



CHALMERS
UNIVERSITY OF TECHNOLOGY



Business & Biodiversity – How businesses understand and work with biodiversity

Master's thesis in Industrial Ecology

HANNA ANDRÉASSON

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF ENVIRONMENTAL SYSTEMS ANALYSIS

CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2023
www.chalmers.se
Report No. E2023:138

REPORT NO. E2023:138

Business and Biodiversity – How businesses understand and work with biodiversity

HANNA ANDRÉASSON

Department of Technology Management and Economics
Division of Environmental Systems Analysis
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2023

Business and biodiversity –How businesses understand and work with biodiversity
HANNA ANDRÉASSON

© HANNA ANDRÉASSON, 2023.

Report no. E2023:138
Department of Technology Management and Economics
Chalmers University of Technology
SE-412 96 Göteborg
Sweden
Telephone + 46 (0)31-772 1000

Cover:
Grazing sheep on a field overlooking the Baltic ocean during sunset in Österlen, Sweden. Photograph taken by the author.

Gothenburg, Sweden 2023

Business and Biodiversity – How businesses understand and work with biodiversity

HANNA ANDRÉASSON

Department of Technology Management and Economics
Chalmers University of Technology

ABSTRACT

The Kunming-Montreal Global Biodiversity Framework that was agreed in 2022 puts increased demand on businesses to understand and take responsibility for their dependency and impact on biodiversity. With the current lack of standardised methods enabling transparency, comparability and equality, there is vast amount of work ahead and there is a need for transformative change to create a new trajectory where the goals and targets of the post-2020 Global Biodiversity Framework can be achieved. The aim of the thesis was to analyse the relationship between business and biodiversity by mapping how businesses understand and work with biodiversity within their organisation, and what incentives or barriers are recognised. The purpose was to bridge the gap between business and biodiversity by increasing knowledge and potentially inspire businesses who haven't yet initiated their work with biodiversity to do so. A qualitative method was used combining a literature study and an interview study with semi-structured interviews. The interviews were held with 17 businesses, from nine different sectors, who had claimed to work with or have an interest in biodiversity.

The findings show that businesses' understanding of biodiversity varies and that there is a lack of knowledge. Although most businesses have a definition for biodiversity, it is not always clear how biodiversity relates to their businesses, as dependency and impact are rarely defined. Businesses tend to use their own methods to strategically work with biodiversity, focusing on implementing biodiversity related measures, use certifications and participating in trade associations. Official frameworks are used to a lesser extent, but among these the most commonly used ones are the Global Reporting Initiative, GRI, and the Mitigation Hierarchy. There is also interest in the upcoming frameworks Taskforce on Nature-Related Financial, TNFD, and Science-Based Targets for Nature, SBTN, which both show potential in becoming standardised methods due to their alignment between each other and to different reporting standards. To set targets, businesses mainly use indicators that focus on activities connected to biodiversity, such as having certain numbers of biodiversity measures implemented or shares of certified products. However, businesses struggle to assess the actual impact on biodiversity and follow up on efforts. Due to this, most businesses do not tend to have any results yet connected to biodiversity, but the few that had used them to find hot spots and what to prioritise. The most frequently mentioned incentives are customers and social acceptance, the interest and internal drive from owners and management, and the demand from financial stakeholders and recent or upcoming regulation. The most frequently mentioned barriers are the lack of standardised methods to assess impact on biodiversity and follow up efforts, prioritisation, economy and the need for increased demand, lack of knowledge on what biodiversity means for businesses, and uncertainties of approach within the work with biodiversity.

This thesis shows businesses willingness to work with biodiversity but that there is a need for further guidance as there is still a lack of knowledge and standardised methods. With the various recently adopted regulations and directives presented in this study, it is clear that the demand on businesses to understand and work with biodiversity will increase significantly. This study has identified different frameworks and tools that could be used by businesses to guide their work with biodiversity and discussed how different incentives have the potential to counteract recognised barriers. Hopefully, this can contribute to bridge the gap between business and biodiversity and inspire businesses to be part of the transformative change that is needed for the achievement of the Kunming-Montreal Global Biodiversity Framework and enhance life on earth.

Keywords: Biodiversity, Business, Frameworks, Indicators, Incentives, Barriers.

Acknowledgement

I would like to thank all the people who have helped me during this process and provided me with insight and tips. A big thank you to all the participating businesses who made the interview study possible. I appreciate you taking the time and thank you for interesting interviews providing important insight not only for this thesis but also for myself.

A big thank you to my examiner and supervisor Ulrika Palme, Senior Lecturer at Environmental Systems Analysis in Technology Management and Economics at Chalmers University of Technology. Thank you for your support and guidance throughout this process and your patience and encouragement during the difficult times. I am also very grateful for the opportunity you provided connected to BIOPATH and many thanks for those involved in the project who let me participate.

Lastly, I would like to thank my sister Linnéa. Thank you for all your love and support during this thesis project and for always being there for me.

Hanna Andréasson

Göteborg
2023-08-30

Abbreviations

BIOPATH	Pathways towards an efficient alignment of the financial system with the needs of biodiversity
CBD	Convention of Biological Diversity
CLImB	Changing Land Use Impact on Biodiversity
CSDDD	Corporate Sustainability Due Diligence Directive
CSRD	Corporate Sustainability Reporting Directive
EFRAG	European Financial Reporting Advisory Group
EIS	Environmental Impact Statement
ENCORE	Exploring Natural Capital Opportunities, Risks, and Exposure
ES	Ecosystem Services
ESG	Environmental, Social and Governance
ESRS	European Sustainability Reporting Standards
ESTER	EkoSystemTjänstEffektRäkning Ecosystem Service effect calculation
EUDR	The EU Deforestation-Free Regulation
GBS	The Global Biodiversity Score
GDP	Gross Domestic Product
GRI	Global Reporting Initiative
IBAT	The Integrated Biodiversity Assessment Tool
IPBES	The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IUCN	The International Union for Conservation of Nature
MEA	The Millennium Ecological Assessment
NCFA	Natural Capital Finance Alliance
NCP	Nature's Contribution to People NCP
NVI	Nature Value Inventory
PB	Planetary Boundaries
SBTN	Science-Based Targets for Nature
SME	Small and medium-sized enterprises
SDG	Sustainable Development Goals
STAR	Species Threat Abatement and Restoration Metric
TNFD	Taskforce on Nature-Related Financial
UNDP	United Nation Development Program
WEF	World Economic Forum
WWF	World Wildlife Foundation

List of figures and tables

Figure 1. The Planetary Boundaries Framework (Azote & Stockholm Resilience Centre, 2022). CC BY-NC-ND 3.0	4
Figure 2. Indirect and direct drivers of biodiversity loss. Adapted from IPBES (2019).	5
Figure 3. The four long-terms goals and overarching target categories of the Kunming-Montreal Global Biodiversity Framework. Based on CBD (2022).	8
Figure 4. The European Green Deal (European Commission, 2019). CC-BY-4.0	9
Figure 5. The ESRS sector-agnostic standards with the environmental standard E4 Biodiversity & ecosystems marked in green. Based on EFRAG & Raad voor de Jaarverslaggeving (2022).	10
Figure 6. EU Taxonomy environmental objectives, in green, and criteria for environmentally sustainable economic activity, in blue. Based on European Union (2020).	11
Figure 7. The Swedish Environmental Quality Objectives. Illustrator: Tobias Flygar. (Naturvårdsverket, 2023). Adapted with permission.	14
Figure 8. Businesses perceived incentives for working with biodiversity.	32
Figure 9. Businesses perceived barriers for working with biodiversity.	36
Table 1. Participating businesses, the sectors they belong to and the role of the interviewees. For interviews with two interviewees from a business, the roles are separated by a comma.	16
Table 2. Frameworks and tools, including reporting standards, connected to biodiversity identified in the literature study.	24
Table 3. An overview of which of the identified official frameworks and tools, including reporting standards, that businesses in the interview study used, expressed interest in or did not mention at all.	31

Table of content

Abstract	i
Acknowledgement	iii
Abbreviations	iv
List of figures and tables	v
1 Introduction	1
1.1 Aim and purpose	2
1.2 Research questions	2
1.3 Delimitations.....	2
2 State of the art	3
2.1 Biodiversity & Ecosystem Services	3
2.2 Drivers of biodiversity loss	4
2.3 Indirect drivers.....	5
2.4 Direct drivers	5
2.5 Business and Biodiversity	7
2.6 UN Sustainable Development Goals.....	7
2.7 The Kunming-Montreal Global Biodiversity Framework	8
2.8 The European Green Deal.....	9
2.8.1 The Corporate Sustainability Reporting Directive	9
2.8.2 The EU Taxonomy	11
2.8.3 The Sustainable Finance Disclosure Regulation	12
2.8.4 The EU Biodiversity Strategy for 2030	12
2.8.5 The Nature Restoration Law	13
2.8.6 The EU Deforestation-Free Regulation	13
2.8.7 The Corporate Sustainability Due Diligence Directive.....	13
2.9 Sweden's Environmental Objectives	13
2.10 Swedish Environmental Code	14
3 Method.....	15
3.1 Literature study	15
3.2 Interview study	15
3.2.1 Participating businesses.....	16
3.2.2 Structure of interviews:	17
3.3 Analysing data.....	17
4 Findings	18
4.1 Definition, Dependency & Impact	18

4.1.1 Literature study RQ1	18
4.1.2 Interview study RQ1	19
4.1.3 Comparative summary RQ1	21
4.2 Strategic work with biodiversity, frameworks & indicators	22
4.2.1 Literature study RQ2	22
4.2.2 Interview study RQ2	27
4.2.3 Comparative summary RQ2	30
4.3 Incentives	32
4.3.1 Literature study RQ3	32
4.3.2 Interview study RQ3	32
4.3.2.1 Customers & Social Acceptance	33
4.3.2.2 Owners and Management	33
4.3.2.3 Shareholders, Investors and Banks	33
4.3.2.4 Recent & Upcoming Regulation	34
4.3.2.5 Relationship to Governmental and Municipal Authorities	34
4.3.2.6 Co-workers	34
4.3.3 Comparative summary RQ3	34
4.4 Barriers	35
4.4.1 Literature study RQ4	35
4.4.2 Interview study RQ4	36
4.4.2.1 Lack of Standardised Methods	36
4.4.2.2 Prioritisation	38
4.4.2.3 Economy	38
4.4.2.4 Demand	38
4.4.2.5 Lack of knowledge	39
4.4.2.6 Uncertainties of Approach	39
4.4.2.7 Regulation & Reporting	39
4.4.3 Comparative summary RQ4	40
5 Discussion	42
5.1 Method	42
5.2 Definition of biodiversity and how it relates to businesses	43
5.3 Businesses strategic work with biodiversity	44
5.4 Incentives to work with biodiversity	45
5.5 Barriers hindering the work with biodiversity	46
5.6 Future research	49
6 Conclusion	50
References	51
Appendix A – Target 15, 19 & 21 of the Kunming-Montreal Global Biodiversity Framework	57
Appendix B – Interview Manuscript	59

1 Introduction

The natural environment, embodied by biodiversity and ecosystem services, provides the fundamental conditions for life on Earth, on which humanity depends (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem [IPBES], 2019). Biodiversity represents the diversity within species, between species and of ecosystems and is crucial for the ability of the biosphere to sustain human life and well-being (IPBES, 2019). Despite this vital dependency, human activity is altering nature in unprecedented ways causing biodiversity to decline faster than ever before. IPBES (2019) has identified the indirect and direct drivers to biodiversity loss. The direct drivers, both natural and anthropogenic such as business activities, have a more immediate impact on biodiversity, while the indirect drivers have an essential role in shaping the underlying causes that enforces the direct drivers. With economic growth, technology advancement, consumption patterns and other indirect drivers, the demand for natural products has increased and more than 50% of the global gross domestic product (GDP) is moderately or highly dependent on nature (IPBES, 2019; World Economic Forum [WEF], 2020).

A strategic plan for biodiversity was adopted at the United Nations Convention of the Parties meeting in 2010. The plan comprised 20 biodiversity targets, called the Aichi Biodiversity Targets, which set out to guide global action to address the indirect and direct drivers of biodiversity loss during the decade 2011-2020 (Convention of Biological Diversity [CBD], 2020). The Aichi Biodiversity Targets aimed to address the underlying causes of biodiversity loss, promote the integration of biodiversity values into national and local planning processes, and ensure the fair and equitable sharing of the benefits derived from biodiversity (CBD, 2020). However, the United Nations Convention of Biological Diversity stated in the Global Biodiversity Outlook 5 from 2020 that although some progress was made, *none* of the Aichi Biodiversity Targets were met on a global level.

At the United Nations Biodiversity Conference in December of 2022, a new global framework on biodiversity, the Kunming-Montreal Global Biodiversity Framework, was agreed upon. The framework includes 23 targets to be reached by 2030, aiming to halt and reverse the loss of biodiversity, in order to achieve the four long-term goals for 2050 with the vision of living in harmony with nature (CBD, 2022). The action-oriented targets focus on reducing threats to biodiversity, ensuring that biodiversity is used sustainably in order to meet people's needs, and putting in place tools and solutions for effective implementation (CBD, 2022). A significant focus on business and biodiversity is presented among the targets related to tools and solutions for implementation, which aim to increase financial resources towards biodiversity and increase measures for businesses to transparently disclose risks, dependencies and impact on biodiversity.

Evident from the outcome of the Aichi Biodiversity Targets, the progress to reverse the current loss of biodiversity has not yet been sufficient and there is a need for transformative change to create a new trajectory where goals for the post-2020 Global Biodiversity Framework can be achieved (IPBES, 2019; CBD, 2020). There is continuous progress in policy responses and actions to conserve nature and mitigate the negative anthropogenic interference with biodiversity and ecosystems. Furthermore, the Kunming-Montreal Global Biodiversity Framework will create an increased demand on businesses to understand and work with biodiversity. However, although the use of policy instruments, voluntary certification and biodiversity offsetting is increasing, their effectiveness is mixed, and the development is not fast enough (IPBES, 2019). Additionally, there is a lack of standardised methods for working with biodiversity that enables transparency, comparability and equality (IPBES, 2019; World Wildlife Foundation [WWF] and Bain & Company, 2023). As the targets of the Global Biodiversity Framework are to be initiated immediately, there is a vast amount of work ahead and an urgent need for

businesses to understand not only their impact and dependency on biodiversity, but also their crucial role in changing the current trajectory towards enhancing life on earth.

1.1 Aim and purpose

The aim of the thesis project is to analyse the relationship between business and biodiversity by mapping how businesses understand and work with biodiversity within their organisation, and what incentives or barriers are recognised. This is done by combining a literature and interview study.

The purpose is to bridge the gap between business and biodiversity by increasing knowledge and potentially inspire businesses who have not yet initiated their work with biodiversity to do so in order to move towards the achievement of the Kunming-Montreal Global Biodiversity Framework and enhance life on earth.

1.2 Research questions

To reach the aim, four research questions are addressed:

1. How do businesses define biodiversity and how it relates to their business?
 - How do businesses perceive their dependency on biodiversity?
 - How do businesses perceive their impact on biodiversity?
2. How do businesses strategically work with biodiversity within their organisation?
 - What frameworks are used to guide the work?
 - What indicators are used to assess impact, set targets and follow up efforts?
 - How are the results used?
3. What incentives are recognised to motivate and encourage businesses to work with biodiversity?
4. What barriers are recognised to hinder businesses to make progress in their work with biodiversity?

1.3 Delimitations

In this thesis project, the literature study focuses on previous research on Swedish businesses work with biodiversity, but it also includes international articles and reports. The interview study is limited to include Swedish businesses for accessibility and feasibility. However, no geographical limitation is set regarding the Swedish businesses' operational areas and value chains. The term "strategically work with biodiversity" has a wide scope aiming to capture various ways businesses could work with biodiversity and is therefore not limited to one specific area. Instead, the term encompasses a variety of methods, frameworks and indicators that businesses could use. Furthermore, the understanding and strategic work within businesses' organisation encompasses businesses' value chains as well. The sufficiency and effectiveness of how the interviewed businesses express to work with biodiversity is not evaluated in the analysis.

2 State of the art

This chapter provides a background on what biodiversity is, how it can be categorised through different frameworks, the drivers of biodiversity loss and how it relates to businesses. The chapter also includes different goals, regulations and directives connected to biodiversity that affect businesses globally, within EU and in Sweden.

2.1 Biodiversity & Ecosystem Services

The Convention of Biological Diversity (CBD) (2006) defines biological diversity, biodiversity, as the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. This definition encompasses the diversity of genetic, species, and ecosystem-level variation and the interactions between them (CBD, 2000). As stated, the natural environment, embodied by biodiversity and ecosystem services, provides the basic conditions for life on earth, on which humanity depends. Biodiversity is essential for the health, stability and resilience of the ecosystems. These ecosystems, in turn, provide goods and services that make up the quality of life of humans (IPBES, 2019).

The Millennium Ecological Assessment (MEA) (2005) defined the goods and services provided by nature as Ecosystem Services (ES). The MEA further categorised the ecosystem services into four different types: provisioning, regulating, cultural and supporting services. Provisioning services include products obtained from ecosystems such as food, drinking water and timber. Regulating services include benefits obtained from ecosystem regulation processes, such as air quality, water purification and climate regulation. Cultural services are non-material benefits obtained from ecosystems that provide recreational, aesthetic, and spiritual benefits. Lastly, supporting services are the underpinning services that enable the other ecosystem services and include photosynthesis, primary production and soil formation.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2019) presented an alternative categorisation of the goods and services provided by nature with the concept of Nature's Contribution to People (NCP). The NCP framework extend beyond the concept of ecosystem services by recognising the diverse ways of nature's contribution to humanity, both positive and negative (Díaz et al., 2018). While ecosystem services primarily focus on the benefits humans derive from nature, NCP encompasses a broader understanding of the diverse ways in which nature contributes to human well-being, including cultural, spiritual, and transformative aspects (Díaz et al., 2018). It highlights the intrinsic and holistic connections between humans and nature, emphasising the importance of understanding and valuing these relationships for sustainable development and decision-making (Díaz et al., 2018). NCP expands the scope of ecosystem services by encompassing a broader range of human-nature interactions and their significance beyond purely economic considerations. However, in an analysis by Muradian & Gómez-Baggethun (2021), the authors state that the NCP concept still share the anthropogenic and utilitarian values of nature as the ES approach and that "It is revealing that the approach has chosen the metaphor "nature's contribution to people" and not, for instance, people's obligations towards nature." (Muradian & Gómez-Baggethun, 2021, p. 4).

In 2009 the concept of planetary boundaries was established (Rockström et al., 2009). These boundaries, represented by nine critical Earth system processes, work as a framework for understanding the limits within which humanity can safely operate to avoid catastrophic environmental changes. Already in 2009, Rockström et al. (2009) stated that anthropogenic pressure has transgressed three of the boundaries: climate change, the nitrogen cycle and the rate of biodiversity loss. In 2015, Steffen et al. published an updated and extended analysis of the planetary

boundaries. The PB regarding biodiversity was refined and the term biosphere integrity was introduced. Instead of only encompassing species loss, biosphere integrity also includes the overall health and resilience of ecosystems. The updated framework highlighted the need to preserve not only species diversity but also the ecological interactions and processes that sustain ecosystems. This perspective recognises that the loss of key species or disruptions to critical ecological functions can have cascading effects on ecosystem health and human well-being (Steffen et al., 2015). In an analysis of the PB framework in 2022 by Wang-Erlandsson et al., a Green Water PB within the Fresh Water Use PB was added. Wang-Erlandsson et al. (2022) stated that, apart from the previously mentioned transgressed PB, the new Green Water PB is already transgressed together with land system change and novel entities, seen in Figure 1 below.

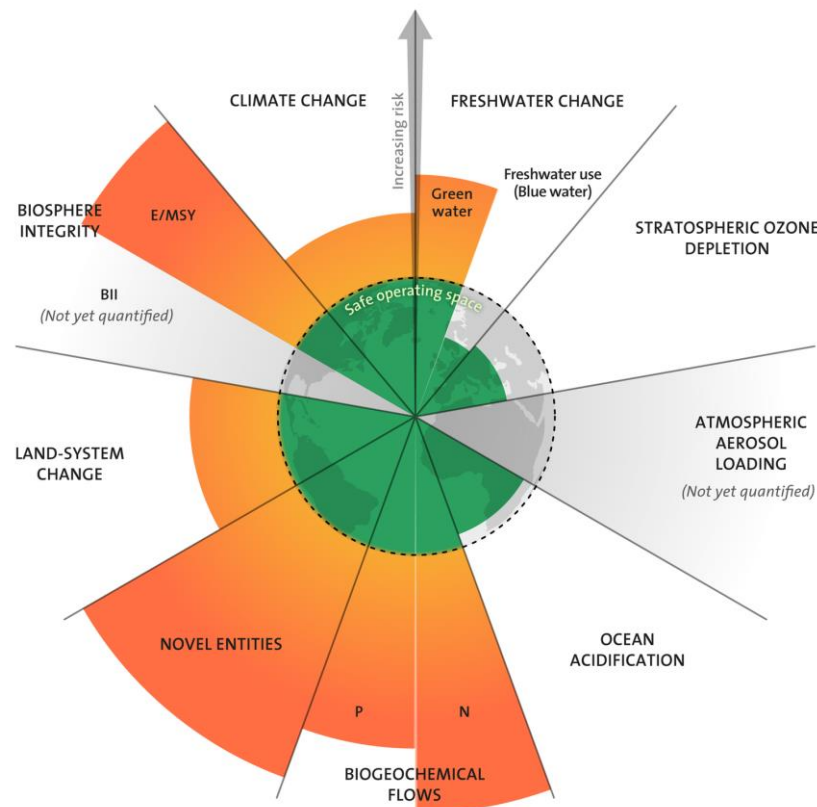


Figure 1. The Planetary Boundaries Framework (Azote & Stockholm Resilience Centre, 2022). CC BY-NC-ND 3.0

2.2 Drivers of biodiversity loss

In the global assessment report on biodiversity and ecosystem services by IPBES (2019) the direct and indirect drivers of biodiversity loss are presented, seen in Figure 2 below. IPBES (2019) identifies five main direct drivers that has the largest negative impact across the globe on biodiversity: changes in land and sea use, direct exploitation of organisms, climate change, pollution and invasion of alien species. Changes in land and sea use is seen as the driver with largest impact across the terrestrial and freshwater realm. However, in the marine realm, direct exploitation has the largest negative impact (IPBES, 2019).

