Master's Thesis – Master Sustainable Development

In the Shadow of the Amazon Rainforest: The EU's Oversight of Problem Shifting to the Cerrado

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Abstract

This thesis explores the exclusion of the Cerrado savannah from the European Union Deforestation-free Regulation (EUDR). The EUDR aims to reduce global deforestation by ensuring EU-consumed products are not linked to deforestation. However, its deforestation-free requirement is geographically limited to forests, excluding critical ecosystems like the Cerrado. This exclusion also fails to address the Amazon-Cerrado problem-shift, where deforestation is increasingly displaced from the Amazon to the Cerrado.

Analysing this issue through the lens of problem-shifting—a concept that highlights how solutions to one problem can inadvertently create new issues elsewhere—the thesis identifies factors inhibiting the addressing of problem-shifts, such as prioritization bias, environmental complexity, and fragmented problem-solving approaches. Through qualitative research, including document analysis, 14 interviews, and participant observation in events organised by European and Brazilian non-profit organisations as part of a lobby tour to advocate for the inclusion of the Cerrado, the study identifies three key elements driving this exclusion.

Based on this, the Cerrado exclusion stems from three interconnected elements that together tell the story of the exclusion of the Cerrado, the EUDR's forest prioritisation, the EU's differing perspectives on the Amazon versus the Cerrado, and the EU's perceived trade-off between reducing deforestation and maintaining commodity supplies. The EU's development of the EUDR reveals a strong focus on forest conservation and is driven by societal demand, research, and international goals. In the Brazilian context the two key biomes of the Amazon and the Cerrado are valued differently by the EU. While the Amazon is seen as a biome with essential ecological value, the Cerrado is perceived more through its productivity in producing commodities central for the EU market. Central to this narrative is the concept of a trade-off, where the EU, despite contentions to this, presumes that tackling deforestation might come at the expense of continuous access to key commodities. Thus, a more incremental approach is chosen where the Cerrado is for now excluded from the EUDR.

Policy recommendations include adopting a more integrated approach to environmental regulation that addresses deforestation comprehensively, breaking away from the current forest bias. Future iterations of the EUDR and similar regulations should consider the conservation needs of all ecosystems to address this issue effectively. Such an inclusive approach would help mitigate the Amazon-Cerrado problem shift and achieve legislative objectives more effectively.

Key concepts

European Union Deforestation-free Regulation, Cerrado, other wooded land, problem-shifting, deforestation, forest bias

Acronyms

ASM	Amazon Soy Moratorium
COP	Conference of the Parties
CSO	Civil Society Organisation
DG ENVI	Directorate-General for Environment
EC	European Commission
EESC	European Economic and Social Committee
EP	European Parliament
EU	European Union
EUDR	European Union Deforestation-free Regulation
FAO	Food and Agriculture Organisation
FC	Forest Code
FERCs	Forest and Ecosystem-Risk Commodities
FRC	Forest Risk Commodities
INPE	Brazil's National Institute for Space research
JRC	Joint Research Centre
MEP	Member of European Parliament
NGO	Non-governmental Organisation
NPO	Non-profit organisation
PA	Protected Area
PO	Participant Observation
SCF	Soft Commodity Forum
SDG	Sustainable Development Goal
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

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1. Introduction

1.1 Problem Definition

In December 2022, the European Union (EU) reached an agreement on a new law, the EU Deforestation-free Regulation (EUDR)[1], to decouple commodity production from deforestation (European Commission, 2022), and guarantee that products consumed by EU citizens do not contribute to deforestation or forest degradation worldwide (Regulation 2023/1115). This legislation prohibits the entry of certain commodities into the EU market if they are connected to deforestation, in form of a deforestation-free requirement (Regulation 2023/1115, Art. 3(a)). For the product to be deforestation-free, they are required to be produced on land that has not been subject to deforestation or forest degradation after the cut-off date of December 31, 2020 (Regulation 2023/1115).

However, the deforestation-free requirement is only applicable to forest biomes based on the Food and Agriculture Organisation's (FAO's) threshold definition of 'forest,'[2] which includes criteria of canopy cover and tree height (Regulation 2023/1115, Art. 2(4)). The regulation specifically excludes 'other wooded lands'[3] in the scope of the deforestation-free requirement, thereby refraining from including other critical ecosystems in its protection. This dismisses complex mosaic ecosystems like the Cerrado, other natural and primary ecosystems, as well as frontier regions and biome boundaries. These biomes feature diverse forests, savannahs, and grasslands with interspersed vegetation and varying tree heights that cross the FAO's forest definition threshold (Gameiro & Patentreger, 2023). Figure 1 provides examples of Latin American biomes and to which extent the deforestation-free requirement excludes critical parts of these biomes considered to be other wooded lands or grasslands.

The possibility of including other wooded lands and natural ecosystems in the scope of the deforestation-free requirement has been acknowledged. The Commission is tasked with evaluating this potential inclusion and, where appropriate, presenting a proposal to extend the EUDR scope to other natural ecosystems with high carbon stocks and high biodiversity value (Regulation 2023/1115, Preamble (82)). Specifically, reviews of this regulation are planned to explore this inclusion (Regulation 2023/1115, Art. 34). The first review, due within one year of the regulation's entry into force (June 2024), will assess the impact of expanding the scope to other wooded lands. Additionally, the second review, to be conducted within two years of the regulation's entry into force (June 2015), will evaluate

[1] Full title of the EUDR = Regulation of the European Parliament and of the Council on the making available on the Union market and the export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010

[2] FAO definition of 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." (FAO, 2018)

[3] Other wooded land as defined in the EUDR: "'other wooded land' means land not classified as 'forest' spanning more than 0,5 hectares, with trees higher than 5 metres and a canopy cover of 5 to 10 %, or trees able to reach those thresholds in situ, or with a combined cover of shrubs, bushes and trees above 10 %, excluding land that is predominantly under agricultural or urban land use"

the impact of further expanding the scope to include ecosystems beyond 'forests' and 'other wooded land'. However, these reviews do not guarantee the inclusion of these biomes in the EUDR, and it remains uncertain whether the regulation will ultimately extend its protections to these other ecosystems (Miribug, 2022).

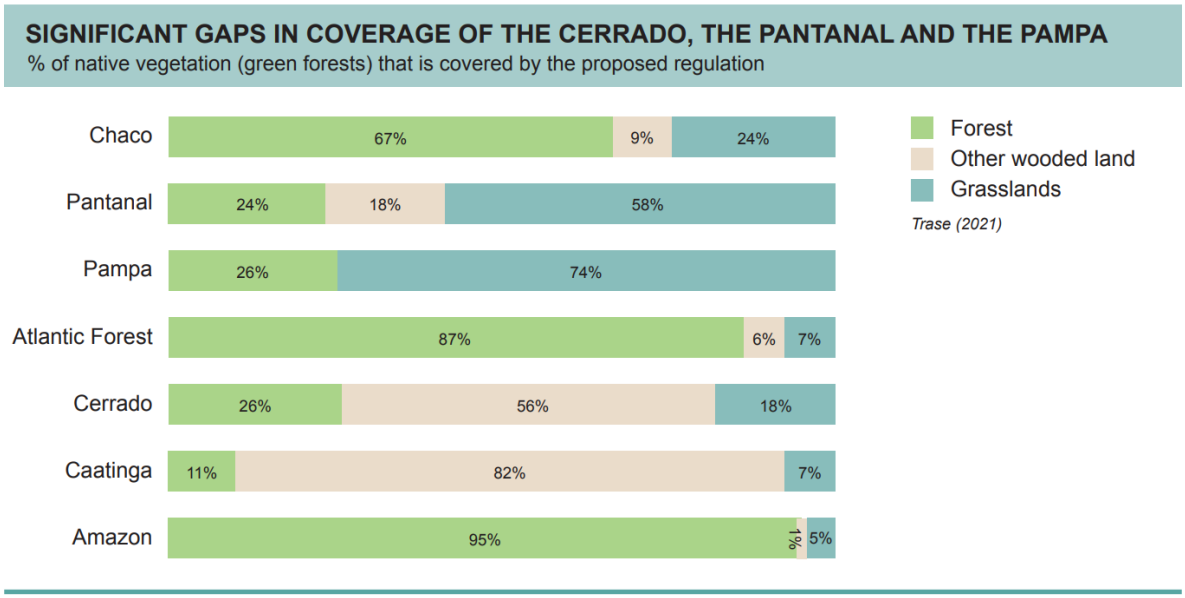

Figure 1. Bars indicating the limited geographic scope of the EUDR for various biomes in Latin America from Bergau et al. (2023)

The exclusion of other wooded land is especially impactful for the Cerrado biome, a diverse biome neighbouring the Amazon (see Figure 2). The situation of deforestation in the Cerrado is critical, having lost about 46% of its native vegetation cover and as little as 19.8% of the biome remaining undisturbed (Strassburg et al., 2017; Alencar et al., 2020). The Cerrado, is globally important for its species richness, endemism, and valuable ecosystem services, featuring a landscape of open grasslands, shrublands, open woodland, and closed canopy woodlands (da Silva & Lacher, 2020). However, so far only 26% of the Cerrado is being covered by the EUDR (Figure 1). A possible expansion of the legislative scope to other wooded land within the reviews could extend the EUDR's application to up to 82% of the Cerrado area, as illustrated in Figure 1 (Gameiro & Patentreger, 2023).

The EU is a central player in the protection of the Cerrado. A study by the European Commission (EC) estimating that the EU is responsible for 10% of global 'embodied deforestation' so, deforestation as an externality of the production, trade and consumption of certain goods, commodities or services (Commission et al., 2013). Brazil is a leading exporter of many commodities covered by the legislation (Cesar de Oliveira et al., 2024), with the Cerrado specifically contributing significantly to this, as for example, it accounts for 54% of the country's soybean production (Magalhães et al., 2020).

Figure 2. Location of the Cerrado biome, from Harris & Pooler (2024)

In Brazil, the issue of deforestation is especially linked to the tropical rainforests of the Amazon, risking that this issue is forgotten in other vital biomes (Strassburg et al., 2017; Lahsen et al., 2016; Overbeck et al., 2015). A major cause of deforestation is agricultural expansion (Curtis et al., 2018), with agricultural conversion rates often being higher in non-forest areas such as tropical savannas than in forest environments (Goldewijk, 2001). This is particularly evident in Brazil's tropical savanna, the Cerrado where deforestation seems to be receiving significantly less controversy than in the Amazon, despite being one of the most threatened biomes on the planet (Lahsen et al., 2016). According to the National Institute for Space research (INPE), in the Amazonian rainforest deforestation was remarkably reduced by 50% from 2022 to 2023. In stark contrast, the neighbouring Cerrado experienced a troubling 44% surge in deforestation in the same time period (WWF-Brasil, 2024; Assis et al., x).

This situation where protecting forests comes at the expense of the degradation of other ecosystems can lead to a problem shift, where solving one issue leads to new problems emerging at different times or places (Kim & van Asselt, 2016). In fact, the occurrence of a spatial problem shift of deforestation from the Amazon to the less protected Cerrado biome has been observed by many different actors such as non-governmental organisations (NGOs) (WWF-Brasil, 2024), as well as academics (Villoria et al., 2022; Bastos Lima et al., 2019; Lahsen et al., 2016; Dou et al., 2018). In this thesis the spatial shift of

deforestation displacing from the Amazon to the Cerrado is referred to as the Amazon-Cerrado problem shift. This problem shift has been going since before the introduction of the EUDR and has been linked to different environmental policies and international agreements that protect the Amazon and overlook the Cerrado, therefore incentivising agricultural expansion there (Villoria et al., 2022; Bastos Lima et al., 2019; Lahsen et al., 2016; Dou et al., 2018). For example, protection of the Cerrado remains weak with only 7.5% of the biome, compared to 46% of the Amazon, being protected under Brazil's Forest Code, while deforestation rates are at times as much as 2.5 times higher than in the Amazon (Strassburg et al., 2017).

When the EU announced the EUDR, this presented an opportunity to address the Amazon-Cerrado problem shift, as the EU is one of the main contributors to deforestation worldwide (Weatherley-Singh & Gupta, 2018). However, by excluding other wooded lands from the deforestation-free requirements of the current EUDR, the legislation fails to address the Amazon-Cerrado problem shift and is likely to further worsen the situation (Gameiro & Patentreger, 2023; Chaves et al., 2023). This is because this legislative gap incentivises deforestation and ecosystem conversion in the Cerrado rather than in the Amazon region, as industry actors may see this gap as an opportunity to bypass EU regulation and intensify production in these less protected areas (Gameiro & Patentreger, 2023).

Surprisingly, in its preamble, the EUDR emphasises its dedication to avoiding such a problem shift, stating that "protecting forests should not lead to the conversion or degradation of other natural ecosystems" (Regulation 2023/1115, Preamble (82)). The EU continues to recognise the importance of diverse natural ecosystems, such as savannahs, in addressing the ongoing biodiversity and climate crises and suggests that future reviews will evaluate the inclusion of such ecosystems in the regulation (Regulation 2023/1115, Preamble (82)).

1.2 Research aim and question

The aim of this thesis is to enhance the understanding of why the Cerrado was excluded from the deforestation-free requirement of the EUDR and thereby does not addressing the Amazon-Cerrado problem shift. Therefore, this research contributes to the literature of the Amazon-Cerrado problem shift, providing a unique perspective from a problem shifting approach to the EUDR not including the Cerrado in its deforestation-free requirement.

The exclusion of the Cerrado from the EUDR is referred to as the limitation of the scope of the deforestation-free requirement to forest biomes based on canopy cover and tree height instead of a broader inclusion of other wooded lands or other natural ecosystems. Specifically, this incorporates the investigation of factors of not addressing problem shift and how these led to the exclusion of the Cerrado biome from the deforestation-free scope of the EUDR. These factors are identified as central to contributing to a failure to address problem-shifts or the overlook and disregard of problem-shifts and

are based on the theoretical understanding of the problem shifting concept. Altogether, this leads to the following research questions:

> *Why was the Cerrado savannah excluded from the deforestation-free requirement stipulated in the EU Deforestation-free Regulation?*

The theoretical approach of problem shifting identifies three key factors for not addressing problem-shifts, namely the occurrence of prioritisation, the complexity of the environmental problems targeted, and lastly, fragmented problem-solving approaches. To effectively answer the research questions, a qualitative analysis was conducted including an analysis of 14 interviews with key actors from non-profit organisations (NPOs), industry representatives, member states institutions and EU staff, an analysis of relevant documents, and an analysis of participant observation in relevant events for enhanced contextual understanding of the topic.

The findings provide key insights into the interconnected elements that together tell the story of the EUDR's Cerrado exclusion. Based on this, the exclusion of the Cerrado from the EUDR stems from the regulation's forest prioritization, the EU's differing perspectives on the Amazon versus the Cerrado, and the perceived trade-off between reducing deforestation and maintaining commodity supplies. The EU values the Amazon for its ecological significance and the Cerrado for its commodity production, leading to an incremental approach that currently excludes the Cerrado to ensure continuous access to key commodities. In the discussion, these findings are contextualised in the light of problem shifting. Moreover, key policy recommendations are made that emphasizes the need for holistic environmental regulations that address interconnected ecosystems to prevent shifting environmental problems. Lastly, limitations are drawn, and suggestions are made for future research.

1.3 Scientific Relevance

The scientific relevance of this thesis lies in addressing a critical research gap by analysing the continuous disregard of the Cerrado biome and its exclusion from the EUDR through the lens of problem shifting. Understanding the continuous disregard for the Cerrado is crucial, as the Amazon-Cerrado problem shift continues to be incentivised and left unaddressed by different policies. In fact, previous studies on the connection of environmental policies and the Amazon-Cerrado shift identify these policies as creators and drivers of this problem shift (e.g. Villoria et al., 2022; Bastos Lima et al., 2019; Bonanomi et al., 2019; Dou et al., 2018). Moreover, these studies reveal a clear pattern of neglect not only for the Cerrado but also for the shifting environmental impact from the Amazon to the Cerrado.

Combining this with the study on problem shifting there also seems to be a lack of research for understanding what is behind problem shifts that are kept unaddressed. Studies on problem shifting for example focus on revealing the absolute environmental impact of sustainability projects through life-

cycle assessments (Phungrassami & Usubharatana, 2021; Yang et al., 2012). However, the failure to address a problem shift when a policy opportunity arises has not been studied yet.

Lastly, to date, the literature on the EUDR has not focused on the neglect of the Cerrado or its contribution to the Amazon-Cerrado problem shift. While some scholars explore various aspects of the EUDR's background, its development, and its potential influences (Köthke et al., 2023; Zhunusova et al., 2022; Hedemann-Robinson, 2022), potential impacts in terms of contribution to the Amazon-Cerrado problem shift remain unexplored. A few studies are starting to criticize the limited scope of the EUDR, highlighting the exclusion of the Cerrado and the risk of unintended consequences (Miribug, 2022; Cesar de Oliveira et al., 2024), however a deeper analysis of its role in the Amazon-Cerrado problem shift has not been undertaken.

This thesis closes this research gap and contributes to these scientific questions. It provides a unique case of an unaddressed problem shift, filling a significant research gap by investigating why despite the opportunity, the EUDR did not address the Amazon-Cerrado shift. By analysing the reasons behind this oversight, the thesis aims to contribute to a better understanding of the disregard of problem shifting in environmental policy, and the continuous neglect of the Cerrado and the shifting of environmental problems to this biome.

1.4 Societal Relevance

This thesis holds significant societal relevance, particularly through its policy recommendations, which advocate for more comprehensive consideration of problem shifting and the development of holistic environmental policies that extend ecosystem protection beyond forests. By addressing the exclusion of the Cerrado biome from the EUDR and the broader Amazon-Cerrado problem shift, this research contributes to a deeper understanding of the exclusion of the Cerrado in this legislation. Understanding the reasons behind the exclusion of the Cerrado can empower advocates and policymakers who aim to include this vital biome in the EUDR. By revealing the factors that have hindered its inclusion, the thesis provides valuable insights that can enhance advocacy efforts and inform more effective strategies for integrating the Cerrado into future environmental regulations.

The protection of the Cerrado is crucial due to its unparalleled ecological and cultural significance. As the most structurally diverse savanna in the world, the Cerrado encompasses a mosaic of vegetation types, from closed-canopy forests to savannas and grasslands (Arruda et al., 2021; Cardoso Da Silva & Bates, 2002). It is also the most biologically diverse savanna globally, recognized as a biodiversity hotspot (Mittermeier et al., 2011). The biome plays a critical role in water supply, climate regulation and is critical for the ecological health of the Amazon, meaning that the conservation of the Cerrado is also essential for the continuing survival of the Amazon rainforest (Malhado et al., 2010). Moreover,

the Cerrado is home to numerous indigenous peoples, quilombola groups, and local communities (ISPN, n.d.).

