



# Nature's Price Tag

The economic cost of nature loss

September 2025





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The cost of nature loss .....	3
Nature's relationship with the global economy .....	6
Putting nature on the balance sheet: Sector risk profiles .....	8
Identifying engagement priorities .....	17
Investor engagement framework .....	19
Appendix.....	28

### **This report:**

**Quantifies the cost of nature loss by driver and ecosystem service type** for each of eight economic sectors using sophisticated models.

**Provides sector risk profiles** that define priority areas for nature action based on potential economic losses tied to ecosystem service dependencies.

**Provides a framework for financial institutions** to understand and engage portfolio companies on nature-related risks.

## Nature's resources and essential ecosystem services underpin the global economy.

They provide key inputs such as food, timber, and minerals while regulating water flows, air quality, and the climate. Yet, current economic systems exert enormous pressure on nature, degrading the very ecosystems they depend on.

**Land and sea use change, the overexploitation of natural resources, climate change, pollution, and the spread of invasive alien species** drive most ecosystem degradation, endangering biodiversity while also threatening human well-being and economic stability.

**While global estimates of the cost of nature loss exist, this report is the first to quantify the economic costs of these main drivers of nature loss on eight key sectors:**

**Biotechnology and pharmaceuticals**

**Chemicals**

**Consumer goods retail**

**Food and beverage retail**

**Food production**

**Forestry and packaging**

**Household and personal goods**

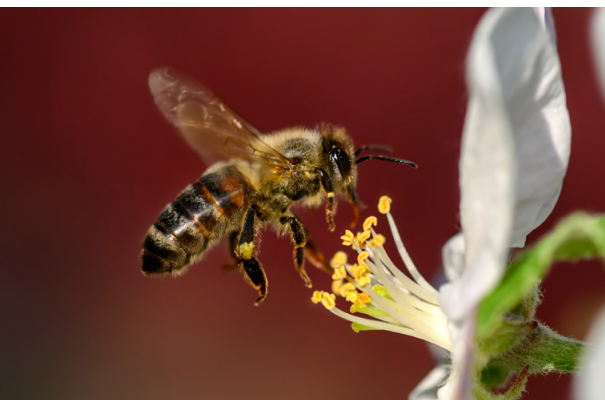
**Metals and mining**

These eight sectors not only have significant impacts on nature but also depend on natural ecosystems to function.

**\$430 billion**  
per year

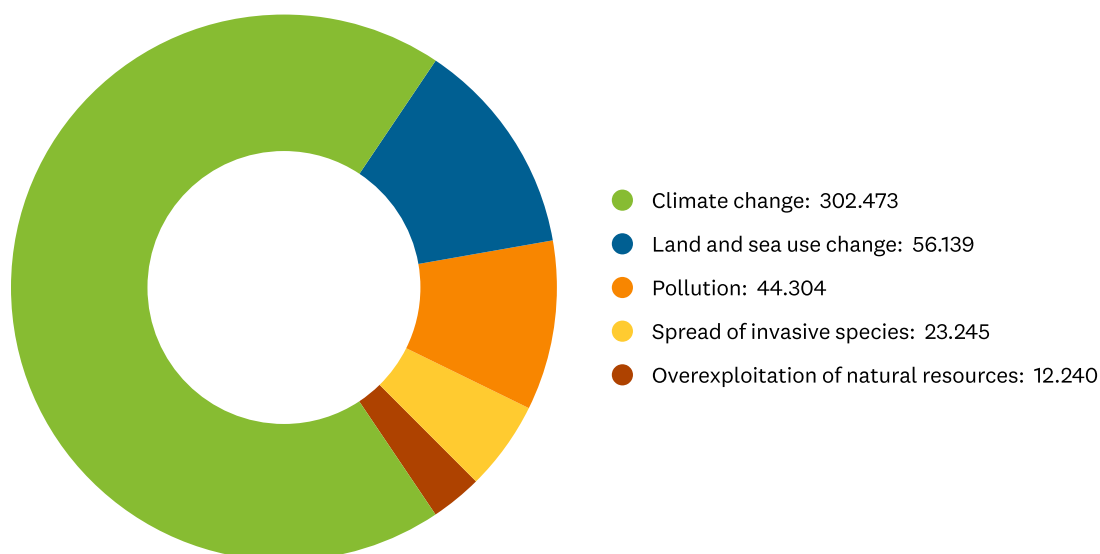
Under a business-as-usual scenario, the decline in ecosystem services caused by the five nature loss drivers has the potential to cost these priority sectors a combined \$430 billion per year globally. Left unchecked, over the next five years this would constitute a cumulative loss of \$2.15 trillion.

**\$2.15 trillion**  
Cumulative loss over next 5 years



For example, for the **food sector** this means \$253 billion in annual losses as ecosystem services such as biomass provisioning, rainfall regulation, and pollination decline. Pollination services alone are valued at nearly \$25 billion per year but are in jeopardy — largely because of land use change, climate change, and pollution. Many companies are resorting to hiring and trucking in beehives — in 2024, U.S. farmers paid over **\$400 million dollars** for hired pollination services — or investing in mechanical pollination at a significant cost. Chinese fruit producers have resorted to hand pollinating apple and pear trees — an infeasible solution in countries with higher labor costs.

**Expected annual losses (million USD) per driver for all eight sectors combined**



**These losses only capture the immediate costs that companies — and their investors — will face from the physical risks associated with how they depend on nature**, such as lower revenue from supply chain disruptions, operational costs from damage to assets or infrastructure, and increases in insurance premiums. However, companies also face additional transition risks, including revenue loss from shifts in market demand, higher investment requirements, and higher litigation costs, from their impacts on nature. If companies also fail to address their impacts on nature, the costs needed to adapt and respond to nature loss — and climate change — will rapidly compound.

Nature loss intensifies the frequency and severity of natural disasters such as droughts, floods, and wildfires that continue to disrupt transportation networks, causing shipping delays, price increases, and supply chain disruptions. For example, persistent drought conditions at the Panama Canal have **created a chokepoint for global trade**, reducing crossings, increasing wait times, and exacting tolls that average eight times the usual.





**At the same time, company contributions to nature loss often coincide with human rights risks.**

Expanding industrial development threatens nearly **60% of Indigenous Peoples' lands**, jeopardizing their rights to culture, food security, lands, and livelihoods. Companies that fail to manage their relationships with these communities may face legal, regulatory, and **reputational risks**, potentially losing hundreds of millions of dollars in costs from **lawsuits**, regulatory restrictions, operational delays, reputational damage, and remediation costs.



After a decades long battle, the Inter-American Court of Human Rights in 2023 found that **Guatemala violated Indigenous rights** by permitting mining on tribal land. All mining activity at Fenix Nickel Mine was ordered to an immediate stop and Guatemala was ordered to grant a land title to the community and create a development fund. No further mining can take place **without the community's consent**. The Solway Group's investment in the project totaled over **\$620 million**.

**Taking action now to halt contributions to nature loss and restore natural ecosystems is more cost effective than allowing environmental degradation to continue and paying to adapt later.** The longer companies wait to act, the higher their costs — ranging from operational to legal — will become. And the more uncertain their long-term outlook will be as the natural resources and ecosystem services they directly and indirectly rely on disappear.

