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Aligning policy and science: a teleological analysis of biodiversity accounting and accountability under the European Green Deal

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Abstract

Purpose – This study aims to analyse biodiversity accounting and accountability regimes under the European Green Deal (EGD), focusing on whether both regulations and actions align with the scientific consensus on biodiversity conservation, particularly regarding underrepresented drivers such as land-use change.

Design/methodology/approach – The research uses a teleological methodology, as articulated by Scott Shapiro and Richard Gardiner, interpreting legal texts through their intended outcomes and broader normative objectives. It critically examines the EGD's legislative texts and actions, comparing them with scientific evidence from Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and key literature on biodiversity drivers, policy gaps and regulatory enforcement.

Findings – The study finds that while the EGD encompasses numerous regulations aimed at halting biodiversity loss, it overemphasizes pollution control at the expense of other critical biodiversity loss drivers like land-use change. The analysis reveals a significant gap between EGD regulations and the scientific consensus on biodiversity drivers, highlighting the need for stronger land-use policies, improved enforcement mechanisms and better integration of biodiversity considerations into sectoral policies like agriculture.

Practical implications – The study provides actionable policy recommendations for reforming land-use policies, enhancing enforcement mechanisms and improving corporate biodiversity disclosures. It also outlines a teleological approach to help policymakers evaluate the effectiveness of biodiversity-related regulations in the EGD, ensuring better alignment with scientific recommendations and sustainable practices.

Social implications – By addressing the gap between EGD regulations and the broader scientific consensus on biodiversity drivers, this study promotes more effective biodiversity conservation strategies that will benefit both the environment and society by fostering sustainable land use and reducing ecosystem pressures.



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Originality/value – This research highlights the necessity of aligning policy measures with scientific understanding to enhance biodiversity conservation. It offers original insights into the misalignment between the EGD's regulatory focus and biodiversity loss drivers and outlines clear policy recommendations such as reforming land-use policies, enhancing enforcement and improving corporate biodiversity reporting through frameworks like the Corporate Sustainability Reporting Directive. This study further concludes with necessary future research avenues on biodiversity accounting, regarding anthropocentrism, valuation, telecoupling and equity perspectives.

Keywords European Green Deal, Biodiversity accounting, Biodiversity, European Union, Sustainability accounting, Regulation

Paper type Research paper

1. Introduction

The European Green Deal (EGD), introduced in 2019, represents a policy framework aiming to transform the European Union's (EU) economy towards sustainability and achieving climate neutrality by 2050 (EU-Commission, 2019; Sikora, 2021; Chiti, 2022). A key goal of the EGD is to halt biodiversity loss caused by rapid declines from current production, consumption and lifestyle practices (Brondizio *et al.*, 2019; Hirsch *et al.*, 2020). Human activities have led to rising extinction rates, indicating a potential sixth mass extinction (Ceballos *et al.*, 2015). The main anthropogenic drivers of this biodiversity loss are land and sea use change, direct exploitation of organisms, climate change, pollution and invasive alien species (Díaz *et al.*, 2015; EU-Commission, 2020a; Hirsch *et al.*, 2020). Importantly, these drivers are closely tied to societal cultures, beliefs, consumer habits and production practices as indirect drivers of biodiversity loss (Millennium Ecosystem Assessment Board, 2005; Brondizio *et al.*, 2019).

Biodiversity, encompassing genetic, species and ecosystem diversity, is essential for maintaining ecological balance and ensuring the resilience of natural systems (Wilson, 1988; UN, 1992). Furthermore, biodiversity provides innumerable benefits for humans. These benefits, known as ecosystem services, are crucial to our survival and well-being. Ecosystem services can be classified into four categories: providing, regulating, cultural and supporting (Millennium Ecosystem Assessment Board, 2005). These services thus encompass vital resources such as food, construction materials, pharmaceuticals and renewable energy sources. Regulatory ecosystem services include climate regulation, soil and water management, natural hazard protection and pollination. Cultural services contribute to human well-being through aesthetics, recovery and education. All these services are underpinned by supporting services such as nutrient recycling (Costanza *et al.*, 1997; Boyd and Banzhaf, 2007). Diversity at all levels – genes, species and ecosystems – enables these services to function efficiently and remain resilient (Jones and Solomon, 2014; Atkins and Macpherson, 2022).

Recognizing the importance of biodiversity, the EU has established numerous regulations, directives and strategies to support its recovery through the EGD. The sheer number and complexity of these regulations can be overwhelming, and differences in views on topics like the anthropocentric or non-anthropocentric question (Jones and Solomon, 2013) are adding confusion and obscure to the path forward for biodiversity accounting. Moreover, ongoing EU developments accentuate the urgent need to engage with biodiversity accounting (Addison *et al.*, 2020; Raar *et al.*, 2020; Kennedy *et al.*, 2022). These include the publication of the European Sustainability Reporting Standards (ESRS), envisioning a phase-in period for biodiversity standard ESRS E4 (EU-Commission, 2023c) and the closely contested nature restoration law vote in the European Parliament (EU-Parliament, 2023).

However, the effectiveness of EGD in impacting biodiversity is extensively investigated in an agricultural context (Wrzaszcz and Prandecki, 2020; Fayet *et al.*, 2022). The influence of the EGD on biodiversity accounting approaches, specifically in terms of regulatory measures and practical actions, remains currently underexplored. This article aims to assess whether, and to what extent, the EGD has influenced biodiversity accounting approaches, scrutinizing both the regulations and actions that have emerged in its wake.

The relevance of this research is underscored by the urgent need to align policy measures with the latest scientific understanding of biodiversity loss drivers. This study aims to assess whether the EGD's regulations and actions align with the scientific consensus on biodiversity conservation. We critically examine the EGD's legislative texts and documents to evaluate their effectiveness in supporting biodiversity. To address this effectiveness, we look at scientific evidence as provided by the general consensus in the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). The IPBES is an independent intergovernmental body established to strengthen the interface between science and policy on issues related to biodiversity and ecosystem services. IPBES's reports, such as the Global Assessment Report on Biodiversity and Ecosystem Services, provide comprehensive scientific evaluations on the drivers of biodiversity loss and their impacts, serving as a crucial reference for aligning policy and regulatory frameworks with scientific consensus (Brondízio *et al.*, 2019).

In particular, we ask:

How effectively do the European Green Deal regulations and resulting actions, related to drivers of biodiversity loss, align with the scientific consensus on these as outlined by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)?

Our approach aims to close the gap between policy intent and its impact on biodiversity. To achieve this, we adopt a teleological methodology – drawing on the seminal works of Shapiro (2011) and Gardiner (2015) – which emphasizes the importance of understanding the purpose and goals behind legal texts. Shapiro (2011) advocates for interpreting regulations through the lens of their intended outcomes, while Gardiner (2015) further highlights the necessity of aligning legal interpretations with broader normative and moral objectives.

After a detailed exploration of the theoretical background and insights into the methodological setup, we deliver our insights in the following three sections. Section 4 presents the findings, emphasizing significant gaps in the alignment between EGD regulations and the key drivers of biodiversity loss. Section 5 then evaluates these findings against the EGD's stated objectives, proposing actionable recommendations to enhance regulatory alignment with biodiversity goals. Section 6 provides conclusions on the broader implications for biodiversity accounting and accountability, underscoring the need for integrated policy measures to address interconnected environmental and social challenges. Section 7 outlines key avenues for future research, focusing on anthropocentrism, valuation, telecoupling and equity.

2. Background

2.1 *The European Green Deal, biodiversity and its relevance for accounting scholars*

The EGD is a policy initiative launched by the European Commission in December 2019, aiming to make Europe the first climate-neutral continent by 2050 (EU-Commission, 2019). This ambitious plan encompasses a wide range of actions and regulations designed to reduce greenhouse gas emissions, promote sustainability and foster economic growth through green technologies and practices. The EGD targets all major sectors of the economy, including energy, industry, transport, agriculture and forestry, with legally binding goals such as

reducing net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels (Schütze and Stede, 2021).

A significant aspect of the EGD is its focus on biodiversity, aiming to halt and reverse biodiversity loss through initiatives like the EU Biodiversity Strategy for 2030 (EU-Commission, 2020a). This strategy is essential for the EGD and emphasizes the protection and restoration of ecosystems, the establishment of protected areas and the integration of biodiversity considerations into all EU policies.

The EGD can be closely related to the broader academic research field of accounting and accountability through several dimensions. This connection can be established by examining how the EGD's objectives and implementation mechanisms align with key principles and emerging trends within these fields.

Firstly, the EGD requires major changes in how environmental impacts are measured, reported and managed. These changes ensure organizations include environmental costs in their financial statements, influencing decision-making (Gray, 2002; Schaltegger and Burritt, 2010). Integrating environmental considerations into financial frameworks supports the EGD's goals of transparency and accountability. The initiative's emphasis on sustainability reporting aligns with the principles of environmental and sustainability accounting, fostering a culture of responsibility towards ecological impacts within corporate strategies (EU-Council, 2022b).

Secondly, the EGD underscores the need for accountability and transparency in achieving its targets, which resonates with academic discussions on corporate governance (Bovens, 2007). The regulatory environment shaped by the EGD demands rigorous disclosure practices, which are essential for stakeholders to assess corporate performance in relation to sustainability. The EGD promotes the integration of environmental, social and governance (ESG) factors into corporate reporting, thus enhancing the accountability of organizations. This alignment with governance principles ensures that companies are not only complying with legal requirements but also contributing to broader societal and environmental goals (EU-Council, 2022b).

Thirdly, the EGD introduces stringent regulatory requirements aiming to reduce carbon emissions and promote sustainability. Compliance with these regulations is a key interest area in accounting, particularly concerning risk management and internal controls (Simnett *et al.*, 2009). Organizations must navigate these complex regulatory landscapes to mitigate risks associated with non-compliance and to capitalize on incentives for sustainable practices. The EGD's comprehensive approach to climate and environmental regulation necessitates robust accounting systems to manage these risks effectively and to ensure that corporate strategies are aligned with regulatory expectations (EU-Council, 2022b).