Despite its importance, the Cerrado has been vastly degraded and the added pressure on the Cerrado through the Amazon-Cerrado problem-shift continues to be largely unaddressed. This inadequate protection led to the loss of about 50% of the Cerrado's native vegetation cover (Lahsen et al., 2016), making it the largest, richest, and potentially most threatened tropical savanna in the world (Cardoso Da Silva & Bates, 2002). This highlighting the significance of leaving this problem-shift unaddressed and imminence of the threat the biome faces.

Therefore, this thesis provides a deeper understanding of the Amazon-Cerrado shift, getting to the bottom of what is behind this neglect and finding possibilities to effectively address this issue. This deeper understanding provides actors fighting for the protection of the Cerrado with the necessary information to advocate for its inclusion in the EUDR and other legislation, thereby enhancing the region's protection and ensuring the sustainable preservation of its unique ecosystems and its cultural heritage.

2. Theoretical Approach

2.1 Conceptualising Problem-Shifting

In the following the phenomenon of problem shifting, specifically in the context of the Amazon-Cerrado problem-shift, will be introduced and conceptualised. This exploration is supported by concepts related to the phenomenon of problem shifting, providing more specific emphasis on aspects of problem shifting related to this research topic. This focused approach helps to narrow down the concepts necessary to understand the studied phenomenon of spatial shifts in deforestation.

By examining both broad and specific aspects of problem shifting, this sub-chapter aims to provide a comprehensive framework for analysing how policies and practices may cause environmental issues to relocate rather than resolving them. This understanding is crucial for exploring the factors behind the exclusion of other wooded lands, like the Cerrado, from regulatory frameworks such as the EUDR.

2.1.1 Problem Shifting & the Amazon-Cerrado Problem Shift

The Amazon-Cerrado problem shift describes a *spatial* shift of an *environmental* problem. It describes the displacement of deforestation from the Amazon rainforest to the Cerrado savannah. While the concept of problem shifting is broad, applying it specifically to this thesis allows for a more focused and relevant interpretation. Problem shifting describes a situation where "a solution for one problem backfires and generates one or more new problems at different times or locations" (Kim & van Asselt, 2016, p. 473). Problem-shifts can be applied diversly to different subject matters. E*nvironmental*

problem-shifting refer to environmental subject matters which in this case indicates a focus on environmental impacts (e.g. Phungrassami & Usubharatana, 2021; Yang et al., 2012). So, environmental problem shifts denote efforts to address one environmental problem which creates new issues or worsens the original problem (Wood Hansen & Van Den Bergh, 2024). An example of an environmental problem shift is ocean fertilisation which enhances the oceans capacity to store carbon, helping climate mitigation, however, leading to increased ocean acidification and disrupting the global carbon cycle (Williamson et al., 2012). Problem shifting as defined by Kim & van Asselt (2016) can be differentiated between the transfer of negative impacts from one location to another (spatial), over time (temporal), or the transformation of one type of impact into another (sectoral). In this thesis the problem of deforestation is tackled in a limited geographic area causing this environmental problem to be shifted spatially to another area. Therefore, in this context problem shifting refers to an environmental type of problem and a spatial shift.

The examination of problem shifts is crucial in the study of environmental policies as it is vital for effective problem-solving, without the creation or worsening of problems. Due to the complexity of the earth system, predictably controlling the dynamics of problem shifting is difficult. Even well-designed solutions and thought through problem transfers can involve unacceptable uncertainties and have far-reaching consequences across the earth system (Kim & van Asselt, 2016). The planetary boundary framework by Steffen et al. (2015) captures the insight that human activities or intervention drive various, interacting effects that cascade through the earth system (Galaz et al., 2012). For example, changes in one subsystem of the earth system can cause effects in another system. This makes problem shifts common features in the complex system of Earth System Governance (Kim & van Asselt, 2016). Nilsson & Persson (2012) emphasise the importance of properly recognising earth system interactions to avoid problem shifting between the earth subsystems or geographic areas. The importance here lies in creating coherent governance arrangement where one policy target does not restrict the achievement of another policy target (Nilsson & Persson, 2012). Moreover, policymakers should be mindful of effects that backfire and counter the actual objective of their policies (Druckman et al., 2011). Therefore, to achieve meaningful improvements in the earth's system, it is essential to consider problem shifts.

In literature the concept of problem shifts is relatively new, however, various concepts have been used to describe the shifting of environmental problems and exhibit additional insights into the shifting of problems. While Van den Bergh et al. (2015) considers problem-shifts largely under-investigated in the study of environmental science and policy, a closer examination reveals that the issue is not a lack of research but rather the absence of uniform terminology for studying problem shifts (Wood Hansen & Van Den Bergh, 2024). Indeed, the issues of problem shifting have been extensively researched using a wide range of terms including trade-offs (Capaz et al., 2020), adverse side-effects (Luderer et al., 2019), spillovers (Bergau et al., 2023), or unintended consequences (Kiesecker et al., 2019). Some concepts

relate to specific types of problem shifts. The concept of displacements, for example, is closely connected to the spatial transfers of problems (Wood Hansen & Van Den Bergh, 2024).

Some of these mentioned concepts have previously been used in literature to describe possible negative impacts of the EUDR's limited geographic scope. Miribug (2022) and Gameiro & Patentreger (2023) point towards the regulation's loophole of limiting the scope of the EUDR, excluding 'other wooded land' such as the Cerrado which can lead to an *unintended consequence* of deforestation shifting from forests to these less protected ecosystems. Bergau et al. (2023) similarly point towards the risk of *spillover effects,* accelerating deforestation in the Cerrado, created by this legislative gap.

These concepts provide for valuable insights into the understanding of problem shifts and the reasons for their overlook when opportunities to address them arise. The general concepts can provide enhanced understanding of problem-shifts, their intentionality (2.1.2), specifically about spatial problem-shifts connected to land-use change (2.1.3), the crucial aspect of connectivity in problem-shifting (2.1.4) and the possible underlying idea of shifting a burden through problem-shifting (2.1.5). Attention is given to provide examples and concepts that more specifically relate to the problem shift under study, which is the spatial shift of deforestation. Thus, when possible, specific types of these concepts that relate to issues like land-use change or agricultural expansion, are provided. A full overview of these concepts and their relation to land-use change and deforestation, their description and examples are provided in Table 1.

Terminology	**Description**	**Examples**
Unintended Consequences	Unintended displacement or transfer of impacts (Lewison et al., 2019)	Expansion of agricultural croplands altering climate and reducing land suitability for cultivation (Ramankutty et al., 2006)
Trade-off	Trade-offs involve sacrificing one aspect for the benefit to gain another (Morrison-Saunders & Pope, 2013; Wood Hansen & Van Den Bergh, 2024)	Agriculture expansion for food security leading to negative environmental concerns (Meyfroidt, 2018)
Spillover	An intervention with an effect beyond the intended target (Truelove et al., 2014).	Supply-chain agreements in the Amazon causing spillover to the Cerrado (Dou et al., 2018)
Land-use Spillover	An intervention into land use in one place has an impact on land use in another place and manifest themselves in changes in land cover use (Meyfroidt et al., 2018).	Spillovers from trade opportunities on land use (Minten et al., 2007)
Leakage	Policy intervention trigger impacts that counter the policy's objective, reducing the overall benefit (Bastos Lima et al., 2019)	Carbon emission caused by emission trading policies (Zhou et al., 2020)

Land-use leakage	Land-use intervention triggers land-use change elsewhere, reducing the overall benefit (Meyfroidt et al., 2018)	Zero-deforestation supply chain policies causing deforestation leakage (Villoria et al., 2022)
Rebound Effect (or Jevons' Paradox)	Efforts to improve resource efficiency or reduce consumption of a resource result in an unintended increase in the overall use of that resource (Lambin & Meyfroidt, 2011)	Agricultural technology improvements leading to land expansion and ecosystem degradation (Villoria, 2019)
Telecoupled Systems	Geographically distant systems that influence each other (Liu et al., 2018)	Using the telecoupling framework to evaluate the spillover effects of displaced land use pressure from voluntary environmental agreements and global soybean demand (Dou et al., 2018).
Burden Shifting	Transfer of an activity and its environmental burdens to another area (Wood Hansen & Van Den Bergh, 2024)	Outsourcing of pollution from industrialised to developing countries through trade liberalisation (Kolcava et al., 2019)

Table I. Key problem-shifting concepts, their description, examples and discipline-specific additions

2.1.2 Intentionality of unintended effects and trade-offs

The concepts of unintended consequences and trade-offs are closely connected to the concept of problem-shifting. *Unintended consequences* are unintentional displacements or transfers of environmental impacts (Lewison et al., 2019). These consequences encompass a number of types of displacements such as between sectors or jurisdictions, negative or positive in character (Lewison et al., 2019). The concept of unintended consequences is broad and is commonly connected to policy intervention. Much of the literature of this concept focuses on unintended consequences of organised action, thus, the unwelcomed outcomes of formal policy (de Zwart, 2015).

Trade-offs, on the other hand, involve sacrificing one aspect or benefit to gain another (Morrison-Saunders & Pope, 2013; Wood Hansen & Van Den Bergh, 2024). This concept usually entails conflicting goals (de Magalhães et al., 2019) or limited resources and highlights the need to balance competing priorities to achieve a desired outcome (de Magalhães et al., 2019; Morrison-Saunders & Pope, 2013). An example for a trade-off due to conflicting outcomes is the agricultural expansion to achieve food security which strikes at the expense of negative environmental concerns (Meyfroidt, 2018). Trade-offs are an integral part of any sustainability project, since they address conflicting objectives, taking into account environmental, social and economic aspects (de Magalhães et al., 2019). The broad concept of problem shifting also incorporates these trade-offs, making them common within this concept.

While both the notions of unintended consequences and trade-offs are encompassed by the term problem shifting, they indicate substantially different degrees of intent of their negative effects. While the term 'unintended consequences' implies the involuntary nature of the effects, it is important to note that these consequences are not always contrary to their intentions, undesirable, or unforeseeable (Karapin & Feldman, 2016). As de Zwart (2015) notes, unintended consequences can be both anticipated and unanticipated. With improved data and theories, as well as more common strategies to avoid them, these consequences are even increasingly becoming anticipated (de Zwart, 2015). Trade-offs which involve sacrificing something to gain something else (Wood Hansen & Van Den Bergh, 2024), are more closely connected to explicit choices by decision-makers who are aware of the potential adverse secondary effects (Kim & van Asselt, 2016). Kim & van Asselt (2016), however, argue that the notion of 'shifting' implies that the transfer or transformation of impacts can be unintentional, as well explicit, with possible side effects already known to the decision-makers. Therefore, both calculated decisions involving trade-offs with possible adverse consequences as well as undeliberate side-effects fall under the concept of problem shifting.

2.1.3 The family of spatial problem-shifts

There are a multitude of concepts more closely related specifically to *spatial* problem shifts. These provide valuable insights into the dynamics of these problem shifts of a more spatial character. Moreover, specifically applying them to land-use shifts provides interesting insight for the study of deforestation related policy intervention causing problem shifts of this nature.

Spillovers make up one of these concepts related to spatial problem shifts. A spillover refers to an effect by an intervention that goes beyond the intended target (Truelove et al., 2014). Thus, a collateral effect that takes place across established governance boundaries whether they are geographical, temporal, jurisdictional, sectoral or political (Bastos Lima et al., 2019). Spillovers can be positive or negative, thus reinforcing or counteracting the policy intervention (Meyfroidt et al., 2020; Truelove et al., 2014). Moreover, spillovers can be either intended or inadvertent, occurring as both expected and unexpected effects (Meyfroidt et al., 2020). Land use spillover specifically describe the process where an intervention into land use in one place has an impact on land use in another place (Meyfroidt et al., 2018). An example of this is the spillover effect of trade-opportunities on land use (Minten et al., 2007).

Leakages provide for a more specific example of spillovers and have been studied extensively in the context of land use change. Leakage refers to a specific, narrower type of spillover in which an environmental policy indirectly triggers impacts that go against the aims of the policy, reducing the overall benefit (Bastos Lima et al., 2019). Therefore, this term specifically refers to a spillover where an intervention with an explicit goal undermines that very goal through its effects. This can for example be carbon emissions leakages caused by emission trading policies (Zhou et al., 2020). The term leakage

has also commonly been used to describe spatial agricultural effects from governance interventions (Miranda et al., 2019; Meyfroidt et al., 2020). In that case, leakage is a form of spillover caused by a land use intervention, such as an environmental conservation policy, which triggers land use change elsewhere, reducing the overall benefit of the local intervention (Meyfroidt et al., 2018). Thus, creating a displacement of deforestation to a neighbouring location by migration of agents of deforestation or through trade of agricultural products (Lambin & Meyfroidt, 2011). Therefore, leakage can decrease the regional and global environmental benefits of policies aimed at conserving natural ecosystems (Lambin & Meyfroidt, 2011).

The rebound effect yields interesting insights into possible causes for the spatial shift of land use. The rebound effect (or Jevons' paradox) also makes part of the concept of spillovers (Truelove et al., 2014), and describes the response of agents or of economic systems to measures aimed at reducing resource use (Lambin & Meyfroidt, 2011). It was originally developed to describe the effect of energy use efficiency improvements resulting in higher energy consumption. The effect refers specifically to a form of spillover where adoption of intensifying practices stimulates land use expansion (Meyfroidt et al., 2018). The term suggests that improving resource efficiency may not reduce total resource use, as lower prices and economic growth can stimulate increased consumption (Lewison et al., 2019). This provides interesting insights into intensification, which is often necessary to fulfil the growing demand for land-based products and at the same time preserve nature, a process also called land sparing (Meyfroidt et al., 2018). Whether intensification actually leads to land sparing, however, is debated (Meyfroidt et al., 2018). While it can lead to land being given back to nature, it can also stimulate even further land use expansion, as suggested by the rebound effect (Meyfroidt et al., 2018). Villoria (2019) for example confirms the 'Jevons' Paradox' and shows that in the past agricultural technology improvements led to land expansion and ecosystem degradation. This provides interesting insights into the underlying mechanisms driving these adverse effects in land use, despite original intentions.

These concepts provide valuable insights into spatial problem shifts specifically connected to issues of deforestation. By examining spillovers, leakages, and the rebound effect, we can better understand how policy interventions designed to address deforestation and promote sustainable land use can sometimes lead to unintended and counterproductive outcomes. It highlights the need for comprehensive, adaptive, and well-coordinated policy interventions that can address the multifaceted nature of land-use changes and their far-reaching impacts. For instance, recognising the potential for negative spillovers and leakages emphasises the need for holistic and integrated policy approaches that consider cross-boundary impacts and the interconnectedness of different land use systems. This need is highlighted more in the next section.

2.1.4 Telecoupled systems: the interconnection of systems

Problem shifting is closely connected to the notion of teleconnection which emphasises the interconnectedness of systems. Understanding teleconnection in the context of problem shifting is crucial because it highlights how local interventions can have far-reaching impacts across the globe, revealing the complexity and interdependency of environmental and socioeconomic systems.

Telecoupling encompasses socioeconomic and environmental interactions over distances, linking human and natural systems globally (Liu et al., 2018). The concepts of spillover and leakage closely relate to the notion of telecoupled systems (Bastos Lima et al., 2019). This framework views global interconnectivity as flows among sending, receiving, and spillover systems, involving exchanges of information, materials, energy, goods, and other resources, with spillover systems indirectly affecting or being affected by the interactions between sending and receiving systems (Liu et al., 2018; Liu et al., 2015).

With the world becoming increasingly connected over distances both socioeconomically and environmentally, the understanding of these telecoupled systems becomes central when studying global sustainability (Liu et al., 2015). The telecoupling framework provides for a comprehensive evaluation of spillover effects including the identification of systems, flows, causes, effects and agents (Dou et al., 2018). Moreover, this notion provides valuable foundations to enhance positive effects and reduce negative effects of telecouplings (Liu et al., 2015). This makes it crucial for achieving global goals and provides an analytical lens for sustainability research and policy (Liu et al., 2018).

The telecoupling framework has frequently been applied to study land use changes, providing valuable insights into the teleconnections of these systems and informing ecosystem governance, which is relevant to the phenomenon studied in this thesis. Recent research, for example, used the telecoupling framework to describe reciprocal relationships in land use changes across disparate locations (Friis & Nielsen, 2019; Dou et al., 2018). Here, teleconnection is used to emphasise how drivers of land system changes exert influence across distinct locations (Lewison et al., 2019). This emphasises the importance of considering spillover effects in the evaluation and planning of conservation efforts, for which the telecoupling framework provides a systematic tool (Dou et al., 2018). More specifically, in the context of ecosystem governance the notion of telecoupling helps conserving ecosystems without impacting other ecosystems (Liu et al. 2015). This shows the key role of teleconnection when aiming to reduce deforestation globally while only including a limited geographical area.

This notion of teleconnection between geographically distant places is also strongly emphasised in the literature of problem shifting. In the context of problem shifting, Nilsson & Persson (2012) stress the importance of thoroughly understanding earth system interactions and potential problem shifts to prevent transferring issues between various subsystems or geographical areas. Therefore, understanding teleconnection is essential not only for grasping the complexity of problem shifting but also for creating

more effective and sustainable policies that consider the global interconnectedness of environmental issues.

2.1.5 Shifting the Burden

Burden shifting is another central concept to understand the dynamics of problem shifting and possible intentions behind it. Burden shifting describes the transfer of an activity and its environmental burdens to another area (Wood Hansen & Van Den Bergh, 2024). An example of environmental burden shifting is the outsourcing of pollution from industrialised to developing countries through trade liberalisation (Kolcava et al., 2019).

Burden shifting manifests itself in ecological impacts and land use intensive products being produced predominantly in developing countries, emphasising the need to consider this more closely in relation to problem shifts. Land transfers embodied in global trade have induced shifting of ecological burdens on a global scale (Li et al., 2024). This displacement results in ecological burdens being transferred from developed to developing countries, raising concerns about environmental inequalities (Li et al., 2024)**.** The concept of unequal ecological exchange captures the inequalities in trade-governed resource use and extraction in which economically strong regions such as the EU outsource their high-consumption, natural resource demands to economically and environmentally weaker regions or countries, depleting their resources in the process (Bruckner et al., 2023; Lewison et al., 2019). Unequal land use distribution compared to consumption highlight this inequality where the EU experiences a low rate in domestic land use change coinciding with rising consumption met through foreign imports of land intensive products (Meyfroidt et al., 2020). This emphasises the need to consider both consumption and production impacts in land use assessments (Li et al., 2024). Interestingly, the environmental Kuznets curve highlights exactly this situation. This curve observes a relationship between economic growth and environmental quality beyond a particular level of per capita income and as pointed out, this can be explained by the spatial displacement of environmental costs to other territories (Lewison et al., 2019).

Previous research examining the EU's overall strategies to combat international deforestation has often been seen as exemplifying the phenomenon known as burden shifting. Weatherley-Singh & Gupta (2018) argue that EU policies focus on shifting the burden of deforestation onto developing countries, ignoring the EU's high consumption patterns that contribute to the problem. Instead of acknowledging the role of EU consumption in driving deforestation, policies have often focused on production issues and framed the issue as a supply side governance challenge, creating a narrative that deflects attention from the EU's own overconsumption of deforestation-linked commodities (Weatherley-Singh & Gupta, 2018). Kumeh & Ramcilovic-Suominen (2023) call this approach a diversion to ensure continued access to key commodities and add that this approach perpetuates global trade imbalances and reinforces power

asymmetries, exacerbating deforestation and requiring the EU to address these inequalities to effectively combat the issue.

