Investor Engagement Brief on Nature

Biotechnology & Pharmaceuticals Sector

This is the second edition of the 'Sectoral Investor Engagement Briefs on Nature' series. It has been designed for use by the Finance for Biodiversity Foundation's members and investors involved in the Nature Action 100 initiative.

January 2026

Finance for Biodiversity Foundation

Overview

- This Investor Nature Engagement Brief on the Biotechnology & Pharmaceuticals Sector forms part of a series of sector-focused engagement briefs that have been created by the Finance for Biodiversity (FfB) Foundation and its members.
- The purpose of this unique series is to support investors engaging with companies on nature-related issues, notably with a series of questions that can serve as a starting point for investors when engaging with companies regarding their impacts and dependencies on nature, and in particular, when seeking to influence company actions and strategies to curb nature loss and shift towards a nature-positive approach.[1]
- The Biotechnology & Pharmaceuticals sector is one of the priority sectors for the Nature Action 100 investor initiative, and this engagement guide has been designed to support investors that are involved in that initiative.
- The Biotechnology & Pharmaceuticals sector generates nearly 4% of the overall impact on biodiversity from companies in the MSCI ACWI Index[2] - which means that this sector ranks seventh of all assessed sectors with an impact on biodiversity.[3]
- The most material impact drivers in the direct operations and the upstream part of the Biotechnology & Pharmaceuticals sector's value chain are land/water/sea-use change; volume of water use; GHG emissions; pollution (non-GHG air pollutants, soil and water pollutants, and solid waste), and disturbances (such as noise and light).[4]
- The sustainable transformation of the Biotechnology & Pharmaceuticals sector is important for nature in order to protect species and their natural habitats from the release of 'active pharmaceutical ingredients' (APIs), solvents, and other chemical substances in water, soil, and the atmosphere.
- The sector's transformation will also contribute to meeting a number of the targets set out in the Global Biodiversity Framework (GBF), and to meeting a number of the UN's Sustainable Development Goals (SDGs). Human health will also benefit significantly from the associated reduction in antimicrobial resistance (AMR).

1. In this guide we generally refer to 'nature', reserving the term 'biodiversity' as a technical term indicating a measure of the diversity life forms within ecosystems which can be used as a measure of the quality or health of those ecosystems (and thus of 'nature') - similar to the distinction between a 'portfolio' and its 'diversity'
2. The MSCI ACWI Index was used as the company universe, as it is a leading benchmark for many investors. The index captures large and mid-cap companies across 23 Developed Markets and 24 Emerging Markets with over two thousand constituents
3. This figure is derived from Finance for Biodiversity's multi-tool study
4. This assessment is derived from ENCORE and analysis by WBCSD – see Figure 2 in this report. There will be considerable variation across different manufacturing and R&D processes

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What's inside the brief

This brief is made up of four sections

The **first section** provides an overview of the sector, including how the sector specifically impacts and depends on nature, particularly in sensitive locations. It then looks at some of the most forward-looking nature-related regulations that can inspire investors as they help to guide the transformation of the companies in their portfolio. Finally, this section considers how the sector links to the objectives of the goals and targets of the Kunming-Montréal Global Biodiversity Framework (GBF), an international agreement adopted in December 2022 under the UN Convention on Biological Diversity (CBD) which sets out an ambitious pathway to reverse nature loss by 2030 and to reach the global vision of a world living in harmony with nature by 2050.

The **second section** then considers, in detail, some of the most relevant sector-specific company actions that investors can expect of companies at different stages of their journey to address biodiversity loss.

The **third section** lays out a series of questions that can serve as a starting point for investors planning to engage with companies on nature.

The **fourth section** provides a curated set of useful supporting resources that can be used to assist the engagement process.

This brief has been developed in alignment with the sectoral guides published by the Taskforce on Nature-related Financial Disclosures[5] (TNFD) and the partnership between Business for Nature (BfN), the World Economic Forum (WEF) and the World Business Council for Sustainable Development (WBCSD). This brief has been written by investors for investors.

The FfB Foundation has also produced a more general Guide on Engagement with Companies for financial institutions that are looking for ways to engage with companies on
across multiple sectors.

5. The TNFD is a market-led, science-based and government-backed initiative providing organisations with the tools to act on evolving nature-related issues

Part I

Connections between the biotechnology & pharmaceuticals sector and nature

Introduction

With global annual revenues of US$1.66 trillion in 2024,[6] the Biotechnology & Pharmaceuticals sector is one of the largest and most profitable industries in the world. Broadly, the sector encompasses research and development (R&D) as well as the manufacturing of drugs to be used as medication.

The sector's value chain has nature impacts and dependencies through extraction, processing, logistics, use, and waste. Biotechnology and pharmaceutical companies invest heavily in R&D to discover and develop new drugs and therapies. Manufacturing is another integral component of the sector which involves adhering to strict quality standards and regulatory guidelines to ensure the production of safe and effective products. The industry plays a crucial role in global health initiatives, including (among others) the development and distribution of vaccines, treatments for infectious diseases, and contributing to pandemic preparedness efforts.

The Biotechnology & Pharmaceutical sector has a global footprint in terms of its sales, but when companies are analysed by their headquarters, a much more concentrated picture emerges. The USA dominates, both in terms of the number of companies and their aggregate revenues, capturing nearly half of global sales. Similarly, US-based companies account for nearly half of the biotech R&D spending (with much of it funded by the major US-based pharmaceutical companies).

Companies based in Europe (including the UK) come a close second in terms of aggregate global revenues and also account for a significant proportion of the global biotech R&D spend. Across the other regions, Japanese companies account for nearly 10% of global revenues, and both India and China are also significant hubs in terms of biotech and pharmaceutical R&D.[7]

Owing to the sector's global reach, the Biotechnology & Pharmaceutical supply chain is highly interconnected, with various components produced in different regions across the world. This complexity (and the associated opacity) potentially creates challenges for investors when engaging with companies. In the current geopolitical climate, larger pharmaceutical companies also face supply chain challenges in terms of tariffs and non-tariff trade barriers, as well as the financial implications for those companies exposed to the shifting regulatory environment in the US.

6. https://www.grandviewresearch.com/industry-analysis/pharmaceutical-market-report
7. Source: Drug Discovery & Development – Pharma 50 (2025). FfB analysis

A number of countries and regions host a significant proportion of global pharmaceutical manufacturing:

- United States (with particular concentrations in New Jersey, Pennsylvania, Massachusetts, North Carolina, and California).
- Western Europe (Switzerland, Germany, Ireland, UK, Belgium, and Italy).
- India (Hyderabad, Visakhapatnam, Ahmedabad, Mumbai, and Bangalore)
- China (Zhejiang, Jiangsu, Shandong, Guangdong).
- APAC (Japan, South Korea, and Singapore).
- South America (Brazil, Mexico, and Argentina).

Figure 1 below illustrates the value chain of the Biotechnology & Pharmaceuticals sector. Companies will need to map out their full value chain[8] to have a clear view of the impacts on nature that have been caused, or contributed to, by a business and its supply chain as well as the dependencies of the business on nature.[9]

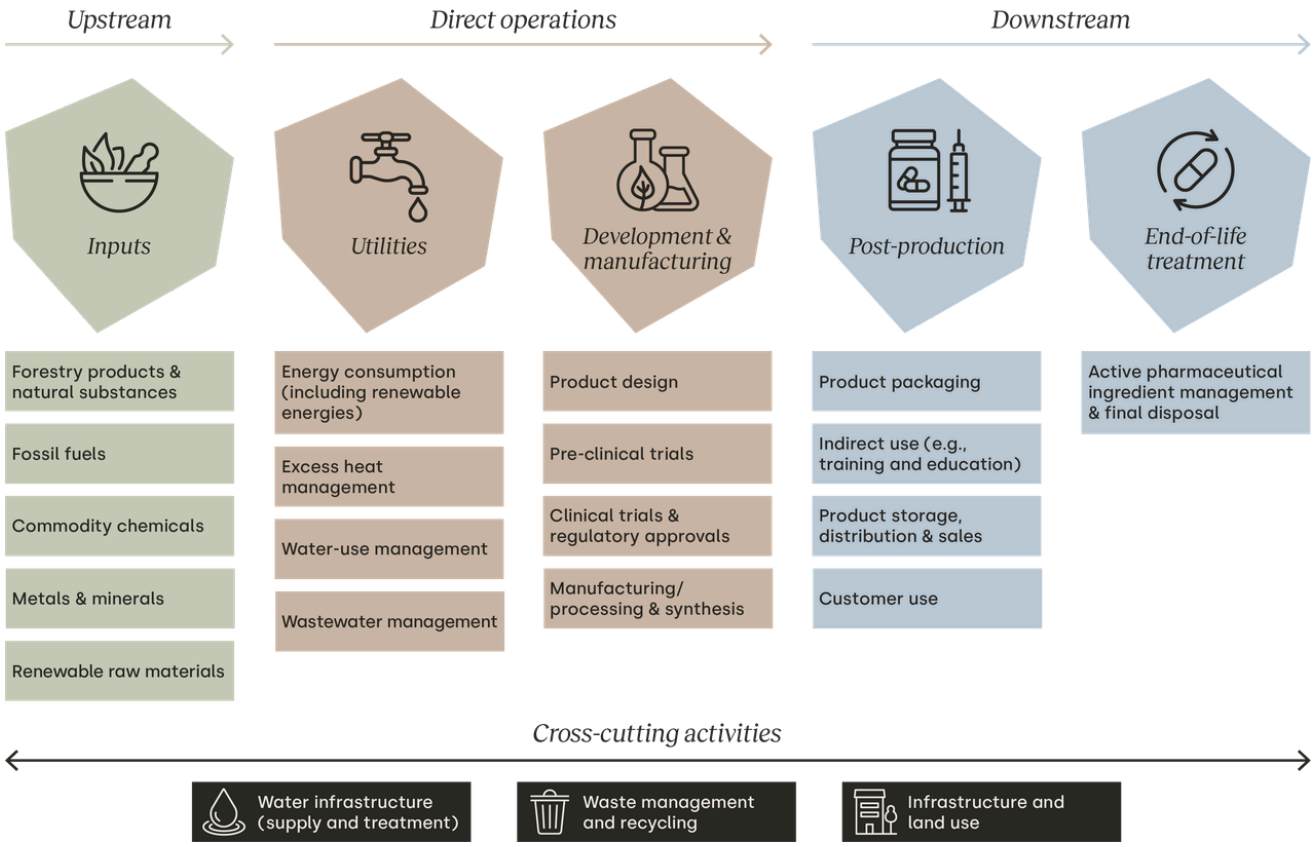


Figure 1: Biotechnology & pharmaceuticals sector value chain. Roadmaps to Nature Positive - Foundations for the pharmaceutical sector (WBCSD, 2025)

8. A value chain goes beyond the selling of goods and products by offering value throughout the customer journey, from marketing to after-sales support. The supply chain focuses on sourcing materials and delivering goods to the customer.
9. See: https://tnfd.global/about/why-nature-matters/

Figure 1 includes management of active pharmaceutical ingredients and final disposal in 'end-of-life treatment'. Management of micropollutants should also be considered in this context.

Investors generally use the Global Industry Classification Standard[10] (GICS) to manage and track the progress of the companies in their portfolio as well as determine which specific type of activities the companies in their portfolio are involved in.

However, governments and other organisations, particularly those focused on assessing nature-related activities, use alternative coding systems such as NACE[11] that don't precisely match to the GICS system. In particular, tools that help organisations explore their exposure to nature-related risk and take the first steps to understand their dependencies and impacts on nature, such as the Science Based Targets Network (SBTN) Materiality Screening Tool (MST)[12] and ENCORE,[13] use the ISIC system.[14] The Nature Action 100 investor initiative groups the companies that it focuses on into eight sectors based on the Sustainable Industry Classification System (SICS).[15]

As a result, it is particularly important for investors engaging with companies to understand these alternative systems so that they can identify where the impacts are occurring and which actors can have the most influence to transform practices for the overall processes in the sector.

This guide is structured to provide useful insights and to support engagement with companies in the Biotechnology & Pharmaceutical sector whichever classification system is being used by the financial institution.[16] We have summarised how the economic activities covered by the sector are classified under a selection of different economic coding systems in an Appendix.

