



# **Biodiversity Management in Companies**

**Case study on biodiversity management practices in three large size companies**

Kaisa Kämäräinen

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Tiivistelmä – Referat – Abstract <p>The purpose of this study was to study the current biodiversity management practices in three large size companies and to study the biggest challenges the case companies are facing regarding biodiversity management. Biodiversity loss has been discussed for decades, but in only in recent years biodiversity has been more discussed also from more strategic point of view in the corporate world. The private sector has a considerable impact on biodiversity as well as a large part of the capacity to slow down and change the direction of biodiversity loss. Therefore, it is important that also the private sector considers and manages its impacts on biodiversity. The study was conducted as a qualitative case study including three case companies. The data was gathered through half-structured questionnaires through Microsoft Forms, a one-hour distance discussion with each of the companies, and from the latest annual reports in the fall of 2020.</p> <p>The results showed that biodiversity is considered to be an important topic among the case companies and that they are increasingly considering their impact on biodiversity as well. All case companies expect regulation on biodiversity to increase in the future and also the stakeholder demand around the topic has increased. However, only one of the companies has considered their impacts on biodiversity for years already; they have a management plan and they are following a specific reporting framework. Two of the companies have started to consider biodiversity separately or as a part of their other sustainability topics but they do not yet have biodiversity management plans in place nor do they follow any specific reporting framework. Regarding the biggest difficulties, the results show that especially finding suitable indicators and measuring the impacts on biodiversity are considered difficult. The results also show that understanding the concept of biodiversity and how biodiversity is related to the business is difficult. Companies also see that there is a lot of information regarding biodiversity available, but knowledge on how to use it for managing biodiversity is lacking.</p> <p>The results as well as the literature review indicate that impacts on biodiversity is increasingly managed but there are difficulties that need to be overcome. There are several biodiversity management frameworks that can be used for assessing the impacts and building suitable management plans. The better understanding companies have on their impacts biodiversity and vice versa, the better. It must be noted that the results indicate the views of large size (over 40 million € net revenue) companies in sectors that have rather direct impact on biodiversity. Therefore, the results may differ when studying companies of different sizes and from other sectors.</p>			
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Tiivistelmä – Referat – Abstract			
<p>Tämän tutkimuksen tarkoituksena oli tutkia biodiversiteettijohtamista sekä siihen liittyviä haasteita kolmessa suuressa yrityksessä. Biodiversiteetikadosta on keskusteltu jo vuosikymmeniä, mutta vasta viime vuosina biodiversiteetista on alettu keskustelemaan yrityksissä myös strategisesta näkökulmasta. Yksityisellä sektorilla on huomattava vaikutus biologiseen monimuotoisuuteen ja sillä on myös laajat resurssit hidastaa biodiversiteetikatoa. Tämän vuoksi on tärkeää, että yrityksissä huomioidaan ja hallitaan biodiversiteettiin liittyviä vaikutuksia. Tutkimus on laadullinen tutkimus, jossa oli mukana kolme yritystä. Tutkimuksessa käytetyt tiedot kerättiin Microsoft Formsin kautta puolistrukturoidulla kyselylomakkeella, tunnin kestäneillä verkkokeskusteluilla yritysten edustajien kanssa sekä yritysten uusimmista vuosiraporteista syksyllä 2020.</p> <p>Tulokset osoittivat, että biodiversiteettia pidetään tärkeänä aiheena yrityksissä ja ne ovat kasvavassa määrin ottamassa biodiversiteettivaikutuksensa huomioon. Kaikki tutkimuksessa mukana olevat yritykset odottavat biodiversiteettiin liittyvän regulaation lisääntyvän lähivuosina. Yritykset myös kokevat, että sidosryhmien vaatimukset aiheeseen liittyen ovat kasvaneet viime vuosina. Tutkimuksen mukaan ainoastaan yksi yritys on jo usean vuoden ajan ottanut huomioon vaikutuksensa biodiversiteettiin ja heillä on aiheeseen liittyen toimintasuunnitelma. Yritys noudattaa myös laajasti tunnettua raportointiviitekehystä. Kaksi muuta tutkimuksessa mukana ollutta yritystä on alkanut erikseen tai osana muita vastuullisuuden aihepiirejä hallitsemaan biodiversiteettivaikutuksiaan, mutta niillä ei vielä ole biodiversiteettiin liittyen toimintasuunnitelmaa eivätkä ne noudata mitään erityistä raportointiviitekehystä. Tutkimuksen mukaan yritysten suurimmat haasteet biodiversiteettijohtamiseen liittyen ovat etenkin sopivien indikaattoreiden löytäminen sekä biodiversiteettiin kohdistuvien vaikutusten mittaaminen. Tulokset osoittavat myös, että biodiversiteetin käsitteen ymmärtäminen sekä se, millä kaikilla tavoin biodiversiteetti ja sen kato liittyvät yrityksen toimintaan, on haastavaa. Yritysten mukaan niillä on runsaasti biodiversiteettiin liittyvää tietoa, mutta osaaminen sen hyödyntämiseen strategisesta näkökulmasta puuttuu.</p> <p>Tulokset ja kirjallisuuskatsaus osoittavat, että biodiversiteetin johtamiseen liittyviä aiheita hallitaan yhä enemmän, mutta on myös haasteita, jotka tulee selvittää. Tällä hetkellä on jo olemassa useita viitekehyksiä, joita yritykset voivat hyödyntää biodiversiteettivaikutusten mittaamisessa sekä johtamissuunnitelmien suunnittelussa. Mitä parempi ymmärrys yrityksillä on omista vaikutuksistaan biodiversiteettiin ja toisaalta biodiversiteetikadon vaikutuksista yritykseen, sitä parempi. Tulosten osalta on huomioitava, että tulokset osoittavat ainoastaan suurikokoisten (yli 40 miljoonan euron vuosiliikevaihto) yritysten näkemykset aloilla, joilla on melko suora vaikutus biodiversiteettiin. Näin ollen tutkimuksen tulokset voivat erota, jos tutkitaan pienempiä tai toisilla toimialoilla toimivia yrityksiä.</p>			
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# 1 Introduction

## 1.1 Background of the study

The concern about biodiversity and its loss has been discussed for decades. According to Convention on Biological Diversity (CBD) (2006), biological diversity (or biodiversity) means “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the logical complexes of which they are part; this includes diversity within species, between species and of ecosystems”. The planetary boundary of biodiversity loss has gone over the safe limit up to a zone where the future’s uncertainty is highly risked (Stockholm Resilience Centre, 2020). Human actions alter the environment and cause biodiversity loss both on land and in water. Approximately 1 million species are about to become extinct. Direct drivers of biodiversity loss include changes in land and sea use, direct exploitation of organisms, climate change, pollution and invasion of alien species. Reasons behind these direct impacts include, for example, production and consumption patterns, human population dynamics and trends, international trade, and technological innovations. (IPBES, 2019)

According to the European Commission, it is estimated that land-cover change has caused approximately 3,5 to 18,5 trillion € of loss to the world, and land degradation caused 5,5 to 10,5 trillion € of loss yearly in 1997-2011. The main losses are a result of reduced crop yields and fish catches, increased economic losses from natural disasters and the loss of potential resources for medicine. It is estimated that half of the global GDP, 40 trillion euros, depends on nature. (European Commission, 2020a) Nature provides society with resources and ecosystem services that can be irreplaceable or, if replaceable, extremely expensive. Human-made replacements also have other downsides as they often cannot provide all the same benefits that nature can. (IPBES, 2019)

Biodiversity has gained more and more attention also in the private sector in recent years. The private sector has a considerable impact on biodiversity as well as a large part of the capacity to slow down and change the direction of biodiversity loss. (Smith, et al. 2020) However, biodiversity loss has not yet achieved the same level of attention as climate change. In 2019, FIBS organization, the largest corporate responsibility (CR) network in the Nordic countries, conducted a corporate responsibility survey among Finnish companies. According to the study, only 8 % of the respondents considered

biodiversity to be a very important focal point in their CSR activities. The same number for climate change was 58 %. (FIBS Finland, 2019)

Risks caused by biodiversity loss have been acknowledged to be more likely and more impactful for businesses now than previously (Ecogain, 2020). Therefore companies need to understand how they are connected to biodiversity and how biodiversity loss might impact the company and its profitability, as businesses can be closely dependent on biodiversity. Managing biodiversity is not only a negative or restrictive issue to companies. By working sustainably on biodiversity, companies can find new business opportunities as well as mitigate risks. (de Souza Dias, 2014)

Companies are also under stakeholder pressure to manage their biodiversity impacts as customers are increasingly interested in the environmental and other impacts that companies and their products and services have. Advocacy groups are also speaking for the responsibility of corporates to do their share for biodiversity loss. (SBTN, 2019) Stricter requirements have been set by the finance sector on the topic and it is essential for companies that they can meet these requirements to secure loaning and other kind of financing.

## **1.2 The scope and goal of the study**

Current studies analyze different aspects of biodiversity management, such as commitment to biodiversity goals (Rainey et al. 2013) or level of biodiversity reporting among different groups (Boiral 2016, Maroun et al. 2018, Lambooy et al. 2018). This qualitative study is made for an international consulting company to support their biodiversity service design development. The study aims to increase understanding of the current biodiversity management practices in companies complementing the current knowledge gap on the topic. This study also examines the main challenges of managing biodiversity in the case companies.

The theoretical part of this study is based on the theory of externalities presenting the regulative instruments aimed at internalizing the biodiversity impacts of companies. In addition to the economic theory, literature review presents some biodiversity management frameworks as well as the most used reporting frameworks.



Data for this study is gathered with a half-structured questionnaire and discussions from three Finnish companies. The research questions studied in this research are:

- a) if and how companies manage biodiversity issues today*
- b) what the biggest challenges they are facing are.*

## **2 Economics of biodiversity**

The environmental and economic systems are closely linked. The natural environment provides the economy with resources, ecosystem services and amenity values. The economic system, however, has an impact on the environment, such as biodiversity loss or pollution. Economics can help solve the environmental issues the economic system has by, for example, internalizing the impacts of externalities into prices. (Hanley, Shogren & White, 2001, pp. 5, 17)

Moving towards a more sustainable pathway means reducing the negative environmental externalities of economic activities both on local and global scales (IPBES, 2019). This can be done by impacting the behavior of consumers and firms with incentives, and often the most important incentive is price (Hanley, Shogren, & White, 2001, p. 5). In recent years, the number of policy measures on biodiversity-related issues have increased rapidly. (OECD Environmental Directorate, 2018). The European Commission is also promoting the use of taxes and pricing to reflect real environmental costs (European Commission, 2020a). The more negative the impact one has on biodiversity is, the more costly it should be. This supports the idea that companies should consider biodiversity issues in their actions.

### **2.1 Theory of externalities**

Adam Smith suggests that when individuals or companies maximize their own interests, the invisible hand in the free markets results in maximizing the public interests and general good in the society (Bishop, 1995). However, his theory neglects the negative externalities (Bartling, Weber & Yao, 2015). In the 20<sup>th</sup> century, Milton Friedman said that “there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits”. Although his description of companies’ tasks neglects the externalities they produce, he acknowledged that the government is the actor who should make the rules by which companies act – and internalize the costs in prices. (Friedman, 1979)

Externality is a type of market failure for environmental problems. An externality occurs when an actor (firm or individual) does not bear all the costs or benefits of its actions, and there are social impacts on others (Hanley, Shogren, & White, 2001, p. 15), i.e. the private marginal cost is lower

than the social marginal cost (see the left side of Figure 1). Figure 1 presents both the cases of negative (left picture) and positive (right picture) externalities.

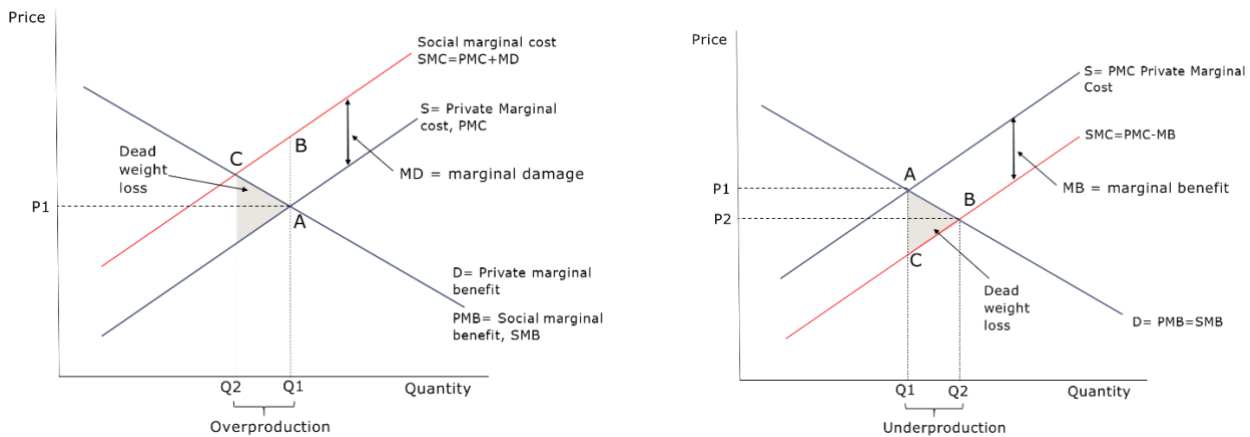


Figure 1 Cases of negative externality (left figure) and positive externality (right figure). Source: Gruber 2012.

Biodiversity can be considered a common pool resource that can be used by the actors in society. The problem is that most of the services are non-rival and non-exclusive. These characteristics often cause that the price of biodiversity is not reflected in market prices, leading to overexploitation of the resource. Overexploitation in the case of biodiversity means biodiversity loss, including for example, loss of species. Therefore, the lack of complete markets is the problem. (Hanley, Shogren, & White, 1997, p. 23) If the negative externality for society was internalized in the price, the one causing the biodiversity loss should pay the costs caused to the society (polluter pays -principle). Milton Friedman also acknowledged the problem and suggested taxing negative externalities. (Bishop, 1995) However, the costs of biodiversity loss are usually not covered by the one causing the loss. Solutions on how to build a market for biodiversity are presented next.