2.2 Landscape on social and environmental accounting research

Biodiversity has emerged as a crucial aspect (Cuckston, 2019b; Atkins and Maroun, 2020) of the dynamic landscape of social and environmental accounting research (SEAR) (Lehman and Kuruppu, 2019; Parker, 2019; Qian *et al.*, 2021). To understand the forces driving research on biodiversity accounting, we first need to revisit contemporary approaches to SEAR. With unwavering dedication, scholars are charting the nuances of the SEAR domain (Bebbington and Unerman, 2020; Larrinaga and Bebbington, 2021; Bebbington and Rubin, 2022), emphasizing its relevance to today's multifaceted socio-environmental scenarios. For example, Lehman and Kuruppu's (2019) comprehensive framework unravels the contemporary trajectories of SEAR. Challenging the predominantly corporate-focused lens of SEAR in liberal democracies, they pose the pertinent question of how SEAR resonates within the diverse socio-economic tapestry, particularly in the global South. In response,

Qian *et al.*'s (2021) examination of SEAR practices in developing nations reveals an unexpected scarcity of studies addressing the distinct challenges faced by these regions. However, Deegan (2017) highlights SEAR's adaptability over the past quarter-century, encompassing both critical and managerial viewpoints. This historical perspective, enriched by Brander's (2022) advocacy for normative SEAR, underscores the need for analytical and directive scholarly endeavours.

As Brown and Tregidga (2017) and Tregidga and Laine (2022) elaborate, SEAR is not a singular, isolated domain. Drawing inspiration from Jacques Rancière, they advocate challenging established norms by shifting from consensus- to dissensus-based approaches. This call for a reimagined SEAR is echoed in Larrinaga and Bebbington's (2021) exploration of the early stages of sustainability reporting in the 1990s. Adams and Larrinaga (2019) further highlight how sustainability accounting and performance engagement with organizations have transformed over recent years, noting their evolving depth and intricacy. Emerging paradigms in sustainability reporting present promising avenues for exploration. For example, Luque-Vílchez *et al.*'s (2023) examination of the Global Reporting Initiative (GRI) underscores key elements such as materiality and comparability. While revealing existing challenges, the GRI discourse also paves the way for future inquiries. Similarly, O'Dwyer and Unerman's (2020) critical assessment of the Task Force on Climate-Related Financial Disclosures reporting emphasizes the need for pioneering research to navigate its inherent complexities. These relate closely to the complexities of accounting for natural capital and biodiversity in general, as reflected in the recent establishment of the Task Force for Nature-Related Financial Disclosures.

In summary, the SEAR domain, with its rich and intertwined tapestry of theory, application and societal implications, evidently stands at the threshold of revolutionary advancements in accounting and organizational change more generally (Brown and Tregidga, 2017; Atkins and McBride, 2021; Brander, 2022; McLaren and Appleyard, 2022). Climate change and biodiversity are at the forefront of this (r)evolution, heralding a new era of sustainable and accountable research and practice.

One of the most prominent streams in biodiversity accounting is on accountability. Sun and Lange's (2022) research on the biodiversity reporting practices of China's largest dairy company, the Yili Group, offers a window into the complexities of corporate biodiversity disclosures. Their findings suggest a nuanced landscape in which symbolic gestures often overshadow substantial commitments. Rimmel (2021) introduces a novel approach to extinction accounting, advocating the use of the International Union for the Conservation of Nature categories. His case study of a Nordic Zoo underscores these categories' potential for enhancing biodiversity disclosures. Maione *et al.* (2023) further provide a comprehensive literature mapping of biodiversity accounting, identifying critical thematic clusters and highlighting the evolving research trends in this field. The collaborative research by Roberts *et al.* (2022) further enriches the discourse, highlighting the symbiotic relationship between corporate accountability and species protection. Adler *et al.* (2020) foreground the significance of global initiatives, such as the United Nations' "Decade on Biodiversity". Their comparative analysis of Australian mining companies' biodiversity disclosures before and after this declaration provides critical insights into evolving corporate responses to global biodiversity imperatives. Adler *et al.* (2018) exploration of the biodiversity reporting practices of Fortune Global companies underscores the challenges and progress in this domain. Delving deeper into the theoretical underpinnings of biodiversity accounting, Cuckston's (2017, 2018, 2019b, 2019a) seminal works navigate the reconciliation of economic development with biodiversity conservation and the role of ecology-centred accounting. Ogilvy *et al.* (2022) demonstrate a natural capital accounting framework suitable

for including primary producers in the environmental performance reporting of supply chains. Historical perspectives on accounting for nature are beautifully captured by [Atkins and Maroun \(2020\)](#), who trace the roots of biodiversity accounting to the 18th-century *Naturalist's Journals* of Gilbert White, and by [Lehner and Kyriacou \(2023\)](#), who revisit Humboldt's visually stunning illustrations as some of the first environmental accounts, and draw intriguing parallels with contemporary practices. Additionally, [Vignieri \(2023\)](#) illustrates how collaborative platforms may leverage active community engagement for climate change adaptation to implement biodiversity preservation policies.

After focusing on the major research streams, it is crucial to identify the four primary methods of biodiversity accounting: ecosystem services approach, natural capital approach, natural inventory and extinction accounting. Furthermore, it is important to understand the two major ethico-ontological perspectives of anthropocentric and non-anthropocentric. Anthropocentric perspectives prioritize human interests and values, advocating for the utilization of natural resources primarily for economic growth and development. Conversely, non-anthropocentric viewpoints recognize the intrinsic value of all living beings, emphasizing the responsibility to protect and preserve the environment for the benefit of future generations and the functioning of ecosystems ([Naess, 1973](#); [Helm and Hepburn, 2012](#); [Jones and Solomon, 2013](#); [Spangenberg and Settele, 2016](#)).

We extend [Jones and Solomon's \(2014\)](#) and [Kennedy et al.'s \(2022\)](#) comparison of ecosystem services and natural inventory to incorporate the other two approaches, prompted by encountering these approaches in various initiatives, EU policies and recent literature. [Table 1](#) presents an adaptation and expansion of [Kennedy et al.'s \(2022\)](#) analysis.

Building on the discussion of biodiversity accounting and the evolving frameworks within SEAR, it is important to critically examine the limitations of market-based conservation approaches and sustainability reporting. While SEAR has increasingly focused on the complexities of biodiversity reporting and corporate accountability, it is necessary to acknowledge that many of these frameworks are grounded in neoliberal policies, which often emphasize financial mechanisms and market-based solutions. This emphasis raises important questions about the efficacy of these approaches in achieving true conservation outcomes, as explored in the following critique of payments for environmental services (PES) and the limitations of sustainability reporting frameworks.

One major criticism of market-based conservation approaches, such as PES, is their inherent reliance on neoliberal principles, which often fail to achieve conservation outcomes while exacerbating social inequalities. As [Fletcher and Büscher \(2017\)](#) argue, these programmes frequently overlook the structural inequalities that drive environmental degradation, instead proposing market solutions that commodify nature without addressing the root causes of ecological crises. This market-centric approach may prioritize profit-making over genuine conservation, as the underlying logic assumes that the same neoliberal mechanisms that contribute to environmental destruction can be used to save it. This contradiction limits the efficacy of market-based conservation, and evidence shows that such programmes often fall short in their conservation goals while reinforcing economic disparities ([Fletcher and Büscher, 2017](#)).

In addition to these concerns, market-based conservation approaches like PES have been criticized for their oversimplification of ecological value, reducing complex ecosystems to marketable "services" that can be traded or offset. [McAfee \(2012\)](#) highlights the problematic nature of assigning monetary value to ecosystem services, which may lead to the commodification of nature and distort the inherent ecological, cultural and social significance of biodiversity. Such approaches risk marginalizing communities that rely on local ecosystems, as these communities may lack the financial resources to compete in a market-driven conservation

Table 1. Accounting and accountability approaches to biodiversity

Approach	Ecosystem service approach	Natural capital approach	Natural inventory approach	Extinction accounting
Scholars	Costanza <i>et al.</i> (1997); Boyd and Banzhaf (2007); Bennett <i>et al.</i> (2009); Feger and Mermet (2017)	Gray <i>et al.</i> (1993); Whitaker (2018); Anderson (2019a); (Anderson, 2019b)	Jones (2003); Siddiqui and Jones (2013); Jones and Solomon (2014)	Atkins and Maroun (2018); Atkins and Macpherson (2022)
Units of measurement	Flows	Stocks and flows	Stocks	Extinction rate of species
Perspective	Anthropocentric	Anthropocentric	Non-anthropocentric	<i>Hybrid</i> : anthropocentric and deep ecological
Valuation	Financial	Financial	Quantitative	<i>Hybrid</i> : quantitative and qualitative
Source: Authors' based on Kennedy <i>et al.</i> (2022) and other literature				

landscape. By focusing on market mechanisms, PES and similar programmes may prioritize financial transactions over long term, sustainable stewardship of natural resources, further complicating the achievement of conservation objectives (McAfee, 2012).

Moreover, the effectiveness of sustainability reporting frameworks has also come under scrutiny. Sullivan (2013) critiques sustainability reporting for its potential to serve as a symbolic gesture rather than a meaningful driver of change. While companies may comply with reporting requirements, these reports often lack transparency and fail to address the full extent of environmental impacts. Additionally, the focus on financial metrics within these frameworks can overshadow more critical concerns, such as social equity and long-term ecological health. This has led to concerns that sustainability reporting may be used to enhance corporate reputations without leading to substantial environmental improvements, echoing the broader criticisms of neoliberal environmental policies that prioritize economic incentives over genuine sustainability (Sullivan, 2013).

3. Methodology

3.1 Overall logic

This research adopts a teleological approach, which is grounded in the paradigm of purposive analysis. The teleological perspective is particularly suitable for this study as it focuses on understanding the underlying goals and intended outcomes of EU policies, regulations and, specifically, actions related to biodiversity. It should be noted at this stage that “actions” here is a technical term of EU regulations and should not be understood in the sense of organizational theory. The various key components of EU actions under the EGD include legislative measures to enforce climate goals, financial instruments to support sustainability projects, strategic initiatives such as the EU Biodiversity Strategy for 2030, collaborative projects and systems for monitoring and reporting progress to ensure transparency and accountability.

By examining the motivations behind these regulations and related actions, we aim to assess their effectiveness in addressing the drivers of biodiversity loss, as identified by the IPBES (Brondízio *et al.*, 2019).

