Rotterdam School of Management
Erasmus University

Erasmus Platform for Sustainable Value Creation & ASN Bank

Conservation through conversation

A framework for shareholder engagement on biodiversity

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Colophon

About the Platform
The Erasmus Platform for Sustainable Value Creation is an academic think-tank at Rotterdam School of Management (RSM), Erasmus University Rotterdam, that collaborates with leading sustainability experts in the financial sector. This report was initiated on the request of its corporate partner ASN Bank.

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All photos show commonly seen but threatened birds in The Netherlands. The cover shows the meadow bird godwit (taken by Soly Moses, derived from Pexels.com). The photos were derived from Pexels.com or Nationale Beeldbank.

Hoopoe, photo by Rajukhan Pathan derived from Pexels.com

Executive Summary

The loss of biodiversity is an increasing problem and threatens the health of our biosphere. Our financial system depends on biodiversity and at the same time constributes to its loss.

One of the instruments financial institutions have at hand to mitigate biodiversity risks and enhance positive biodiversity impact, is shareholder engagement. This study aims to provide an overview of the current state of affairs of the practice of engagement in relation to biodiversity. We aim to answer the question:

How can financial institutions effectively engage on the topic of biodiversity?

From a literature study and round of interviews among experts, we conclude that there are four elementary criteria needed to formulate a biodiversity engagement strategy:

1. Knowledge
2. Workable metrics, indicators & targets
3. Size of equity stake
4. Momentum & legitimacy

These criteria help investors to formulate a strategy. Having a clear idea on how to escalate the engagement process if it is lacking sufficent results, can help.

Knowledge

Engagement requires knowledge and investigation. Affinity with the investee is necessary. For this, financial institutions need to build capacity, both internally within financial institutions as well as externally in meaningful coalitions.

Building internal capacity for knowledge and investigation

- This includes hiring new, perhaps unconventional forms of expertise into your

Table 1 - Framework
Source: Author's own

Knowledge	Workable metrics, indicators and targets
• Build internal capacity • Build external capacity • Strategic partnerships	• Accelerate best practices • Biodiversity as strategic matter
Size of equiy stake	**Momentum and legitimacy**
• Collaborative engagement • Workable size of collaboration • Divide the burden • Ensure incentives and trust	• Prepare the ground • Principle-based investors • File resolutions and vote • Workable escalation hierarchy

organisation.
- Biodiversity is a matter of strategy, which requires awareness and willingness to act at the top of the organisation all the way down to operations. We recommend appointing at least one board member as responsible for the topic biodiversity and striving for a diverse board and organisation in general (Carvajal et al., 2022).
- Decisions made on management level and corporate behaviour are key issues for biodiversity (Michie, 2022). We therefor suggest extending this strategy to the targeted companies for engagement.

Building external capacity can be done through meaningful coalitions and through strategic partnerships
- Meaningful coalitions are for example collaborative actions between financial institutions. Financing such coalitions is an area of concern since coalitions usually require one financial institution to take the lead and others to support. Furthermore, the incentives should be aligned. There have been experiments with acquiring external funding, setting up co-funded foundations or setting up a lead rotation system within the coalition. The latter requires a great deal of trust among the coalition members. One other suggestion is to view the coalition members as a syndicate, all providing finance for the engagement efforts. The fund is divided according to the costs. The lead investor then takes up a proportionally bigger amount of the fund to cover for the costs involved. Finally, Dimson et al. (2018) suggests PRI Collaboration Platform can act as a third-party coordinator in several forms of collaborative engagement efforts.
- There are several examples strategic partnerships between financial institutions and NGOs.

Workable metrics, indicators and targets
Literature and expert findings indicate that there are considerable problems with data obtainability, data quality and the lack of data standardisation. There are several metrics to use, each with their own advantages or disadvantages. Harmonisation of the instruments is expected to be a focal point of attention in the sector the coming years. While this field will emerge, building an engagement strategy requires acting today. We suggest to carefully consider which metric the investor wants to use and why.
- There are companies that already apply workable indicators. Financial institutions could accelerate those approaches and put it on the agenda with other companies.
- A possible success indicator is to evaluate in what way the investee has identified biodiversity as a topic of strategy and to what extent there is demonstrable management awareness and willingness on the topic.
- Most experts find that making biodiversity concrete and target-driven is an important strategy. Examples could be to require investees to minimise deforestation in certain areas, or to increase water quality in other areas.

Size of equity stake
Size matters. That holds for the size of equity stake primarily. Investors who only hold a very small stake in a corporation, are not expected to have a serious 'seat at the table'. Teaming up with other like-minded investors can help. This way, your engagement efforts are backed by more investors (i.e., more equity).

Collaborative engagement has the potential to be effective, cost-reducing and helpful in building momentum
- A workable size of the coalition. Collaboration is most appealing for mid-sized investors and investors are more likely to engage when the target is domestic. Lead investors often have the "necessary resources, skill, motivation and skin in the game" (Dimson et al., 2018). Collaborative engagement initiatives can also be too big to have real effect. This is one of the critiques the Climate Action 100+ received. In terms of preferable group size, Dimson at al. (2018) find that on average the investor group consists of 26 organisations, with 2 domestic investors.
- Ensuring profound incentives and forming a coalition of the willing is paramount. This requires a great deal of mutual trust. Especially when the lead investor is appointed on rotation, there is a risk of parties backing out of the initiative at some point. Defining a growth model with an intentional horizon of 7 years could serve as a trust fundament to deal with these risks.
- Strategic partnerships with NGOs can be useful.

Sovereign engagements also in collaborative efforts, can be effective.
One example is the Investor Policy Dialogue on Deforestation, or IPDD (Tropical Rainforest Alliance, 2021).

Momentum and legitimacy
The literature findings and expert findings indicate that the role of principle-based investors is important. Such investors (e.g., religious funds, NGOs) prepare the ground where mainstream investors can build on. The goal of any biodiversity engagement is ultimately to steer the transition to a net-positive world.

Preparing the ground, building momentum and legitimacy is a key condition for the success of engagement.
- Frontrunners are much needed in this process, although they will not always see a causal effect on their efforts.

Filing resolutions and voting helps, regardless of whether a resolution is accepted.
There are some findings in literature that suggest that the public availability of those resolutions can create positive momentum (Raghupathi et al., 2020). Furthermore, there are emerging initiatives to give more weight to a minority of shareholders on certain topics (van der Elst & Lafarre, 2017). No literature was found on the effectiveness of rejected biodiversity-related resolutions. A full systemic overview of literature on shareholder resolutions is beyond the scope of this report.

Having a workable escalation strategy, can help for the investor's social legitimacy (walk the talk).
Furthermore, it serves as a pressure tool for the effectiveness of the engagement process.

Short-eared owl, photo derived from Nationale Beeldbank

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Introduction

The loss of biodiversity is mainly caused by human interference and is increasingly becoming a worldwide challenge. The economy as a whole and the financial system as well, are deeply embedded in the earth's biosphere (NGFS, 2020). We depend on the services that ecosystems supply us with and are at the same time depleting them through (economic) mismanagement (Dasgupta, 2021). Multiple studies find that over half of the world's GDP is moderately to highly dependent on nature, and quantifying estimates of the value of all ecosystem services range from USD 44-125 trillion (Global Canopy, 2021; NGFS, 2020; World Economic Forum, 2019). The Dutch Central Bank DNB estimates that the biodiversity footprint of the Dutch financial sector is a rough equivalent to a loss of 58,000 km2 of pristine nature, which is represented through roughly 80% of the companies in the share portfolios of Dutch financial institutions. At the same time, they estimate that 36% of the share portfolio of Dutch financial institutions is 'highly or very highly dependent on one or more ecosystem services' (DNB, 2020). This urges the need for financial institutions to formulate effective strategies to deal with biodiversity. There is a broad variety of strategies that are currently being explored or could be relevant – on the public as well as the private side. While the public financial sector is not scoped in in this report, private financial institutions could advance their biodiversity strategies through the pricing of capital (e.g., sustainability-linked loan facilities, issuing green bonds, or launching dedicated funds), or through their relationships with the companies they invest in. The best-known examples are exclusion policies (i.e., excluding companies from investment based on biodiversity-linked criteria) and engagement policies (van Tilburg et al., 2022).

Shareholder responsibility and engagement

Although firms were originally supposed to be responsible to increase profits only (Friedman, 1970), they nowadays ought to fulfil a broader set of responsibilities towards shareholders and other stakeholders. These responsibilities include environmental and social issues as well. The responsibility of shareholders has simultaneously evolved from being solely profit-driven, to avoiding unethical behaviour, to mainstreaming social and environmental issues in risk management, and finally towards the consideration of real-world impact (Busch et al., 2021). When firms fail to fulfil their responsibilities, investors can handle in two main ways[1]: divesting or engaging in the firm. Engagement is defined as investors exercising their rights to influence the way businesses are managed or more broadly 'investor empowerment' (Dimson et al., 2015; Ringe, 2021). In the last decade, shareholder engagement has become one of the most popular strategies to tackle environmental, social and governance (ESG-) related problems from an investor perspective (Dimson et al., 2015; Wagemans et al., 2018).

Engagement on biodiversity: still in its infancy

While the practice has matured on topics like climate change and some social issues, engagement specifically on biodiversity is still in its infancy. Lambooy et al (2017) find that 'tangible strategies for successfully tackling [biodiversity and natural capital] issues' are absent. The approaches developed so far are not clearly enough linked to (financial) risks and opportunities in the past, present or future' (Lambooy et al., 2017). Biodiversity is increasingly included as a topic in sustainable finance and engagement, but regulations on disclosure and policies addressing biodiversity are lacking (UN PRI, 2020). While climate change and biodiversity are two different ecological concepts, they are communicating vessels in the sense that both issues cannot be solved without solving the other. Climate change is one of the (five) main drivers of the loss of biodiversity. At the same time, further weakening of ecosystems could lead to their decreased ability to absorb and mitigate Greenhouse Gas (GHG) emissions. Even though the planetary boundaries on biodiversity are more exceeded than on climate (van Tilburg et al., 2022), in the realm of (ESG) investing the 'E' is often still viewed as an equivalent of climate risk (ESG Investors Wake up to Biodiversity Risk, 2020). Regardless of the disastrous consequences of biodiversity loss and the crossing of planetary boundaries, incorporation of biodiversity into financial policies is lacking (Zandbergen-Albers, 2020).

Aim of this study

This study aims to provide an overview of the current state of affairs of the practice of engagement in relation to biodiversity. We aim to answer the question: How can financial institutions

[1] The main instruments are not the only instruments. For example, there are also in-between methods, like not providing extra capital to a company until the engagement issue is solved. The Norwegian asset manager Storebrand has done so in the past (Olsen, 2022).

effectively engage on the topic of biodiversity? We provide an overview of the latest insights from academia and other relevant organisations like central banks, the Finance for Biodiversity pledge and NGFS. A round of interviews provides further understanding of the standpoints of relevant actors in the field: financial institutions, NGOs, corporations, and other stakeholders.

Structure of the report

This report has two parts. The first part is explorative; it summarises the findings from literature, presents an overview of interview findings and takes a closer look at some practical examples. It starts with a description of biodiversity and on what levels harm is being done. Subsequently, the connection to the economy and the link with finance is discussed. We provide an overview of the main literature in shareholder engagement and present some expert findings. The second part synthesises these insights and presents a framework for shareholder engagement on biodiversity. It includes recommendations for financial institutions and an overall conclusion.