## 2.2 Policy instruments in guiding biodiversity issues

As there is often too little interest for public benefits such as environmental protection, policy instruments must be used. Policy instruments can be economic market-based instruments (MBI), such as taxes, subsidies or compensation system, or command-and-control (CAC) instruments. It is noted that as biodiversity is such a heterogenous good, policies need to be tailored to local needs. This means that MBI and CAC instruments are to be used complementarily. (Bräuer, et al., 2006) The next chapter presents instruments that are relevant for the business sector. It is good to note that there are

also other instruments, such as Metso Programme in which forest owners can participate (Ministry of Agriculture and Forestry in Finland, 2020). These are, however, not gone through in this study.

### 2.2.1 Economic instruments

In 1980, the environmental regulators and lobbyists recognized the power of the market system in environmental protection. The role of economic instruments is that they try to make environmentally unsustainable solutions more costly by internalizing the externalities in the price and that way impact the choices actors in society make, but with more flexibility and more cost-efficiently than the traditional regulatory approach. (Tietenberg, 1990)

The need for economic instruments has also been acknowledged in the Aichi targets (more information in chapter 3.5) where target 3 includes updating the economic instruments to support biodiversity. Aichi target 20 and SDG 15A consider the mobilization of financial resources to be important tools in guiding biodiversity loss. (OECD Environmental Directorate, 2018) Economic instruments that gather money for the government are also a way to finance biodiversity actions (Tietenberg, 1990). A study by the OECD Environmental Directorate shows that in recent years the number of economic instruments has increased and is increasing in the future (OECD Environmental Directorate, 2018).

In theory, there are three ways how markets can be created for the environment. The first option is to assign property rights for the environment and let sellers and buyers negotiate the price and quantity. The second and third options include the regulator. In the second case, the regulator would set a market price for the environment, for example, for different types of habitats. In this case, the amount of biodiversity loss would be freely set on the market. Biodiversity offsetting system, nature fees and taxes are included here. The third option is to set a quantity for the biodiversity loss that could be bought. The price of each unit of biodiversity loss would then be determined freely in the markets. (Hanley, Shogren & White, 2001, p. 24)

**Biodiversity offsetting.** Biodiversity offsetting, also called ecological compensation, is one alternative way to minimize the net negative, unavoidable loss due to a development process (ten Kate; Bishop; & Bayon, 2004). The idea of biodiversity offsetting is similar to the idea of carbon trading. It sets the maximum amount of biodiversity loss and lets the price be determined by the

balance of demand and supply in the market. (Broughton & Pirard, 2011) The market brings flexibility into the command-and-control regulation (Hanley et al. 2012). The original idea of biodiversity offsetting is based on its ability to correct market failures by putting a price on biodiversity losses, encourage developers to implement practices that minimize biodiversity losses and act as a new source of funding for biodiversity conservation (Broughton & Pirard, 2011). Biodiversity offsets are linked to the “polluter-pays”, or in this case, “polluter-restores” principle, which internalizes the externality caused by an actor. (Vaissière et al. 2020) A company (or other actor) can make biodiversity compensatory actions itself as well, but the idea of the biodiversity offsetting market is to bring together those who need compensations (demand side) and those who can offer them, such as landowners (supply side) (Boisvert, Méral & Froger, 2013).

Offsetting is the last alternative in the mitigation hierarchy (Figure 2) after avoidance, minimization and restoration (see for example Bull & Brownlie, 2015). Avoidance means avoiding impacts on biodiversity by, for example, screening potential risks before project design or selecting an alternative site. Minimizing includes, for example, the use of more environmentally friendly construction methods. Restoration can be, for example, reseeded affected land or implementing a breeding scheme for affected species. (Arlidge et al. 2018) According to BBOP (2012), “the goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people’s use and cultural values associated with biodiversity”.

However, ecological compensations are criticized for being an “easy” solution; there is a risk that the mitigation hierarchy will not be followed anymore. There is concern that if offsetting was introduced to the legal framework, it could encourage developers to forego the correct application of mitigation hierarchy (IEEP, The Institute for European Environmental Policy, 2014). There are several challenges related to mitigation hierarchy, especially related to the offsetting step. Arlidge et al. (2018) have identified the next issues that should be considered when considering offsetting: additionality of an offset action, compliance and monitoring issues, biodiversity indicators, equivalency between losses and gains, the order of actions based on cost efficiency, the longevity of an offset scheme, multipliers used in calculating biodiversity gains, reversibility of biodiversity, substitutability between biodiversity types, thresholds of no-go areas, and time lags between development and offset gains. For example, if damages and restoration efforts cannot be quantified,

it is difficult to compare them (Wissel & Wätzold, 2010). Destroyed habitats may differ in three ways from those created and where the compensation is done: type, space and time. Also, the ecosystem functions habitats produce may differ depending on the place. (Ruhl & Salzman, 2000) The case companies in this study also raised these questions when discussing biodiversity offsets as a possibility.

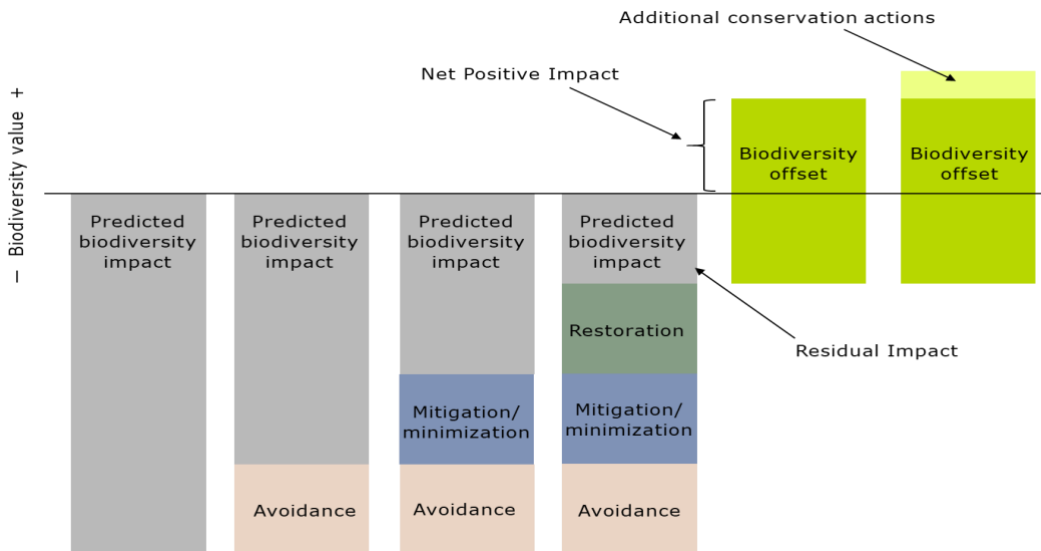


Figure 2 Biodiversity mitigation hierarchy.

Biodiversity offsetting markets have already emerged in several countries like United States, Australia, Brazil, Colombia, South Africa, Netherlands, Sweden and United Kingdom (Kiesecker & McKenney, 2010). Even though offsetting was not compulsory, like it is in some countries such as Germany (Tucker, 2016) and France (Bezombes, Kerbirou, & Spiegelberger, 2019), some companies do voluntary offsetting, which is also found in this study. In Finland, the biodiversity offset market is being studied and it seems that the offset market would be large enough to function (Kangas & Ollikainen, 2019).

**Payments for ecosystem services.** Payments for ecosystem services (PES) are connected to the “beneficiary-pays” or “provider gets” principle. The idea is that the consumer pays to the provider (e.g., a farmer) of ecosystem enhancing services. Biodiversity offsets and payments for ecosystem services may seem similar, but they have some differences. Where the idea of biodiversity offsets is to compensate for the biodiversity losses occurring due to economic development, payments for ecosystem services are designed to incentivize landowners to offer improved environmental outcomes. (Vaissière et al. 2020)

**Nature fees or nature taxes.** Another economic instrument is nature fees, also called nature taxes. The idea is to pay a fee to the government based on the area and nature type where the biodiversity loss occurs due to a project. This is similar to the idea of emission tax in climate politics. The price for loss is set, but the volume of biodiversity loss varies depending on the nature payment price compared to mitigation efforts. This instrument is currently being considered in Norway. (Lindhjem & Magnussen, 2015)

Biodiversity-relevant taxes also cover taxes levied on pesticides, fertilizers, forest products and timber harvests. They are based on the polluter-pay-principle. The number of countries having biodiversity related taxes have increased almost by five during the last 40 years. In 2018 there were 150 different biodiversity-relevant taxes in 49 countries. (OECD Environmental Directorate, 2018)

**Other economic instruments.** Fees and charges such as fees to enter national parks, biodiversity-relevant tradable permits such as fishery quotas and biodiversity-relevant subsidies such as subsidies for forest management or organic agriculture are also instruments that have an impact on biodiversity (OECD Environmental Directorate, 2018). More detailed information on environmental instruments in different countries can be found from the [OECD Pine database](#).

### 2.2.2 Command-and-control instruments

Command-and-control (CAC) instruments, also called regulatory instruments, are considered a traditional regulatory approach. They make particular forms of behavior or specific technological choices mandatory. CAC-instruments are often seen to be more costly compared to economic instruments. (Tietenberg, 1990)

On the EU level, the Birds Directive (1979 onwards) and the Habitats directive (1992 onwards) are directives that guide nature and biodiversity conservation. Several species are protected with these directives. The EU-wide Natura 2000 network was established to protect threatened species and habitats in the EU. It covers over 18 % of the EU's land area and over 8 % of the marine area. (European Commission, 2020b) The Natura 2000 network areas are the only areas where biodiversity offsets are mandatory in Finland (Pappila, 2017).

On a country level, environmental permitting is a tool to guide concrete projects that occur within countries borders. Permit must be applied for activities that cause or may cause environmental pollution. The permit defines, for example, the extent of the project and the maximum amount of pollution, and the ways to mitigate pollution in a project. (Ympäristö.fi, 2020)



### **3 Biodiversity management in business context**

The role of biodiversity, among other sustainability issues, has increased in recent years. Companies have started to pay attention to their connection to biodiversity issues from a more strategic perspective. Previously the work has mostly been based on local protection and local encouragement of nature, not strategic work (Overbeek, Harms & Van den Burg, 2013).

Policies presented in the previous chapter, are tools to make all companies consider their impacts on biodiversity. There are, however, also studies showing it is beneficial for companies to exceed the regulations. In 2014, Eccles et al. studied the performance of different companies based on their corporate sustainability. They found out that companies that have implemented voluntary sustainability policies, called “high sustainability companies”, outperform in the long run companies that have not implemented such policies, “low sustainability companies”. Better results are seen both in stock market and accounting performance. (Eccles, Ioannou & Serafeim, 2014)

This chapter discusses biodiversity management in companies, presents some selected tools that companies can use to assess their impacts on biodiversity and those difficulties to companies that are found in the literature. The last part presents some selected business-relevant biodiversity initiatives.

#### **3.1 Managing sustainability topics**

Managing a company does not only mean managing economic performance. Other impact categories must also be noted. In 1997, John Elkington presented the concept of the Triple Bottom Line (TBL) (Elkington, 1998). The TBL is a sustainability accounting framework that includes three dimensions of performance: economic, social and financial. It was intended to be a system change - to transform capitalism, not to be an accounting framework. The idea was to encourage businesses to track and manage their economic, social and environmental value-added. (Elkington, 2018) Economic responsibility is based on the idea that a company is responsible to employees to offer fairly paid and safe jobs, to stakeholders to offer a reasonable return on their investment and for customers to offer fairly priced products that satisfy their expectations. To fulfill these expectations, the company must stay in business. (Habisch, et al. 2005, p. 337) Environmental responsibility of a firm means that it minimizes its negative impacts on society. It includes, for example, conservation of water bodies, air and soil, decreasing greenhouse gas emissions, conservation of biodiversity, efficient and sustainable

use of environmental resources, minimizing waste and management of environmental risks. Social responsibility of a firm includes improving employee well-being, work safety and its development, and offering possibilities to develop knowledge at work. (Harmaala & Jallinoja, 2012)

The TBL concept is captured in the corporate world in the form of corporate responsibility (CR), a concept that includes all these three aspects. However, a specific definition is lacking for CR (or for any of the terms used alternatively used for it, such as CSR, sustainability, or corporate citizenship) (Soumodip & Searcy, 2016). The European Commission has defined CSR to be “the responsibility of enterprises for their impacts on society” (European Commission, 2021), indicating that CSR is not something that can be measured as it is more of a business model. Therefore, the discussion around corporate responsibility has recently shifted to ESG criteria. ESG criteria, meaning environmental, social and governance, are the most common responsibility criteria that are used to evaluate corporations and their responsibility actions (Pörssisäätiö, 2020). ESG criteria are considered more measurable, and companies can be compared based on their ESG scoring. The financial sector, is using the ESG criteria to evaluate their investees. Evaluating the ESG performance of a company is also seen as a way to understand corporate risks. (Stewart, 2015)

All sustainability topics do not need to be managed with the same effort. To understand which aspects are important, or material, a materiality analysis is made. The results are presented in a materiality matrix that presents topics as a function of significance of economic, environmental and social aspects, and influence on stakeholder assessments and decisions (GRI, 2015). An organization should include several stakeholders in making a materiality analysis to get a broad understanding of what is considered material from different perspectives. (Bellantuono, Pontrandolfo & Scozzi, 2016; GRI, 2015)



Figure 3 Materiality matrix according to GRI (GRI 2015). The most prioritized topics are located further from the origo.

