



Norwegian University  
of Life Sciences

**Master's Thesis 2023 30 ECTS**

Noragric

# **Sustainable Forestry in Norway:** Analysing the Norwegian Forest Governance with a focus on public and private forest owners

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Master of Science

International Environmental Studies

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December 2023

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## **Declaration**

I, Oda Agnete Berg Havdal, declare that this thesis is a result of my research and findings.

Sources of information other than my own have been sited and a reference list has been appended. This work has not previously been submitted to any other university for award of any type of academic degree.

Date.....15/12-2023.....

Signature...Oda Agnete Berg Havdal.....



## **Acknowledgements**

The journey through this project has been anything from smooth sailing. Therefore, I want to express my deepest gratitude to my supervisor, Pål Vedeld, who has been extremely patient and understanding during this project. Your encouragement and feedback are appreciated greatly.

In addition, I'd like to express my gratitude to my family and friends, who have been encouraging whenever I've wanted to talk about my thesis, and understanding wherever I really didn't.

## **Abstract**

This master thesis, titled "Sustainable Forestry in Norway: Analysing the Norwegian Forest Governance with a focus on public and private forest owners," offers an examination of sustainable forest management practices in Norway, with a focus on the varied interests and perspectives of both public and private forest owners. Forests play a vital role in global ecosystems, impacting the environment, economies, and cultures significantly. They are central to biodiversity conservation and climate mitigation, with over one-third of Earth's land area covered by forests, home to more than 80% of terrestrial biodiversity, and supporting approximately 1.6 billion people worldwide. The thesis explores the delicate balance between utilizing and conserving these ecosystems, particularly in the Norwegian context, where forests cover about one-third of the national land area and play a significant role in biodiversity, climate action, recreation, and the economy. The study delves into the intricacies of Norwegian forest governance, encompassing policies, measures, and instruments for sustainable forest management. It addresses the conflicting practices of logging and conservation, the discourses surrounding them, and seeks to identify disparities in perceptions and experiences based on property ownership. Central to the research are three objectives: describing forest governance systems in Norway, investigating the legitimacy of the outcomes of these systems, and examining forest owners' perceptions and experiences with logging and conservation. The study aims to bridge the gap in understanding optimal strategies for balancing forest conservation with economic utilization, particularly in the context of diverse private ownership in Norway. This thesis contributes to understanding sustainable forest management practices, emphasizing their importance for local communities, climate change mitigation, and forest conservation.



# Sustainable Forestry in Norway:

Analysing the Norwegian  
Forest Governance, with a  
focus on public and private  
forest owners.

## Table of Contents

1	Introduction .....	1
1.1	Problem Statement .....	3
1.1.1	Objectives and Research questions .....	4
	.....	1
2	Background .....	1
2.1	Forest and Forestry .....	1
2.1.1	Forest Ecosystem Services .....	2
2.1.1.1	Provisioning Services.....	3
2.1.1.2	Regulating Services .....	3
2.1.1.3	Cultural Services .....	4
2.1.1.4	Supporting Services .....	5
2.1.2	Economics of ecosystems services.....	5
2.1.2.1	Criticism.....	6
2.1.3	Climate and the Green Transition .....	7
2.1.3.1	The Green Transition .....	8
2.1.4	Biodiversity and Conservation .....	8
2.1.4.1	The biodiversity in Norway .....	9
2.1.4.2	Conservation .....	10
2.1.5	Sustainable use: Logging .....	11
2.1.5.1	Clear-cut forestry .....	11
2.1.5.2	Continuous-cover methods .....	13
2.1.6	Global agreements.....	16
2.2	Norwegian Forest and Forestry .....	17
2.2.1	Background .....	17
2.2.1.1	Case area: Steinkjer.....	18
2.2.2	The forest policy.....	21

2.2.3	Forestry measures, and instruments .....	21
2.2.3.1	Legal and administrative instruments .....	21
2.2.3.2	Subsidies .....	24
2.2.3.3	Payment scheme.....	25
3	Theory .....	27
3.1	Environmental governance.....	27
3.1.1	Resource regimes .....	28
3.1.1.1	Property and use rights.....	28
3.1.1.2	Interaction rules .....	28
3.1.1.3	Governance structure: Actors and Institutions.....	29
3.1.1.4	Environmental Governance Systems .....	30
3.2	Legitimacy.....	31
3.2.1	Input Legitimacy .....	31
3.2.1.1	Participation .....	31
3.2.1.2	Transparency and Accountability .....	33
3.2.2	Output Legitimacy.....	33
3.2.2.1	Distributive Justice.....	33
3.2.2.2	Effectiveness .....	34
3.2.2.3	Efficiency .....	34
3.3	Discourses .....	35
3.3.1	The conservation discourse .....	35
3.3.2	The sustainable use discourse .....	35
3.3.2.1	Good Agronomy .....	36
4	Methodology .....	37
4.1	Case selection.....	37
4.2	Research Strategy, Design and Method .....	38
4.2.1	Qualitative research.....	38



4.2.2	Multiple-case studies .....	38
4.2.3	Semi structured interviews .....	38
4.2.3.1	Interview Guide .....	39
4.3	Sampling method.....	39
4.4	Data collection and analysis .....	40
4.4.1	Interview sessions .....	40
4.4.2	Data analysis .....	41
4.5	Assessment and Limitations .....	42
4.5.1	Limitations .....	42
4.5.2	Biases .....	43
5	Discussion .....	45
5.1	Governance Structure .....	45
5.1.1	The forest policy.....	45
5.1.1.1	Habitats, recreation, and climate mitigation .....	48
5.1.2	Governance Structure .....	49
5.1.2.1	Actors and Institutions .....	49
5.1.3	Resource Regime.....	51
5.1.3.1	Property and Use Rights .....	51
5.1.3.2	Rules of Interaction.....	52
5.1.4	Environmental Governance Systems .....	53
5.1.4.1	The environmental resources and processes .....	53
5.1.4.2	Technologies and infrastructures .....	55
5.1.4.3	Pattern of Interaction.....	56
5.1.5	Summary .....	57
5.2	Legitimacy.....	59
5.2.1	Input Legitimacy .....	59
5.2.1.1	Participation .....	59

5.2.1.2	Transparency .....	61
5.2.1.3	Accountability .....	62
5.2.2	Output Legitimacy.....	63
5.2.2.1	Distributive justice .....	63
5.2.2.2	Effectiveness .....	64
5.2.2.3	Efficiency .....	66
5.2.3	Summary .....	67
5.3	Logging and Conservation .....	68
5.3.1	Logging .....	68
5.3.1.1	Forest owners' perception and experiences with logging.....	69
5.3.1.2	Differences between public and private sector .....	71
5.3.2	Conservation.....	71
5.3.2.1	Forest owners' perception and experiences with conservation.....	72
5.3.2.2	Differences between public and private sector .....	73
5.3.3	Summary .....	73
5.4	Final Critique and Assessment.....	73
6	Conclusion.....	75
7	Reference list.....	78
8	Appendix .....	85
8.1	Interview Guide in Norwegian .....	85
8.2	Interview Guide English translation.....	87

## Translations and Abbreviations

English	Norwegian	Abbreviations/Explanations
Agricultural Office	Landbrukskontoret	A municipal office
County Governor's Office	Fylkesmannen	
Decare	Dekar (1 decar = 1000m <sup>2</sup> )	Daa (1 decar = 1000m <sup>2</sup> )
Economic and environmental measures in forestry	Tilskudd til nærings- og miljøtilskudd i skog	NMSK
Forestry Act	Skogbrukslova	Skogbrukslova
Frivillig Vern	Voulantary Conservation	
Key Habitats	Nøkkelbiotop	
Ministry of Agriculture and Food	Landbruks- og Matdepartementet	LMD
Non-Governmental Organisation	Interesseorganisasjon	NGO
Norwegian Agriculture Agency	Landbruksdirektoratet	
Norwegian Association for the Protection of Nature	Miljøvernforbundet	
Norwegian Environment Agency	Miljødirektoratet	NEA
Norwegian Forest and Landscape Institute	Norsk institutt for bioøkonomi	NIBIO
Norwegian krone	Norsk krone	NOK
Norwegian Society for the Conservation of Nature	Naturvernforbundet	
Outfield	Utmark	Lakes and water, beaches, marshes, forests and mountains
Payment for Ecosystem Services	Betaling for økosystemtjenester	PES
Right of public access	Allemannsretten	
Seed-Tree Harvest	Frøstillingshogst	

Site Index	Bonitet	
Statistics Norway	Statistisk sentralbyrå	SSB
Steinkjer Municipal Forest	Steinkjer kommuneskoger	SMF
The Economics of Ecosystems and Biodiversity		TEEB
The Norwegian Forest Owners' Federation	Norges Skogeierforbund	
World Wildlife Fund	Verdens Naturfond	WWF



# 1 Introduction

Forests are not just vast expanses of greenery; they are vital ecosystems that significantly impact the global environment, economies, and cultures. Covering over one-third of the Earth's land area, forests are home to more than 80% of terrestrial biodiversity and support the livelihoods of approximately 1.6 billion people worldwide (United Nations, n.d.-b). This thesis explores the intricate balance between utilizing and conserving these crucial ecosystems, with a specific focus on Norwegian forests.

The pivotal role of forests in climate mitigation and biodiversity conservation cannot be overstated. Internationally, forests are at the forefront of numerous development goals, as outlined by initiatives like the United Nations Sustainable Development Goals and the European Green Deal. These programs recognize that sustainable forest management is key to preserving biodiversity, promoting sustainable development, and eradicating poverty. However, this balance is under threat due to deforestation and land use changes driven by agriculture, commodity production, and natural disturbances like wildfires (Curtis et al., 2018). The loss of over 12 million hectares of forest annually not only diminishes biodiversity but also exacerbates climate change, as forests are crucial carbon sinks (Curtis et al., 2018). The loss of over 12 million hectares of forest annually not only diminishes biodiversity but also exacerbates climate change, as forests are crucial carbon sinks (Arroyo-Rodríguez et al., 2020).

In the context of Norway, forests cover about one-third of the national land area, playing a significant role in biodiversity, climate action, recreation, and the economy. This research delves into the Norwegian perspective, where forest management and use are subjects of intense debate among various stakeholders, including private forest owners, conservationists, and government entities. About 60% of Norway's known species are forest-dependent, and many endangered species are found within these forests (Henriksen & Hilmo, 2015b). Consequently, the way Norway manages its forests has profound implications for both local and global ecosystems.

Central to understanding the multifaceted role of forests is the concept of ecosystem services – the benefits that humans derive from ecosystems. Forests provide a myriad of ecosystem services, including provisioning services like timber and non-timber forest products, regulating services such as climate regulation and water purification, cultural services including recreational and spiritual benefits, and supporting services like soil formation and nutrient cycling. These services are not only crucial for ecological balance but also for economic and social wellbeing. In the Norwegian context, the ecosystem services provided by forests are especially significant for local communities, influencing livelihoods, cultural practices, and recreational activities.

Despite the recognized importance of forests, there remains a gap in understanding the optimal strategies for balancing forest conservation with economic utilization, especially in the context of diverse private ownership in Norway. This thesis aims to bridge this gap by exploring sustainable forest management practices that harmonize ecological integrity with economic viability. It seeks to answer how forest governance can be effectively structured to support sustainable practices while accommodating the interests of various stakeholders.

Considering the multitude of actors, interests, perspectives, values, and such that exists within forestry, and the challenges this brings for policymakers when different stakeholders emphasise different benefits from the forests. There are those that advocate for the socio-economic benefits, while other advocate socio-ecological benefits. This study intends to investigate the forest policy's governance system and the legitimacy of the outcomes, with the perspective of private and public forest owners. While also looking at forest owners view on the discourses of logging and conservation. Another aspect is to look at differences in perception and experiences between public and private forest owners.

