for this is the appointment of a sustainability manager. This position can be seen as a network node that bundles and further develops all biodiversity-relevant skills and activities across departments and is in contact with relevant external stakeholders (e.g. via forums or by talking to suppliers together with Purchasing) to protect and promote biodiversity. Overall, this central position serves to raise awareness of biodiversity both internally and externally and to communicate about it.

Structures to promote biodiversity in the company

To integrate biodiversity into company processes and implement measures effectively, additional responsibilities in the various departments central to biodiversity are required. These include the purchasing, product development and quality assurance departments. The internalization of biodiversity protection throughout the company can be further advanced by establishing cross-departmental teams, appointing biodiversity, and sustainability officers in key departments (e.g. in purchasing), building up expertise throughout the company and raising awareness of the protection and promotion of biodiversity within the company.

Although the company's sustainability management can coordinate activities and monitor current developments, biodiversity needs to be anchored in the various departments where experts for the operational processes are located (see "Anchoring sustainability management in the company"). Like this, appropriate measures for previously set goals can be developed and implemented (Chapter 8). In this regard, companies often initially choose creating individual projects for which teams are assembled. Ritter Sport did this, for example, for the more sustainable procurement of cocoa. The creation of biodiversity projects can have many advantages, including the complementary nature of each team member's skills and perspectives and the opportunity to develop and test new solutions within the team (see "Integration of the biodiversity footprint into the merchandise management system"). However, exclusively dealing with biodiversity in the context of projects can also come with the disadvantage that projects usually occur in addition to daily work and lose importance once the project is completed. Care must be taken to ensure that the project content is swiftly integrated into company processes and that appropriate responsibilities and competencies are established.

Anchoring biodiversity protection in the company

Seeberger Gruppe - Anchoring sustainability management in the company



In recent years, the Seeberger Group has progressively strengthened its sustainability management and defined responsibilities in key departments. The company has created a central responsibility for sustainability in Purchasing, which comes as an addition to the central staff unit that is responsible for sustainability reporting and reports directly to the management.

This ensures that sustainability issues are adequately mapped in the supply chain. "That's why the BioVal project is also my responsibility," says Nadine Kellner, who is responsible for sustainability in Purchasing. She regularly accompanies the company's purchasers on supplier visits to address and explain important sustainability issues such as human rights due diligence and biodiversity protection measures and to discuss optimization potential together with the suppliers. "We are currently testing the BVI dashboard³ with selected suppliers for various of our products on different continents. The idea is to make the tool available to suppliers so that they can assess their own management practices in terms of biodiversity directly on site."

In the opinion of Isabell Schäfer, Central Sustainability Officer, anchoring sustainability in Purchasing has proven its worth: "A better understanding of the process in Purchasing makes implementation easier and gives us a more valid and better overall view of suppliers and possible approaches to biodiversity protection. However, it is just as important to communicate the importance of biodiversity within the company, because ultimately, as a food company, we at Seeberger are very dependent on biodiversity."

Raising employee awareness and motivation

Developing knowledge on biodiversity is a crucial prerequisite for further integration to succeed. This can be achieved by training employees. In BioVal, we have developed an exemplary set of slides for internal training courses ([↗ download set of slides](#)). Other ways of building up biodiversity knowledge within the company include exchanging information in forums or recruiting staff. In any case, it is important that biodiversity expertise is built up within the company. This is particularly necessary in those departments that

³ The BVI Dashboard is an Excel tool that was developed as part of BioVal and can be downloaded [here](#) free of charge.

Anchoring biodiversity protection in the company

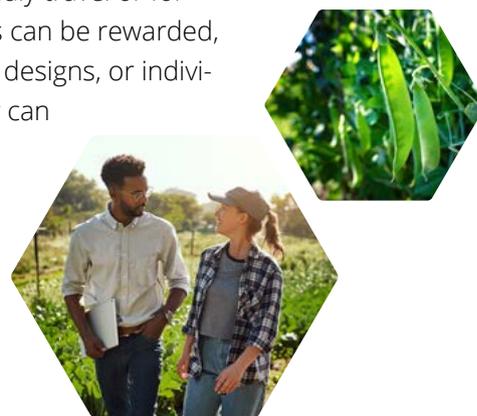
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have a major influence on the company's biodiversity performance. This is because the integration of biodiversity into company processes requires not only strategic decisions at management level, but also active awareness-raising and implementation by employees. Comprehensive measures for increasing biodiversity awareness are therefore conducive to achieving an effective anchoring in the company.