How this sector impacts and depends on nature

The sustainable transformation of the Biotechnology & Pharmaceuticals sector is important for nature in order to protect species and their natural habitats from the release of pharmaceutical ingredients (APIs), solvents, and other chemical substances in water, soil, and airways. The Pharmaceuticals sector was identified as generating nearly 4% of the overall corporate impact on biodiversity in the FfB Foundation multi-tool analysis. This analysis aggregated and normalised the results from four biodiversity impact assessment tools to provide biodiversity footprint scores of high-impact sectors and industries. The Biotechnology and Pharmaceuticals sector ranks seventh[17] against the other 73 GICS Level 3 Industries covered by the MSCI ACWI used in the multi-tool study.

10. The Global Industry Classification Standard (GICS) is an industry taxonomy developed in 1999 by MSCI and Standard & Poor's (S&P) for use by the global financial community.
11. The Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE, is the industry standard classification system used in the EU.
12. The SBTN's MST is designed to help users carry out a first screening of the types of environmental impacts that are potentially materially relevant to the direct and upstream operations of a sector and a company's activities
13. ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)
14. The International Standard Industrial Classification of All Economic Activities (ISIC) is the international reference classification of productive activities.
15. SICS uses sustainability profiles to group similar companies within industries and sectors. In SICS, a company's sustainability risks and opportunities are more important for its classification than other traditional factors, such as economic cycles and revenue streams
16. The Nature Action 100 investor initiative uses SICS when allocating companies to sectors for engagement purposes. Commercial banks often use NACE and ISIC codes in their analysis of their lending portfolios.
17. These studies used the MSCI ACWI Index as the company universe, as it is a leading benchmark for many investors. The index captures large and mid-cap companies across 23 Developed Markets and 24 Emerging Markets with over two thousand constituents.

It is crucial for investor engagement practices to be anchored in science and best practices in order to help drive the sustainable transformation of companies toward the goals and targets of the Kunming-Montréal Global Biodiversity Framework (GBF). Understanding, as well as measuring, how this sector impacts and depends on nature is, therefore, essential for the better management of supply chains and to encourage more nature-friendly and regenerative practices.

Assessing impacts using ENCORE

Figure 2 below shows the direct and upstream operational impacts of the Biotechnology & Pharmaceuticals sector. This analysis was produced by the WBCSD based on the assessment provided by ENCORE, supplemented by input from members of the WBCSD's Roadmap to Nature Positive for the Pharmaceutical Sector working group.

We provide more information on the ENCORE assessment of direct operations in an Appendix.

Impacts associated with phases of the pharmaceutical sector value chain*

IPBES drivers of change	Impact drivers (Pressures)	Upstream				Direct Operations	Downstream	Cost-cutting		
		Agricultural products[1]	Chemicals[1]	Materials[1]	Energy[1]	Pharmaceutical manufacturing and services[1]	Healthcare[1]	Waste management[1]	Water utilities[1]	Transport and distribution[1]
Land-/water-/sea-use change	Area of land use	VH	L	M	H	M	L	M	H	M
	Area of freshwater use	H	N/A	VH	VH	N/A	N/A	N/A	H	M
	Area of seabed use	H	N/A	VH	VH	N/A	N/A	ND	M	M
Natural resource use and exploitation	Volume of water use	VH	H	M	M	M	L	M	M	M
	Other biotic resource extraction (e.g., fish, timber)	VH	N/A	N/A	N/A	VL	N/A	N/A	N/A	N/A
Climate change	Other abiotic resource extraction	N/A	N/A	H[2]	N/A	N/A	N/A	N/A	N/A	N/A
Pollution	GHG emissions	H	M	M	VH[3]	M	VL	H	H	H
	Non-GHG air pollutant emissions	VH	H	H	VH[3]	M	L	M	M	VH
	Toxic soil and water pollutant emissions	H	VH	VH	VH	M	L	M	VH[6]	L
	Nutrient soil and water pollutant emissions	VH	N/A	VH	N/A	M	ND	M	VH[7]	M
Invasive species and others	Generation and release of solid waste	VH	M	VH	H	M[4]	M	M[5]	M	M
	Disturbances (e.g., noise, light)	H	VH	VH	VH	M	L	H	VH	VH
	Introduction of invasive species	VH	N/A	L	L	L	L	M	VH	VH

VH: Very High Impact | H: High Impact | M: Medium Impact | L: Low Impact | VL: Very Low | ND: No data** | N/A: Not applicable***

Materiality ratings are based on the ENCORE (July 2024) database.

*Refer to the notes on table 1 below for a description of the superscript numbers in this table.

**"No data" refers to areas for which insufficient data was available to ENCORE to calculate a materiality rating.

***"Not applicable" refers to areas where ENCORE has determined an ecosystem service does not apply to a given business activity.

Notes:

1. Annex 5.1 outlines the methodology and list of International Standard Industrial Classification (ISIC)-aligned business activities for each component of the value chain.
2. Some, but not all, pharmaceutical companies have identified the impact from the extraction of both biotic and abiotic materials, such as metals, minerals and inorganic salts by mining and quarrying, as an impact of note.
3. The impact of GHG emissions is significantly lower for pharmaceutical companies that already source most or all their energy from renewable sources, rather than from fossil fuels.
4. The pharmaceutical sector's direct operations strictly manage solid waste due to stringent regulation, minimizing its output.
5. Several industry experts identified plastic waste as a notable impact throughout the value chain, although there was emphasis that, for many, it may be less material than other impacts identified. The industry uses plastics throughout the value chain, for example for lab equipment, protective gear, drug delivery mechanisms, storage, sterile containers and in packaging.
6. They consistently identified the presence of APIs, particularly antibiotics that could contribute to AMR, in the environment as a key downstream impact of pharmaceutical product use. It is also necessary to consider other pollutants, such as salts and heavy metals.
7. Companies identified nutrient pollution, such as nitrates, phosphates and organic carbon sources, as important for consideration, particularly from agricultural runoff from upstream suppliers.

Figure 2: Material impacts for the Pharmaceuticals Sector (WBCSD analysis of ENCORE). Roadmaps to nature positive - foundations for the pharmaceutical sector (WBCSD, 2025)

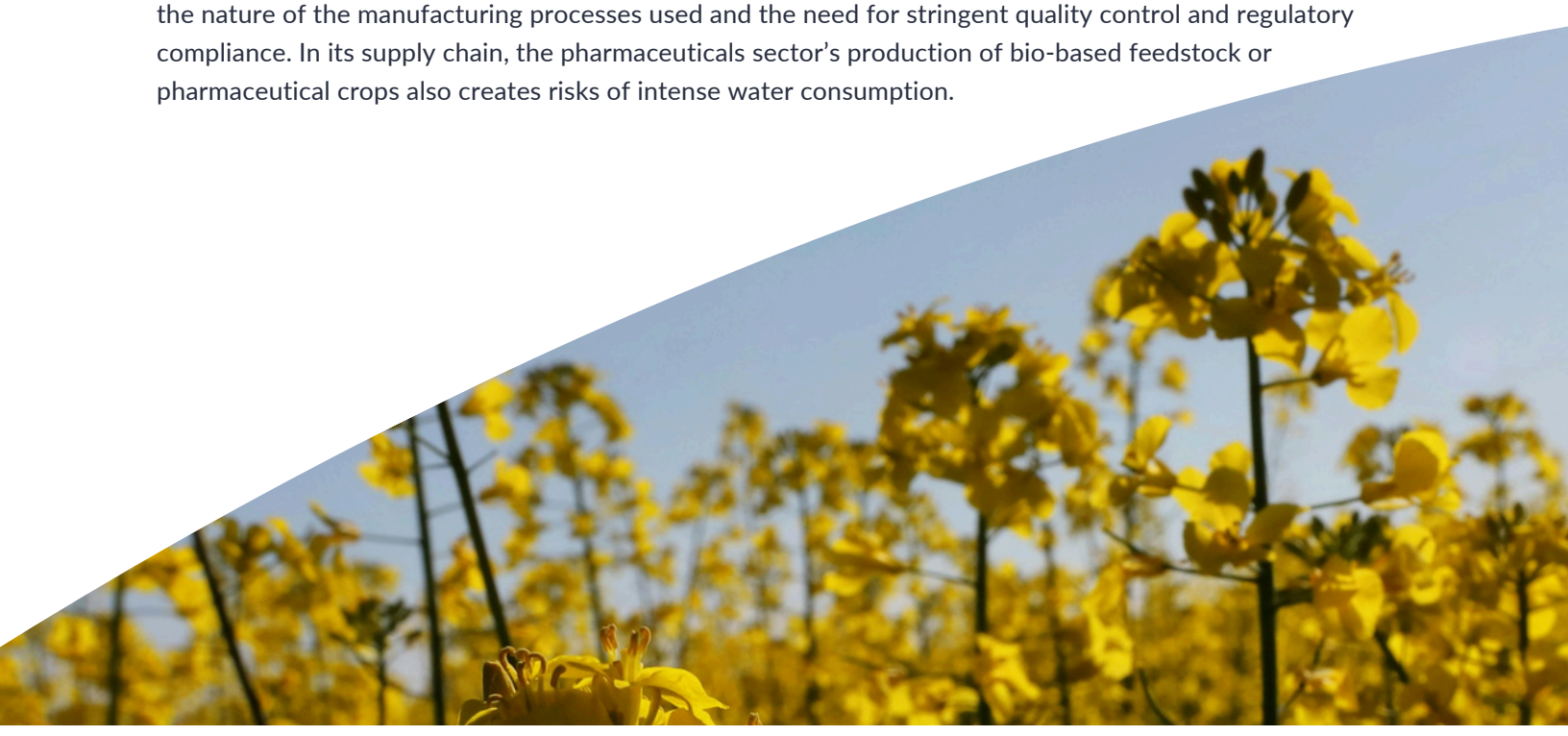
Based on the WBCSD analysis, the most material impact drivers in the direct operations of the Biotechnology & Pharmaceuticals sector are area of land use, volume of water use, GHG emissions, non-GHG or pollutant emissions, toxic and nutrient soil and water pollutants, solid waste, and 'Disturbances'.[18] These are all assessed as 'Medium' impact in contrast to the impacts that result from the upstream part of the sector's value chain.

As Figure 2 (previous page) shows, the upstream impacts of the sector vary depending on the inputs that are most material for the specific company under consideration so further analysis and investigation will be required. However, it is clear that the impacts coming from agricultural products are either Very High or High across all the categories that are relevant to direct operations, with the addition of Very High impacts with respect to 'Other biotic resource extraction', and 'Introduction of invasive species'. The use of 'Materials' (such as metals, minerals, and inorganic salts extracted by mining or quarrying) by some pharmaceutical companies is assessed as having a High impact with respect to 'Other abiotic resource extraction'.

Taking upstream and direct operations as a whole, it is clear that the **most material impacts overall come from: land/water/sea-use change; volume of water use; GHG emissions; pollution (non-GHG air pollutants, soil and water pollutants, and solid waste), and disturbances.**

Land-use change is a specific problem in relation to pharmaceuticals that rely on agricultural products and/or biofuels in their production, so for some companies this will be a very material issue, but for others it will be negligible.

Volume of water use is likely to be a more common issue across a variety of businesses in the sector due to the nature of the manufacturing processes used and the need for stringent quality control and regulatory compliance. In its supply chain, the pharmaceuticals sector's production of bio-based feedstock or pharmaceutical crops also creates risks of intense water consumption.



18. ENCORE defines 'disturbances' as 'Activity produces noise or light pollution that has potential to harm organisms.'

Soil and water pollutants are released during the manufacturing of pharmaceutical products at various points in the value chain, including solvents such as toluene and isopropanol, and other chemical substances such as heavy metals (e.g. magnesium hydroxide and chromium salts). These pollutants are frequently toxic to humans, animals and plants, and often accumulate in soils and the food chain rather than being broken down, further increasing the risks to biodiversity and the population located near where the pollution is taking place. Non-GHG pollutants such as nitrogen dioxide are a particular issue in the manufacture of fertilisers, and contribute significantly to climate heating and respiratory disorders.

GHG emissions will vary significantly depending on the energy source being used by the upstream supplier and the pharmaceutical company itself. The World Bank estimated that the healthcare sector was responsible for approximately 5% of all GHG emissions globally and cited an earlier study based on the US that estimated half of the healthcare sector's emissions could come from pharmaceutical manufacturing[19] (which would imply a global GHG footprint of around 2.5% of total emissions). Use of renewable energy sources will significantly reduce this impact for individual companies.

