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DWS

Why companies are waking up to nature's value

Whitepaper #2: How nature affects the bottom line

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IN A NUTSHELL

— Land use change and the exploitation of resources and species, in terms of fishing, logging, and hunting, are estimated[1] to account for more than 50% of biodiversity loss across terrestrial, freshwater and marine ecosystems.

— Companies with a high dependency and impact on nature, both directly and in their supply chains, are exposed to physical and transition risks which may hit corporate profitability. These, in turn, present market and credit risks for investors.

— To assess these risks, investors need to start by examining the specific locations of an investee companies' operations. Tools, such as the WWF Biodiversity Risk Filter,[2] can therefore provide valuable insights into where the physical and reputational risks relating to biodiversity exist.

— The sectors which typically have a high direct dependency on nature include fishing and aquaculture and agricultural products. Meanwhile. Those with a high direct impact on nature include not just those in the food sector but also companies operating in the materials and energy sectors[3].

— A variety of initiatives and frameworks have been developed, which should help to improve investor visibility towards biodiversity risk.

— These include the Taskforce on Nature-related Financial Disclosures, sector-specific guidance from the Business for Nature consortium and the setting of targets under the Science Based Targets Network.

Introduction

Nature degradation and biodiversity loss present financial hazards to investors. A Banque de France study[4] found that 42% of the total value of securities held by French institutions were issued by companies highly or very highly dependent on at least one ecosystem service[5]. Another study[6] assessing nature risks in the Dutch financial system found the equivalent figure was 36%. Similarly high levels of financial sector exposure to physical, as well as transition risk to nature were discovered in an analysis examining the financial markets of Brazil, Malaysia and Mexico[7]. With increasing nature-related regulation[8], the financial materiality of these risks for investors is only likely to grow in importance. This paper is organized in four sections. The first examines the drivers of biodiversity loss across terrestrial, freshwater and marine ecosystems. The second section assesses the steps to uncover the financial materiality of biodiversity loss from a sector perspective. The third section investigates how biodiversity loss has an impact on a company's bottom line and the final section assesses some of the initiatives companies can adopt to assist in mitigating or eliminating the negative externalities of their activities on nature.

[1] Science Advances (November 2022). The direct drivers of recent global anthropogenic biodiversity loss
[2] WWF (January 2023). Tackling biodiversity risks
[3] Finance for Biodiversity Foundation (April 2023). Top 10 biodiversity-impact ranking of company industries
[4] Banque de France (August 2021). A "silent Spring" for the financial system? Exploring biodiversity-related financial risks in France
[5] Ecosystem services are classified under four groups: provisioning, regulating, cultural and supporting services
[6] De Nedelandsche Bank (June 2020). Exploring biodiversity risks for the Dutch financial sector
[7] Calice et al (August 2021). Nature-related financial risks in Brazil; Bank Negara (March 2022) An exploration of nature-related financial risks in Malaysia; Martinez-Jaramillo, Montanez-Enriquez (2021). Dependencies and impacts of the Mexican banking sector on ecosystem services
[8] DWS Research Institute (December 2023). Nature-focused regulations start to get serious

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1 / The drivers of biodiversity loss

Biodiversity is defined[9] as the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems. Biodiversity is an output of our natural capital ("the stocks") just as the natural capital is an input factor for biodiversity in complex ecosystems which in turn deliver ecosystem services ("the flows") to our economies and societies[10].