To strengthen biodiversity awareness, awareness-raising projects can also be implemented directly at the company site. Examples include projects such as the installation of insect hotels, the planting of flowering meadows by employees or the use of biodiversity-friendly food in the canteen. Symbols and audio-visual elements such as icons, mascots or sounds can also be used to provide regular information on biodiversity and make it visible and tangible. Some companies have even designed their own biodiversity mascots that explain the positive effects of biodiversity protection on the value chain and agricultural productivity in a playful way (see "Don Schoko for the species protection in cocoa cultivation"). In this way, biodiversity can be made tangibles for all employees. In addition, communicating the (biodiversity) vision and mission as well as the defined values and goals can create an orientation framework for everyone.

Incentive systems for employees can be helpful in promoting active engagement. For example, companies can provide monetary incentives for climate-friendly travel or for soil-conserving agriculture on their own land. In addition, project ideas can be rewarded, for example for biodiversity-friendly production methods and product designs, or individual employees or teams with a particular commitment to biodiversity can receive an award (non-monetary incentives).

All these actions contribute to a corporate culture that views biodiversity as an integral part of the company's understanding. This not only raises awareness, but also creates a basis for long-term environmental commitment.



Bringing biodiversity protection into the supply chain

If the company itself is aware of biodiversity, the logical next step is to bring the issue into the supply chain. Companies can position themselves as multipliers for biodiversity protection and use their influence to protect biodiversity in the country of origin of the raw materials. Raising awareness among suppliers is a first step. This involves informing suppliers about biodiversity, jointly discussing possible biodiversity measures and

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communicating the resulting activities. This can be done, for example, with the help of an information letter in which the company's own biodiversity goals and actions are listed to emphasize biodiversity as a relevant sustainability issue. Emphasizing the urgency for suppliers, it can be made clear that biodiversity will (in the future) become part of the supplier assessment. In addition, the protection of biodiversity can be anchored in the [↗ Supplier Code of Conduct](#).

Reflecting on business practices and promoting specific cooperation projects with suppliers are further instruments for raising awareness of biodiversity. Concrete measures for improvement should be derived from these findings. Companies can continuously expand their opportunities to exert influence, especially in complex supply chains. Regular meetings with suppliers can serve to evaluate progress and jointly determine further steps (Chapter 8).

The aim should not be to view cooperation with suppliers as an isolated project. Instead, biodiversity should be integrated into the existing supplier management. Standards and guidelines such as a [↗ Code of Conduct](#) can help to ensure that planned measures are successfully implemented. Incentives for suppliers, such as awards for outstanding biodiversity performance or the communication of the supplier's biodiversity performance on products, can provide additional motivation. Companies can also create monetary incentives to reward suppliers who are committed to biodiversity-friendly cultivation or production methods. Continuous engagement with biodiversity protection leads to a deepening of knowledge and enables processing companies as well as their suppliers to adapt their goals and measures as needed.

Anchoring biodiversity protection in the company: a continuous process

Anchoring biodiversity conservation in the company requires time, patience, and continuous adjustments. Alternating between creating a sense of purpose, implementing measures, and using instruments forms the basic framework for the long-term integration of biodiversity conservation in the company. In the long term, effective implementation of biodiversity management (Chapter 5) can lead to an increased awareness of biodiversity within the company.

Over time, this can result in the development of a corporate culture that promotes biodiversity. As a prerequisite, the company should be prepared to continually reflect

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critically on its own actions and on opportunities to exert influence and actively shape an open exchange between departments and along supply chains. It can also be helpful to share one's own best practices and to engage in an exchange with other companies in the food industry (see "Learnings from three years of BioVal in practice"). Mutual learning and openness can certainly be beneficial for the corporate culture.