This study aims to contribute to the understanding of sustainable forest management practices, highlighting their importance in local economies, climate change mitigation and forest conservation. The structure of the thesis is as follows: The Introduction serves as the starting point for the thesis, providing an overview of the problem statement along with the objectives and research questions. The second chapter Background includes a look at the importance of the forest and dives deeper into the Norwegian forest and forestry. This is then followed by the Theory chapter that explains the theoretical frameworks used for this thesis. The fourth chapter looks at the Methodology and then transitions into the discussion. Lastly, we have the conclusion.

## 1.1 Problem Statement

The forestry sector is at the crossroads of socio-economic and ecological considerations, sparking debates in Norway over the definition and priorities of sustainable forestry. This raises a crucial question: Should we favour economic growth, climate benefits, or the preservation of nature, or can a balance be achieved in forest management? This thesis delves into the complexities of Norwegian forest governance, encompassing policies, measures, and instruments aimed at fostering sustainable forest management. It explores the conflicting practices of logging and conservation, and the discourses surrounding them. Additionally, this study examines the perceptions and experiences of both public and private forest owners, seeking to identify any notable disparities based on property ownership.

The forestry sector has been assigned the responsibility of socio-economic and socio-ecological concerns. This has led to disagreements in Norway regarding what sustainable forestry entails and what aspects of forest management should be prioritised. Should we prioritise the economy, climate, or nature? Or is it possible for forest management to adhere to all of them? This thesis will investigate Norwegian forest governance, which includes policies, measures, and instruments designed to promote sustainable forest and forest management. It will also investigate the discourses within the two often conflictual practices, logging, and conservation. In addition, this project will look into the perception and experiences of both public and private forest owners, while seeing if there are significant differences between the two different property ownership.

This thesis will examine forest governance in Norway through three objectives. The first objective is to describe forest governance systems in Norway. The second objective

investigate the legitimacy of the outcomes. The last objective will examine forest owners' perception and experiences with logging and conservation.

### ***1.1.1 Objectives and Research questions***

1. Describe the governance system of forestry in Norway.
  - 1.1. According to the EGS-framework, how is forest governance arranged in Norway?
  - 1.2. How efficient and effective are the forestry measures and instruments?
  - 1.3. Are there differences between the public and private forests?
2. Investigate the legitimacy of the outcomes.
  - 2.1. Is the forestry policy considered legitimate in terms of input legitimacy?
  - 2.2. Is the forestry policy considered legitimate in terms of output legitimacy?
  - 2.3. Are there differences between the public and private forests?
3. Forest owners' understanding on logging and conservation.
  - 3.1. What are the typical logging methods and the reasons for the selection?
  - 3.2. How do forest owners perceive the performance of the conservation efforts?
  - 3.3. Have they experienced conflicts concerning logging or conservation?
  - 3.4. Are there differences between the public and private forests?

The research approach will investigate the governance system to understand the forest policy, what institutions and actors that are involved, and how the measures and instruments of the policy performs. It will also look at the legitimacy of the forest policy, to view the outcomes of the policy. Furthermore, discourses will be an important part to understand the different interests, such as logging and conservation, and if they are compatible.

This research will use both secondary data, primary data to investigate forest owners and how they perceive the forest policy, forest management, and conflicts with logging and conservation. While also discussing differences between private and public forest owners. The primary data is collected by a qualitative approach, to get a better understanding of forest owners on the forest policy, logging, and conservation.





## 2 Background

### 2.1 Forest and Forestry

The forest maintains the highest level of biological diversity among terrestrial ecosystems and offers numerous ecological services. The forest is home to more than 80% of terrestrial animals, plants, and insects (United Nations, n.d.-a). In addition, forests sequester carbon dioxide and emit oxygen through the process of photosynthesis. This helps in mitigating climate change by reducing greenhouse gas emissions and regulating temperature (Fahey et al., 2010; Farooqi et al., 2021). Furthermore, it plays a key role in protecting watersheds and maintaining a balance in the levels of oxygen, carbon dioxide, and humidity in the atmosphere (United Nations, n.d.-a). Numerous individuals rely directly on forest ecosystems for sustenance, clean water, energy, shelter, medicine, and monetary earnings; thus, it is crucial to ensure that the pressures on forests do not irreparably harm their systems (Kramer et al., 2022).

Human activities have a considerable influence on forest ecosystems, leading to a faster rate of species extinction and degradation of forests. Consequently, there is a growing urgency to prioritize the protection, restoration, and sustainable management of forests (Oettel & Lapin, 2021). Global objectives and agreements have addressed the necessity for improved forest management, with the goal of decreasing the pace

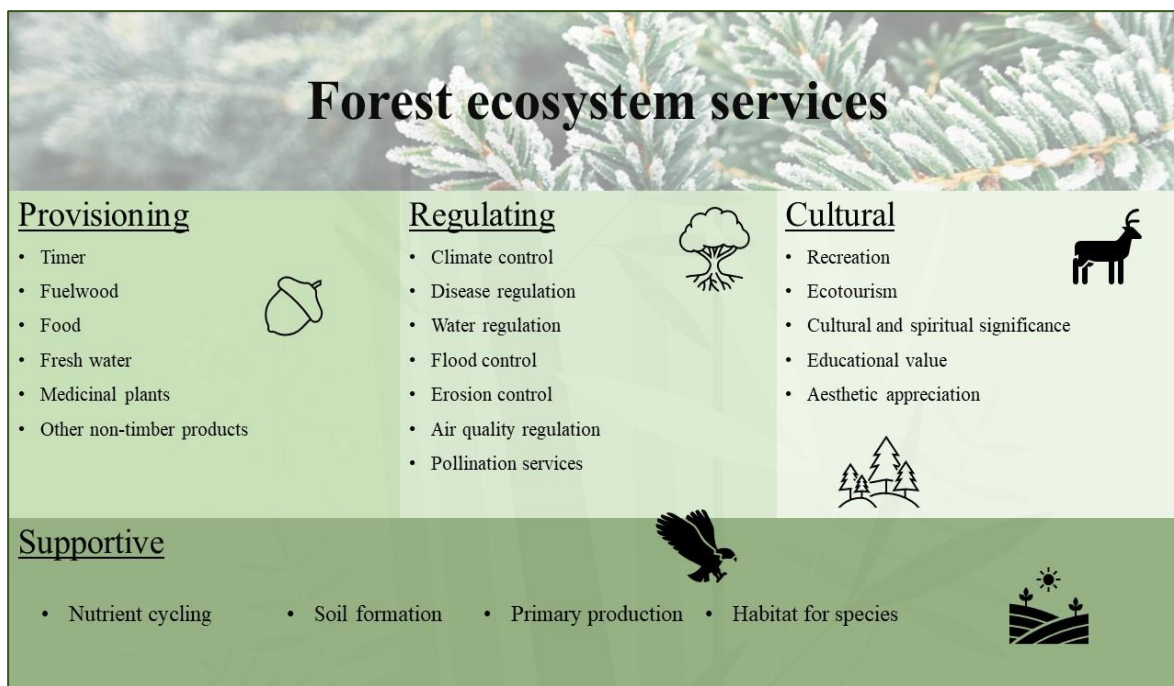
of biodiversity decline, enhancing carbon dioxide absorption, and promoting sustainable forestry, restoration, and conservation efforts (United Nations, 2015; Buchanan et al., 2020). Sustainable forestry involves balancing the needs of human society with the preservation of forest ecosystems. It focuses on maintaining the health and productivity of forests while ensuring their long-term viability. By implementing sustainable forestry practices, we can protect biodiversity, conserve natural resources, and promote economic development in a way that does not compromise the needs of future generations. This includes carefully planning timber harvests to minimize environmental impact, promoting reforestation efforts, and preserving sensitive habitats within forests.

Many are looking to the economic valuation of natural resources to find a solution to these problems with natural resources like forests. And one's understanding of nature depends on how they classify it. Vatn (2015) discusses four viewpoints regarding the categorization of nature. The first concept is nature viewed as capital, followed by nature viewed as services. Additionally, there is the perspective of nature as a common resource and nature as a competitor resource. Lastly, there is the notion of nature as a complex system, each of which has specific implications for policymaking. This thesis will focus on nature as services.

### ***2.1.1 Forest Ecosystem Services***

Ecosystem services are essential for the well-being of both human society and the stability of ecosystems. These services represent the benefits and goods that people obtain from ecosystems, playing a critical role in sustainable management policies. They encompass a wide range of benefits such as climate regulation, water supply, timber, energy, food, and habitat for numerous species (Kramer et al., 2022). In the face of urbanization and global change, ecosystem services are facing unprecedented threats.

Forests are a highly valuable ecosystems when it comes to providing a wide range of ecosystem services. Forests offer various provisioning, regulating, supporting, and cultural services that are vital for human well-being and the health of the planet. Sustainable forestry in Norway entails striking a balance between the preservation of natural resources, the provision of forest services, and the needs and interests of different stakeholders. Additionally, it underscores the necessity for sustainable forest management in order to safeguard cultural heritage, promote economic benefits, and preserve biodiversity (Lindhjem & Magnussen, 2012).



Picture 1. Categories of forest ecosystem services with examples.

### 2.1.1.1 Provisioning Services

Provisioning services are products that humans can extract from ecosystems for their use and consumption. For forests these services include the production of timber, fuelwood, and non-timber forest products, as well as the essential role that forests play in providing food, water and medicinal plants (Kramer et al., 2022). In 2022 the amount of timber in the Norwegian forest were estimated to almost 1 000 million cubic meters (Statistics Norway, 2023a). And the 2022 annual yield of timber for sale in Norway was about 11,5 million cubic meters (Statistics Norway, 2023b), this is the highest yield recorded with 60 000 cubic meter increase from the year before (Steinset, 2023). The price for timber has also continue to grow for the last decade, including for the year 2023. Even though the price has continued to increased from 2022 to 2023, the first 3 quarters of 2023 show an decrease in yield of timber (Steinset, 2023).

### 2.1.1.2 Regulating Services



Regulating services refer to the advantages derived from the regulation of ecosystem processes (Kramer et al., 2022). Climate control is a forest ecosystem service that acts as a carbon sink by absorbing carbon dioxide through photosynthesis and releasing oxygen. This mechanism facilitates the management of the Earth's temperature by diminishing the concentrations of greenhouse gases in the atmosphere (Kramer et al., 2022). Another is disease regulation; forests have a vital role in the management of diseases by supporting biodiversity. Ecosystems with high ecological diversity demonstrate enhanced tolerance to pests and diseases, hence reducing the frequency and spread of diseases (Kramer et al., 2022). Further examples of forest regulating services include water regulation, flood and erosion control, air quality regulation, and pollination services (Kramer et al., 2022). Forests in Norway are believed to absorb approximately 50 percent of the country's total domestic greenhouse gas emissions (NIBIO, 2018). Dalen (2021) looks at the importance of forest for carbon storage and carbon sequestration. The author explains that mature forests continue to absorb carbon for extended periods, even after reaching an advanced age (60-120 years). Although there is still more knowledge to be gained regarding the forest's capacity to store carbon, the findings suggest that the growth rate of mature forests is stable. The author suggests that forest management allows for more freedom in terms of forestry and felling than previously believed (Dalen, 2021). See more in Chapter 2.1.2

### 2.1.1.3 *Cultural Services*

Cultural services refer to the non-material benefits that humans enjoy from ecosystems. Forests offer a wide range of cultural services that enhance our quality of life and contribute to our overall welfare (Kramer et al., 2022).

Forests provide several recreational and ecotourism activities, including hiking, camping, birdwatching, nature photography, and hunting. Forests also provide cultural and spiritual significance, educational value, and aesthetic appreciation (Kramer et al., 2022). Norwegians have a long cultural connection with the forest, and the free access to the public to roam in the forest. Including hiking, horse-riding, biking, berry- and mushroom picking, camping, and more. As of today there are not much data on the value of cultural services in the forest (Gundersen & Vistad, 2021).