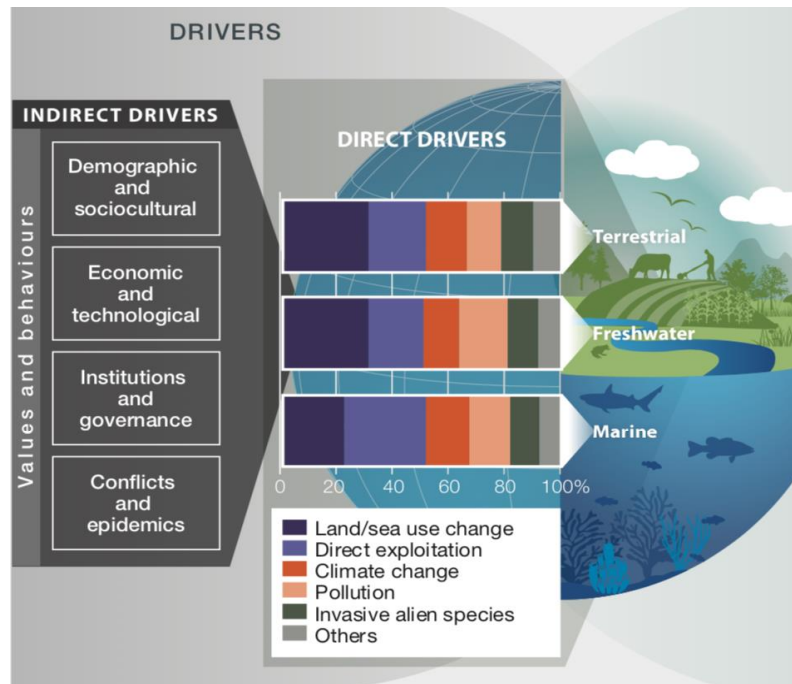


Figure 2. Indirect and direct drivers of biodiversity loss. Adapted from IPBES (2019).

2.3 Indirect drivers

The indirect drivers of biodiversity loss are interconnected and often reinforce one another, creating complex interactions and cumulative impacts on biodiversity (IPBES, 2019). In the report by IPBES (2019) it is stated that population growth, urbanisation and changes in consumption patterns driven by economic systems contribute to increased demand on natural resources, which put pressure on ecosystems and biodiversity. It is also stated that technology advances have the potential to develop more efficient practises and alleviate pressures on biodiversity. However, such advances can also facilitate further exploitation, production and consumption patterns. Social and political factors, including governance systems, policy frameworks, and cultural values, also have a significant role in shaping how societies interact with nature (IPBES, 2019). Cultural norms and traditions can foster a strong connection to nature and a responsibility to protect it. On the contrary, inadequate governance, political instability, and conflicting interests can disrupt conservation efforts and further enable unsustainable use of natural resources. Epidemics can also arise from disruptions in ecosystems and wildlife trade, which not only can affect biodiversity but also humans directly (IPBES, 2019).

2.4 Direct drivers

IPBES (2019) identifies human changes in land and sea use as the direct driver with most negative impact. In the terrestrial realm, activities such as agriculture, forestry, mining, and infrastructure development lead to clearing of forests and changes in natural ecosystems for the acquisition of land (IPBES, 2019). This can result in the conversion, fragmentation and degradation of natural habitats, ecosystems and agro-ecosystems, altering and reducing habitats for different species, which contributes to the loss of biodiversity. Activities such as fishing, aquaculture, and shipping have been shown to alter marine habitats, degrade water quality and disrupt marine ecosystems. In turn, these alterations have negative impact on fish populations, coral reefs, and other important marine habitats, which can cause a ripple effect throughout the food chain (IPBES, 2019).

Direct exploitation, and specifically overexploitation, has the largest relative impact in marine ecosystems and the second largest within the terrestrial and freshwater realms according to IPBES (2019). Activities such as fishing, logging, hunting and wildlife trade overharvest and extract natural

resources such as animals, plants, water and other organisms and put pressure on and disrupt ecosystems (IPBES, n.d.-a). Overfishing has severe impact on ocean ecosystems, threatening fish stocks and thus entire food chains with predator pray relationship and can also have negative impact on marine mammals, seabirds and other species (IPBES 2019). The unsustainable harvesting of plants for timber, fuelwood, medicinal purposes, and other commercial uses damage habitats and lead to the loss of plant species, disrupting ecosystem dynamics and the organism's dependent on the vegetation (IPBES, 2019).

According to IPBES (2019), climate change has the third largest impact out of the five direct drivers of biodiversity loss. Greenhouse gases contribute to significant changes in temperature, precipitation, weather patterns and ocean circulation, which in turn affect many species and ecosystems directly or indirectly (IPBES, 2019). Furthermore, climate change can affect the timing and distribution of seasonal events such as migration, breeding, and flowering and therefore also the timing of food availability and reproductive cycles (IPBES, 2019; WWF and Bain & Company, 2023). Additionally, climate change cause changes in the frequency and severity of extreme weather events such as floods, droughts, hurricanes, and wildfires that can results in significant negative impacts on many species and ecosystems, including the loss of habitat and direct mortality (IPBES, 2019).

Out of the five main drivers of biodiversity loss, pollution has the fourth largest significant impact on biodiversity loss (IPBES, 2019). The introduction of harmful substances or excessive levels of naturally occurring substances into the environment negatively impact biodiversity through various pathways in all biomes. The use of pesticides, herbicides, and fertilisers in agriculture or other industries can cause chemical pollution, especially through nitrogen and phosphorous deposition. By seeping into the soil, air and water bodies the harmful substances cause cascading effects with soil degradation and air and water contamination, such as eutrophication and acidification, that lead to an overall decline in biodiversity (IPBES, n.d.-a). Air pollution also stems from emissions from other industries, such as factories and transportation, that can cause changes in climate patterns and have effect on natural processes such as the carbon cycle where increased carbon dioxide in the atmosphere lead to the acidification of oceans and lakes (IPBES, 2019). In addition to agricultural runoff, water pollution can occur from many sources, including transportation and industrial waste and sewage, where the contamination of waterways have devastating impact on aquatic species and the ecosystems they inhabit (IPBES, 2019). According to IPBES (2019), plastic pollution is another significant threat to biodiversity that is escalating. With plastic accumulating on land and in the oceans at alarming rates, it affects species in various ways such as entanglement, habitat destruction, ingestion and poisoning. As plastic fragments are difficult to remove from nature, they are of particular concern, especially in the oceans, as they are easily digested and accumulate throughout the food chain, affecting different marine species and mammals as well as sea birds and even humans IPBES (2019).

Invasive alien species, presented as the fifth largest driver of biodiversity loss, are non-native species that are introduced to an ecosystem, often unintentionally, and can have negative impacts on the native species and entire ecosystems (IPBES, 2019). Due to global demand and activity, there is an increase of transports of goods and travel that enables the introduction of species across long distances from their natural areas (IPBES, n.d.-a). The invasive species have been shown to outcompete local and indigenous species for resources such as food, water, and habitat, resulting in negative implications for biodiversity. Furthermore, invasive predators such as rats and feral cats have been documented to have significant negative impact on biodiversity, especially seabird populations, preying on birds and eggs but also other animals (IPBES, 2019). Invasive species can also be vectors for diseases and disrupt ecosystems by altering natural processes such as nutrient cycling and pollination. (IPBES, n.d.-a).

2.5 Business and Biodiversity

All businesses are dependent on ecosystem services and thus biodiversity, either directly or indirectly through supply chains (WEF, 2020; Church et al., 2022). According to the World Economic Forum (2020), more than 50% of the global GDP is moderately or highly dependent on nature and its services. Furthermore, with the identified direct drivers of biodiversity loss by IPBES (2019) it is shown that businesses across various sectors have significant negative impact on biodiversity. Despite businesses crucial dependency and significant impact on biodiversity, WEF (2020) states that there is a lack of knowledge and understanding among businesses regarding their dependency and impact on biodiversity. According to IPBES (2019), economic incentives have had a general focus on economic growth without consideration of the environment. Furthermore, the current trends in biodiversity and ecosystem functions are projected to worsen with a continued unsustainable production and consumption. However, it has also been shown that incorporation of the values and functions of biodiversity and ecosystems generate not only better ecological outcomes, but also social and economic (IPBES, 2019). Businesses, as key actors of the global economy, have a crucial role in changing the current trajectory and need to understand their dependency and impact on biodiversity as biodiversity loss also poses critical risks for their own operation (IPBES, 2019; WEF, 2020, WWF and Bain & Company, 2023).

There are three types of risks a business can face connected to biodiversity loss (WEF, 2020). Firstly, the destruction of biodiversity can create risks through businesses direct or indirect dependency on nature and the ecosystem services that it provides for the existence of their operation. Secondly, business activities direct or indirect impact on biodiversity can cause negative consequences related to reputational, legal, regulatory and market risks, which can result in costly actions. Thirdly, the impact of businesses can aggravate further biodiversity loss that affects the whole society and its response, which in turn can lead to both physical and market risks. In the report *The Economics of Biodiversity: The Dasgupta Review*, Dasgupta (2021) also highlights these nature-related risks and the implications of not understanding the interconnection to business. It is stated that “As long as risks emerging from our unsustainable use of the biosphere, and opportunities to correct this overshoot, are not reflected in market prices, there will be few incentives for these risks to be incorporated in financial decisions” (Dasgupta, 2021, p. 427). Biodiversity is currently not sufficiently incorporated into financial decisions, and it is essential to recognise that in order to create sustainable economic growth, nature and its services needs to be correctly incorporated (Dasgupta, 2021; Nedopil, 2022).

2.6 UN Sustainable Development Goals

In 2015 the 2030 Agenda for Sustainable Development was adopted by all United Nations’ Member States (United Nation Development Program [UNDP], n.d.). The 2030 Agenda includes 17 Sustainable Development Goals (SDG) and 169 associated targets that supports the global commitment towards a sustainable future (Messerli et al., 2019). It is a call for action to end poverty, protect the planet, and ensure all people enjoy peace and prosperity by the year 2030 (UNDP, n.d.). The SDGs are integrated and indivisible, connected to the three sustainable development dimensions social, economic and environmental (Messerli et al, 2019). The SDG 14, life below water, have specific focus on biodiversity in the marine realm and seeks to “Conserve and sustainably use the oceans, seas and marine resources for sustainable development.” (CBD, 2016, p. 17). Furthermore, SDG 15, life on land, focus specifically on biodiversity in the terrestrial realm and seeks to “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.” (CBD, 2016, p. 19). However, biodiversity and ecosystems are prominently featured across many of the SDGs, highlighting the important interrelations between the goals (CBD, 2016). Sustainable development is dependent on resilient biodiverse ecosystems with their provisioning, regulation and supporting services (Messerli et al, 2019). Therefore, the importance of biodiversity is not only connected to SDGs 14 and 15 but is also essential for achieving several of the sustainable development goals.

2.7 The Kunming-Montreal Global Biodiversity Framework

The updated post-2020 Kunming-Montreal Global Biodiversity Framework, seen in Figure 4 below, was agreed at the United Nations Biodiversity Conference in December of 2022 (CBD, 2022). The post-2020 Global Biodiversity Framework sets out to catalyse and enable the transformative action needed to halt and reverse biodiversity loss as well as support the Sustainable Development Agenda and goals (CBD, 2022). The framework includes four long-term goals for 2050 that relate to the 2050 vision “By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.” (CBD, 2022, p. 7) The four long-term goals focus on Goal A – Ecosystem integrity and species conservation, Goal B – Sustainable use and valuation of biodiversity, Goal C – Equitable sharing of genetic resources and knowledge and Goal D – Adequate means of implementation of the framework (CBD, 2022). The framework introduces a theory of change with 23 action-oriented targets set to be achieved by 2030 to ensure that the 2050 vision for Biodiversity is reached. The targets address three overarching categories where targets 1-8 focus on reducing threats to biodiversity, targets 9-13 on meeting people’s needs through sustainable use and benefit-sharing, and targets 14-23 on tools and solutions for implementation and mainstreaming (CBD, 2022).

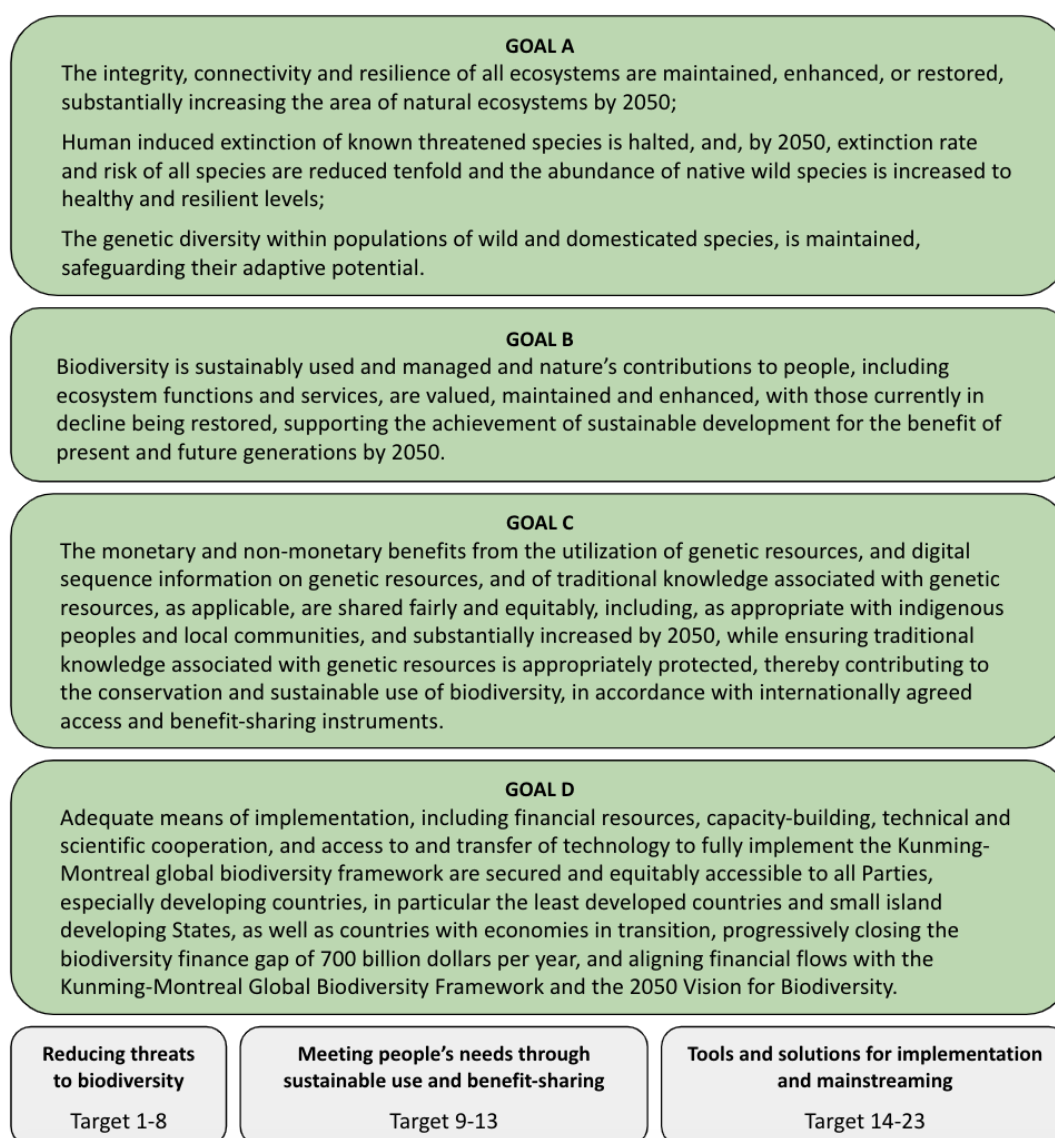


Figure 3. The four long-terms goals and overarching target categories of the Kunming-Montreal Global Biodiversity Framework. Based on CBD (2022).

A significant focus on business and biodiversity is especially found in targets 15, 19 and 21, which relates to tools and solutions for implementation. Target 15 aim to increase legal and policy measures to encourage and enable businesses to transparently access and disclose risks, dependencies and impact on biodiversity (CBD, 2022). Target 19 sets out to increase financial resources, both from the public and private sector, for implementation of national biodiversity strategies and action plans (CBD, 2022). Lastly, target 21 aim to ensure the accessibility of best available data and knowledge for decision makers and businesses in order to guide effective governance and management of biodiversity. This also regard the traditional knowledge and participation of indigenous peoples and local communities (CBD, 2022). For full description of targets 15, 19 and 21 see Appendix A.

2.8 The European Green Deal

In 2019, the European Commission adopted the European Green Deal, which aims to steer the European Union towards climate neutrality by 2050 whilst ensuring a fair and prosperous society with an economy that is modern, resource-efficient and competitive (European Commission, 2019). The EU Green Deal also plays an important role in the Commission's strategy to implement the sustainable development goals from the 2030 Agenda (European Commission, 2019). In order to transform the EU's economy for a sustainable future, the EU Green Deal includes a set of policy initiatives, seen in Figure 5 below. Among these, one initiative specifically regards preserving and restoring ecosystems and biodiversity, but the policy initiative also focuses on climate neutrality, clean energy, sustainable industry, sustainable building and renovation, sustainable mobility, food sustainability and pollution (European Commission, 2019). Furthermore, the EU Green Deal sets out to pursue green finance and a just transition as well as mobilising research and fostering innovation in order to achieve the transformation. To fulfil and reach the initiatives set in the European Green Deal, the European Commission has presented several regulations and strategies, which member countries in the EU will have to adapt into national law (European Commission, 2019).

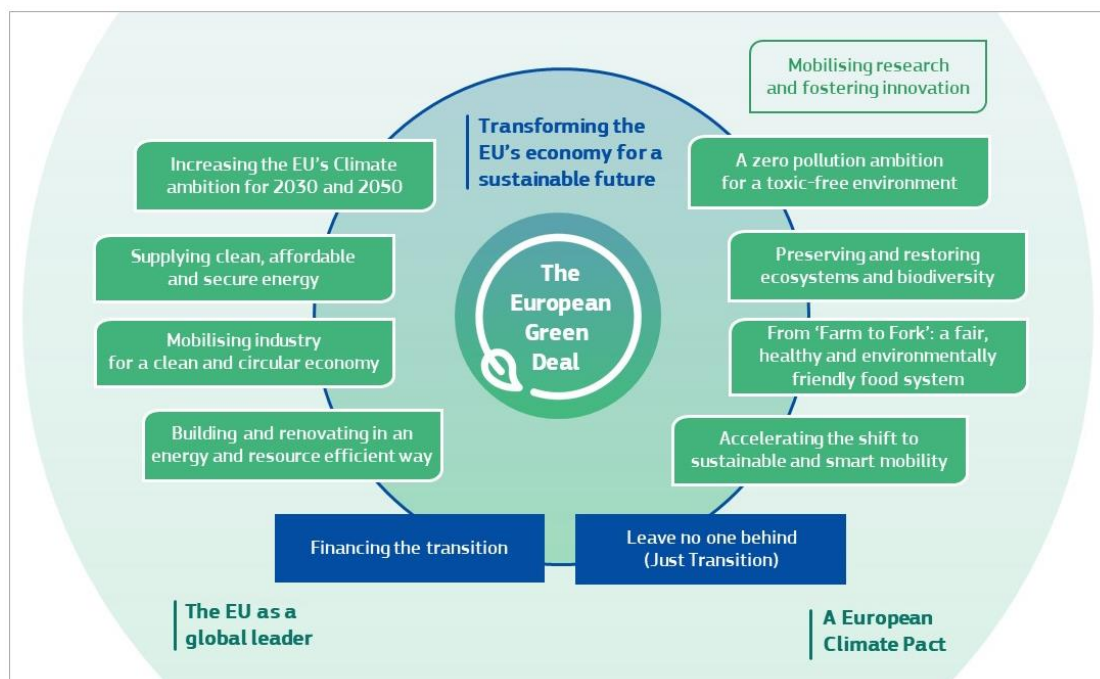


Figure 4. The European Green Deal (European Commission, 2019). CC-BY-4.0

2.8.1 The Corporate Sustainability Reporting Directive

When the European Green Deal was approved in 2020, the European Commission set out to revise the Non-Financial Reporting Directive (NFRD) (European Parliament, 2023a). The NFRD, adopted in 2014, required large public-interest entities, with more than 500 employees, to publish a non-financial

report and to disclose information about their environmental, social, and governance (ESG) performance (European Commission, 2021a). Today, the quality of the NFRD rules on sustainability information is insufficient and hinders EU's transition to a sustainable economy (European Council, 2022). To strengthen and modernise the rules, the European Commission proposed the Corporate Sustainability Reporting Directive (CSRD), which was approved in 2022 and put into force in January 2023 (European Commission, n.d.-a). The CSRD will require more extensive corporate reporting according to the European Sustainability Reporting Standards (ESRS), which was developed by the European Financial Reporting Advisory Group (EFRAG) (European Commission, n.d.-a). Furthermore, the CSRD expands the scope of businesses covered by the directive to all large businesses, meaning all businesses that meet two out of the three criteria: having more than 250 employees, €40 million in turnover, and €20 million in total assets. The scope also expands to apply to all listed businesses, including small and medium-sized enterprises (SME), and the updated and expanded directive will in total affect an additional 50 000 businesses to the approximately 11 000 covered by the former NFRD (Finansinspektionen, 2022; European Commission, 2021a).

The first draft set of European Sustainability Reporting Standards include 13 sector-agnostic standards for corporate reporting on ESG data, see Figure 6 below. The sector-agnostic standards include two general cross-cutting standards, five environmental, four social and two governance standards. Within the five topic specific standards for environmental disclosure requirements, the fourth one, ESRS E4, specifically focuses on biodiversity and ecosystems (EFRAG, 2022a). Furthermore, as impact on biodiversity and ecosystems is present across other environmental issues, there are several overlaps between the E4 standards and the remaining four environmental standards (EFRAG, 2022a). Additionally, as people benefit from biodiversity and ecosystems, the impact on biodiversity and ecosystems can affect communities creating an overlap between standard E4 and the social standard S3 Affected communities (EFRAG, 2022a).