Biodiversity is declining exponetially with wildlife populations down 69% by 1970[11]. The drivers[12] of biodiversity are:

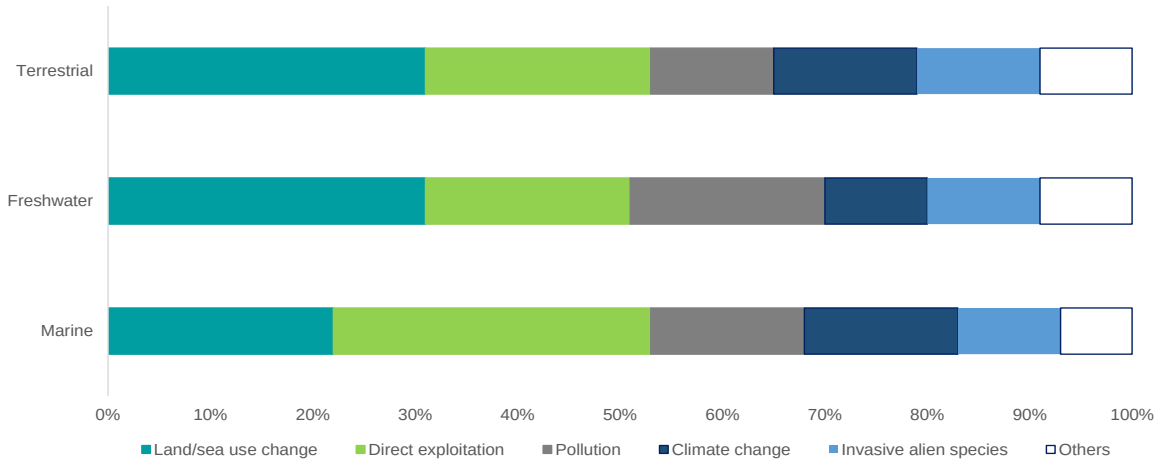
(i) Change in land and sea use and specifically the expansion of agricultural land at the expense of forests and grasslands
(ii) Species and resource over-exploitation since one-third of the world's fisheries are overfished[13] and more than 1,200 mining sites lie within key biodiversity areas[14].
(iii) Pollution This includes pesticide and fertilizer run-off, leading to the build-up of algae blooms and dead zones at sea. Microplastic pollution is also negatively impacting marine and terrestrial species' populations.
(iv) Climate change and the increasing concentration of carbon dioxide in the atmosphere. This is leading oceans to become warmer and more acidic[15]. This in turn is causing marine heatwaves and coral bleaching[16]. Rising temperatures on land are also triggering droughts and forest fires further weakening the carbon sink capacity of forests[17].
(v) Invasive species and disease in the form of plants or animals which have been brought there by humans, for example, through the illegal wildlife trade.

The drivers of biodiversity loss can be illustrated in the following areas:

(i) Terrestrial: A third of the world's forest area has been destroyed[18], a third of the world's topsoil has been degraded, and more than 85% of wetlands have been lost since 1970.
(ii) Freshwater: 80% of the world's wastewater is returned to the environment untreated[19].
(iii) Marine: One third of the world's assessed fisheries are overfished.[20]

When it comes to attribution, land use change and the exploitation of species, in terms of fishing, logging and hunting, account for more than 50% of biodiversity loss across terrestrial, freshwater and marine systems, with pollution the third most important driver followed by climate change[21], Figure 1.

Figure 1: The drivers of biodiversity loss by activity on land, freshwater and marine systems