Ruff, photo by Patrice Shoefolt, derived from Pexels.com

Part I

Current state of affairs

Biodiversity

Biodiversity

Biodiversity is observed at many levels: from the living species of plants and animals inhabiting earth, to the populations and communities that they form, to their interactions with the physical environment – culminating in whole, complex ecosystems. The UN Convention of Biological Diversity (CBD) defines biodiversity as encompassing the variability among living organisms from all sources, and the ecological complexes of which they are a part, which "includes diversity within species, between species and of ecosystems" (UN, 1992). Ecological diversity is central to the concept of biodiversity for two reasons. Firstly, the genetic variability among species creates diverse functional traits, enabling the myriad of interactions necessary to form a self-organising, regenerative biosphere whose systems regulate all living things (Steffen et al., 2015). Secondly, each living organism forms an "information bank" of genetically unique material that has evolved over millions of years, which determines the genetic potential for all future life on earth (Steffen et al., 2015). In short, biodiversity is all current, and the potential for all future, life on earth. Throughout this report, the terms nature, biodiversity, environment, and ecosystems are used. While nature encompass all existing systems of the earth (including the weather, mountains, etc.) biodiversity is that part that is alive within those existing systems (CBD, n.d.). Biodiversity is the variety of ecosystems, which on their part represent natural environments, which refer to a context or surroundings of interacting flora and fauna on earth. Ecosystem services are seen as the services that ecosystems provide for humankind (European Environment Agency, 2020).

How to view nature

Despite radical trends post the industrial revolution distancing day-to-day human interaction with the environment, our society and economy is nonetheless inextricably embedded in nature (Dasgupta, 2021). Biodiversity provides ecosystem services (Winn & Pogutz, 2013). CICES outlines three services provided by ecosystems that enable and sustain human well-being: provisioning services, regulating and maintenance services, and cultural services (Roy Haines-Young & Potschin, 2018). Provisioning services include the provision of materials and energy such as food, fresh water, and fuel – the primary resources on which human livelihood depends. Regulating and maintenance services ensure the stability of the ecosystem through maintaining the atmosphere composition; regulating the climate, flow of water, decomposition of waste; and disease and pest control. This category ensures the conditions to produce provisioning services. Lastly, cultural services encompass non-material benefits, and refers to the strong cultural, aesthetic, and religious relationship that human beings share with nature (Dasgupta, 2021). In providing these services, nature is essential for human quality of life. Most contributions cannot be fully replaced by manmade alternatives, while others are even irreplaceable (Díaz et al., 2019). Additionally, it is impossible to ignore the importance of biodiversity in achieving the UN Sustainable Development Goals – with current negative trends in biodiversity undermining 80% of its targets (Díaz et al., 2019).

Kennedy et al. (2022) view the ecosystem services approach as one of the two main methods in corporate biodiversity measurement. The other main method is natural inventory. Where the ecosystem services approach takes an anthropocentric lens focuses more on mapping the flow of benefits derived from ecosystems, the natural inventory approach has a more eco-centric lens and focuses on specific biodiversity components (stocks). The authors find that both methods have their limitations, mainly because they fail to accurately integrate the dynamics of ecosystem changes (e.g., when critical points are exceeded). Moreover, while ecosystem services are a useful tool for recognising the dependence on nature, valuing biodiversity as a service is limiting in and of itself (Victor, 2020). Reducing nature's value entirely to how it serves human needs and desires is a problematic instrumental view that is recognised as one of the indirect drivers of biodiversity loss. Through viewing nature as a pool of material resources, it enables and justifies large-scale, systemic exploitation of nature, and implies its substitutability. As such, recognising the intrinsic value of nature – namely its worth independent from human experience – is paramount for refuting the ideology that enabled its destruction in the first place (Díaz et al., 2019; Thompson, 2015). Whether or not to view biodiversity of having intrinsic or instrumental value, is ongoing. Some scholars rather argument for a focus on attitudes and a human virtuous relationship towards nature (Thompson, 2015).

Biodiversity loss and transformative change

The possibility of irreversibly destabilising the earth system is not a distant reality: most biodiversity indicators are currently in decline.[2] Moreover, the rate of species extinction is tens to hundreds of times higher than average over the last 10 million years with 25 per cent of species and plant groups (approximately 1 million) currently classified as threatened (WWF, 2020). The key direct drivers of this damage to biodiversity (in decreasing order of impact) have been changes in land and sea use, direct exploitation of organisms, climate change, pollution, and invasion of alien species (Díaz et al., 2019). In terrestrial and freshwater ecosystems, the largest relative negative impact has been land use change, where agricultural expansion is the main cause with one third of terrestrial land surface being used for cropping and animal husbandry. Direct exploitation has had the second largest negative impact, mainly through harvesting, logging, hunting, and fishing. For marine ecosystems, direct exploitation has been most damaging, followed by land/sea-use change through coastal development and aquaculture. Biodiversity loss is further motivated by underlying, indirect drivers including societal values and behaviours, population trends, trade, technological innovation, and governance (Díaz et al., 2019). To tackle biodiversity loss, both indirect and direct drivers must be addressed. The conservation and sustainable use of nature will not be achieved under current trajectories, meeting goals such as those embodied by the Paris Agreement requires urgent transformative change (Díaz et al., 2019; Kok et al., 2018).

Economic sectors

The direct impact and dependency of a company on biodiversity is primarily contingent on the economic sector in which it operates and its position within the supply chain. This report uses sectors to describe businesses in terms of their economic activity (with primary sector indicating resource extraction; secondary sector as transforming these resources; tertiary sector as the provision of services[3]), and industry to refer to the product or service a business provides. Looking at the economic sector in which business operates has consequences on the way in which it relates to nature. Resource producing companies in the primary sector (e.g., mining, fisheries, agriculture) are in direct physical contact with the earth, and their relation to nature is easily attributable. In the secondary sector, manufacturing companies (e.g., food, clothing, paper producers) are tied indirectly to nature through their supply chain. Lastly, companies in the tertiary sector (e.g., banks, retailers) are linked to the operations of primary and secondary companies in their portfolio through the financial capital and services they provide. As such, regardless of physical interaction with nature, companies in all sectors share the responsibility and effect of the impacts and dependencies on biodiversity (van Oorschot et al., 2020). Beyond mediating the physical relationship with nature, a company's sector also influences the appropriate response for biodiversity action. Companies operating mainly in the primary sector should focus on their own activities, with specific measures including the sustainable exploitation of ecosystems and restoration measures. Those in the secondary and tertiary sector should focus on critically examining their interaction with the primary sector and influencing their supply chain – not solely by relying on reported data from their suppliers. Specific measures for this include assessing their sourcing practices, reducing environmental pressures in their production process, the circular use of resources, and compensation schemes for positive and negative impacts (van Oorschot et al., 2020). In fact, processors, traders, retailers, and investors have a key role in influencing primary producers and have the most potential for impacting supply chains, due to their central and strong positions, encouraging interaction with both producers and consumers (Wilting & van Oorschot, 2017). The reduced number of actors at these levels increases their influence and allows a small number of actors to realise major changes (van Oorschot et al., 2020). Structural path analysis of supply chains in various industries show that 45-50% of biodiversity impact is caused upstream of direct suppliers (Wilting & van Oorschot, 2017). As companies focus primarily on recording the direct impacts of their most relevant suppliers, substantial biodiversity losses are overlooked in supply-chain impact reports (Wilting & van Oorschot, 2017). This inaccurately minimizes the role of companies outside the primary sector and further emphasises that companies downstream should be targeted as well (Finance for Biodiversity, 2022).

[2] In fact, IPBES (2019) finds that 75 per cent of the Earth's land surface is significantly altered; 66 per cent of the ocean area is experiencing increasing cumulative impacts; and over 85 per cent of wetlands (area) has been lost.
[3] We use the three-sector model (Fisher, 1939).

Activities and supply chain position

Several company activities have a significant direct impact on biodiversity. Most harmful activities are found in the primary sector, including fisheries, agriculture, harvesting, and mining. IPBES (2019) finds that fisheries have the largest biodiversity footprint of all – four times larger than that of agriculture. Additionally, land clearing, crop production, and fertilization associated with agriculture are responsible for 25% of global GHG emissions. Mining sites occupy 1% of land area and have negative effects on vast areas beyond that through pollution of surface and ground water and air quality degradation. Moreover, ocean mining is increasing, with approximately 6,500 offshore oil and gas installations worldwide. In 2017, global harvests of roundwood continued to generously exceed area of planted forests by an estimated 3.89 billion m3, of which half was used for industrial purposes and half as fuel wood (NGFS, 2020). Other actions with direct impacts in biodiversity include infrastructure, tourism, and transportation. Infrastructures such as dams, roads, and cities have highly negative impacts on local biodiversity – and contribute significantly to land-use change. While urban areas account for under 3% of total land area, the international Union for the Conservation of Nature estimates that infrastructure expansion results in 40% of global habitat loss (BCG, 2021). Moreover, fast, and ill-planned expansion in rapidly growing areas (particularly in Africa and East Asia) are especially damaging to nature. Tourism's negative impact is increasing as well: its carbon footprint rose by 40% from 2009 to 2013, with 8% of CO_2 emissions from transport and food consumption driven by tourism. This negative impact is exaggerated with higher-end options. Lastly, the airborne and seaborn transportation of goods and people contribute to 15% of global CO_2 emissions and has led to a significant rise in invasive alien species. The number of air flights has doubled globally from 1980-2010, and seaborne carriage has quadrupled for general cargo (NGFS, 2020). A minority of companies engage in these activities as their core business process. However, most companies rely on and encourage these biodiversity damaging activities nonetheless through their interaction with other companies. These connections are exposed when examining how different economic sectors interact, and how companies are connected through their supply chain.

Industries

The particular products and services that a business provides also has an impact on their interaction with biodiversity, primarily through the activities required in the value creation process.[4] This warrants an overview of the industries and value chains that relate to nature. While variation between businesses exist, the industries and associated value chains most commonly flagged for their dependence on biodiversity include a) agriculture, forest products and fisheries, b) fashion (textiles, apparel, luxury goods), c) food, beverages and tobacco, and d) electric utilities. In terms of the industries and associated value chains with the highest negative impact on biodiversity, a) agriculture, forest products and fisheries, b) food, beverages, and tobacco, c) infrastructure and mobility, d) energy and mining, e) fashion, and f) other including pharma, cosmetics, and consumer electronics, are most often reported (Finance for Biodiversity Pledge, 2022). In fact, the Boston Consulting Group (2021) estimates that roughly 90% of biodiversity loss can be attributed to four dominant value chains: food, infrastructure and mobility, energy, and fashion – with food/agriculture accounting for over 50% of this. A summary of industries and their contribution to the main drivers of biodiversity loss is summarised in figure 1. A useful tool for assessing the impact and dependencies of specific industries and subindustries is developed by ENCORE.[5]

Geo-spatial factors

Due to an increasingly globalised economy and the complexity of supply chains, biodiversity impacts are often felt in distant and disperse locations. For example, 80 to 99% of the biodiversity impact of food consumption in industrialised countries occurs abroad (Green et al., 2019). This complicates the attribution of biodiversity impacts and dependencies for two reasons. Firstly, opaque supply chains and complex networks of global trade mask the drivers contributing to local biodiversity losses. Secondly, as the effects on biodiversity are highly regional, the level of impacts are usually determined by location (Green et al., 2019). As such, evaluating biodiversity impact depends heavily on the location, and a complete understanding of geo-spatial variations across the globe is essential.

[4] This report uses sectors to describe businesses in terms of their economic activity (with primary sector indicating resource extraction; secondary sector as transforming these resources; tertiary sector as the provision of services), and industry to refer to the product or service a business provides.