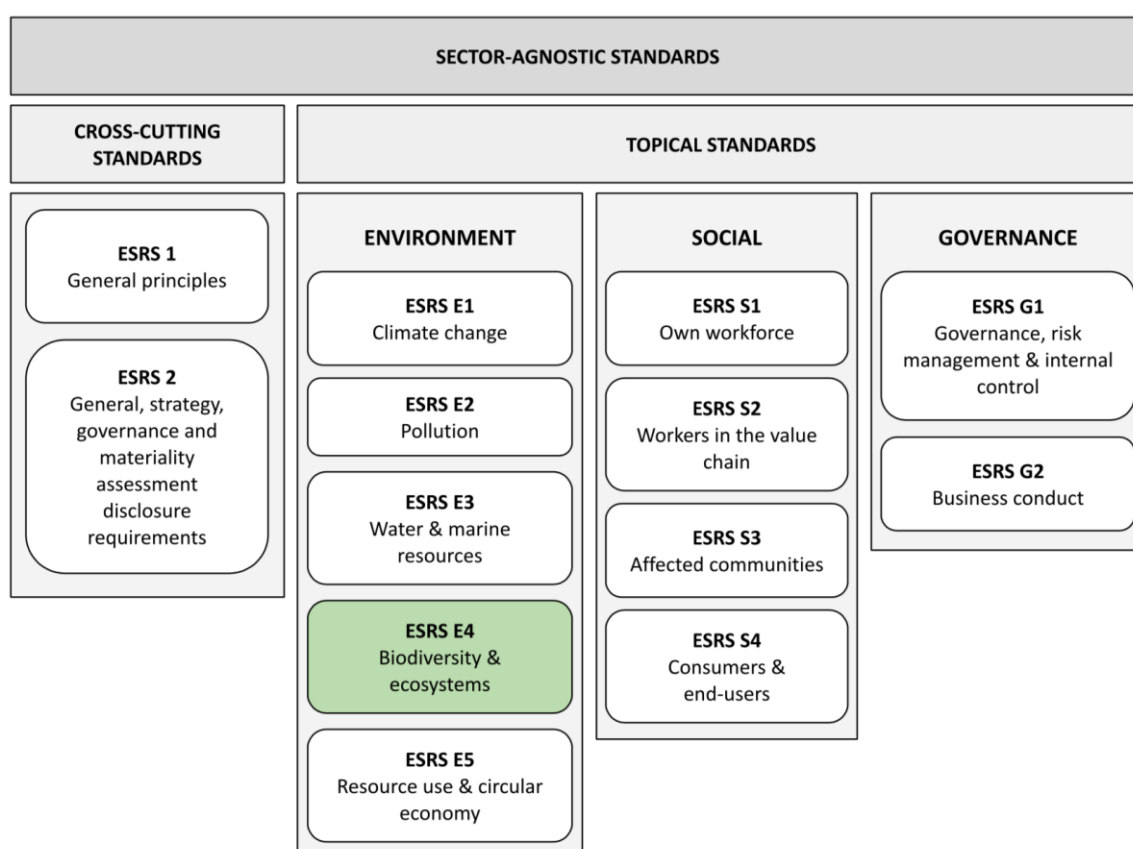


Figure 5. The ESRS sector-agnostic standards with the environmental standard E4 Biodiversity & ecosystems marked in green. Based on EFRAG & Raad voor de Jaarverslaggeving (2022).

The CSRD and ESRS aims to increase the quality, consistency and comparability within corporate disclosures (European Council, 2022). Businesses will need to perform double materiality assessments where they not only report on their impact on people and nature, but also how nature have impact on their business with potential financial risks (WWF, 2022). Furthermore, the standard E4 will require disclosure of businesses plans and capacity of adapting strategy and business models with respect to the planetary boundaries and in line with targets outlined in the Kunming-Montreal Global Biodiversity Framework as well as the EU Biodiversity Strategy for 2030, which is described further below (EFRAG, 2022a). To increase the reliability, the CSRD also includes obligated independent third-party assurance of the reported information together with ESRS compliance (European Commission, n.d.-a).

The Member States of EU have to implement the CSRD into national law by July 2024 (PwC, 2022). Additionally, the application of the reporting requirements for businesses will happen in three steps. First, businesses that are already subjected to the former NFRD will need to report for the financial year of 2024. Second, all large businesses not formerly subjected to the NFRD will need to report for the financial year of 2025. Third, listed SMEs as well as other undertakings will need to report for the financial year of 2026, but they also have the possibility to opt-out and be exempted from the application until 2028 (European Parlaiment, 2022).

2.8.2 The EU Taxonomy

In order to move towards a sustainable economy and climate neutrality by 2050, the European Commission presented the EU Taxonomy Regulation, see Figure 7, which entered into force in 2020 (European Commission, n.d.-b). The regulation is part of EU’s efforts to reach the objectives in the European Green Deal and aims to classify economic activates to ensure that capital is directed towards environmentally sustainable investment (European Commission, n.d.-b). The EU Taxonomy includes six defined environmental objectives focusing on climate change mitigation and adaptation, sustainable use and protection of marine resource, circular economy, pollution, and protection and restoration of biodiversity, see Figure 7 (European Union, 2020). The classification system is based on four overarching criteria that must be met for an economic activity to be considered environmentally sustainable. To qualify as environmentally sustainable, an economic activity must contribute substantially to at least one of the six objectives, do no significant harm to any of the other five objectives, comply with minimum safeguards, and comply with technical screening criteria, see Figure 7 (European Union, 2020).

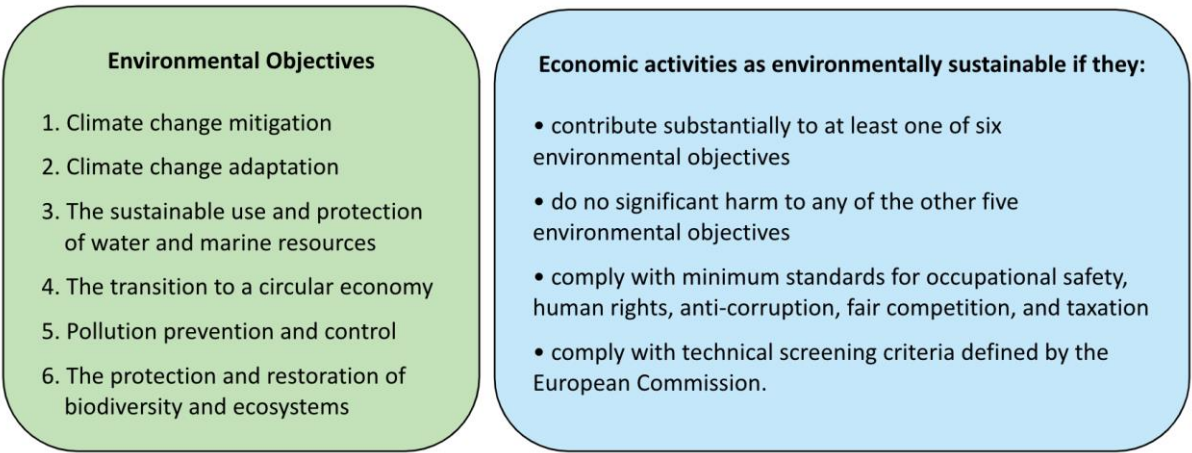


Figure 6. EU Taxonomy environmental objectives, in green, and criteria for environmentally sustainable economic activity, in blue. Based on European Union (2020).

The EU Taxonomy applies to financial market participants and businesses covered by the CSRD. A first Delegated Act “The EU Taxonomy Climate Delegated Act” was entered into force in January 2022. It regards the first two environmental objectives and delivers technical criteria for defining economic activities that contribute to climate change mitigation and adaptation. Not until June this year, 2023, was the Environmental Delegated Act adopted by the European Commission, which included a new set of criteria for economic activities contributing to one or more of the remaining four non-climate environment objectives (European Commission, n.d.-b). Additionally, the Commission also adopted revisions regarding expanding economic activities within the Climate Delegated Act (European Commission, 2023). The addition of more activities to the EU Taxonomy across all six environmental objectives intends to increase the transparency and usability for sustainable investment that in turn can contribute to the European Green Deal objectives (European Commission, 2023).

2.8.3 The Sustainable Finance Disclosure Regulation

The Sustainable Finance Disclosure Regulation (SFDR), enacted in March 2021, is an integral part of the EU Green Deal strategy to advance sustainable finance (European Union, 2020). The regulation aims to increase the transparency and accountability within financial markets by requiring financial market participants and financial advisors to disclose how they incorporate ESG factors into their investment decisions and products (European Union, 2019). At the company level, SFDR requires businesses to disclose information regarding their sustainability policies, practices, and processes. It is also mandatory to report on the principle adverse impacts of their business activities on sustainability factors (Envoria, 2022). This is done by using principle adverse impact indicators that covers a wide range of ESG risks addressing issues such as carbon emissions, biodiversity and social responsibility. At the product level, the SFDR additionally classifies three categories of financial products in Articles 6, 8 and 9, seen below, with disclosure requirements varying with product group (Envoria, 2022).

- Article 6: General financial products
- Article 8 (light green): ESG financial products with environmental or social characteristics
- Article 9 (dark green): ESG financial products with the aim of sustainable investment.

The EU Taxonomy is integrated into the SFDR as financial market participant that claim to offer Article 8 or 9 financial products must assess and disclose the alignment of their portfolio with the Taxonomy framework (Envoria, 2022). The Sustainable Finance Disclosure Regulation is still being phased in and necessary changes are continuously reviewed to enhance the regulation and its coherence with other recent legislation (EY, 2023). Currently, as of the second half of this year 2023, the European Commission is evaluating the framework, assessing issues such as legal certainty, usability and how the SFDR can have a part in tackling greenwashing (European Commission, n.d.-c).

2.8.4 The EU Biodiversity Strategy for 2030

In May 2020, the EU Biodiversity Strategy for 2030 was adopted by the European Union and is a core part of the European Green Deal. The strategy sets out objectives and actions for the next decade to protect and restore nature and ecosystems to halt and reverse the loss of biodiversity and ecosystem services by 2030 (European Commission, 2020). The Strategy contains specific commitments and actions to be delivered by 2030, organised around four main pillars: protect nature, restore ecosystems, enable transformative change, and EU action to support biodiversity globally (European Commission, 2020). To achieve these objectives, the EU Biodiversity Strategy for 2030 sets out a comprehensive action plan with specific targets and measures to be implemented by 2030 (European Commission, 2022a). Some of the key measures include:

- Legally protect at least 30 percent of land and sea and strictly protect at least 10 percent.
- Restoring degraded ecosystems and establishing green corridors to connect protected areas.

- Transitioning to a more sustainable agricultural and fisheries sector, with measures such as reducing the use of pesticides and fertilisers, promoting sustainable practices, and supporting organic farming.
- Strengthening the EU's legal framework on invasive alien species and wildlife trade.
- Reducing pollution, including by implementing a zero-pollution action plan for air, water, and soil.
- Promoting sustainable urban development, with measures such as increasing green infrastructure and reducing the use of pesticides and fertilisers in urban areas.

The EU Biodiversity Strategy for 2030 is a critical part of the EU's efforts to promote sustainable development and achieve its commitments under international agreements such as the Convention on Biological Diversity and the United Nations Sustainable Development Goals (European Commission, 2021b).

2.8.5 The Nature Restoration Law

The Nature Restoration Law is a proposal that sets out to restore all needed ecosystems by 2050 and oblige member states to restore at least 20% of EU land and sea by 2030 (European Commission, n.d.-d). The law is a key element to the EU Biodiversity Strategy and includes forests, wetlands, rivers, grasslands and marine ecosystem (European Commission, n.d.-d). The proposal was recently adopted by the European Commission, as of June this year, 2023, and EU countries will have to submit National Restoration Plans presenting how they will reach the targets (European Commission, n.d.-d).

2.8.6 The EU Deforestation-Free Regulation

The proposal of the EU Deforestation-Free Regulation (EUDR) requires due diligence obligation on certain products to ensure that they do not contribute to deforestation or forest degradation (European Commission, n.d.-e). The products include cattle, wood, palm oil, soy, coffee, cocoa, rubber, and their derived products. With the aim to promote deforestation-free products, the EUDR could further support the European Green Deal by reducing climate change and biodiversity loss. The EUDR was just recently entered into force as of June of this year, 2023 (European Commission, n.d.-e).

2.8.7 The Corporate Sustainability Due Diligence Directive

The Corporate Sustainability Due Diligence Directive (CSDDD) is a proposal by the European Commission that will require the implementation of due diligence regarding both human rights and environmental impact of businesses' operation and across their supply chains (European Commission, 2022b). With the mandatory due diligence, the CSDDD proposal is a complement to the Corporate Sustainability Reporting Directive. The European Parliament adopted its position as of June this year, 2023, and the adoption is followed by negotiations with Member States regarding the final text of the legislation (European Parliament, 2023b).

2.9 Sweden's Environmental Objectives

In 1999, the Swedish Parliament established the Swedish environmental objectives, Sveriges Miljömål in Swedish, with the aim of handing over a society to the next generation where the major environmental problems have been solved (Naturvårdsverket, 2018). The Swedish environmental objectives consist of 16 national environmental quality objectives that can be seen in Figure 8 below. The quality objectives have been instrumental in guiding Sweden's environmental policy and action to maintain a high level of well-being for current and future generations and to ensure that environmental impacts are reduced, and sustainable use of natural resources are promoted (Naturvårdsverket, 2018). In line with Agenda 2030, the Swedish environmental objectives also have

the year 2030 as the next point of reference. Biodiversity has a specific focus in quality objective 16, A Rich Diversity of Plant and Animal Life, which is also crucial for and present in many of the other goals (Naturvårdsverket, 2018).



Figure 7. The Swedish Environmental Quality Objectives. Illustrator: Tobias Flygar. (Naturvårdsverket, 2023). Adapted with permission.

2.10 Swedish Environmental Code

The Swedish Environmental Code, Miljöbalken in Swedish, was enacted in 1999 and is a comprehensive legislation that serves as the foundation for environmental and natural resource management in Sweden (Naturvårdsverket, n.d.; Thews et al., 2017). The purpose of the legislation is to promote sustainable development ensuring a healthy environment for both present and future generations where nature is worthy of protection (Naturvårdsverket, n.d). In addition to the purpose, the objectives of the Swedish Environmental Code also state that the code shall be applied in such a way that:

1. human health and the environment are protected against damage and detriment, whether caused by pollutants or other impacts;
2. valuable natural and cultural environments are protected and preserved;
3. biological diversity is preserved;
4. the use of land, water and the physical environment in general is such as to secure a long-term good management in ecological, social, cultural and economic terms; and
5. reuse and recycling, as well as other management of materials, raw materials and energy are encouraged with a view to establishing and maintaining natural cycles (Thews et al., 2017).

All persons and operators who undertake activities or measures that may have an impact on the fulfilment of the objectives need to comply with the Environmental Code (Thews et al., 2017). Accordingly, it also applies to all activities that could cause negative impacts on human health or the environment. According to the Swedish Environmental Code (Ds 2000:61), Environmental Impact Statement (EIS), miljökonskvensbeskrivning in Swedish, is a key instrument used to evaluate potential environmental impacts of projects and activities and help authorities make informed decisions on permits and authorisations. For new plans and programs as well as for environmentally hazardous activities and water operations, permit applications require EISs (Thews et al., 2017). Within the EIS, the direct and indirect impacts need to be described so that an environmental impact assessment can be made (Thews et al., 2017). Furthermore, Nature Value Inventory (NVI), naturvärdesinventering in Swedish, is commonly used as a basis for permit applications as it can provide an overview of the biodiversity and ecological processes within an area (Boverket, 2021).

3 Method

The method used for the thesis combined a literature study with a qualitative interview study. As a first step the literature study provided the structure of the thesis' framework and scope. With the framework and scope set, it was possible to begin collecting secondary data through the literature study and initiate the interview study that provided primary data. The analysis of the primary and secondary data was an iterative process with the data collection. When the collection of data was complete, the analysis of all gathered data generated the findings that answered the research questions.

3.1 Literature study

As an initial phase, a literature study was performed. This provided not only the scope and state of the art for the thesis but also secondary data. For the collection of secondary data, the literature study was focused towards, but not limited to, how Swedish businesses work with biodiversity as this correlated to the scope of the interview study. Literature and previous research on the topic were collected from reports produced by intergovernmental and non-intergovernmental organisations together with the databases Google Scholar and ScienceDirect. Additionally, some literature was provided by the supervisor. The snowball effect was also used where further literature was collected from going through the references in the reviewed articles and reports. Search words to find relevant literature through the databases were: business AND biodiversity, business AND biodiversity assessment, business AND biodiversity reporting, biodiversity framework, biodiversity indicators and biodiversity regulations.

3.2 Interview study

The method for selecting businesses for the qualitative interview study was a two-step process. With many initiatives and regulations being recently adopted or in development, the topic of business and biodiversity is at an early stage. Therefore, as a first step, businesses that had proclaimed to already be working with or have an ambition and willingness to work with biodiversity were of interest. They were seen as having more potential to provide answers to the research questions as they might have come further in their work. One way to find these businesses were by going through members of existing business and biodiversity networks and initiatives such as Business@Biodiversity Sweden and the Mistra research programme Pathways towards an efficient alignment of the financial system with the needs of biodiversity (BIOPATH). Additionally, businesses were found by going through the Ecogains Biodiversity Index list of 2022 and the examination of Swedish listed companies, Hållbara Bolag 2022, by Lund University and Dagens industri. Furthermore, businesses who produce sustainability reports, either under the Swedish Annual Accounts Act or voluntarily, that include biodiversity aspects were also of interest. From the first step, there was a large number of businesses to choose from and reach out to for the next step.

In the second step the goal was to enable the mapping to be representative and generalised for the aim of the thesis. This was done by contacting businesses from different sectors with direct or indirect impact on biodiversity. The aim was to include sectors that connected to the five main direct drivers of biodiversity loss and that each direct driver was represented by at least one contributing sector. To increase the generalisation, several businesses within a sector were contacted with the goal to have at least two businesses representing each included sector. The two-step selection process resulted in 17 businesses accepting to participate in the interview study.

3.2.1 Participating businesses

The 17 participating businesses covered nine different sectors, Mining, Construction, Construction & Material, Forestry, Forestry & Material, Shipping, Energy, Consumers Staples and Finance. Each sector had a representation of one to four businesses. The categorisation was made to uphold businesses anonymity. The sectors Mining, Construction, Forestry, Shipping and Energy related to more direct impact on nature. Construction & Material and Forestry & Material were businesses that represented more than one sector that could both offer products and services with indirect impact as well as having extractive processes with direct impact. Additionally, Construction & Material were business that were part of the construction sector and represented the extractive operations for material and Forestry & Material represented both forest management as well as buying and selling forest material. Furthermore, Consumer Staples and Finance related to indirect impacts through their supply chains and portfolios. Consumer Staples was represented by businesses with different types of products such as food, beverages, home and household products and personal care products. Among the participating businesses, four were governmentally or municipally owned. The participating businesses, what sector they belong to and the role of the interviewees is presented in Table 1 below.

Table 1. Participating businesses, the sectors they belong to and the role of the interviewees. For interviews with two interviewees from a business, the roles are separated by a comma.

Sector	Business	Role of Interviewee
Mining	Mining 1	Director sustainability & quality
	Mining 2	Sustainability strategist
Construction	Construction 1	Head of communication & sustainability
Construction & Material	Construction & Material 1	Raw material manager
	Construction & Material 2	Business change manager, Operational development manager
Forestry	Forestry 1	Nature conservation manager
Forestry & Material	Forestry & Material 1	Head of sustainability
Shipping	Shipping 1	Head of sustainability
	Shipping 2	Head of sustainability, Environmental manager
Energy	Energy 1	Director of environmental projects
	Energy 2	Environment and climate change manager
	Energy 3	Sustainability manager, Environmental specialist
Consumer Staples	Consumer Staples 1	Life cycle sustainability manager, Senior project manager agriculture & biodiversity
	Consumer Staples 2	Sustainability innovator
	Consumer Staples 3	Senior environmental specialist
	Consumer Staples 4	Director corporate responsibility
Finance	Finance 1	Senior sustainability specialist

3.2.2 Structure of interviews:

The primary data was collected through qualitative semi-structured interviews, which allowed for flexibility while maintaining a certain level of structure to be able to compare data from different interviews. The interviews followed an interview manuscript that consisted of 15 questions, which had been constructed to provide data to each of the four research questions of the thesis. The interview manuscript was created based on the research questions supported by the initial phase of the literature study and with guidance from the supervisor. The initial phase of the literature study allowed for additional interview questions to be formulated connected to the research questions, hence providing further primary data. For more details, see the interview manuscript in Appendix B. The interviews took place through video meetings that were recorded and auto-transcribed. The length of the interviews varied from 45 to 60 minutes, apart from two interviews that were limited to 30 minutes. Two of the 17 interviews were conducted and accessed through the BIOPATH programme and these interviews were held by two professors at Gothenburg University. Permission was given to use the primary data and the two interviews followed a similar interview structure and manuscript as the ones for this study making it possible to utilise the data for this thesis. Lastly, all interviews were held in Swedish except for one of the BIOPATH interviews, which was held in English.

3.3 Analysing data

Analyses of the primary and secondary data collected was done through a thematic analysis and with an inductive approach. The interviews were auto-transcribed, resulting in a Word document with a transcript in the language spoken. These transcripts were reviewed by listening to the video recordings and edited manually by the author to correct mistakes made by the program. The thematic analysis was conducted with the research questions as a framework for the data analysis and color-coding was used to sort the data connected to the relevant research question. Through the inductive approach with a systematic and iterative process of analysing the data, reoccurring patterns and themes emerged within the research questions. Relevant and valuable quotes that provided further insights to emerging patterns and themes were also collected. Any quotes used from the Swedish interview transcripts were translated to English by the author, making sure to maintain the integrity of the content. The analysis also included a comparison of the identified primary and secondary data for each research question that summarised the similarities and differences between the findings.

4 Findings

In this chapter, the respective findings from the literature study and interview study are presented, followed by a comparative summary, for each research question.

4.1 Definition, Dependency & Impact

The first research question focused on how businesses define biodiversity and how it relates to their business in terms of how they perceive their dependency and impact on biodiversity.

4.1.1 Literature study RQ1

According to Johansson et al. (2022), who conducted a review on how Swedish businesses work with biodiversity, there is not a clear definition and common understanding on what biodiversity means for businesses. Furthermore, the World Economic Forum (2020) states that despite all businesses being dependent on biodiversity and ecosystem services, and more than 50% of the global GDP depending on nature, there is a lack of knowledge and understanding amongst businesses regarding their dependency and impact on biodiversity. The lack of knowledge on dependency and impact is also recognised in the report by the WWF and Bain & Company (2023), who analysed awareness, ambition and strategies relating to biodiversity amongst 43 Swedish businesses. In this report the authors found that 60% of the participating businesses expressed low or no impact locally in Sweden and 40% expressed low or no impact globally. In a case study by Watson & Newton (2018), based on responses from 212 businesses across 28 sectors in England, a similar conclusion was made regarding businesses perceived dependency on biodiversity. The authors found that although 98% of businesses were familiar with ecosystem services, only 50% considered themselves dependent on the flows of the ES.