One example of proactive action is the shift to **sustainable packaging**. The market is predicted to grow at a compound annual growth rate of 7.6% and **surpass \$350 billion** in 2030. Reusable, recyclable, biodegradable, and streamlined packaging helps preserve nature by reducing the use of raw materials and minimizing the release of harmful plastic pollution into water sources and ecosystems. It also lowers costs and enhances brand value. **The L'Oréal Groupe**, for instance, is shifting many of its brands to refillable packaging options that save the company over 60% in material costs. This is one of many companies across sectors rethinking packaging design not just for environmental benefit but for operational savings and revenue growth.



Companies and their investors are recognizing and starting to grapple with nature-related risks. **This report is designed to pinpoint, sector by sector, how nature loss drivers are driving risk by eroding critical ecosystem services.** The results can inform how investors engage their portfolio companies to take action to reverse environmental impacts, reduce their reliance on resource-intensive practices, and build resilience.



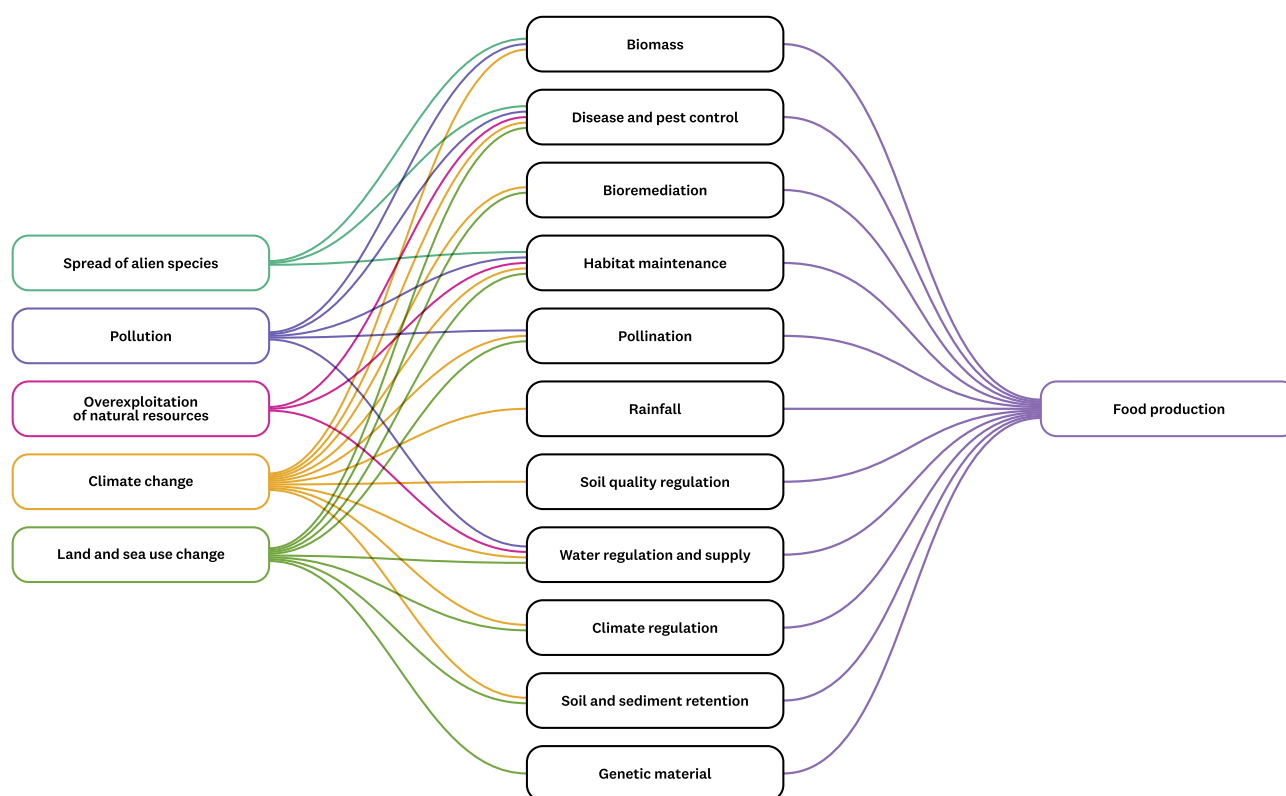
# Nature's relationship with the global economy

The five primary drivers of nature loss exert a significant toll on natural resources and **ecosystem services**. At the same time, companies heavily contribute to these nature loss drivers through their direct operations as well as their up- and downstream activities. Companies are also highly dependent on ecosystems to support their operations. As a result, nature loss or degradation directly undermines economic output across sectors.

For example, the agricultural sector drives nature loss through emissions-intensive farming processes, the conversion of natural ecosystems to farmland, agrochemical pollution, extensive water withdrawals for irrigation, and the spread of invasive plants. In turn, these practices deplete nature's ability to provide ecosystem services including pest and disease control, climate regulation, habitat maintenance, pollination, and soil retention.

## The linkages between nature loss drivers and the ecosystem services supporting food production

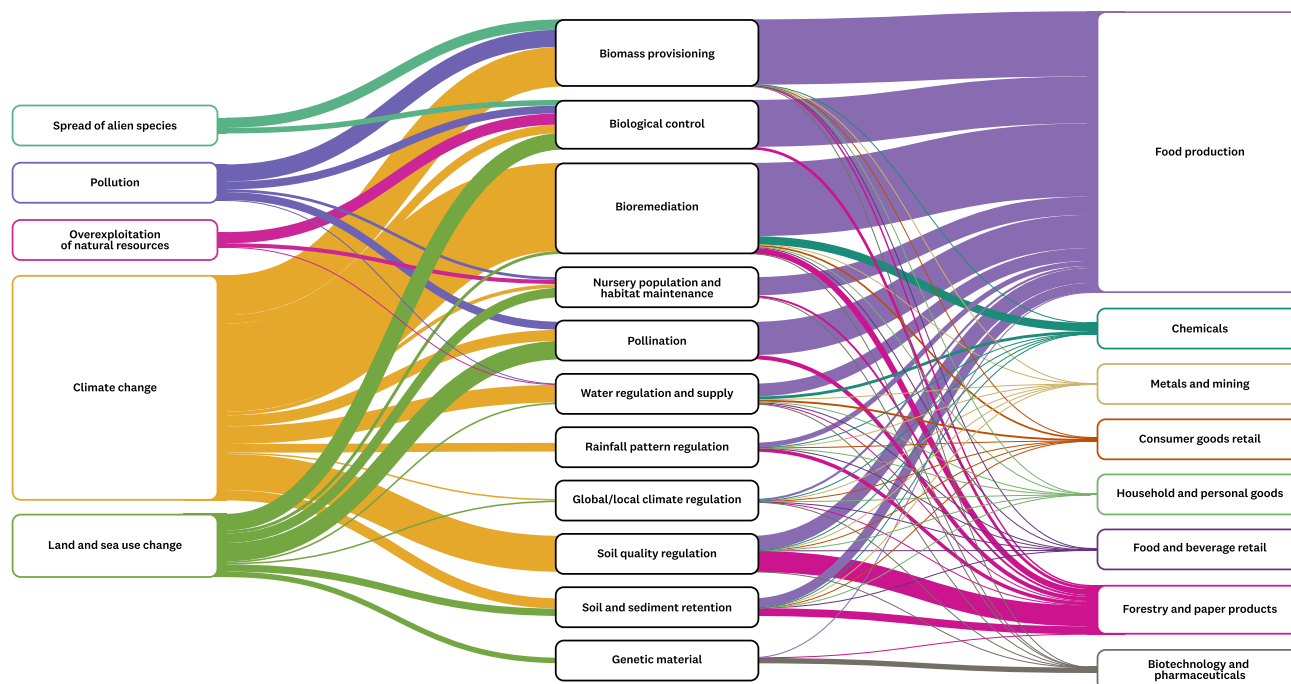
Nature loss caused by land and sea use change, the overexploitation of natural resources, climate change, pollution, and the spread of invasive alien species decrease the availability of ecosystem services. The loss of these ecosystem services impacts economic output.