#### *2.1.1.4 Supporting Services*

Supporting services are the fundamental processes that allow ecosystems to deliver other services. Forests have a crucial function in facilitating these services (Kramer et al., 2022). One example of this is nutrient cycling, when bacteria, fungus, and other soil-dwelling creatures breakdown fallen leaves, branches, and deceased organisms. The process of decomposition liberates vital nutrients into the soil, making them accessible for absorption by plants. Forests also provide essential services such as soil formation, primary production, and serving as habitats for a wide range of animals (Kramer et al., 2022). The forest provide habitat for almost half of the endangered species, and much is found in the older forests that have not been subjected to forestry practises in a long time (Miljødirektoratet, 2021), see more in Chapter 2.1.3.1.

#### *2.1.2 Economics of ecosystems services*

The purpose of ecosystem service mapping was to integrate these services into the economic market. When natural scientists, economists, and other social scientists collaborate, they can generate extremely pertinent decision support for maximizing the returns on ecosystem services via policy (Lindhjem & Magnussen, 2012).

The Economics of Ecosystems and Biodiversity (TEEB) is an example of valuating the economic value of ecosystem services and natural resources. It evaluates biodiversity conservation and sustainable use costs and benefits and the economic impact of its loss. TEEB considers ecosystems' direct and indirect effects on human well-being and provides a framework for integrating ecological and economic factors into decision-making (TEEB - The Economics of Ecosystems and Biodiversity, 2013). Policymakers, corporations, and society may make more sustainable and prosperous decisions by understanding biodiversity's economic importance. This method enhances the ability to conserve biodiversity and highlights its economic benefits. The conservation and sustainable use of biodiversity is a

moral imperative and a strategic choice that can lead to a more prosperous and resilient future (TEEB - The Economics of Ecosystems and Biodiversity, 2013).

One example where the economic value of biodiversity can be seen is in forests. Forests provide a wide range of ecosystem services, such as carbon sequestration, timber products, water purification, and habitat for numerous species (See chapter 2.1.1). These services reduce water treatment costs, create jobs, and enable ecotourism. Deforestation can cost communities their livelihoods and increase climate change mitigation expenditures. For sustainable forest management and long-term development, forests must be valued for their economic contributions. TEEB promotes biodiversity conservation and sustainable usage, which is crucial (TEEB - The Economics of Ecosystems and Biodiversity, 2013).

Payment for Ecosystem Services (PES) is a practical instrument that embodies the TEEB principles. PES systems support the conservation and sustainable management of natural resources by assigning a monetary value to ecosystem services. Payment for Ecosystem Services (PES) is defined by a set of criteria. It entails a voluntary transaction in which a clearly recognised environmental service, or a form of land use expected to secure that service, is 'bought' by at least one buyer of environmental services. This transaction involves at least one of these service providers. The payment is conditional on the environmental service provider successfully delivering the agreed-upon service, which is a critical feature of this agreement (Vatn, 2015). The payment scheme for voluntary forest conservation in Norway is an example of PES.

#### *2.1.2.1 Criticism*

TEEB has been criticised for "putting a price on nature" and reducing its intrinsic value to money. Critics say pricing nature risks commodifying and exploiting it rather than valuing it. They claim that nature's value cannot be defined and that TEEB's approach oversimplifies the complicated relationship between ecosystems and human well-being (Sukhdev et al., 2014). TEEB states that it is not a cost-benefit model for Earth's ecosystems and biodiversity. Instead, TEEB accepts values from multiple worldviews as legitimate in their socio-cultural settings. The most ethical reaction to risk and uncertainty, according to TEEB, is precaution and conservation rather than waiting for perfect information before acting (Sukhdev et al., 2014).

Opponents of TEEB further worry opponents that by monetizing natural resources, it could lead to a situation where only those with financial means can afford to access and enjoy

nature, excluding marginalized communities from its benefits (Sukhdev et al., 2014). They further argue that TEEB ignores systemic environmental challenges like unsustainable production and consumption by focusing on economic valuation. These opponents urge for a comprehensive strategy that values nature, promotes environmental justice, and addresses the core causes of biodiversity loss and ecosystem deterioration (Sukhdev et al., 2014). TEEB argues that in the absence of valuation, essential and declining ecosystem services are already being ‘traded’ as commodities, sometimes for an implicit price of zero. (Sukhdev et al., 2014).

### ***2.1.3 Climate and the Green Transition***

Forests are essential in reducing the impact of climate change, and implementing sustainable practices can assist Norway in increasing the absorption of greenhouse gases or reducing the emission. The Norwegian Forest absorbs around 50% of the total greenhouse gas emissions in Norway (Norwegian Environment Agency, 2020b). Forests function as carbon sinks, absorbing and storing substantial amounts of carbon dioxide from the atmosphere. Trees absorb and retain carbon dioxide during their growth phase, with some of this carbon being retained in the soil. Once the trees have attained a specific level of growth, the process of carbon sequestration diminishes. However, the carbon remains stored in both the trees' biomass and the soil. Whereas, when trees are cut down the carbon in the soil is released, leading to more carbon in the atmosphere. While the carbon contained in the trees remains stored in the biomass, and when planting new trees, the carbon will once again be sequestered inside the biomass if the new trees (Flugsrud, 2016). It is important to note that Norway has a cold, boreal climate, and it takes between 60-120 years before the trees are considered mature for harvest. This means that forest carbon uptake must be seen in a long-term perspective (Norwegian Environment Agency, 2020b).

The report Flugsrud (2016) is a collaboration between the Norwegian Environment Agency, NIBIO and the Norwegian Agriculture Agency. The report aims to determine the environmental advantages of forest conservation and forest use in Norway. And conclude that Norway does not need to prioritise the preservation of their forest to combat climate change. Note that this report concentrates on the benefits for the carbon cycle and does not consider other services such as biological diversity, habitat, and culture. It is widely acknowledged that in the short-term, there are greater advantages to forest conservation. While in long-term there are benefits in using the forest. When using the forest, what we do with the resources have a

significant impact on the climate calculation. As an illustration, tree products that have a lengthy lifespan will retain their carbon content, whereas burning the biomass will result in an immediate impact on carbon levels (Flugsrud, 2016). It is important that the forest management measures for sustainability and climate is implemented as fast as possible, so the forest can fulfil its purpose as a carbon sink, a biomass resource, as bioenergy, and to be a substitute to fossil resources (Norwegian Environment Agency, 2020a)

### *2.1.3.1 The Green Transition*

Europe is striving to address climate change and environmental deterioration through the implementation of the European Green Deal. The objective is to convert the European Union into a modern, resource-efficient, and competitive economy, while guaranteeing that there are no net emissions of greenhouse gases by 2050, that economic growth is detached from resource use, and that no individual or place is neglected. This entails a substantial transition towards renewable energy sources, a notable decrease in greenhouse gas emissions, and investment in state-of-the-art research and innovation to propel ecological transformation. The plan targets crucial sectors including energy, buildings, transportation, industry, and agriculture, with the objective of disconnecting economic growth from resource use (European Commission, n.d.-a). Central to this is the energy issue, where forests play a significant role as a possible substitute for fossil fuels (European Commission, n.d.-b). The forest and the forestry industry play a significant role in facilitating the green transition (Landbruks-og matdepartementet, 2019). Consequently, the forest industry is pushed to expand production in order to satisfy forthcoming demands (Framstad et al., 2017).

### *2.1.4 Biodiversity and Conservation*

This section delves into the intricate relationship between biodiversity and conservation. Biodiversity, the variety of life in all its forms, levels, and combinations, includes ecosystem diversity, species diversity, and genetic diversity. In Norway, this diversity manifests in a rich tapestry of species and habitats, each playing a critical role in the ecological balance and providing numerous benefits to both the environment and human society.

This section first explores the current state of biodiversity in Norway. It addresses the challenges and threats to the forest ecosystem. Subsequently, the focus shifts to conservation efforts, examining the strategies and policies implemented to protect and preserve Norway's natural heritage.



#### 2.1.4.1 *The biodiversity in Norway*

In recent decades, the preservation of biological diversity has been an urgent priority. International agreements have been established to safeguard biodiversity, see more in Chapter 2.1.4. The conservation of biodiversity is crucial not just for aesthetic and cultural purposes. But also, for a diverse natural environment, which plays a vital role in providing ecological services like as nutrient cycling, climate regulation, and soil formation. Additionally, the provisioning services provide the chance to gather wild flora and fauna for sustenance, energy, medications, and fibres (Bergseng, 2009). Furthermore, the Norwegian government has established objectives to conserve parts of the forest, which is crucial for the country's biological diversity given its vast coverage (Framstad, 2018). The Norway “*red-list*” is a registry for species that are threatened with extinction. This record classifies the species into various categories, each of which indicates the species' current risk of extinction (Henriksen & Hilmo, 2015a). This report contains species that have been officially classified as threatened, falling under the categories of Critical Endangered (CR), Endangered (EN), or Vulnerable (VU).

In Norway there are a total of 2400 species registered in the Norwegian red-list for species. When limited to only forest areas it is more than 1000 species (Henriksen & Hilmo O. (red.), 2015). Note that all species are not registered, and the number of threatened species is expected to be higher. A variety of factors contribute to the endangerment of these species, impact on habitat is the most recurring. This includes activities such as forestry, grazing, development of recreation, drainages, and housing development. Additionally, pollution and the impact of native species occur regularly. Other factors that occur are alien species, climate change, human disturbances, nature disasters, harvest, random mortality, and influences outside the Nordic region (Henriksen & Hilmo O. (red.), 2015).

Another register gives information on status of different habitats in Norway and their risk of extinction. For forest habitats there are 9 that are registered as threatened, no habitat is considered critical endangered. However, two habitat types—limestone deciduous forest and olive forest—are classified as endangered. Additionally, seven forest habitats are deemed vulnerable (Framstad, 2018). Forest habitats are mainly affected by forestry, especially forestry with uniform felling of entire stands and short turnaround, increasing land preparation such as planting and care management, and also natural disturbances such as forest fires (Framstad, 2018).

Given the substantial influence that forestry exerts on forest species and ecosystems alike, it is important to organise forestry management strategies that mitigate the detrimental effects of forestry on biodiversity. This can be accomplished using logging techniques that have a smaller ecological footprint, forest care, and forest conservation.

#### *2.1.4.2 Conservation*

Preserving forests is essential for maintaining biodiversity, as they provide as the primary habitat for numerous endangered species. And preserving land that provides a suitable habitat for a wide range of species tends to be the most efficient method to safeguard biodiversity (Bergsens, 2009). There are efforts to increase the forest conservation in Norway, but the efforts have stagnated the last years. In 2016 it was decided to protect 10% of the forest, but in the beginning of 2023 we are still only at 5,2% (Frivillig Vern, 2023). The protected forests have shown improved quality compared to those that are not under protection. Additionally, the protected forests have a greater abundance of dead wood and old-growth forest. These ecosystems have a crucial role in supporting a wide range of species, including fungi, insects, mosses, lichens, and birds. Furthermore, one should be aware of which forests are protected to ensure that a diverse range of forests is represented in the protected forests (Hambro, 2020).

The Environmental Directorate has provided the forestry industry with instructions about the specific types of forests they are aiming to conserve on privately owned land. The focus is on forest types that fill gaps in forest conservation efforts, by guaranteeing the preservation of a diverse range of forests and safeguarding those that are essential for endangered species. Furthermore, an assessment will be conducted to determine the suitability of public land for conservation, in addition to the voluntary conservation efforts on private land (Miljødirektoratet, 2021). Also, the importance of implementing forest conservation in a way



that has the least consequences for the forestry industry and the green shift is emphasised (Miljødirektoratet, 2021).

