The unknown path to business strategies for the elusive nature

- the pushing requirements and the inhibiting obstacles

JASMINE AXELSSON 2023

MVEM12 EXAMENSARBETE FÖR MASTEREXAMEN 30 HP
MILJÖVETENSKAP | LUNDS UNIVERSITET

The unknown path to business strategies for the elusive nature

- The pushing requirements and the inhibiting obstacles

Jasmine Axelsson

2023

LUNDS UNIVERSITET

Jasmine Axelsson
MVEM12 Examensarbete för masterexamen 30 hp, Lunds universitet
Huvudhandledare: Maria Hansson, Centrum för miljö- och klimatvetenskap (CEC), Lunds universitet
Externa/biträdande handledare: Helena Granborg och Lydia Rydin, Ecogain

CEC - Centrum för miljö- och klimatvetenskap
Lunds universitet
Lund 2023

Abstract

Biodiversity is fundamental for human well-being, and we depend on nature's ecosystem services for our survival. Today, biodiversity loss occurs at an accelerating rate and the number of endangered species is higher than ever. Despite this, biodiversity loss has long been overshadowed by the climate issue. However, the issue of biodiversity is now receiving more attention and new frameworks and policies are coming into force. Nature is also the foundation for economic growth and corporations both depend on and impact biodiversity. The business sector therefore has an essential role in reversing the loss of biodiversity. In this study I have examined what obstacles companies experience when incorporating biodiversity in its business strategies. The study has also provided a compilation of topical biodiversity frameworks and policies. The study has been carried out with a triangulation method including a questionnaire, interviews and compilation of topic frameworks and policies. The result shows that low access to data, lack of measurement methods and difficulties in mapping the value chain are the greatest obstacles experienced. Many companies do not know how they impact biodiversity, making it very difficult for other companies to map their own impact throughout the value chain. Lack of data is not just troubling when trying to map the impact but also when illustrating your actions. Many companies experience issue in performing actions and measure progress and the demand for frameworks with proposals for indicators and actions is great. Simultaneously, upcoming policies contain large requirements. However, there are abilities for these to cooperate with voluntary biodiversity frameworks and together they can enable a successful outcome. The requirements can be a catalyser for the development of new methods for mapping a company's impact however, in order to reverse biodiversity loss continued research on how to measure and quantify biodiversity is required.

Keywords: biodiversity, frameworks, policies, business strategies, biodiversity data, measurement methods, obstacles.

Populärvetenskaplig sammanfattning

Nu kommer kraven för att återställa naturen – hur ska företagen lösa detta bortprioriterade ämne?

Planetens alla livsavgörande funktioner såsom matförsörjning och materialtillgångar är beroende av en välmående natur. Funktioner som just nu håller på att gå förlorade på grund av en global massutrotning av planetens arter. Äntligen börjar makthavare lyfta blicken och inse att det inte bara handlar om att skära ner på koldioxidutsläpp, utan det behövs även direkta naturåtgärder för att bromsa utrotningen. Men hur ska företag kunna implementera åtgärder när de inte ens vet hur de påverkar naturen och dess arter?

Det senaste decenniet har klimatförändringar och koldioxidutsläpp varit högt upp på agendan i de flesta forum, inte minst i företagssektorn. Brun energi har successivt bytts ut mot grön energi och företag rapporterar stolt hur klimatneutrala de är. Samtidigt, i skuggan av klimatförändringar, har forskare desperat försökt få gehör i biodiversitetsfrågan, en fråga som är minst lika väsentlig som klimatfrågan. Det är nämligen tack vare en hög biodiversitet vi får fungerande ekosystem, som i sin tur förser oss med de mest vitala funktionerna i livet, exempelvis mat på bordet och material så att vi kan skapa våra trygga hem. Visst gynnar bromsade klimatförändringar naturen, men stort fokus måste också läggas på att återställa all den natur som vi människor under många år förstört. Företag är en stor anledning till att vi idag förlorar natur, exempelvis jordbruket som förvandlar skogar till kala åkrar eller gruvor som tar värdefull natur i anspråk, så att din bil kan tillverkas. Efter flera år av desperata rop har forskare äntligen fått lite gehör och överallt poppar nya direktiv och förordningar rörande biodiversitet upp. De innehåller krav som sätter stor press på företag, men hur förberedda är företagen egentligen? Inte så mycket, antyder resultatet. Många av lagkraven innebär att företag måste avslöja både sin påverkan på och beroende av naturen men även sina åtgärder för att återställa dess värdefulla funktioner. Vi som tidigare trodde att det var agerandet som var bristande, men resultatet har avslöjat ett ännu värre scenario. Innan förbättringar kan ske, måste man först identifiera vilka problem som finns. Syftet i studien har därför varit att kartlägga vilka hinder företag ser med att inkludera biodiversitet och naturrelaterade aspekter i sina företagsstrategier. Resultatet antyder att företag idag inte ens vet hur de påverkar och beror på naturen. Men även om företag skulle kunna kartlägga sin påverkan så finns det andra stora problem. Biodiversitet, till skillnad från klimatförändringar, är idag inte kvantitativt mätbart. Det går inte att sätta en siffra på hur stor påverkan ett företag har,

än mindre vilken positiv påverkan ens potentiella åtgärder kan ha. För att komma vidare i arbetet måste vi, inom snar framtid, kunna exkludera och ställa krav på företagens biodiversitetsarbete. Men för att kunna göra det måste en gemensam nämnare för biodiversitet utvecklas. Och flertalet idéer finns.

Table of Contents

Glossary

GBF = Global Biodiversity Framework
SBTN = Science-based Targets for Nature
SBTi = Science-based Targets Initiative
TNFD = Taskforce on Nature-related Financial Disclosures
TCFD = Taskforce on Climate-related Financial Disclosures
LEAP = Locate, Evaluate, Assess, Prepare
ESRS = European Sustainability Reporting Directive
CSRD = Corporate Sustainability Reporting Directive
NFRD = Non-Financial Reporting Directive

1. Introduction

Rising temperatures, melting glaciers, rising sea levels and changing precipitation patterns are a few consequences of prevailing climate changes. This in turn causes great loss and degradation of the world's ecosystems and one million of the earth's estimated eight million species are at risk of extinction (Intergovernmental Panel on Climate Change [IPCC], 2022). The loss of biodiversity occurs at an accelerating rate, hundreds of thousands times faster than historically. Today it is ranked as the top five biggest threats against our planet (Anthony & Morrison-Saunders, 2022). Nature is the backbone of human well-being and we depend on biodiversity and functioning ecosystems in order to get food, material and recreation (Ardeleanu & Breabăn, 2021; Science-based Targets for Nature [SBTN], 2020). Degraded ecosystems and loss of biodiversity is therefore a direct threat to human life (IPCC, 2022). It's also the foundation for all economic activity and provides services estimated to be worth more than US$ 40 trillion, approximately half of global GDP (SBTN, 2020). The corporate sector depends on nature and degraded ecosystems and loss of biodiversity threatens crucial economic- and community resources (Anthony & Morrison-Saunders, 2022; Collaço de Carvalho, et al. 2022). Even though the loss of biodiversity is an acute crisis, the problem is less famous than the climate crisis (Erling, 2022). Many states that the crisis for biodiversity has been overshadowed by the climate crisis. It can be derived to the fact that biodiversity is a much more complex question (Erling, 2022). Biodiversity can be defined as the variability among living organisms from all sources, including the ecological complexes of which they are part of. It includes diversity within species, between species and of ecosystems and can be divided into genetic, species and ecosystem diversity (Panwar, Ober and Pinkse, 2022). Genetic diversity refers to the variation in genes within species and is the foundation for all biological diversity. Low genetic diversity loses adaptive capacity and becomes more vulnerable to extinction. If diversity at a genetic level falls below critical levels, diversity in species and ecosystems cannot be sustained. Species diversity is the variety of species within a given area. Several species will perform similar ecological functions when high species diversity occurs. This provides the system with "insurance" against a loss of functionality, if the conditions change and one or more species cannot survive. Even if some species get extinct, it is likely that some, performing similar functions, will survive and continue to provide these vital functions (Panwar, Ober and Pinkse, 2022). Ecosystem diversity is the assortment of ecosystems. It is a dynamic complex of plant, animal and microorganism communities and the surrounding environment.

Furthermore, the levels of diversity are dependent on one another. Genetic diversity is the foundation for species diversity which creates ecosystem diversity. Likewise, genetic diversity persists from species diversity, and ecosystem diversity enables species diversity (Panwar, Ober and Pinkse, 2022). Unlike the climate changes where we can measure how much carbon dioxide increases in the atmosphere and get a number on the rising temperatures, biodiversity is about interactions and relationships, a network between species and how they depend on each other (Erling, 2022). Thomas Hickman, political scientist at Lund university believes biodiversity is less famous because the climate crisis is "easier" to deal with (Erling, 2022). For example, through the conversion to renewable energy (Erling, 2022). Even though entities depend on nature, "business as usual" drives the loss of nature and changing business strategies are vital (SBTN, 2020). To speed up the process, many have been hoping for an implementation of a framework corresponding to the Paris Agreement (Erling, 2022). Ardeleanu & Breabăn (2021) states that frameworks have the potential to connect economically important sectors to the protection of biodiversity through financial instruments, in order to support and promote a sustainable exploitation of natural resources. However, three decades of multilateral negotiations, approaches and national policies has not succeeded to halt the loss of biodiversity (Kok & Ludwig, 2022). Even though companies depend on

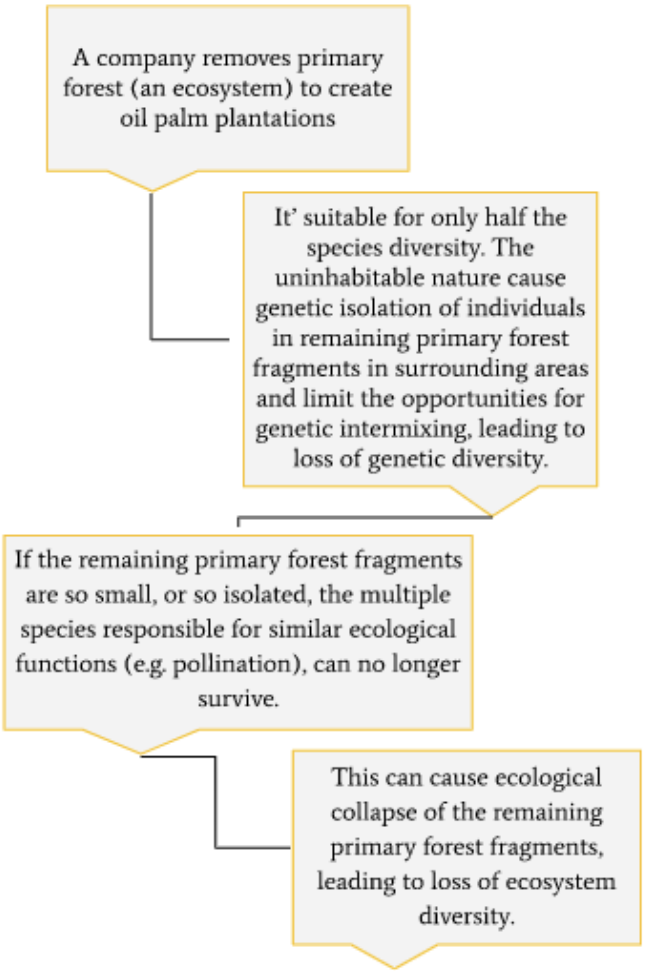

Figure 1. Illustration of how companies can affect biodiversity (Panwar, Ober and Pinkse, 2022).

natural resources, they have also failed to take responsibility for their impact on biodiversity (Kok & Ludwig, 2022). As biodiversity becomes more relevant, new frameworks and policies are implemented. On December 19, 2022, at the UN Conference on Biodiversity, a new framework for biodiversity was adopted. The main purpose of the framework is to stop and reverse the loss of biodiversity (Swedish government, 2022; CBD, 2022). But it is not only the lack of policies and frameworks which hinders the proceeding. Pesce et. al. (2021) means that in order to reach goals, new measurement methods must be implemented. Methods that allow better conservation and restoration of biodiversity and ecosystem services. To understand and address the loss of biodiversity and the degradation of ecosystems is a challenging problem that cannot be solved without the best and latest research (Pesce et al., 2021). Nonetheless, the time to reverse the loss of nature is limited, the effort must take place now and it must be extensive. If we fail to reverse it, the chance for economic growth will be lost and the vision for a better life will be destroyed (SBTN, 2020).

1.1 Purpose and framing of questions

The purpose of the thesis is multiple. First, the study aims to compile newly added frameworks and policies that may become relevant for companies. This includes three frameworks: 1) the Global Biodiversity Framework, 2) the Science-Based Targets for Nature's framework and 3) Taskforce on Nature-related Financial Disclosure's framework as well as three EU-policies: 1) the EU-taxonomy, 2) the Corporate Sustainability Reporting Directive and 3) the European Sustainability Reporting Standards. The compilation further aims to provide an insight into the purpose of the frameworks and instruments, which requirements they include and who may be affected. The study also aims to analyse what role these policies and frameworks can conceivably have in the work towards reversing the loss of biodiversity as well as evaluate how they can interact with each other. Further, the study aims to provide insight into how engaged companies are in their impact on biodiversity today, as well as identify what difficulties they experience when incorporating biodiversity in their business strategies. Finally, the study aims to provide increased knowledge about the possibilities to work measurably and data-driven with biodiversity, along with reporting what challenges corporations witness. The thesis thereby aims to answer following questions:

- Which biodiversity related frameworks and policies are there today, affecting the corporate sector?

- What challenges do companies experience when incorporating biodiversity strategies into their own business strategies?

- What obstacles and possibilities are there for companies to work with biodiversity in a data driven and measurable way?

1.1.1 Boundaries

The study is limited to policies meant for biodiversity and ecosystems. The study does therefore not include requirements for climate change, even though climate change is an indirect threat to biodiversity. The survey has been limited to companies covered by the regulative policies included in the study. Furthermore, larger companies generally have better resources and thus it is a greater chance that they carry out some kind of work linked to biodiversity. Likewise has the interviews taken place with companies that already have an engaging biodiversity policy.

2. Method

The study has conducted a triangulation of multiple methods. It is an efficient way of determining the empirical phenomenon (Alvehus, 2019). The empirical basis becomes more exact and more complete when different types of methods are combined. Furthermore, dividing the methods makes it possible to shed light on the problem from several different perspectives (Alvehus, 2019). Each method is described below.

2.1 Compilation of frameworks and policies

The selection of frameworks and policies included in the compilation has been conducted in collaboration with Ecogain, a consulting firm working towards companies depending on and impacting biodiversity. Ecogain are experts in the field and are well updated on which frameworks and policies that are relevant to businesses and biodiversity. The study has only analysed policies which have a direct impact on companies and does not include policies such as the EU regulation of Nature 2000 areas. The selection has been based on newly added frameworks and policies that are still unfamiliar to many companies. The earliest instrument is added in 2020 and the latest in 2023. The collected information for each framework and policy has primarily been collected from each organisation's website and reports released from each organisation. When conducting a compilation, formulation of definitions, precise search terms and well-thought-out selection criteria is critical for a successful outcome (Backman, 2008). In this compilation however, it is regarding frameworks and policies. It has already been determined which ones that shall be included and relevant information about each framework and policy is relatively easy to access through each organisation's website. Therefore, clear definitions and specific search terms have not been necessary, since the relevant documents can be found on the respective organisation's website.

2.2 Survey

A survey was sent out by e-mail to Sweden's 100 largest companies based on their turnovers in 2022. This information has been retrieved from Ecogain's Biodiversity Index, as it includes Sweden's 100 largest companies. The purpose of the survey was to get a comprehensible insight of how companies both are understood in the frameworks and policies but also to acknowledge what barriers companies experience in their biodiversity work.

The survey consisted of ten questions, where the majority was "substantive" questions. Trost (2007) states that a few open questions can be favorable in the survey and gives an opportunity to add information in the case where the respondent wishes to do so. Therefore, two of the totally ten questions were open questions. Two questions were so-called "attitude questions", where the respondents may take a position on several statements. According to Trost (2007), these questions can exhaust the respondents, hence they have been limited to only two. All questions were developed to be as short and concise as possible, in order to avoid that the respondent perceives the questions as long and complicated (Trost, 2007). Also, the order of the questions is crucial and can affect the respondent's mindset (Trost, 2007). Due to this, much emphasis has been placed on the sequence, to ensure there was a common thread throughout the survey.

The survey was sent out on March 6, 2023, and the last day to respond was March 31, 2023. A reminder was sent out March 27, 2023. A total of 26 responses were received. All questions can be found in Appendix A.

2.3 Interviews

Three interviews were conducted with three companies: Boliden, Handelsbanken and Orkla. The purpose was to get a deeper understanding of the companies' perspective regarding measurable and data-driven biodiversity strategies. The companies interviewed have been selected due to following factors; 1) where in the value chain they affect biodiversity the most, 2) being a large company and 3) having some sort of biodiversity strategy today. All interviews have been semi-structured, to enable the interviewee to answer each question as freely as possible. The purpose was to get a deeper understanding of the challenges and possibilities existing regarding developing measurable and data-driven biodiversity strategies. Two of the interviews occurred online, through Teams and one was held in person.