As it is the case with all new topics, the integration of biodiversity into a company's sustainability management first and foremost requires determining responsibilities and involvements – whether internally or externally. In practice, the integration of new topics does not always follow the outlined ideal-typical process and is rarely as linear as outlined. Instead, it is important to consider and utilize the dynamics that arise when processes are adapted to integrate new topics. It will be necessary to constantly readjust priorities, goals, and actions. This includes reacting to uncertainties that arise, such as a shortage of raw materials, as well as the necessary revision of in-house data interfaces that make it necessary to find alternative solutions.

Companies should not be discouraged by this but should continue to pursue their path towards greater biodiversity protection and promotion at their own pace.

Learnings from three years of BioVal in practice



An interview analysis at the beginning and end of the BioVal project with the participating practice partners shows a growing awareness of biodiversity. The three companies have integrated biodiversity into their processes, for example through training, strategic actions, and communication initiatives. Initial applications of the BVI method have already helped to make biodiversity targets "more precise and tangible."

However, companies also face challenges when it comes to the further integration of biodiversity into their management systems. These include conflicting objectives between biodiversity and other factors such as quality or animal welfare, as well as dependencies within the supply chains and the associated limited scope for influence. Different cultivation conditions at the origin and the large number of different suppliers also make it difficult for companies to formulate standardized biodiversity



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criteria. In some cases, potential for improvement is also seen in internal company and customer-oriented awareness-raising. The complexity of the biodiversity issue and the lack of knowledge in some cases are cited as barriers here.

At the same time, opportunities are seen in current developments. For example, new reporting obligations such as the Act on Corporate Due Diligence Obligations in Supply Chains (LkSG) and the Corporate Sustainability Reporting Directive (CSRD) are helping to increase the focus on biodiversity. In addition, the measurement of biodiversity impacts, e.g. using the BVI method, helps to raise awareness of the need to protect biodiversity. Transdisciplinary projects such as BioVal are also seen as important levers for advancing biodiversity efforts beyond company boundaries. One practice partner summarized this as follows:



I think it's very nice that [...] projects are created where companies are involved, because I believe that a lot of this also leads to an increase in awareness and then the practical examples [...] will later be the ones that can do the convincing.



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For companies, the question arises as to how they can communicate sustainability services to customers without being suspected of greenwashing. This question also arises with biodiversity topic. The first prerequisite for effective communication is a well-founded strategy with goals and measures that are also implemented and tracked (Chapter 5 and Chapter 8).

This chapter answers the following questions:

- What expectations do consumers have of corporate measures to protect biodiversity and what do they want to be informed about?
- Which consumer groups are interested in biodiversity?
- What is their willingness to act and pay?
- Which communication channels are most effective according to the target groups, and which communication messages can be best used to reach them?

To clarify these questions, two nationwide representative online surveys were conducted. The aim of the first survey was to record consumers' awareness of biodiversity and information requirements (1,028 respondents aged between 18 and 75). In the second survey, communication messages were tested and the willingness to pay for biodiversity-friendly products was determined (1,500 respondents between the ages of 18 and 75). It was conducted as a choice-based conjoint analysis for two products (frozen garden peas, walnut kernels) as well as an advertising poster of the project partners FRoSTA, Seeberger and Ritter Sport. This established marketing method was used to simulate a fictitious purchasing situation in which the acceptance of different product concepts (e.g. combinations of price, slogan, and information on biodiversity **measures**) was analysed.

Expectations and information requests

The protection and promotion of biodiversity is a relevant topic for consumers: 91 %

of respondents believe it is important that biodiversity is preserved. It is also clear that companies in the food industry are expected to be committed to protecting biodiversity. This was expressed by 85 % of respondents. The results also show that companies in the food industry are expected to be committed to protecting biodiversity. This was expressed by 85 % of respondents. Almost half (46 %) even rated this as very important. 79 % of customers want to be informed about the measures that companies take to conserve biodiversity. They also want information about the biodiversity impact of the offered food product (61 %). This is important to respondents because most of them do not feel sufficiently informed (84 %). Although most have heard of “biodiversity” or “biological diversity”, only 17 % know the correct meaning of the term. More than half (55 %) of respondents is unsure how they can contribute to the preservation of biodiversity when buying food.

According to the respondents, information on product packaging or advertising posters should be brief, concise, clear, and appealing. The trustworthiness of the information is particularly important. There is often strong scepticism towards information that appears to be advertising and towards unknown institutions, projects, labels and seals. Credibility can be achieved particularly by linking to well-known institutions or brands, by certifying measures and by providing information that is clearly differentiated from product advertising.