### ***2.1.5 Sustainable use: Logging***

Logging is the process of cutting trees for commercial purposes, it creates jobs in the districts and can bring economic benefits to local communities. Logging supplies renewable materials that can replace fossil products. Logging has always been controversial because it harms the ecosystem. As, logging causes deforestation, soil erosion, wildlife habitat loss, and carbon dioxide emissions. Many governments have established sustainable forestry strategies to ensure that responsible logging may benefit society while minimising environmental consequences. Sustainable forestry regulations include reforestation, harvesting limits, and different logging techniques.

In Norway, the trees are usually felled between the ages of 60 and 100 years. Choosing the time for harvest is important, as it can have a significant effect on the economic benefits for the forest owner (The Norwegian Forest Owners' Federation, n.d.-a). When forest is cut too early it loses the phase where it grows most. But, when waiting too long the growth stagnates and the risk for rot, insect attacks and windfall increase. Also, if the dimension of the timber exceeds a certain size the pay is not as good (The Norwegian Forest Owners' Federation, n.d.-a). There are different logging practices in forestry, this chapter will outline and discuss the most common practices of clear cutting, seed-tree harvest, selective cutting and shelterwood cutting.

#### ***2.1.5.1 Clear-cut forestry***

##### ***2.1.5.1.1 Clear cutting***

The most common method for logging in Norway is clear cutting. Clear cutting is the practice of removing all the trees in a designated area. This is seen as the most efficient method to maximize timber production. It requires less planning and operational complexity compared to other approaches (The Norwegian Forest Owners' Federation, n.d.-a). This also makes clear cutting more cost-effective, as it facilitates for large-scale operations that will reduce the cost per unit timber. It has also been shown to have an environmental benefit for tree species that need access to a lot of sun and thrive in open space areas. While this is a method that is found to have some ecological benefit and have a higher yield of timber compared to the other practices, it is questioned if the benefits may be outweighed by the negative environmental impacts of clear cutting.

There are several negative impacts experienced from clear cutting that can have long-term impacts on the forest ecosystem. One possible negative environmental impact is soil erosion. When the trees are removed, the soil are exposed to the elements, and the top layer of the soil can be washed away. This can lead to reduced soil fertility, increased sedimentation in nearby waterways, and degradation of water quality (Löfgren et al., 2009; Wu et al., 2011). Another negative impact is ecological disturbance including biodiversity and habitat loss, also increasing spread of invasive species (Henriksen & Hilmo, 2015b). When removing all the trees in an area the species that are dependent on the forest ecosystem are displaced, this can decrease the diversity of the species affected (Hanski, 2011; Durães et al., 2013). There is also an increased risk of colonization by invasive plant species, as they can outcompete the native plants when there is an absence of established vegetation (Harrod & Reichard, 2000). Lastly, clear cutting can also have a negative visual impact (Silvennoinen et al., 2002), as clear cutting the forest changes the land area significantly and for some it can be considered a loss of aesthetic and lead to an impact on recreational and tourism activities that depended on an intact forest ecosystem (Tyrväinen et al., 2017). Considering these negative impacts on the environment many want to move from clear cutting to more environmentally sustainable methods, such as selective and shelterwood cutting.

Most people would agree that a considerable portion of Norway's oldest forest is in areas that are either not economically feasible or have very limited economic significance for forestry. Hence, significant conservation efforts can be undertaken in these areas. Also, many people will stress the importance of promoting the protection of smaller areas that have high ecological value. It is crucial to preserve the conservation of these valuable forests through voluntary conservation efforts (Miljødirektoratet, 2021). The voluntary forest conservation programme involves forest owners who willingly offer their forested areas for protection. The area can be conserved if it has natural and environmental qualities that justify protection and if the conservation authorities agree to accept the offer (Frivillig vern, (n.d.)).

#### *2.1.5.1.2 Seed-Tree Harvest*

Another open-logging method is seed-tree harvest. This logging method is an alternative for clear cutting and is used for pine. As pine produces seeds far more often than spruce and has a deeper root network. It is more common to focus on natural rejuvenation of pine. This method leaves seed trees with good timber properties on the felled area. The trees left standing will spread seeds and ensure that new forest grows (The Norwegian Forest Owners' Federation, n.d.-a). This form of felling affects the landscape in a different way than clear-cut felling,

since more trees are left behind (The Norwegian Forest Owners' Federation, n.d.-a). When the new pine trees are well established the seed trees can be cut down. The felling of these trees must be done carefully, so that there is no damage to the young trees (The Norwegian Forest Owners' Federation, n.d.-a).

With natural regeneration it takes longer for new forest to grow than with afforestation. Therefore after felling there may be necessary to prepare the ground, to reduce the waiting time and to ensure that a sufficient number of trees are established (The Norwegian Forest Owners' Federation, n.d.-a). Although the cost associated with a seed tree stand felling is higher than with flat felling, it is compensated by the fact that the seed trees grow larger before felling. You also avoid spending money on sowing or planting (The Norwegian Forest Owners' Federation, n.d.-a).

#### *2.1.5.2 Continuous-cover methods*

This method can provide timber while preserving a healthy forest ecosystem more effectively than clear-cut forestry. One of the benefits of continuous-cover forestry is the preservation of forest biodiversity, which includes a variety of tree species, sizes, and ages. This technique preserves a portion of the forest canopy, thereby mitigating soil degradation through the reduction of soil erosion and water runoff (Puettmann et al., 2015). Additionally, it improves the habitat for species that rely on standing forests. And another benefit is that you avoid large open areas, something that is often appreciated by local communities that prefer forested areas for recreation. It is crucial to note that to preserve a healthy forest ecosystem, management must be executed thoroughly; failure to do this could result in the forest experiencing some of the negative impacts associated with clear cutting.

##### *2.1.5.2.1 Selective Cutting*

Selective cutting will select trees that meet specific criteria for harvest, while leaving the rest to continue growing. The larger and mature trees are usually chosen, which then promotes regeneration and growth of the younger trees that are still standing. When using this method, the felling will often be done every 10-30 years. It is also most suitable for spruce trees as this species can tolerate the shade better than pine and deciduous forests (The Norwegian Forest Owners' Federation, n.d.-a). A forest suitable for selective cutting should be multi-layered, meaning have an even distribution of trees in varied sizes and age. Further the forest should be resilient against storms and not too exposed to wind, so the trees that are left after felling

will not blow over. Selective cutting also supposes a naturally rejuvenation, thus the ground vegetation must be suitable for this (The Norwegian Forest Owners' Federation, n.d.-a).

This method will increase the administrative and operational costs of the harvest, as it will require more planning, and the logger must use time on differentiating the trees that are to be harvested against what trees to leave standing (The Norwegian Forest Owners' Federation, n.d.-a). Furthermore, the logger must use more time when moving between the trees that are to be harvested, while making sure not to damage the trees that are to be left standing. Though, this cost will be partly compensated as the trees that are removed are typically larger, and costs for planting are avoided as this method is based on natural rejuvenation (The Norwegian Forest Owners' Federation, n.d.-a).

In Norway today, there is not a lot of forest that have the qualities for a successful selective cutting. But there are possibilities to convert some areas of forest to be suitable for this method of harvest, but it will require a well-planned and long-term management. And in this period of restructuring the forest growth will be reduced for decades (The Norwegian Forest Owners' Federation, n.d.-a).

#### *2.1.5.2.2 Shelterwood Cutting*

Shelterwood cutting involves leaving a few mature trees that shelter and shade for the new growth. This method allows more trees to be left standing per decare, compared to the open method of "seed-tree harvest." This means that there will be more shade, and this method is therefore more suitable when wanting natural rejuvenation of tree species that tolerated shade better, such as spruce (The Norwegian Forest Owners' Federation, n.d.-a).

The trees that are chosen to be left standing should be large and strong with deep crowns. To obtain such trees, there is a need for young forest care and thinning. Also, these trees need to have genetic characteristics that can produce preferable seeds (The Norwegian Forest Owners' Federation, n.d.-a). With this method the growing spruce will have less competition from deciduous trees, grass and herbaceous vegetation as they have less tolerance for shade (The Norwegian Forest Owners' Federation, n.d.-a).

The shelter trees are usually harvested in two rounds, to stimulate a soft transition for the young trees and to stimulate increased seed production. When removing the shelter trees, the logging machines need to be careful not to damage the young trees (The Norwegian Forest Owners' Federation, n.d.-a). There are risks for the young trees as they can be damaged under

layers of bark. Also, the wind can put the trees at risk making it necessary to remove the shelter trees in several rounds (The Norwegian Forest Owners' Federation, n.d.-a). The possible need of harvesting the shelter trees over several rounds, creates a need for short distance between the felling area and storage area. Therefore, a well-planned access road system is essential (The Norwegian Forest Owners' Federation, n.d.-a).

After the shelter trees are felled, the land appears as a young forest field. Thus, one does not get the immediate change in landscape, as with clear cutting. Though shelterwood cutting is demanding with higher operating costs, the planting costs are avoided (The Norwegian Forest Owners' Federation, n.d.-a).



### ***2.1.6 Global agreements***

The UN sustainable development goals (SDGs) are a global partnership for sustainable development in the economic, social, and environmental dimensions. There are 17 goals and 169 targets that aim to eradicate poverty and inequality, give universal access to education, healthcare, food, and clean water, sustain healthy habitats, and promote peace. The agenda should be fully implemented by 2030 (United Nations, 2015). The forest topic is covered largely by SDG 15 life on land, this goal aims to “*protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss*” (United Nations, n.d.-a). Target 15.1 is to ensure the conservation, restoration, and sustainable use of terrestrial ecosystems, such as forests. Target 15.2 aim to promote sustainable management of forests, stop deforestation, restore degraded forests, and increase afforestation and reforestation globally. Both these targets were to be ensured by 2020. Lastly, target 15.b looks to finance sustainable forest management, this include incentives to developing countries to proceed with sustainable management, including conservation and reforestation (United Nations, n.d.-a).

The Aichi biodiversity targets (ABTs) was introduced by the Convention on Biological Diversity in 2010 to address biodiversity loss by 2020. The goal was to restore, value and conserve biodiversity. The ABTs have 20 targets divided into 5 strategic goals, the targets focus on the state of biodiversity, the pressures of biodiversity, underlying drivers, policy responses, and integration of biodiversity issues across sectors (O'Connor et al., 2015; Butchart et al., 2016; Buchanan et al., 2020).

Recently, in 2022, a new UN global biodiversity agreement was made, the Kunming-Montreal Global Biodiversity Framework. This framework builds on previous goals and targets. The aim of this framework is to protect 30% of the world’s terrestrial, ocean, and water areas within 2030, in line with the SDGs 2030 agenda. Where all nature types, such as forest, must be represented (Convention on Biological Diversity, 2022).

With new agreements and targets there also needs to be strategies that make them achievable, as actions to meet targets have shown positive result, but the goal is rarely reached (O'Connor et al., 2015; Butchart et al., 2016; Buchanan et al., 2020)



## 2.2 Norwegian Forest and Forestry

### 2.2.1 Background

Forest covers about 37.4% of the Norwegian mainland, and consists mainly of spruce, pine, and deciduous trees such as birch (Statistics Norway, 2020). The yearly growth of spruce is 12 million m<sup>3</sup>, and for pine and deciduous trees the growth is about 5 million m<sup>3</sup> (Statistics Norway, 2020). While forest growth remains ongoing, there has been a modest decline in annual growth. Concurrently, there has been an increase in timber harvesting (Steinset, 2020).

In Norway, the forestry is small-scale because of the irregular topography, varying production conditions and the property structure (Tomter & Dalen, 2018). Each year, for the last 10 years, about 10% of the forest properties have had active felling (Statistics Norway, 2020). In 2020 the felling in Norway was about 7.2 million m<sup>3</sup> of spruce, which was 11.2% increase from 10 years before. For pine, the felling was 2.8 million m<sup>3</sup>, an increase of 53.2% from 10 years before. Lastly, for deciduous trees the felling was roughly 0.3 million m<sup>3</sup> which was more than 3 times the amount from 10 year before (Statistics Norway, 2020).