When an aspect is seen as material to a company, it should be reported as well. Sustainability reports should emphasize the most material aspects of the company. (GRI, 2015) Issues that are not material to the audience for which the report is aimed, may be reported on the websites or on supplementary documents, where different stakeholders may find relevant information. A study in Northern America showed that among Canadian companies, a tendency to report only on the topics for which information is easily available has been seen. Also, 24 % of the WBCSD companies in the US and Canada showed disconnection between what is said to be material and what they are disclosing to authorities. (WBCSD, 2018)

### **3.2 Managing biodiversity**

According to the World Economic Forum (2020a), nature has at least three ways how it impacts businesses. Businesses might be directly dependent on nature in terms of operations, supply chain performance, or business continuity, for example; direct and indirect impacts can cause negative consequences such as legal actions or regulatory changes, or nature loss can cause disruption in the society and markets, causing physical and market risks. These are reasons why companies should pay more attention to their interaction with biodiversity. Overbeek et al. (2013) look at the link between companies and biodiversity. They distinguish three different relationships between companies and biodiversity. Some companies can strengthen biodiversity and are therefore interested in whether their actions will be rewarded either by customers or the government. Some companies are dependent on biodiversity and they should focus on finding a balance to produce products without exhausting the ecosystem. The third group of companies have impacts on biodiversity when processing resources. These companies should reduce their negative impact as much as possible and compensate for the residual negative impacts.

Companies need to integrate biodiversity issues more systematically into their management systems (Boiral & Heras-Saizarbitoria, 2017a). For example, the World Economic Forum (WEF) (2020b) highlights the importance of biodiversity in its recently published report “The Global Risks Report 2020” in which WEF published the results of the Global Risks Perception Survey. According to the results, both the likelihood and impact of biodiversity have been increasing in the risk landscape. For the first time, environmental questions were ranked highest in the long term (next ten years) both in terms of likelihood and impact. The concern for climate action failure was ranked in both cases higher

than biodiversity loss, but both were in the top 4 in both rankings. “The Global Shapers Community”, a group combined of younger respondents, showed even more concern for biodiversity loss, ranking biodiversity loss to be the no. 1 impact in the long term and no. 2 in terms of likelihood. The World Economic Forum (2020a) suggests incorporating nature-based risks into the risk-management process that exists in companies already.

Biodiversity is one extra aspect to consider when aiming towards more sustainable business. Some companies may find it to be just an extra burden, but it may have significant impacts on business and should therefore be considered. Several reasons can be found behind the increased interest in biodiversity management and commitment to scientific targets in companies. The list of reasons or benefits of biodiversity management seems long, but Boiral and Heras-Saizarbitoria (2017b) found that not all motivations for biodiversity management are equally important in different sectors. The rest of this chapter presents the benefits of biodiversity management to companies.

Stakeholders are a diverse group of actors who have interest in the subject (here: company) activity (here: business) (McGrath & Whitty, 2017) including, for example, customers, employees, suppliers, environmentalists and media (Freeman, 1984). Stakeholder and shareholder demand to consider biodiversity in more detail has been seen to increase both from the consumer and civil society side (see for example de Silva et al. 2019; Smith et al., 2020). Increased pressure towards making actions for biodiversity can be seen especially on companies exploiting natural resources such as those in mining, forestry and energy sectors (Boiral, Heras-Saizarbitoria & Brotherton, 2019). The results of this study also show that different stakeholders can be of importance in helping companies to achieve their biodiversity targets when engaged in the processes.

Banks and other actors in financial markets, on top of the private sector, are increasingly concerned about the financial losses that biodiversity and ecosystem service loss may cause. They are important actors for biodiversity as they impact large projects worldwide (Pappila, 2017), and they can impact globally through their value chains and all aspects of investments (Mace et al. 2018). Liability risks are related to physical or ecosystem impacts, transition to a sustainable or regenerative economy and misrepresentation of biodiversity risks or ecosystem impacts (Barker, Mulholland & Onifade, 2020). For example, the International Finance Corporation (IFC) has a performance standard for biodiversity conservation and sustainable management of living natural resources, which requires achieving a net

gain for critical habitats (IFC, 2012). Also some other investment and development banks, require following the No Net Loss (NNL) principle (ICMM & IUCN, 2012). To minimize the risks caused by biodiversity loss, investors have started to ask for climate and biodiversity risk information from companies (World Economic Forum (WEF), 2020a). In North America, it is even expected that investors will be drivers for disclosing non-financial information (WBCSD, 2018). On the EU level, the new EU Taxonomy is formed to act as a framework and support financing of sustainable future. Protection and restoration of biodiversity is one of the goals that shall be considered. (European Union, 2020)

Greening the business image by minimizing environmental impacts is a way to increase companies' acceptability. Reputational reasons are also important as demand for transparency of actions has increased especially from the stakeholders' side (Fernandez-Feijoo, Romero & Ruiz, 2014). Companies also more easily achieve license to operate when managing biodiversity impacts (IFC, 2021). Boiral et al. (2018) found that the increased license to operate due to biodiversity certification includes more specifically three components: social acceptability of corporate activities and prevention of possible conflicts with local communities, implementation of self-regulation, and marketing aspects.

Managing biodiversity can enhance a company's risk management. Nature risks are material for businesses in three different ways: businesses may be directly dependent on nature and its biodiversity, they may have direct and indirect impacts on nature which may also cause negative consequences, or somewhat indirectly as nature loss can cause disruption in the society and markets (World Economic Forum (WEF), 2020a). Not all impacts are direct or easily detectible, and therefore companies in different sectors should assess their dependency on biodiversity and its loss. All sectors are, however, affected by biodiversity loss; just the level of exposure varies (Addison, Bull, & Milner-Gulland, 2018). F&C (2004, p. 13) provides a classification to divide sectors based on their biodiversity risk (Table 1). The red zone sectors present mostly the primary production sectors. It is expected that the higher biodiversity risk is for a sector, the more companies in those sectors are managing biodiversity risks (F&C, 2004, p. 14). Another source for assessing sector dependencies on nature is the SASB (The Sustainability Accounting Standards Board) that offers a materiality map that identifies sectors that are likely to be affected by biodiversity loss (category: ecological impacts) (SASB, 2020). More on SASB in the reporting chapter (chapter 4).

Table 1 Level of biodiversity risk by sector. Source: F&C 2004.

Red Zone High-risk sectors	Amber zone Medium-risk sectors	Green zone Lower-risk sector
Construction & Building Materials	Beverages	Aerospace & Defence
Electricity	Chemicals	Automobiles & Parts
Food & Drug Retailers	Financial Services	Diversified Industrials
Food Producers & Processors	General Retailers	Electronic & Electrical Equipment
Forestry & Paper	Household Goods & Textiles	Engineering & Machinery
Leisure & Hotels	Personal Care & Household Products	Health
Mining	Support Services	Information Technology Hardware
Oil & Gas	Tobacco	Media & Entertainment
Utilities	Transport	Software & Computer services
		Steel & Other Metals
		Telecom services

Nature related risks can be categorized as physical risks, regulatory and legal risks, market risks and reputational risks. Physical risks more specifically include commodity risks (food crops: lack of pollinators), supply chain performance risks (forests: degradation), damage and business continuity risks (mangrove forests: flood protection), and business value risks (invasive species: lower property prices). (World Economic Forum (WEF), 2020a) Also the results of my study show that companies can identify risks that biodiversity loss may cause them.

### 3.3 Biodiversity management frameworks

Companies need tools for managing diverse topics. Some of the tools can be used more generally for identifying environmental impacts and building a general management framework. In the last couple of years, more specific tools for assessing biodiversity and understanding the links between companies and natural capital have been introduced. Some selected tools are presented in this chapter more thoroughly.

#### 3.3.1 Environmental Management Systems (EMS)

One of the most used tools for managing impacts on environment around the world are environmental management systems (EMS). ISO Standard 14001: Environmental management systems is the dominant standard in the field, according to which EMS' are registered. In Europe, firms can also register the environmental management systems according to the EMAS, the Eco-Management and Audit Scheme, which is a voluntary environmental management system for companies. It includes

the ISO 14001 standard as well as an environmental report, e.g., EMAS report. (Morrow & Rondinelli, 2002)

ISO 14001 is widely considered to be an effective tool in improving environmental practices and organizational effectiveness (Boiral et al. 2018). The ISO 14001 standard is based on the Plan, Do, Check, Act (PDCA) concept. It aims to continually improve the environmental management of a company. The first step of following the ISO 14001 is to have an environmental policy that includes organizations' intentions and direction related to environmental performance. The following steps are according to the PDCA: planning, implementation and operation, checking and corrective actions, and lastly, management review. The ISO 14001 mentions biodiversity as a topic that can be considered, but it does not state anything more specifically on the topic. (ISO, 2015) To include biodiversity more thoroughly in the ISO 14001, a committee was established in 2020 to develop a standard for biodiversity management in organizations (ISO, 2020).

To achieve sustainable results, implementing EMS is not enough. Concrete work after implementing an EMS is often focused on identifying the impacts of activities, rather than understanding the principles of these impacts (MacDonald, 2005). To have a deeper understanding of the impacts and how they could be minimized, other management and assessment tools designed especially for biodiversity are needed.

### **3.3.2 SBTN framework for nature**

In 2020, Science Based Targets Network (SBTN) presented their initial suggestion for a management framework with five stages: assessment, interpreting and prioritizing, measurement, setting and disclosing, acting and tracking (Figure 4). One must note that this framework supports companies on their actions towards increased sustainability in terms of biodiversity, but it is important to note that biodiversity issues are complex and intertwined. Due to this, following only this framework is not enough and businesses should support this movement also in their value chains and have system-level collaboration with other actors. (SBTN, 2020)



Figure 4 5-step process of SBTs for nature. Source: SBTN 2020.

### 3.3.3 Natural Capital Protocol

The Natural Capital Coalition has developed a Natural Capital Protocol, a decision-making framework for organizations. It helps organizations to “identify, measure and value their direct and indirect impacts and dependencies on natural capital”. It aims to operationalize the relationship with biodiversity into internal decision-making. In 2020, a new extension, guidance specially designed for biodiversity issues, was published. (Capitals Coalition & Cambridge Conservation Initiative, 2020)

Figure 5 Natural Capital Coalition Framework presents the approach of the Natural Capital Protocol.

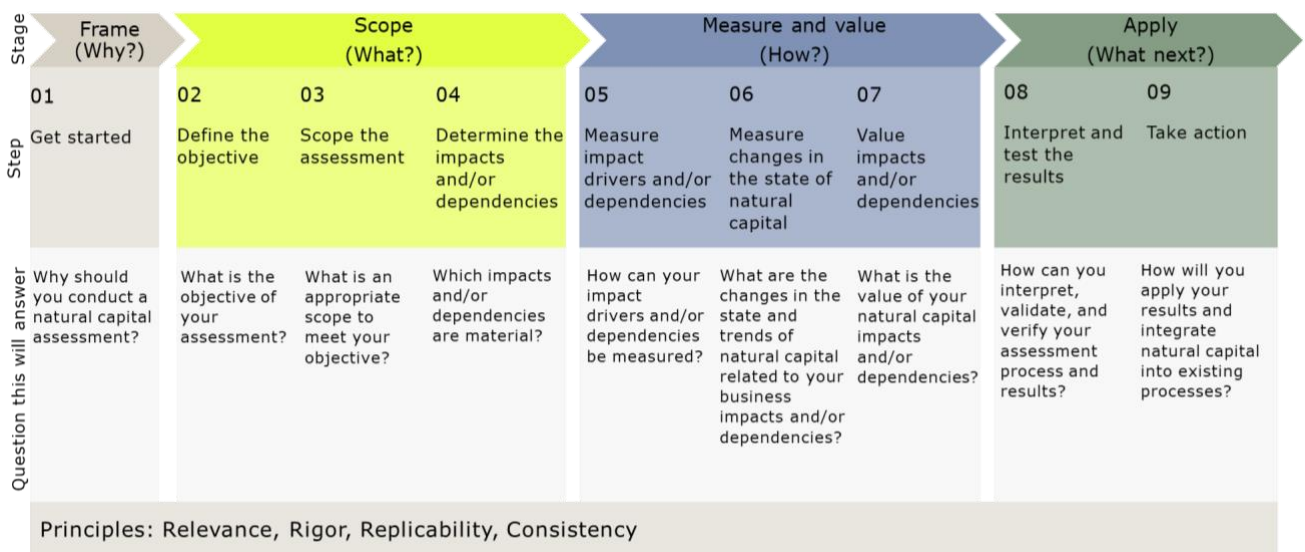


Figure 5 Natural Capital Coalition Framework. Source: Capitals Coalition & Cambridge Conservation Initiative 2020.



### 3.3.4 Biodiversity footprint

Some new frameworks related to biodiversity seem to follow the path of climate frameworks. For example, GHG-protocol and its scopes have been adapted to biodiversity thinking (Figure 6). Biodiversity impacts can now be assessed through 4 scopes, where scope 0 presents the static footprint and scopes 1-3 the dynamic footprint.

**Scope 0:** Static footprint, also called ecological opportunity cost. Occurs due to having the facilities somewhere that prevents other activities in the area.

**Scope 1:** impacts resulting from what the entity (a company) consumes or restores on the area controlled by the entity and other impacts directly caused by the entity during the period assessed.

**Scope 2:** Impacts resulting from (emissions from) the generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as ‘energy’).

**Scope 3:** Impacts that are a consequence of the activities of the company but occur from sources not owned or controlled by the company, both upstream and downstream of its activities. (Berger et al. 2018)

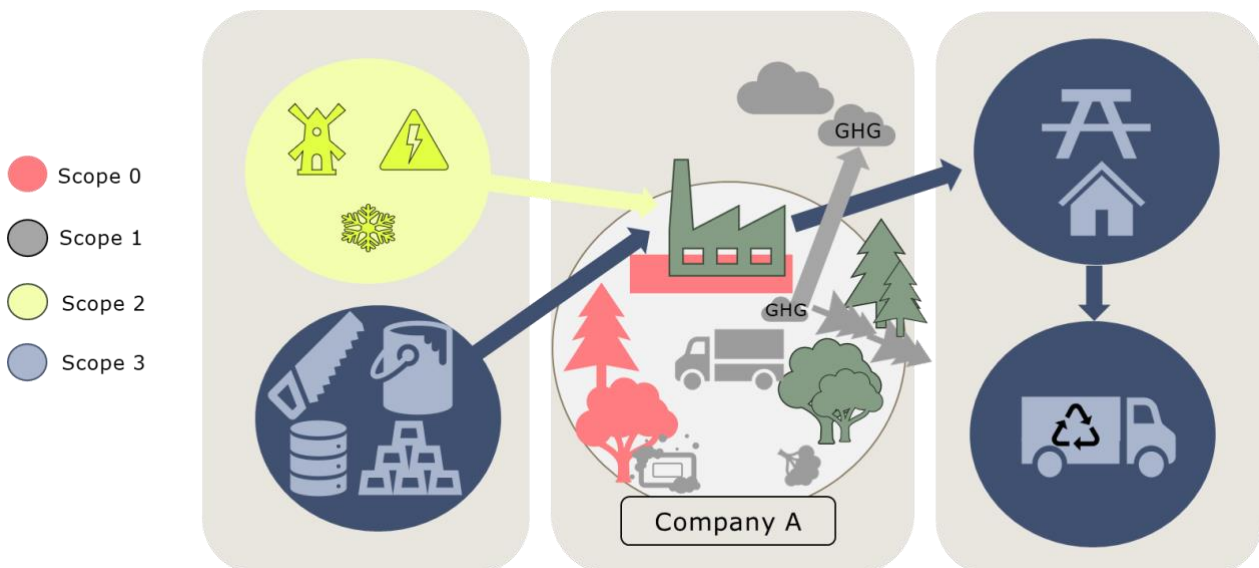


Figure 6 Biodiversity footprint scopes. Adapted from Berger et al. 2018.