Target groups

The respondents' awareness of biodiversity conservation, i.e. their knowledge and attitudes towards it as well as their own willingness to act, varies greatly. The following respondent groups are particularly interested in the conservation of biodiversity:

- Consumers with a high level of education (high school diploma, technical college/university degree),
- Consumers with above-average income (monthly net household income >4,000 €),
- Consumers in the 41 - 60 age group and
- Women.

Compared to other respondents, these groups are generally better informed about the global biodiversity crisis and feel more personally affected by it. It is also more important to them that biodiversity is protected, and that food is produced in a biodiversity-friendly way. They are also more willing to limit their consumption to protect biodiversity, for

example by avoiding or reducing certain foods such as products containing palm oil, meat, or sea fish. When buying food, they consciously choose organic food more often than others, also to preserve biodiversity.

Willingness to act and pay

The willingness to do something to preserve biodiversity is high. Almost three quarters of respondents (71 %) would be willing to pay attention to appropriate labels when buying food and give preference to biodiversity-friendly products. Respondents with a high level of education are even more willing to pay attention to biodiversity protection (81 %). Women prefer such products slightly more (75 %) than men (66 %).



The willingness to pay expressed is also high: almost two thirds (64 %) would be prepared to pay a little more money for food whose production does not harm biodiversity. Here too, the willingness to pay is highest among respondents with a high level of education and above-average income.

In the simulated purchase situation (conjoint analysis), the greater willingness to pay of this target group was also confirmed. Younger consumers (18-40 years) proved to be more willing to pay than older age groups. Overall, it became clear that indications of biodiversity-friendly food production have a positive effect on the purchase decision. As expected, price plays a central role and the product with the lower price is always preferred to a product with a higher price but same performance. However, a closer look at the results of the tested product concepts shows that a low price is the primary selection criterion for only 25 to 33 % of respondents. The willingness to pay higher prices doubles if the products are labelled on the packaging with an attractive slogan on biodiversity protection or a positive biodiversity value. This means that suitable communication messages can help to ensure that higher prices are accepted for food produced in a biodiversity-friendly way.

Communication channels and messages

Biodiversity should best be communicated on the product packaging: Overall, product packaging is the preferred information medium for biodiversity protection measures, followed by information in food retail outlets as well as company websites and sustainability reports. Advertising in public places and communication via social media platforms are not as popular (Figure 6).