Forestry produce and yield renewable resources. This practice is the foundation for forest-owners income, value creation, employment, carbon sequestration, and production of products that are needed and products that can substitute fossil and energy-intensive materials (The Norwegian Forest Owners' Federation, n.d.-b). The implementation of Norwegian forestry policies is based on different measures and instruments, such as tax policies, financial support schemes and subsidies, legislation, guidance, and research. Also included in the Norwegian regulations are international agreements, which include Norway's obligation to maintain a sustainable forestry (Tomter & Dalen, 2018). For forest owners the forest management is a long-term investment, and therefore forest owners have a strong responsibility when it comes to management. A long-term and responsible management plan entails maintaining a balance between many different considerations, and is needed to produce a forest with quality timber (The Norwegian Forest Owners' Federation, n.d.-b). Further responsibility is given by the forestry act (*Skogbrukslova*). This act addresses sustainable management of forest resources (Skogbrukslova, 2005)

Forestry occurs mostly in the rural districts of Norway and the forest owners usually have other professions, often leaving forestry as a secondary income (The Norwegian Forest Owners' Federation, n.d.-b). 18 323 forest owners had positive income from forestry in 2019,

and the average net income was at 57 000kr, which is a 16.3% increase from the previous year (Statistics Norway, 2020). The forestry sector in Norway employs more than 6000 people (Statistics Norway, 2020), and an important part of working with forest is to plan for the use of the forest property over time.

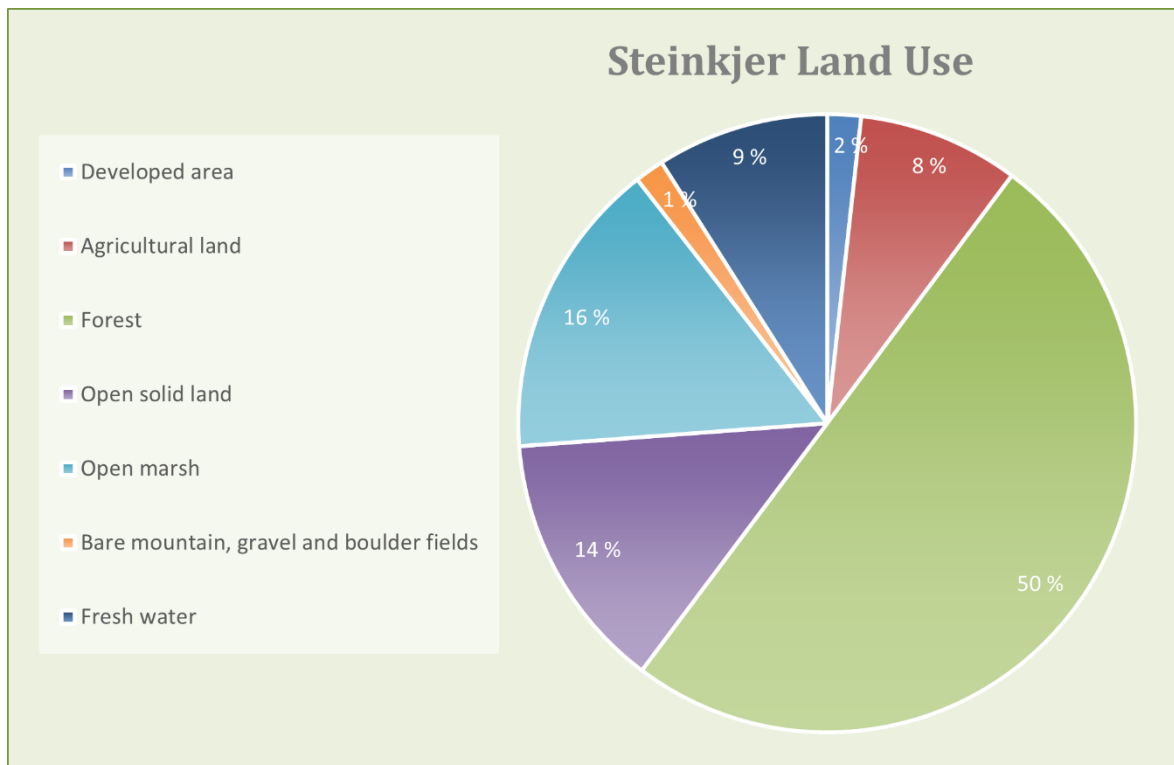
In 2021 there were registered almost 125 000 forest properties in Norway, with an average size of 560 decares of productive forest land. Most of them are individual owners that own a smaller forest area, that together represent about 75% of the forest. While the last 25% is mostly owned by private institutions, state, municipality, or county. Table 1 shows the distribution between different forms of ownership, and the amount of productive and unproductive forest measured in decare (Statistics Norway, 2022a).

*Table 1. The number of properties divided into ownership form, also show the amount of productive and unproductive forest within the different ownership forms Source: Statistics Norway (2022a), Forest properties and forest area by owner category 2021.*

	<b>Forest properties</b>	<b>Productive forest in decares</b>	<b>Unproductive forest in decares</b>
<b>Private forest owner (Individual)</b>	117 683	54 084 282	22 254 286
<b>Private ownership (excluding individuals)</b>	1 851	4 417 485	6 828 808
<b>State (public)</b>	686	6 176 256	5 951 379
<b>Municipality/county (Public)</b>	479	2 123 560	534 215
<b>Village commons (bygdeallmenning)</b>	52	1 797 853	337 791
<b>estate (law)</b>	2 910	880 344	410 586
<b>other/unspecified</b>	890	244 532	117 542
<b>Total</b>	<b>124 551</b>	<b>69 724 312</b>	<b>36 434 607</b>

### *2.2.1.1 Case area: Steinkjer*

Steinkjer is a municipality in Trøndelag, Norway. It has a population of almost 24 000, and 66% of the population lives in urban areas. The land area in Steinkjer is about 2100 km<sup>2</sup>, and the forest area is about 50% of the total land area (Statistics Norway, n.d.).



Picture 2. Show the distribution of land use in Steinkjer. Data from Statistics Norway (n.d.).

Almost 75% of the forest in Steinkjer is productive forest, and in 2022 Steinkjer had almost 80 000m<sup>3</sup> forests harvested (Statistics Norway, 2023b). Steinkjer fall under the management of the Trøndelag County Governor's office, this includes the forestry management. According to Trøndelag County Governor (n.d.), the forestry industry in Trøndelag faces a big challenge: making sure that the forest industry in the area gets the most local timber possible. Because of this, an important part of the County Governor's job is to help increase logging in the county while also making sure it is done sustainably. The most important parts of the job are knowing about the forest resources, managing the funds that encourage logging, and focusing on the forestry infrastructure. Trøndelag has established environmental and climate measures in forestry. For instance, increased dense planting in established forest regions leads to enhanced long-term carbon dioxide (CO<sub>2</sub>) sequestration. Implement forest fertilisation to enhance growth and increase carbon dioxide sequestration. Planting forests in new areas is an additional measure; this initiative sought to increase carbon sequestration in forests by planting forests in new areas. Finally, there are grants designated for environmental initiatives that protect and advance the value of the forest's ecological diversity, landscape, outdoor life, and cultural heritage (Trøndelag County Governor, n.d.). As of 2022, Steinkjer municipality has almost one thousand registered individual private forest owners. Also, they are the owners of Steinkjer Municipal Forest, which includes large portions of the community's forest

properties and natural resources. The primary focus of this municipal enterprise is to promote and support local business activities related to forestry, hunting, fishing, and various recreational opportunities. The forest covers a vast area of 220,000 decares (daa), out of which 80,000 daa are productive woodland. It plays a crucial role in promoting employment and business opportunities in the surrounding area. In addition, the establishment provides rental cabins and cabin plots, making it convenient for both small and big game hunting. The area boasts more than 50 fishing lakes and is also equipped with well-marked hiking trails and starting points for excursions, making it a great destination for outdoor enthusiasts of all kinds (Steinkjer kommuneskoger, 2023).



### ***2.2.2 The forest policy***

The Norwegian forestry policy request sustainable resource management. The definition of sustainable forestry management in Norway demands that felling of trees does not exceed tree growth. Also, that one considers other essential functions of the forest, such as habitats for plants and animals, recreational arena, and as a carbon storage and capture. This is required by the forestry act (skogbrukslova) announced in 2005 (Forestry act, 2005).

The forestry act §1 aim to “*promote sustainable management of forest resources in the country with an active local and national value creation, and to ensure biological diversity, care for the landscape, recreation and cultural values in the forest*” (Forestry act, 2005). This act concerns all forest and woodland. The ministry of agriculture and food is the governing authority of forestry. They can transfer funds to other administrative bodies, such as the county governor, the county, and the municipality. It is the county governor that has the authority in forestry management for forests owned by the municipality or the county.

The forest owner has the responsibility of managing their forest, this is specified in the forestry act §4 (Forestry act, 2005). They must ensure that all the measures in the forest are conducted in accordance with the act and regulations. The forest owner must be familiar with the environmental values in their forest and consider these when implementing the measures. This consideration can indicate that some measures cannot be conducted. Within these frames the forest owner can manage their forests according to their own goals. The ministry (of agriculture and food) can elaborate on regulations the forest owner must follow in relation to the environment (Forestry act, 2005).

The forestry measures include forest registration and forest plan, land care and regeneration, forest roads, logging, preventive measures, measures for forest damage, and forest report duty.

### ***2.2.3 Forestry measures, and instruments***

#### ***2.2.3.1 Legal and administrative instruments***

##### ***2.2.3.1.1 Forest fund***

The forest fund is a statutory savings fund for forest owners. The purpose is to secure the forest owners capability to finance sustainable management of forest resources through

compulsory allocation of funds, as explained in the act on forest fund (Regulations on forest funds etc., 2006). The money in the forest fund is connected to the forest property and belongs to the forest owner. The funds can be used to measures connected to the forest property, such as measures for forest culture, forest roads, environment, and forest planning. To disburse funds the forest owner must send a reimbursement claim to the forestry officer in their municipality, but only when the measure is completed, and they have an overview of the costs. The forest owner also has a possibility to apply to release their funds from the forest fund, this will not give a tax advantage (Regulations on forest funds etc., 2006).

#### *2.2.3.1.2 Forestry plan*

A *forestry plan* keeps record over the resources and environmental values on a forest property. This is an important part of managing a forest, as it will lay a foundation on how to best utilize the economic potential of the forest property, and at the same time take care of important environmental values (The Norwegian Forest Owners' Federation, n.d.-c). The information gathered about resources and values in the forest is presented in maps and are made for the areas of a property that have active forestry. The planning is usually organized as a cooperation between the public and private appraisal companies. And the plans usually span 10-15 years and are made either for larger geographical regions such as municipalities, or it can be for individual properties in joint projects. There are subsidies and tax benefits available for the financing of forestry planning (The Norwegian Forest Owners' Federation, n.d.-c). The importance of documenting what is done with the forest is increasing, as the forestry plan is used to both document that necessary environmental considerations is taken, and to plan measures (The Norwegian Forest Owners' Federation, n.d.-c). In the forestry industry in Norway, much of the work that is done in the forest is executed by someone other than the forest owner. This means that the information about the forest that is collected should be accessible to all who need that information to do their job well. Today forestry plans are made by digital solutions, making them easy to access and keep up to date (The Norwegian Forest Owners' Federation, n.d.-c). To be allowed to cut and sell timber there are requirements that needs to be fulfilled such as the regulation on sustainable forestry, environmental registration and certification (The Norwegian Forest Owners' Federation, n.d.-c).