Downstream impacts of the sector are not included in ENCORE but have been estimated by the WBCSD. In broad terms, the generation and release of solid waste is a particular concern, rated as having a Medium impact. This will include plastics which are used extensively throughout the supply chain and play a particular role in achieving sterile delivery of medicines. Although pollutants are rated as Low impact, the release of active pharmaceutical ingredients, including antibiotics, is a particular concern given the significant increase in antimicrobial resistance (AMR), mainly caused by the excessive use of antibiotics in intensive livestock farming systems, and the presence of antibiotics in waste water systems that feed into rivers.[20]

19. Climate-Smart Healthcare – Low-Carbon and Resilience Strategies for the Health Sector (World Bank 2017). The US study cited is Chung J, Meltzer D (2009). Estimate of the Carbon Footprint of the US Healthcare Sector. JAMA. 2009;302(18):19671972. doi:10.1001/jama.2009.1610 12
20. A 2024 study published by the Global Research on Antimicrobial Resistance (GRAM) Project estimated that by 2050 deaths directly attributable to AMR could be almost 70% higher than they were in 2022. Naghavi M, Vollset SE, Ikuta K, et al. Global burden of bacterial antimicrobial resistance 1990–2021: a systematic analysis with forecasts to 2050. The Lancet. 16 September 2024. doi: 10.1016/S0140-6736(24)01867-1

Assessing dependencies (ENCORE)

In addition to these impacts, it is important to consider the sector's dependency on natural systems and their ecosystem services. For example, the pharmaceutical industry is heavily reliant on groundwater, surface water, and natural filtration for many manufacturing processes, including drug synthesis, purification, and quality control. The industry also relies on a wide range of natural resources, including medicinal plants, marine organisms, and minerals, to produce active pharmaceutical ingredients (APIs) and other raw materials. According to the Convention on Biological Diversity, for example, over 80% of registered medicines and pharmaceutical ingredients either come from, or have been inspired by, the natural world. Thus, unsustainable harvesting practices, such as deforestation or overexploitation of certain plant species, can enhance risks for the sector and the financial assets derived from it.

The ENCORE tool can be used to identify the key nature dependencies[21] of a sector (on a scale from Very Low to Very High). The key dependencies of the Biotechnology & Pharmaceutical sector are:

- **Genetic Materials: HIGH** (Biotechnology research is assessed as having a MEDIUM dependency).
- **Water Supply: HIGH** (Biotechnology research is assessed as having a LOW dependency).
- **Water Purification: VERY HIGH** (Biotechnology research is assessed as having a MEDIUM dependency).
- **Water Flow Regulation: VERY HIGH.**

Refer to the Appendix for more details on ENCORE's assessment of these ecosystem services.

The WBCD's report referred to earlier includes a detailed summary of the sector's dependencies across the value chain – see Figure 3.

*Dependencies associated with phases of the pharmaceutical sector value chain**

Ecosystem service category	*Impact drivers (Pressures)*	Upstream				Direct Operations	Downstream	Cost-cutting		
		Agricultural products[1]	Chemicals[1]	Materials[1]	Energy[1]	Pharmaceutical manufacturing and services[1]	Healthcare[1]	Waste management[1]	Water utilities[1]	Transport and distribution[1]
Provisioning	Other provisioning services – animal-based energy	M	N/A	N/A	N/A	N/A	N/A	N/A	N/A	M
	Biomass provisioning	VH	N/A	VL	N/A	L[4]	N/A	N/A	VL	N/A
	Genetic material	VH[2]	N/A	N/A	N/A	H[2]	N/A	N/A	N/A	N/A
	Water supply	VH[3]	M	H	H	H[3]	M	M	M	L
Regulation and maintenance	Water purification	VH[3]	M	VH	M	VH[3]	VH	M	VH	M
	Water flow regulation	VH[3]	M	H	H	H[3]	H	M	H	M
	Rainfall pattern regulation	VH	M	VH	M	N/A	N/A	M	VH	VH
	Solid waste remediation	VH	L	M	M	L	M	VH	VH	ND
	Soil and sediment retention	VH	M	M	M	M	L	VL	M	H
	Soil quality regulation	VH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Other regulating and maintenance services – dilution by atmosphere and ecosystems	M	L	M	M	L	N/A	M	M	VL
	Biological control	H	N/A	VL	N/A	VL	VL	VL	VL	VL
	Nursery population and habitat maintenance	H	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Pollination	VH	N/A	N/A	N/A	L	N/A	N/A	N/A	N/A
	Air filtration	H	VL	VL	VL	VL	VL	M	M	VL
	Flood control	H	M	H	H	M	H	M	H	H
	Storm mitigation	H	M	M	M	M	H	L	H	H
	Global climate regulation	VH	VL	H	VH	L	VL	VL	VL	M
	Local (micro and meso) climate regulation	VH	L	L	M	L	L	L	L	L
	Noise attenuation	VL	VL	VL	M	VL	VL	VL	VL	VL
	Other regulating and maintenance services – mediation of sensory impacts (other than noise)	VL	VL	L	L	VL	VL	VL	VL	N/A
Cultural	Recreation-related services	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	VH
	Visual amenity services	N/A	N/A	N/A	N/A	N/A	VH	N/A	N/A	VH
	Education, scientific and research services	VH[2]	N/A	N/A	N/A	VH[2]	N/A	N/A	N/A	N/A
	Spiritual, artistic and symbolic services	VH	N/A	N/A	N/A	N/A	VH	N/A	N/A	N/A

VH: Very High Impact | H: High Impact | M: Medium Impact | L: Low Impact | VL: Very Low | ND: No data** | N/A: Not applicable***

Materiality ratings are based on the ENCORE (July 2024) data

*Refer to the notes on table 2 for a description of the superscript numbers in this table.
***"No data" refers to areas for which insufficient data was available to ENCORE to calculate a materiality rating.
****"Not applicable" refers to areas where ENCORE has determined an ecosystem service does not apply to a given business activity.

Notes:
1. Annex 5.1 provides the methodology and list of ISIC-aligned business activities for each component of the value chain.
2. We have identified genetic material as a key dependency for the pharmaceutical sector given the role nature can play in drug discovery, research and development.
3. We defined water use, supply and purity as key dependencies for the reliable production of agricultural inputs, as well as production and cooling processes in pharmaceutical manufacturing, such as the use of water for injection (WFI).
4. The pharmaceutical sector relies on bio-based products derived from both wild species and agricultural resources. For example, the sector can use **squalene** from shark liver in certain vaccine formulations, while **soy products** support antibody production and syrups and other medicines include them. Additionally, bio-based materials play a key role in packaging, with **timber** providing paper and **cellulose** supporting various manufacturing processes.

Figure 3: Material dependencies for the Pharmaceuticals Sector (WBCSD analysis of ENCORE). Roadmaps to nature positive - foundations for the pharmaceutical sector (WBCSD, 2025)

21. ENCORE can also be used to identify impacts but unlike the SBTN's Materiality Screening Tool (MST) it does not provide a quantitative score– refer to the Appendix for more details.

Priority locations within the sector value chains

As expressed in the TNFD recommendations [22] nature-related impacts and dependencies are location-specific and therefore require local, context-specific assessment and responses. As a result, investors benefit from knowing the locations that are concerned with the supply chains of an overall industry. The TNFD provides sectoral guidance for individual companies on how to locate their interface with nature, as the first step of their LEAP assessment (Locate-Evaluate-Assess-Prepare), a four-step integrated assessment framework for nature-related issues.

Companies and investors should focus on 'priority locations' i.e. areas that are:

- **Material locations** – where the organisation has material nature-related impacts, dependencies, risks and/or opportunities; and/or
- **Sensitive locations** – defined by the TNFD as ecologically sensitive locations that meet one or more of five criteria: important for biodiversity, including species; and/or areas of high ecosystem integrity; and/or areas of rapid decline in ecosystem integrity; and/or areas of high physical water risks; and/or areas of importance for ecosystem service provision, including benefits to Indigenous Peoples, local communities and stakeholders. [23]

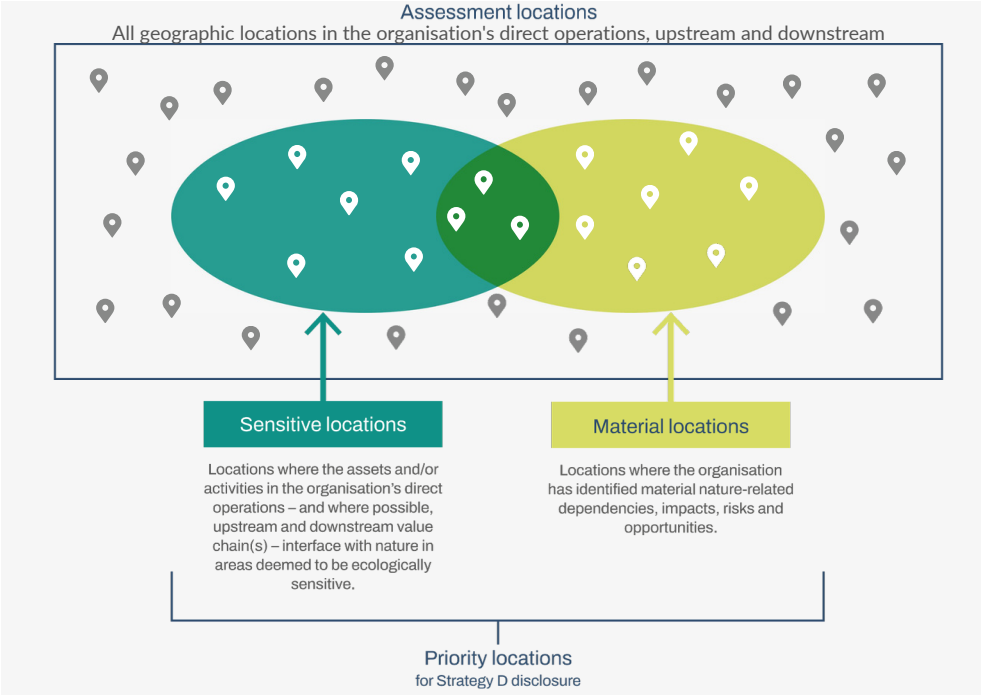


Figure 4: Priority locations, Guidance on the identification and assessment of nature-related issues - The TNFD LEAP approach v1 - September 2023

22. These are recommendations that provide companies and financial institutions of all sizes with a risk management and disclosure framework to identify, assess, manage and, where appropriate, disclose nature-related issues, green transition plans, nature markets and bioeconomy investment strategies.
23. See: https://tnfd.global/wp-content/uploads/2023/08/Guidance_for_Financial_Institutions_v1.pdf?v=1695215983

The assessment of impacts on priority locations, therefore, will vary greatly for each individual company.

Water risk provides a useful illustration of this effect. As noted previously, water pollution is among the main pressures from the Biotechnology & Pharmaceuticals sector. Figure 5 below shows the water quality map available in the Water Risk Filter of the World Wildlife Fund. Companies can use this tool to identify their exposure to water risks based on the locations of their direct and indirect operations.

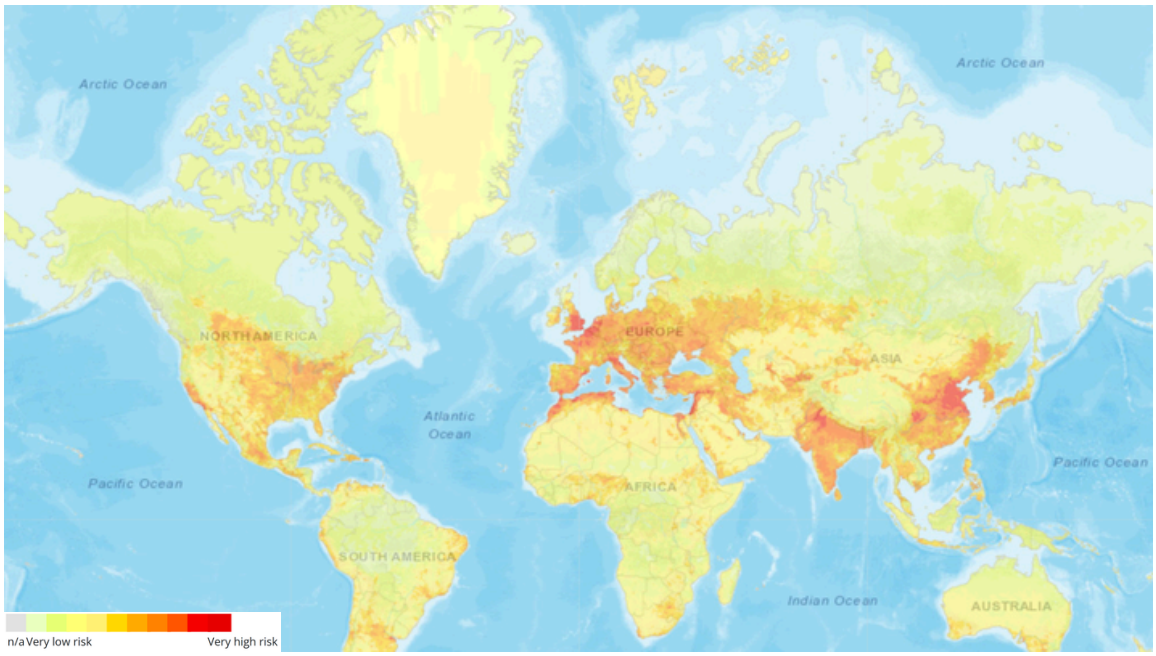


Figure 5: Map of the Global Water Quality Risk, WWF water risk filter (2024)

The "water quality" risk category in the Water Risk Filter tool considers parameters with well-documented direct and indirect negative effects on water security for both humans and freshwater biodiversity. These are also aligned to the Sustainable Development Goal (SDG) 6.3.2[24]:

There is often an overlap between dependencies and impacts and tools like this can help with both. Direct operations or those of suppliers located in areas of high water risk are likely to have a more serious negative impact on nature than similar activities undertaken in a low water risk area.