Ecogain, a Swedish biodiversity consultancy company, assessed the biodiversity reporting and its content (identification, goals, actions and metrics) of the 100 biggest companies in the Nordics in 2019. They found out that thinking biodiversity in scopes is not yet mainstream - none of the 100

biggest companies in the Nordics use scopes of biodiversity footprint in their reporting yet. (Ecogain, 2020)

### 3.3.5 A framework to develop biodiversity indicators

Addison et al. (2020) have built a framework for the development and use of biodiversity indicators. It can be used together with other business management frameworks both on site-level and corporate-level. Their suggestion is based on the Plan, Do, Check, Act -management framework and includes six steps (Figure 7). With biodiversity issues, spatial context is critical to be considered as biodiversity impacts are local, contrary to climate issues.

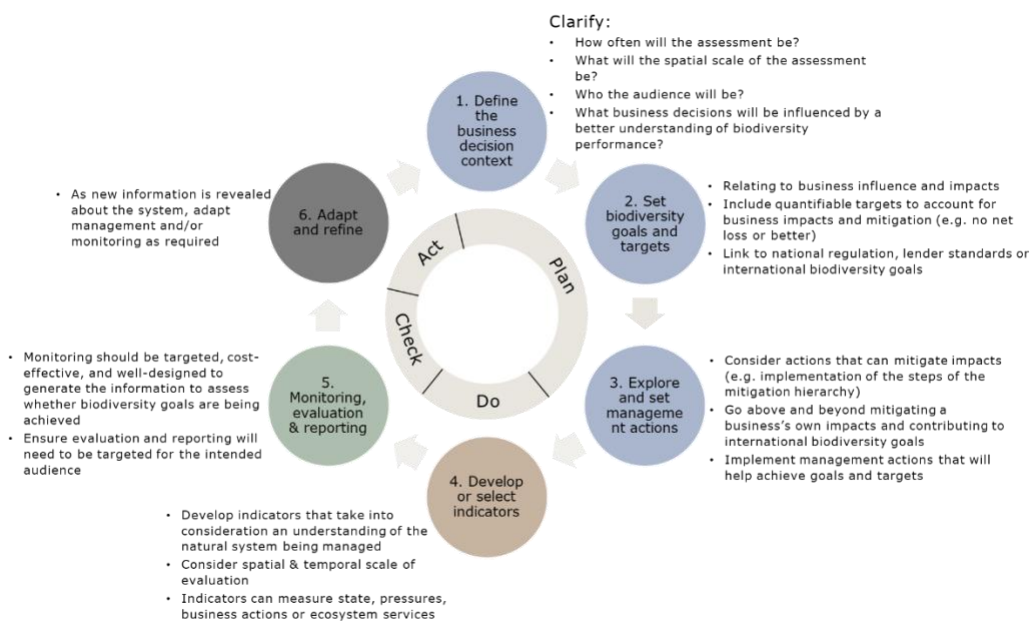


Figure 7 Framework to guide the development and use of biodiversity indicators by business (Addison et al. 2020)

## 3.4 Challenges of biodiversity management

Managing biodiversity is often considered to be complicated. It is considered a complex topic, difficult to measure and the outcomes of biodiversity initiatives are considered intangible. Biodiversity is more context-specific than climate and very specific in terms of ecology, making standardization of biodiversity more difficult. Also, the lack of standardization of indicators makes comparing organizations difficult. (Boiral, Heras-Saizarbitoria & Brotherton, 2018) Due to the complex characteristics, the relevance of biodiversity to business might also be unclear (van den Burg & Bogaardt, 2014). Rest of this chapter presents the difficulties of biodiversity management found in previous studies. Most of these were also found to be difficult in this study.

### 3.4.1 Identification

The identification of the biodiversity impacts of business might be difficult. WEF (2020a) suggests that understanding biodiversity loss impacts to business and the necessary steps to tackle the issue are not yet clear. WEF suggests that incorrectly priced nature in supply chains is one of the main reasons for the incomplete understanding. Identification of natural capital dependence (Boiral, Heras-Saizarbitoria & Brotherton, 2018) and the real impact of activities (Overbeek, Harms & Van den Burg, 2013) are found to be difficult due to lack of knowledge. These issues also lead to uncertainty whether there are business benefits for protecting the ecosystems and biodiversity (van den Burg & Bogaardt, 2014). Many companies have long supply chains and are dependent on ecosystems somewhere else in the world. It may be challenging to understand and know all the dependencies and impacts on what they have along the supply chain, positive and negative ones. (Overbeek, Harms & van den Burg, 2013) The results of this study indicated that this is indeed a relevant challenge for the case companies.

### 3.4.2 Measuring

“What is measured gets managed” is a line that is often used to rationalize the need for measuring, and the importance of suitable indicators. Indicators should support proactive and responsible environmental management, restore biodiversity and abate threats to biodiversity (Addison et al. 2020). However, biodiversity and its loss are difficult from a measurement and calculation point of view. Biodiversity loss impact can be calculated on different levels, such as species, populations or habitats (Capitals Coalition & Cambridge Conservation Initiative, 2020a, p. 14; Dempsey, 2013). Also, the scope and the goal of the assessment impact what kind of indicators should be used. As the topic is complex, it poses a challenge for the business to select what indicators should be used to support biodiversity management.

Measuring impacts is also necessary to be able to prove that the targets companies have set are genuinely met (Addison, Bull & Milner-Gulland, 2018). Biodiversity impacts are more difficult to measure than climate impact, as biodiversity changes from place to place and is not interchangeable (Overbeek, Harms & Van den Burg, 2013; de Silva, Regan, Pollard & Addison, 2019). In the corporate world, companies seek monetary benefits from development. As the impact of biodiversity loss is still difficult to translate into monetary terms, it might be difficult to explain the risk in a way

it gets noticed (Dempsey, 2013). Due to the same reasons, it is challenging to demonstrate the progress of biodiversity improvement to stakeholders (Boiral, Heras-Saizarbitoria & Brotherton, 2018).

The EU Business @ Biodiversity Platform ordered an assessment of the biodiversity measurement approaches for business and financial institutions. The assessment included 14 different frameworks, and it was found that one biodiversity measurement approach is not enough. Several measurement approaches are needed to support different business applications and organizational focus areas. (Lammerant, et al., 2019) The study emphasizes the necessity to evaluate whether a framework is suitable or not for a company's information needs, organizational focus (product, site corporate or supply chain) and the limitations and strengths of the measurement framework.

### **3.4.3 Internalization of the topic**

Literature shows a lack of internalization of biodiversity issues. Internalization is necessary at different levels of companies. Employee involvement is considered essential in improving biodiversity practices in companies. Without involved employees, practices may remain symbolic, superficial and remain separate from daily activities. 23 % of the respondents in a study by Boiral, Heras-Saizarbitoria, & Brotherton (2019) recognized lack of integration of biodiversity issues into daily activities. Also, the role of managers and middle-managers is vital in implementing biodiversity plans. Managers are needed to internalize the new processes related to biodiversity management and standards (Boiral, Heras-Saizarbitoria & Brotherton, 2018). Lack of interest or knowledge among fieldworkers is also found to be a problem. Implementing guidelines is not enough, they also need to be followed (Boiral, Heras-Saizarbitoria & Brotherton, 2019). Lack of knowledge on how biodiversity should be managed is also found to be a problem, and lack of interest to invest in resources in this is an issue (Boiral & Heras-Saizarbitoria, 2017b).

### **3.4.4 Lack of information and data**

CREM and Arcadis (2017) made a pilot for natural capital reporting. They found out that there is a lack of information needed to understand the actual impacts and dependencies on natural capital. Overbeek et al. (2013) also note that there is a lack of knowledge on how useful information should be collected. This highlights the need for broader adoption of natural capital assessment in companies,

also including data development. The Capitals coalition & Cambridge Conservation Initiative (2020a) note that there are two kinds of data, primary data and secondary data, that can be used. Secondary data may be easier and cheaper to gain, but it may result in less detailed results. Another issue from the data perspective is the lack of knowledge on how to interpret data in the natural capital context (CREM and Arcadis, 2017).

De Silva et al. (2019) suggest that the low levels of biodiversity commitments (NNL or NPI) might result from the challenges in setting realistic and achievable commitments that are connected to decision-makers and the sustainability report audience. To overcome this, they suggest dividing the biodiversity commitments into segments so that it is easier to make them meaningful as well as act and report on their development.

### **3.5 Linking businesses and biodiversity related scientific targets and initiatives**

There are several biodiversity related goals and targets set by different societal organizations. Corporations are interested in reporting their actions against the international biodiversity goals (Addison, et al. 2020) and making public commitments for biodiversity (Addison, Bull & Milner-Gulland, 2018; de Silva et al. 2019). For example, Sustainable Development Goals and responses to them are mentioned by several companies in their communication (KPMG, 2017). The United Nations Global Compact (UNGC) also encourages companies “to align strategies and operations with universal principles on human rights, labour, environment and anti-corruption, and take actions that advance societal goals” (UNGC, 2015). This chapter presents some of the most relevant biodiversity conventions and goals for the business sector and strategies that may impact them.

Table 2 presents the scientific goals for biodiversity. These are often mentioned in the literature and companies increasingly make commitments to these goals. Table 3 presents selected business relevant biodiversity initiatives and their linking to businesses.

Table 2 Scientific goals for biodiversity

Goal	Meaning	Other information
No Net Loss (NNL)	A neutral outcome of a development project to the environment after all biodiversity losses are compensated with biodiversity gains somewhere else by, for example, habitat restoration. (Bull & Brownlie, 2015; Rainey, et al. 2015)	Scientific targets include three features that should be fulfilled: they should be specific, measurable, time-bound (Addison, Bull, & Milner-Gulland, 2018), and based on scientific information (SBTN, 2020).  Studies show that only a handful of companies are committed to scientific targets in biodiversity when comparing to climate change or deforestation. (see for example: (de Silva, Regan, Pollard & Addison, 2019; Addison, Bull & Milner-Gulland, 2018; Rainey, et al. 2015) According to Ecogain, none of the 100 biggest Nordic companies had a goal aligned with science. 27 companies reported having some type of goal for biodiversity and 73 companies had no goal concerning biodiversity. Only 3 % of companies report committing to the NNL target and 1 % to the BNG target. (Ecogain, 2020)  As large investors nowadays require committing to NNL, its importance is increasing among companies.
Biodiversity Net Gain (BNG) / Net Positive Impact (NPI)	Biodiversity Net Gain and Net Positive Impact mean that biodiversity gains outweigh the biodiversity losses of a project. (Bull & Brownlie, 2015; Rainey, et al. 2015)	
Science Based Targets (SBT)	Science based targets for climate are already formulated but for biodiversity science based targets are not yet formulated. However, there is a need for an unambiguous target (Mace, et al. 2018). The Science Based Target Network (SBTN) has started developing these targets and they are planned to be ready in 2022.	Currently, SBTN has initial guidance on these for the business sector. (SBTN, 2020)

Table 3 Selected business relevant biodiversity initiatives

Name of the initiative and year	Initiator	Main idea	Connection to businesses	Other Info
Aichi Targets, 2010	Convention on Biological Diversity (1987), An UN convention	Aichi Targets include 20 targets aiming to fulfill five different strategic goals related to biodiversity for years 2010-2020. Aichi Targets are part of the Strategic Plan for Biodiversity aiming to provide an overarching framework for biodiversity.	Previously the CBD has mainly focused on the states' responsibilities on biodiversity but from 2006 onwards, the necessity to integrate businesses in achieving the CBD objectives has been noticed. (CBD, 2019) The business sector has now been engaged to be a critical partner for CBD in sustainable development and biodiversity protection and Target 4, for example, includes explicitly also businesses.  From the businesses' perspective, the strategic goals were not aimed at them but from government to government. To fix this issue, the post-2020 targets should be written in simple terms and present the issue in terms of risks and opportunities. (CBD, 2018a)	Despite good intentions, the success of Aichi targets, unfortunately, follow the path of other previously set targets and strategies that have not stopped the biodiversity loss. (Mace, et al. 2018) Some Aichi Biodiversity targets have been achieved partially but none of the Aichi targets will be fully met by the end of 2020. (Secretariat of the Convention of Biological Diversity, 2020)
The 2030 Agenda for	The United Nations	17 Sustainable development goals targeted to secure "the	The SDGs are familiar to businesses, as 92 % of	Goals 14 and 15 are among the SDGs least reported by firms