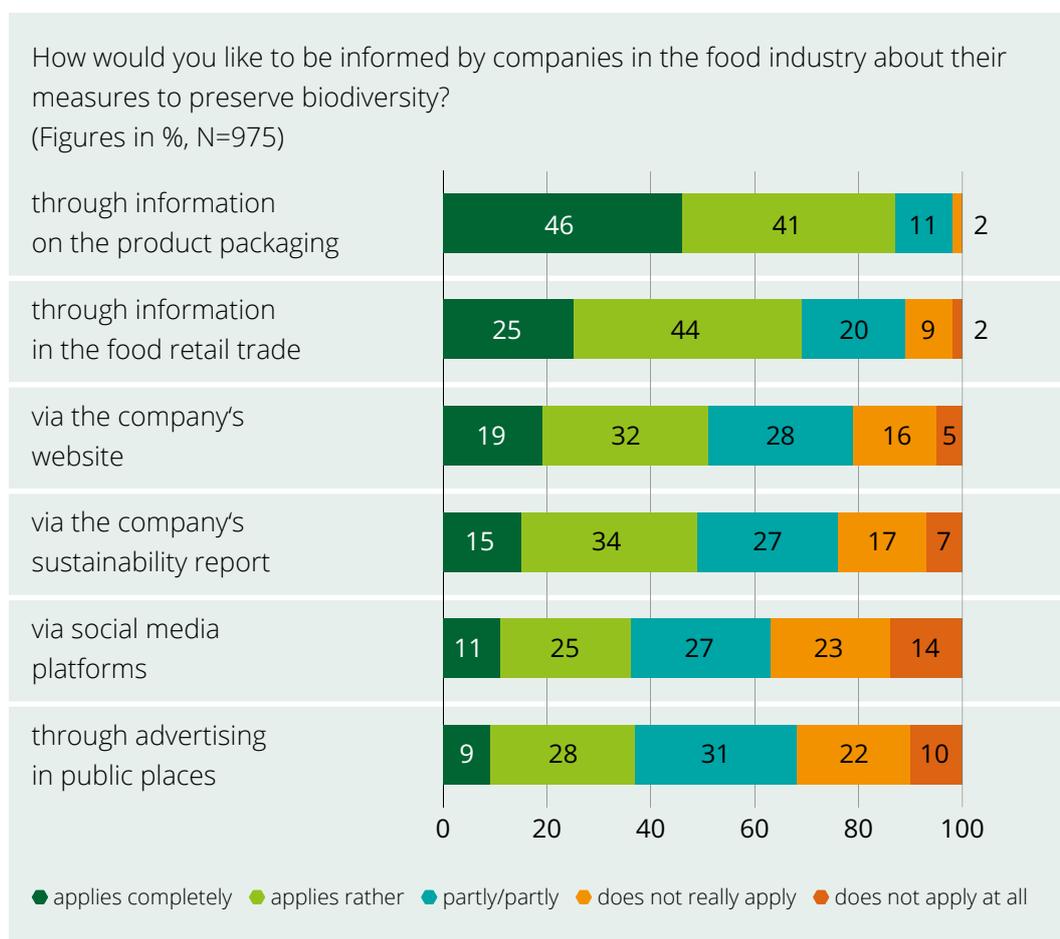


Figure 6: Evaluation of communication channels (online survey in June 2022, N = 975, only respondents who think it is important for companies in the food industry to provide information about actions to conserve biodiversity)

Consumers with a high level of education and above-average income are slightly more likely to desire information on product packaging and women are more interested than men in being informed through food retail. They are also slightly more open to adverti-

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sing in public and information via social media platforms.

Of the possible elements for communicating biodiversity in the food sector - which have not yet been used by the companies - the following options proved to be particularly effective in the test:

The indication of a biodiversity value on the product: products with a high (positive) biodiversity value are clearly preferred.

The use of an understandable slogan: For example, the slogan “Promotes biological diversity” or “Promotes species conservation” are preferred, while “Promotes biodiversity” is less attractive.

The reference to known standards: The Rainforest Alliance label, for example, is considered credible here.

The certification of biodiversity actions by a well-known institution, such as TÜV – short for Technischer Überwachungs-Verein – tests the safety of technical installations, machinery and motor vehicles.

The comprehensiveness and detail of the information on biodiversity protection measures and the type of commitment (measures at the company site or with suppliers, participation in research, donations to biodiversity projects) were less important to the respondents.



Figure 7: Effective options for communicating biodiversity

Ritter Sport – Don Schoko for species protection in cocoa cultivation



Ritter Sport introduced the sloth Don Schoko as an ambassador for species conservation in 2021. The sloth is native to Nicaragua, stands for intact nature and lives on Ritter Sport's agroforestry plantation “El Cacao”: “The fact that Don Schoko lives there is also a sign that El Cacao is more than just a normal cocoa farm. El Cacao is also something like a large biotope. In all of this, it is important that we do not do this as idealistic do-gooders but have the clear goal of ensuring that our cocoa farm is also economically successful.”^{xv} Nicaragua is already the source of some of the cocoa used in Ritter Sport chocolates.



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Don Schoko is used to communicate the importance of biodiversity and impart interesting facts about biodiversity and chocolate: "The cocoa comes entirely from El Cacao, the home of Don Schoko. Incidentally, howler monkeys, alligators, many birds and numerous species of insects, snakes and spiders also live there. The protection of biodiversity is a top priority on El Cacao."