Similar patterns characterize all sectors, resulting in a complex web of relationships between nature loss drivers, ecosystem services, and economic output.



## How nature loss reduces ecosystem services that support key sectors, weighted by million USD



**At the same time, the destruction of natural ecosystems accelerates climate change, fueling further nature loss and heightening business risks.**

Land clearing releases carbon and decreases nature’s ability to absorb it, worsening global warming and shifting rainfall patterns. Changes to the climate, such as hotter, drier conditions, lead to degraded terrestrial ecosystems that are unable to provide the services businesses rely on — from stable water supply to fertile soils and pollination. These same changes contribute to ocean warming, acidification, and deoxygenation which threatens marine ecosystems, including their ability to provide suitable habitat and support fisheries.

This nature-climate feedback loop creates compounding financial risks. Companies dependent on nature face higher costs, operational disruptions, and revenue loss as ecosystems and their services decline. At the same time, business impacts on nature expose firms to transition risks, including market shifts, litigation, regulatory action, and reputational harm. While the sector risk profiles in this report showcase climate change as a key driver of nature loss, it is imperative that nature action goes beyond climate action. Otherwise, companies will miss the financial materiality of risks stemming from their nature-related impacts and dependencies, the compounding effects of climate-nature interactions, and potential synergies and cost efficiencies that come from jointly addressing climate and nature.

Critically, company contributions to other nature loss drivers tend to be localized. This creates more direct linkages between company impacts, ecosystem functionality, and nature-related dependencies. For example, as a food manufacturing company pollutes a river, it reduces its ability to access clean water for use as an ingredient, for processing products (such as conveying, heating, cooling, rinsing, dissolving, dispersing, diluting, and separating raw materials), and for cleaning equipment.

**Addressing climate and nature in isolation is no longer viable. To protect long-term value, companies and financial institutions need to adopt integrated strategies that reflect the full scope of interconnected nature and climate risks.**



# Benefits of Nature Action

The costs of nature loss are high, but companies have innumerable opportunities to act — and benefit. Nature action not only presents companies with opportunities to build resilience, reduce risk, protect gross value add, and secure their bottom-line, but also introduces potential cost savings alongside novel revenue streams and increased market valuation.

<b>Brand value</b>	Companies that act early on nature can gain a competitive advantage as they establish a reputation as a market leader. For example, companies such as <a href="#">Ferrero</a> , <a href="#">Mars Wrigley</a> , and <a href="#">Nestlé</a> have garnered positive press for their support of the European Union’s Regulation on Deforestation-free Production (EUDR). Similarly, <a href="#">Kering</a> , <a href="#">GSK</a> , and <a href="#">Holcim</a> have received attention as pioneers of science-based targets for nature.
<b>Legal benefits</b>	Nature action also helps secure companies’ abilities to operate under evolving regulatory and compliance regimes, from a <a href="#">Global Plastics Treaty</a> to <a href="#">restrictions on forever chemicals</a> . Companies that demonstrate responsible use and protection of the natural environment may be positioned to avoid penalties and charges as they anticipate and avoid negative impacts and reduce their dependencies. Moreover, companies that address their impacts and dependencies on nature may qualify for expedited permitting processes and faster approvals for new operations. For example, a number of cities across the U.S., including Chicago, Illinois, <a href="#">San Diego, California</a> , and <a href="#">Seattle, Washington</a> , offer faster permitting for cleaner, more efficient building projects.
<b>Market share</b>	By differentiating their products based on nature-positive aspects, companies may be able to capture a larger market share and <a href="#">price premium</a> compared to competitor products. Market research indicates that there are significant opportunities for companies that stay at the forefront of consumer consciousness and preferences with <a href="#">millennial</a> and <a href="#">GenZ</a> consumers demanding more sustainable products and showing <a href="#">major consumer shifts</a> away from single-use plastics, meat, and towards other ethical considerations. As companies build a reputation for delivering on nature goals, they may also be able to establish special business relationships. For example, becoming partners of choice for government procurement or development contracts.
<b>New revenue streams</b>	Companies may be able to capitalize on new revenue streams and business models by reducing their impacts and dependencies on nature. For example, some governmental programs will compensate companies for protecting the ecosystem services their land provides. The <a href="#">New York City Watershed Agricultural Council</a> pays farmers and other private landowners to protect the local watershed. Automakers in California are required to produce and sell enough zero-emissions vehicles (ZEV) to earn a minimum number of “ZEV credits”— those that over comply can generate billions of dollars <a href="#">selling excess credits</a> to other, non-compliant automakers.
<b>Talent acquisition and retainment</b>	Companies that differentiate themselves with strong environmental stewardship may be better positioned to attract and retain talent. For instance, <a href="#">70% of U.S. workers</a> say they consider a company’s environmental record when deciding whether or not to take a job. The trend is strong enough that even <a href="#">C-suite executives are taking note</a> .





# Putting nature on the balance sheet: Sector risk profiles

These risk profiles detail the economic costs associated with the physical risks of nature loss primarily based on direct operations within each sector. Cost estimates are conservative; actual costs are likely much higher, especially once upstream and downstream value chain activities, transition risks, and environmental tipping points are factored in.

Nature loss could create systemic risks if ecological or financial systems are pushed past a tipping point. Systemic risks within ecological systems may occur as natural systems are destabilized and experience an extreme shift in function or total collapse, or in financial systems as compounding (nature-related) physical and transition risks destabilize economic systems. For example, deforesting an additional [3-8% of the Amazon](#) could upturn the region from an emissions sink into a major emissions source, triggering a significant portion of the biome to shift to a degraded, savanna-like environment. This would severely disrupt local rainfall cycles and collapse local agricultural production systems, sending shockwaves through global supply chains. Passing this tipping point could cost the Amazon region alone an [estimated \\$257 billion in cumulative gross domestic product by 2050](#).

A multistep methodology was followed to model the economic cost of nature loss and the contributions of each nature loss driver:

- Mapping out nature dependencies by sector using [Exploring Natural Capital Opportunities, Risks and Exposure](#) (ENCORE) database
- Developing a gross value add (GVA) metric for relevant ecosystem services and corresponding drivers of nature loss using EXIOBASE and peer-reviewed research, for each sector
- Identifying the impact pathways that link drivers of nature-loss to declining [ecosystem services](#) based on ENCORE and peer-reviewed literature
- Estimating reductions of each ecosystem service and their consequences for business outputs by consulting peer-reviewed literature
- Integrating preceding analyses by linking ecosystem service dependencies with the impacts of nature-loss drivers on ecosystem services to calculate annual economic losses per sector

For the complete methodology and details on the model see the [Appendix](#).