In a study by Romero & Streman (2021), the authors conducted a combined survey and interview study with businesses from nine different industries in Sweden including Mining, Manufacturing, Forestry, Food industry, Energy, Construction, Transport, Professional Services and Other. A total of 15 businesses contributed to the study, with seven businesses completing both the survey and interviews, five businesses only filling out the survey and three businesses only participating in interviews. The authors found that out of the 10 businesses that were interviewed, all considered themselves dependent on biodiversity, and nine out of the 10 expressed the responsibility they have towards biodiversity. Furthermore, Romero & Streman (2021) presented survey responses on businesses perceived impact on biodiversity. With the options to agree or disagree, either completely or partly, or neither agree nor disagree, the authors found that almost 50% of the 12 businesses partaking in the survey did completely or partly agree that their business *did not* have an impact on biodiversity. For businesses' impact on biodiversity connected to the direct drivers of biodiversity loss identified by IPBES (2019), Romero & Streman (2021) found in the survey that more than 50% completely or partly agreed to have impact on biodiversity through climate change. Furthermore, slightly less than 50% completely or partly agreed to have impact on biodiversity through land use change and through consumption of natural resources. Lastly, less than 25% completely or partly agreed that to have impact on biodiversity through pollution and less than 10% partly agreed to have impact on biodiversity through invasive species.

According to Dasgupta (2021) and Nedopil (2022), biodiversity is currently not sufficiently incorporated into financial decisions. However, Johansson et al. (2022) found that some of the businesses from their interviews had started to reflect on how the loss of biodiversity could affect their organisation. Furthermore, WWF and Bain & Company (2023) also recognise how businesses are starting to address the risk connected to biodiversity. In the report by Johansson et al. (2022), reputational risk was mentioned and businesses within the agriculture sector expressed risk connected to their direct dependency. However, the authors states that there is often a lack of

systematic work regarding biodiversity as a financial risk and some businesses did not know what the biggest risks were. A different type of risk that was found by Romero & Streman (2021) in their interview study was that high biodiversity values and legislation regarding such values could be a business risk as it could lead to not obtaining a permit or even the risk of losing permits for operation or development in an area.

4.1.2 Interview study RQ1

When asked how the interviewees would define biodiversity and what it meant for their business, some referred to the existing definition by the CBD and many formulated what it meant to them with their own words, similar to the CBD definition. It also happened that interviewees did not specifically express a definition for biodiversity, but instead directly started talking about their dependencies and impact. Lastly, one interviewee explicitly expressed that their organisation lacked a definition of biodiversity.

Out of the 17 interviewees, 14 expressed that they depend on biodiversity. Of the remaining three, the two interviewees Shipping 2 and Construction & Material 2 stated not being directly dependent on biodiversity. They specified that for their own specific operation, biodiversity was not a necessity and they did not express other types of indirect dependencies that could exist. Furthermore, the question of dependency was not asked in one of the BIOPATH interviews and it was not possible to gather information on dependency through other material provided by the business. For the interviewees who did state that they depend on biodiversity, their responses explaining the exact nature of their dependency varied. Some explained their direct dependency on biodiversity, specific areas of dependency and indirect dependencies through supply chains or their portfolio. Others were not as specific and explained in a more general way that in the end everyone depend on nature and biodiversity.

“Just the fact that our product is an ecosystem service means that, without trees, there is no us. That's the simple connection. Then, of course, we are dependent on everything else as well, all the other ecosystem services and experience values.” – Forestry 1

“We usually talk about business-critical resources for our operations. We are completely dependent on the biological systems because our core business is based on food. Thus, if food is not available, we do not have a core business. Therefore, we have defined food and energy as some of our most critical resources”. – Consumer Staples 4

“I would absolutely say that we depend on nature. Considering what type of business we run, wind and water are inputs to our energy production and they come from nature and the natural systems, so there is clearly a dependency on nature. – Energy 1

“Yes, absolutely, I think we all are dependent. The ecosystem doesn't work if we don't have a healthy ecosystem. Absolutely, we are dependent on having a healthy ecosystem and I think it's important to feel that it goes both ways.” – Mining 1

All 17 interviewees expressed that their business have negative impact on biodiversity. Connected to the main direct drivers of biodiversity loss identified by IPBES (2019), negative impact through land use change was the most frequently mentioned, while impacts through the remaining four direct drivers were less frequently expressed, with direct exploitation not mentioned in any of the interviews. Regarding negative impact through specifically land use change, both sectors with direct and indirect impact acknowledge that their operation implies claiming and changing land. The one business that did not specifically express that they have impact through land use change was

Consumer Staples 1. They mentioned to have negative impact in general but in terms of land use, they claimed to contribute with positive impact on biodiversity.

“But when it comes to biodiversity, they [business actions] could be both negative but also positive with semi-natural meadows and so on and natural pasture in Sweden for example. That is really, really important for biodiversity as well.” – Consumer Staples 1

Additionally, 4 other interviewees mentioned that their operation can have a significant positive impact on biodiversity, although stating negative impact through land use change. The two interviewees from Construction & Material mentioned that the different biodiversity related measures they implement during their operations on a site, such as creating a pond or creating rock shelves, increase biodiversity in that area. Similarly, two interviewees from the Energy sector also expressed that the measures they implemented during their operation in power lanes, such as maintenance of removing trees and cutting grass, have positive impact and increase local biodiversity. When talking about their positive impact, all 4 interviewees expressed that their measures taken during their operation could increase biodiversity compared to the previous biodiversity levels, which could have been lower.

“In some cases, if we have a very homogeneous nature base in an area it is possible that when we go in and do something, we can see that biodiversity decreases when we remove some trees and remove some soil and so on. But then it can also increase, because you create new environments that have not existed in that area before.” – Construction & Material 2

“However, we also see from our analyses and field inventories that we have areas in the grid that actually have very high values. They may have been old pastures where forest has begun to grow, but when we come in and do continuous maintenance, the old values and the species linked to the former agricultural land come back. And there are usually many red-listed species to be found in these areas.” – Energy 1

In terms of climate change, no interviewee specifically expressed that they have significant impact on biodiversity through climate change, although all interviewees talked about climate change in some way during the interview. Some pointed out the need to work on both issues, climate change and biodiversity together, as they are interconnected, instead of treating them as different entities.

“It is also about looking at the big picture as a whole. I think we need to work towards not treating climate and biodiversity as two different things.” – Energy 1

Invasive species was mentioned by Energy 3 as well as Shipping 1 and 2 when asked about perceived impact on biodiversity. The interviewee from the energy sector expressed that there is a large focus at the moment on how to prevent the spreading of invasive species, especially plant species, in their planning of power lanes and during maintenance. The two interviewees from the shipping sector explain that in terms of ballast water, the water pumped in to maintain safe operating conditions during the voyage, and which is later discharged, there are international regulations in place from the International Maritime Organisation that demand treatment systems to prevent dispersal. However, Shipping 1 expressed that the focus is on the equipment and its effectiveness, and that the Swedish Transport Agency preforms spot checks rather than continuous checks and that the control of the actual water is inadequate. The risk of dispersal of invasive species due to hull fouling was also discussed, and that regulations to prevent it can be contradicting when it comes to cleaning the hull, with some ports not allowing it, which can result in dirtier hulls and thus more invasive species.

“There are many somewhat contradictory regulations where, for example, some ports say that you are not allowed to clean the hull because there is a risk of scraping off invasive species. But this leads to ships being unable to clean their hulls, which can result in dirtier hulls and more invasive species that can sail along instead. Therefore, it is important to always take a holistic view and see both sides of the coin.” – Shipping 1

Impact through pollution was mentioned by some sectors, specifically Shipping 1 and 2, but also some from Mining and Consumer Staples. However, some interviewees also stated that due to EU directives and strict regulations on pollution today, they have very low emissions to both air and water making it a less relevant impact. The interviewees from the Shipping sector mentioned both pollution to air and to water having impact on biodiversity. Shipping 2 also addressed that there are international regulations regarding pollution and discharge of water, but that some types of water from ships, such as domestic wastewater, could be allowed to be discharged into the ocean, as well as sewage water in certain areas.

To get further insight into how businesses understand biodiversity and how it relates to them, an additional question was asked regarding if they had started to look into business and financial risks specifically connected to biodiversity. Most businesses answered no to this question and only a few expressed that they have started. Furthermore, one interviewee was unsure and did not provide an answer. Amongst the interviewees who claimed to not directly evaluate risks connected to biodiversity, several stated that biodiversity is however included in their materiality analysis. However, some also lacked biodiversity in their materiality analyses, which was the case for Energy 3 and Forestry & Material 1 as well as for the interviewee that was unsure and did not answer the question regarding risk.

There was an expressed interest among some interviewees to start looking at risk connected to biodiversity and dependency during this or the coming year. Some also mentioned that the financial risk analysis they are doing connected to climate change could act as a stepping board, and that they are following what is happening in the development regarding biodiversity. Out of the 16 interviewees that provided an answer when asked regarding risk connected to biodiversity, 5 interviewees stated that they had started. These 5 interviewees represented different sectors, including Mining, Forestry, Energy, Consumer Staples and Finance. The interviewee from Consumer Staples explained that they already evaluate risk connected to biodiversity when looking at how they source their produce.

“You have to buy from different places and different suppliers to be able to spread the risk. If there is a storm somewhere or an ecosystem collapse somewhere, we should still be able to buy produce from somewhere else.” – Consumer Staples 2

Another type of risk connected to biodiversity was mentioned by interviewees from sectors that go through permit processes and nature value inventories for land acquisition. Mining 1 and 2, Construction & Material 1 & 2 and Energy 1 said to be dependent on biodiversity in terms of whether or not they can receive a permit for operating in an area. They stated that if too high nature values are found in the inventory, it could result in not getting a permit, which was seen as a business risk.

4.1.3 Comparative summary RQ1

This interview study showed that businesses' definition of biodiversity varies, but that many interviewees referred to or gave a similar explanation to the CBD definition. However, some interviewees said to not have a definition or associated it with dependency and impact on biodiversity, which is consistent with Johansson et al. (2022), who concluded that there is not a clear definition of what biodiversity means for businesses.

According to WEF (2020), a large share of the global GDP is dependent on nature and all businesses are dependent on biodiversity, either directly or indirectly. However, previous research also showed that there is a lack of knowledge regarding dependency among businesses and that a large share does not perceive to be dependent on biodiversity (WEF, 2020; WWF and Bain & Company, 2023; Watson & Newton, 2018). This differs from the results in both this interview study as well as in the interview study by Romero & Streman (2021). In these two interview studies, of similar size and representation of sectors, most businesses did express that they dependent on biodiversity. However, neither of the two interview studies further investigate the level of understanding regarding the perceived dependency. Similar to the understanding of dependency, the research by WEF (2020) and WWF and Bain & Company (2023) stated that there is also a lack of knowledge among businesses regarding their impact on biodiversity. This was further supported by Romero & Streman (2021) who found that almost half of the businesses participating in their survey did not perceive to have an impact on biodiversity. However, this differed greatly from the results of this interview study that, on the contrary, found that all businesses perceived to have an impact on biodiversity, although not always stating exactly how.

Regarding how businesses perceive their impact on biodiversity connected to the five main drivers identified by IPBES (2019), this interview study found that most businesses expressed impact through land use change. This differ from Romero & Streman (2021) who found that only half of their survey participants agreed, or partly agreed, to have impact through land use change, with the most agreed, or partly agreed, upon impact was through climate change. Again, this differ from the results of this interview study where climate change was not discussed by many in terms of impact on biodiversity. Businesses did however point out the interconnectedness between biodiversity and climate and the need to treat it as one question. Another significant difference between this interview study and the report by Romero & Streman (2021) regards the perceived impact through direct exploitation. Romero & Streman (2021) found that almost 50% of businesses completely or partly agreed to have impact through direct exploitation, whereas this impact was not mentioned by any business in this interview study. A similarity between these two studies was how businesses barely mentioned to have significant impact through neither pollution nor invasive species. Furthermore, both studies found that some businesses expressed that they have positive impact on biodiversity.

Business risks connected to biodiversity and how it relates to dependency and impact is a growing topic and previous reports states that it is currently not successfully incorporated into financial decisions (Dasgupta, 2021; Nedopil, 2022). This is further shown in the results from this interview study where the majority of businesses had not started to look into biodiversity as a business or financial risk. However, this interview study also found that some businesses have started the work, which was also recognised by Johansson et al. (2022) and WWF (2022). Similarly, Johansson et al. (2022) and this interview study both found that sectors connected to agriculture already look at risk connected to their operation due to the close link to and dependency on biodiversity. Businesses who expressed a dependency on biodiversity in terms of attaining permits for land use, and the business risk connected to high nature values, was not only found in this interview study, but was also identified in Romero & Streman (2021).

4.2 Strategic work with biodiversity, frameworks & indicators

The second research question focused on how businesses strategically work with biodiversity, looking at what frameworks and indicators, and the results from these, are be used.

4.2.1 Literature study RQ2

According to WWF and Bain & Company (2023), Swedish businesses are aware that they have an impact on biodiversity, but not as much to what extent and how it manifests itself. The authors further

states that many businesses do not have targets related to biodiversity, or that if they do set targets, these are often intangible. In the report by Johansson et al. (2022), the authors identify that the majority of interviewed businesses did not have clear targets directly connected to biodiversity but that businesses instead perceived that biodiversity was integrated and part of other targets. The authors further identify that there is ongoing work among businesses to start incorporating biodiversity into business strategies and setting up future targets. Biodiversity being included within other sustainability goals was also found by Romero & Streman (2021).

Some businesses have started to identify and set relevant targets and indicators connected to biodiversity (WWF and Bain & Company, 2023; Johansson et al., 2022; Romero & Streman, 2021). These targets and indicators often relate to percentage of certified materials in the supply chain, the share of sales of certified products, amount of biodiversity related projects within their operation, and having net positive impact on biodiversity. The biodiversity related projects were stated as biodiversity enhancing, but examples were seldom provided. Johansson et al. (2022) further identified that businesses see certifications as important in their work with biodiversity, and WWF and Bain & Company (2023) further state that certifications can help businesses take immediate change, especially in their supply chains. Common certifications schemes, identified in both Johansson et al. (2022) and WWF and Bain & Company (2023), as well as by IPBES (n.d.-b), include:

- Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) for the forest sector.
- BRE Environmental Assessment Method (BREEAM) and Leadership in Energy and Environmental Design (LEED) in the building sector.
- Marine Stewardship Council (MSC) and Aquaculture Stewardship Council (ASC) for fishery and aquaculture.
- Better Cotton Initiative (BCI), Global Organic Textile Standard (GOTS), Organic Content Standard (OCS), Responsible Wool Standard (RWS), Roundtable on Sustainable Palm Oil (RSPO), Rainforest Alliance, KRAV and IP-Sigill within the agriculture sector and for consumer products.

Although some businesses have started the work with biodiversity, there are still many who struggle to set tangible indicators and targets with specific focus on biodiversity (WWF and Bain & Company, 2023). Business collaboration, being part of biodiversity initiatives, and collaborations with NGOs or trade associations can all be helpful for sharing knowledge and building necessary new capacity for working with biodiversity (Johansson et al., 2022; Van Oorschot et al., 2020; WWF and Bain & Company, 2023).

As stated in the introduction and chapter 2, there is an increase in policy responses, regulatory action and initiatives aiming at conserving nature and mitigating the anthropogenetic pressure on biodiversity and ecosystems. The Kunming-Montreal Global Biodiversity Framework is calling out for transparency in reporting and measurable actions. In addition, the EU has developed and is preparing several regulations and directives under the European Green Deal, which ultimately will contribute to the global post-2020 biodiversity framework. These global ambitions and different regulations will influence business practices significantly with new reporting expectations, which will increase transparency and enable comparisons. The previous research on businesses' strategic work with biodiversity by Johansson et al. (2022) and WWF and Bain & Company (2023) state that it can be a challenging task, but the authors also present different existing and upcoming frameworks and tools that can initiate and guide the process. Among these, both Johansson et al. (2022) and WWF and Bain & Company (2023) highlight that the two frameworks Taskforce on Nature-Related Financial (TNFD) and Science Based Targets for Nature (SBTN), which still are in development, have potential to standardise how businesses work with biodiversity.

There were limited findings on what framework and indicators businesses actually use in their strategic work with biodiversity. Thus, additional secondary data was collected through the literature study regarding what framework and tools businesses *could* use, which is presented in Table 2 below. The table consists of different frameworks, including reporting standards, and tools that connects to biodiversity, which businesses could utilise to guide their work with biodiversity. Furthermore, the table is organised in two categories, “Reporting Standards” and “Frameworks & Tools”, and the order within each category is mainly alphabetical but with certain exceptions to facilitate readability and comprehension of different alignments.

Table 2. Frameworks and tools, including reporting standards, connected to biodiversity identified in the literature study.

Reporting standards	
GRI	The Global Reporting Initiative (GRI) is the most widely used sustainability reporting standard globally (KPMG, 2022). Biodiversity is addressed within the topical standard GRI 304: Biodiversity 2016 that includes 4 topic-specific disclosures. GRI 304 is currently being revised with an expected release in the last quarter of 2023 and will require additional topic-specific disclosures with increased focus on impact on biodiversity (GRI, n.d.). The revision is aimed to increase the alignment of recent developments and regulative instruments and represent the agreed best practice internationally. Furthermore, the revision could support businesses in meeting the reporting requirements in line with the Kunming-Montreal Global Biodiversity Framework, specifically target 15 regarding corporate disclosures (GRI, n.d.).
ESRS	The European Sustainability Reporting Standards, ESRS, under the reporting directive CSRD, constitute more extensive and detailed reporting requirements within sustainability (European Council, 2022). They include topic specific standards for environmental disclosures including biodiversity in ESRS E4 – Biodiversity and ecosystems. Apart from the general requirements in ESRS2, the E4 standard also includes 6 disclosure requirements (EFRAG, 2022a). Furthermore, the disclosure requirements of other environmental standards, and the social standards S3 – Affected communities, should be read in conjunction with E4 since overlaps occur (EFRAG, 2022a). The standard E4 is structurally compliant with the Taskforce on Nature-Related Financial Disclosures framework, which is presented below (EFRAG, 2022b). Furthermore, the ESRS are fully or closely aligned with the Global Reporting Initiative Standards (EFRAG, 2022b). The final standards were adopted as delegated acts by the European Commission in July of this year 2023 and is currently transmitted to the EU Parliament and Council for a two-month scrutiny period. In case of no objections, the first businesses under the scope of CSRD will need to adopt the standards for the financial year of 2024 (European Commission, n.d.-a).
Frameworks & Tools	
ENCORE	Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE), developed by the Natural Capital Finance Alliance (NCFA), is a free tool created to visualise how different economic sectors and production processes potentially depend and impact on nature, and expose how these can represent a business risk (NCFA, n.d.). It includes different economic sectors and production processes, how these connect to different ecosystem services, which in turn rely on different natural capital assets, and show how different drivers of environmental change can affect the natural assets (NCFA, n.d.). For an overview of the biodiversity metrics used in ENCORE, see Annex 1 in the report by UNEP-WCMC et al. (2019).

ESTER	The Ecosystem Service Effect Calculation tool (ESTER), EkoSystemTjänstEffektRäkning in Swedish, is an ecosystem services assessment tool for Excel that can be used in the planning process for building and land development (Boverket, 2022). It can assist in identifying and comparing ecosystem services within a specific area before and after development and highlight the potential impact on the ecosystem services (Boverket, 2022).
EXIOBASE	EXIOBASE is a global, detailed Multi-regional Environmentally Extended Supply-Use and Input-Output database that integrates economic and environmental data across different sectors and regions (Stadler et al., 2018). It allows researchers, policymakers, and businesses to track environmental impacts along global supply chains and analyse the interrelations between global production and consumption processes (Stadler et al., 2018).
BioScope	BioScope aims to provide a quick scan tool for businesses and financial institutions to calculate the most important biodiversity impacts due to supply chain or financial products (BioScope, 2022). It consists of two key elements, first, an inventory of commodities used in a given supply chain or financial product done by an input-output approach by using EXIOBASE, and second, a biodiversity impact model where the resulting impacts are calculated using the life cycle impact assessment method ReCiPe. In ReCiPe, the endpoint indicator related to biodiversity "Damage to ecosystems" is expressed in Potentially Disappeared Fraction of species per m ² or m ³ (BioScope, 2022).
GBS	The Global Biodiversity Score (GBS) is a biodiversity footprint assessment tool that can be used to evaluate businesses' or investments' footprint or impact on biodiversity across the value chain (Berger et al., 2021). It assesses direct operations and upstream impacts on terrestrial and freshwater biodiversity and covers pressures connected to IPBES identified direct drivers, such as land use and fragmentation, climate change and pollution. The results of the GBS are expressed in the metric MSA.km ² , Mean Species Abundance x Surface (Berger et al., 2021).
IBAT	The Integrated Biodiversity Assessment Tool (IBAT) is a software tool used to assess potential impacts of development projects on biodiversity (IPBES, n.d.-c). IBAT combines three global biodiversity datasets: The International Union for Conservation of Nature's [IUCN] Red List of Threatened Species, the World Database of Key Biodiversity Areas and the World Database on Protected Areas. These datasets include information on protected areas, species distributions, and ecological importance to provide users with insights and guidance on how to minimise or mitigate the potential negative impacts on biodiversity during project planning and implementation (IPBES, n.d.-c). Through IBAT, the Species Threat Abatement and Restoration Metric [STAR] can be accessed, which allows quantification of the potential contributions that species threat abatement and restoration activities offer towards reducing extinction risk.
Mitigation Hierarchy	The Mitigation Hierarchy aims to reduce and mitigate the direct and indirect impact of development projects by using a step-by-step process to achieve No Net Loss or Net Gain (Forest Trends, n.d.). It follows four key actions, Avoid, Minimise, Restore, and Offset, where the first step Avoid has most significance for preventing impact and conserve biodiversity. If impact remains after the first three steps Avoid, Minimise and Restore, then the last step Offset enables ecological compensation where No Net Loss can be achieved or preferably Net Gain (Forest Trends, n.d.).

