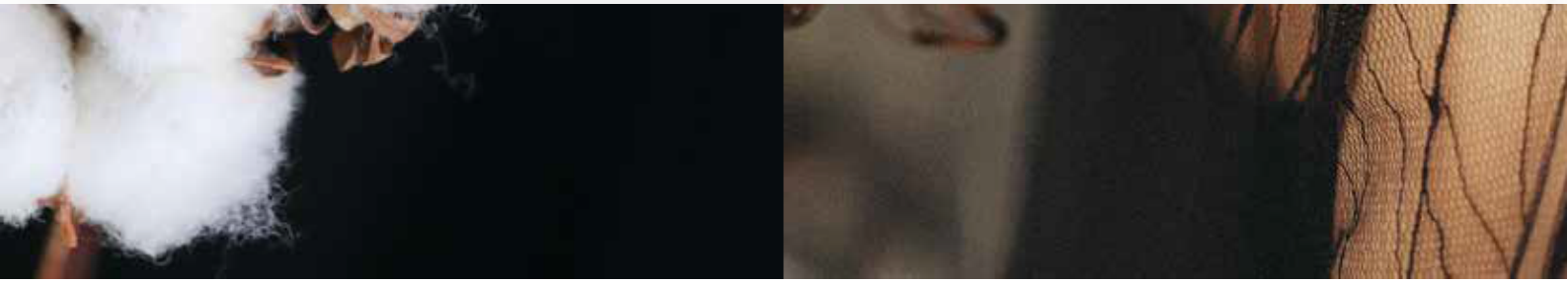
Global Nature Fund

Biologische Vielfalt
Das Bundesprogramm



BIODIVERSITY CHECK

for the Textile, Fashion and Clothing industry



In cooperation with:

INTERSPORT THE HEART OF SPORT

kik

Marc O'Polo

seidensticker group

Biodiversity assessments for companies

This guide offers companies a wide range of information as well as a checklist for biodiversity management. If your company needs any support – whether in going through the checklist or as individual advice, please feel free to get in touch. The Global Nature Fund team offers the following formats and adapts them to your needs:

- Biodiversity Check: Assessment of the company's impacts and dependencies on biodiversity, round table with company representatives to discuss the results, detailed report including measures
- Quick Biodiversity Check: Workshop format with biodiversity experts and the relevant stakeholders of the company
- Biodiversity Convoy: Development of biodiversity measures with a group of representatives from different companies together with biodiversity experts

If you are interested and enquired: **info@globalnature.org**

Report translated into English by European Outdoor Group
www.europeanoutdoorgroup.com

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Biodiversity check

The Global Nature Fund (GNF) has developed this "biodiversity check" for companies in the industry together with four companies in the fashion industry (**Intersport, KiK, MarcO'Polo and Seidensticker**) as well as various textile standards as part of the "Companies for Biological Diversity – UBi" project. The Partnership for Sustainable Textiles (BNT) has supported the Global Nature Fund in providing a platform for networking and exchange.

The UBi project aims to support the implementation of the National Biodiversity Strategy (NBS) and to activate companies for the topic of biodiversity. The project is funded by the Federal Agency for Nature Conservation (BfN) in the Federal Programme for Biological Diversity with funds from the Federal Ministry for the Environment, Climate Protection, Nature Conservation and Nuclear Safety (BMUKN).

The industry check is based on a comprehensive screening of the textile industry, on the experience of experts in biodiversity and sustainability management, and on findings from biodiversity checks with four textile companies that contributed their practical knowledge to this process. Together with the start-up **Kuyua,** and by using the **Nala platform**, locations were digitally analysed and valuable information was also gained.

The check is aimed at companies in the textile and clothing industry and sheds light on both the industry's impact on biodiversity and its dependencies on functioning ecosystems.

The experts from the Global Nature Fund looked in particular at the drivers of biodiversity loss and the role of the individual business sectors:

1. Strategy, Management and Stakeholders
2. Procurement and Purchasing
3. Product range development & own brands
4. Logistics and invasive species
5. End Products and Circular Economy
6. Sales and Marketing
7. Human Resources
8. Company premises and real estate

How to use this check

The industry check provides a compact overview of the relevance of various business areas for the protection of biodiversity. The findings also help textile companies to develop a materiality analysis for biodiversity and ecosystems (see box). For each business sector, a checklist is available in this document, which in our view contains key measures with which textile companies can establish sustainable biodiversity management. These checklists serve as a practice-oriented catalogue of criteria that support companies in systematically recording where they stand in terms of biodiversity conservation and what steps they can still take.

From today's perspective, the checklists are deliberately ambitious. Many of the measures listed require far-reaching changes and require long-term processes and further development of the business model. It is not therefore assumed that companies already fully meet all the criteria today.

Many of the measures are to be implemented across divisions and require cooperation from different areas of the company. As a result, some very similar measures are listed in the individual chapters, as the measures address different responsibilities.

In the long term, companies should strategically align their business activities with these requirements. Not only to live up to their ecological responsibility, but also to remain fit for the future and resilient to the increasing risks of biodiversity loss.

Double materiality – what is it?

According to the EU Corporate Sustainability Reporting Directive (CSRD), the "double materiality assessment" is a concept to identify whether a topic is relevant to a company or not. Two aspects are examined for this purpose:

- Impact materiality (inside-out perspective): How do the company's activities influence biodiversity and ecosystems?
- Financial materiality (outside-in perspective): How do risks and changes in biodiversity affect the company, for example through dependence on ecosystem services or economic risks?

A sustainability aspect is considered material if it is material either from the perspective of impact and/or from the financial perspective of the company.

The **Michael Otto Foundation** has created a guideline for determining the materiality of biodiversity: Understanding nature-related dependencies and opportunities.

Further information can also be found on the website of the German Sustainability Code.

EXECUTIVE SUMMARY: FIELDS OF ACTION FOR TEXTILE COMPANIES

The analyses reveal the following fields of action which companies in the textile industry should address:

1. Building a biodiversity strategy for the entire company and portfolio

Many textile companies are already implementing a sustainability strategy, often focusing on the topics of CO_2, chemical management, circular economy, material conversion, supply chain responsibility and transparency. Topics such as biodiversity and ecosystems have hardly been actively addressed so far and play an indirect role, if at all, in connection with raw material or chemical management.

However, biodiversity should not be treated as an additional topic, but as an overarching perspective that is closely linked to existing sustainability and supply chain processes. The logic of CSRD reporting (especially the ESRS standards) can provide helpful guidance for strategic development, as it captures key areas of impact in a structured way:

- Impact of the company on biodiversity
  - Climate Change (ESRS E1)
  - Pollution (ESRS E2)
  - Resource overuse (ESRS E3 and E5)
  - Land Use (ESRS E4)
  - Invasive species (ESRS E4)
- Dependencies on ecosystem services (ESRS E4)
- State of nature (ESRS E4)

The key is to integrate biodiversity into the core functions of the company, especially in purchasing, product design, supplier management and reporting, rather than looking at it in isolation. Clear goals and measures can make biodiversity the basis for strategic decision-making. It also makes sense to link closely to water-related topics, as these are closely related to biodiversity impacts. The goal should be for the respective company to continuously reduce its biodiversity footprint and avoid negative impacts along the entire supply chain together with its suppliers/partners.

Above all, this means transforming from linear business models to circular approaches with "lived" ecological sustainability, including longevity and reuse. Higher-level business goals should align with the avoidance hierarchy (Avoid / Reduce / Restore / Regenerate).

This industry check is intended to help companies prioritise measures and justify them internally, for example with regard to budget decisions. In addition, the international framework Science Based Targets for Nature (SBTN) provides guidance for the development of science-based goals.

The prerequisite for successful implementation is that companies provide sufficient human and financial resources for biodiversity management and that the management recognises biodiversity as a strategically relevant issue.

2. Strengthening biodiversity criteria in procurement and making supply chains more transparent

The greatest biodiversity impacts in the textile industry occur at the beginning of the supply chain, especially in the extraction of raw materials. Accordingly, purchasing, such as product design, plays a central role in specifically avoiding or reducing negative impacts.

Resource savings and the protection of biodiversity must be taken into account as early as the design phase of products in order to be effective. Designers should be aware of the ecological impact of various textile fibres and consistently develop products according to the principle of a closed cycle.

In the context of the present analysis, the focus was on cotton, wool and synthetic petroleum-based fibres. Even though not all raw materials were comprehensively assessed, numerous studies show that cotton and animal fibres in particular are associated with significant biodiversity risks. At the same time, there are concrete starting points for improvements, for example through more sustainable and regenerative agricultural practices.

For particularly risky materials such as leather, it should be checked whether it makes sense to do without it.

Synthetic fibres are also relevant from a biodiversity perspective, as they are based on raw materials that cannot be renewed. Central approaches are the reduction of virgin fibres and the use of recycled fibres, ideally from textile origin (textile-to-textile recycling), if materials cannot be avoided.

In principle, a stronger focus on recycled materials across all raw material groups is recommended.

The industry guidance from *Business for Nature* (2023)[1], which defines key priorities for action for the textile industry, provides helpful guidance:

- Avoidance and reduction of highly polluting or non-certified materials
- Reduction of hazardous chemicals in the supply chain
- Reducing freshwater consumption through sustainable water management
- Restoring degraded land and promoting regenerative agriculture
- Transformation of business models towards a circular economy

At present, however, biodiversity, longevity and recyclability do not yet play a central role in product development in many companies. The prevailing linear business model, characterised by a high variety of articles and short product life cycles, leads to increasing resource consumption and significantly increases the pressure on ecosystems.

Against this background, the following measures are particularly relevant:

- **Reduction of the product range** to long-lasting, relevant core products
- **Abandonment** of short-lived, fashionable items
- Greater use of **mono-materials** to improve recyclability
- Systematic analysis of materials used and increased use of low-impact materials

In the long term, effective biodiversity conservation requires a transformation towards circular business models, for example through:

- Use of secondary raw materials
- Repair and service offers
- Take-back and further processing of products

Such an orientation enables companies to significantly reduce their biodiversity impacts and at the same time build more resilient structures.

3. Industry collaboration and transformation

An industry dialogue on biodiversity can help to disseminate existing experiences in the industry and to learn from each other. Many companies have similar supply chains or work with trading partners in similar regions, which offers great potential for **joint approaches.** Exchange with other stakeholders (e.g. within the framework of memberships such as Textiles Partnership, Biodiversity in Good Company, Textile Exchange or similar) can also help to disseminate best practices/practices and develop collective solutions to protect biodiversity.

4. Quick win: Strengthening conservation commitment at the local and international level

Even if the greatest negative impacts on biodiversity occur in the global supply chains, companies can visibly assume responsibility at their own location and underline their commitment to biodiversity conservation. Ecological upgrading of one's own sites offers a low-entry threshold, e.g. by designing the company premises in a way that is close to nature and promoting native species and habitats. This can also include measures to restore or upgrade areas, ideally with a measurable and relevant impact. To identify suitable projects, it makes sense to approach local nature conservation associations or the municipality.

Such activities can help to raise awareness of biodiversity in the company and to gain initial practical experience.

However, local nature conservation measures must not replace the necessary transformation of supply chains. They should therefore always be seen as a supplementary measure. A one-sided focus on local projects carries the risk of accusations of greenwashing if key impacts along the value chain are not taken into account.

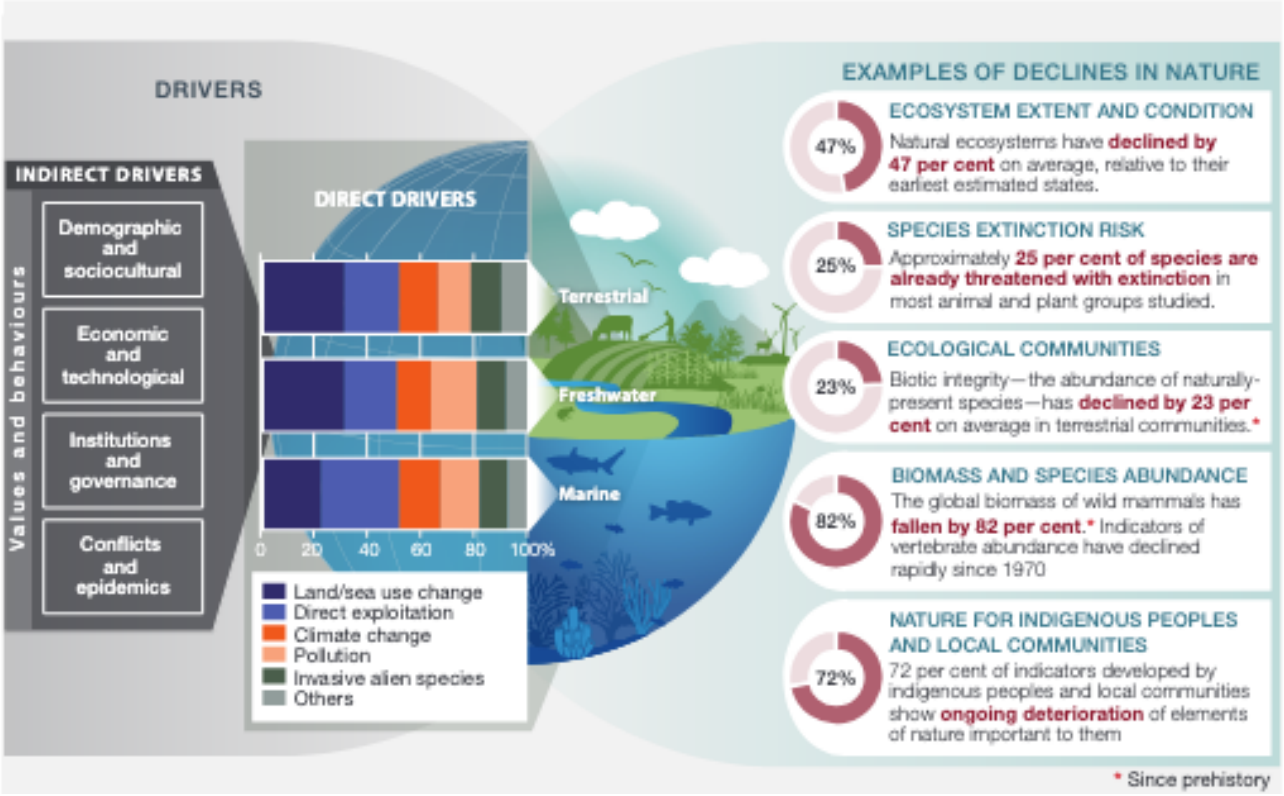
STATE OF BIODIVERSITY

In addition to climate change, the loss of biodiversity is the greatest and most central challenge of our time. According to estimates, more than 100 species become extinct every day, with consequences that we cannot estimate. Two-thirds of all ecosystems and their services to humans, such as clean water, wood and fertile soils, are at risk. Globally, 75% of the land surface is affected by human interventions such as intensive agriculture or cultivation, and 66% of marine ecosystems are affected by overfishing, pollution and other factors. [2]

The causes of biodiversity loss are manifold. They include:

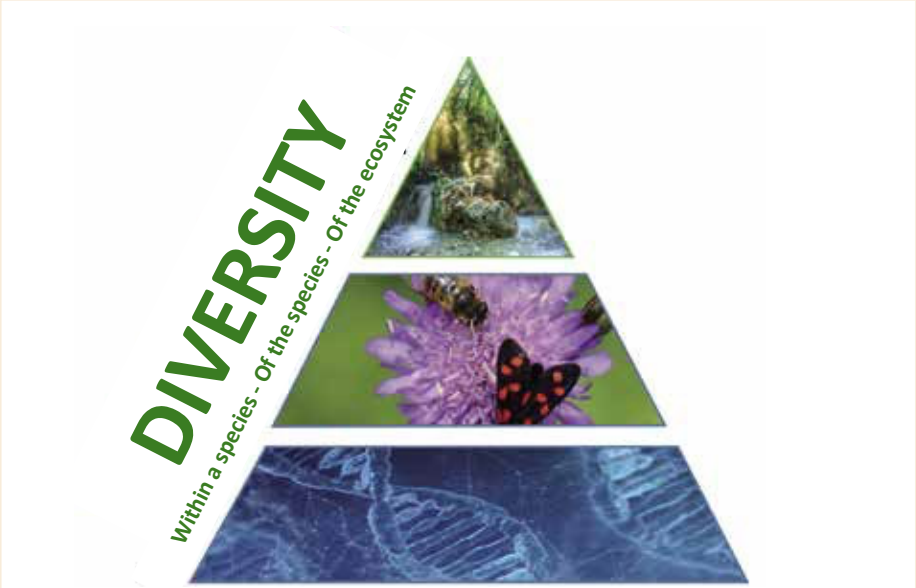
- The overexploitation of natural resources,
- Pollution,
- The impairment of habitats,
- The introduction of invasive alien species, and
- Climate change.

Behind all these causes of biodiversity loss are human and economic action.



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BIODIVERSITY AND THE TEXTILE AND CLOTHING INDUSTRY – RISKS



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What is biodiversity?

Biodiversity is the biological **diversity of species**, **genetic diversity** within species and the **diversity of ecosystems** (as defined by the UN Convention on Biological Diversity, CBD).
In addition to its intrinsic value, biodiversity forms the essential basis for sustainable development. Ecosystems provide essential goods and services such as food, clean air and water for humans and other life forms, act as a natural CO_2 sink and help prevent floods and other natural disasters.

The textile and clothing industry is closely intertwined with nature at all levels and at the same time one of its greatest burdens. From fibre to disposal, every textile product leaves its mark on ecosystems worldwide. Anyone who works in this industry actively shapes these interactions, whether consciously or unconsciously.

Ecosystems are already being directly altered during the extraction of raw materials: the extraction of fossil raw materials for synthetic fibres is accompanied by enormous environmental pollution and high CO_2 emissions. Cotton cultivation and forestry for man-made cellulose fibres can displace diverse habitats due to monocultures. The use of pesticides damages pollinators and soils, and high water consumption can contribute to the overexploitation of water bodies and groundwater. Livestock farming for the production of wool or cashmere can also lead to overgrazing and degradation of land if not managed sustainably.

At the same time, the textile industry is highly dependent on functioning ecosystems: without fertile soils, intact water cycles and stable ecosystems, many textile raw materials would not be available.

This close interdependence continues in fibre processing. High energy and water consumption and chemical residues in wastewater pollute the environment and water, while clean water remains indispensable as a basis. The same applies to textile production, which generates enormous chemical pollution with dyeing, printing and finishing. Polluted rivers, sewage sludge and microplastics are only the most visible consequences, and at the same time it clearly shows how much the industry depends on the filter and self-cleaning power of functioning ecosystems.

The burdens also add up in the following steps (from cutting and sewing to storage, transport and sales): energy consumption, packaging waste and transport emissions have an indirect impact on ecosystems. And even after the sale, this responsibility does not end; during washing, microplastics and detergent residues end up in the water, while growing mountains of textile waste and a lack of recycling structures continue to pollute the environment.

Indirect risks also play a role at all levels: transport routes, ports and logistics centres depend on stable climate conditions and natural protective functions such as flood protection through intact ecosystems. Extreme weather events or coastal damage can massively disrupt supply chains and drive up costs.

The textile chain clearly shows that each stage of production influences biodiversity and that each stage is dependent on it at the same time. Raw materials, water, stable climatic conditions: nature provides all of this. Where these foundations disappear, textile production also becomes unstable.

Biodiversity is therefore not a marginal issue, but a central risk area for the textile industry. Those who produce and purchase responsibly today make decisions that influence not only costs and delivery times, but also the burden on or preservation of ecosystems worldwide. Sustainable action along the entire chain is a strategic necessity for the future viability of this industry.

BIODIVERSITY IN TEXTILES VALUE CHAINS AND STANDARDS

Textile value chain (plant fibres)

Textile value chains are highly dependent on functioning natural services. In addition, the textile industry is considered one of the sectors with the largest negative footprint on biodiversity. The following table presents the sections of the value chain and the effects and dependencies on biodiversity using the example of plant fibres. The effects and dependencies of synthetic fibres can be found in the chapter "Synthetic fibres". Important for all materials: It also depends on where production takes place and what the local conditions are or which protective measures a manufacturing company is already implementing!

Value chain [3/4]	Processes with negative impacts on biodiversity	Dependencies on ecosystem services in processes
Extraction of raw materials (cultivation or extraction of raw materials) (supplier / Tier 4)	• Harmful climate emissions due to intensive land use with high inputs based on fossil energy (mineral fertilisers, pesticides) • Changed land use due to monocultures, degradation, deforestation • Habitat destruction • Water and soil contamination due to high use of pesticides and fertilisers • Overexploitation of resources such as water, soil (erosion) • Distribution of invasive species	• Soil health • Retention function • Water filter function • Microclimate • Pest regulation • Biomass availability • Genetic material • Water regulation • Rainfall • Energy • Air quality • CO2 sequestration
Fibre processing and yarn production (raw fibres are processed into yarn) (Tier 3):	• Climate-damaging emissions due to energy consumption during machine operation (including mineral oil, coal, wood biomass as energy sources) • Use of dangerous chemicals • Water consumption and pollution, including microparticles • Production of waste, including the generation of sewage sludge • Air pollution from pollutants, dust, microparticles • Exhaust fumes, light and noise from operations and logistics • Surface sealing	• Microclimate • Energy • Air quality • Raw material availability • Water availability and cleanliness

Value chain [3/4]	Processes with negative impacts on biodiversity	Dependencies on ecosystem services in processes
Textile production (fabric production – textile surfaces (fabrics) are created from yarns that are then dyed or finished) (Tier 2):	• Climate-damaging emissions due to energy consumption during machine operation (including mineral oil, coal, wood biomass as energy sources) • Intensive use of hazardous chemicals • Water consumption and pollution, including microparticles • Production of waste, including the generation of sewage sludge • Air pollution from pollutants, dust, microparticles • Emission of light and noise from operations and logistics • Surface sealing	• Microclimate • Energy • Air quality • Water availability and cleanliness • Floors
Fabrication (cutting and sewing – processing of fabrics into garments or other textile products) (Tier 1)	• Climate-damaging emissions due to energy consumption during machine operation (including mineral oil, coal, wood biomass as energy sources) • Use of water as a resource in laundries • Waste due to textile residues/cuts • Pollution, e.g. microparticles (dust and wastewater) • Possible contamination by chemicals (air/water/wastewater) • Emission of light and noise from operations and logistics • Surface sealing	• Microclimate (temperature) • Energy • Air quality • Water
Marketing and sales (products reach retailers and end consumers) (Tier 0)	• CO_2 emissions from operation • CO_2 emissions from logistics • Introduction of invasive species • Non-recycled transport and product packaging • Land use for commercial space • Emissions of light and noise from operations and logistics • Surface sealing	• Energy

Value chain [3/4]	Processes with negative impacts on biodiversity	Dependencies on ecosystem services in processes
Use by consumers (textile product is worn, cared for and cleaned – sometimes for many years)	• Use of water as a resource • Energy consumption and CO_2 emissions from washing and drying • Water pollution, including microparticles • Influence of detergents and care products (e.g. surfactants, etc.)	• Energy • Water • Wastewater treatment by ecosystems
End-of-Life (Possible Paths: Second-Hand/On-Life) Textile recycling: mechanical (e.g. to cleaning bags) or chemical (e.g. fibre recycling), upcycling: creative reuse, disposal: as residual waste or incineration)	• Relocation of used textiles to countries with lower environmental requirements • Massive land use and pollution from landfills • Emissions from recycling processes • Use of chemicals for recycling • Emissions of greenhouse gases, dioxins and toxic substances into the environment, in particular through the combustion of textiles	• Areas for landfill • Water

BIODIVERSITY AS A "CLIMATE PROTECTION LEVER"

Measures to protect biodiversity in the textile sector go far beyond ecological objectives: they often also have an emission-reducing effect and thus actively contribute to climate protection and adaptation. The preservation of near-natural ecosystems, the conversion to organic farming methods or the reduction of synthetic materials not only stabilise habitats, but also bind carbon, reduce energy consumption and reduce the use of fossil resources. Against this background, biodiversity-promoting measures should be regarded as integral components of ambitious climate strategies. However, they are only effective within the framework of a systemic approach that addresses production, design, use and disposal in equal measure.