Sustainable development: Sustainable Development goals (SDGs), 2015		peace and prosperity for people and planet, now and into the future". All goals are divided into sub-targets and indicators are developed, which helps to follow the success of these targets. Especially targets 14 and 15 are directly linked to biodiversity. Many other goals are indirectly linked to biodiversity.	companies in a survey by GRI, UN Global Compact and WBCSD, were familiar with SDGs, and 71 % were planning to take them into account within five years. (GRI; UN Global Compact; WBCSD, 2015) According to a survey by KPMG (2017), approximately 40 % of the world's largest companies refer to SDGs in their reporting. In North America, 6,2% of companies have integrated all 17 SDGs into their external reporting (WBCSD, 2018).	(KPMG, 2018). In the Nordic countries, the situation in 2019 looks a bit more positive. According to the Ecogain study, 26 % of the companies mention SDG 14 and 29 % mention SDG 15. Due to Covid pandemic and reduced human activity, goal 14 might be easier to achieve. It has also been noted that the state of biodiversity contributes to human health by preventing diseases from spreading. This highlights the necessity for SDG goal 15 even more. (United Nations, 2020)
EU Biodiversity Strategy, 2020	EU	The European Commission published a new biodiversity strategy for 2030. The new strategy includes goals for protected areas, restoration of degraded ecosystems both at land and sea, new 20 billion EUR funding per year for biodiversity, integrating natural capital and biodiversity considerations into business practices, and putting EU in the leading position in addressing the global biodiversity crisis. (European Commission, 2020a)	The goal is to restore nature and provide immediate business and investment opportunities for the European economy (European Commission, 2020d)	EU Commission has also set up EU Business @ Biodiversity Platform that aims to provide a dialogue forum to discuss the links between business and biodiversity. The aim is to help businesses to integrate natural capital and biodiversity considerations into business practices. Business @ Biodiversity Platform produces information for the business sector, for example, on biodiversity related tools. (European Commission, 2020c)

## **4 Biodiversity reporting as part of non-financial reporting**

Company reporting comprises two parts: compulsory financial reporting and voluntary or compulsory non-financial reporting. Reporting on biodiversity is part of the non-financial reporting. Sustainability information, including biodiversity, can be disclosed in a separate sustainability report, or done together with financial reporting in an integrated report. Integrated reports can be seen as part of a comprehensive strategic framework that also support long-term value creation and contribute to positive organizational change (Solomon & Maroun, 2012). These act as tools to stakeholder communication showing companies' actions on economic, environmental and social impacts (Beske, Hausteine & Lorson, 2020) and change external perceptions (Bonson & Bednárová, 2015). Sustainability reporting addresses a broader audience than only financially oriented investors (Beske, Hausteine, & Lorson, 2020). According to GRI (2015), sustainability reporting aims to answer “how an organization contributes or aims to contribute in the future, to the improvement or deterioration of economic, environmental and social conditions, developments and trends at the local, regional or global level”.

Disclosing non-financial information was previously voluntary for all companies, but in 2014 the EU set a new directive on non-financial reporting according to which “Public-interest entities which are parent undertakings of a large group exceeding on its balance sheet dates, on a consolidated basis, the criterion of the average number of 500 employees during the financial year shall include in the consolidated management report a consolidated non-financial statement containing information to the extent necessary for an understanding of the group's development, performance, position and impact of its activity, relating to, as a minimum, environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters” (European Parliament, 2014). Similar regulations on reporting requirements can be found on all other continents as well (Van der Lugt, van de Wijs & Petrovics, 2020).

This chapter includes an overview of the past and current development of biodiversity reporting and the most commonly used sustainability reporting frameworks.

### **4.1 Development of biodiversity reporting**



The pressure for more transparent disclosing has increased in recent years (Bonson & Bednárová, 2015). Literature shows that biodiversity is mentioned more and more frequently in non-financial reporting, such as in CSR or ESG reports, but it is still not mainstream. The vast majority give also only general statements that are lacking details. (Adler, Mansi & Pandey, 2018) Several studies show that companies operating in environmentally sensitive sectors disclose more about the topic compared to other sectors (Bonson & Bednárová, 2015). However, less than ten years ago, studies still showed that businesses do not commonly view biodiversity as material risk (Dempsey, 2013).

According to Addison, Bull & Millner-Gulland (2018), out of the top 100 companies in Fortune 500 listing, 49 mentioned biodiversity in their reporting in 2016, but only 31 had made biodiversity commitments. Out of these, only four companies had specific, measurable and time-bound commitments. Companies in high biodiversity risk sectors (such as Food Producers & Processors, Mining, Electricity, and Forestry & Paper) had made more biodiversity commitments than companies in medium or low-risk sectors. (Addison, Bull & Milner-Gulland, 2018) According to Ecogain which studied the 100 biggest companies in the Nordics, 50 % of the companies mention biodiversity in sustainability reporting. However, only 34 % have some measures for biodiversity, and only 4% of companies require or implement mitigation hierarchy for mitigating negative impacts. (Ecogain, 2020)

There are several reasons why companies also report voluntarily. Rimmel and Jonäll (2013) found that sustainability reports are used to gain, maintain, and repair legitimacy (Suchman, 1995) as well as to reduce future costs and liabilities caused by companies' impacts on biodiversity. Increasing corporate image is found to be a reason for increased non-financial reporting (Belal & Owen, 2007). Reporting on biodiversity issues through sustainability reporting is a way to release more reliable information on biodiversity issues and reinforce both corporate accountability and transparency on the actions (Boiral, 2016).

Several studies show that publicly available information on biodiversity differs greatly. Maroun, Usher and Mansoor (2018) found that companies that report on biodiversity have three different reporting styles; some companies report actively on biodiversity providing detailed information on operational changes and policies for mitigating biodiversity loss and describing their mission statements and the species affected by operations. Companies with avoidance strategies disclose some

information on biodiversity, but it is not possible to conclude the level of the company's internalization of biodiversity. Companies that follow organized hypocrisy disclose only little context, and it is generally on environmental actions but not always specifically on biodiversity. The number of action-focused companies increased almost by half between 2013 and 2016, and the number of companies with avoidance-strategy decreased. (Maroun, Usher & Mansoor, 2018) Boiral and Heras-Saizarbitoria (2017a) studied GRI reporting of mining and forestry companies and distinguished four main approaches to biodiversity management: implementation of biodiversity management systems, management of relationships with stakeholders, implementation of technical and operational measures, and development of partnerships on research and conservation programs. In their study, more than 2/3 of the companies reported formalized managerial practices for biodiversity.

Maroun, Usher and Mansoor (2018) also found that companies prefer to report on already made actions and achievements rather than future commitments that may be costly to firms. This way, they may present themselves in a more favorable light. Some companies disclose their biodiversity impacts but, it might still be difficult to assess whether they generate a net negative or positive impact on biodiversity at the end (Smith, et al., 2020). A study by Boiral (2016) shows that there are “four non-mutually exclusive techniques of neutralization” that companies use in biodiversity reporting: “claim of a net positive or neutral impact, denial of significant impact, distancing from the reported impacts, and dilution of responsibilities”. Too positive a note on biodiversity reporting hides the pitfalls of biodiversity management and the possible difficulties are usually overlooked and are not shown in reporting (Boiral & Heras-Saizarbitoria, 2017b).

To overcome the unclear message of biodiversity reporting, Smith et al. (2020) suggest that companies “must a) make a clear commitment to balance or out weight any negative impacts on biodiversity through mitigation activities [...]), b) quantify their impacts on biodiversity, and the biodiversity benefits that are derived from their actions, and c) determine the net outcome of their biodiversity performance at site, supply chain or organizational level”.

## **4.2 Reporting frameworks for biodiversity**

The development of non-financial reporting has been rapid and fragmented, and as a result, there are several kinds of reporting frameworks and regulations on the topic (WBCSD, 2018). To get the best out of reporting, it must be designed for the intended audience (Addison, et al. 2020). This section presents some of the most common reporting frameworks currently used by companies and how they consider biodiversity issues. The measures disclosed in these different reporting frameworks may also act as guidelines for what companies could consider when planning biodiversity management and relevant measures and indicators.

#### **4.2.1 Global Reporting Initiative (GRI)**

GRI has become the most common framework for companies to report their non-financial information (Adler, Mansi & Pandey, 2018; KPMG, 2017). The first version of the guidelines was launched in 2000. The current version of GRI guidelines is the fourth, launched in 2013. (GRI, 2020) GRI is suitable for organizations regardless of their size, sector, or location (GRI, 2015). As GRI emphasizes reporting only material aspects to companies, and not all topics need to be included in the report. It can be assumed that companies might not report currently on biodiversity issues even though they might be relevant, they have not done materiality assessment, or the relevance of biodiversity issues is overlooked.

GRI is composed of Universal standards (GRI 101: Foundation, GRI 102: General disclosures, GRI 103: Management approach) and Topic Specific Standards (GRI 200: Economic, GRI 300: Environmental, GRI 400: Social) that are designed to be used with GRI 103: Management approach. Each topic-specific standard includes disclosures related to the topic, for example, biodiversity disclosure (GRI 304). (GRI, 2016) Biodiversity disclosures include four topics:

304-1: Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas

304-2: Significant impacts of activities, products, and services on biodiversity

304-3: Habitats protected or restored

304-4: IUCN Red List species and national conservation list species with habitats in areas affected by operations

Each of these topics include reporting requirements i.e. what must be reported, reporting recommendations i.e. what should be reported, and guidance with background information on the topic.

#### **4.2.2 Sustainability Accounting Standards Board (SASB)**

The SASB Foundation is an independent standards-setting organization from the USA. It was founded in 2011. The SASB Foundation has established and maintains standards that help companies disclose financially material, decision-useful sustainability information to investors. By disclosing according to SASB standards, companies can provide information for investors regarding their sustainability issues affecting their ability to create value. (SASB, 2018)

SASB has divided companies into 11 sectors that have further been divided into 77 industries that all have their own standard. SASB provides a [Materiality Map](#) that helps to identify sustainability issues that are likely to affect companies' financial condition or performance in different sectors and industries. There are five dimensions that include altogether 26 general issue categories. One of these categories is "Ecological Impacts". SASB has identified that ecological impacts are likely to be a material topic for companies in Extractives & Minerals Processing, Food & Beverage, Infrastructure, Renewable Resources & Alternative energy, Services, and Transportation sectors. Each industry that might consider ecological impacts material, have their own specific accounting metrics for ecological impacts. For example, companies in Construction material industry should report on the terrestrial acreage disturbed, and percentage of impacted and restored. Companies in Solar Technology & Project Developers industry should describe their effort in solar energy system project development to address community and ecological impacts. (SASB, 2020)

#### **4.2.3 CDP**

CDP (previously Carbon Disclosure Project) is a non-profit charity based in Europe running a global disclosure system for several actors like investors, companies, cities, states, and regions. CDP focuses only on actors' environmental impacts and measuring them. They have three focus areas: climate, water, and forests. (CDP, 2020a) CDP offers specified disclosure questionnaires for cities, companies, and states and regions. Companies are divided further into different sectors. The questionnaires are divided into segments, and each sectoral questionnaire includes material aspects of these sectors. Each questionnaire also includes separate questions for the supply chain. CDP uses its independent scoring methodology to score companies based on the results. (CDP, 2020b)

When considering the questionnaires designed for companies, biodiversity is mostly considered in the forest questionnaire. The forest questionnaire is relevant for three sectors: coal, metals & mining, and paper & forestry. The questionnaire includes the following segments and each of them is also considered from a biodiversity point of view: the current state, procedures, impacts, risks and opportunities, governance, business strategies, implementation, engagement, and verification. Biodiversity is also mentioned in the climate questionnaire but only as a side impact of, for example, management practices. The water questionnaire does not include biodiversity. (CDP, 2020b) However, most companies disclose only climate or both climate and water questionnaires. The forest questionnaire is the least disclosed one. (CDP, 2020c)

#### **4.2.4 Task Force on Nature-related Financial Disclosures (TNFD)**

The need for building awareness and capacity to reduce impacts on nature and biodiversity has been acknowledged in the financial sector. Therefore, a Task force on Nature-related Financial Disclosures (TNFD) is being developed. It is a new guidance for companies to answer the needs of the financial sector to evaluate the nature-related financial risks and to increase recognition of nature-positive investments within the financial sector. The work on developing TNFD has only begun and the reporting frameworks will be developed in 2021 and tested in 2022. The aim is to “resolve the reporting, metrics and data needs of financial institutions that will enable them to better understand risks, dependencies and impacts on nature”. An informal group including for example Global Canopy, UNDP, WWF, and UNEP FI together with tens of financial institutions, private firms, governmental bodies, think tanks, and other actors are building the TNFD. (TNFD, 2020)

## **5 Methods and data**

This chapter presents the qualitative research methods used in the research and the respondents of this study.

### **5.1 Methods**

The study is a multiple case study that is conducted by using qualitative research methods. The study includes three independent cases. Case study was chosen as the method as the goal in this study was to gain in-depth understanding of the topic of biodiversity management and practices in the selected case companies, and according to Stake (1995) case studies fulfill this need. Case study research technique supports the goal of understanding the case in its context (Kovalainen & Eriksson, 2008). More specifically, multiple case study offers a researcher the possibility to analyze the data within and between different situations and understand both the differences and similarities between the cases. (Yin R. K., 2003)

In case study research, data can be collected from several sources (Kovalainen & Eriksson, 2008). To gain information for the study, both primary and secondary data were used. The primary data was gathered from different sources, as interviews and with a written half-structured questionnaire. Before sending the questionnaire to the respondents and to engage companies in the project, I had a one-hour discussion with each company via TEAMS. In the discussion, we discussed six selected questions from the questionnaire and other issues related to the topic brought forth by the respondents. Notes on these discussions were written by hand during the discussion and were used to supplement data gathered with the questionnaire. The main data gathering method was a half-structured questionnaire on the Microsoft forms -platform. A link was sent to the respondents via email in October and in the beginning of November. Answers came back at the end of October and at the beginning of November. Written answers were considered more straightforward to manage than recorded discussions as it required less time to manage the responses in a tightly scheduled thesis project.

A half-structured questionnaire was selected as the data gathering method. It was considered to be a suitable way to gain information on the specific subject, in this case, the current activities related to biodiversity and views on it. A half-structured interview is suitable for discussions where one wants to gain information on a specific topic and it is not wanted or necessary to give too much freedom to the respondents. A half-structured interview includes the same or almost the same questions in the

same or a slightly different order. There is not, however, a uniform definition for a half-structured interview. (Hirsjärvi & Hurme, 2001) The theory is expected to hold for a half-structured questionnaire as well. Some questions were presented to all respondents, but the questionnaire also included dependencies between questions, and therefore previous answers partly defined the upcoming questions. This way it was also possible to include more specific follow-up questions in the questionnaire when including dependencies in it. The questionnaire can be found in the annex.