Ritter Sport has set up an agroforestry system in Nicaragua for the cultivation of cocoa. This is also conveyed in the communication via Don Schoko. "Don Schoko [...] stands for everything that we do differently there. It starts with the fact that we only use just under half of the 2,500 hectares of land for cocoa cultivation. A full 1,200 hectares are forest and wetland areas that will be preserved and left untouched in the future so that Don Choco and his friends can continue to feel at home there. We also take a different approach to cocoa cultivation and rely on the agroforestry system - a special form of mixed cultivation - which also promotes biodiversity."^{xvi}

The sloth is also used in interactions with customers. In 2017, they were able to choose the name of the sloth: "By the way, he owes his name to you! In 2017, Ritter Sport fans voted and named the idler Don Schoko. The name just fits perfectly. Because Don Schoko lives on our El Cacao cocoa farm in Nicaragua."^{xvii}



The results of the consumer survey show that social media platforms and company websites are not the first choice of respondents for communicating biodiversity and that they are used primarily to reach younger consumers. However, only one fifth reject company websites as a source of information. In the

case of social media platforms, a third of respondents do not consider this source of information to be useful.

Ritter Sport has had good experiences with Don Schoko. It is embedded in a



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multifaceted marketing campaign and has helped to significantly increase overall sales for the chocolates. Don Schoko also raises awareness for the preservation and promotion of biodiversity.

Conclusion

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Corporate biodiversity management combines business success with the protection of biodiversity. This practical handbook describes the entire process of corporate biodiversity management: it ranges from providing basic information on biodiversity, integrating biodiversity into sustainability management, identifying, and assessing biodiversity risks, formulating goals and measures for biodiversity protection to the integration into organizational structures and the communication of biodiversity efforts to consumers.

To accompany this handbook, we have developed and tested instruments and tools that can help companies integrate biodiversity into their sustainability management. The table below summarizes and briefly describes each of the tools. They were all developed as part of the BioVal project and explained in detail in the handbook. The table therefore also includes a reference to the chapter in which the tool is described in more detail, as well as a download link.

Table 2: Tools for the biodiversity management from BioVal

Tool	Description	Chapter
Code of Conduct – Component biodiversity Download	A Code of Conduct forms the basis for ethical conduct, integrity, and compliance with legal regulations in all areas of the company and the supply chain. The “Biodiversity building block” shows how biodiversity can be anchored in the Code of Conduct.	Chapter 9
Supplier questionnaire Download	The supplier questionnaire supports the comparative assessment of suppliers with regard to the protection of biodiversity and is compatible with the BVI method (see below) for assessing the biodiversity impact of products.	Chapter 6



Conclusion

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Tool	Description	Chapter
Ecoregion map Download	The ecoregion map shows the different value of different ecoregions. The values can be read off site-specifically and used for an initial assessment of higher or lower risks of negative impacts on biodiversity or, conversely, for an assessment of lower or higher opportunities to promote biodiversity. The map is also important for the BVI method (see below).	Chapter 6
Dashboard biodiversity footprint (BVI method) Download	The BVI method can be used to calculate the biodiversity footprint of products - like the calculation of a climate footprint. It was tested and further developed in BioVal and made user-friendly by means of a dashboard.	Chapter 7
Set of slides for employee training Download	To effectively implement biodiversity protection in the company, employees must be aware of and understand the importance of biodiversity and its protection. The set of slides developed in BioVal provides support here.	Chapter 9

We hope that this handbook can provide inspiration on how to minimize biodiversity risks in the supply chain by integrating biodiversity into a company's sustainability management and thus not only improve the corporate image, but also help to operate successfully on the market.

BioVal – Research project and project team

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Research project



The research project “BioVal - Biodiversity Valuing and Valuation” consisted of four research modules:

● Modul 1: Social values

In Modul 1, consumer attitudes towards biodiversity and awareness of the connection between food production and biodiversity were recorded for various social groups in Germany



● Modul 2: Impact assessment biodiversity

In Module 2, the existing biodiversity impact assessment method for terrestrial biodiversity according to [Lindner et al. \(2019\)](#) was further developed and optimized based on the information from the three real-life laboratory companies. At the same time, the method was expanded to include marine biodiversity and the biodiversity impacts of diffuse effects caused by non-point or non-area-bound pressures.



● Modul 3: Biodiversity in companies

Module 3 answered the question of how biodiversity can be integrated into the management decisions of food companies so that the effects on biodiversity are adequately considered at their own sites and along the product life cycles.