BIODIVERSITY MEASURES AND COMPETITIVE ADVANTAGES

Biodiversity is not a new topic for the textile industry. Textile companies from upper price segments such as Kering or Hugo Boss analysed the topic for themselves as early as 2016 and began to implement strategies. The two industry initiatives Textile Exchange[5] and The Fashion Pact[6] are driving forward the exchange of best practices in the industry at an international level.

A 2021 survey of 157 member textile companies[7] conducted by Textile Exchange clearly showed that most companies face the same challenges: **only 14% of companies knew the countries where their key raw materials are grown or extracted.**

Of the companies surveyed, just over half (51%) already classified biodiversity risk as a primary business risk. Slightly more (59%) have publicly committed themselves to taking active action against biodiversity loss.

Sustainability standards are currently among the most widely used instruments: Four out of five companies surveyed rely on them to address impacts on biodiversity.

A particular focus was placed on the choice of materials: 80% of the companies also saw it as a way to manage their impact on biodiversity. Certified organic cotton was used most frequently, followed by other cotton standards used. In addition, some of the companies have already taken more far-reaching approaches: around one in three companies (38%) had begun to implement initial restorative or regenerative measures to support biodiversity. [8]

Frequently implemented measures in companies related to biodiversity, which were compiled as part of this research (as of 04 / 2025):

Upstream supply chain	Own company	Downstream supply chain
• "Basket" of minimum standards for purchasing • Animal welfare policy • Code of Conduct contains some requirements for suppliers • Partial certification of production facilities • Chemical management by different levels of ZDHC • Partial traceability up to Tier 2 • Use of tools such as HIGG/ Worldly, retraced • Calculation GHG is usually available • No systematic data collection • **So far, hardly any implementation of concrete measures in the supply chain to protect biodiversity**	• Partial environmental management system in place • Partial certification of our own production facilities, e.g. according to OEKO-TEX • **Hardly any biodiversity strategies (with targets, measures)** • Increasing number of staff with specialist expertise • Biodiversity not yet taken into account in design • Little activity on company premises	• In the downstream supply chain, deficits and the need for action were mainly identified: • Circular strategies often not fully defined over the entire product life cycle • End-use and end-of-life recycling of textiles often unclear • **Low communication on biodiversity aspects along the supply chain**



STRATEGY, MANAGEMENT AND STAKEHOLDERS

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Biodiversity and functioning ecosystems are of central importance for the textile industry. Accordingly, it should be an overarching goal of companies to continuously reduce their biodiversity and resource footprint. **The basis for this is a science-based analysis of their own impacts and dependencies as well as the state of nature, for example as part of a materiality analysis.**[9] This inventory forms the basis for defining concrete goals and measures, which must be backed up by clear responsibilities and sufficient human and financial resources. Biodiversity should therefore also be an integral part of corporate and financial planning.



© SBTN

Avoidance hierarchy

The orientation of the strategy and implementation of measures in companies and businesses should be carried out along the avoidance hierarchy – in this case according to Science-based Targets for Nature, SBTN:

1. Avo d ng negat ve mpacts on b od vers ty
2. Reduction of unavoidable impacts
3. Restoration of nature
4. Transformation together with suppliers and other industry players

Transformation in collaboration with suppliers and other industry stakeholders as an overarching goal.

On this basis, the management has the responsibility to create the strategic framework conditions for the continuous improvement of biodiversity-related performance. In view of the complex interdependencies and the special challenges in avoiding and reducing negative impacts, the topic of biodiversity requires a structured and long-term approach.

It is crucial that **the Executive Board, Supervisory Board and Management** actively understand and take into account biodiversity risks and opportunities as relevant business aspects. The Corporate Sustainability Reporting Directive (CSRD) also increases the responsibility of the supervisory bodies for monitoring and monitoring.

In the textile industry, sustainability strategies usually already exist in which biodiversity is partially taken into account. However, there is often a lack of consistent strategic anchoring in key business areas, especially in design, supply chains and production, where the greatest impact occurs. Companies should therefore examine whether biodiversity should be integrated as a core issue in the existing sustainability strategy or addressed by an independent biodiversity strategy.

Data collection – How do other companies do it?

Driven by various stakeholder initiatives, a mix of selected data is increasingly being collected, including:

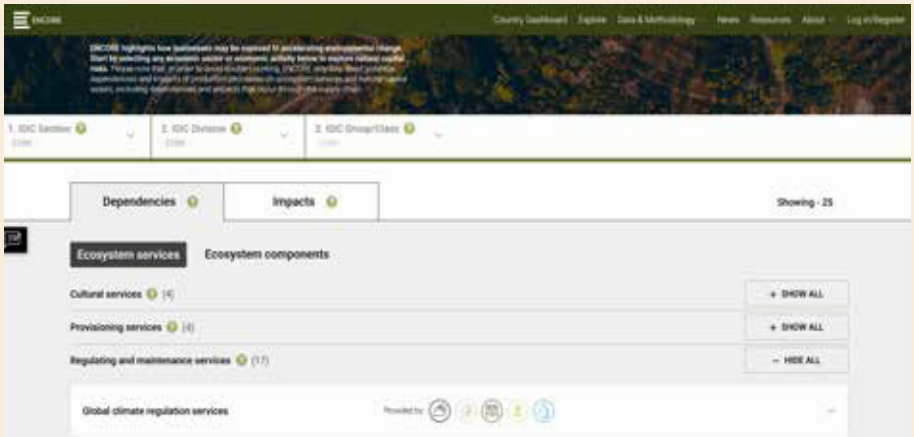
- Impacts
- Dependencies
- The "State of Nature"
- Management Response Data

For example, impact data from environmental management systems, supplier queries, geodata and life cycle assessments complement each other with specific goals from corporate policies.

Pioneers from the upper price segment of the textile industry, such as Kering and Hugo Boss, have already carried out a life cycle assessment in 2016, including impact data on water and land use. Hugo Boss has carried out a natural capital evaluation. Decathlon has carried out its life cycle assessment using the Mean Species Abundance (MSA) metric. H&M uses LCA (Exiobase) to collect its land use data. Primark has had a biodiversity risk assessment of its supply chains carried out.

For all the companies mentioned, the realisation is that the greatest impact on nature (state of nature) lies in the upstream supply chain in the production of raw materials. So far, there is little systematised knowledge about the dependencies.

Biodiversity is measured by these companies using the Land Footprint and MSA, among other things. A tool such as ENCORE (see screenshot), which enables an assessment of the essential processes, or the SBTN Screening Matrix is certainly sufficient to get started. The former also contains information on the dependencies on nature. The State of Nature can be roughly recorded using the free WWF Biodiversity Risk Filter. A more accurate data source is offered by fee-based tool providers such as Kuyua or Nala. These summarise a large number of relevant data sets for site analyses and thus help in particular with the prioritization of sites and measures.



© ENCORE

Management and strategy checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked 'darker' are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION [10]	Why is the criterion relevant?	Possible indicators/KPIs and possible instruments	CHECK [11]: Yes / No / Partial
The company regularly conducts an inventory / materiality analysis of the relevant processes, raw materials and locations with regard to their impact on and dependencies on biodiversity and ecosystems. The state of nature is also recorded. The materiality analysis is the basis for the development of a theory of change/transformation plan.	In order for the company to implement targeted measures, a prior analysis of the most important impacts and dependencies is crucial. External experts can provide support in this regard. ESRS E4-relevant.	List of relevant processes, raw materials, locations Rerecherche, ENCORE, WWF Risk Filter Suite, SBTN Screening Matrix or Global Forest Watch (as free offers) are suitable for analysis.	
The Executive Board and Supervisory Boards are trained in biodiversity risks, including due diligence (e.g. CSRD, CSDDD, EUDR).	Management should be aware of the risks associated with biodiversity loss and should be able to act accordingly.	Formats performed, analysis for the GF Guidelines on Biodiversity Management for Supervisory Boards (Code, ASCG 2024)	
The management is committed to protecting biodiversity as a corporate goal.	In order to demonstrate the relevance of the topic both internally and externally, there should be a commitment and a mandate from the employees.	Commitment, articulation internally and vis-à-vis politics Budget	
Financial planning includes a budget for measures that help to halt the loss of biodiversity and/or improve the state of nature.	The implementation of measures, training of suppliers and personnel, and the establishment of a data management system require continuous investment. ESRS E4-relevant.	Establishment of a budget line	

CRITERION [10]	Why is the criterion relevant?	Possible indicators/KPIs and possible instruments	CHECK [11]: Yes / No / Partial
Biodiversity criteria are taken into account when investing.	The financial sector is one of the biggest levers and is increasingly integrating biodiversity into its products and assessments (EBA Guidelines).	ESG criteria are taken into account, in particular ambitious environmental criteria	
The company has in-house expertise (including time resources) on biodiversity and ecosystems.	Biodiversity needs expertise, and in the long term this must be built up in-house.	Depending on the size of the company, at least 1 full-time position	
Biodiversity is anchored organisationally across all departments (e.g. through a focal point).	Biodiversity is a cross-sectional topic and must be dealt with as such and regularly put on the agenda. Goals must be monitored in this way. ESRS E4-relevant.	Organisational structure including focal points, etc. (e.g. also contact persons in the relevant departments)	
The company evaluates its physical, transformational and systemic risks.	Recording the risks helps with prevention. ESRS E4-relevant.	Analysis	
The company involves affected stakeholders and experts in its substantiality analysis.	Affected stakeholders and experts on biodiversity provide a different perspective and further information that can influence the company's actions. ESRS E4-relevant.	List of identified stakeholders and experts	

CRITERION [10]	Why is the criterion relevant?	Possible indicators/KPIs and possible instruments	CHECK [11]: Yes / No / Partial
The company implements a strategy to reduce its biodiversity footprint according to the "less is more" model. This strategy includes: • Prioritisation • Goals and measures along the avoidance hierarchy and the drivers of biodiversity loss, including through less resource consumption • Goals and measures for upstream, own operations and downstream • Clear responsibilities • A monitoring system	The biodiversity strategy sets out the main line for reducing the biodiversity footprint. It can also open up new business areas. In this way, the company specifies which goals and measures it wants to achieve and monitors its performance. ESRS E4-relevant. This includes in particular measures to curb resource consumption. [12]	Biodiversity Strategy incl. Objectives, Measures, Indicators This checklist, for example, can be used as a guide; ISO 17298:2025 Biodiversity Strategy Requirements and guidelines EMAS-Guide 2023 – Protection of biodiversity in EMS The Nature Strategy Handbook	
The company implements an environmental management system.	An environmental management system is a good basis for excluding the most important negative effects on biodiversity (e.g. emissions, pollution).	Implementation of EMAS, ISO 14001 or a system based on it	
The company regularly collects relevant biodiversity-related data	The company uses biodiversity-related data to measure its own performance and can take measures if necessary. ESRS E4 relevant.	Minimum collection of data on the drivers of biodiversity loss, dependencies, state of nature (based on CSRD). For own sites at least: basic EMAS data including total area, near-natural area, sealed area See also • CSRD ESRS • GRI 101 - Guide on best practices sharing biodiversity data for private companies • Nature Positive Initiative: Data management discussion paper	

CRITERION [10]	Why is the criterion relevant?	Possible indicators/KPIs and possible instruments	CHECK [11]: Yes / No / Partial
The company works together with stakeholders from the industry on biodiversity issues	Individual companies are under price pressure in competition; complex biodiversity measures can therefore only be managed together.	Joint measures with the industry (e.g. Textile Partnership or Fashion Pact), commitment to Biodiversity in Good Company (cross-sector) and collaborations with nature conservation stakeholders	

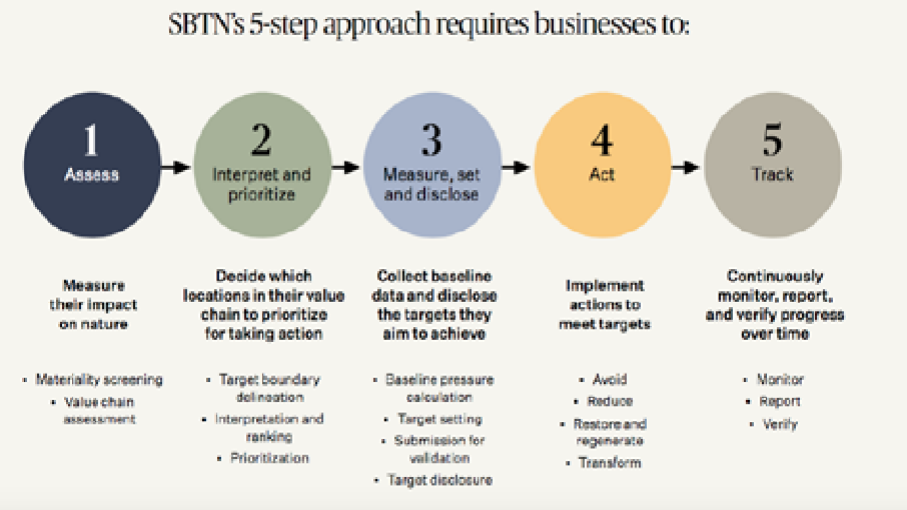
Science-based Targets for Nature

Since 2022, a globally recognised group of scientists and environmental NGOs has been working on the development of approaches that enable companies to systematically record biodiversity, then set and implement goals to improve their "footprint". The guide, created by the Science Based Targets Network initiative, provides guidance on how to record nature, methodological objectives and formulate activities along the avoidance hierarchy and provides a good orientation for anyone who wants to implement strategic biodiversity management and measurable activities. The approach can be easily combined with an environmental management system.

To date, SBTN has developed target proposals for climate, water, oceans and land use, which companies can use as a guide when formulating their own goals and metrics.

https://sciencebasedtargetsnetwork.org/companies/take-action/

For the textile sector, SBTN and Textile Exchange 2025 have developed a joint guide: Guidance on Science-Based Targets for Nature – Textile Exchange



© Science Based Targets Network (2024)



Product design controls the entire life cycle of a product from the very beginning, including its impact on biodiversity.

The primary (design) goal should therefore be to reduce the pressure on natural resources and ecosystems. Circularity must be a central guiding principle of the design philosophy: products are designed in such a way that they are timeless, durable, made of high-quality and raw materials, repairable and versatile, before they are finally taken back by the manufacturer and returned to the textile cycle.

This approach covers not only the first cycle, but all life cycles of a product, thus enabling full assumption of responsibility.

Designers are empowered to use biodiversity-oriented product design:

- *Consciously control the choice of materials*
    - Designers understand the key differences between materials and can avoid or reduce burdensome or risky raw materials in the design process.

- *Thinking about circularity*
    - Designers take into account fundamental principles of the circular economy, e.g. reduced variety of materials, mono-materials and durable product design.

- *Apply sustainability criteria in the design process*
    - Designers use clear guidelines (e.g. material guidelines or design checks) to systematically integrate biodiversity and resource aspects into their decisions.

A 2020 study by McKinsey concluded: "One of the most powerful changes the apparel sector can make in the interest of biodiversity is simply to stop producing too much clothing. The average overproduction is estimated at around 20 per cent. Manufacturers recycle around 75 per cent of pre-consumer textile waste. But the remaining 25 per cent mainly ends up in landfills or is incinerated – without ever having been worn, although some of it can be donated." [13]

The EU Ecodesign Regulation for textiles, within the framework of Regulation (EU) 2024 / 1781 establishing a framework for the establishment of ecodesign requirements for sustainable products (ESPR),[14] sets requirements for durability, reparability, recyclability, recycled content and the use of chemicals.[15] In doing so, it provides important impetus for more resource-efficient and circular textile production. The first concrete measures will take effect as early as 2026, such as the ban on the destruction of unsold textiles[16], while more far-reaching product-specific requirements are currently being developed[17]. However, biodiversity has not yet been explicitly addressed as an independent goal, but has only been taken into account indirectly through criteria such as chemical management, resource efficiency and circular economy. As a result, key influencing factors such as raw material extraction, land use and impacts on ecosystems have so far remained underexposed. From a biodiversity perspective, there is therefore considerable potential to supplement regulation in a more targeted manner in the future with corresponding requirements.

It is imperative for companies to include these aspects at the time of product development and design and to prepare for the legislation:

- **Durability:** Textiles should be designed in such a way that they can be used for a long period of time. A timeless design helps to avoid short-lived fashion trends. In addition, the quality should meet the requirements of strict ISO standards – for example, in terms of pilling or colour fastness.

  Example: Tom Cridland offers clothing with a 30-year warranty.

- **Repairability:** Products should be developed in such a way that individual components can be easily repaired or replaced. Especially in blouses or shirts, collars and cuffs often wear out first.

  Examples: Brands such as Aluc or Brainshirt start here and enable the uncomplicated replacement of these parts. Patagonia actively supports on-site repairs with the "Worn Wear Mobile".

- **Recycled content:** The proportion of virgin fibres used should be significantly reduced and the use of recycled fibres – not only made of polyester – should be significantly increased.

- **Recyclability:** As early as the product design and material selection stage, care must be taken to ensure that textiles can be recycled as easily as possible at the end of their life cycle. Mono-materials and textile-to-textile recycling approaches play a central role here.

  Textile recycling is currently still a major challenge for the industry. Regulation (EU) 2024/1781 (ESPR) has created a framework for defining corresponding requirements in the future – for example, on the use of recycling-friendly materials, improved dismantling, homogeneous material composition and separability by type. Specific product-specific specifications are currently still being developed and are expected in the coming years, especially for textiles.

- **Chemicals:** Within the framework of the Ecodesign Directive, the European Commission sets requirements for the use of chemical substances, in particular those that impair the recyclability or reusability of textiles. In the context of the CSRD and the ESRS (in particular E2 "Pollution", E3 "Water and Marine Resources" and E5 "Resource Use and Circular Economy"), companies are required to systematically record, assess and manage the use of chemicals along the entire life cycle. This includes in particular:
  - The identification and reduction of problematic substances (e.g. persistent, bioaccumulative or toxic)
  - Aligning the selection of materials and chemicals with the principles of Design for Recycling
  - Ensuring compatibility with existing and future recycling processes

  At the same time, the use of chemicals is closely linked to biodiversity effects: pollutant inputs can pollute waters, soils and ecosystems and affect aquatic habitats and pollinators in particular. A current example is per- and polyfluorinated alkyl substances (PFAS). These refer to a large group of synthetic chemicals consisting of carbon and fluorine atoms. Due to their water, dirt and oil-repellent properties, they are used in numerous applications, including textiles, shoes and outdoor clothing. PFAS do not occur in nature and are extremely persistent ("forever chemicals"): they are hardly degraded, can accumulate in the environment and in organisms and are associated with risks to the environment and health. [18]

Due to these properties, PFAS can both impair the recyclability of materials and cause long-term damage to ecosystems. Against the background of the far-reaching restriction of this group of substances being discussed at EU level, it is clear that companies should align their chemical strategies with foreseeable regulatory developments at an early stage and consistently substitute problematic substances.

One example of regulatory dynamics is France: Law No. 2025-188 of 27 February 2025 introduced a comprehensive national regulatory regime for PFAS. From 1 January 2026, the manufacture, import and marketing of certain products containing PFAS – including cosmetics, ski waxes, clothing textiles and footwear (with exceptions) – will be banned. The regulations are to be further tightened in the following years and extended to additional product groups. [19]

- **Energy and water efficiency:** The promotion of resource-saving manufacturing processes is essential, especially with regard to energy and water consumption throughout the entire life cycle of a product.
  Example: The DryDye process enables textiles to be dyed without water consumption.

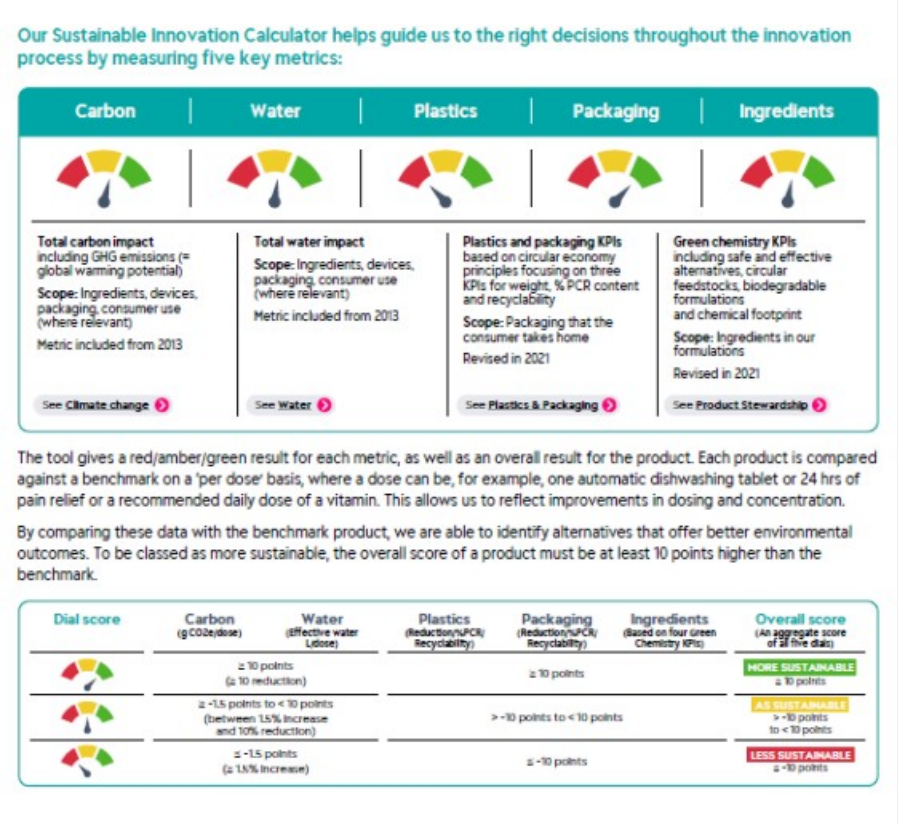
Biodiversity is another good reference point for evaluating products, as the drivers of biodiversity loss also cover many other environmental issues: climate impacts, pollution, land use or resource consumption are good categories for further recording the "performance" of a product. Based on these categories, a simple scoring system can be created (see example Reckitt “Sustainable Innovation Calculator” on next page).

Life cycle assessments can provide important information on biodiversity-relevant environmental impacts such as land use, water consumption or pollution. However, methodological risks and uncertainties of such methods must always be taken into account[20]. As also emphasised by Textile Exchange, current approaches have considerable methodological limitations, especially when it comes to mapping site-specific and complex biodiversity impacts. Complementary, context-specific approaches are therefore required for a well-founded assessment – see also the position paper Ensuring Integrity in the Use of Life Cycle Assessment Data[21] by Textile Exchange.

Further information can be found in the chapter "Life Cycle Assessments" on page 36.

Example: Reckitt Sustainable Innovation Calculator

Before developing products, the chemical company Reckitt relies on a tool that evaluates important aspects of the product life cycle to ensure that innovations in the product range make a positive contribution to resource conservation and corporate sustainability. According to the company, this has reduced the consumption of plastics, carbon and water. Reckitt collects five key figures based on LCA evaluations. However, the scheme itself can also be used as a simple point system before the introduction of new products – supplemented by biodiversity criteria.