[5] ENCORE is a biodiversity data providing tool to map the impact of environmental change on the economy. It was developed by the Natural Capital Finance Alliance together with UNEP-WCMC.

On a global scale, nature demonstrates astounding variation. This results from millions of years of evolution responding to diverse combinations of water-energy dynamics, geology, and tectonic activity. The ecosystems that have thus developed each have a unique ecosystem structure and function, sustaining various compositions of ecological communities with distinct species populations, organismal traits, and genetic composition. Each major ecosystem faces different intensities, types of environmental pressures, and has varying abilities to withstand these.

Impact of biodiversity loss varies per type of natural environment. Particular attention can be paid to tropical and subtropical dry and humid forests, temperate grasslands, wetlands, and shelf systems[6]. Tropical and sub-tropical forests cover 52% of forested area and holds 70% of the carbon stock in forests globally. The rate of deforestation is highest in South America and Africa, driven primarily by large scale commercial agriculture (44%), followed by local subsistence agriculture (33%), urban expansion (10%), infrastructure (10%), and mining (7%). Temperate grasslands cover 5-10% of global terrestrial surface and houses a high biodiversity of animals. It has faced the highest level of degradation of any biome, with approximately 60% of it converted by habitat conversion, fragmentation by transport infrastructure, and local overgrazing. Wetlands, covering around 6% of the worlds land surface, are responsible for an estimated 21.5-30% of nature's contribution to people through providing food, freshwater, and protection from erosion, natural disasters, and pollution. Moreover, they are declining rapidly; by approximately 31% between 1970 and 2008 – driven by land/sea use change, invasive species, and pollution. Lastly, shelf systems (which extend from the shoreline to 200 metres into the ocean) cover 8% of the earth's surface and contribute 90% to the world's marine production. It is a highly accessible and productive biome that is put under extreme pressure from fishing, eutrophication, waste, habitat fragmentation and underwater noise from shipping (Díaz et al., 2019).

Figure 1 - Summary industry dependencies and impacts
Source: retrieved from SBTN (2020)

[6] Covering 8% of Earth's surface, shelf systems are found from shoreline to 200m deep (coral, kelp forests, etc.).

Hotspots

Conservation efforts, due to the logical consideration that priorities must be set because of limited resources, have focused on biodiversity hotspots (Kareiva & Kareiva, 2017). Biodiversity hotspots are characterized by a combination of exceptional biodiversity (being particularly rich in rare, endemic species) and facing considerable habitat loss. Currently, the IPBES recognises 35 terrestrial biodiversity hotspots, covering about 17.3% of the Earth's terrestrial surface. On average, biodiversity hotspots decline 74% faster than biodiversity across the world as a whole (Díaz et al., 2019). In general, biodiversity hotspots are affected by the same threats as biodiversity found worldwide, only more intensely (Brooks et al., 2002). However, each hotspot is faced with threats that are especially impactful for them. Table 3 in the Appendix highlights the key threats facing the 10 biodiversity hotspots that the Critical Ecosystem Partnership Fund currently funds conservation efforts in. Although hotspots have had a significant role in prioritizing conservation efforts, they are not free from criticism. The 'simple' species counts at the heart of this approach offer a (too) simplistic interpretation of biodiversity and undermine vast ecological areas that contribute significantly to the generation and maintenance of biodiversity (Marchese, 2015). Moreover, analysis has revealed a low correlation between high-diversity areas and high-ecosystem-service areas (Kareiva & Kareiva, 2017).

Crested lark, photo by Jonathan Clark, derived from Pexels.com

Biodiversity's relation to finance

The most significant way by which financial institutions interact with biodiversity is through the companies they invest in. As enablers of economic activity, the way in which financial institutions allocate capital determines the extent of human demands on nature (NGFS, 2020).

Double materiality

A defining characteristic of the relation between finance and biodiversity is that financial institutions both impact and are affected by biodiversity, i.e., concept of double materiality (Täger, 2021). Following from this, when financial institutions contribute to biodiversity loss, they actively contribute to the risks they hedge against, by exacerbating the decline of ecosystem services (NGFS, 2020). On the one hand, financial institutions are affected by biodiversity. Due to the embeddedness of the economic system within nature – and its reliance on ecosystem services – the companies in which the financial sector invests are dependent on biodiversity. On the other hand, financial institutions contribute to its deterioration through allocating capital to activities and companies that harm biodiversity. Currently, an estimated USD 78-91 billion is invested in global biodiversity finance per year. However, estimates on financial flows necessary for reaching important biodiversity milestones (such as the Aichi targets) approximate required financial flows of 150-440 billion USD annually (Global Canopy, 2021). The financial sector actively invests in companies that increase their exposure to environmental risk (NGFS, 2020). Although investment in biodiversity restoration and protection is necessary, financial flows that negatively impact biodiversity must be reduced as well (OECD, 2020; Working Group on Biodiversity, 2021).

Risks

Through the financial sector's endogenous relation with biodiversity, it is exposed to physical/systemic, transition and reputational risk (van Tilburg et al., 2022). Risks associated with the dependence of the financial sector on biodiversity are physical/systemic risks. Physical risks are the result of failing ecosystem services leading to inaccessibility or disruption of a natural resource – usually on a local scale. This can represent credit and investment risks to financial institutions due to poor investment results or business default (Working Group on Biodiversity, 2021). The DNB estimates that Dutch financial institutions hold EUR 510 billion in investments (36% of their portfolio) highly dependent on one or more ecosystem services – exposing them to physical risk. Systemic risks are declines in the market value of investment portfolios due to large scale failure of ecosystem services. This risk is difficult to estimate, as it requires forecasting many interconnections and feedback loops, and is therefore not integrated in day-to-day risk management (DNB, 2020; van Tilburg et al., 2022). Increasingly, the concept of 'green swans' is emphasized (Bolton et al., 2020; Chandellier & Malacain, 2021; van Tilburg et al., 2022).

Risks related to the impact financial institutions have on biodiversity are transition risks and reputational risks. Transition risks result from misalignment in a financial institutions portfolio with transformational economic change. One good example of such a situation is the debate around Rabobank's portfolio of high transition risk borrowers in the agricultural sector (Manifest Climate, 2022). This can result from technological break throughs, stricter government measures and regulations, or changing customer preferences that lead to stranded assets (DNB, 2020; NGFS, 2020). Closely related are reputational risks, which stems from negative behaviour of companies in the portfolio. DNB finds that 14% of the Dutch financial institution portfolio is invested in companies with recent environmental controversies (DNB, 2020).

Strategies and instruments for financial institutions to tackle biodiversity issues

Although some investors are indirectly addressing biodiversity-related risk through adopting sector specific policies on, for example, deforestation, many investors still have limited awareness and few commitments to biodiversity investment policies (van Tilburg et al., 2022). Common strategies to tackle biodiversity issues are raising awareness, adopting commitments and initiatives, investment allocation, stewardship, policy, and meaningful data (UN PRI, 2020). In particular, the Mitigation Hierarchy (see Figure 2) elaborates

on which elements to prioritise when transitioning from net negative outcomes to net positive, starting by avoiding and minimising negative impacts, then restoring areas of biodiversity degradation, and lastly incorporating positive actions (UN PRI, 2020). In order to do that, investors need to build internal capacities to ensure awareness of biodiversity's importance. When allocating investments, biodiversity-related risks and opportunities must be assessed, and filters should be put in place to exclude companies based on biodiversity criteria. Capital should be allocated to sectors or business models that avoid and reduce biodiversity loss and increase positive biodiversity outcomes. Stewardship can be utilised to engage with companies to avoid and minimise biodiversity impacts. Particular attention should be paid to companies who engage in activities with known negative impacts on biodiversity, like deforestation (UN PRI, 2020). While policy on biodiversity is less developed than that on climate change, further developments in the EU Taxonomy, Convention on Biological Diversity's post-2020 global biodiversity framework, and the EU's Biodiversity Strategy for 2030 show that biodiversity will increasingly be included in sustainable finance policy. Investors can engage with policy makers to reform incentives that drive biodiversity loss and increase pressure on disclosure. Investors should engage with companies to increase the availability of meaningful and consistent biodiversity data (UN PRI, 2020). To help guide investors and businesses on how to assess their interaction with nature, the Taskforce on Nature-related Financial Disclosures (TNFD) has created a voluntary analytic assessment process LEAP (locate, evaluate, assess, prepare). Furthermore, the need to harmonise and standardise methods and instruments to map biodiversity impacts and dependencies is well-recognised. PBAF is one of the instruments that aims for that (PBAF, n.d.).

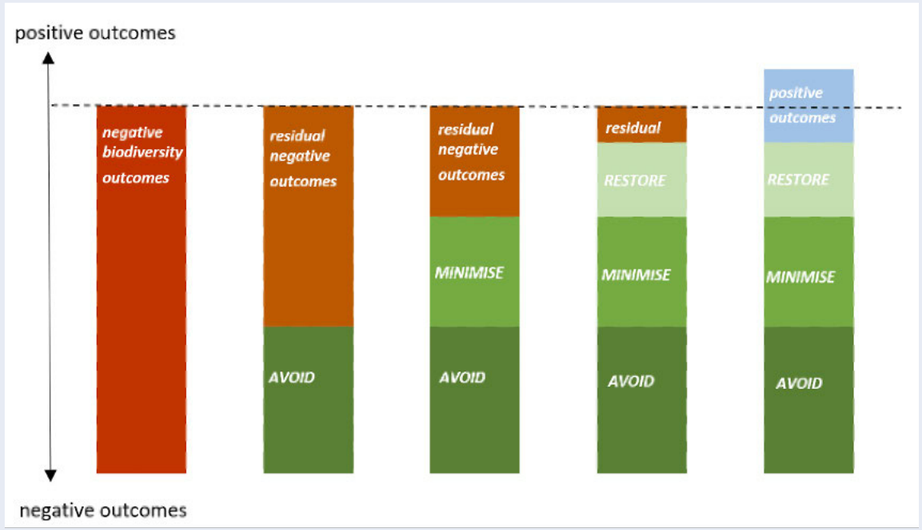


Figure 2 - The mitigation hierarchy
Source: adapted from the Principles of Responsible Investment (PRI) (2020)

Shareholder engagement

The previous section explored the concept of biodiversity and its relation to finance. This section dives into shareholder engagement – as a general practice in financial institutions, but also in relation to biodiversity. A brief history of the practice explains the important role it gained in the financial sector. Several types of shareholder engagement are explored to understand which are better suited to deal with biodiversity and which are not.

The rise of shareholder engagement

Shareholders engage with investees on several topics. The practice increasingly is focused on influencing corporate decision-making, which stretches beyond formally submitting resolutions or voting at annual meetings. It is an increasingly important instrument and while it is still mostly used in the communication with larger companies, engagement with mid-sized companies is developing as well (Gatti et al., 2022). This practice has its origin in focusing on financial performance only (Friedman, 1970). However, there is a growing focus on social and environmental issues. Different developments from the 2000's onwards have emphasized the need of all levels to act on these issues, such as the emergence of the concept of "ESG"[7] by the United Nations Global Compact in 2004, the adaption of the UN's sustainable development goals in 2015, and the Paris Agreement in 2016 (Ringe, 2021). Arguable, the inclusion of the private sector into social justice ideals has also contributed to a conceptualisation of environmental and social issues as a risk to be managed (Michelon et al., 2020). Increasingly, awareness on social and environmental issues stretches beyond the avoidance of unethical behaviour and purely risk management towards a concern for real-world impact (Busch et al., 2021). While engagement is on the rise as an important practice for financial institutions to deal with social and environmental challenges, the effectiveness of the practice is debated in literature. Derwall & Koedijk (2022) for example find that although shareholder engagement can improve profits and the ESG score of the target corporations, there is little evidence that ESG-engagement results in an evident improvement of the actual environmental and social impact of the company. Gatti et al (2022) however find that shareholder engagement is effective. They find that it leads to corporate practice changes and that it affects voting behaviour.