CLImB	Changing Land Use Impact on Biodiversity (CLImB) aims to measure and quantify biodiversity within the Mitigation Hierarchy for land use change development projects (Ecogain, n.d.). It sets out to calculate a base line for the project's impact area, the potential loss of biodiversity and identify compensation areas to offset the biodiversity value. The model is expected to be available for testing and evaluation in the last quarter of 2023 (Ecogain, n.d.).
Natural Capital Protocol	The Capitals Coalition has developed a publicly available decision-making framework, the Natural Capital Protocol, which can be used by businesses to identify, measure and value their direct and indirect impacts as well as their dependencies on natural capital (Capitals Coalition, n.d.-a). The accompanied Biodiversity Guidance enables businesses to incorporate biodiversity and its value into natural capital assessment and provides guidance and examples on corporate biodiversity measurement approaches (Capitals Coalition, n.d.-b). The Capitals Coalition has collaborated with the TNFD framework where the Evaluation step in the LEAP approach is built on and aligned with the dependency and impact analysis of the Natural Capital Protocol (Capitals Coalition & TNFD, 2022).
SBTN	Building on the Science Based Targets for Climate, the Science Based Target for Nature will guide businesses in their work to assess their impact on nature and biodiversity and how to set measurable, actionable and time-bound objectives and targets (Science Based Targets Network, 2020). The SBTN follows 5 steps: assess, interpret and prioritise, measure, set and disclose, act, and track. Step 4, act, is built on the mitigation hierarchy theory and includes steps to avoid, reduce, regenerate, restore and transform (Science Based Targets Network, 2020).
TNFD	The Taskforce on Nature-Related Financial Disclosures assesses and discloses nature related risks and opportunities (TNFD, 2023). The TNFD framework builds on the Taskforce on Climate-Related Financial Disclosures and outlines indicators and metrics for nature related disclosures (TNFD, 2023). It also provides a voluntary guidance for assessing risk and opportunities with the LEAP approach, which follows four steps: Locate, Evaluate, Assess and Prepare. The LEAP approach, which the ESRS E4 materiality assessment also reference and follows, was developed in collaboration with Capitals Coalition where the Evaluation step in the LEAP approach is built on and aligned with the dependency and impact analysis of the Natural Capital Protocol (EFRAG, 2022b; Capitals Coalition & TNFD, 2022). The TNFD framework has also collaborated with the Science Based Target for Nature framework to enable alignment, where the process for setting targets according to SBTN is recommended within the TNFD framework (TNFD, 2023). Furthermore, the framework is developed in close collaboration with standard bodies such as GRI and EFRAG, which TNFD both draws from and feed into (TNFD, 2023). The framework is currently in the 4 th and final Beta version for pilot testing with an expected release for market adoption in September of 2023 (TNFD, 2023).
WWF Biodiversity Risk Filter	The WWF Biodiversity Risk Filter assesses biodiversity impact, risk and opportunities in business operations and across value chains. It includes four steps, informing, exploring, assessing, and responding. The first three steps were launched in January 2023, and the last step being released at a later stage (WWF, 2023). Currently, as of the first half of 2023, the tool assesses biodiversity-related physical and reputational risk and will incorporate regulatory risk in the future (WWF, n.d.). For an overview of the WWF Biodiversity Risk Filter 33 risk indicators, see Appendix 0.3, Table 8, in the report by WWF Biodiversity Risk Filter (2023).

4.2.2 Interview study RQ2

Regarding the strategic work with biodiversity, Energy 2 and Consumer Staples 2 expressed that they have a specific biodiversity strategy in place. Businesses from Mining and Construction & Material follow biodiversity roadmaps and guidelines, which they either developed themselves or gathered through their trade association. Consumer Staples 1 and Energy 3 expressed that they were currently developing a strategy specifically for biodiversity within their organisation. Several interviewees said to instead have biodiversity as a specific focus area in their sustainability work, and some said that it was incorporated into larger sustainable focus areas around nature or ocean.

In terms of targets, interviewees across various sectors mentioned having targets, or ambitions, connected to biodiversity efforts. They were often related to having less impact, having a positive impact, having certain amounts of biodiversity measures or projects in place, or relating to a specific share of certifications or sales of organic produce. Having targets related to biodiversity measures and projects was mainly expressed by interviewees from Mining, Construction & Material, Energy and Construction. These biodiversity measures could include activities such as installing insect hotels, leaving dead wood and sand piles, planting wildflower meadows, and keeping or creating ponds. Furthermore, the biodiversity related projects could include restoration projects for wetlands or the re-introduction of a specific species to an area. The targets connected to certifications was often expressed by interviewees from Consumer Staples, but also Finance 1 and Forestry 1. Not having targets specifically on biodiversity was mentioned by Material & Forestry 1, Shipping 1 and 2 and Consumer Staple 1.

In regard to how businesses follow up on their expressed targets and efforts, many said that they are measured in terms of whether a biodiversity related action had been implemented or not, if the aimed number of implemented actions or projects had been achieved, or what percentages of their material or product sales were certified. However, most businesses did not have indicators to specifically assess the actual impact on biodiversity and follow up on the effect of their efforts, and this was said to be very difficult. The way businesses were working with their biodiversity projects and implemented measures was often expressed to be based on general knowledge of what can have positive impact on biodiversity. This difficulty to actually assess impact and follow up on efforts was also mentioned by businesses who had strategies or targets relating to less impact, no net loss, net gain or positive impact on biodiversity. They explained that although they might not have a specific indicator to measure the target, they still considered it to be an important concept or ambition to have.

"We have chosen to formulate Net Positive Impact on Biodiversity by 2030 as an 'ambition statement' rather than a measurable target because there is currently no consensus on what Net Positive Impact on Biodiversity means and how it should be measured. What is most important as a first step is to integrate an approach where strengthening and enhancing biodiversity is an integral part of our work methods." - Energy 1

"It is more conceptual so far. But you could say that we want, just like saying you want to be net zero for CO2, you think you should be net positive or past net zero for nature. Therefore, our investments should contribute more to nature than their negative impact. (...) I think for us, it still helps to have that target because I think it's an important concept, but I don't know if we're going to have a number on it." – Finance 1

Many businesses expressed that they are part of biodiversity initiatives either connected to their specific sector or larger ones with many participants across different sectors. Several interviewees across all sectors also mentioned cooperation and having biodiversity research projects with non-government organisations, authorities, and academia, as part of their strategic work. For the biodiversity initiatives, some interviewees expressed that initiatives could fully focus on biodiversity,

and some expressed that there could be focus groups dedicated to biodiversity within global, European, or national trade associations. In these groups and associations, knowledge sharing was possible as well as developing frameworks and guidelines connected to biodiversity. Furthermore, several interviewees expressed that these associations have the potential to co-develop sector specific practices, which could create equality and comparability if everyone within a sector follows similar methods. However, some interviewees pointed out that although sharing best practices was a beneficial part of trade associations, standards should maybe not come from them, as such standards could be too nationally focused for businesses operating globally.

“Trade associations are often national, or regional, and we are a global company. We can't aggregate 10 countries' standards and everyone using different methods to measure.” – Energy2

The Mitigation Hierarchy and Nature Value Inventory were the most commonly mentioned frameworks or methods. These were specifically mentioned by interviewees from sectors with land use and land-use change such as Forestry, Mining, Construction & Material and Energy. They pointed out that the Mitigation Hierarchy connects to the provisions in the Swedish Environmental Code that needs to be followed for their operation. Additionally, they mentioned that the first step of planned development when applying for permits for operating in an area often requires a Nature Value Inventory. Construction & Material 1 and 2 discussed how finding high nature values can prohibit exploitation of that area. It was also mentioned by Shipping 1 as well as Mining 1 and 2 that ecological compensation, following the Mitigation Hierarchy, can open up the possibility of receiving a permit to land use change. Furthermore, many described that the steps in the Mitigation Hierarchy, avoid, minimise, restore, offset, and compensate, follow their operational phases quite well. When asked about if it was possible to measure the steps, especially for restoration and compensation, the interviewees said that it is difficult or not known how to do such assessments.

Several businesses across different sectors expressed that they use, or have used, the reporting standards GRI and that following the GRI framework was beneficial in terms of preparation for coming regulation and frameworks. Energy 2 expressed that they report according to GRI, but that it is not audited by a third party. Furthermore, Construction 1 expressed that they follow GRI voluntarily, as they see it as guiding for their sustainability work. Others also pointed out that GRI can be guiding, especially in the beginning of ESG reporting, but added that it is not worth upholding the standard or feeling limited by the structure.

“You could say that in practice we still follow GRI, but we don't verify that we do. (...) All these types of standards and certifications are worth a lot when you first get them, because that's when you do the work to develop yourself up to a certain level. To then maintain that level is not at all the same value for money.” – Shipping 1

“We thought GRI was a very good framework to report against when we were new to sustainability reporting as it gave us a lot of lessons and a lot of support in how to start building a report. But in the last few years when we reported according to GRI, we felt locked into their structure rather than being able to report on what we thought was important to us. That's why we left GRI.” – Consumer Staple 4

Working with certificates was mentioned by representatives from Consumer Staples, but also by Finance 1, Forestry 1, and Forestry & Material 1. Finance 1 expressed that they follow certification in their portfolio to ensure that certain criteria were met. Businesses connected to Forestry mentioned FSC and PSFC certification, which both have consideration for biodiversity in them. For businesses within Consumer Staples, certifications related to risk commodities that could come from unsustainable agriculture and deforestation practices. Forestry 1 and Consumer Staples 2 and 3 also

said that they set even higher ambitions than the certifications, or that they have additional demands that need to be fulfilled regarding forests and suppliers. Consumer Staple 2 did however state that certification is preferable.

“That is one way for us to follow up with the companies, how much of their purchasing is certified according to frameworks that we find acceptable.” – Finance 1

“But we can't keep up the pace if we were to set specific requirements for everything, they won't be as relevant, and it won't be as easy to verify compliance. We can almost only work in terms of asking questions to the suppliers. We can't go to the sites all the time to check. Thus, certifications are first and foremost. Then we work with additional requirements beyond that, but certifications are absolutely preferable.” – Consumer Staple 2

The Swedish initiative CLImB was mentioned by interviewees from Energy, Mining, Forestry and Construction & Material. They expressed an interest in the model and hoped it could assist in measuring the effect of the steps taken according to the Mitigation Hierarchy and making it possible to follow up efforts over time. One interviewee pointed out a potential limitation of the model depending on the type of operation that will take place, which could either change the land or have continuous use.

Two interviewees from the Energy sector, two from Consumer Staples and one from Mining, expressed that they are exploring or will join the Science Based Targets for Nature. It was also pointed out by another interviewee from Consumer Staple that the SBTN might be too specific for their sector, and the difficulty in following the framework for each of their many different products. Almost half of the interviewees said to be following the development of the TNFD and will potentially report according to the framework. This was said by everyone from the Consumer Staple sector, both from Mining, two from Energy and Finance 1.

The WWF Risk Filter was mentioned by two interviewees from the Consumer Staples sector. One of the interviewees stated that it follows similar work processes that they already have in place and the other one expressed that they are interested and might work with it. The interviewee from Finance 1 expressed that they are working with the tool ENCORE to map the business dependencies to nature within their portfolio and that they have chosen focus areas from the results. One business from Energy had used the Global Biodiversity Score tool to analyse their impacts on biodiversity and find hot spots.

“And that analysis, you do that to get an overall picture in order to be able to set priorities. Partly priorities based on the degree of impact, what has the most impact, but also priorities based on what you can influence.” – Energy 1

Several of the interviewees represented businesses that will need to follow the reporting directive CSRD. The standards following the directive, the ESRS, were expected to have great impact on their work with biodiversity. Furthermore, Energy 2 pointed out that third-party assurance will become mandatory on ESRS disclosures and how that will be a game changer amongst businesses. Construction 1 said that although they might not fall under the legislation at the moment, they still aim to work according to the standards. Additionally, businesses who fall under the regulation of CSRD will also need to comply with the EU Taxonomy. Several interviewees have started the work in regard to climate and is following the development of the remaining environmental objectives. Some interviewees mentioned the Kunming-Montreal Global Biodiversity Framework and seeing what demand will come from that. The two interviewees from Mining and Forestry 1 also mentioned that the upcoming Nature Restoration Law will have significant impact on their work with biodiversity. Furthermore, Consumer Staples 2 and 3 mentioned that the EU Deforestation-Free Regulation would impact their work.

When talking about how the results are used from businesses strategic work, the businesses who used the tools GBS and ENCORE expressed that they use their results to find hot spots and what to prioritise and find areas where they can make the biggest difference. However, most participating businesses did not have any results yet, as many interviewees had already stated to not use any official frameworks or tools and struggled to assess the impact and measure their effect on biodiversity. Instead, these businesses talked about how such results *could* be used and also expressed that they want to find hotspots and what to prioritise in their work. Interviewees connected to Mining and Construction & Material also mentioned that they want results in order to see if their efforts to implement biodiversity related measures have actually increased biodiversity in that area when comparing before and after their operation. Additionally, several interviewees mentioned results in terms of wanting to use it for regulations and reporting, but this was often expressed as an incentive for them to work with biodiversity, which connects to a different research question.

4.2.3 Comparative summary RQ2

Johansson et al. (2022), Romero & Streman (2021) and WWF and Bain & Company (2023) found that businesses have started to formulate and set targets connected to biodiversity. It was also identified in these reports that there was a lack of tangible and clear targets and that business might not have direct biodiversity targets but instead incorporates it into other targets. Additionally, it was identified that in the literature that some businesses do not have any strategies or targets set for biodiversity. This interview study had similar findings, identifying that several of the interviewed businesses have targets or ambitions directly connected to biodiversity, some incorporates biodiversity into larger sustainability targets and that some of the businesses do not have any biodiversity specific targets.

This interview study identified that some businesses do have specific biodiversity strategies, either developed by the organisation or following guidelines connected to trade associations. Moreover, trade associations and initiatives for biodiversity were stated by the interviewed businesses to be part of their strategic work in terms of knowledge sharing and developing frameworks and guidelines. Such business collaborations were also recognised in previous research and stated to be beneficial and necessary ways for businesses to advance in their work with biodiversity (Johansson et al., 2022; Van Oorschot et al., 2020; WWF and Bain & Company, 2023). Both Johansson et al. (2022) and this interview study identified that businesses connected to Agriculture, Consumer Staples, Forestry and Finance directly or through their supply chains or portfolio, see certifications as important in their work with biodiversity. Furthermore, this interview study found that some businesses stated that they also set even higher ambitions and demands than the requirements of certain certifications.

In terms of the frameworks and tools, including reporting standards, identified in the literature study and presented in Table 2, only four were stated to be used by businesses in the interview study. Among the remaining 10 identified framework and tools, the interviewees expressed interest in five of them and the other five were not mentioned at all. An overview of this comparison between the identified framework and tools in the literature study and the findings from the interview study is presented in Table 3 below.

Table 3. An overview of which of the identified official frameworks and tools, including reporting standards, that businesses in the interview study used, expressed interest in or did not mention at all.

	Used by businesses	Expressed to be of interest by businesses	Not mentioned by businesses
Reporting standards			
GRI	X		
ESRS		X*	
Frameworks & Tools			
ENCORE	X		
ESTER			X
EXIOBASE			X
BioScope			X
GBS	X		
IBAT			X
Mitigation Hierarchy	X		
CLImB		X**	
Natural Capital Protocol			X
SBTN		X**	
TNFD		X**	
WWF Biodiversity Risk Filter		X**	
<p>* Businesses who fall under the Corporate Sustainability Reporting Directive, CSRD, will be required to report according to the European Sustainability Reporting Standards, ESRS, but interest was also expressed by businesses exempted from the CSRD.</p> <p>** The frameworks and tools are not fully developed and available for businesses, as they do not yet exist in their full capacity.</p>			

The most commonly mentioned and used framework among the interviewed businesses was the Mitigation Hierarchy, as it was stated to follow a similar process as the one for land development and permit application according to the Swedish Environmental Code, which they follow. These businesses also mentioned Nature Value Inventory, as it is often required as a first step in permit processes for development, according to the Swedish Environmental Code. The Global Reporting Initiative, GRI, which is stated to be a widely used reporting standard globally, was also expressed to be used by several businesses in this interview study. However, some interviewees explained that they only use it for guidance and some businesses stated that they have used it in the past but have now stopped. Furthermore, one business from the interview study used the tool ENCORE and another interviewed business used the tool Global Biodiversity Score, GBS.

In terms of how businesses measure their targets, both Johansson et al. (2022) and this interview study found that the indicators used often included the number of certain biodiversity actions or projects in place, shares of certified products or share of sales of organic or certified products. However, it was also found that many of the biodiversity efforts were based on common knowledge and businesses had difficulties measuring targets and follow up on the actual effect of their efforts. Due to this, it was also found in this interview study that most businesses did not have results connected to biodiversity yet. However, the few who had used them to find hotspots and what to prioritise, which was also what those businesses who did not have results wished to use them for, as well as to show the effect of implemented biodiversity measures. This interview study also found that businesses with nature positive targets and having net positive impact expressed that these were important ambitions to have, even though they did not know how to measure or show it. Businesses with targets regarding net positive impact was also identified in Romero & Streman (2021).

The literature study identified several regulations and ambitions on global, European and National level that creates an increased demand on businesses to work strategically with biodiversity and report on their dependency and impact. However, some of these regulations and ambitions are under development or have just recently been adopted and have therefore not yet affected businesses and their work with biodiversity. The post-2020 Kunming-Montreal Global Biodiversity Framework and The European Green Deal, with its related regulations, strategies and directives, were discussed in this interview study and businesses expressed that they are following the development of these and how it will affect their operation. Some businesses also expressed interest in aligning with certain directives, such as the Corporate Sustainability Reporting Directive, to create transparency and enable comparison with other businesses to remain competitive, even though they might not be obligated to or fall under the requirements.

4.3 Incentives

The third research question focused on what incentives are recognised to motivate and encourage businesses to work with biodiversity.

4.3.1 Literature study RQ3

Regulation is a common incentive that can create change and push businesses to work with biodiversity conservation and initiatives (WWF and Bain & Company, 2023; Smith et al, 2020; Romero & Streman, 2021). As presented in previous chapters, there are several recently adopted and upcoming regulations that will create increased demand on businesses to understand and work with biodiversity. Different types of stakeholder groups can also create a demand for increased effort and focus on biodiversity (Romero & Streman, 2021; Van Oorschot et al., 2020). Romero & Streman (2021) identified seven different stakeholders that create incentives for businesses to work with biodiversity. These were authorities, customers, employees, investors and owners, local stakeholders, the general public and Non-Governmental Organisations. Furthermore, these stakeholders were also recognised by Van Oorschot et al. (2020), who specifically emphasised the large potential that financial stakeholders have to create incentive and drive change amongst businesses in their portfolio.

4.3.2 Interview study RQ3

From the interview study it was possible to identify six different incentives, seen in Figure 9 below, which the participating businesses experience to motivate and encourage them to work with biodiversity.

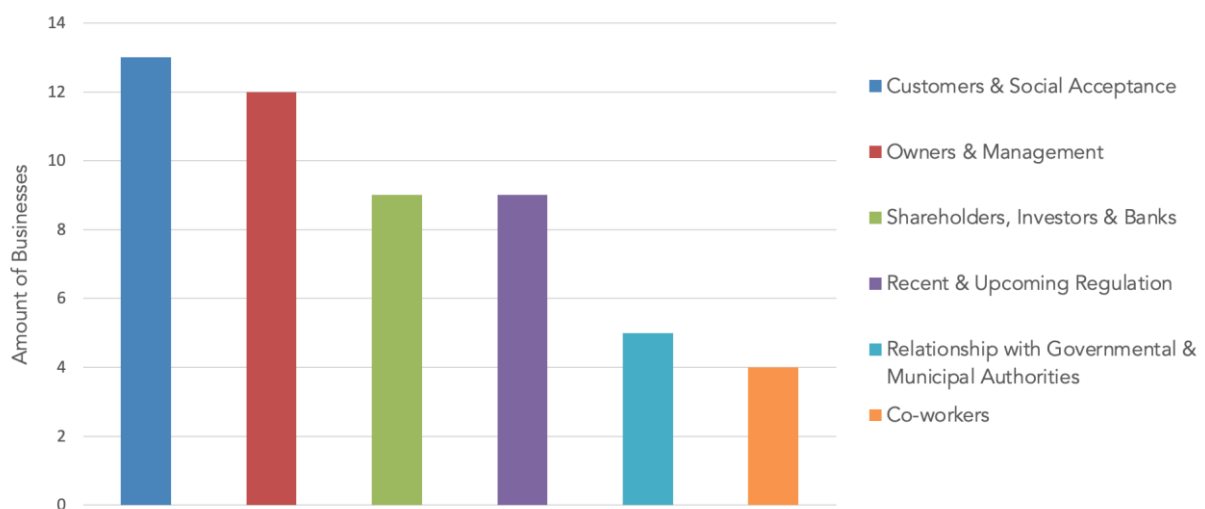


Figure 8. Businesses perceived incentives for working with biodiversity.

4.3.2.1 Customers & Social Acceptance

Customers, both individual consumers and business customers, was the stakeholder group that was mentioned the most (13 out of 17) when asked about what creates incentives for working with biodiversity. Businesses from Consumer Staples experience a growing demand from consumers and that more questions and expectations arise regarding biodiversity.

“Soon you won't be able to get away with not working with biodiversity, because it's almost like if you don't no one will be going to our store.” – Consumer Staples 2

Energy 1 and 2 specifically mentioned an increased demand coming from their business customers, who might have their own goals and ambitions and want to be able to describe their projects as having a positive effect on biodiversity. Interviewees across different sectors also stated that being able to communicate one's efforts and potential positive impact regarding biodiversity creates incentives for their business. They explained that working with biodiversity was an important brand question, as it could generate great publicity and create a good reputation among customers. Additionally, interviewees from Mining and Construction & Material further explained how working with biodiversity is important to create a good relationship with people in local communities and get social acceptance.

“Social acceptance is important to us. We have our operation in close proximity to communities and we want to be a good neighbour. Being able to create biological values in our local areas benefits not only biodiversity but also us, the people living nearby.” – Mining 2

4.3.2.2 Owners and Management

Several interviewees (12 out of 17) specifically mentioned that the incentive to work with biodiversity comes from the engagement and interest in biodiversity from their owners and management of the business. Some interviewees mentioned that they have an opportunity to contribute and some also added that they want to do better and evolve as a business. The incentive from owners was especially mentioned by the interviewees from businesses that were government owned. These interviewees stated that such ownership comes with principles and responsibilities to live up to regarding being at the forefront and a role model in all areas of sustainability, including biodiversity. Some interviewees also connected this incentive to their dependency on biodiversity and how that makes it an inevitable question that their organisation needs to address. This was most prominent amongst all Consumer Staples representatives but was also mentioned by Forestry 1 and Finance 1.

4.3.2.3 Shareholders, Investors and Banks

More than half of the interviewees (9 out of 17) expressed incentive coming from the financial sector, as they are starting to get questions on biodiversity from shareholders, investors and banks. Although most of these interviewees mentioned that questions regarding biodiversity are starting to increase, three interviewees from Mining, Energy and Construction & Material stated that they have experienced such questions during the last one or two years. The interviewee from the energy sector added that questions from investors is most likely the reason for why the business management started taking an interest in biodiversity.

“The finance sector is starting to ask questions ‘what are you doing within biodiversity?’ and then it gets very clear that, we have to have a project within biodiversity. (...) I can't see any other reason than the demand from the financial sector.” – Energy 3

4.3.2.4 Recent & Upcoming Regulation

About half of the interviewees (9 out of 17), across different sectors, expressed that recently adopted and upcoming regulation, especially the reporting directive CSRD and the connected ESRS, will really amplify the demand and incentive for working and reporting on biodiversity. Some also stated that they aim to follow regulations and increase their work with biodiversity even though they might not be obligated to or fall under the requirements for certain laws. This was explained by wanting to remain competitive and be transparent in their work as it could be an advantage in comparisons. Additionally, it was explained by wanting to be prepared for either potential structural changes in the organisation or the requirements of the regulation.

