

Environmental Disclosures in European State Forest Enterprises: A Comparative Analysis of Austria, Poland, and Sweden*

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Abstract

The implementation of the Corporate Sustainability Reporting Directive (CSRD) and the European Sustainability Reporting Standards (ESRS) has significantly increased the importance of structured sustainability reporting in the European Union, particularly in resource-intensive sectors such as forestry.

Despite the growing body of literature on ESG reporting, relatively little attention has been devoted to reporting practices in the forestry sector, especially in the context of ESRS implementation. This study addresses this gap by examining environmental disclosures in state-owned forest enterprises.

The aim of the study is to identify and assess the scope, structure, and ESRS alignment of environmental disclosures in the State Forest Enterprise in Poland (PGL Lasy Państwowe), using Sveaskog (Sweden) and Österreichische Bundesforste AG (Austria) as comparative benchmarks. The analysis focuses on ESRS E1 (climate), E4 (biodiversity), and E5 (resources).

The study employs a qualitative–quantitative content analysis of reports from 2022–2024. The findings reveal distinct reporting models: Sveaskog demonstrates a high level of integration between environmental and financial data, Österreichische Bundesforste emphasizes ecological indicators, while PGL LP provides detailed operational data but lacks systematic linkage to financial outcomes and ESRS structures.

The results indicate that improving comparability, standardization, and the integration of environmental and financial information is essential for aligning forestry sector reporting with ESRS requirements.

Keywords: sustainability reporting, ESRS, forest sector, environmental disclosures, ESG, State Forests

Introduction

In recent years, there has been a growing emphasis on reporting information related to sustainability in the operations of businesses and public institutions. In response to the need for greater transparency regarding non-financial data, the European Union has introduced new regulations, notably the Corporate Sustainability Reporting Directive, which expands the scope of mandatory environmental, social, and governance disclosures. These requirements have been clarified under the European Sustainability Reporting Standards, which establish uniform rules for presenting information on an organization's environmental impact (Martínez-Torres, 2024).

Previous regulations, introduced by the Non-Financial Reporting Directive, were of a more general nature and did not ensure sufficient data comparability (*Directive - 2022/2464 - EN - CSRD Directive - EUR-Lex*, no date; Lipskyte and Koster, 2018). Environmental reporting is of particular importance in sectors related to natural resource management, such as the forestry sector, where entities possess extensive data on biodiversity, natural resources, and carbon sequestration.

The aim of this article is to identify and assess the scope and structure of environmental information disclosed by the State Forest Enterprise (Lasy Państwowe) and to evaluate its alignment with ESRS requirements in a comparative analysis against selected European forestry entities. The research problem addressed in this study concerns the insufficient alignment of environmental reporting practices in state-owned forestry enterprises with the structured and financially integrated requirements of the European Sustainability Reporting Standards (ESRS). However, Polish state-owned forests face significant challenges in aligning their reporting with ESRS requirements, stemming from increasing regulatory complexity, the need for data standardization, and the need to link environmental indicators to financial information.

Regulatory Framework for Sustainability Reporting

The development of sustainability reporting in the European Union stems from the growing importance of non-financial information and stakeholders' increasing expectations regarding the transparency of corporate activities. The modern approach to reporting involves disclosing not only financial results but also information regarding an entity's impact on the environment, society, and its governance. The aim of EU regulations is to ensure that this data is reliable, comparable, and useful for decision-making.

The first stage in shaping this framework was the adoption of the Non-Financial Reporting Directive, which introduced an obligation to disclose selected non-financial information, while leaving considerable discretion regarding its form and scope. Consequently, reports were characterized by limited comparability and consistency (Mikropoulou, 2024; Leal Filho *et al.*, 2025).

The response to these limitations was the Corporate Sustainability Reporting Directive, which significantly expanded the scope of reporting and introduced more detailed ESG disclosure requirements (*Delegated regulation - EU - 2023/2772 - EN - EUR-Lex*, no date). The new regulations elevate the status of non-financial reports, bringing them closer in terms of quality and verifiability to financial statements, and also introduce the obligation to apply uniform reporting standards (Leal Filho *et al.*, 2025). A key element of this system is the European Sustainability Reporting Standards, which set out detailed rules for identifying, measuring, and presenting ESG information. Their aim is to enhance data comparability and integrate non-financial information with risk analysis and performance assessment.

