



**CHALMERS**  
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# **Tracing Timber and Testing Governance: Exploring the Gaps between Sweden's Domestic Forest Policy and the EU Deforestation Regulation**

Master's thesis in Industrial Ecology

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CHALMERS UNIVERSITY OF TECHNOLOGY

Gothenburg, Sweden 2025

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MASTER'S THESIS 2025

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Master's Thesis 2025

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## **Abstract**

Deforestation and Forest degradation remains pressing global challenges, prompting the European Union to adopt the EU Deforestation Regulation (EUDR) as a key policy measure. Ensuring sustainable supply chains of raw materials has long been a critical barrier in sustainability transitions, particularly in the forestry sector. In Sweden, the timber industry plays a central role in advancing the bioeconomy, making it an important case for assessing traceability and transparency requirements under the EUDR. This study evaluates the extent to which Sweden's current regulatory frameworks and industry practices align with the traceability and data transparency demands of the EUDR. The research combines a review of existing Swedish regulations with an assessment of sustainability data currently recorded during the timber trade from forest to industry. In addition, semi-structured interviews with industry experts provide insights into practical challenges and opportunities for implementing the EUDR in Swedish timber supply chains. These perspectives have been instrumental in shaping the findings and discussions of the thesis. The findings highlight key challenges, including insufficient monitoring systems, limited forestry data to prevent degradation, and industry concerns about administrative burdens, costs and regulatory complexity. At the same time, opportunities exist to strengthen national regulations, logging assessments, improve digital monitoring and data management, and enhance verification of sustainability attributes. Addressing these issues can support effective EUDR implementation while promoting sustainable forest management and strengthening timber supply chains in Sweden.

Keywords: Timber, Traceability, Transparency, Governance, Sweden



## **Acknowledgements**

I would like to express my deepest gratitude to all those who supported me during the course of this thesis.

First and foremost, I am profoundly thankful to my supervisor, Caroline Sartorato Silva Franca, at Chalmers, for her continuous guidance, encouragement, and invaluable feedback. Her insights and support have been instrumental in shaping the direction and quality of this work.

I am also sincerely grateful to my examiner, Martin Persson, whose thoughtful comments and perspectives challenged me to reflect critically and approach the subject from new angles. His guidance helped me to think more deeply and broaden my understanding of the issues at hand.

Special thanks are extended to all the professionals from various organizations who generously shared their time, knowledge, and industry experience through interviews. Their valuable contributions provided essential context and enriched this research.

Finally, I would like to express my heartfelt appreciation to my family and friends for their unwavering encouragement and support, which have been my greatest source of strength throughout this journey.

I would also like to acknowledge the use of AI tool for minor grammatical corrections, sentence refinement and improving readability. All research design were done with the help from Caroline Sartorato Silva Franca, Martin Perrson and Egil Harding, data collection was done with the help from Egil, analysis and interpretations are done by me.

Akshay Garg, Gothenburg, September 2025



# List of Acronyms

Below is the list of acronyms that have been used throughout this thesis, listed in alphabetical order.

EC	European Commission
EPA	Environmental Protection Agency
EU	European Union
EUDR	European Union Deforestation Regulation
EUTR	European Union Timber Regulation
FAO	Food and Agriculture Organization
FLEGT	Forest Law Enforcement, Governance and Trade
FSC	Forest Stewardship Council
HCV	High Conservation Values
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	International Panel on Climate Change
IPF	Intergovernmental Panel on Forests
IUCN	International Union on Conservation of Nature
LULUCF	Land Use, Land-Use Change and Forestry
NFI	National Forest Inventory
NRA	National Risk Assessment
PEFC	Program for Endorsement of Forest Certification
SFA	Swedish Forest Agency
SFIF	Swedish Forest Industries Federation
Swedish Gov	Swedish Government
UN	United Nations
UNFCCC	United Nations Framework on Climate Change
UNTP	United Nations Transparency Protocol
VPA	Voluntary Partnership Agreement
WKH	Woodland Key Habitats
WWF	World Wildlife Fund
XML	Extensible Markup Language



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## 1. Introduction

Data availability and transparency have become pivotal in driving sustainable transitions across sectors. By enabling better access to accurate and timely information, data fosters informed decision-making, enhances accountability, and supports the development of efficient strategies to address complex global challenges (Alexander et al., 2020). In the context of forest management and climate action, available data systems have allowed stakeholders to better understand patterns of land use, deforestation, and ecosystem services, contributing to more sustainable governance practices (Gardner et al., 2019).

Historically, forests have been fundamental to human survival—initially serving as sources of firewood and food, and later, as essential materials for construction and industrial products (De Marzo et al., 2023). However, their continuous and excessive exploitation has disrupted ecological balances, driving biodiversity loss, soil degradation, and accelerating global climate change (Hoang & Kanemoto, 2021). In recent decades, a central driver of deforestation and forest degradation is the expansion of agricultural land to meet growing global demand for food, fiber, and fuel, growing pressure on forest ecosystem (Pendrill et al., 2022). These land-use changes threaten biodiversity, disrupt nutrient cycles, and undermine ecosystem resilience, with far-reaching consequences for both the environment and human well-being.

Recognizing these challenges, recent multi-stakeholder dialogues facilitated by the IPCC and IPBES—engaging climate scientists, indigenous communities, government agencies, environmental NGOs, and private sector actors—have highlighted the urgent need for more stringent and effective regulatory frameworks to safeguard forests and biodiversity. (IPCC, 2023;IPBES, 2012 ; EC, 2023).

In line with the 2019 initiative “Stepping up EU Action to Protect and Restore the World’s Forests,” the European Union has taken steps to strengthen governance of world’s forests and ensure deforestation-free supply chains for commodities linked to forest loss (EC, 2019). These efforts are closely aligned with the EU Biodiversity Strategy 2030, the European Green Deal, and the Farm to Fork Strategy, aiming to influence both production and consumption patterns to promote long-term sustainability of forests (EC, 2023e).

As part of this agenda, the European Union has introduced the EU Deforestation Regulation (EUDR), a landmark policy designed to tackle deforestation and forest degradation embedded in global supply chains (EC, 2023). The regulation targets the trade and consumption of high-risk commodities within the EU, requiring companies to ensure responsible sourcing, enhance supply chain transparency and traceability of the product. Specifically, it covers seven key commodities—cattle, cocoa, coffee, palm oil, rubber, soy, and wood—along with a broad range of derived products. The regulation entered into force on 29 June 2023 and will apply from 30 December 2025, marking a critical step in the EU’s efforts to curb deforestation and safeguard biodiversity worldwide.

Despite the primary concerns surrounding imports of deforestation-linked commodities—mainly associated with producers in tropical regions—the EUDR also mandates that member states ensure the products they place on the EU markets or exports are deforestation-free (EC, 2023). This makes it crucial for both traders and operators (forest owners, timber processing industries) to ensure that both imports, exports and domestic sales of such commodities and related products comply with deforestation- and degradation-free requirements (EC, 2023).

Consequently, it is essential for member states to strengthen their due diligence frameworks, particularly within relevant domestic industries, to ensure full compliance with EUDR requirements.

A key requirement for compliance with the regulation is to conduct a due diligence to verify the legality of commodities and ensure full traceability to their geolocation, alongside the maintenance of transparent and interoperable data systems across operators and traders. (EC, 2023, art. 12). These systems should be capable of securely storing and managing relevant information, enabling timely access and verification when needed. Such transparency intends not only to support compliance with regulatory requirements, but also fosters traceability and promotes long-term sustainability in the forest sector (EC, 2023, art. 30). This includes advancing biodiversity conservation, sustainable forest management, and the protection of the rights of forest-dependent communities and Indigenous peoples.

In the case of timber supply chains, the compliance goes beyond verifying the legality of timber; companies must also demonstrate that the commodities they trade—such as timber and timber-based products—have not contributed to deforestation or forest degradation at any stage of the supply chain (Forestpolicy, 2025). While the industry has experience in implementing the EU Timber Regulation (EUTR), the additional requirements under the new regulation—such as the provision of precise geolocation data, submission of due diligence statements, and centralized reporting across the entire European Union—pose greater challenges. These measures may result in increased administrative burdens, higher compliance costs, and longer processing times for businesses; however, assessing these implications is essential for understanding the overall impact, effectiveness, and potential trade-offs of the regulation.

In this context—as the world’s third largest exporter of sawn wood timber and fourth largest producer of paper and paper wood products (FAO, 2024), —Sweden represents a particularly important case. Sweden harvested over 71 million m<sup>3</sup> of industrial roundwood in 2022 (FAO & UNECE, 2023)—the most of any European country—and exported more than half of the forest products to other European countries (SFIF, 2025). Around 90% of the pulp and paper produced in Sweden is exported and close to 70% of the sawn wood products are exported from the country (SFIF, 2025). According to the Swedish Forest Industries Federation (SFIF, 2025), in 2024 the export value of these forestry products reached approximately 185 billion SEK, with the forest sector employing an estimated 140,000 people annually. Hence, a sector of importance to the Swedish economy.

Given the scale and significance of Sweden’s timber industry, it is essential to examine how national forestry governance aligns with the EUDR. The regulation requires companies operating in Sweden to comply with specific legal obligations regarding traceability, data transparency and due diligence. Specifically, companies must ensure that timber products are deforestation-free, do not contribute to forest degradation and are fully traceable to the geolocation (EC, 2023, art. 4, 5, 8, 14, 16). Sweden’s long-standing private forest ownership provides an important benchmark for evaluating the effectiveness of governance structure and the industry’s readiness for EUDR compliance. Equally important is the examination of national data management systems and key operational practices, which can reveal how existing frameworks support-or fall short of supporting- the EUDR’s objectives of transparency and traceability.

### **1.1. Aim and Objectives**

The study aims to perform an analysis of the requirement gap between Sweden's existing forest management and supply chain policies and those introduced by the EUDR. In specific, it seeks to answer:

- a) What are the existing national regulations and data disclosure requirements in Sweden governing timber production, traceability and sustainability?
- b) What type of data are currently collected and made available in Swedish forestry sector to support traceability and verification of legal and sustainability standards and how accessible are these data?
- c) How do the data requirements of EUDR compare with the availability and accessibility of Swedish forestry and what gaps remain for ensuring compliance?

The analysis critically examines how current systems—including databases and reporting protocols—align with or diverge from the requirements of EUDR. Key areas of interest include geolocation accuracy, traceability across supply chain stages, and the transparency of centralized reporting. Ultimately, the study seeks to identify actionable improvements that can enhance Sweden's capacity to ensure compliance and strengthen supply chain integrity for sustainable forest governance under the EUDR framework.

### **1.2. Delimitations**

- **Geographical and Supply Chain Scope:** This study focuses exclusively on the domestic timber supply chain within Sweden, from forest operations to the point of processing or acquisition by Swedish companies. Due diligence requirements related to the import and export of wooden products from or to Sweden are not considered.
- **Commodity Scope:** While EUDR covers seven key commodities (wood, cattle, cocoa, coffee, palm oil, rubber, and soy), this research is limited to the wood sector. Other commodities and their respective supply chains are excluded from the scope of this study.
- **Thematic Focus:** The study primarily focuses on traceability and transparency in due diligence data under the EUDR. While briefly discusses the factors related to forest degradation, technical aspects such as carbon accounting or broader ecological impacts fall outside the scope of this research.
- **Temporal Scope:** The analysis reflects the regulatory landscape and stakeholder perspective as of the time of data collection. Future developments, updates to the EUDR, technology developments and implementation practices are subject to change with the progress in implementation.

### **1.3. Thesis outline**

This study is organized into several sections. The Background provides an overview of key international agreements and EU policies aimed at preventing deforestation and promoting sustainable forest management, alongside a historical overview of Swedish forest policies. This

is followed by an examination of the EUDR, outlining its objectives, legal requirements, and potential implications for the timber industry. The section also discusses the conceptual foundations of traceability and transparency in timber supply chains as essential tools for ensuring deforestation-free and sustainable practices. The methodology section then details the approaches used for data collection and analysis. The results section presents the main findings of the study, which are subsequently explored in the discussion section in relation to the existing literature and stakeholder insights. Finally, the conclusion summarizes the key contributions of the study and provide recommendations for strengthening sustainable forest governance.

## 2. Background

According to the Food and Agriculture Organization (FAO) (FAO, 2020), approximately 420 million hectares of forest were lost globally between 1990 and 2020, with an additional 10 million hectares continuing having been lost annually since 2020. Deforestation and forest degradation are among the primary drivers of global warming and biodiversity loss. The Intergovernmental Panel on Climate Change (IPCC, 2022) estimates that Land Use, Land-Use Change and Forestry (LULUCF) accounts for 11% of global GHG emissions, with deforestation alone contributing 5% (2.9 billion tons of CO<sub>2</sub>eq) (FAO, 2024). Forests are indispensable for regulating the Earth's climate and sustaining essential ecosystems functions and services.

Boreal forests are often referred to as the 'second lung' of the planet after tropical forests and are recognized as the major hotspots of biodiversity, yet they are frequently overlooked due to greater emphasis placed on tropical forestry (UN, 2024). In recent years, intensive forest management in boreal forests in the Nordic regions has resulted in drastic reduction in the old-growth forests and dead wood, which has consequently resulted in decrease in native flora and fauna (Kuuluvainen, 2009). Reduced biodiversity has been observed in the managed and altered forests as well as there has been reduction in natural fires which take place as natural disturbances in the forests for management of good forest health (Borges et al., 2021).

According to (Nirhamo et al., 2025), the review study demonstrated differences in biodiversity across forest types- clear-cut, managed and old growth- and found that the species richness increases with the forest age, reaching its highest level in old-growth stands. In contrast, commercially managed forests exhibit altered habitats that support distinct collection of species, differing significantly from the diverse natural flora and fauna characteristics of old-growth ecosystems. Similarly, (Asplund et al., 2024) examined the effects of forest management and reported a reduction in deadwoods within managed forests. Since, deadwoods provide essential habitats for many species, its scarcity results in simplified forest structures and lower biodiversity as compared to old-growth forests.