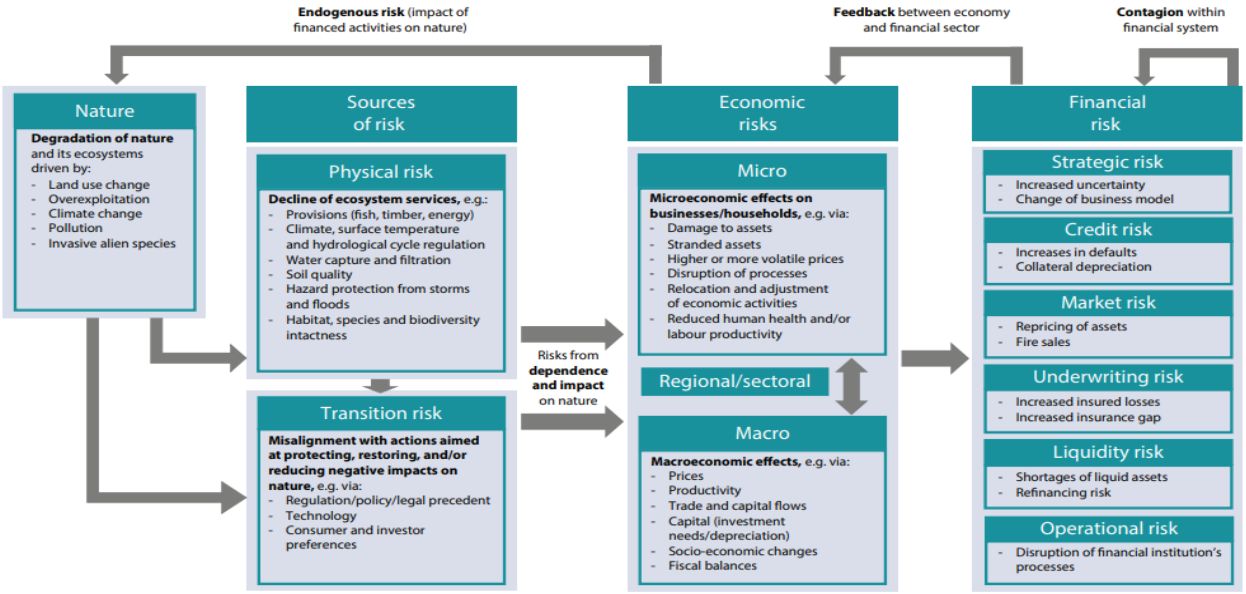
Source: Global Assessment Report on Biodiversity and Ecosystem Services. IPBES, 2019.

[9] Officially adopted definition by the Convention on Biological Diversity
[10] Capital Coalition and Cambridge Conservation Initiative (May 2020). Integrating biodiversity into natural capital assessments
[11] WWF (October 2022). Living Planet Report
[12] IPBES (November 2019). The global assessment report on biodiversity and ecosystem services – summary for policymakers
[13] WWF (2023). Fighting illegal fishing
[14] S&P Global (November 2022). Rocks and hard places. The complicated nexus of energy transition materials and biodiversity
[15] US EPA (November 2023). Climate change indicators: ocean acidity
[16] Nature (2022). Compound marine heatwaves and ocean acidity extremes
[17] WRI (January 2021). Forests absorb twice as much carbon as they emit each year
[18] Our World In Data: Deforestation and forest loss; CDP (April 2020). Cleaning up their act
[19] CDP (April 2020). Cleaning up their act
[20] FAO SDG indicators data portal
[21] Science Advances (November 2022). The direct drivers of recent global anthropogenic biodiversity loss

2 / Assessing the materiality of biodiversity loss

The degradation of nature and its ecosystems initially create two sources of risk. First, physical risks such as limited protection from floods or wildfires or a scarcity of clean water affecting the operations of a business and second, transition risks stemming from a misalignment of economic activities with actions aimed at protecting, restoring, and/or reducing negative impacts on nature. This can include mismanaging nature-related risks resulting in litigation. These two dimensions of risk can then pose economic and financial risk, Figure 2.