Understanding the concept of burden shifting is crucial for addressing the dynamics of problem-shifting in deforestation. It highlights the need to recognise how environmental burdens are transferred through global trade and economic policies, often from developed to developing countries. This transfer exacerbates environmental inequalities and undermines the effectiveness of interventions aimed at reducing deforestation. Moreover, it underscores the importance of considering both consumption and production impacts in land use assessments, rather than focusing solely on production issues.

2.2 Underlying Factors inhibiting the Addressing of Problem Shifts

In the dynamic landscape of environmental and socio-economic systems, problem shifts are a recurring phenomenon. Occasionally, an opportunity arises where a policy intervention could address these problem shifts. Despite this opportunity, they are often not seized, resulting in continued or exacerbated negative impacts, such as in the case of the EUDR and the Amazon-Cerrado shift.

This section explores the factors contributing to the failure to address problem shifts during crucial windows of opportunity. These factors include prioritization bias (2.2.1), the complexity of environmental issues (2.2.2), and fragmented approaches to problem-solving (2.2.3). Together, these elements provide a comprehensive understanding of why such opportunities are missed. This discussion is framed using problem-shifting concepts and Earth System Governance literature. Examples are provided to illustrate these factors and their effects. This analysis is crucial for developing strategies to overcome these barriers and effectively address problem shifts in the future.

2.2.1 Prioritisation Bias

This section highlights limited resources as a key factor enabling problem shifts to remain unaddressed. It discusses how limited resources drive prioritisation and necessitate sacrifices, particularly when trade-offs occur. The example of ecosystem prioritization in biodiversity hotspots is provided to illustrate these dynamics.

Limited amount of resources can lead to trade-offs and sacrifices in decision-making. Especially as source constraints force decision-makers to prioritise some issues over others, resulting in problem shifting but also the overlook of existing problem shifts. Morrison-Saunders & Pope (2013) emphasise that trade-offs are inherent in the realities of decision-making due to the limited resources available to decision-makers. Consequently, allocating limited resources to benefit one aspect often necessitates sacrificing another. The winners of the allocation of these limited resources are commonly priority objectives.

Prioritisation has become a key approach to allocate limited available resources to priority zones. One example for this is the concept of biodiversity 'hotspots'. Biodiversity hotspots, regions with high concentration of biodiversity and endemism, have become central to conservation strategies (Myers et al., 2000). Identifying and prioritising hotspots for global priority areas is crucial for reducing global biodiversity loss, especially given the limited resources available (Mittermeier et al., 2011; Strassburg et al., 2020). Thus, by designating these areas for conservation, efforts can be concentrated where they are most effective, as hotspots contain significant biodiversity within relatively small areas (Hecht, 2005). This approach directs resources to the regions that need them the most and has proven to be extremely effective at directing international funding and philanthropy. Thus, being explicit about potential consequences (i.e. extinctions) of inadequate funding can elicit more resources from governments and donors than fostering the 'we can save everything' delusion (Bottrill et al., 2009).

However, this approach of biodiversity hotspot is also met with critique about the limited approach this takes as areas outside of the hotspot space, so called 'coldspots', are considered less important leading to the sacrifice of many of these coldspots (Kareiva & Marvier, 2003). Moreover, critique is based on questions about the knowledge of regional biodiversity, different forms of biodiversity and key environmental services of these areas (Kareiva & Marvier, 2003). Carolan (2009) argues that while there is a great power behind these well-known earth biodiversity hotspot maps, they however only provide a partial view of the world, as many assumptions are embedded within these maps. This highlights the narrow focus of these priority zones, which fail to consider the bigger picture.

Prioritisation in policymaking inherently involves trade-offs, where the emphasis on certain goals often results in sacrifices in other domains. This is connected to managing limited resources which involves making strategic decisions to achieve the best possible results under constraints. These dynamics of prioritisation, trade-off and sacrifice are key to understanding the overlook of problem-shifts. When policymakers choose to focus on certain priorities, they often shift resources away from other issues, which can lead to the emergence of new issues or the continuation of the displacement of problems.

2.2.2 The Complexity of Environmental Problems

A major factor contributing to the overlook of problem-shifts is the complexity of environmental issues. These complexities manifest in various ways, from trade-offs to scientific uncertainty, making it challenging to develop policy interventions that adequately address the issues, let alone potential problem shifts. These intricate dynamics are particularly evident in spatial problem shifting concepts.

Sustainability issues are highly complex due to inherent trade-offs and uncertainty. Interventions to achieve sustainability involve criteria from various domains, making decision-making challenging due to overlapping and conflicting environmental, social, and economic objectives (Magalhaes 2019). Furthermore, environmental negotiations are often impeded by various aspects of scientific uncertainty,

including incomplete data, gaps in scientific knowledge and the complexity of systems (De Santo et al., 2019).

At times these uncertainties adding to complexity are actively created and exacerbated by actors with certain interests. Here, certain actors deliberately manipulate information to create uncertainty and confusion (De Santo et al., 2019). These actors for instance conduct financed disinformation campaigns to protect short-term profits or other interests (Bradshaw et al., 2020). Indeed, arguments for delaying ambitions to achievement environmental objectives have been and continue to be very present in environmental debates (Michaels, 2020; Oreskes & Conway, 2011; Lamb et al., 2020). These strategies for delay can include an emphasis on downsides of a policy, the promotion of ineffective solutions, raising doubt about the feasibility of the policy or the redirection of responsibility (Lamb et al., 2020). These same strategies can be used to avoid the addressing of a problem shift by a policy.

Complex realities are particularly evident in issues of global supply-chains, ecosystem governance and in addressing global deforestation. Global deforestation represents a wicked problem, characterized by the absence of simple or straightforward solutions for achieving deforestation-free global commodity supply chains (Alexander et al., 2022). The term 'wicked problem' in this context underscores the complexity of ecosystems and the diverse human perspectives on defining environmental problems and solutions (Vasseur et al., 2017). Governing land use is particularly challenging because land use systems are intricate, with drivers operating directly and indirectly through dynamic interactions and feedback loops (Meyfroidt, 2018). Furthermore, agricultural commodity supply chains are highly complex, making it difficult to quantify risks and trace the exact origin of products (Lyons-White & Knight, 2018; Zu Ermgassen et al., 2020). This difficulty is exacerbated by economic globalization, which intensifies the challenge of preserving ecosystems while simultaneously enhancing food production (Lambin & Meyfroidt, 2011).

Spatial problem-shifting concepts, such as spillovers, leakages, and rebound effects, underscore the complexities and challenges in achieving the intended goals of initiatives tackling global deforestation. Mechanisms of displacement and rebound can accelerate land conversion despite efforts to curb it (Lambin & Meyfroidt, 2011). For example, spillover effects are evident when conservation efforts and supply-chain agreements focus only on the Amazon biome, causing these issues to spill over into the Cerrado due to the telecoupled nature of our earth system (Dou et al., 2018). Similarly, Villoria et al. (2022) identified that while the Amazon Soy Moratorium (ASM) resulted in a significant amount of avoided deforestation, it was offset by increased deforestation outside the Amazon, leading to a within-Brazil leakage rate of 53%. These displacements of land use often occur with the aim of reducing environmental pressure in one area, highlighting the difficulty of achieving policy goals, especially when they are geographically limited. This exacerbates problem-shifts and potentially overlooks existing ones.

The complexity and unpredictability of environmental systems often lead to unintended consequences and overlooked problem shifts. With the high complexity of the earth systems, it is challenging to predictably control dynamics of possible problem-shifts (Kim & van Asselt, 2016). Thus, this complexity makes it challenging to foresee all potential effects, sometimes resulting in the unintended acceleration of problems elsewhere. Additionally, addressing problem shifts once they have occurred is difficult due to the intricate and interconnected nature of these systems and the complexity of the problem that is at the core of an intervention.

2.2.3 Fragmented Approaches to Problem-Solving

The overlook of problem-shifts can also be attributed to the fragmented approach to environmental issues which inhibits the possibility to holistically perceive the entirety of the earth system. This is highlighted by concepts of environmental reductionism, ultimately resulting in the disregard of problem shifts.

One primary factor for the overlooking of occurring problem shifts is as Kim & van Asselt (2016) point out the failure to perceive the entirety of the earth system, resulting in limited successes. In essence, conventional approaches to solving environmental problems tend to address individual components of the system, rather than having a holistic view of an integrated and interconnected system (Kim & van Asselt, 2016; Nilson & Persson). Therefore, single successes towards sustainability such as reducing water pollution or improving natural reserves and protected areas are outdone by system failures that lead to irreversible tipping-points, disappearing ecosystems, irreversible species extinction and other negative situations (Bosselmann, 2010). So, metaphorically, while some trees are saved, the forest is being lost (Bosselmann, 2010).

The concept of environmental reductionism helps explain the limited ability to perceive the entirety of the earth system more clearly. Environmental reductionism leads to the oversimplification of complex real-world phenomena (Young & Stokke, 2020). As a result, agendas are streamlined, and focus is placed solely on key issues to facilitate successful negotiations (Young & Stokke, 2020). However, reductionism overlooks important aspects and ignores the interconnected nature of the earth system in environmental policymaking (Young & Stokke, 2020; Bosselmann, 2010; Kim & van Asselt, 2016). This reductionism manifests itself in modern environmental law and governance, which reflects a compartmentalized, fragmented, anthropocentric and economically charged idea of the environment leading to legislative failures (Bosselmann, 2010). The compartmentalisation of environmental issues describes its isolation from other policy areas (Bosselmann, 2010).

Policy integration present a notion that is key to combating reductionism and achieving a more holistic view of the earth system. The principle of environmental policy integration highlights the need to incorporate environmental concerns into other areas of policymaking such as economic or

transportation policies (Runhaar et al., 2014; Jordan & Lenschow, 2010). Additionally, this approach also advocates for the integration of different environmental goals within the environmental policy domain (Biermann et al., 2009). This policy integration is crucial as environmental law is not merely a new segment of society that needs to be regulated but rather a new dimension in the spectrum of legal rights and visible in many already existing activities (Bosselmann, 2010).

This reductionism and singular approach to problem-solving in environmental policymaking also manifests itself in fragmentation, posing challenges to solving environmental problems. Internally, environmental policymaking is characterised by high institutional and organisational fragmentation (Biermann et al., 2009). The various earth systems, their aspects and functions are therefore regulated by different laws all following their own logic, rather than protecting the earth system as a whole (Bosselmann, 2010). This fragmentation leads to the focus on solving specific aspects of the environment, rather than protecting the earth system as a whole (Bosselmann, 2010). Moreover, fragmentation inhibits the development of a rule to not harm the environment as a whole, and rather rules are set for different environmental aspects that limit harm to a certain level (Bosselmann, 2010). However, designing such a global governance structure considering the entire earth system and its interactions proves to be challenging due to its high complexity (Nilsson & Persson, 2012). Some point to the need for internal integration within the environmental policy domain, next to the integration of environmental policies with non-environmental policies (Biermann et al., 2009).

Bringing this back to the concept of problem-shifting, provides insights into the occurrence of problem-shifts. Kim & van Asselt (2016) highlight that within the context of environmental law, problem-shifting stems from gaps between de-partmentalised institutions each focused on distinct environmental issues. For example, this fragmentation can lead to a policy targeting one environmental area which can at the same time restrict the achievement of another target (Nilsson & Persson, 2012). This failure to holistically view the earth system, leads to interventions in one area triggering repercussions elsewhere, often referred to as the butterfly effect (Kim & van Asselt, 2016). Moreover, agreements fail to include provisions to effectively address all relevant issues (Young & Stokke, 2020), possibly causing problem shifts or overlooking existing ones. These simplistic views are commonly traced back to intense bargaining, leading to compromised agreements (Young & Stokke, 2020). Indeed, previous studies highlight the role of compromise in competing arguments about environmental topics as central to settle these disputes (Nyberg & Wright, 2013).

In conclusion, the failure to perceive the entirety of the earth system and the tendency to address environmental issues in isolation, are primary factors leading to the occurrence and overlooking of problem-shifts. Environmental reductionism exacerbates this issue by oversimplifying complex phenomena and streamlining agendas, which leads to fragmented, compartmentalised policies that fail to account for the interconnected nature of the earth system and is more likely to overlook occurring problem shifts. Policy integration, incorporating environmental concerns into all areas of policymaking,

is crucial for effective governance and the successful addressing of occurring problem-shifts. Therefore, recognising the interconnected nature of the earth system and promoting comprehensive, integrated policy approaches are essential to mitigating problem shifts.

3. Methodology

3.1 Research Design

The purpose of this study is to explore the factors and dynamics behind the decision-making process leading to the overlook a problem shift within a specific policy context. Given the nuanced and context-dependent nature of these phenomena, a qualitative research approach was deemed most suitable. Qualitative research provides a framework to gain in-depth insights into the complex realities of the decision-making process, its meanings, experiences, and interpretations (Creswell & Poth, 2016). This study employs a triangulation of qualitative methods, specifically semi-structured interviews, document analysis, and participant observation. Triangulation enhances the credibility and validity of the research findings by combining multiple data sources and methods, allowing for a comprehensive and multi-faceted exploration of the research questions. The following sections detail the data collection methods, data analysis procedures, and considerations regarding ethical implications of the research.

3.2 Data Collection Methods & Analysis

Data collection is based on the idea of triangulation stipulating the combination of methodologies to study the same phenomenon (Bowen, 2009). These three methods will be semi-structured interviews, document analysis, and participant observation. Data collection methods have limits due to their nature and data collected. Notably, document analysis cannot stand alone and should rather be used in combination with other data sources, as documents alone cannot be taken as definitive evidence as described above (Atkinson & Coffey, 2004). The data collected during the participant observation was similarly limited due to the nature of the event.

Therefore, this research combines these three data collection methods in form of a triangulation, accounting for their respective limitations. Drawbacks of individual data collection methods will be counteracted through triangulation. This triangulation results in rich, and less biased data as data is collected through multiple methods that provide a diverse set of perspectives (Thurmond, 2001). This enhances the confidence and validity of the research quality and findings (Thurmond, 2001), as the validity of data can be tested through convergence of information from different sources (Carter et al., 2014). Moreover, it helps develop a more comprehensive understanding of the studied phenomena (Carter et al., 2014).

3.2.1 Semi-structured Interviews

Firstly, semi-structured interviews were conducted with a total of 14 interviewees. These interviewees were selected strategically to best answer the research questions. Relevant interviewees were

systematized selected, based on whether they (i) have been directly engaged in the deliberations surrounding the elaboration of the law, (ii) had influence into this process of deliberation and formulation of the law though lobbying for a particular policy formulation (iii) are in a relevant position for the adoption of the law in Brazil, or (iv) have in-depth knowledge in relation to the key issues that will define the regulation in a Brazilian context.

An iterative process of purposeful sampling helped maximise the depth and richness of the data and effectively answer the research question (DiCicco-Bloom & Crabtree, 2006). This means that throughout the interview process additional relevant actors with crucial perspective and influence on the legislative process were discovered and contacted. Here, snowballing proofed to be especially useful to gather contacts of additionally relevant interviewees.

In total 14 interviews were conducted, of which 8 were with European, international and Brazilian civil-society organisations (CSOs), charities, non-governmental organisations (NGOs) or other non-profit organisations (NPOs). Moreover, two interviews were conducted with governmental institutes from the EU and EU member states, two with relevant industries or their representative organisations, as well as one with an expert of this thematic and one with a Cerrado local active in NGO and agricultural practices in the Cerrado. In Table II an overview of the interviews are depicted.

Identifier	Description	Date	Additional Information
I01	NPO	08.12.2023	
I02	Supply-Chain Expert	22.12.2023	
I03	Global Advocacy Organisation	26.01.2024	
I04	Brazilian NGO	31.01.2024	
I05	Brazilian Business	14.02.2024	*written interview reply
I06	Brazilian NGO	21.02.2024	
I07	Environmental charity	01.03.2024	
I08	Brazilian CSO	08.03.2024	
I09	NPO	13.03.2024	
I10	EU Commission member	18.03.2024	*written interview reply
I11	Local to the Cerrado from a family of farmers, engaged in NGO work and Cerrado conservation	19.03.2024	
I12	International NPO	26.03.2024	
I13	Industry group representative	05.04.2024	
I14	EU Member State Ministry	15.04.2024	

Table 2: Interview Overview

The interviews were conducted individually, with each session lasting approximately one hour. Individual interviews were deemed the most suitable data collection method for this research, as they

allow for the acquisition of in-depth information about specific topics (Alshenqeeti, 2014). Moreover, the interviews were semi-structured, a format chosen for its effectiveness in answering the research questions comprehensively. Unlike questionnaires, which can be limited in scope, semi-structured interviews are more powerful in eliciting narrative data. Semi-structured interviews offer a flexible yet systematic approach to gathering qualitative data, which made them well-suited for exploring the complex and multifaceted phenomena. This method enables researchers to delve deeply into participants' views and experiences (Alshenqeeti, 2014).

An interview guide was created around main topics and questions central to answer the research question. Moreover, the flexibility of semi-structured interviews allowed for the exploration of multiple leads and the opportunity for follow-up questions (Adams, 2015). Moreover, this approach ensured that while a consistent framework guided the discussion, there was ample room to probe into areas that may emerge as significant during the conversation (Adams, 2015). The interviews were conducted in English, Portuguese, and German, and subsequently transcribed in their original languages. Quotes used in the analysis were translated into English by the researcher to maintain consistency and clarity in the presentation of findings.

A Qualitative Interpretive Analysis (QIA) was employed to explore the phenomenon of the exclusion of other wooded lands from the scope of the EUDR. This approach involved systematic inductive coding of the interview transcripts to facilitate the identification and interpretation of patterns within the data. The coding process began with a thorough review of the transcripts, during which patterns were identified and assigned specific labels. This iterative process, next to the data analysis of the document analysis and participant observation and continued until saturation was reached, meaning no new insights or patterns emerged from the data. This method ensured a comprehensive understanding of the factors contributing to the exclusion of certain wooded lands, such as the Cerrado, from the EUDR. Coding served as a fundamental tool in this analysis, enabling the researcher to systematically examine and interpret the gathered data to elicit meaning, gain understanding, and develop empirical knowledge. By identifying and relating patterns, the coding process provided valuable insights into the dynamics of the studied phenomenon, enriching the overall findings of the research.

3.2.2 Document Analysis

In this study document analysis will be used for various purposes: (i) as part of triangulation to validate findings and corroborate evidence from interviews, (ii) for (supplementary) research on the EUDR and reasons for the exclusion of the Cerrado, and (iii) to provide context of the conditions in which the investigated phenomenon occurs (Bowen, 2009).