The EU commission's Biodiversity strategy for 2030 includes measures to protect old-growth forests (Biodiversity Strategy for 2030 - EC). However, definition of "old-growth" remains unclear, and strong legislative mechanism for protection are lacking, leading to continued decline (Mikoláš et al., 2023). In Sweden, most old forests have been converted to managed plantations, and unprotected boreal forests face high pressure- 19% of clear-cuts since 2003 occurred in previously untouched forests, which are disappearing at a rate of 1.4% per year, potentially, completely disappear by 2070s (Ahlström et al., 2022).

Old-growth forests are critical for biodiversity conservation, carbon storage, and maintaining essential ecosystem functions (Mildrexler et al., 2020). Forest degradation, often overlooked compared to deforestation, can result in greater carbon loss than deforestation itself (Qin et al., 2021). Sweden's rotation forestry system—clear-cutting followed by replanting over 50–100-year cycles—complicates monitoring of carbon, biodiversity, and ecosystem functions, and it is unclear whether plantations can replicate the ecological value of natural forests (Bauhus et al., 2009), (Ahlström et al., 2022). This even-aged silviculture cycle has long supported the needs of forest industry, Sweden has failed to meet both its national and international biodiversity commitments under the Convention on Biological Diversity, (Angelstam et al., 2020a).

Protecting natural forests while accounting for their economic potential makes it essential to regulate forest use to safeguard ecosystem values, as forest degradation can pose an even greater threat than deforestation. Recognizing illegal deforestation and forest degradation as interconnected threats, it is therefore essential for designing effective policy and conservation strategies. This recognition is reflected in various international agreements, policies and declarations that seek to integrate forest conservation into broader climate and biodiversity frameworks.

## **2.1. Key International Declarations and agreements on Forest Conservation**

Recognizing the critical importance of sustainable forest management, the Bali Declaration of the International Tropical Timber Organization (ITTO) was adopted in 1990 (ITTO, 1990). The declaration set an ambitious target: by the year 2000, all tropical timber exports should originate from sustainably managed sources (UN, 2004). This was a landmark initiative that fostered global collaboration, particularly among the three major tropical timber-producing regions—Asia, Africa, and South America. It catalysed the development of various forest governance strategies and project plans aimed at promoting the sustainable management and trade of tropical forests (Prins et al., 2023).

Later in the same year, in December 1990, the First Ministerial Conference on the Protection of Forests in Europe was held in Strasbourg. In contrast to the tropical focus, this conference marked a significant step toward enhancing sustainable forest management across Europe (Strasbourg 1990 - FOREST EUROPE, 2020). Its primary goal was to strengthen cooperation among European nations in conserving and restoring forests, particularly those that had been degraded or damaged. The Strasbourg declaration emphasized the need for joint action to protect European forests.

To develop a global action plan for sustainable development and encourage international cooperation, the United Nations Conference on Environment and Development (UNCED)—commonly known as the Rio Earth Summit—was held in Rio de Janeiro, Brazil, in 1992 (United Nations, 1992). One of the key topics discussed was forest conservation. However, despite the global attention, the summit failed to establish a legally binding international convention on forests, largely due to disagreements among the countries (UNCED, 1992). As a result, the summit only produced the Forest Principles—a non-legally binding agreement outlining guidelines for the sustainable management of forests.

In response to the need for stronger forest governance, the Intergovernmental Panel on Forests (IPF) was established in 1995. It was mandated to carry out a two-year work programme to address deforestation, forest degradation, and other related issues to propose required actions (UN – IPF). Building on the foundation laid by IPF, the Intergovernmental Forum on Forests (IFF) was formed in 1997 to continue and expand upon previous work (UN – IFF).

These efforts culminated in the creation of the United Nations Forum on Forests (UNFF) in October 2000, under the United Nations Economic and Social Council (ECOSOC) (UN Forum on Forests – UNFF). The UNFF was established with the objective of promoting the management, conservation, and sustainable development of all types of forests, and to strengthen long-term political commitment to these goals at the global level.

In June 1993, the Second Ministerial Conference on the Protection of Forests in Europe was held in Helsinki. This conference marked a significant advancement in the region's forest policy by introducing general guidelines for the sustainable management of European forests and for the conservation of forest biodiversity. A key outcome of the Helsinki Conference was the formal adoption of a clear and comprehensive definition of Sustainable Forest Management (SFM) (Helsinki 1993 - FOREST EUROPE, 2020). This definition laid the foundation for harmonized forest management practices across Europe. According to the declaration: (Helsinki RESOLUTION H1, pg-1),

*"Sustainable forest management means the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems."*

## **2.2. Historical overview of EU's Deforestation regulating policies**

Between 1990 and 2020, Europe experienced a 9% increase in forest area, reflecting a positive trend in forest recovery and management. Today, forests cover approximately 35% of the continent's total land area (FOREST EUROPE, 2020a). This growth is largely the result of domestic forest policy implementation, natural regeneration on abandoned agricultural land, and the adoption of machine-intensive agricultural practices that improved efficiency and yields (Rudel et al., 2020). However, industrialization and urbanization also fueled rising food demand, which in turn drove an increase in the import of high-risk forest commodities from tropical and subtropical regions, resulting in significant deforestation in those countries (Pendrill et al., 2019). Therefore, it is essential to develop policies that not only support sustainable management domestically but also prevent deforestation and environmental harm in third-party countries.

To promote the legal timber trade and sustainable consumption, the EU launched the Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan in 2003. As part of this initiative, the FLEGT Regulation, effective from 2005, introduced licensing through Voluntary Partnership Agreements (VPAs) with timber-exporting countries. VPAs aimed to strengthen governance and establish systems to verify timber legality (EC - 2173/2005). While they enhanced stakeholder engagement and governance in some cases, there is limited evidence that they significantly reduced illegal logging (Ricardo & Dubey, 2021). Moreover, the high costs of implementing VPAs, issues of sovereignty, legitimacy, lack of institutions and weak laws and governance often outweighed the associated trade benefits, limiting the overall effectiveness of FLEGT licensing (Ricardo & Dubey, 2021).

To complement the FLEGT licensing approach and further strengthen the legality of timber entering the EU market, the EU enforced the EU Timber Regulation (EUTR) in March 2013 laying down obligations of legality on operators who place timber and timber products on the market (EC, 2010). The EUTR aimed to prevent the trade of illegally harvested timber and timber products, whether sourced domestically or internationally (EC, 2010). It required EU operators to exercise due diligence by gathering information on the timber's origin, species, quantity, supplier details, and compliance with national laws. Operators were also expected to assess this information and evaluate the risk of illegality within their supply chains (EC, 2010).

However, as pointed out by (Ricardo & Dubey, 2021) verifying the accuracy of such data, especially from countries with weak governance, proved challenging. This made the concept of 'negligible risk' complex and uncertain, while also imposing additional compliance costs on EU operators. From both supply and demand sides, EUTR achieved only limited success in reducing illegal timber imports (Jonsson et al., 2015).

Thus, despite these regulatory efforts, broader challenges in global forest conservation persisted. Although Europe has experienced an increase in overall forest cover, the FLEGT and EUTR initiatives have had limited impact in preventing deforestation and forest degradation elsewhere. Meanwhile domestically, approximately 2.2% of Europe's forests remain undisturbed and can be considered natural forests, as most have been heavily managed for economic purposes, affecting biodiversity and forest ecosystems (FOREST EUROPE, 2020a). Although EUDR primarily targets import from third countries, the current state of forests in Europe also needs closer scrutiny. Strengthening monitoring and governance within domestic timber supply chains is equally important for ensuring environmental integrity. Building on the lessons from previous policies, the EUDR seeks to strengthen information systems and due diligence frameworks by actively involving stakeholders and authorities for more effective monitoring (EC, 2023/1115). It also forms a key part of broader strategies such as the European Green Deal, the EU Biodiversity Strategy 2030, and the Farm-to-Fork Strategy.

### **2.3. Historical overview of Swedish National Forestry policies**

Sweden's forests have played a significant role in the country's industrial development and economic growth. By 1860, timber exports accounted for one-third of Sweden's export revenues, driven by strong demand from European markets (Ohlin, 1955). To sustain this growth and ensure a steady supply of forestry products, the government took an active role in forest management. In 1903, the Forestry Act was introduced, mandating private landowners to engage in regenerative practices to secure the long-term availability of raw materials (Nylund, 2009). Later in 1905, government established county forestry boards and by 1915, school and university level education for forestry was initiated. In 1923, the Swedish National Forestry Inventory was started to monitor the growth and maintenance of forests (SLU-NFI, 2025).

In 1941, the Swedish government established the National Board of Forestry (Skogsstyrelsen) as a centralized administrative authority. Its primary role was to coordinate and oversee the regional county forestry boards, to help ensure consistent and effective implementation of national forestry laws and policies across the country (Jansson, 2011). At the time, forestry practices in Sweden were largely based on selective cutting. This method involved harvesting high-value and easily accessible trees while leaving others standing, relying heavily on natural regeneration through seed dispersal from remaining trees (Tirén, 1949). In addition to economic uses, forests were also valued for their non-material benefits, including aesthetic, cultural, and spiritual significance (Lindkvist et al., 2009).

However, by the 1950s, selective cutting came under growing criticism due to poor forest regrowth and declining forest health. Advances in silvicultural science, combined with the mechanization of forestry operations, led to a major shift in forest management practices. Large-scale clear-cutting emerged as the dominant method, replacing naturally regenerated forests with managed plantations and seedling-based regeneration (Lisberg Jensen, 2011). This

transition significantly increased afforestation and timber production across the country. While the new approach improved economic outcomes for the forestry sector, it also sparked public concern over environmental degradation (Lisberg Jensen, 2011). These concerns culminated in a strong environmental movement during the 1960s and early 1970s. In response, the Swedish Forestry Act was revised in 1979 to incorporate environmental, recreational, aesthetic, and cultural values, reflecting a more holistic approach to forest management (Bush, 2010).

However, continued biodiversity loss and growing international momentum for sustainable development, together with increasing public demands for stronger forest protection, created tensions between environmental advocates and forest owners in Sweden (Nylund, 2009). In response, the Forestry Act was reformed in 1993, introducing the principle of “freedom with responsibility.” This reform established that forest owners retained considerable freedom in how they managed their land but carried the responsibility to balance two legally equal objectives: safeguarding environmental values and ensuring long-term timber production (Löfmarck et al., 2017). Forest owners were granted operational freedom, but with a legal obligation to balance timber production with the protection of biodiversity, cultural heritage, reindeer husbandry, and recreational values (Bush, 2010). This legislative shift prompted greater investment in conservation and improvements in forest management practices.

At the same time, global forest certification systems such as the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) were established to promote and verify sustainable forest management practices. In 1998, Sweden became the first country in the world to have a national FSC standard approved, marking a significant milestone in aligning domestic forestry with international sustainability standards (Carl-Anders Helander, 2015). Shortly thereafter, Swedish forest owners also became eligible for PEFC certification, broadening their access to global markets and recognition. Today, approximately 77% of Swedish forest land is certified under both FSC and PEFC, reflecting the strong influence of Sweden's national forest policies in promoting sustainable practices and ensuring compliance with international standards (Certified Forest Area - Skogsstyrelsen, 2024).

To improve transparency and centralize forest governance, the regional forestry boards were merged in 2006 into a single national authority, forming the current structure of the Swedish Forest Agency (Skogsstyrelsen) (The Swedish Forestry Model, 2009). As the central government authority for forest-related matters, the agency ensures that forest owners and companies comply with national forest legislation, including laws on legality, environmental sustainability, and the protection of cultural values (Swedish Forest Agency - Skogsstyrelsen, 2025).

Today, the Swedish Forest Agency (SFA) is responsible for overseeing that forestry practices align with national regulations. Its core tasks include monitoring, inspections, and providing guidance and support to both private forest owners and companies. It also works with generating national forestry statistics, protect forests and financially support to the forest owners (Swedish Forest Agency, 2025). In the context of EUDR, the agency also plays a key role in ensuring that national forestry operations are adapted to meet the new compliance requirements (Regulation - Skogsstyrelsen, 2025).

## 2.4. EU Deforestation Regulation (EUDR)

### 2.4.1. Definitions and key concepts

At the heart of the legislation are the issues of deforestation and forest degradation. To fully grasp the significance of due diligence under the EUDR, it is essential to understand the definitions of key terms used in the regulation. These terms are often misunderstood or misinterpreted, which can lead to non-compliance. A clear understanding is necessary for companies and other stakeholders to meet due diligence obligations and to effectively carry out risk assessment and risk mitigation measures. This includes both scientific terminology and the specific roles and responsibilities of various actors across the supply chain.

**Forest:** Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use (Forest Resource Assessment 2000).

**Deforestation:** “the conversion of forest to agricultural use, whether human-induced or not” (EC, 2023, article 2 §3).

**Forest Degradation:** is defined as the structural change of forest cover from primary forest or naturally regenerating forests into plantation forest or into other wooded land or the conversion of primary forest into planted forest (EC, 2023, article 2 §7).

**Illegal Logging:** Illegal logging is the harvesting, transporting, processing, buying or selling of timber in violation of national laws. This definition also applies to harvesting wood from protected areas, exporting threatened plant/tree species, and falsifying official documents. It also includes breaking license agreements, tax evasion, corrupting government officials and interfering with access and rights to forest areas (ACPWP 44).

**Operator:** A natural or legal person who, in the course of a commercial activity, places relevant products on the EU market for the first time or exports them from the EU. This includes entities that use relevant products as inputs and, after further processing or manufacturing, place the resulting goods on the market. The role of an operator may vary depending on their position in the supply chain. Importantly, only the entity that first makes the relevant product available on the EU market (or exports it) qualifies as an operator under the EUDR (EC- Guidance Document, 2024).