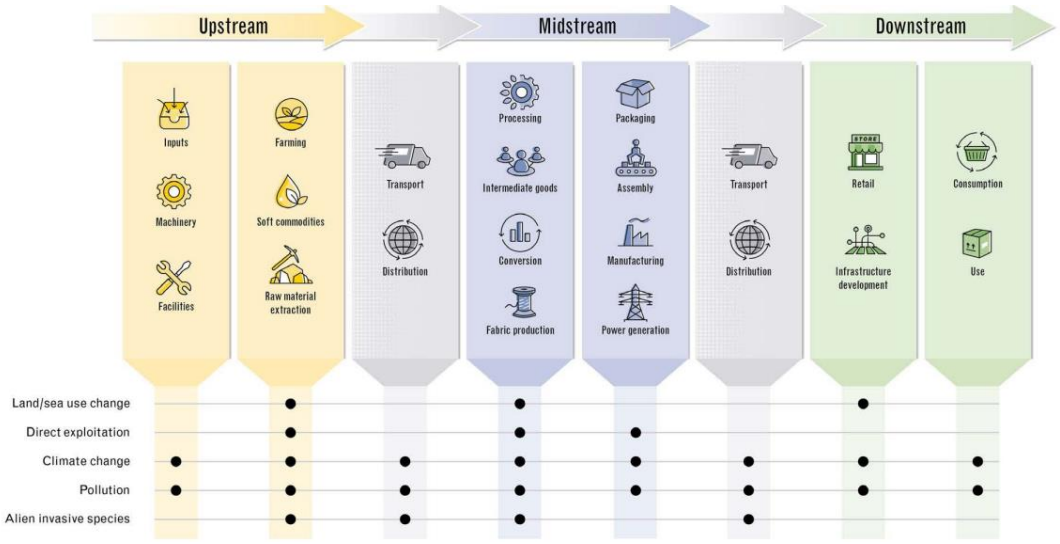
Figure 2: Transmission channels relating to the degradation of nature and its ecosystems



Source: NGFS (September 2023) Adapted from Svartzman, R. et al. (2021).A "Silent Spring" for the Financial System? Exploring Biodiversity-Related Financial Risks in France.

How a company's direct and indirect activities can affect biodiversity along the entire value chain is illustrated in Figure 3. This shows the relevance of a particular sector or activity, such as farming, to one or more of the drivers of biodiversity loss.

Figure 3: How the value chain affects biodiversity by specific driver



Source: Finance for Biodiversity (April 2022). Guide on engagement with companies

To analyse the transmission channels between economic activity, biodiversity loss, and financial risk, investors can consider following these four steps:

(i) Establish a systematic and consistent first step heatmap analysis to identify the most exposed and dependent sectors and companies across the investment portfolio.

(ii) Assess those sectors and companies with a high dependency on nature, for example those with a high dependency on water resources. These risks are typically classified as physical risks, which can negatively impact business operations. This would then have implications for corporate profitability and the ability to repay lenders, which in turn presents market and credit risks for investors.

(iii) Assess those sectors and companies with a high impact on nature, such as those operating in ecologically or biologically significant areas of the world. These risks are typically categorised as transition risk which are affected by regulation, technological change, or consumer preferences. These can also affect business operations and profitability.

(iv) Assess the supply chains of sectors and companies, since often this can be where the greatest dependencies and impacts on nature and ecosystem services exist. Unlike the previous two dimensions of biodiversity risk, these risks to a company's operations will be indirect but may become more material for companies in the event of regulation or acute events leading to disruptions of ecosystem services[22].

Assessment tools:

A number of tools exist to assess nature dependencies and impacts at a corporate and portfolio level. Here we outline those developed by ENCORE and WWF.

Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) provides users with a view of how economic activities (referred to as 'production processes') might depend on or impact natural capital. The tool also provides qualitative materiality ratings for dependencies and impacts, which help users understand which dependencies and impacts might warrant the most immediate attention.

WWF Biodiversity Risk Filter is a spatial risk assessment tool, helping companies and financial institutions prioritize high risk areas and issues relating to the physical and reputational risks around biodiversity loss. This can then enable companies and investors to prioritize action on what and where it matters the most to address biodiversity risks, and for enhancing business resilience and contributing to a sustainable future.

Both approaches are aligned with the Task Force on Nature-related Financial Disclosures (TNFD) framework and their recommendations of *Locate* your interface with nature; *Evaluate* dependencies and impacts; *Assess* material risks and opportunities; *Prepare* to respond and report or LEAP for short.