2.4 Analysis of the collected material

An analysis in the form of abduction has been used, which is an alternation between theoretical and empirical reflection. The method means that you work with the theory, return to the empirical and then think about what it can mean in the light of the theory (Alvehus, 2019). The results from the interviews have been transcribed. Furthermore, a qualitative analysis has been carried out for both the results from the survey and the interviews. It has also been analysed against the background of the collected literary material and put in relation to the compilation of the policies and frameworks.

2.5 Ethical reflection

Much of the collected material comes from individual employees. The survey was anonymous and there was no possibility to trace the results to individuals or companies. The transcription has been sent to the interviewees for reconciliation. Furthermore, they have had to give their approval of the final version and decide for themselves whether they want to be anonymous or not.

2.6 Method development

Establishing suitable interview and survey questions is many times difficult. The method could have been developed by giving even more time to refine both the survey and interview questions. Since the study have three different methods and treats three relatively separate issues, both the result and the scope of the analysis are limited. In a future study, the scope could have been limited to one or two questions. This would have given more room and time to collect even more empirical data as well as an even more in-depth and nuanced analysis.

3. Result

The result from the study has been divided into three parts. First, a presentation of the six frameworks and policies are provided, to give the reader a first insight in what possible demands companies may face the coming years. The presentation will illustrate demands, targets and purpose from a biodiversity perspective. After this, the result from the survey will be illustrated, which will give the reader an overview of how companies relate to biodiversity today. Lastly, the more in dept results from the interview will be presented with detailed information on measurability and quantitative data on biodiversity today, as well as the obstacles and future possibilities the interviewees experience.

3.1 Compilation of policies and frameworks

Table. 1.
An overview of the policies and frameworks included in the compilation.

EU taxonomy	Corporate Social Reporting Directive	European Sustainability Reporting Standards	Global Biodiversity Framework	Taskforce on Nature Financial Disclosures	Science-based Targets for Nature
EU policy	EU policy	EU policy	Global framework	Global framework	Global framework
Mandatory	Mandatory	Mandatory	Voluntary	Voluntary	Voluntary
Requires: Reporting Acting	**Requires:** Reporting	**Requires:** Reporting	**Requires:** Acting	**Requires:** Reporting Acting	**Requires:** Reporting Acting
Released: July 2020	Released: January 2023	Released: June 2023	Released: December 2022	Released: September 2023	Released: -

The six policies and frameworks mentioned in table 1 will be described in more detail below.

3.1.1 EU taxonomy

The EU taxonomy was first published in June 2020 and entered into force on July 12, 2020. Six environmental objectives were established and one of them is 'the protection and restoration of biodiversity and ecosystems' (EU Technical Experts Group on Sustainable Finance [TEG], 2020). The main purpose of the taxonomy is to create a common language and a clear definition of what the word 'sustainable' is (European Commission [EU-commission] n.d.a). By establishing a list of environmentally sustainable economic activities, it creates a classification system and by that it can provide companies, investors and policymakers to see which economic activities are to be considered environmentally sustainable. Thereby eliminating greenwashing and help shifting investors towards sustainable investments (EU-commission, n.d.a). The Taxonomy have three performance thresholds:

1) make a substantive contribution to one of the six environmental objectives,

2) do no significant harm to the other five, where relevant; and

3) meet minimum safeguards, for example UN Guiding Principles on Business and Human Rights (TEG, 2020).

Taxonomy's six objectives

1. Climate change mitigation
2. Climate change adaption
3. Sustainable and protection of water and marine resources
4. Transition to a circular economy
5. Pollution prevention and control
6. Protection and restoration of biodiversity and ecosystems

Figure 2. The six objectives for the EU taxonomy (TEG, 2020).

Even if only one of the objectives are directly related to biodiversity, taxonomy-aligned activities must not harm other objectives, meaning when contributing to another of the five objectives, the activity cannot have a significant harmful impact on biodiversity and ecosystems (TEG, 2020).

The Taxonomy comes with both mandatory requirements and voluntary requirements and is a regulation for Member States and the EU to use. Large financial

and non-financial companies that fall under the scope of the Non-Financial Reporting Directive (NFRD) will have to disclose to what extent their activities meet the criteria set out in the EU Taxonomy (EU-Commission n.d.b). There is a national variation, but generally NFRD covers large public-interest companies with at least 500 employees. This also includes listed companies, banks and insurance companies (TEG, 2020). Further, financial market participants will have to disclose to what extent their activities, which their financial products fund, meet the Taxonomy's criteria (EU-Commission, n.d.b).

Table 2.
Description of the substantial contributions that can be made.

Two types of substantial contributions can be made to an objective in order to be Taxonomy-aligned.	
An economic activity that makes a substantial contribution based on its own performance	**an activity that enables a substantial contribution to one of the objectives**
for example, energy efficient manufacturing processes.	for example, development of a component that improves the environmental performance for another activity, like machinery that manufactures low carbon products

In Regulation 2020/852 it is stated that the criteria determining whether an economic activity is environmentally sustainable should be harmonised at Union level. This in order to eliminate barriers to the functioning of the internal market. Each objective should have specified criteria determining whether an economic activity contributes substantially to that specific objective (Regulation 2020/852). EU Taxonomy's focus so far has been on Climate mitigation and adaptation, and the screening criteria for those two objectives was established in 2020. It was said that the criteria for the other four objectives would be adopted by the end of 2021 and enter in application by the end 2022 (TEG, 2020). However, this has been postponed. In 2021, The Technical Group released a suggestion regarding technical screening criteria for the other four objectives (Platform on Sustainable Finance [PSF], 2021). The report proposes that substantial contribution to objective number six can be made either by conservation of habitats and ecosystems or restoration of ecosystems. An activity includes conservation and restoration in natural, semi-natural and urban areas. Thus, it does not include conservation or restoration of components of biodiversity outside of their natural habitat (TEG, 2021). In the almost thousand pages long report, covering

technical screening criteria for objective three to six, many suggestions are stated regarding economic activities aiming to improve biodiversity (PSF, 2021).
The proposed criteria for the two activities (restoration and conservation) are basically the same. For example, a management plan shall be established. More detailed information about what shall be included in the plan can be seen in figure 4.

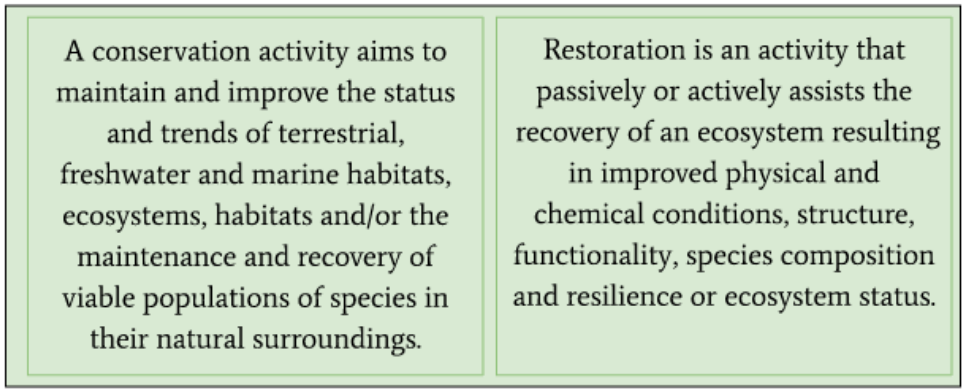

Figure 3. The EU definition of the purpose of conservation and restoration (PSF, 2021).

The area shall also, every two years, be controlled by either a relevant national competent authority or other third-party certifier (for example VCA, IUCN Green List). Both shall also have a business plan where current and future resourcing and funding needs required for the implementation of the activity shall be documented. It shall define a time-bound target for financial self-reliance defined as the percent of funds derived from direct or indirect market-based revenue generating mechanisms over the total yearly operating cost of the area. The area must also be protected in at least five years (PSF, 2021). Important to note is that the PSF (2021) report is just a suggestion, thus none of this has been decided yet.

.

The management plan shall include:

- Scientifically based goals for the conservation or restoration.
- Based on the scientific information, 9 detailed elements be described, for example a clear description of the approach to achieving the goals including strategies, measurements and activities (all elements can be found in the PSF (2021) report).
- Continuous monitoring and measuring of performance against the goals.
- The management plan shall be reviewed at least every fifth year.
- Be aligned with wider policy objectives set by the EU and/or other relevant national law or targets established by the CDB.
- The goal must be achieving a good status in the area, for habitat and species and there must be a clear timeframe.
- All the elements necessary for the implementation shall be in place and defined in detail in a Governance Strategy or similar instrument, among all describing how they ensure equitable governance, full accountability, reporting requirements and wide participation of all stakeholders involved.
- Possible partnerships to support the monitoring of the area and undertake research studies leading to an improved scientific understanding of the area shall be stated.
- How the information from possible research, monitoring and status of relevant habitats and/or species is going to be gathered, used and shared.

Figure 4. Description of what the management plan must contain, when contributing to the EU taxonomy's objective number six (PSF, 2021).

3.1.2 Corporate Sustainability Reporting Directive

The legislative proposal for a Corporate Sustainability Reporting Directive (CSRD) was adopted by the European Commission in April 2021 (European Financial Reporting Advisory Group [EFRAG], 2022a). The directive was designed to replace and amend the existing reporting requirements in the NFRD (EU-commission, 2021; EU-commission, n.d.c). NFRD included reporting on environmental matters and

approximately 11 700 companies were covered by NFRD (EU-commission, n.d.c). The purpose of CSRD is to help stakeholders such as investors, social society organisations and consumers to assess companies' sustainability performance (EU-commission, n.d.c). This shall be achieved by strengthening and modernising the rules about the social and environmental information companies must report on. The purpose is to ensure stakeholders have access to information needed to assess investment risks arising from climate and environmental issues. The new requirements will also create transparency regarding the impact of companies on people and the environment (EU-commission, n.d.c). Further, CSRD will make it mandatory for companies to have an audit on the reported information. It includes more detailed reporting requirements and that they are digitally tagged, so it can be machine read and fed into the European single access point envisaged in the capital markets union action plan (EU-commission, 2021). CSRD entered into force on January 5, 2023 (EU-commission, n.d.c).

The scope of companies covered by the directive has also been extended to include all companies listed on the regulated markets. A broader set of large companies, as well as listed small and medium-sized enterprises (SMEs), will now also be required to report on sustainability. Furthermore, companies not established in the EU but with securities listed on the EU-regulated markets with a combined group turnover in the EU of more than EUR 150 million are also required to report (Nurandianti, 2022). This means that approximately 50 000 enterprises must regularly publish reports on their social and environmental risks they are facing and on how their activities impact people and the environment (European Commission, B n.d.). In the financial year 2024, companies already obligated to report under NFRD must start to report according to CSRD. Large companies not obligated to disclose under NFRD shall start to report in the financial year 2025 and listed SMEs must start in the financial year 2026 (Nurandianti, 2022). In table 3, the two main factors determining whether a company is an SME or not are listed. However, these ceilings apply to the figures for individual firms only. A firm that is part of a larger group may need to include staff headcount/turnover/balance sheet data from that group too (EU-commission, n.d.d).

Table 3.
The main factors determining if a company is an small och medium-sized enterprise or not (EU-commission, n.d.d).

	Staff headcount	Turnover *or* Balance sheet total
Medium-sized company	< 250	≤ € 50 m *or* ≤ € 43 m
Small company	< 50	≤ € 10 m *or* ≤ € 10 m
Micro company	< 10	≤ € 2 m *or* ≤ € 2 m

3.1.3 European Sustainability Reporting Standards

To comply with CSRD, companies must report according to the European Sustainability Reporting Standards (ESRS) (EU-commission, n.d.b). During the proposed CSRD, The European Financial Reporting Advisory Group (EFRAG) was technical adviser for the development of the standards. EFRAG is a non-profit organisation counselling the European Commission on the acceptance of international reporting standards (Directive 2022/2464). One draft was submitted in April 2022 and NGOs and other stakeholders could leave comments until August 2022. Thence, the feedback has been addressed and the first draft of ESRS were handed over to the European Commission in November 2022 (EFRAG, 2022b; EFRAG, 2022c). The final standards shall be adopted in June 2023 and the reporting requirements will be phased in over time, depending on the type of company. The policy is developed to be aligned with many other policies and frameworks, such as the UN SDGs and the EU taxonomy. All standard definitions, concepts and disclosures are also built on the Global Reporting Initiative (GRI) standards and are fully or closely aligned with the GRI (EFRAG, 2022d). Further, ESRS E4 is built to comply with Taskforce on Nature-related Financial Disclosures (TNFD) and extensively refers to the TNFD. E4's materiality assessment has been structured to follow the sequence of the Locate, Evaluate, Assess and Prepare (LEAP) framework (EFRAG, 2022d). More information about LEAP can be found in chapter 3.1.5.

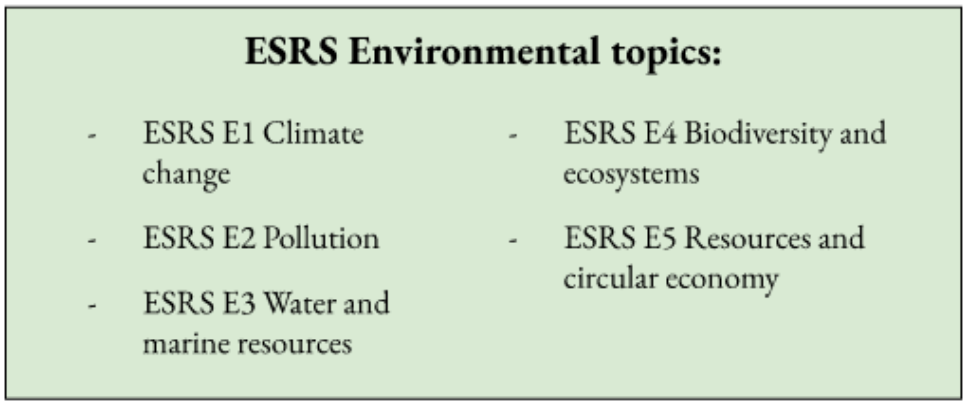

Figure 5. The ESRS environmental topics (EFRAG, 2022a).

ESRS consists of two cross-cutting standards; ESRS 1 for 'general requirements' and ESRS 2 for 'general disclosures' and three topical standards; Environment (ESRS E), Social (ESRS S) and Governance (ESRS G). They are further divided into ten more specific topical standards (EFRAG, 2022a).

EFRAG's (2022e) draft of ESRS E4 includes six disclosure requirements and two other requirements from the cross-cutting standards are incorporated as well. However, even if a company is covered by CSRD and thereby ESRS it does not necessarily mean that you must report on ESRS E4. EFRAG (2022c) states that the company must only report on those impacts, opportunities and risks that are material for the company. However, some disclosure requirements are mandatory for some sectors (EFRAG, 2022e). All ESRS E4 disclosure requirements will be described further down.

ESRS E4-1 are mandatory for the following sectors:
Agriculture and Farming, Forestry, Construction and Engineering, Oil and Gas and from midstream and downstream; Energy production and Utilities, Water and Waste Services, Food and Beverages, Paper and Wood Products, Building Materials, Chemical products, Coal Mining, Oil and Gas, Upstream and Services; Pharma and biotechnology, Textiles, Accessories, Footwear and Jewelleries, Tobacco and Transportation.

Figure 6. Example of a disclosure requirement that is mandatory for some sectors (EFRAG, 2022e).

The company shall report on sustainability matters based on a double materiality assessment. The whole procedure of performing a double materiality assessment is described in ESRS 1 and ESRS 2 (EFRAG, 2022c). The materiality assessment examines in two different dimensions:

Impact materiality - how the company affects people and environment.
Financial materiality - how people and environment affect the company financially.

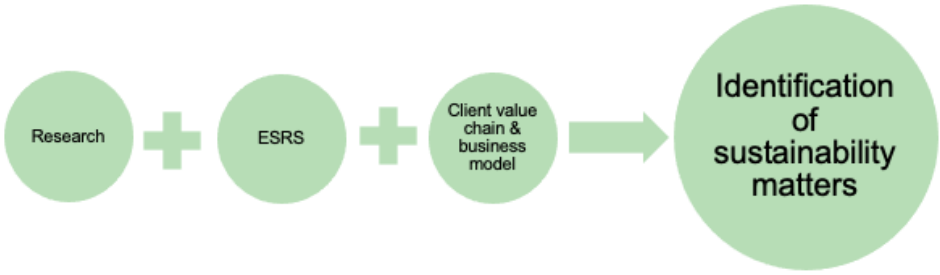

Figure 7. brief process flow over performing a double materiality assessment.

They state that a sustainability matter is material from an impact perspective when it pertains to the entity's material actual or potential, positive or negative impacts on people or the environment over short-, medium- and long-term time perspective. It includes impacts from the whole value chain and are not limited to direct contractual relationships (EFRAG, 2022c). Likewise, a sustainability matter is material from a financial perspective if it triggers or may trigger material financial effects on the entity. This occurs if it generates or may generate risks or opportunities that have, or are likely to have, on the company's cash flows, development, performance, position, cost of capital or access to finance in both short and long-term time frames (EFRAG, 2022c). Lastly, a topic can be material either from impact or financial or both (EFRAG, 2022c). When the company has assessed its material matters, they need to report according to the corresponding disclosure requirements of the relevant topical ESRS (EFRAG, 2022c). In EFRAG (2022c) report's Appendix B, a conclusion of the sustainability matters covered in topical ESRS (e.g., biodiversity and ecosystems) has been made. It's an input of topics to include when performing the double materiality assessment. Every topic is further divided into sub-topics and sub-sub-topics (table 4) (EFRAG, 2022c).