Our Sustainable Innovation Calculator helps guide us to the right decisions throughout the innovation process by measuring five key metrics:

Carbon	Water	Plastics	Packaging	Ingredients
Total carbon impact including GHG emissions (= global warming potential) **Scope:** Ingredients, devices, packaging, consumer use (where relevant) Metric included from 2013	**Total water impact** **Scope:** Ingredients, devices, packaging, consumer use (where relevant) Metric included from 2013	**Plastics and packaging KPIs** based on circular economy principles focusing on three KPIs for weight, % PCR content and recyclability **Scope:** Packaging that the consumer takes home Revised in 2021	**Green chemistry KPIs** including safe and effective alternatives, circular feedstocks, biodegradable formulations and chemical footprint **Scope:** Ingredients in our formulations Revised in 2021	
See Climate change	See Water	See Plastics & Packaging	See Product Stewardship	

The tool gives a red/amber/green result for each metric, as well as an overall result for the product. Each product is compared against a benchmark on a 'per dose' basis, where a dose can be, for example, one automatic dishwashing tablet or 24 hrs of pain relief or a recommended daily dose of a vitamin. This allows us to reflect improvements in dosing and concentration.

By comparing these data with the benchmark product, we are able to identify alternatives that offer better environmental outcomes. To be classed as more sustainable, the overall score of a product must be at least 10 points higher than the benchmark.

Dial score	Carbon (g CO2e/dose)	Water (Effective water L/dose)	Plastics (Reduction/%PCR/ Recyclability)	Packaging (Reduction/%PCR/ Recyclability)	Ingredients (Based on four Green Chemistry KPIs)	Overall score (An aggregate score of all five dials)
	≥ 10 points (≥ 10 reduction)		≥ 10 points			MORE SUSTAINABLE ≥ 10 points
	≥ -1.5 points to < 10 points (between 1.5% increase and 10% reduction)		> -10 points to < 10 points			AS SUSTAINABLE > -10 points to < 10 points
	≤ -1.5 points (≥ 1.5% increase)		≤ -10 points			LESS SUSTAINABLE ≤ -10 points

© Reckitt

Product development and design checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
Designers are empowered to design products in a biodiversity-oriented way.	• Consciously select materials according to their environmental impact and avoid critical raw materials • Products designed to be recyclable and resource-saving (e.g. durable, repairable, mono-materials) • Apply binding sustainability guidelines in the design process (e.g. material guidelines, design checks).	Training programme, regular training sessions Provide training, for example re.: Cradle to Cradle, Textile Exchange, Global Nature Fund	
The company is developing a comprehensive circular strategy including criteria for product design (longevity, durability, repairability, recyclability).	Savings are the top priority here in design with regard to biodiversity effects. In this regard, circular criteria should become the basis of the design.	Circular strategy Percent products according to comprehensive criteria Circular design training	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company tests products before development or tenders using a simple sustainability scoring: • CO_2 emissions • Land Use • Disposal & Reusability • Recycled content • Use of chemicals • Possible effects on animal and plant species • (Invasive species) • Plastics/PFAS	Products should serve a purpose, consume as few resources as possible in order to have a low negative impact on biodiversity. During development and design, it should be checked whether a product meets these requirements and should therefore be brought to market at all. ESRS E4 relevant.	Scoring-System	
The company tests various materials and their life cycle assessment.	Many fibre alternatives are currently being tested and tried out on the market. Companies should deal with these new fibres/materials and deal directly with their environmental impact in order to be able to continuously use "better" fibres/materials. Particular attention should be paid to the origin and cultivation methods of the raw materials for bio-based synthetic fibres.		

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
Biodiversity targets for raw materials and processes are specified for suppliers.	For certain products, the company can evaluate which countries are particularly risky, also which raw materials and processes are more environmentally friendly. Procurement can also specify biodiversity criteria through sustainability certifications and evaluation of suppliers' environmental performance. These requirements for suppliers can significantly reduce impacts/dependencies.	Purchasing Specifications	
The company lists non-necessary and non-sales-relevant products.	The practicality of products must be examined, as each product requires an expenditure of resources. Here, it is important to look at the assortment to see which items are duplicate, bring in little turnover or are short-lived "disposable goods". At best, these should be de-listed. We recommend focusing on items that are necessary / high turnover for consumers.	Catalogue of criteria and continuous testing	



Effects and dependencies on and biodiversity along supply chains

Textiles are ubiquitous and connect a large number of players: from the agricultural production of natural fibres and the extraction of other materials, to textile production and production, to use by consumers. At the end of the process there is the market for used clothing reuse through recycling and disposal.

In recent years, the textile industry has experienced rapid growth, driven by the increasing demand for frequently changing fashion trends and fast fashion. At the same time, it is one of the main causes of the loss of nature and biodiversity worldwide. Fashion is based on natural resources and at the same time depends on them: many textile raw materials come from agricultural production, often produced in ecologically sensitive regions. Dyes and production processes are closely linked to water resources. In addition, people and their livelihoods are directly integrated into global supply chains and at the same time affected by their social and ecological impacts.

The ecological impacts and risks of the textile and fashion industry have now been relatively well researched: The TNFD Sector Guidance on "Textiles and Apparel" (2025) shows effects on biodiversity and dependencies along the various process steps of the **upstream** supply chain. The data basis for the analysis comes from the ENCORE tool.

Impacts along the upstream supply chain:

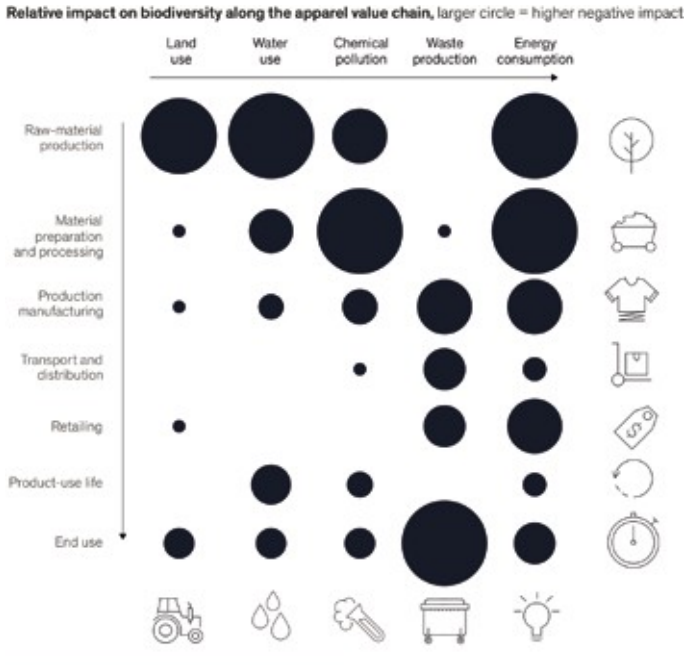
Drivers of nature change	Impact drivers	Raising of sheep and goats	Raising of cattle and buffaloes	Growing of fibre crops	Other land transport	Extraction of crude petroleum	Manufacture of refined petroleum products	Manufacture of other chemical products	Manufacture of other textiles	Manufacture of man-made fibres	Manufacture of basic chemicals
Land, freshwater and ocean-use change	Land ecosystem use	High	Very high	High	Medium	Low	Low	Low	Low	Low	Low
	Freshwater ecosystem use	High	High	High	N/A	Very high	N/A	N/A	N/A	N/A	N/A
	Ocean ecosystem use	N/A	N/A	N/A	N/A	Very high	N/A	N/A	N/A	N/A	N/A
Climate change	Greenhouse gas (GHG) emissions	High	High	Medium	Medium	High	Medium	Medium	Low	Medium	Medium
Pollution/ pollution removal	Non-GHG air pollutants	High	High	High	Low	Medium	High	Medium	Medium	Medium	Medium
	Emissions of toxic soil and water pollutants	High	High	High	Low	Very high	Very high	Very high	Medium	Medium	Very high
	Emissions of nutrient soil and water pollutants	High	High	High	Medium	N/A	N/A	N/A	Medium	N/A	N/A
	Solid waste	High	Very high	High	Very low	Low	Medium	Medium	Medium	Medium	Medium
	Disturbances (e.g noise, light)	Medium	Medium	Medium	Medium	Very high	Very high	Very high	Medium	Medium	Very high
Resource use/ replenishment	Water use	High	High	High	Low	Low	Low	Medium	Medium	Medium	Medium
Introduction of invasive alien species		Medium	High	Medium	Low	Low	N/A	N/A	N/A	N/A	N/A

N/A = Non-applicable; ND = No data

Source: ENCORE Partners (Global Canopy, UNEP FI, and UNEP-WCMC) (2024). ENCORE: Exploring Natural Capital Opportunities, Risks and Exposure. Cambridge, UK: the ENCORE Partners. DOI: https://doi.org/10.34892/dz3x-y059.

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McKinsey has also visualised the greatest pressures on biodiversity along various supply chains of the textile industry in a study[22] (excluding invasive species).



[23] *© McKinsey*

The results of both studies clearly show that **the majority of negative environmental impacts are concentrated in three central areas within the textile value chain:**

- **Raw material production:** cultivation of cotton, soil degradation, water use and use of chemicals (Fashion Pact adds the topic of deforestation here)
- **Material preparation and processing:** use of chemicals and non-degradable waste in dyeing processes, leather tanning, energy
- **And the end of life:** contamination by microfibre abrasion during washing and improper disposal[24]

Issues such as the use of chemicals and pollution by non-GHG pollutants, light, noise, etc. run through all process stages of the supply chain.

On the **dependencies on ecosystem services,** very good overviews of the supply chain can be found in the TNFD Sector Guidance on "Textiles and Apparel" (2025), here is an excerpt for the **upstream** supply chain:

Dependencies on nature's services in the upstream supply chain:

Ecosystem services		Raising of sheep and goats	Raising of cattle and buffaloes	Growing of fibre crops	Other land transport	Manufacture of other textiles	Manufacture of manmade fibres	Extraction of crude petroleum	Manufacture of refined petroleum products	Manufacture of other chemical products	Manufacture of basic chemicals
Provisioning services	Water supply	High	High	High	Very low	Medium	Medium	Medium	Low	Medium	Medium
	Genetic material	Medium	Medium	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Other provisioning services	N/A	N/A	Medium	Medium	N/A	N/A	N/A	N/A	N/A	N/A
	Biomass provisioning	High	Very high	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Regulating and maintenance services	Solid waste remediation	Low	Medium	Medium	ND	Low	Low	Low	Low	Medium	Low
	Soil and sediment retention	Very high	Very high	Very high	Low	Low	Low	Low	Medium	Medium	Medium
	Water purification	High	High	Very high	ND	Medium	Medium	Very low	High	Medium	Medium
	Soil quality regulation	High	High	Very high	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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According to these analyses, the dependencies primarily include the dependencies on **water availability and quality, soil quality and the availability of natural raw materials** (with a focus on biotic raw materials[25]).

Raw material production

The extraction of the raw materials necessary for the textile industry causes serious environmental damage worldwide: oil industry processes, deforestation, overexploitation of pastureland, conversion of natural habitats, enormous water consumption and water pollution are among the most common consequences.

In particular, the production and processing of raw materials (Tier 4 and Tier 3) make a significant contribution to the loss of biodiversity. It is therefore imperative to find out about the detailed origin of these raw materials. Transparency is a basic prerequisite for effectively protecting biodiversity.

The Biodiversity Consultancy, The Fashion Pact and Conservation International have developed a dashboard to help fashion companies understand the risks and impacts of the industry on biodiversity. There is a particular focus on the impact of raw material production on terrestrial biodiversity at the very beginning of the supply chain (often referred to as "Tier 4"):

- Almost all important materials for the textile industry are produced in areas that are close to deforestation fronts.
- The production of cattle and sheep (for leather and wool) consumes a lot of land and plays a major role in the extinction risk for species.
- Although synthetic fibres require less land for raw material production, they cause significant environmental problems such as habitat destruction, greenhouse gas emissions, and water pollution, which also affect biodiversity. [26]



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© pexels/pixabay

Life cycle assessments

Here, different lifecycle assessments show similar trends (not all take into account the same raw materials):

- Fashion Nature Risk Lens sees (with a focus on land use) the greatest impacts in all animal fibres (cow, goatskin, sheepskin, wool). [27]
- At Hugo Boss, cotton, leather, wool and synthetic fibres represent the greatest impacts in the context of a Natural Capital Evaluation. [28]
- Collective Fashion Justice, based on the Higg MSI/Higg Materials Sustainability Index, sees CO_2, eutrophication, water scarcity, resource reduction/fossil fuels and the use of chemicals as the most problematic and the greatest impacts in silk, alpaca, cowhide and goatskin as well as cotton and hemp. [29]
- In Kering's EP&L, leather, animal fibres and metals (in this case high water impact) perform poorly in terms of impact. In the case of leather and animal fibres, land use, GHG and air emissions are particularly relevant. [30]

The various analyses unanimously show that animal raw materials in particular, especially leather and wool, are associated with high biodiversity and environmental impacts, especially due to land use, greenhouse gas emissions and other environmental pollution. Cotton and silk also have significant impacts in many assessments, especially in connection with land use, water consumption and chemical use.

At the same time, the significance of these assessments must be viewed differently with regard to biodiversity. Lifecycle assessments (LCAs) often record biodiversity impacts only indirectly, for example via indicators such as land use, emissions or water consumption. Location-specific differences that are crucial for biodiversity (e.g. production in biodiversity hotspots or under regenerative conditions) are often insufficiently represented.

This is especially true for synthetic, petroleum-based fibres: These sometimes perform better in LCAs because they have fewer land-based impacts. At the same time, however, impacts of oil extraction, habitat destruction, pollution and end-of-life problems (e.g. microplastics) are not always fully or consistently taken into account. This can create a distorted picture that underestimates the actual biodiversity risks.

Overall, LCAs provide important information on environmental impacts, but are not sufficient for a well-founded assessment of biodiversity alone and must be supplemented by context-specific analyses.

This assessment is also supported by Textile Exchange's position paper "Ensuring Integrity in the Use of Life Cycle Assessment Data". It emphasises that LCAs are an important but limited tool, the results of which depend heavily on model assumptions, data quality and system boundaries. Textile Exchange also warns against simplifying or isolating the use of LCA results, as this can insufficiently account for site-specific risks, differences in production practices (e.g. regenerative vs. conventional) and systemic effects such as habitat loss.

Therefore, Textile Exchange's position paper "Ensuring Integrity in the Use of Life Cycle Assessment Data"[31] calls for industry-wide integrity in the use of LCA data, highlighting both its strengths and limitations, and introducing an expanded "LCA+" approach to address critical gaps.

5. Key recommendations for using LCA data

Textile Exchange provides clear guidelines for the responsible handling of LCA data. These include:

- Apply LCA data only with a full understanding of the assumptions, methods and limitations, ideally in consultation with experts;
- Avoid comparisons between unrelated LCA studies or between fundamentally different material categories (e.g. synthetic vs. natural fibres) or regions, as these systems are not comparable;
- Improve data quality and transparency by fully documenting methodological decisions, assumptions, and constraints;
- Use of supplier-specific and high-quality primary data for Scope 3 balancing, while using LCA databases (such as Higg MSI or Quantis WALDB) with caution;
- Extending measurement beyond standard LCA indicators to include biodiversity, soil health, water quality, animal welfare, and livelihoods – what Textile Exchange refers to as the "LCA+" approach.

6. Challenges and limitations of LCAs

Although LCAs provide valuable insights, they are subject to several structural limitations:

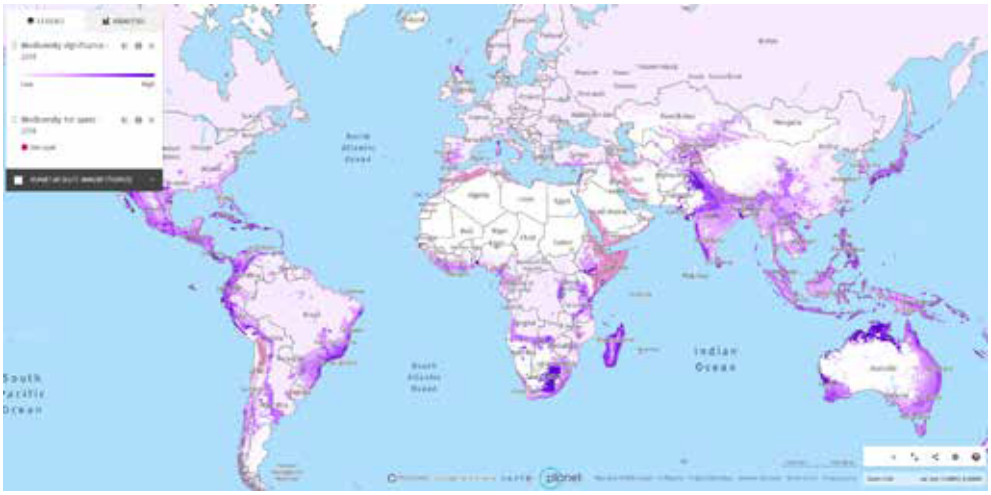
- They are static and represent impacts at a specific point in time, making continuous progress tracking difficult;
- The results are often based on geographical averages, which obscures important local differences;
- Secondary data is often used to fill in gaps, but may not reflect real-world conditions;
- LCAs usually exclude broader areas of impact such as biodiversity or social dimensions and thus only provide an incomplete picture;
- Methodological assumptions such as system boundaries, allocation rules and background data sets are subjective, which limits comparability between studies. [32]

Supply chains & risk areas

In order to assess the risk of biodiversity, it is important to record not only the production and business processes, but also the production sites and their relevance for biodiversity. Tools for this can include the WWF Biodiversity Risk Filter or, for example, Global Forest Watch (both currently free of charge).

Biodiversity Hot Spots

The figure from Global Forest Watch shows two filters, the Biodiversity Hot Spots (i.e. above all very high occurrence of endemic species) and Biodiversity Significance. There are currently 36 recognised hotspots of biodiversity. These are the biologically richest and at the same time most threatened regions on earth.



© Global Forest Watch[33]

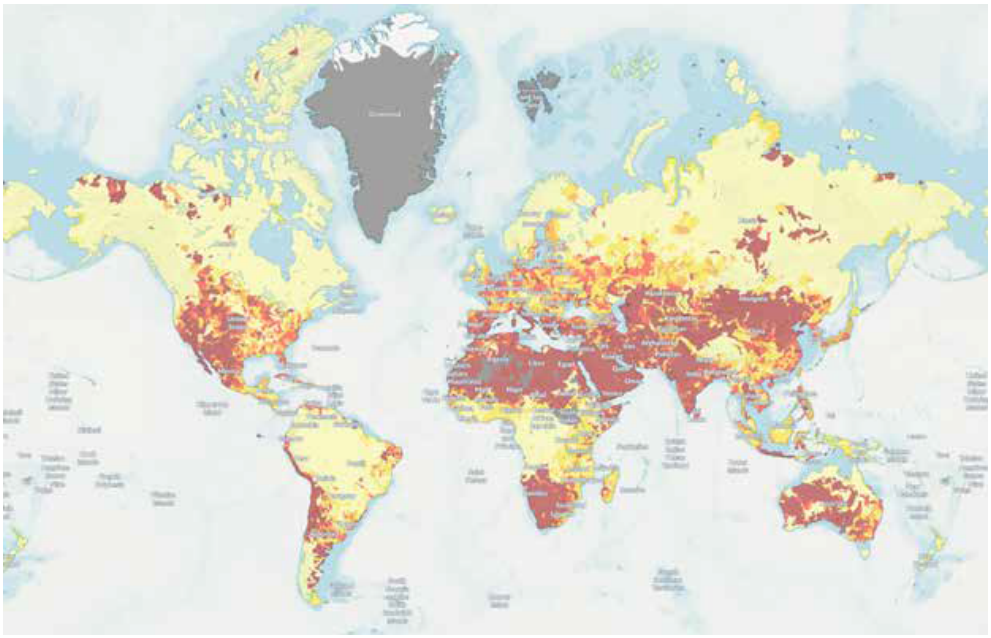
To qualify as a biodiversity hotspot, an area must meet two strict criteria:

- It must contain at least 1,500 species of vascular plants that are found nowhere else on Earth (so-called endemic species).
- It must have lost at least 70% of its original vegetation.

Many of the biodiversity hotspots exceed these two criteria. At the same time, the loss of vegetation in some hotspots has reached a staggering 95%. [34]

Water risks

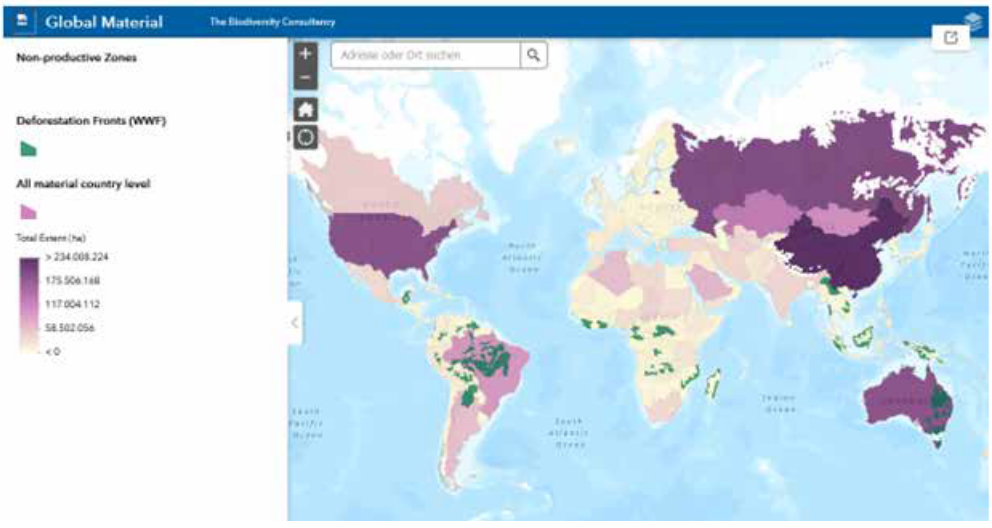
The examination of water-related risks is also very relevant. Here there is, for example, a Water Risk Filter from the WWF, as well as the Aqueduct tool from the World Resources Institute. Here, the Aqueduct tool (related to all water risks, i.e. from droughts to floods) shows major problems in important producing countries of the textile industry.



© WIR/Aqueduct[35]

Land Use and Deforestation

Land use and deforestation play an important role in the production of materials for the textile sector. The map of the Biodiversity Consultancy shows the planned production area for various materials at the country level. The darker the area, the larger the production area. China has the largest area with about 234 million hectares,



© Biodiversity Consultancy[36]

followed by Russia with 194 million hectares and Australia and the USA with 183 million hectares each. Of the materials examined, cattle and wool production in particular play a major role.

The areas used for the production of raw materials are shown in dark purple. Areas marked in green are deforestation areas, according to a report by the WWF. White areas show "unproductive" areas such as the tundra.

The simultaneous representation of production and deforestation areas does not mean that production leads directly to deforestation, but that there is a higher risk of linkage. More details and factors on this topic can be found in the WWF report on deforestation fronts. [37]

Of all the materials studied, cattle farming requires the most land: about one billion hectares of land are used for farming, whose hides are used for the fashion industry. If you only look at the proportion of the area that is specifically used for leather production and use by the fashion industry, the land requirement is 60 million hectares.

Wool production requires the second largest area before economic allocation, about 615 million hectares. For the fashion industry after economic allocation, the land requirement is 129 million hectares, which is the largest area for this sector. [38]

➔In summary:

In countries of the Global South – the important raw material and production sites of the textile industry – there are particularly high biodiversity risks. On the one hand, these regions still have a great diversity of ecosystems and species, and on the other hand, the ecological pressures caused by raw material extraction and production are high. This threat is exacerbated by often weak or insufficiently enforced environmental legislation.

The textile industry usually takes place in risk areas, which is why it is essential to collect and evaluate location data across the entire textile supply chain Tier 1 – 3/4.



How does OEKO-TEX® STeP address biodiversity and environmental aspects and what added value does this offer along the textile supply chain?