“We might also be bought by a very large company that falls under CSRD. Therefore, we still have to adapt. But even if we were to continue as we are today, we would still want to align because there are 50,000 companies affected by it in the EU, and even if we are significantly smaller than the criteria, it’s still what you will adapt to, which is great.” – Construction 1

“We want to follow, as far as possible, standardised frameworks because it is easier for our stakeholders to compare our performance against others' performance.” – Consumer Staples 4

4.3.2.5 Relationship to Governmental and Municipal Authorities

Relationship to authorities was mentioned as an incentive by some interviewees (5 out of 17) across sectors such as Construction, Shipping and Construction & Material. The interviewees stated that working with biodiversity can create good publicity, and how that not only could be beneficial financially and towards customers, but also towards governmental and municipal authorities. By working with biodiversity, they said that it can create a good relationship with authorities and a good reputation, which in turn can be beneficial during permit processes and land allocation competitions.

“We get publicity from working with biodiversity. We get good relations with municipalities that see that we're making a real effort, that it's not just 'we're working on sustainability' but this is what we're doing, now we've done it, now we're taking it with us and moving on.” – Construction 1

“And when you apply for a permit and you get a good relationship with the authorities and so on, it may also be a little bit easier to get a permit if you have shown that you are doing something good for the environment.” – Construction & Material 1

4.3.2.6 Co-workers

Co-workers and their interest in biodiversity was mentioned by a few interviewees (4 out of 17) when asked about incentives. The incentive could come from both increased questions and engagement from employees regarding biodiversity as well as wanting to be an attractive employer. One interviewee from Energy and one from Material also pointed out how the commitment and passion of the co-workers out on sites have driven the biodiversity work that is now being applied in a more strategic way across the organisation.

4.3.3 Comparative summary RQ3

An important incentive to drive change and encourage the strategic work with biodiversity is regulation, mentioned in both this interview study and by WWF and Bain & Company (2023), Smith et al (2020) and Romero & Streman (2021). There are existing regulations that already have obligations or considerations connected to biodiversity that needs to be followed such as the Swedish

Environmental Code for land development. However, there is also an expected increase in demand through upcoming regulations on a global, European and national level. From this interview study it was also found that some businesses, who does not actually fall under certain regulations, such as the CSRD, will still aim to adhere to and align with them to remain competitive and transparent.

Customers and local stakeholders, such as nearby residents, were also a commonly mentioned incentive in both this interview study and in the reports by Van Oorschot et al. (2020) and Romero & Streman (2021). Both this interview study and Romero & Streman (2021) found that specifically businesses within the Consumer Staples sector discussed this incentive. Similarly, both highlighted how extractive sectors, such as Mining and Construction & Material, stated that having a good relationship with nearby communities to their sites is important. Additionally, this interview study found incentive stemming from a growing demand from business customers, which was also mentioned as an incentive in Van Oorschot et al. (2020).

Internal incentives were identified in Van Oorschot et al. (2020), who specifically highlighted the important role the financial sector can play, with their investments and ownership, in terms of incentivising change among the businesses in their portfolio. Investors and owners were also identified as creating incentive in the report by Romero & Streman (2021). These incentives were also further identified in this interview study. It was found that many of the interviewed businesses perceive that the incentive for working with biodiversity comes from the interest and willingness to be better amongst their owners and management. Some interviewed businesses also perceive that the incentive comes from shareholders, investors, and banks, as a few businesses already experience questions from the financial sector and others see an upcoming demand from these stakeholders.

The incentive to work with biodiversity coming from employees was expressed by a few businesses in this interview study and also identified in Van Oorschot et al. (2020) and Romero & Streman (2021) as well as how working with biodiversity could be an attractive trait as an employer. This interview study further found that for some businesses the incentive stemmed from the engagement and interest from employees out on sites that have driven the work.

Businesses from similar sectors in both this interview study as well as in the study by Romero & Streman (2021) expressed that an incentive to work with biodiversity is that it creates good relationships with governmental and municipal authorities. These businesses explained that being able to show positive biodiversity efforts can create a good reputation amongst authorities, which in turn can potentially benefit a business during permit processes and land allocation competitions.

4.4 Barriers

The fourth research question focused on what barriers are recognised to hinder businesses in making progress in their work with biodiversity.

4.4.1 Literature study RQ4

Romero & Streman (2021) identifies different perceived challenges by businesses to implement biodiversity initiatives. They found that knowledge about impact and knowledge about biodiversity measures was seen as the most agreed or partly agreed perceived challenges amongst their survey participants. Additionally, the authors found from their interviews that businesses experience a lack of methods to monitor biodiversity but also to measure biodiversity over time. Businesses lack of understanding of the dependency and impact on biodiversity and how that can hinder setting tangible goals was also identified by WWF and Bain & Company (2023). The authors stated that Swedish businesses experience challenges regarding the lack of standardised methods and metrics as well as the lack of guiding regulations and reporting requirements. This is also mentioned by Johansson et al.

(2022), who found that not being able to measure and evaluate biodiversity makes it difficult for businesses to show the effect of biodiversity efforts, which is important to demonstrate to financial stakeholders.

According to Johansson et al. (2022), the complexity of biodiversity is seen as a challenge amongst business, as is the lack of scientific evidence and knowledge on what actions are needed and considered to be sufficient. The authors also mentioned that businesses within agriculture express that there needs to be an increase in demand and willingness to pay. Johansson et al. (2022), as well as Romero & Streman (2021), further identifies economic resources and different priorities among the business as perceived challenges. Lack of time and personnel could result in biodiversity being less prioritised, but also in comparison to climate being more at the forefront. WWF and Bain & Company (2023) also state that biodiversity is less prioritised than other sustainability issues like climate change due to lack of capacity. WWF and Bain & Company (2023) state that, despite businesses not having the “perfect” standardised framework yet, there is a need for action and to start somewhere and not let the complexity hinder the work, which is also mentioned in Johansson et al. (2022).

4.4.2 Interview study RQ4

From the interview study it was possible to identify seven different barriers, seen in Figure 10 below, which the participating businesses experience could hinder their work with biodiversity.

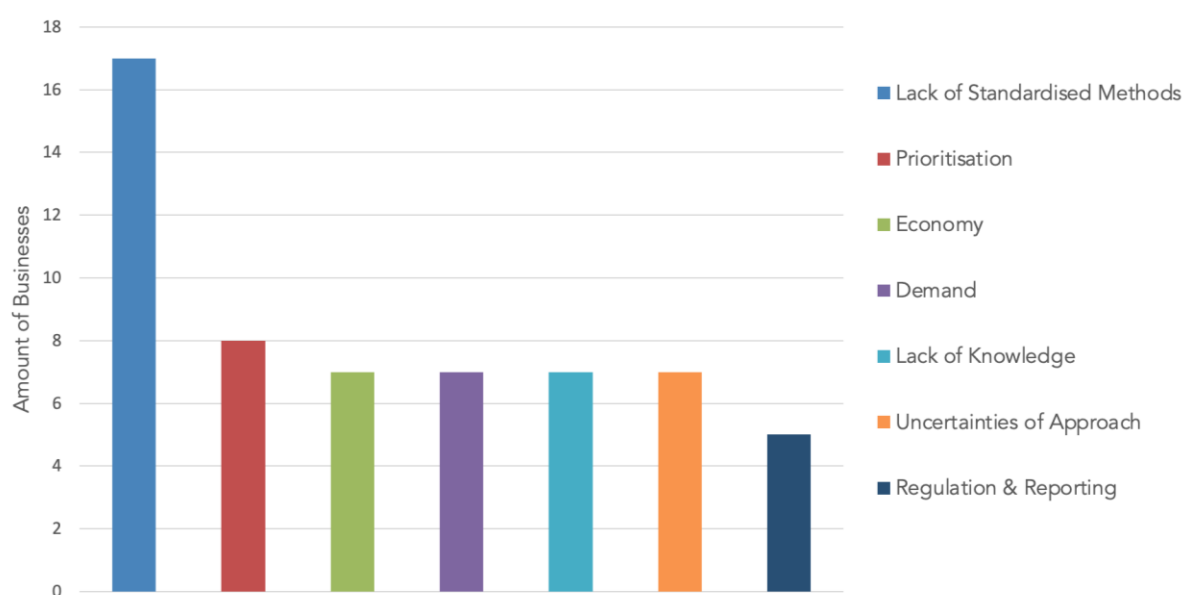


Figure 9. Businesses perceived barriers for working with biodiversity.

4.4.2.1 Lack of Standardised Methods

The lack of generally accepted or standardised methods, such as frameworks, tools, and indicators, to assess the impact on biodiversity and follow up efforts, was mentioned in every interview (17 out of 17), as some type of barrier or challenge for working or progressing the work with biodiversity. Three interviewees from the Energy and Consumer Staples sector also pointed out the specific challenge in the lack of data. Several interviewees expressed that they want to have a tool or be able to measure the effect of biodiversity efforts in order to set more targets and how that could enforce action. Being able to follow up to see that something is actually being done and the effect of it was also mentioned. Also, to be able to measure the effect in order to make decisions on materials, be able to prioritise what to focus on and find where one can make most difference, was mentioned by interviewees from several sectors.

"I welcome anything that can clarify the impact of different measures on biodiversity." – Forestry 1

"Yes, but there are many measurements, I think, that show that you get more done when you have a measurable target to prioritise an area. Therefore, it is highly likely that we will formulate additional and more detailed targets in this area in the near future." – Consumer Staple 3

"It makes it a bit more challenging to work with, because it is a little bit like 'what gets measured gets done'. It's easier to push forward and know that you can find hot spots when you can also measure it." – Consumer Staple 4

The need for a standardised frameworks or tools to be able to show results to financial stakeholders and enable comparisons was expressed by both Mining 1 and 2 but also Consumer Staples 4 and Energy 3. Connected to comparability, it was also specified that standardisation is needed as it otherwise could become complicated and confusing if every business developed own methods.

"It has also been understood that you have to have a measurement, you have to somehow show the financial market that you are looking at biodiversity as well." – Energy 3

"Because if all companies were to develop different ways of measuring biodiversity, it would be very difficult for the consumer to know which company is good or bad. Thus, in order to be comparable, standards are more important." – Mining 1

"Because what's really hard for our suppliers is when all retail chains come up with their own reporting framework for an issue and send it out to suppliers and say fill this in, report on this, because we want to monitor biodiversity. Therefore, there is a need for standardised ways of looking at what biodiversity is and how to monitor, set criteria and report on it." – Consumer Staple 4

The general difficulty in measuring biodiversity was mentioned by a few interviewees across different sectors. It was also mentioned that it could be a risk if measuring methods are too generalised. The difficulty to assess impact and follow up efforts due to time aspects, and that it takes years to see results, was discussed by Forestry 1, Energy 3 and Mining 2. Geographical difficulties were also mentioned such as operating in different countries and different types of environments.

When talking about the barrier of not having standardised methods and ways to measure the effect on efforts, the concept Green Hushing was brought up by one interviewee. It was explained that although a biodiversity-related effort might have positive impact, businesses in general could be reluctant to report about it, as they could be unsure if it is incorrect or seen as too small. Therefore, business could withhold information regarding their sustainability goals, despite having them, to avoid potentially being called out for not doing enough or not meeting set goals. On the other hand, some interviewees expressed that even though you do not have a way to measure a target, it is still important to start reporting on how you are working with biodiversity even if it is not perfect. They stated that, in turn, this could open the dialog of where potential common challenges lie.

"I think that it is good if the companies that actually do the work also talk about it and report quite openly and that they dare to report, that they dare to report even what is challenging and difficult and so on, so that there is an open dialog about where the challenges lie. I hope we can do that together." – Finance 1

“For us it's also important that we describe our impact objectively. We don't want to make it seem better than it is. Not everything we include in the sustainability report is perfect, but we also feel that we need to start actually presenting and reporting on our work a little more systematically as well.” – Energy 2

4.4.2.2 Prioritisation

Almost half of the interviewees (8 out of 17) across different sectors, mentioned prioritisation as a barrier for working with biodiversity. Shipping 2 and Consumer Staples 1 expressed that it is not possible to focus on everything at once and right now climate takes is their main focus. Others also expressed that the focus on climate is currently taking up much of the resources. Energy 3 and Consumer Staples 2 also explained that it can be difficult to incorporate biodiversity when deadlines and sales goals are being prioritised. Lack of resources in terms of time and personnel was also mentioned to be a barrier as focus is prioritised more on different regulations but also climate.

“Often, unfortunately, we don't really consider the effect when we think about what is important (to focus on), but what is actually most relevant right now and generally speaking climate is more important than biodiversity and its protection.” – Shipping 2

“I think it (biodiversity) is equally important as the climate. We just had the need to prioritise due to resources and but also due to some external stakeholders here.” – Consumer Staple 1

“If I was 3 people, we would run after every ball (biodiversity initiatives and frameworks). But I'm only one person, so we have to prioritise. Complying with the law comes first and then meeting investors' demands is second, you could say. Being at the forefront and influencing science and frameworks, that comes lower down even though it is important for our preparation”. – Energy 2

“And now it's all about climate change. Biodiversity is on the back burner for now.” – Shipping 1

4.4.2.3 Economy

Economic limitations were mentioned as a perceived barrier by some interviewees (7 out of 17). Although wanting to have biodiversity projects, interviewees pointed out that such projects still need to be financed and that recourses can be limited. Construction & Materials 1 and 2 talked about how their efforts to increase biodiversity sometimes results in protected species entering their sites. Both discussed that the increase in biodiversity is due to their efforts and how that could make it a difficult situation since they in the end are a business who needs to be able to operate. Construction 1 explained that it comes down to economy in terms of what material they choose. Although knowing that wood from continuous-cover forestry is better in terms of biodiversity than that from a clear-cutting forestry, each project budget needs to be met.

“But for us it is the availability of materials that has decreased. As a result, the prices of materials have also increased, which makes projects expensive in general. In combination with higher interest rates and inflation, our projects are becoming much more expensive, which makes it difficult to start construction in general. In addition to external factors and the availability of materials, there is the economy. And each project has its own budget that needs to be met.” – Construction 1

4.4.2.4 Demand

Some interviewees (7 out of 17) expressed that there is not much demand currently on biodiversity and how that could be a barrier in terms of them working with biodiversity. Some expressed that they

also want to see an increase demand, and stricter and more specific demand. This was mentioned by both Shipping 1 and 2, but also by one interviewee from each of the other sectors apart from Mining.

4.4.2.5 Lack of knowledge

The lack of knowledge regarding biodiversity and how it relates to businesses, or that knowledge needs to increase, was pointed out by several interviewees (7 out of 17) across different sectors such as Energy, Shipping, Consumer Staples and Forestry & Material. The complexity of biodiversity was mentioned as well and that it can have a high learning curve. Lack of knowledge in specific areas within an organisation, such as purchasing teams and project managers, was said to be a barrier by Consumer Staples 2 and Finance 1. They identified those areas and people as being important since they have the potential to actually create a difference. An interviewee from Consumer Staples also mentioned that increasing knowledge can generate a positive impact of wanting to protect what you know.

“That is where I think it’s so important to focus on the awareness but also on the knowledge level. Because you like to protect what you know.” – Consumer Staples 1

4.4.2.6 Uncertainties of Approach

Some interviewees (7 out of 17) expressed uncertainties regarding the strategic work with biodiversity and being unsure of how to approach it. Unlike the barrier lack of standardised methods, uncertainties of approach related more to the constant and fast development within the topic of business and biodiversity, with many different initiatives, as well as uncertainties within the strategic work itself. Energy 3 expressed that they are lacking a clear picture on what biodiversity means for their organisation and how they should be working with it. Uncertainty on how to approach it was also mentioned by Consumer Staples 1, who pointed out that there are many different initiatives and that it is difficult knowing where one should sign up, where to find the most relevant information and how to know what to follow. The number of initiatives and the fast development of these, and the topic in general, was also expressed as a challenge by Energy 1 and Consumer Staple 4. They highlighted that it is difficult to follow everything in detail and knowing exactly what everything will entail. Uncertainties was also mentioned by some interviewees when talking about using external help, such as biologists, for doing field inventories in terms of what results they will gain depending on what expert they use.

“Then we will find what that specific biologist is good at. Because I know that, if we bring in someone who starts inventorying hazel mice, suddenly it's not red-listed anymore because he was so good at it. Therefore, you have to be careful when doing inventory, because the person you commission will look at what they are good at. They will look at everything else as well, but the focus will be on a salamander or owl or whatever they are good at.” – Energy 3

4.4.2.7 Regulation & Reporting

The increased demand on reporting from regulations and the level of detail in indicators and frameworks were discussed as a potential barrier from a handful of interviewees (5 out of 17). With many new regulations and frameworks on how to report on biodiversity and how to find possible indicators to follow up on targets, interviewees highlighted that there is a risk that resources will be focused more on reporting than actually working with and implementing biodiversity measures.

“Eventually we will be stuck with a reporting structure that is not meant for anything else other than to report. There is a risk that there will be so many different reporting frameworks, sometimes connected and sometimes not connected, that we will spend more time doing the actual reporting than actually working with the issues.” – Consumer Staples 1

“Because what we notice now is that there are a lot of legal requirements on the way which are very difficult to interpret and apply in the business community. It is very resource intensive. It is a fact that resources are spent on reporting and not implementing measures that make it better. But maybe it's a short-term thing, but we'll see.” – Energy 2

“There is always a discussion about how detailed they should be. On the one hand, you want them to be so detailed that they provide something, but on the other hand, if it's too complicated, it doesn't happen.” – Construction & Material 1

“And what is happening now with legislation, as I see it from my perspective, is that we need to structure how we do things and need to get a consensus on how we should work going forward. Preferably without killing this local commitment, because that's the important part lies, I think. That's where you can make a difference.” – Construction & Material 2

4.4.3 Comparative summary RQ4

The lack of generally accepted and standardised methods and tools to work with biodiversity, to assess impact, and to measure the effect of targets and efforts, was a prevailing perceived barrier identified across both the literature and interview study. It was identified as a common challenge by Swedish businesses in the reports by Johansson et al. (2022), WWF and Bain & Company (2023) and Romero & Streman (2021) and expressed by each of the 17 participating businesses in this interview study where the lack of available data was also mentioned. Both Johansson et al. (2022) and this interview study found that methods and tools were also requested to be able to prioritise amongst biodiversity efforts and to find where it is possible to make the most difference. Additionally, both identified that being able to measure will enable showing the effect of efforts and how that is important towards financial stakeholders. This interview study also identified that businesses experience challenges regarding assesses impact and measure effect on biodiversity in terms of time and geographical aspects. The difficulty to monitor biodiversity over time was also mentioned by Romero & Streman (2021). The concept of green hushing was identified in this interview study connected to lack of methods. It was said that it could be possible that businesses withhold information as they are unsure if their efforts are considered wrong or too small since they struggle to measure or show effects. Although there is a high demand for methods and tools, WWF and Bain & Company (2023), as well as businesses from both the report by Johansson et al. (2022) and this interview study, express the need for action and to start reporting on what is being done despite not having an agreed or “perfect” method or tool.

Prioritisation was a commonly expressed barrier in this interview study and was also identified by Johansson et al. (2022), Romero & Streman (2021) and WWF and Bain & Company (2023). This regarded time allocation with the need to follow deadlines and sales goals, as well as lack of personnel, which connects to the time aspect but also that other areas such as climate change or following regulations and reporting standards gets prioritised. Some businesses in this interview study specifically expressed that the increase of regulation and reporting directives could be a potential barrier. It was said to be a potential risk that resources might be re-allocated to focus solely on reporting instead of actually working with and implementing biodiversity efforts.

The reports by Johansson et al. (2022), Romero & Streman (2021) and WWF and Bain & Company (2023) as well as this interview study identified the lack of knowledge among businesses as a barrier for working with biodiversity. The complexity of biodiversity was raised in relation to knowledge and that it is difficult to understand and to know what biodiversity measures are needed, as well as when and where. This interview study further identified uncertainty on how to approach biodiversity as a barrier. It specifically regarded the fast development of the topic and the many different initiatives

available where businesses stated that it was difficult to following everything in detail or knowing what to sign up to. The uncertainties regarding approach also included what external help to use and how the results can vary depending on what expertise is used. Johansson et al. (2022) identified a similar barrier where businesses experience uncertainty regarding evaluating what biodiversity measures are considered sufficient enough.

Economy was presented as a barrier in Johansson et al. (2022) and Romero & Streman (2021), as well as in this interview study. Businesses expressed that in the end they are a business with budgets and that there must be a willingness to pay for the biodiversity efforts. Connected to the economic barrier, this interview study and Johansson et al. (2022) also identified that some businesses experience a lack of demand on biodiversity, which acts as a barrier for working with biodiversity.

5 Discussion

This chapter will discuss the limitations to the findings in this thesis, the interpretation and implications of the findings connected to each research question and lastly future recommendations.

5.1 Method

There are limitations to the chosen method of the thesis project. Although the validation was increased by using the combination of a literature study and an interview study, they both have limitations that could have influenced the results. In terms of the literature study, there was a limited amount of previous research found regarding how businesses across different sectors understand and strategically work with biodiversity. This could be due to the topic of business and biodiversity being at an early stage. Another potential explanation could be that the literature study focused on the research that aggregated businesses across different sectors in their research. This focus was chosen for the scope of the literature study and the interview study to be as close as possible, providing a general depiction instead of analysing literature and research on each specific sector individually.

For the interview study, there are possible limitations to the findings due to the number of participating businesses, which was a total of 17. As the study aimed for the mapping to be as generalised as possible with a wide representation of sectors, 17 businesses are a rather narrow representation. Although it was possible to cover nine different sectors, there are still many industries that are not represented that could have affected the results such as Agriculture and Fishery. Furthermore, the number of businesses representing each sector varied between one to four, which potentially affected the results. Having more than one business from the finance sector could have been a valuable addition considering the findings presented regarding their potential knowledge and increased demand on businesses. With the limited representation of sectors and number of businesses within them, the findings should not be generalised for a specific sector.

Regarding the process of finding relevant businesses for the interview study, the criteria of having proclaimed to already be working with or have an ambition and willingness to work with biodiversity were chosen. These criteria also led to having larger businesses being more represented, as they fall under more reporting requirements on sustainability than small and medium sized businesses. This choice could have influenced the results by not having a wider representation of different sized businesses. Additionally, there is also a risk for potential bias among the participating businesses as they might have had more knowledge on the subject and being more at the forefront, as larger businesses are more affected by regulations. This choice of the participating businesses was based on the expectation that these businesses would be able to provide more answers connected to the research questions as the topic of business and biodiversity is at an early stage. With this, it should be noted that despite the potential risk of bias among the participating businesses, the study still found that there is a lack of understanding of the relationship between business and biodiversity and how to strategically work with it.