24. The SDG indicator 6.3.2 (SDG 632) helps countries to report on ambient water quality in a consistent and straightforward manner. See: https://www.unep.org/resources/report/sustainable-development-goal-indicator-632-options-maximising-indicators-positive

Forward-looking regulations relevant to the sector

Investors can be inspired by forward-looking nature-related regulations to guide the transformation of the companies in their portfolio. With engagement, they can exercise influence on companies to improve their practices and be prepared in the context of a sustainable policy transition, which goes further than simply complying with current environmental safeguards. In the Pharmaceuticals sector, the most comprehensive forward-looking nature-related regulation has been identified in Europe, serving as a best-practice example for setting minimum standards .

Europe

The EU Commission has proposed a significant reform to the EU pharmaceutical legislation (replacing Directive 2001/83 and Regulation 726/2004) after four years of deliberation. This marks the first major review since 2004, aiming to enhance innovation and ensure timely access to high-quality medicines.[25] The reform also addresses the security of supply and shortages through specific measures. To bolster the global competitiveness and innovation of the pharmaceuticals sector, the proposal seeks a balance between incentivising innovation, addressing unmet medical needs, and promoting equitable access and affordability. Notably, the proposed Directive suggests that Marketing Authorisation applications for medicinal products in the European Union should include an Environmental Risk Assessment (ERA) and corresponding risk mitigation measures. Failure to submit a complete ERA or propose adequate risk mitigation measures may result in the refusal of marketing authorisation.

25. EU Pharmaceutical Legislation Reform EU Commission Proposal

This reform aims to better align the pharmaceutical legislation to other existing EU environmental policies, with special regard to water regulations such as the Water Framework, Groundwater, Urban Wastewater, and Drinking Water directives.[26] The proposed reform is still working its way through the EU legislative process and so could be subject to significant changes before final approval. The final Regulation and Directive are not expected to be published until sometime in 2026. The Regulation will take effect immediately; however, the Directive will need to be transposed into national laws by member states within 36 months of its publication.

In January 2025, the revised EU Urban Wastewater Treatment Directive (2024/3019) took effect with the objective of removing micropollutants from wastewater more effectively, particularly residues from pharmaceuticals and cosmetics. The UWWTD envisages the staged introduction of progressively more effective water treatment techniques and equipment, and imposes extended producer responsibility (EPR) on pharmaceutical and cosmetics companies that supply products to customers in the EU that generate micropollutants in wastewater at the end of their lives. Companies caught by this new Directive will have to contribute 80% of the costs of introducing and operating the systems required to remove micropollutants from wastewater with effect from 31 December 2028.[27] A number of pharmaceutical companies are taking legal action to challenge the EPR aspect of this legislation so the impact currently remains uncertain.

Outside of the EU, other notable legislation to consider includes:

India: Draft Guidelines for the Pharmaceutical Industry (Central Pollution Control Board) introducing criteria for the management of waste water and hazardous waste. The comment period relating to these Guidelines closed on 5th February 2025. There is currently no timetable for publishing the final Guidelines.

China: Draft Environmental Code seeking to align Chinese legislation with the provisions of the Convention on Biological Diversity (CBD) and the Nagoya Protocol. The Code is expected to come into force in 2026. The effects will be wide-ranging, however, companies in the Biotechnology and Pharmaceutical sector may be particularly impacted by strengthened requirements relating to the introduction of new chemicals, circular economy and waste management provisions, and increased levels of fines and/or personal liability for senior executives if the Code is breached (including with respect to reporting requirements).

26. The EU pharmaceutical package: Environmental aspects
27. https://www.lexology.com/library/detail.aspx?g=c49eb79d-2535-4965-920c-be305961c459

The Cali Fund - building on the Nagoya Protocol

Given the sector's dependence upon genetic materials, the implications of the launch of the Cali fund and the associated increasing focus on sharing the benefits derived from Digital Sequence Information (DSI)[28] are potentially far-reaching. The Nagoya Protocol is an international agreement that entered into force in 2014, which aims at sharing the benefits arising from the utilisation of genetic resources and drug discoveries in a fair and equitable way.

The Nagoya Protocol sets out core obligations for its contracting Parties to take measures in relation to access to genetic resources, benefit-sharing, and compliance. Benefits may be monetary or non-monetary, such as royalties and the sharing of research results. Sharing is subject to mutually agreed terms.

At the United Nations Biodiversity Conference[29] (COP 15) in Montreal, Canada, in December 2022, governments agreed that benefits from the use of Digital Sequence Information (DSI) on genetic resources should be shared fairly and equitably (decision 15/9) and further agreed to establish a multilateral mechanism to that effect, including a global fund. It was recognised that the monetary and non-monetary benefits arising from the use of digital sequence information on genetic resources should, in particular, be used to support conservation and sustainable use of biological diversity and, inter alia, benefit Indigenous Peoples and local communities.[30]

This fund, referred to as the 'Cali Fund',[31] was launched in February 2025. It is designed to provide a vehicle for collecting contributions from companies using DSI for profit and distributing those funds to Indigenous Peoples and Local Communities (50%), developing countries, and global biodiversity initiatives that are aligned with the CBD's three objectives (conservation, sustainable use, and benefit-sharing) and/or provide support for protected areas, species recovery, and combating biodiversity loss.

Companies in the Biotechnology & Pharmaceuticals sector (as well as those involved in areas such as, cosmetics, agriculture, and nutraceuticals) are highlighted by the CBD as likely to be receiving significant commercial benefits from DSI. Companies using DSI for profit are expected to contribute if they meet two out of three financial thresholds ($20m assets, $50m sales, $5m profit).[32]

Contributions are voluntary. The Cali Fund has published an 'indicative contribution model' that envisages contributions equivalent to 1% of profits or 0.1% of revenue - companies can choose to contribute less than the indicated amount. All contributions will be recognised on the Multi-Partner Trust Fund website. Companies making contributions at or above the expected level will receive a certificate from the Secretariat of the Cali Fund.

28. DSI is the collective term used in international negotiations to denote information (data) derived from genetic resources.
29. See: https://www.unep.org/un-biodiversity-conference-cop-15
30. See: https://www.cbd.int/dsi-gr/whatdone.shtml
31. The 'Cali Fund for the Fair and Equitable Sharing of Benefits from the Use of Digital Sequence Information on Genetic Resources' (as decided at CBD COP 16 in Cali, Columbia)
32. https://www.cbd.int/dsi-gr/califund.guide.pdf

How the sector links to the objectives of the Global Biodiversity Framework

The sustainable transformation of companies in the Biotechnology & Pharmaceuticals sector can contribute to halting nature loss by 2030. Table 1 below provides a summary of the issues to keep in mind, and also levers that could be activated in the sector, with regard to the targets of the Global Biodiversity Framework (GBF), and which could be applied to find ways to reduce company pressures on biodiversity and/or develop concrete solutions for nature recovery.

More details on the actions particular companies could take are discussed in Part II.

Issue	*Classification*	*Explanation*	*Framework Linkages*
Spatial planning & ecosystem restoration (facility siting, sourcing impacts)	Impact, Dependency	Poor land/sea-use decisions contribute to habitat loss; reliance on intact ecosystems for raw materials and community license to operate.	GBF Targets 1-3; TNFD (location-based risk); SBTN (ecosystem restoration)
Use of medicinal species & biodiversity resources (plants, fungi, marine organisms, microbes)	Dependency, Risk	Drug discovery pipelines depend on genetic diversity; overharvesting risks supply shortages, regulatory action, and reputational harm.	GBF Targets 4-5; Nagoya Protocol / ABS;[33] TNFD (dependencies in value chain)
Pollution from manufacturing (effluents, solvents, antimicrobial residues)	Impact, Dependency, Risk	Effluents damage aquatic ecosystems, contribute to AMR; companies rely on clean water for production; exposure to stricter wastewater regulations.	GBF Target 7; TNFD/SBTN (pollution pressure); UN SDG 6, 14, and 15

Table 1: Biotechnology & Pharmaceuticals sector - nature issues matrix, Finance for Biodiversity Foundation (2025)

33. Access and Benefit Sharing (ABS) – a framework under the Nagoya Protocol that governs how genetic resources can be accessed and the benefits from their use can be shared

Issue	*Classification*	*Explanation*	*Framework Linkages*
Benefit-sharing of genetic resources	Risk, Opportunity	Failure to comply with ABS rules risks litigation and project delays; transparent sharing strengthens community trust and innovation access.	GBF Target 13; Nagoya Protocol; TNFD (stakeholder rights); SDG 10 and 15)
Disclosure of nature risks & impacts	Risk, Opportunity	Investors demand nature disclosures; poor reporting limits finance and creates greenwashing risk; robust disclosure can unlock nature-positive investment.	GBF Target 15; TNFD (LEAP); CSRD/ESRS
Sustainable consumption & awareness (supplier/consumer engagement, disposal practices)	Opportunity, Risk	Educating supply chain and consumers reduces improper disposal/pollution; enhances brand trust and compliance with sustainable procurement norms.	GBF Target 16; SBTN (demand-side action); SDG 12.
Indigenous rights & participation (FPIC,[34] equitable partnerships)	Risk, Dependency	Ignoring Indigenous rights risks legal challenges and reputational damage; partnerships provide ecological knowledge and community license.	GBF Target 22; Nagoya Protocol; UNDRIP; TNFD (stakeholder engagement); SDG 15 and 16

Table 1 (continued) - Biotechnology & Pharmaceuticals sector - nature issues matrix, Finance for Biodiversity Foundation (2025)

34. FPIC: Free, Prior, and Informed Consent

Part II

Recommended Company Actions to Help Address Nature Loss

Introduction

All companies in the Biotechnology & Pharmaceuticals sector need to have a clear nature strategy to minimise negative nature impacts and contribute to the reversal of nature loss by 2030. This nature strategy should be embedded in the company's overall business strategy, which should take a holistic, integrated, approach to climate, nature, and social/health issues.[35]

This strategy should encompass the company's supply chain as well as its direct operations. Supply chain traceability is an essential tool for companies that wish to put in place an effective nature strategy, and effective implementation will invariably require collaboration with other companies in the value chain.

The nature strategy should follow the **ACT-D framework:** **Assess, Commit, Transform, Disclose.**[36]

Assess

Measure and prioritize impacts and dependencies on nature to ensure the company is acting on the most material ones.

As a starting point, investors need to ensure that companies understand their supply chains' dependencies and impacts on nature, as identified through an assessment of nature-related dependencies, impacts, risks, and opportunities (DIRO), conducted following the TNFD LEAP [37] process.

The DIRO assessment needs to encompass biodiversity loss pressures on all relevant biomes, as well as evaluating nature dependencies, impacts, risks, and opportunities across the whole supply chain, from indirect raw material and components suppliers to how consumers use and dispose of the company's products. The assessment will allow companies to identify and address the most material nature risks and impacts, notably relying on the SBTN Materiality Screening Tool,[38] as well as understanding its sphere of influence. Refer to the previous discussion on impacts and dependencies to identify what might be expected for companies at particular points of the value chain.

35. The UN Sustainable Development Goals (SDGs) provide a useful framework https://sdgs.un.org/goals
36. Developed by a variety of organisations including the Capitals Coalition, Business for Nature, WBCSD, TNFD, Science Based Targets Network, WEF and WWF. https://capitalscoalition.org/business-actions/
37. See TNFD's Tool catalogue for Nature-related data tools to help assess nature-related issues and aligned with the TNFD's LEAP approach. See: https://tnfd.global/guidance/tools-catalogue/
38. https://sciencebasedtargetsnetwork.org/companies/take-action/assess/materiality-screening/

Commit (set targets)

Set transparent, time-bound, specific, science-based targets to put the company on the right track towards operating within the Earth's limits and aligning with the Global Biodiversity Framework, with the aim of reversing nature loss by 2030.