The analytical procedure of this document analysis entails finding, selecting, appraising (making sense of), and synthesising data contained in documents (Bowen, 2009). The document selection includes an

extensive review of official EU documents, legislative texts, impact assessment and policy reports related to the EUDR and its considerations regarding the Cerrado biome. This encompasses identifying statements, discussions, and decisions pertaining to the inclusion or exclusion of the Cerrado biome.

The documents for this analysis were selected through a semi-systematic search through official EU websites as well as through the websites of stakeholders involved in the EUDR process. Any documents published during the process of the development of the EUDR, relating to the EUDR, or related to the topics of EU efforts to reduce deforestation were sampled. Moreover, public position statement, press releases and other forms of communication from stakeholders affected by the EUDR or having directly or indirectly exerted influence on the development of the EUDR were gathered. This also includes any kind of publicly made available documents during lobbying activities. Based on this criterion a total of 48 documents was selected, a full overview of the documents is presented in Appendix A. These documents are divided into three groups based on their source from either, industry groups, NPOs or from official EU sources. During the interview process relevant documents were forwarded to the researcher by interviewees. These documents were also included in this analysis.

The selected documents were systematically coded similarly to the interview transcripts, in order to facilitate the appraisal and synthesis of relevant data. Special attention here is given to the reality of the development of the analysed documents. Documents, as Atkinson & Coffey (2004) puts it, are 'social facts' generated, shared and utilised in a socially organised manner (p. 79). Therefore, documents are not neutral, transparent reflections of organisational realities, making it crucial that they are considered in light of their organisational setting and cultural values (Atkinson & Coffey, 2004).

Therefore, while coding the documents in NVivio, special attention was given to the self-portrait of these organisations, their objectives, intentions and actions. Nevertheless, the documents were coded with the same approach as the interview transcript, based on inductive coding. The documents especially added to contextual codes, the EU perspective on excluding other wooded land, as well as to the understanding of lobby strategies from the relevant stakeholders in the EUDR development.

3.2.3 Participant Observation and Informal Conversations at the 2024 APIB tour in the Netherlands

Participant observation (PO) played a crucial role in enhancing the depth and contextual understanding of this research topic. This method provided a unique opportunity to gain firsthand insights into the dynamics surrounding the exclusion of the Cerrado from the EUDR

The PO were conducted at a lobby tour organized collaboratively by Brazilian and European NGOs and CSOs, along with Brazil's Indigenous People Articulation (APIB) to raise awareness about the importance of including the Cerrado in the EUDR. The collaborative nature of the lobby tour brought together diverse perspectives and expertise, including those of the APIB, which represents Brazil's

Indigenous Peoples. Incorporating indigenous voices added a significant dimension to the advocacy efforts, providing a more comprehensive understanding of the issues at stake. I participated in three of their events: two public events where the importance of the Cerrado and the ongoing problem-shift were highlighted, as well as a meeting involving the European NGOs, and Brazilian CSOs preparing for a ministry meeting as well as a conversation with industry groups.

This method allowed me to gather data directly in the environment object to this study. I managed to observe the strategies employed by the organizers, the reactions of participants, and the broader discourse surrounding the Cerrado's inclusion in the EUDR. Moreover, informal conversations with actors at the events provided deeper understanding of dynamics that could otherwise not have be directly observed from interviews and documents alone. This method brought a level of authenticity and richness to the data gathered, complementing the insights gained from document analysis and interviews (Musante & DeWalt, 2010).

This data collection method encountered limitations, especially due to the specific circumstances of the events where participant observation was conducted. Firstly, the events participated in during the lobby tour were limited to two publicly open events and one meeting between NGOs and CSOs. This means that the participant observation is not sufficient to have gained in depth knowledge of the activities of these actors and their values and perspectives for an extended period of time. Rather, a small number of events that were deemed relevant in the context of this study were selected. Moreover, these events take place long after the decision of excluding the Cerrado from the scope of the EUDR. This is a crucial fact that needs to be kept in mind during the data collection and data analysis part of this research. It needs to be clarified that the idea behind this data collection method is not to provide direct observations into the negotiations and discussions at place during the development of the EUDR, as the policy is already adopted. Rather, in light of the revision happening for the inclusion of the Cerrado and this ongoing lobbying for the Cerrado, underlying patterns and contexts can be identified as well as an impression can be made on how such advocacy efforts look like.

Observations and informal interviews conducted during the participant observation were systematically recorded in the form of field notes, which I later transcribed to facilitate analysis. This included mapping the scene and describing the physical and social context of the events, providing essential context for understanding the observations and conversations (Musante & DeWalt, 2010). The analysis of this data involved relating the gathered data with the developed patterns from the document analysis and interviews. This process enhanced the overall comprehensiveness of the study by incorporating nuanced socio-political dynamics and the subtleties of the interactions observed during the events. Through this method, the researcher gained a more holistic understanding of the factors influencing the exclusion of the Cerrado from the EUDR, enriching the study with authentic and contextually grounded insights.

3.4 Ethical Considerations & Positionality

3.4.1 Ethical Considerations

During this study special attention was given to the upholding of ethical standards to ensure transparency, to respect the research participants and to maintain the integrity of the research process. Therefore, participation in this research was completed with rigorous rules of consent. Firstly, in the interview process, informed consent was obtained from all participants before conducting the interviews. This was done by providing a consent form where participants were informed about their rights as participants of this study, the interview procedures and the possibility to stay anonymous throughout this research (see Appendix B). Moreover, through this informed consent form, permission was given to record and use the data obtained.

Secondly, the participant observation was based on formal or informal clearance (Musante & DeWalt, 2010). Formal clearance was provided by the person that invited the researcher to the events. Moreover, during the process of informal conversations the researcher ensured that transparency was provided about this being a PO as part of a master thesis project and what this entails.

Lastly, strict measures were implemented to ensure the confidentiality and secure storage of collected data. Personal information was handled in compliance with data protection regulations that are also specified in the informed consent form.

3.4.2 Reflexivity & Positionality

The interpretation of qualitative data involves an inherent degree of subjectivity as it is inevitable that researchers bring in their own perspective, experiences, and biases (Charmaz, 2014). Therefore, transparency about the researcher's background, assumptions and analytical decisions (Charmaz, 2014), as well as systematic procedures (Yin, 2009; Creswell & Poth, 2016) are central to minimise bias. Moreover, Charmaz (2014) emphasises the importance of reflexivity and encourages researchers to critically reflect on their own positions, assumptions and biases throughout the research process.

Here, I would like to state my own positionality, as my social, cultural, and personal position within society, inherently influences my perspectives and interpretations. By openly acknowledging my positionality, I hope to mitigate bias and enrich the depth of understanding in this research as well as foster critical reflection and enhancing the credibility of my work. Thus, through this reflexivity I hope to ensure transparency and enhancing the validity of the findings.

As a researcher, my positionality is shaped by my dual heritage as German-Brazilian, which gives me a unique perspective rooted in both cultures. Nevertheless, I want to acknowledge that I was predominantly raised in Europe and have adopted many European perspectives due to my educational background. However, I was also brought up with many Brazilian values and perspectives and

continued to seek a more Brazilian understandings of the world, in my free time and during my studies. This mixed background clearly influences my research lens and how I see things in my research. Moreover, it also helped me deal with diverse cultural contexts with sensitivity and have unique insights based on my European and Brazilian cultural influences.

4. Findings

This thesis delves into the exclusion of the Cerrado biome from the deforestation-free requirement in the EUDR, identifying the reason for this omission and the disregard of the ongoing Amazon-Cerrado problem shift. The exclusion of the Cerrado can be explained by the interaction of three elements which together tell the story of the Cerrado exclusion from a problem shifting perspective. This includes the EUDR's prioritisation of forests, the diverging EU perspective on the ecological Amazon compared to the productive Cerrado, and the trade-off of reducing deforestation while ensuring a continuous supply of commodities in Europe.

Starting off, the development of the EUDR showcases a forest focus, despite broader ambitions the EUDR's emphasis on forests persists. Forests are perceived as crucial for addressing international environmental and climate challenges, reinforcing their priority in EU legislation. This bias is driven by societal demand for forest protection, supported by EU research, and linked to internationally recognised environmental goals. The forest-centric approach is further illustrated through the practical usage of definitions in the EUDR, which determine the scope of application of the deforestation-free requirement. The prioritisation of forest biomes, particularly the Amazon, over other natural ecosystems such as the Cerrado, is a direct result of adhering to internationally recognised definitions. This legislative process lacks the capacity to incorporate non-forest biomes due to insufficient research, knowledge and uncertainties about suitable definitions incorporating other natural ecosystems. The ease of agreeing on a forest definition contrasts with the constraints faced when defining other wooded lands, emphasising the exclusion of the Cerrado.

Zooming in on this focus on forests and the disregard for other natural ecosystems, in the Brazilian context two biomes become predominant, namely the Amazon rainforest and the Cerrado savannah. The Amazon's ecological significance is widely recognised, supported by its role as a carbon sink and its biodiversity value, which is also focused on for reaching international commitments such as the Paris Agreement. In contrast, the Cerrado's critical functions as a carbon sink and biodiversity hub are overlooked, and ecological values of the Cerrado are only acknowledged when supporting the priority zone of the Amazon. The higher ecological value assigned to the Amazon by the EU allows for the sacrifice of the Cerrado to ensure a continuous supply of commodities. This division of value underscores the trade-off between conserving the Amazon and sacrificing the Cerrado to ensure a continuous supply of commodities to Europe.

Further examining the trade-off leading to the sacrifice of the Cerrado is crucial for understanding its exclusion from the EUDR and makes up the third and last element. While some industry groups highlight this trade-off, NPOs contest the existence of it. The EU, nevertheless, wants to ensure a continued supply of commodities and decided on a more step-by-step approach for this legislation. Focusing on the soy supply chain, which is the most produced commodity in the Cerrado region,

provides insights into this trade-off. The prioritisation of the Amazon and the exclusion of the Cerrado become clearer when considering the continuous supply of soy. Moreover, this supply chain highlights the trade-off between protecting nature and mitigating global deforestation while ensuring the supply of key commodities.

4.1 The EU's Forest Focus

The primary factor for the exclusion of the Cerrado biome from the EUDR lies in the focus on forests. This section highlighting how the EU ambition prioritises forest biomes and, consequently, leads to the exclusion of the Cerrado. This initial examination of the EUDR's forest focus sets the stage for understanding the specific result for biomes is Brazil. From an EU perspective, the Amazon is prioritised as an area of conservation over the Cerrado savannah, which is designated as a zone of sacrifice for the continuous supply of products. This is part of a direct result of a trade-off between conservation and unceasing production of commodities.

First, the forest focus will be detailed by describing the initiation and development of the EUDR, clearly demonstrating that despite some broader ambitions, a forest bias persists within the EU. Then, the reasons behind this forest bias will be presented. Lastly, this forest focus will be illustrated through the practical question of the usage of definitions in the legislation. By examining these aspects, we can better understand how the forest-centric approach of the EUDR has shaped the regulation, leading to the exclusion of the Cerrado and highlighting the inherent trade-offs in prioritizing one biome over another in the following sections.

4.1.1 The Ceaseless Focus of Forest in the EUDR: The Forest Bias

The EUDR was initiated out of a focus on forests which sets the first layer to the ultimate exclusion of the Cerrado from the EUDR. The documents initiating the EUDR, outline the main objectives of the EUDR and showcase the focus on forests to realise these ambitions. The EUDR was first announced in a Commission Communication emphasizing five priorities to step up EU action against deforestation and forest degradation (I10, D3.1). The commitment was to assess possible demand side measures to achieve these goals and makes part of the ambitions of the European Green Deal[4], a climate transition plan that includes a series of sectoral strategies to achieve the goal of greenhouse gas emissions

[4] Communication from the Commission to the European Parliament, the Council, the European, Economic and Social Committee and the Committee of the Regions, *The European Green Deal*, COM/2019/640 final.

neutrality by 2050 (D3.2). This goal is also highlighted in the 2030 EU Biodiversity Strategy[5] and the Farm to Fork Strategy[6], which announce the EUDR legislative proposal (D3.5, D3.6).

These documents mention other natural ecosystems beyond forests to a varying degree. In the Green Deal deforestation ambitions focuses on forest preservation and does not mention other ecosystems (D3.2), while the biodiversity strategy takes a more integrated approach to biodiversity including different ecosystems ranging from great rainforests to gardens (D3.5). So, beyond forests the strategy mentions the importance of grasslands and other natural carbon-rich ecosystems to achieve emission reduction and climate adaptation (D3.5). The Farm to Fork Strategy focuses on challenges of a sustainable food system in general and similarly aims for an integrated approach, without a clear focus on solely forest ecosystems (D3.6).

Following this, in November 2021, the EC put forward the legislative proposal for the EUDR with the objective to curb deforestation and forest degradation driven by the expansion of agricultural land used to produce European commodities (D3.1, D3.2 D3.3, D3.13). However, other wooded lands and with that the Cerrado, were not mentioned in the deforestation-free requirement stipulated in the proposal and fall outside of its scope (D3.13). The prime objective of this legislative initiative is the mitigation of greenhouse gas emissions contributing to climate change and reduction of global biodiversity loss (D3.3). An interviewee explains how the policy development was limited by the scope of the policy announcement, which was focused on forests and deforestation (I07). While this scope could have been extended later on, there was a certain focus or even a perceived limit to this (I07).

The central legislative goal of the EUDR connects to climate mitigation and biodiversity protection, which was especially connected to forests. A multitude of European documents leading to the EUDR and contributing to the development and final draft of the legislation highlight the carbon sequestration and storage functions of forests as well as their biodiversity richness, which are crucial for achieving the EUDR's key ambitions of climate mitigation and biodiversity preservation (D3.2, D3.3, D16). By tackling global deforestation, the EUDR also contributes to achieving biodiversity objectives of the Kunming Montreal Global Biodiversity Framework and climate targets stipulated in the Paris Agreement (D2.14, D3.2, D3.3, D3.21).

The focus on forests has led to a clear oversight of other vital natural ecosystems and their functions to achieve the EUDR's main objectives. Nevertheless, a more holistic approach to ecosystem protection, addressing the biodiversity crisis and climate emergency in the context of wider ecosystem preservation

[5] Communication from the Commission to the European Parliament, the Council, the European, Economic and Social Committee and the Committee of the Regions, *EU Biodiversity Strategy for 2030 Bringing nature back into our lives*, COM/2020/380 final

[6] Communication from the Commission to the European Parliament, the Council, the European, Economic and Social Committee and the Committee of the Regions, *A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system*, COM/2020/381 final.

beyond forests, has only received limited attention and even less success on the EU level. With that the Amazon-Cerrado problem shift also only receives marginal attention.

The significance of including other natural ecosystems was highlighted by various EU institutions and staff members throughout the legislative procedure. Early in the EUDR's development, the EC acknowledged that the legislative requirements for forest biomes would also benefit other ecosystems experiencing habitat loss due to the same drivers causing forest loss there (D3.1). Especially from the side of the EP, however, there was support for the expansion of the EUDR (I07, I09), highlighting that a significant obstacle to achieving deforestation-free supply chains is the narrow 'forest-centric' approach (D3.1). Some EP staff such as EUDR rapporteur Christophe Hansen, emphasize the importance of protecting not only rainforests but also other ecosystems (D3.22). The European Economic and Social Committee (EESC) brought forward a document expressing the support for extending the scope to other high-value conservation ecosystems threatened by European consumption (D3.15). The EP even refers to a due diligence requirement for 'forest and ecosystem-risk commodities' (FERCs), rather than merely 'forest risk commodities' (FRCs) (D3.2).

This argument is supported from the sides of environmental NPOs, with NGOs highlighting the need to expand the legislative scope to protect ecosystems beyond forests (D2.3, D2.7, D2.8, D2.13.) These calls for inclusion are connected to international commitments pledged by the EU and its member states such as the United Nations (UN) Sustainable Development Goals (SDGs), particularly SDG15 (life on land) and the UN Convention on Biological Diversity and the Ramsar Convention (D1.1 D2.7).

Even further this neglect of natural ecosystems is recognised as an overlook of possible shifts in pressure from forests to these non-forest ecosystems and specifically a disregard for the Amazon-Cerrado problem shift. NPOs strongly highlight the effect such a limited scope has on problem-shifting, emphasising the added pressure this adds to increasing degradation in other ecosystems through spillovers, leakages and rebounds (D2.3, D2.7, D2.13, D2.12). This knowledge and ambition also partly reached the EU level, with key EU documents highlighting these views from NPO (D3.2). Expert presentations in the EU highlight the risk this forest-centric approach poses to the deforestation-free requirement and emphasise that when projecting current deforestation trends, by 2030 eleven places will account for 80% of embodied deforestation, one of them being the Cerrado (D3.1). Members of the European Parliament (MEPs) and EU documents even started acknowledging the need for this inclusion in order to prevent conversion and degradation issues from shifting to these landscapes (D3.2, D3.8).

Nevertheless, the main focus remains on forest biomes, with other natural ecosystems and especially the Cerrado continuing to be peripheral. Advocacy efforts tend to focus on increasing knowledge about forests rather than promoting awareness and understanding of other natural ecosystems (D3.1). Although protecting other ecosystems with biodiversity and carbon sequestration functions is

mentioned, it is sidelined in favour of the primary goal of preventing deforestation in forest biomes (D3.9, D3.2, D3.1, D3.7). Initial EU communications on combating deforestation prioritize forests' contributions to greenhouse gas reduction and biodiversity goals, with other ecosystems like 'other wooded lands' mentioned only peripherally (D3.1). Another EU document even acknowledges that biodiversity loss is not limited to species directly linked to forests, but also highlight the importance of for example mangrove forests (D3.3). Nevertheless, other natural ecosystems like the Cerrado continue to be excluded from the report (D3.3).

The European Parliamentary Research Service (EPRS) explains this gap, noting that the regulation's focus remains on forests, saying that despite the call from EP and other institute for the inclusion of other wooded land, the main ambitions of the regulation are around forest biomes (D3.2). Instead, reviews within two years of the regulation's entry into force will assess the feasibility of expanding the scope beyond forests (D3.2).

4.1.2 Reasons for the Fores Focus in the EUDR

The focus on forests can be explained by a variety of reasons. These range from the high societal demand for a protection of forests and EU research supporting the legislation focusing on forests to the presumed link of forest protection to internationally recognised goals.

The focus on forests within the EUDR can be attributed to strong societal concerns regarding the state of the world's forests. Public sentiment has played a critical role in shaping the regulation, as global deforestation poses a vital concern about European citizens (D2.15). This is evident in the historically high levels of participation in online consultations initiated by the European Commission. This surge in engagement was primarily driven by concerns about the loss of 420 million hectares of forests between 1990 and 2020—an area larger than the European Union (D.3.16). As noted by an MEP, the law reflects the will of the citizens and their urgent call for forest protection. This also becomes evident in public demonstrations across Europe, sparked by issues like burning rainforests, further underscoring the citizens' demand for legislative action (D3.21).