● Modul 4: Transdisciplinary integration

In Module 4, the knowledge from the three research modules was brought together, discussed, and further developed together with the three real-world laboratory companies and other companies. The present handbook was developed here, also based on the findings on the



- Evaluation of biodiversity (Modul 4.1),
- Communication of biodiversity (Modul 4.2),
- Practicability of biodiversity recording (Modul 4.3) and
- the results of the five “Biodiversity Working Groups” with many different companies in the food industry (Modul 4.4)

BioVal – Research project and project team

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The project was accompanied by a formative evaluation: Indicator-based project monitoring as well as regular feedback surveys and reflection workshops were used for impact-oriented project management.

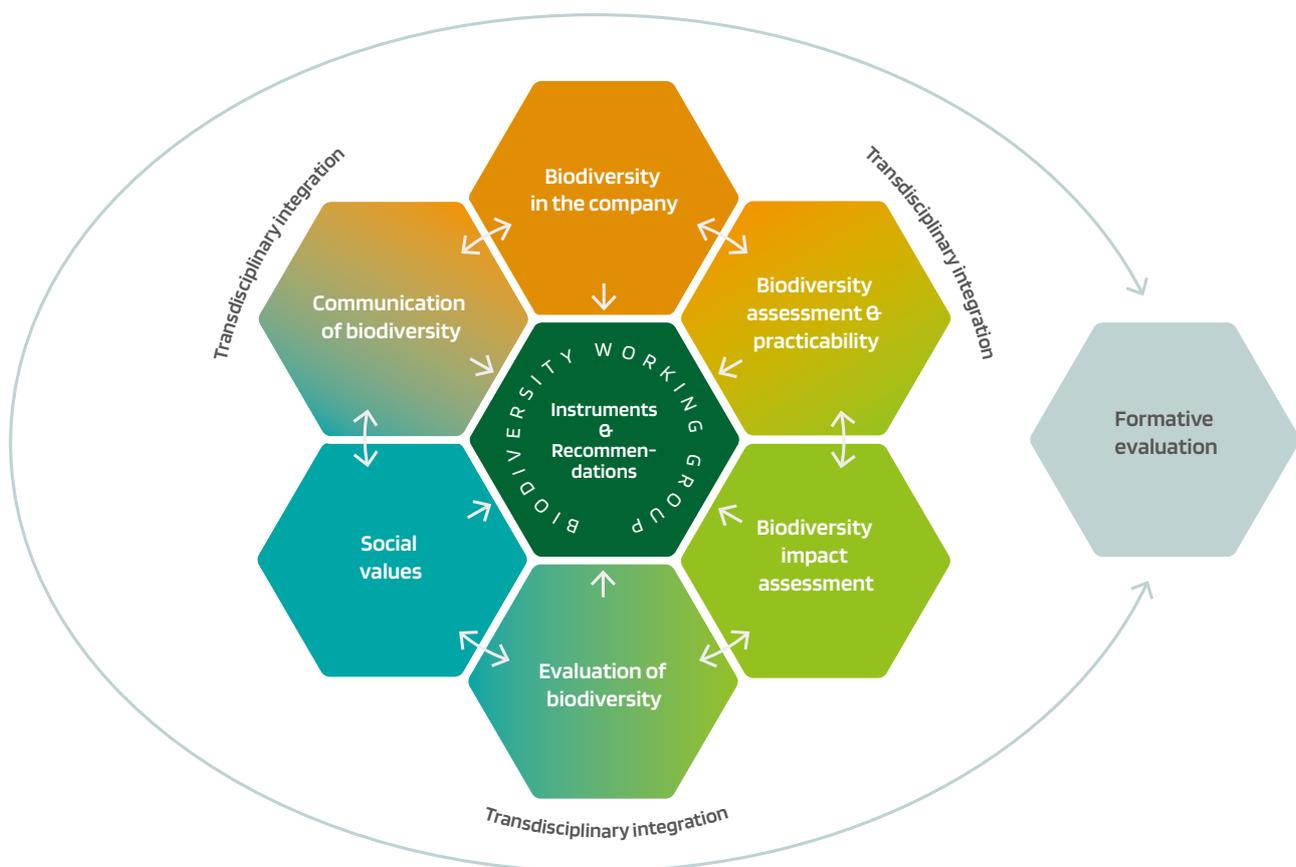


Figure 8: The research modules of the joint project “BioVal - Biodiversity Valuing and Valuation”