Types of engagement

Investors can engage with portfolio firms in multiple ways, such as writing letters to the firm, asking questions at annual meetings, filing for shareholder resolutions, and discussions with management or the board (Goodman & Arenas, 2015). These discussions can be either private or public, of which private dialogue is often described as the main approach (Dimson et al., 2015; Dyck et al., 2018; Krueger et al., 2018; McCahery et al., 2016). In private engagements, 75% of ESG-engagements are financially material. Engaged investees financially perform higher (Bauer et al., 2022). Shareholder resolutions on environmental and social issues are rarely actually voted on (Dyck et al., 2018).

From disclosure to impact and targets

Engagement on biodiversity has so far focused primarily on disclosure. This points out the need for a transition towards more focus on impact and targets. Firms experienced a vast increase in CSR[8] disclosure due to transparency proposals by shareholders over the period of 2006 to 2012. However, the actual CSR practices of these firms appeared to have worsened over that same period (Michelon et al., 2020). This clearly illustrates the necessity to move beyond solely asking questions and increasing disclosure. While this might help investors assessing risks, it does not extend to society by creating impact (Doan & Sassen, 2020). Yet, moving the needle beyond disclosure might also lower the success rate of the engagement. In fact, when reorganisation is demanded, the chance of success lowers by 16.3% compared to the overall rate (Barko et al., 2021).

How to engage most effectively

Multiple conclusions are found in literature. Engagement is a process in which two conflicting interests are

[7] Environmental, social, governance
[8] Corporate social responsibility

involved: it is aprocess of simultaneous cooperation and confrontation between investors and firms. It is a reputational threat and dialogue coming together to create common ground between the two parties. This would lead to mutual understanding despite initial conflicting interests. The key steppingstone in this process is the 'frame', a shared definition of the situation that creates common ground (Beccarini et al., 2022; Ferraro & Beunza, 2019). This process also emphasises the mutual aspect of engagement in which investors must show commitment and discipline to gain trust and motivation from the firms to fully accept the engagement (Ferraro & Beunza, 2019).

Private engagement furthermore consists of steps with multiple rounds of dialogue and an action plan in the end. The action plan is essential as it describes the goal and recommendation of the engagement, and this is where it can move beyond disclosure efforts towards actual target setting and impact (Semenova & Hassel, 2019). This is also advocated by the Finance for Biodiversity Pledge (Finance for Biodiversity Pledge, 2022). They identify three steps for engagement: determining goals and targets, planning the engagement and tracking the process, and validating the engagement results. Even though making impact is the most integral part of engagement, due to lack of suitable metrics very few investors analyse their impact through engagement. There are some determinants described that affect the impact of engagement, such as the cost of reform for the firm, investor influence, and the company's level of ESG-experience (Kölbel et al., 2020).

Escalation hierarchy

Engagement can be seen as sequence of actions or phases (Beccarini et al., 2022; Schormair & Gilbert, 2021). Shareholder engagement practices entail several actions, which can be understood in an escalating order. An escalation hierarchy is a ladder of consequential actions if the engagement efforts prove to be unsuccessful. Some studies find an escalation strategy an integral part of engagement (Birkmose & Madsen, 2021). An escalation ladder is characterised by a set of actions that are of increasing intrusiveness on the investee and the relationship between the investor and the investee. At the bottom of the ladder, actions start with sending letters to the company, and having informal or even formal dialogues with the company. Going a step further, investors might consider issuing or supporting shareholder resolutions or voting. Usually, the ultimate action is excluding the company from the investment universe. This consequently means that the investor will not be able to exercise influence over the company (Lambooy et al., 2017). What type of actions an investor can take, typically depend on the jurisdiction the investor belongs to (UN PRI, 2018). Robeco Asset Management for example, considers escalation strategies like 'contacting the board, issuing a public statement, using voting, filing a resolution, seeking legal remedies, and reducing exposure' in the investment universe. Furthermore, Robeco could seek collective engagement, attend a shareholder meeting in person or might consider adverse proxy voting instructions at a shareholder meeting. Lastly the nomination of directors is also an escalation action (Robeco, 2022). UN PRI mentions contacting the board, directly or at a shareholder meeting, collaboration with other investors, the use of public statements or media campaigns, filing resolutions, voting against the re-election of directors, submitting nominations for the board, legal actions, threatening to reduce exposure or (last resort) divest (UN PRI, 2018). Divestment can be normatively motivated, but also motivated from an increased perception of risk (Norges Bank, 2019). Before divesting completely, investors can also (temporarily) stop providing additional capital to the company. An example of that is asset manager Storebrand that put Bunge and ADM under observation (Olsen, 2022). It must be noted that adjusting the weightings of an investment is only possible for active investors (UN PRI, 2018). Next to divesting, litigation is also seen as a last-resort action, that can even have a fiduciary motivation (UN PRI, 2018). When escalation is considered appropriate, is a matter of investor's preference and should be part of the engagement policy. Lastly, while the actions above can be used solely for their escalation purposes, they can also be considered as valuable stand-alone measures. This underscores the importance of communicating to the investee whether a measure should be seen as an escalation and a disapproval of the progress in the engagement process.

Engagement on biodiversity

Although the topic of biodiversity is gaining awareness, policies and regulation on disclosure are still often lacking (UN PRI, 2020). The focus still lies mostly on climate (Zandbergen-Albers, 2020). And even when the engagement is targeted on ESG issues, investors are still often focused on traditional financial activism (Semenova & Hassel, 2019). Typical target firms still have the same characteristics such as being large, young companies with low leverage. These have not been adapted for engagement on ESG-specific issues, and biodiversity is yet a more specific and complex topic. The term biodiversity is often considered unclear and complex by both investors and firms. It is an ambiguous subject due to the complexity of interactions and feedback loops, uncertainty of outcomes, and non-linear dynamics of biodiversity. To deal with that, the subject is regularly broken down into indicators which can vary across investors. The distinct indicators are assigned different degrees of materiality by both investors and companies. A 2017 study shows that most materiality was assigned to carbon emissions, whereas other indicators among like water use, land use, and chemicals received little attention (Lambooy et al., 2017). Due to the perceived vagueness of the concept and indicators, investor expectations on good practices are not aligned or consistent. This prevents companies from fully understanding what investors require (UN PRI, 2020). Furthermore, the dependencies and impact on biodiversity are also highly localised across value chains. For engagement purposes, this makes it challenging to aggregate biodiversity data at firm-level (UN PRI, 2020) because biodiversity impacts are often felt in distant and disperse locations, as highlighted in section two. Water use may be an important indicator in regions with high water scarcity, but not in others. E.g., five countries in Asia are responsible for 60% of plastic waste entering the ocean. This makes pollution or ocean protection as indicators specifically important for parts of the value chain located in these areas (BlackRock, 2021). The locality of the issue emphasises the need to involve local stakeholders and gain better understanding of local conditions (VBDO, 2020). It could also stress the importance of specifying the engagement topic to a particular realm or biome, geographical area, and biodiversity challenge, e.g., 'deforestation in the Amazon rainforest' (Finance for Biodiversity, 2022). One overarching complexity about engagement on biodiversity issues is the lack of awareness of a relationship to financial value (BlackRock, 2021; Lambooy et al., 2017).

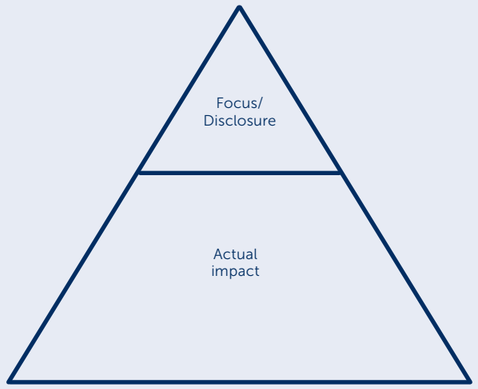
Data and metrics and the challenges

Finance for Biodiversity Pledge identifies six main measurement approaches: the Corporate Biodiversity Footprint (CBF), the Biodiversity Footprint Financial Institutions (BFFI), the Species Threat Abatement and Restoration (STAR), the Global Biodiversity Score for Financial Institutions (GBSFI) and the Biodiversity Impact Analytics powered by the Global Biodiversity Score (BIA-GBS). Besides these quantitative methods, PBAF can be added to that lexicon. PBAF aims to standardise existing impact and dependency mapping tools, and harmonises qualitative and quantitative approaches. It has published three 'standard works' for several financial institutions – from the ones starting with the topic biodiversity, to the ones who have more experience and are ready to implement. PBAF aligns with TNFD (PBAF, n.d.). The Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) can be used for risk management, communication and stakeholder engagement, and biodiversity target setting and portfolio alignment. It includes both dependencies and impact and looks at spatial data. However, the assessment is done based on a generic global screening and should be complemented with more specific data. It also does not include impacts and dependencies of the up- and downstream value chain.

Since the five different drivers for biodiversity loss are only fully included for three out of six measurement approaches, and the approaches focus on different coverage, scopes, metrics, and data types, they will likely result in a variety of outcomes (Díaz et al., 2019). This is a recurring issue in the world of ESG ratings and attempts to quantify environmental impacts, where environmental ratings from six major rating agencies correlate for a mere 0.53 (Berg et al., 2022).[9] An additional problem is the quality of data. Data is often either self-reported or derived from algorithms, which negatively affects reliability (Ringe, 2021). Even if standardised metrics were established, appropriate biodiversity data on firm level is lacking (UN PRI, 2020). Many firms already report on environmental impact mainly on their CO2 emissions. However, water and land

[9] In comparison to a correlation between traditional credit ratings of 0.99, it is evident that measurement of the environment has not reached consensus.

Figure 2 -
Schematic overview
Source: Author's own



use reports are frequently still lacking. The creation of a benchmark such as the biodiversity impact of the MSCI world index, could motivate companies to report more extensively (Kan, 2021). Existing measurement approaches do not adequately assess biodiversity loss throughout the supply chain, while 45% of biodiversity loss caused by food and chemical sectors in the Netherlands occurred in the upstream supply chain. Furthermore, 50% of the loss in the supply chain occurred abroad (Wilting & van Oorschot, 2017). This emphasizes the need to look further than direct and sectoral impact, towards analysing supply chain and local characteristics.

Obtaining data is difficult as well. Most data are self-reported, which assumes a firm knows what is going on in the supply chain. That is often not the case. This transparency fallacy means the degree of transparency achievable is hindered by the current supply chain conditions around multinational corporations, including the complexity of supply chains, the geographical and cultural distance between the links, and the resistance to transparency measures by suppliers (Gold & Heikkurinen, 2018). It is important to differentiate between direct impact/dependencies that are related to the firm's own activities, and indirect impact/dependencies that are related to the up- and downstream supply chain activities. Sectors downstream the value chain are among the prioritised targets to engage with, in order to drive systemic change throughout the whole value chain (Finance for Biodiversity Pledge, 2022). The complexity and ambiguity regarding biodiversity metrics and data is problematic for both investors and firms, to the point of even preventing investors from doing biodiversity investments (Credit Suisse, 2021). Despite standardisation ambitions of PBAF, global standardised metrics are still lacking. This results in unaligned or inconsistent investor expectations on good practices. Yet, since the characteristics of biodiversity loss are not compatible with traditional financial risk management tools, mitigating actions on a precautionary basis are advisable (Kedward et al., 2020). These actions would be justified mostly by qualitative assessments of system-wide risks, instead of an attempt to gather detailed quantitative data. Also, Kan (2021) sees a division in measurement approaches, divided into the 'broad' and

'detailed' categories. The broad category means screening the entire portfolio at surface level to identify the lowest performers. The detailed category entails a more detailed screening of a few potential new investments to help steer them towards improvement. Lastly, some scholars consider it problematic that mapping biodiversity impact and dependency data is mostly in the hands of private organisation. This pleads for making biodiversity data freely and openly available (Stephenson et al., 2022).