The methodological nature of a teleological analysis is particularly suited for examining the EGD to determine its effectiveness in relation to science-based drivers for biodiversity loss. Teleological analysis focuses on the purposes and goals that a piece of legislation is intended to achieve, making it a powerful tool for interpreting regulatory frameworks like the EGD, which aims to address complex environmental challenges. By prioritizing the end goals, this method aligns well with the multifaceted and forward-looking objectives of the EGD. Scott Shapiro’s and Richard Gardiner’s works on teleological analysis provide a robust foundation for this approach. Shapiro (2011) underscores the importance of understanding the intended purposes behind legal texts to derive meaningful and actionable interpretations. Gardiner (2015) further elucidates that teleological interpretation necessitates a deep engagement with the text, its context and the broader normative goals it seeks to serve.

Applying this methodology to the European biodiversity legislation involves a detailed textual analysis to discern how the legislation’s provisions align with scientific recommendations for mitigating biodiversity loss. This includes interpreting key terms and clauses considering the overarching goals of the EGD, which are rooted in halting biodiversity loss and restoring ecosystems by 2050, which served as benchmarks for our evaluation.

Moreover, the teleological approach incorporates a critical examination of the normative versus moral outcomes of the EGD. Shapiro’s argumentation logic suggests that while normative outcomes focus on compliance and the achievement of legislative goals, moral outcomes reflect the ethical implications and the broader impact on society and the

environment. Gardiner’s insights support this by emphasizing the importance of aligning legal interpretation with the ethical dimensions of environmental sustainability.

To evaluate the normative effectiveness of the EGD and related policies in mitigating biodiversity loss, we conducted a comprehensive analysis that compared regulatory frameworks and actions before and after the implementation of the EGD. This process involved several key stages, which will be explained in more detail in the subsequent sections.

3.2 Document selection and access

An integral aspect of our methodological framework is meticulous content analysis of a diverse array of documents, with a pronounced emphasis on elucidating their intrinsic connections with the domain of biodiversity. The data set encompassed a diverse range of sources, including policy briefs, regulatory texts and scientific reports, providing a holistic view of the EU’s biodiversity strategy and its intended outcomes. The resulting documents encompass a spectrum ranging from EU laws, accounting regulations as well as actions aligned with the EU’s biodiversity strategy, which collectively serve as essential resources for unravelling the EU’s stance on biodiversity.

We began our search for biodiversity-related legislation by building on the content found in the works of [Hermoso et al. \(2022\)](#) and [Bouwma et al. \(2018\)](#), which provided a strong foundation for identifying relevant EU laws and actions. These foundational studies, along with insights from the EU’s biodiversity strategy, shaped our initial selection criteria, helping us to focus on legislation that aligns with the core objectives of biodiversity conservation. From there, we expanded our selection by incorporating additional legislation and actions, as detailed in [Tables 2](#) and [3](#).

To access EU legislation, we used EUR-Lex, the official gateway for EU law and public documents. This methodological approach was aligned with the overarching research design, facilitating screening, analysis and summarization of each piece of legislation to distil its essence. In this phase, each legislative enactment was meticulously categorized by the Directorate-General (DG) responsible and the form of publication. The result of this process was a detailed timeline that included all the legislations that were included in the scope of the study.

In parallel, we used the EU’s Online Biodiversity Action Tracker (<https://dopa.jrc.ec.europa.eu/kcbd/actions-tracker/>) as a key resource for identifying and cataloguing biodiversity-related actions. This process mirrored our approach to legislation, with a focus on understanding the

Table 2. Analysis of policies in year Group A, 1992–2018

Directorate-General	Name of policy	Publication type
Environment	Birds	Directive
	Habitats	Directive
	Timber	Regulation
	Water Framework	Directive
	Invasive Alien Species	Regulation
	Marine Strategy Framework	Directive
Health and food safety	Food Information to Consumers	Regulation
	Sustainable Use of Pesticides	Directive
Agriculture and rural development	Organic Production and Labelling	Regulation
Climate action	Land Use, Land Use Change and Forestry	Regulation
Energy	Use of Energy from Renewable Sources	Directive
Maritime affairs and fisheries	EU Common Fisheries Policy	Regulation

Source: Authors’ own creation

Table 3. Analysis of policies in year Group B, 2019–2023

Directorate-General	Name of policy	Publication type
Environment	EU Biodiversity Strategy for 2030	Communication
	EU Pollinators Initiative	Communication
	EU Soil Strategy for 2030	Communication
	New Circular Economy Action Plan	Communication
	New EU Forest Strategy for 2030	Communication
	Revision of the EU Action Plan Against Wildlife Trafficking	Communication
	Nature Restoration	Proposal
	Action Plan: Towards Zero Pollution for Air, Water and Soil	Communication
Financial stability, financial services and capital markets union	Sustainability-related Disclosures in the Financial Services Sector	Regulation
	Sustainable Europe Investment Plan	Communication
	Taxonomy	Regulation
	Corporate Sustainability Reporting	Directive
	European Green Bond	Proposal
Agriculture and rural development	Action Plan for the Development of Organic Production	Communication
	Common Market Organization	Regulation
	Financing the CAP	Regulation
	CAP Strategic Plan	Regulation
Health and food safety Communication	Farm to Fork Strategy	Communication
	European Green Deal	Communication

Source: Authors' own creation

primary drivers behind each action. We carefully screened and categorized the actions, ensuring their relevance to the broader EU biodiversity strategy. All these insights were systematically organized in an Excel format, enriching our data set and providing a strong foundation for in-depth analysis.

3.3 Coding process

The process of identifying motivators for biodiversity legislation in the EU was conducted through a structured coding process. Our methodology relied on inductive coding, which enabled us to extract and categorize key themes from a wide array of EU biodiversity-related documents. The initial coding stage involved a detailed reading of policy documents, particularly those within the scope of the EU's biodiversity strategy. We systematically analysed these texts, focusing on their titles and summaries and identified recurrent themes. These themes served as the basis for developing broader categories that represent key motivators in EU biodiversity policy:

- *Driver minimization:* This motivator encapsulates the overarching objective of curtailing the primary drivers of biodiversity loss, encompassing changes in land and sea use, direct exploitation of organisms, climate change, pollution and the proliferation of invasive alien species. This objective illuminates the fundamental drivers of the European Commission's legislative initiatives in this realm.

- *Protection*: This motivator pertains to all legislative endeavours conceived with the explicit aim of safeguarding terrestrial and marine ecosystems and preserving endangered species such as pollinators.
- *Financing*: Within this motivator, we include legislation that places significant emphasis on financing plans or commitments, often accompanied by reporting regulations that shed light on financial or non-financial consequences.
- *Governance*: This motivator is distinguished by communications or legislative efforts aimed at rejuvenating existing policies and establishing robust frameworks and strategies spanning multiple DGs.
- *Support*: This refers to laws with goals and actions that impact indirectly on biodiversity, although their connections are not explicit.
- *Restoration*: This motivator is associated with endeavours directed towards rehabilitating terrestrial and marine areas, and species that are currently in an unacceptable state of conservation.

The coding process allowed for the identification of broader patterns and trends in EU biodiversity policy, facilitating a comparative analysis between pre- and post-EGD legislation. By organizing the data into these categories, we were able to assess the extent to which EU biodiversity policies align with scientific recommendations, such as those outlined by [Brondizio et al. \(2019\)](#). This analysis also highlighted existing gaps in policy and enforcement mechanisms, suggesting areas for future legislative improvements.

Building on this analysis, we applied a structured coding process to key EU regulations to further validate our findings. For example, the Taxonomy Regulation ([EU-Council, 2020](#)) was coded under the “Financing” motivator, as it primarily aims to redirect financial flows towards sustainable investments. The regulation’s objective is to establish “a technically robust classification system at Union level to establish clarity on which activities qualify as ‘green’ or ‘sustainable’” ([EU-Council, 2020](#)). This emphasis on sustainable finance clearly aligns with the motivator classification. As a point in case, the Action Plan: Towards Zero Pollution for Air, Water and Soil ([EU-Commission, 2021a](#)) was coded under the “Driver Minimization” motivator, given its explicit focus on reducing pollution, a key driver of biodiversity loss. The action plan, for instance, recognizes that “pollution threatens biodiversity and significantly contributes to the ongoing mass extinction of species” ([EU-Commission, 2021a](#)). This systematic coding approach ensured that each regulation was aligned with its intended environmental objectives, thereby enhancing the transparency and robustness of our analysis.

4. Findings

The EU shapes regulatory and strategic policies for its member states, establishing regulations that harmonize laws across all states. In addition, it develops directives, which set out goals for member states, granting them autonomy to achieve these goals in ways they find suitable. The EU also issues communication documents to delineate political priorities and initiate public consultation. In instances where a regulation is effective yet requires modification, or where a new regulation is being devised, the EU issues proposals to stimulate further public consultation.

4.1 European Union biodiversity policy framework

To understand the scope of existing and forthcoming biodiversity laws, we categorize them by year of adoption, primarily because many of these regulations are currently under revision

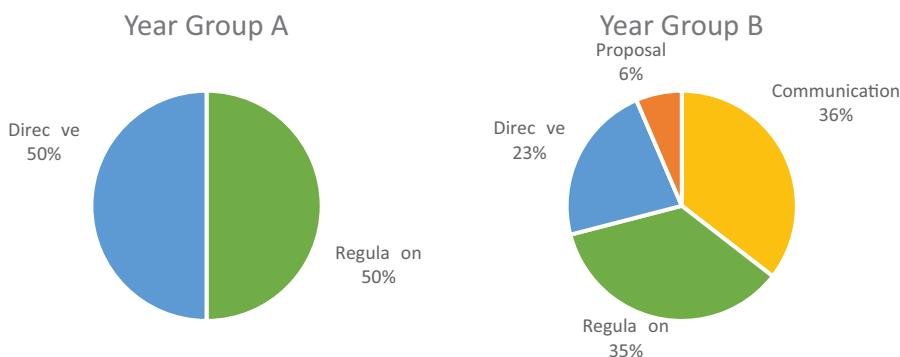
as part of the EGD. Published in 2019, the Green Deal outlines the EU's ambition to achieve climate neutrality by 2050. Over half of EU publications relating to biodiversity have been published since the announcement of the Green Deal. Consequently, we distinguish between Year Groups A (1992–2018) and B (2019–2023).