In the environmental domain, the ESRS cover, among other things, reporting on climate change (E1), pollution (E2), water resources (E3), biodiversity and ecosystems (E4), and resource use and the circular economy (E5). These requirements call for the presentation of data in a measurable and structured manner, which poses a challenge for sectors where reporting has historically been descriptive in nature.

A central element of the ESRS is the principle of double materiality, according to which entities disclose information that is material both from the perspective of their impact on the environment and the impact of environmental and social factors on their financial and operational performance.

Literature Review

In recent years, there has been a rapid expansion of research on sustainability reporting and the implementation of ESG standards, particularly in the context of new European regulations such as the European Sustainability Reporting Standards. The literature extensively examines the implications of ESRS adoption by public sector entities and companies of significant social importance, with particular emphasis on the transparency, comparability, and quality of non-financial disclosures (Janicka and Sajnóg, 2023b, 2023a)

Existing studies focus primarily on regulatory compliance, implementation challenges, and the impact of ESG reporting on risk management and strategic decision-making (Dumay, Guthrie and Farneti, 2010; Montecalvo, Farneti and de Villiers, 2018; Pasko *et al.*, 2021). Furthermore, the growing role of standardized reporting in enhancing accountability and institutional credibility has been widely recognized (Shabana, Buchholtz and Carroll, 2017; Chakraborty, 2019; Jackson *et al.*, 2020; Lin, 2022; Tăbîrcă and Djaouahdou, 2024).

Against this backdrop, research on the forestry sector remains relatively limited. While existing studies address sustainable forest management (Loreggian, Secco and Pettenella, 2023; Pecurul-Botines *et al.*, 2023), the relationship between forestry and the Sustainable Development Goals (Ahrens *et al.*, 2025), and forestry policy instruments in the context of climate change (Dubova *et al.*, 2021), they focus predominantly on environmental and policy dimensions.

Additional contributions examine certification systems such as the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification, as well as general aspects of environmental reporting (Zamula *et al.*, 2020; Pecurul-Botines *et al.*, 2023; Cordero Aparicio, 2025). However, relatively few studies directly address ESG reporting practices in forestry enterprises, particularly in the context of ESRS implementation.

In particular, the integration of environmental disclosures with financial information and the operationalization of the double materiality principle in the forestry sector remain underexplored. This indicates a clear research gap and justifies the need for further empirical studies in this area.

Methodical Approach

The objective of this research section is to compare quantitative and qualitative disclosures regarding key environmental issues in three state-owned forestry entities: Sveaskog, Österreichische Bundesforste AG, and the State Forest Enterprise Lasy Państwowe (hereinafter: PGL LP). The analysis focuses on assessing the degree to which the reported indicators align with the requirements of the European Sustainability Reporting Standards (ESRS), particularly in the areas of ESRS E1 (climate change), ESRS E4 (biodiversity and ecosystems), and ESRS E5 (resources and the circular economy).

The selection of the analyzed entities was purposeful. Sveaskog and Österreichische Bundesforste AG were chosen as benchmark cases due to their relatively advanced sustainability reporting practices and their active engagement in climate- and biodiversity-related disclosures. In contrast, PGL Lasy Państwowe represents a large-scale public forestry entity with a strong operational reporting base, making it suitable for assessing the transition towards ESRS-aligned reporting.

The study's time frame covers the years 2022–2024, understood as the period of the most recent available reports and the transitional phase preceding the mandatory implementation of the Corporate Sustainability Reporting Directive and the ESRS in the European Union. This perspective allows for an assessment of the maturity level of reporting by the analyzed entities.

The study is comparative in nature and is based on three research questions:

1. What environmental and operational indicators are disclosed, and are they measurable, comparable, and repeatable?
2. To what extent do these disclosures align with the structure of ESRS requirements E1, E4, and E5, including in terms of policies, actions, metrics, and financial impacts?
3. What information gaps exist in the case of PGL LP, and what solutions could enhance the compliance and reporting utility of the data?

The study employed a qualitative-quantitative content analysis of reporting documents from 2022–2024. The unit of analysis was an “indicator,” defined as a numerical metric or an unambiguous descriptive statement of an indicative nature.