To undertake these tasks, investors can look for guidance from the Finance for Biodiversity Foundation[23] or the TNFD. For example, TNFD recommends financial institutions to:

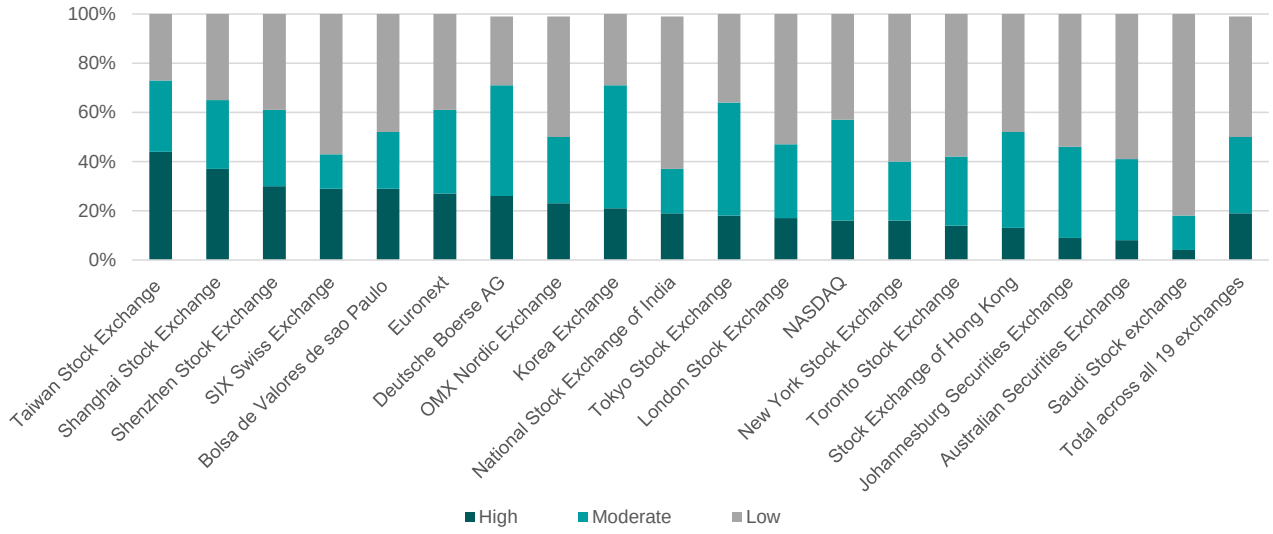
1) First, screen the portfolio at a sector level. This will then identify which sectors from a portfolio, including direct operations and value chains, present moderate or high dependencies and impacts on nature (sector materiality screening).
2) Second, screen the portfolio at a location level to assess its exposure to sensitive locations. This will then identify the geographic locations of the screened sectors with potentially moderate and high dependencies and impacts on nature. This will then allow for increased clarity on the relevant ecosystem service being relied upon or affected as well as whether or not a company is operating in a biodiverse-sensitive location.
3) Finally, investors are then in a more informed position to assess the risks and opportunities as they relate to nature's dependencies and impacts. For example, taking measures to address the most exposed part of the portfolio to physical and or transition risk.

In our next paper in this biodiversity whitepaper series, we will explore in greater detail the various biodiversity standards and frameworks including TNFD's LEAP approach[24].

[22] One example is the EU's Corporate Sustainability Due Diligence Directive (CSDDD) which if enacted would require companies to assess the environmental considerations of their operations and along their supply chains.
[23] Finance for Biodiversity Foundation (February 2024). Guide on biodiversity measurement approaches
[24] Released in September 2023, the TNFD has provided guidance on the identification and assessment of nature-related issues via its LEAP approach: Locate, Evaluate, Assess, and Prepare

Analysis[25] by PwC examined the exposure to financial risk through high or moderate dependency on nature across 19 major stock exchanges. Their findings showed that for 10 of the 19 major stock exchanges, more than half of the value of the listed companies exhibited high or moderate nature dependence, Figure 4. In addition, other work[26] has shown that of the 1,565 companies of the MSCI World Index, the top 250 high-impact companies capture over 70% of the negative *potential* impact on biodiversity of the index.