Potential limitations to the findings could occur due to the structure and approach of the interviews. The structure of the interviews was based on the interview manuscript where explanations or examples to the questions were only provided when necessary and asked for. This was done to minimise the risk of transferred bias and to get an authentic and accurate mapping of businesses understanding and approach to biodiversity. Furthermore, to create a safe environment and to get truthful answers, it was made clear to the interviewees that the study did not set out to evaluate the sufficiency and effectiveness of each individual business's work. Although the results could have been different and other viewpoints could have emerged if certain examples or options were given, the chosen structure did allow for an honest depiction for the mapping where potential gaps could become visible.

5.2 Definition of biodiversity and how it relates to businesses

The findings showed that most businesses from the interview study had a definition of biodiversity. However, some businesses expressed that they lack a clear definition, which was also found in Johansson et al. (2022). This shows that the understanding amongst businesses varies, which could also explain why many businesses directly started talking about dependency and impact when asked about a definition. An interesting finding from the interview study was that most businesses stated to be dependent on biodiversity, which differs from what previous research have found (WWF and Bain & Company, 2023; Watson & Newton, 2018). The findings from the interviews also showed that all businesses perceived to have impact on biodiversity, which significantly differed from Romero & Streman (2021), who had a similar size and representation of participating businesses as this study. These discrepancies could be explained by the choice of participating businesses in this interview study, who had stated to have an ambition to or already work with biodiversity, and potentially indicate an increased awareness among businesses and their relationship to biodiversity, despite not always being able to provide a definition. However, it should be noted that many of the interviewees expressed dependency in a more general way connecting it to humanity and life on earth but did not give clear examples as to their specific dependencies. Also, in terms of impact, businesses did not always state exactly in what way their operation had impact on biodiversity. Therefore, it is difficult to assess the level of their understanding of dependencies and impacts, which previous research has found is lacking (WEF, 2020; WWF and Bain & Company, 2023).

In terms of perceived impact on biodiversity connected to the five main direct drivers of biodiversity loss identified by IPBES (2019), businesses in the interview study focus mostly on impact through land use change. On the other hand, Romero & Streman (2021) found that most businesses perceived impact through climate change. Interestingly, this impact was not mentioned by businesses in this interview study as a direct impact, although some expressed that it is important to work with the two topics together. Impact through direct exploitation was also a relatively high perceived impact among businesses in the report by Romero & Streman (2021) but interestingly, it was not mentioned at all in this interview study. The findings and the discrepancies between the two studies is likely due to a lack of wider representation of sectors connected to different impacts and differences among the participating businesses for each study. However, it also potentially highlights a lack of knowledge among the businesses from this interview study. Another possible explanation could be that Romero & Streman (2021) used a survey that provided each impact category as an option to choose from whereas this interview study applied open questions.

An unexpected finding from the interview study regarding perceived impacts was that businesses considered pollution and invasive species to be less relevant, as they follow regulations controlling accepted levels. This was unexpected as these two impact categories are identified as part of the top five main global contributors to biodiversity loss. Interestingly, it was also pointed out in the findings, although only by one business, that the controls are seen as insufficient. These findings could therefore raise questions regarding the effectiveness of the monitoring regulations and potentially indicate a need for more thorough inspections.

Although the findings from the interviews showed that almost all businesses expressed that they depend on biodiversity, the majority had not started to evaluate business risks connected to it. Similarly, previous research state that biodiversity is not effectively incorporated into financial decisions, which is essential for sustainable economic growth (Dasgupta, 2021; Nedopil, 2022). This indicates a need for increased knowledge regarding what the dependency on biodiversity actually implies for businesses and how it could translate into business risks at the current rate of biodiversity loss.

An unexpected finding that emerged from the interview study was that several businesses expressed to be dependent on biodiversity in terms of obtaining, or keeping, a permit for land development connected to the levels of biodiversity in that specific area. An interesting shift occurred where, instead of focusing on how the loss of biodiversity could affect businesses, the focus was turned to how high or increased levels of biodiversity was seen as a potential risk. This highlights a potentially sensitive and difficult issue in terms of whether or not the levels of biodiversity should be seen as more important than the business operation. One aspect of this potential dilemma that businesses discussed was that during new development in an area with high biodiversity levels, offsetting could be an option for permit acquisition. This left questions regarding how the biodiversity levels would be evaluated in terms of how, or even if, they could be correctly compensated for unanswered. Another aspect of the potential issue was discussed by business who implement biodiversity measures within or around their existing operational site, for which they had a permit. This posed a sensitive question whether there could be a risk of losing the permit if the implemented biodiversity measures lead to an increase of biodiversity within that specific area. However, businesses pointed out a potential counter argument that without their efforts, the increased level of biodiversity would not have existed in that area to begin with.

5.3 Businesses strategic work with biodiversity

The findings from the literature study showed that several frameworks and tools exist that could be used by businesses to strategically work with biodiversity. Despite these findings, the interview study showed that many businesses do not extensively use recognised frameworks, as seen in Table 3, but instead focus more on methods and indicators developed by themselves. However, some frameworks were mentioned and the reporting standard GRI and the Mitigation Hierarchy stood out as more recognised and used ways to work with biodiversity amongst businesses. GRI was specifically mentioned by several businesses to be of great guidance when starting out in sustainability reporting. With the standard being currently updated to further align with upcoming regulations connected to biodiversity and agreed best practices, it shows great potential for it to guide businesses even further in their work with biodiversity. In terms of the Mitigation Hierarchy, it was often mentioned and followed by businesses from sectors connected to land use or land-use change such as forestry and extractive industries. The framework was used both intentionally and unintentionally, as it was explained to follow similar steps in businesses operational phases, and also that it connects to the Swedish Environmental Code. This indicates the potential the Mitigation Hierarchy has to become a standardised method as businesses are likely to be familiar with the steps. With this, the identified initiative CLImB should be mentioned as it aims to develop a model that enables measuring connected to the Mitigation Hierarchy, which was otherwise stated to be difficult. This could further motivate the use and potential of the framework, as the CLImB model was also of great interest amongst businesses, who hoped that it would assist their work.

Two frameworks that were found to be of significant interest and potential were the Taskforce on Nature-related Financial Disclosure and Science Based Targets for Nature. Several businesses from the interview study expressed their interest in the frameworks and follows their development as they are yet to be fully ready and accessible. Furthermore, reports by Johansson et al. (2022) and WWF and Bain & Company (2023) pointed out the potential ability of the two frameworks to standardise the way businesses work with biodiversity. As described in Table 2, there is not only alignment between the two frameworks, but there is also further alignment with the reporting standards GRI and ESRS. This interconnectedness and alignments further strengthen the potential of the frameworks to become a standardised way of assessing risk, dependencies and impact connected biodiversity and guide target setting. In turn, this indicates how these frameworks could play an important part in achieving the targets set in the Kunming-Montreal Global Biodiversity Framework, specifically Target 15.

Although many different frameworks and tools could be identified, a very limited amount of previous research was found regarding what businesses actually use in terms of more acknowledged methods. Instead, it was highlighted across literature that there is a lack of standardised methods (IPBES, 2019; WWF and Bain & Company, 2023). The interview study identified a limited use of frameworks and tools amongst businesses today, which could explain why there were also limited findings on the matter in preceding research. Interestingly, it was instead found in both this interview study and previous research (Johansson et al., 2022; Romero & Streman, 2021) that many businesses have their own strategies and set their own targets. These were often related to the implementation of different biodiversity measures and the use of certification, but also included setting nature-positive targets with net gain or positive impact on biodiversity. However, the findings also showed that there is a lack of indicators used among businesses to assess impact or follow up potential effect on biodiversity specifically. Again, this likely relates back to the identified minimal use of frameworks and tools among businesses as well as the lack of standardised methods. Despite the difficulty to assess impact and measure effect, the interview study as well as Johansson et al. (2022) found that businesses used more general indicators related to numbers of biodiversity measures implemented or percentage certified material or products. Furthermore, businesses also expressed that, even though they did not know how or if nature-positive targets could be measured, it was still a very important ambition to have and strive towards.

In both the interviews and in literature such as WWF and Bain & Company (2023) it was found that trade associations were a significant part of businesses strategic work. An interesting finding was how businesses highlighted that it could be possible to not only share information but also to co-develop sector specific practices regarding biodiversity. This suggests the great potential trade associations can have, not only to increase knowledge on biodiversity but also to find generally accepted methods within a sector that could increase comparability. However, businesses operating globally pointed out that standards coming from national trade associations could have a too much of a local focus and that it would not be possible to aggregate several standards, with various methods, from different countries.

5.4 Incentives to work with biodiversity

The incentives for working with biodiversity were found to often stem from different stakeholder groups, seen both in literature such as Romero & Streman (2021) and the interview study. Customers was the stakeholder group most often referred to as creating incentives for the interviewed businesses. Especially businesses from the Consumer Staples sector stated that there is already an expectation from their customers that businesses take biodiversity into consideration. An increased number of questions on how businesses work with biodiversity was also experienced from business customers, which was said to create incentives for other sectors as well. With the different types of risks presented in chapter 2.5 *Business and Biodiversity*, these findings show that reputational risk is clearly significant as it creates strong incentives.

The findings from the interview study showed that many businesses expressed that their incentive for working with biodiversity was coming from their own management. This could also relate back to reputational risk and the importance for businesses to address it for their own brand. Furthermore, businesses expressing that their incentive comes from within the organisation, wanting to start the work and to do better, could provide an explanation to why businesses use and set own methods and targets, as discussed in 5.3 *Businesses strategic work with biodiversity*. An interesting finding was also that businesses who were governmentally or municipally owned highlighted how such ownership came with the responsibility of being a leader and at the forefront regarding sustainability issues, including biodiversity. This could often be seen in how they understood and worked with biodiversity, although they still experienced similar barriers and challenges as other businesses. The interest and engagement from management was specifically present for sectors who had recognised how

biodiversity is essential for the existence of their business such as consumers staples and forestry, but also finance in terms of their portfolio. These businesses stated that business risks connected to their dependency makes working with biodiversity inevitable. This shows how an increased knowledge on biodiversity and its connection to businesses is important as it can generate a stronger incentive to strategically work with it.

As stated, there is a need for transformative change to create a new trajectory for the conservation and restoration of biodiversity. Different reports such as WWF and Bain & Company (2023) and Smith et al (2020) present that regulation is a common incentive to create necessary change as it can push businesses to understand and work with biodiversity. Upcoming regulations was also a mentioned as a significant incentive for several businesses from the interviews. This thesis has identified several different regulations and the reporting directive CSRD was specifically pointed out by interviewed businesses in terms of how it will significantly change how they work with biodiversity. Notably, the directive, with the related reporting standards ESRS, has potential to become a standardised framework, as businesses not even affected by it still pointed out that they aim at adapting to it to remain competitive and enable comparability. Furthermore, the CSRD is likely to create great change as it also includes mandatory independent third-party assurance, which was also mentioned by interviewed businesses to be a game changer.

Van Oorschot et al. (2020) specifically highlighted the important role the financial sector can play in terms of incentivising change among the businesses in their portfolio. This could also be seen in this interview study as the participating business representing the finance sector presented that they have started to set demands on businesses in their portfolio. Additionally, they were also one of the very few businesses who had already started to work with identifying financial risks connected to dependency of biodiversity across their portfolio. In line with Van Oorschot et al. (2020), this could indicate that the financial sector will create an increased demand on businesses since they, as investors or shareholders, already recognise their indirect dependency. Interestingly, incentive from the financial sector was not commonly mentioned by other businesses in the interview study and it was found that only a few businesses currently experience questions from shareholders, banks, and investors. This can likely be explained by the topic of financial risks connected to business and biodiversity being at an early stage, with many businesses expressing that they are in fact seeing a growing interest and expect an increased demand.

An unexpected finding from the interviews was that a handful of businesses expressed that an incentive for them to work with biodiversity was that it could generate good relationships with authorities, and how that in turn could be beneficial in permit processes for land development. This was unexpected, as it was often mentioned by the same businesses who also stated that high nature values were a potential businesses risk connected to keeping or obtaining permits, as discussed in 5.2 *Definition of biodiversity and how it relates to businesses*. Interestingly, working with and enhancing biodiversity was stated to be a potential asset in permit processes and at the same time a potential business risk. The findings of these two opposing views co-existing was realised at a later stage and unfortunately not further discussed in the interviews.

5.5 Barriers hindering the work with biodiversity

Even though many frameworks and tools exist to strategically work with biodiversity, the lack of generally accepted and standardised methods was the dominating perceived challenge identified in this thesis. It was not only found in the literature (Johansson et al., 2022; WWF and Bain & Company, 2023; Romero & Streman, 2021) but also expressed by every participating business from the interview study. Amongst the interviewees, some stated that they wanted a tool and be able to measure effects in order to set targets and enforce action. Interestingly, other interviewees pointed out how the lack of standardised tools should not hinder the strategic work with biodiversity and that there is a need to

start somewhere. Both Johansson et al. (2022) and WWF and Bain & Company (2023) also pointed out the need for action despite not having a perfect standardised framework yet. This could provide an explanation as to why several businesses set their own formulated targets and have more general ways to measure them, as previously discussed in *5.3 Businesses strategic work with biodiversity*. An important finding connected to this was the revelation of the concept Green Hushing. As businesses could be unsure whether certain biodiversity goals or efforts would be considered wrong or not enough, they refrain from disclosing the information. Furthermore, although not expressed in the term Green Hushing, the report by Johansson et al. (2022) also found that businesses, due to the lack of scientific evidence and knowledge, are unsure on what biodiversity actions would be considered sufficient. This concept was identified during in one of the last interviews and thus raised the questions of whether or not green hushing, intentionally or not, could have affected the findings from this interview study. If it has affected businesses in terms of not wanting to disclose certain information, then it could serve as another possible explanation for the lack of findings regarding what framework and tools businesses actually use, which targets they set, and how impact and efforts could be measured, as discussed in *5.3 Businesses strategic work with biodiversity*. However, some of the interviewed businesses did express the need to initiate the work and start reporting even if it is not perfect and highlighted the possibility of how that could open the dialog of where potential common challenges lie. This could be of great importance with the identified increased demand on businesses to understand and work with biodiversity, and different reporting requirements, as it could enable collective action to find solutions and better, and potentially standardised, methods.

The lack of knowledge and understanding among businesses regarding what biodiversity means for them, and their dependency and impact on it, was clearly depicted across literature and previous studies (Johansson et al., 2022; Romero & Streman, 2021; WEF, 2020; WWF and Bain & Company, 2023). Furthermore, the findings from the interview study showed that lack of knowledge was also recognised by some businesses themselves as a perceived barrier. With these businesses acknowledging the need for increased knowledge within their organisation, they provide one possible explanation to the lack of definition and difficulty to assess the level of understanding of biodiversity, as discussed in *5.2 Definition of biodiversity and how it relates to businesses*. However, it should be noted that this barrier was expressed by 7 out of the 17 interviewed businesses, which shows that more than half *did not* identify lack of knowledge as a barrier. This is an interesting finding as it potentially highlights a gap in businesses perception of their relationship to biodiversity when connecting it back to how businesses rarely gave clear answers or stated exactly how they depend or had impact on biodiversity, as discussed in *5.2 Definition of biodiversity and how it relates to businesses*.

That lack of standardised methods and lack of knowledge are perceived as barriers is likely a reason for why businesses from the interview study also perceived uncertainties of approach as a barrier. Businesses stating uncertainties regarding how they should work with biodiversity and what it means for them, clearly relates to the lack of knowledge previously discussed. Additionally, businesses also expressed uncertainty regarding how to approach the strategic work with biodiversity and what initiatives and methods to follow. Similarly, in the report by WWF and Bain & Company (2023), businesses experienced a lack of guiding regulations and reporting requirements. With the many frameworks and tools identified in this study, it is not unlikely that the uncertainties of approach stem from the combination of too many options together with the lack of standardised methods, in addition to a lack of knowledge. Furthermore, these three identified barriers can together explain the findings of the limited use of the identified frameworks and tools amongst businesses, as discussed in *5.3 Businesses strategic work with biodiversity*.

As presented in this thesis, there are several new regulations and directives that put emphasis on business and biodiversity. Furthermore, as discussed in *5.4 Businesses perceived incentives for working with biodiversity*, businesses mentioned this as an incentive to work with biodiversity, but they also

expressed that they see a demand from customers, their own organisation and the financial sector. However, an interesting finding was that several businesses from the interview study, and briefly mentioned in Johansson et al. (2022), expressed a lack of demand or the need for an increased demand as a perceived barrier for them to work with biodiversity. This finding could explain the lack of knowledge and uncertainty of approach expressed by some businesses as they might not have needed to or had a reason for strategically working with biodiversity yet. Additionally, this perceived barrier could indicate the adolescent stage of business and biodiversity where the mentioned frameworks and regulations have yet to be fully integrated into common practices.

Identified in both the interview study and literature such as Johansson et al. (2022) and Romero & Streman (2021), businesses perceived economy as a barrier for working with biodiversity. An important finding from the interviews, in terms of economy, connected back to the topic of retaining a permit after biodiversity efforts potentially increases biodiversity values in an area, as previously discussed in *5.2 Definition of biodiversity and how it relates to businesses*. Some businesses stated that, in the end, they are a business who needs to be able to operate, which connects to the potential dilemma of whether increased biodiversity values could restrict operations. This becomes important as it highlights the possibility of businesses not investing in implementing such positive biodiversity measures if it could become a business risk. Furthermore, lack of demand could also serve as an explanation for the perceived economic barrier as it could further discourage businesses to invest in biodiversity projects.

Connected to the barriers lack of demand and economy, businesses also perceived a barrier to work with biodiversity due to prioritisation. This was expressed by almost half of the interviewed businesses and also found across literature (Johansson et al., 2022; Romero & Streman, 2021; WWF and Bain & Company, 2023). With businesses experiencing economic limitations and some also a lack of demand, it can explain why more pressing actions connected to regulations and disclosures on other sustainability issues like climate change were expressed to be prioritised. As presented in chapter 2 *State of the art*, biodiversity and climate change are closely interlinked and have a significant impact on each other. Therefore, it should be noted that prioritising climate change also has a positive impact through mitigating biodiversity loss. Although some businesses did state that they recognise the need to work with these two topics simultaneously, as discussed in *5.2 Definition of biodiversity and how it relates to businesses*, it is still interesting that no interviewed business directly expressed climate change as a contributor to biodiversity loss. This could again relate back to lack of knowledge and potentially highlight a gap where businesses tend to oversee the connection between the two topics and how they relate to one another.

An important finding from the interview study was how some businesses expressed that the increase of different regulations and reporting demands could become a potential barrier. A handful of businesses highlighted the possible risk of getting stuck in reporting structures where resources might have to be allocated away from tangible biodiversity efforts and implementing biodiversity related projects and measures. This indicates that, despite the fact that many recently adopted and upcoming regulations aim to enhance biodiversity, businesses might need to be further ensured that continued investment to implement actual biodiversity measures are profitable and valued.

The many recently adopted and upcoming regulations and directives, together with the identified increase in questions from different stakeholder groups, create incentives and demand for businesses to further understand and prioritise biodiversity. With businesses obligated to start disclosing information and report on their strategic work, the increased demand will also require more resources to be directed towards biodiversity. Although the increase in regulation and reporting requirement is a recognised incentive and could result in several barriers being diminished, it was also identified as a potential barrier since there is a risk of getting stuck in reporting structures where resources might have to be allocated away from tangible biodiversity efforts and implementing biodiversity measures.

A directive like the EU Taxonomy shows great potential to encourage businesses to still invest in activities and efforts with positive impact on biodiversity, as it can also be profitable for them. Additionally, the EU Taxonomy has further potential as it could, together with the increased demand from other reporting regulations, obliterate Green Hushing as transparency would not only be necessary but also beneficial for businesses. However, as the Delegated Act for the remaining four non-climate environment objectives were recently released, after the interview study was conducted, the potential effect of the EU Taxonomy is not yet visible.

5.6 Future research

As discussed in *5.1 Method*, the interview study had certain limitations connected to the number of participating businesses and what sectors and how many businesses within these were represented. Therefore, for future research, it would be interesting to include a wider selection of businesses where more sectors could be represented. This could enable further generalisation where more potential similarities and differences within and between sectors could become visible. Furthermore, many of the participating businesses in this study were of larger size, thus generally being more affected by regulations and potentially being further ahead. It would therefore also be of interest for future research to map and analyse the understanding and potential work amongst SMEs, which could provide additional important insights and highlight potential knowledge gaps.

Many of the participating businesses came from sectors associated with land use and land-use change where permit processes are a central part of their business development and operation. From this, several interesting findings were identified and discussed connected to the dynamic between permit processes and biodiversity. Many businesses expressed that they have positive impact and increase biodiversity values with their biodiversity action and efforts. Furthermore, they stated that working with biodiversity can be beneficial as it can generate good relationships with authorities and how that, in turn, could be beneficial in permit applications. At the same time, these businesses also pointed out that high biodiversity values in an area could be a business risk and hinder permit acquisition or where increased biodiversity could lead to the risk of losing a permit. Additionally, even though biodiversity offsetting was mentioned as a potential solution to such risks, the findings showed that businesses were unsure how, or even if it was possible, to measure it and safeguard the value. These findings are important as they indicate a potential gap where biodiversity efforts can be used to businesses' advantage, but risk being discarded at later stages. To ensure that working with biodiversity is encouraged and valued, and not a possible business risk, future research is greatly needed to further study the potential dilemma between biodiversity and permits.

The thesis presented many different regulations and directives connected to biodiversity that will affect businesses and it also identified several frameworks and tools that can be used to guide the strategic work. However, as discussed, there is still a lack of standardised methods, which was also recognised by the interviewed businesses as the most common barrier. With the amount of recently adopted and upcoming demand on businesses to understand and work with biodiversity, there is a need for guidance on how to approach it. Hence, future research analysing the many different alignments, both potential and existing, between regulations, frameworks and tools would be of great value. This could sort through and highlight the most synergetic methods, which in turn could enable standardisation and assist businesses in their strategic work with biodiversity.

6 Conclusion

The aim of the thesis was to analyse the relationship between business and biodiversity by mapping how businesses understand and work with biodiversity within their organisations, and what incentives or barriers are recognised. The findings showed that businesses' understanding of biodiversity varies, and that they work with biodiversity in their own ways using official frameworks to a lesser extent. Furthermore, the findings identify several incentives that encourage businesses to work with biodiversity but also many different barriers that can hinder progress.