The coding process was based on the following criteria: assignment of the indicator to an ESRS area (E1, E4, E5), the presence of a numerical value and unit of measurement, specification of the reporting period, comparability across entities, and linkage to management actions or financial categories. Additionally, elements enhancing reporting reliability were considered, such as external assurance, references to the Task Force on Climate-related Financial Disclosures, and compliance with the EU taxonomy.

The research material included reports from the three analyzed entities: Sveaskog (Annual and sustainability report 2024, Green Bonds Report 2024), Österreichische Bundesforste AG ((Consolidated Management Report. Annual Accounts 2024, Sustainability Report 2022)), and the State Forest Enterprise Lasy Państwowe (Raport o Stanie Lasów w Polsce 2022-2024; Sprawozdanie Finansowo-Gospodarcze PGL LP 2022-2024)

In the interpretive section, disclosures were referenced to the ESRS framework. Under ESRS E1, analyses included climate policies and targets, greenhouse gas emissions, energy consumption, and the financial impacts of climate risks. Similarly, ESRS E4 covered the impact on biodiversity, management actions, and impact metrics, while ESRS E5 focused on resource flows (inflows/outflows) and their link to financial risks and impacts

To ensure a proper interpretation of environmental indicators, the analysis was preceded by a summary of the basic operational parameters of the entities under study. As the literature indicates, the comparability of data in the forestry sector depends on the scale of resources (ha), intensity of use (m³/ha), and the structure of protective and economic functions.

Table 1 presents key figures, such as forest area, revenue, employment, and timber harvest volume, serving as a reference point for further analysis in ESRS areas E1, E4, and E5.

Table 1. Key operating indicators (selected) – comparison of three units

Indicator	Sveaskog	Österreichische Bundesforste (ÖBf)	State Forests (PGL LP)
Ownership	100% state-owned (Sweden)	100% state-owned (Austria)	State-owned entity (Poland)
Total land area	3.89 million ha (land holdings; 30 Sept 2023)	850,000 ha (2022)	7,624,213.40 ha (31 Dec 2023)
Forest area	n/a (not explicitly disclosed in analyzed documents)	510,000 ha (2022)	7,338,939.97 ha (31 Dec 2023)
Revenues / operating performance	Net sales: SEK 8,304 million (2024)	Operating performance: EUR 342.9 million (2024)	Total revenues: PLN 14,626,486.2 thousand (2023)
Employment	826 employees (end of 2024); average 850 (2024)	1,077 FTE (average, 2022)	n/a (not explicitly disclosed; report includes organizational structure)
Timber harvest (total)	n/a (no volume disclosed in analyzed documents)	1.98 million solid m ³ (2024)	40,070.6 thousand m ³ net (under bark) (2023)
Share in national forest ownership	—	—	76.9% of forests in Poland managed by PGL LP (2022)

Source: own elaboration based on selected financial and operational disclosures from annual reports, management reports and official statistical publications of Sveaskog, Österreichische Bundesforste AG and Państwowe Gospodarstwo Leśne Lasy Państwowe for the period 2022–2024.

Even at the stage of analyzing basic operational disclosures, an asymmetry in “reporting granularity” is evident among the entities under review. PGL LP publishes highly detailed data on land use structure and timber harvest volumes, indicating a high level of operational detail. In contrast, Sveaskog’s disclosures place greater emphasis on financial indicators and—particularly in green bond reports—climate and cost indicators related to “green projects.” This indicates different approaches to reporting: operational and resource-based for PGL LP, and financially integrated for Sveaskog.

Findings

To assess the compliance of environmental disclosures with ESRS requirements, they were systematically categorized under areas E1, E4, and E5. In cases where data was missing, the designation “n/a” (not disclosed in the analyzed reports for the years 2022–2024) was used, treating it as a potential reporting gap—provided that the given area would be deemed material in the double materiality assessment process.