Author: OEKO-TEX®, Carolin Franitza

For more than 30 years, OEKO-TEX® has been offering scientifically sound and standardised solutions with which companies in the textile and leather industry can design their production processes transparently, safely and sustainably. Working worldwide with OEKO-TEX®, 35,000 companies and millions of consumers use the labels as a guide for responsible purchasing decisions.

OEKO-TEX® STeP is a production site certification that assesses production facilities holistically on environmental and social requirements. The standard has been further developed in a targeted manner in order to systematically integrate biodiversity as an overarching sustainability issue.

In terms of content, OEKO-TEX® STeP addresses biodiversity-relevant environmental aspects in the areas of chemical management, fresh and wastewater, sewage sludge, waste, resource procurement and emissions, among others. The update added additional requirements such as those relating to land use, local ecosystems and invasive species.

By integrating biodiversity, OEKO-TEX® STeP strengthens the resilience of companies to risks such as resource scarcity, supply chain disruptions and increasing regulatory requirements. At the same time, the standard supports continuous improvement in environmental performance, strengthens the market position of companies and increases transparency towards customers, partners and other stakeholders.
OEKO-TEX® supports companies with practical tools, clear criteria and an international network in order to integrate biodiversity and environmental aspects into production processes in an effective and implementation-oriented manner.

Chemical Management and Biodiversity

Author: ZDHC, Klaas Nuttbohm[39]

The industrial use of chemicals and water for the production and dyeing of textile fabrics or leather entails significant risks for nature and biodiversity. Uncontrolled discharge of wastewater poses risks not only in terms of acute toxicity due to harmful or toxic substances, but also in terms of long-term effects (e.g. substances with carcinogenic, mutagenic or endocrine disruptive effects) and eutrophication of water bodies due to increased phosphorus, nitrogen and overall nutrient levels (BOD, COD). In addition, excessive abstraction of water also has consequences for people and nature in terms of ecosystem functioning and agricultural use, especially in regions with increased water stress.

For this reason, ZDHC has created the Roadmap to Zero Programme and set the goal of not allowing particularly harmful chemicals for production in the first place or replacing them with harmless, or at least less hazardous, alternatives where they are used. To this end, the ZDHC has published a Manufacturing Restricted Substances List (MRSL), which the chemical industry uses to test chemical products for the production of textiles and shoes and publish them in the ZDHC Gateway Register. Factories can find the appropriately certified chemicals there. The chemicals used at factory level are checked via the ZDHC InCheck Report, a comparison of the factory's chemical inventory with the data from the Gateway Register, which should then also be verified by means of an audit. In this way, the brand companies, as customers of the factory, can also understand that the particularly harmful substances excluded by the ZDHC MRSL are not used, and thus cannot endanger the employees in the textile factories or consumers, nor pollute the environment.

A second important component of the ZDHC Roadmap to Zero Programme is the ZDHC Wastewater & Sludge Guidelines, according to which factories with wet processes have their wastewater regularly checked for compliance with limit values. The wastewater tests are carried out by independent laboratories and the results are communicated to the manufacturers, but also to the ZDHC and its brands (ZDHC ClearStream Report). While compliance with the requirements for the ZDHC MRSL parameters and metals primarily addresses toxicity and potential long-term harmful effects, specifications are based on international standards for conventional wastewater parameters (e.g. colour, biological and chemical oxygen demand, solids content, phosphorus and nitrogen, pH value). The solids content of the wastewater, for example, can also be used to make a statement about potential contamination with microplastics. The requirements for handling and testing the sewage sludge generated at the factories complete the industry's toolkit for ensuring that contaminated industrial sewage sludge does not end up as fertilizer on agricultural land—thereby merely shifting the associated problems elsewhere.

The ZDHC Foundation invests in a better understanding of the complex effects on water and biodiversity (see, for example, the study Protecting Supply Chains and Natural Capital: The Power of Safer Chemistry) and is working to translate findings into improvements to guidelines and tools. In the Detox Live Map, the general public can also find out about the status of the respective factories.

In addition to the ZDHC MRSL and the ZDHC Wastewater Guidelines, the ZDHC also offers other tools in the field of sustainable chemicals management. An overview of the results of the work can be found in the ZDHC Impact Report.

Procurement checklist

Textile brands have many options for decisively controlling their biodiversity footprint through purchasing policies. In addition to the selection of materials, the origin, production standards and transparency of suppliers are also among the selection criteria that purchasing should take into account.

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators / KPIs	CHECK: Yes / No / Partial
A biodiversity risk analysis for the entire range is available.	In order for the company to be able to implement targeted measures, a prior analysis of the most important impacts and dependencies is crucial. External experts can provide support in this regard. ESRS E4-relevant.	Analysis, e.g. with ENCORE, WWF Risk Filter Suite, SBTN Screening Matrix or Global Forest Watch (as free offers)	
The company prioritises its fields of action (recommended: according to impact and/or sales).	With the large number of products and supply chains, prioritisation is recommended. ESRS E4-relevant (essentiality).	ENCORE and the SBTN Screening Matrix also allow processes to be prioritised.	

CRITERION	Why is the criterion relevant?	Possible indicators / KPIs	CHECK: Yes / No / Partial
The company screens relevant seals and certifications for biodiversity criteria.	Sustainability standards only include partially ambitious biodiversity criteria. Demanding standards are therefore preferable when purchasing.	Screening & identification of the most important standards Textile Exchange Preferred Fibre Matrix ITC Standards Map	
A purchasing policy including biodiversity criteria (certifications, standards, risk countries, requirements for suppliers) has been developed and implemented for prioritised products/product ranges/raw materials.	The greatest impact on biodiversity usually lies in the upstream supply chains. That is why it is important to have specific purchasing requirements in order to minimise the company's biodiversity footprint. ESRS E4 relevant.	Policy with goals, measures, resources Including specifications on certifications, standards, risk countries, requirements for suppliers	
Buyers are regularly trained on biodiversity and ecosystems.	Buyers should know what impact the products have on biodiversity in order to pay attention to standards, risk countries and supplier commitment.	Training program, regular trainings JARO offers general sustainability training. The Global Nature Fund and the Lake Constance Foundation also offer biodiversity training courses	
The company knows its (essential) suppliers along the entire supply chain.	Since biodiversity risks are mainly at the beginning of the supply chain, it is essential that traceability is ensured, at least for high-risk products. ESRS E4-relevant.	Information on suppliers (location, environmental management available, additional biodiversity data)	

CRITERION	Why is the criterion relevant?	Possible indicators / KPIs	CHECK: Yes / No / Partial
The company systematically requests biodiversity-relevant data from its suppliers.	Systematic monitoring is crucial in order to gain an overview of its biodiversity impacts and dependencies and to measure the performance of suppliers.	• Biodiversity risk analyses? • Environmental management system? • Water • CO2 • Land Use • Proximity to biodiversity-sensitive areas e.g. Worldly / HIGG already contains relevant queries for this See Discussion Paper on Biodiversity Data Management Location data can also be evaluated using tools such as the WWF Biodiversity Risk Filter (free of charge) or IBAT, Kuyua, Nala (fee-based).	
The company supports (selected) suppliers (financially) in the implementation of biodiversity measures.	The implementation of biodiversity measures initially costs money. The company should therefore provide strategic suppliers with targeted support in the implementation of relevant measures. The avoidance hierarchy should be taken into account in this context.	Biodiversity Action Plan with Financial Plan Amount of support in euros/pounds/dollars Implemented measures and their impact	

CRITERION	Why is the criterion relevant?	Possible indicators / KPIs	CHECK: Yes / No / Partial
The company supports recovery efforts in its supply chains.	In addition to measures to avoid negative impacts, the company should also invest in the restoration of nature. Ideally, with local actors.	Amount of support in euro/pounds/dollars Implemented measures and their impact Biodiversity Action Plan with Financing Plan.	
Sales people are regularly trained on biodiversity and ecosystems.	The sales department should be able to answer customers' questions about sustainability well and support them in their purchase decision.	Training programme, regular trainings, documents / guidelines	



COLLABORATION WITH SUPPLIERS

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Many textile companies have so far only had limited insight into their supply chains but often know their direct suppliers at Tier 1 and Tier 2 level. Even at this level, it is crucial to address key issues such as water use and sanitation, chemical management and the use of renewable energies in a targeted manner through exchange, training and joint programmes. These measures not only contribute to an improved environmental balance but also have a positive impact on the conservation of biodiversity, for example by reducing pollutant inputs into ecosystems or conserving natural resources. For strategically important supply chains, companies should go one step further and gradually cover the entire supply chain. Such transparency creates the basis for targeted action where the greatest risks to biodiversity exist. The prerequisite for this is stable and long-term supplier relationships that promote trust and cooperation.

On the ground, it can also make sense to cooperate with stakeholders from environmental and nature conservation, for example from science or nature conservation NGOs. These partners can sensitise and train suppliers and support them in understanding and implementing measures to avoid negative impacts on biodiversity and developing projects to restore nature.

Obtaining information from suppliers

Supplier query tools such as Worldly/HIGG, retraced or SEDEX, for example, already contain some biodiversity-relevant aspects and are therefore worthwhile for centralised collection of environmental data along strategic supply chains.

Minimum questions that the company should ask its suppliers:

- Does the supplier/producer have an environmental management system?
- Does the supplier record its impact on and dependencies on biodiversity?
- Does the supplier/producer implement substantial measures for biodiversity conservation?
- How are these measures examined?
- Are production processes or products certified? And do these certifications include biodiversity criteria?
- Location data (GPS) of the supplier
- Are the sites in or near protected areas? [40] Are corresponding management plans of the areas known? (this question can also be analysed with the help of geodata)
- In turn, where does the supplier/processor source their products from? (Names of upstream tiers + location)
- Recording of the negative effects together with suppliers / processors / producers

Supplier cooperation checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. From an expert's point of view, the activities marked darker are considered to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company is setting a budget for investments in the supply chain / "insetting".	Investments in the supply chain are crucial to alleviate pressure on biodiversity and adaptation to climate risks.	Investments in % of total budget	
Supplier production companies implement an environmental management system, ideally with biodiversity targets and measures.	An environmental management system (EMS) lays the foundation for environmental protection measures.	EMS is available	
Production companies are looking for further ambitious environmental standards certified with biodiversity criteria (e.g. GOTS, OEKO-TEX® STeP, ZDHC etc.).	Certifications such as OEKO-TEX® STeP or GOTS ensure that the manufacturing company complies with environmental standards. If the production facilities are in-house, measures can also be taken.	Certification with standards that include biodiversity criteria.	
The company supports strategic suppliers in analysing their impacts and dependencies on and on biodiversity, as well as in developing a biodiversity action plan.	A materiality analysis to determine the most important fields of action for the supplier operation and to define measures is very effective. The company can support the supplier methodically, for example by sharing analysis tools, sharing data or exchanging data.	% share of suppliers with analysis carried out (see HIGG where applicable)	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
Together with strategic suppliers, the company pursues strategic supply chains back to the origin. Prioritisation of risk raw materials (leather, cotton, synthetic fibres, animal fibres).	The impact on biodiversity and dependencies is greatest the further the supply chain is traced back to its origin. The implementation of very good and effective measures therefore (only) goes hand in hand with transparent supply chains.	% share of traced products / materials Systems: e.g. ABTF's Hard Identity Preserved System for the traceability of Cotton made in Africa and Cotton made in Africa Organic Cotton from gin level (= tree wool bales) to the finished product	
The company implements training with suppliers on biodiversity and water.	Water problems were one of the main risks in the Biodiversity Check, both in terms of availability and droughts as well as due to flooding. To this end, the textile company should engage in a strong exchange and raise awareness among suppliers.	Trainings conducted	
The company supports suppliers in a strategy to reduce primary fibres, including targets.	The reduction of resources is one of the most important factors in biodiversity conservation. The reduction of primary fibres is a key lever for reducing resource consumption and biodiversity effects. At the same time, it supports the transformation towards circular and resource-saving business models. The company communicates this strategy to its suppliers in a binding manner and jointly develops concrete substitution strategies as well as clear minimum requirements for remaining primary fibres.	% share of virgin fibres or recycled fibres, targets	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company is significantly reducing the use of animal materials and prioritising non-animal and recycled alternatives.	Animal materials are often associated with high biodiversity effects, e.g. through land use, deforestation, overgrazing and high emissions. If animal fibres continue to be used, they may only be used from systems that meet high requirements for animal welfare, environmental impact and traceability (e.g. IVN BEST, GOTS for wool, as well as specific standards such as Responsible Wool Standard (RWS), Responsible Mohair Standard (RMS), Responsible Alpaca Standard (RAS) or Responsible Down Standard (RDS)). The company communicates this strategy to its suppliers in a binding manner and jointly develops concrete substitution strategies as well as clear minimum requirements for remaining animal materials.	Reduction targets, % share of animal materials or recycled fibres	
The company requires renewable energy sources and energy efficiency in the manufacturing process and controls accordingly; it supports suppliers in the outphasing of fossil fuels (e.g. co-financing solar panels, electric cars).	Very high energy consumption, often based on energy sources such as wood-based biomass or coal, makes a major contribution to the loss of biodiversity. The switch to renewable energy sources may be time-consuming and expensive, and should therefore be supported.	Recorded CO_2 emissions and energy sources	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company supports suppliers in developing a water strategy and measures such as rainwater treatment and green filtration systems. Control of the water temperature of discharged water.	It is important that suppliers take measures to save water and improve the water quality of aquatic ecosystems.	% share of suppliers with water strategy, sampling of measures	
The company requires its suppliers to manage chemicals in accordance with at least ZDHC standard + Greenpeace Detox and monitors this.	The high use of hazardous chemicals, among other things, is one of the most important levers for nature conservation (and the people who work in production). ZDHC has committed itself to established as the industry standard, but the highest level should be strived for.	% share of suppliers certified according to ZDHC	
Waste management: Suppliers recycle fabric waste in a targeted manner and comply with packaging material specifications. The company asks for data to reduce waste.	The goal is to keep textile fibres directly in the cycle, and the volume of waste should also be continuously reduced. Proper disposal should also be checked.	Supplier Requirements Verification Waste Measurement and Reduction	
The company provides specifications to suppliers for the transport and avoidance of invasive species	In some cases, invasive species are spread through transport and logistics. Specifications for loading and control can help here.	Orientation	
The company tests harmful light, noise and other emissions/pollutants in production together with suppliers.	In addition to pollutants and waste, light and noise also have a major impact on the environment, especially on certain species of insects, bats and birds.	% share of suppliers with measures	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company supports suppliers in the ecological upgrading of the company's premises through natural design (where possible) – also with regard to climate adaptation (e.g. cooling of buildings).	In industrial areas in particular, biodiversity and climate adaptation measures can be ideally combined, and temperature differences, among other things. Suppliers can provide targeted advice and financing offered.	% share of suppliers with measures	
The company supports local nature conservation NGOs or scientific NGOs in the implementation of nature conservation measures, e.g. with suppliers in the implementation of protection and restoration measures.	Measures in the value chain should be carefully planned with experts and carried out with the involvement of suppliers. At best, the measures follow the avoidance hierarchy.	Project + Budget	



In the following, the focus is on **cotton and synthetic fibres**, as they together account for the largest share of global textile fibre production and are at the same time associated with significant environmental and social impacts (see Textile Exchange, Materials Market Report[41]). The selection of these materials thus follows both their quantitative relevance in the market and their systemic importance for environmental and biodiversity impacts along the supply chain.

However, animal fibres and other animal materials such as leather, hides or skins are not considered in detail, although their production is also associated with considerable biodiversity effects, especially in connection with land use, deforestation and overgrazing. This distinction is made in order to sharpen the focus of the analysis and to enable an in-depth examination of the dominant material flows. The use of materials from protected species is also not taken into account in this analysis.

For a more in-depth analysis of the ecological and ethical impacts of animal materials, reference is made to the work of Collective Fashion Justice[42], which presents these questions in a comprehensive and differentiated manner.

In addition, we do not address bio-based fibres in the analysis. These in turn pose further risks to biodiversity (e.g. very high land use, monoculture cultivation, material recycling) and must be assessed in detail.



Today, synthetic fibres account for around 68% to 70% of global textile fibre production. [43] The main reasons for this are their inexpensive production, high durability and long shelf life. The most commonly used man-made fibres, at around 99 %, include polyester, acrylic and polyamide, which are produced from crude oil. The use of recycled raw materials has so far played only a very minor role: less than 3% of the total materials processed in the clothing industry come from recycled sources, and less than 1% of the material used is processed into new clothing. [44]

Ecological & Social Challenges of Synthetic Fibres

The dominant role of synthetic fibres in the textile industry is accompanied by considerable environmental and social burdens. These not only affect the consumption of resources and emissions during production but also have an impact along the entire value chain – from raw material extraction to processing and disposal. The most important challenges can be divided into four central areas:

- Dependence on raw materials and fossil risks

  Production is based almost entirely on crude oil, a finite raw material with strong price fluctuations and geopolitical dependencies. Rising energy prices or political crises can make production more expensive.

- Environmental and health hazards

  Synthetic fibres are made using chemicals[45] that can pollute the air, water and soil:

  1. **Polyester:** Production is energy- and water-intensive. Antimony trioxide (ATO), a carcinogenic catalyst, leads to high human toxicity in life cycle assessments. In addition, volatile organic compounds (VOCs) are produced, which are harmful to health and the environment. Polyester releases microplastics, which pollute water bodies and are difficult to degrade.
  2. **Polyamide:** Production causes high greenhouse gas emissions, especially nitrous oxide (N_2O), which is around 300 times more harmful to the climate than CO_2.
  3. **Polyacrylic:** Fiber production is energy-intensive and requires numerous hazardous chemicals. Acrylonitrile is considered carcinogenic. Other CMR substances such as dimethylformamide (DMF) or dimethylacetamide (DMA) are used in spinning.
  4. **Elastane:** The production process uses chemicals that are hazardous to health and the environment, such as organotin compounds and aromatic diisocyanates. Some of the solvents DMF and DMA remain in the fibre and end up in the wastewater. [46]

In addition, microplastic particles are not only produced during wearing and washing, but also during material production (e.g. when cutting polyester or fleece fabrics) and during textile processing (grinding, brushing, cutting). These particles enter the environment via production wastewater, exhaust air or the sewage sludge produced during wastewater filtering and can thus also be introduced into soils and waters. During later washing, further fibres are released, which are often not completely retained by sewage treatment plants and ultimately end up in rivers, oceans or the food chain. [47]

- Impairment of biodiversity

  The extraction and processing of crude oil for fibre production entails considerable environmental pollution: natural habitats remain increasingly impaired by land consumption (e.g. for extraction activities, infrastructure), pollutant inputs, oil spills and increased use of chemicals. The consequences range from local ecosystem disturbances to soil and water pollution to the direct threat to flora and fauna – which contributes to the loss of biodiversity.

- Increasing demand

  According to the Textile Exchange Materials Market Report 2024, the quantities of virgin fossil-based synthetic fibres increased from 67 million tonnes in 2022 to 75 million tonnes in 2023, i.e. by around 12 million tonnes or almost 12%[48]. This development illustrates the strong growth in the synthetic segment and thwarts efforts to achieve more sustainable materials and climate targets. This is promoted by fast fashion trends, which in turn increases resource consumption, waste volumes and makes it more difficult to switch to recycled materials.

➔ In summary:

Apparently, synthetic raw materials have a lower impact on the area (but oil production / fracking is often not taken into account in life cycle assessments), but the environmental impacts such as greenhouse gas emissions, water consumption & chemical use, microplastics and air emissions are significant.

Impacts and dependencies of petroleum-based synthetic fibres on and on biodiversity

Drivers	Upstream (raw material extraction & intermediate products)	Own operations (fiber and textile production)	Downstream (Nut-zung & End of Life)
Land use / habitat destruction	Oil (and gas) production leads to direct habitat destruction (drilling fields, pipelines, infrastructure), fragmentation of sensitive ecosystems	Industrial plants take up space, mostly in areas that are already in use, but with local habitat displacement	Landfills and uncontrolled landfill take up land and damage local ecosystems
Overuse of resources	Extraction of fossil raw materials (non-renewable); high energy consumption along the production chain	High energy requirements (often fossil-based); Water requirements for cooling and processes	Energy consumption in the use phase (washing, drying); lack of recycling increases primary resource requirements
Pollution	Air and soil pollution and noise emissions from the extraction of petroleum products. Oil spills, leaks and emissions (e.g. methane) damage marine and terrestrial ecosystems. Chemical processes	Chemical emissions, production waste, air and water pollution; microplastics already in production	Microplastic release during washing: washed out fibres from synthetic clothing items account for 35% of the microplastic input described above in the sea. [49] Persistent inputs into soils and waters, potentially toxic additives. Microfibres sometimes end up in the environment with sewage sludge (60-90% is filtered out). [50]

Drivers	Upstream (raw material extraction & intermediate products)	Own operations (fiber and textile production)	Downstream (Nut-zung & End of Life)
Invasive species:	Indirectly through transport infrastructure (e.g. shipping) possible spread of invasive species	Low direct relevance	Microplastics as a carrier medium ("plasticsphere") for microorganisms.
Climate change	High greenhouse gas emissions from the extraction and processing of fossil raw materials (including methane emissions)	Energy-intensive production processes cause significant CO_2 emissions	Emissions over the life cycle (use, disposal, incineration)
Dependencies / Risks	Dependence on stable ecosystems for safe raw material extraction (e.g. protection of infrastructure from extreme weather); Risks from climate impacts	Dependence on water availability and functioning ecosystems for production processes; increasing regulatory risks (e.g. microplastics)	Risks from stricter regulation (e.g. microplastic filters, Extended Producer Responsibility); Dependence on functioning waste and recycling systems

Seals, certifications

From a biodiversity perspective, the use of synthetic fibres should be reduced overall. Synthetic materials such as polyester are usually based on fossil raw materials, the extraction of which is associated with significant interventions in ecosystems. In addition, they contribute to environmental pollution along their entire life cycle, in particular through greenhouse gas emissions and microplastics, which enter water and soil and can harm organisms there. Recycled polyester can partially reduce these impacts by reducing the need for primary raw materials. Nevertheless, challenges remain, especially with regard to microplastic emissions and the handling of chemicals in the recycling process.

Against this background, polyester, whether as a primary fibre or recycled fibre, should only be used where functional requirements make it absolutely necessary. At the same time, companies should pursue strategies for material reduction, substitution and the promotion of circular solutions.

Virgin Polyester

For virgin polyester (i.e. newly produced from crude oil, not recycled), there are no standards that comprehensively address biodiversity criteria along the entire textile value chain, especially in the extraction of crude oil. However, standards such as **bluesign®** and **OEKO-TEX® MADE IN GREEN** can help to reduce negative impacts in the manufacturing phase, especially with regard to chemical management, wastewater and occupational safety.

- **bluesign®** focuses on the entire production process and ensures that

environmentally harmful chemicals are eliminated at the beginning of the supply chain. It calls for resource-saving processes, controls energy and water consumption and monitors wastewater and exhaust air quality.

- **OEKO-TEX®** MADE IN GREEN combines product safety testing (OEKO-TEX® Standard 100) with sustainability and social auditing (STeP by OEKO-TEX®). In addition to being free of harmful substances, it is checked whether the production facilities are environmentally friendly and in compliance with international labour standards, such as the ILO core labour standards. A QR code on the product gives consumers insight into production facilities and certification details.

In addition, the **ZDHC Roadmap to Zero** is an important industry initiative that contributes to the reduction of pollutant inputs into water bodies through common chemical lists (MRSL) and wastewater requirements.

Recommendation: If virgin polyester is unavoidable, it should preferably be sourced from suppliers who use bluesign-certified® materials, use OEKO-TEX® STeP certified production facilities and can demonstrate ZDHC-compliant chemical management (e.g. MRSL conversion). This combination ensures both environmentally friendly production processes and binding social standards. At the same time, the company should pursue a clear strategy to reduce virgin polyester and work towards preferred alternatives (e.g. textile-to-textile recycling).