EU research has been pivotal in framing the EUDR's focus on forest, emphasising the significance of forests in reaching legislative goals. In fact, comprehensive reports on forest biomes underscore the ecological and economic significance of these ecosystems. The EC's Joint Research Centre (JRC) has conducted extensive mapping of global forest cover, aligned with the EUDR's objectives (D3.24). Impact assessments and other studies were similarly conducted with a focus on forests and their governance (D3.12). Besides enforcing a focus on forests this effort also overlooks non-wooded ecosystems and includes errors omitting forests in mixed mosaic landscapes, such as the Cerrado (D3.24). Additionally, international research, such as the FAO forest review, provides crucial data on carbon stock and other forest values, further limiting the EUDR's focus to forests (D3.2).

The value of forests is also closely linked to international goals, particularly the UN SDGs. EU documents highlight the connection between forest protection and the achievement of SDGs (D3.3, D, 3.1, D, 3.2, D 3.6). This includes positive impacts such as sustainable consumption and production patterns (SDG12), carbon capture and storage (SDG13), and biodiversity conservation (SDG15). Moreover, forests play a vital role in providing resources such as income (SDG1), medicinal plants (SDG3), and freshwater for drinking and irrigation (SDG6). Conversely, deforestation exacerbates vulnerabilities to extreme weather (SDG1), reduces rainfall and crop pollinators (SDG2), and increases respiratory illnesses from forest fires (SDG3), negatively impacting various SDGs.

Forest protection has also become a focal point in global climate discussions within European and international bodies (D3.16). At the Conference of the Parties (COP) 26 of the United Nations Framework Convention on Climate Change (UNFCCC) in November 2021, the critical role of forests and the land sector in climate change mitigation was widely acknowledged (D3.16). Protecting forests is seen as essential for achieving the goals of the Paris Agreement, reinforcing the EUDR's emphasis on forest conservation (D3.2, D3.3, D3.16).

Thus, the EUDR's focus on forests is underpinned by strong societal demand, robust EU research, and alignment with international goals. This reflects the critical importance perceived by the EU of forests addressing both environmental and societal challenges.

4.1.3 The Forest Focus when Defining Anything but Dense Forest

The focus on forests within the EUDR development is a key reason for the exclusion of the Cerrado from the deforestation-free requirement. To understand why this focus led to the exclusion of other wooded lands, it is essential to examine the role of the forest bias on definitions in the EUDR. This is because the usage of the threshold forest definition and the exclusion of other wooded land delineate what counts as deforestation, ultimately leaving the Cerrado outside the deforestation-free requirement of the EUDR. It becomes evident that while the forest definition was much easier agreed upon, the other wooded land definition was surprisingly met with much constraint, emphasising this focus on forests and how it leads to the exclusion of the Cerrado on a more practical level.

Internationally recognized definitions are crucial for global legislative ambitions like the EUDR. Early considerations for protecting the world's forests highlighted the necessity of refining and harmonizing relevant terms, making it essential to base legislation on well-established definitions, such as those from the FAO (D 3.3, D3.15, D 3.16). Eurostat similarly used the FAO's definition of forest to harmonise varying definitions among EU member states for international forestry statistics in previous ambitions (D3.23).

The EUDR's reliance on internationally recognized definitions helps avoid differing interpretations that could create legal uncertainty for economic operators and ensures a harmonised implementation of the legislation based on a shared understanding of its provisions (D3.15, D3.16). From the industry's perspective, clear definitions and a shared approach are essential for the successful implementation of regulations (D1.6, D1.3, D1.9). NGOs also stress the necessity of robust, efficient, and comprehensive forest-related definitions to guide operators, traders, and competent authorities in implementing and enforcing the regulation (D2.7, D2.2, D2.10). Thus, robust and comprehensive forest-related definitions were considered crucial to develop a middle ground and create international consensus as pointed out by this interviewee:

> *"It was a compromise. It was an attempt to find a middle ground. I actually talked about it with someone from DG Environment at the European Commission who said: "Look, we needed or wanted a minimum international consensus and it would be easier to achieve this if we used the FAO definition of forests." Which is a definition based on vegetation height, vegetation density, all that."*[7] – I12, translated from Brazilian Portuguese

Definitions have a significant impact on the effectiveness and scope of legislations. NGOs often advocate for a broader definition that encompasses deforestation and conversion of all wooded lands, savannahs, wetlands, and grasslands (D2.12, D2.3, D2.6, D2.13, D2.1). This is because the FAO definition of forests has led to the exclusion of biomes like the Cerrado savannah. An interviewee recalls a webinar during the pandemic when a Directorate-General for Environment (DG ENVI) official explained the adherence to internationally recognized definitions, which resulted in the Cerrado's exclusion. This highlights the significant impact that definitions can have on the scope and effectiveness of legislation:

> *"I still remember a webinar, because there were several during the pandemic, back in 2020, when the DG Environment official was there. Asking about the scope and he said: "Look at that". This kind of slippery language in this kind of political endeavour. "We try to be in line with international definitions and a more consensual understanding of what forests are, and that's why, at least initially, we're adhering to this biophysical understanding of forests." Basically, he turned round to say that the Cerrado was out."*[8]

[7] Original Brazilian Portuguese version: "Em parte, sim. Foi um 'compromise'. Foi uma tentativa de encontrar um meio termo. Eu, em verdade conversei sobre isso com alguém do DG Environment là da comissão europeia que falou: "olha, nós precisávamos ou queria um mínimo de consenso internacional e era mais fácil conseguir isso se usássemos a definição da FAO de florestas." Que é uma definição baseada em altura da vegetação, densidade da vegetação, essa coisa toda."

[8] Original Brazilian Portuguese version: A"inda me lembro de um webinário, porque ouve vários durante a pandemia, lá em 2020, quando o funcionário lá do DG Environment estava lá. Perguntando sobre o escopo e ele: "Veja bem". Neste tipo de aquela linguagem bem escorregadia neste tipo de política de esforço. "A gente busca

- I12, translated from Brazilian Portuguese

Opposite to the precision of using the forest definition of the FAO, using the FAO definition of other wooded lands was surprisingly met with much more constraint. In fact, the proposal to extend the legislation to include other wooded land, such as the Cerrado savannah, was met with mixed opinions and a need for further clarifications. An interviewee points out that extending the legislative scope has been contested at the EU level due to ambiguity about its application (I14). To address these uncertainties, an external consultancy was commissioned to assess the impact of including other wooded lands in the legislative scope (I03, I07). One interviewee even expressed hope that this assessment would also consider definitions beyond other wooded lands to explore the inclusion of critical biomes (I14). This assessment aims to provide a comprehensive analysis of the implications and practicalities of such an inclusion, given that the previous assessment on the EUDR did not cover this aspect.

The need for such an assessment highlights the necessity for clarification regarding what the inclusion of other wooded lands entails and the potential impacts of such an extension. The contestation at the EU level underscores the confusion and lack of consensus about the definitions and scope, which could lead to inconsistent implementation and enforcement, going against the original intent to use internationally recognised definitions to avoid such inconsistencies (D3.15, D3.16). Therefore, this thorough examination is crucial to ensure that the legislation is effective, clear, and based on a comprehensive understanding of all relevant factors. An interviewee describes some of the questions that arose during the legislative process and need to be addressed in the external review, which highlight a clear lack of knowledge on the term and what it encompasses:

> *"They're looking at: What constitutes 'other wooded lands'? How much 'forest risk commodities' are coming into Europe from those landscapes?"* – I03

Nevertheless, it is quite surprising to observe the considerable uncertainty, perceived inconsistencies, and lack of knowledge surrounding the definition and inclusion of other wooded lands in the EUDR. This ambiguity starkly contrasts with the clarity and precision applied to forest-related definitions. While EU research has focused on forest biomes, particularly the Amazon, it has overlooked the potential inclusion of the Cerrado and its associated impacts. Practically, inclusion was challenging due to the limited availability of information and insufficient research on the possibilities that would include these critical biomes.

Altogether, the prioritisation of forest biomes, driven by the need to adhere to internationally recognised definitions, has led to a legislative process that is not fully equipped to incorporate carbon-rich and

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estar de acordo com definições internacionais. E um entendimento mais consensual do que são florestas. E é por isso que, pelo menos num primeiro momento, nós estamos aderindo a este entendimento biofísico de floresta." Basicamente, deu a volta para dizer que o cerrado estava fora.

biodiverse biomes like the Cerrado into the EUDR. With a lack of suitable international definitions and insufficient research addressing these non-forest biomes, a significant gap has become evident within EU scientific efforts. As highlighted previously much of the research conducted in the EUDR such as the impact assessment focused on the forest definition, leading to a clear lack of knowledge on the other wooded land question. Thus, while the EUDR's intent to use internationally recognized definitions is commendable, it highlights a significant oversight in encompassing a broader range of biomes, stemming from the focus on forests. Therefore, the forest focus can clearly explain why the Cerrado was excluded also on a more practical level.

4.2 The Ecological Amazon and the Productive Cerrado

The focus on forests and the disregard for other natural ecosystems directly influences the protection of Brazilian biomes, particularly affecting the relationship between the Amazon rainforest and the Cerrado savannah. Thus, zooming in on the forest focus, specifically investigating the EU's bias playing out in Brazil, this reveals interesting diverging perspectives on the Amazon rainforest and the Cerrado savannah. Especially with the Amazon being the most well-known tropical rainforest, makes it interesting to look more specifically at a forest focus in Brazil, uncovering different values for the Amazon rainforest and the Cerrado savannah.

First, this diversion of perspective from the ecological Amazon to the productive Cerrado will be laid out in detail. This clarifies that from an EU perspective, the Amazon is prioritised for protection and conservation due to its global ecological value, while the Cerrado with less ecological importance for the EU, is kept as a place for commodity production. Then, the Cerrado as a zone of sacrifice clarifies that this division is considered critical from an EU perspective to ensure the continuous supply of commodities in Europe. Central to this sacrifice is a trade-off that will be discussed in more detail after.

4.2.1 The Ecological Value of the Amazon: An EU Perspective

First, the diverging perspectives on the Cerrado and Amazon in terms of its ecosystem function necessary for the reaching of the EUDR legislative goals are highlighted. The same prioritisation of the Amazon for conservation is highlighted from different perspectives from the highlight of the precarious situation of the Amazon to the indigenous communities living in the forest and its visual appeal. However, the Cerrado despite similar qualities is not emphasised in conservation ambitions, except for ecosystem services that are needed for the conservation of the Amazon. This suggests the division of value from an EU perspective, of the ecological value of the Amazon compared to the productive value of the Cerrado in terms of commodity production.

Despite the Cerrado's critical functions as a carbon sink and biodiversity hub, its ecosystem services are widely overlooked and not considered significant enough to be included in the legislation to reach the EUDR objective of reducing emissions and protecting biodiversity. At the same time the Amazon rainforest's ecosystem function such as its working as a carbon sink is heavily emphasised in documents and political debates.

The information on the Cerrado vital ecosystem functions central to the EUDR objectives have been clearly document and provided to the EU, indicating that there was no lack of knowledge about the Cerrado's significance with regards to the EUDR objectives. In fact, NGOs and CSOs have produced invaluable reports highlighting this oversight in the EUDR. Mighty Earth, for instance, summarises the carbon sink functions of the Cerrado, noting that it stores approximately 13.7 billion tons of carbon underground in an immense root system, often referred to as an 'inverted forest' or an 'upside-down forest' (see Figure 3) (D2.12). Moreover, NGOs emphasise that the Cerrado contains 5% of the world's biodiversity and is the world's most biodiverse savannah (D2.12). Therefore, they provide the necessary information to clarify that the inclusion of the Cerrado is critical to align the EUDR provision further with the legislation's objective.

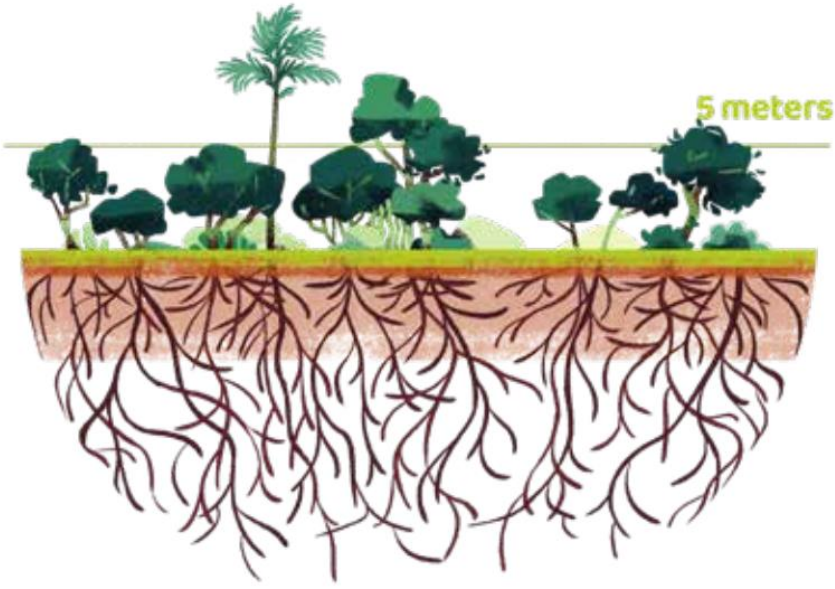

Figure 3. Illustration of the upside-down or inverted forest from the Cerrado with a root system that is deeper than the height of the trees. Credit: D2.18

Despite the prevision of these information, EUDR discussions at the EU level continue to focus predominantly on the Amazon when addressing biodiversity and carbon protection. With EU deforestation analysis and ecosystem studies focusing not just on forest but also specifically on the Amazon (D3.14, D3.19, D3.11, D3.2). Moreover, metaphors are commonly used to highlight the importance of the Amazon, with similar phrases for the Cerrado, however, gaining less traction. Phrases

like the Amazon being the 'lungs' of our planet are frequently used in EU parliamentary debates and official documents (D3.1, D3.18, D3.21), while similar efforts to popularise the Cerrado with phrases like 'the forgotten jewel' or 'the birthplace of water' (PO, D2.5) did not gain the same traction. These phrases highlight the Cerrado's vital ecosystem functions, such as water provision and the issue of the Cerrado being overlooked despite its high biodiversity functions. Nevertheless, these phrases do not make it into the EU level debates or EU documents. Instead, there is a general call for the inclusion of carbon-rich and biodiverse ecosystems without specific references to the Cerrado as an 'inverted forest' (D3.22, D3.9, D3.2, D3.1, D3.1, D3.15). So, phrases such as the forest being the world's 'lungs' have not been replaced or at least mentioned alongside the value of other natural ecosystems and the Cerrado being an 'inverted forest'.

This centre of attention on the protection of the Amazon on the EU level is observed in various cases, from a focus on the devastating effect of Bolsonaro's presidency on the Amazon to a focus of indigenous groups in the Amazon. The precarious situation of the Amazon and its destruction during the Bolsonaro time in office are especially receiving much attention. The EP debate in 2022 as well as another one in April 2023 lay out the bad state of the Amazon under the Bolsonaro government in Brazil where deforestation rates skyrocketed (D3.18, D3.21). Other EU documents support this priority of the Amazon, highlighting how the Brazilian government de facto supported deforestation there and compared to the previous year in 2019 there was a 50% increase in the number of deliberate fires (D3.3, D3.2). The Cerrado similarly, is faced with enormous destruction and high deforestation rates (I03, I12). As highlighted by an interviewee:

> *"We talk to a lot of journalists who go out to the Cerrado, and they say, they have never seen anything like it. You know, the aggressive expansion and destruction that they're seeing. They're like: "It's really hardcore.""* - I03

Nevertheless, on the EU level the discussion remains focused on the Amazon. In an EP debate, some MEPs describe their recent visit to the Amazon region, with one MEP especially astounded by the soy highway transporting soy to the ports and then in huge ships down the Amazon River to Europe and China (D3.18).

Additionally, the issue of deforestation is connected to indigenous people and local communities, with EU documents welcoming the incorporation of indigenous people and local communities in the dialogue and highlighting their rights in the legislation (D3.3). However, solely forests are mentioned as home to indigenous communities (D3.3). MEPs seem particularly worried about the indigenous tribes and the destruction of their livelihoods, invasion of their land, and destruction of their culture and knowledge about forests (D3.18). However, they overlook that the Cerrado is also home to more than 80 indigenous people (PO). Indigenous people from the Cerrado are threatened in their livelihood and

have been trying to lobby the popularity of the Cerrado (PO). Nevertheless, they are not mentioned on the EU level in the negotiations to the EUDR and their supporting documents.

A similar focus on the Amazon is observed in NPO activities. NGOs and CSO activities and presence are rather little in the Cerrado compared to the Amazon region (I01). An interviewee points out that they never managed to work on a project about the conservation of the Cerrado, as they always ended up working in the Amazon instead (I11). While in the last years some NGOs have realised the importance of the Cerrado and initiated projects for its protection, it is still very much linked and compared to the Amazon (I11).

> *"I work a lot for international organisations. I've never managed to work on a project focussed on conservation in the Cerrado. All the organisations arrive in Brazil saying: "We're going to work in the Cerrado." In the end, you're working in the Amazon. In the end, (anonymous NGO) is the same. They get here: "We're going to do a project in the Cerrado." The projects are all going to the Amazon, national funding is all going to the Amazon, conservation is all going to the Amazon."*[9] - I11, translated from Brazilian Portuguese

Additionally, forest ecosystems, particularly the Amazon, receive significant attention due to their visual appeal, while the Cerrado is perceived as less visually striking and therefore less important (I12, I11). This perception leads to the undervaluation of the Cerrado, making it more vulnerable to agricultural expansion as its destruction is seen as less impactful (I11).

Interestingly, the Cerrado is only mentioned when it is about the ecological protection of the Amazon, showing this relationship of the Cerrado as only important when it is about the priority of keeping the ecological value of the Amazon intact. The phrase 'birthplace of water' emphasizes this layer of the Cerrado-Amazon relationship, specifically the Cerrado's role in supplying water to the Amazon and its influence on droughts in the region. Indeed, these two biomes are inherently connected, so that "without the Cerrado, there would be no Amazon" (I11, PO). However, praise for the Cerrado is framed in terms of its support for the better-known Amazon highlighting that the Cerrado itself is not important but only its ecological service provisions to the Amazon (I11, I12, PO).

Some interviewees emphasise the lack of ecological and exceptional value given to the Cerrado, including its unique products, its ecological importance, beauty, and ecosystem services. Unlike the well-known guarana and acai from the Amazon, products like the baru nut from the Cerrado have not gained recognition in Europe (I12, PO). An interviewee points out that people need to understand the

[9] Original Brazilian Portuguese quote: "Eu trabalho muito para organizações internacionais. Eu nunca consegui trabalhar em um projeto focado em conservação do cerrado. Todas organizações chegam no Brasil dizendo: "A gente vai trabalhar no cerrado." No final, você está trabalhando na Amazônia. No final, (ONG anonimizada) é a mesma coisa. Chegam aqui: "A gente vai fazer um projeto no cerrado." Os projetos estão indo todos para Amazônia, financiamento nacional todo para Amazônia, conservação toda pra Amazônia."

unique value of the Cerrado, that it has its own ecological functions and indigenous people that deserve to be protected (I11).