# Food

## Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Air filtration	—	—	—	—	—	—
Biological control	6,037.57	11,712.43	7,917.43	5,542.20	3,958.71	35,168.34
Biomass provisioning	29,018.50	—	—	12,414.65	7,469.19	48,902.33
Bioremediation	53,222.49	1,796.08	—	—	—	55,018.57
Genetic material	—	933.32	—	—	—	933.32
Climate regulation	3,909.37	3,909.37	—	—	—	7,818.75
Nursery population and habitat maint.	2,474.51	6,491.75	2,749.46	1,924.62	1,374.73	15,015.07
Pollination	7,238.65	12,064.41	—	5,630.06	—	24,933.12
Rainfall pattern regulation	37,371.63	—	—	—	—	37,371.63
Soil and sediment retention	4,229.44	2,986.00	—	—	—	7,215.44
Soil quality regulation	11,156.88	—	—	—	—	11,156.88
Water regulation and supply	8,506.98	763.65	509.1	458.19	—	10,237.92
<b>Total per nature loss driver</b>	<b>163,166.02</b>	<b>40,657.02</b>	<b>11,175.99</b>	<b>25,969.72</b>	<b>12,802.63</b>	<b>253,771.37</b>

### Example

Drought conditions in major coffee producing countries, such as Brazil and Vietnam, are decreasing yields and causing coffee prices to surge over the past year. The price of arabica beans, a staple for coffee chains including Starbucks hit an [all-time high](#) in February 2025. Similarly, price spikes have hit robusta beans, a cheaper variety typically used for instant coffee.

# \$253 billion

Estimated annual losses, globally

# Consumer Goods Retail

## Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Biomass provisioning	20,837.48	—	—	—	5,363.44	35,115.58
Bioremediation	1,346.86	45.45	—	—	—	1,392.31
Climate regulation	3,385.73	3,385.73	—	—	—	6,771.47
Rainfall pattern regulation	24,855.84	—	—	—	—	24,855.84
Soil and sediment retention	15.22	10.74	—	—	—	25.96
Soil quality regulation	64.57	—	—	—	—	64.57
Water regulation and supply	1,369.44	122.93	81.95	73.76	—	1,648.09
<b>Total per nature loss driver</b>	<b>51,875.15</b>	<b>3,564.86</b>	<b>81.95</b>	<b>73.76</b>	<b>5,363.44</b>	<b>69,873.82</b>

### Example

The stores, facilities, and distribution centers of many consumer goods retailers may be directly damaged by natural disasters and adverse weather conditions. For example, 14% of [Walmart Inc.'s global facilities](#) are exposed to hurricanes and 16% to floods. Walmart reports that Hurricanes Helene and Milton impacted its stores, operations and supply chains in the Southeastern US in 2025 and while total costs are undisclosed, previous hurricanes have cost the company [tens of millions](#). The economy at large faces significant risk with the National Oceanic and Atmospheric Administration (NOAA) estimating that extreme weather events in the US cost [\\$2.915 trillion](#) from 1980 to 2024.

# \$69 billion

Estimated annual losses, globally



# Food and Beverage Retail and Restaurants

Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Air filtration	—	—	—	—	—	—
Biomass provisioning	15,027.34	—	—	6,428.97	3,867.95	25,324.26
Bioremediation	753.45	25.43	—	—	—	778.88
Climate regulation	3,217.06	3,217.06	—	—	—	6,434.12
Rainfall pattern regulation	20,761.79	—	—	—	—	20,761.79
Soil and sediment retention	13.1	9.25	—	—	—	22.36
Soil quality regulation	56.95	—	—	—	—	56.95
Water regulation and supply	761.27	68.34	45.56	41.0	—	916.17
<b>Total per nature loss driver</b>	<b>40,590.97</b>	<b>3,320.08</b>	<b>45.56</b>	<b>6,469.97</b>	<b>3,867.95</b>	<b>54,294.52</b>

## Example

Darden Restaurants, which owns such casual dining chains as Olive Garden, LongHorn Steakhouse, and The Capital Grille, experienced a four to five million dollar [increase in operating costs](#) in the second quarter of 2022 when wholesale lettuce prices spiked as a result of poor growing conditions and weather-related events, including crop disease and drought.

# \$54.2 billion

Estimated annual losses, globally

# Forestry and Paper Products

## Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Air filtration	—	—	—	—	—	—
Biological control	354.3	687.31	464.61	325.23	232.31	2,063.75
Biomass provisioning	2,362.44	—	—	1,010.70	608.08	3,981.22
Bioremediation	4,319.22	145.76	—	—	—	4,464.98
Genetic material	—	51.3	—	—	—	51.3
Climate regulation	474.15	474.15	—	—	—	948.3
Nursery population and habitat maint.	263.31	690.79	292.57	204.8	146.28	1,597.75
Pollination	1,029.77	1,716.28	—	800.93	—	3,546.97
Rainfall pattern regulation	3,233.34	—	—	—	—	3,233.34
Soil and sediment retention	3,447.75	2,434.12	—	—	—	5,881.87
Soil quality regulation	15,741.49	—	—	—	—	15,741.49
Water regulation and supply	459.66	41.26	27.51	24.76	—	553.19
<b>Total per nature loss driver</b>	<b>31,685.43</b>	<b>6,240.96</b>	<b>784.69</b>	<b>2,366.41</b>	<b>986.67</b>	<b>42,064.15</b>

### Example

Nature loss plays an exacerbating role in wildfire occurrence. From 2001 to 2021, between [18.5–24.7 million hectares](#) of timber-producing forests were ravaged by severe wildfires resulting in billions of dollars in losses. The threat of wildfires has led to a [\\$11.2 billion reduction](#) in the value of private timber land in California, Oregon, and Washington.

# \$42 billion

Estimated annual losses, globally



# Chemicals

## Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Air filtration	—	—	—	—	—	—
Biomass provisioning	75.48	—	—	32.29	19.43	127.2
Bioremediation	6,070.17	204.85	—	—	—	6,275.02
Climate regulation	761.46	761.46	—	—	—	1,522.93
Provisioning services	—	—	—	—	—	—
Rainfall pattern regulation	887.43	—	—	—	—	887.43
Soil and sediment retention	0.58	0.41	—	—	—	0.98
Soil quality regulation	2.49	—	—	—	—	2.49
Water regulation and supply	1,810.99	162.57	108.38	97.54	—	2,179.48
<b>Total per nature loss driver</b>	<b>9,608.60</b>	<b>1,129.29</b>	<b>108.38</b>	<b>129.83</b>	<b>19.43</b>	<b>10,995.53</b>

### Example

Most chemical transportation occurs via river barge, given its cost-effectiveness. However, these barges can only travel when river water levels are sufficiently high. In 2022, drought led to [low water levels on the Rhine](#), forcing German chemical producers to [reduce barge cargo](#). To avoid significant delays, companies had to shift to trucks, trains, and other transportation modes.

# \$10 billion

Estimated annual losses, globally

# Household and Personal Goods

Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Air filtration	—	—	—	—	—	—
Biomass provisioning	661.68	—	—	283.08	170.31	1,115.08
Bioremediation	370.29	12.5	—	—	—	382.79
Climate regulation	406.99	406.99	—	—	—	813.98
Rainfall pattern regulation	1,067.86	—	—	—	—	1,067.86
Soil and sediment retention	0.66	0.47	—	—	—	1.13
Soil quality regulation	2.84	—	—	—	—	2.84
Water regulation and supply	408.36	36.66	24.44	21.99	—	491.45
<b>Total per nature loss driver</b>	<b>2,918.68</b>	<b>456.61</b>	<b>24.44</b>	<b>305.07</b>	<b>170.31</b>	<b>3,875.12</b>

## Example

Many household and personal products, from cosmetics and skincare to soaps and detergents, contain palm oil. Yet pollination loss is decreasing palm oil yields globally. For example, the future of Indonesia's palm oil production is threatened by the [die-off of pollinating insects](#) that are unable to withstand the country's prolonged heat waves. These insects also help control pests, improve soil aeration, and support overall ecosystem balance. Extreme heat is likely to force plantations to seek alternative pollination methods that cost more than \$110,000 per hectare.