Recycled Polyester

For recycled polyester, the **Global Recycled Standard (GRS)**[51] is currently the most comprehensive and widely used sustainability standard.

- **GRS** guarantees a documented recycled content and also checks environmental management, chemical use and social standards along the supply chain. The standard also records the **origin of the recyclate** and distinguishes between material of textile origin (e.g. used textiles) and other sources such as **PET beverage bottles**. The latter are currently still accepted because textile-to-textile recycling quantities are very limited globally [52/53]

As much of the currently available GRS polyester still comes from PET bottles, the targeted demand for textile recycling sources (and thus the development of technologies) is crucial to promote the transition to a true textile circular economy.

The majority of recycled polyester currently comes from PET bottles – not from used textiles. Only about 1% of rPET is currently actually obtained from textile waste. This is problematic because PET bottles could be kept in the cycle and recycled back into bottles – unlike textiles. The EU is using Extended Producer Responsibility (EPR) to require companies to recycle their own waste from 2025, including in the textile industry.

There is still a lack of sufficient single-origin used textiles and effective recycling processes. While used clothing is collected in Europe, this has hardly happened in Asia, where the majority of synthetic fibre production takes place. After all, production waste is already recycled there. Mechanical recycling should be preferred to chemical recycling.

Since recycled polyester is made from materials that have already been used, the material may contain dyes, additives or functional finishes from previous use. These are not necessarily completely removed by the recycling process and can pose a potential environmental and health risk.

In addition, the ZDHC Recycled Guideline (from 2026)[54] is gaining in importance, as it formulates requirements for the handling of chemicals in the recycling process and thus addresses existing gaps in the assessment of recyclates.

The Recycled Claim Standard (RCS) can serve as a minimum proof of recycled content but does not include any further environmental or social requirements and is therefore much less demanding than GRS.

In the future, Textile Exchange is developing the Materials Matter Recycled Standard (MMRS), a more far-reaching standard that is intended to complement GRS and RCS or replace them in the long term. The introduction is expected from 2026.

Recommendation: Preference should be given to the use of GRS-certified recycled polyester from textile sources in order to reduce the need for primary raw materials and promote the development of a circular textile economy. In addition, requirements for effective chemical management in the recycling process (e.g. in accordance with ZDHC) and for additional safeguarding of the absence of harmful substances should be supplemented by the use of OEKO-TEX® Standard 100 or – if the supply chain is sufficiently transparent – OEKO-TEX® MADE IN GREEN/STeP. In particular, this can reduce pollutant inputs into water bodies and ensure environmental and social standards along the textile value chain.

Classification of microplastics in recycled synthetic fibres

Recent scientific studies also show that recycled synthetic fibres can release more microplastics than virgin polyester under certain conditions. Studies[55] report up to 50-60% higher release of microfibres during washing, which is attributed to a change in the fibre structure and lower mechanical stability caused by recycling processes, among other things. At the same time, researchers emphasise that the release of microplastics depends heavily on yarn structure, fabric construction and surface treatment and is not determined solely by recycling status. [56]

This makes it clear that although recycling contributes to reducing the use of fossil raw materials, it does not solve the microplastic problem structurally. As long as synthetic fibres continue to be produced and used in large quantities, fibre abrasion will remain a relevant environmental burden along the entire life cycle – from production to use to disposal.

At the same time, recent material developments and finishes, such as **OceanSafe NaNea**, **Ciclo®** and **Livinguard**, show that research is being carried out on solutions to reduce fibre abrasion and improve the environmental compatibility of synthetic materials. However, most of these approaches are still in the scaling and evaluation phases and underline that **further innovations, binding standards and a reduction in the overall use of materials are necessary to effectively limit microplastic emissions**.

Synthetic fibre procurement checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERIA[57]	Why is the criterion relevant?	Possible indicators / KPIs and instruments	CHECK: Yes / No / Partial
The company records relevant supply chains and production sites (for relevant raw materials), areas of origin, proximity to protected areas and production conditions.	In order for the company to be able to implement targeted measures, a prior analysis of the most important impacts and dependencies is crucial. External experts can provide support in this regard.	List of essential products, places of origin, suppliers, sales, volumes, impacts, dependencies	
The company has set itself an ambitious milestone goal for the outphasing of virgin plastic (e.g. polyester, nylon fibres) and chemical fibres. Setting up a monitoring system	In order for the company to be able to implement targeted measures, a prior analysis is important. Based on this, targets should be developed and clear responsibilities defined. The focus is on reducing Virgin Fibres.	% share Goals and measures, milestones	
The company uses 100% recycled synthetic fibres up to mm.yyyy (e.g. textile to textile, GRS/Materials Matter certified and manufactured in accordance with the ZDHC Recycled Polyester Guideline.	Where the use of synthetic fibres is necessary, they should be recycled (from textile raw materials) in order to avoid further oil production. However, other environmental impacts must be evaluated.	% share	
The company's purchasing specifications are mono-materials, no mixed fibres.	Mono-materials are easier to feed into the cycle and recycle.	Listed in the purchasing specifications	

CRITERION[57]	Why is the criterion relevant?	Possible indicators / KPIs and instruments	CHECK: Yes / No / Partial
Purchasing guidelines should include standards such as Wordly/Higg Product Tools, bluesign or OEKO-TEX STeP in the selection of materials. Or suppliers should be obliged to implement the ZDHC Road map to Zero programme.		Adapted purchasing guidelines	
The company is exchanging ideas with other textile companies on the outphasing of virgin polyester.		Exchanges carried out Workshops e.g. within the framework of the Textiles Partnership	
The company calls for treatments to prevent microplastic decomposition (e.g. Livinguard, Ciclo) or uses corresponding fibres, e.g. from Ocean Safe.	Companies can use special fibres, finishes or additives in the production of synthetic textiles that prevent or reduce the release of microplastics.	Processes	
The company generally prohibits the use of PFAS in manufacturing processes and has appropriate control mechanisms in place.	PFAS (per- and polyfluorinated alkyl substances) are found in synthetic textile fibres are not naturally contained but can be used specifically in the equipment. PFAS are non-degradable and accumulate in the environment and in the human body, so companies should use PFAS-free alternatives (e.g. wax-based).	Policy including controls	

CRITERION[57]	Why is the criterion relevant?	Possible indicators / KPIs and instruments	CHECK: Yes / No / Partial
The company sensitises customers to synthetics / microplastics.	Textile companies should provide transparent information about the environmental impact of synthetic fibres – in particular about the release of microplastics during washing and the limited recyclability. Customers should receive clear information on the material composition, care and avoidance of microplastics (e.g. through washing bags or lower washing frequency). In addition, companies should visibly label alternatives made from recycled materials and explain their advantages in an understandable way.	Communication materials	
The company trains suppliers and exchanges information with them on a regular basis.	This depends on where individual suppliers already stand when it comes to synthetic fibres.	If necessary, training courses Regular exchanges Audits	



Cotton is the most important natural fibre for the textile industry and accounts for around 20% of global fibre production.[58] The global area under cultivation for the fashion sector alone amounts to around 34 million hectares, of which India cultivates the largest area with around ten million hectares.[59] According to the International Cotton Advisory Committee, the global amount of cotton certified according to sustainability standards can be estimated at roughly one third of the total share.[60 / 61]

Environmental and social challenges of cotton

- ### Climatic dependence and risks

  Cotton grows mainly in warm, sunny regions and requires long frost-free periods. More than half of the cultivated area depends on rain, which makes it particularly vulnerable to climate change-related droughts and irregular rainfall. Both too much moisture and longer dry seasons can cause significant yield losses. According to forecasts, half of the growing regions will be exposed to a high climate risk by 2040.[62]

- ### High pesticide use and health hazards

  The plants are very susceptible to pests and are sprayed up to twenty times per season in conventional cultivation. According to the Pesticide Action Network UK (2018), 16% of the world's insecticide and 4% of herbicide waste are on cotton.

In India, pesticides are the second most common cause of death after traffic accidents; around 7,000 people die there every year due to accidental exposure. [63]

- Monocultures, genetic engineering and biodiversity loss

  Around 75% of conventionally grown cotton is genetically modified. [64] Monocultures and the use of such varieties promote pest resistance, impair soil and water bodies and endanger biodiversity. Many insects, including pollinators, are directly harmed or lose their habitat.

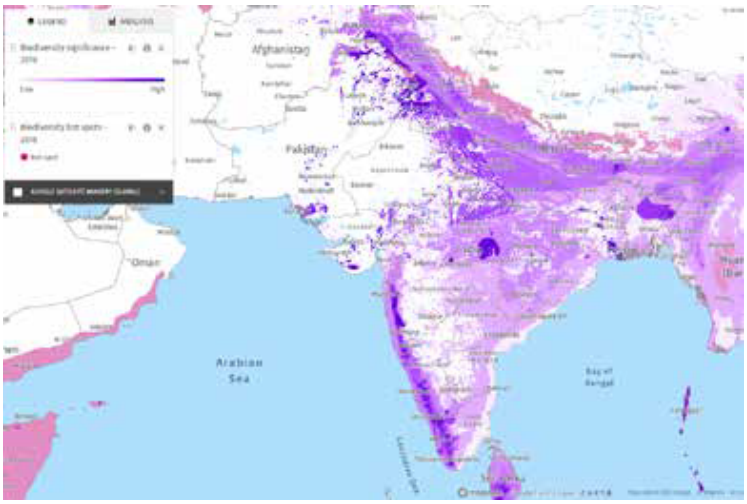
- Growing demand and need for action

  Global demand for cotton has risen sharply in recent years – with the same acreage. In view of climate risks, biodiversity loss and chemical pollution, the switch to sustainable cultivation methods as well as the expansion of organic cultivation is crucial for sustainable cotton production.

Cotton & Biodiversity

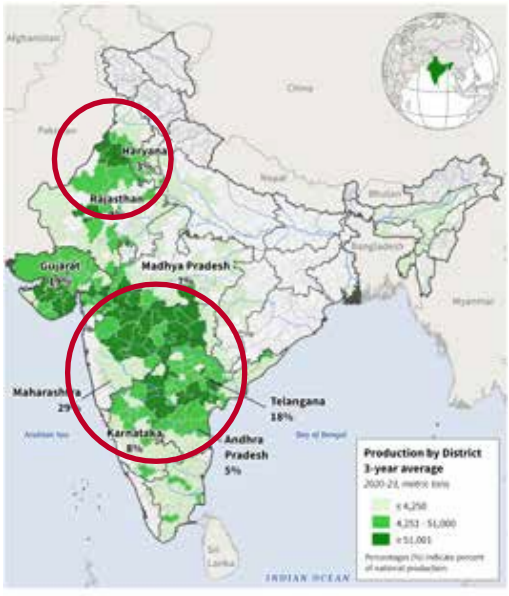
If we compare one of the main cotton producing countries India with the Biodiversity Hotspots and the Biodiversity Significance filter, we can see overlaps between particularly biodiversity-rich areas and cotton-growing regions. The risk of biodiversity being damaged by the local production steps is therefore very high, especially in the cultivation of cotton. It is estimated that biodiversity in cotton-growing areas has declined by about 90% due to production intensity. The area corresponding to the "Total Species Lost" of cotton is about 16.8 million hectares. [65]

India: Biodiversity hotspots



© Global Forest Watch

Cotton production



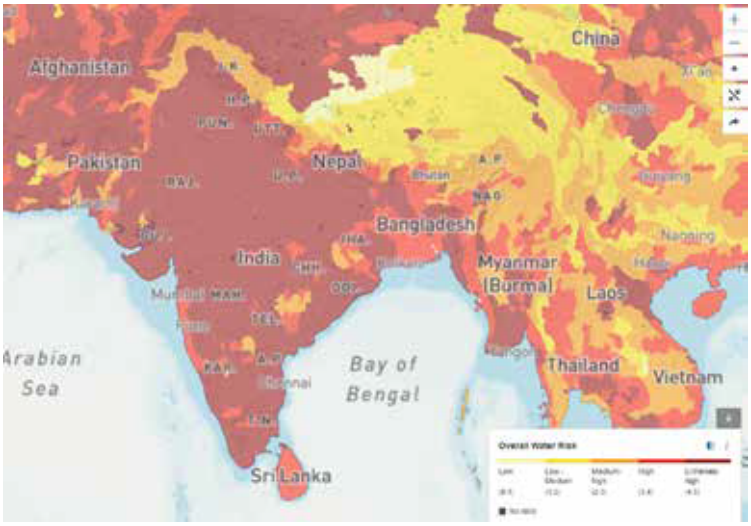
Sources: India Ministry of Agriculture, Directorate of Economics and Statistics, Market Year 2020/21 - 2022/2023 data by districts; Survey Of India, Department of Science and Technology, Govt. of India, District Boundaries 2024

© India Ministry of Agriculture

Cotton & Water Risks

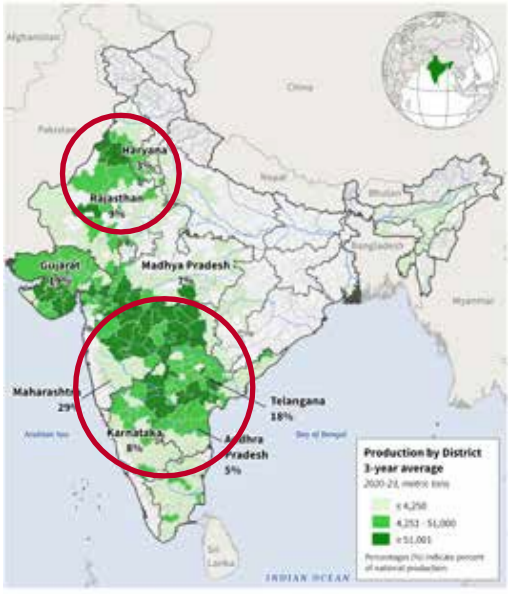
Cotton is one of the most water-intensive plants of all. In India, 23,000 litres of water are used for one kilogram of the fibre. This is the world's highest water footprint for cotton, which is far above the global average of 11,000 litres per kilogram. [66] On the one hand, cotton is very susceptible to disease in the event of too much rain, and on the other hand, it also needs basic soil moisture. Longer dry periods can also lead to losses. The risk filter for water from the World Resources Institute Aqueduct shows the drought and flood risks. The cultivation areas are extremely risky.

India: Water Risk Areas



© Aqueduct

Cotton production



Sources: India Ministry of Agriculture, Directorate of Economics and Statistics, Market Year 2020/21 - 2022/2023 data by districts; Survey Of India, Department of Science and Technology, Govt. of India, District Boundaries 2024

© India Ministry of Agriculture

Cotton & Deforestation Risks



[67] Quelle: Fashion Nature Risk Lens

Worldwide cotton acreage, shown in purple. Darker areas mean a larger cotton acreage, green areas are deforestation fronts. White areas are unproductive zones such as tundra.

The map shows cotton acreage (in purple) and deforestation areas (in green) worldwide. Although cotton and deforestation often occur together, cotton is not necessarily the cause of deforestation. According to a WWF analysis, cotton is not explicitly named as the main driver of deforestation; however, agriculture is generally considered a primary or secondary cause in some areas.

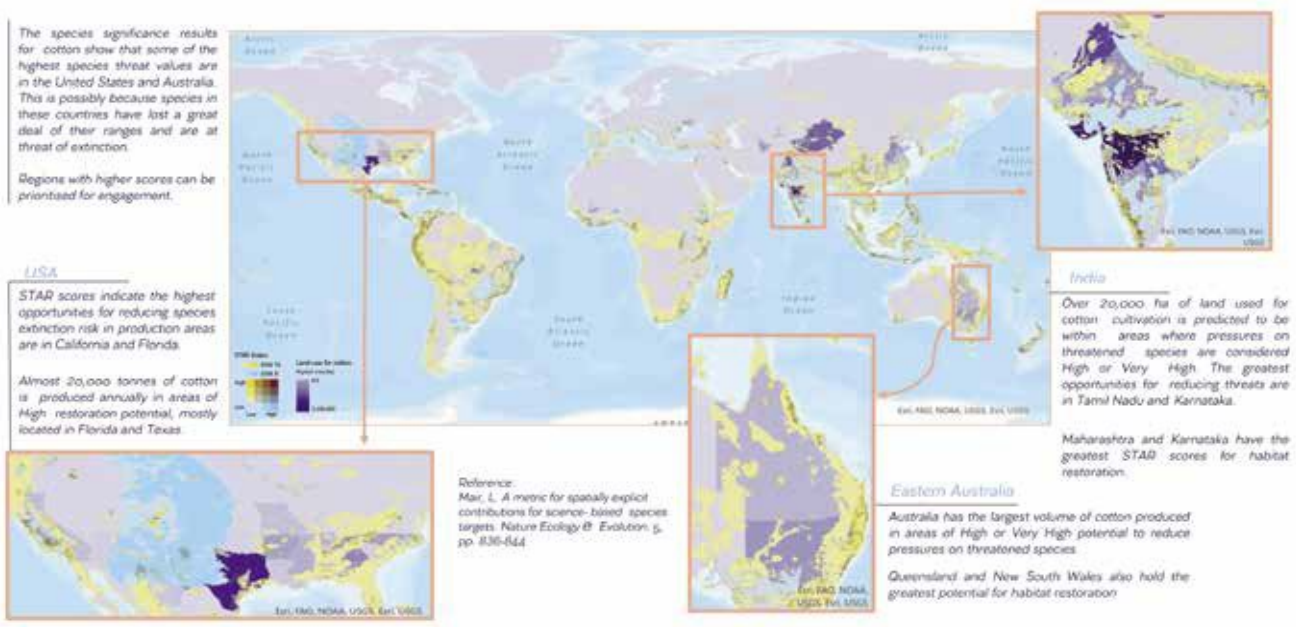
The map shows where cotton is grown close to deforestation areas and where further research is needed to determine whether cotton contributes to deforestation. In Brazil, for example, cotton cultivation and deforestation overlap, but cattle farming and soybean cultivation are seen as the main causes of deforestation. In some regions, cotton is grown alternately with soy.

➔ Summary: Cotton & Country Risks

When we collectively assess risks to biodiversity, water and deforestation in cotton cultivation, the following countries are particularly high-risk and offer the highest potential for commitment to species conservation:

- USA
- Australia
- India
- China
- Turkey

STAR SCORES IN PRODUCTION AREA



© Fashion Nature Risk Lens [68]

This means that companies should ensure that they can trace cotton, especially in these countries (ideally down to cultivation). At the very least, high-quality standards in cultivation, such as controlled organic farming, should be used and, at best, audits should be carried out down to farm level to check biodiversity measures. It is also recommended that companies provide concrete support to raw material producers in biodiversity and water measures. ("Insetting"). In addition, the focus should be on the transformation towards renewable energy sources (no use of coal or wood).

Impacts and dependencies of cotton production on and from biodiversity

Drivers	Upstream supply chain	Own business (brand)	Downstream (Use phase & End of Life)
Land use / habitat destruction	• Monoculture cultivation • Land clearing / possibly even deforestation • High land use		
Overuse of resources	• Use of considerable quantities of water; is partly grown in water-scarce regions • Soil degradation • High use of coal • Fossil fuels • Use of (wood) biomass as an energy source	Packaging material (paper, pallets, etc.)	• Disposal of packaging material • Disposal of textiles
Pollution	• High use of pesticides • High use of fertilisers • Air and soil pollution • Groundwater pollution • The Discipleship • High use of chemicals in dyeing	Use of chemicals in processing	
Invasive species	• Very strong spread, sometimes of invasive species • Invasive species are sometimes used for biological pest control and can spread as a result • If necessary, by transport / logistics • GMO	If necessary, by transport / logistics	

Drivers	Upstream supply chain	Own business (brand)	Downstream (Use phase & End of Life)
Climate change	• High energy consumption in production • Degradation of soils emits CO_2	Energy (CO_2 emissions)	
Dependencies / Risks	• Water • Plant health • Soil fertility/soil stability / erosion control • Energy (fossil raw materials) for mining / production / logistics • Stable microclimate • Soil stability / erosion control • Energy (fossil raw materials) for mining / production / logistics	• Energy (fossil raw materials) for logistics / storage • Raw materials for packaging materials	Energy (fossil raw materials) for recycling

Seals & Certifications

A desktop analysis of the most commonly used sustainability standards in the cotton sector revealed a wide range of certifications and, in some cases, biodiversity-relevant criteria. Procurement should be geared towards ambitious and transparent standards that include both verifiable biodiversity criteria and traceability.

Cultivation methods of cotton

Since cotton is grown on an agricultural basis, the respective cultivation methods have a significant influence on ecosystems and biodiversity. In particular, soil fertility, biodiversity, water quality and the occurrence of beneficial insects differ significantly depending on the form of cultivation.

- **Conventional cotton cultivation**, which accounts for the majority of global production, is often characterised by monocultures, the use of synthetic nitrogen fertilisers, chemical herbicides and insecticides as well as genetically modified varieties. The absence of crop rotations and soil-conserving measures promotes soil degradation, the loss of biodiversity and the development of resistant pests ("super-pests"). Chemical pesticides also damage pollinators, beneficial insects and soil organisms and affect entire food webs.
- **(Controlled) organic cotton cultivation**, on the other hand, is a much more biodiversity-friendly form of farming. Organic standards prescribe the complete avoidance of synthetic pesticides and mineral fertilisers as well as genetically modified organisms. Measures such as crop rotations, soil-covering crops, organic fertilisation and the use of natural antagonists of pests promote soil fertility, increase biodiversity in and on the soil and strengthen the resilience of agroecosystems.
- Textile brands are also increasingly advertising "**regenerative agriculture**". Since the term has not yet been uniformly defined, it should be carefully examined which specific practices are being implemented and whether they have been independently verified. However, initial initiatives and standards (e.g. from the Aid by Trade Foundation (AbTF) or the Union for Ethical Biotrade (UEBT)) exist but have not been analysed in detail as part of this analysis.

BIO-ANBAU	UMWELTEFFEKTE	KONVENTIONELLER ANBAU	UMWELTEFFEKTE
Natürliche Bewirtschaftung von Bodennährstoffen mit Kompost und niedrigtoxischen Ergänzungen	Erhöhte Kohlenstoffsequestrierung; Abschwächung des Klimawandels; höhere Bodengesundheit; erhöhte biologische Vielfalt im Boden	**Synthetischer Stickstoff Düngemittel**	Versauerung der Böden; Schädigt das Ökosystem Boden
Bodendeckende Kulturpflanzen	Höhere Bodenfruchtbarkeit und -gesundheit; höhere Artenvielfalt		
Fruchtfolgen	Höhere Bodenfruchtbarkeit; weniger Krankheiten und Schädlinge; Unkrautbekämpfung; höhere Artenvielfalt	**Keine Fruchtfolgekulturen**	Monokultur-System, das die Ansammlung von Insekten- und Krankheitsschädlingen fördert
		Herbizide und Herbizid-tolerante Baumwolle	Entwicklung von „Super-Unkräutern" bei Einsatz von gentechnisch verändertem (gv) Saatgut
Fallen-Kulturen	Pflanzen fangen Schadinsekten, um die Baumwollernte zu isolieren	**Synthetische Insektizide**	Einige Insektizide schaden Bienen und anderen Bestäubern
Entomopathogene (Pilze)	Natürliche Behandlungen mit nützlichen Mikroorganismen, die Baumwollschädlinge unterdrücken können	**gentechnisch veränderte Baumwolle**	Schädlich für Nutzinsekten, die die Schädlingspopulationen in Schach zu halten
Insekten- und krankheitsresistente Sorten	Unterstützung von Nützlingen ohne den Einsatz von Chemikalien	**Insekten- und krankheitsresistente Sorten**	Entwicklung von „Super-Schädlingen" bei Einsatz von GV-Saatgut
Spätere Pflanzung und in warmen Böden	Vermeidung von bodenbürtigem Pilzbefall der Setzlinge; unterstützt Nutzorganismen	**Synthetische Saatgut-Behandlungen**	Schädigt nützliche Bodenbiota; Systemische Behandlungen können weiterhin nützliche Insekten während des gesamten Lebenszyklus der Baumwolle schädigen

© Shade/Delate o.J.