4.2 Temporal analysis of biodiversity legislation

Interestingly, these groups have significantly different time horizons, indicating the EU's recently intensified efforts to develop a sustainable economy. This is further reflected in the distribution of publication types in the two-year groups, as illustrated in [Figure 1](#). While all publications in Year Group A have legal commitments, many in Year Group B are still under strategic consultation or have been communicated only recently.

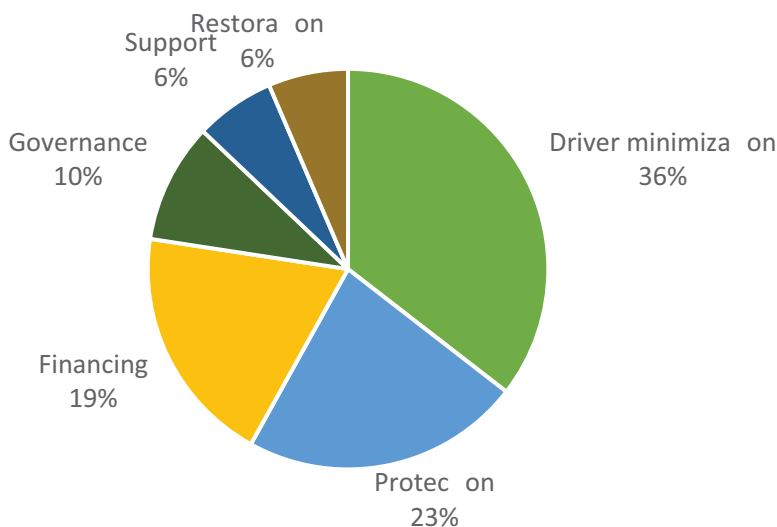
We also examined the teleology of legislation, resulting in the identification and categorization of six motivating factors. The “driver minimization” category contains publications aimed at reducing the primary direct causes of biodiversity loss. The laws in the “protection” and “restoration” motivator categories are closely related because the first aims to protect regions and species, and the second seeks to rehabilitate hazardous or overexploited ecosystems and species for subsequent protection. The fourth motivator, “financing”, covers all laws dealing with financing the transition to a system favourable to biodiversity or directing financial flows into such investments. “Governance” and “support”, the remaining two motivators, deal with the strategic framework of the biodiversity strategy and with laws that relate indirectly to biodiversity but will enhance the other categories. [Figure 2](#) illustrates the distribution of motivators in the two-year groups.

To glean insights into their intentions and origins, we assigned the selected legislation and communications to their corresponding DGs within the European Commission, as shown in [Tables 2](#) and [3](#). DGs are the Commission's divisions in charge of specific policy domains, each with distinct resources, organizational structures and scopes of authority. They are not merely technical departments providing objective knowledge ([Ershova, 2019](#); [Rauh, 2020](#)) but units with varying degrees of influence and distinct characteristics influencing proposed legislation. Several factors affect the success of a proposal, including the policy's complexity, the DG's age and expertise, the policy's coordination within the Commission and the European Parliament's influence on its development. A policy proposal tends to be more successful if the European Parliament is not involved in its creation, the policy is less



Source: Authors' own creation

Figure 1. Distribution by publication type

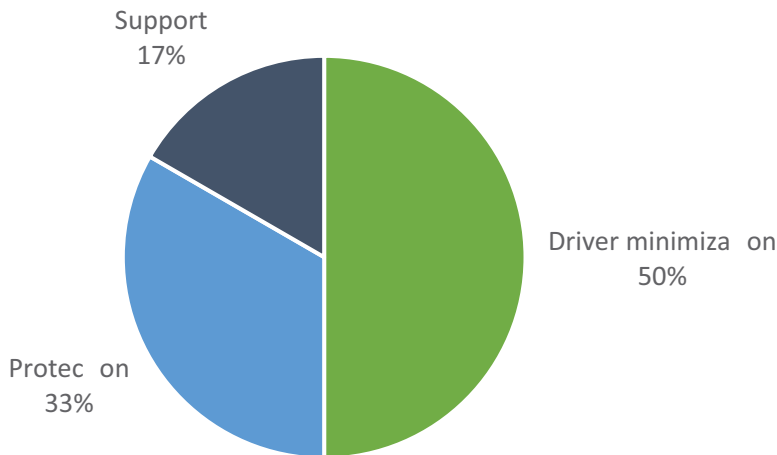


Source: Authors' own creation

Figure 2. Distribution of motivators

complex, the DG has deep knowledge and has been in operation for an extended period, and there are fewer conflicts within the Commission.

As shown in Figure 3, half of these laws were established to minimize the drivers of biodiversity loss. Most laws in this category address the key driver, the direct exploitation of organisms. Notable examples include the Common Fisheries Policy (CFP), which seeks to



Source: Authors' own creation

Figure 3. Distribution of motivators in year group A

promote sustainable fishing practices to prevent overfishing in European aquatic ecosystems, and the Timber regulation, which aims to stop imports of wood from illegal logging, thereby encouraging sustainable forest management to curb overuse of timber. The Regulation on the Use of Renewable Energy is another example that establishes criteria against over-exploitation, particularly concerning the production and origin of biofuels (EU-Council, 2010b, 2013, 2018). From this analysis, it can be inferred that multiple DGs are involved in addressing the drivers of biodiversity loss.

4.2.1 Year Group A: Early efforts and legal commitments. Before examining relevant publications more closely, an overview of regulations enacted between 1992 and 2018 is warranted. The DG for Environmental Affairs issued most biodiversity-related legislation during this period, followed by the DG for Health and Food Safety with two regulations. The DGs for Agriculture and Rural Development, Climate Action, Energy and Maritime Affairs and Fisheries each released one regulation.

The DG Environment was the most proactive in addressing biodiversity issues from 1992 to 2018. The Natura 2000 programme, established in 1992, aimed to protect and promote the long-term survival of European member states' most valuable and endangered species and habitats. This programme was co-created through the Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (Habitats Directive) and the Directive on the Conservation of Wild Birds (Birds Directive). Together, they cover 18% of European territory, making them the world's largest cohesively connected network of ecosystems (EU-Council, 1992, 2010a; Boćkowski *et al.*, 2022). These directives are associated with the "protection" motivator, given their common objective of conserving Europe's ecosystems. Despite the EU's early initiatives, including the Birds directive in 1979 and the subsequent Natura 2000 network, biodiversity conservation targets were not met. Boćkowski *et al.* (2022) attribute this failure to several obstacles, including the absence of a clear vision and governmental support at all levels (local, regional and national), low stakeholder awareness of protected areas' value, challenges in reconciling economic, social and ecological preservation goals and policymakers' misunderstandings.

In 2014, the EU introduced its Regulation on the Prevention and Management of the Introduction and Spread of Invasive Alien Species. This regulation lists species considered invasive in the EU, implements measures for border controls and trade and raises public awareness. Working on the precautionary principle, it aims to prevent potential adverse effects, given the uncertainty surrounding the impact of certain species on humans and biodiversity in various environments (EU-Council, 2014). This regulation, designed to inhibit the introduction of invasive alien species, falls into the "driver minimization" motivator category. The surge in global trade networks, increased individual mobility, ongoing environmental degradation and rising temperatures have all contributed to the introduction of invasive alien species (Brondizio *et al.*, 2019).

This regulation, designed to inhibit the introduction of invasive alien species, falls into the "driver minimization" motivator category. The surge in global trade networks, increased individual mobility, ongoing environmental degradation and rising temperatures have all contributed to the introduction of invasive alien species (EU-Council, 2010b). However, its impact on illicit forest products has been limited, as Birchby *et al.* (2021) report in their European Union Timber Regulation (EUTR) fitness check. They suggest that a stricter, simpler due diligence system and broader product coverage might enhance EUTR's performance. In response, the European Commission has proposed a rule specifically targeting exports of goods and commodities associated with deforestation and forest degradation and their availability in the EU market. Besides illegally harvested timber and wood-based products, the proposal also encompasses goods such as soy, palm oil, beef and

cocoa, which contribute to deforestation and forest degradation. This proposal aims to address biodiversity loss, of which deforestation is a primary cause. To accomplish this, the regulation's scope will be expanded to mandate participants in supply chains of forest-risk commodities to report on their due diligence processes (EU-Commission, 2021c). Given its aims and the range of selected goods, this regulation is categorized under the "driver minimization" motivator, the primary driver being the direct exploitation of organisms.

The DG Health and Food Safety, another DG that has issued biodiversity-related legislation, promulgated the Regulation on the Provision of Food Information for Consumers (FIC) and the Directive on Establishing a Framework for Community Action to Achieve the Sustainable Use of Pesticides (SUD). Both are linked to biodiversity issues and are currently under review for proposal by the DG. As detailed in Section 3.3, legislation classified as a "support" motivator is indirectly connected with biodiversity. This applies particularly to the FIC regulation. The SUD directive pertains to the SUD in agriculture and is therefore classified as a "driver minimization" motivator. Currently, pesticide use is regulated by a directive requiring all European member states to formulate national plans and set goals and limits on pesticide usage (EU-Council, 2009). As pesticide use contributes directly to biodiversity loss and human health issues, the European Commission is formulating a regulation to harmonize rules and limits across all member states, with a proposal published in 2022. In conjunction with other strategies and legislation cited in Year Group B (EU-Commission, 2022b), this regulation aims to reduce pesticide use by 50% by 2030, ban hazardous pesticides that exacerbate biodiversity loss and restore Europe's natural capital. These reduction targets are also demanded by "Save Bees and Farmers", a citizens' initiative that has amassed over a million signatories in the EU (Dermine, 2023).