Conclusions:

- Businesses' understanding of biodiversity varies and there is a lack of knowledge. Although most businesses have a definition of biodiversity, it is not always clear how biodiversity relates to their businesses, as dependency and impact are defined to a lesser extent.
- Many official frameworks and tools exist that could be used to strategically work with biodiversity, but most businesses tend to use their own methods, focusing on implementing biodiversity related measures, using certifications and participating in trade associations.
 - The Mitigation Hierarchy and the reporting standard GRI are the most commonly used frameworks among the participating businesses to guide the work with biodiversity. There is also interest in the upcoming frameworks TNFD and SBTN, which show potential in becoming standardised methods with their alignment between each other and to both GRI and ESRS.
 - To set targets, businesses mainly use indicators that focus on activities connected to biodiversity, such as having certain numbers of biodiversity measures implemented or shares of certified products. However, businesses struggle to assess the actual impact on biodiversity and follow up on efforts, as well as for targets connected to no net loss or net gain.
 - Most businesses do not have any results yet connected to biodiversity, but the few that had used them to find hot spots and what to prioritise.
- Several incentives are recognised that motivate and encourage businesses to work with biodiversity. The most frequently mentioned incentives are customers and social acceptance, interest and internal drive from owners and management, and the demand from financial stakeholders and recent or upcoming regulation.
- Several barriers are recognised that can hinder businesses' work with biodiversity. The most frequently mentioned barriers are the lack of standardised methods to assess impact on biodiversity and follow up efforts, prioritisation, economy and the need for increased demand, lack of knowledge on what biodiversity means for businesses, and uncertainties of approach within the strategic work with biodiversity.

To achieve the goals and targets of the post-2020 Kunming-Montreal Global Biodiversity Framework, the enhancement of biodiversity is crucial. This study was conducted to bridge the gap between business and biodiversity as businesses play a vital role in changing the current trajectory of biodiversity loss. Based on this, the study intended to increase knowledge and hopefully inspire businesses who have not yet initiated their work with biodiversity to do so. This thesis shows businesses' willingness to work with biodiversity, but also the need for increased knowledge and additional guidance as there is still a lack of standardised methods. With the various regulations and directives presented in this thesis, it is clear that the demand on businesses to understand and work with biodiversity will significantly increase. The study has identified many different frameworks and tools that could be used by businesses to guide their strategic work with biodiversity and discussed how different incentives have the potential to counteract recognised barriers. With this I hope that my thesis provides valuable insights and can be of benefit to businesses whether they are more established in their work with biodiversity or at the beginning. Lastly, I hope this thesis inspires businesses to be part of the transformative change that is needed for the achievement of the Kunming-Montreal Global Biodiversity Framework and enhance life on earth.

References

- Azote & Stockholm Resilience Center. (2022). *The Planetary Boundaries Framework* [Photograph]. <https://www.stockholmresilience.org/research/planetary-boundaries.html>
- Berger, J., Choukroun, R., Costes, A., Mariette, J., Rouet-Pollakis, S., Vallier, A., Zhang, P. (2021). *Global Biodiversity Score: Establishing an ecosystem of stakeholders to measure the biodiversity performance of human activities*. (Mission Économie de la Biodiversité, Paris, France, 56p.). CDC Biodiversité. <https://www.cdc-biodiversite.fr/publications/global-biodiversity-score-update2021-cahier18/>
- Bioscope. (2022). *BIOSCOPE Methodology 2022*. <https://bioscope.info/>
- Boverket. (2021). *Naturvärdesinventering*. <https://www.boverket.se/sv/PBL-kunskapsbanken/teman/ekosystemtjanster/verktyg/kartlaggning/naturvardesinventering/>
- Boverket. (2022). *ESTER – verktyg för kartläggning av ekosystemtjänster*. <https://www.boverket.se/sv/PBL-kunskapsbanken/teman/ekosystemtjanster/verktyg/ester/>
- Capitals Coalition. (n.d.-a). *Natural Capital Protocol*. https://capitalscoalition.org/capitals-approach/natural-capital-protocol/?fwp_filter_tabs=guide_supplement
- Capitals Coalition. (n.d.-b). *Biodiversity Guidance*. https://capitalscoalition.org/guide_supplement/biodiversity-4/
- Capitals Coalition & TNFD. (2022). *Additional draft guidance for corporates on the ‘Evaluate’ Phase of the TNFD’s LEAP Approach for Dependency and Impact Analysis – TNFD framework beta v0.2 – June 2022*. <https://framework.tnfd.global/wp-content/uploads/2022/06/TNFD-Impact-and-Dependency-Analysis-June-2022-Beta-v0-2.pdf>
- CBD. (2006). *Article 2. Use of Terms*. <https://www.cbd.int/convention/articles/?a=cbd-02>
- CBD. (2016). *Biodiversity and the 2030 agenda for sustainable development - technical note*. <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>
- CBD. (2020). *Global Biodiversity Outlook 5. Secretariat of the Convention on Biological Diversity*. <https://doi.org/10.5281/zenodo.4031437>
- CBD. (2022). *Kunming-Montreal Global biodiversity framework. Draft decision submitted by the President*. <https://www.cbd.int/doc/c/e6d3/cd1d/daf663719a03902a9b116c34/cop-15-l-25-en.pdf>
- Church, R., Walsh, M., Engel, K., & Vaupel, M. (2022). *A Biodiversity Guide for Business*. WWF. <https://www.wwf.se/dokument/wwf-rapport-a-biodiversity-guide-for-business/>
- Díaz, S., Pascual, U., Stenseke, M., Martín-López, B., Watson, R. T., Molnár, Z., Hill, R., Chan, K. M., Baste, I. A., Brauman, K. A., Polasky, S., Church, A., Lonsdale, M., Larigauderie, A., Leadley, P. W., Van Oudenhoven, A. P., Van Der Plaats, F., Schröter, M., Lavorel, S., . . . Shirayama, Y. (2018). *Assessing nature’s contributions to people: Recognizing culture, and diverse sources of knowledge, can improve assessments*. *Science*, 359(6373), 270–272. <https://doi.org/DOI:10.1126/science.aap8826>

Ds 2000:61. *The Swedish Environmental Code.*

<https://www.government.se/contentassets/be5e4d4ebdb4499f8d6365720ae68724/the-swedish-environmental-code-ds-200061>

Ecogain. (n.d.). *Metod.* <https://climb.ecogain.se/method>

EFRAG. (2022a). *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>

EFRAG. (2022b). *DRAFT EUROPEAN SUSTAINABILITY REPORTING STANDARDS – Explanatory note of how draft ESRS take account of the initiatives and legislation listed in Article 1 (8) of the CSRS adding article 29 (b) -5 to the Accounting Directive.*

<https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2F03%2520Explanatory%2520note%2520Fist%2520set%2520of%2520ESRS%2520Article%252029%2520b%2520la%2520st.pdf>

EFRAG & Raad voor de Jaarverslaggeving. (2022). *RJ/EFRAG Outreach event Sustainability Reporting (ESRS ED).* [PowerPoint slides]. EFRAG.

<https://www.efrag.org/Assets/Download?assetUrl=%2Fsites%2Fwebpublishing%2FSiteAssets%2FThe%2520netherlands%2520outreach%2520esrs.pdf>

Envoria. (2022, April 1). *Sustainable Finance Disclosure Regulation: How the SFDR impacts your business.* <https://envoria.com/insights-news/sustainable-finance-disclosure-regulation-sfdr-how-it-impacts-your-business>

European Commission. (n.d.-a). *Corporate sustainability Reporting.*

https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

European Commission. (n.d.-b). *EU taxonomy for sustainable activities.*

https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

European Commission. (n.d.-c). *Sustainability-related disclosure in the financial services sector.*

https://finance.ec.europa.eu/sustainable-finance/disclosures/sustainability-related-disclosure-financial-services-sector_en

European Commission. (n.d.-d). *Nature restoration law.*

https://environment.ec.europa.eu/topics/nature-and-biodiversity/nature-restoration-law_en

European Commission. (n.d.-e). *Regulation on deforestation-free products.*

https://environment.ec.europa.eu/topics/forests/deforestation/regulation-deforestation-free-products_en

European Commission. (2019, December 11). *Communication from the commission, The European Green Deal.* (Report: COM/2019/640).

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0640>

European Commission. (2020, May 20). *EU Biodiversity Strategy for 2030*. (Report: COM/2020/380). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52020DC0380>

European Commission. (2021a, April 21). *Questions and Answers: Corporate Sustainability Reporting Directive proposal*. https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_1806

European Commission. (2021b, July 15). *EU Biodiversity Strategy*. https://knowledge4policy.ec.europa.eu/biodiversity/eu-biodiversity-strategy_en

European Commission. (2022a). *EU Biodiversity Strategy Actions Tracker*. <https://dopa.jrc.ec.europa.eu/kcbd/actions-tracker/#ENABLING%20TRANSFORMATIVE%20CHANGE>

European Commission. (2022b, February 23). *Just and sustainable economy: Commission lays down rules for companies to respect human rights and environment in global value chains*. [Press release]. https://ec.europa.eu/commission/presscorner/detail/en/IP_22_1145

European Commission. (2023, June 13). *Sustainable Finance: Commission takes further steps to boost investment for a sustainable future*. [Press release]. https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3192

European Council. (2022, June 30). *New rules on corporate sustainability reporting: provisional political agreement between the Council and the European Parliament*. [Press release]. <https://www.consilium.europa.eu/en/press/press-releases/2022/06/21/new-rules-on-sustainability-disclosure-provisional-agreement-between-council-and-european-parliament/>

European Parliament. (2022, November 10). European Council. (2022, June 30). *New rules on corporate sustainability reporting: provisional political agreement between the Council and the European Parliament*. [Press release]. <https://www.europarl.europa.eu/news/en/press-room/20221107IPR49611/sustainable-economy-parliament-adopts-new-reporting-rules-for-multinationals>

European Parliament. (2023a). *Corporate Sustainability Reporting Directive (CSRD)*. <https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-review-of-the-non-financial-reporting-directive>

European Parliament. (2023b, June 1). *MEPs push companies to mitigate their negative social and environmental impact*. [Press release]. <https://www.europarl.europa.eu/news/en/press-room/20230524IPR91907/meps-push-companies-to-mitigate-their-negative-social-and-environmental-impact>

European Union. (2019, November 27). *Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector (Text with EEA relevance)*. Official Journal of the European Communities, 317, 1-16. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R2088>

European Union. (2020, June 18). *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 (Text with EEA relevance)*. Official Journal of the European Communities, 198, 13-43. <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32020R0852>

EY. (2023, May 26). *Sustainable Finance Disclosure Regulation: getting ready for “level II” application*. https://www.ey.com/en_lu/sustainability-financial-services/sustainable-finance-disclosure-regulation-getting-ready-for--le

Finansinspektionen. (2022). *Hållbarhetsredovisning - Regler för redovisning och rapportering av hållbarhetsrelaterad information tas fram internationellt, inom EU och i svensk rätt*. <https://fi.se/sv/hallbarhet/regler/redovisning/>

Forest Trends. (n.d.). *The Mitigation Hierarchy*. <https://www.forest-trends.org/bbop/bbop-key-concepts/mitigation-hierarchy/>

GRI. (n.d.). *Topical Standard Project for Biodiversity*. <https://www.globalreporting.org/standards/standards-development/topic-standard-project-for-biodiversity/>

GRI. (2022, January 17). *Most companies align with SDGs – but more to do on assessing progress*. <https://www.globalreporting.org/news/news-center/most-companies-align-with-sdgs-but-more-to-do-on-assessing-progress/>

IBAT. (nd.) *Species Threat Abatement and Restoration Metric (STAR)*. <https://www.ibat-alliance.org/star>

IPBES. (n.d.-a). *Models of drivers of biodiversity and ecosystem change*. <https://www.ipbes.net/models-drivers-biodiversity-ecosystem-change>

IPBES. (n.d.-b). *Policy instrument – Eco-labelling: certification schemes*. <https://www.ipbes.net/policy-support/tools-instruments/eco-labelling-certification-schemes?page=3>

IPBES. (n.d.-c). *Policy support tool – Integrated Biodiversity Assessment Tool (IBAT)*. <https://www.ipbes.net/policy-support/tools-instruments/integrated-biodiversity-assessment-tool-ibat>

IPBES. (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services*. (IPBES). <https://doi.org/10.5281/zenodo.3553579>

Johansson, H., Mattsson, E., & Perjo, L. (2022). *Näringslivets arbete med biologisk mångfald: En kartläggning av företagens strategiska arbete och uppföljning*. IVL Swedish Environmental Research Institute. <https://www.diva-portal.org/smash/get/diva2:1665145/FULLTEXT01.pdf>

Keller, H. E., & Lee, S. (2003). *Ethical issues surrounding human participants research using the Internet*. *Ethics & behaviour*, 13(3), 211-219. https://doi.org/10.1207/S15327019EB1303_01

KPMG. (n.d.). *Reporting the SDGs: What good looks like*. <https://kpmg.com/xx/en/home/insights/2018/11/reporting-the-sdgs-what-good-looks-like.html>

KPMG. (2022, October). *Big shifts, small steps*. <https://assets.kpmg.com/content/dam/kpmg/se/pdf/komm/2022/Global-Survey-of-Sustainability-Reporting-2022.pdf>

Messerli, P., Murniningtyas, E., Eloundou-Enyegue, P., Folli, E. G., Furman, E., Glassman, A., ... & van Ypersele, J. P. (2019). *Global sustainable development report 2019: the future is now—science for*

- achieving sustainable development. United Nations.
https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf
- MEA. (2005). *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.
<https://www.millenniumassessment.org/documents/document.356.aspx.pdf>
- Muradian, R., & Gómez-Baggethun, E. (2021). *Beyond ecosystem services and nature's contributions: Is it time to leave utilitarian environmentalism behind?*. *Ecological economics*, 185, 107038.
<https://doi.org/10.1016/j.ecolecon.2021.107038>
- Naturvårdsverket. (n.d.). *Om miljöbalken*. <https://www.naturvardsverket.se/lagar-och-regler/om-miljobalken/>
- Naturvårdsverket. (2018). *Sweden's environmental objectives: an introduction*.
<http://naturvardsverket.diva-portal.org/smash/record.jsf?pid=diva2%3A1477059&dswid=-1857>
- Naturvårdsverket. (2023). *The Swedish Environmental Quality Objectives. Illustrator: Tobias Flygar*. [Photograph].
<https://www.sverigesmiljomal.se/kontakt-och-material/presentationsmaterial/>
- NCFA (n.d.). *About*. <https://encore.naturalcapital.finance/en/about>
- Nedopil, C. (2022). *Integrating biodiversity into financial decision-making: Challenges and four principles*. *Business Strategy and the Environment*.
https://onlinelibrary.wiley.com/doi/full/10.1002/bse.3208?casa_token=hDt5tcdJUqcAAAAA%3AbJIYzOoy_6AZZrBgkG393xjqWBUFe5RAepuXYgELAXPWNMg_70hJuQegZUbBcfUJAY7ALTka3jN9ll
- PwC. (n.d.). *New ESRs published*.
<https://www.pwc.nl/en/topics/sustainability/esg/corporate-sustainability-reporting-directive/new-esrs-published.html>
- PwC. (2022). *Finalisation of EU Corporate Sustainability Reporting Directive (CSRD)*.
https://viewpoint.pwc.com/dt/gx/en/pwc/in_briefs/in_briefs_INT/in_briefs_INT/finalisation-of-eu.html
- Romero, V., & Streman, J. (2021). *Business and Biodiversity: Dependencies, Responsibilities and Collaboration*. <https://hdl.handle.net/20.500.12380/302899>
- Science Based Targets Network. (2020). *Science-based targets for nature: initial guidance for business*.
<https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/09/SBTN-initial-guidance-for-business.pdf>
- Smith et al. (2020). *Biodiversity means business: Reframing global biodiversity goals for the private sector*. *Conservation Letters*, 13(1), e12690. <https://doi.org/10.1111/conl.12690>
- Stadler, K., Wood, R., Bulavskaya, T., Södersten, C.-J., Simas, M., Schmidt, S., Usubiaga, A., Acosta-Fernández, J., Kuenen, J., Bruckner, M., Giljum, S., Lutter, S., Merciai, S., Schmidt, J.H., Theurl, M.C., Plutzar, C., Kastner, T., Eisenmenger, N., Erb, K.-H., de Koning, A. and Tukker, A. (2018). *EXIOBASE 3: Developing a Time Series of Detailed Environmentally Extended Multi-Regional Input-Output Tables*. *Journal of Industrial Ecology*, 22: 502-515. <https://doi.org/10.1111/jiec.12715>

Stockholm Resilience Centre. (2022). *Freshwater boundary exceeds safe limits*. <https://www.stockholmresilience.org/research/research-news/2022-04-26-freshwater-boundary-exceeds-safe-limits.html>

Thews, B., Höjding, P., & Jansson, B. (2017). *Swedish Environmental Law: An introduction to the Swedish legal system for environmental protection*. Naturvårdsverket. <http://www.diva-portal.org/smash/get/diva2:1421472/FULLTEXT01.pdf>

UNDP. (n.d.). *Sustainable Development Goals*. <https://www.undp.org/sustainable-development-goals>

UNEP-WCMC, UNEP Finance Initiative & Global Canopy. (2021). *Aligning Financial Portfolios with Biodiversity Goals: Scoping report and full method for the ENCORE biodiversity module*. UNEP-WCMC, Cambridge, UK, 61 pp. https://resources.unep-wcmc.org/products/WCMC_RT291

Van Oorschot, M. M. P., Kok, M. T. J., & Van Tulder, R. (2020). *Business for biodiversity. Mobilising business towards net positive impact*. PBL Netherlands Environmental Assessment Agency, The Hague. https://www.pbl.nl/sites/default/files/downloads/pbl-2020-business-for-biodiversity-4143_0.pdf

Wang-Erlandsson, L., Tobian, A., van der Ent, R. J., Fetzer, I., te Wierik, S., Porkka, M., ... & Rockström, J. (2022). *A planetary boundary for green water*. *Nature Reviews Earth & Environment*, 3(6), 380-392. <https://doi.org/10.1038/s43017-022-00287-8>

Watson, S. C., & Newton, A. C. (2018). *Dependency of businesses on flows of ecosystem services: A case study from the county of Dorset, UK*. *Sustainability*, 10(5), 1368. <https://doi.org/10.3390/su10051368>

WEF. (2020). *Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy*. https://www3.weforum.org/docs/WEF_New_Nature_Economy_Report_2020.pdf

WWF. (n.d.). *BIODIVERSITY RISK FILTER*. <https://riskfilter.org/biodiversity/home>

WWF. (2022). *EU Commission's advisory group publishes the first set of sustainability reporting standards*. <https://www.wwf.eu/?8284941/EU-Commissions-advisory-group-publishes-the-first-set-of-sustainability-reporting-standards>

WWF and Bain & Company (2023). *Swedish businesses & the biodiversity crisis Opportunities & risks associated with biodiversity loss*. <https://www.wwf.se/dokument/rapport-swedish-businesses-and-the-biodiversity-crisis/>

WWF Biodiversity Risk Filter. (2023). *WWF Biodiversity Risk Filter Methodology Documentation, January 2023*. https://cdn.kettufy.io/prod-fra-1.kettufy.io/documents/riskfilter.org/BiodiversityRiskFilter_Methodology.pdf

Appendix A – Target 15, 19 & 21 of the Kunming-Montreal Global Biodiversity Framework

TARGET 15

Take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions:

- (a) Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains and portfolios;
- (b) Provide information needed to consumers to promote sustainable consumption patterns;
- (c) Report on compliance with access and benefit-sharing regulations and measures, as applicable;

in order to progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production.

TARGET 19

Substantially and progressively increase the level of financial resources from all sources, in an effective, timely and easily accessible manner, including domestic, international, public and private resources, in accordance with Article 20 of the Convention, to implement national biodiversity strategies and action plans, by 2030 mobilizing at least 200 billion United States dollars per year, including by:

- (a) Increasing total biodiversity related international financial resources from developed countries, including official development assistance, and from countries that voluntarily assume obligations of developed country Parties, to developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, to at least US\$ 20 billion per year by 2025, and to at least US\$ 30 billion per year by 2030;
- (b) Significantly increasing domestic resource mobilization, facilitated by the preparation and implementation of national biodiversity finance plans or similar instruments according to national needs, priorities and circumstances;
- (c) Leveraging private finance, promoting blended finance, implementing strategies for raising new and additional resources, and encouraging the private sector to invest in biodiversity, including through impact funds and other instruments;
- (d) Stimulating innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits, benefit-sharing mechanisms, with environmental and social safeguards;
- (e) Optimizing co-benefits and synergies of finance targeting the biodiversity and climate crises;
- (f) Enhancing the role of collective actions, including by indigenous peoples and local communities, Mother Earth centric actions and non-market-based approaches including community based natural

resource management and civil society cooperation and solidarity aimed at the conservation of biodiversity;

(g) Enhancing the effectiveness, efficiency and transparency of resource provision and use.

TARGET 21

Ensure that the best available data, information and knowledge, are accessible to decision makers, practitioners and the public to guide effective and equitable governance, integrated and participatory management of biodiversity, and to strengthen communication, awareness-raising, education, monitoring, research and knowledge management and, also in this context, traditional knowledge, innovations, practices and technologies of indigenous peoples and local communities should only be accessed with their free, prior and informed consent, in accordance with national legislation.

Appendix B – Interview Manuscript

The interview manuscript consists of 15 questions, which were aimed to provide data to each of the four research questions of the thesis. The categorisation of the interview questions in terms of what research question they relate to can be seen below. Apart from the questions with a clear connection to the research questions, additional interview questions were formulated to provide further primary data on how businesses understand and work with biodiversity.

Businesses understanding of biodiversity

- How would you define biodiversity and what it means for your company?
- Would you say that the company depends on biodiversity in any way?
- How would you describe the company's impact on biodiversity?
- Have you identified any risks related to biodiversity, dependencies and/or impacts?

Businesses strategic work with biodiversity

- Does the company have a declared strategy and/or action plan for their work with biodiversity?
- Has the company set any goals/targets for biodiversity, which ones?
- Does the company use any methods and/or frameworks to strategically work with biodiversity?
- Does the company follow any regulations or reporting standards connected to biodiversity?
- Is the company part of any networks where biodiversity is being discussed and knowledge sharing can happen? (Option to draw a network mind map)
- How are you working with indicators and metrics to assess impact, set targets and follow up efforts?
- How have the results been used by the company?

Incentives

- Are there any incentives within the company to work with biodiversity?
- Is there anything specific you would want to see in the future to encourage and guide the work with biodiversity?

Barriers

- In your work with biodiversity, are there any barriers you are facing to make progress in regard to:
 - Regulation and reporting standards?
 - Methods, frameworks and guidelines?
 - Indicators, metrics and KPI:s?
- Is there anything that could help and/or guide you to make progress?

DEPARTMENT OF TECHNOLOGY MANAGEMENT AND ECONOMICS
DIVISION OF ENVIRONMENTAL SYSTEMS ANALYSIS
CHALMERS UNIVERSITY OF TECHNOLOGY

Gothenburg, Sweden
www.chalmers.se



CHALMERS
UNIVERSITY OF TECHNOLOGY