Conventional cotton

There are no recommended minimum standards for the procurement of conventional cotton with a view to biodiversity, as the use of synthetic pesticides and fertilisers as well as monocultures and genetically modified varieties are structurally associated with negative effects on soil ecosystems, insect diversity and agricultural landscapes.

Recommendation: Conventional cotton should – especially from a biodiversity perspective, be avoided as much as possible.

Organic cotton/cotton from controlled organic cultivation

For the procurement of cotton from controlled organic cultivation, both requirements for the cultivation of raw materials and for further processing in the textile value chain are relevant:

1. Requirements for the cultivation of raw materials:
   - **Organic farming as a basis:** Organic cotton is based on recognised standards of organic farming (e.g. EU Organic Farming Regulation or equivalent systems). These include the avoidance of synthetic pesticides and mineral fertilisers, the exclusion of genetically modified organisms and measures to promote soil fertility. This reduces negative impacts on biodiversity, especially with regard to soil organisms, insects and adjacent ecosystems.
   - **Cotton made in Africa Organic (CmiA Organic):** CmiA Organic is based on the principles of organic farming and is aimed in particular at smallholder structures in Africa. The standard combines requirements for organic farming with social criteria and contributes to improving soil fertility and local ecosystems. The requirements relate primarily to the raw material level.
   - **Verification standards for organic cotton (OCS, OEKO-TEX® Organic Cotton):** Standards such as the Organic Content Standard (OCS) or OEKO-TEX® Organic Cotton confirm the use of cotton from controlled organic cultivation and ensure traceability along the supply chain. However, they do not contain any further requirements for environmental or social aspects in processing and therefore only represent a minimum proof at the raw material or product level.

2. Requirements for further processing:
   - **GOTS (Global Organic Textile Standard):** GOTS certifies processing along the entire textile supply chain from the raw material to the end product. The standard does not contain any independent certification of cultivation, and thus no explicit biodiversity criteria, but it implements the requirements for organic farming (e.g. EU Organic Regulation or equivalent standards) in a binding manner at the cultivation level. In addition, GOTS includes requirements for chemical management, environmental and social standards in further processing.
   - **Modular approaches:** If organic cotton is procured using standards such as OCS, OEKO-TEX® Orga- nic Cotton or CmiA Organic, these should be supplemented by further processing requirements. These include, in particular:
     - **OEKO-TEX® STeP:** Certification of production facilities with regard to environmental and social standards

- **bluesign®:** Focus on comprehensive chemicals management and resource-saving processes
- **ZDHC Roadmap to Zero:** Industry Initiative to Reduce Hazardous Chemicals and Improve Wastewater Management

By combining raw material and processing standards, a much more comprehensive safeguarding of environmental and social impacts along the supply chain can be achieved, especially with regard to pollutant inputs into water bodies and the associated biodiversity effects.

Recommendation: For cotton from controlled organic cultivation, comprehensive standards such as GOTS (or IVN Best) are preferable, as they not only use certified organic fibres but also impose requirements on environmental and social criteria along the entire textile value chain.

Alternatively, modular approaches can be chosen, in which organic detection standards (e.g. OCS, Oeko-Tex® Organic Cotton or CmiA Organic) can be combined with more extensive processing requirements (e.g. OEKO-TEX® STeP, Bluesign® or ZDHC). However, these require careful selection and combination of the individual systems in order to achieve a comparable effect.

Cotton from improved cultivation systems

- **Cotton made in Africa (CmiA)** is a standard with comparatively comprehensive criteria for environmental and biodiversity protection at the cultivation level, especially in smallholder cotton cultivation in sub-Saharan Africa. The standard promotes crop rotation, soil protection measures and the reduced use of pesticides and fertilisers, no GMOs, protection against invasive species, use of biochar, compost for soil fertility, only use of rainwater (no irrigation). At the same time, it allows the limited use of chemical inputs and thus does not meet the requirements of organic farming. CmiA refers exclusively to cotton cultivation and ginning; requirements for further textile processing are not part of the standard.

Classification: CmiA represents a significant improvement compared to conventional cotton cultivation, but from a biodiversity perspective it is not to be equated with organic cotton in the area of the use of chemical inputs.

Complementary social aspects

- **Fairtrade Cotton:** The Fairtrade cotton standard is first and foremost a social standard. It promotes living incomes, long-term trade relationships and supports producers through training, minimum prices and premiums. Biodiversity criteria are not the focus but can indirectly enable positive effects through improved economic conditions.

Recycled cotton

From a biodiversity perspective, the use of recycled cotton is particularly recommended, as the agricultural cultivation of raw materials with its negative effects on soils, ecosystems and biodiversity is completely eliminated. Cotton is predominantly recycled mechanically, which means that the additional use of chemicals in the recycling process is eliminated

compared to synthetic fibres. **Recycled cotton may contain residues from previous use (e.g. dyes or finishing chemicals) that are not completely removed in the recycling process. In addition, further processing has an environmental impact, especially wet processes.**

The Global Recycled Standard (GRS) is particularly relevant for the procurement of recycled cotton.

- **GRS (Global Recycled Standard)** guarantees a documented recycled content and verifies environmental management, chemical use and social standards along the supply chain. The standard creates transparency about the origin of the recycled material and ensures that minimum requirements for environmental and working conditions are met.
- Supplementary standards for processing and product safety. For further protection, additional requirements for chemical management and production processes should be taken into account, e.g.:
    - **ZDHC** Roadmap to Zero (Chemical Management and Wastewater)
    - **bluesign®** (comprehensive control of chemicals and production processes)
    - **OEKO-TEX®** STeP (environmental and social standards at company level)
    - **OEKO-TEX®** Standard 100 (testing of the absence of harmful substances of the end product)

Recommendation: Recycled cotton should be used preferably where qualitatively and functionally possible, as it reduces the need for primary raw materials. GRS-certified materials should preferably be used and supplemented by requirements for effective chemical management in processing (e.g. in accordance with ZDHC, bluesign® or OEKO-TEX® STeP). OEKO-TEX® Standard 100 is also recommended to ensure product safety. Easy Guide for download

Example: Supporting and collaborating with suppliers in the cotton supply chain

Author: CmiA, Christina Ben Bella

Standards and certifiers often work directly with the producers, thus forming a "bridge" from the brand "into the field". The promotion of sustainable practices for more climate and environmental protection in agriculture, for example, has been anchored in the **Cotton made in Africa** (CmiA) standard for many years and is taught to smallholder farmers in the regular training courses. Almost 40% of African cotton is CmiA-verified. This means that so far, more than 700,000 smallholder farmers have grown cotton in accordance with CmiA standards and are achieved through training. They currently produce **more than 520,000 tonnes of ginned cotton in ten countries in sub-Saharan Africa according to the criteria of the CmiA and CmiA Organic Standards.**

In 2025, CmiA was able to record an impressive number of training contacts together with the local cotton companies. For example, there were over 620,000 training contacts on the topic of "Good Basic Agricultural Practices", almost 290,000 on "Techniques for Improving Soil Fertility", 475,000 in "Integrated Production and Pest Control", over 540,000 on the topic of "Proper Use and Storage of Pesticides" and an additional 390,000 on the topic of "Biodiversity". Soil protection and the increase of soil organic matter are new focus topics for all CmiA countries. The potential of innovative practices in cotton cultivation, such as biochar (pyrolysis of plant material), is also discussed differently from country to country.

But companies are also implementing direct projects with suppliers and producers: **Primark**, for example, has been committed to greener cotton production in India since 2013 with the **Sustainable Cotton Programme** (PSCP). The aim is to reduce environmental impact while improving farmers' livelihoods. Since 2021, around 3,000 farmers in India, Bangladesh and Pakistan have been participating in a pilot project testing regenerative farming methods such as catch crops, agroforestry, biological pest control and reduced tillage.

According to Primark, a study of 1,408 farmers in Gujarat found that participants in the programme implemented an average of 43.6% more environmentally friendly practices than peer groups. From 2013 to 2019, farmers were able to achieve 14.3% higher yields and 205.5% higher profits through the programme, while using less water (−9.9%), chemical fertilisers (−26%) and pesticides (−41.7%).

Cotton sourcing checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company records its cotton supply chains and production sites (for relevant raw materials), areas of origin, proximity to protected areas and production conditions	In order to understand where the company has the best leverage for action, good traceability is essential. For many suppliers, it is relevant to start with traceability with the most relevant ones (e.g. those with the highest turnover).	% share of recorded suppliers / production sites Tools that can support this, for example: • WWF Biodiversity Risk Filter • Kuyua; Nala etc. • IBAT • Retraced • Worldly	
The company is continuously increasing the proportion of organic cotton and recycled cotton and is developing a target for this.	This depends on where individual suppliers already stand when it comes to biodiversity. There may be a need for training or simply a need for joint exchange on how biodiversity targets can be implemented.	% share of organic cotton, % share of recycled fibres – both significant increases!	
The company develops guidelines for purchasing including certifications, specifications for risk countries, certification specifications (see above)	Biodiversity measures have a positive impact primarily in the supply chain. However, producers lack the time, money, commitment or know-how to implement the right measures.	Purchasing Guidelines / Criteria	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company supports suppliers in the supply chain in improving production, starting with T1/2: • Chemical Management • Water management and reduction • Energy management (especially avoidance of energy sources such as coal and wood) The further the company gets in the supply chain, the more relevant land use measures become.	In addition to biodiversity measures, the analysis also revealed that water measures in particular were particularly relevant. The status quo was to be assessed here and improvements should be worked on together with key suppliers.	Projects with suppliers / investment in euros	
The company educates sellers on biodiversity and water		Training courses conducted	

Basic principle for material decisions according to the avoidance hierarchy

1. Avoidance (highest leverage)
   - Reduction of the total use of materials and avoidance of materials that are particularly harmful to biodiversity.
   - In the case of synthetic fibres, this applies in particular to virgin polyester and other petroleum-based materials, the extraction of which is associated with considerable interference with ecosystems and additional pollution from microplastics.
   - In the case of natural fibres, materials from intensive agriculture or animal husbandry with a high impact on land use, water consumption and ecosystems should be reduced.

2. Substitution (better choice of material)
   - Replacement with materials with lower biodiversity impacts.
   - In the case of synthetic fibres, this means in particular the substitution of virgin polyester with recycled materials, preferably from textile sources, in order to reduce the pressure on fossil resources.

- In the case of natural fibres, the focus is on cotton from controlled organic cultivation and, in the future, from regenerative cultivation systems that actively promote soil fertility and ecosystem functions. Innovative, bio-based materials can also play a role, provided that their impact on biodiversity is taken into account.

3. Optimisation (Standards & Processes)

- If materials are used, then only under demanding environmental, chemical and social standards.
- In the case of synthetic fibres, effective chemical management along the production processes is particularly crucial in order to reduce pollutant inputs into water bodies and the associated biodiversity losses.
- In the case of natural fibres, processing steps should be taken into account in addition to the requirements for cultivation, as wet processes in particular can have a significant impact on aquatic ecosystems.

4. Transformation (systemic change)

- Active promotion of circular economy, innovation and improved production systems.
- In the case of synthetic fibres, this means in particular the transition from linear to closed cycles (e.g. textile-to-textile recycling) and the reduction of microplastic emissions.
- In the case of natural fibres, this includes the further development towards regenerative cultivation systems that actively promote biodiversity, as well as the strengthening of regionally adapted, resilient production systems.



LOGISTICS AND INVASIVE SPECIES

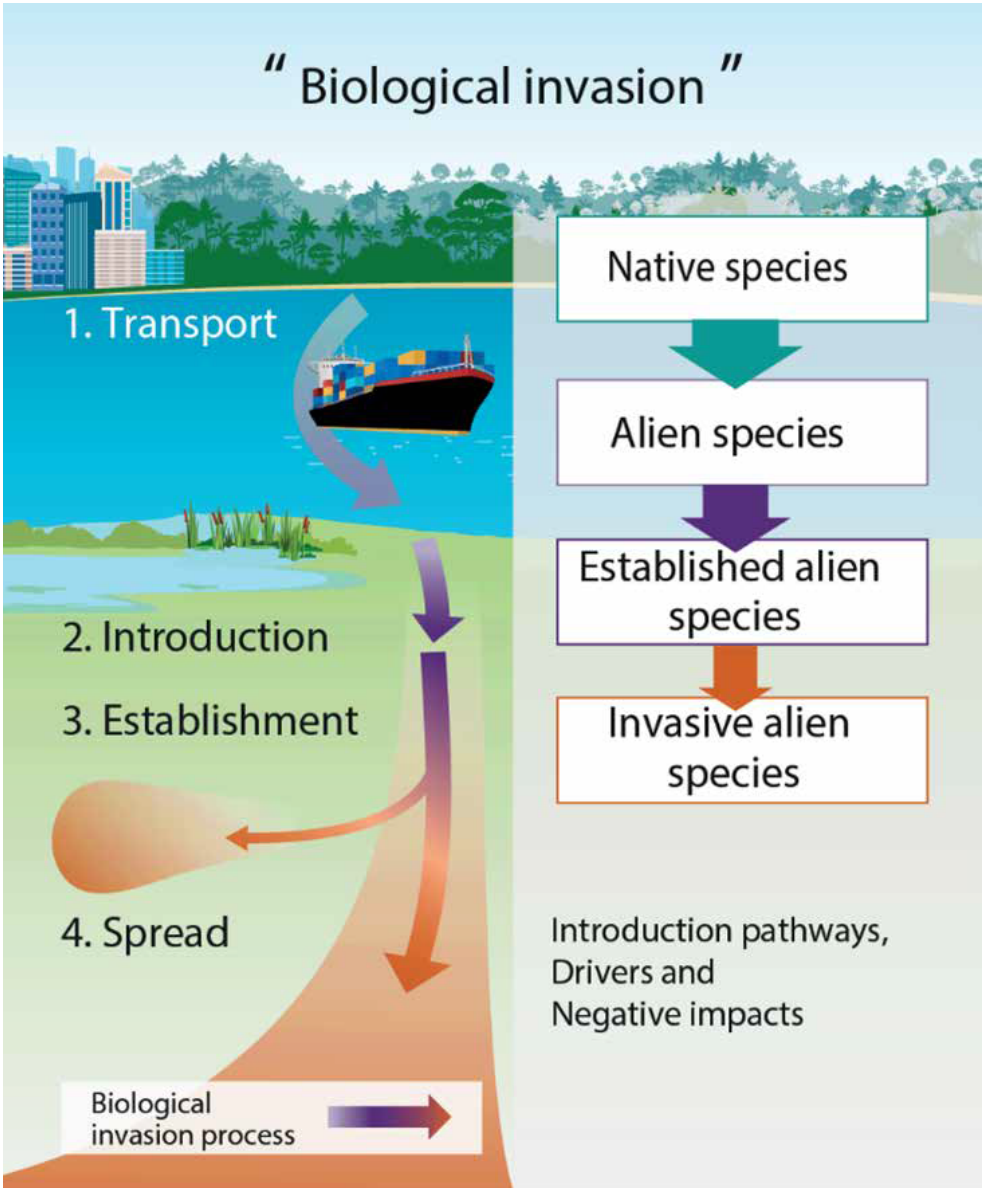
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The movement of goods is a major problem for biodiversity worldwide. Transport causes CO_2 emissions and contributes significantly to the climate crisis, while transport routes and logistics facilities seal off valuable land that is no longer available to natural roundabouts. Traffic causes noise and is responsible for countless wild animals accidents. Wildlife migration routes and the opportunities for genetic exchange are interrupted primarily by roads. The aim should therefore always be to avoid traffic as much as possible, to bundle it, to shorten distances and to choose the most environmentally friendly means of transport. This applies to the movement of goods as well as to the mobility of employees.

In addition, logistics, especially shipping, contributes to the spread of invasive species. According to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2023), invasive species were the sole trigger for the extinction of animal and plant species in 16% of documented cases. In a further 1,200 cases, invasive species caused at least the disappearance of other species from certain areas. The economic costs caused by biological invasions have at least quadrupled in every decade since 1970. The IPBES report puts the economic damage at well over $400 billion in 2019 alone. [69]

For the textile industry with its many international supply chains, it is therefore particularly important to ensure that logistics partners implement measures to avoid invasive species. This can include complying with international standards for shipping traffic, disinfecting transported goods and minimising loading at night, as light sources attract insects. Of course, it also makes sense to regularly exchange ideas with logistics partners on this topic.

The topic of the company's own logistics locations and their land consumption is addressed in the chapter "Company premises".



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Logistics and invasive species checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs	CHECK: Yes / No / Partial
The company implements an effective strategy to avoid its CO_2 emissions through transport / logistics / mobility.	CO_2 emissions and the climate change caused by them are one of the main drivers of biodiversity loss.	CO_2	
The company takes ecological aspects into account when selecting logistics: regional purchasing, bundling transport routes, ensuring optimum utilisation of means of transport, choosing alternative drives or demanding them from logistics partners, encouraging freight forwarders to introduce an environmental management system or commissioning them with an existing one.	Ecological aspects minimise the pressure on biodiversity. If necessary, they can be bundled in an orientation or in a strategy together with CO_2 minimisation.	Specifications	
The company prefers rail transport over truck and shipping over air travel.	In particular, preference should be given to those means of transport that have a lower environmental impact, including land use in addition to CO_2.	% Means of transport	
Logistics partners implement guidelines to avoid invasive species, including: • Standards on ballast water, biofouling • Disinfection (at best with heat, not chemicals) • Avoidance of nocturnal insects during loading	Invasive species are one of the main drivers of biodiversity loss. Together with logistics partners, it is important to evaluate how the transport of invasive species can be reduced. Here it can also make sense to identify the main products that pose a risk.	Queries and discussions by / with logistics partners.	



In the chapter "Design", we have already discussed the fact that recyclable processes and material selection also contribute to resource consumption, and thus to biodiversity conservation.

This chapter therefore focuses on what happens to products that are used by consumers.

Circular economy

The study Model Germany Circular Economy[70] by WWF Germany, the Oeko Institute, Fraunhofer ISI and FU Berlin estimates: "The reduction of textile consumption makes a significant contribution to the circular economy, accounting for 44% of the predicted greenhouse gases and 41% of raw material savings in the textile sector. This can save five million tons of CO_2 and six million tons of raw materials as well as 500,000 hectares of land. New models such as product-as-a-service and second-hand also enable savings

Fibre-to-fibre recycling of cotton could save 1.5 million tonnes of CO_2 and 2.7 million tonnes of raw materials, with additional potential through innovative recycling processes." The renunciation of so-called virgin or virgin materials and the choice of materials can significantly reduce the pressure on biodiversity and ecosystems. At present, however, there is still a lack of sufficient take-back and reprocessing systems in many areas to close textile cycles on a large scale and reliably supply companies with high-quality recycled raw materials.

This is where the EU Textile Strategy[71] for sustainable and circular textiles comes in. It formalises the European Commission's political vision for the textile sector up to 2030 and forms the basis for future regulatory requirements.

The EU's vision is that in the future:

All textile products placed on the market in the EU:

- Are durable, repairable and recyclable,
- Consist largely of recycled fibres,
- Do not contain any hazardous substances,
- Are produced in compliance with social rights.

The transition to extended producer responsibility along the entire value chain is particularly relevant. Companies are increasingly expected to take responsibility for the entire life cycle of their products. [72]

Extended producer responsibility/Textile strategy

Extended Producer Responsibility (EPR) is becoming increasingly important. The aim is to require companies that sell textiles in the EU to take responsibility for them throughout their entire life cycle – in particular for the collection, sorting, reuse and recycling of used textiles.

With the amended EU Waste Framework Directive, EU member states are obliged to introduce separate collection systems for used textiles. Since 1 January 2025, the EU has been obliged to collect textiles separately. In addition, the European Union is working on harmonised EPR regulations specifically for the textile sector.

It is planned that companies will have to pay mandatory EPR fees based on the quantities of textiles placed on the market. These EPR fees are intended to cover the costs accrued, i.e. the costs incurred for collection, transport, sorting and recycling. However, there is critical discussion of the fact that the current design of extended producer responsibility has so far focused primarily on collection, sorting and recycling at the end of the product life cycle. This has so far created only limited incentives to avoid textile waste in advance or to reduce the industry's overall very high material throughput.

From a biodiversity and resource conservation perspective, greater consideration of upstream approaches would therefore be necessary. These include, in particular, long-lasting product design, reduced production volumes, reparability, reusability, and recyclable materials and business models.

Against this background, the principle of so-called "eco-modulation" is gaining in importance. In the future, companies' contributions are to be geared more closely to the environmental characteristics of their products. Criteria such as durability, reparability, recyclability or recycled content could thus be taken into account financially.

In the long term, it will be crucial that extended producer responsibility not only improves waste management, but at the same time creates effective incentives for a real transformation towards low-resource and circular business models. [73]

Use of textiles

In addition to durability and circularity, aspects of use by consumers must also be taken into account.

Possible building blocks:

Care & Wearing Instructions	To extend the use phase of textiles, it is essential to properly care for the textiles and communicate them to customers **Example:** Initiative Clever Care: https://clevercare.info/de WWF campaign together with Procter & Gamble "#WirDrehenRunterFürsKlima" https://www.wwf.de/zusammenarbeit-mit-unternehmen/procter-gamble
Avoiding microplastics	It is essential to point out the microfibre abrasion during wear and washing of all synthetic textiles **Example:** The first and easiest means of choice for consumers is the use of a washing bag, e.g. "Guppyfriend" is recommended. This consists of a high-tech material through whose fabric no plastic fibers can get into the wash water: Link **Example:** Zara & chemical company as a cooperation: Link **Example:** Cooperation with a manufacturer of washing machines: e.g. AEG or a manufacturer of such filters, which can be installed in any washing machine.

Repair services	The company can actively approach customers and offer appropriate repair services itself. This is easy to implement in stationary shops, as the textiles can be handed in there with appropriate instructions. For example, cooperation with local alteration tailors is a good way to implement this. **Example:** This is already being implemented in an exemplary way by Globetrotter.de or Patagonia, for example: Patagonia repairs For customers who want to repair themselves, so-called repair kits should be offered, possibly even product-related with buttons, sewing thread and small fabric patches.
Upcycling	As part of the resource saving, there is also the possibility of using left-over materials or non-repairable returns with the design team, but also customers in upcycling workshops to process them into new products.
Borrowing and 2nd Hand "Pre-Loved"	Industry experts estimate that the volume of the second-hand fashion market in Germany will increase from around 3.5 billion euros in 2022 to five to six billion euros by 2025. One of the reasons for this is that, in view of tight budgets, many people cover their clothing needs with low-priced second-hand textiles. At the same time, more and more consumers are taking advantage of the opportunity to use these channels to purchase luxury products and brands that they would otherwise not be able to afford. It also allows clothes that are only needed for a specific occasion to be consumed in a sustainable way. It is therefore crucial that companies in the apparel sector deal intensively with these markets and develop appropriate models to meet the requirements and wishes of future generations.
Collection, recycling and disposal	In order for a textile or product to be used as a raw material at the end of life, various processes are now available to return it to either the biological or technical cycle. Due to the large number and diversity of the materials used, there are various options to choose from.