> *"We also need to understand that the Cerrado has its own ecologies, its own ecological and human dynamics. There's a whole scientific and social adaptation to it."*[10] - I11, translated from Brazilian Portuguese

Altogether, the competition between the Cerrado and the Amazon unfolds on multiple levels, yet one fact stands out: the Amazon is globally renowned, with certain areas designated as UNESCO World Heritage Sites. Thus, the Cerrado is not merely contending with any forest but with *the* forest, the Amazon. Despite the Cerrado also being central to the achievement of the EUDR's objectives of emission reduction and biodiversity preservation, and the ecological importance of the biome, the focus is still put on the Amazon. Thus, for the EU the Amazon has become the priority area for protection and conservation, while the Cerrado is considered of less ecological importance for the EU.

4.2.2 The Cerrado: A Biome of Sacrifice

This prioritisation of forests and specifically the Amazon for conservation, evolves into a sacrifice of the Cerrado. This is because, in the context of the EUDR, prioritising one biome over another extends beyond mere forest protection and conservation, it signifies a form of sacrifice. This approach implies that the destruction of one biome is deemed necessary to ensure the protection of another, based on the premise that it is impossible to protect everything simultaneously (I03, I09).

The prioritization of forests, particularly the Amazon, results in clear winners and losers. Thus, at the EU level, these two biomes are not considered equals. As an interviewee points out this disparity creates a deeper issue than mere inequality, as one biome is protected while the other faces destruction (I11). The Amazon continues to be highlighted for its ecological value, which is considered to have a high environmental price (I12). On the other hand, the Cerrado, with its formidable conditions for growing critical commodities such as soy, is seen as the biome to be sacrificed (I12). Consequentially the separation of an ecologically valuable biome of the Amazon and the productivity of the Cerrado combined with its dispensable ecosystem result in a sacrifice. As an interviewee puts it:

> *"As in the case of the Amazon. It's a place with difficult logistics, which has a very high environmental value. The land is difficult to clear, it's far away. Soya doesn't do so well. It's more work.*

[10] Original Brazilian Portuguese version: "A gente precisa entender também de que o Cerrado tem ecologias próprias, e tem dinâmicas ecológicas e humanas próprias. Então, tem toda uma adaptação científica, social a respeito"

So, it came to this: "The environmental part, you focus on the Amazon and the Cerrado is ours." It became a sacrifice zone or an 'ox of piranha' in good Brazilian slang. That is, when you're crossing a river where there are piranhas, with a herd of cattle. There's the one you know is going to die so that the piranhas go there, and you can pass with the rest."[11]

- I12, translated from Brazilian Portuguese

This sacrifice underscores the inherent contradictions in the current approach to environmental protection (I11). Clear arguments are brought forward to highlight the illogical nature of sacrificing the Cerrado for the sake of protecting the Amazon. One of the most compelling points is the interdependence of these two biomes, where consequently, you cannot effectively protect one biome while neglecting the other (I11). As an interviewee points out the two biomes are intrinsically connected, both economically and ecologically (I11). For instance, the Cerrado, often referred to as the 'water fountain' for the Amazon, highlights the ecological importance of this connection (I11, I12, D2.5).

Nevertheless, the sacrifice of the Cerrado continues. This is not because of this ecological connectedness of these two biomes but despite it, as another key connection lays within the economic realm. As an interviewee point out these biomes are also economically connected (I11). Specifically, the EU can withdraw its responsibility for causing deforestation in the Amazon, when production is changed to the Cerrado. This is because of an aspect central to the idea of this sacrifice observed at the EU level, which suggests that production must be relocated elsewhere, leading to the destruction of the Cerrado to meet commodity demands (I09, I12). This is also highlighted here:

"For example, an agronomist, a botanist from the Cerrado. They wrote in the 1970s: "The Cerrado is the price we pay to leave the Amazon standing." So, we're going to deforest the Cerrado in order to make the Cerrado the breadbasket of Brazil, while the Amazon will remain standing there so that we can preserve it for bioprospecting, and so on. [...]

This shows, firstly, that economically these two areas are connected. The changes that happen in the Cerrado will have repercussions in the Amazon, environmentally too. Because the Cerrado is the source of water. Ecologically, there is no Amazon without the Cerrado. Even before the Amazon, the Amazon was Cerrado.

[11] Original Brazilian Portuguese version: "Como no caso da Amazônia. É um lugar com logística difícil, que tem um apreço ambiental muito grande. As terras são difíceis de desmatar, até aquela coisa toda é longe.
A soja não se dá tão bem assim. Dá mais trabalho.
Então chegou nisso: "A parte ambiental, vocês focam na Amazônia e o cerrado é nosso." Virou uma zona de sacrifício ou um 'boi de piranha' na boa gíria brasileira. Que aquele quando você está atravessando um Rio que tem piranha, com uma manada de gado. Tem aquele que você sabe que vai morrer para as Piranhas irem toda lá e você passar com o resto."

> *So, I think that's the great logic behind the discussions about whether or not the Cerrado should remain in the EUDR. Basically, the calculation that people have put forward is: "Do we cut down the Cerrado or not?" [...] Because production has to go somewhere."*[12]
>
> I11, translated from Brazilian Portuguese

Altogether, the prioritisation of the ecological value of the Amazon over the Cerrado within the EUDR highlights a significant environmental sacrifice. The protection of one biome at the expense of another raises questions about the logical consistency and long-term sustainability of such an approach. Recognising the interconnectedness of these biomes and addressing the inequalities in their treatment is crucial for a more balanced and effective environmental policy.

4.3 The EUDR Trade-off Leading to the Cerrado Sacrifice

The previous sections highlighted the higher ecological value the EU assigns to the Amazon, allowing for the sacrifice of the Cerrado to ensure the continued supply of commodities to the EU. This approach, however, is inherently illogical as these two biomes are interconnected. One cannot effectively protect the Amazon while destroying the neighbouring Cerrado, which provides key ecosystem services to the Amazon. Therefore, it is crucial to dive deeper into the trade-off leading to the sacrifice of the Cerrado to better understand its exclusion from the EUDR.

By examining this trade-off, we can enhance the understanding of why the Cerrado was excluded from the EUDR. This exclusion resulted from prioritising the Amazon over the Cerrado at the EU level, where the Cerrado was deemed the loser. To illustrate this trade-off, we will focus specifically on the soy supply chain, as soy is the most produced commodity in the Cerrado region. By examining this supply chain, the workings of the trade-off, along with the prioritisation of the Amazon and the sacrifice of the Cerrado, become clearer.

[12] Original Brazilian Portuguese version: "Por exemplo, um agrônomo, um botânico do cerrado. Eles escrevem na década de 70: "O Cerrado é o preço que a gente paga pra deixar Amazônia de pé." Então a gente vai desmatar o cerrado para poder fazer o cerrado celeiro do Brasil, enquanto a Amazônia vai ficar de pé lá pra gente poder preservar ela para bioprospecção, e tal. [...]
Isso mostra, em primeiro lugar, de que economicamente essas duas áreas, as terras estão conectadas. As alterações, que acontecem no cerrado, vão ter repercussões na Amazônia, ambientalmente também. Porque o cerrado é a fonte de água. Ecologicamente sem Cerrado não existe Amazônia. Antes da Amazônia essa Amazônia, Amazônia era cerrado, inclusive.
Então eu acho que essa é a grande lógica, assim, para entender as discussões que estão por trás da permanência ou não do Cerrado no EUDR. Basicamente, o cálculo que as pessoas colocaram é: "A gente corte o cerrado, ou não?" [...] Porque para algum lugar a produção tem que ir."

4.3.1 Balancing a Trade-off

A deeper understanding of the trade-off at play when sacrificing the Cerrado will provide insights into the exclusion of the Cerrado. Specifically, this concerns the trade-off of both trying to achieve protection of nature and mitigate global deforestation while ensuring the continuous supply of key commodities.

This trade-off comprises the need for a continuous supply of commodities while tackling the deforestation caused by their production. Especially, the industry has highlighted the risk of possible bottlenecks resulting from the EUDR (D1.8, D1.7). In fact, industry groups raise concerns about potential supply chain disruptions and shortages, fearing that administrative and logistical burdens could lead to higher commodity prices and be very disruptive to trade (D1.4, I03). Consequently, industry groups suggest avoiding excessive requirements in due diligence statements and even delaying the EUDR's implementation to mitigate these risks (D1.9, D1.6). Therefore, the industry enforces the trade-off logic highlighting that the regulation will bring negative consequences for trade and supply in Europe.

An interviewee provides an explanation for the industry's arguments that strengthen this trade-off and diminish the chances of including the Cerrado in the EUDR (I03). This explanation especially highlights the industry's desire to conduct business as usual and have a free pass to continue sourcing from and producing in the Cerrado region. An interviewee highlights this:

> *"It's deliberate evasion of responsibility. It's a strategy to continue business as usual and these big traders are profiting from that distraction.*
>
> *So, you can use language like problem shifting. What they were trying to do is kind of, downplay that there's any problem and give the impression: "Okay, we will protect the Amazon and the forests". That's a good thing. It's 'problem avoidance'. They know where their production is coming from. I think they tricked quite a lot of the campaign groups."* - I03

Moreover, this is expanded on here:

> *"Industry associations really fought hard not to include OWL [other wooded lands] in the in the law, in the EUDR. They lobbied very hard. Because they knew a lot of their production is in OWL areas. So, they wanted to have a free pass, really. [That] is our assessment. They lobbied governments not to include OWL. And then in the end, because enough confusion and opposition [was there], it didn't get in. The compromise was to have them review. [...].*
>
> *Because they know where their production is! They know where they're buying from! They can see the statistics. So, they deliberately, obscured where lots of their production is coming from and wanted it not to be included in the regulation."* – I03

However, the actual occurrence of a trade-off here is contested, especially by NPOs. In an open call NPOs highlight that this lower availability of products is unlikely to happen for key commodities covered by the EUDR and produced in the Cerrado, such as soy (D2.8). Specifically, NPOs provided invaluable information, demonstrating that continued destruction of the Cerrado is not necessary to avoid supply shortages (D2.8). Moreover, NGO and CSO groups counter industry arguments of price increases, asserting that the price increases would be marginal (D2.8, D2.7).

This discussion also unfolds at the EU level, with different EU institutions being on different sides of this arguments. The EP provided statements that the legislative initiative refers to several studies indicating that the EUDR would not impact volume and price and that any extra cost incurred by operators would be minimal (D3.9, D3.8). On the other hand, the EESC sides with industry groups in an opinion piece, explaining the rising resource prices faced by the European farming sector (D3.15). Therefore, the EESC suggests careful consideration of timing and choice of measure to give the supply chains time to adapt and avoid sharp price increases (D3.15). Moreover, other EU documents highlight that the burden of the legislation should be kept minimal and that the scope should be limited to risk where impacts would be the most significant based on appropriate assessment (D3.9, D3.8).

Therefore, despite this contestation the trade-off remains central in the debate about the EUDR. As interviewees point out the argument remains that products need to come from somewhere (I11, I09). In fact, central to the EUDR, is the focus on achieving zero-deforestation commodity supply, rather than reducing Europe's demand. An MEP points out this green liberalist approach to the EUDR, which aims to achieve sustainable trade while protecting biodiversity (D3.21). The goal is to minimise the consumption of deforestation-risk products while increasing the demand for deforestation-free commodities in the EU (D3.15). Therefore, central to this endeavour was to ensure the continued access to these commodities, rather than to reduce the actual demand.

Altogether, the idea of trade-off remains present in the EU. With the prioritisation of forest as well as the division of the Amazon and the Cerrado, as the Amazon being valued from the ecological standpoint and the Cerrado as a breadbasket to the world, the sacrifice of the Cerrado can be explained from this point.

Furthermore, this trade-off highlights the compromised and the incremental nature of the EUDR. An interviewee points out the decision for a review to include other wooded lands was seen as a balanced compromise, aiming to address civil society's environmental concerns while also considering the industry opposition (I12). Especially as exact repercussions of the legislation are uncertain, a step-by-step approach is suggested where first a good framework is established with the possibility of extending the legislative scope afterwards (I07, D3.18). However, many interviewees pointed out the now high improbability of inclusion due to the anticipated shift towards a more conservative political environment in the latest European election (I07, I08, I09, I12,). Especially as putting the legislation up

to change in more conservatively structured EU institutions could risk a weakening of the law (I07). Thus, highlighting that an inclusion is not very likely.

Faced with the priority of forests, the feasibility challenges of including the Cerrado, and industry opposition, a balanced legislative text was necessary. This notion of compromise is central to the development of the EUDR. EU documents acknowledge that while many of the EP's suggestions were incorporated to improve the legislative text, the regulation might not reflect every desired aspect, as it is inherently a compromise (D3.2). The need to balance ambition with feasibility was highlighted, with a compromised text presented by the presidency striking the right balance between ambition and pragmatism, making it easier to implement (D3.17). Moreover, during parliamentary debates, the importance of enforceability was emphasised, underscoring the need to balance the legislation's ambition with its practicality (D3.18). MEPs called for a careful balance between the level of ambition, the burden on businesses, and the practicality of the requirements and provisions (D3.18).

This compromise is crucial given the ambitious nature of the legislation. Effective implementation is key, and while there is a desire to expand its scope, caution is necessary to avoid overburdening the system, suggesting a step-by-step advancement. This reflects the legislative background and the central element of compromise that is decisive in the Cerrado decision.

4.3.2 The Soy Supply-Chain

The soy supply chain highlights the playing out of this trade-off more clearly and how this combines with the focus on forests and ecological protection prioritisation of the Amazon and results in the exclusion of the Cerrado.

Soy stands as the primary product sourced from the Cerrado region, a significant hub for soy production. In 2016, a substantial 77% of the deforestation associated with soy imported into the EU originated from Brazil, with the Cerrado biome alone accounting for 70% of this figure, followed by the Amazon biome at 7% (D2.11). The hotspot of the Cerrado to produce soy is also recognised by MEPs in EP debates (D3.18). Moreover, in an open letter NGOs emphasise the critical situation of soy, saying that of all the commodities imported into the EU, soy caused most deforestation between 2005 and 2017 and is especially concentrated in the Cerrado (D2.8).

The governance of the soy supply chain in the two biomes of the Amazon and the Cerrado reveal significant regulatory disparities. While the Amazon Soy Moratorium (ASM) has established a stable foundation for achieving traceability compliant with the EUDR in the Amazon rainforest, the absence of such a moratorium in the Cerrado presents challenges (I12, D2.4). Attempts to adopt a Cerrado Soy Moratorium faced setbacks (I12). In the Cerrado, efforts toward achieving traceability have been initiated by the Soft Commodity Forum (SCF), which unites the six largest soy traders in Brazil (D2.8,

I12). However, despite the joint efforts from soy traders in the SCF to reduce deforestation, these traders continue to invest in soy silos and deforestation connected to soy production continues to rise in the area (D2.8). This situation combines with the previous arguments made of the Amazon being the centre of attention for international conservation efforts, while the Cerrado continues to be the hotpot for commodity production, particularly for the production of soy.

Industry groups stress the diverse complexities of supply chains and advocate for sector-specific regulations tailored to the distinct characteristics of the soy supply chain (1.9, D1.6). They emphasise the significant costs involved in segregating deforestation-free supplies and propose the implementation of a mass balance approach, that allows mixing EUDR non-compliant and compliant soy, provided a certain percentage is compliant (D1.8). Industries regard such measures key to ensure the continued access of soy in Europe. Thus, as highlighted before, the industry fuels arguments of a trade-off where a secure supply of soy can be inhibited by the strict standards and great ambitions of the EUDR.

Opposite to this, some NPOs follow a different line of argument. NGOs in an open letter explain that deforestation of soy is highly concentrated in a small number of municipalities facilitating the possibility for traders to achieve zero-deforestation and zero-conversion targets (D2.8). Moreover, these NPOs point out the hypocrisy of the industry's critique on the EUDR as the industry themselves put forward policies to not trade soy causing deforestation, including those sold to China and other markets (D2.8, D2.15, D2.9). Additionally, the EUDR does not create new, unachievable technical requirements but builds on established transparency frameworks (D2.15). This especially discredits arguments suggesting raising costs. Additionally, this letter points to the cocoa sector that despite more complex supply chains is subject to full traceability standards (D2.8).

In Europe, this discussion is followed in the context of needing products from somewhere, especially in light of the European protein deficiency. This is further emphasised by the previously mentioned green liberalist approach to the EUDR, which aims to achieve sustainable trade while protecting biodiversity (D3.21). The goal is to minimise the consumption of deforestation-risk products while increasing the demand for deforestation-free commodities in the EU (D3.15). Therefore, it is considered central to ensure the continued access to these commodities.

This holds especially true in light of this European protein deficiency requiring imports of soy to the European market. This situation is highlighted by an interviewee, as the EU has problems sourcing protein from inside of the EU (I13). The EESC also underscores the structural protein deficit in Europe, currently met by imported protein-rich feed, some of which originates from regions at risk of deforestation (D3.15). Similarly, in expert presentations presented to the EU, the dependency on soy imports is highlighted as well as the priority to build up value-chains for soy suppliers (D3.1). This also emphasises the imperative for Europe to enhance its self-sufficiency in plant protein (D3.15). However, for now the supply of soy in Europe remains critical.

Combining knowledge of the complex soy supply chain with the EU's critical need for imported soy, new insights emerge about the forest prioritisation bias. The legislation emerged out of a focus on forests and divides the ecological value of the Amazon from the economic value of the Cerrado. As the Amazon receives more attention and protection, the Cerrado remains vulnerable to agricultural expansion and exploitation, particularly for soy production, which is a key protein source for the EU. Moreover, implementing the EUDR in the Cerrado is considered more ambitious by some due to the area's previous regulatory neglect (D2.8, I12).

At the same time, excluding the Cerrado is seen as less controversial since it is regarded as the 'biome of sacrifice', where agriculture was incentivized and encouraged to protect the Amazon and ensure continuous access of key commodities (I03, I09, I11, I12). The European protein deficiency exacerbates the challenges of including the Cerrado, as ensuring continued access of soy from one biome leads to a trade-off, with the Cerrado being exploited to protect the Amazon. This imbalance underscores the necessity of extending protective measures to the Cerrado to prevent its degradation and ensure sustainable agricultural practices.

5. Discussion

Substantial research has highlighted the problem shift caused by environmental policies where agricultural expansion incentivises a leakage of deforestation from the Amazon to the Cerrado (e.g. Villoria et al., 2022; Bastos Lima et al., 2019; Lahsen et al., 2016). This is both the effect of national legislation, as well as international efforts focusing on the conservation of the Amazon rainforest rather than other key ecosystems. In light of the absence of strong governance in the Cerrado and many of the environmental policies in place creating a leakage effect to the Cerrado, the international efforts such as the EUDR present for an optimal option to address these shortages. Therefore, this research takes the problem shifting lens to specifically analyse the recent ambitions of the EUDR to reduce deforestation in European supply chains and understand the Cerrado exclusion from the EUDR.