Targets need to be ambitious (while also being achievable), set against a clear baseline, with specific timeframes and measurable KPIs to fulfil the company's nature ambition.[39] The targets should be based upon the company's assessment of its impacts and dependencies on nature, and should focus on the most material factors in its direct operations and those of its value chain.

Transform (take action)

The company should design an action plan using the SBTN's AR3T Action Framework: Avoid, Reduce, Regenerate, Restore, and Transform.

Companies at the start of their nature positive journey will need to focus on avoiding and reducing their negative impacts on nature. However, more mature companies should take actions that will actually regenerate and restore nature, with the ultimate aim of acting to transform the underlying systems that are driving nature loss.

It is also important that the design and implementation of the plan prioritises rights-based approaches and is developed in collaboration with Indigenous Peoples and local communities when they are affected.

Companies will inevitably need to consider trade-offs when deciding what actions to take. Investors should expect companies to provide clear, science-based and evidenced-backed, explanations to support such decisions.

The TNFD has published guidance for companies setting out how to incorporate nature into their Transition Plans that builds on existing frameworks and ensures that nature, climate and social issues are considered and disclosed in an integrated way.[40]

Disclose

Track performance and publicly report material nature-related information on a regular and consistent basis.

Companies should use the overall reporting framework provided by the TNFD to guide them when compiling and reporting nature-related information, and their reporting should comply with the relevant sustainability reporting standards such as those provided by the ISSB, EFRAG, and the GRI.

39. Targets should be SMART: specific, measurable, achievable, relevant, and time-bound
40. Guidance on nature in transition plans, TNFD, November 2025 https://tnfd.global/publication/guidance-on-nature-in-transition-plans/

Recommended company actions

The specific actions taken by a company will depend on its position in the value chain, the nature of the products and services it provides, the inputs it depends on, and will be location-specific. However, given the most material impacts discussed earlier, it is possible to identify actions that are likely to be relevant to many companies in the sector.[41] Unsurprisingly, these are consistent with the top five 'priority actions' recommended by the WBCSD in their Pharmaceutical Roadmap to Nature Positive report. The actions will apply to companies' direct operations and to activities across their supply chains.

The appropriate actions will also depend upon the company's 'maturity level'. In this Sector Brief we have used a scale from 'basic' to 'mature' summarised in Table 2 below. The levels assigned are meant as guidance only and do not represent precise classifications.[42]

Maturity level	Description
Basic	This action should be within the grasp of the majority of companies.
Intermediate	This action is more likely to require a greater level of organisational maturity with respect to nature actions.
Advanced	This action is likely to require the organisation to be applying a comprehensive ACT-D framework, and to have embedded nature into its business operations, strategy, and governance.

Table 2: Company maturity levels, Finance for Biodiversity Foundation (2025), derived from WBCSD and Capitals Coalition

41. The 'Assess' and 'Commit' stages of the ACT-D framework obviously involve taking action; in addition, positive policy engagement is an essential tool that should be deployed alongside any set of actions to align with the 'Transform' element of ACT-D. These elements are not included in the action lists in this section to avoid repetition.
42. There are numerous ways to define maturity level – investors can refer to WBCSD's Roadmaps to Nature Positive - Foundations for all businesses and the Capitals Coalition Maturity Tool for further guidance.

More mature companies will be able to extend their actions across the majority of their operations and a larger proportion of their supply chains than less mature companies.

The recommended actions are grouped into seven categories for ease of reference.[43] The categories that match the five priority actions recommended by WBCSD are indicated by an asterisk.

1. **Reduce water use;***
2. **Reduce pollution;***
3. **Reduce GHG emissions;***
4. **Reduce solid waste;***
5. **Reduce land-use impacts and restore ecosystems;**
6. **Sustainable sourcing and lower-impact materials;* and**
7. **Building responsible supply chains.**

The actions shown include an indication of:

1. the likely biodiversity benefit from taking the action (high or lower); and
2. the likely feasibility of the action in the near to mid-term (dependent on cost, current technology, regulatory clarity, etc).[44]

Companies should prioritise more feasible actions with a high benefit to nature, as summarised in Table 3.

		Feasibility	
		'Easy'	'Difficult'
Benefit to nature	High	Priority 1 - P1	Priority 2 - P2
	Lower	Priority 3 - P3	Priority 4 - P4

Table 3: Prioritising actions (nature benefit vs feasibility)[45], Finance for Biodiversity Foundation

43. In practice, many actions will relate to more than one category
44. Feasibility is estimated independent of the maturity of the company. However, more mature companies are more likely to be able to undertake actions that are judged to be less feasible ('difficult') where organisational capacity (knowledge, and resources) is an important factor. For example, creating products that are 'safe and sustainable by design' is challenging, but mature organisations are more likely to have the capacity to achieve this due to stronger leadership, human resources, supplier relationships, etc.
45. Important caveat: the 'feasibility' of a particular action is based on broad judgements, not on detailed analysis, and changes in technologies, regulation, and other factors may significantly change the assessed feasibility of an action in the future

Reduce water use

Action	Maturity	Nature benefit	Feasibility	Priority
Perform water scarcity risk assessments to identify vulnerabilities in water-stressed regions, prioritise actions in those locations, and prepare for potential disruptions.	**Basic**	High	Easy	**P1**
Conduct regular audits and provide employee training.	**Basic**	Lower	Easy	**P3**
Invest in water-efficient technologies and optimise processes to reduce water requirements.	**Basic**	High	Easy	**P1**
Implement recycling and reuse systems to minimise freshwater demand.	**Intermediate**	High	Difficult	**P2**
Collaborate with stakeholders to strengthen water management practices in priority locations.	**Intermediate**	High	Difficult	**P2**
Engage local communities and Indigenous Peoples to ensure that the company is using water in accordance with FPIC principles.	**Advanced**	High	Difficult	**P2**

Reduce pollution

Action	Maturity	Nature benefit	Feasibility	Priority
Ensure all facilities meet site-level emissions regulations.	**Basic**	Lower	Easy	**P3**
Deploy technologies to capture and treat harmful emissions to prevent them reaching the environment.	**Basic**	High	Difficult	**P2**
Implement site-level risk assessments and end-of-life management for chemicals and by-products to mitigate ecotoxic and nutrient pollution.	**Basic**	High	Easy	**P1**
Certify antibiotic manufacturing against standards such as the BSI Antibiotic Manufacturing Standard[46] to reduce environmental antibiotic discharge.	**Basic**	High	Easy	**P1**
Innovate products by incorporating environmental criteria into pharmaceutical R&D to develop greener, benign-by-design active pharmaceutical ingredients.	**Intermediate**	High	Difficult	**P2**
Reconfigure manufacturing processes to minimize emissions of active pharmaceutical ingredients, antibiotics, and harmful chemicals (including volatile organic chemicals and non-GHG chemicals).	**Intermediate**	High	Difficult	**P2**
Adopt circular sourcing models for solvents, reagents, buffers, and feedstocks, and embed circularity in product and process design.	**Advanced**	High	Difficult	**P2**

46. https://www.amrindustryalliance.org/antibiotic-manufacturing-standard/

Reduce pollution (continued)

Action	Maturity	Nature benefit	Feasibility	Priority
Adopt circular sourcing models for solvents, reagents, buffers, and feedstocks, and embed circularity in product and process design.	**Advanced**	High	Difficult	**P2**
Collaborate across industry to identify and prioritise the most material and ecotoxic effluents for reduction.	**Advanced**	High	Difficult	**P2**
Partner with wastewater treatment plants to strengthen their ability to remove ecotoxic chemicals and prevent downstream accumulation.	**Advanced**	High	Difficult	**P2**
Address the risk of increasing AMR by prioritising measures to reduce antibiotic pollution across the supply chain including downstream (including collaborating with medical practitioners, governments and other non-state actors to ensure responsible antibiotic use along with improved storage and disposal).	**Advanced**	High	Difficult	**P2**

Reduce GHG emissions

Action	Maturity	Nature benefit	Feasibility	Priority
Increase efficiency in manufacturing, storage, and distribution processes, with focus on high-demand systems such as HVAC (heating, ventilation and air-conditioning) and purified water systems to reduce energy use.	**Basic**	High	Easy	**P1**
Implement a “no deforestation/no conversion” policy across supply chains, especially for agricultural inputs like palm oil, soy, or timber-derived excipients and packaging.	**Basic**	High	Easy	**P1**
Use product-level life-cycle assessment (LCA) to identify priority areas for emission reduction.	**Basic**	Lower	Easy	**P3**
Engage suppliers and CDMOs[47] on energy efficiency and promote the adoption of clean, renewable energy sources.	**Intermediate**	High	Difficult	**P2**
Adopt green chemistry techniques to reduce emissions intensity in manufacturing.	**Advanced**	High	Difficult	**P2**
Work with downstream customers to reduce emissions linked to distribution and patient access, e.g., through optimized logistics and digital solutions that lower patient travel.	**Advanced**	Lower	Difficult	**P4**

47. CDMO: Contract Development and Manufacturing Organization – an outsourcing company that provides comprehensive services for drug development and manufacturing to pharmaceutical and biotechnology firms

Reduce solid waste

Action	Maturity	Nature benefit	Feasibility	Priority
Enhance material efficiency by maximizing yield, adopting continuous manufacturing, and redesigning product systems to minimize waste.	**Basic**	High	Difficult	**P2**
Educate customers and stakeholders on responsible product use and disposal, including safe handling of unused or expired medicines.	**Basic**	High	Easy	**P1**
Work with recyclability standard-setters and regulators to ensure comprehensive guidance and enable timely adoption.	**Basic**	Lower	Difficult	**P4**
Review and redesign product packaging and components to reduce material use, increase recycled content, and move away from virgin plastics and paper.	**Basic**	High	Easy	**P1**
Engage suppliers, CDMOs, and stakeholders to adopt waste hierarchies and circularity principles in management systems.	**Intermediate**	High	Difficult	**P2**
Establish take-back schemes for used devices to improve recycling infrastructure, patient convenience, and material recovery.	**Intermediate**	High	Difficult	**P2**
Support circularity-friendly policies by working with policymakers on waste reduction initiatives (e.g., collective waste gathering, sustainable material standards).	**Intermediate**	Lower	Difficult	**P4**

Reduce solid waste (continued)

Action	Maturity	Nature benefit	Feasibility	Priority
Collaborate across the value chain to design out waste and promote circular business models.	**Advanced**	High	Difficult	**P2**
Design pharmaceutical products, devices, and components for recyclability, collaborating across industries to standardize recyclable formats and enable economies of scale.	**Advanced**	High	Difficult	**P2**

Reduce land-use impacts and restore ecosystems

Companies that are materially dependent on bio-materials should consider the following actions:

Action	Maturity	Nature benefit	Feasibility	Priority
Implement a "no deforestation/no conversion" policy across supply chains, especially for agricultural inputs like palm oil, soy, or timber-derived excipients and packaging.	**Basic**	High	Easy	**P1**
Adopt procurement approaches requiring sustainable land-use practices (e.g., RSPO-certified palm oil, FSC-certified paper/packaging, etc.).[48]	**Basic**	High	Easy	**P1**
Ensure site selection and raw material sourcing respects Indigenous and local community rights and is supported by Free, Prior and Informed Consent (FPIC).	**Basic**	High	Easy	**P1**

48. Note that certification systems vary in quality, rigour, and reliability. More mature companies will ensure the certification systems specified by their procurement rules achieve the required objectives

Reduce land-use impacts and restore ecosystems (continued)

Action	Maturity	Nature benefit	Feasibility	Priority
Integrate biodiversity into site selection and planning; use spatial planning tools (e.g., Integrated Biodiversity Assessment Tool – IBAT) to avoid siting facilities or sourcing from Key Biodiversity Areas.	**Intermediate**	High	Difficult	**P2**
Prioritize land-efficient sourcing and R&D alternatives (synthetic biology, fermentation, biocatalysis) to reduce pressure on ecosystems.	**Intermediate**	High	Difficult	**P2**