BioVal – Research project and project team

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Project team

ZNU – Centre for Sustainable Leadership at the Witten/Herdecke University



Dr. Ulrike Eberle
Project management & module 3 & management module 4



Dr. Charlott Hübel
Management module 3



Maïke Dilly
Scientist module 3



Dr. Julius Wenzig
Management module 3
(until 12/2023)



Dr. Verena Timmer
Scientist module 4



Alicia Seifer
Scientist module 4 &
Project communication
(until 6/2024)

BioVal – Research project and project team

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Project team

Zentrum Technik und Gesellschaft der Technischen Universität Berlin
(Centre Technology and Society of the Technical University of Berlin)



Prof. Dr. Dr. Martina Schäfer
Management module 1



Uta Böhm
Scientist module 1



Dr. Jasmin Wiefek
Management formative
evaluation

University of Augsburg



Nico Mumm
Scientist module 2



Prof. Dr. Jan Paul Lindner
Management module 2



Julian Quandt
Scientist module 2

BioVal – Research project and project team

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Project team

Alfred Ritter GmbH & Co. KG



Georg Hoffmann
Sustainability manager & management
occupational safety

FRoSTA AG



Helene Eulenstein
Sustainability manager
(until 05/2024)



Tomke Hinrichs
Sustainability manager
(since 04/2024)

Seeberger Gruppe



Verena Schädler
Sustainability manager
(in project until 07/2023)



Nadine Kellner
Sustainability in purchasing
(since 05/2023)



Isabell Schäfer
Sustainability manager
(since 07/2023)

Further information

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Further initiatives on biodiversity:

Biodiversity in Good Company

Founded in 2008 by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) together with companies, the cross-sector initiative aims to promote the commitment of companies to protect biodiversity. By signing a mission statement and a leadership commitment, which can be viewed on the website, the member companies of the initiative undertake to consider the protection of biodiversity in their sustainability strategy and to integrate it into their management processes. The initiative also acts as a platform for learning and dialog to promote exchange and learning from one another.

» **Further information:** www.business-and-biodiversity.de/

Food for Biodiversity

As part of the EU LIFE project "Food & Biodiversity", several national industry dialogs and initiatives have been established to promote biodiversity in the food industry. One project output is the founding of the "Food for Biodiversity" association. Food for Biodiversity places the promotion, restoration, and conservation of biodiversity at the heart of its work. Food manufacturers and retailers, standards and other players in the industry, scientific institutions and environmental organizations are committed to implementing actions that anchor the protection of biodiversity in the food industry and its upstream value chains.

» **Further information:** <https://food-biodiversity.de/en/>

Lake Constance Foundation

The private environmental and nature conservation organization has been working for 30 years in the Lake Constance region and beyond in five different fields of action - energy transition, agriculture & food, nature & water protection, companies & biodiversity, municipal sustainability management - for more sustainability and nature conservation.

» **Further information:** <https://www.bodensee-stiftung.org/en/>

Global Nature Fund

The Global Nature Fund is an international foundation for the environment and nature. It is committed to an intact nature and an environment worth living in and is involved in various projects.

The purpose of the foundation is realized particularly through:

- The implementation of development cooperation projects worldwide;
- Initiating and implementing nature and environmental protection projects to preserve wildlife and its habitats;
- The development of model projects to promote a sustainable economy;
- Publications and organization of events on nature and environmental protection;
- Support for international conventions.

» **Further information:** globalnature.org

WWF Biodiversity Risk Filter

The Biodiversity Risk Filter is a free tool provided by WWF to help companies understand the interactions between business activities and biodiversity, identify and assess biodiversity risks and opportunities in their own company, and based on this, take appropriate actions to minimize biodiversity risks and thus strengthen the company's resilience in the long term and contribute to a more sustainable future.

» **Further information:** <https://riskfilter.org/biodiversity/home>

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Contact person:

Dr. Ulrike Eberle

ZNU – Centre for Sustainable Leadership

Witten/Herdecke University

Alfred-Herrhausen-Straße 50

58455 Witten, Germany

ulrike.eberle@uni-wh.de

Dr. Verena Timmer

ZNU – Centre for Sustainable Leadership

Witten/Herdecke University

Alfred-Herrhausen-Straße 50

58455 Witten, Germany

verena.timmer@uni-wh.de

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www.bio-val.de
www.bvi-method.org

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