Figure 4: Assessing 19 stock exchange exposure to nature dependency



Source: PwC (April 2023). Managing nature risks: from understanding to action

Case study: Equity portfolios of the Dutch central bank[27]

At the end of 2023, the DnB held approximately €8 billion in investments. Around half of these assets were held in sovereign, supra and agency bonds which are managed internally, and the remainder is invested in equities and corporate bonds, which are managed externally.

The DnB undertook analysis of two of its externally managed global developed markets equity portfolios: (i) Broad Markets Fund with an ESG screen (BMF) and (ii) its actively managed portfolio with a Paris-aligned objective (PAM).

Their work revealed that the portfolio allocation to sub-industries with a high and very high impact on nature for BMF (77%) and PAM (73%) were in line or higher than the broad market as proxied by the MSCI World Index (73%). From a dependency perspective, both PAM (26%) and BMF (32%) had a slightly lower allocation to subindustries that are highly and very highly dependency on nature relative to the MSCI World Index (36%).

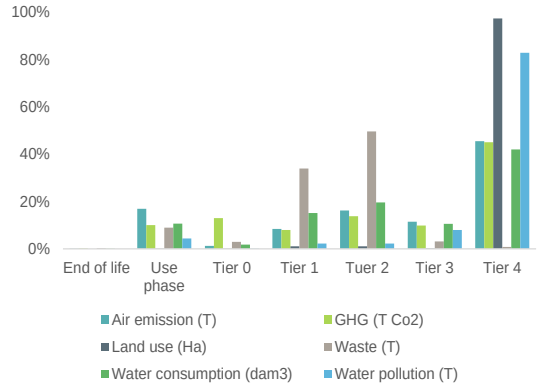
[25] PwC (April 2023). Managing nature risks from understanding to action
[26] Finance for Biodiversity Foundation (April 2023). Top 10 biodiversity-impact ranking of company industries
[27] De Nederlandsche Bank (February 2024). Nature-related financial risks in our own account investments: An exploratory case study and deep dive in electric utilities

3 / How biodiversity loss affects the bottom line

Nature's ability to replenish ecosystems is under strain, moving us towards constraints on these resources and regulatory action to protect them. For example, the EU deforestation-free products regulation[28] will impose fines of at least 4% of EU turnover for non-compliance. In certain instances, companies are considering internalizing the environmental costs of their operations. However, this is proving challenging. Unlike climate, where a carbon price often applies, there is no global standard for assessing and quantifying an organization's natural capital and ecosystem impact. One example of efforts to estimate the negative externalities of food production on nature and health is the EU Food Cost Project[29] and the move to full cost accounting.

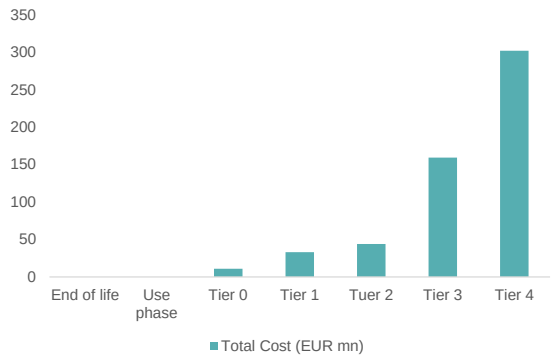
In the past, approaches to evaluate the biodiversity risk of companies has led to some remarkable results. For example, a French-based multinational corporation specializing in luxury goods, found that just 6% of its overall nature impact is attributed to its direct operations (Tier 0—stores, warehouses, and offices), and the remainder resided in their supply chain (Tier 1 to 4—assembly, manufacturing, and sourcing, including product use), Figure 5. Meanwhile, the initial findings for a German sporting goods company, revealed that 94% of their environmental footprint originated within their supply chain, reaching 98% in 2022, and 84% of the total estimated monetary value of the environmental externalities is attributed to either Tier 3 or Tier 4, Figure 6. Consequently, assessing the impact of environmental losses on financial statements, it is critical to map the entire supply chain, as for many secondary and tertiary sectors, the problem is deeply rooted at the bottom of the pyramid[30].