Table 2. Matrix of environmental indicators related to ESRS E1, E4, and E5 (values, units, year)

ESRS (area)	Indicator (operationalization)	Sveaskog	Österreichische Bundesforste (ÖBf)	State Forests (PGL LP)
E1 (Climate)	Net change in forest carbon stocks (t CO ₂ e)	9.65 million t CO ₂ e (2024)	n/a	n/a (for entire PGL LP); context: forests in Poland absorb net 22,240 kt CO ₂ (2021, NIR data)
E1 (Climate)	Climate risk disclosures aligned with TCFD (proxy for E1-9: physical/transition risks)	TCFD reporting indicated in documentation (2023)	n/a	n/a
E1 (Climate)	Carbon sequestration enhancement programs – area (ha) and effect (t CO ₂)	n/a	n/a	Forest Carbon Farms (LGW): 23 forest districts, >11,000 ha; estimated additional sequestration ~930,000 t CO ₂ (2017–2046); activities in 2022: 1,299.62 ha
E4 (Biodiversity)	Protected/set-aside areas (ha; % of forest resources)	approx. 500,000 ha of “conservation forests” (>16% of forest area) (2024)	approx. half of the area under protection regulations; 1/3 of mountain forests classified as “Schutzwald” (2022)	Nature reserves: 1,305 units, ~126,000 ha; Natura 2000: SPA 2,223.35 thousand ha, SAC 1,658.11 thousand ha (2023)
E4 (Biodiversity)	Wildlife pressure – damage indicator (units/ha)	n/a	3,845 “young trees with leader shoot damage per ha” (2022)	Reports wildlife damage in hectares, but no density indicator (units/ha) (2022)
E5 (Resources)	Seedling production/delivery (units) as proxy for artificial regeneration	131 million seedlings delivered by Svenska Skogsplantor (2024)	1.367 million seedlings (2022); reduction in favor of natural regeneration	n/a (in units); reports regeneration and afforestation area: 64,621 ha, including 11,774 ha natural regeneration (2023)

E5 (Resources)	Timber harvest (m ³) as key resource outflow	n/a	1.98 million solid m ³ (2024)	40,070.6 thousand m ³ net (2023)
E5 (Resources/Finance)	Costs/financing of “green” activities (CAPEX/OPEX) – environment–finance linkage	Green bonds: e.g. harvesting cost SEK 720 million (SEK 582 million financed by green bonds); nature conservation SEK 33 million (SEK 27 million financed by green bonds) (2024)	n/a (not explicitly disclosed in environmental metrics 2022)	Direct costs: regeneration and afforestation (including stand conversion) PLN 515,485.2 thousand (2023)

Source: own elaboration based on selected disclosures from annual reports, sustainability reports, green bond reports and management reports of Sveaskog (2023–2024), Österreichische Bundesforste AG (2022–2024) and Państwowe Gospodarstwo Leśne Lasy Państwowe (2022–2023).

An analysis of the matrix reveals three key mechanisms that differentiate the reporting practices of the entities under review.

First, Sveaskog clearly “financializes” its environmental disclosures. This is particularly evident in its green bond reporting, where both costs (CAPEX/OPEX) and quantitative climate indicators (e.g., carbon footprint) are presented. This approach is consistent with the logic of the European Sustainability Reporting Standards, which emphasizes the link between environmental information and risk as well as financial performance.

Second, Österreichische Bundesforste AG introduces biological and pressure-related indicators, such as crown browsing expressed in units per hectare. This indicator fits well within the structure of ESRS E4 as a measure of ecosystem health and the pressure affecting forest regeneration processes.

Third, PGL LP presents a wide range of data on nature conservation measures and silvicultural activities on a per-area basis. At the same time, there is a visible gap in “closing the information loop”—from identifying impacts and risks, through metrics, to translating them into financial outcomes. In particular, there is a lack of systematic linking of environmental data to costs (e.g., conservation restrictions) or revenues, which limits their usefulness within the ESRS framework.

ESRS E1 – Climate-Related Disclosures

Under ESRS E1, the following are of key importance: the completeness of disclosures regarding greenhouse gas emissions (Scope 1–3), the existence of a transition and adaptation plan, and—from an accounting perspective—the disclosure of the expected financial impacts of physical and transition risks (E1-9). Among the entities analyzed, Sveaskog stands out for its high level of quantification of climate data. The green bond report indicates a change in carbon stocks of 9.65 million tons of CO_{2e} in 2024, broken down into main components (living biomass, dead wood, soil carbon) and accounting for losses resulting from timber harvesting and natural processes. Additionally, the report presents the mechanism for allocating “climate benefits” to the financial instrument, indicating the relationship between the share of CAPEX/OPEX financing and the attributed amount of “net sequestration.”