#### *2.2.3.1.3 Forest certification*

*Forest certification* is a voluntary market-based instrument that promote sustainable forestry (PEFC, n.d.), and make sure of traceability in all parts of the forest sector, from forest owner to final product (The Norwegian Forest Owners' Federation, n.d.-c). In Norway there are two

certifications for forest, Norwegian PEFC forest standard (Programme for the Endorsement of Forest Certification) and FSC (Forest Stewardship Council) (Tomter & Dalen, 2018). Essentially all forest properties with logging activity are covered by the PEFC certification, which is about 40 000 properties with 60 million decares of productive forest. And about 100 forest properties, 4.4 million decares forest, are certified with both PEFC and FSC (Tomter & Dalen, 2018).

There is not much difference between these two certifications when it comes to the requirements for forest management and environmental considerations. The difference between the certifications is that FSC asks for more control and documentation at property level, making this system a better fit for larger forest properties. While the PEFC system is more adaptable for also smaller forest properties, as there are use of group certification where the control and documentation is at a greater extent contributed to the timber buyers (The Norwegian Forest Owners' Federation, n.d.-d).

The Norwegian PEFC forest standard describes the requirements that forest owners need to uphold to achieve sustainable management. It contains 27 requirements, that is divided up into the three sub-groups. The first sub-group is manager responsibility and planning, here the requirements focus on responsibilities and planning of the forest property. Next is felling and forestry operations, which concerns the planning and implementation of where the work needs to be done. The last sub-group is special environmental values, is concerned with maintaining biodiversity, cultural heritage and the values of outdoor recreation and experiences.

#### *2.2.3.1.4 Forest report duty*

Forest report duty is when a forest owner must apply for permission to start felling and measures related to rejuvenation and maintenance of the forest. This report duty is required when the municipality or other forestry authority find it necessary to keep control that the law is followed. It is stated under the nature diversity act §54, that before implementing forestry measures that affect selected nature types and that do not require a permit, one must report to the municipality and receive feedback. The municipality can refuse the measure or give instructions on how the measure is to be carried out, if they find that it results in a deterioration of the nature type distribution and the ecological state (Nature diversity act, 2009). It may concern one or more forest owners in the municipality. This report must be in writing and include information on the plans for felling or measures.

## 2.2.3.2 Subsidies

### 2.2.3.2.1 Forest culture

*Forest culture* concerns subsidies that are given to various forestry measures. The most common are subsidies for young forest care and land preparation. While one can also be subsidized for fertilization, trenching, and other quality-enhancing forestry measures. *Young forest care* is considered important to secure good production and opportunities in the future. And includes removing competing vegetation and distance regulation of the main tree population (Hanssen, Kjersti Holt, 2017). *Land preparation* is a measure to increase the survival and growth of both cultural plants and natural regeneration, it processes the soil's top layer to improve the conditions for establishment of forest plants. The benefits of land preparation are better germination substrate during natural regeneration and sowing, faster establishment when planting, improves survival and increases growth (Hanssen, Kjersti Holdt, 2017).

### 2.2.3.2.2 Climate and environmental measures

There are several *Climate and environmental measures* that is aimed at subsidising forest owners when they implement forestry measures that are considered positive for the climate and environment (Landbruksdirektoratet, (n.d.)). One is *forest fertilizing* where the forest owner can apply for a subsidy if they use calcareous fertilization, another is *denser afforestation* that subsidises for new planting, planting after land preparation and supplementary planting after felling (Landbruksdirektoratet, (n.d.)). *Environmental measures in the forest* are subsidies for tending to and further developing environmental values linked to biological diversity, landscape, outdoor life and cultural heritage in forest (Landbruksdirektoratet, (n.d.)). The forest owner can go to the municipality to get subsidies through the regulation on grants for economic and environmental measures in forestry (NMSK). The purpose of NMSK is to subsidise economic and environmental measures when local priorities and adjustments stimulate an increased value creation in forestry, while also taking care of and developing environmental values linked to biological diversity, landscape, outdoor life and cultural heritage in the forest (Regulations on environmental measures etc. in forestry, 2004).

### 2.2.3.2.3 Roads, harvesting, transport and other measures

There are subsidies for *forest road measures*, the most common is a subsidy to construction of new forest roads, or reconstruction of existing forest roads. In some parts of Norway there is



also common to give subsidies to building heavier tractor roads that serves as a forestry purpose (Landbruksdirektoratet, (n.d.)).

*Forest management with cable car, horse, and other management methods.* The most common measure is extracting timber with cable car, but one can also apply for subsidies when extracting forest timber with horses or other operating methods such as long or difficult terrain transport, and operating disadvantages (Landbruksdirektoratet, (n.d.)).

*Forest fund tax exemption* is an indirect measure in the form of reduced taxes, that forest owners' access when using the forest fund. The forest owner has tax on income from timber sales, but the part of the income that they put in the forest fund will not be recognised as income or taxed before the money is taken out of the fund to cover forest investments. When the money is taken out of the fund, it will be recognised as income and only 15% of the amount will be taxed, the rest is tax-free. The reduced taxes correspond to an ordinary measure at approximately 40-50% reduction of cost, or more if your tax-percentage is high (Landbruksdirektoratet, (n.d.)).

A restricted subsidy for cleaning up after windfall from storms and similar events in 2021/2022 is available for specific municipalities and is authorised in the NMSK regulation. The subsidy is for measures aimed at damage prevention and to facilitate new rejuvenation (Landbruksdirektoratet, (n.d.)).

### 2.2.3.3 *Payment scheme*

*Voluntary conservation* is a payment scheme that compensates forest owners for protecting their forest from harvest, the forest management go from active forestry under the forestry act to a nature reserve under the nature diversity act §37 (Frivillig vern, (n.d.)). The forest owners offer an area of their forest for conservation, and then the environmental authorities evaluate if the offered area has qualities that make them suitable for forest conservation, and then if it is deemed suitable a formal protection process is implemented (Framstad & Blindheim, 2010). The process includes to negotiate an agreement between the forest owner and the state, where the agreement includes demarcation of the area, regulations that govern the use of the area, and compensation. The owner is assisted in all phases of the conservation process by experts from organisations for forest owners, these experts also oversee contact with the environmental authorities. The forest owner can withdraw from the agreement if they are not satisfied (Frivillig vern, (n.d.)). This arrangement was developed in the early 2000s, where the idea was that the government made the criteria for forest that should be protected

from felling, and that the forest owners should find the suitable areas. This way the forest owners wouldn't appear as the main opponent when expanding the forest conservation plans, as the primary reason for the resistance was the way the conservation process worked (Gundersen et al., 2010).



### 3 Theory

#### 3.1 Environmental governance

A model for the environmental governance system (EGS) used in this thesis is based on the framework by Vatn (2015). Where environmental governance refers to the use, management and protection of environmental resources and processes, that often include some level of conflict. Meaning that governance often involves taking sides or developing compromises (Vatn, 2015). Governance is a concept that include some level of authority, within both processes and structures. The processes refer to forming priorities, acknowledging, and resolving conflicts, and how to manage peoples resource use. While the structures refer to how these processes are organized and administered, by defining priorities and achieving goals (Vatn, 2015). The EGS framework investigates the relationship between several concepts and variables and define their relationship. The factors that are included in this framework are resource regimes, the governance structure, the attributes of environmental resources and processes, technologies and infrastructure, patterns of interaction and the outcomes for the resources use and state (Vatn, 2015). *Figure 1* shows the framework of EGS, and all the factors that should be considered when researching environmental problems, its causes and solutions.

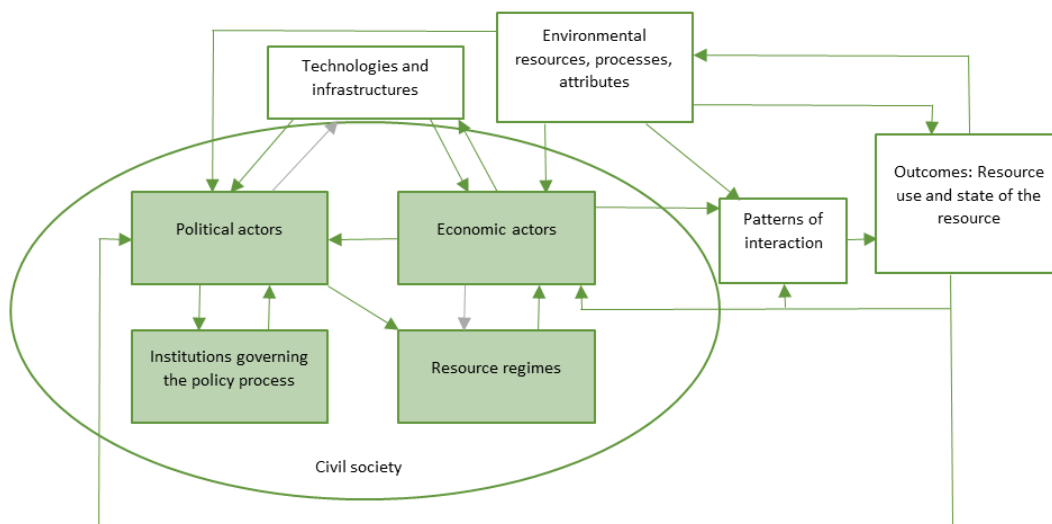


Figure 1: The Environmental Governance System Framework (EGS). Figure adopted from Vatn (2015).

### ***3.1.1 Resource regimes***

#### ***3.1.1.1 Property and use rights***

Property and use rights refer to the rules that decide who can benefit from a resource. Vatn (2015) refers to different rights of access to these resources, definitions that covers the rights to physically enter a place. Where they emphasize the rights to access, withdrawal, management, exclusion, and alienation. Access refers to the right to enter a physical property, withdrawal is the right to obtain products from the resource, and management refers to the right to regulate the resource use and transform the resource. Exclusion is the right to decide who has access to the resource and how it may be transferred, while alienation is the right to sell or lease the above rights (Vatn, 2015).

Property rights are also important, regarding rights of resources. Property rights refers to the relation between right-holders and rights-regarders, which is defined and supporter by a specific authority structure such as a state. Property rights is often divided into four groups, private property, common property, public property, and open access. Private property often refers to an individual right-holder, while common property is regarded as a private property for a group of co-owners. For public property the ownership is the state, or other lower public levels such as county or municipality. Lastly, open access means that there is no property (Vatn, 2015). Open access is the original state, the situation before the decision to transform the relation into one of the three other property rights. The motivation for the transformation can be a wish to gain exclusive access to the benefits of the resource. Or the motivation can be the need to regulate the resource use, to protect from overuse or regulate side-effects from different uses (Vatn, 2015).

#### ***3.1.1.2 Interaction rules***

Interaction rules refers to interactions' actors with access to a resource have, as well as how they are influenced by decisions regarding the resources. Interaction can be divided up to direct and indirect. Direct interaction refers to communication, cooperation, coordination, and competition. While indirect interaction are side-effects of action, such as pollution from production and consumption (Vatn, 2015). Vatn (2015) identifies four types of interaction that is important for the purpose of EGS model, those are trade, command, community rules and no rules.

Trading refers to the exchange of goods and services, usually with a payment. The basis for trade is the ownership of the resource that is to be traded. And what is important is the price, quantity, and quality of the good or service. In trade the power is mostly associated with wealth, thus the parties involved in the trade may be formally equal, but difference in purchasing power can create inequality (Vatn, 2015).

Command is a different type of interaction, and is based on hierarchical power (Vatn, 2015). Actors use commands both internally and externally. The line of command within actors, such as corporations or governmental administration, determines how a resource will be used (Vatn, 2015). Third party authority is used when there is a commanding relationship between actors. Here, the power of command is frequently employed to establish and defend property rights. Making public payments and funds, such as taxes and subsidies, important (Vatn, 2015).

Community-based interaction strengthen the relations between individuals or groups. And refer to how people in a community may treat each other as they organize their activities when they face daily challenges. These interaction rules are both within and between communities (Vatn, 2015). Within communities we have informal structures such as neighbourhoods and friendships, and formal structures such as family, common properties, and civil society organizations. While for the relationship between communities strengthening relations are important, and norms of reciprocity is the form that is most common across cultures (Vatn, 2015).