Industrial Waste	Post-industrial waste should be collected and processed in production facilities, as this is a very high-quality raw material that can be recycled very well due to the low level of contamination – e.g. from ingredients, prints, etc.
Packaging	Packaging plays an important role, especially in the online sector, so that the products are protected and arrive at the customer undamaged. It also protects the textiles from possible pest infestation and moisture immediately after production for transport and remaining in the warehouse. In the interests of sustainability and resource conservation, packaging should only be used where it is absolutely necessary to protect the textiles/product protection. According to WWF[74], doing without packaging is a top priority, and only indispensable packaging has the potential to be environmentally friendly at all. Unavoidable packaging should therefore be designed in such a way that it can be used for as long as possible. Be it, for example, that the shipping packaging can be kept in circulation for as long as possible – there are already various suppliers in this regard, such as Boomerang – or have a double use. And if it has to be disposed of, then it is imperative that it is recyclable. "Design for Recycling: The primary goal must not be beautiful marketing but must be recyclability in addition to product protection. There is a minimum standard here, which is published annually in agreement with the Federal Environment Agency, and there is no justifiable reason for companies not to comply with it from an ecological point of view." [75] It is imperative not to use packaging material based on fossil raw materials. Plastic waste even reaches remote regions of the world such as the Arctic, where it pollutes the ecosystem. The Alfred Wegener Institute (AWI), for example, has evaluated washed up waste in Spitsbergen: one third of the clearly identifiable plastic waste comes from Europe, a large part of it from Germany. [76]

Packaging	According to WWF[77], almost 90% of all plastic packaging is made from virgin plastic, and more than half is incinerated after use. This amounts to 1.6 million tons of plastic packaging worth 3.8 billion euros annually. By 2040, Germany can reduce the total volume of waste by 40%, the consumption of new plastic by around 60% and the incineration of waste for energy generation by over 70%. This could mean that up to 68 million tonnes of greenhouse gases by 2040. **Example:** The American company Prana has launched a highly recommended initiative and also provides concrete recommendations for action on its homepage: Responsible Packaging Guide

Example: Houdini Circle – Sustainable concept to rent, repair and try out

Houdini Sportswear, a Swedish outdoor clothing company, has developed a new retail concept with Houdini Circle that challenges conventional consumption and offers a more sustainable alternative. Since September 2023, customers have been able to buy, rent, subscribe or purchase used items at the first Houdini Circle store in Stockholm. Repair and recycling services are also part of the offer.

The concept goes one step further by giving customers the freedom to decide for themselves how they want to use a product – be it new, used or repaired. Houdini wants to promote the transition to more sustainable business models.

Checklist end products and cycle

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company analyses the impact of its products in the "end-of-life" phase.	The company was to record the negative biodiversity effects at the end of the supply chain of the products it sells. ESRS E4 relevant.	Analysis Prioritised areas of action Lifecycle assessments containing land use and biodiversity data, for example, are suitable for this purpose	
The company implements measures to avoid significant negative impacts at the end of the value chain.	Negative impacts at the end of the value chain should be mitigated, e.g. through improved information, reusable options, degradable fibres, etc. ESRS E4-relevant.	Measure-specific	
The company develops and implements a circular strategy.	In principle, every extraction and processing of a raw material has an impact on the environment. [78] Reduced use of natural resources, the reduction of environmental pollution and biodiversity-friendly resource extraction should be part of the strategy.	Strategy, goals, measures, corresponding KPIs	
The company informs its customers about the proper disposal of substances that fall into GHS hazard classes / SIN List / PFAS candidate lists.	Many substances are harmful to ecosystems and must be disposed of at least properly.	Information / Awareness at the POS	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The products do not emit microplastics. Refraining from the conscious use of PFAS in water, dirt and oil-repellent finishes of products	Microplastics and PFAS are not biodegradable and disrupt or alter ecological processes. [79]	Screening of products Outphasing measures	
The company takes back products and/or components.	As part of its circular strategy, the company should pursue the take-back and recycling of products.	Measure-specific	
The company is involved in industry initiatives to build circular systems.	In areas such as alternative fibres (e.g. from waste materials), fibre recycling or the take-back and refurbishment of clothing. If necessary, cross-industry solutions are found to return more raw materials to the cycle. This requires cooperation with other industries, e.g. the food or chemical industries.	Cooperations	
The company actively informs its customers about the correct use, care and disposal of products.	In sales talks or with information at the POS, reference should be made to the correct disposal of such products. In the case of water-repellent products, advice should be given on how to maintain their function (e.g. Avoidance of harmful sprays for retrofitting by the customer)	Information / Communication	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company offers repair services.	Repair formats reduce the consumption of raw materials and thus the pressure on biodiversity. They can increase customer loyalty and represent a new business model.	Expansion of offers	
The company is committed to projects to eliminate the textile litter of nature.	Textile waste litters large areas of landscapes, especially in countries of the Global South. The company should get involved here with NGOs and local communities.	Weight / volume / % of waste removed	



COMMUNICATION AND MARKETING

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Sustainability awareness in the fashion and apparel sector is growing steadily. In a 2022 survey by the market research company GfK, 69% of consumers said that environmental and social compatibility are very or fairly important to them when purchasing clothing and shoes. In particular, the group of 'glamour greens', a consumer group that consciously shows its ecological actions as a status symbol to the outside world, has grown significantly over the past ten years. [80] For consumers, sustainability is no longer a "nice-to-have", but a "need-to-have". The Harvard Business Review recently found that Gen Z and Millennials customers who believe a brand cares about the impact on people and the planet are 27% more likely to make a purchase than older generations.[81]

At the same time, current consumer trends show that attitudes are increasingly reflected in behaviour. For example, analyses by Greenpeace[82], among others, indicate that consumers tend to use clothing longer and consume it more consciously. Longevity is thus becoming a key decision-making criterion, not only for cost reasons, but also from an environmental perspective. From a biodiversity perspective, this is particularly relevant:

A longer service life reduces the demand for new raw materials, reduces land pressure, pesticide use and environmental pollution along the entire supply chain, and thus contributes directly to the protection of ecosystems. Longevity is therefore a central, often underestimated lever for biodiversity and should accordingly be anchored more firmly in product and marketing communication.

For companies, this means integrating biodiversity into customer communication to a greater extent than before. Biodiversity is a complex topic that cannot be accessed through simple messages. Instead, clear translations into concrete purchasing decisions are needed.

A central starting point is certifications and seals of approval. They offer orientation but are often difficult for consumers to compare. Companies should therefore:

- Systematically classify relevant seals,
- Explain their biodiversity relevance in an understandable way (e.g. protection of soils, water, ecosystems),
- Make differences in ambition level and impact transparent.

In addition, curated product ranges or clear product recommendations can help reduce complexity for customers. Moreover, behavioural economic approaches (nudging) are gaining in importance. These include, for example:

- Highlighting durable or repairable products,
- Default options in favour of more sustainable materials,
- Transparent information on the expected service life.

Such measures can subtly but effectively steer purchasing decisions towards more biodiversity-friendly options.

What are "biodiversity-friendly products"?

The term should be specified in communication. Biodiversity-friendly products are particularly those that:

- Cause lower surface pressure (e.g. through recycled materials or resource-efficient natural fibres),
- Reduce the burden on ecosystems (e.g. by reducing the use of pesticides and chemicals),
- Conserve water resources and minimise pollution,
- Enable circularity (e.g. through mono-materials or textile-to-textile recycling),
- Are durable and repairable to avoid new production,
- Ideally come from production systems that actively contribute to the preservation or regeneration of ecosystems (e.g. regenerative agriculture).

With regard to the EmpCo Directive and "biodiversity washing", caution is advised when advertising "environmentally friendly products".

Environmental statements should:

- Be specific and verifiable,
- Be based on recognised standards or scientific data as far as possible,
- Not use blanket or misleading terms ("environmentally friendly", "nature-friendly") without context.

Collaboration with scientific organisations and NGOs can help to substantiate claims with third-party data. Overall, it is highly recommended to communicate implemented measures rather than unvalidated impacts/claims.

As a general rule, the responsibility for more sustainable products should not lie primarily with consumers. Rather, companies should ensure that the products they offer meet high ecological standards. Communication can make these efforts visible and provide orientation (but does not replace the need to systematically integrate biodiversity into product development, procurement and supply chains).

Communication and marketing checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The communications and marketing team is trained in biodiversity and ecosystems.	Biodiversity is complex and sometimes difficult to communicate. This makes it all the more important that the Communication and Marketing staff can convey the topic to the outside world in a way that is specific to both science and target groups.	Building expertise in the team Participation in training courses	
A communication analysis and strategy related to biodiversity has been developed.	Targeted long-term communication is required, adapted to the target group, if necessary also with other industry players (e.g., The Campaign).	Analysis of existing communication and potentials Strategy with goals, measures and corresponding KPIs	
The company offers verified information on biodiversity management on its website (targets, measures).	Customers and other stakeholders (e.g. investors) should understand what the company is doing in the area of biodiversity. Here, both the strategic orientation of the business model and relevant topics should be examined.	Website with a strategic focus on biodiversity Biodiversity information on relevant product ranges Biodiversity criteria in the online shop (e.g. certifications with biodiversity aspects)	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company only uses scientifically verifiable claims.	In some cases, products are advertised with claims that cannot be verified and are not based on scientific facts. These claims should be checked and adapted.	Claims review process	
The company uses nudging measures to market biodiversity-promoting/friendlier products.	Both at the POS and online, nudging measures can contribute to the marketing of more biodiversity-friendly products.	Measures taken, guideline if applicable	
The company provides targeted information to customers in biodiversity protection at home through better information on products, labels and measures.		Communication materials e.g., Standards & Labels: ITC Standards Map	
The company does not use paper advertising.	More than 28 billion advertising brochures are distributed every year. 42 billion litres of water, 4.3 billion kilowatt hours of energy and 1.6 million tonnes of wood are used each year to produce the advertising flyers[83]	0% paper advertising	
The company works with others to develop campaigns for biodiversity conservation.	Many topics (e.g. native species, alternative building materials)	Campaign with others See also AbTF Fund to finance supply chain activities: AbTF launches Biodiversity Fund	



If biodiversity is to play a role in a company, it needs people who understand the relevance of the topic and want to get involved in it. In all areas, people with in-depth expertise are needed who can support the topic. Here, companies must specifically promote and train employees. From our point of view, there are the following prioritised target groups:

- **Managers/executives** should have basic knowledge of biodiversity (including links to other environmental topics), be familiar with the regulations, liabilities and risks to the business model (impacts and dependencies), and promote biodiversity conservation measures.
- **Product designers** should be familiar with sustainability and biodiversity criteria of products and raw materials, potential risks of production processes, and durability and circularity of materials.
- **Buyers** should be familiar with sustainability and biodiversity criteria for the products, raw materials and certifications, as well as risk regions and in-depth basic knowledge of biodiversity in general (impacts and dependencies). Buyers should also engage in regular exchange with suppliers and visit companies in the supply chains to gain a good knowledge of the situation, challenges and opportunities

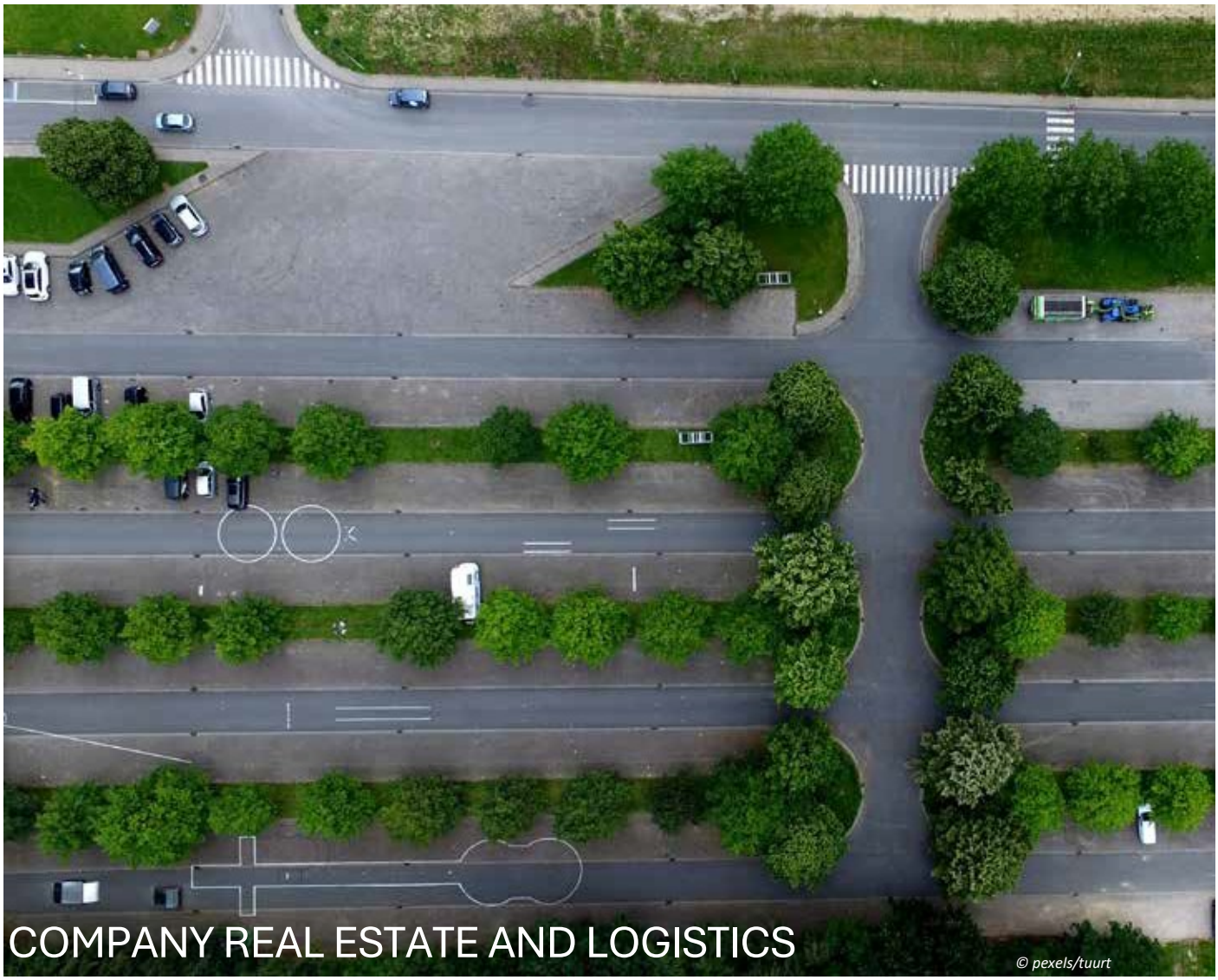
- **ESG employees (including real estate)** should have in-depth knowledge of biodiversity (including links to other environmental topics), be aware of legislation and risks, and promote the implementation of biodiversity conservation measures. Regular training should be encouraged.
- **Employees** could be involved in a motivating way through sponsorship activities, such as company outings to a renaturation/forest project or supply chain-related projects. Ideally, they understand how they contribute to the conservation of biodiversity through their work.
- **Sellers** should be familiar with the sustainability and biodiversity criteria of the products, raw materials and certifications in order to be able to provide customers with competent advice in the store.

Human Resources Checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. The activities marked darker are considered by experts to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company develops and applies training materials/online formats on biodiversity for buyers (e.g. in cooperation with nature conservation NGOs).	Since the biggest impact usually lies in the supply chain, it is important that buyers in particular consider the issue.	Training formats	
The company develops and applies training materials / online formats on biodiversity for salespeople.	At the POS, sales assistants have the important function of supporting customers in making decisions. To this end, they should also be trained in response to sustainability enquiries.	Training programme / materials Multiple training sessions conducted % of trained employees	
The company has biodiversity capacities in sustainability management.	See above.	Number of experts	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company trains decision makers in the company on legal obligations and the importance of biodiversity.	Decision makers should be aware of the risks associated with biodiversity loss and be able to act accordingly.	Training programme / materials Training courses conducted	
The company promotes community activities on biodiversity.	Employee awareness is important in order to anchor the topic in everyday life. Joint activities, such as company outings or activities on the company premises, contribute to environmental education.	Activities carried out If necessary, create a working group of employees	



According to the European Environment Agency, Europe is one of the continents that is used most intensively. Up to 80% of the area is used as settlement or production land (including agriculture and forestry) or for infrastructure.[84] Currently, the daily conversion of undeveloped land into settlement and transport areas in Germany is around 56 hectares per day. These areas are being lost for animals and plants as places of retreat and home. [85]

Compared to the supply chain, the impact on biodiversity caused by the company's own locations, such as sales outlets in city centres or a head office, is usually of less relevance. Nevertheless, it is worthwhile to record the risks of the locations, to rule out negative impacts (e.g. through very good environmental management) and to exploit potential for biodiversity. Numerous biodiversity measures also help with climate adaptation, for example: green and shaded roofs, walls and parking spaces e.g. lower temperatures and thus energy costs in the building. Furthermore, a natural site provides employee motivation and is the company's flagship for customers and guests.

Continuous information for employees on biodiversity issues is also worthwhile, including the early involvement of the workforce, e.g. by the works council (if available) in activities on the company premises, for example. See also the communication guidelines from the Nature branch project for internal communication.

Financing of measures on the company premises

Development banks such as KfW, regional development banks or BMWK/BAFA, FNR, DBU offer comprehensive programmes to finance measures both on the company premises and for measures in production. Further programmes can be found at: http://www.foerderdatenbank.de/

Topics:

- Company premises
- Natural climate adaptation
- Soil sealing
- Protected areas
- Data Management
- Canteens
- Raising customer awareness & "business card to the outside world"

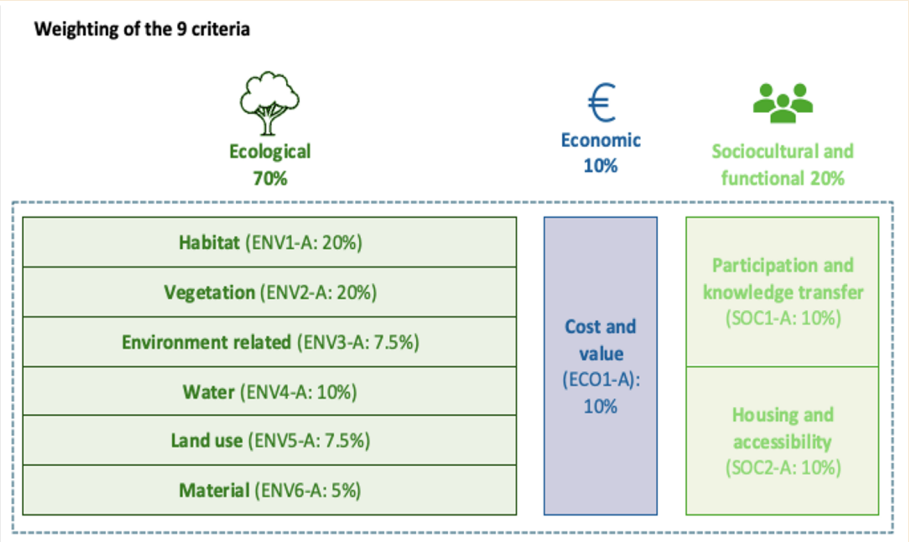
Checklist for company premises, real estate and logistics centres

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. From an expert's point of view, the activities marked darker are considered to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company has conducted a strategic biodiversity analysis of its properties.	In order for the company to be able to implement targeted measures, a prior analysis of the most important impacts and dependencies is crucial. External experts can provide support in this regard. ESRS E4-relevant.	List of all locations, analysis of all areas and processes that have an impact on the properties (land use, pollution, etc.) Information can be found in development plans, through external advice.	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company knows the protected areas and biodiversity-sensitive areas within a radius of 5km around its properties.	The company understands its embedding in the landscape around the site and can contribute to the networking of biotopes if necessary. Areas that are particularly sensitive to biodiversity also require special protection. ESRS E4-relevant.	Mapping of all sites in the vicinity of protected areas (e.g. FFH areas, bird protection areas, UNESCO, Ramsar, national) and biodiversity-sensitive areas (Key Biodiversity Areas, KBA) Tools: BfN Nature Reserves-Map or Global Forest Watch (both free of charge). Data on KBA are currently only commercially available in IUCN IBAT	
The company is aware of the risks and opportunities for biodiversity (e.g. draining or rewetting of wetlands) on its company premises and within a radius of 5 km of them.	A risk assessment helps the company to understand what potential effects it has and how it can avoid them. Opportunities can be exploited. ESRS E4 relevant.	List of possible risks and opportunities	
A policy for company premises and properties is available.	Property and landscape maintenance should be strategically anchored in the company and backed up with resources in order to be effective. Regulations for new buildings can also be anchored here. ESRS E4 relevant.	Policy with goals, measures, resources	
The policy includes a strategy for the continuous improvement of biodiversity on the land, including unsealing.	The goal should be to continuously reduce the company's land footprint. At the same time, natural climate adaptation should be taken into account.	Land use data on vegetation	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
A maintenance plan related to biodiversity on the company premises is being implemented.	The care plan contains the concrete measures that must be agreed with the nursery/landscaping department, among others. This also includes measures against invasive species, selection of native species, avoidance of pesticides, etc.	Care plan Training of nursery/landscaping staff	
The company implements measures to avoid negative effects on and around its company premises.	This criterion once again asks about the actual implementation of measures. The impact of these measures would also have to be monitored. ESRS E4-relevant.	Implemented measures, ideally backed up with KPIs and contribution to the avoidance hierarchy A scorecard is suitable here Many suggestions for measures on Biodiversity Premises	
Biodiversity measures are linked to climate adaptation measures.	Biodiversity measures and natural climate protection complement each other perfectly and should therefore always be thought of together.		
The company implements a strategy to avoid light emissions.	Lighting plays a major role, especially at the company's own production sites, as it has a negative impact on the lifestyles of moths, bats and plant species.	Are measure-specific to be selected, e.g. percentage of converted lighting	
The company systematically and regularly collects biodiversity-relevant data from its land (e.g. area sealed in accordance with EMAS, near-natural areas on and restored areas off the company premises), soil degradation.	The company uses biodiversity-related data to measure its own performance and can take measures if necessary. ESRS E4 relevant.	Sealed surface Near-natural area Restored areas away from the company premises Soil degradation	



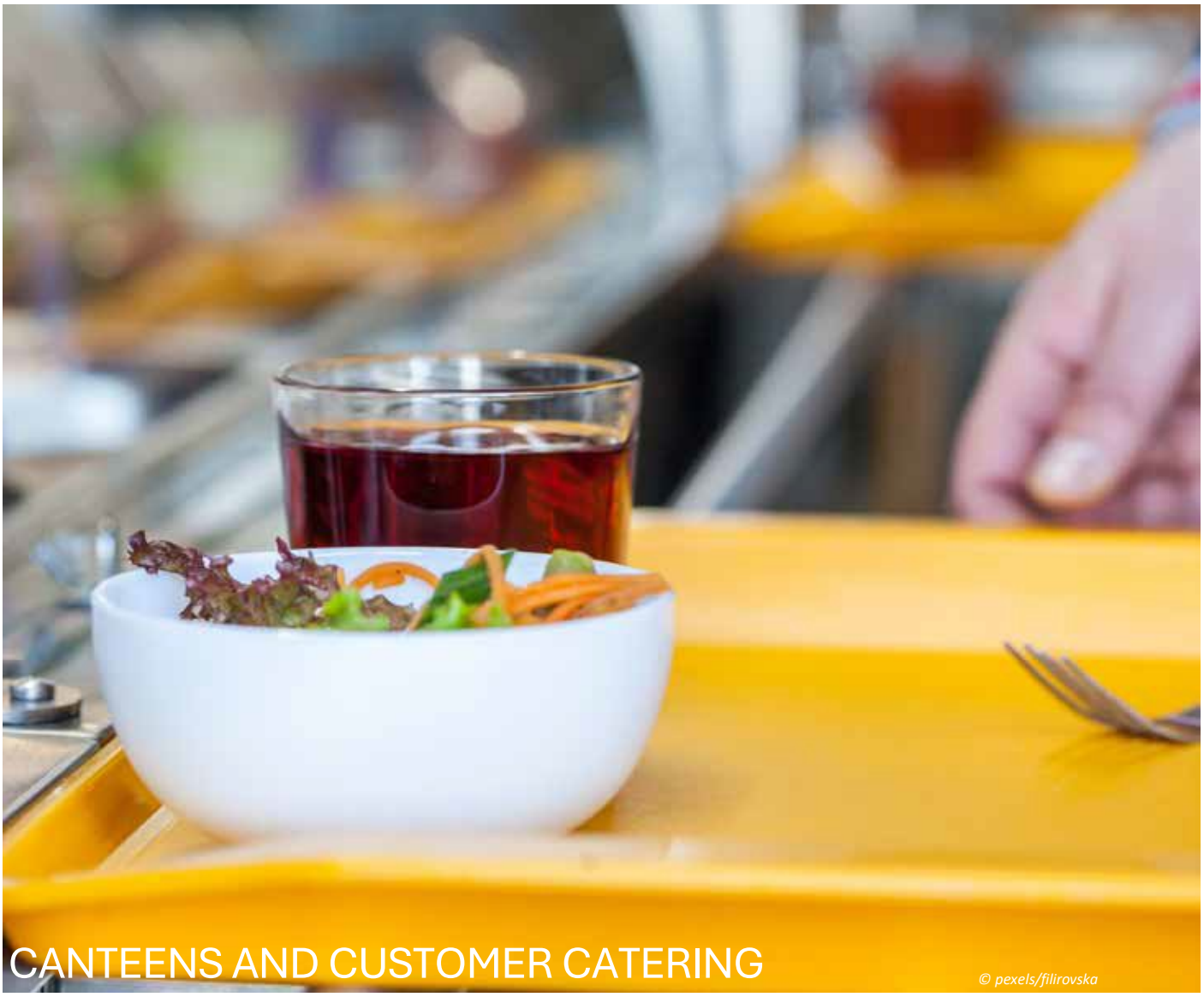
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DGNB Biodiversity Standard for Outdoor Areas

The German Sustainable Building Council (DGNB), together with the Lake Constance Foundation, has developed a biodiversity certification for the design of outdoor areas as part of the UBi project; the new criteria of the certification can be an interesting orientation for specifications for new buildings, but also for existing stores and their outdoor areas. The certification itself is associated with costs.