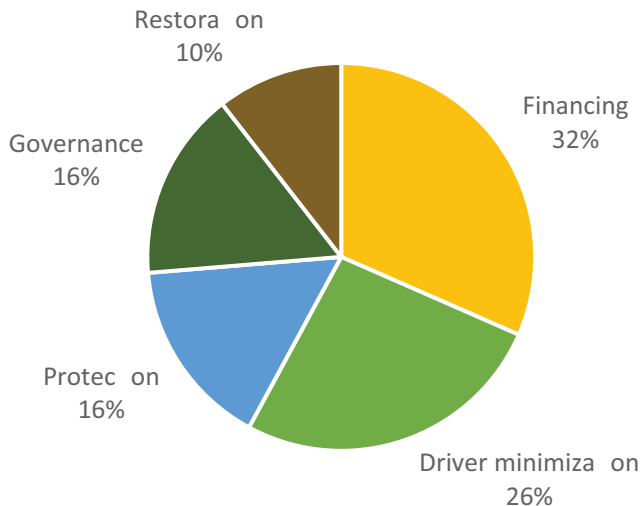
4.2.2 Year Group B: Intensified efforts under the green deal. Focusing on Year Group B, a pivotal influence is the EU's growth strategy, the Green Deal. This prioritizes resource efficiency and circular economy principles in pursuit of a sustainable and equitable continent. According to a communication by the EU-Commission (2019, p. 2):

It is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use.

Prior to the publication of this new EU growth strategy, several policies, referenced earlier in Year Group A, influenced biodiversity. However, the Green Deal has significantly affected existing regulations, prompting reform and publication of numerous new regulations. Table 3 lists the policies analysed in Year Group B from 2019 to 2023 across various DGs. The same DGs as in Year Group A were primarily responsible for releasing laws and plans relating to biodiversity, as shown in Table 3. Furthermore, regulations that may impact on future biodiversity were released by the DG Financial Stability, Financial Services and Capital Markets Union (FISMA), reflecting the Green Deal's attention to sustainable finance and funding mechanisms for the envisioned future (Sikora, 2021). The DG Environment continued to issue the majority of laws in Year Group B, closely followed by DG FISMA.

Interestingly, Figure 4 reveals the domination of financial motivators in Year Group B. Following the EGD, new laws with financial implications emerged, primarily owing to the incorporation of sustainability themes into DG FISMA. The "governance" category, which primarily covers the EU's biodiversity strategy, is another new addition.

The EU Biodiversity Strategy for 2030 is one of the most significant publications in Year Group B, as it delineates the roadmap towards biodiversity recovery and seeks to amalgamate several other regulations, including Natura 2000, Renewable Energy Directive II (RED II), land use, land-use change, and forestry (LULUCF), CFP, Marine Strategy Framework Directive (MSFD), water framework directive (WFD) and invasive alien species (IAS), along



Source: Authors' own creation

Figure 4. Distribution by motivators in year Group B

with several other regulations in Year Group B. This strategy encompasses an intricate network of regulations pertinent to biodiversity, like the complex structure of a spider's web.

As a crucial component of the EGD, biodiversity policy is aligned with the broader goals of the deal. The strategy underpins the governance structure and enumerates its objectives, such as safeguarding 30% of the EU's terrestrial and marine territories and mitigating the dominant threats to biodiversity. Additional goals include preventing biodiversity loss and endeavouring to restore as much biodiversity as is feasible by 2030. Through these objectives, the Commission aspires to engender novel green job opportunities in fields such as sustainable agriculture and nature-based tourism.

The strategy recognizes the principle of natural capital, which is perceived as a tool for valuing and revitalizing nature across the EU. It specifically brings to light a natural capital accounting model that accounts for the life cycle of an organization's products. It also addresses the subject of ecosystem-based management in the fishing sector and underscores the roles of the MSFD and the CFP. It places considerable emphasis on fostering full respect for Indigenous communities and promoting an inclusive approach to participation (EU-Commission, 2020a).

According to [Hermoso *et al.* \(2022\)](#), the strategy's ultimate effectiveness rests on EU member states' ability to strategically orchestrate their implementation of conservation measures amid constrained and uncertain budgets. [Hermoso *et al.* \(2022\)](#) advocate for greater public involvement, resolution of potential clashes with other socio-economic objectives and enhancement of sectoral policies. In essence, they champion compensation for ecosystem service provisions and collaboration between private and public entities. This view is also endorsed by the United Nations, as demonstrated in the post-2020 Global Biodiversity Framework, which sets a target to conserve 30% of the world's land and sea area ([Convention on Biological Diversity, 2022](#)).

Inextricably linked with the Biodiversity Strategy is the proposed regulation on nature restoration. When considered in conjunction with previous frameworks such as Natura 2000, this legislation might be interpreted as an extension of the Biodiversity Strategy. However, its objectives relate more explicitly to restoration, setting a target of restoring 20% of habitats by 2030. Consistent with the underlying strategy, the proposal identifies job creation as a principal objective of the European Commission's pursuit of a more sustainable future. Furthermore, it acknowledges essential methodologies rooted in nature-based solutions to sustain biodiversity, which will deliver valuable ecosystem services for humanity. Data obtained from sensor technology, artificial intelligence, public input and earth observations are viewed by the proposer as pivotal to implementing these measures. This is because the proposed legislation takes a keen interest in stakes and measures for nature restoration and, by extension, applications of accounting techniques for regular reporting (EU-Commission, 2022a).

The habitat directive is intimately tied to the proposed amendments in that it may serve as a vehicle for rectifying existing shortcomings in nature restoration in the EU. Hoek (2022) explains how the proposal tackles issues within the directive, resulting in its constructive development. It establishes standards and objectives, laying down a baseline and setting targets for 2030, 2040 and 2050. The legislation also adopts a more expansive approach to biodiversity, recognizing its existence in ecosystems beyond those covered by Natura 2000, such as urban and agricultural areas.

Hoek (2022) identifies aspects not reformed by the nature restoration law, including the omission of objectives for major pollutants in natural habitats and the lack of a quantified approach to ecosystem connectivity recovery. He contends that there is still ample opportunity to enhance the proposal before its official enactment.

As previously suggested in relation to the DG Environment's legislation, the keystones of the Green Deal – sustainable finance, corporate responsibility for professional practices and monetization of biodiversity-linked indicators – are gaining significance. In an effort to steer financial resources towards sustainable business paradigms and investments, DG FISMA has issued a suite of regulations and directives. This heightened emphasis is reflected in the ascendant role of the finance motivator. DG FISMA's aim is to shape a financial infrastructure that bolsters sustainable growth and actualizes the social and environmental targets of the EGD and related strategies. A critical aspect of these mandates is that they treat sustainability risks, such as climate change and biodiversity loss, as indispensable management responsibilities.

A primary objective for DG FISMA is to enhance transparency, particularly for investors, thereby enabling them to discern opportunities to invest in sustainable business models. The ambition to secure at least one trillion euros to facilitate the transition towards a sustainable EU is highlighted in the Sustainable Investment Plan. The development of a platform for sustainable investments and a novel Green Bond Standard are projected to augment the transparency of sustainable investments (EU-Commission, 2020b).

4.3 Financial mechanisms for biodiversity

The Regulation on Sustainability-Related Disclosures in the Financial Services Sector (SFDR) is DG FISMA's inaugural regulation linked with biodiversity. This aims to standardize the requirements for financial market participants' and advisors' reporting of sustainability risks, impacts and other pertinent information associated with their financial products. Under this regulation, sustainable investment means that the investee complies with good governance principles and that the investment fosters environmental or social objectives. Biodiversity features prominently in these environmental objectives. Financial market participants are required to disclose their sustainability risk management processes

on their websites and to incorporate these risks into their remuneration policies. The rules also provide a crucial safeguard against greenwashing in the banking sector by insisting that marketing information must be aligned with disclosures stipulated by the SFDR. In their study of the impact of the SFDR on mutual funds, [Becker et al. \(2022\)](#) determine that investors tend to allocate more capital to funds compliant with SFDR Articles 8 and 9. Thus, they suggest that asset managers should make greater efforts to adhere to these articles. Their research underscores this regulation's effectiveness in re-directing resources to sustainability-related investments.

The SFDR's connection with biodiversity is made explicit primarily through published delegated acts that refer to it, offering indicators for various financial market actors such as invested firms and real-estate corporations. For instance, biodiversity-related indicators may include actions by invested companies that harm ecosystems vital for biodiversity or the percentage of investments in business operations that influence vulnerable species. The regulation also encompasses indicators linked with biodiversity in the broader contexts of climate, energy, waste and water ([EU-Council, 2022a](#)). Financial market participants' obligation to disclose information applies also to the organizations in which they invest. This creates significant reporting requirements for businesses, so biodiversity accounting must assume a central role.

The second regulation instituted by DG FISMA, known as the Taxonomy Regulation, is intended to create a standardized framework for sustainable finance within the EU. It provides a classification system for determining the ecological sustainability of economic activities, thereby effectively directing capital flows towards sustainable investments. Both financial market participants and enterprises mandated to report under the Corporate Sustainability Reporting Directive (CSRD) are obliged to disclose how their economic activities align with these goals.

Crucially, any economic activity must substantially advance one or more environmental objectives without significantly undermining any others while conforming with minimum safeguard standards. The sixth objective, which focuses on protecting and restoring biodiversity and ecosystems, will be significantly assisted by the preservation of nature and biodiversity, sustainable land use, agricultural practices and forest management. Facilitating any of these aspects is deemed to be a substantial activity ([EU-Council, 2020](#)).

Although the Taxonomy Regulation was promulgated in 2020, the Commission is currently formulating technical screening criteria to evaluate whether actions considerably further these objectives. Criteria for the first two goals (climate change adaptation and mitigation) were introduced in 2021 ([EU-Council, 2021a](#)) for the first two goals (climate change adaptation and mitigation). Under the delegated act for the sixth objective on biodiversity and ecosystem conservation, the Taxonomy Regulation acknowledges two primary contributory economic activities: environmental protection and restoration, and accommodation activities linked with tourism. Although the other goals are connected with biodiversity conservation, it seems questionable that activities in the construction or agricultural sector are not included ([EU-Commission, 2023b](#)).

As previously mentioned, the third regulation introduced by DG FISMA, known as the Directive on CSRD, is closely linked with the Taxonomy Regulation. The CSRD, along with the SFDR and the Taxonomy Regulation, form part of the Sustainable Finance Action Plan, aiming to foster transparent and comparable sustainability disclosures by businesses ([EU-Council, 2022b](#)). Companies obliged to report under the CSRD must also adhere to the Taxonomy Regulation and are required to include their key taxonomy performance indicators in their sustainability reports, which form part of their management reports.