Table 4.
Illustrates the Appendix guidance for ESRS E4 - Biodiversity and ecosystems for the double materiality assessment (EFRAG, 2022c).

Topical ESRS	Sustainability matters covered in topical ESRS		
	Topic	**Sub-topic**	**Sub-sub-topic**
ESRS E4	Biodiversity and Ecosystems	Direct impact drivers of biodiversity loss	• Climate change · Land-use change · Direct exploitation · Invasive alien species · Pollution · Others
		Impacts on the state of species	Examples: · Species population size · Species global extinction risk
		Impact on the extent and condition of ecosystems	Examples: · Land degradation · Desertification · Soil sealing
		Impact and dependencies on ecosystem services	

Below, the disclosure requirements for ESRS E4 will be briefly concluded. It also includes the two disclosure requirements from ESRS 2, both applying to the materiality assessment. A more detailed summary of the totally eight requirements can be found in Appendix B.

ESRS 2 SBM-3 - Material impacts, risks, and opportunities and interaction with strategy and business model(s)
The company shall describe its strategy and business model(s) resilience in relation to biodiversity and ecosystems. It shall include an assessment of the resilience to biodiversity and ecosystems-related physical, transition and systemic risks and

opportunities. The resilience analysis shall include own operations as well as up- and downstream value chain (EFRAG, 2022e).

ESRS 2 IRO-2 - Description of processes to identify and assess material biodiversity and ecosystems-related impacts, risks and opportunities

The company must describe the process of identifying material impacts, risks and opportunities, including identified and assessed actual and potential impacts and dependencies both in own operations and in the value chain. An assessment criterion shall also be included (EFRAG, 2022e).

Furthermore, if the company concludes that biodiversity and ecosystem are not material and therefore omits all the disclosure requirements for that ESRS, they shall briefly explain its conclusions of its materiality assessment of the topic (EFRAG, 2022c).

E4-1 - transition plan on biodiversity and ecosystems

The company's business model(s) and strategy shall be compatible with the respect of planetary boundaries and relevant targets outlined in international frameworks, such as the Post 2020 Global Biodiversity Framework. How the company plans to ensure these requirements must be disclosed with a high-level explanation. Own operations and its responding to material impacts shall be included. Further, the company shall illustrate how the process of implementing and updating the transition plan is managed along with metrics, related tools to measure progress and current challenges and limitations (EFRAG, 2022e).

E4-2 - Policies related to biodiversity and ecosystems

Policies implemented to manage material impacts, risks and opportunities shall be disclosed and shall be connected to other relevant policies, frameworks and targets. The policies must support traceability of products, components and raw material with significant actual or potential impact along the value chain. Lastly, the company shall disclose whether it has adopted a protection policy for operational sites owned, leased or managed in or near a protected area or a biodiversity-sensitive area (EFRAG, 2022e).

E4-3 - Actions and resources related to biodiversity and ecosystems

Actions and resources allocated to their implementation shall be disclosed in order to enable understanding of the key actions taken and planned that significantly contribute to the achievement of related policy objectives and targets. The description of key actions shall follow the mandatory content from requirement ESRS 2 DC-A "Actions and resources in relation to material sustainability matters". More information about the mandatory content can be found in the report ESRS 2 - general requirements, page 16 (EFRAG, 2022e).

E4-4 - Targets related to biodiversity and ecosystems
Adopted targets shall be disclosed and the description shall follow the mandatory content defined in requirement ESRS 2 "DC-T Tracking effectiveness of policies and actions through targets and include the following information", if the targets are related to material aspects in paragraph AR 4. More information about the mandatory content can be found in report ESRS 2 - general requirements report, page 20. Information regarding if dates and milestones, ecological thresholds and allocations of impact to the company were applied when setting targets shall also be included (EFRAG, 2022e).

E4-5 - Impact metrics related to biodiversity and ecosystem change
The company shall disclose its metrics related to its material impacts resulting in biodiversity and ecosystem change. If negative effects are identified on sites located in or near a biodiversity-sensitive area, the number and area of sites owned, managed or leased in or near these areas shall be disclosed (EFRAG, 2022e). Depending on how the company affects biodiversity, disclosure requirements vary. See figure 8 for more information. Lastly, if the company directly contributes to the impact drivers of accidental or voluntary introduction of invasive alien species, it shall disclose how it manages pathways of introduction and spread and the risks posed by invasive alien species (EFRAG, 2022e).

E4-6 - Potential financial effects from biodiversity and ecosystem-related impacts, risks and opportunities
Potential financial effects of material risks and opportunities arising from related impacts and dependencies shall be disclosed. The disclosure shall include:
- A quantification of the potential financial effects in monetary terms or where impracticable, qualitative information.
- A description of the effects considered the related impacts and dependencies to which they relate and the time horizons in which they are likely to materialise.
- The critical assumptions used in the estimate as well as the sources and the level of uncertainty attached to those assumptions.

The purpose of this is to understand how the undertaking affects biodiversity, in terms of material positive and negative, actual and potential impacts and illustrate any actions taken along with its results and to protect biodiversity by preventing or mitigating material negative actual or potential impacts (EFRAG, 2022e).

What a company must report on according to E4-5, depending on how they affect biodiversity:

Directly contributes to the impact of drivers for land-use change, freshwater-use change and/or sea-use change, the following shall be reported:

- The conversion over time of land cover (e.g. deforestation).
- Changes over time in the management of ecosystem (e.g. through intensification of agricultural management).
- Changes in the spatial configuration of the landscape (e.g. fragmentation).
- Changes in ecosystem structural connectivity.
- The functional connectivity (e.g. how well genes or individuals, move through land).

Impacts related to the state of species, it shall report metrics it considers relevant and:

- Consider population size, range within specific ecosystems as well as extinction risk.
- Include indicator that measures changes in the number of individuals of a species within a specific area, for example counting the number of individuals or breeding pairs.
- Include indications when disclosing information on species at global extinction risk such as the threat status and how activities may affect the threat status or change in the relevant habitat for a threatened species as a proxy of its impact on the local population extinction risk.

Impacts related to ecosystems, two aspects to obtain insights into the health of ecosystems should be considered per ecosystem category:

- Ecosystems extent: shall report an indicator that measures area coverage of a particular ecosystem.
- Ecosystems condition: one or more indicators that measures the quality of ecosystems relative to a pre-determined reference state or indicator that measures multiple species within an ecosystem, for example scientifically established species richness and abundance indicator that measure the development of (native) species composition within an ecosystem against the reference state.
- The undertaking could also have one or more indicators that may also reflect structural components of condition, such as habitat connectivity.

Figure 8. Overview of what to report on, depending on how the activity affect nature (EFRAG, 2022e).

3.1.4 Kunming-Montreal Global Biodiversity Framework

The Convention on Biological Diversity (CBD) started in 1992 and entered force in 1993. It's an international treaty for the conservation and sustainable use of biodiversity, seeking to address all threats to biodiversity and ecosystem services. Today the CBD has 196 parties (Convention on Biodiversity [CBD], 2022a). December 19 2022 was a historic day when nations of the world agreed on adopting the Kunming-Montreal Global Biodiversity Framework (GBF) (CBD, 2022a). The purpose of the framework is to engender, empower and galvanise urgent and transformative action to halt and reverse biodiversity loss. It is built on the Strategic Plan for Biodiversity 2011-2020 and its achievements, lessons learned and gaps. GBF is an action- and results-oriented framework aiming to guide and encourage the revision, development, updating, and implementation of policies, targets, goals, national biodiversity strategies and action plans at all levels.

The four overarching goals of the Global Biodiversity Framework

Goal A - The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050; Human induced extinction of known threatened species is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels; The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.

Goal B - Biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline being restored, supporting the achievement of sustainable development for the benefit of present and future generations by 2050.

Goal C - The monetary and non-monetary benefits from the utilization of genetic resources, and digital sequence information on genetic resources, and of traditional knowledge associated with genetic resources, as applicable, are shared fairly and equitably, including, as appropriate with indigenous peoples and local communities, and substantially increased by 2050, while ensuring traditional knowledge associated with genetic resources is appropriately protected, thereby contributing to the conservation and sustainable use of biodiversity, in accordance with internationally agreed access and benefit-sharing instruments.

Goal D - Adequate means of implementation, including financial resources, capacity-building, technical and scientific cooperation, and access to and transfer of technology to fully implement the Kunming-Montreal global biodiversity framework are secured and equitably accessible to all Parties, especially developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, progressively closing the biodiversity finance gap of 700 billion dollars per year, and aligning financial flows with the Kunming-Montreal Global Biodiversity Framework and the 2050 Vision for Biodiversity.

Figure 9. The four overarching goals of the GBF (CBD, 2022d).

It includes four overarching goals and 23 targets for achievement by 2030 (CBD, 2022a). The four goals for 2050 are aligned with CBD's vision of a planet living in harmony and a world where biodiversity is valued, conserved, restored and wisely used. Where ecosystem services are maintained and a healthy planet delivering benefits essential for all people is sustained (CBD, 2022b). The 23 targets are established with the purpose of urgent actions by 2030. They're divided into three categories: 1) reducing threats to biodiversity, 2) meeting people's needs through sustainable use and benefit-sharing and 3) tools and solutions for implementation and mainstreaming. According to CBD (2022d) the actions need to be implemented immediately and completed by 2030, if we shall reverse the loss of biodiversity. Further, the goals shall

The targets in section 1) Reducing threats to biodiversity

Target 1: in order to achieve or come close to zero loss of areas with high biodiversity importance and ecosystems of high ecological integrity by 2030; companies must ensure that all areas are managed with in consideration to biodiversity and while also addressing land- and sea-use change.

Target 2: Guarantee that by 2030, at least 30% degraded lands and water ecosystems are under effective restoration.

Target 3: By 2030, 30% percent land- and water areas, especially those with high biodiversity importance, are effectively conserved through ecologically representative, well-connected and equitable governed systems of protected areas. Simultaneously, indigenous peoples' rights are not restrained.

Target 4: Urgent actions shall be taken to halt human induced extinction of threatened species and include in situ and ex situ conservation and management practices. This to ensure recovery of species and their genetic diversity within and between populations along with minimising the human-wildlife conflict.

Target 5: Use, harvesting and trade of wild species shall be safe and legal and sustainably managed in order to prevent overexploitation and reduce the risk of pathogen spillover while still respecting and protecting the indigenous peoples and local communities customary use.

Target 6: The impacts of invasive species shall be eliminated, minimised, reduced or mitigated by preventing their introduction of priority invasive species. The company shall reduce the rate of introductions and establishments of known or potential invasive species by at least 50% by 2030.

Target 7: Pollution risks and the negative impacts from pollution from all sources shall be reduced to a, for biodiversity, non-harmful level by 2030. It shall be done by reducing: 1) excess nutrients lost to the environment to at least half, 2) pesticides and highly hazardous chemicals to at least half and 3) working towards elimination of plastic pollution.

Figure 10. The targets in section 1) reducing threats to biodiversity (CBD, 2022d).

be implemented in accordance with other international obligations and be in harmony with national circumstances, priorities and socioeconomic conditions (CBD 2022d).

The agreement obligates countries to monitor and report at least every five years on headlines and other indicators related to the progress against the framework's goals and targets (CBD, 2022a). This includes the number of companies disclosing its impact and dependencies on biodiversity (CBD, 2022a). CBD (2022d) states in their report that the framework is for the entire community. Political will and recognition at the highest level of government is needed as well as action and cooperation within both governmental level and business level as well as individual human level (CBD, 2022d). By that, the GBF invites business and finance communities, NGOs and representatives of sectors related to or dependent on biodiversity to also develop commitments aligned with the framework (CBD, 2022b). Nevertheless, it is still voluntary for the corporate sector.

The targets in section 2) meeting people's needs through sustainable use and benefit-sharing

Target 9: Provide social, economic and environmental benefits for people by sustainable management and use of wild species. This includes sustainable biodiversity-based activities and products and services that amend biodiversity.

Target 10: Agriculture, aquaculture, fisheries and forestry are managed sustainably, especially with respect to biodiversity. To ensure food security, companies shall increase the use of biodiversity-friendly practices in order to contribute to resilience and long-term efficiency and productivity of these production systems.

Target 11: Through nature-based solutions and ecosystem-based approaches, nature's contribution to people, such as ecosystem services, regulation of air, water and soil health shall be restored, improved and maintained. Thereby also reducing the risk of diseases and natural disasters.

Target 12: *C*ontribute to sustainable urbanisation by significantly increasing the area, quality, connectivity, access to and benefits from green and blue spaces in densely populated areas. Further, include biodiversity in urban planning, enhance native species and improve ecological connectivity and integrity.

Target 13: Ensure fair and equitable sharing of benefits arising from the utilisation of genetic resources by taking effective, legal, administrative and capacity-building measures. By 2030, favour a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing tools.

Figure 11. Illustration of the targets belonging to section 2) meeting people's needs through sustainable use and benefit-sharing (CBD, 2022d).

During the negotiations at COP15, finance was an important part. Many other agreements regarding monitoring, reporting and reviewing were also established in order to further ensure that progress will be made (UN Environment programme, 2022). For example, the CBD and its Protocols will provide support mechanisms and

strategies to facilitate and enhance the implementation of GBF (CBD, 2022d). If this offer also applies to companies or is only for the member states is not stated.

The targets in section 3) tools and solutions for implementation and mainstreaming

Target 14: Ensure full integration of biodiversity and its multiple values into all policies and regulations to ensure all national levels and all business sectors progressively align its activities with the GBF.

Target 15: Take measures to encourage and enable corporates to:
a) monitor, assess and disclose their risks, dependencies and impacts on biodiversity and have requirements for large and transnational companies and financial institutions, to do this along their supply and value chains and portfolios.
b) provide information needed so consumers can obtain a sustainable consumption pattern.
c) where applicable, report on compliance with access and benefit-sharing regulations and measures.

Target 16: Establish policies and regulations along with educating the community so people can be encouraged and have the possibility to make sustainable consumption choices. By 2030, the global footprint of consumption shall be reduced, global food waste halved and waste generation substantially reduced.

Target 17: Biosafety measures shall be established, strengthened and implemented in all countries as well as measures for the handling of biotechnology and distribution of its benefits.

Target 18: Identify and phase out harmful reform incentives and subsidies by 2025. By 2030, they shall be reduced by at least $500 billion per year and biodiversity-positive incentives shall be scaled up.

Target 19: The level of financial resources from all sources shall be substantially and progressively increased, to implement national biodiversity strategies and actions plans. By 2030, at least $200 billion per year shall be mobilised by among all, increasing financial resources from developed countries, promoting innovations such as biodiversity offsets and credits and leveraging private finance and encouraging the private sector to invest in biodiversity.

Target 20: Reenforce capacity building, development and the access to and transfer of technology along with access to innovative, technical and scientific cooperation worldwide, for effective implementation especially in developing countries. Promote common development and scientific research programmes along with strengthening the research and monitoring capacities.

Target 21: Safeguard that data, information and knowledge are accessible to both decision makers and practitioners as well as the public, in order to effectively and equitably guide governance and the management of biodiversity. Furthermore, to enforce communication, education, monitoring and research.

Target 22: Ensure a just representation and participation in decision-making. Ensure indigenous peoples and local communities access to justice and information related to biodiversity as well as full respect to their lands, resources and traditional knowledge.

Target 23: Ensure gender equality in the implementation of the Framework, both regarding access to natural resources and participation in decision-making.

Figure 12. The targets in section 3) tools and solutions for implementation and mainstreaming (CBD, 2022d).

3.1.5 Taskforce on Nature-related Financial Disclosures

The Taskforce on Nature-related Financial Disclosures (TNFD) is a global, market-led initiative established in 2021. It consists of 40 individual members from financial institutions, corporations and market service providers (Taskforce on Nature-related Financial Disclosures [TNFD], 2023a). Its mission is to support the shift of global financial flows from nature-negative to nature-positive outcomes. They aim to reach this by developing a risk management and disclosure framework for corporations to report and act on. The framework emerged from the Task Force on Climate-related Financial Disclosures (TCFD) framework and has been developed over time with continuous releases. The first release occurred in March 2022 and has since been followed by three more releases, the most recent in March 2023. The final version is due in September 2023 (TNFD, n.d.). The framework is a voluntary guidance intended to support internal, nature-related risk and opportunity assessments within corporates and financial institutions (TNFD, 2023a). The guidance is developed to be suitable for a wide range of enterprises as well as financial institutions. TNFD has earlier developed an integrated assessment system called LEAP (see figure 12). It's developed to help organisations to identify dependencies and impacts on nature in a structured manner (TNFD, 2023a). They have also developed an assessment system more suitable for financial institutions, called LEAP-FI which focuses on the assessment of nature-related risks and opportunities in relation to financial activities (TNFD, 2023a). There are three methods to assess nature-related risks using the LEAP approach; Heatmapping, Asset tagging, and Scenario-risk assessment method and companies can find step-by-step guides at TNFD's webpage (TNFD, 2023a).