# \$3.8 billion

Estimated annual losses, globally



# Metals and Mining

## Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Air filtration	—	—	—	—	—	—
Biomass provisioning	121.47	—	—	51.97	31.27	204.7
Bioremediation	177.15	5.98	—	—	—	183.13
Climate regulation	476.42	476.42	—	—	—	952.84
Rainfall pattern regulation	1,159.91	—	—	—	—	1,159.91
Soil and sediment retention	0.76	0.53	—	—	—	1.29
Soil quality regulation	3.32	—	—	—	—	3.32
Water regulation and supply	195.87	17.58	11.72	10.55	—	235.72
<b>Total per nature loss driver</b>	<b>2,134.89</b>	<b>500.52</b>	<b>11.72</b>	<b>62.52</b>	<b>31.27</b>	<b>2,740.91</b>

### Example

Water stress poses a risk to copper mining in Chile with severe drought [significantly impacting local mining operations](#). Anglo American's Los Bronces mine in central Chile experienced a 17% year-on-year decrease in production in the first quarter of 2022, that was partly attributable to water scarcity. Water scarcity similarly led to a 24% drop in production in 2022 at the Los Pelambres mine operated by Antofagasta Minerals.

To mitigate risks, several mining companies are increasing their capital expenditure as they invest in multibillion desalination plants that can guarantee continued water supply. For example, [Antofagasta Minerals](#) established a desalination plant in Los Pelambres, which it plans to further expand. Capital costs for the project are expected to total approximately \$2 billion.

# \$2.7 billion

Estimated annual losses, globally

# Biotechnology and Pharmaceuticals

Sum of GVA losses per ecosystem service, in USD million

	Climate change	Land and sea use change	Overexploitation of natural resources	Pollution	Spread of alien species	Total per ecosystem service
Air filtration	—	—	—	—	—	—
Biomass provisioning	13.7	—	—	5.86	3.53	23.09
Bioremediation	109.53	3.7	—	—	—	113.23
Genetic material	—	98.67	—	—	—	98.67
Climate regulation	118.73	156.23	—	—	—	274.96
Rainfall pattern regulation	129.26	—	—	—	—	129.26
Soil and sediment retention	0.08	0.06	—	—	—	0.14
Soil quality regulation	0.37	—	—	—	—	0.37
Water regulation and supply	121.92	10.94	7.3	6.57	—	146.73
<b>Total per nature loss driver</b>	<b>493.59</b>	<b>269.6</b>	<b>7.3</b>	<b>12.43</b>	<b>3.53</b>	<b>786.45</b>

## Example

Pharmaceutical companies rely on access to genetic material for drug discovery, development, and production. For example, pharmaceutical giant [Astrazeneca](#) states that “the decline of natural ecosystems threatening to disrupt many important supply chains including our own. Decreasing biodiversity also limits access to raw materials of natural origin that we rely on to discover, develop and produce life-changing medicines.”

# \$786 million

Estimated annual losses, globally



# Identifying engagement priorities

Investor exposure to nature-related risks is a function of their portfolio companies' nature-related impacts and dependencies. These impacts and dependencies are in turn shaped by a company's sector and business activities, as well as the locations of its facilities and value chains. Investors interested in assessing their nature-related portfolio risks may start their analysis in any of these places.

## Starting points for identifying nature-related risks in investment portfolios

Sectoral Exposure	Geographic Exposure	Activity Exposure
Identify investments in sectors and industries likely to have high dependencies and/or impacts on nature  e.g., Agriculture	Examine geographic locations of company value chains  e.g., Overlap between farm fields and Key Biodiversity Areas	Assess company production processes for activities likely to have high dependencies and/or impacts on nature  e.g., Pesticide use

This report's overview of the economic cost of nature loss, combined with the report, [Exploring Nature Impacts and Dependencies: A Field Guide to Eight Key Sectors](#), by Ceres and Nature Action 100, can help investors identify priority areas for engagement within their portfolios.

### Field Guide

#### Sector A

- Impacts: High or Very High
- Dependencies: High or Very High

### Nature's Price Tag

#### Sector A

- High cost of nature loss
- Key drivers of nature loss identified
- Key ecosystem services affected

### Engagement Priorities

- Sector A because of material risks from nature-related impacts and dependencies, twinned with high cost of nature loss
- Focus engagements on how the company is reducing impacts and dependencies, with leading drivers of nature loss and key ecosystem services as important areas of interest

# Danske Bank Asset Management

## A case study on identifying engagement priorities

Danske Bank Asset Management is one of the largest asset managers in the Nordic region, managing over \$140 billion in assets. As a responsible investment manager, they are mindful of not only how sustainability factors impact investment performance, but also how their investments may impact society.

When Danske Bank Asset Management set their first nature engagement target back in 2023, they used ENCORE to identify companies belonging to sectors with high impacts or dependencies on nature. Since then, they have complemented ENCORE data with company revenue data on various business activities to get a better understanding of potential nature-related investment risk. Through this exercise, Danske Bank is also able to identify thematic areas, such as water or deforestation, to further refine its engagement priorities. The financial institution recognizes that nature-related impacts and dependencies are location specific, however companies do not always share location data for their value chains. Danske Bank assesses nature-related risk on a geographic basis when such information is available.

Following these steps ultimately helped Danske Bank identify 30 companies to prioritize for engagement. To assess companies and follow their progress, the asset manager evaluated each company using its proprietary biodiversity assessment framework. Using publicly available data it assessed how well each company governs and manages its biodiversity impacts and dependencies — as well as related risks and opportunities across 19 indicators that map to five levels of progress:

- Level 0 - Unaware of biodiversity being a business issue.
- Level 1 - The company is acknowledging biodiversity as a business issue.
- Level 2 - Building the foundation.
- Level 3 - The company is integrating biodiversity into the business.
- Level 4 - The company has a strategic and holistic approach.

The framework enables Danske Bank to prioritize companies to engage and which topics to engage them on based on their level of maturity.

Novo Nordisk, a Danish pharmaceutical company, is one of the 30 companies Danske Bank identified as an engagement priority. As a [Nature Action 100](#) investor participant, Danske Bank is part of a group of investors engaging Novo Nordisk. Over the course of multiple dialogues with the company bilaterally and through Nature Action 100, Danske Bank Asset Management encouraged the company to set tangible and relevant nature targets to curb material nature-related risks and promote long-term business success. In the beginning of 2025, Novo Nordisk disclosed a roadmap to address its key impacts and dependencies on nature in order to halt nature loss in its value chain by 2033 and become nature-positive by 2045.



# Investor engagement framework

Most companies are still in the early stages of their nature journeys leaving investors with questions about how they plan to mitigate nature loss to manage their risks. Through research and consultations, the following were revealed to be high on the list of information that investors want to know:

- How companies are identifying, prioritizing, and focusing efforts on material nature-related impacts, dependencies, risks, and opportunities,
- What targets companies are setting in response to their assessments of nature-related impacts, dependencies, risks, and opportunities,
- What actions companies are taking to achieve their nature targets, reduce their nature-related risks, and capitalize on nature-related opportunities throughout their full value chains, and
- How company actions are supporting the transformation of capital markets to deliver better outcomes for nature.