With explicit criteria for "biodiversity at the site" for buildings, the influence on the surrounding ecosystems is taken into account in DGNB certification. This also takes into account aspects that are less visible at first glance, such as biotope networking so as not to isolate plant and animal species, or long-term biodiversity strategies and management instructions.

More information on https://www.dgnb.de/de/nachhaltiges-bauen/biodiversitaet



CANTEENS AND CUSTOMER CATERING

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Company canteens offer an enormous leverage effect to protect biodiversity and raise awareness of the issue among employees. Every German consumes an average of 160 out-of-home catering services per year, which is the second largest sales channel of the German food industry. Company catering alone causes at least 1.5 million tonnes of CO_2 equivalents annually and has a significant negative impact on biodiversity due to the fact that food is produced by agriculture and livestock farming.[86] These have a particularly large footprint on biodiversity, for example through land use, monocultures, fertiliser and pesticide use, etc. Therefore, canteens play a decisive role in biodiversity conservation due to their large consumption volume and range.

For their own business, companies can influence the design of the canteen program. In general, the following factors should be taken into account when choosing ingredients:

- Choice of food
- The origin of the ingredients
- The cultivation method of the ingredients

The effects on biodiversity vary depending on the food. As part of the "BiTe" research project funded by the German Federal Ministry of Education and Research (BMBF), the Technical University (TU) Berlin has developed a NAHGAST calculator that calculates the impact of dishes on biodiversity.

Canteen Checklist

The following checklist shows key criteria that a company should meet in order to introduce effective biodiversity management. From an expert's point of view, the activities marked darker are considered to be particularly effective and should therefore be prioritised in terms of time and finance. Since they can usually be implemented in the short term and achieve a high level of benefit, it is advisable to start with these measures. The last column serves as a practical checklist for the company to monitor its own progress.

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
The company has reduced animal products in the canteen range / is continuously reducing them; in particular reducing meat and fish (transition: smaller portions, certified), but also dairy products.	According to the study, animal products such as meat, sausage or cheese account for by far the largest share of the biodiversity footprint at 77%. Only 23% result from the consumption of plant-based foods. In the case of animal products, the enormous land requirement for animal feed has a negative impact – and in some cases in regions with particularly valuable biodiversity. The higher the proportion of fruit, vegetables, cereals and nuts in the diet mix, the lower the global biodiversity footprint triggered by nutrition in Germany. [87]	% share of animal products Size of meat portions	

CRITERION	Why is the criterion relevant?	Possible indicators/KPIs and instruments	CHECK: Yes / No / Partial
In the case of meat: if the company cannot avoid meat completely, it buys certified organic goods	In conventional farms, a large part of the animal feed still consists of soy from South America. There, more and more forests are being cut down in order to cultivate the protein- and nitrogen-rich fodder plant in huge monocultures. In forests, biodiversity is dwindling and the soils are eroding. The increasing, large-scale use of pesticides is also poisoning groundwater and river water.	% Share For further purchases: 100% preference for, e.g., Bioland, Naturland, Demeter, Biokreis or Biopark, otherwise EU organic	
For fish: if unavoidable, the canteen only uses "green" species from the WWF fish guide, with MSC certification.	Many fish stocks around the world have already collapsed; sustainable fisheries are also failing to meet their targets. It is therefore questionable whether fish is still a suitable product for canteens.[88]	% share For further purchases: 100% MSC WWF fish guide	
The company is continuously increasing the proportion of sustainably certified products, especially products such as coffee and cocoa (e.g. organic, Fairtrade, Rainforest Alliance).	Sustainability standards often include ecological production criteria, in some cases also on biodiversity. Their negative impact is estimated to be significantly lower than that of conventional products. In particular, high-risk products (coffee, cocoa, palm oil, soy, meat) should be purchased according to ambitious certifications.	% share of certified goods	
The company is continuously increasing the proportion of regional and seasonal products.	Regional products have a smaller footprint and promote local biodiversity.	% share	



Some of the most important policy frameworks, strategies and laws related to biodiversity are presented on the Global Nature Fund website: Biodiversity – Laws and Frameworks – Global Nature Fund

LINKS

Introduction to the topic of biodiversity & companies

- Biodiversity & Environmental Management Guide (2023 in German and English, Bodensee Foundation, Global Nature Fund): This 100-page guide provides an insight into how biodiversity management can be structured and implemented.
- Guidelines for Biodiversity Management for Supervisory Boards (2024 in German, Code and DNSR): Supervisory boards are obliged to monitor the environmental performance of the company. Here you can find assistance on the topic of biodiversity.

- Discussion paper on the introduction to the management of biodiversity-related data (2024 in German, Global Nature Fund, Lake Constance Foundation): For companies that are still at the beginning, this paper offers an insight into the discussion around the topic of "Measuring biodiversity".
- CSDDD and biodiversity (2024 in German, Global Nature Fund and German Environmental Aid): The EU Supply Chain Directive imposes new due diligence obligations on companies. The info sheet provides an overview of the biodiversity requirements.

Developing biodiversity strategies

- Biodiversity & Environmental Management Guide (2023, Lake Constance Foundation, Global Nature Fund): This 100-page guide provides an insight into how biodiversity management can be structured and implemented.
- Nature Strategy Handbook (2023, Business for Nature): This English-language document shows what a strategy for biodiversity can look like.
- Initial guidance of Science-based targets for nature (2020) and SBTN website: SBTN is considered a recognised methodology for the development of biodiversity management and presents in this short publication in English which steps need to be followed. On the SBTN website you will find further guidelines for goals and tools.
- Get started with the Biodiversity Check (Global Nature Fund/Lake Constance Foundation/CSCP): The Biodiversity Check helps you to carry out a biodiversity assessment and to build strategic measures and goals along your business sectors on it.

Recommendations for Purchasing

- Helpdesk Business and Human Rights: The Helpdesk is the point of contact for companies on environmental due diligence and offers advice and information.
- Training courses to identify good purchasing standards and further training for buyers: e.g. Lake Constance Foundation, Global Nature Fund and/or JARO Institute
- ITC Standards Map collects sustainability and biodiversity criteria in the various purchasing standards and enables a comparison of the seals in English.
- In German, the page Siegelklarheit compiles more information.

Measuring biodiversity-related data & reporting

- Guidelines for determining materiality according to CSRD / ESRS E4 in German (2024, Michael Otto Foundation): The guide explains how a materiality analysis can be carried out systematically with regard to biodiversity and ecosystems and presents the tools ENCORE, WWF Biodiversity Risk Filter, IBAT and Kuyua.
- LEAP approach by TNFD (2023): The methodology of the Taskforce on Nature-related Financial Disclosures provides a very good overview of how companies can structure their substantiality analysis and record key figures. A tool database is also available.
- TNFD Tools Catalogue: This catalogue of TNFD provides an overview of tools/tools that help to assess nature-related issues and are in line with the TNFD's LEAP approach.

- Global Reporting Initiative Guidelines for Biodiversity Reporting (2024): GRI is the world's most widely used standard for reporting and in 2023 updated its biodiversity requirements to align them with the CSRD.
- Guide on Biodiversity Measurement Approaches, 4th edition (2024, Finance@Biodiversity): This compilation of an EU working group gives a good overview of biodiversity footprinting methods.

Practical examples of implementation

- Implementation of near-natural company premises: On the website of the BooGI-BOP project you will find implementation examples and detailed literature on the subject of company premises and design options. Further examples have been implemented by the Hannover Environmental Centre in the Nature Branch project and NABU. You will also find options for certifying a site on the DGNB website.
- Implementation in companies in various industries: Biodiversity in Good Company presents the reports of its members and their measures
- Examples of implementation from supply chains in the cosmetics and food industry International: Union for Ethical BioTrade (UEBT) is a member organisation and certifier that obliges its companies to make supply chains biodiversity-friendly and biodiversity action plans
- Examples of implementation from agriculture and food: Food for Biodiversity is working as a member organisation on the implementation of biodiversity-friendly agriculture and Biodiversity Action Plans
- Examples of implementation in the textile industry: Textile Exchange collects examples of implementation
- Implementation of corporate strategies: Business for Nature collects examples of implementation at the strategic level

German-language initiatives for exchange

- Company Biodiversity
- Biodiversity in Good Company e. V.

FOOTNOTES

[1] Business for Nature (2023): Fashion and Apparel

[2] S. Díaz et al. Shin, I. J. Visseren-Hamakers, K. J. Willis and C. N. Zayas (eds.) / IPBES (2019): Summary for policymakers of the global assessment of biodiversity and ecosystem services of the Intergovernmental Platform on Biodiversity and Ecosystem Services. https://www.de-ipbes.de/de/German-language-summary-for-political-decision-makers-in- nen-des-globalen-2134.html

[3] TNFD Sector Guidance Apparel (2023): https://files.sciencebasedtargets.org/production/files/SBT_App_Guide_final_0718.pdf

[4] This overview deals with the effects on biodiversity and the industry's dependencies on biodiversity. The social aspects, such as health risks for workers, were not taken into account for reasons of focus.

[5] Textile Exchange is an international non-profit organisation that supports companies in using more sustainable materials in the textile industry, such as organic cotton, recycled fibres or responsibly produced wool. It develops standards, collects industry data and helps brands to make their supply chains more climate-friendly and transparent.

[6] The Fashion Pact is an association of large fashion and luxury companies that are jointly committed to environmental and climate goals. The focus is on topics such as climate protection, biodiversity and marine conservation. Unlike Textile Exchange, the Fashion Pact focuses less on specific material standards and more on more strongly on joint political and strategic commitments by the industry.

[7] Textile Exchange (2021): Biodiversity Benchmark – Textile Exchange

[8] Textile Exchange (2021): Biodiversity Insight Report

[9] A science-based analysis of impacts and dependencies (e.g. materiality analysis, as part of the inventory) and reporting in line with the European Sustainability Reporting Standard (ESRS) E4 reporting standards for biodiversity and ecosystems are therefore part of the company's obligations. The checklists on the following pages therefore also explicitly provide information and assistance for ESRS reporting, with a focus on ESRS E4.

[10] Sorted by: 1. Leadership and Responsibility, 2. Resources and Organization, 3. Analysis and Data Management, 4. Strategy and Actions, 5. Collaboration and Engagement

[11] To be completed by the company.

[12] For example, by prioritising product groups and outphasing non-high-turnover products. New business areas could be, for example, a second-hand platform for own products or leasing/rental models.

[13] McKinsey (2020): Biodiversity: The next frontier in sustainable fashion

[14] European Union (2024): Regulation 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for setting ecodesign requirements for sustainable products, Official Journal of the European Union.

[15] European Commission (2025): Ecodesign for Sustainable Products Regulation – Working Plan 2025–2030, Brussels.

[16] Green Forum – Green Forum – European Commission

[17] European Commission, Joint Research Centre (JRC) (2023–2025): Preparatory studies for ecodesign requirements for textiles, Brussells.

[18] Federal Environment Agency (UBA): Per- and polyfluorinated chemicals (PFAS) – properties, uses and risks: PFAS-Portal: Start | Federal Environment Agency; European Environment Agency (EEA): Emerging chemical risks in Europe – PFAS, Emerging chemical risks in Europe — 'PFAS' | Publications | European Environment Agency (EEA)

[19] French Republic: Law No. 2025-188 of 27 February 2025 to protect the population from the risks associated with perfluoroalkyl and polyfluoroalkyl substances (PFAS), https://www.legifrance.gouv.fr/

[20] Mattia Damiani, Taija Sinkko, Carla Caldeira, Davide Tosches, Marine Robuchon, Serenella Sala (2023): Critical review of methods and models for biodiversity impact assessment and their applicability in the LCA context – ScienceDirect, Environmental Impact Assessment Review, Volume 101.

[21] Textile Exchange (2025): Ensuring Integrity in the Use of Life Cycle Assessment Data– Textile Exchange

[22/23] McKinsey (2020): Biodiversity: The next frontier in sustainable fashion

[24] McKinsey (2020): Biodiversity: The next frontier in sustainable fashion

[25] Abiotic raw materials are less taken into account in the ENCORE tool.

[26] Fashion Nature Risk Lense (2023): https://storymaps.arcgis.com/stories/8b83b45265964789848590badc1ebe4a

[27] Fashion Nature Risk Lense (2023): https://storymaps.arcgis.com/stories/8b83b45265964789848590badc1ebe4a

[28] HUGO BOSS Group (2016): Natural capital evaluation

[29] Collective Fashion Justice: Overcoming green-washing and misinformation in fashion (Download 2025)

[30] Kering: EP&L: environmental measurement tool for sustainable Luxury | Kering (Download: 2025)

[32] Textile Exchange (2025): Ensuring Integrity in the Use of Life Cycle Assessment Data

[32] EU Textiles Ecosystem Platform (2025): Responsible use of Life Cycle Assessment data in TCLF

[33] Forest Monitoring, Land Use & Deforestation Trends | Global Forest Watch (Download: 2025)

[34] CEPF (2023)

[35] WRI / Aqueduct

[36] Fashion Nature Risk Lens (2023): https://storymaps.arcgis.com/stories/8b83b45265964789848590badc1ebe4a

[37] Pacheco, P., Mo, K., Dudley, N., Shapiro, A., Aguilar-Amuchastegui, N., Ling, P.Y., Anderson, C. and Marx, A. (2021): Deforestation fronts: Drivers and responses in a changing world. WWF, Gland, Switzerland. https://wwfint.awsassets.panda.org/downloads/deforestation_fronts___drivers_and_responses_in_a_changing_world___full_report_1.pdf

[38] Fashion Nature Risk Lens (2023): https://storymaps.arcgis.com/stories/8b83b45265964789848590badc1ebe4a

[39] ZDHC stands for Zero Discharge of Hazardous Chemicals and is an international industry initiative of the fashion and footwear industry. Its goal is to avoid harmful chemicals from the production of textiles and leather and thus better protect the environment and health. To this end, ZDHC is developing common guidelines, testing standards and tools so that brands and suppliers worldwide can use safer chemicals and cleaner production processes. In contrast to the Textile Exchange (focus on sustainable materials) and Fashion Pact (strategic environmental goals), ZDHC focuses specifically on chemical management and pollutant-free production.

[40] A protected area is a clearly defined geographical area that is recognised, designated and managed in order to achieve the long-term conservation of nature and the associated ecosystem services and cultural values through legal or other effective means Source: IUCN or World Database on Protected Areas (WDPA). /Key Biodiversity Area (KBA)(Footnote: A Key Biodiversity Areas are areas that make a significant contribution to the long-term sustainability of global biological diversity. Source: World Database of Key Biodiversity Areas (WDKBA)

[41] Materials Market Report 2024 – Textile Exchange

[42] Collective Fashion Justice (Download: 2025)

[43] Textile Exchange: Materials Market Report 2024 https://textileexchange.org/knowledge-center/reports/materials-market-report-2024/

[44] Fashion Changers (2021): "Recycled polyester fibres in the apparel industry" – the e-book

[45] We did not look at the production of chemicals separately in this check.

[46] Dr. Jenny Teufel, Viviana López, Katja Moch, Lucía Gascón (2024): Ecological assessment of textile fibres – from "classic" fibres to recycled fibres to innovative and rediscovered fibres | Federal Environment Agency

[47] Mark Anthony Browne, Phillip Crump, Stewart J. Niven, Emma Teuten, Andrew Tonkin, Tamara Galloway, Richard Thompson (2022): Accumulation of Microplastic on Shorelines Woldwide: Sources and Sinks. Environ. Sci. Technol. 2011, 45, 21, 9175–9179. https://pubs.acs.org/doi/10.1021/es201811s

[48] Textile Exchange (2024): Materials Market Report 2024

[49] Primary microplastics in the oceans – resource | IUCN (Download: 2025)

[50] UBA (2016): Microplastics in the environment: UBA involved in research consortia; FONA/BMBF (2022): Joint project REPLAWA: Reduction of the input of plastic into the aquatic environment via wastewater – Plastic in the environment

[51] GRS was replaced by the Material Matter Standard in 2026.

[52] Textile Exchange (2024): https://textileexchange.org/knowledge-center/reports/materials-market-report-2024/

[53] Fashion for Good (2024): https://www.fashionforgood.com/our_news/fashion-for-good-and-textile-exchange-team-up-to-trace-textile-waste/

[54] Roadmap To Zero – Fibre (Download: 2025)

[55] SustainabilityOnline (2025): Recycled polyester creates more microplastic particles during washing, study suggests – Sustainability Online; Recycled polyester releases more microplastics – Dress Ecode

[56] Manqi Gao, Tong Yang, Claudia Som, Bernd Nowack (2024): Differences in the release of microplastic fibers and fibrils from virgin and recycled polyester textiles, Resources, Conservation and Recycling. Volume 207, ScienceDirect. Differences in the release of microplastic fibers and fibrils from virgin and recycled polyester textiles

[57] Sorted by: 1. Risk Analysis and Prioritization, 2. Purchasing Policy, 3. Supply Chain Management and Monitoring, 4. Support and Collaboration, 5. Training and Awareness

[58] Textile Exchange (2024): https://textileexchange.org/knowledge-center/reports/materials-market-report-2024/

[59] Fashion Nature Risk Lens: A Global Assessment of Fashion Materials' Risk to the Environment (2023): https://storymaps.arcgis.com/stories/8b83b45265964789848590badc1ebe4a

[60] ICAC (2025): ICAC Releases 2025 Edition of the Specialty Cotton Report

[61] Textile Exchange (2024): https://textileexchange.org/knowledge-center/reports/materials-market-report-2024/

[62] Forum for the Future (2023): https://www.nytimes.com/2023/02/18/climate/climate-change-cotton-tampons.html

[63] PAN UK (2018): Tackling pesticide poisoning in cotton – Pesticide Action Network UK

[64] ISAA (2019): ISAAA Brief 55-2019: Executive Summary | ISAAA.org

[65] Cotton: Risk & Impacts in Raw Material Production https://storymaps.arcgis.com/ (Download: 2025)

[66] WWF (2021): Origin of cotton, https://www.wwf.de/themen-projekte/landwirtschaft/produkte-aus-der-landwirtschaft/woher-stammt-mein-shirt Agriculture/Products-from-Agriculture/Where-From-My-Shirt

[67] Cotton: Risk & Impacts in Raw Material Production https://storymaps.arcgis.com/ (Download: 2025)

[68] Fashion Nature Risk Lens (2025): Cotton

[69] IPBES (2023): https://www.de-ipbes.de/de/Neuer-IPBES-Bericht-zu-invasiven-gebietsfremden-Arten-veroffentlicht-2214.html

[70] WWF (2025): Modell Deutschland Circular Economy

[71] Although the EU Textile Strategy itself is not directly binding law, it forms the political framework for numerous new regulatory requirements for products, materials and recyclability.

[72] EU Commission (2023): Sustainable and circular textiles by 2030, https://op.europa.eu/en/publication-detail/-/publication/615d8686-21f4-11ee-94cb-01aa75ed71a1/language-en

[73] Sachdeva, Anurodh; Ariel Araujo and Martin Hirschnitz-Garbers (2021): Extended Producer Responsibility and Eco-modulation of Fees. Opportunity: Eco-modulation of Fees as a Way Forward for Waste Prevention. Berlin: Ecologic Institute. https://www.ecologic.eu/de/18226:

[74] WWF: Packaging in the circular economy, https://www.wwf.de/nachhaltiges-wirtschaften/circular-economy/verpackungen (Download 2025)

[75] WWF, https://www.worldwildlife.org/our-work/funds/wwf-gef/projects/circular-solutions-to-plastic-pollution/

[76] AWI (2023): Plastic waste in the Arctic comes from all over the world – including Germany, https://www.awi.de/ueber-uns/service/presse/presse-detailansicht/plastikmuell-in-der-arktis-stammt-aus-aller-welt-auch-aus-deutschland.html

77 WWF: Packaging in the circular economy, https://www.wwf.de/nachhaltiges-wirtschaften/circular-economy/verpackungen (Download 2025)

78 Federal Environment Agency (2021): https://www.umweltbundesamt.de/themen/abfall-ressourcen/ressourcennutzung-ihre-folgen

79 Water 3.0 (2024): https://wasserdreinull.de/wissen/mikroplastik/

80 BTE: https://www.bte.de/nachhaltigkeit-was-erwarten-die-konsumenten-von-der-fashionbranche/ (Download 2025)

81 Harvard Business Review (2023): Research: Consumers' Sustainability Demands Are Rising. Research: Consumers' Sustainability Demands Are Rising

82 GEO (2022): Greenpeace sees more environmental awareness when buying fashion. Survey: Awareness of sustainable fashion has increased

83 Haufe (2023) with data DUH (2019): https://www.haufe.de/sustainability/strategie/green-marketing-werbung-co2-und-ein-neues-denken_575772_607074.html

84 European Environment Agency (2020): https://climate-adapt.eea.europa.eu/de/eu- adaptation-policy/sector-policies/land-use-planning

85 Federal Environment Agency (2022): https://www.umweltbundesamt.de/themen/boden-flaeche/bodenbelastungen/bebauung-versiegelung

86 Background (2022): https://www.fona.de/de/aktuelles/nachrichten/2022/BiTe_Interview.php

87 WWF Germany (2022): https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Landwirtschaft/WWF-studie-kulinarischer-kompass-biodiversitaet-ernaehrung-zusammenfassung.pdf

88 RND (2023): Catches overestimated. Fish stocks are even more threatened than assumed; https://www.rnd.de/wissen/ueberfischung-fisch-bestaende-noch-bedrohter-als-angenommen-3VS4DE3F6RIVBDEHEVWER5GNVE.html

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