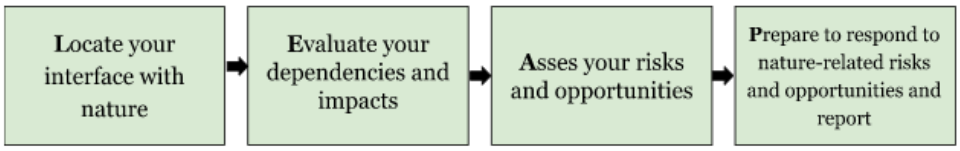

Figure 13. Illustration of the LEAP system and what it stands for (TNFD, 2023a).

Further, the four pillars Governance, Strategy, Risk and impact management and Metrics and targets originating from TCFD remain in the TNFD framework. The framework comes with six general requirements and four recommendations, all connected to the four pillars. Lastly, the framework covers both direct operations and operations in the value chain. The latest version of the framework is newly released and contains metrics and indicators for corporations to use. Important to mention, this is suggestions and TNFD awaits feedback from organisations to further develop the framework before its final release in September 2023 (TNFD, 2023a).

The six general requirements in the TNFD

1. The approach for materiality should be aligned with external standards and regulatory requirements
2. The scope of disclosures should have a clear description
3. Nature-related risks and opportunities should be identified, basing on an assessment of dependencies and impacts on nature.
4. Locations of the company's interface with nature should be considered
5. Nature-related issues should be linked, where possible, to other sustainability issues as well as possible trade-offs
6. Stakeholder engagement should be considered across the company's disclosures.

Figure 14. The six general requirements in the TNFD framework (TNFD, 2023a).

They recognise that the criterias mentioned in figure 15 are challenging to meet however, with the rapid innovation in data, analytics and technology, it will ease in the future (TNFD, 2023a).

Measurements are developed to support:

• Decision-useful information for reporting

• Practicality for report preparers to assemble, assess and report information at reasonable cost, on an annual report cycle basis and subject to limited assurance
• Comparability across and within sectors by report users

• Alignment to global and national policy goals and targets, such as those in the Global Biodiversity Framework (GBF)

Metrics are designed to be:

- A distinction between:
  - Informative assessment metrics for internal use with the ability to help manage decisions, and linked to the phases of the LEAP method and
  - Disclosure measures on follow or explain basis suitable for report users.

- A distinction between cross-sector metrics and sector- and biome-specific metrics:
  - It's aligned with and builds on the approach of the TCFD, and standard setting bodies such as the Global Reporting Initiative (GRI) and the European Financial Reporting Advisory Group (EFRAG).

- Specification of a set of core disclosure metrics to help comparability within and across sectors on areas of high priority. These are divided into:
  - Core global metrics, covering all sectors and
  - Core sector metrics, which are sector-specific.
  - Beyond this, there's also additional disclosure metrics which are recommended but not required.

Figure 15. The criteria measurements and metrics are developed to support (TNFD, 2023a).

They recommend organisations to set disclosure metrics for all nature-related issues, from dependencies to opportunities (impacts and risks) and an organisation's responses to these. Following division of metrics has also been recommended: 1) A small set of core disclosure metrics covering dependencies and impacts, aligned with global targets such as GBF and 2) Additional metrics that can be used flexibly, based on specific considerations for the business, sector, biome and/or location.

An indicator is quantitative factor or variable that provides a simple and reliable means to measure performance, for example volume of water discharged or area of land converted.

A metric is a system or standard of measurement, for example volume for freshwater discharged.

Figure 16. TNFD's definition of an indicator and a metric (TNFD, 2023a).

Table 5.
An example from TNFD (2023a) illustrating how one nature risk can be adopted in every step of the LEAP approach as well as suggestions on metrics and indicators.

	Locate	**Evaluate**	**Access**	**Prepare**
Nature risk: Land use change impact	Organisation identifies that it is converting natural ecosystems for agricultural purposes in close proximity to a biodiversity hotspot	Organisation identities that as a result of the land use change, there may be a reduction in the integrity of the biodiversity hotspot.	Organisations assesses the risk and opportunities arising from the land use change, including the financial value of dependent product lines, and determines the risk level	Organisation assesses different response options and decides to set up a sustainable management programme in the area, create an area-specific biodiversity ney gain target and monitor biodiversity levels in the area twice a year
Indicators/metrics	**Location prioritisation:** Area of direct or indirect influence that overlaps with areas of low integrity or high	**Exposure:** Extent of terrestrial ecosystems converted/degraded by ecosystem type and business activity (absolute and % change)	**Magnitude:** Value of assets/revenues dependent on the area Increased operational	**Response:** Commitment to no conversion of natural ecosystems Performance against

	biodiversity important (absolute and % change) Ha of direct assets/sites located in areas of low integrity or high biodiversity important (absolute and % change)	Measurement of the ecosystem condition, e.g. MSA, species richness (absolute and % change) Presence/density of trees/shrubs (absolute and % change) Vegetation index (absolute and % change) Altered level of livestock and/or	costs due to reduction in loyalty from stakeholders Compliance costs Description and costs related to loss of operating areas Costs of relocating operations	commitment for biodiversity net gain (baseline y-1) Number of meaningful engagements with affected stakeholders, including rightsholders and local communities, when assessing biodiversity-related impacts % of affected stakeholders meaningfully engaged in area

In the TNFD (2023b) report they state that when setting metrics, a company should ask themselves the following questions:

1) are the metrics understandable?
2) Is the data accessible (can it be collected at a reasonable cost and in a timely manner)?
3) Is it aligned to best practice frameworks and standards already used in the market, both now and over time?

In TNFD (2023b) corporates can find several suggestions on how to set targets when incorporating the framework. The targets as well as the metrics and indicators are relevant to other global policies, such as the GBF. Today corporates can perform a pilot testing of the TNFD framework, to see how the framework would suit their organisation. Corporates can also join the TNFD Forum and thereby contribute to the work of the Taskforce (TNFD, n.d.b). Since the framework is not complete yet, it is difficult to say how companies can apply to the framework.

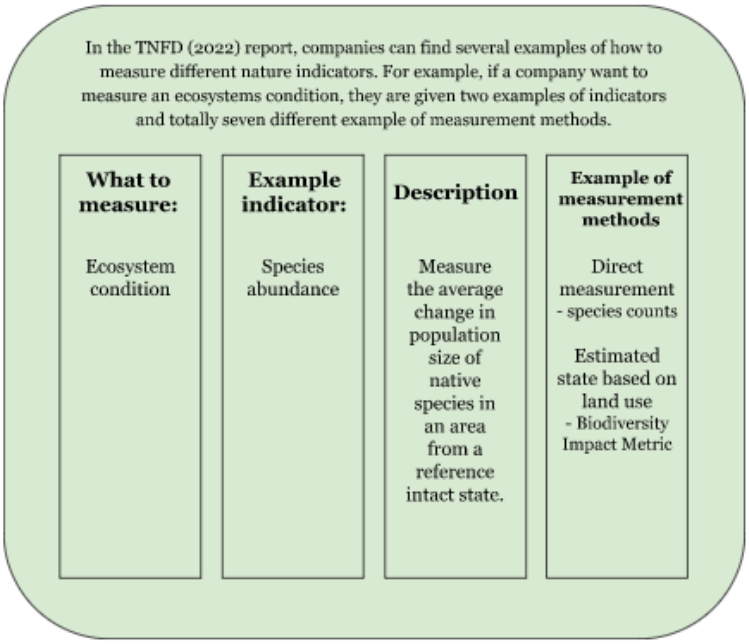

Figure 17. An example over a measurement method for an indicator (TNFD, 2023b).

3.1.6 Science-based Targets for Nature

International non-profit organisations, agencies and mission-driven entities together created the Science-Based Targets Network, whose purpose is to turn the science into targets for businesses and cities (Science-based Targets for Nature [SBTN], 2020). The Science-based Targets Initiative (SBTi) is a commitment regarding greenhouse gas emissions reduction and nearly a thousand large companies have agreed to the commitment. In 2020, SBTi launched Science-based Targets for Nature (SBTN), with the purpose to define how companies can work with their dependencies on nature (SBTi, 2020).

Science-based targets (SBTs) are based on an understanding of the nature-related risks facing businesses and offer a pathway for sufficiently ambitious corporate action (SBTN, 2020). The SBTs are described to be measurable, actionable and time-bound targets, based on the best available science and thereby allow actors to align with Earth's limits as well as societal sustainability goals (SBTN, 2020). According to SBTN (2020), setting SBTs is very beneficial for their businesses, including generating

stronger reputation among stakeholders, being one step ahead of regulation and policy changes, driving innovations beneficial to both the planet and their business as well as improved profitability.

The process of adopting SBTN includes five steps: 1) Asses, 2) Interpret and prioritise, 3) Measure, set and disclose, 4) Act and 5) Track (SBTN, 2020). SBTN are due to release their SBTs version one in March 2023. This has however been postponed to later in the Spring 2023 (TNFD, 2023). It is supposed to give companies technical guidance in setting science-based targets for nature. The second version is planned to be released in 2024 and will then provide detailed guidance on how to measure, report and verify progress against the SBTs (Grogan-Fenn, 2023). Actions recommended in the SBTN framework are built upon the mitigation hierarchy and will cover actions to *avoid* future impacts, *reduce* current impacts, *regenerate and restore* ecosystems and *transform* the systems in which companies are embedded (SBTN, 2020).

Due to the delay of version 1.0, more detailed information about the framework and its measurement methods cannot be shared in this paper.

Figure 18. Flow chart of the process of implementing SBTN (SBTN, 2020).

3.2 The companies' point of view

In this chapter the results from the survey are displayed.

As figure 19 illustrates, a variation of sectors participating in the survey can be seen.

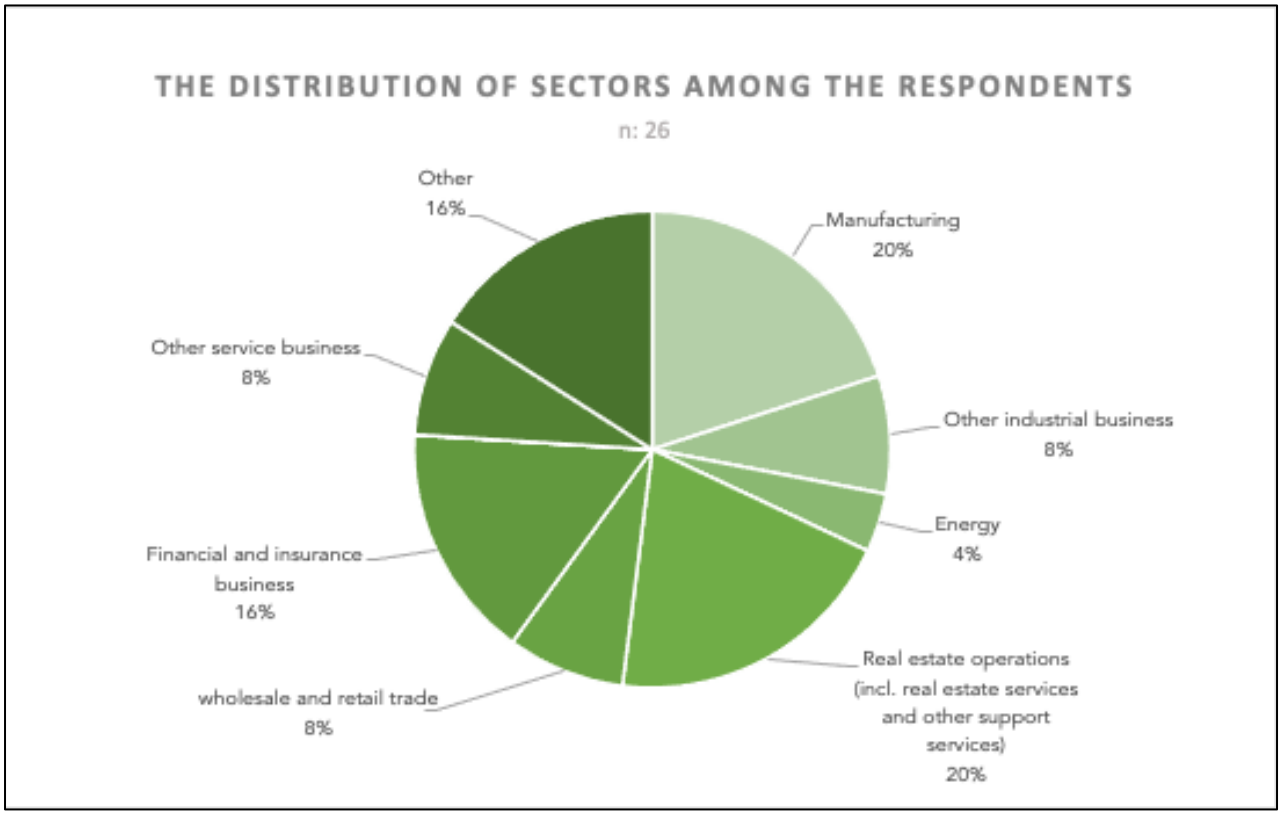

Figure 19. Illustration over the distribution of sectors among the responding companies.

Based on the titles, it appears that many respondents work with the company's sustainability work in some sort of way. Further, 46 percent is the sustainability manager. Among "others" was for example 'Head of Group reporting and control', landscape architect and 'Investor Relations Officer'.

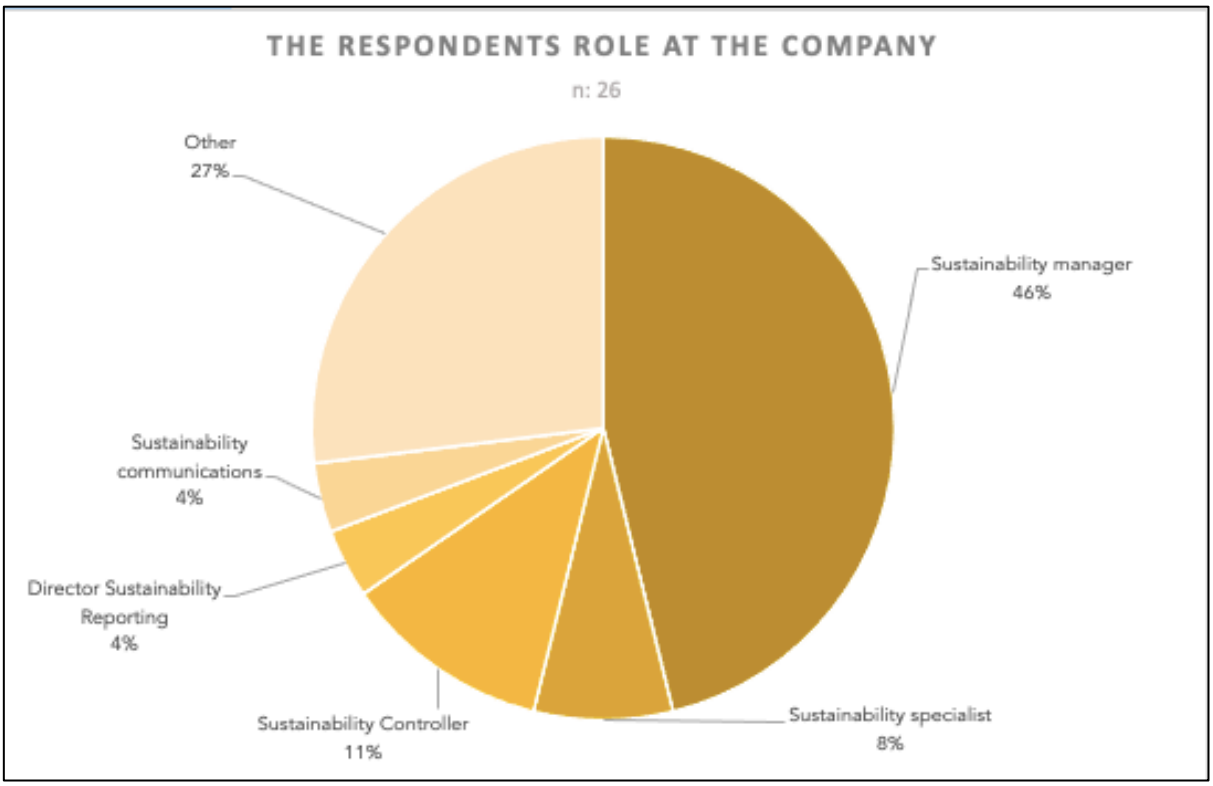

Figure 20. Illustration of each respondent's role at the company.