**Trader:** Any natural or legal person in the supply chain, other than the operator, who in the course of a commercial activity, makes relevant products available on the EU market. “Making available on the market” refers to any supply of relevant products for distribution, consumption, or use on the EU market in the course of a commercial activity, whether in return for payment or free of charge (EC- Guidance Document, 2024).

### 2.4.2. Due diligence Statement

A core objective of EUDR is to strengthen the transparency of information systems, thereby significantly strengthening the effectiveness of due diligence processes. Transparency is

essential for ensuring effective governance of commodity supply chains, enabling operators and traders within the EU to assess and mitigate the risk of deforestation associated with the products they handle (EC, 2023, article 11, 30). At the heart of the regulation is the requirement for full traceability of timber to the exact geolocation of harvest. Specifically, the regulation mandates that accurate geospatial data must be provided for any plot of land larger than four hectares where the timber was sourced (EC, 2023, art. 9). To facilitate this, EUDR requires operators to submit due diligence statements that consolidate relevant information from all actors across the supply chain.

These statements are linked through a unified due diligence reference number, enabling traceability across all stages—from harvest and processing to transportation and final sale. This integrated, verifiable chain-of-custody approach ensures that only legally compliant and responsibly sourced products are placed on the EU market (EC, 2023/1115). It is also important to note that the products made entirely of recycled materials are exempt from due diligence requirements under EUDR (EC Guidance Document, 2024).

Data transparency plays a crucial role not only in supporting regulatory compliance but also in improving the social and environmental performance of the timber supply chain (Gardner et al., 2019). Under the EUDR, enhanced transparency enables both operators and the European Commission to conduct effective due diligence-, helping to prevent the placement of products on the market that are linked to deforestation and forest degradation. Furthermore, transparency supports fair and non-discriminatory trade which is consistent with World Trade Organization (WTO) rules, thereby avoiding biased treatment of specific countries or organizations (Durán, 2025). Moreover, transparent data empowers customers and regulatory authorities to make informed, sustainable decisions and strengthens accountability across the supply chain (Gupta et al., 2020).

It is necessary to meet three following requirements for commodities to comply with the regulation (EC, 2023, art. 3):

- i) They are Deforestation-free [and degradation-free]
- ii) They have been produced in accordance with the relevant legislation of the country of production; and
- iii) They are covered by a due diligence statement.

Under EUDR, the requirement to perform due diligence varies according to a country's risk classification, as defined by the EU's benchmarking system (EC, 2023, art. 29). This system categorizes both EU member states and third countries into three levels of risk based on their likelihood of misconduct in the compliance with deforestation-free requirements:

- i) High Risk:** This category includes countries, where assessments indicate a significant likelihood that relevant commodities or derived products do not comply with deforestation-free requirements.
- ii) Low Risk:** This category includes countries where there is a minimal likelihood of non-compliance with deforestation-free requirements for relevant commodities and products.
- iii) Standard Risk:** This category applies to countries that are not classified as either high-risk or low-risk. They represent an intermediate level of risk regarding potential non-compliance.

According to the EU commission, the assessment is based on several quantitative criteria, including (EC, 2025b):

- Rate of deforestation and forest degradation
- Rate of agricultural land expansion for relevant commodities
- Production trends of relevant commodities and of relevant products

According to the benchmarking document, Sweden has been classified as a low-risk country. It is important to note that all European Union member states are similarly categorized as low risk. In contrast, countries from other continents are classified either as low-risk or standard-risk, with only four countries—Russia, Belarus, North Korea, and Myanmar are designated as high-risk. The level of due diligence required under the EUDR is directly influenced by a country's risk classification. For instance, operators and traders sourcing from or placing products originating in low-risk countries on the EU market are required to collect all necessary information but are not obligated to carry out a risk assessment or implement risk mitigation measures. In such cases, simplified due diligence is sufficient for commercial activity with 1% check annually by competent authorities.

By contrast, sourcing from standard-risk countries requires full due diligence, including information collection, risk assessment, and risk mitigation measures and 3% competent authority checks annually. For high-risk countries, the same full due diligence applies, but with additional obligations—such as more frequent checks i.e., 9% checks annually by competent authorities—due to the elevated risk of non-compliance. Due Diligence Statement.

## **2.5. Data Transparency and Traceability**

Forests have long been monitored using tools such as remote sensing, geospatial data, and in-situ forest data which play a critical role in informing decisions aimed at environmental protection and societal well-being. These technologies enable continuous observation of forest ecosystems, supporting timely interventions and policy development (Liang & Gamarra, 2020). In the context of climate change, forest degradation, biodiversity loss, and deforestation, systematic monitoring and data transparency have enhanced our understanding of ecological change and facilitated coordinated action at both national and global levels (Seidl et al., 2017). Researchers and scientists rely on these data streams to improve insights into natural systems and the societal impacts of environmental degradation (Seidl et al., 2017). International initiatives such as the Global Forest Resources Assessment (FRA), the Capacity Building Initiative for Transparency (CBIT-Forests) coordinated by the Food and Agriculture Organization (FAO), and Global Forest Watch (GFW) exemplify standardized and interoperable platforms that promote consistent data sharing and collaborative decision-making (FAO, 2020a),(FAO, (CBIT-FOREST) (GFW).

The United Nations Transparency Protocol (UNTP) aims to support governments and industry with practical measures to counter greenwashing by implementing supply chain traceability and transparency at the scale needed to achieve meaningful impacts on global sustainability outcomes (UN Transparency Protocol). Building on the role of transparency in environmental monitoring, it is often regarded as an inherently positive attribute, enabling companies to foster trust and credibility among stakeholders while enhancing accountability (Sègbotangni et al., 2025). Beyond its function in marketing or public relations, supply chain transparency plays a

critical role in tracking raw material sourcing, assessing environmental and social impacts, and ensuring compliance with sustainability standards (Budler et al., 2024). Various tools and frameworks—such as Environmental Product Declarations (EPDs), Greenhouse Gas (GHG) Protocol, Environmental, Social, and Governance (ESG) data reporting, and the Global Reporting Initiative (GRI)—have been developed to standardize disclosure and improve comparability across industries and nations (GHG Protocol),(GRI). These mechanisms are intended not only to inform external stakeholders but also to support internal decision-making, helping companies identify inefficiencies and environmental hotspots, thus contributing to continuous improvement.

However, to effectively implement transparency in supply chains, it is essential to understand the nature and scope of data involved. Transparency can encompass a wide range of information—from supplier traceability and transactional records to environmental and social impact data (Schäfer & Schäfer, 2022). One of the key challenges lies in determining the appropriate level of disclosure: while insufficient data can obscure accountability and hinder action, excessive transparency may risk exposing proprietary information and jeopardizing competitive advantage (Gardner et al., 2019). Therefore, finding a balance between openness and confidentiality is crucial. Transparency strategies must be thoughtfully designed to serve both public interest and business integrity, enabling informed decision-making without compromising sensitive operations (Kraft et al., 2020).

The ISO definition of traceability refers to “the ability to trace the history, application and location of item which is under consideration, and for products this can include the origin of materials and parts, the processing history and the distribution and location of the product after delivery” (ISO 9000:2005(En), Quality Management Systems —pt. 3.5.4). Traceability involves not only the core requirement of physically tracking products throughout the supply chain—from origin to destination and vice versa—but also the ability to provide detailed information about their association, composition and the transformations they have undergone (Digital Traceability Events).

According to United Nations Global Compact, a more comprehensive, hybrid definition of traceability is adopted, combining elements of the ISO standard with a strong emphasis on sustainability (A Guide to Traceability: UN Global Compact). It is defined as “The ability to identify and trace the history, distribution, location and application of products, parts and materials, to ensure the reliability of sustainability claims, in the areas of human rights, labour (including health and safety), the environment and anti-corruption.”

Traceability is widely used by companies to closely monitor their upstream suppliers. It serves as a vital tool to regulate supplier operations, support sustainability initiatives, and substantiate claims of responsible sourcing. In the case of forest products, which often involve complex and opaque supply chains, traceability becomes even more critical (“FAO- Timber Traceability” 2022). To address these challenges, multi-stakeholder initiatives have established global traceability schemes such as the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC). These schemes include chain of custody (CoC) certification systems that help verify the authenticity and sustainability of supply chains (Bruzzese et al., 2025). Products bearing these certification labels indicate that the raw materials were sourced from certified, responsibly managed forests.

To address deforestation and forest degradation, both countries and companies are increasingly striving to make their supply chains deforestation-free. One key approach is the adoption of

zero-deforestation commitments—voluntary sustainability initiatives through which companies pledge to reduce or eliminate deforestation linked to the commodities they produce, trade, or sell (Garrett et al., 2019). However, these commitments vary widely, as each company defines its own goals, implementation strategies, and monitoring mechanisms (FAO, 2018).

The effectiveness of such initiatives is often hindered by the complexity of global commodity supply chains, which span diverse geographies, involve various chain-of-custody models, and operate within different forest ownership regimes and industrial contexts such as sawmills. Oversight is further complicated by the interplay of national policies and international regulatory frameworks (Tysiachniouk, 2013). Achieving these goals requires enhanced transparency and traceability across all levels of the supply chain. To achieve meaningful progress, it is essential to strengthen transparency and traceability at every level of the supply chain.

### 3. Methodology

A qualitative research approach was adopted to examine the existing body of information and gather insights from key stakeholders across the Swedish timber sector. This approach was chosen to capture not only the technical and regulatory dimensions of EUDR but also the perspectives, experiences, and challenges faced by industry actors in meeting its requirements.

The study began with a systematic review of official sources, including official regulatory documents, peer-reviewed research articles, policy briefs, and webpages from the European Commission and Swedish authorities such as *Skogsstyrelsen*, which is the competent authority for EUDR implementation in Sweden. This material provided an essential foundation for addressing Research Questions (a) and (b), as it clarified the legal framework, compliance obligations, and institutional responsibilities while also offering insights into the broader governance context of Swedish forestry. Further depth was added through an examination of scientific literature and official reports published by the Royal Swedish Academy of Agriculture and Forestry. These sources traced the historical development of Swedish forestry over the past two centuries, highlighting the evolution of national policies, legislation, and conservation efforts that continue to shape current practices and sustainability models.

The role of certification systems was also examined using both certification bodies' official publications and peer-reviewed studies. This enabled an assessment of their contribution to forest health, governance, and supply chain traceability, as well as their potential adaptation to align with EUDR compliance requirements. Such insights were particularly relevant for Research Question (a) and (b), which focused on the role of existing systems and governance mechanisms and data availability in supporting EUDR objectives. Environmental NGOs provided complementary perspectives through their reports and risk assessment tools, highlighting biodiversity considerations and conservation strategies in Swedish forests. To further contextualize the regulation, EU policy portals and legislative archives were consulted to compare the EUDR with its predecessor, the EU Timber Regulation (EUTR). This comparison was especially useful for Research Question (c), which required identifying regulatory shifts, gaps in current practices, and the implications of stricter traceability and due diligence requirements. Regularly updated implementation guides and FAQs issued by the European Commission also served as key resources for clarifying ambiguities in reporting and enforcement responsibilities.

To complement the analysis, in-depth semi-structured interviews were conducted with actors in the Swedish timber sector. The stakeholder selection was guided by a mapping exercise during the literature review to ensure coverage of groups most directly affected by the EUDR. A summary of the interviewees is provided in Table 1. A total of 11 interviews were conducted, including representatives from regulatory bodies (2), a non-governmental organization (1), a service provider (1), and traders (2). The remaining interviewees (5) represented companies involved in multiple operations like forest ownership and management, operators (e.g., sawmills, processing industries) and traders. To comply with the GDPR agreements signed during the interviews, the names of the companies have been anonymized. The interview questions were tailored to each stakeholder group, taking into account their specific roles and responsibilities within the timber supply chain, as well as their potential exposure to the regulatory requirements of the EUDR. The interview questions were designed to gather insights that would help validate the data and information obtained from the literature review, official sources, and relevant legislation.

The interviews provided essential insights into ground-level realities and the readiness of different actors to comply with the new regulation. For sawmill operators and traders, questions focused on current traceability systems and documentation practices, directly contributing to Research Questions (a) and (b) by revealing operational strengths. The interview questions are listed in Annex 1. Service providers were asked about available data management tools, the degree of transparency they provide, and the institutions responsible for managing relevant databases, which also informed Research Questions (b) and (c). Interviews with policymakers and regulatory authorities, concentrated on strategies for compliance monitoring, enforcement mechanisms, and anticipated environmental impacts of the EUDR. These perspectives were especially valuable for addressing Research Question (c), which examined the regulatory implications and the types of interventions required to ensure compliance and sustainability. The questionnaire for the semi-structured interviews is provided in Annex 2.

The semi-structured format allowed for flexibility in discussion, enabling interviewees to expand on their experiences while ensuring the study's core questions were consistently addressed. Importantly, the interview findings served both to validate and enrich the data obtained from the literature and policy review. By integrating these complementary sources, the methodology ensured that the research questions were approached from multiple angles—legal, institutional, and operational. This design assisted in capturing the fresh perspectives of industry actors, thereby providing a comprehensive understanding of the challenges and opportunities associated with implementing the regulation in the Swedish timber sector.

**Table 1:** List of stakeholders interviewed

Number	Domain	Role
1	Governmental Authority	EU level Regulatory Guidance
2	Governmental Authority	National Authority, Forest law Enforcement, Regulatory guidance
3	Non- Governmental Organization (NGO)	Global Forest Policy Expert
4	Service Provider	Technological solutions provider
5	Timber Company	Trader
6	Timber Company	Trader
7	Timber Company	Forest Owner, sawmill Operator and Trader
8	Timber Company	Forest Management service provider, Operator, Trader
9	Timber Company	Forest Owner, sawmill operator, Trader
10	Timber Company	Forest Owner, forest management guidance, sawmill operator, Trader
11	Timber Company	Sawmill operator

### **3.1. Limitations**

- While the interviews included representatives from forest associations, the study did not directly capture the perspectives of individual small scale forest owners. This may have limited the ability to fully reflect the views and challenges experienced at the individual ownership level.
- The results are subject to change, as the European Commission continues to update and refine the official guidance documents for EUDR implementation. Future revisions may alter the interpretation of compliance requirements.
- The number of interviews conducted was limited, which may have constrained the diversity of perspectives captured. A larger sample size could have provided a broader representation of stakeholder viewpoints and offered additional insights into the implications of the EUDR for the Swedish forestry sector.