This chapter first contextualises the findings and connects them back to the factors inhibiting the addressing of problem shifts, highlighting the insights this theoretical approach of problem shifting has on the empirical findings. Based on the thesis findings policy recommendations are made. Then, limitations are pointed out and suggestions are made for future research on this topic.

5.1 Contextualising the Findings

Interpreting and contextualising the findings of this thesis helps explore their implications in relation to existing literature. This chapter bridges the gap between the empirical results and the broader academic and practical contexts in which they are situated. By critically analysing the findings, we can draw meaningful conclusions about their significance and relevance to both theory and practice.

The results focused on three elements which together tell the story of the Cerrado exclusion from a problem shifting perspective. This story is told by first diving into the EU's forest focus when developing the EUDR. Then, the diverging EU perspective on the two key Brazilian biomes are highlighted. The Amazon advances as an area crucial for conservation and protection spared from EU caused deforestation while the Cerrado is seen more in regard to an area of sacrifice of less ecological but more economical value for the EU, that can ensure the continued access of crucial commodities such as soy on the EU market. Central to this perspective is the idea of a trade-off where this sacrifice is necessary to ensure both the protection of an area of conservation priority (the Amazon) and the continued access of key commodities extracted by another.

The contextualisation of these findings will be divided into three sections corresponding to the original factors inhibiting the addressing of problem shifts when policy opportunities arise, namely, a prioritisation bias, complexities of environmental issues and fragmented problem-solving approaches. It is important to note that the findings do not perfectly fit into each of these factor categories but rather overlap with some of them.

5.1.1 Prioritisation, Trade-offs and Sacrifices

Examining this topic through the lens of problem shifting reveals several valuable insights and particularly deepens the understanding of the prioritisation of ecosystems and sacrifices involved, visible through the emerging trade-off.

The prioritisation of forest biomes and the simultaneous undervaluing of other ecosystems is a well-documented phenomenon. Compared to forests, grassy vegetations such as savannas and grasslands are poorly understood and inadequately conserved (Bond & Parr, 2010; Overbeck et al., 2015). Historically, these ecosystems were mistakenly considered products of forest clearance rather than ancient, independent ecosystems (Bond & Parr, 2010). This tendency to protect forests at the expense of other ecosystems, such as the Cerrado, creates the impression of an inherent trade-off, where the conservation of one biome comes at the expense of another.

This is also the case in Brazil itself, where non-forest ecosystems are undervalued in national legislation. In Brazil there has been a systematic neglect of adequate protection for non-forest environments (Overbeck et al., 2015), with different policies fortifying this body of thought and, indirectly incentivising deforestation moving towards the Cerrado region, enhancing this view of the Cerrado as a zone of sacrifice (Calmon, 2022; Pires, 2020). Brazil's national law exhibit a severe land-use bias, protecting forest habitats such as the Amazon while neglecting valuable ecosystems such as the Cerrado (Bonanomi et al., 2019; Brock et al, 2021). Brazil's Forest Code (FC), for example only requires a 20% to 35% legal reserve on privately owned land in the Cerrado, compared to an 80% requirement in the Amazon (Brasil, 2012). Moreover, under the National System of Protected Areas, currently, only 8.62% of the Cerrado is classified as an area falling under Protected Areas as defined in the legislation, against 28.41% in the Amazon (CNUC, 2023). Even with PAs in the Cerrado rapidly expanding since the late 1990s, the majority of these PAs are *Environmental* Protection Areas which are less strictly protected areas that allow individual properties and urban and rural settlements (Eloy et al., 2016). In the Amazon, policies such as the 2006 Amazon Soy Moratorium (ASM) and the 2009 zero-deforestation cattle agreement contributed to an 84% decline in annual deforestation between 2004-2012 in the Amazon biome (Calmon, 2022; Brandão et al., 2020). In contrast, agricultural expansion in the Cerrado was encouraged by the 2015 Presidential Decree (Decree 8447/2015) creating an Agricultural Development Plan for Matopiba, an area in the Cerrado, which attracted international investment (Calmon, 2022). These policies add to the view of the Cerrado as a biome of sacrifice also from the Brazilian side, enhancing the prioritisation of the Amazon and paving the way for a trade-off at the expense of the Cerrado.

In fact, this bias is also evident in the EUDR which focuses on regulating commodities coming from forests, overlooking other crucial ecosystems and failing to break away from the forest bias. This trend

is particularly clear when comparing the Amazon and Cerrado biomes. This prioritisation of the Amazon over the Cerrado lies within a deeper bias toward forest ecosystems at the expense of other natural ecosystems. Hecht (2005) calls this a 'high forest bias' where overwhelming attention is given to high biomass and humid tropical forests, deflecting attention from other ecosystems. The findings in this thesis highlight a pronounced bias evident in the development of the EUDR, where much of the focus was ultimately placed on the ecological value of forests and the Amazon biome, despite some emerging efforts towards a more integrated approach.

At the same time the Cerrado was considered a zone of sacrifice in light of the emphasis of the EUDR trade-off. The concept of the Cerrado as a zone of sacrifice is not a new discourse. Oliveira & Hecht (2016) describes the Cerrado next to other south American ecosystems as a 'sacrifice zone' where environmental policies in one region lead to detrimental impacts in another. This is facilitated by the better monitoring and enforcement in place in the hyper-institutionalised Amazonian landscapes (Oliveira & Hecht, 2016). Conversely, the Cerrado remains more vulnerable due to weaker national and international networks of concern, lack of conservation infrastructure such as deforestation monitoring, and general neglect of these dry and open forest ecosystems (Oliveira & Hecht, 2016).

Altogether, these conditions of forest focus, prioritisation and sacrifice are the same ones that caused previous leakage effects into the Cerrado, as well as the problem-shift described in this thesis. Despite the intentions of avoiding such a problem-shift stemming from the EUDR, these issues have not been overcome.

5.1.2 Complexity of Deforestation

The lens of problem-shifting also reveals various insights into the complexity of the issue addressed by the EUDR and the impact this has on the Cerrado exclusion. Thus, the complexity of tackling global deforestation has contributed to the oversight of the Amazon-Cerrado shift. Applying a problem shifting lens provides valuable insights into the elements underlying this oversight, revealing how complexities of the issue inhibit the addressing of the problem shift.

As pointed out in this thesis, thinking in terms of trade-off played a central role in the Cerrado exclusion. This specifically entails the need to maintain the supply of commodities covered by the EUDR and avoiding supply shortages. These kinds of trade-offs are previously pointed out by scholars, which highlight the trade-off between food security and negative environmental impacts (Meyfroidt, 2018). However, as presented in this thesis this trade-off is deeply contested.

Nevertheless, trade-offs are inherent in complex decision-making processes (Morrison-Saunders & Pope, 2013), and require balancing various factors or options, where gaining something necessitates losing something else of value. This process involves making choices to achieve the best possible

outcome within certain constraints. In the specific case of biome protection, a trade-off entails deciding which biome to prioritise for conservation efforts, based on the understanding that production needs to come from somewhere. In fact, Cerri et al. (2018) suggests an intensification of agricultural production in the Cerrado in order to reduce deforestation in the Amazon and advance food security and climate change mitigation goals.

Scholars have analysed the effects of these ideas of trade-off and sacrifice and their policies in terms of creating a spatial problem-shift from the Amazon rainforest to the Cerrado biome. Dou et al. (2018) determined that with the focus of conservation effects and supply-chain agreements on impacts within the Amazon biome only, these problems spill over to the Cerrado. This is due to the telecoupled nature of our earth system (Dou et al., 2018).

The analysis of this trade-off raises questions about the deliberateness of the EUDR's decision to protect the Amazon at the expense of the Cerrado. The decision of exclusion significantly influences the political and governance strategies required to address these policy gaps and impacts the strategies that parties interested in protecting the Cerrado need to adopt (Bastos Lima et al., 2019). This research indicates that efforts have been made to move away from the notion of sacrificing the Cerrado, especially from NPO sides. However, concerns about the accessibility and continued supply of products persisted, leading to a delay in the inclusion of the Cerrado to first gain a more comprehensive understanding of the possible impacts of such an ‘ambitious’ legislation.

This delay strategy was largely influenced by industry groups aiming to create uncertainty and postpone the ambitions of the EUDR. Previous studies suggest a deliberate calculation by some industry groups to shift focus from the increasingly contested Amazon rainforest to the less protected Cerrado biome, ensuring continued access to natural resources and profits for powerful actors (Calmon, 2022; Pires, 2020). In the literature, delaying strategies also include arguing for distortional caution in setting too ambitious policy aims (Lamb et al., 2020). As well as downplaying the need for more stringent or new types of additional action (Gillard, 2016; Lamb et al., 2020). This combines with the ultimate decision to exclude other wooded land, justified by a step-by-step legislative approach to avoid harsh impacts leading to possible supply bottlenecks.

Moreover, the complexities in combating global deforestation through legislation, such as the EUDR, are exemplified by the soy supply chain, which presents significant challenges. One major challenge is achieving full traceability, particularly in the Cerrado region, which has historically been neglected in protection efforts. The Cerrado has seen less rigorous enforcement of environmental standards, making it more difficult to verify the origins of soy products. Therefore, efforts to implement robust traceability mechanisms are further complicated in the Cerrado region. Additionally, Europe's protein deficiency exacerbates this issue, emphasising the critical trade-off between maintaining product availability and ensuring deforestation-free supply chains. Here, the pressure to secure a steady protein supply for

Europe often conflicts with the goal of eliminating deforestation from these supply chains. This dual demand places policymakers and industry stakeholders in a challenging position, balancing environmental sustainability with economic and food security needs.

5.1.3 The Fragmented Approach of the EUDR

Analysing the EUDR through the problem-shifting perspective highlights how the regulation takes a fragmented approach to mitigate deforestation. The EUDR neglects addressing the Amazon-Cerrado problem shift in the regulation which also inhibits effective realisation of the legislative objectives. Especially as the Cerrado is struggling to receive the same level of attention and protection as the Amazon, despite its intrinsic ecological value and its role in achieving EUDR's objectives, such as biodiversity conservation and emission reduction.

By using the problem shifting lens, this bigger picture becomes clearer. This perspective emphasises the importance of a holistic and integrated approach to problem solving, which is crucial for achieving the intended results, especially in the complex field of environmental policymaking. The findings highlight the need to incorporate other natural ecosystems to achieve an effective mitigation of deforestation causing biodiversity loss and heat trapping emissions. The EUDR's goal of reducing deforestation and objectives to reduce emissions and conserve biodiversity become compromised. Moreover, this also neglects the broader ecological interconnectedness of the Amazon and Cerrado.

Spatial problem-shifting concepts highlight the negative effects of limited geographic scopes. Leakage is said to be likely to occur whenever the geographic scope of an intervention is limited compared to the overall scope of the targeted activity (Villoria et al., 2022). Thus, leakage presents a substantial barrier to the effectiveness of zero-deforestation supply chain policies because land conversion restrictions apply to only a fraction of total production (Villoria et al., 2022; Soterroni et al., 2019). The findings similarly suggest that the EUDR's limited geographic scope of excluding other biodiverse and carbon-rich beyond forests limit the legislations' ability to fulfil its original objectives of biodiversity conservation and greenhouse gas emission reduction. This is similar to the results presented in this thesis where the exclusion of the Cerrado and the Amazon-Cerrado problem shift inhibits reaching legislative objectives.

Moreover, the fragmented approach in the EUDR limited the ability to consider the issue more broadly. Supporting documents of the legislation such as ecosystem mapping and scientific support, such as impact assessments by the EU, were predominantly focused on forests. This narrow focus posed significant feasibility challenges. The inclusion of critical biomes like the Cerrado was practically difficult due to limited information and insufficient research on integrating these areas. Consequently, the prioritisation of forests resulted in a legislative process ill-equipped to incorporate carbon-rich and biodiverse biomes like the Cerrado into the EUDR. The lack of suitable international definitions and

targeted research for these non-forest biomes further exacerbated this gap, highlighting deficiencies within EU scientific efforts.

Beyond a limited geographic scope of the legislative to incorporate all relevant biomes in the EUDR, some also call on a wrong approach of the legislation to address the problem at hand. In this thesis this is highlighted with the green liberalist approach to this legislation which focuses on making EU trade green instead of reducing high European consumption. Previously, Kumeh & Ramcilovic-Suominen (2023) have characterised the EU's approach to deforestation as a shrinking in its responsibility. Thus, connected to unequal ecological exchanges, the global North externalises its environmental burden from economic production to the global South. Moreover, by focusing predominantly on supply-side policies the burden of responsibility is shifted onto the global South (Kumeh & Ramcilovic-Suominen, 2023). This limited approach developed early on in the legislative process and impeded the development of more comprehensive understanding of the problem the legislation faces. This is however, not to say that future policies could not incorporate this bigger picture in additional EU legislative efforts.

Altogether, to effectively address global deforestation the bigger picture needs to be seen. Complex land use systems with drivers operating directly and indirectly through dynamic interactions and feedbacks make the governance of land use challenging (Meyfroidt et al 2018). A systemic perspective that accounts for indirect effects and problem shifts is needed for diversified governance schemes to tackle the increasing complexity of global value chains and achieve sustainable outcomes (Meyfroidt et al., 2020). In the context of ecosystem governance, the notion of telecouping helps conserving ecosystems without impacting other ecosystems (Liu et al. 2015). Recent research used the telecoupling framework to describe reciprocal relationships in land use changes across disparate locations (Friis & Nielsen, 2019; Dou et al., 2018). Teleconnection is used to emphasise how drivers of land system changes exert influence across distinct locations (Lewison et al., 2019). This study highlights that spillover effects should be considered in the evaluation and planning of conservation efforts, for which the telecoupling framework works as a useful tool to do that systematically (Dou et al., 2018).

By examining spillovers, leakages, and the rebound effect, we can better understand how policy interventions designed to address deforestation and promote sustainable land use can sometimes lead to unintended and counterproductive outcomes. For instance, recognising the potential for negative spillovers and leakages emphasises the need for holistic and integrated policy approaches that consider cross-boundary impacts and the interconnectedness of different land use systems.

Moreover, the rebound effect highlights the complexities involved in resource efficiency improvements and their potential to stimulate increased consumption and land use expansion. This insight is crucial for policymakers to design interventions that not only aim for immediate conservation goals but also consider long-term sustainability and the broader economic and social dynamics that drive land use changes.

Similarly, addressing burden shifting requires a more holistic approach to policy-making, one that considers the interconnectedness of global trade, consumption patterns, and environmental impacts. It calls for greater accountability and responsibility from developed countries to acknowledge their role in driving deforestation and to implement policies that address both production and consumption impacts. This includes promoting sustainable consumption patterns, supporting fair trade practices, and investing in sustainable land use practices in both domestic and international contexts.

5.2 Policy Recommendations

The contextualisation of the thesis' findings and the usage of the problem shifting lens provides insight into possible policy recommendations. Analysing the EUDR from a spatial problem shifting perspective in deforestation provides a nuanced understanding of the complex dynamics at play. It highlights the need for comprehensive, adaptive, and well-coordinated policy interventions that can address the multifaceted nature of deforestation processes and their far-reaching impacts. Thus, it is central to incorporate the complexity of the deforestation problem with a holistic approach that considers the wider possibility of interventions rather than adopting fragmented policy solving approaches. This can effectively address the forest prioritisation bias present in the EUDR and help with refraining from sacrificial thinking in terms of the Cerrado and the perceived trade-off. By incorporating these insights, policymakers can better navigate the challenges of deforestation and work towards more sustainable practices.

One of the key findings of this analysis is that the EUDR requires a more inclusive approach that includes ecosystem beyond forest. Current policies, such as the EUDR, often focus predominantly on forested regions, neglecting other wooded lands and natural ecosystems that are also critical to environmental sustainability. Specifically, the Amazon and Cerrado region are perceived detached from each other as a zone of ecological value and a zone of sacrifice. To effectively tackle deforestation and mitigate problem-shifts and break away from this forest bias, it is essential to expand the EUDR's scope beyond forests and include other wooded lands and other natural ecosystem. This more inclusive approach should also be adopted by other policy ambitions aiming to reduce deforestation and address global supply-chains.

Expanding the scope of deforestation policies to include other wooded lands, such as the Cerrado, offers several significant benefits. First, addressing a broader range of ecosystems can help mitigate the problem shift observed between the Amazon and Cerrado biomes. The deforestation pressures transferred from the Amazon to the Cerrado illustrate the interconnectedness of global ecosystems, where protecting one area can inadvertently lead to degradation in another (Dou et al., 2018). By including the Cerrado and other wooded lands in policy frameworks, the EUDR and similar regulations can more effectively manage these complex, telecoupled environmental systems.

Moreover, an integrated approach within the EUDR helps to more effectively achieve its policy objectives. Including the Cerrado is essential for mitigating climate change and preserving biodiversity, both crucial for reaching global climate and environmental goals. Additionally, more inclusive legislation would address deforestation more effectively by preventing deforestation leakages and reducing overall deforestation.

Expanding the scope of deforestation policies to include the Cerrado also empowers civil society and NPOs fighting for greater recognition and protection of this biome. Inclusive policies can provide these groups with stronger leverage to advocate for comprehensive environmental protections. This visibility and support can help ensure that the Cerrado is not sacrificed or forgotten in the broader environmental agenda. Additionally, the EUDR can be used as a source of inspiration for other environmental policies to follow a similar integrated approach to addressing deforestation.

To protect the Cerrado effectively, it is crucial to break away from the traditional forest focus and Amazon bias prevalent in both EU and Brazilian policies. Historically, environmental policies have prioritised forested areas like the Amazon, often overlooking other critical ecosystems such as the Cerrado. This bias leads to unintended consequences, such as the displacement of deforestation activities from the Amazon to the Cerrado, exacerbating environmental degradation in the latter. By adopting a more inclusive approach, policies can better reflect the diverse ecological landscapes that require protection. This means recognising the unique value and vulnerability of the Cerrado, which is a biodiversity hotspot and a vital carbon sink. Policies that include the Cerrado would ensure that conservation efforts are more evenly distributed, preventing the shifting of environmental pressures from one biome to another.

At the forefront of this stands the need to develop and implement policy frameworks that embrace a holistic and integrated approach to solving the complex problem of deforestation. This involves moving beyond a narrow focus on forests to consider the full range of natural ecosystems and their interdependencies. However, beyond this, policies should be designed to address not only direct deforestation but also the broader, systemic impacts of environmental degradation. For example, the EU should incorporate mechanisms that address consumer behaviour and reduce the overall demand for products linked to deforestation in its policy framework, such as promoting sustainable consumption practices. This approach is essential to mitigate the burden shifting involved in regulations such as the EUDR (Weatherley-Singh & Gupta, 2018), and alleviate the pressure of agricultural expansion in production countries such as Brazil. Such a truly holistic framework must also account for possible rebound effects, where reductions in consumption do not always result in less agricultural expansion and less deforestation (Meyfroidt et al., 2018). By addressing both the complexity and fragmentation inherent in environmental issues, these measures can help prevent burden-shifting and promote more effective and equitable environmental outcomes.