Quantitative versus qualitative measures: A synthesis

There is much focus at the intersection of biodiversity and finance on improving biodiversity reporting and on improving biodiversity indicators to create quantitative evaluations of biodiversity impacts and dependencies, potentially tying this to a monetary figure that can be used in risk evaluations. This has definitive benefits, including increased accountability, facilitating materiality assessments and decision making, enabling quantitative target setting, and improving the communication of the risks and dependencies in a financial setting. However, the conversion of biodiversity metrics into monetary valuations also suffers from several difficulties, ultimately struggling to provide meaningful estimates (Kedward et al., 2020). No universal metric for biodiversity applies, nor is a single metric all-encompassing. The concept of biodiversity is complex in terms of interactions and feedback loops, uncertainty of outcomes and a general non-linear dynamic. This is further amplified by the concept of double materiality. Understanding biodiversity data and measurements is a matter of both risk as well as impact. Moreover, monetary valuations implicitly assume the substitutability of biodiversity, where one area providing similar ecosystem services is equated to another (Atkinson et al., 2012; Victor, 2020), or might result in an undervaluation of sectors that contribute less to GDP but with societal implications (NGFS, 2020). Furthermore, monetizing biodiversity is the ultimate anthropocentric valuation of nature, where biodiversity is only made valuable to the extent that it provides a service to humans (Victor, 2020). To deal with these complexities, Kedward et al (2020) proposes a synthesis between quantitative methods and a more qualitative, precautionary, and common-sense dimension. PBAF is one of the standards that emphasises harmonising both quantitative and qualitative assessments. A qualitative high-levels first scan can help identifying the high impact risk sectors. This can be supplemented with more in-depth more detailed quantitative assessment (PBAF, 2022).

Cooperation between investors and other stakeholders

One emerging trend is collaborative engagement (Derwall & Koedijk, 2022). Collaborative engagement increases investor empowerment, lowers the accompanied costs, creates a system of checks and balances, and can result in great successes. Especially for engagement on environmental and social topics, coordination can be beneficial. Collaborative engagement is characterised by a two-tier engagement with a lead investor and support by collaborative investors. This approach leads to higher success rates, especially when the leader is geographically, linguistically, culturally, and socially suitable for the target firm (Ceccarelli et al., 2021; Dimson et al., 2015, 2018). Collaborative engagement is a signal of being committed to resolving ESG issues. Some main challenges of cooperative engagement include free-rider problems, competition between investors, coordination costs, and the regulatory barrier of coordination such as "fair disclosure" in which collaborative parties should first disclose on their collaboration (Ringe, 2021). A significant number of investors state that they do not collaborate on engagement because of legal concerns (McCahery et al., 2016). Coordination platforms such as the UN PRI ICCR, Ceres, The Platform Living Wage Financials and FAIRR could help to overcome these problems. Current collaborative engagements in biodiversity focus mostly on deforestation, little attention is paid to other biodiversity-related topics (Finance for Biodiversity Pledge, 2022). Goodman et al. (2015) states that engagement with legitimate impact requires the participation of all affected by the decision. Especially for issues which are culturally sensitive, this is important. However, marginalised stakeholders might reject such action, fearing the for-profit strategies of companies and investors involved. One specific type of engagement that could take these difficulties into consideration is sovereign ESG engagement. Sovereigns are key players in shaping the sustainable landscape, both locally and globally. They can set policies, influence regulatory boundaries, and are aware of cultural

characteristics and other country-specifics (van Zanten et al., 2021). Particularly in lower-income countries with high biodiversity, there are unsymmetrically high data gaps. It urges the need for building capacity for biodiversity monitoring on a country level (Stephenson et al., 2022).

Critique

The Platform for Responsible Investments (PRI) coordinates collaborations of investors to engage in ESG issues. A platform as such can reduce the challenges that cooperation between investors can present. These challenges include coordination costs, free-rider problems, and regulatory barriers. The PRI has initiated several collaborative investor-led engagements, under which Climate action 100+. Climate action 100+ emerged as an investor-led initiative, motivating corporations to take necessary action on climate change. Although many financial institutions joined, the initiative has received criticism for being largely ineffective. Just 10 out of 45 participating companies set net-zero goals for 2050 and none of them met the benchmark indicators. Also, from the side of investors, the efforts were undermined. Even though 23 of 45 companies failed to achieve full compliance with any benchmark indicator, the investors still voted in favour of the incumbent director in half of these 23 companies (Majority Action, 2021). The excessive number of participants in the initiative resulted in a decline of commitment strength (Ceccarelli et al., 2021). In response to the failure of climate action 100+, and the gap in action on biodiversity loss, Nature action 100+ has been proposed (World Bank, 2021). A net-zero loss of biodiversity in the near-medium term, a universal metric, and a centralised management with one leader is one of the key advice for this initiative.

Grouse, photo by Daniil Komov, derived from Pexels.com

Expert findings

We conducted a round of interviews among experts in the field as part of this report. We summarise the most relevant findings. They are structured along four themes: internal operations, measurement, share size, and systemic change.

Internal operations

The first identified topic in relation to internal operation issues, is **capacity building**. Hiring people with new, perhaps unconventional, forms of knowledge (like ecologists, biologists, ethicists, etc.) is necessary to build the required skill set and bridge the gap between ecology knowledge and the complexities of firms and financial institutions. This goes for internal capacity (e.g., on executive level but also throughout operational level), as well as the specific capacity within engagement teams. The latter can also be acquired by cooperating smartly with peers in the field, which would also be cost saving. The second topic is **strategy**. Biodiversity is a matter of a company's (and an investor's) strategy. The four-pillar strategy from TNFD is a preferable approach[10]. Specifically, it is advised to look at how the concept of nature is integrated in the entire organisation and to what degree the strategy is prepared for nature-related scenarios. Board-level responsibility for the concept of biodiversity is paramount in that.

Measurement

As discussed above, there are considerable complications with measuring biodiversity. First, there is the problem of **specificity**. Using aggregated metrics, for example a global figure for deforestation by a company, seems undesirable. While on the one hand it makes things more workable, on the other hand a lot of granulated information is lost in such an aggregated indicator. Also, biodiversity is very location-specific (which makes the data non substitutable). Moreover, while it seems an appropriate quantitative measure, it is uncertain how more quantitative considerations can be included. Successful engagement requires in-depth knowledge of the company and the relation to the company. Relying on standardised metrics only does not suffice, rather it is advisable to look at the supply chain of the company and the context of the location it is embedded in. This poses a challenge because companies are often active in multiple locations at once. The impact in location A can be diametrically different than in location B. The term 'biodiversity' is found to be too broad in and of itself. Rather, investors can report on specific topics like water, pollution, etc. This leads to the second consideration, which is the **continuum between holistic versus sub indicators**. With biodiversity, information needs to be broad and specific at the same time. This is a challenge. On the one hand it requires investors and investees to break down overarching goals into thoughtful intermediary sub goals. On the other hand, awareness on the topic of biodiversity requires a form of 'holistic thinking'.

Thirdly, **measuring impact** is still in its infancy. Retrieving data 'from the ground' is important. Furthermore, investors should be aware that it is often the big companies that are most susceptible for shareholder demands, but these demands are often (too) incremental. Lastly, it is difficult to (causally) attribute impact to the engagement efforts, especially in the case of sovereign engagements. Moreover, a lot of preparing work is often done by NGOs. While they create the momentum, investors can make use of that.

[10] The four-pillar TNFD strategy focuses on governance, strategy, risk management and metrics and targets.

> "It is about the health of the system and the urgency is underrated if you do not look at the full concept of biodiversity."

Size of equity stake

The first challenge identified is how investors should decide **whom to engage with**. While it does not make sense to only engage with companies that only want to improve themselves under pressure, these might exactly be the companies where most of the harmful impact is created. An indicator for successful engagement is having 'an ally' in the investee company. While engaging with companies that already disclose information on biodiversity is important, investors should not forget to raise awareness at the companies that do not yet report on the topic. It was observed that a serious engagement strategy requires engaging on the majority or even all companies in the investor's portfolio. This is often not possible for asset managers or banks with over thousand companies in their portfolio. Consequently, among respondents there was some critique on overdiversified and subsequently fragmentised shareholder portfolios.

The second challenge is to **engage or divest**? Divestments have little direct impact, but they change norms and rules that then enable other shareholders to create impact. This is an important interplay. Divestment can also have detrimental long-term financial consequences for the companies (lower stock price, higher cost of capital), especially when done by a sizable fraction of investors. Having a serious escalation or perhaps even **exit strategy** is considered crucial. At the same time, a co-human approach based on mutual commitment and common ground is also critical. Filing resolutions is also experienced as a currently undervalued but important mechanism. The third challenge is **transparency versus goal setting**. While a lot of engagement efforts are focused on increasing companies' disclosure, steering on actual reduce of negative impact or increase of positive impact requires goal setting. Both are needed. It starts with transparency, but goal setting must follow quickly after. Investors should be aware of the geographical disparities in this. In some regions of the world, transparency on this topic is not yet top-of-mind. Fourth, **monitoring and accountability** are important instruments. Engagement should be a process, not a one-off incident. This requires at least an annual engagement, a record of progress tracking and mutually agreed terms to check in on. Fifth, the topic of **common ground** was mentioned. Engagement should be a collaborative process. Rather than just pursuing demands and finger-wagging, investors should work together with investees and create incentives (e.g., providing additional capital). This entails asking the right questions, providing the right incentives, and see investees as partners. The governance of both investors and investee should also align with this process. The sixth topic is **legitimacy and groundwork**. Legitimacy can be broken down in legitimacy of the shareholder, and the legitimacy of demands of the shareholder. The legitimacy of the shareholder means that the engagement efforts cannot substitute the lack of legitimacy at the investor (e.g., engaging with one oil company while fully investing fossil fuels elsewhere in the portfolio is not a sustainable strategy). The legitimacy of the demands of the shareholder is more context-driven. The more mainstream something is, the more it is perceived to be legitimate. Awareness that the 'ground has to be prepared' for biodiversity is critical. Shareholders should also contribute to this broader context in which it becomes legitimate to talk about biodiversity. This also involves field building activities in which investors develop certain standards, make statements, set a precedent, act as an example, and so on. Lastly, on the topic of **coordinated engagement**, the observation is that it can serve as a cost-saving instrument that can add weight to the discussion because more investors (and a larger joint share size) are involved. It can also ensure the harmonisation of investor demands. However, it is important to collaborate with like-minded investors, to prevent a free-rider effect, to make sure the engagement efforts are ambitious enough and well-organised.