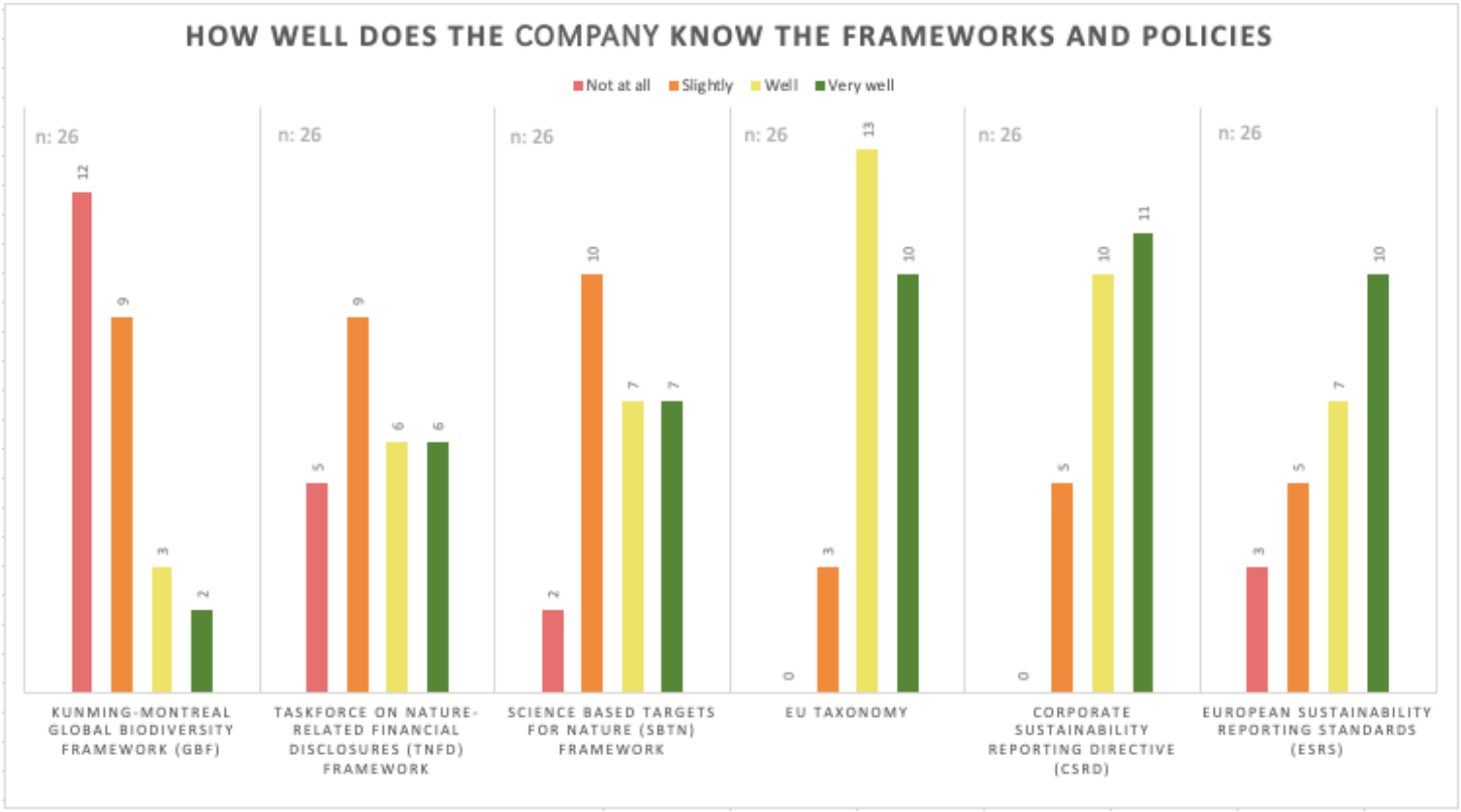

Figure 21. Showing how well the respondents know about the frameworks and the policies.

The GBF framework was the least known framework and 46 percent did not know about the framework at all. The respondents recognised the taxonomy and CSRD the most. More than 50 percent know ESRS well or very well. The result also shows that SBTN is slightly more known than the TNFD framework, however it varies greatly how well companies know both frameworks.

Approximately 54 percent of respondents are working with biodiversity today in different magnitudes and 42 percent are not working on it. About 27 percent are planning to start next year.

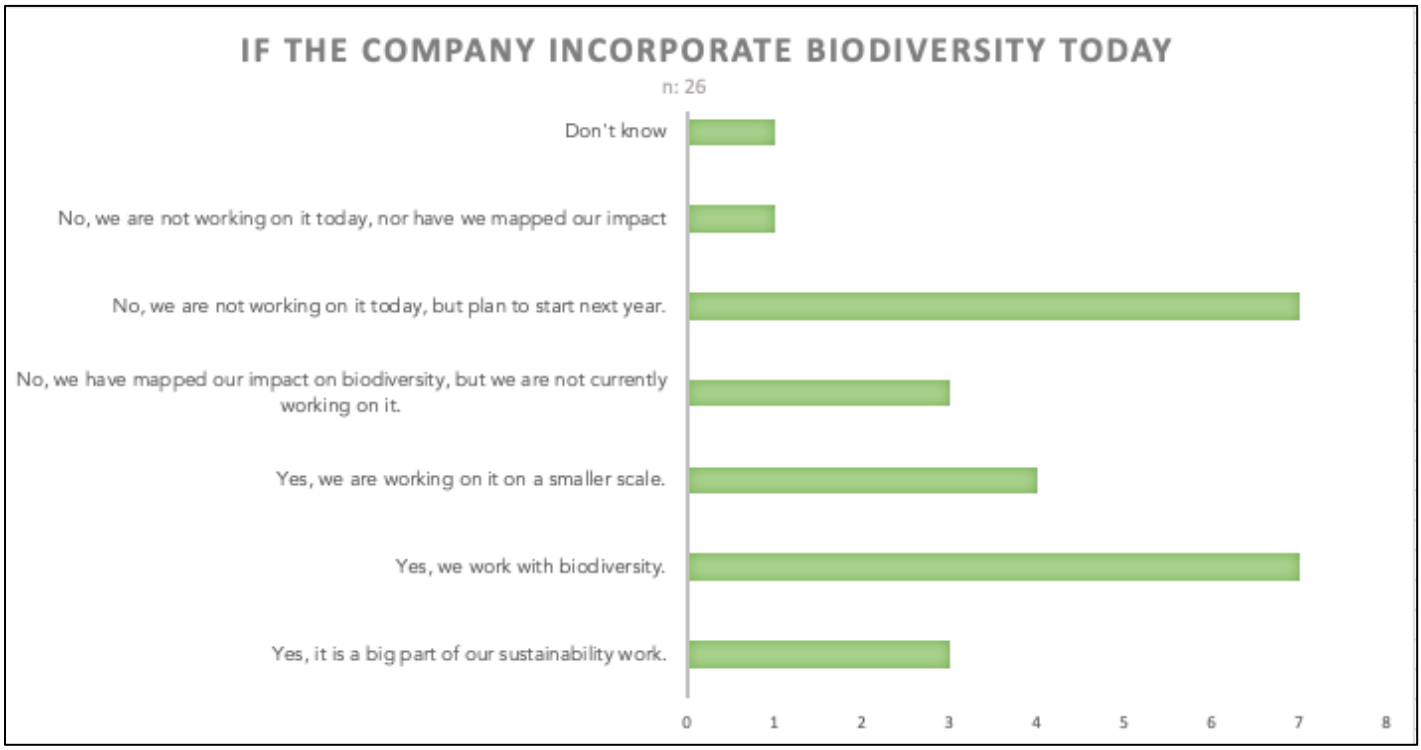

Figure 22. Visualising the companies' engagement with biodiversity today.

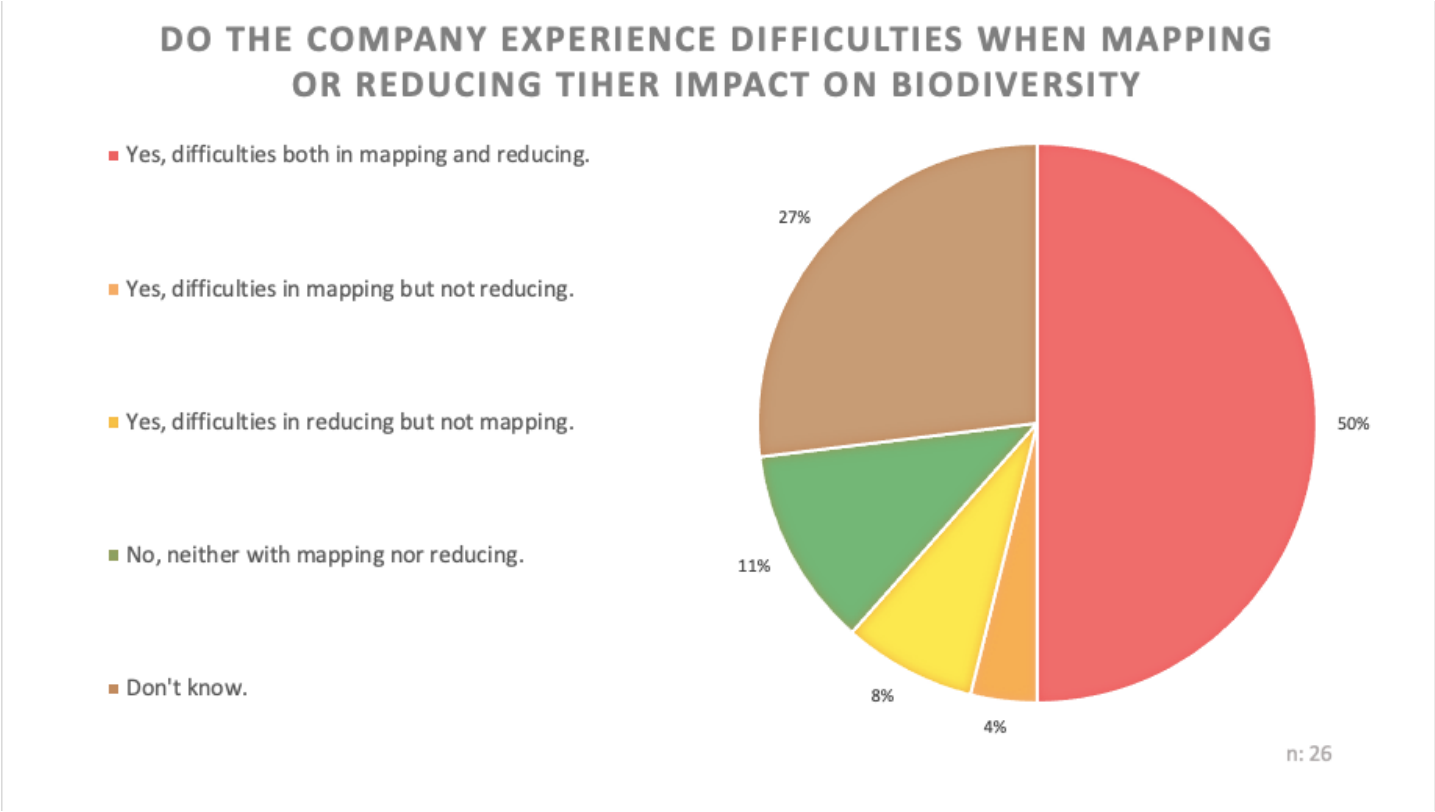

Figure 23. Showing how many companies are experiencing difficulties to map or reduce its biodiversity impact.

As can be seen in figure 23, half of the companies experience issues with both mapping and reducing its biodiversity impact. 11 percent of the companies have replied that they do not experience any difficulty in mapping or reducing. Furthermore, 27 percent answered 'don't know'. The companies answering don't know was both companies planning to start to work with biodiversity, companies who have mapped their impact but are not currently working with it and companies working with biodiversity today. Approximately 67 percent of the companies not experiencing any difficulties in mapping or reducing are working heavily with biodiversity. 33 percent have mapped its impact but are not working with it.

Figure 24 shows that 'access to data and lack of measurability' is the one factor which most companies experience as a very large obstacle. Mapping the value chain is another difficulty many companies experience. Furthermore, the majority also answered that it is a big or very big obstacle, more precisely 18 respectively 15, out of 26. Lack of financial resources and lack of profitability are the smallest obstacles among the respondents. In table 6, the answers from figure 24 are categorized according to how the company incorporates biodiversity into its business strategy. No correlation can be seen between how the company works with biodiversity and what difficulties they experience.

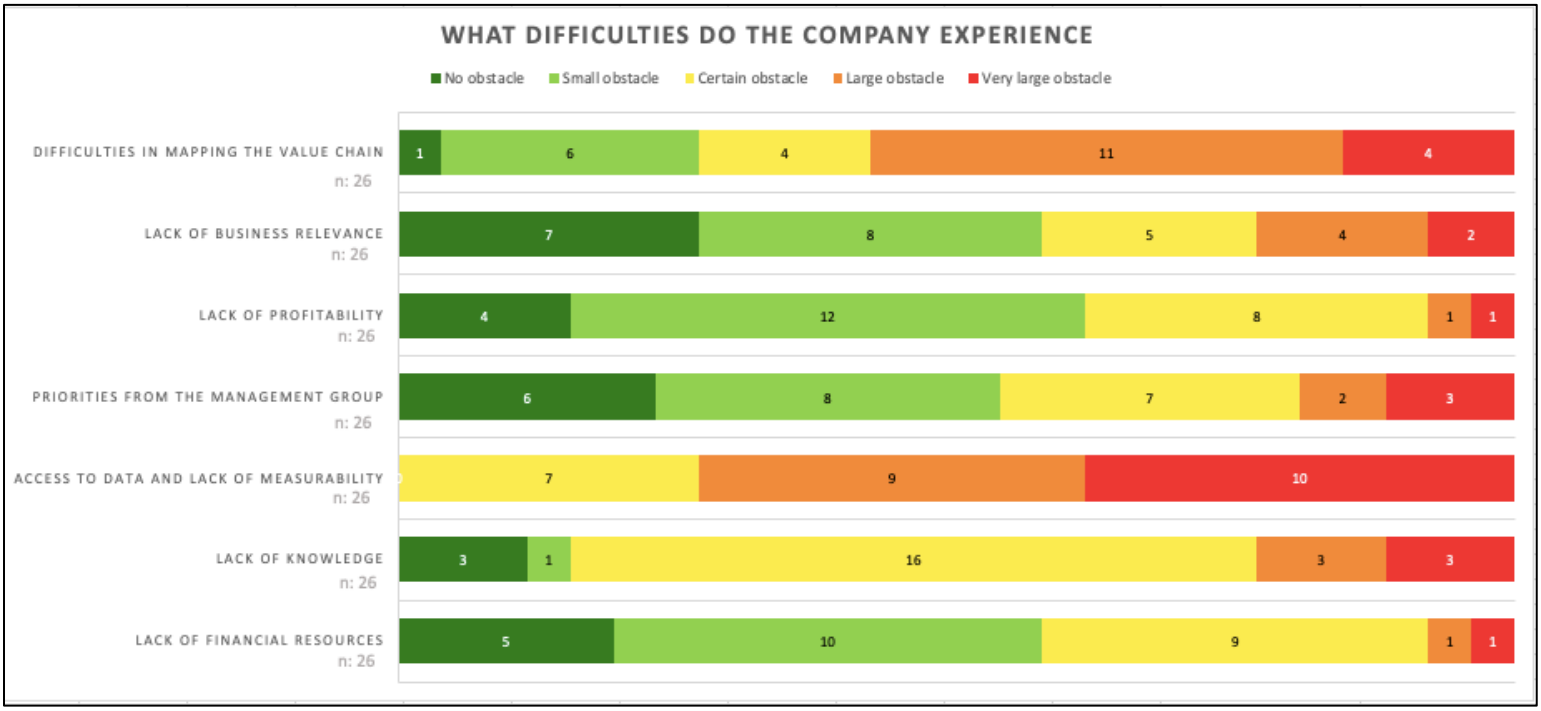

Figure 24. Illustration of how big of an obstacle different factors are to the companies' biodiversity work.

Table 6. Illustration of the difficulties companies experience depending on how much they work with biodiversity. The colors in the table represent the following: red = very big obstacle, orange = big obstacle, yellow = certain obstacle, light green = little obstacle and dark green = no obstacle. Every vertical row is one company's answer.

How much they incorporate biodiversity	Lack of finance	Lack of knowledge	Access to data	Prioritise	Lack of profitability	Business relevance	Mapping the value chain
Planning to start working with it							
Have mapped but not working with it							
On a smaller scale							
Are working with it							
It is a big part							
Not working nor mapped							
Don't know							

In the table below the companies' free text answers are illustrated, where they explain in more detail what obstacles they experience.

Table 7.

Shows the companies' free text responses regarding obstacles experiencing as well as what factor/s it stated as a large or very large obstacle (answers illustrated in figure 23).