From the ESRS perspective, this constitutes an example of advanced reporting practice, linking environmental indicators to their financial context and disclosing the methodology used. Additionally, Sveaskog reports climate risks in accordance with the Task Force on Climate-related Financial Disclosures (TCFD) framework, covering, among other things, risks of wildfires, pests, and forest diseases, as well as adaptation measures (*Task Force on Climate-related Financial Disclosures. (2017). Recommendations of the TCFD. Financial Stability Board., 2017*). This can be interpreted as partial compliance with ESRS requirements E1-9, though full compliance would require their financial quantification.

In the case of Österreichische Bundesforste AG, climate disclosures are primarily strategic and narrative in nature, focusing on concepts such as “climate-fit forests” or “forest of the future.” This approach strengthens adaptation communication; however, the analyzed reports lack directly comparable quantitative indicators, such as carbon

balance or Scope 1–3 emissions. At the same time, the 2024 management report indicates a significant physical risk indicator—the proportion of damaged timber at 75% of total harvest, with a significant share of wind damage(Österreichische Bundesforste AG, 2024). This indicator effectively reflects the materiality of climate risks; however, its compliance with ESRS E1 would require linking it to financial consequences.

PGL LP addresses climate issues primarily through the lens of forests' CO₂ absorption capacity and ongoing programs to increase carbon sequestration. The “Report on the State of Forests in Poland 2022”(Państwowe Gospodarstwo Leśne Lasy Państwowe, 2022a) indicates that forests in Poland absorb a net 22,240 kt of CO₂ and also describes the Forest Carbon Farms project, covering 23 forest districts and over 11,000 ha. The project utilized the CBM-CFS3 model and presented a forecast of additional CO₂ absorption for the 2017–2046 period (approx. 930,000 tons).

Although these data have high methodological value, indicating a well-developed forecasting approach, they reveal significant gaps from the perspective of ESRS E1. These include the lack of a comprehensive account of operational emissions and emissions in the value chain (E1-6), the lack of a structured disclosure of “removals and credits” (E1-7), and the lack of systematic quantification of the financial impacts of climate risks (E1-9).

ESRS E4 – Biodiversity and Ecosystem Disclosures

European Sustainability Reporting Standard E4 stipulates that users of reports should gain a full understanding of an entity's impact on biodiversity and ecosystems, including how material impacts and risks are identified, the policies and management actions in place, as well as impact metrics and—ultimately—the expected financial outcomes (E4-6). These requirements shift the focus from describing conservation measures to their measurability, comparability, and link to economic performance(Martínez-Torres, 2024).

Among the analyzed entities, Sveaskog stands out for its use of transparent and comparable quantitative indicators. A key example is the area set aside from commercial use (“set-asides”), totaling approximately 500,000 ha, which accounts for over 16% of the forest area. The entity also discloses specific conservation tools, such as pre-harvest assessments of natural values, the creation of eco-parks, and the retention of biotope elements.

Another key element of reporting is the indicator of environmental practices related to timber harvesting—on average, 15% of the harvested area is set aside as a so-called “environmental consideration” (2024), alongside a qualitative target stipulating that 99% of operations should take place without significant negative impacts on natural and cultural values. These indicators align with the ESRS framework, enabling the monitoring of changes over time and the assessment of the effectiveness of actions.

From an accounting perspective, it is also important to disclose the costs of conservation activities (e.g., “nature conservation”), which are partially financed through the issuance of green bonds. This serves as an example of integrating environmental information with financial results, in accordance with the principles of the ESRS.

Österreichische Bundesforste AG, on the other hand, provides two types of information particularly relevant in the context of ESRS E4. First, it discloses the structural characteristics of the nature conservation system—approximately half of the managed area is subject to conservation regulations, and one-third of mountain forests have the status of protected forests. Second, it publishes an indicator of faunal pressure on regeneration processes—an average of 3,845 young trees with leader damage per hectare, corresponding to approximately 20% of regeneration.

This indicator serves as an example of an advanced biological impact metric that can be interpreted as a measure of ecosystem health and the quality of regeneration processes. At the same time, it has the potential to be used as an operational risk indicator, as its increase may imply higher costs for protective measures and corrective actions, which aligns with the logic of the ESRS.

In the case of the PGL LP, disclosures within the ESRS E4 area are primarily of a formal and spatial nature. The 2023 report indicates the number and area of nature reserves (1,305 units, approx. 126,000 ha) and the significant scale of areas protected under the Natura 2000 network(Raport o Stanie Lasów w Polsce 2023). These data demonstrate a high level of reporting detail and significant commitment to nature conservation.