To enhance transparency, the Commission has empowered the European Financial Reporting Advisory Group (EFRAG) to develop ESRS that companies must follow. ESRS E4, which focuses on biodiversity and ecosystems, mandates that firms must report on the following (EU-Commission, 2023a):

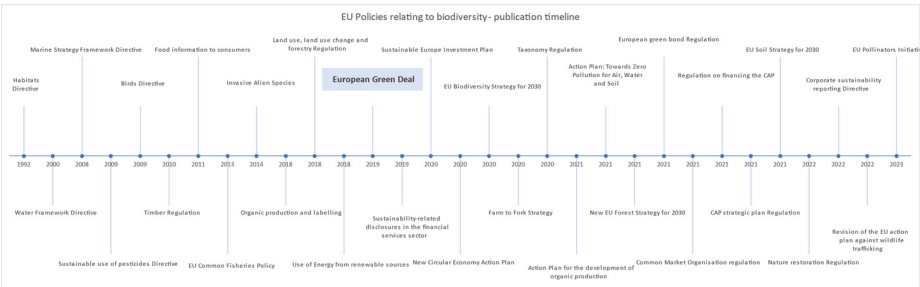
- How biodiversity and ecosystems affect the firm, both positively and negatively, and how they affect the future.
- Steps to maintain biodiversity and ecosystems and to avoid or reduce actual or potentially negative impacts.
- Plans to change business models in accordance with international biodiversity frameworks.
- Opportunities and risks associated with the firm’s influence on biodiversity and ecosystems.
- Impacts of biodiversity and ecosystems on the firm’s financial performance over the short, medium and long term.

The last in the suite of regulations proposed by DG FISMA is the Regulation on European Green Bonds. This aims to establish a framework for the issuance of and investment in green bonds aligned with the Taxonomy Regulation. According to the proposal, green bonds are those that finance ecologically sustainable projects. The issuer must provide a green bond framework that details the planned use of the investment and its correlation with the environmental impact. The framework’s positive environmental effect must be verified by an independent auditor (EU-Commission, 2021d).

As explored in the previous section, regulations relating to biodiversity are quite intricate, and understanding all their interconnections, the timelines for their establishment, and their alignment with the EGD is challenging. To aid comprehension, all relevant laws are mapped chronologically in Figure 5.

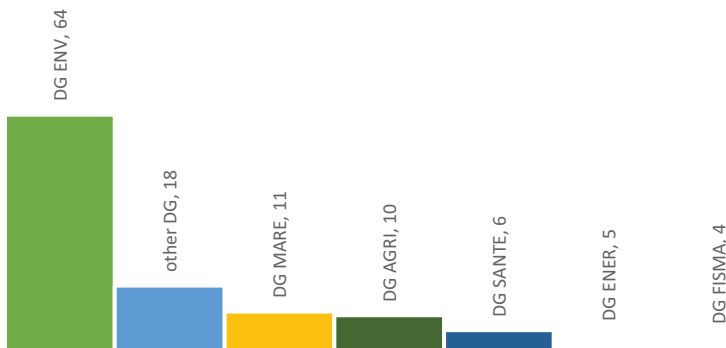
4.4 Biodiversity actions in the European Union

The EU Biodiversity Strategy for 2030 has led to the initiation of over one hundred biodiversity-related activities across various DGs. An action tracker is in place to monitor their execution and completion and promote transparency (EU-Commission, 2023d). We undertook a thorough analysis of these activities, leading to their categorization from three distinct perspectives.



Source: Authors’ own creation

Figure 5. EU policies relating to biodiversity



Source: Authors' own creation

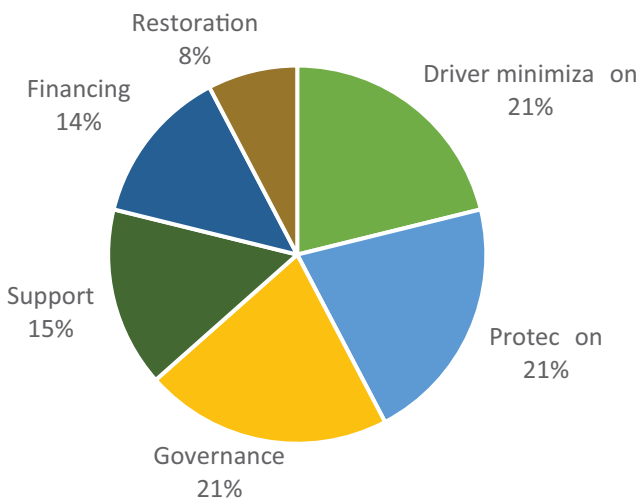
Figure 6. Distribution of DGs involved in biodiversity actions

4.4.1 First analysis: Directorate-General. The first analysis pertains to the “chef de file” or the leader of the action. Some activities are led by more than one DG and are consequently categorized in multiple DG groups. For instance, if an action is steered by the DGs for Environment and Agriculture, it is listed in both columns. [Figure 6](#) indicates that the DG Environment has the greatest involvement, echoing the findings of the legislative analysis in Section 4.1. Specifically, the DG Environment has the sole direction of over three-quarters of the initiatives, demonstrating its significant role in addressing biodiversity issues. Among the other DGs, DG Trade is the primary actor responsible for three activities, while the remaining DGs oversee two or fewer actions. Despite climate change being a significant contributor to biodiversity loss, DG Climate neither leads nor participates in any initiatives to promote biodiversity. This observation is corroborated by the legislative analysis, as since the inception of the EGD, no legislation has been proposed by DG Climate.

This analysis of responsibility for law and actions sheds light on the landscape of forthcoming legislation. There is a clear demarcation between the issuing or responsible DGs. For instance, DG Environment directs or participates in over half of the actions and is also responsible for the majority of new publications in Year Group B. However, its focus is on releasing numerous plans rather than producing effective regulations or directives. Meanwhile, although DG FISMA is only accountable for four actions, it has established three laws that have already taken effect, with a fourth – the Green Bond regulation – set to be implemented in 2023. This incongruity across the various DGs has substantial implications for the distribution of governmental influence within the Commission.

4.4.2 Second analysis: Motivators. In our second analysis, the actions are assigned to our motivators. As illustrated in [Figure 7](#), they are distributed fairly evenly. The EU’s prioritization of actions motivated by “driver minimization” is a significant positive development, as unless the causes of loss are reduced, restoration or conservation will be ineffective. The second motivator, “protection”, is also crucial, given its connection with other policy areas and DGs, such as the Common Agricultural Policy (CAP), the CFP and the MSFD. The “governance” cluster of actions constitutes the other substantial motivator, which is a positive trend because it encompasses the integration of biodiversity objectives into various EU-level policies.

The “support” and “financing” motivators receive slightly less attention, with 14% and 15% of actions, respectively. However, in these cases, many laws are already stipulated by

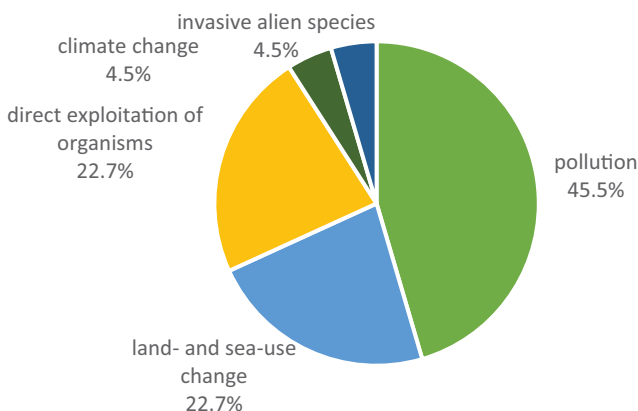


Source: Authors' own creation

Figure 7. Distribution of biodiversity actions by motivator

regulations or embedded within other acts. The implementation of information systems, categorized as a support motivator, makes biodiversity more comprehensible to the public. The final segment of the pie chart represents the “restoration” motivator, for which over half of the actions are slated to continue until 2030. Completion of these actions is contingent on the successful execution of the initiatives resulting from other motivators.

4.4.3 Third analysis: Driver minimization. In our third analysis, we focus on scrutinizing the “driver minimization” motivator. As shown in Figure 8, actions within this cluster are categorized according to their associated primary motivators, recognizing that



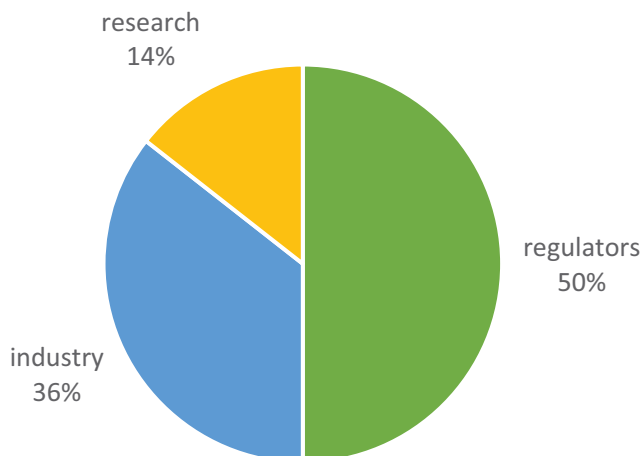
Source: Authors' own creation

Figure 8. Distribution of actions within the “driver minimization” motivator by the driver

certain actions may simultaneously address multiple motivators. Pollution stands out as the chief driver that the actions aim to mitigate. Most actions in this group impact on the agricultural sector, such as the proposal to review the Sustainable Use of Pesticides Directive and the action plan for organic farming. However, efforts encompassed by the zero-pollution action plan also influence other sectors.