Sector	Greatest challenge experienced	Experiencing issues (large or very large obstacle)
Manufacturing	Create a reliable overview of where in the value chain the greatest impact is, including the consumer perspective. An extensive work effort is required to collect and verify the data.	Lack of knowledge, access to data and lack of measurability and difficulties in mapping the supply chain.
Manufacturing	The management team has limited knowledge of biodiversity and this is of course a major obstacle for us to address the issue, but the main reason is the lack of business relevance.	Access to data and lack of measurability, difficulties in mapping the supply chain
Manufacturing	the lack of measurement methods, and that there are so individual solutions on different farms	Priorities from the management group, lack of business relevance.
Other industrial business	The fact that biodiversity is not a priority today due to the type of business we conduct, other areas are therefore prioritised by the management team.	
Wholesale and retail trade	We have not mapped out how we could influence in the most positive direction and where our industry has the biggest challenges in the matter.	Access to data and lack of measurability, difficulties in mapping the supply chain.
Finance and insurance business	Lack of useful data. In finance, there are mainly two approaches to obtain biodiversity data about their investments and/or clients: either by obtaining it from the companies themselves (which in turn have difficulty measuring and publishing relevant data) or by "scanning" the portfolio based on external databases that often contain template-based information with low accuracy	
Other (group in several industries)	It is probably to make it visible since the measurement with biodiversity is difficult. We do a lot, but what exactly is the cumulative effect and which initiatives should be	Lack of financial resources, access to

	invested more in (which have the most impact) is difficult to concretize.	data and lack of measurability
Real estate operations (incl. real estate services and other support services)	Transparency and data in the value chain.	Difficulties in mapping the value chain
Finance and insurance business	As a major bank, the biggest obstacle is access to relevant data at an aggregated level. We need to measure the impact of our loan and investment portfolio and right now there are no such effective methods in place. We also need more accurate geographic data from our customers, which we do not currently have. The addresses registered for our customers are at their administrative address. We need geographic data on where their economic activities are carried out (especially for the forestry and agricultural sector, easier to get data in e.g. the real estate sector). That is why we encountered difficulties with mapping the value chain as a very big obstacle.	Access to data and lack of measurability.

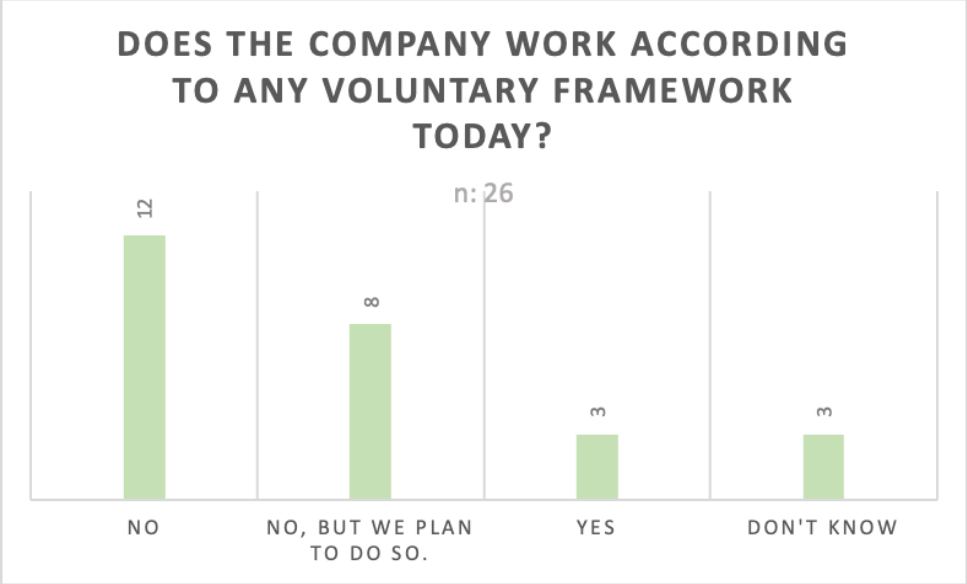

Figure 25. Showing how many companies' are working according to any voluntary framework today.

The majority of the respondents do not work according to any framework today. However, 31 percent are planning to start.

3.3 Measurably and data-driven strategies

This chapter contains a compilation of the three interviews that were conducted. One interview has been held with Sara Carlsén, who is coordinator for biodiversity at Boliden. One interview has been held with Philip Gudinge, who is a sustainability specialist at Handelsbanken, and one interview has been held with Lars Lundahl, who is sustainability manager at Orkla.

3.3.1 How they impact biodiversity

The three companies affect biodiversity in different ways. Lars states that Orkla's main impact on biodiversity occurs upstream in the value chain, in the primary production of the raw materials used in their products, for example through agriculture and fishing. According to Sara Boliden their main impact occurs in their direct operations through establishing or expanding mines. Boliden also has smelteries and they partly use their own minerals but also purchase minerals from other mining companies. They have not evaluated their impact throughout their value chain yet, but Sara believes it will display that the smelteries have a pretty large impact as well. Philips says Handelsbanken's biggest impact occurs downstream, more specifically through their financing and investing. They are currently mapping their impact, but Philip is still sure their biggest impact occurs through their customers.

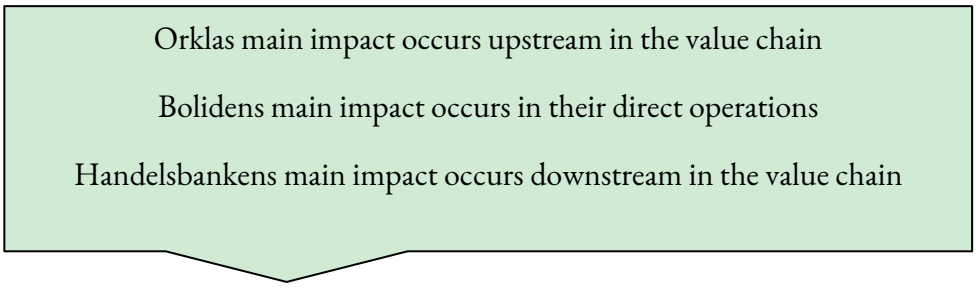

Figure 26. Excerpts of the most important that emerged from the interviews.

3.3.2 Measurements and strategies

Since the companies impact biodiversity in separate ways, their measurements and strategies differ. Lars states that Orkla has targets such as no transformation of natural ecosystems. They measure their performance on biodiversity mainly by measuring the share of raw materials certified. A certification indicates that the farmer meets certain requirements, for example carrying out maintenance measures that contribute to biodiversity and by measuring certified raw materials, Orkla can ensure that some actions are taken. For example, products containing palm oil and cocoa can contribute to deforestation. By having a certification system Orkla can ensure that, or at least reduce the risk, of contributing to deforestation. Lars states that they use these measurements in lack of better indicators. Orkla is searching for more quantified indicators, they are for example a member of SBTN's Corporate Engagement Program and wants to further evaluate if they can set any targets based on the methods being developed. However, due to their position in the value chain, Lars states that they must measure biodiversity at a more aggregated level. Boliden, on the other hand, performs biodiversity measures in their direct operations, such as ecological compensation. It can for example be moving dead wood and vascular plant species. They measure their progress through follow-up programs and structured recurring inventories, for example they measure how well insects have spread with insect traps. Likewise, they track how well nature establishes to ensure the development is moving towards the target image. Sara says they also measure other parameters important for the microclimate such as the ground temperature, soil moisture and pH. When trying to recreate nature, sometimes there is none or very little information regarding how the area looked before it was exploited. In order to know what to plant where, Boliden searches for sites with similar conditions in surrounding landscapes and tries to imitate the flora and fauna of that place. Sara further states that Boliden uses a new measurement tool called Climb. The tool launches in 2023 and its main purpose is to quantify biodiversity measurements. Simply explained, the tool gives you a score for both your negative and positive impact and Boliden will be able to place a number on for example how well their ecological compensation benefits biodiversity. Climb has been developed by several companies and it is not an official method today. Philip states that it is difficult to affect Handelsbanken's biodiversity impact and no measurements were mentioned in the interview. According to Philip, Handelsbanken can affect their impact on biodiversity either through an open dialogue or by excluding customers. Another strategy is to sign pledges. Handelsbanken have not signed any specific agreements yet, instead they are focusing on performing a TNFD pilot. Another action Philip thinks could be interesting is to do something equivalent

to climate-friendly lendings (lendings with low carbon footprint) for biodiversity, that is lendings with low biodiversity footprints.

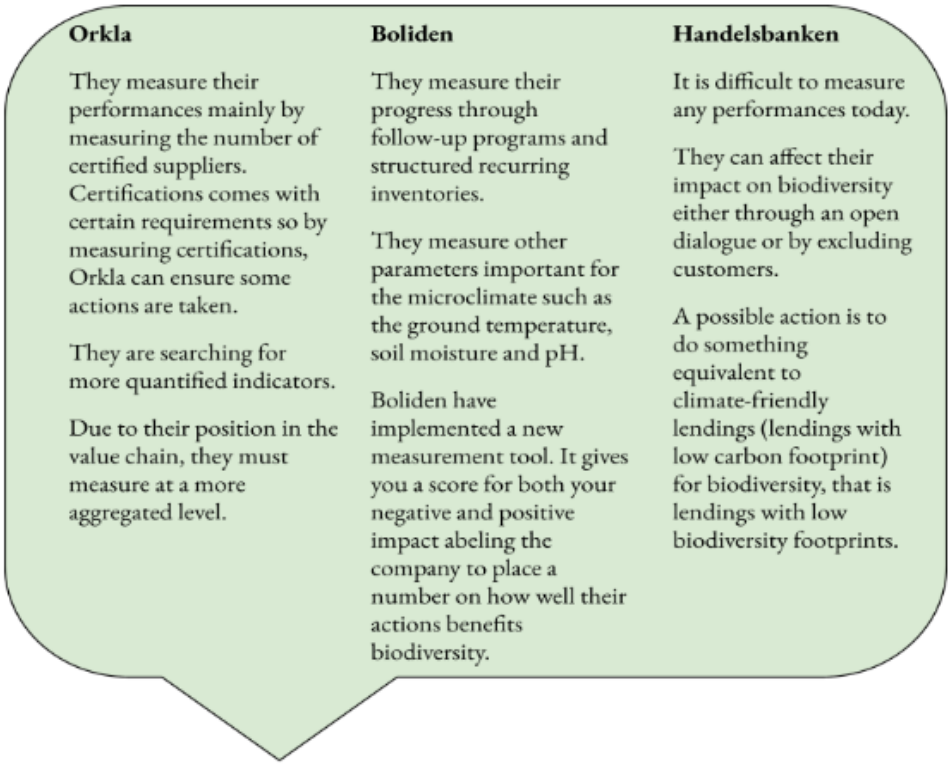

Figure 27. Excerpts of the most important that emerged from the interviews.

3.3.3 Greatest challenges

When asking what challenges each company experiences, both similar and dissimilar objects were brought up. According to Lars more precisely measures on biodiversity, than measuring certifications, are today very difficult for Orkla. The main issue is that there often are many steps in between the cultivation of a product and when Orkla receives it. Orkla is in the middle of the value chain, between the consumers and the farmers. If they want information, they need to ask their suppliers, which often also are a middle hand. In addition, Orkla has many different products and furthermore, one product can consist of several different compounds, from several different suppliers. Even though Orkla knows where for example their palm oil has been produced, that is not enough. Lars says that they need to go further up in the supply chain to where the palm oil has been cultivated. Nevertheless, Orkla has some statistics

of biodiversity actions from some farmers in Sweden but in these cases, there are no middle hands either states Lars. In Boliden's direct operations, Sara says the greatest challenge is to create a sufficiently good basis. For example, inventorying a thousand-hectare forest in detail is very difficult. Sara states it is a challenge to illustrate their impact on such big areas without having to manually inventory the entire area and hope that a method using satellite images will be developed. Another issue is the access to land. The impact on biodiversity can never be completely avoided and in order to compensate for that damage land is needed. Today it can take quite many years to access land and perform actions in the near area. Climb is very flexible with where the compensation area is located, nevertheless Boliden wants to perform the compensation in the near area to the site, not just for nature but also for the indigenous people. Lastly, Sara believes it would be even more suitable if there was an official measurement tool, or if Naturvårdsverket adopted and recommended Climb as an official method. According to Philip, Handelsbankens biggest challenge is the lack of data. The reasonable thing to do would be to ask the companies, but they do not know either. Philip states that much of the data Handelsbanken is expected to present today, many of their large company customers are still trying to collect. Furthermore, Handelsbanken can both lend out money directly to a specific project, but it can also go directly to a company. In the last scenario, Handelsbanken does not always know what the money is used for specifically within the company.

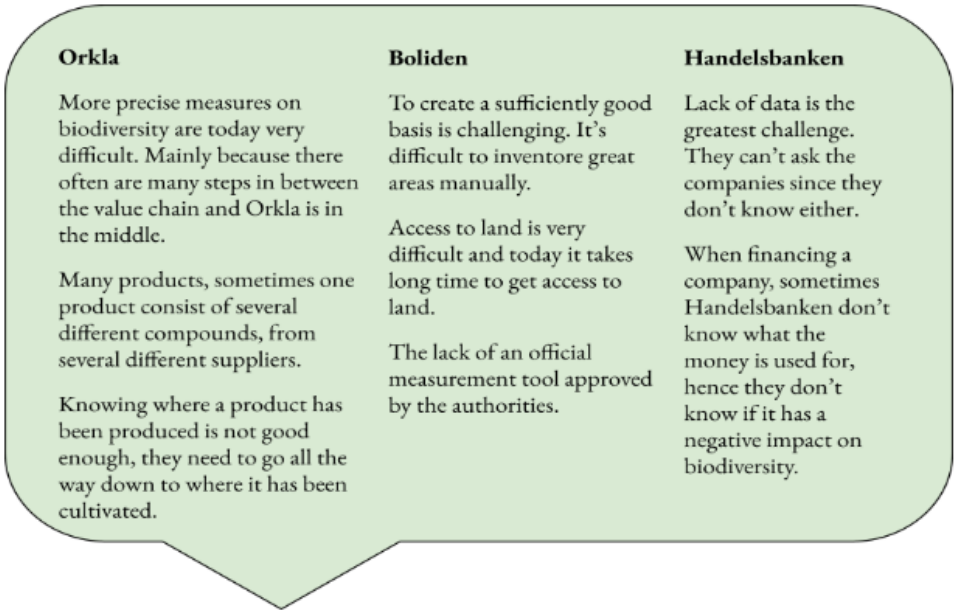

Figure 28. Excerpts of the most important that emerged from the interviews.

3.3.4 Initiate development and the next step forward

One of the questions for all interviewed was what they believe must happen in order to push the development forward, if they believe legal requirements are necessary, if frameworks from NGOs can help or if the companies can push it themselves. According to Lars, legal requirements can help to push the development forward but states that investors request this information as well, and they will also be able to drive the development. Sara does not believe legal requirements will help to achieve measurable and data-driven biodiversity strategies. It tends to become too detail-oriented and lose its flexibility. For it to have an effect, it is important that the measurement tools are flexible otherwise it becomes difficult to implement. However, Sara believes that investors' demands have a bigger impact than you can imagine. Philip however believes that legal requirements tend to speed up the process. What previously was considered impossible, becomes possible when you are forced to do it. Therefore, he believes legal requirements are necessary at some level but also points out that it cannot be too detailed so that you just "tick off" things on a list.

The next step for Handelsbanken, Philip believes, is to do an overarching mapping over their customers' impact, in order to understand the bigger picture and the risks. He believes it can be done qualitatively. But later, a change must be made where Handelsbanken can collect this data from our customers. This will also ensure their customers work with these numbers as well. If there was an overarching way to quantify your biodiversity impact, Handelsbanken could for example collect this data from the customer, perform their analysis model and get a number on the customer's impact. For example, if a customer gets 70 out of 100 points, Handelsbanken could give them one interest and offer a lower interest if the customer reaches 80 points. Philip states that we need to find that flow and get a steady grip around how the process will look like. He hopes that companies soon can have their own models enabling them to assess their own impact on biodiversity. Nevertheless, Philip believes Handelsbanken need to start with “Spatial Finance”, where you look at where the customer is located. It is easier with real estate where you have a specific area to examine. It is more difficult with companies who have their headquarters at one place, but their fabrics are somewhere else. It becomes difficult to pare the data. Lastly, according to Sara the ideal would be if there was a common method for all companies and a database where everyone displayed their impact and measurements. That way you could easily evaluate in your value chain how other companies affect biodiversity

and it would be easier to place demands, deselect companies with too much impact and so on.

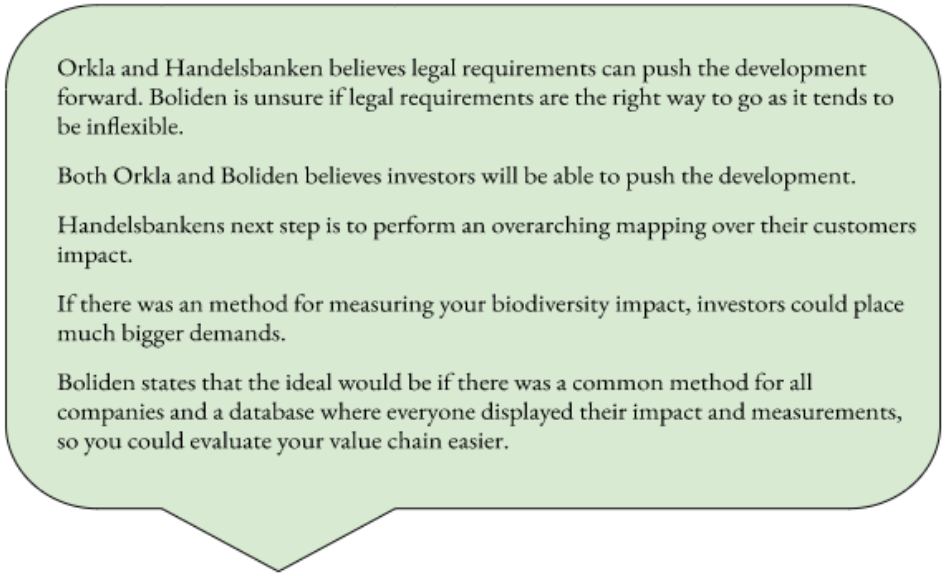

Figure 29. Excerpts of the most important that emerged from the interviews.