Additionally, the Forest Status Report 2024 (Raport o Stanie Lasów w Polsce 2024)provides information on biotic pressures, such as damage caused by wildlife, reported in terms of area, as well as a comprehensive assessment of threats (insects, diseases, fires).

However, in the context of ESRS E4 requirements, there is a gap in synthetic impact and effect measures. There is a lack of aggregated indicators of biodiversity status (e.g., proportion of habitats in good condition, level of deadwood, scale of restoration activities), as well as—and this is particularly important—disclosures regarding the anticipated financial impacts of biodiversity-related risks and opportunities (E4-6). This limits the ability to integrate environmental data with the economic analysis of business activities.

ESRS E5 – Resources and Circular Economy

Under the European Sustainability Reporting Standards E5, it is crucial to move from a descriptive approach to activities towards identifying and measuring resource flows ('resource inflows' and 'resource outflows') and their links to strategy, objectives and financial performance (E5-6). In the forestry sector, a prime example of "outflows" is timber raw material expressed in m³, whilst "inflows" include, amongst other things, nursery stock, material and energy inputs, and infrastructure used in forest management.

Compared to the other entities analysed, Sveaskog presents a relatively advanced approach to disclosing "inflows". In particular, it reports a very high volume of nursery stock production – 131 million seedlings were supplied in 2024. Furthermore, the green bond report discloses the structure of capital and operating expenditure (CAPEX/OPEX) related to forest management (including regeneration, harvesting and fertilisation), along with their financing through debt instruments.

From the ESRS perspective, E5 provides a sound basis for interpreting forestry activities as a set of resource flows linked to costs and sources of financing. At the same time, the analysed documents lack a clear presentation of 'outflows' in the form of timber harvest volumes (m³), which limits direct comparability with other entities.

Österreichische Bundesforste AG presents a more balanced approach, covering both 'inflows' and 'outflows'. The entity reports a total timber harvest volume of approximately 1.98 million m³ in 2024, as well as operational indicators regarding timber prices and stocks. At the same time, it highlights a strategy of reducing artificial regeneration in favour of natural regeneration ("Gezielte Reduktion zugunsten von natürlicher Verjüngung"), which can be interpreted as an element of resource management within the logic of the circular economy.

In the case of the PGL LP, disclosures under ESRS E5 are of the most operational and detailed nature. The 2023 report contains data on silvicultural work, including the area of regeneration and afforestation (64,621 ha), of which natural regeneration covered 11,774 ha. In addition, the area of forest nurseries (1,724 ha) is reported, which constitutes a significant component of 'inflows'. In terms of 'outflows', PGL LP presents detailed data on timber harvesting – 40,070.6 thousand m³ net. A significant advantage is the ability to link this data to costs, e.g. the costs of regeneration and afforestation (515,485.2 thousand PLN), which forms the basis for the development of management accounting in the ESG area.

Despite the high level of operational detail, however, there is a clear gap in the full implementation of ESRS E5 logic. There is no systematic presentation of resource flows, covering, among other things, material consumption (fuel, fertilisers, plant protection products), waste generation and resource efficiency indicators. Circularity parameters, such as the structure of timber use (long-term use vs. energy purposes), are also not disclosed.

Consequently, despite the availability of detailed operational data, PGL LP's reporting does not fully meet the requirements of ESRS E5 regarding the transition from a 'take–make–waste' model to a circular economy, based on measurable resource flows and their link to environmental and financial impacts.

Conclusion

The results of the analysis indicate that PGL LP (Lasy Państwowe) possesses a relatively robust database of operational data specific to the forestry sector, including, among other things, forest area, timber harvest volume, the scale of reforestation, and the scope of nature conservation measures. At the same time, this reporting requires a significant overhaul to achieve full compliance with the logic of the European Sustainability Reporting Standards.

In particular, it is necessary to: (a) improve the comparability of the definitions and units of measurement used (e.g., units/ha, t CO₂e), (b) close the information loop—from the identification of impacts and risks, through metrics and management actions, to their financial effects, and (c) organize disclosures in accordance with the ESRS structure (E1, E4, E5), including the introduction of information on expected financial effects (E1-9, E4-6, E5-6).