## 4. Results

### 4.1. National regulations on timber production, trade and disclosure

In Sweden, the forestry sector is primarily regulated by the Swedish Forest Agency (SFA, *Skogsstyrelsen*), the national competent authority. The SFA is responsible for administering the Forestry Act and the Swedish Wood Measurement Act and ensuring sustainable forest management, biodiversity protection, reforestation, and standardized timber measurement procedures. The Swedish Environmental Protection Agency (*Naturvårdsverket*) administers the overarching Environmental Code (*Miljöbalken*), which sets environmental policies and laws covering biodiversity, climate, water, and soil protection, and works closely with County Administrative Boards (*Länsstyrelserna*) to implement regulations such as the Species Protection Ordinance at the regional level. The Swedish Board of Agriculture (*Jordbruksverket*), serving as Sweden's National Plant Protection Organization, oversees plant health, pest control, and the trade of seeds and plants, including aspects relevant to forestry, in coordination with the Swedish Chemicals Agency for plant protection product approvals. Together, these agencies ensure that forestry operations comply with environmental, sustainability, and plant health regulations, integrating national policies with regional enforcement. Table 2 summarises the primary national laws and regulations applicable to actors involved in the timber production and trade nationally.

**Table 2:** Primary rules and regulations applicable to timber production and trade

<b>Laws and Regulations</b>	<b>Description</b>
The Forestry Act (SFS, 1979) <i>(Skogsvårdslag, SFS 1979:429, SFS 1993:553, SFS 2024:807)</i>	The Forestry Act states the demands that society has on you as a forest owner. The law states that the forest is a renewable resource that is to be managed sustainably yielding a good revenue. At the same time, forest owners have an obligation to take consideration to nature, cultural heritage, reindeer husbandry and other interests.
Swedish Wood Measurement Act (Lag om virkesmätning SFS 2014:1005) <i>(SFS, 2014)</i>	This Act aims to provide both sellers and buyers with equal and transparent information, ensuring fair opportunities to assess whether the compensation for the transferred timber is reasonable. Timber measurement is conducted to determine both the quantity of timber and its suitability for the intended use (timber, pulpwood).
Production and trade of seeds and plants <i>(EC, 1999)</i>	Production and marketing of forest seed and plants in Sweden is implemented according to EU are regulated by the Council Directive 1999/105/EC on the marketing of forest reproductive material. This regulation was established to promote trade of reproductive materials in EU for restoration and afforestation of forests.
Swedish Species Protection Ordinance (SFS, 2007)	The Swedish Species Protection Ordinance (2007:845) sets forth the rules that specify

	which species are protected by law. The ordinance contains provisions governing capture, killing and taking of species from the wild, trade and other actions involving specimens of animals and plant species in the need of protection. About 585 of the estimated 50,000 known plant and animal species in Sweden are protected by law throughout the country.
Swedish Environmental Code (Miljöbalk SFS 1998:808)  (SFS, 1998)	The Environmental Code comprises a set of rules designed to promote sustainable development. It applies to individuals and operators engaged in activities that may affect environmental conservation objectives, such as the protection of natural and cultural environments, the preservation of biodiversity, and the sustainable use of land, water, and other physical resources.
Plant Protection Act (Växtskyddslag, SFS 2022:725)  (SFS, 2022)	The act regulates the prevention, monitoring and control of harmful insects like greater pith borer, eight toothed bark beetles, (spruce bark beetle), and the six toothed bark beetle that can damage trees and forest ecosystem. The act is co-regulated by Swedish Board of Agriculture and the Swedish Forest Agency.

**The Forest Act:** It is the primary piece of legislation regulating Sweden's forest sector. Under this act, any final felling activity on forest land exceeding 0.5 hectares must be reported to the SFA at least six weeks before operations begin. The notification must include details such as the map of land, tree species composition, and the estimated volume of timber to be harvested (–SFS, 1979). Once submitted, only the outer boundaries of the area to be felled are made publicly available through the mapping services Forest Basic Data and Geodata Portal (SFA, 2024a). Information such as names, personal identification numbers, property designations or property boundaries is not displayed (SFA, 2025c).

During this six-week notification period, the SFA reviews the proposed felling application for compliance with national forestry and environmental legislation using its automated review tool (*Skogsstyrelsens automatiska granskning*) (SFA, 2025). This review process includes verifying whether the proposed site overlaps with protected conservation areas or habitats of endangered species. If no inconsistencies are flagged by the system and all ecological and legal requirements are satisfied, the felling is approved.

For both mountainous woodland and noble broad-leaved woodland, forest owners must apply for a permit from the SFA before planning any felling activities (SFA, 2025e). In these woodlands, permission to harvest is required. The application must specify how forest restocking will be ensured and detail the considerations planned for protecting nature, cultural heritage, and reindeer husbandry (SFA, 2025m). These forests contain significant areas of old-growth biodiversity that require conservation. Their ecological balance is highly sensitive, and even minor disturbances from timber production can lead to a rapid decline in biodiversity (Löf

et al., 2010). Mountainous woodlands are predominantly located in the northern part whereas the noble broad-leaved woodlands are found in southern parts of Sweden and play a vital ecological role by serving as habitats for endangered species (Nilsson et al., 2001).

According to SFA (SFA, 2025m), noble broad-leaved woodlands are defined as areas with over 70% coverage of deciduous species, with at least 50% coverage of noble broad-leaved species. The noble broad-leaved species include beech, oaks (*Quercus robur* and *Quercus petraea*), elms (*Ulmus glabra*, *Ulmus laevis*, *Ulmus minor*), ash (*Fraxinus excelsior*), hornbeam (*Carpinus betulus*), wild cherry (*Prunus avium*), maple (*Acer platanoides*), and limes (*Tilia cordata*, *Tilia platyphyllos*, *Acer campestre*) (Löf et al., 2010; Swedish Gov, 1997). These woodlands can also include stands mixed with pasture. Harvesting in noble broad-leaved woodlands also requires permission (SFA, 2025m). According to the requirements, the application must outline how restocking will be secured and describe the considerations for preserving the natural environment and cultural heritage. Furthermore, harvested trees must be restocked specifically with noble broad-leaved species. This permission is required due to high ecological values in these regions.

Exceptions to the above notification/reporting are routine thinning or pre-commercial thinning operations—conducted to enhance forest vitality and long-term productivity, as they are considered part of standard forest management practices (SFS, 1979). According to the timber industry [8], this exemption has traditionally provided significant operational flexibility for forest owners and contractors, allowing them to respond swiftly to forest management needs without undergoing administrative procedures.

In Sweden, a small percentage of wood is traded as delivery wood known as “*leveransvirke*”. In this system, the forest owner—often with the assistance of employees or a contractor—performs the felling of timber. The wood is then delivered to a designated roadside location, where it is collected by the buyer (SFA, 2025). The forest owner is responsible for submitting the felling notification to the SFA, while the buyer must obtain a map of the plot and relevant data regarding sustainability certification to verify that the wood has been legally and sustainably harvested (Guidance- Swedish Forest Agency). According to SFA, less than 10% of the wood is sold through this method (SFA, 2025b).

According to the Forest Act, following any final felling, forest regeneration is mandatory. This must be carried out within three years and can be achieved through natural regeneration, seeding, or planting of saplings (Swedish Gov, 1903a). If regeneration results in excessive density, a pre-commercial thinning should be conducted to ensure adequate space and resources for healthy tree growth (Swedish Gov, 1993). The overall goal is to maintain forest continuity and ensure a sustainable long-term supply of wood.

**The Environmental Code:** The code was adopted in 1998 to establish a legal framework aimed at promoting sustainable development by guiding environmental policy and regulations. Its purpose is to protect and preserve the environment, ensuring a healthy and sustainable use of natural resources across ecological, social, cultural, and economic dimensions for present and future generations (SEPA, 2025b). According to the Code, principles such as precaution, prevention, and intergenerational equity are emphasized, ensuring a balance between economic growth and environmental conservation. It also includes provisions on penalties and sanctions for violations or environmental crimes (SEPA, 2025). In this way, the Environmental Code serves as a broad legal framework, providing overarching guidance for more specific directives

such as the Forest Act, the Swedish Wood Measurement Act, the Species Protection Ordinance, and others.

**Swedish Species Protection Ordinance:** This ordinance is the part of the Environmental Code to protect wild flora and fauna. The ordinance is based upon the EU provisions on species protection from the Birds Directive (2009/147/EC) and the Habitats Directive (92/43/EEG). All the information and data regarding the protected species in Sweden can be found on the website of Swedish EPA (Naturvårdsverket) (SEPA, 2025a). In Sweden, if red-listed species, EU-protected species, or nationally protected species are found in an area notified for felling, the SFA has the authority to halt the logging operation for further investigation (SEPA, 2017). These areas may be inspected not only by the SFA but also by environmental NGOs such as the Swedish Society for Nature Conservation (SSNC) and Skydda Skogen (Protect the Forests). In such cases, forest owners and logging companies are instructed to temporarily suspend operations (Charlier & Krause, 2024 ;Sjödin, 2024).

The process of inspecting felling notifications and overseeing wood production in forests is regulated under the Swedish Forestry Act, supported by environmental safeguards set out in the Environmental Code, and the Species Protection Ordinance (SFS, 2007) (SEPA, 2017). Depending on the outcome of the inspection, the area in question may be formally set aside for conservation, or buffer zones may be established to ensure that protected habitats and species are not disturbed. If there is a dispute—whether from the authorities or the forest owner—an appeal can be made to the Land and Environment Court (SEPA, 2017). This legal route allows both parties to present their case and potentially reach a mutually acceptable solution. If illegal logging occurs in protected areas, penalties such as fines or imprisonment may be imposed on the responsible parties (Swedish Gov, 2014c). These legal obligations apply uniformly, regardless of the size of the landowner, ensuring that both smallholders and large forest owners are held to the same environmental standards.

**Swedish Wood Measurement Act:** The act was enacted in 2014, establishing a standardized framework for measuring timber used as the basis for payments to forest owners. Its primary objective is to uphold that both buyers and sellers have equal and reliable information regarding the quantity and quality of wood, thereby promoting transparency and trust in commercial transactions (Swedish Gov, 2014d). The SFA serves as the competent authority, responsible for regulation and oversight.

Key Provisions (SFS, 2014):

- **Measurement Standards:** the act mandates timber measurement companies to follow specific methods for measuring wood, including required accuracy levels and documentation practices. It also stipulates that measurement results and certain data must be stored for a minimum of two years.
- **Issuance of measurement receipts:** companies conducting measurements are required to issue standardized receipts to both buyers and sellers, ensuring transparency in transaction process.
- **Annual Reporting:** All the companies involved in timber measurement must notify the SFA annually by March 1, detailing their measurement activities and the volume of wood measured. This practice enables the SFA to monitor and record the total flow of timber in Sweden.

The act applies to timber harvested in Sweden, including stems, stumps, branches, and chips, when measurements are used as the basis for payments to forest owners. It does not cover industrially processed wood products, such as boards and pulp (Swedish Gov, 2014b). The SFA serves as the supervisory authority and has the right to request information, access documents, and enter areas, premises, and other sites related to timber measurement to carry out inspections, investigations, and sample collection as needed (Swedish Gov, 2014b) (SFA, 2022).

**Other Supporting legislations:** Apart from these key laws, other pieces of legislation summarized in Table 2 are also noteworthy in their direct or indirect support for the implementation of forest management activities and trade of relevant products. The regulation on the **production and trade of seeds and plants** sets standards for the quality, health, and certification of seeds, plants, and tree seedlings. While primarily focused on agriculture and horticulture, it also covers forestry through the trade of forest reproductive material for reforestation and afforestation (SFA, 2023a). Such material can only be marketed with a Master Certificate, which provides a unique register ID and confirms that the seeds are collected from approved basic material. The certificate includes details on the material's type, quality, and origin, with all approved sources listed in the national register (*Rikslängden*) (SFA, 2021).

Additionally, the **Plant Protection Act** is a forestry-related pest control legal instrument managed by the SFA. SFA has authority over major forest pests such as the spruce bark beetle, pine bark beetle, and six-toothed bark beetle. It can order the removal of infested trees, impose restrictions on timber storage and transport, and carry out targeted control measures without declaring special control zones (SFA, 2025h).

Furthermore, to protect the rights of Sweden's Indigenous Sami community, the **Reindeer Husbandry Act** (*Rennäringslagen* 1971:437, (SFS, 1971)) grants them exclusive rights to engage in reindeer husbandry—including herding, hunting, and fishing—within their *sameby* (reindeer herding community) territories (Swedish Gov, 1971). When forestry operations occur in these areas, companies are legally required to consult with the *sameby*, plan harvesting to avoid migration and calving periods, preserve lichen-rich grazing forests and movement corridors, minimize disturbance from machinery and infrastructure, and protect culturally significant sites (ICR, 2025). These measures safeguard Sami livelihoods and maintain the ecological integrity of reindeer grazing lands.

Across all such pieces of legislation, a key factor is where the harvest occurs in the first place. In that regard, since February 2016, the SFA has started publicly releasing maps (<https://kartor.skogsstyrelsen.se/Kartor/>), with felling notifications, enabling everyone to see where clear-cutting is planned across the country. These maps display the geographic location of intended logging and anonymize sensitive information such as forest owner names and property numbers. The primary goal of this initiative is to promote transparency, build public trust in the forest sector, and streamline the Agency's operations (Altinget, 2016). It also facilitates open data access for forest and energy companies, environmental organizations, and other stakeholders.