No rules are also a rule of interaction. This refers to the situation where there are no commonly defined ways to interact. Here people can do what they want, without considering the consequences for others (Vatn, 2015).

### *3.1.1.3 Governance structure: Actors and Institutions*

Governance structure consists of both actors and institutions. The actors can be divided into three groups, economic, political, and civil society. And they all have their rights, responsibilities, capacities, and goals. One person can be identified as more than one type of actor (Vatn, 2015). Economic actors are either private, state or community, that own and use productive resources, they are often grouped as producers and consumers (Vatn, 2015). An example is both private and public forest owners. Political actors may be grouped as local actors, actors at state level and actors at international level. They have the power to formulate resource regimes, and they define the interaction rules. Political actors can be divided into two

types, public authorities and international governmental organizations (IGOs) (Vatn, 2015). Lastly, civil society is considered the normative basis for society, and develops in both organized and unorganized ways. Civil society actors ensure democratic legitimacy of political action, they are considered to be the voice of the citizens interests and will (Vatn, 2015).

Institutions are imbedded in society, as norms, conventions, and formally sanctioned rules. As a part of the governance structure institutions facilitate interaction, within and between the actors. They represent the rules and practices that define the policy processes and interactions in civil society (Vatn, 2015).

#### *3.1.1.4 Environmental Governance Systems*

The EGSs need a few more variables to be complete, this includes environmental resources and processes, technologies and infrastructures, patterns of interaction, and outcomes.

The attributes of environmental resources refer to characteristics of a resource, such as the quantity, replacement rate, reproduction rate, and spatial distribution. Attributes in forests are for example carbon storage, timber production, tree density, species and habitat. Attributes have a direct influence on outcomes, and it also is assumed to have an influence on the choice of resource regime, actions of economic actors, and interaction pattern. And the way actors perceive the resources is often what influence the choice of resource regime and the action of economic actors (Vatn, 2015). An example from forest governance is the resolution to protect 10% of the forest in Norway (Miljødirektoratet, 2016). This was decided by the Storting, and with the resolution one can argue that we are not protecting enough forest if the protection rate is lower than 10%, or that we are protecting too much if it is exceeding 10%. This perception would largely be based upon the resolution from the Storting, not the resource attribute itself.

Technologies and infrastructure are the technological preconditions of a governance system and the available support systems. Technologies and infrastructure have a significant impact on the decisions made by actors in governance. As a result, they are crucial elements for the other components of the governance system (Vatn, 2015). The availability of technology has a significant impact on the opportunities available to actors. Consequently, it can also influence the incentives of economic actors to invest in the development of technology (Vatn, 2015). What is also important is the role of research and other civil society actors. The different patterns of interaction are influenced by the relationship between the choices of

single economic actors, the number of the actors involved, and the characteristics of the resources (Vatn, 2015).

The purpose of the governance system is to achieve outcomes that align with the management targets or overall goals. If the outcomes do not align with these aims, it is necessary to adapt the governance system, thereby creating a new and improved system. The wanted outcomes are primarily influenced by how actors perceive the actual resource and the targets involved. Different outcomes serve different interests, which leads to varying perceptions among different actors regarding how the resource system should be adapted (Vatn, 2015).

## 3.2 Legitimacy

To study the legitimacy in this thesis I will use the framework on legitimacy suggested by Vatn (2015). This framework distinguishes between input and output legitimacy. Input legitimacy refer to the decision-making process itself, while output legitimacy state the legitimacy of the results (Vatn, 2015).

### ***3.2.1 Input Legitimacy***

Input legitimacy involves how appropriate and acceptable the possess of decision-making is concerning the principal grounds and the interests of the different actors. It involves how to delegate the power to decide while holding that power accountable, what the conditions are for making decisions, the inclusion of participation, and the transparency of the process. The core concept of input legitimacy is procedural justice. Procedural justice is when authority is linked to fair process. Vatn (2015) refers to Rawls (1971) “A theory of justice” that specifies the concept procedural justice, where Rawls reference fair procedure as in the meaning of equal opportunity. And he emphasizes that procedural justice concerns only the quality of the process and not the expected outcomes (Vatn, 2015). The concept of procedural justice includes elements such as participation, transparency, and accountability (Vatn, 2015).

#### ***3.2.1.1 Participation***

Participation refers to people and how they engage and interact with others, through social institutions, values and normes - it concerns democracy and governance (Vedeld, 2017). Democracy calls for equal opportunity to participate, where decision-making has a basis in competent dialogue (Vatn, 2015). Participation at the governance level is related to a society’s

classical democratic questions regarding who decides what, when, where, how and why, and the control and distribution of power (Vedeld, 2017). Power in participation can relate to having the power to decide, or to being able to be involved in concrete decisions (Vatn, 2015). Researching participation is important in input legitimacy, as it will show who has the power and influence in making the critical decisions.

There are multiple approaches to participation (Vedeld, 2017), and including different perspectives will give a broader understanding of participation. This thesis will outline two participation approaches suggested by Vedeld (2017). The approaches are Participatory development and Cultural-institutional participatory development.

The first approach, Participation development, approaches participation as a means to an end. Where local participation is a means to increase effectiveness or efficiency (Vedeld, 2017). The view of this approach is that if people are involved, they are more likely to support the development effort. The development efforts for local change in this approach usually have external or pre-conceived goals or ambitions, and to reach successful outcomes the people must be both capable and willing to follow the instructions and maintain this over time (Vedeld, 2017). Approaches to Participation development often see participation as an economic efficient way of reaching goals and is funded in a rational choice theory where people act on choices that benefit their interests (Vedeld, 2017).

The second participation approach is Cultural-institutional participatory development, and consider participation to be a social institution and a right (Vedeld, 2017). This approach is mostly a critique of the participation development approach, and is largely based on the paper “Paradoxes of participation” by Cleaver (1999). The Cultural-institutional participatory development question the homogeneous community, goal-oriented and rational choice focus in the participatory development approach. And shifts the focus to including the wide dynamics of a community, an approach that incorporates the changing power relations, that recognises participation entail both inclusion and exclusion, and that incorporates social relations (Cleaver, 1999; Vedeld, 2017).

Both approaches are theoretical perspectives on participation and are not mutually exclusive (Vedeld, 2017), in reality participation can be experienced as a mix of different theoretical participation perspectives. This thesis will use these perspectives on participation as framework to discuss participation within forestry governance. To avoid a theoretical evaluation, a framework for participatory research, *policy analysis*, will be used. The policy



analysis research approach “*investigates how a principle of participation is permeated into policy goals, measures and instrument selection, and implementation process*” (Vedeld, 2017, p. 60). Further the policy analysis study economic, legal, and administrative tools, how actors respond, and outcomes (Vedeld, 2017). The policy analysis approach was chosen as the focus of this participation application fit well within the aim of this thesis.

### ***3.2.1.2 Transparency and Accountability***

Transparency and accountability are the next elements in input legitimacy, and they are important regarding access to information and delegation of power (Vatn, 2015). Transparency refers to how open and accessible the process is to the public. To have a transparent process, the public need to have access to information about the decisions and its arguments (Vatn, 2015). The information should be distributed as soon as possible, and it must be both relevant and easy to understand. This is important as it gives the public a way to see whether they are treated justly (Vatn, 2015).

Accountability is just as important for legitimacy in a process, as it refers to the relationships between actors (Vatn, 2015). It holds decision-makers responsible toward stakeholders and wider society. And refers to how decision-makers acquire their right to decide in the interest of others, and who has the right to change that authority (Vatn, 2015). Accountability is often found in the form of hierarchical accountability where there is a clear perspective as to who is accountable, such as a government is accountable to their citizens (Bäckstrand, 2006). But there may be situations where these assumptions of hierarchical accountability do not apply, such as partnerships where there is complicated to discern who they are accountable to (Bäckstrand, 2006).

### ***3.2.2 Output Legitimacy***

Output legitimacy concerns the legitimacy of the outcomes in environmental governance. And can be divided into the three sub-criteria distributive justice, effectiveness, and efficiency (Vatn, 2015).

#### ***3.2.2.1 Distributive Justice***

Distributive justice concerns how the benefits and burdens are distributed across society (Vatn, 2015). Vatn (2015) mentions eight principles about distributive justice, some of which are based on different philosophies of what constitutes justice, four of these are described in *Table 2*.

Table 2: Different principles of distributive justice, as described by Vatn (2015).

<b>Principle of Distributive Justice</b>	<b>Definition</b>
Strict egalitarianism	Everyone should have the same level of material goods and services.
Resource based principle	Equal opportunity, everyone should have access to the same amount of resources.
Welfare principle	Social welfare should be maximized.
Desert-based principle	Everyone should be rewarded according to their effort. Effort meaning input of work, input of capital, or loss of income.

### 3.2.2.2 Effectiveness

Effectiveness is the second criteria of output legitimacy, and evaluates how well a policy meets its goal (Vatn, 2015). Vatn (2015) mentions three issues concerning the effectiveness. First is that to reach a goal through compensation, there is a need for necessary resources for that compensation. Second issue is that the necessary targets must be obtained, in a perspective of forest conservation this means that one must be able to find forest-owners who have land that is suitable for biodiversity conservation (Vatn, 2015). Last issue, is to avoid leakage. Leakage happens when issues avoided at one place are moved to another place, which will reduce the net effect of the policy and lessen the effectiveness. One example of leakage is if protection of forest at one place, leads to increased logging another place (Vatn, 2015). Motivation is important for both the second and third issue, do they find the regulation fair and follow its intention, or do they disagree and move to find ways around the regulation. If the government has low legitimacy or the monitoring capacity is low, there can be instances where the owner receive compensation for a regulation they do not adhere to (Vatn, 2015).

### 3.2.2.3 Efficiency

Efficiency is the last criteria of output legitimacy, it derives from economic theory, cost-efficiency, and aim to reach goals set at lowest cost (Vatn, 2015). In the case of forest conservation and efficiency, question would be how much forest should be protected? Protecting forest from logging, means that one loses the income from logging activities in the

protected areas. To achieve efficiency the value of the trees as timber need to equal the value of the trees in protection (Vatn, 2015). This definition of efficiency is problematic as it demands economic valuation on environmental values, and it indicates that distribution of resources/incomes is what brings about efficiency. This definition of efficiency coupled with disruptive justice will give an inconsistency in the criteria for output legitimacy, but to avoid strategies with high cost and nothing gained, one should still include a criterion that evaluates costs. Therefore we need to include a different definition for efficiency (Vatn, 2015).

Efficiency as a criterion for output legitimacy should not demand economic valuation and have less conflict with other criteria for legitimacy (Vatn, 2015). Cost-efficiency, the ability to meet the target at lowest cost, can work well. It includes both opportunity cost and transaction cost, meaning the cost from loss of income and costs from decision-making, contracting, reporting and such, respectively. As these costs depend on distribution of resources, efficiency cannot be seen independently of disruptive justice. And one must find what disruptive justice criteria influence the calculation of cost (Vatn, 2015).

### 3.3 Discourses

#### ***3.3.1 The conservation discourse***

The conservation discourse is centered around a widely-accepted understanding of nature and its conservation, predominantly driven by expert knowledge (Vatn, 2015). It advocates for the preservation of natural areas, flora, and fauna, thereby challenging human activities like forestry that potentially harm the environment. Central to this discourse is the belief that nature remains most pristine when undisturbed by human intervention, and that the protection of natural habitats should take precedence over human requirements.

#### ***3.3.2 The sustainable use discourse***

The sustainable use discourse emphasises use of nature, and thus can be seen as the opposite of the conservation discourse. In this thesis the concept of “good agronomy” as outlined by In contrast, the sustainable use discourse promotes the utilization of nature and can be viewed as the counterpoint to the conservation discourse. This thesis utilizes the concept of "good agronomy," as defined by Vedeld (2002); (Vedeld, 2003) , to represent a sustainable use approach that values nature's utility. This concept is applicable to practices on small forest properties owned by individuals.