4. Discussion

4.1 Can the framework and policies coexist?

The result from this study indicates that all six frameworks are connected, in one way or another. The EU taxonomy is probably the one that stands most alone, not referring to any of the other policies or frameworks. According to the taxonomy, a company must perform conservation or restoration actions in order to make a substantial contribution to biodiversity. The TNFD framework has some recommendations regarding restoration and conservation (table 5) and could therefore interact with the taxonomy. The SBTN framework lacks information due to their delay, however they work according to the mitigation hierarchy which includes restoration and thus, can be connected to the taxonomy as well. To comply with the CSRD, companies must report according to the ESRS. In ESRS E4-1, it states that a company's business model must include targets relevant to international frameworks such as the Post 2020 Biodiversity framework. This framework has now been replaced with the GBF, so probably this is now the framework you need to align your business model with. Business policies shall also be connected to other international policies and frameworks, according to ESRS E4-3. Thus, it can be guessed that the business policy should be connected to both GBF and for example the taxonomy. Further, ESRS is built on TNFD who also states that their targets are relevant to the GBF. The TNFD framework also refers to the SBTN framework in some aspects, meaning that SBTN probably are interlinked with CSRD and ESRS as well, since these two policies are built upon TNFD.

The three directives included in the study do not give any clear suggestions how a company should perform its actions, nor do GBF. The ESRS only demands disclosures, and the taxonomy states which types of actions must be carried out to contribute to biodiversity, but it does not provide any suggestions for example indicators and metrics. While GBF gives guidance of what type of actions in which areas should be prioritised, a more precise guidance can be found in the TNFD framework and is said to be found in the coming update of the SBTN as well. Both demands and guidance from these frameworks and policies could therefore be used for a common purpose and support companies in their actions. For example, companies can use the framework's guidance and suggestions to simply meet the requirements of the policies. That companies were least familiar with GBF while the

taxonomy and CSRD was the most well-known can be derived from the fact that the GBF is the latest released framework, unlike the taxonomy and CSRD which has been on the table for a while. SBTN is slightly more known than the TNFD, however the variation among how well a company knows these two frameworks are large. It is important to note that all policies also include other sustainability issues such as climate change and circular economy. Although it appeared that the survey focused on biodiversity, it may be that the companies answered how well they know policies in general and not from a biodiversity perspective. It is therefore not possible to determine that they actually know for example, taxonomy object 6 as well as the result indicates. This could also be an explanation for why the voluntary frameworks were less familiar to the companies, since these three only focus on nature issues. Further, the majority of the respondents do not work according to any framework today, which could also be an indication to why they do not know these three voluntary frameworks very well.

4.2 The biggest obstacles in relation to biodiversity involvement

That only 14 out of 26 companies incorporate biodiversity in their business strategy today is an expected result given Thomas Hickmans theory of biodiversity not being as famous as climate. It cannot be determined that this is the primary reason why companies do not include biodiversity in their business strategy. However, Hickmans theory of this being due to biodiversity's complexity, can be confirmed by the results. In figure 24 it clearly states that the greatest challenges are 1) difficulties in mapping the value chain, 2) lack of measurability and low access to data and 3) lack of knowledge. Although the results vary depending on how the company incorporates biodiversity, as seen in table 6, there is no significant difference between barriers experienced and how much the company works with biodiversity. However, some differences can be seen. Regarding the companies planning to start working with biodiversity, "prioritisation from the management group", "lack of knowledge" and "mapping the value chain" are stated as the greatest obstacles. Business relevance is also an obstacle for many. If you are lacking knowledge, cannot find data on biodiversity and have trouble mapping your value chain, it can be difficult to see the business relevance, since you do not know your company's impact. Likewise, deprioritisation from the management team does not enable better knowledge, access to data and tools to map the value chain. The three companies who have mapped its impact but do not work with biodiversity, business relevance together with access to data, lacking measurability and knowledge were the biggest obstacles experienced. Again, lack of knowledge can mean that one does not see the business relevance and

conversely, you can assume that if you do not think it is relevant to the company, you might not try to gain knowledge. Lack of knowledge is also stated as an obstacle for the companies working with biodiversity. However, none of these companies stated business relevance as a big or very big obstacle, and most of them answered no or little obstacle. This concludes that even if these companies lack knowledge, they still see the business relevance. One explanation can be that they lack knowledge in other ways, for example how to act in a specific area of impact. In summary, it can be established that lack of data and measurability together with mapping the value chain are the obstacles that most companies point out as the biggest ones, when incorporating biodiversity into their business strategy.

4.2.1 Convert the dynamic nature to static numbers

That companies encounter difficulties in how to act or measure in a specific area of impact is confirmed by Sara, who says Boliden has issues presenting their actions' effects on biodiversity, due to difficulties in presenting quantitative data. Simultaneously, Sara's answer shows that the problem does not only include actions but also mapping one's direct operations is challenging. A lack of measurement methods leads to a lack of data, which in turn leads to difficulty for companies to illustrate their actions' impacts, both for stakeholders and themselves. Further, one company also mentioned that the lack of measurement methods leads to individual solutions. That companies develop their own methods and solutions is good. Nevertheless, due to biodiversity being a complex subject, the combination of individual solutions and lack of data becomes a further complicating factor when illustrating the companies' positive and negative impact, since a common denominator is missing. It becomes impossible to compare both separate commitments and companies. As the results illustrate, there are some methods when performing actions, and parameters to track and follow up on. In these scenarios however, the lack of ways to present it is missing. We need to be able to transform this information and find a common way to present it, so one can illustrate and compare different actions and companies.

4.2.2 The issue goes beyond biodiversity actions

Both the survey free text answers and the interviews indicate that the large and concerning issue that emerges is difficulties in mapping their impact due to the lack of data, which is a prerequisite for a company to be able to act. Hence, the issue is not only how to reverse the loss of biodiversity, but it goes beyond that. Today, companies are not even certain of how they drive the loss of biodiversity. Corporates do not lack data and measurement methods only to perform solid actions, but they lack data of

how they impact and depend on biodiversity. It can be interpreted as a consequence of issues with both quantifying biodiversity and prioritisation, perhaps because biodiversity earlier has been less relevant than some other environmental issues. Regardless, it is a bit shocking that big players on the market do not always know the impact of its entire value chain, not even the origin of a product. According to Lars, long and widespread supply chains and heavy workload when mapping, are the main obstacles. Both Lars and Philip state that they cannot map their value chain due to lacking data. This is also confirmed by several companies (table 6), writing they have troubles getting valid and reliable data from their suppliers. Further, the result makes it clear that companies need guidance in their biodiversity work and many places great hope in frameworks like the SBTN and TNFD to bring indicators for companies to adopt. However, these indicators cannot be used if they first do not assess their entire impact.

Many probably think like Philip, that a clear mapping can be done qualitatively, with some basis. However, as it stands today, it is not enough for companies to have an overview of their impact and dependencies. We need to have full transparency of our impact and dependence, which requires data. This can also become a problem when it comes to legal requirements, as many of them require companies to demonstrate their relationships with biodiversity throughout the value chain. Above all, this result implies that one should question the credibility when companies report on the positive impacts of their actions, because how can a company ensure that goals are achieved if they do not know the actual impact from the start?

In conclusion, the greatest issue is that lack of data to perform actions does not perivale to be the greatest issue - companies do not even have a reliable mapping of how they impact biodiversity. Or is this because there are no verified measurement methods and data? Or is it because biodiversity has not been prioritised? It is hard to tell what comes from what. It may be necessary to map your entire business to understand how your business depends on biodiversity, but if a company do not believe they depend on it, they will not map it either. If they do not know how to map it, how can they determine that they depend on and influence biodiversity?

4.3 Success requires a starting point

The first priority for reversing the loss of biodiversity should be to map one's impact, so that one's greatest impact areas can be identified, and an appropriate strategy can be designed. According to both Lars and Philip, legal requirements can catalyse the development of valid biodiversity strategies. Now, legal requirements demanding a full mapping of the value chain are around the corner. While two of the interviewees believe that legal requirements can help push the development forward, Sara states that legal requirements tend to lose flexibility. However, that is probably not the case with these

policies and frameworks, since they do not cover the exact execution, but only that measures must be implemented. Instead, the thing that may bring issues is that the policies do not do enough, or simply the lack of them. This problem may be obscured in the taxonomy, since a company only must contribute to one of the six objectives. Due to biodiversity being both more complex and less "famous" as for example climate change and counting greenhouse gas emissions, one can suspect that many companies will choose to contribute to climate change and just make sure to not do a significant harm to biodiversity. Which leads to another potential weakness with the taxonomy, the word significant. It is very abstract and interpretable. The draft of ESRS on the other hand, is a heavy matter to comply with if a company identifies biodiversity as a financial or material matter. The draft states that the materiality analysis must cover the entire value chain and goes beyond the company's own contracts and shall include both impacts and dependencies. This could imply many companies to include biodiversity in their assessments since, as Anthony & Morrison-Saunders (2022) states, in the end every company depends on biodiversity and nature. ESRS can thus be a driving factor in the development of companies' biodiversity strategies. Likewise, frameworks such as GBF can help with both the mapping of transnational value chains and their targets for biodiversity. Since all UN countries have signed this agreement, pressures may arise directly on suppliers and intermediaries from their national authorities. In this way, pressure to improve the work with biodiversity comes from different directions. Both from customers, who in turn have demands from, for example CSRD and ESRS, but also nations that have pressure through the GBF. In addition to the instruments and frameworks included in the study, there are other regulations and proposals that can further catalyze the mapping of value chains (Olsson, 2022). For example, EU is currently working on a regulation regarding traceability, which purpose is to increase consumers' knowledge of products' content and environmental impact. The EU Commission's proposal on eco-design also includes requirements around traceability (Olsson, 2022). Nevertheless, the actual impact of the frameworks and policies will need to be evaluated in future studies. From previous experience, it is known that the outcome of a policy or framework rarely turns out exactly as it was intended.

Another accelerating factor are investors, which both Lars and Sara believe plays an important role in the development. This would give investors a pioneering position where they really can affect the development of biodiversity strategies and measurement methods. Several potential solutions for how an investor can push incorporates to become biodiversity-friendly has been stated during the interview with Philip, such as biodiversity-friendly lending. Another interesting example is if you could set demands on customers by letting their biodiversity work affect their interest and fees. However, this requires that we succeed in quantifying biodiversity and fully map our impacts.

4.3.1 A common denominator needs to be developed

It is not possible to ascertain whether a qualitative assessment of a company's impact and dependencies is sufficient or not, because the result indicates that few have carried out a qualitative mapping of their entire value chain. What can be determined, however, is that the possibilities to quantify biodiversity are both in demand and necessary. By quantifying biodiversity, not only investors could place demands, but also consumers as Sara mentioned, for example through excluding collaboration with companies which do not meet a certain standard, or which have too great of negative impact. However, as the results indicate, this is prevented by the lack of measurement methods and data. At the same time, we see indications that a quantification of biodiversity and natural values has begun. For example, the measurement method Sara talks about, which can be one of the first steps in the development of quantifying biodiversity. Perhaps calculations may not need to be completely correct now, but the most important thing is that we start exploring and developing a method so that it can exist soon. One advantage that can be seen in the development of biodiversity strategies and policies, is that we can use the lessons learned from the development of halting climate change. It can thus be assumed that the development regarding improving the strategic biodiversity work can go faster than the development of the climate strategies. However, the challenge remains regarding quantifying biodiversity, as it is an elusive subject and very different from climate change. Conclusively, more studies on how we can quantify biodiversity are required.

5. Conclusions

Low access of data, lack of measurability and limited knowledge are the biggest obstacles for companies performing biodiversity actions. However, major issues arise even earlier in the process, more precisely when mapping one's impact. The result demonstrate that many companies have not done a full-scale mapping of their impacts and do not actually know how they affect biodiversity and ecosystems. The result indicates shortcomings both in mapping, data and measurability. It is a three-unity, and all depend on, and influence each other's success. To be able to make a complete mapping, validated measurement methods are needed. In order to illustrate our impact in an understandable way, we need to develop a common way to quantify biodiversity. It will be difficult to carry out a detailed mapping of the value chain if we lack measurement methods and data. Likewise, we need to carry out this mapping to know how and where to act in order to succeed in reversing the loss of biodiversity. Irrespective of the issues, biodiversity is getting more and more attention and the need for solutions is growing. Several policies and frameworks are being implemented, something that seems to be in request both by society and companies. The legal requirements that are coming are obvious and companies are facing major challenges to fulfil these demands. At the same time, it is probably exactly these kinds of requirements that are needed to catalyse development. It is also possible to conclude that a way to quantify, measure and compare both positive and negative impacts on biodiversity is in high demand. Due to the complexity of the subject, this is something that does not seem to be able to be developed within the near future. But perhaps legal requirements can speed up that progress as well.

Regardless of the methods we have today, whether we can measure or not measure our actions and report the outcome of them, the most important thing is that we act, today, now. The biodiversity trend needs to reverse, and we cannot wait a day to slow the loss. Meanwhile the work of mapping value chains and designing effective actions is in process, companies can start restoring natural values. A company does not need to map their value chain to know that the need to restore nature is great. It can be done independently of the business's impact and dependencies, let alone the business relevance because in the end, we all depend on nature. The process to quantify and make biodiversity measurable is still important and must take place in parallel with the work to reverse and restore the loss of nature, before it is too late. Both are equally important to society's, businesses' and the planet's future.

6. Acknowledgements

A big thank you to all the companies participating in the survey sharing your experiences. Another thanks you to the companies who participated in the interviews for insightful and exciting conversations. Without the companies' participations the study would not have been possible to pursue. I would also like to thank Ecogain for giving me the opportunity to write this paper in close collaboration with them and a special thank you to Helena Granborg and Lydia Rydin for your dedication, inspiring commitment and supporting ideas. Last but not least, I would like to thank my supervisor Maria Hansson for all advice and soothing support through the course of labor.

7. References

Alvehus, J. (2019). *Skriva uppsats med kvalitativ metod* (2:a ed., Vol. 1). Liber AB. ISBN: 978-91-47-12939-3.

Anthony, Samuel J. & Morrison-Saunders, Angus. (2022). Analysing corporate forest disclosure: How does business value biodiversity? *Business Strategy and the Environment.* DOI: 10.1002/bse.3164

Ardeleanu, Nicoleta-Nona & Breabăn, Iuliana-Gabriela. (2021). Biodiversity policies, opportunities for restoring the economy. *Present Environmental and Sustainable Development.* (15):2 p. 162-169. DOI: https://doi.org/10.15551/pesd2021152013

Backman, J. (2008). *Rapporter och uppsatser* (2:e ed., Vol. 1). Narayana Press/Studentlitteratur. ISBN: 978-91-44-04286-0.