## 4.2. Data reporting and transparency for timber legality and sustainability verification

### Timber Traceability

Sweden's forestry sector is supported by multiple digital infrastructure and co-developed by industry actors for their business operations (Hultman et al., 2024). A key data management system is VIOL (Virke Online) platform, a nationwide digital tool developed by Biometria for managing trade and logistics information in the Swedish forest sector. Biometria is a cooperative jointly owned by stakeholders from the bioenergy, sawmill, and pulp and paper sectors (Biometria, 2025). The cooperative is responsible for developing and maintaining measurement standards, systems, and tools to ensure that all timber measurements are conducted in compliance with the Swedish Timber Measurement Act (Biometria, 2025).

To meet legal trade requirements, under the Act (1915:218) on contracts (Swedish Gov, 1915), a legally binding contract is necessary to sign between the buyer, typically a timber company, and the seller, usually the forest owner or a forest owner association as an agreement to perform felling operations. The contract specifies key details such as the location of the land, the tree species to be harvested (for example, spruce, pine, or birch), the expected volumes and assortments of wood (such as sawlogs, pulpwood, or biomass), quality specifications, and delivery arrangements, including timing and measurement locations, which are specifically managed under the Swedish Wood Measurement Act (Swedish Gov, 2014a ;Billerud, 2025). Fig. 1. Shows the description of the whole system how the trade occurs from forest to the company.

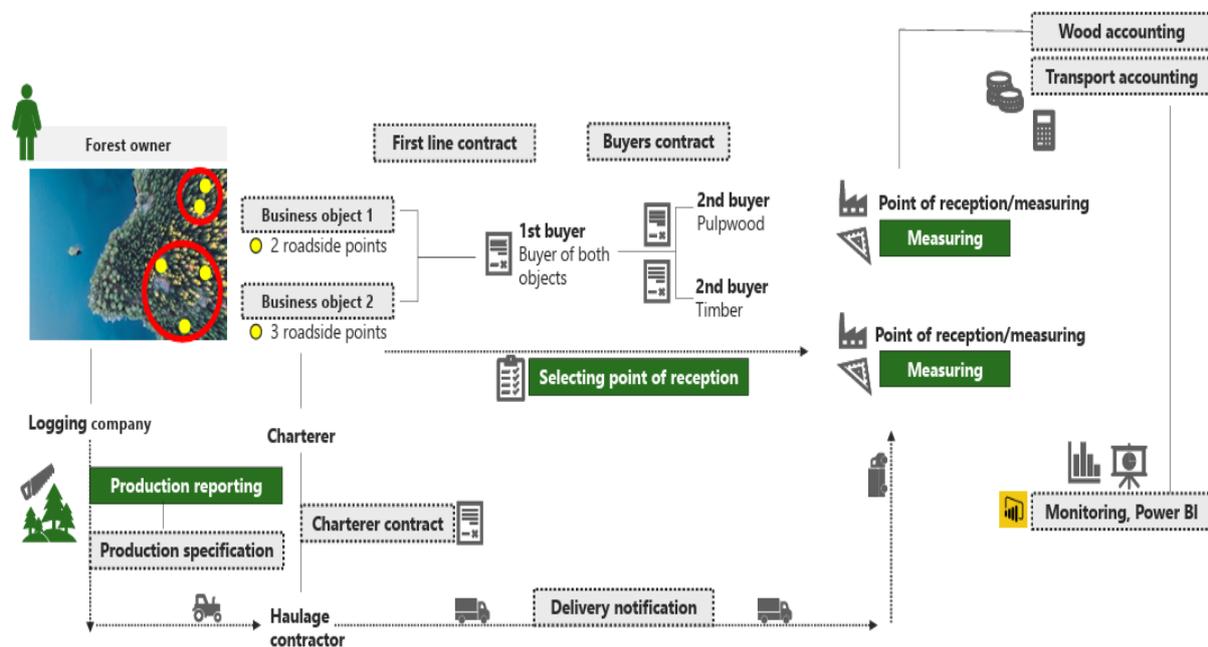


Fig.1. Diagram of the timber supply chain from forest to buyer (Rixon & Persson, 2020)

The contracts between buyers, harvesters and sellers are uploaded to VIOL once finalized. (Biometria, 2025a). To ensure interoperability across the Swedish forest industry, these contracts are documented using the papiNet standardized electronic format, structured as XML files that facilitate data exchange between forest owners, buyers, logistics providers, and

processing facilities (Biometria, 2025g). Fig. 2. shows the user interface of the contract on VIOL platform.

## Contract information - Traceability

Certification status of The original seller

Certification type

Forest management	Chain of Certidty	Environment (nature conserv)
0 = No information	0 = No information	0 = No information
1 = PEFC	1 = PEFC	1 = ISO14001
2 = FSC	2 = FSC	
3 = PEFC and FSC	3 = PEFC and FSC	

Coordinates is compulsory to ensure the origin of the products

Läge	Lägesrad Kartext	Kartblad	SydNörd	Väst-Öst
1			6882297	445994
2			6882083	445477
3			6882130	444411
4				

Additional information about county and district

The VIOL-system is the ground for WTA and is a good and safe help to secure and document traceability for EU traders who place timber products on the EU market for the first time, Its also a part of the DDS-system to exercise '[due diligence](#)' according to requirement from EUTR.



Fig. 2. Use interface for the contract page at VIOL webpage(Rixon & Persson, 2020)

Following the registration of the contract, Biometria is automatically notified via VIOL, enabling it to plan impartial measurement operations in accordance with the Swedish Timber Measurement Act (SFS, 2014) (SFA, 2025I). The subsequent worksite preparation and harvest planning, however, are managed by the timber-buying company (or its appointed logging company). This process is independently done by the buyer company through company systems, and involves detailed forest planning using GIS-based forest inventory data, mapping of stands, and verification of legal and environmental compliance, including adherence to FSC and PEFC certification requirements and biodiversity protection rules (Persson, 2021). Harvest planning data—such as harvest instructions, stand maps, and optimized machine routes—are then transmitted digitally to contracted forest machine operators, ensuring that operations comply with contractual specifications and sustainability standards (Triona, 2025).

According to the timber companies [8,9,10] the measurement data is uploaded into the centralized digital system- VIOL. VIOL supports the entire logistics chain—from harvesting in the forest to delivery at the industry terminal—thereby enabling traceability of timber. This system provides quality control, transparency, and compliance in adapting to fair trade and traceability requirements until the timber reaches the industry.

Both representatives from environmental NGO [3] and timber company [8] agreed that, while VIOL is not publicly accessible, it provides transparency among commercial stakeholders, ensuring that buyers and suppliers can access shared data on trade and transportation of material and manage their trade fairly.

Interviewee [3] also mentioned that:

“Sweden is well positioned with the infrastructure for traceability. EUDR will also strengthen the wood market due to extra control on the market. EUDR will have some effect but not so revolutionary impact. Sweden has good traceability system, 99% of the wood goes through VIOL system. It is advantage we have a system used by the whole industry.”

During the timber harvesting process, forest machines such as harvesters and forwarders operate using StanForD (Standard for Forest machine Data and Communication), an internationally recognized standard for data communication and reporting (StanForD - Skogforsk). Developed and maintained by Skogforsk (Sweden’s forestry research institute), StanForD enables standardized data exchange between forest machines, forestry companies, and centralized databases (Arlinger et al., 2021).

Through StanForD, forest machines automatically record and transmit key operational data in real time, including the GPS-based time and location of each felled tree, as well as details such as tree species, diameter, length, quality, and assortment classification (Möller et al., 2013). The logs are assigned with Keys and UserId, through which every single log can be separated from all other logs produced globally (Skogforsk, 2010). These data are structured to support interoperability and can be transmitted wirelessly to forestry companies and centralized systems, facilitating effective monitoring, logistics coordination, and production reporting (Picchi et al., 2022).

This system should facilitate near real-time decision-making and traceability, allowing individual logs to be tracked from standing trees in the forest all the way to industrial delivery points. Forestry companies can remotely adjust machine settings—such as cutting lengths and product mixes—based on real-time demand from sawmills and pulp industries (Kemmerer & Labelle, 2021). According to the reported information, it appears that the StanForD system optimizes resource allocation, reduces waste and improves overall economic efficiency.

Furthermore, the standardized XML-based data format used by StanForD simplifies integration with various data systems (increasing interoperability), reducing the need for format conversions and making it easier for system developers to process and analyze the information (Arlinger et al., 2021). The reliable and structured data also supports quality assurance, operational benchmarking, and compliance with certification systems like FSC and PEFC, particularly their chain of custody, which increasingly demand full supply chain traceability.

### **Supporting actors**

Within Biometria, the Council for Measurement and Reporting (RMR) plays a key role. The RMR is responsible for authorizing independent measurement companies, ensuring staff competence, and overseeing the calibration and approval of measuring equipment (Biometria, 2022). In addition, the RMR handles issues related to the measurement and accounting of raw materials and products traded between market parties.

Another committee operating under Biometria is Council for Production and Transport (RPT). RPT is responsible for handling issues related to forestry transport and production processes (Biometria, 2025). To transport the wood from the forest to the mill terminal, truck drivers are employed and authorized by transport companies (hauliers). The transport company is responsible for hiring, verifying licenses, and granting drivers permission to operate, as well as registering them in Biometria’s *Chaufförsklienten* (Driver Client) system so they can log in and report deliveries (Biometria, 2025d). Upon arrival at the measurement sites, independent

measuring companies authorized by Biometria handle the physical measurement and verification of timber, ensuring volumes, quality, and data are accurately recorded in accordance with the Swedish Timber Measurement Act ensuring standardized measurement (Biometria, 2025f). The driver's access to the measurement system stems from their transport company, allowing them, upon arrival, to register loads, and complete the measurement and reporting process in collaboration with the measuring companies (Biometria, 2025d). The measuring companies are responsible for uploading the measured data to the VIOL system. Biometria is responsible for verifying the quantity information in accordance with the contract between the seller and the buyer, assessing the value of the goods, and validating the trade (Biometria, 2025h). Fig 3 shows the system overview of VIOL for analysing the trade based on the data.

According to one timber company representative [8], detailed information on wood trade remains confidential due to commercial considerations. In the current system, the geolocation of the harvested timber is not shared downstream; instead, downstream actors rely primarily on wood certification as shown in Fig.3. However, Biometria provides aggregated data from industry terminals, where timber is measured, to the SFA under the Wood Measurement Act, reported annually on March 1, as mentioned in section 4.1. This reporting includes the total volume of wood measured by Biometria but does not include geolocation information (SFA, 2024b). Thus, it appears that geolocation data on timber harvesting remains non-transparent in current business practices. In addition to Biometria's data, the agency integrates information from multiple sources, including the SLU National Forest Inventory, felling notifications, and stock surveys (SFA, 2025g). These combined datasets form the basis for the official statistics on harvested wood volumes in Sweden, which are published by the SFA and made publicly accessible (SCB, 2025) (SFA, 2025h). Furthermore, the agency reports on forest areas designated for environmental protection and conservation purposes (SFA, 2025f).

## The VIOL-system administrates business deals and the accounts in the WTA

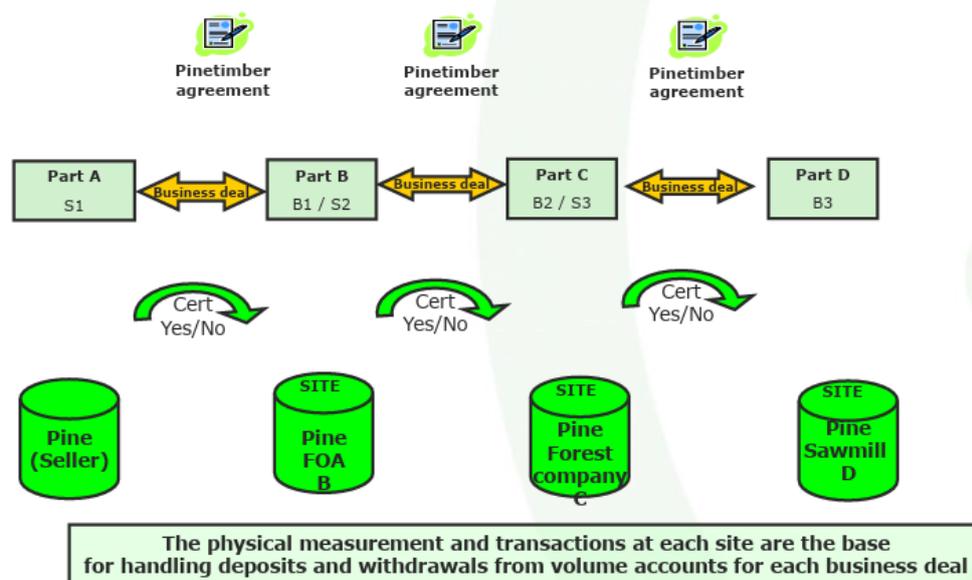


Fig. 3. System overview of trade verification based on data uploaded (Rixon & Persson, 2020)

### **Sustainability Verification**

When a timber trade contract is created, details about the forest's certification status—such as FSC or PEFC—are recorded and uploaded to the VIOL system (see Figure 1). Sustainability certifications, such as FSC and PEFC, are widely recognized indicators of responsible sourcing in the timber industry (Zanchini et al., 2022). Reporting the forest's certification status ensures that certified timber is properly documented and traceable throughout the trade process. By verifying certified origin, VIOL supports compliance with sustainability standards. FSC and PEFC certification schemes confirm that timber comes from responsibly managed forests, safeguarding ecosystems, upholding workers' and indigenous peoples' rights, and ensuring adherence to environmental and social regulations for sound forest management practices (Sustainable Forest Products, 2025).

As discussed in section 4.2, approximately 77% of Sweden's forests are certified under both FSC and PEFC schemes. However, small-scale forest owners often face significant barriers to certification, primarily due to the high costs associated with obtaining and maintaining FSC certification. To address this, FSC has introduced mechanisms like group certification and the Controlled Wood standard (Villalobos et al., 2016).