Sustainable sourcing and lower-impact materials

Action	Maturity	Nature benefit	Feasibility	Priority
Identify key chemical and agricultural inputs (e.g., palm oil, petrochemicals) and sources, and evaluate environmental impacts and risks using tools such as product LCAs, the SBTN High Impact Commodity list, and other value chain assessment tools.	**Basic**	High	Easy	**P1**
Require responsible sourcing of raw materials, including certification where available (RSPO palm oil, FSC paper, etc.[49]) and compliance with Access & Benefit Sharing (ABS) rules for genetic resources.	**Basic**	High	Easy	**P1**
Improve supply chain traceability, ideally tracking ingredients to the raw material level.	**Intermediate**	High	Difficult	**P2**

49. See previous footnote regarding certification systems

Sustainable sourcing and lower-impact materials (continued)

Action	Maturity	Nature benefit	Feasibility	Priority
Accelerate adoption of circularity and alternative, lower-impact materials, working with regulators (FDA, EMA) to ensure timely approval and acceptance.	**Advanced**	High	Difficult	**P2**
Reduce dependency on high-impact commodities like petrochemicals and virgin plastics.	**Advanced**	High	Difficult	**P2**
Collaborate with industry groups to strengthen assessment and sourcing practices.	**Advanced**	Lower	Difficult	**P4**

Building responsible supply chains

As noted previously, actions to address a company's impacts and dependencies on nature should encompass its supply chain as well as its direct operations. The following actions will help ensure this:

Action	Maturity	Nature benefit	Feasibility	Priority
Adopt and align with Pharmaceutical Supply Chain Initiative (PSCI) Principles on ethics, labour, health & safety, environment, and management systems as the baseline standard for suppliers.	**Basic**	High	Easy	**P1**
Include human rights safeguards in supplier agreements: uphold fair wages, safe working conditions, non-discrimination, and respect for Indigenous and local community rights (aligned with UN Guiding Principles on Business & Human Rights).	**Basic**	High	Easy	**P1**

Building responsible supply chains (continued)

Action	Maturity	Nature benefit	Feasibility	Priority
Establish clear supplier codes of conduct covering environmental, social, and governance (ESG) expectations, referencing Pharmaceutical Supply Chain Initiative (PSCI) requirements and Current Good Manufacturing Practices (CGMP).	**Basic**	High	Easy	**P1**
Conduct supplier on-boarding due diligence and risk assessments, prioritising high-risk geographies, commodities, and CDMOs.	**Basic**	High	Easy	**P1**
Implement regular supply chain audits and monitoring, including PSCI Shared Audits to reduce duplication and drive efficiency across the sector.	**Intermediate**	High	Difficult	**P2**
Support supplier capacity building through training, joint improvement plans, and knowledge-sharing.	**Intermediate**	High	Difficult	**P2**
Enhance supply chain transparency by mapping to lower-tier suppliers and identifying critical raw material sources (down to raw material level where feasible).	**Intermediate**	High	Difficult	**P2**
Integrate environmental stewardship requirements into supplier contracts (e.g., GHG reduction, water use efficiency, waste minimisation, pollution control).	**Intermediate**	High	Difficult	**P2**

Building responsible supply chains (continued)

Action	Maturity	Nature benefit	Feasibility	Priority
Support suppliers in adopting circularity principles and producing alternative materials, while reducing the use of high-impact commodities like petrochemicals and virgin plastics.	**Advanced**	High	Difficult	**P2**
Work with suppliers to ensure that the company's linked nature and climate plans incorporate just transition principles into supply chain changes.	**Advanced**	Lower	Difficult	**P4**

Summary

In 2021, the CBD published an article ("Pharmaceuticals and Biodiversity: to protect ourselves, we must protect the planet") which identified five ways that the Biotechnology and Pharmaceuticals sector can be part of the 'solution for nature':

1. recognise that investing in biodiversity is good for the bottom line, considering that natural assets provide the ecosystem services that companies depend on;
2. engage with Indigenous Communities to preserve traditional knowledge about the ecology, taxonomy, and usage of medicinally important organisms;[50]
3. implement the Nagoya Protocol to help ensure the equitable sharing of benefits from drug discoveries (ollowing the launch of the Cali Fund, it would be reasonable to add 'contribute to the Cali Fund' as a practical way to implement the Nagoya Protocol);
4. mainstream biodiversity within the pharmaceuticals industry, incorporating expertise, environmental analysis, and risk assessment; and
5. promote sustainability in the commercialisation of natural products.

For further details of how companies in the Biotechnology & Pharmaceutical sector can contribute to halting and reversing nature loss, financial institutions can refer to the sector roadmap produced by WBCSD.

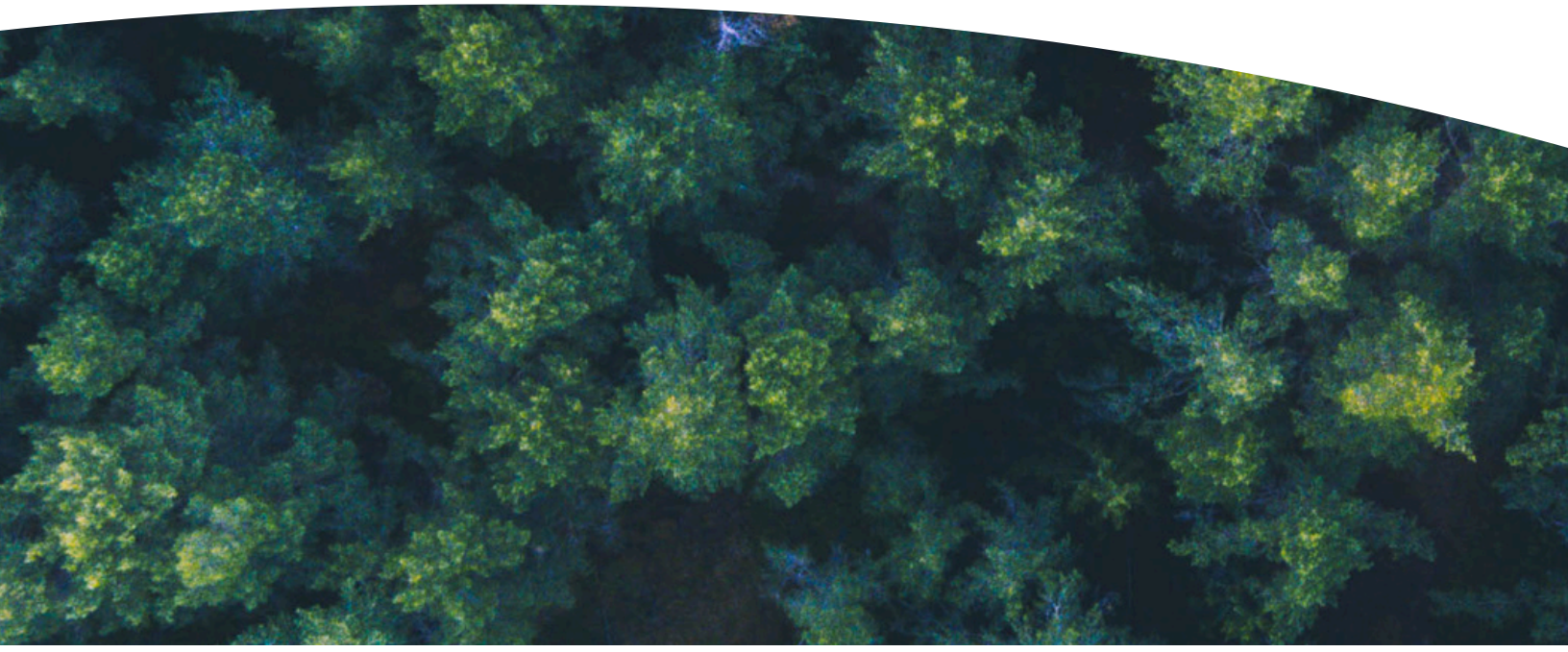
50. The August 2023 agreement between the Iwi Māori tribal organisation and Roche could be an example

Part III

Finance for Biodiversity Foundation's Call to Action: Questions for Investors Engaging with Companies on Nature

As investors enter into engagements with companies from the Biotechnology & Pharmaceuticals sector, the list of questions below can be used as a checklist to evaluate companies' reporting and performance, and to identify areas where investors should request further information and/or push for more ambitious actions. The questions have been organised following the structure of the Nature Action 100 Investors Expectations, covering ambition, assessment, targets, implementation, governance, and engagement with stakeholders.

Many of the questions are cross-sectoral and have been applied across all of our briefs. The questions coloured in blue are specific to the sector focus of this particular brief. The questions are divided into those that are likely to be answered in company reports (assuming adequate disclosure), and those that are more likely to answered during the engagement process.[51]



51. The extent to which questions can be answered from company reports is a potential indicator of the company's maturity

1. Ambition

Companies need to publicly commit to minimise contributions to key drivers of nature loss and to conserve and restore ecosystems at the operational level and throughout value chains by 2030.

Disclosure-based questions (from reports)

1A Does the company publicly commit to minimising contributions to key drivers of nature loss and to conserving and restoring ecosystems across its operations and value chain by 2030?

1B How is nature integrated and positioned within the company's overall sustainability strategy?

1C Has the company committed to reporting regularly on nature using frameworks such as TNFD?

1D Has the company set science-based targets for nature (using SBTN guidance)?

1E Has the company disclosed commitments to reduce dependency on petrochemicals, virgin plastics, and other high-impact materials in product design, packaging, and delivery systems?

1F Has the company committed to eliminating antibiotic discharge from its operations and supply chain, in line with recognised standards (e.g. BSI Antibiotic Manufacturing Standard)?

1G Does the company recognise antimicrobial resistance (AMR) as a nature-related risk and explicitly commit to addressing it within its nature strategy?

Potential follow-up questions (for engagement interactions)

- Does the company have Board-level or executive buy-in for its nature ambition, and is there evidence of a public commitment to this ambition?
- If no nature commitments exist, is the company willing to set one - and could this be linked to executive remuneration to signal ambition?
- How material does the company view nature issues in relation to its long-term strategy and financial performance?
- With respect to eliminating antibiotic discharge from its operations and supply chain:
  - How is the company planning to achieve this?
  - How much is planned to be invested in this process?

2. Assessment

Companies need to assess and publicly disclose nature-related dependencies, impacts, risks, and opportunities at the operational level and throughout value chains.

Disclosure-based questions (from reports)

2A Does the company disclose priority locations under TNFD for its direct operations, and, where material, for upstream and downstream activities in its value chain?

2B What proportion of the supply chain can the company trace (including CDMOs, Tier 1 suppliers and beyond) and what plans are in place to expand this scope if it is incomplete? [If relevant] Does the company assess and disclose its exposure to high-impact commodities (see SBTN High Impact Commodity List)?

2C Has the company conducted nature-related impact and dependency assessments for its direct operations and value chain?

2D What metrics does the company use to assess and manage material nature-related risks and opportunities?

2E Has the company undertaken a nature-related risk scenario analysis? If so, what are the results?

2F To what extent does the company conduct comprehensive assessments of potential ecotoxic impacts, and/or nature impacts and dependencies, for new suppliers, CDMOs, or new projects?

2G What disclosures does the company provide regarding water use, and the use, manufacture, or disposal of key pollutants?[52]

2H Does the company assess and disclose risks linked to API[53] emissions and other ecotoxic effluents, including persistence and bioaccumulation potential?

Potential follow-up questions (for engagement interactions)

- What has the company identified as its most material nature dependencies and risks - and how do these link to financial materiality?
- What nature-related opportunities has the company identified? What is their estimated financial potential?
- What proportion of significant operating sites have had nature-related risks assessed and monitored?
- What proportion of nature-related supply chain risk remains unassessed or unreported, and how and when is the company planning to close those gaps?
- How does the company ensure nature risks are considered in capital allocation, supply chain decisions, and long-term business resilience?
- With respect to eliminating antibiotic discharge from its operations and supply chain:
  - How does the company assess its progress?
  - How far has the process progressed to date?
- How does the company identify and monitor water-stressed locations of R&D and manufacturing facilities, and assess the risks to continuity of operations?

52. E.g. Concentrations of key pollutants (e.g. Active Pharmaceutical Ingredients) in the wastewater discharged? Pollutants released to soil? Weight of hazardous and non-hazardous waste generated? Total volume of water withdrawn; water reused/recycled? High water-stressed regions where operations are located?]
53. API: active pharmaceutical ingredients

3. Targets

Companies need to set time-bound, context-specific, science-based targets informed by risk assessments on nature-related dependencies, impacts, risks and opportunities, and disclose annual progress against targets.

Disclosure-based questions (from reports)

3A Has the company published science-based targets on nature,[54] with baselines, intermediary milestones, and transparent methodologies?