The following framework, developed with investor feedback, is a tool investors can use to guide their engagements with companies on nature. The framework is organized around four areas of company action:

- 1) **Assessing impacts and dependencies**
- 2) **Making commitments and setting targets**
- 3) **Taking action through the value chain**
- 4) **Creating an enabling environment**

To most effectively decrease portfolio exposure to nature-related risks, it is in investors' best interests to prioritize companies' most material impacts and dependencies in engagements across all topic areas. While the terminology may differ slightly, these areas for engagement are aligned with the Business for Nature [ACT-D approach](#) and Nature Strategy Handbook, [Nature Action 100 Investor Expectations for Companies](#), Science-Based Targets Network's [target-setting process](#), and the Taskforce for Nature-related Financial Disclosures (TNFD) [locate, evaluate, assess, prepare \(LEAP\) approach](#). The framework is designed to facilitate investors' nature engagements grounded in any such approach.

## Alignment between this engagement framework and prominent nature-related initiatives

	Assessing impacts and dependencies	Making commitments and setting targets	Taking action through the value chain	Creating an enabling environment	Disclosing progress
<b>ACT-D</b>	<b>Assess</b>	<b>Commit</b>	<b>Transform</b>		<b>Disclose</b>
<b>Nature Action 100</b>	<b>Assess</b>	<b>Targets</b>	<b>Implementation, Governance, Engagement</b>		<b>Disclose</b>
<b>Science Based Targets for Nature</b>	<b>Assess, Prioritize</b>	<b>Set targets</b>	<b>Act, Track</b>		<b>Disclose</b>
<b>Taskforce on Nature-related Financial Disclosure</b>	<b>Locate, Evaluate, Assess</b>	<b>Prepare</b>			<b>Disclose</b>

# 1. Assessing impacts and dependencies

Assessments give companies critical insight on how to act meaningfully on nature. They inform how companies should prioritize and focus efforts by identifying activities, supply chains, and geographies most likely to be associated with material nature-related impacts, dependencies, risks, and opportunities. Without performing a thorough assessment of their activities and value chains, companies risk overlooking or underemphasizing important areas. Assessments also help investors prioritize engagements around companies' most material impacts and dependencies to meaningfully encourage company action on nature.

## Key elements of a robust assessment

**Assessment scope.** Companies may have impacts and dependencies on nature in both the short- and long-term, and these impacts and dependencies may arise in their direct operations, as well as their upstream and downstream value chains. It is important that nature assessments are comprehensive and quantitative so that companies and their stakeholders have a full picture of the risks they face, including risk magnitude.

**Double materiality lens.** Nature (loss) affects company development, performance, and value, especially when businesses heavily rely on ecosystem services and natural capital. Company operations and value chains have the potential to positively or negatively impact nature. It is important that companies assess (and ultimately disclose) materiality from financial and impact perspectives and consider how they are interconnected.

**Priority locations.** Location matters greatly for assessing and managing nature-related risks and opportunities because the material importance of a company's impacts and dependencies will differ based on where they occur. While substantive nature-related impacts and dependencies create physical and transition risks for companies, risks are elevated when these nature touch points occur in ecologically sensitive locations (including those areas important for biodiversity, of high ecosystem integrity, experiencing rapid decline in ecosystem integrity, with high physical water risks, and of importance for ecosystem service provision).

**Economic valuation.** By quantifying costs associated with their impacts and dependencies on nature, companies can better understand the relative importance of their risks and opportunities and identify which are most material. It is important that companies value impacts and dependencies stemming from direct operations and value chains.

**Impacts on Indigenous Peoples and local communities.** Indigenous Peoples and local communities have a traditionally close relationship with nature for cultural, social, and spiritual reasons — as well as practical ones. Nature often supports their lives and livelihoods as they directly depend on the land, resources, and the services it provides. This makes them particularly susceptible to the adverse impacts of nature loss.

## GREEN FLAGS

- Full value chain mapped, including upstream and downstream operations
- Value chain assessed for potential nature-related impacts and dependencies
- High impact commodities prioritized for data collection
- Data gathered — including location data and proximity to ecologically sensitive areas — from all operational locations, including value chain activities potentially associated with moderate or high nature-related impacts or dependencies
- Scope of materiality assessment clearly specified, including in-scope activities, commodities, value chain actors, and geographic locations, in addition to the methodology, metrics, and indicators used
- Comprehensive overview of material dependencies, impacts, risks, and opportunities, over the short-, medium-, and long-term



## 2. Making commitments and setting targets

Commitments establish company ambition to contribute to a nature-positive world in order to manage their risks and opportunities. This ambition should be supported by one or more specific, time-bound targets that relate to a company's nature-related impacts, dependencies, risks, and opportunities, with plans to annually monitor, evaluate, and disclose progress. These targets should be aligned with societal goals, such as the [Global Biodiversity Framework](#), and based in science.

As companies fulfill their targets, they are contributing to the achievement of their broader commitments, and in doing so, they can bolster their image and reputation while differentiating themselves from their competitors.

### Key elements of making commitments and setting targets

**Nature commitment.** A corporate commitment to nature establishes a cohesive strategic direction that outlives executive changeover, guiding corporate action in the long-term. Early-stage commitments may include promises to conduct nature-related assessments. Building from assessment findings, companies may then develop new nature commitments that focus on high-priority areas, phasing in an increased scope over time. The most robust commitments apply to all of the raw materials a company sources, including all direct and indirect suppliers across all sourcing regions. They also establish a clear timeframe for a company to eliminate or mitigate negative impacts on nature from the value chain, as well as a commitment to protect all rights of Indigenous Peoples and local communities. The [Global Biodiversity Framework](#), an agreement adopted by over 190 countries at the fifteenth Conference of the Parties (COP15) of the United Nations' Convention on Biological Diversity in December 2022, sets out an ambitious pathway for global action on nature that companies may consider as a North Star.

**Time-bound targets.** The results of the materiality assessments should inform the development of company targets to effectively minimize nature-related risks and maximize nature-related opportunities. The most rigorous nature targets will be specifically scoped around key activities, geographic locations, and value chain segments, address assessed impacts, dependencies, risks, and opportunities, adhere to definitive achievement timeframes, and have a basis in science, as provided by the [Science-Based Targets Network \(SBTN\)](#). Many of these elements require that companies establish value chain traceability, to understand who their suppliers are and where they operate, prior to setting their targets. In addition, the SBTN recommends that company action prioritize avoiding and reducing nature loss followed by efforts to regenerate and restore nature to ensure that the full spectrum of actions necessary for a nature positive future is considered.

**Monitoring plan.** All targets should be accompanied by clearly articulated, and regularly disclosed, definitions, methodologies, and metrics to enable the company to credibly demonstrate its progress to external stakeholders. Target monitoring is also important for informing companies' own decision-making and ensuring continuous improvement.

**Climate alignment.** In light of the [inextricable linkages between the nature and climate crises](#), achieving global climate ambitions requires simultaneous action to prevent and reverse nature loss, and vice versa. Company targets that deliver joint benefits for nature and climate are part of the solution. As they set their nature targets, companies should consider how nature-climate synergies can be leveraged.