Data regarding the companies' biodiversity reporting was gathered as secondary data from companies' annual and sustainability reports (the year 2019). The questions that were studied considering the section are:

- 1) Does the company follow any specific reporting standard? If yes, what?
- 2) Does the report include biodiversity in it?
- 3) What aspects of biodiversity are reported?
- 4) Do they report their materiality assessment? Is biodiversity considered material?

Respondents were able to comment on the text after writing the result and analysis chapter to ensure the correctness of the responses.

The analysis method of the research data was chosen when all information was gathered. In this study, the analysis was based on the case description method which forms the framework for organizing a case study. According to Stake (1995), such analysis does not need to be based on formal coding but on direct interpretation of the research materials. This analysis method is suitable when a researcher is interested in themes, categories, activities, and patterns in the data, not a pre-given theoretical framework. (Kovalainen & Eriksson, 2008)

All written results from Microsoft Forms were exported to excel and then answers from discussions were incorporated into the results. The answers were divided into sections to formulate an understandable and logic description of the results. The results were divided as follows: background information of the company and current state of biodiversity management, responsible organization for biodiversity management, reasons for biodiversity management, drivers and actions for biodiversity, difficulties in biodiversity management, viewed risks, and biodiversity reporting of the company.

## 5.2 Respondents

The study included three Finnish companies. The aim of a case study is to learn as much as possible (Stake, 1995, p. 4), and therefore companies were selected from sectors that are considered to have impacts on biodiversity and therefore the companies would be assumed to consider biodiversity as a material aspect to them. All companies are large size companies, meaning that their annual net revenue is over 40 million euros (Accounting act 1997/1336 § 1a). The selection of cases can be done freely; they can be for example typical, critical, relevant or unique (Yin, 2014). Table 4 presents some relevant background information about the companies.

Table 4 Case companies' background information

Company Background			Information regarding the respondents		
Company	Sector	Net Revenue	Participants from the company in the discussion	Role of the respondents to the questionnaire	Notes
Company A	Municipal enterprise, infrastructure	>40 Mill. €	3	Environment and quality manager, Environmental expert	Two persons responded to the questionnaire.
Company B	Manufacture of non-metallic mineral products (TOL 23)	>40 Mill. €	2 (of which 1 person only first half of the time)	Environmental Specialist	
Company C	Electricity, gas, steam and air conditioning supply (TOL 35)	>40 Mill. €	1	Quality and environmental manager	



## 6 Results

This study aims to gain a deeper understanding of the biodiversity management process and practices in each case study company, rather than compare case study companies. Therefore, the results of the study are presented case by case. The *citations* are direct quotes from the questionnaire or discussion. Table 5 presents an overview of the results, after which each case is presented separately.

Table 5 Overview of the results

Theme	Topic	Company A	Company B	Company C
Current stage of biodiversity management	Managing biodiversity	Starting	Yes	Yes, parts of it among other environmental topics
	Management plan	No	Yes	No
	Scope of biodiversity management	Both on company and site level	Both on company and site level	Both on company and site level
	Guiding policies	Environmental programme of the city	-	Environmental programme of the city
	Aligned goals	-	NG, NNL, SDG 14 and 15	-
	Internal goals	Goals on biodiversity in each project separately.	To leave nature in their sites more valuable in terms of biodiversity at the end of the operations than it was before it.	Regarding biodiversity, these will be stated at the beginning of the year 2021. Other biodiversity linked goals: carbon neutral in 2030, becoming circular.
Responsible team	Environmental and quality team	Quality and environmental team	Environmental and quality team	
Reasons and benefits of biodiversity management	<ul style="list-style-type: none"> <li>- Willingness to appear among the best in the industry</li> <li>- Redeem sustainability commitment</li> <li>- Positive public image</li> <li>- Proud employees</li> <li>- Acceptability</li> <li>- Stakeholder demand</li> <li>- Nature's intrinsic value</li> </ul>	<ul style="list-style-type: none"> <li>- Being able to do conservation work</li> <li>- Being forerunner</li> <li>- Acceptability</li> <li>- Cooperation with stakeholders</li> <li>- Easier licensing</li> <li>- Finding new ways for aftercare</li> <li>- Minimizing the negative effects</li> <li>- Readiness for legislative changes</li> </ul>	<ul style="list-style-type: none"> <li>- Increased sustainability</li> <li>- Stakeholder communication</li> <li>- Readiness for legislative changes</li> </ul>	

Drivers and actions for biodiversity, indicators	Impact categories	<ul style="list-style-type: none"> <li>- Natural resource use and exploitation</li> <li>- Climate Change</li> <li>- Land and Sea use change</li> <li>- Invasive alien species</li> <li>- Pollution</li> </ul>	<ul style="list-style-type: none"> <li>- Natural resource use and exploitation</li> <li>- Climate Change</li> <li>- Land and Sea use change</li> <li>- Invasive alien species</li> <li>- Pollution</li> </ul>	<ul style="list-style-type: none"> <li>- Climate change</li> <li>- Natural resource use and exploitation</li> <li>- Pollution</li> </ul>
	Concrete actions	Building insect hotels, leaving trees for flying squirrels, leaving felled tree trunks for rotten wood, using recycled substrates, building sunny and dry habitats and redds as new habitats, moving endangered species, and building birdhouses and tube connections for small animals	Building ecosystem hotel, designing the aftercare in a way that it supports endangered species such as building better habitats for both birds, reptiles and flora, and seedling new flora species in the area	Fish steps at the hydropower site
	Followed indicators	No indicators. However, flora and fauna screenings are done in projects, and changes in the environment are screened as well.	Following all the actions for biodiversity. How many new biodiversity management plans there are (group-level indicator)	Size of the peat production areas are followed. The company does also emission and impact screenings (related to environmental permits)
Difficulties		<ul style="list-style-type: none"> <li>- Finding suitable indicators</li> <li>- Lack of knowledge on the topic</li> <li>- The flow of information is not smooth yet</li> <li>- Information from surveys are not used effectively</li> <li>- Balancing between citizens views and biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>- Understanding the concept of biodiversity</li> <li>- Measuring biodiversity impacts</li> <li>- Reporting</li> </ul>	<ul style="list-style-type: none"> <li>- Measuring biodiversity impacts</li> <li>- Building a suitable management plan</li> <li>- Reporting</li> <li>- Defining biodiversity in their business context</li> <li>- Managing and using currently available biodiversity relevant information</li> </ul>
Identified risks caused by biodiversity loss the for company		<ul style="list-style-type: none"> <li>- Environmental risks</li> <li>- Social risks</li> </ul>	<ul style="list-style-type: none"> <li>- Economic risks</li> <li>- Environmental risks</li> <li>- Resource or material availability risks</li> <li>- Operational risks</li> <li>- Social risks</li> </ul>	<ul style="list-style-type: none"> <li>- Economic risks</li> <li>- Environmental risks</li> <li>- Resource or material availability risks</li> <li>- Operational risks</li> <li>- Social risks</li> </ul>
Future views, views on offsetting	Future views	Expected to increase in importance in business' agenda, all case companies are or could be open for compensation projects in the future.		
	Offsetting projects Views on future offsetting	Yes Yes	Yes Yes	No Maybe
Reporting	Reporting framework	No framework	GRI4, GCCA KPIs	No framework

	Reported indicators on biodiversity	-	<ul style="list-style-type: none"> <li>- Significant impact on activities, products, and services on biodiversity (GRI)</li> <li>- Local impacts (GCCA)</li> </ul>	-
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## 6.1 Case Company A

Company A is a municipal enterprise (later called “company”) working in the infrastructure sector. They operate on approximately 100km of routes. The company is at the beginning of managing biodiversity issues on company level. They have lately identified the need to manage biodiversity issues as new projects have begun. The company considers biodiversity issues both on company and site level, but they have had more site level actions. There is no specific biodiversity management plan in place at the moment in the company, but biodiversity is mentioned in the new environmental strategy of the city which is also followed by the company. There are no explicitly stated goals for biodiversity at company level yet. The company does set environmental goals for each project, and one aspect of the goals is biodiversity preservation. The projects are aimed to respond also to different goals at the municipal level which also include biodiversity-related goals.

The company has an environmental and quality team that is responsible for the environmental strategy. In the projects, there are environmental specialists responsible for the implementation of the strategy and making sure that the goals set for the project are met. Previously the environmental specialists in the projects were not part of the environmental team of the company. Now there has been a change, and the company’s environmental manager is heading the environmental specialist. This change is considered to have increased the discussion between projects as well.

The company has several reasons why it considers managing biodiversity important:

*“Willingness to appear among the best in the industry sector”*

*“To redeem the sustainability commitment”*

*“Positive public image”*

*“Employees can be proud of their work”*

*“The acceptability of the projects increases when there are practical actions”*

*“Stakeholder demand”*

*“The knowledge and awareness has now grown in relation to biodiversity and now it has been understood that the environment also has intrinsic value.”*

The company has impacts on several drivers of biodiversity loss. These are natural resource use and exploitation, climate change, land- and sea use change, invasive alien species, and pollution. To minimize the impacts on biodiversity, the company has done several actions. In the newest project, biodiversity has been considered already in the design phase of the project. Specific actions at project sites to protect and enhance biodiversity include, for example, building insect hotels, leaving trees for flying squirrels, leaving felled tree trunks for rotten wood, using recycled substrates, building sunny and dry habitats and spawning bed as new habitats, moving endangered species, and building birdhouses and tube connections for small animals. Current habitats are designed to be extended from water bodies closer to the project site surroundings. Actions to protect or enhance biodiversity have in many cases turned out to be “*surprisingly cost-efficient*”. On top of these actions, the company has also done a biodiversity offsetting project in the past.

The company has identified some difficulties in managing biodiversity issues. Currently, there is a lack of suitable indicators to be used in measuring biodiversity impacts. They are, however, developing suitable indicators, especially in larger projects. There are also difficulties in the flow of information from one actor to another, and remote working is considered to complicate it even more. Flora and fauna surveys are done in the projects when necessary but the information from surveys is not necessarily used later. For example, The Centres for Economic Development, Transport and the Environment (ELY Centres) require information of different species and the vitality of the population condition to be collected but later on, the information is not used. Another large issue is considered to be a lack of knowledge and information on the topic among employees and stakeholder groups. There is not yet enough information on the impacts to biodiversity and what solutions would be most effective. This is also linked to citizens’ views on what looks and what would be good from a biodiversity point of view. Citizens would prefer that instead of thickets and wastelands (meaning young forests and meadows), there should be grass and ornamental plantations. This poses difficulties in planning and constructing the areas as these goals may be contradictory to enhancing biodiversity.

A change in the attitudes among the different project parties is considered necessary and more efforts are needed to internalize the topic among employees. Currently, the environmental aspects, including biodiversity, of projects are considered difficult to be discussed as it is the “necessary bad” and only one part of the project, not something that is considered in every step of the project. The company

considers it important that in the future, designing environmental aspects of the projects and relevant goals are considered already from the beginning of the project.

Company A considers biodiversity issues to be more important in the future than now even though they currently consider climate issues to be much or a bit more important than biodiversity issues.

*“I believe that biodiversity is a growing topic and more attention will be paid to it in the future than currently”*

*“Increasing the level of biodiversity is common for more actors than it currently is and the attitude may be improving.”*

The respondents consider biodiversity loss to cause both environmental and social risks in the future for the company. Biodiversity offsets are considered a possibility in minimizing negative impacts on the environment. The company however doesn't have an idea how much it would cost to offset its biodiversity loss if compensation was compulsory.

Company A does not follow any specific reporting standard. The yearly report of the company includes an environmental section that includes some metrics for environment, but there are no metrics related to biodiversity. The report has a small section that includes information about protecting a species during a project. Company A does not report its materiality assessment.

It can be concluded that Company A has started the work to manage biodiversity at the company level as they have identified the need for it after starting new large infrastructure projects. The most recent action is to have a strategy that also includes biodiversity. The company has also recently organizationally included environmental experts in their company-level environmental team, not only as part of the project organization, which helps to communicate environmental topics also horizontally between different projects.

The results do not indicate whether the company is following any biodiversity management framework or whether it has included any stakeholders in the process of designing biodiversity management. Also, the level of current biodiversity reporting is low as the company has not included biodiversity in it. In order to successfully implement biodiversity management in the company and to be more transparent about its impacts on nature, these aspects should be considered more.

## 6.2 Case Company B

Company B is a private company in the natural resource sector. They operate in tens of production sites in Finland and also have operations abroad in two countries. The company is a part of multinational group.

The company manages biodiversity issues actively both on site- and company level, and they have a company level biodiversity management plan. Biodiversity management plan is considered important at the company level and therefore such a plan is projected to be put into practice at all other sensitive sites of the group as well. The company has committed to No Net Loss (NNL) and Net Gain (NG) goals: "...nature at our sites is more valuable in terms of biodiversity at the end of the operations than it was before it". They also have goals aligned with SDG 14 and 15.

A specific steering group, to which CEO and Business Unit Leaders belong to, is responsible for the biodiversity management program. The quality and environmental team is responsible for updating and developing the biodiversity management program. It was the former CEO who initiated this work for biodiversity. Operational level is responsible for the daily work on biodiversity. The current management of the company is also highly committed to the topic, and this is considered the most important aspect of successful biodiversity management. Committed managers have also given resources – time and money – for the work. This has helped to create a deeply rooted culture for working on biodiversity issues in the company. The company educates its employees on smaller biodiversity enhancing activities at sites and keeps the knowledge up to date. When planning and executing larger projects, the company uses external resources such as experts from the Finnish Environment Institute (SYKE) and NGOs and consultants, as the company does not have adequate knowledge on these issues.