Group certification allows small forest owners to share the costs and responsibilities of certification, making it more accessible. For instance, companies like Stora Enso Skog AB and Sydved AB manage group certifications covering extensive forest areas and numerous members, facilitating broader participation (FSC Sweden, 2025b). While this approach has proven effective in some cases, it may not fully alleviate the financial and administrative burdens for all smallholders, particularly those with limited resources or in remote areas (Johansson, 2018).

FSC Controlled Wood originates from non-certified forests but must be verified as free from unacceptable sources, including illegal harvesting, human rights violations, threats to high conservation values, forest conversion, or genetically modified trees (FSC Sweden, 2025a). To manage these risks, FSC requires companies to apply due diligence measures guided by National Risk Assessments (NRAs). In Sweden, the FSC's Centralized National Risk Assessment (CNRA) provides the framework for evaluating risks related to species protection, landscape conservation, and ecosystem integrity, which companies must address before sourcing (FSC, 2018) (Lehtonen et al., 2021). Controlled Wood can be mixed with FSC-certified material under controlled wood certification to produce "FSC Mix" products, allowing responsibly verified but uncertified timber to enter the market under defined sustainability standards (FSC Sweden, 2025a).

### **4.3. Challenges and opportunities in data reporting under EUDR**

#### **On eliminating Deforestation and Forest Degradation**

The EUDR primarily aims to prevent deforestation and forest degradation by ensuring that commodities placed on the EU market are deforestation- and degradation-free. To understand

its data reporting requirements, it is essential to examine the existing definitions and knowledge on deforestation and forest degradation (Zalles et al., 2024). According to the EUDR: [Click or tap here to enter text.](#)

“Forest Degradation is defined as the structural change of forest cover from primary forest or naturally regenerating forests into plantation forest or into other wooded land or the conversion of primary forest into planted forest.” (EC, 2023, article 2 §7)

Since 1950, Sweden has experienced a major transformation of its landscapes. Approximately, 60% of the country’s productive forests have been converted to production forests, largely driven by clear-cutting practices and the replacement of diverse forest stands with monocultures (Larsson et al., 2011). This conversion has profoundly altered forest structure and compromised ecological integrity. Biodiversity and vegetation in forest ecosystem integrity play a central role in forest ecosystem functioning, and the ecological importance of old-growth forests—those largely undisturbed by humans—cannot be overstated, as they provide irreplaceable habitats and complex ecological functions that cannot be replicated by plantations or managed forests (skydda skog, n.d.). (Berglund & Jonsson, 2005).

In Sweden, old-growth forests are rare and rapidly declining, with studies showing significant logging of unprotected stands in recent decades. According to (Ahlström et al., 2022), old-growth forests in Sweden are being cleared at a faster pace than those in the Amazon. Between 2003 and 2019, approximately 20% of all clear-cut areas in Sweden were old-growth forests, meaning that a substantial share of timber, paper, and bioenergy originates from trees that are centuries old. These forests are disappearing at an estimated rate of 1.4% per year, which, if the trend continues, could lead to their complete loss by the 2070s. Despite this alarming trend, there is no systematic national-level monitoring, no comprehensive environmental impact assessments specific to old-growth forest loss, and limited public awareness of the issue.

However, a major challenge lies in the limited availability of transparent, spatially detailed data on designated old-growth forests versus planted or production forests. While national forest inventories exist, they rely on sample-based methods, leaving gaps in high-resolution mapping (Ahlström et al., 2022). This lack of clear data creates ambiguities and gives companies room to operate under commercial forestry practices that may, intentionally or unintentionally, target older natural forests, undermining biodiversity conservation goals (WWF, 2025b).

Under Article 10 of the EUDR, operators are required to perform risk assessments that include consideration of the “prevalence of deforestation or forest degradation in the country of production or parts thereof” (EC, 2023e). However, the lack of transparent, detailed, and up-to-date data on the extent and status of old-growth and natural forests in Sweden poses a significant challenge for accurate risk assessment and due diligence. While Sweden has strong biodiversity-related legislation, such as species protection provisions, the Environmental Code, and Natura 2000 site designations under EU law, there is no specific national regulation focused explicitly to tackle forest degradation (WWF, 2025a). This legal and data gap raises concerns about Sweden’s capacity to effectively safeguard its remaining old-growth and primary forests, especially in light of increasing demand for bioenergy and timber products (Linder & Östlund, 1998). Furthermore, without high-resolution spatial data distinguishing old-growth from managed or planted forests, compliance with EUDR may be undermined, allowing continued harvesting of ecologically valuable forests under the guise of sustainable forestry (EC, 2023c).

According to the interviewee [3] on discussing impact of EUDR on deforestation and forest degradation in Sweden, they mentioned that:

“The EUDR is likely to have minimal impact on the Swedish forestry sector as deforestation and conversion to agricultural land is not an issue in Sweden. Sometimes it is overlooked that the commodities are produced according to the relevant legislation.

I hope positive impact in some of the legislations in Sweden. Currently, the legislation is flexible and EUDR might lead to sharpen the focus to ensure that the commodity really meets the compliance and that’s what the forest sector is afraid of. Other legislations like - **Environmental Code** (*Miljöbalken*) [stated in section 4.1] can strongly be enforced. But it also depends upon the interpretation.”[3]

However, when discussing the basis for modifying existing regulations, there is no exact definition of forest degradation, making it unclear how forests can be protected under new laws to meet the objectives of the EUDR. Interviewee from environmental NGO [3] mentioned that:

“The definition of forest degradation is not that strict. If you convert the virgin forest into a plantation forest, but logging is still conducted and there is not much of protected virgin forest left in Sweden.

Both the definition of virgin forest and plantation forest is established. The definitions are quite very strict; there might be difference in the interpretations. The definitions are not really strong in Sweden.”

Based on the insights from the interviewee, it was observed that although strict definitions of primary forest and old-growth forest exist, there are notable difference between the Swedish and EU interpretations. According to the EU definition (EC, 2023b), which builds on FAO, primary forest is a: “naturally regenerated forest of native tree species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed” (FAO, 2018, p. 188).

The EU further defines old-growth forest as: “a forest stand or area consisting of native tree species that have developed, predominantly through natural processes, structures and dynamics normally associated with late-seral developmental phases in primary or undisturbed forests of the same type. Signs of former human activities may be visible, but they are gradually disappearing or too limited to significantly disturb natural processes” (EC, 2023b).

In the Swedish implementation of the Renewable Energy Directive, however, the term old-growth forest is translated as *gammal skog*, which primarily focuses on the age of the forest rather than its ecological structures (SFIF, 2024b). By contrast, in Swedish translations of EU guidance documents, old-growth forests are called *naturskog*, a term that often refers to a forest that has been unaffected by human activities for so long that it has largely regained the characteristics of a primary forest (Eriksson et al., 2024). *Naturskog* is described more in line with the EU commission’s definition, highlighting ecological diversity and minimal human influence. This ambiguity between interpretations of legal and guidance translations complicates forest monitoring and decisions regarding protection measures.

It appears based on the discussion that there is consensus on virgin forests and plantation forests. However, the conversion of these virgin forests has not been stopped as described above, because these forests are not protected under the national regulations. Thus, the companies continue logging due to difference in interpretations. A similar view was presented by interviewee [11]:

“The legislation is not meant for Sweden per se especially regarding deforestation which makes it a bit arbitrary. Even in the context of forest degradation (an ever-relevant discussion), Sweden is doing a sufficient job in protecting the forests and that there is already better legislation (national or supra-national) that deals better with the issue.”

“Deforestation with conversion to agricultural land, which the Deforestation Regulation primarily focuses on, is less relevant to forestry in Sweden.” (interviewee [4])

### **Do we really need EUDR, when EUTR already exists?**

During the interviews, a recurring opinion was the initial hesitation among companies regarding the introduction of the EUDR. Many perceived the regulation as unnecessary, arguing that the existing EUTR already provided an effective framework for timber supply chain governance. Concerns were raised that additional regulations would increase the administrative burdens, related cost and require considerable time to understand and implement. Several interviewees recalled that, at the time of the EUDR’s introduction, the industry was overwhelmed and resisted to its enforcement. The regulation was initially perceived as an added layer of complexity rather than an improvement. However, as the requirements became clearer—supported by guidance documents issued by the European Commission and the SFA—most respondents reported feeling less apprehensive. They acknowledged that many practices required under the EUDR were already in place through the EUTR and national regulations in Sweden, and thus began preparing for the additional administrative adjustments necessary for compliance.

Thus, on discussing the impact of the EUDR as compared to the existing EUTR on the Swedish forestry and timber industry operations, NGO [3] added that:

“The industry is already governed by national regulations and operates within a structured framework. The regulation’s primary intent appears to be the inclusion of other high-risk commodities under a unified legislative instrument. Timber, which was already subject to regulatory oversight under the EUTR, may have been included in the EUDR largely for the purpose of regulatory harmonization across all seven commodities.”

Most business operators and traders [8,9,10, 11] perceive EUDR as an extension of the existing EU Timber Regulation (EUTR), with added emphasis on additional administrative requirements related to geolocation traceability and enhanced due diligence.

“The complaint from the companies is mostly due to the cost.” – interviewee [1]

“Increased level of administration and traceability may create overhead costs which adds costs to everyone, especially for smaller ones potentially. Small suppliers may be left behind.” – interviewee [6]

“We don’t forward this traceability knowledge to downstream suppliers as of today since it is not necessary to do so in accordance with EUTR when buying wood within the EU. This will however change with EUDR. However, the data reported downstream will be just reference number and identification number.” – interviewee [6]

“Increase the amount of administration dramatically as compared to today. For every site there is a need to report or feed information to TRACES [Trade Control and Expert System set up by the European Commission] with information on geolocation, assortments and who the parties are and the volume of wood that we expect as the output. Today, we perform operations under EUTR, that is very similar in many ways to EUDR. Thus, not very big difference, it adds traceability. It will lead to increased cost in Swedish forest industry. This will decrease margin, which will lead to a decrease in the amount of money that forest owners will receive. We will help forest owners to do the declaration process. This will be included in the service charge.” (interviewee [8])

“The Swedish companies already have good regulations, adding EUDR will just increase extra regulation and extra administrative work load.” (interviewee [9])

“We already do lot of work that EUDR demands. EUDR will not majorly affect our operations. We already have all the systems and routines. Controlled wood is purchased. Already traceability certificates exist to make sure that everything is alright. EUDR is an administrative burden for us.” (interviewee [10])

“It will barely make things better, and it is just a headache to deal with.” (interviewee [11])

However, regulatory authority [2] mentioned:

“EUDR is a significantly stricter framework, aimed at improving transparency, enhancing traceability, and reducing the environmental impact and forest degradation due to supply chains of high-risk commodities.”

“Not really sure if there will be an extra cost of administration by the companies.”- interviewee [3]

The companies [7,8,9,10] also identified data management as a significant challenge for ensuring traceability under the EUDR. According to them:

“While Swedish timber companies maintain detailed internal records covering business agreements with forest owners, land plots, deliveries, pricing, and commodity flows, the situation becomes more complex when timber enters centralized terminals. Companies typically have centralized storage facilities where wood is stored, which often results in the mixing of different wood batches. This makes it challenging to accurately trace the wood and link it to its specific reference number.”

“Information Technology (IT) might be a hurdle for small actors in the market with the technical solutions”- interviewee [10]

To address the centralized storage issue, the European Commission recommends applying a first-in, first-out (FIFO) storage approach. This method helps maintain the link between stored timber and its corresponding documentation, improving traceability and compliance with EUDR requirements.

While discussing the same concept of data management with trader [6], a mixed opinion was presented:

“Bigger companies are more prepared while smaller companies may have a harder time setting people of (training them to understand the changes in data requirements and reporting). However, in our opinion there is not a major concern even among their smaller suppliers. Thanks to EUTR existing from before the new legislation is easier to meet.” (interviewee [6])

“There is an uncertainty is how everyone is going to collect this due diligence statement information. Especially those who have not collected the information before. Mostly concerned regarding the tools and how things are going to work” (interviewee [6])

The interviews show that the companies are generally reluctant to the EUDR, primarily due to the perceived increase in administrative workload and the anticipated costs of managing large volumes of data. A particular concern within the industry relates to the management of internal data and the tracking of wood flows, especially once the material passes through terminals and enters the centralized storage systems.

In contrast, regulatory authorities and environmental NGOs expressed a more favorable view of the regulation. From the perspective, the EUDR represents an important step towards improving data transparency and strengthening commodity traceability along the supply chains to improve governance. Currently there is no empirical evidence to estimate the significance of additional costs for the companies. However, considerable uncertainty persists regarding both the practical management of the due diligence data and the extent to which the regulation may deliver tangible benefits for the industry.

### **Are existing data management systems sufficient for the compliance?**

When interviewees mentioned that many of the EUDR requirements were already part of their existing practices, the discussion naturally shifted toward the current structure of data flows within the supply chain and the potential changes needed under the new regulation. As outlined in Section 4.2, all information related to trade contracts is currently entered into the VIOL system. However, under the EUDR, operators and traders will additionally be required to register timber trade transactions in the TRACES (Trade Control and Expert System) platform managed by the EU commission, to obtain a reference number and a verification number for the associated due diligence statement. These identifiers will subsequently need to be included when uploading the trade contract to VIOL. Consequently, each timber trade recorded in VIOL will need to be linked to the corresponding EUDR reference and verification numbers.

This additional requirement introduces a procedural step prior to uploading trade contracts into VIOL and necessitates modifications at the national level to align the existing Swedish timber trade data reporting system with EU regulatory obligations. Moreover, companies will be required to implement API-based solutions or equivalent digital systems to facilitate data exchange, ensure interoperability between platforms, and manage the submission of due diligence information. In accordance with European Commission guidelines, operators must also maintain these records for a minimum of five years to demonstrate compliance during potential audits or inspections. According to interviewee [10]:

“All the forest companies in Sweden will use Biometria for the carrier of reference numbers and verification numbers from TRACES. So, we will report the trade to TRACES and will get the reference numbers from there and then will report it in Biometria the delivery. Then VIOL will connect the reference numbers and verification numbers to the wood delivery and make sure it’s connected all the way to the pulp mill or sawmill. VIOL makes it a bit simpler; it’s about putting all the technical solutions together.”