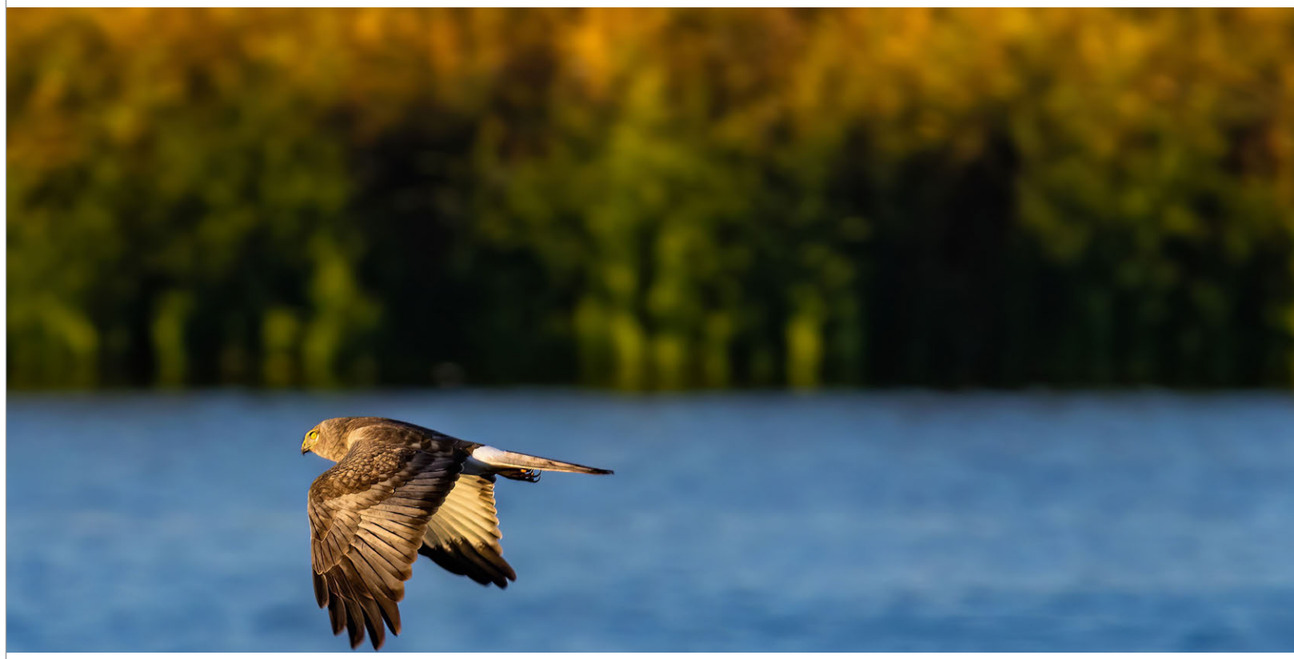
> "Divestments have little direct impact, but massive symbolic influence."

Systemic change

While engagement is seen as a useful tool, there are some systemic challenges to overcome. Firstly, the **portfolio size** is an issue. The number of companies included in most portfolios is considered are considered too big and fragmented to be of any real change as an investor. This might urge the need for reducing the number of companies in portfolios with a big negative biodiversity impact. Investors should have a lot less companies in their portfolio so they can really get a deep understanding of the companies they invest in. Otherwise, engagement is pointless.

Secondly, **long-term commitment** is a topic. One observation is that investing should be "brought back to its roots" – one should invest in a company because they believe in it. Simply buying and selling shares does not deal with biodiversity. Lastly, **principle-driven investors** play an important role in preparing the ground (e.g., religious funds or NGOs that actively engage on normatively motivated topics, thus preparing the ground and the societal debate. This preparational work is important for more mainstream investors to build on). The overall conclusion is that business will have to be willing to take steps that hurt, especially when it comes to climate change and biodiversity. The biodiversity problem will not be solved without something changing fundamentally. The required field to build on that momentum is necessary. It might not create direct return. This requires asset owners who do not need an immediate business case rationale behind their actions. While it can in the long-term increase profits for all shareholders, it is often not possible to capitalise on it as a single (first mover) investor.

> "If you want to take engagement seriously, you should not be scared of filing resolutions."



Harrier, photo by Robert So, derived from Pexels.com

Conclusion

Biodiversity is all past, current, and future life on earth. With that it is a complex concept. The loss of biodiversity is happening in an unprecedented rate and is predominantly caused by human interference[11]. Most biodiversity indicators are currently in decline, it is increasingly becoming a worldwide challenge. The key direct drivers of this are changes in land and sea use, direct exploitation of organisms, climate change, pollution, and invasion of alien species. There is harmful impact across all economic sectors, company's activities, industries and on multiple locations. We outline the main conclusions in the table below.
Over half of the world's GPD is moderately to highly dependent on nature, making it a problem with a clear economic and financial angle as well. The financial sector is exposed to biodiversity risks on a physical/systemic, transitional, and reputational level. The most significant way by which financial institutions interact with biodiversity is through the companies they invest in. A defining characteristic for the relation of finance to biodiversity, is the concept of double materiality. Strategies to deal with biodiversity vary and there is not yet a common standard.

[11] Species loss can have natural causes, like the occurrence of diseases or natural disasters. However, human interference is the most predominant factor.

Table 2 -
Main conclusions
Source: Author's own

Sectors	Most harm is done in the primary sector, but processors, traders, retailers, and investors in the secondary and tertiary sector have a key role in influencing primary producers
Activities	Fisheries, agriculture, harvesting and (ocean) mining are most damaging. Also infrastructure, tourism and transportation are harmful. A minority of companies engage in these activities as their core business process, but most companies rely on and encourage these activities through their supply chains.
Industries	Agriculture, forest products and fisheries, food, beverages, tobacco, infrastructure and mobility, energy, and fashion.
Geo-spatial factors	Biodiversity impacts are often felt in distant and disperse locations, this complicates the attribution of responsibility. Particular attention to: (sub)tropical dry and humid forests, temperate grassland, wetlands, and shelf systems.
Hotspots	35 recognized hotspots, characterized by a combination of exceptional biodiversity and facing considerable habitat loss, decline 74% faster than average. Hotspot-approach also criticized for being oversimplifying.

One instrument for financial institutions to deal with biodiversity is through (shareholder) engagement. The practice consists of a variety of actions and can be categorised by private versus public undertakings. Private dialogues are the main approach. While the practice is increasingly employed for social and environmental issues and has an increasing focus on real-world impact, social and environmental resolutions still are rarely voted on. Central to a workable engagement strategy, is an escalation strategy. Possibly, investors must be prepared to divest as a last resort. Collaborative engagement efforts have proven to be effective tools, although there are some criteria to be met. The focus in engagement has been much on disclosure, but impact and target-setting are gaining traction. For tracking progress, measuring impact, and interpreting the subsequent data, is important. Currently, there are multiple limitations to the obtainability, quality, and granulation of biodiversity impact data. Furthermore, due to the non-linear dynamics of biodiversity loss, there is a need to find means to include forward-looking qualitative data as well. Often, the data available covers mostly self-disclosed reports and 'information from the ground' is missing. Engagement on biodiversity-related topics is considered difficult, due to the non-linear dynamics and ambiguity of the topic. Companies often do not fully understand what investors require and demands among investors are not always harmonizable. Biodiversity is highly context and location specific, making it difficult to aggregate impact data and subsequent demands at firm-level. Current collaborative engagement efforts on biodiversity are mostly targeted on deforestation, disregarding other relevant topics. The inclusion of a variation of stakeholders in the engagement process (local communities, governments, NGOs, etc.) is considered important. PBAF is one of the promising initiatives that tries to combine, standardise, and harmonise different types of impact and dependency data into a methodology.

From expert findings, we conclude that there are several indicators for successful engagement. First, financial institutions need to build capacity. Possibly, they need to do this together or with a broader range of stakeholders. This consists of integrating new knowledge into the organisation. This holds for the tone-at-the-top as well as throughout operations. Furthermore, biodiversity should be seen as a matter of strategy. Secondly, there is a need for meaningful data. Data should be specific (detailed enough and portraying real impact on the ground) but workable. Furthermore, the approach should be both holistic as well as topic driven. Thirdly, the share size is sometimes important. Financial institutions should decide who to engage with and should decide whether divestment is an exit strategy if the engagement does not go as planned. While divestments have little direct impact, they have symbolic power. Finding common ground, setting targets, demanding transparency, monitoring progress, and building legitimacy are other important indicators. The role of principle-driven investors should not be underestimated. They engage in field-building activities at times when others are unwilling to. As such, they 'prepare the ground'. Collaborative engagement can be a valuable and effective instrument. It increases share size, harmonises investor demands, and is cost-saving. At the same time, there is a risk of free-rider effects and a lack of ambitious and profound objectives. Lastly, there are several systemic challenges that surround the topic of biodiversity engagement. The main challenges are portfolio size and long-term commitment.

Redshank, photo by Ylanite Koppens, derived from Pexels.com

Part II

A framework for biodiversity engagement

Framework

Investors select investees to engage with. Engagement is used for those companies that are not currently meeting the ideal criteria but have the potential to do so. Based on the insights from literature and the round of interviews, we propose a framework for biodiversity engagement. The framework consists of four elements: knowledge, workable metrics, indicators & targets, size of equity and momentum & legitimacy. We consider all four elements necessary for a successful biodiversity engagement strategy.

Knowledge

Engagement requires knowledge and investigation. Affinity with the investee is necessary. For this, financial institutions need to build capacity, both internally within financial institutions as well as externally in meaningful coalitions.

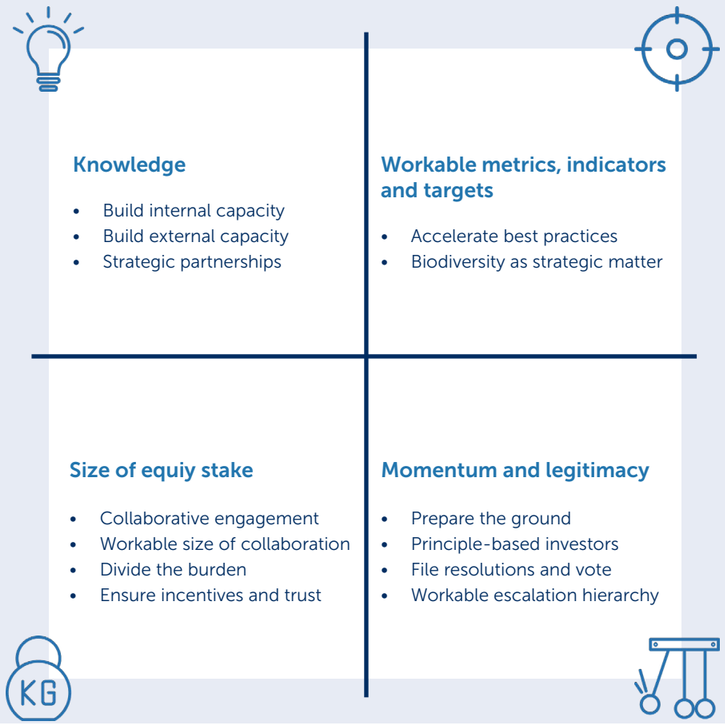
Building internal capacity for knowledge and investigation

- This includes hiring new, perhaps unconventional forms of expertise into your organisation.
- Biodiversity is a matter of strategy, which requires awareness and willingness to act at the top of the organisation all the way down to operations. We recommend appointing at least one board member as responsible for the topic biodiversity and striving for a diverse board and organisation in general (Carvajal et al., 2022).
- Decisions made on management level and corporate behaviour are key issues for biodiversity (Michie, 2022). We therefor suggest extending this strategy to the targeted companies for engagement.