Biodiversity management is considered important in the company for several reasons:

*"Being able to do conservation work"*

*“Being a forerunner, acceptability of the operation [by neighbors], cooperation with stakeholders, easier licensing in some cases, finding new more effective ways for the aftercare on our sites, minimizing/compensating negative effects to nature and biodiversity of our operation, being ready to legislative changes”*

Explicitly stated environmental values are considered helpful also when recruiting new employees and employees are said to be proud of the company they work for. The respondents see that the largest impact is that as forerunners they set a standard for the sector which other companies can follow.

Company B has impacts on several drivers of biodiversity loss: climate change, natural resource use and exploitation, pollution, invasive alien species, and land and sea use change. Biodiversity is considered in several steps along the operations life cycle to minimize these impacts: Biodiversity aspects are considered already in the design phase of the operation according to the biodiversity plan. Also, some plans for biodiversity enhancing activities must be presented already when the environmental permit is applied for, but more specific plans are done as the operations at the site are coming to an end. Most of the measures are taken at the end of the operations and during the aftercare phase of the operation site. The company has done, in cooperation with other actors, different kind of biodiversity enhancing experiments, like an ecosystem hotel. The company can use its products to build habitats for species both on land and water. As the company does not own all the sites where it operates, they cannot be sure what happens to the areas after their responsibilities of the aftercare have ended. This is considered problematic in the long run.

They consider understanding the concept of biodiversity, measuring the impacts on biodiversity, and reporting on the topic to be the most difficult aspects in biodiversity management as the topic is so manifold. As ecological compensations are rather new and there are not yet specific rules for the compensations, the company has some difficulties in knowing what projects can be considered a compensation. The company follows the current states of their operation sites, but they do not yet have a scoring method for it. They also follow the number of species found on some of the sites, how different measures affect biodiversity and how they succeed. Even though the company does follow the state of the operation sites, they see that it is difficult to know the exact impacts on biodiversity. The respondents say that there is almost too much information on the topic but using it effectively is difficult. Also, the lack of knowledge on the authorities' side has been seen to prevent some biodiversity enhancing actions as the company have not always gotten a permission to implement

biodiversity enhancing measures in the aftercare phase. Authorities have been using a guide book by the Ministry of the Environment that promoted reforestation instead of other activities. However, in 2020, the guide book “Extraction of soil materials – guide to sustainable use of material” was updated and it includes larger variety of actions for enhancing biodiversity in the extraction areas. This is expected to change the authorities’ decisions, at least in the long run.

Company B considers climate issues to be a bit more important than biodiversity issues. They believe that biodiversity issues will be considered more in the future:

*“The attitude is developing so that at least the larger companies are doing their measures to to have a positive effect on biodiversity. Also, the legislation is changing so that the negative effects on biodiversity could be minimized or compensated. I think the whole sector has to improve its biodiversity issue management in the close future because of legislation etc.”*

Biodiversity loss is considered to cause economic, environmental, resource or material availability, operational, and social risks. Therefore, the company has done a wide range of biodiversity enhancing experiments.

Company B has a common yearly report together with the group it belongs to. The group report includes references to the GRI reporting framework and its indices and they include also biodiversity (GRI 304) in their reporting. Currently, the group discloses information only regarding one of the four biodiversity metrics required by GRI but they are developing their internal reporting on biodiversity in order to gain more information for GRI reporting. The group report also includes disclosure on KPIs required by their sector association, and these KPIs include also metrics on local impacts and biodiversity.

The group’s yearly report includes an environmental section that has a subtopic on biodiversity. They report on biodiversity management plans, collaborations, and management of activities that are relevant for enhancing biodiversity. The report also includes some biodiversity-relevant targets they have set, for example, a goal of having a management plan for biodiversity by 2030 in all relevant locations. Also, materiality assessment including biodiversity can be found in the report.



It can be concluded that Company B has biodiversity high on its agenda and they have strong internal support for managing biodiversity. This aspect is considered extremely important in the company. They want to be the forerunner of the sector in biodiversity. The company has had a management plan for biodiversity for almost a decade and the idea has also been further spread in the group. The goal of the company is to have better biodiversity in the area where they work after the actions have ended compared to the beginning. To support biodiversity actions in the company, they have included several stakeholders such as local residents, experts, and authorities in the process.

Despite their long experience with biodiversity practices, they still have areas to be developed. For example, their reporting does not show all indicators for biodiversity, but this is already under development in the company.

### **6.3 Case Company C**

Case company C is a municipality-owned company in the energy sector. Company C produces both heat and electricity. They operate at four main sites and at several other sites where they produce wind power and reserve power. The company procures its energy sources mainly from locations 100km from its production sites.

Company C manages biodiversity related issues among other environmental topics, but they do not have a specific biodiversity management plan. In general, the company will focus more deeply on sustainability in its new strategy of 2021-2025. As the company is a municipal company, they also follow the environmental programme of the city. Biodiversity as such is not mentioned in the company's strategy but biodiversity issues are considered under the concept of environmental protection that includes, for example, direct impacts on peatlands, indirect impacts on water bodies, carbon neutrality, emissions from production facilities, circular economy through wood procurement and decreased use of peat. The company manages these different environmental aspects on site level. Some aspects, like emissions, are regulated by threshold values and the company follows these.

At the moment there are no specific goals for biodiversity. Some goals may come when the new strategy is implemented at the beginning of 2021. The current main goals of the company are to be carbon neutral in 2035 by reducing the amount of peat used in energy production and to become

circular. Also, the carbon neutrality goal is in line with minimizing the impacts on biodiversity as it reduces impacts on land and water bodies.

Environmental aspects are managed by the quality and environmental team that has 6-7 members. The team is part of the energy production segment of the company. Among other things, the team is responsible for following the relevant legislation which is their main focus.

The company sees that managing biodiversity offers them several benefits. Biodiversity management is important especially as the company is concerned for the environment, stakeholders consider it important and the company can secure their license to operate by being more sustainable.

*“It has to do with responsibility and through that, stakeholder communication. Also authorities are following the topic.”*

Managing biodiversity is considered important also because of tightening regulation and its impact on products and sales. Managing and reporting of biodiversity also brings transparency on the activities and increases the acceptance among stakeholders.

The company considers itself to have impact on the following drivers of biodiversity loss: climate change, natural resource use and exploitation, and pollution. To minimize these impacts, the company follows how large the areas it uses for peat production are and they have built fish steps in their hydropower plant. They also do large-scale emission and impact assessments which are linked to the environmental permits the company has.

Company C considers especially defining biodiversity with respect to their company difficult, and therefore also measuring biodiversity with relevant indicators and measuring the company's impacts on biodiversity are considered difficult. Building a suitable management plan is considered difficult as it is only one topic among other environmental sustainability aspects. Rather than having a specific plan for biodiversity, a more general approach would be appreciated. The company sees that there is a lot of information but it is not organized in a way that it could be used for managing biodiversity. They also have not yet considered which information is linked to biodiversity. Reporting is considered difficult as stakeholders require different kinds of information from the company. The company sees that reporting for different stakeholders takes a lot of time and would need to be synthesized in order to be meaningful for the company.

Currently, climate issues are considered a bit more important than biodiversity issues in the company.

*“Biodiversity issues are not an independent issue to be considered in isolation. They are intertwined with carbon neutrality and other environmental monitoring. The issue will probably come up in the coming years.”*

The company has not done compensation projects in the past, but it considers compensation projects to be possible in the future to offset their impacts on biodiversity.

Biodiversity loss poses economic, environmental, resource and material availability related, operational, and social risks to the company. One of the most important things for the company is the availability of energy sources. They source for example wood for energy production, and therefore impacting positively on forest growth is considered important. The company does not currently use wood that is cut directly for energy production but they use available side streams.

Company C does not disclose according to any specific reporting standard. Their yearly report has a section related to environment, but biodiversity related aspects are not explicitly mentioned in the report. Company C does not currently include any measurable KPIs for their goal of minimizing their biodiversity impacts. The report includes a verbal description of projects that have a positive impact on species or emissions and where the company is involved in. The report does not include a materiality assessment.

It can be concluded that Company C manages biodiversity issues among other large topics, such as carbon neutrality and circular economy. They measure and follow aspects related to biodiversity, but they do not have a specific management plan for biodiversity. The company does not consider it relevant to manage biodiversity separately and therefore a solution on how to include the topic meaningfully to management is needed. The company does already have information on the biodiversity relevant issues as they follow the direct impacts that they have on peatlands and water bodies.

As the company does not explicitly report their impacts on biodiversity or any indicators for biodiversity in the external yearly report, reporting is not yet transparent in this regard. The company could include stakeholders in the process of considering the relevance of biodiversity to the company as external stakeholders could help understanding the link between the company and biodiversity.

## 7 Discussion

Biodiversity management is getting more and more common now that companies have started to identify the necessity of it. Especially the pressure from different stakeholders, such as customers, regulators and the finance sector, has impacted the development. This was found both in the literature and in this study. A lot of scientific and private studies have been made in the last couple of years in this field.

The first research question in this study was if and how companies manage biodiversity issues today. The results of the study show that all interviewed case companies were at different stages of managing biodiversity. Two of the companies explicitly stated that they want to be in the forefront of biodiversity management and lead development in their sectors and all companies agree that in the future biodiversity aspects will be considered more than now. Company B is the most advanced as it already manages biodiversity issues, has a specific plan for biodiversity management, and has set goals for biodiversity. Company A is at the beginning of managing biodiversity issues. Company C has until now considered parts of biodiversity among other things but not as a separate entity. These findings are in accordance with the literature – the work in biodiversity management is in many cases currently developing but there are already some who are managing biodiversity (Overbeek, Harms & Van den Burg, 2013). The results also showed that only one company had explicit goals for biodiversity. This is also found in the previous studies which show that the uptake remains confined to a limited amount of companies (de Silva et al. 2019).

Based on the discussions and written results, I assessed the stage of companies' biodiversity management to the PDCA -management framework: Company A is in the planning phase, Company B has done the whole cycle and Company C is in the planning phase when considering purely the stage of biodiversity management as there is not yet a specific plan for it in place.

Business opportunities and risks are generally considered important drivers for companies to manage different topics. The case companies can see the benefits of managing biodiversity, which are similar to the findings in the literature. The case companies have identified both internal and external benefits, and they include both environmental, social, and economic benefits. The results of this study also indicate that companies do not see biodiversity management only as a burden. Managing biodiversity can also ease some aspects of the business activities, such as the acceptability among stakeholders of

new projects. All case companies also saw that the regulation will increase in the future, which can also be seen in studies (OECD Environmental Directorate, 2018), and that it is necessary to be able to adapt to it beforehand. The responses did not directly indicate whether some of the benefits that companies see were considered to bring cost savings. It could be, however, expected as companies that are working beforehand in this regard do not need to make hasty decisions.

Risk mitigation is an important benefit of managing biodiversity in the case companies, as also literature shows. Case companies indicated several risks that biodiversity loss may cause them. The data gathering questionnaire included a selection of impacts and all these risk categories were mentioned at least by two respondents. As all the case companies were from sectors that have a rather direct impact on biodiversity, it was understandable that companies found several risks. The responses of case companies indicated also that not all companies have the same risks. Especially companies in the sectors of the F&C (2004) red list and sectors identified in the SASB materiality matrix (SASB, 2020) should consider the relevance of biodiversity loss to them. It can be expected that for a lot of companies it is difficult to identify the risks of biodiversity loss in their supply chains. De-risking the supply chains that are often long and international, is also vital along with de-risking business' own actions. Companies are often dependent on other actors on their purchases of resources that are needed for production. Access to these resources may be at risk due to biodiversity loss. (ten Kate, Bishop & Bayon, 2004)

Two of the companies reported that they have not measured their current impacts on biodiversity. In order to be able to measure the development, having a baseline is necessary. Therefore, it would be relevant information for companies to acquire. For example, Natural Capital Protocol and Biodiversity Footprint, explained in more detail in chapter 3, are frameworks that could be used to assess the companies' current impacts on natural capital. The good thing is that some of these frameworks are similar to frameworks used in assessing climate impacts. I see that this is an advantage, as it may make it easier and faster for companies to understand the logic and functionality behind them, and adapt these frameworks to their use.

In all case companies, it is the environmental and quality team that is responsible for biodiversity management. These teams are typically responsible for a vast amount of tasks. Previous studies suggest that it is important to have support from the managerial level to secure the resources (see for

example (Boiral & Heras-Saizarbitoria, 2017b)). It could be assumed that when a strong internal support exists, the task would be considered more important and beneficial, and not only another compliance task to be done. For example, in company B there is a specific steering group for biodiversity issues that also includes members of the management team of the company. Having a high-level of commitment to the topic was seen in company B as the key to success.

All companies could identify several drivers for biodiversity loss which they have an impact on. The results show that biodiversity impacts are closely linked to other impacts the companies have and therefore understanding the environmental impacts on a larger level is necessary.

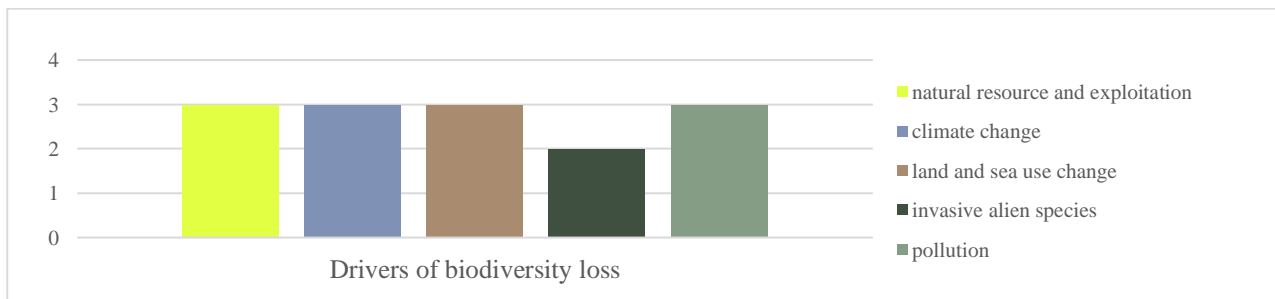


Figure 8 Identified impacts on drivers of biodiversity loss.