Figure 5: Distribution of environmental impacts across value chain for a luxury goods company (FY2022)



Source: French consumer goods annual accounts, EPL, DWS CROCI Research

Figure 6: Distribution of environmental impacts across value chain for German sporting goods company (FY 2022)



Source: German sporting goods company annual accounts, EPL, DWS CROCI Research

Overall, the monetary value of the reported negative externalities appears to be quite significant and could – if internalized properly - have a profound impact on the margins and profitability of a company, unless the business is able to pass the cost on to the end consumer. For example, a Dutch medical device company**,** reported EUR 1.63 billion of environmental impact during 2022, which is close to 70% of its adjusted EBITDA, of which approx. 45% is attributed to product use phase[31].

Case study: Measuring water externalities in the apparel and meat-packing industries

In December 2021[32], DWS teamed up with Ceres and Bluerisk to examine the financial implications of water pollution and excess water use by major companies in the apparel and meat-packing industries. The analysis found that the cost of addressing harmful water impacts could range from nearly USD60 million to USD1.8 billion annually for some large publicly traded packaged-meat and apparel companies. Assuming companies were unable to pass on costs to customers and were required to clean up and reduce their water use, the additional spending could impact apparel company earnings by -21% to -47% while net profits for meat companies could range anywhere from -5% to -165%.

[28] European Commission (May 2023). Regulation on Deforestation-free products
[29] Foodcost (June 2023). Full-cost accounting and redefining the cost of food
[30] Environmental profit and loss accounting methodology was used to measure and quantify an organization's environmental impact, a technique which has been developed by PwC and S&P Trucost
[31] DWS CROCI analysis (April 2024).
[32] DWS Research Institute (December 2021). Financial implications of addressing water externalities in the apparel and meat industries

4 / Company actions

Multiple stakeholders have a role to play to address company dependencies and impacts on nature, from nature-focused regulation by governments, reporting frameworks by regulators and engagement strategies by investors. When it comes to companies, efforts also need to be stepped up since, according to one S&P Global study[33], only 20% of the constituents of the S&P500 have made nature-related commitments. According to the World Benchmark Alliance[34], agricultural expansion is responsible for nearly 90% of global deforestation, placing a significant responsibility on food system companies.

A variety of initiatives have been developed that are providing guidance for companies. Among the most comprehensive has been launched by Business For Nature, the World Economic Forum and the World Business Council for Sustainable Development. Their work has provided guidance across 12 sectors from agri-food and apparel companies to chemical and water utility companies. The guidance papers are helping to inform how the typical impacts and dependencies can shape sector-specific priority actions that companies should take to transform their businesses.

The sector guidance on fashion and apparel, for example, aims to drive transformation in business practices and value chains to ensure the sector plays a role in halting and reversing nature loss by 2030, as outlined in the Global Biodiversity Framework. To enhance resilience to nature loss, the sector must transition to circular and regenerative business models, necessitating innovation and transformation throughout its value chain.

A recent analysis by the thinktank Planet Tracker[35] reveals that numerous apparel brands are neglecting water-related risks. After scrutinizing 3,900 documents, transcripts, and filings from 29 major apparel brands, Planet Tracker discovered that 90% of the evaluated documents did not address water-related risks and only 15 of these brands disclosed their water usage to CDP. Nonetheless, there has been a noticeable surge in references to water-related risk, increasing from approximately 2,000 in 2018 to over 9,000 in 2022, indicating a growing awareness among companies. However, the emphasis has predominantly been on water consumption, with minimal attention given to toxins and contaminants.