Building external capacity can be done through meaningful coalitions and through strategic partnerships

- Meaningful coalitions are for example collaborative actions between financial institutions. Financing such coalitions is an area of concern since coalitions usually require one financial institution to take the lead and others to support. Furthermore, the incentives should be aligned. There have been experiments with acquiring external funding, setting up co-funded foundations or setting up a lead rotation system within the coalition. The latter requires a great deal of trust among the coalition members. One other suggestion is to view the coalition members as a syndicate, all providing finance for the engagement efforts. The fund is divided according to the costs. The lead investor then takes up a proportionally bigger amount of the fund to cover for the costs involved. Finally, Dimson et al. (2018) suggests PRI Collaboration Platform can act as a third-party coordinator in several forms of collaborative engagement efforts.
- There are several examples strategic partnerships between financial institutions and NGOs.[12]

Table 3 - Framework
Source: Author's own



Workable metrics, indicators and targets

Literature and expert findings indicate that there are considerable problems with data obtainability, data quality and the lack of data standardisation. There are several metrics to use, each with their own advantages or disadvantages. Harmonisation of the instruments is expected to be a focal point of attention in the sector the coming years. While this field will emerge, building an engagement strategy requires acting today. We suggest to carefully consider which metric the investor wants to use and why.[13]

- There are companies that already apply workable indicators. Financial institutions could accelerate those approaches and put it on the agenda with other companies.
- A possible success indicator is to evaluate in what way the investee has identified biodiversity as a topic of strategy and to what extent there is demonstrable management awareness and willingness on the topic.
- Most experts find that making biodiversity concrete and target-driven is an important strategy. Examples could be to require investees to minimise deforestation in certain areas, or to increase water quality in other areas.

Size of equity stake

Size matters. That holds for the size of equity stake primarily. Investors who only hold a very small stake in a corporation, are not expected to have a serious 'seat at the table'. Teaming up with other like-minded investors can help. This way, your engagement efforts are backed by more investors (i.e., more equity).

Collaborative engagement has the potential to be effective, cost-reducing and helpful in building momentum

- A workable size of the coalition. Collaboration is most appealing for mid-sized investors and investors are more likely to engage when the target is domestic. Lead investors often have the "necessary resources, skill, motivation and skin in the game" (Dimson et al., 2018). Collaborative engagement initiatives can also be too big to have real effect. This is one of the critiques the Climate Action 100+ received. In terms of preferable group size, Dimson at al. (2018) find that on average the investor group consists of 26 organisations, with 2 domestic investors.
- Ensuring profound incentives and forming a coalition of the willing is paramount. This requires a great deal of mutual trust. Especially when the lead investor is appointed on rotation, there is a risk of parties backing out of the initiative at some point. Defining a growth model with an intentional horizon of 7 years could serve as a trust fundament to deal with these risks.
- Strategic partnerships with NGOs can be useful.

Sovereign engagements also in collaborative efforts, can be effective.
One example is the Investor Policy Dialogue on Deforestation, or IPDD (Tropical Rainforest Alliance, 2021).

Momentum and legitimacy

The literature findings and expert findings indicate that the role of principle-based investors is important. Such investors (e.g., religious funds, NGOs) prepare the ground where mainstream investors can build on. The goal of any biodiversity engagement is ultimately to steer the transition to a net-positive world.

[12] For example, the strategic partnership between Robeco and WWF.
[13] The distinction by Kennedy et al. (2022) can help. It differentiates between two main approaches: an ecosystem services approach and a natural inventory approach. The first focuses on mapping the flow of benefits derived from ecosystems and is more anthropo-centric, the latter has a more eco-centric lens and focuses on specific biodiversity components (stocks). Kennedy et al. (2022) suggest supplementing this distinction by applying a more systemic resilience lens and look at critical (tipping) points as well.

- Preparing the ground, building momentum and legitimacy is a key condition for the success of engagement. Frontrunners are much needed in this process, although they will not always see a causal effect on their efforts.
- Filing resolutions and voting helps, regardless of whether a resolution is accepted. There are some findings in literature that suggest that the public availability of those resolutions can create positive momentum (Raghupathi et al., 2020). Furthermore, there are emerging initiatives to give more weight to a minority of shareholders on certain topics (van der Elst & Lafarre, 2017). No literature was found on the effectiveness of rejected biodiversity-related resolutions. A full systemic overview of literature on shareholder resolutions is beyond the scope of this report.
- Having a workable escalation strategy, can help for the investor's social legitimacy (walk the talk) and by serving as a pressure tool for the effectiveness of the engagement process.

Final suggestions

Having a clear idea on how to escalate the engagement process if it is lacking good results, can help. In Table 4 we present a broad overview of the types of actions an investor can take. The framework, built on current literature and expert finding, is still broad. How to exactly define what is effective and what is not, must be iteratively re-evaluated by the financial institution throughout the process. The debate on what type of engagement is effective and on whether it is truly effective on an impact-level, remains debatable in literature. This partly has to do with the difficulties to link actual impact to the engagement efforts – not in the least because most engagement takes place behind closed doors. We suggest investors remain critical about the actual impact of engagement efforts, and remain cautious not to over-estimate the results.

Table 4 - Escalation hierarchy
Source: Author's own

Phase	Private	Public	Collective
Engagement phase	Letters	Supporting resolutions and voting	Alliance with like-minded investors to align engagement ambitions
	Informal dialogue with investor relations and/ or the board	Filing resolutions	Alliance with strategic partners like NGOs
		Attending AGM	• Supporting resolutions • Proxy voting • Filing resolutions • Attending AGM
Escalation phase	Formal dialogue with the board	Voting against re-election	Voting against re-election
		Submitting nominations	Submitting nominations
		Public statement	Public statement
		Media campaign	Media campaign, possibly in collaboration with NGOs
Last resort phase	Stop additional capital	Stop additional capital	Stop additional capital
	Legal action	Legal action	Legal action
	Divest	Divest	Divest

Part III

References

Appendix I

Biodiversity	Main threats
Tropical Andes	- Population pressure and migration - Transportation infrastructure - Dams for hydroelectric production and irrigation - Mining - Overexploitation of species - Hunting and illegal trade
Mountains of Central Asia	- Habitat change - Poaching, excessive hunting and collection of plants - Overgrazing - Human-wildlife conflict - Invasive and alien species
Mediterranean basin	- Pressure on water resources - Forest fires - Pollution - Agricultural intensification and land abandonment - Infrastructure and residential development - Transportation infrastructure
Wallacea_	- Small-scale and illegal logging - Unsustainable small-scale fishing - Hunting and collecting - Industrial agriculture and forestry - Expansion and intensification smallholder agriculture and livestock
Madagascar and the Indian Ocean Islands	- Deforestation - Hunting for local consumption - Trafficking of animals and plant species - Invasive animal species - Climate change
Indo-Burma	- Hunting and trade of wildlife - Agro-industrial plantations - Hydropower dams - Agricultural encroachment - Infrastructure - Logging
Guinean Forests of West Africa	- Agriculture - Bushmeat hunting and wildlife trade - Logging - Overfishing - Oil and gas extraction - Fuelwood and charcoal production - Mining
East Melanesian Islands	- Deforestation - Agriculture - Mining - Coastal development - Overharvesting
Caribbean Islands	- Biological resource use: over-exploitation, persecution, and control - Agricultural and aquaculture expansion and intensification - Invasive species and infection disease - Residential, commercial, industrial and tourism development

Table 5 - Biodiversity hotspots and main threats
Source: Author's own

Bibliography

Atkinson, G., Bateman, I., & Mourato, S. (2012). Recent advances in the valuation of ecosystem services and biodiversity. In Oxford Review of Economic Policy (Vol. 28, Issue 1). https://www.jstor.org/stable/43741282

Barko, T., Cremers, M., & Renneboog, L. (2021). Shareholder Engagement on Environmental, Social, and Governance Performance. Journal of Business Ethics. https://doi.org/10.1007/s10551-021-04850-z

Bauer, R., Derwall, J., & Tissen, C. (2022). Private Shareholder Engagements on Material ESG Issues. SSRN Electronic Journal. https://ssrn.com/abstract=4171496

Beccarini, I., Beunza, D., Ferraro, F., & Hoepner, A. G. F. (2022). The Contingent Role of Conflict: Deliberative Interaction and Disagreement in Shareholder Engagement. Business Ethics Quarterly. https://doi.org/10.1017/beq.2021.46

Berg, F., Kölbel, J. F., Rigobon, R., Sloan, M., King, A., Orts, E., Jay, J., Kaminski, K., Goldberg, L., Bohnsack, R., Eccles, R., Ramelli, S., Lyon, T., Busch, T., Le, Y., Hsieh, J., Gori, A., Lu, A., Duddy, E., … Dettwiler, N. (2019). Aggregate Confusion: The Divergence of ESG Ratings *. SSRN Electronic Journal. https://ssrn.com/abstract=3438533

Birkmose, H. S., & Madsen, M. B. (2021). The Danish Stewardship Code-The past, the present and the future The Danish Stewardship Code-The past, the present and the future*.

BlackRock. (2021). Our approach to engagement on natural capital. https://www.blackrock.com/corporate/literature/publication/blk-commentary-engagement-on-natural-capital.pdf

Bolton, P., Despres, M., Pereira da Silva, L. A., Svartzman, R., Samama, F., & Bank for International Settlements. (2020). The green swan: central banking and financial stability in the age of climate change.

Brooks, T. M., Mittermeier, R. A., Mittermeier, C. G., B Da Fonseca, G. A., Rylands, A. B., Konstant, W. R., Flick, P., Pilgrim, J., Oldfield, S., Magin, G., & Hilton-taylor, C. (2002). Habitat Loss and Extinction in the Hotspots of Biodiversity. In Conservation Biology (Vol. 16, Issue 4).

Busch, T., Bruce-Clark, P., Derwall, J., Eccles, R., Hebb, T., Hoepner, A., & Weber, O. (2021). Impact investments: a call for (re) orientation. SN Business & Economics, 1(2), 1–13.

Carvajal, M., Nadeem, M., & Zaman, R. (2022). Biodiversity disclosure, sustainable development and environmental initiatives: Does board gender diversity matter? Business Strategy and the Environment, 31(3), 969–987. https://doi.org/10.1002/bse.2929

CBD. (n.d.). Difference biodiversity and nature. N.d. Retrieved November 1, 2022, from https://www.cbd.int/idb/activities/difference-biodiversity-nature.pdf

Ceccarelli, M., Glossner, S., Homanen, M., & Schmidt, D. (2021). Which institutional investors drive corporate sustainability? SSRN Electronic Journal. https://ssrn.com/abstract=3988058

Chandellier, J., & Malacain, M. (2021). Biodiversity and Re/insurance: An Ecosystem at Risk. https://hal.archives-ouvertes.fr/hal-03213905

Credit Suisse. (2021). 5 facts about biodiversity finance and investing.

Dasgupta, P. (2021). Economics of Biodiversity : The Dasgupta Review. HM Treasury.

Derwall, J., & Koedijk, K. (2022). Actief aandeelhouderschap, engagement en ESG: rendement en impact? KVS Preadviezen.

Díaz, S., Settele, J., Brondízio, E., Ngo, H., Guèze, M., Agard, J., Arneth, A., Balvanera, P., Brauman, K., Butchart, S. H., & Chan, K. (2019). The global assessment report on biodiversity and ecosystem services. www.jameslowen.com

Dimson, E., Karakaş, O., & Li, X. (2015). Active ownership. The Review of Financial Studies, 28(12), 3225–3268.