As outlined in Section 4.2, information stored within VIOL is intentionally kept non-transparent to preserve business competitiveness among market participants. While discussing the level of transparency that EUDR calls for, there were similar views among the stakeholders:

“The person responsible for the contract and the charterer/transport company (the person responsible for or carrying out the timber transport) have access to the geographical origin of the timber, in the current system.”- interviewee [4]

“Traceability to the geographical origin of the timber already existed with the Timber Regulation (and is supported by VIOL). Transparency does not mean that all actors can see the geographical origin of the timber in other timber transactions.”- interviewee [4]

“VIOL system will not be public. It will only be open for business.”- interviewee [8]

The review of data management systems, reporting practices and the statements from interviewees indicate that VIOL demonstrate strong competence in managing geolocation data. Consequently, traceability is unlikely to pose a significant challenge in Sweden, as the timber industry already records the exact harvesting locations.

Nevertheless, the issue of data transparency remains open to discussion. Since, VIOL is primarily designed as a business-oriented data management system, the disclosure of commercially sensitive information—the degree of transparency that should be ensured continues to be a subject of debate.

### **Expected changes in data reporting for traceability**

In the current Swedish forestry system, routine operations such as thinning and pre-commercial thinning do not require prior reporting or notification to the SFA. However, with the implementation of EUDR, all wood harvesting activities—including those associated with thinning—must be documented and reported in TRACES to obtain an EUDR reference number and verification number, ensuring traceability and regulatory compliance. Before purchasing

wood, the operator must verify the corresponding due diligence statement using the reference number so that it can be provided to downstream actors if required.

According to company No. [8]:

“This will also impact the flexibility of operations in a negative way. For example, if the company is harvesting at a forest owner’s site and a neighbor forest owner comes and asks for help for thinning in his forest. The declaration process will make it much more difficult to perform activities like this, as there is a need to get an answer from TRACES at least before the woods can be directed to sawmills and that could take some days to receive number from TRACES. That is negative for our business operations. This may result in financial losses due to postponed or cancelled activities.”

While discussing about the *leveransvirke* (delivery wood), where forest owner manages the notification reporting and harvesting, it was observed that according to the interviewees, there would be a major shift in the case of delivery wood. According to environmental NGO expert [3]:

“The implementation of EUDR introduces a major shift in responsibility. Forest owners will now be required to upload due diligence data for their timber on the TRACES platform, as they are considered the first to place the product on the market. Without a valid due diligence number provided by the forest owner, the timber companies will not be allowed to purchase the wood, and forest owners will be unable to sell it legally. This marks a significant administrative change, and many forest owners may need additional support to comply. As a result, it is likely that the process will evolve—potentially allowing forest owners to sign a selling contract with timber companies, whereby the companies take on the responsibility of carrying out the due diligence requirements.”

They further added that:

“There are total 8000 operators according to SFA, and EUDR requires to check operations of 1% operators per year as Sweden is low-risk country. *Leveransvirke* is hard to control, you just directly buy timber. There might be some legal implications. This is quite complicated. It might affect some of these activities.”

“*Leveransvirke* is a really important aspect. 80% of the material come through the contracting process. We also purchase around 10-20% of the wood which is cut down by the forest owners themselves. They take that wood to the road and contact us to buy it and pick it with mentioning the quantity of the wood. In this condition we do not have a control. This wood is known as *Levransvirke* (Delivery Wood). This will change under EUDR. Now they will have to report the plot of land where they have harvested rather than just selling the wood. That is small technical change. Currently they go on the internet and report the wood but now they have to enter the plot of land on the map where it comes from.” – interviewee [10]

To monitor this, the European Commission has developed the EU Observatory on Deforestation and Forest Degradation, a system designed to monitor and verify land use changes through global spatial data (EC, 2025c). By mapping these geolocations, authorities can confirm whether or not natural forests have been cleared for the production of regulated

commodities. This tool has been developed in assisting in risk assessment and due diligence of the commodities ensuring that forestry products are sourced without contributing to new deforestation, thus strengthening the integrity and effectiveness of deforestation-free policies.

### **Will there be unequal enforcement of the regulation?**

During the interviews, discussions on the competence and readiness of the Swedish timber sector revealed a combination of confidence, concern, and cautious optimism. Companies consistently emphasized that Sweden benefits from one of the strong legal frameworks for timber supply, and advanced data management systems, such as VIOL, which supports traceability requirement for the compliance, and provide a competitive edge. At the same time, some interviewees expressed concern about the uneven enforcement of laws across EU member states.

According to [2], a key concern regarding the EUDR is the uneven enforcement of regulations across EU member states, particularly in relation to company size and national governance structures and competent authorities. In countries like Sweden, the forestry industry is subject to strict regulations that require extensive data reporting and strong compliance mechanisms. According to interviewees:

“Swedish companies invest heavily in administrative systems to meet these high standards. However, when all companies across the EU are assessed against the same compliance benchmarks—regardless of their national regulatory frameworks—this places companies in highly regulated countries at a competitive disadvantage.”-interviewee [9]

“Several other European countries lack competent regulatory bodies, and in at least three member states, no formal institutions currently oversee the forestry sector”-interviewee [2],(EC, 2025).

“This regulatory gap allows companies in these regions to operate with lower compliance costs, undermining the efforts of firms adhering to stricter sustainability standards. The absence of competent authorities raises serious concerns about the harmonized and consistent implementation of the EUDR, threatening both fair competition and the regulation’s overall credibility.”- interviewee [2]

These issues also cast doubts on the reliability of the risk benchmarking list published by the European Commission. Some EU countries with limited institutional capacity and weak regulatory oversight have been categorized as low-risk, which heightens the likelihood of non-compliance. In such contexts, companies in those countries can more easily demonstrate legality under national regulations, even when those regulations are insufficient to prevent forest degradation. As a result, countries with weak forestry laws may find compliance comparatively easy to achieve, undermining the intent of the regulation.

According to NGO [3]: “Since low-risk countries are subject to simplified due diligence, including limited risk assessment and mitigation requirements, this classification could distort market competitiveness and weaken the regulation’s intended environmental benefits.”

At the same time, some interviewees argued that Sweden’s strong institutional and regulatory framework could allow it to benefit under the EUDR.

“EUDR will be stricter traceability but VIOL would be competent as compared to other countries.”- interviewee [3]

“It would bring a competitive edge to Swedish forestry since we have all things in order, deforestation is not an issue in Sweden, good traceability, existence of VIOL to transfer reference number among business partners. That could lead to cheaper implementation of EUDR in Swedish companies as compared to other countries.” – interviewee [8]

### **How will EUDR affect certification schemes?**

In Sweden, forest certification schemes such as FSC and PEFC have long played a significant role in verifying sustainable forest management practices. These schemes typically involve field inspections to assess compliance with environmental, social, and economic sustainability standards. However, with the introduction of the EUDR, the role and relevance of these certification systems are being reassessed.

The EUDR introduces stricter legal requirements, particularly regarding traceability. Under the new regulation, companies must be able to trace wood products to the precise geolocation of the land where the wood was harvested, ensuring both legality and compliance (Heldt, 2024). Unlike earlier practice, relying solely on certification is no longer sufficient to demonstrate sustainability compliance. The EUDR does not automatically recognize certification schemes as proof of compliance, creating uncertainty about whether competent authorities will perform on-the-ground verification comparable to that of FSC or PEFC, if the certificates go obsolete.

From a regulatory perspective, the EUDR focuses primarily on deforestation and forest degradation prevention through high levels of transparency and traceability. While this represents a major step forward in monitoring supply chains, it also raises questions about whether broader sustainability goals—such as biodiversity conservation, social equity, and responsible forest management—will continue to be addressed if certification schemes are phased out. It appears that certification schemes set restrictions that can go beyond EUDR requirements. For instance, a forest may be legally harvestable under EUDR but be designated as a high conservation value area under FSC or PEFC, thereby restricting logging.

Interviewees expressed a diversity of opinions about the future of FSC and PEFC certifications under the EUDR framework:

**Potential Decline in Relevance** – Some stakeholders ([5], [8]) believe that these certifications may become obsolete in the coming years because the EUDR places greater emphasis on traceability and transparency. They also note that the regulation could create an equal opportunity for forest owners who currently lack certification, allowing them to compete in timber markets without bearing certification costs.

“We have not decided anything yet on certificates. FSC and PEFC are getting obsolete in EUDR. Still need to consider if we continue with certificates or not. But we are planning to leave them.” – interviewee [8]

“Forest owners might be able to manage the extra cost if any due to EUDR, but can escape the cost of certification and have equal opportunity in the market.” – interviewee [5]

**Continued Value of Certification** – Others, particularly in the timber industry ([1], [3], [6], [9], [10]), stress that the EUDR cannot entirely replace FSC or PEFC, as these schemes address a wider range of sustainability issues beyond traceability—such as conservation of high-value forests, sustainable harvesting, and social aspects like human rights, workers conditions. For instance,

Interviewee [1]: Certificates might still be relevant.

[3]: “Certification can play a very important role. FSC is developing lot of tools and will provide a module, where you can apply for EUDR due diligence. It would be very unfortunate, if they show only that there is traceability and no deforestation. As the certificates represent sustainable production. But of course, legislation is primarily developed for other commodities. Implementation of certification can strengthen it because there might be legal consequences if you don’t do it the right way.

Traceability to the plot of land can be the game changer. Certifications system doesn’t have it today but they are moving towards that. This also has lot of other advantages. Painful in beginning for all the actors but with technological development EUDR will have positive impact.”

[8]: “There are many aspects of certificates that are not covered by EUDR like conservation work in forest. It is important to have considerably good forestry. Certifications would help in making sure that everything is alright in the forest and not just deforestation or forest degradation. There are forests which could be allowed to harvest according to EUDR, but these forests can be high in conservation value which is under certificates policy. They do not cover each other. Certificate and EUDR both have their own significance.”

[11]: “We are currently using FSC & PEFC but we think whether these will still be necessary going forward. There is still a demand for these certificates for now, so they hold relevance (especially since they tackle economic and social aspects) but for a longer timeframe we will have to see.”

**Overlap and Administrative Burden** – Some companies ([9]) raised concerns about the “triple compliance” challenge—managing EUDR, FSC, and PEFC simultaneously. While all three aim for sustainable forestry, their requirements are not harmonized, leading to increased costs, administrative complexity, and uncertainty over legal or financial risks if full compliance with each system is not achieved.

Several interviewees provided insight into how certification currently supports monitoring and sustainability in Sweden. According to [10]:

“The forest owners who are certified with FSC and PEFC, they have a forest management plan. It contains map of the forest and it contains all the polygons in the forest. The management plan is to divide the forest into different departments, depending on how old the forest is and what the management plan is due to final felling

or just thinning. So, already there is a lot of controlled wood. This forest management plan is not an official document, but we being an economical association, the company professional can look into these plans. So, it's rather easy to monitor the forests. We have almost all the geolocations already.”

“There are already systems through FSC and PEFC, working alongside the new system in EUDR which are all very similar and work parallel to each other, which will be very inefficient.”- interviewee [9]

While discussing the aspect of FSC controlled wood, environmental expert [3] mentioned that:

“There is this advantage today with Sweden that FSC has this minimum requirement in chain of custody system control wood, which is and that's required and that is basically a requirement today to sell something on the market.”

### **Overall impression of interviewees on Benefits and Drawbacks of EUDR**

To conclude the interviews, a final question was asked to gain an overall perspective from the interviewees. Their responses reflected a mix of positive, negative, and neutral views, with some expressing cautious optimism as they await the regulation's implementation and its outcomes.

“Traceability and transparency of data will be a gamechanger, because it goes beyond legality” – interviewee [1]

“[Benefit] We see big benefits that our normal operation will be legitimized and seen as green. Drawback is that the legal requirements and bureaucracy is still unclear. We don't want it to be delayed anymore.” – interviewee [5]

“We are positive about its work to combat deforestation. We were previously worried about the timeframe of implementation but are less so now thanks to the postponement to 2026. Much of this was because information systems weren't in place.” – interviewee [6]

“We dislike that there are different rules for different actors based on size, that seems very unfair. There might also be issues for smaller companies we imagine. What is the benefit of full traceability/transparency, is it really important for chips, sawdust and such?”

“[Positive]The objective of the legislation, really to ensure EU does not contribute to deforestation.

[Negative] We are pressing too much to make it perfect. There are other countries who could implement EUDR at a very different level. Thus, it is upto the politicians to decide the level of implementation of EUDR to the same degree with other countries and not overwork on it.” – interviewee [8]

“A benefit is the policing of timber being imported to the EU market ensuring it is sustainably sourced. We have also seen a number of small actors popping up recently who don't rely on certificates [but rather EUDR going forward] and in such a way not having to

pay for expensive certificates could level the playing field for forestry actors.” – interviewee [9]

“The overall idea of the regulation is really good. We don’t want deforestation and forest degradation. In Sweden we need deforestation for biodiversity conservation. The problem in Sweden is that there are many old pastures and agricultural lands that have been abandoned and now it has grown back into forest again and then we lose biodiversity again. That is already been taken care of.” – interviewee [10]

“The intention is good, but it will be hard since all our products scrambled, making traceability very hard.”- interviewee [11]

## 5. Discussion

For the implementation of a new regulation, it is necessary to get the perspectives of the stakeholders to identify the opportunities and challenges in meeting the goals of the policy. Environmental experts and regulatory bodies have emphasized that key technical terms in the EUDR—such as deforestation, natural forest and forest degradation—lack clarity and consistency. Given the forest ecosystems and land-use histories vary significantly across different geographies, applying generic EU-level regulations without geographical adaptation risks misinterpretation and poor enforcement outcomes. In Sweden, the absence of clear data on forestry makes it difficult to distinguish between primary forests, old-growth forests and plantation forests in monitoring and reporting. Without these distinctions, assessing forest degradation and identifying high conservation value areas remain challenging. This can be interpreted as a shortcoming of the initiatives both at national and EU level for healthy forest conservation.