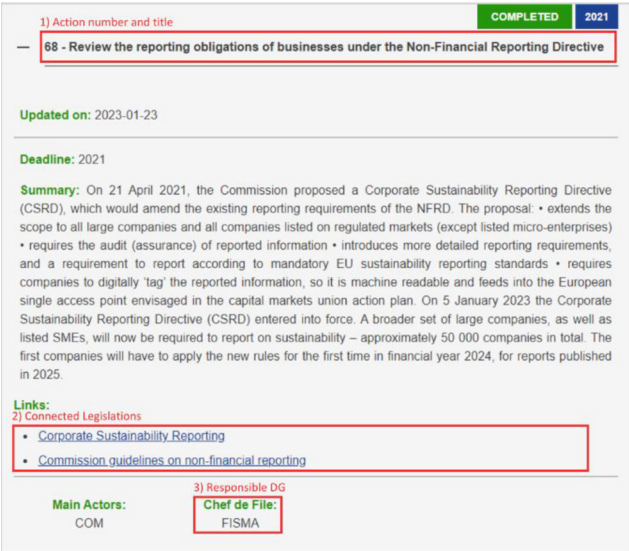
Actions aimed at mitigating the primary direct drivers, namely, direct exploitation of organisms and changes in land and sea use, are closely intertwined. Direct exploitation of biomass, and particularly forest products, has been addressed by RED II and the proposed Timber Regulations. The Wildlife Trafficking Action Plan has been revised to focus on wildlife exploitation. Similarly, changes in land and sea use may be exacerbated by attempts to control and implement regulations in the agricultural sector. The EU Strategy for Sustainable Built Environment is an action that highlights land use changes beyond agricultural zones. The main activity targeting the driver of invasive alien species is the adoption of invasive alien species regulations across all member states, with updates every two years.

4.4.4 Fourth analysis: Sector. As depicted in [Figure 9](#), regulatory institutions are responsible for over half of all biodiversity-related actions. This is primarily because most measures are initiated by the Commission and must be translated into national legislation or regulatory acts. In addition, member states share their data with the Commission for consolidation at the EU level in preparation for subsequent Commission reviews. Actions impacting on specific industry sectors account for 36% of the total, underscoring the importance for businesses across all sectors of keeping abreast of legislation and advances relevant to biodiversity. Every enterprise is intrinsically linked to biodiversity and must, therefore establish related objectives ([Panwar et al., 2022](#)). As indicated by EU actions, integrating biodiversity considerations into funding and risk management objectives is equally crucial.



Source: Authors' own creation

Figure 9. Distribution of biodiversity actions by affected institution types



Source: EU-Commission (2023d)

Figure 10. CSRD action Nr. 68

As previously noted, the research cluster has the fewest explicitly mentioned research actions. However, this cluster implicitly contributes to almost all of the Commission’s actions by examining their impacts and effectiveness.

CSRD Action No. 68 exemplifies this. As shown in Figure 10, actions are categorized by their number and title, succeeded by any corresponding legislation and their predominant DG (chef de file), as previously illustrated in the DG classification in Figure 6. DG FISMA has recently promulgated a new directive pertinent to this action (see Section 4.1). The driving force behind this action is the ambition to amplify transparency and accountability, and to expand the directive’s reach to encompass more companies. The directive also seeks to prompt enterprises to identify specific domains for enhancement through obligatory sustainability reporting.

5. Discussion

Our teleological analysis, drawing on the works of Scott Shapiro and Richard Gardiner, explored the legislative texts of the EGD with a focus on their underlying goals and intended outcomes. This approach illuminated a critical disconnect between the EGD’s biodiversity-related regulations and the broader scientific consensus on the drivers of biodiversity loss. While the EGD has indeed shaped important regulations, the subsequent actions often fail to fully address key ecological challenges.

Despite the comprehensive regulatory framework established under the EGD, significant misalignments persist, particularly concerning the drivers of biodiversity loss identified by the IPBES. The IPBES highlights multiple interrelated causes of biodiversity decline, including habitat destruction, overexploitation of resources, pollution, climate change and the spread of invasive species. While the EGD addresses pollution through initiatives such as the Action Plan for Zero Pollution (EU-Commission, 2021a), other drivers – most notably land-use change and climate change – are comparatively underrepresented. This gap in

policy focus suggests that the EGD may be insufficient in tackling the root causes of biodiversity decline, which are multifaceted and deeply interconnected.

Recent scholarship emphasizes the need for a more integrated approach to biodiversity conservation. [Niesenbaum \(2019\)](#) argues that sustainability goals must be seamlessly incorporated into conservation strategies to ensure the long-term functionality of ecosystem services. This viewpoint supports our findings, stressing that biodiversity protection is not merely a matter of reducing pollution; it requires the preservation of the ecosystem services on which biodiversity depends. Yet, this aspect remains marginal in the current EGD framework. The need for such an integrated approach has been further substantiated by studies examining ecosystem resilience and species interactions ([Loreau *et al.*, 2002](#); [Del-Claro and Torezan-Silingardi, 2021](#)).

A practical example of addressing these underrepresented drivers is the proposed Nature Restoration Law, which, if implemented by member states, could provide a more holistic approach to biodiversity conservation. This legislation aims to restore degraded ecosystems and align regulatory measures with the key drivers of biodiversity loss identified by IPBES. Such an approach is essential for the EGD to realize its biodiversity objectives and strengthen the overall accountability of its regulatory framework. As pointed out by [Hermoso *et al.* \(2022\)](#), habitat restoration and the maintenance of ecological connectivity are critical components of effective biodiversity policies.

[Loreau *et al.* \(2002\)](#) offer an important contribution to understanding the complex interactions between biodiversity and ecosystem functioning. Their research demonstrates that biodiversity is integral to maintaining essential ecological processes such as nutrient cycling and carbon sequestration – processes that are often overlooked in current policy frameworks. Our analysis echoes their findings, suggesting that regulatory approaches must reflect the complexity of these ecosystem functions if biodiversity conservation efforts are to succeed.

Moreover, the role of mutualistic species interactions, as highlighted by [Del-Claro and Torezan-Silingardi \(2021\)](#), is critical in supporting ecosystem resilience. Their work underscores the importance of plant–animal relationships, which are frequently ignored in existing biodiversity accounting frameworks. By failing to consider these vital ecological interactions, current conservation efforts risk treating biodiversity as a set of isolated components rather than a network of interdependent relationships that sustain ecosystem stability.

The challenges facing the EGD in this regard are multifaceted. The EGD places a significant emphasis on transparency and reporting, which aligns with the principles of environmental and sustainability accounting ([Gray, 2006](#)). By mandating biodiversity accounting, the EGD seeks to integrate environmental costs into corporate financial statements, thereby promoting greater corporate accountability for environmental impacts. This is consistent with the broader goals of sustainable development, which aim to ensure that businesses account for the full spectrum of their environmental footprint ([Bebbington and Fraser, 2014](#)). However, measuring biodiversity in financial terms remains inherently difficult due to the complex, often intangible nature of biodiversity, which does not easily fit into traditional accounting models.

Further complicating this issue are operational differences between key European regulatory bodies. For instance, DG FISMA, which focuses on financial regulation, has different priorities from directorate-general for environment (DG ENV), directorate-general for maritime affairs and fisheries (DG MARE) and directorate-general for agriculture and rural development (DG AGRI), which concentrate on environmental and agricultural concerns. This divergence complicates efforts to integrate biodiversity concerns into financial frameworks, as these bodies often operate with distinct goals and methodologies. [Büscher *et al.* \(2012\)](#) raise concerns that the market-based approach applied through the

EGD may commodify nature in ways that obscure deeper ecological crises, such as habitat fragmentation and the loss of ecological connectivity. By treating biodiversity as a tradable asset, this approach risks failing to address the structural drivers of biodiversity loss, such as unsustainable land use and agricultural expansion.

The implementation of the EGD has involved the development of numerous regulations, often pre-announced through due process communications, ensuring stakeholder engagement and transparency. However, while DG FISMA has played a central role in formulating many of these regulations, its influence wanes during the implementation phase, where the responsibility shifts to DG ENV, DG MARE and DG AGRI. This shift highlights a fundamental misalignment between the financial motivations driving the initial regulations and the environmental objectives that underpin their execution. As pointed out by [Hoek \(2022\)](#), such a disconnect can hinder the effectiveness of policy execution, making it difficult to translate regulatory intent into tangible conservation outcomes.

One initiative aimed at addressing these challenges is the EU LIFE project “Transparent”, which sought to establish a standardized methodology for Natural Capital Management Accounting. Led by the Value Balancing Alliance, in collaboration with the Capitals Coalition and the World Business Council for Sustainable Development, this project developed the first set of standardized principles for natural capital accounting. Despite its potential, the methodology developed through the Transparent project has not been fully integrated into the ESRS or the EU Taxonomy on biodiversity. This gap reveals a broader issue within the EU’s regulatory approach, where financial reporting frameworks often overshadow more holistic environmental accounting practices, limiting the potential for meaningful biodiversity conservation.

In conclusion, while the EGD has made important strides in promoting transparency and accountability through rigorous biodiversity reporting, several significant challenges remain. These include the inherent complexity of biodiversity measurements, the divergence of priorities among EU bodies and the risk of commodifying nature. Addressing these issues will be crucial if the EGD is to align its ambitious goals with the effective conservation of biodiversity, as demanded by both scientific evidence and ecological realities.

6. Implications and policy recommendations

As we discussed in the previous section, our findings underscore that while the EGD places significant emphasis on pollution as a primary driver of biodiversity loss, it insufficiently addresses other critical factors, such as land-use change, climate change and natural resource exploitation ([Brondízio et al., 2019](#)). Although mitigating pollution is an essential component of biodiversity conservation, this singular focus overlooks the broader array of interconnected drivers that exacerbate biodiversity decline.

For instance, while initiatives like the Action Plan for Zero Pollution ([EU-Commission, 2021a](#)) effectively target pollution, our analysis reveals that land-use change, predominantly driven by agricultural expansion, urbanization and infrastructure development, continues to pose a substantial threat to biodiversity ([Wrzaszcz and Prandecki, 2020](#)). Over-reliance on pollution control strategies leaves significant gaps in addressing the systemic causes of biodiversity degradation, particularly those rooted in land and resource management.

To address the found underrepresentation of land-use change as a driver of biodiversity loss, the lack of integration between biodiversity conservation and climate mitigation efforts and the insufficient use of financial incentives to promote sustainable practices, we recommend that policymakers re-evaluate land-use policies to ensure they are better aligned with the latest scientific evidence ([Brondízio et al., 2019](#)). As [Hermoso et al. \(2022\)](#) argue, stricter land-use regulations are necessary, with a focus on habitat preservation and the

maintenance of ecological connectivity. These recommendations are consistent with those of the IPBES, which highlights that comprehensive land-use strategies are vital for mitigating biodiversity loss. Strengthened policies promoting habitat restoration and reforestation, as advocated by [Kennedy et al. \(2022\)](#), are proven methods for enhancing ecosystem resilience and should be central to policy reform.