Dimson, E., Karakaş, O., & Li, X. (2018). Coordinated Engagements. European Corporate Governance Institute, 721/2021(Finance Working Paper).

DNB. (2020). Indebted to nature – Exploring biodiversity risks for the Dutch financial sector.

Doan, M. H., & Sassen, R. (2020). The relationship between environmental performance and environmental disclosure: A meta-analysis. Journal of Industrial Ecology, 24(5), 1140–1157. https://doi.org/10.1111/jiec.13002

Dyck, A., Lins, K. v, Roth, L., & Wagner, H. F. (2018). Do Institutional Investors Drive Corporate Social Responsibility? International Evidence. SSRN Electronic Journal. https://ssrn.com/abstract=2708589

European Environment Agency. (2020). Biodiversity - Ecosystems. https://www.eea.europa.eu/themes/biodiversity/intro

Ferraro, F., & Beunza, D. (2019). Creating common ground: A communicative action model of dialogue in shareholder engagement. Organization Science, 29(6), 1187–1207. https://doi.org/10.1287/orsc.2018.1226

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

Fisher, A. G. (1939). Production, primary, secondary and tertiary. Economic Record, 15(1), 24–38.

Friedman, M. (1970). A Friedman doctrine - The Social Responsibility Of Business Is to Increase Its Profits. . The New York Times Magazine.

Gatti, M., Strampelli, G., & Tonello, M. (2022). How Does Board-Shareholder Engagement Really Work? Evidence from a Survey of Corporate Officers and from Disclosure Data. https://ssrn.com/abstract=4256925

Global Canopy. (2021). The Little Book of Investing in Nature - A simple guide to financing life on Earth. www.globalcanopy.org

Gold, S., & Heikkurinen, P. (2018). Transparency fallacy: Unintended consequences of stakeholder claims on responsibility in supply chains. Accounting, Auditing and Accountability Journal, 31(1), 318–337. https://doi.org/10.1108/AAAJ-06-2015-2088

Goodman, J., & Arenas, D. (2015). Engaging Ethically: A Discourse Ethics Perspective on Social Shareholder Engagement. Business Ethics Quarterly, 25(2), 163–189. https://doi.org/10.1017/beq.2015.8

Green, J. M. H., Croft, S. A., Durán, A. P., Balmford, A. P., Burgess, N. D., Fick, S., Gardner, T. A., Godar, J., Suavet, C., Virah-Sawmy, M., Young, L. E., & West, C. D. (2019). Linking global drivers of agricultural trade to on-the-ground impacts on biodiversity. Proceedings of the National Academy of Sciences of the United States of America, 116(46), 23202–23208. https://doi.org/10.1073/pnas.1905618116

Kan, D. (2021). The many ways to get started in biodiversity assessment of investments. https://pre-sustainability.com/articles/get-started-biodiversity-assessment-of-investments/

Kareiva, P., & Kareiva, I. (2017). Biodiversity hotspots and conservation priorities. Oxford Research Encyclopedia of Environmental Science.

Kedward, K., Ryan-Collins, J., & Chenet, H. (2020). Managing nature-related financial risks: a precautionary policy approach for central banks and financial supervisors. https://www.ucl.ac.uk/bartlett/public-purpose/wp2020-09

Kennedy, S., Fuchs, M., Ingen, W., & Schoenmaker, D. (2022). A resilience approach to corporate biodiversity impact measurement. Business Strategy and the Environment. https://doi.org/10.1002/bse.3140

Kok, M., Ranković, A., Löwenhardt, H., Pattberg, P., Prip, C., Widerberg, O., & Laurans, Y. (2018). From Paris to
Beijing: Insights gained from the UNFCCC Paris Agreement for the post-2020 global biodiversity framework. https://www.pbl.nl/sites/default/files/downloads/pbl-2018-from-paris-to-beijing-3412.pdf

Kölbel, J. F., Heeb, F., Paetzold, F., & Busch, T. (2020). Can Sustainable Investing Save the World? Reviewing the Mechanisms of Investor Impact. Organization and Environment, 33(4), 554–574. https://doi.org/10.1177/1086026620919202

Krueger, P., Sautner, Z., & Starks, L. T. (2018). The Importance of Climate Risks for Institutional Investors. SSRN Electronic Journal. http://ssrn.com/abstract_id=3235190www.ecgi.org/wphttps://ssrn.com/abstract=3235190

Lambooy, T. E., Maas, K., van't Foort, S., & van Tilburg. R. (2017). Investors and Companies' Biodiversity and Natural Capital Reporting and Performance Assessing the request for and use of company reporting on biodiversity and natural capital by asset managers and fund managers.

Majority Action. (2021). Fulfilling the Promise: How Climate Action 100+ Investor-Signatories Can Mitigate Systemic Climate Risk.

Manifest Climate. (2022, August). Rabobank's woes herald a new phase in climate transition risk management. https://manifestclimate.com/blog/rabobanks-woes-herald-a-new-phase/

Marchese, C. (2015). Biodiversity hotspots: A shortcut for a more complicated concept. In Global Ecology and Conservation (Vol. 3, pp. 297–309). Elsevier B.V. https://doi.org/10.1016/j.gecco.2014.12.008

McCahery, J. A., Sautner, Z., & Starks, L. T. (2016). Behind the Scenes: The Corporate Governance Preferences of Institutional Investors. Journal of Finance, 71(6), 2905–2932. https://doi.org/10.1111/jofi.12393

Michelon, G., Rodrigue, M., & Trevisan, E. (2020). The marketization of a social movement: Activists, shareholders and CSR disclosure. Accounting, Organizations and Society, 80. https://doi.org/10.1016/j.aos.2019.101074

Michie, J. (2022). Forms of ownership for sustainability and resilience: the need for biodiversity and corporate diversity. In Economic Policies for Sustainability and Resilience (pp. 91–133). Palgrave Macmillan, Cham.

NGFS. (2020). Biodiversity and financial stability: exploring the case for action.

Norges Bank. (2019). Divestments. https://www.nbim.no/en/thefund/responsible-investment/divestments/

OECD. (2020). A Comprehensive Overview of Global Biodiversity Finance A Comprehensive Overview of Global Biodiversity Finance.

Olsen, V. (2022, January 24). Storebrand AM places Bunge and ADM on observation list due to deforestation risk. https://www.storebrand.no/en/asset-management/news/storebrand-asset-management-places-bunge-and-adm-on-observation-list-due-to-deforestation-risk

PBAF. (n.d.). About PBAF. N.d. Retrieved November 1, 2022, from https://pbafglobal.com/about-pbaf

PBAF. (2022). Taking biodiversity into account - PBAF Standard v 2022 Biodiversity impact assessment - Overview of approaches. www.pbafglobal.com

Raghupathi, V., Ren, J., & Raghupathi, W. (2020). Identifying corporate sustainability issues by analyzing shareholder resolutions: A machine-learning text analytics approach. Sustainability (Switzerland), 12(11). https://doi.org/10.3390/su12114753

Ringe, W. G. (2021). Investor-led Sustainability in Corporate Governance. SSRN Electronic Journal.

Robeco. (2022). Stewardship Policy Robeco.

Roy Haines-Young, by, & Potschin, M. (2018). Common International Classification of Ecosystem Services (CICES) V5.1 Guidance on the Application of the Revised Structure. www.cices.eu

SBTN. (2020). Science-based Targets for Nature - Initial Guidance for Business.

Schormair, M. J. L., & Gilbert, Di. U. (2021). Creating Value by Sharing Values: Managing Stakeholder Value Conflict in the Face of Pluralism through Discursive Justification. Business Ethics Quarterly, 31(1), 1–36. https://doi.org/10.1017/beq.2020.12

Semenova, N., & Hassel, L. G. (2019). Private engagement by Nordic institutional investors on environmental, social, and governance risks in global companies. Corporate Governance: An International Review, 27(2), 144–161. https://doi.org/10.1111/corg.12267

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., de Vries, W., de Wit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Reyers, B., & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. Science, 347(6223). https://doi.org/10.1126/science.1259855

Stephenson, P. J., Londoño-Murcia, M. C., Borges, P. A. v., Claassens, L., Frisch-Nwakanma, H., Ling, N., McMullan-Fisher, S., Meeuwig, J. J., Unter, K. M. M.,

Walls, J. L., Burfield, I. J., do Carmo Vieira Correa, D., Geller, G. N., Montenegro Paredes, I., Mubalama, L. K., Ntiamoa-Baidu, Y., Roesler, I., Rovero, F., Sharma, Y. P., … Fumagalli, L. (2022). Measuring the Impact of Conservation: The Growing Importance of Monitoring Fauna, Flora and Funga. Diversity, 14(10), 824. https://doi.org/10.3390/d14100824
Täger, M. (2021). 'Double materiality': what is it and why does it matter? Grantham Research Instituteon Climate Change and the Environment.

Thompson, A. (2015). The Oxford Handbook of Environmental Ethics (S. M. Gardiner & A. Thompson, Eds.; Vol. 1). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199941339.001.0001
Tropical Rainforest Alliance. (2021). Investors Policy Dialogue on Deforestation (IPDD) Initiative. https://www.robeco.com/en/media/news-item/2021/group-of-investors-meet-again-with-vice-president-of-brazil.html

UN. (1992). Convention on biological diversity. https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-8&chapter=27&clang=_en
UN PRI. (2018). A Practical Guide to Active Ownership in Listed Equity.

UN PRI. (2020c). Investor action on biodiversity: discussion paper. https://www.unpri.org/biodiversity/investor-action-on-biodiversity/6335.article#download

van der Elst, C., & Lafarre, A. (2017). Shareholder Voice on Executive Pay: A Decade of Dutch Say on Pay. European Business Organization Law Review, 18(1), 51–83. https://doi.org/10.1007/s40804-017-0065-3

van Oorschot, M., Kok, M., & van Tulder, R. (2020). Business for biodiversity: Mobilising business towards net positive impact.

van Tilburg, R., Bosma, D., & Simic, A. (2022). From Paris to Kunming - Enabling a carbon net zero and nature-positive financial sector.

van Zanten, J. A., Sharma, B., & Christensen, M. (2021). Sustainability integration for sovereign debt investors: engaging with countries on the SDGs. Journal of Sustainable Finance and Investment. https://doi.org/10.1080/20430795.2021.1929806

VBDO. (2020). Engagement guide on biodiversity and mining.

Victor, P. A. (2020). Cents and nonsense: A critical appraisal of the monetary valuation of nature. Ecosystem Services, 42. https://doi.org/10.1016/j.ecoser.2020.101076

Wagemans, F. A. J., van Koppen, C. (Kris), & Mol, A. P. J. (2018). Engagement on ESG issues by Dutch pension funds: is it reaching its full potential? Journal of Sustainable Finance and Investment, 8(4), 301–322. https://doi.org/10.1080/20430795.2018.1485379

Wilting, H. C., & van Oorschot, M. M. P. (2017). Quantifying biodiversity footprints of Dutch economic sectors: A global supply-chain analysis. Journal of Cleaner Production, 156, 194–202. https://doi.org/10.1016/j.jclepro.2017.04.066

Winn, M. I., & Pogutz, S. (2013). Business, Ecosystems, and Biodiversity: New Horizons for Management Research. Organization and Environment, 26(2), 203–229. https://doi.org/10.1177/1086026613490173

Working Group on Biodiversity. (2021). Biodiversity in the financial sector – From pledges to action. A practitioners' Guide.

World Bank. (2021). Nature Action 100+ - Changing and greening investor and corporate behavior to protect ecosystems and biodiversity. https://thedocs.worldbank.org/en/

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