3B Has the company published targets to:
- Reduce GHG emissions?
- Decrease water footprint?
- Achieve deforestation and conversion-free supply chains?
- Minimise the release of pollutants in the water and the soil?
- Reduce the use of priority substances of concern?
- Restoring and replenishing river basins?

3C Has the company set time-bound targets for increasing its sustainable sourcing[55] and the use of lower-impact materials (including sustainable APIs, solvents, reagents, and packaging) as part of a circular economy strategy?

3D What targets has the company set in relation to supply chain traceability?

3E Has the company set explicit reduction targets for antibiotic discharge and other pollutants linked to AMR and ecotoxicity?

3F Are there specific targets for recyclability or take-back of pharmaceutical packaging, medical devices, and delivery systems?

3G Has the company set targets for sustainable sourcing of natural ingredients, consistent with Access & Benefit-Sharing (ABS) requirements?

Potential follow-up questions (for engagement interactions)

- How does the target setting process compare between nature and climate targets?[56]
- How do targets link to employee incentives or procurement policies?
- What financial or other constraints are preventing the company from setting targets or making commitments in particular areas, and how/when might these be overcome?
- To what extent is the company currently engaged in ecosystem restoration, what is planned for the future, and how will success be measured?
- With respect to eliminating antibiotic discharge from its operations and supply chain:
  - What targets and timelines have been set for this process?

54. i.e. targets that contribute to stopping nature loss by 2030 and to restoring ecosystems by 2050 in line with SBTN guidelines
55. Sustainable sourcing goes beyond 'responsible' or 'ethical' sourcing https://thecosa.org/responsible-sourcing-and-sustainable-sourcing-2/
56. Factors to consider could include: scope of direct and indirect operations covered by targets, Board involvement in overall ambition, relationship to capital allocation and financial decision-making, etc.)

4. Implementation

Companies need to develop a company-wide plan on how to achieve targets. The design and implementation of the plan should prioritise rights-based approaches and be developed in collaboration with Indigenous Peoples and local communities when they are affected. The plan should encompass its direct operations and its value chain. Progress against the plan should be disclosed annually.

Disclosure-based questions (from reports)

4A Does the company have a Nature Action Plan[57] linked to its impact/dependency assessments?

4B Are the company's actions to reduce nature impacts prioritised according to the mitigation hierarchy?[58]

4C What investments, including capex, has the company made (and what is planned) to reduce its impact on nature, and to protect and restore impacted ecosystems?

4D What is the company's strategy for recycling/reusing the water used in its production and R&D processes? How does the company manage water-related risks in its own operations, especially in water-stressed areas?

4E What is the company's strategy and process for managing pollution risks from **APIs, antibiotics, solvents, and other chemicals of concern**?

4F What steps is the company taking to engage and support suppliers to achieve full supply chain traceability?

4G What systems are in place to monitor, capture, and treat emissions of APIs and antibiotics before environmental discharge?

4H How is the company partnering with wastewater treatment plants or municipalities to strengthen removal of ecotoxic compounds?

4H How does the company ensure sustainable sourcing and use of genetic resources, including compliance with Access and Benefit-Sharing requirements and measures to safeguard biodiversity?

Potential follow-up questions (for engagement interactions)

- To what extent is nature risk management integrated into enterprise risk management and investment planning?
- What are the company's priority levers for implementation - technology, partnerships, supplier engagement?
- How does the company engage with Indigenous Peoples and Local Communities to ensure the implementation of its Nature Action Plan follows a rights-based approach, including adherence to FPIC (Free, Prior, Informed Consent) principles and to Access and Benefit Sharing requirements?
- What is the expected level of future capex associated with the company's Nature Action Plan and what are the expected financial and non-financial benefits?
- How is the company's Nature Action Plan progressing? What are the current barriers to implementation and how is the company attempting to overcome these (and by when)?
- What steps is the company taking to address the issue of AMR?

57. More mature companies should be expected to incorporate nature, climate, and social issues into an integrated transition plan – questions referring to Nature Action Plans should be adjusted accordingly to reflect this expectation. The TNFD has provided guidance on how to include nature into transition plans (https://tnfd.global/publication/guidance-on-nature-in-transition-plans/)
58. Avoid, minimise, restore, and offset – see Recommended resources section for more information

- With respect to eliminating antibiotic discharge from its operations and supply chain:
  - What steps has the company taken to date?
  - What is the capex spending associated with this initiative (to date and planned)?
- What is the company currently spending on managing pollution risks from APIs, antibiotics, solvents, and other chemicals of concern; how is this expected to change over the next period, and what are the drivers?
- What steps is the company taking to address end-of use plastic waste relating to its products?
- What programmes is the company supporting to educate healthcare providers, pharmacists, and patients on safe handling, storage, and disposal of unused or expired medicines, and how is it measuring success?
- How is the company embedding circularity principles into product design, packaging, and take-back schemes for medical devices? What proportion of its products are covered by these principles currently?
- What steps is the company taking to replace high-impact agricultural or petrochemical inputs with lower-impact alternatives (e.g. biobased or recycled substitutes)?

5. Governance

Companies need to establish Board oversight[59] - which is key to ensuring nature is embedded in strategic decisions and implementation - and disclose management's role in assessing and managing nature-related dependencies, impacts, risks, and opportunities.

Disclosure-based questions (from reports)

5A What governance structures, policies, and procedures are in place to ensure the achievement of the company's nature commitments and targets, and the effective application of the company's nature strategy and risk management processes?

5B Does the Board or a Board Committee oversee nature-related dependencies, impacts, risks (such as AMR, ecotoxicity, and water stress), and opportunities? Does a senior executive[60] have specific responsibility for the Nature Action Plan?

5C To what extent is executive remuneration linked to sustainability KPIs (including antimicrobial stewardship, pollution reduction, and circular product design) and the Nature Action Plan?

5D Does the company embed nature-related indicators and/or requirements for sustainability certification in procurement strategies and policies?

5D Does the Board or a Board Committee oversee the company's impacts on, and engagement with, Indigenous Peoples and Local Communities?

Potential follow-up questions (for engagement interactions)

- How are nature-related issues reflected in Board discussions and decision-making?
- [Where gaps are identified] What are the barriers preventing the company from adopting particular structures, policies, and procedures relating to nature, and what steps is the company taking to overcome these?
- What is the current level of nature-related expertise in the C-suite and Board, and what plans are there to maintain/increase this expertise?

59. Board oversight involves the continual inquiry by directors into whether the board's delegation of authority to management is reasonable, and whether the board has received sufficient and accurate information from management to make that determination. See: https://corpgov.law.harvard.edu/2022/01/05/board-oversight-key-focus-areas-for-2022/
60. E.g. CEO, Chief Sustainability Officer, or other executive reporting directly to the Board or Board Committee

6. Engagement with stakeholders

Companies need to engage with external parties, including actors throughout value chains, trade associations, policymakers, and other stakeholders, to create an enabling environment for implementing the plan and achieving targets.

Disclosure-based questions (from reports)

6A Has the company published a sustainable procurement code or policy?

6B To what extent does the company participate in collective programmes/alliances organised with stakeholders to optimise the sustainable sourcing and use of key raw materials?

6C To what extent does the company engage with stakeholders[61] to create an enabling environment for implementing its Nature Action Plan and achieving the targets of the Global Biodiversity Framework?

6D To what extent does the company comply with GBF Target 22[62] when engaging with Indigenous Peoples and local communities with respect to nature-related issues? What processes does the company have in place to ensure Free, Prior, and Informed Consent (FPIC)?

6E How is the company implementing the Nagoya Protocol and ensuring equitable benefit-sharing? What has the company contributed to the Cali Fund? Is the company involved in stakeholder partnerships under Access and Benefit Sharing (ABS) frameworks?

6F What steps is the company taking to raise the awareness of consumers regarding nature-related impacts and risks (e.g. AMR and the responsible use and disposal of antibiotics)?

6G How does the company engage with healthcare systems, practitioners, and governments to promote responsible use, storage, and disposal of antibiotics and high-risk medicines?

6H Does the company collaborate with peers or industry bodies to standardise approaches for identifying and reducing ecotoxic effluents?

Potential follow-up questions (for engagement interactions)

- What barriers currently impair the company's ability to engage with suppliers, customers Indigenous Peoples, and Local Communities regarding nature-related issues and how is the company attempting to overcome these (and over what timeframe)?
- What investments is the company making in its stakeholder engagement efforts and what benefits is it seeing / does it expect in the future?
- What examples / case studies can the company provide to illustrate its engagement with IPLCs, including partnerships to preserve traditional medicinal knowledge and ensure it complies with Access and Benefit Sharing (ABS) requirements?
- How is the company's strategy developing with respect to nature-related benefit-sharing and its use of DSI? What are the opportunities and threats associated with this issue?
- How is the company contributing to collective multi-stakeholder initiatives to tackle AMR as both a public health and nature challenge?
- How does the company work with regulators (e.g. EMA, FDA) and industry bodies to accelerate approval of greener chemistries, circular materials, and sustainable packaging?

61. Including actors throughout value chains, trade associations, policymakers, IPLCs, and other stakeholders
62. Target 22 of the Global Biodiversity Framework requires companies to ensure IPLCs have 'full, equitable, inclusive, effective, and gender-responsive representation and participation in decision-making, and access to justice and information related to biodiversity' https://www.cbd.int/gbf/targets/22

Part IV

Supporting resources for company analysis

This section provides various supporting tools in the form of recommended resources and collaborative engagements covering issues in the sector, as well as sector-specific and cross-sectoral data sources. These supporting tools help to access more information and build further knowledge to mobilise when engaging with companies: examples of KPIs to monitor, additional resources, existing collaborative investor engagements on key topics for the sector, and data sources.

Recommended resources

We recommend the following resources to help investors gather more information about the sustainable transformation of the sector toward the protection of nature:

- TNFD has proposed core sector disclosure indicators and metrics in its Biotechnologies and Pharmaceuticals Additional Sector Guidance.
- Roadmaps to Nature Positive: Foundations for the pharmaceutical sector by the WBCSD, provides a structured approach[63] to assessing the pharmaceutical sector's nature-related impacts across the value chain, from raw material sourcing and supply chain management to product end-of-life considerations and the fair and equitable sharing of benefits from the use of genetic resources.
- Pharmaceutical sector: Priority actions towards a nature-positive future (PwC/WBCSD) - provides a sector-level summary of potential key impacts and dependencies on nature, and sets out the priority actions that leading businesses in the sector should take now to transform and ensure the pharmaceutical sector plays its part in meeting the global goal to halt and reverse nature loss by 2030.
- WWF Diagnosing current and future water risks facing the pharmaceutical sector - The purpose of this report is to analyse the sector's positioning of water within the current and future water contexts in which it operates and provide recommendations for a strategic sectoral repositioning on water to meet these future challenges.
- Pharmaceutical pollution of the world's rivers - Research findings of a global study of pharmaceutical pollution in rivers, published in 2021. The study monitored 1,052 sampling sites along 258 rivers in 104 countries of all continents, thus representing the pharmaceutical footprint of 471.4 million people.
- In the United States, the Environmental Protection Agency (EPA) finalised regulations for the management of hazardous waste pharmaceuticals by healthcare facilities and reverse distributors in a rule published in the Federal Register on February 22, 2019.

63. The ACT-D framework (Assess, Commit, Transform, and Disclose) has been developed by WBCSD, SBTN, TNFD, WEF, and Capitals Coalition to provide businesses with a consistent approach to effectively address their relationship with nature.

- The British Pharmacopoeia (BP) has published an environmental sustainability information pack with the help of reputable external contributors and BP users. This information pack is focused on reducing the environmental impacts associated with quality control testing, and so predominantly applies to a laboratory setting.
- UN CBD Connecting Global Priorities: Biodiversity and Human Health - In this 364 page State of Knowledge Review (published in 2015), CBD, WHO and UNEP estimated that 'The value of the global trade in plants used for medicinal purposes may exceed US$ 2.5 billion, and is increasingly driven by industry demand'.
- The Biodiversity Consultancy has published a Cross-Sector Guide for Implementing the Mitigation Hierarchy (avoid, minimise, restore, and offset) when companies are planning development projects (e.g. new laboratories or factories).
- The CEIC has developed guidance on corporate target-setting for the circular economy for the whole value chain, from upstream sourcing to downstream products end-of-life, in order to mobilise measurable progress.
- The TNFD has published guidance to help companies incorporate and disclose nature-related issues alongside climate in their transition plans.

Collaborative engagements covering issues in the sector

In its Guide on Engagement with Companies, the FfB Foundation built an Overview of biodiversity-related collaborative engagements, to help investors discover initiatives to point financial institutions to ongoing engagements that they can join.