In conclusion, approaching the EUDR's exclusion of other wooded lands through the perspective of problem shifting provides valuable policy recommendations that help move away from the EU's forest prioritisation, and effectively address complex issues through integrated policy-solving approaches. Addressing the complex issue of deforestation requires that the EUDR is extended beyond the current focus on forests to include other wooded lands and natural ecosystems in its deforestation-free requirements. By adopting a more holistic and integrated approach, this can help in effectively addressing the Amazon-Cerrado problem shift, reaching policy objectives, empowering civil society groups and inspiring similar inclusive approaches to solving the issue of deforestation.

5.3 Limitations and Suggestions for Future Research

While this study provides valuable insights into the exclusion of the Cerrado biome from the EUDR, several limitations must be acknowledged. This study focuses on the specific situation of the exclusion of the Cerrado biome from the scope of the EUDR, limiting the generalisability of the empirical findings. An in-depth qualitative analysis was conducted to understand the dynamics leading to this exclusion and the consequent problem-shifting. While this approach provides a detailed understanding of the specific dynamics at play, it inherently restricts the applicability of the findings to broader theories of problem-shifting or to other similar instances of overlooked problem-shifts. The highly context-specific nature of the studied phenomenon means that generalisability to similar cases is constrained. Instead, the strength of this study lies in its ability to offer detailed and nuanced insights into the complex issues within the defined scope of the phenomenon. Therefore, while this study provides valuable insights into the particular case of the Cerrado biome and the EUDR, caution should be exercised when attempting to apply its findings to other contexts or situations.

Nevertheless, the detailed understanding gained here is crucial for appreciating the unique factors at play in this instance, but it may not directly translate to other cases without considering their specific contexts. Future research, however, could develop a more generally applicable framework for studying unaddressed problem shifts. This framework could identify generalisable factors that lead to the continuous overlook or disregard of problem-shifts when opportunities arise to address them, similar to what has been done in this study. By expanding the scope of analysis beyond a single case, future studies could provide broader theoretical insights and practical recommendations for mitigating problem shifts in various contexts. Developing a robust analytical framework for understanding and addressing problem shifts will be crucial for advancing knowledge in this area and for informing more effective and inclusive environmental policies in the future.

Another limitation stems from the EUDR being a very recent policy initiative. Obligations on operators and traders to comply with the deforestation-free requirements of the legislation are not enforceable until December 2024, and for small and medium enterprises, the compliance date is as late as June 2025.

Consequently, the actual impacts of the EUDR and therefore its contribution to the Amazon-Cerrado problem shift are not observable yet. This timing issue poses a limited understanding of the specific causal effect of the Cerrado exclusion to exacerbating the Amazon-Cerrado problem shift.

Additionally, the timing of this study relative to the scheduled reviews for a geographical expansion of the EUDR is a notable limitation. The first review on the inclusion of other wooded lands is due in June 2024, and the second review about extending the scope to ecosystems beyond 'forests' and beyond 'other wooded land' in June 2025. Although this research does not include the outcomes of these reviews, conducting the study at this juncture was crucial. It provides a foundation for understanding the factors leading to the exclusion of the Cerrado, which can inform and support advocacy efforts for its inclusion in future policy adjustments. Understanding these factors before the review process allows NPOs and other actors to be better prepared to address potential shortcomings in the EUDR and advocate for more comprehensive coverage. Future research could incorporate the outcome of the reviews in their analysis, adding to the understanding of the EUDR's neglect of the Amazon-Cerrado problem shift. Such research could add to the findings of this thesis and investigate the EUDR from the perspective of problem shifting in a more long-term focus, investigating possible changes in the examined elements leading to the exclusion of the Cerrado.

Overall, while the limitations related to the newness of the EUDR and the speculative nature of some findings are significant, they do not diminish the value of this study. Instead, they highlight the need for ongoing research and continuous monitoring of the EUDR's impacts over time. This study provides a critical foundation for understanding the initial challenges and opportunities presented by the EUDR, setting the stage for future research to build upon and expand these insights as more data becomes available.

Additionally, understanding the interconnectedness of various policies and their cumulative impacts is crucial for developing more comprehensive and effective environmental regulations. In this case specifically, as pointed out previously, different environmental policies and initiatives led to the creation and exacerbation of the Amazon-Cerrado problem shift. These initiatives, thus similarly decided not to address the ongoing problem shift and excluded the Cerrado in one way or another. Therefore, future research could investigate the EUDR in this broader policy mix, identifying similarities and differences between these policies from a problem-shifting perspective.

Moreover, future research could look into how the EUDR decision to exclude Cerrado influences environmentally active stakeholders but also the broader regulatory landscape. Such a study could further identify potential synergies and conflicts between different policies, leading to more integrated and holistic approaches to environmental conservation. This includes examining how the regulation's limitations might affect other international and national environmental policies and conservation efforts.

Altogether, while this study offers important insights into the exclusion of the Cerrado biome from the EUDR, and its limitations highlight the need for further research.

6. Conclusion

This thesis is set out to explore the exclusion of the Cerrado biome from the EUDR and its implications for the Amazon-Cerrado problem shift. The EUDR is a regulation aiming to prevent deforestation and forest degradation worldwide by ensuring that products consumed by EU citizens are not linked to deforestation, requiring that commodities entering the EU market meet strict deforestation-free criteria. This deforestation-free requirement however is geographically limited to forest biomes, excluding other wooded lands such as the Cerrado. Thus, the regulation fails to address the Amazon-Cerrado problem shift where deforestation is increasingly being displaced from the renowned Amazon rainforest to the less well-known Cerrado savannah. By investigating the reasons behind this omission, the study aimed to understand the dynamics at play leading to this overlook.

In this thesis, the issue of the Cerrado's exclusion from the EUDR is analysed through the lens of problem shifting, a concept that highlights how solutions to one problem can inadvertently create new issues elsewhere. By focusing on addressing deforestation in the Amazon rainforest, the EUDR neglects the Cerrado, an equally critical but less protected biome. This narrow focus is likely to exacerbate the Amazon-Cerrado problem shift, where stringent protections for the Amazon lead to increased deforestation pressures on the Cerrado. The lens of problem shifting provides interesting insights into the factors inhibiting the addressing of problem-shifts, namely, prioritisation bias that led to possible sacrifice, the complexity of environmental problems being addressed, and the fragmented nature of problem-solving approaches.

Through detailed qualitative research, involving the analysis of key documents, 14 interviews and participant observation in events as part of a lobby tour advocating for the inclusion of the Cerrado in the EUDR, several key findings have emerged. These involve the interaction of three central elements that together explain the exclusion of the Cerrado from the EUDR.

The development of the EUDR highlights the first element of a significant bias towards forest conservation, despite the regulation's broader environmental ambitions. This forest-centric focus, driven by societal demand, EU research, and international environmental goals, prioritises forests, especially the Amazon, over other critical ecosystems like the Cerrado. This bias is evident in the practical application of forest definitions within the EUDR, which exclude non-forest biomes due to insufficient research and uncertainties about defining these ecosystems.

The second element highlights this forest focus in a Brazilian context where the Amazon rainforest and the Cerrado savannah are two predominant biomes. The Amazon's ecological significance is widely recognised, supporting its prioritisation in the EUDR. In contrast, the Cerrado's critical functions as a carbon sink and biodiversity hub are often overlooked, and its ecological values are only acknowledged when they support the Amazon. This results in a trade-off, where the Cerrado is sacrificed to ensure a continuous supply of commodities to Europe.

This trade-off makes up the third element to understand the exclusion of the Cerrado from the EUDR. Industry groups highlight the necessity of this trade-off, while NPOs contest its existence. The EU's step-by-step legislative approach aims to ensure a steady supply of commodities, particularly soy from the Cerrado region, further emphasising this trade-off. This focus on the soy supply chain illustrates the balance between protecting nature and mitigating global deforestation while maintaining commodity supplies.

Through this analysis, the thesis has successfully answered the research question. This research explains that the Cerrado's exclusion from the EUDR is a result of the EU's forest-centric approach, which is particularly evident in the Brazilian context where the Amazon's ecological value is put in contrast to the Cerrado's value in terms of producing key commodities.

The findings underscore the need for a more holistic and integrated approach to environmental regulation that effectively addresses the complex environmental issue of deforestation and breaks away from the forest bias. The exclusion of the Cerrado biome from the EUDR represents a significant oversight of a problem shift in global environmental policy. The current focus on forests, particularly the Amazon, has contributed to the problem-shift from the Amazon to the Cerrado, exacerbating deforestation in this vital biome. To address this issue effectively, future iterations of the EUDR and similar regulations must adopt a more inclusive approach that considers the conservation needs of all ecosystems. This yields many benefits from addressing the Amazon-Cerrado problem shift to a more effective reaching of the legislative objectives.

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Appendix A: Table of the Documents Used in the Document Analysis

Group	No.	Document Title	Organisation & Document Type	Authors	Date
1	1	ECF position paper Towards a deforestation-free coffee production	ECF		Feb-19
	2	Joint position on how to accelerate action against deforestation	COCERAL, FEDIOL, FEFAC		18-May-20
	3	ECF position paper Stepping up EU action to reduce EU-driven deforestation	ECF		Nov-20
	4	ECF Reactive Statement on the European Commission Proposal for a Regulation to Minimise the Risk of Deforestation and Forest Degradation Associated with Products Placed on the EU Market	ECF		Jan-22
	5	Coffee Deforestation Initiatives Overview	ECF		Feb-22
	6	Deforestation-free products	FoodDrink Europe, Position Paper		Feb-22
	7	Joint Position on the Commission Proposal for a Regulation for Deforestation-free Supply Chains	COCERAL, FEDIOL, FEFAC		15-Feb-22
	8	Joint Position on the Deforestation-free Regulation for Trilogue Negotiations	COCERAL, FEDIOL, FEFAC		17-Oct-22
	9	Global forest-based industries' call for legal clarity and adequate transition time to ensure a smooth and effective implementation of the EU Deforestation Regulation	22 International Industry Groups, Letter to EU staff		08-Apr-24
2	1	Proposed EU Regulation on Deforestation & Forest Degradation: Understanding the impact of excluding other ecosystems	The Greens/EFA in the EP, policy maker summary		N.S.
	2	Civil Society Position Statement on the proposed EU regulation on deforestation-free products	More than 100 NGOs and CSOs		N.S.
	3	Call for a more ambitious EU Regulation on Deforestation-free Products: Inclusion of Natural and Primary Other Wooded Lands (OWL) in the Scope of the Proposal	WWF		N.S.
	4	10-Year of Soy Moratorium in the Amazon: History, Impacts and Expansion into Cerrado Areas	Imaflora		N.S.
	5	Manifesto: The Future of the Cerrado in the hands of the market: deforestation and native vegetation conversion must be stopped	More than 40 CSOs and NGOs		11-Sep-17
	6	NGO recommendations on the future EU Regulation to address the forest, ecosystem, and human rights impacts associated with products placed on the EU market	Client Earth, Conservation International, EIA, fern, global witness, greenpeace, WCS, WWF		Apr-21
	7	Greenpeace's views on the Commission proposal for an EU regulation on deforestation-free products	Greenpeace		Feb-22

	8	Open Letter: Call to uphold stringent requirements for traceability and transparency in forthcoming EU Regulation	Canopée, Earthsight, Ecologistas en Acción, Environmental Action Germany, Fern, Focus Association for Sustainable Development, Forests of the World, Harvest, Mighty Earth, Polish Ecological Club, Rainforest Foundation Norway, SEO/BirdLife, ZERO	Klervi Le Guenic, Rubens Carvalho, Luis Rico, Sascha Mülle, Nicole Polsterer, Nina Tome, Anne-Sofie Henningsen, Anahita Yousefi, Alex Wijeratna, Maria Staniszewska, Nils Hermann Ranum, Asunción Ruiz, Francisco Ferreira	11-Mar-22
	9	Getting to "deforestation-free": Clarifying the traceability requirements in the proposed EU deforestation regulation	Client Earth		Jun-22
	10	EU ministers, Commissioner and Members of the European Parliament: the world is counting on you to adopt a strong EU regulation on deforestation-free products	More than 100 NGOs and CSOs		18-Oct-22
	11	EU Deforestation Law: Traceability Viable in Brazilian Cattle and Soy Supply Chains	Chain Reaction Research	Rita Raleira, Gerard Rijk, Matthew Piotrowski	01-Nov-22
	12	Saving the Cerrado: Why Bunge, Supermarkets and Governments must act fast: Record deforestation in the Cerrado slips through the cracks of the EU Deforestation Regulation	Mighty Earth	Mariana Bombo Perozzi Gameiro, Boris Patentreger	Jun-23
	13	Why the new EU Deforestation Regulation should include 'Other wooded land'	More than 50 NGOs and CSOs	Sven Bergau, Isabel Fernández, Tom Kucharz, Anne-Sofie Sadolin Henningsen, Nico Muzi, Alex Wijeratna, Solveig Firing Lunde	Sep-23
	14	Re: Implementation of the EU Deforestation Regulation	More than 100 NGOs and CSOs, Letter to EC President		11-Apr-24
	15	Every second counts to protect global forests and ecosystems	25 Brazilian NGOs and CSOs, Letter to the EC President		15-May-24
3	1	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Stepping up EU Action to Protect and Restore the World's Forests	EC Communication		23-Jul-19
	2	The European Green Deal	Communication from the EC to the EP, the Council, the EESC and the Committee of the Regions		11.12.2019
	3	Draft Report: On stepping up EU action to protect and restore the world's forests	EP Draft Report	Stanislav Polčák (Rapporteur)	23-Mar-20

4	Brazil and the Amazon Rainforest: Deforestation, Biodiversity and Cooperation with the EU and International Forums	EP Research (Requested by the ENVI committee)	Cristina Müller	May-20
5	EU Biodiversity Strategy for 2030 Bringing nature back into our lives	Communication from the EC to the EP, the Council, the EESC and the Committee of the Regions		20-May-20
6	A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system	Communication from the EC to the EP, the Council, the EESC and the Committee of the Regions		20-May-20
7	An EU legal framework to halt and reverse EU-driven global deforestation: European added value assessment	EPRS	Aleksandra Heflich	Sep-20
8	Binding legislation needed to stop EU-driven global deforestation, say MEPs	EP Press Release		01-Oct-20
9	Legislation with binding measures needed to stop EU-driven global deforestation	EP Press Release		22-Oct-20
10	An EU legal framework to halt and reverse deforestation	EP Briefing	Matteo Ciucci	Nov-20
11	Deforestation and forest degradation in the Amazon: Status and trends up to year 2020	EC, JRC Technical Report	René Beuchle, Frédéric Achard, Clément Bourgoin, Christelle Vancutsem, Hugh Eva, Marco Follador	2021
12	Commission Staff working document impact assessment executive summary	EC, Commission Staff Working Document		17-Nov-21
13	Proposal for a Regulation of the European Parliament and of the Council on the making available on the Union market as well as export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010	EP and Council		17-Nov-21
14	Deforestation and forest degradation in the Amazon: Updated status and trends up to year 2021	EC, JRC Technical Report	René Beuchle, Frédéric Achard, Clément Bourgoin, Christelle Vancutsem	2022
15	Minimising the risk of deforestation and forest degradation associated with products placed on the EU market	European Economic and Social Committee, Opinion	Arnold Puech d'Alissac (Rapporteur), Christa Schweng (EESC president)	09-Feb-22
16	Proposal for a Regulation of the European Parliament and of the Council on the making available on the Union market as well as export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing Regulation (EU) No 995/2010 - Policy debate	Council of the European Union, Interinstitutional File from the Presidency to the Permanent Representatives Committee/ Council		28-Feb-22

17	Regulation on the making available of certain commodities and products associated with deforestation and forest degradation: Information from the Presidency on the state of play	Council of the European Union, Interinstitutional File from the Presidency to the Council		06-Jul-22
18	Debate in EU Parliament - 12.09.2022	EP		12-Sep-22
19	Deforestation and forest degradation in the Amazon: Update for year 2022 and link to soy trade	EC, JRC	René Beuchle, Clément Bourgoin, Léa Crepin, Frédéric Achard, Mirco Migliavacca, Christelle Vancutsem	2023
20	Towards deforestation-free commodities and products in the EU	EP Briefing by EPRS	Vivienne Halleux	Apr-23
21	Debate in EU Parliament - 17.04.2023	EP		14-Apr-23
22	Parliament adopts new law to fight global deforestation	EP Press Release		19-Apr-23
23	The European Union and Forests	EP Research	Vera Milicevic	Oct-23
24	Mapping Global Forest Cover of the Year 2020 to Support the EU Regulation on Deforestation-free Supply Chains	EC, JRC	Clement Bourgoin, Iban Ameztoy, Astrid Verhegghen, Baudouin Desclée, Silvia Carboni, Jean-Francois Bastin, Rene Beuchle, Andreas Brink, Pierre Defourny, Baptiste Delhez, Steffen Fritz, Valery Gond, Martin Herold, Celine Lamarche, Nicolas Mansuy, Danilo Mollicone, Duarte Oom, Stephen Peedell, Jesus San-Miguel, Rene Colditz, Frederic Achard	21-Mar-24

Appendix B: Consent Form

Utrecht University

CONSENT FORM

I. INTRODUCTION

I am a master student of Sustainable Development at Utrecht University in the Netherlands, conducting research as part of my master thesis project under supervision of Dr. Rak Kim.

The goal of this research project is to better understand the European Union's new Deforestation-free Regulation. This regulation includes biomes such as the Amazon but fails to include most of the Cerrado biome in its scope.

II. PARTICIPATION

Your participation in this interview is completely voluntary. You can quit at any time without providing any reason. Your contribution to the study is very valuable to me and I greatly appreciate your time taken to complete this interview.

Please respond to the questions honestly and feel free to say anything you like. The questions will be read out to you by the interviewer. You can skip questions you do not feel comfortable answering. You can also ask the interviewer to clarify or explain questions before answering. The data you provide will be used for writing a Master thesis report and may be used for other scientific purposes such as a publication in a scientific journal or presentation at academic conferences. Only patterns in the data will be reported through these outlets. Your individual responses will not be presented or published.

III. DATA PROTECTION

The interview is audio taped for transcription purposes. The audio recordings will be available to the Master student and academic supervisors. We will process your data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act). Audio recordings will be deleted when data collection is finalized and all interviews have been transcribed.

If you have questions, comments, or concerns about this research project, you can talk me directly. Please contact Laura Bengel at l.bengel@students.uu.nl, or via phone at +31 6 38 01 98 72 .

I confirm that:

- I am satisfied with the received information about the research;
- I have no further questions about the research at this moment;
- I had the opportunity to think carefully about participating in the study;
- I will give an honest answer to the questions asked.

I agree that:

- the data to be collected will be obtained and stored for scientific purposes;
- the collected, completely anonymous, research data can be shared and re-used by scientists to answer other research questions;

I understand that:

- I have the right to see the research report afterwards.

Do you want to stay anonymous in my research?

Yes

No

Full name:

Organisation:

Date, Signature