Since the fashion and apparel sector is heavily reliant on agriculture, mining, and forestry for many of its raw materials, such as cotton, wool, cellulose, and plastics, key actions include avoiding and reducing the use of high-impact materials, hazardous chemicals, and freshwater throughout the value chain, as well as embracing regenerative practices and promoting circularity. However, the subsequent case study suggests that actions taken thus far have fallen short of expectations.

Case study: Water-related targets often fall short of the mark

Currently, 72%[36] of the global population is facing water insecurity. The increasing demand for freshwater is projected to outstrip supply by 40%[37] by 2030. This presents challenges to industries which are heavily reliant on water such as agriculture, which accounts for 72% of total water withdrawals globally. According to the World Benchmarking Alliance (WBA), 30% of evaluated companies have reported reductions in their water usage, and 32% have disclosed sourcing water from water-stressed regions, demonstrating a growing awareness among businesses of their role in preserving water availability. However, only 4.5% of companies have set specific targets for reducing absolute water withdrawals, and just 10.2% are actively engaging with suppliers to decrease water usage. Furthermore, a mere 0.5% of companies have implemented water targets in water-stressed regions within their supply chains.

Addressing water insecurity goes beyond simply reducing water consumption; it also entails safeguarding the quality of water available for essential human needs such as drinking and sanitation. Agricultural pollution[38] and untreated wastewater are identified as significant threats. According to the WBA, only 13.9% of evaluated companies have disclosed metrics on discharged pollutants, with just 2.9% establishing targets for their reduction. In addition, only 12.3% of companies are committing to upholding the water, sanitation, and hygiene (WASH) rights of local communities and just 4% outlining plans for preventive and corrective actions. These findings corroborate the water quality findings of the Valuing Water Finance Initiative Benchmark, which reveal water quality is largely overlooked in setting corporate water stewardship targets.

Source: World Benchmarking Alliance (March 2024). Nature benchmark 2023

[33] S&P Global (February 2022). Nature is climbing the agenda, but corporate diversity commitments remain rare
[34] World Benchmarking Alliance (March 2024). Nature benchmark 2023
[35] Planet Tracker (January 2024). Urges Increased Water Risk Disclosure in the Apparel Industry
[36] World Benchmarking Alliance (March 2024). Nature benchmark 2023
[37] World Economic Forum (March 2023)
[38] Water pollution from agriculture: a global review (2017)

To assist companies in assessing their environmental impacts, the Science Based Targets Network (SBTN) equips companies with the guidance to set science-based targets for all of Earth's systems. These science-based targets are defined as measurable, actionable, and time-bound objectives, to align with Earth's limits and societal sustainability goals. For example, increasing water use efficiency to ensure sustainable withdrawals and alleviate water scarcity. While the full SBTN target setting methods is under development, it has published guidance on freshwater, and land, in addition to a biodiversity paper.

The TNFD's recommendations, unveiled in September 2023, enable companies to enhance their ability to identify, evaluate, and disclose dependencies, impacts, risks, and opportunities through the LEAP methodology: locate, evaluate, assess, and prepare. As of January 16th, 2024, a total of 320 companies, financial institutions, and market service providers have committed[39] to disclosing nature-related information in accordance with the TNFD recommendations. Among these, 43% of the companies are based in Europe, 42% in the AAPC region, and only 6% in North America.

Our forthcoming whitepapers will delve into biodiversity-focused reporting frameworks, aimed at offering guidance on mitigating biodiversity risks. The objective is to outline DWS's expectations regarding these frameworks and the need for investors to actively engage with their portfolio companies to steer investments away from environmentally harmful practices towards those that foster a nature-positive future.

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[39] TNFD: inaugural-tnfd-early-adopters (Jan 2024)

Important information – North America

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