In the ESRS E1 area, it is crucial to separate reporting on carbon sequestration in forest ecosystems from reporting on operational emissions and emissions in the value chain. In practice, this means implementing a comprehensive greenhouse gas emissions inventory (Scope 1–3) and a consistent carbon balance model for forest resources (e.g., based on the CBM-CFS3 model), along with disclosure of the assumptions made and the level of uncertainty. It is also important to link environmental data with financial information by reporting the costs of adaptation and mitigation measures in CAPEX/OPEX terms. In this regard, Sveaskog's practices can serve as an important reference point.

In the ESRS E4 area, it is recommended to supplement formal and spatial disclosures with a set of synthetic indicators of condition and pressure (the so-called “E4 table”), including, among others, the indicator of wildlife pressure on regeneration (animals/ha), modeled on the practice of Österreichische Bundesforste AG, as well as standardized structural biodiversity indicators (e.g., deadwood, species composition, renaturation areas). A key challenge remains the implementation of disclosures regarding the anticipated financial impacts of biodiversity-related risks and opportunities (E4-6).

In the area of ESRS E5, it is necessary to standardize the reporting of resource flows within the “resource inflows/outflows” framework. This includes both detailed disclosures regarding the harvesting of timber and by-products, as well as data on material consumption, energy use, and capital expenditures. A positive practice at PGL LP is the reporting of regeneration and afforestation costs, which could serve as a basis for expanding CAPEX/OPEX disclosures in the context of environmental objectives.

From the perspective of ESRS implementation, ensuring connectivity between strategy, operational activities, indicators, and financial data is of key importance. Increasing the reliability of data through assurance is also a significant element. Sveaskog's practice, which involves verifying selected environmental disclosures in accordance with the ISAE 3000 standard, points the way for the further development of reporting in the forestry sector.

Limitations and Future Research

The conducted comparative analysis is subject to several limitations resulting from both the characteristics of the available data and the specificity of sustainability reporting frameworks in the forestry sector.

First, the comparability of environmental indicators is constrained by definitional and methodological differences between the analyzed entities. This applies in particular to categories related to biodiversity protection and timber harvesting volumes. For example, the concept of “conservation forests” used by Sveaskog is not fully equivalent to legally defined protection forms reported by Państwowe Gospodarstwo Leśne Lasy Państwowe. Similarly, differences in measurement units (e.g. Efm, solid m³, net m³ under bark) limit direct quantitative comparability.

Second, the scope and structure of disclosures vary across the analyzed entities. Sveaskog places greater emphasis on climate-related metrics and financially integrated disclosures (e.g. green bond reporting), while Österreichische Bundesforste AG focuses on selected environmental indicators, including proxies of physical and biotic risks. In contrast, Państwowe Gospodarstwo Leśne Lasy Państwowe provides extensive operational and spatial data, but with limited disclosures on standardized climate metrics (e.g. Scope 1–3 emissions) and financial impacts of environmental risks. This asymmetry affects the assessment of alignment with ESRS requirements.

An additional limitation stems from the heterogeneity of the analyzed reporting sources. In the case of Sveaskog and Österreichische Bundesforste AG, sustainability and integrated reports were analyzed. In contrast, for Państwowe Gospodarstwo Leśne Lasy Państwowe the study relied primarily on sectoral and operational reports (e.g. Forest Status Reports), which are not fully equivalent to corporate sustainability reports. This difference affects the comparability of disclosures and should be considered when interpreting the results.

Third, the analysis is influenced by the nature of the European Sustainability Reporting Standards, which are based on the principle of double materiality. As a result, the scope of disclosures depends on entity-specific materiality assessments. A full evaluation of ESRS compliance would therefore require reconstruction of these processes, which is not always possible based on publicly available reports.

Despite these limitations, the analyzed documents can be considered representative of current reporting practices in European state-owned forest enterprises. The analyzed reports (2022–2024) provide valuable insights into the level of preparedness for the implementation of the Corporate Sustainability Reporting Directive and ESRS.

Future research should focus on developing sector-specific approaches to ESG reporting in forestry, including the standardization of key environmental indicators and the integration of environmental and financial information in

line with ESRS requirements. In particular, further empirical studies are needed to assess how forest enterprises operationalize double materiality and translate environmental impacts into measurable financial outcomes.

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