The SFA has been addressing emerging uncertainties in EUDR implementation through dialogue with the EC and communicating clarifications to the national stakeholders. Acting as a medium between national actors and EU institutions, the agency offers guidance on regulatory obligations and conducts webinars and outreach to support forest owners and companies. Despite these efforts, several practical challenges remain. There is limited clarity regarding penalties for unintentional non-compliance, as well as concerns over the technical competence required to navigate the TRACES portal. Moreover, uncertainty persists about how the system will function in practice. While many companies have undertaken extensive preparations, they remain unsure whether they have developed sufficient tools and expertise to manage the administrative demands of the EUDR.

Interviews revealed that some companies initially felt overwhelmed by the regulation and its implementation requirements. However, over time, their confidence has grown as the European Commission has issued clarifications and released guidance documents. Several interviewees noted similar resistance with the implementation of the previous EU Timber Regulation (EUTR), which also presented initial challenges but became more manageable as companies adapted. They expressed optimism that a similar adaptation process will occur with the EUDR, especially given the additional one-year preparation period granted by the Commission.

In response to extra administrative burdens and data management requirements, companies are developing internal application programming interface (APIs) to integrate EUDR requirements into the system, for example SCA has developed a latest API for handling the data under EUDR (SCA, 2025). Biometria has updated VIOL 3 to enhance compliance under the regulation (Biometria, 2025). These measures suggest a shift toward more technologically integrated compliance system, but they also highlight the dependency on technical expertise, which may not be equally accessible to all stakeholders specifically in the case of smaller companies.

Insights from the literature and stakeholder interviews suggest that, ensuring geolocation traceability to the point of origin is unlikely to pose a significant barrier to implementation of the EUDR in Sweden. The VIOL system already comprises of proper mechanisms to facilitate reliable traceability along the supply chain, from the forest to the company terminal. However, the issue of transparency in data disclosure remains uncertain. Questions persist regarding the level at which such data should be shared—whether at the business, national or EU level—

and to what extent it should be made publicly accessible. Concerns also arise about how the disclosed data would be managed.

As discussed in section 4.1. since 2016, all felling notifications in Sweden are made publicly available by SFA, enabling stakeholders to monitor upcoming harvests. While this policy has enhanced transparency, it can also sometimes lead to backlash against forest owners. The general public often perceives clear-cutting, which still the dominant harvesting method- as synonymous with deforestation, thereby generating negative reactions (Lofstedt, 2019). Based on the interviews conducted during the study, (Lofstedt, 2019) concluded that such opposition is largely due to a lack of understanding about sustainable forestry practices and the operational context of Swedish forestry.

Several recent cases in Sweden expose systemic weakness in forest monitoring and enforcement. The Swedish Society for Nature Conservation (SSNC) found that the SFA's automated review tools fails in most reported felling cases to detect illegal or non-compliant logging, especially areas hosting protected species (Society for Nature Conservation, 2024). The Land and Environmental Court of Sweden has ruled that the agency failed to uphold the Environmental code (Verdict: Law violation, 2024). In another case in 2023, the NGO Tjust's Forest Group alerted the agency about planned logging by Södra in an area with high conservation value in Västervik municipality. Despite a court ruling prohibiting logging in that area, the agency was unable to prevent Södra from carrying out the felling (Södra: Violation court sentence, 2023).

These incidents reveal two systemic weaknesses:

- i) Monitoring tools are not operationally effective
- ii) Enforcement mechanisms fail to act even when violations are clearly established

These systemic weaknesses pose a serious concern in the context of EUDR, which requires that commodities placed on the EU market comply with national laws. If monitoring tools fail to conduct thorough assessments and enforcement mechanisms cannot prevent illegal logging, there is a risk that timber harvest in violation of national regulations (As discussed in Section 4.1) could enter the market. This raises critical questions regarding the responsibilities of the national competent authority SFA: should it enhance its monitoring tools and strengthen governance structures to ensure that illegally harvested wood is effectively identified and prevented from entering the supply chain? Additionally, should more effective measures be implemented to prevent the logging in protected areas? Addressing these weaknesses is essential to ensure compliance with both national regulations and the requirements of EUDR.

This systematic weakness can be considered as a serious concern with respect to EUDR. As EUDR requires the commodity to be legal with respect to national laws. However, if there are instances reported which shows that the tools for evaluating the felling notifications fail to perform a thorough assessment and fail to prevent the logging. But the logging performed in the area which violates the national regulations as discussed in section 4.1. This raises a question, that would the national competent authorities need to improve the assessment tools and improve governance structure to avoid these illegally harvested woods to enter the market.

Although forest certification systems are recognized globally, there have been instances in Sweden where environmental organizations such as the Swedish Society for Nature Conservation (SSNC), Protect The Forest (*Skyddaskogen*) and World Wide Fund for Nature

(WWF) have criticized certified forest owners and industries. They argue that the FSC standards are too weak to effectively safeguard forest ecosystems (Karin Åström, 2013). In northern Sweden, the clear-cutting of old-growth forests has triggered a biodiversity crisis, and FSC certification has failed to prevent the exploitation of these ecologically significant areas (SSNC | FSC-Watch). Research also indicates that forestry companies often prioritize economic returns over conservation (Angelstam et al., 2020), leading Sweden to fall short of its national and international environmental commitments (Chapron, 2022).

A recent report from Assurance Services International highlights that Woodland Key Habitats (WKHs) encompass significant areas of High Conservation Value (HCV) and, under the Swedish National Forest Stewardship Standard (NFSS, FSC-STD-SWE-03-2019), should be excluded from almost all forest management activities (Allee, 2023). According to the *Central National Risk Assessment* tool for Sweden, developed by FSC (FSC-CNRA-SE V1-0 EN), WKHs serve as proxies for HCVs 1 and 3, and therefore should not be used for sourcing-controlled wood.

Despite these strict restrictions, FSC Chain of Custody (CoC) certified companies have been able to conduct logging operations in these HCV regions. This is largely due to the absence of precise technical definitions for restricted areas, such as habitats of red-listed species, and the lack of universally applied assessment methods. Many of these cases involve small private landowners, and in several legal disputes, the courts have found that the SFA failed to properly identify WKHs.

Methodological challenges remain in distinguishing between “a forest stand containing red-listed species that require special protection” (Allee, 2023) and a WKH, particularly in determining what quantity or density of red-listed species within an ecosystem qualifies it as a WKH. Furthermore, there is no national regulation mandating the protection of “Western Taiga” spruce forests (Allee, 2023). In 2021, the Court of Justice of the European Union ruled that Sweden must strengthen provisions for assessing and protecting rare birds and other red-listed species.

Environmental stakeholders advocate for the use of species-based indicators in forest assessments prior to logging, as these are more effective for biodiversity protection. By contrast, companies tend to favor structure-based indicators, which are relatively less efficient and have been deemed inappropriate by the SFA (Allee, 2023). Nevertheless, in the absence of clear regulations, companies often rely on structural assessments to fulfil due diligence requirements and proceed with logging for economic gain.

Several recent cases highlight the continued logging of areas with high conservation values, despite their ecological significance and legal protections. For instance, in 2023 FSC-certified SCA clear-cut a forest at Orrmyrarna in Sollefteå municipality, Sweden, that contained thousands of red-listed orchids (Skyddaskogen, 2023b). In 2022, one of Stockholm County’s most species-rich calcareous coniferous forests home to rare ground-living fungi were logged in violation of both the EU Habitats Directive as well as Swedish law (Skyddaskogen, 2022). Similarly, a 120–160-year-old mixed coniferous forest west of Bredsjöbäcken in Ljusnarsberg’s municipality with habitat for the near-threatened black woodpecker and located within the Bredsjöbäcken and Rällsälven areas, which also support populations of the endangered freshwater pearl mussel- was subjected to logging activities (Skyddaskogen, 2023a). Furthermore, FSC-certified SCA has announced plans to log additional forests with very high conservation values at Svartjärnsåsen and Marktjärn in Ånge municipality

(Skyddasogen, 2023). Environmental NGOs argue that these forests' conservation value stems precisely from their long-standing lack of forestry intervention, and that logging would irreversibly degrade their ecological integrity.

These findings indicate that forest certification schemes alone are insufficient to ensure the protection of HCV areas without effective monitoring mechanisms. They also raise important questions about the role and effectiveness of certification after the implementation of the EUDR, particularly regarding whether certification standards should be revised and how. Furthermore, the results call into question the adequacy of the assessment tools currently used by forestry companies and the SFA to evaluate forest areas. Strengthening both national legislation and monitoring systems is essential, alongside the development of a comprehensive database of HCV areas and red-listed species, to ensure these regions are effectively protected.

However, these trends of logging in HCV represents a weak governmental commitment to safeguarding HCV forests, potentially allowing logging companies to continue operations in these areas for economic gain. Consequently, the reliability of due diligence statements submitted by timber companies is called into question, raising doubts about whether these statements are truly appropriate and effective. It also prompts concerns over whether the European Commission possesses sufficiently advanced technologies and monitoring systems to detect and address such issues in practicing EUDR.

In Sweden, species protection is regulated through the Species Protection Ordinance which is based on EU Birds and Habitats directive, as describes in section 4.1. However, species included on the Swedish Red list, which is based on the International Union on Conservation of Nature (IUCN) criteria- do not automatically receive legal protection. As a result, forests with red-listed species may still be logged unless strict protections are in place. This regulatory gap allows logging in ecologically valuable areas, contributing to habitat loss and forest degradation. Including red-listed species under national legislation would therefore strengthen biodiversity protection in Sweden, and such measures are also timely in the context of the EUDR, which would assist in eliminating deforestation and forest degradation from Swedish timber supply chains.

The Swedish National Forest Inventory (NFI), managed by the Swedish University of Agricultural Sciences, has recorded over a century of publicly accessible data to support evidence-based policy and long-term forest trend analysis (SLU-NFI, 2025). However, detailed information on primary and old-growth forests is still lacking. Developing efficient assessment tools and instruments for these forests is crucial, as they hold high conservation value. Integrating such data with plantation forest records would enable more accurate monitoring of forest degradation and strengthen compliance with the EUDR. Without this, ecologically valuable but unrecorded old-growth areas remain at risk of exploitation.

## 6. Conclusion

This study examined the traceability and transparency regulation in Swedish forestry and timber supply chain, with particular focus on the implications of EUDR. Based on the literature review and the interviews with company representatives, the findings reveal that the introduction of the EUDR was initially met with confusion and concern. Companies, already accustomed with EUTR, expressed resistance to additional requirements, citing risks of the regulatory fatigue and increased complexity.

The interviewees commonly questioned the added value of the EUDR in the Swedish context. The forestry sector is already widely perceived by the industry actors to operate with a level of transparency, carefully balancing openness with the protection of business-sensitive information. From this perspective, the EUDR was viewed less as an opportunity for improved governance and more as an additional administrative burden, with limited tangible benefits.

However, critical shortcomings in national regulations like the Forestry Act and the Environmental Code, enforcement mechanisms, and certification schemes like FSC and PEFC highlight deeper governance challenges. Repeated failures to effectively safeguard biodiversity-rich areas, combined with limited regulatory capacity and the use of inefficient monitoring tools, cast doubt on whether company-led due diligence under the EUDR can be considered fully reliable. These weaknesses are particularly concerning given the ongoing ecological impacts of current forestry practices, where logging activities may comply with national legislation but still contribute to forest degradation.

Overall, while EUDR's emphasis is on transparency and traceability represents a valuable step towards improving oversight in forest-risk supply chains, these measures alone are insufficient. Without strong enforcement mechanisms, competent authorities, and meaningful governance reforms, transparency risks becoming a procedural exercise rather than a driver of substantive forest protection. Ensuring that the Swedish forestry system effectively prevents degradation will therefore require not only enhanced reporting but also systemic shifts in governance to align forest management practices with long-term ecological sustainability.

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## **Appendix**

### **Annex 1**

#### **Business Questions**

1. What are the operations that your organization does within the timber supply chain?
2. What is your current knowledge about the EUDR?
3. How do you think the EUDR will impact your business operations?
4. Who do you see as the main actors responsible for its implementation, enforcement and development?
5. What tools are currently available in Sweden for traceability of timber throughout the supply chain that you know of?
6. What are your thoughts regarding the increased level of traceability and transparency that the EUDR calls for?
7. What is the current level of data gathering and reporting that you do? Do you know how it differs from EUDR requirements?
8. What upstream knowledge about wood and its origin does your organization have?
9. What are your worries the current legislation may be overlooking?
10. What is your overall view of EUDR? (Benefits and Drawbacks)

### **Annex 2**

#### **Policy Questions**

1. What do you see as the main sustainability challenges in Swedish forestry?
2. How would EUDR support the sustainable management of forests in Sweden, considering aspects of forest degradation and biodiversity?
3. In your opinion, are the current levels of data transparency and traceability within the supply chain sufficient to enable stakeholders to comply with the requirements of the EU Deforestation Regulation (EUDR)?
4. In your opinion, would there be a need of amendments in the national laws related to forestry industry in Sweden?
5. Do you think that implementation of EUDR will make a change in the way we use forests in Sweden or will bring any impact on forest degradation?
6. What do you see as the main limitations of the EUDR in promoting more sustainable forestry practices in Sweden?
7. In your opinion, does complying with due diligence requirements under EUDR present economic benefits or impose additional cost burdens for forest landowners?
8. Will the EUDR lessen the need for forestry certification systems in Sweden? Or should forestry companies be able to use certification to prove compliance with the EUDR?