Collaço de Carvalho, Sergio H., Cojoianu, Theodor & Ascui, Francisco. (2022, 10 June).From impacts to dependencies: A first global assessment of corporate biodiversity risk exposure and responses. *Business Strategy and the Environment.* DOI: 10.1002/bse.3142

Convention on Biological Diversity (2022a, 19 December). *COP15: Nations adopt four goals, 23 targets for 2030 in landmark UN biodiversity agreement.* Convention on Biological Diversity. https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022 [Retrieved: 2023-01-17]

Convention on Biological Diversity. (2022b, 18 December). *Kunming-Montreal Global biodiversity framework: Draft decision submitted by the President (CBD/COP/15/L.25).* UN Environment Programme.

https://www.cbd.int/doc/c/e6d3/cd1d/daf663719a03902a9b116c34/cop-15-l-25-en.pdf

Convention on Biological Diversity. (2022c, 18 December). *Mechanisms for planning, monitoring, reporting and review: Draft decision submitted by the President (CBD/COP/15/L.27).* UN Environment Programme.

https://www.cbd.int/doc/c/e0b8/a1e2/177ad9514f99b2cff9b251a2/cop-15-l-27-en.pdf

Convention on Biological Diversity. (2022d, 19 December). *Decision adopted by the conference of the parties to the convention on biological diversity 15/4: Kunming-Montreal biodiversity framework (CBD/COP/DEC/15/4).* UN Environment programme. https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf

Directive 2022/2464. *Europaparlamentets och rådets direktiv (EU) 2022/2464: av den 14 december 2022: om ändring av förordning (EU) nr 537/2014, direktiv 2004/109/EG, direktiv 2006/43/EG och direktiv 2013/34/EU vad gäller företagens*

hållbarhetsrapportering. https://eur-lex.europa.eu/legal-content/SV/TXT/PDF/?uri=CELEX:32022L2464&from=EN

Erling, Anna Maria. (2022, 28 november). *Dags att sätta biologisk mångfald på agendan - fem Lundaforskare om utmaningarna inför COP15*. Lund universitet. https://www.lu.se/artikel/dags-att-satta-biologisk-mangfald-pa-agendan-fem-lundaforskare-om-utmaningarna-infor-cop15#:~:text=utmaningarna%20inf%C3%B6r%20COP15-,Dags%20att%20s%C3%A4tta%20biologisk%20m%C3%A5ngfald%20p%C3%A5%20agendan,Lundaforskare%20om%20utmaningarna%20inf%C3%B6r%20COP15&text=Krisen%20f%C3%B6r%20den%20biologiska%20m%C3%A5ngfalden,Bild%3A%20Kaleni%2FPixabay. [Retrieved: 2023-01-19]

European Commission. (N.d.a). *EU taxonomy for sustainable activities*. European Commission. https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en#documents [Retrieved: 2023-01-30]

European Commission. (N.d.b). *FAQ: What is the EU Taxonomy and how will it work in practice?* European Commission. https://finance.ec.europa.eu/system/files/2021-04/sustainable-finance-taxonomy-faq_en.pdf

European Commission. (N.d.c). *Corporate sustainability reporting*. European Commission. https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en [Retrieved: 2023-02-22]

European Commission. (N.d.d). *SME definition*. European Commission. https://single-market-economy.ec.europa.eu/smes/sme-definition_en [Retrieved: 2023-02-22]

European Commission. (2021, 21 April). *Sustainable finance package*. European Commission. https://finance.ec.europa.eu/publications/sustainable-finance-package_en [Retrieved: 2023-02-22]

European Financial Reporting Advisory Group. (N.d.). *Public consultation on the first set of Draft ESRS*. https://www.efrag.org/lab3 [Collected: 2023-02-10]

European Financial Reporting Advisory Group. (2022a, 23 November). *EFRAG delivers the first set of draft ESRS to the European Commission*. EFRAG. https://www.efrag.org/Assets/Download?assetUrl=/sites/webpublishing/SiteAssets/final_EFRAG+Draft+Press+Release+.pdf [Retrieved: 2023-02-10]

European Financial Reporting Advisory Group. (2022b, November). *Draft European Sustainability Reporting Standards - Due process note*. https://efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2F02%2520Due%2520process%2520note%2520-%2520First%2520set%2520of%2520ESRS%2520-%252022%2520November%25202022.pdf

European Financial Reporting Advisory Group. (2022c, November). *Draft European Reporting Standards - ESRS 1 General requirements*. https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%

2FSiteAssets%2F06%2520Draft%2520ESRS%25201%2520General%2520requirements%2520November%25202022.pdf

European Financial Reporting Advisory Group. (2022d, April). *Cover note for public consultation: Draft european sustainability seporting standards.* https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2F03%2520Explanatory%2520note%2520Fist%2520set%2520of%2520ESRS%2520Article%252029%2520b_last.pdf

European Financial Reporting Advisory Group. (2022e, November). *Draft European Sustainability Reporting Standards - ESRS E4 Biodiversity and Ecosystems.* https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2F11%2520Draft%2520ESRS%2520E4%2520Biodiversity%2520and%2520ecosystems%2520November%25202022.pdf

EU Technical Experts Group on Sustainable Finance (2020, March). *Technical report: Taxonomy: Final report of the Technical Expert Group on Sustainable Finance.* https://finance.ec.europa.eu/system/files/2020-03/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf

Intergovernmental Panel on Climate Change. (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. Cambridge University Press, Cambridge, UK and New York, NY, USA. p. 121. Doi: 10.1017/9781009325844

Kok, Marcel T.J. & Ludwig, Kathrin. (2021). Understanding international non-state and subnational actors for biodiversity and their possible contributions to the post-2020 CBD global biodiversity framework: insights from six international cooperative initiatives. *Int Environ Agreements.* (22) p. 1-25. https://doi.org/10.1007/s10784-021-09547-2

Nurandianti, F. (2022, 10 November). *4 things you need to know about the ESRS*. SustainLab. https://sustainlab.co/blog/4-things-you-need-to-know-about-the-ESRS [Retrieved: 2023-02-24]

Olsson, Leo. (2022, 16 December). *Ny europeisk produktpolicy skärper kraven på spårbarhet.* Kvalitetsmagasinet. https://kvalitetsmagasinet.se/ny-europeisk-produktpolicy-skarper-kraven-pa-sparbarhet/ [Retrieved: 2023-05-19]

Panwar, R., Ober, H. and Pinkse, J. (2022, May). The uncomfortable relationship between business and biodiversity: Advancing research on business strategies for biodiversity protection. *Business Strategy and the Environment.* DOI: 10.1002/bse.3139

Pesce, Stéphane., Mamy, Laure., Achard, Anne-Laure., Le Gall, Morgane., Le Perchec, Sophie., Réchauchère, Oliver., Tibi, Anaïs., Leenhardt, Sophie & Sanchez, Wilfried. (2021). *Environmental Science and Pollution Research.* (28) p. 38448-38454. https://doi.org/10.1007/s11356-021-14863-w

Platform on Sustainable Finance. (2021, August). *Platform on sustainable finance: technical working group: Part B - Annex: Full list of technical screening criteria.*

https://finance.ec.europa.eu/system/files/2021-09/210803-sustainable-finance-platform-report-technical-screening-criteria-taxonomy-annex_en.pdf

Regulation 2020/852. *Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088*. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0852&from=EN

Swedish government. (2022, 21 December). *Nytt globalt ramverk för biologisk mångfald.* https://www.regeringen.se/pressmeddelanden/2022/12/nytt-globalt-ramverk-for-biologisk-mangfald/#:~:text=Beslutet%20togs%20den%2019%20december,utrotningen%20av%20djur%20och%20v%C3%A4xter [Retrieved: 2023-01-17]

Science-based Targets for Nature. (No date.a). *Biodiversity.* Science-Based Targets Network. https://sciencebasedtargetsnetwork.org/our-mission/issue-hubs/biodiversity/ [Retrieved: 2023-03-02]

Science-based Targets for Nature. (No date.b). Science-Based Targets for Nature - Initial Guidance for Business Executive Summary. Science-Based Targets Network. https://sciencebasedtargetsnetwork.org/guidance-highlights/ [Retrieved: 2023-03-02]

Science-based Targets for Nature. (2020, September). *Science-based Targets for Nature - Initial Guidance for Business.* https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/Science-Based-Targets-for-Nature-Initial-Guidance-for-Business.pdf

Task-force on Nature-related Financial Disclosures. (No date.a). *About.* Task-force on Nature-related Financial Disclosures. https://tnfd.global/about/ [Retrieved: 2023-04-17]

Task-force on Nature-related Financial Disclosures. (2023a, March). *The TNFD Nature-related Risk and Opportunity Management and Disclosure Framework - Final Draft- Beta v0.4*. https://framework.tnfd.global/wp-content/uploads/2023/03/23-23882-TNFD_v0.4_Integrated_Framework_v7.pdf

Task-force on Nature-related Financial Disclosures. (2023b, March). *The TNFD Nature-related Risk and Opportunity Management and Disclosure Framework - Beta v0.4 Annex 4.8 Guidance on Target setting.* https://framework.tnfd.global/wp-content/uploads/2023/03/23-23882-TNFD_v0.4_Annex_4.8_v4-1.pdf

Task-force on Nature-related Financial Disclosures. (2022, June). *The TNFD Nature-related Risk and Opportunity Management and Disclosure Framework - Beta v0.2 Annex 2.* https://framework.tnfd.global/wp-content/uploads/2022/06/TNFD-Framework-Annex-2.pdf

Task-force on Nature-related Financial Disclosures. (No date.b). *Consultation & Engagement.* https://tnfd.global/consultation-and-engagement/#framework%20platform [Retrieved: 2023-04-18]

Trost, J. (2007). *Enkätboken* (3:e ed., Vol. 1). (Författaren och Studentlitteratur)/Pozkal. ISBN: 978-91-44-04046-2.

UN Environment programme. (2022, 20 December). *COP15 ends with landmark biodiversity agreement.* https://www.unep.org/news-and-stories/story/cop15-ends-landmark-

biodiversity-agreement#:~:text=The%20GBF%20aims%20to%20address,ecosystems%20under%20protection%20by%202030. [Retrieved: 2023-02-09]

Appendix A

The survey questions.

1. Vilken sektor tillhör företaget? *

- ◯ Jordbruk, skogsbruk, fiske
- ◯ Tillverkning
- ◯ Utvinning av mineral
- ◯ Annan industriverksamhet
- ◯ Energi
- ◯ Fastighetsverksamhet (inkl. fastighetsservice och andra stödtjänster)
- ◯ Finans- och försäkringsverksamhet
- ◯ Parti- och detaljhandel
- ◯ Verksamhet inom juridik, ekonomi, vetenskap eller teknik
- ◯ Annan serviceverksamhet
- ◯ Annat

2. Vilken är din roll på företaget? *

Ange ditt svar

3. Hur väl känner du till följande styrmedel och ramverk? *

	Inte alls	Lite grann	Väl	Mycket väl
Kunming-Montreal Global Biodiversity Framework (CBD)	○	○	○	○
Taskforce on Nature-related Financial Disclosures (TNFD) Framework	○	○	○	○
Science Based Targets for Nature (SBTN) Framework	○	○	○	○
EU taxonomi	○	○	○	○
Corporate Sustainability Reporting Directive (CSRD)	○	○	○	○
European Sustainability Reporting Standards (ESRS)	○	○	○	○

4. Bedriver företaget något hållbarhetsarbete för biologisk mångfald? *

- ○ Ja, det är en stor del av vårt hållbarhetsarbete.
- ○ Ja, vi arbetar med biologisk mångfald.
- ○ Ja, vi arbetar med det i mindre omfattning.
- ○ Nej, vi har kartlagt vår påverkan på biologisk mångfald men vi arbetar inte med det i dagsläget.
- ○ Nej vi arbetar inte med det idag men planerar att påbörja kommande år.
- ○ Nej, vi arbetar inte med det och har inte heller kartlagt vår påverkan på biologisk mångfald.
- ○ Vet ej.

5. Om du önskar finns här möjlighet att utveckla ditt svar från fråga 4. Exempelvis genom en kort beskrivning av hur ni arbetar med biologisk mångfald.

Ange ditt svar

6. Upplever företaget svårigheter med att kartlägga och/eller minska er påverkan på biologisk mångfald? *

- ◯ Ja, svårigheter både med att kartlägga och minska.
- ◯ Ja, svårigheter med att minska men *inte kartlägga.*
- ◯ Ja, svårigheter med att kartlägga men *inte minska.*
- ◯ Nej, varken med att kartlägga eller minska.
- ◯ Vet ej.

7. Hur stort hinder utgör nedan faktorer på företagets arbete med biologisk mångfald?

*

	Inget hinder	Litet hinder	Visst hinder	Stort hinder	Väldigt stort hinder
Brist på ekonomiska resurser	◯	◯	◯	◯	◯
Kunskapsbrist	◯	◯	◯	◯	◯
Tillgång till data och brist på mätbarhet	◯	◯	◯	◯	◯
Prioriteringar från ledningsgrupp	◯	◯	◯	◯	◯
Brist på lönsamhet	◯	◯	◯	◯	◯
Avsaknad av företagsrelevans	◯	◯	◯	◯	◯
Svårigheter med att kartlägga värdekedja	◯	◯	◯	◯	◯

8. Om du vill önskar finns här möjlighet att skriva vad du anser är de största utmaningarna med att inkorporera biologisk mångfald i företagets hållbarhetsarbete.

Ange ditt svar

9. Arbetar företaget utefter något frivilligt ramverk kopplat till biologisk mångfald? *

- ◯ Ja, vi arbetar idag utefter ett frivilligt ramverk.
- ◯ Nej, men vi planerar att göra det.
- ◯ Nej, det gör vi inte.
- ◯ Vet ej.

10. Om du svarade ja på föregående fråga, vänligen skriv vilket ramverk ni arbetar utefter alternativt planerar att arbeta utefter.

Ange ditt svar

Appendix B

ESRS 2 IRO-2 - Description of processes to identify and assess material biodiversity and ecosystems-related impacts, risks and opportunities
The company must describe the process of identifying material impacts, risks and opportunities, including identified and assessed actual and potential impacts and dependencies both in own operations and in the value chain. An assessment criteria shall also be included. Further, conducted consultations with affected communities on sustainability assessments of shared biological resources and ecosystems must be disclosed (EFRAG, 2022-c).

E4-2 - Policies related to biodiversity and ecosystems
Policies implemented to manage material impacts, risks and opportunities shall be disclosed and shall be connected to other relevant policies, frameworks and targets. The policies must support traceability of products, components and raw material with significant actual or potential impact along the value chain. It shall also address social consequences of the related impacts. Lastly, the company shall disclose whether it has adopted a protection policy for operational sites owned, leased or managed in or near a protected area or a biodiversity-sensitive area (EFRAG, 2022-c).

E4-1 - transition plan on biodiversity and ecosystems
The company's business model(s) and strategy shall be compatible with the respect of planetary boundaries and relevant targets outlined in international frameworks, such as the Post 2020 Global Biodiversity Framework. How the company plans to ensure these requirements must be disclosed with a high-level explanation. Own operations and its responding to material impacts shall be included. Impact drivers and possible mitigation actions following the mitigation hierarchy shall be highlighted and planned offsets shall be disclosed. They shall include main path-dependencies and locked in assets related to biodiversity and ecosystem change. Further, the company shall illustrate how the process of implementing and updating the transition plan is managed along with metrics, related tools to measure progress and current challenges and limitations. In the absence of a transition plan, the company shall provide an explanation of its biodiversity and ecosystems-related ambition, including information of when they will adopt a transition plan (EFRAG, 2022e).

E4-2 - Policies related to biodiversity and ecosystems

Policies implemented to manage material impacts, risks and opportunities shall be disclosed and shall be connected to other relevant policies, frameworks and targets. The policies must support traceability of products, components and raw material with significant actual or potential impact along the value chain. It shall also address social consequences of the related impacts. Lastly, the company shall disclose whether it has adopted a protection policy for operational sites owned, leased or managed in or near a protected area or a biodiversity-sensitive area (EFRAG, 2022e).

E4-3 - Actions and resources related to biodiversity and ecosystems

Actions and resources allocated to their implementation shall be disclosed in order to enable understanding of the key actions taken and planned that significantly contribute to the achievement of related policy objectives and targets. The description of key actions shall follow the mandatory content from requirement ESRS 2 DC-A "Actions and resources in relation to material sustainability matters". More information about the mandatory content can be found in the report ESRS 2 - general requirements, page 16. In addition to that, the following should be included: which layer in the mitigation hierarchy the action can be allocated, if they used offsets in their action plan and if so, more information shall be included such as its aim, nature-based solutions and financing effects. For each key action, key stakeholders, their involvement and how they're impacted by actions shall be disclosed. Further, impacts or benefits created for affected communities, smallholders, indigenous groups or other vulnerable groups shall be included. The company shall also disclose whether the action tends to be a one-time initiative or a systematic practice. They shall also disclose if the key action plan is carried out only by the company using the company's resources, or if it is part of a wider action plan. If so, information on the project, its sponsors and other participants shall be provided (EFRAG, 2022e).

E4-4 - Targets related to biodiversity and ecosystems

Adopted targets shall be disclosed and the description shall follow the mandatory content defined in requirement ESRS 2 "DC-T Tracking effectiveness of policies and actions through targets and include the following information", if the targets are related to material aspects in paragraph AR 4. More information about the mandatory content can be found in report ESRS 2 - general requirements report, page 20. Information regarding if dates and milestones, ecological thresholds and allocations of impact to the company were applied when setting targets. If the target is based on conclusive scientific evidence, further information should be provided. It shall also be noted if the targets are informed by, and/or aligned with relative frameworks, whether the company used biodiversity offsets in setting its targets as described in E4-3 (above), and to which of the layers in the mitigation hierarchy the target can be allocated to (EFRAG, 2022e).

E4-5 - Impact metrics related to biodiversity and ecosystem change

The company shall disclose its metrics related to its material impacts resulting in biodiversity and ecosystem change. If negative effects are identified on sites located in or near a biodiversity-sensitive area, the number and area of sites owned, managed or leased in or near these areas shall be disclosed. Further, if the undertaking operates in one of the sectors for which DR E4-1 is applicable and has identified material impacts with regards to land-use change, or impacts on the extent and condition of ecosystems, the undertaking shall also disclose their land-use based on a Life Cycle Assessment (EFRAG, 2022e). Depending on how the company affects biodiversity, disclosure requirements vary. See figure 7 for more information. Lastly, if the company directly contributes to the impact drivers of accidental or voluntary introduction of invasive alien species, it shall disclose how it manages pathways of introduction and spread and the risks posed by invasive alien species (EFRAG, 2022e).

E4-6 - Potential financial effects from biodiversity and ecosystem-related impacts, risks and opportunities

Potential financial effects of material risks and opportunities arising from related impacts and dependencies shall be disclosed. The disclosure shall include:

- A quantification of the potential financial effects in monetary terms or where impracticable, qualitative information.
- A description of the effects considered the related impacts and dependencies to which they relate and the time horizons in which they are likely to materialise.
- The critical assumptions used in the estimate as well as the sources and the level of uncertainty attached to those assumptions.

The purpose of this is to understand how the undertaking affects biodiversity, in terms of material positive and negative, actual and potential impacts and illustrate any actions taken along with its results and to protect biodiversity by preventing or mitigating material negative actual or potential impacts (EFRAG, 2022e).