We identify the following collaborative engagements as interesting to engage with companies on topics relevant to the Pharmaceuticals sector:

- Ceres Valuing Water Finance Initiative is a global investor-led effort to engage companies with a high water footprint to value and act on water as a financial risk and drive the necessary large-scale change to better protect water systems.
- ChemSec: Investor Initiative on Hazardous Chemicals

Furthermore, collaborative engagements have been developed with a broader environmental and social focus:

- SDG 3 Collaborative Engagement - This opportunity allows investors to collectively drive pharmaceutical companies toward the achievement of the UN's Sustainable Development Goal 3: to ensure healthy lives and promote well-being for all at all ages. This long-term investor-led engagement uses the Access to Medicine Index to drive and track pharmaceutical company's progress and impact on increased access to medicine.
- Investor Action on Antimicrobial Resistance - A coalition between the Access to Medicine Foundation, the FAIRR Initiative, and the UK Government Department of Health and Social Care to galvanise investor efforts to address global antimicrobial resistance. The deadline for investors signing on to this initiative closed on 31 December 2024.

Sector-relevant sustainability initiatives

When assessing companies in the sector, investors can also refer to various sustainability initiatives that are relevant for companies in the Biotechnology & Pharmaceuticals sector. These not only demonstrate what is already happening within and among companies in the sector, but also show the level of ambition that is needed from the companies that investors are engaging with to effectively halt and reverse nature loss.

- Act4nature International is an initiative led by business networks with scientific partners, environmental NGOs, and public bodies. Its objective is to develop the mobilisation of companies in favour of biodiversity through pragmatic commitments supported by their CEOs.
- Access To Medicine Foundation is an independent research foundation, providing analysis that encourages healthcare companies to improve access to medicine. They benchmark companies and stimulate competition by identifying top performers who are acting to improve access to medicine.
- The AMR Industry Alliance is one of the largest private sector coalitions set up to provide sustainable solutions to curb antimicrobial resistance, with over 100 biotechnology, diagnostics, generics and research-based pharmaceutical companies and associations joining forces. It facilitates collaboration, reports on industry's contribution to the fight against AMR and engages with external stakeholders.
- The CEO Water Mandate seeks to mobilise a critical mass of business leaders to address global water challenges through corporate water stewardship, notably through the Water Resilience by 2050 Pledge.
- The European Federation of Pharmaceutical Industries and Associations (EFPIA), through the Eco-Pharmaco-Stewardship (EPS) initiative, is focusing on areas where the European pharmaceutical industry can most effectively reduce the potential environmental risks that might result from its activities.
- The International Federation of Pharmaceutical Manufacturers and Associations (IFPMA) represents the pharmaceutical industry at the international level and in official relations with the United Nations. The mitigation of climate change effects on health is part of their areas of work. They expressed concern about global health security, in a reaction to the GBF adoption.
- The Partnership for Health System Sustainability and Resilience (PHSSR) is a non-profit, global collaboration between academic, non-governmental, life sciences, healthcare, and business organisations with a unified goal to improve global health by building more sustainable and resilient health systems for the future.
- The Pharmaceutical Supply Chain Initiative (PSCI) promotes excellence in safety, environmental, and social outcomes, across the global pharmaceutical and healthcare value chain through the PSCI Principles for Responsible Supply Chain Management which provide a blueprint for responsible supply chain practices in the pharmaceutical and healthcare industry.
- The Pharmaceutical Environment Group is a collaborative initiative between leading healthcare companies ‘working together to improve the environmental sustainability of the world’s leading pharmaceutical companies’.

Sector-specific and cross-sectoral data

Investors looking for data specific to the Pharmaceuticals Sector can turn to the following sources:

- Pharma in the Environment - This website brings together key information and materials about pharmaceutical pollution, recommendations for stakeholders, and an overview of flagship EU regulatory developments. It also features a free-to-access database of initiatives to tackle pharmaceuticals in the environment and pharmaceutical waste.

For cross-sector information, we recommend the following data sources:

- CDP (Forest, Land, Water) provides companies, investors, states, and regions with opportunities to measure and manage their nature-related dependencies, impacts, risks, and opportunities. Companies can disclose their environmental data and investors can sign up to request this data.
- Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) is a free, online tool that helps organisations explore their exposure to nature-related risk and take the first steps to understand their dependencies and impacts on nature.
- The Global Biodiversity Information Facility (GBIF) is an international network and data infrastructure funded by the world's governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth.
- The SBTN Natural Lands Map of "Core Natural Lands" is intended to be used in the Science Based Targets Network target on "no conversion of natural ecosystems".
- WWF Water Risk Filter - Corporate and portfolio-level screening tool to help companies and investors to prioritise action on what and where it matters the most to address water risks.
- WBCSD launched a Nature Action Portal in November 2025. The Portal's objective is to help 'sustainability practitioners identify the most relevant metrics to measure and report on actions to halt and reverse nature loss, in alignment with major voluntary and regulatory frameworks. By facilitating access to a prioritized set of metrics, the Portal aims to accelerate corporate action and accountability on nature and drive investment to solutions that make the most significant progress on the societal goal of halting and reversing nature loss by 2030'.[64]

64. https://www.wbcsd.org/resources/harmonizing-the-use-of-nature-related-metrics-by-corporations/

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Expert review

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This publication is one of the many practical guides developed by the Finance for Biodiversity (FfB) Foundation in collaboration with its members, to support financial institutions on their journey towards fully integrating nature into their businesses. FfB Foundation membership allows financial institutions to take part in our active working groups which bring together leading banks, investors and insurers to independently share perspectives and best practices. The many guidance documents we produce are the result of these collaborations. We welcome all financial institutions to join the Foundation and fast track alignment of their financial activities and investments with nature recovery. There are now two options to work with us: membership and Hub participation. Visit Finance for Biodiversity Foundation | Join us to find out more.

Appendix 1

ENCORE Impacts Databse - Biotechnology and Pharmaceuticals

Below are listed the main impacts and dependencies identified in ENCORE for the Biotechnology & Pharmaceuticals sector (on a scale from Very Low to Very High materiality). Impacts and dependencies where the ENCORE result is below Medium have been excluded. Where the results for R&D are significantly different from manufacturing they have been highlighted.

ENCORE sets out how the economy - sectors, subsectors and activities - depends and impacts on nature. Financial institutions in particular can use data from ENCORE to identify nature-related risks they are exposed to through their lending, underwriting and investment in high-risk industries and sub-industries.

ENCORE only assesses the impacts and dependencies of direct operations. The SBTN Materiality Screening Tool (MST) uses the same underlying data as ENCORE but changes have been made in the interpretation and materiality scoring to reflect the purpose within the SBTN analysis. Companies are recommended to use the MST results when setting their Science Based targets (SBTs).

ENCORE Impacts Database

ISIC Divisions covered:

- Manufacture of pharmaceuticals, medicinal chemical and botanical products; and
- Research and experimental development on natural sciences and engineering.

Disturbances: MEDIUM

- Manufacture of pharmaceuticals can cause disturbances like noise and light pollution that can disrupt or negatively impact species.
- R&D has a LOW impact.

GHG emissions: MEDIUM

- Manufacture of pharmaceuticals can release greenhouse gases from the direct energy use in the manufacturing process.
- R&D has a LOW impact.

Water use: MEDIUM

- Manufacturing processes and facilities use water in their operations which can increase the risk of drought and impact ecological habitats.
- Office buildings and laboratories require water for a variety of purposes including cooling servers, and air-conditioning.

Non-GHG air pollutants: MEDIUM

- In manufacturing processes, potential pollutants include gaseous emissions including volatile organic compounds, particulate matter, and hazardous air pollutants.
- R&D has a LOW impact.

Water Pollutants: MEDIUM

- Chemicals used in production can contribute to environmental pollution if not handled safely. Specifically, wastes and wastewater from production may contain eutrophicating substances, heavy metals, or active pharmaceutical ingredients, which can lead to pollution of river sediments, surface, ground and drinking water. Discharges from manufacturing plants have been linked to population changes in exposed biota, by intoxicating some or causing significant changes to animal physiology.
- R&D has a LOW impact.

Soil Pollutants: MEDIUM

- Discharges from manufacturing units can lead to contamination of irrigated soils. Packaging and chemicals used in production processes can contribute to environmental pollution if not handled correctly.
- R&D has a LOW impact.

Solid Waste: MEDIUM

- Manufacturing processes and laboratories can produce waste material (some of which may be reused or recycled). Packaging and other waste material used in, or created through, production processes, can contribute to environmental pollution if not handled correctly.

ENCORE Dependencies Database

Genetic Materials: HIGH

- Genetic material services are the ecosystem contributions from all biota (including seed, spore or gamete production) that are used by economic units, for example (i) to develop new animal and plant breeds; (ii) in gene synthesis; or (iii) in product development directly using genetic material. This is most commonly recorded as an intermediate service to biomass provisioning.
- R&D is assessed as having a MEDIUM dependency.

Water Supply: HIGH

- Water supply services reflect the combined ecosystem contributions of water flow regulation, water purification, and other ecosystem services to the supply of water of appropriate quality to users for various uses including household consumption. This is a final ecosystem service.
- R&D is assessed as having a LOW dependency.

Water Purification: **VERY HIGH**

- Water purification services are the ecosystem contributions to the restoration and maintenance of the chemical condition of surface water and groundwater bodies through the breakdown or removal of nutrients and other pollutants by ecosystem components that mitigate the harmful effects of the pollutants on human use or health. This may be recorded as a final or intermediate ecosystem service.
- R&D is assessed as having a MEDIUM dependency.

Water Flow Regulation: **VERY HIGH**

- Baseline flow maintenance services are the ecosystem contributions to the regulation of river flows and groundwater and lake water tables. They are derived from the ability of ecosystems to absorb and store water, and gradually release water during dry seasons or periods through evapotranspiration and hence secure a regular flow of water. This may be recorded as a final or intermediate ecosystem service. Peak flow mitigation services are the ecosystem contributions to the regulation of river flows and groundwater and lake water tables. They are derived from the ability of ecosystems to absorb and store water, and hence mitigate the effects of flood and other extreme water-related events. Peak flow mitigation services will be supplied together with river flood mitigation services in providing the benefit of flood protection. This is a final ecosystem service.
- R&D is assessed as having a LOW dependency.

Appendix 2

Comparing different economic classification systems

Global Industry Classification Standard (GICS) Level 3	352010 - Biotechnology 352020 - Pharmaceuticals
International Standard Industrial Classification (ISIC)	C2100 - Manufacture of pharmaceuticals, medicinal chemical and botanical products N7210 - Research and experimental development on natural sciences and engineering
Nomenclature of Economic Activities (NACE)	C21 - Manufacture of pharmaceuticals, medicinal chemicals and botanical products M72.11 - Research and experimental development on biotechnology
Sustainable Industry Classification System[65] (SICS)	Biotechnology & Pharmaceuticals

Table 4: Classification and scope of the Biotechnology & Pharmaceuticals sector

Investors generally use the Global Industry Classification Standard (GICS)[66] to manage and track the progress of the companies in their portfolio as well as determine which specific type of activities the companies in their portfolio are involved in.

The ISIC system[67] is used by a number of tools that help organisations explore their exposure to nature-related risk and take the first steps to understand their dependencies and impacts on nature such as the Science Based Targets Network (SBTN) Materiality Screening Tool (MST)[68] and ENCORE.[69]

The NACE system[70] is frequently used by governments and other related organisations, when classifying economic activities.

The Sustainable Industry Classification System (SICS)[71] was developed by the Sustainable Accounting Standards Board (SASB, now incorporated into the International Sustainability Standards Board (ISSB). It is used by the Nature Action 100 investor initiative to group the companies that it focuses on into eight sectors.

65. SASB Standards use the Sustainable Industry Classification System® (SICS®) to group companies based on shared sustainability risks and opportunities.
66. The Global Industry Classification Standard (GICS) is an industry taxonomy developed in 1999 by MSCI and Standard & Poor's (S&P) for use by the global financial community.
67. The International Standard Industrial Classification of All Economic Activities (ISIC) is the international reference classification of productive activities.
68. The SBTN's MST is designed to help users carry out a first screening of the types of environmental impacts that are potentially materially relevant to the direct and upstream operations of a sector and a company's activities
69. ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure)
70. The Statistical Classification of Economic Activities in the European Community, commonly referred to as NACE, is the industry standard classification system used in the EU.
71. SICS uses sustainability profiles to group similar companies within industries and sectors. In SICS, a company's sustainability risks and opportunities are more important for its classification than other traditional factors, such as economic cycles and revenue streams

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