Moreover, the integration of land-use policies with economic incentives is critical for addressing the multifaceted challenges of biodiversity loss. Aligning biodiversity conservation efforts with climate-focused initiatives, such as carbon farming and payments for ecosystem services, can generate synergistic benefits. Such initiatives not only contribute to biodiversity preservation but also enhance carbon sequestration, thus aligning biodiversity objectives with broader climate mitigation efforts. This interdisciplinary approach, combining land management, economic incentives and biodiversity conservation, offers a more comprehensive strategy to promote sustainable practices across sectors. Recent evidence suggests that linking financial incentives to environmental stewardship can drive sustainability across multiple industries ([Maione et al., 2023](#)). By fostering collaboration between environmental policymakers, agricultural stakeholders and economic planners, the EGD can establish a more robust and effective framework for biodiversity conservation.

However, existing frameworks, such as the EU's CAP ([EU-Council, 2021b](#)), are inadequate for promoting sustainable practices that protect biodiversity. The CAP does not fully address the ecological impacts of land-use changes, necessitating reform to prioritize biodiversity conservation as a core objective. Aligning agricultural and environmental policies through CAP reform could alleviate pressure on ecosystems ([Jones and Solomon, 2014](#)), potentially through fiscal incentives for industries that adopt sustainable practices such as carbon farming and reforestation.

The effectiveness of the EGD is further undermined by inconsistent enforcement mechanisms. As [Addison et al. \(2020\)](#) point out, weak enforcement significantly reduces the efficacy of biodiversity regulations. To bridge the gap between policy intent and practical outcomes, we recommend the implementation of stronger penalties for non-compliance, alongside the deployment of advanced monitoring technologies, including satellite imaging and artificial intelligence, to detect illegal land-use activities and deforestation. These technologies can enhance transparency and facilitate rapid responses to violations, ensuring more effective enforcement of biodiversity policies.

From a practical perspective, it is essential to integrate biodiversity considerations into broader policy frameworks. Our findings suggest that addressing biodiversity loss requires a holistic approach that targets multiple drivers simultaneously. One practical measure is to strengthen biodiversity reporting requirements under the CSRD. By mandating more transparent corporate disclosures, companies can be held accountable for their biodiversity impacts, as seen in the Corporate Sustainability Due Diligence Directive. Research by [O'Dwyer and Unerman \(2020\)](#) supports the notion that clear and robust reporting frameworks encourage businesses to adopt more sustainable practices.

Summing up our recommendations, enhancing the effectiveness of the EGD requires a closer alignment of its biodiversity measures with scientific recommendations, particularly those from IPBES. Key policy recommendations include revisiting land-use policies to encourage biodiversity-positive practices, bolstering enforcement mechanisms and embedding biodiversity considerations into broader economic and agricultural policies. Our research emphasizes the importance of adopting a comprehensive approach that addresses all drivers of biodiversity loss while promoting transparency and fostering cross-sectoral collaboration.

7. Further research

The key findings of this study not only shed light on the underlying question regarding the effectiveness of EU regulations and actions in the context of biodiversity but also indicate three promising areas for future research around: anthropocentrism, valuation, telecoupling, and finally equity, which, building on the gained insights in this article need to further advance our understanding of biodiversity accounting and accountability.

7.1 Anthropocentric stance

[Jones and Solomon \(2013\)](#) identify two general philosophies for defining biodiversity. From the anthropocentric perspective, nature has value to human beings and is, therefore, essential to the planet's well-being. From the non-anthropocentric perspective, nature has value itself and biodiversity is explained in moral and ethical terms. In particular, [Naess's \(1973\)](#) theoretical approach to deep ecology addresses this non-anthropocentric perspective. Academic views are widely diverse, particularly in relation to valuation, including the monetization of ecosystem services and species.

Few businesses adopt a non-anthropocentric approach ([Treich, 2022](#)). However, in academic research, this viewpoint is taken up in [Jones's \(1996\)](#) natural inventory approach. [Helm and Hepburn \(2012\)](#) and [Spangenberg and Settele \(2016\)](#) also discuss the problems and ethics of conducting valuations of species. Businesses tend to align more closely with the anthropocentric approach. This perspective forms the basis for corporate structures ([Raar et al., 2020](#)); however, even for Indigenous populations, the anthropocentric stance may have economic benefits, for example, through tourism in protected areas ([Strickland-Munro and Moore, 2013](#); [Akbar and Hallak, 2019](#)). This view is, therefore, particularly important because it currently takes priority in business decisions.

The EU's policies manifest this predominantly anthropocentric stance on biodiversity accounting, with human benefits being prominent in their strategies. These undoubtedly place the needs of humanity first, whether aiming to improve human welfare or generating employment through sustainable development ([EU-Commission, 2023d](#)).

7.2 Valuation and natural capital

The anthropocentric view and, in some instances, valuations of ecosystem services and natural capital are vital for communicating the economic value of nature and its services to decision makers ([Costanza et al., 1997](#); [Jones and Solomon, 2014](#); [Spangenberg and Settele, 2016](#)). It can help make the range of possible values of ecosystem services more obvious and can be a vital means of conveying the significance of conservation to decision makers. However, some authors ([Helm and Hepburn, 2012](#); [Spangenberg and Settele, 2016](#); [Treich, 2022](#)) conclude that valuing biodiversity as a whole is not purposeful and that valuations should be limited to particular aspects. They mention cost-benefit analysis as a possible valuation method.

Valuation also plays an important role in European policies. For example, the Biodiversity Strategy aims to establish a natural capital accounting standard ([EU-Commission, 2020a](#)). The introduction of this new standard, called Transparent, in collaboration with the Capitals Coalition, will reinforce the European anthropocentric view. Given that companies are the primary audience for the Transparent standard, the surprising lack of methodologies for demonstrating required business practices in ESRS E4 might be remedied through this new standard by elucidating how targets can be measured. The current misalignment may be attributable to the different responsible DGs. DG FISMA initiated the establishment of the ESRS, whereas DG Environment established the Transparent project. In addition, policy initiatives such as the CAP and the new Forestry Strategy rely on assessment methods

adopting an anthropocentric view to develop mechanisms to provide compensation for applying sustainable practices and mitigating biodiversity loss (EU-Commission, 2021b; EU-Council, 2021b).

7.3 Telecoupling

The EU still lacks a comprehensive understanding of telecoupling (Liu *et al.*, 2013) regarding the interplay of socio-economic and environmental systems across long distances. Current European policies, such as the EU Timber Regulation, take an environmental approach to tackling the causes of deforestation and biodiversity loss. Despite some recognition of the importance of integrating Indigenous communities, they lack a structured framework similar to telecoupling (EU-Commission, 2021c).

It is important to consider the broader context to bridge this gap and improve our understanding of telecoupling in European policy, as well as in the different accounting approaches. The approaches themselves, as well as ESRS E4, mention the implications of reporting on the connectivity of habitats, ecosystem services and species (EU-Commission, 2023a). Nevertheless, there is still significant potential to better integrate this concept into ESRS E4, as connectivity refers not only to natural systems but also to social systems (Liu *et al.*, 2018; Alkemade *et al.*, 2022). These social systems, and especially local communities and Indigenous people living in habitats with high biodiversity (Brondizio *et al.*, 2019), need to be considered in biodiversity accounting.

7.4 Equity

The need to involve local communities is also raised by Hermoso *et al.* (2022), who suggest approaching biodiversity considerations from a social equity perspective. In line with this perspective, the EU has recognized the importance of integrating equity considerations into policy development.

Some current policies, such as the CSRD, are tangible examples of this commitment, with the results demonstrated in initiatives such as ESRS S3. In addition, the CSRD, in conjunction with ESRS E4, establishes reporting requirements that emphasize the impact of environmental considerations on Indigenous people and local communities (EU-Council, 2022b; EU-Commission, 2023a). This is an important step towards recognizing and addressing the interconnection of natural and social systems in biodiversity conservation efforts. Incorporating a social equity perspective into biodiversity accounting approaches is emerging as a critical requirement, not only to ensure the well-being of local communities but also to promote a more holistic understanding of interdependencies between ecological and social well-being (Alkemade *et al.*, 2022).

7.5 Political and economic factors influencing biodiversity policy

The EGD demonstrates a dual emphasis on environmental regulation and economic strategy, revealing both alignment and tension between political and economic goals at the EU level. Politically, the EGD aims to unify member states under a cohesive biodiversity framework, exemplified by the EU Biodiversity Strategy for 2030 and the nature restoration proposals. However, the implementation of these policies highlights disparities in member states' commitment and capacity, particularly concerning enforcement and funding mechanisms (Hermoso *et al.*, 2022).

Economically, the EGD prioritizes market-driven mechanisms, such as the Taxonomy Regulation and the CSRD, to channel financial flows towards sustainable activities. These instruments focus on aligning corporate interests with biodiversity objectives but risk commodifying natural resources (Büscher *et al.*, 2012). The introduction of financial

motivators like the European Green Bond Standard further underscores the economic-centric approach of DG FISMA, often at odds with the ecological priorities of DG ENV and other directorates.

The divergence between political priorities, such as inclusivity and environmental justice, and economic objectives, like efficiency and profitability, results in uneven policy implementation. For instance, financial regulations under DG FISMA, while innovative, may not sufficiently address the systemic drivers of biodiversity loss, such as unsustainable land use (Brondizio *et al.*, 2019). This mismatch limits the practical impact of biodiversity policies and raises questions about the integration of political and economic objectives in EU legislation.

Future research should focus on aligning the political and economic objectives of the EGD by examining how ecological inclusivity and market efficiency can be harmonized in policy implementation. The long-term impact of biodiversity-linked financial instruments, such as the Taxonomy Regulation and Green Bonds, should be evaluated to determine their effectiveness in driving systemic conservation efforts. Institutional coordination and enforcement mechanisms also warrant attention to ensure legislative intent translates into measurable outcomes. Additionally, exploring the integration of social equity into biodiversity policies, particularly the inclusion of Indigenous and local communities, is essential for fostering inclusive governance. Finally, the reliance on anthropocentric valuations of biodiversity should be critically assessed to ensure policies adequately reflect both intrinsic ecological value and broader conservation goals.

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