## GREEN FLAGS

- Commitment to shift business strategies and models to halt and reverse nature loss and achieve nature positive outcomes
- Initial targets focus on highest priority activities, as identified through materiality assessments, with plans to phase in additional targets to ultimately cover all material nature-related issues across the company's full value chain
- Targets framed around the achievement of positive changes for nature (impact-based), rather than around operational changes (operationally-based)
- Targets have been validated as science-based by an independent third party (where relevant validation bodies exist), or are otherwise science-aligned
- Targets includes clear baseline values, base year (as applicable), targeted values, metrics, and timeframes for achievement
- The company sets out a plan to monitor, evaluate, and disclose progress against each of its targets
- Nature targets are aligned with the company's climate targets and potential trade-offs and synergies have been identified

### Integrating Nature into Climate Engagements

Nature-related issues are an emergent topic compared to longer-standing climate concerns. Yet, the interconnections between nature and climate provide an opportunity for investors to [integrate nature into existing climate-focused engagements](#) with portfolio companies and efficiently address all drivers of nature-related risk. Sector risk profiles reveal that that climate change is a key anthropogenic driver of nature loss across all sectors. However, engagements may generate the most impact by identifying potential synergies with other non-climate drivers of nature loss. For example, [reforestation projects](#) have the potential to sequester significant quantities of carbon, providing a climate solution, while improving lost biodiversity and ecosystem functionality.

In many ways, nature action will need to mirror what is already well-established for climate action. Many companies are well-positioned to leverage the knowledge base they have amassed on climate and apply it to their work on nature. For instance, actions to address nature will ultimately need to parallel the format of climate transition plans. Both necessitate the development of time-bound, comprehensive strategies for reducing impacts and addressing related risks across full value chains. Given the interconnectedness of nature and climate, companies can be more effective [by addressing the two issues in an integrated manner](#).

### 3. Taking action through the value chain

Companies' nature commitments and targets are only as effective as the strategies they have for implementing them. Developing and actualizing plans to address nature-related impacts, dependencies, risks, and opportunities and to realize nature commitments and targets, will require changes to companies' own operations and across their full value chains. It is important that these plans are designed and executed in a manner that prioritizes rights-based approaches, and that they are accompanied by annual disclosures of progress.

In particular, companies should prioritize the rights of those that have been historically excluded and/or stand to be most impacted by their decisions. For example, while Indigenous Peoples steward a significant proportion of intact ecosystems and hold a wealth of traditional knowledge related to conservation and sustainable use of nature, their stewardship capacity, subsistence, and [even their lives](#), are often jeopardized by industrial development. Few companies appear to be taking the necessary precautions. By integrating [rights-based approaches](#) into their action plans, companies can ensure that their value chains uphold and respect individual and collective rights, including those of Indigenous Peoples and local communities. Positive partnerships can also support company and community resilience by protecting ecosystems from overexploitation and the impacts of waste and pollution.

#### Key elements of taking action through the value chain

**Action plans.** Companies' action plans break down the steps they will take, across their full value chain, to achieve their targets. The strongest plans will clearly define and prioritize location- and activity-specific actions the company is taking to avoid and reduce negative impacts on nature, as well as to restore and regenerate nature. Actions should reflect assessment results, with the most material nature-related impacts, dependencies, risks, and opportunities prioritized. In some cases, it may be necessary for companies to shift business models in order to move beyond incremental environmental improvements. In addition, companies that annually track and disclose against their action plans ensure progress while providing important transparency and accountability to stakeholders.

**Value chain engagement.** Companies' nature-related impacts and dependencies extend beyond their direct operations, stretching from upstream producers to downstream end-user consumers. To manage the extended risks — and opportunities — presented by their full value chains, it is important that companies' implementation strategies include engagements with their value chain partners. This may include setting nature-related criteria for suppliers, providing financial or technical assistance to suppliers, improving corporate customers' end-of-life treatment of products, or developing lower-impact products that are more attractive to consumers.

**Senior leadership oversight and expertise.** Assigning oversight and responsibility of action plan implementation to a company's board or board committee can help ensure that nature is sufficiently prioritized, resourced, and integrated within overall risk management processes. Given the complexity of nature-related topics, it is also important that decision-makers — including the board and senior executives — hold sufficient expertise for managing nature-related issues. This includes the expertise requisite for managing impacts on and engagement with Indigenous Peoples and local communities.



## GREEN FLAGS

- Senior leadership, including board members and executives, has the expertise to oversee company-wide assessment and management of nature-related impacts, dependencies, risks, and opportunities.
- Executive long-term remuneration arrangements link to performance on nature-related issues
- Plans in place to manage changing requirements for sustainability reporting on nature-related impacts, dependencies, risks and opportunities (e.g., such as the EU's Sustainability Reporting Standards (ESRS) and Corporate Sustainability Reporting Directive (CSRD)), given the potential that additional jurisdictions are likely to mandate nature-related disclosures in the future
- Supporting policies, frameworks, and procedures in place to deliver the company's nature strategy
- Engagement with upstream and/or downstream value chain partners to achieve nature-related targets and address material nature-related issues
- Mechanisms in place to monitor compliance, enforce standards, and remedy breaches
- Actions relate to stated targets and material dependencies, impacts, risks, and opportunities
- Actions to address value chain activities link to key nature loss drivers (as captured in the sector risk profiles) that drive material dependencies, impacts, risks, and opportunities

## 4. Creating an enabling environment

Companies and investors need a supportive policy environment to fully address nature-related risks and avoid economic losses. Companies have a role to play in advocating for that environment. This includes advocating for regulations that value and account for nature's ecosystem services, restrict actions that degrade nature, ascribe company responsibility for external costs, and end public policies and incentives that create harmful outcomes, such as agricultural subsidies that promote fertilizer over-application or monoculture cultivation. Companies may use their voice to champion this transformation within their industry and trade groups. At the same time, companies can leverage their value chain position to exert influence, for instance through their relationships with producers, as well as their supplier expectations and procurement policies. Companies in more downstream positions, like retailers, can contribute to market shifts by offering innovative, circular customer-facing products.

### Key elements of creating an enabling environment

**Advocacy and lobbying.** Corporate lobbying strongly influences the creation, or blockage, of sound and robust public policy that supports nature action, [reduces risk, and levels the playing field](#). It is important that companies' own advocacy and lobbying activities, as well as the advocacy and lobbying activities of the trade associations to which they belong, align with the goals of [The Global Biodiversity Framework](#). Many companies lack transparency around their nature-related advocacy, [while belonging to industry associations that actively oppose nature-related policies](#).

**Stakeholder engagement.** Companies often engage stakeholders to mitigate and manage risk, but stakeholder engagement also has potential to encourage company innovation and resilience. At every step of a company's nature journey, stakeholder engagement can provide important insight on where and how a company's nature-related impacts, dependencies, risks, and opportunities emerge. It can ensure that companies are setting well-informed targets and integrating rights-based approaches into their action plans. Critically, companies should be engaging all key stakeholders throughout their value chains, including employees, customers, and communities adjacent to or impacted by company activities.

### GREEN FLAGS

- Policy positions and direct lobbying activities align with company nature commitments and with the ambition of [The Global Biodiversity Framework](#)
- Policy advocacy and lobbying activities within trade associations and industry groups align with [The Global Biodiversity Framework](#)
- Process for identifying and engaging with relevant stakeholders disclosed
- Stakeholder input informs company strategy for addressing nature-related issues
- Implementation of a rights-based approach to engagement with Indigenous Peoples and local communities

## Disclosing Progress

The preceding sections offer guidance to investors interested in engaging with companies on nature. At each step, it is important that companies disclose their progress-to-date. Company transparency on nature action is key for investors to make informed investment decisions, structure effective dialogues, and address financial risk. Importantly, disclosures also help meet the requirements of a growing landscape of voluntary and mandatory accountability mechanisms, such as the [Taskforce on Nature-related Financial Disclosures](#) (TNFD) and the [Corporate Sustainability Reporting Directive](#) (CSRD).