One of the most used reporting frameworks internationally is GRI. However, only one of the companies are currently following the GRI framework. Other companies had divided the report into sections, one of them being related to environmental sustainability. In these two reports, there was a lack of expressing specific biodiversity indicators and impacts, leading to a lack of information for the reader. In order to make reporting easier for companies, reporting should be meaningful for the companies and ideally the company could use only one reporting framework to report for different stakeholders complemented with sector or company relevant extra indicators. Even though companies would not see relevant to follow any specific reporting framework throughout the report, some ideas could be taken from those existing frameworks. Using similar indicators as other companies would increase the comparability and transparency of the impacts.

The second research question was what the biggest challenges they are facing are. In general it can be said that the findings are similar to findings in the literature. Even though all three case companies are working in different sectors, they all identified similar difficulties in managing biodiversity.

Two companies also mentioned the difficulty of understanding the concept of biodiversity and defining biodiversity in their business context as the concept is so wide. This indicates a need to increase the understanding of biodiversity issues from the business sector aspect. One company indicated that this problem also leads to a lack of internalization of the topic; they see that biodiversity is just one extra thing to consider and it is seen more as a compliance topic that must be ticked in the box. One solution on how to understand the importance of biodiversity to a company and find a reason to internalize it properly is to include stakeholders in the discussions. Different stakeholder groups look at the issue from different angles and they may have relevant knowledge on the topic which could help the company to understand the meaning of biodiversity to them.

All respondents mentioned the difficulty of measuring biodiversity and finding or developing suitable indicators to follow and report on. The framework to guide development and the use of biodiversity indicators suggested by Addison et al. (2020) could be used to help. Companies could benchmark existing reporting frameworks, such as SASB, GRI or CPD, to find out if there are suitable indicators that companies could use. On top of this, also help from specialized experts could be used. As a solution for biodiversity being too a large and difficult an issue to measure, Lambooy et al. (2018) suggest that companies should translate the topic into concrete components which would then be easier to follow up on.

This issue of measuring is also linked to available data. Literature suggests that there is a lack of suitable data for managing biodiversity. The case companies see, however, that they already follow multiple topics related to biodiversity and therefore have a lot of information, almost too much. The difficulty is how to use this already existing information for biodiversity management purposes and in such a way that it is meaningful. Firstly, a general understanding of what information exists should be obtained and links to possibly available indicators should be made. Also here, different stakeholder groups could have relevant ideas on what information to use or what would be the data gaps to be fulfilled.

In terms of different biodiversity initiatives, there is a risk that abundance of initiatives might cause confusion among business actors which initiatives are relevant to follow and commit to. As shown in chapter 3, there are several international initiatives for biodiversity. According to this study, only one company had made commitments to some of the initiatives and showed that in their reporting.



On top of the research questions, there were questions related to other topics as well, such as the future of biodiversity management, regulation and consulting services. All companies expect regulation to increase in the future. Biodiversity compensations are a rather new regulation tool and it is still voluntary in Finland. Two of the respondent companies reported having done compensations. The third company said it could maybe use compensations to decrease its impact on biodiversity. However, concerns about how actual changes can be transparently and correctly measured and who decides the equivalence of the losses and benefits, were raised in the discussions. Therefore, more studies and information on the practicalities are needed.

The results on consulting service questions show that companies also need external help for managing biodiversity issues. As said, in all these case environmental and quality team which usually have several topics to manage is responsible for the management of biodiversity topics. Case companies have used several different consultancy services that are linked to biodiversity. They also consider several kinds of consulting services related to biodiversity possible to be used in the future. In the questionnaire, there was a list of five different consulting services related to biodiversity and option “other” out of which the respondents could choose which ones they already use and which ones are considered possible in the future. Figure 9 presents the answers. All companies have used locally provided environmental studies (for example diverse environmental investigations at the site). Only one reported to have used strategic consulting services but all reported they could consider it to be used in the future.

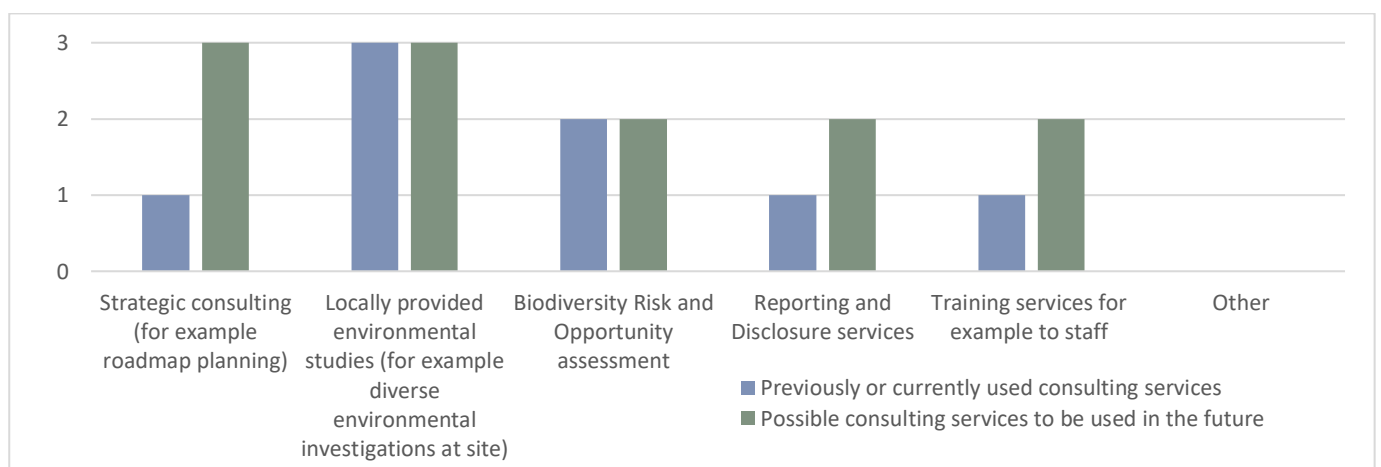


Figure 9 Consulting services

The results show two aspects that are considered most important when choosing a consultant: knowledge of the consultant in the topic and price. Knowledge was mentioned by all respondents and price was mentioned by two respondents. On top of these, working cooperation, the suitability of the proposed actions, concrete improvement suggestions, and references were mentioned as well.

### **Validity and reliability of the study**

In this study I studied three selected Finnish companies that are expected to have impacts on biodiversity. As the number of case companies in this study is only three, the responses are not to be generalized. The case companies in the study include forerunners in biodiversity management or companies aiming towards it, and therefore the study gives a rather positive picture of the situation. To get an even larger picture of the stage and challenges of biodiversity management, it would have been interesting to include more companies with different kind of background (for example sector and size) in the study.

The questionnaire, discussions and reports were considered a good way to receive results for the study. Triangulation of the data, in this case combining two different data gathering methods for primary data and one for secondary data, was fruitful. Triangulation of the data means that to cross check the information, multiple sources are used for data collection (Eriksson & Kovalainen, 2011). With information from the discussions it was easier to form a wide understanding of the stage and views on biodiversity and with the questionnaire I received specific answers for some questions that were presented. However, combining answers from two primary sources also caused some problems as in some cases the responses diverged a bit between the discussion and the written answers within a company. In these cases, I used the written answer as the main result but also additionally mentioned the response from the discussion. Also, the questionnaire could have been a bit longer and included some more questions on, for example, used frameworks or their recognizability.

## 8 Conclusions

Biodiversity management in companies is increasing but it is still not mainstream, as both previous literature and this study show. Therefore it was interesting to study these three case companies to understand their practices and those difficulties that these companies see that are to be solved. Previous studies show the level of biodiversity management mostly based on external reporting (Boiral 2016, Maroun et al. 2018, Lambooy et al. 2018). Reporting, however, is a way to show the results externally, but does not show all aspects of practices. This study is able to show a deeper picture of the case study companies and their practices and the measures that are taken in companies to minimize their impacts on biodiversity. This study also shows the most challenging parts of biodiversity management that need to be solved.

Based on this study, my view is that biodiversity management in companies will increase in the future quite rapidly. A lot remains to be done in the future, as most companies are only beginning their journey in this topic. Especially the main difficulties shown in this study need to be solved in order for the management level of biodiversity to increase in general. Main challenges include for example finding suitable indicators and measuring the impacts on biodiversity. Companies also need to have biodiversity management plans and they need to be sure that the topic is internalized in a necessary manner in the company. Otherwise, the plans will not be followed. Companies do not seem to have vast resources internally, indicating that external resources may be needed. However, I do not see that the current issues would be too difficult to overcome as a lot of knowledge is already available, there are some frameworks that can be used. It also seems that the urge to solve the challenges related biodiversity management is rather high.

As all companies are not willing to be forerunners in this respect, and to ensure that biodiversity is considered more thoroughly in all companies, regulation is needed. Regulatory instruments will be important to guide the development and to indicate the necessity to consider biodiversity among other topics. It is also promising that some of the case companies already had experience of biodiversity offsetting, and all gave a positive sign for them in the future as well. Introducing new regulation may take time and therefore also faster solutions, such as requirements from financial institutions are necessary. It is good to see that the finance sector is already playing an important role, and it can be assumed that the requirements will get even tighter.

In the future, the study could be expanded to include several companies from a certain sector to get a deeper view of the management practices and to understand if and how they differ. It would also be interesting to gain a deeper understanding of the costs and cost savings from biodiversity management by using for example qualitative methods. Also, as biodiversity compensations are introduced in the future, it would be interesting to know about the costs on companies or whether they could even bring cost savings to companies.

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## Appendix 1

# Questionnaire on Biodiversity Management

\* Pakollinen

### Background information

1. Name of the Company \*

2. Role of the respondent \*

## Managing biodiversity in your company

Biodiversity means the variety of life on Earth in all its forms (species, ecosystems). Biodiversity loss means the decrease of species or ecosystems.

3. To which of the next drivers of biodiversity loss your company has direct impact on?

\*

*Biodiversity loss means the decrease of species or ecosystems.*

Land- and Sea Change-Use Change

Climate Change

Natural Resource Use and Exploitation

Pollution

Invasive alien species

Muu

4. Does your company manage biodiversity issues?

Yes

Not yet, but planning to

No

5. Your company is not managing biodiversity issues currently. What are the reasons for this?

6. Does your company currently have a biodiversity management plan? \*

Yes

No



7. Who (a person or team) is responsible for managing biodiversity in your company? \*

8. How important are the following reasons for your company to manage biodiversity issues? \*

	Not important at all	Somewhat important	Important	Very important
Concern about the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stakeholder demand (staff, consumers, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To secure the licence to operate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Marketing and impact to sales of products/services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Preparing for the coming regulation regarding biodiversity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. On which level does your company manage biodiversity? \*

- On site level
- On company level
- Both on site and company level

Muu

10. What are the benefits of biodiversity management to your company? \*

11. Does your company have biodiversity targets? \*

- Yes
- Planning to have them
- No

12. With which of the following are your company's targets in line with? \*

- No Net Loss (NNL) (NNL means that company tries to have no negative impact on biodiversity in total, e.g. it compensates for the negative impacts)
- Net Gain (NG) (NG means that company tries to impact biodiversity positively)
- Biodiversity related Sustainable development goals (goals 14 and 15)
- I don't know
- 

Muu

13. Does your company have a roadmap on how to achieve your biodiversity targets? \*

- Yes
- No
- I don't know

14. When approximately are you planning to set the biodiversity targets? \*

15. What are the reasons for not having targets for biodiversity? \*

16. In terms of biodiversity management, what aspects are considered difficult in your company? \*

*You may choose several answers.*

Understanding the concept of biodiversity

Measuring biodiversity impacts

Data collection

Building a suitable management plan

Employee commitment to the topic

Reporting

Muu

## Measuring and reporting biodiversity issues

17. Do you have some metrics for biodiversity, or how do you follow the development and success on this topic? What are the metrics you have? \*

18. Has your company calculated its impact on biodiversity? \*

*E.g. hectares of land or amount of species it impacts.*

Yes

No

I don't know

19. Respect to what has your company calculated its biodiversity impact? \*

*E.g. hectares of land or amount of species it impacts.*

## Biodiversity among other environmental sustainability issues

20. Do you currently consider biodiversity issues to be more, equal or less important to your company than climate issues? \*

- Biodiversity issues are much more important
- Biodiversity issues are a bit more important
- Biodiversity and climate issues are equally important
- Climate issues are a bit more important
- Climate issues are much more important

21. How do you see that attitude towards biodiversity issue management will develop in the sector of your company? \*

## Economic aspects of biodiversity and biodiversity offsetting

22. Do you see that biodiversity loss imposes/ might impose economic or other risks to your company now or in the future? \*

*Choose all applicable options.*

- Yes, economic risks
- Yes, environmental risks
- Yes, resource or material availability related risks
- Yes, operational risks
- Yes, social risks
- No risks

Muu

23. Does your company have an estimation how much it would cost to offset biodiversity loss caused by your company? \*

*Offsetting means compensating for the negative impacts though for example a compensation project where the vanishing ecosystems and species are moved to another place.*

- Yes
- No
- I don't know

24. Has your company made biodiversity offsetting e.g. compensated for some or all of its biodiversity impacts? \*

- Yes
- No
- I don't know

25. If yes, does your company make the compensations itself or are you partnering with another operator? \*

Company itself

With a partner

26. Does your company consider voluntary biodiversity offsetting as a possibility for the company to mitigate its negative impacts on biodiversity? \*

Yes

No

Maybe

I don't know

## Biodiversity consulting services

27. Which of the following consultancy services has your company used in biodiversity related questions in the past 5 years? \*

*Choose all applicable options.*

- Strategic consulting, such as biodiversity roadmap planning
- Locally provided environmental studies, such as diverse environmental investigations at site
- Biodiversity risk and opportunity assessment
- Reporting and disclosure services
- Training services for example to staff
- 

Muu

28. What kind of consulting services related to biodiversity management could you consider your company would need from a consultancy company? \*

*Choose all applicable options.*

- Strategic consulting, such as biodiversity roadmap planning
- Locally provided environmental studies, such as diverse environmental investigations at site
- Biodiversity risk and opportunity assessment
- Reporting and disclosure services
- Training services for example to staff
- 

Muu

29. What factors in your opinion are the most important when your company is choosing consultant to help in biodiversity issues? \*