Disclosures should detail material nature-related impacts, dependencies, risks, and opportunities, as well as the targets, strategies, and actions that companies have established to address them. The Green Flags at the end of each section suggest relevant disclosures, with additional considerations described below.

**Assessing impacts and dependencies.** When companies report on the methodologies used for nature-related materiality assessments, they provide investors with the information necessary for them to evaluate the quality of disclosed data. It is important that companies specify the scope (i.e., direct operations, upstream value chain, and/or downstream value chain) of their materiality assessments, along with the metrics and indicators used to assess, measure, and value existing and emerging nature-related impacts, dependencies, risks, and opportunities — complete with the time horizon considered. The TNFD provides [guidance on appropriate indicators and metrics](#), including those specific to [assessment](#).

**Making commitments and setting targets.** Through regular (at least annual) reporting against a set of defined metrics, companies can keep investors and other stakeholders informed on their progress towards their nature-related targets. The [TNFD recommends](#) companies utilize both quantitative and qualitative performance indicators. It is important that progress updates on targets include comparisons to baseline data or reference conditions.

**Transforming the value chain.** The [TNFD recommends that companies disclose](#) on their governance, strategy, and risk management approaches to nature. This includes how executive oversight and decision-making processes incorporate nature-related risk and opportunities, how the company integrates actual and potential effects of nature-related risks and opportunities on their business model, strategy, and financial planning, and how the company integrates nature-related risks into overall risk management. Companies should make it clear to investors what approaches they are utilizing to monitor and manage nature-related risks, not only in their direct operations, but also up and down their value chains.

**Creating an enabling environment.** Company transparency on advocacy for nature-related policies and initiatives is important to ensure that their internal ambition on nature is met with a supportive external environment. Disclosures provide a check against misalignment between internal company policies and external advocacy efforts. Companies should disclose the nature-related advocacy activities they are involved in, including how activities align with goals and targets of [The Global Biodiversity Framework](#) — and any reasons for misalignment. This includes the trade associations where they hold membership. Companies should also disclose their policies and engagement activities with respect to Indigenous Peoples, local communities, and other affected stakeholders. Value chain engagement is essential for bringing action plans to scale.



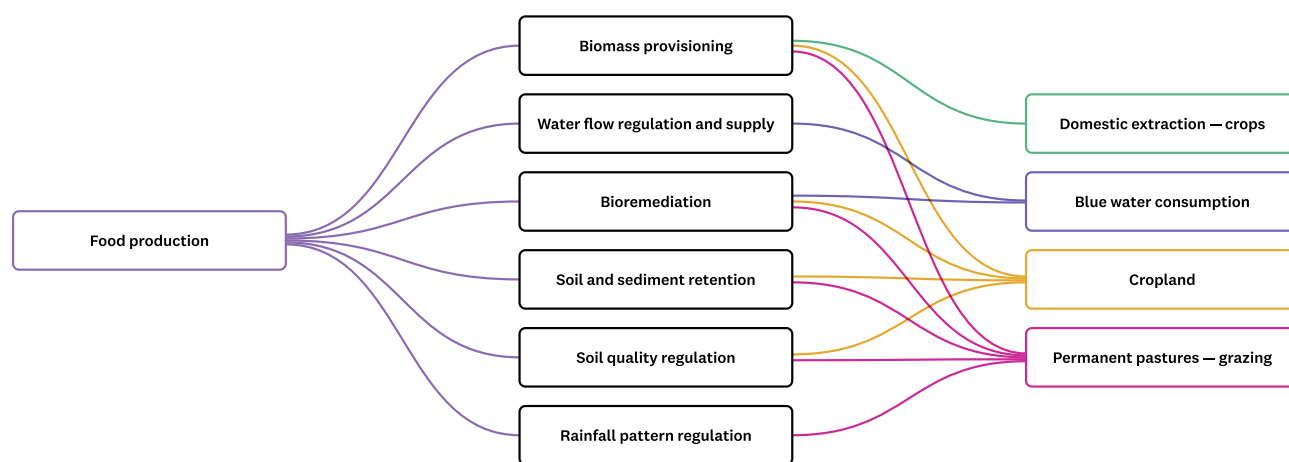
# Appendix

## Calculating the nature dependencies of individual sectors

To calculate the economic cost of nature loss, this report first mapped nature dependencies by sector using the [Exploring Natural Capital Opportunities, Risks and Exposure](#) (ENCORE) database. The most important ecosystem service dependencies (i.e., those rated as “high” or “very high”) were identified for each sector.

To quantify each sectors’ direct reliance on nature, each [ecosystem service](#) was then mapped to the corresponding factor(s) of production in EXIOBASE (Environmentally Extended Input-Output tables). For example, water regulation and supply (an ecosystem service identified in ENCORE) was mapped to freshwater consumption (a factor of production in EXIOBASE). For ecosystem services that could not be mapped in EXIOBASE, estimates were derived from academic research.

### Illustrative example of the linkages between ENCORE ecosystem dependencies and EXIOBASE factors of production



Monetary values were assigned to each factor of production by researching corresponding investment costs in academic research. Then, to estimate a sector’s nature dependency in terms of gross value add (GVA), the quantity of natural inputs used (e.g., freshwater consumption) was multiplied by the corresponding investment cost (e.g., water saving measures). This value was then divided by the sector’s gross output and adjusted using sector-specific GVA-to-output ratios. This process converts the cost of nature loss from gross economic output data from EXIOBASE, which reflects the total economic activity of each sector, to GVA, which reflects the contribution each sector makes to the economy.

Resulting GVA losses for land and water transport were incorporated into the GVA total for each sector of interest based on the amount of land and water transport output attributable to a given sector.

## **Determining the cost by driver of nature loss**

Linkages between nature-loss drivers and ecosystem service availability were established using ENCORE and the supporting academic literature. Then, estimated annual reductions in ecosystem service availability per nature loss driver were quantified through detailed review of the academic literature. To calculate the economic impact of nature loss driver, these estimates of annual reductions were multiplied by the GVA losses previously calculated from the ecosystem dependencies characterizing each sector of interest.

## **Limitations**

The analysis primarily captures costs arising from disruptions to companies' direct operations and does not fully reflect costs from value chain disruptions — which would likely be much higher. Modelling focused on physical risks linked to nature-related dependencies given the difficulty of quantifying additional transition risks that stem from companies' nature impacts and are characterized by uncertain frequency and magnitude.

The cost estimates provided in this report are designed to reflect direct economic losses to companies in the eight focus sectors from ecosystem degradation. They do not capture the full range of potential financial impacts, such as social costs, trade and price effects, or labor market consequences. The model also does not account for systemic ecosystem interactions or environmental tipping points. As such, the results presented here understate the full economic cost of nature loss.

## About Ceres

Ceres is a nonprofit advocacy organization working to accelerate the transition to a cleaner, more just, and resilient economy. With data-driven research and expert analysis, we inspire investors and companies to act on the world's sustainability challenges and advocate for market and policy solutions. Together, our efforts transform industries, unlock new business opportunities, and foster innovation and job growth — proving that sustainability is the bottom line. For more information, visit [ceres.org](https://ceres.org).

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