### 3.3.2.1 Good Agronomy

is identified as a farming practice aimed at ensuring optimal outcomes for the farm, embodying the principles of a self-reliant agricultural lifestyle (Vedeld, 2002). It encompasses five key elements: Independence and self-reliance, proprietorship, proficiency, management responsibility, and production orientation.

*Independence and self-reliance* relate to the farmer, and how they are self-sufficient within the farm. Experiences and living on the farm constitute a property identity, this is the second element *proprietorship*. As the farm is the main productive asset, the farmers knowledge and competence will be connected to this specific farm or the type of farming. Further, as farms are often handed down through generations it will be tied to the individual and family history. The third element is *proficiency* is the ability to perform a respectable quality of work (Vedeld, 2002).

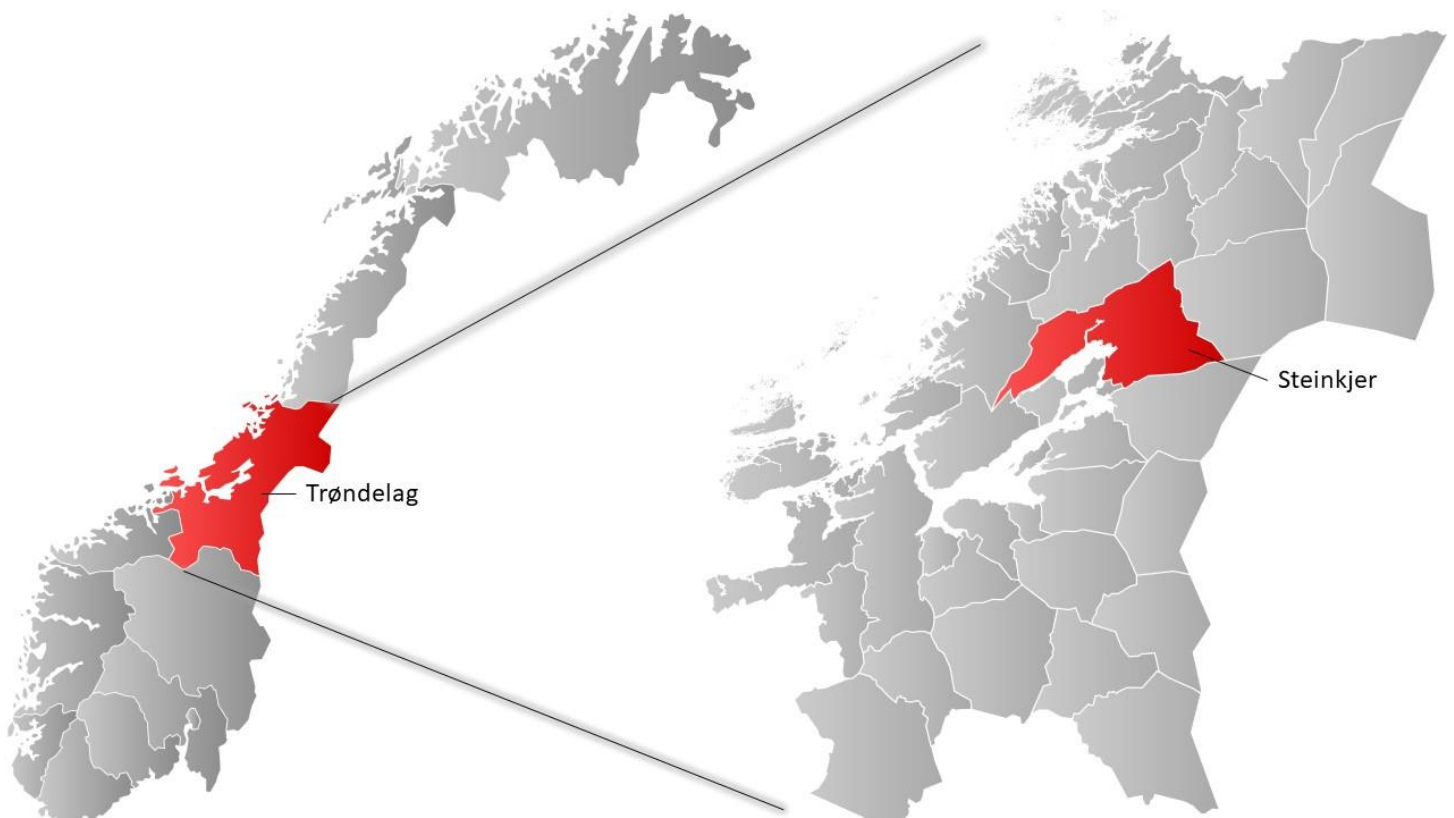
The fourth element *management responsibility* refers to the farmers strong sense of responsibility towards the farm, both in present and future. As the farm is often handed down to family, it is important for the farmer that the farm is both environmentally and economically sustainable (Vedeld, 2002). The last element is *production orientation*, to sustain the farm there needs to be a satisfactory economic result. This may create a conflict between a farmers wish to manage the farm in an environmentally sustainable way, and the realities of the economy of securing high incomes and cutting costs (Vedeld, 2002). This means that the farmer may find it difficult to confer with both *management responsibility* and *production orientation* (Vedeld, 2003).



## 4 Methodology

### 4.1 Case selection

The study area in this thesis is Steinkjer Municipality, see picture 3. This area was chosen for two main reasons. The first is that Steinkjer is a municipality with a large area of productive forest with many private forest owners and a large public forest owned by Steinkjer Municipality. The idea was first to have the study area be Trøndelag, but with over 14 000 forest properties, the number of forest owners was too large. Leading to a narrowing of the study area into one municipality. As of 2022, Steinkjer has almost one thousand registered private forest owners. And, has the ninth largest area of productive forest of the 356 municipalities in Norway, with 785 000 decares (Statistics Norway, 2022b), this is almost 1% of the total forest in Norway. Another reason Steinkjer Municipality was chosen is that the researcher grew up here. The benefit of this is the familiarity with the area and knowledge of the local dialect. This makes working with the interviews much easier and more accurate. The participants are a representative from Steinkjer Municipal Forest (SMF), and individual forest owners with forest land in Steinkjer. Note that this thesis is not representative to all forest owners in Steinkjer, but rather a view on some of the perspectives and experiences within the Steinkjer forestry sector.



Picture 3. Illustrating the area of Trøndelag county (Wikimedia Commons, 2022) and Steinkjer Municipality (Wikimedia Commons, 2020). (Personally made small edits to the pictures).

## 4.2 Research Strategy, Design and Method

### ***4.2.1 Qualitative research***

This thesis uses a qualitative investigation as its research design. The goal of qualitative research is to comprehend the significance and experiences of people or groups. In the social sciences and humanities, it is frequently employed to investigate intricate phenomena that are difficult to measure or quantify (Bryman, 2016). Interviews, focus groups, observation, and document analysis are examples of qualitative research techniques (Bryman, 2016). This method is appropriate for the research for this thesis since the goal is to examine opposing discourses while focusing on the experiences and viewpoints of a particular group of people.

Qualitative research is not without drawbacks. Because most research involves small sample sizes and in-depth investigation of individual events, one drawback is that it might be challenging to generalise the findings to larger populations (Bryman, 2016). Its susceptibility to bias and subjectivity is another drawback. There is a chance that the researcher's personal prejudices and presumptions will affect the analysis since the research entails the researcher's interpretation of the data (Bryman, 2016). Lack of transparency and replication difficulties are other criticisms, as the study method can occasionally be ambiguous and disorganised (Bryman, 2016). However, no study is perfect, and a qualitative approach to research is a suitable choice for this thesis's criteria.

### ***4.2.2 Multiple-case studies***

The research design for this study is a multiple-case study. A multiple-case study involves an in-depth examination of two or more cases that share common characteristics. The goal is to gain an understanding of the cases studied and identify similarities and differences between them (Bryman, 2016). The cases can be selected based on different criteria, such as geographic location, demographic characteristics, or specific experience (Bryman, 2016). This design suits this research, as this thesis aims to compare two cases that have been selected by both geographic location, Steinkjer, and the characteristic that they either own forest or work in a municipal forest. The cases this thesis is comparing are private forest owners with forests located in Steinkjer and Steinkjer Municipal Forest.

### ***4.2.3 Semi structured interviews***

The research method employed for this project included the use of semi-structured interviews. This approach typically involves an interview guide with questions related to the topics that

the interviewer intends to address. However, it also provides the opportunity for flexibility, wherein the interviewer has the ability to ask questions in a different order or allow follow-up questions that are not predetermined (Bryman, 2016). This approach was chosen over a structured one because of the opportunity to be able to ask follow-up questions and allow the interview to flow with the participants' responses. In addition to ensuring that every necessary subject is addressed, this method simplifies the coding process, making it more efficient and less time-consuming compared to an unstructured approach. The semi-structured approach was used for this research as it allows for gathering the interviewee's thoughts and experiences while also receiving answers on specific themes. A structured approach, such as a questionnaire, would be unsuitable for gaining insight into the participants' experiences and attitudes (Bryman, 2016). And an unstructured approach has no predefined themes or concepts (Bryman, 2016), making the process unsuitable for the scope of this research.

#### *4.2.3.1 Interview Guide*

The interview guide has a planned set of questions that pertain to the research topics and the theoretical framework. When employing a qualitative methodology, it is crucial to refrain from rigidity and instead formulate questions that are open-ended and consistent with the tenets of qualitative investigation. This entails directing attention towards the viewpoints of the participants and their understanding of the social environment (Bryman, 2016). The interview guide for the interviews was organised under four topics: Introduction, Governance, Logging, and Conservation. Each topic comprised multiple questions that covered the required material. Not all questions were asked, as several were open-ended and overlapping, resulting in participants' answers often including information related to several topics. This allowed the participant to respond to the questions in a more unrestricted manner, granting them the autonomy to engage in discussion and express themselves in their own unique style.

### **4.3 Sampling method**

This research uses purposive sampling, this is a kind of sampling in which the researcher deliberately chooses cases or participants based on certain criteria that are relevant to the research questions being asked (Bryman, 2016). Due to the research purpose of examining forest management with forest owners, the selection of interviewees was restricted to a certain group of individuals. This project includes public and private participants. Steinkjer Municipal Forest is the public participant, and their representative was selected through contact with their offices. The private forest owners that participated in this thesis were

chosen from a list of forest property owners in Steinkjer. Each private forest owner was assigned a unique number, and a random number generator was used to choose participants for the survey. Subsequently, the selected owners were called and asked about their willingness to participate in an interview. Additionally, there was a goal to secure the participation of private forest owners with varying sizes of forest properties. The purpose of purposive sampling is to ensure that the resulting sample demonstrates a significant level of diversity, with participants varying from each other in terms of essential features that are relevant to the research question (Bryman, 2016). This sampling strategy does not permit the researcher to make generalisations to a population, but it is also not a convenience sample (Bryman, 2016).

## 4.4 Data collection and analysis

### *4.4.1 Interview sessions*

The data collection for this thesis consisted of six interviews. The first session was with a representative of Steinkjer Municipal Forest, while the other five interviews were with private forest owners with forest in Steinkjer, see table 3. To make sure the participants are comfortable, the interviews are recommended to be held in quiet locations (Bryman, 2016). All the participants got options on how they preferred to conduct the interview, either meet at their home, at a public space, their office or digitally. Three of the sessions were held at the home of the participants, and one interview was held digitally where the participant and the interviewer were at their own home. While the two interviews were held at other locations. One interview was held at a public area, and the interview with Steinkjer Municipal Forest was held at their office.

The length of the interviews was planned to be around 30-60 minutes. Four of the interviews were within the planned time, while two exceeded the time by about 10 minutes. None of the participants seemed to be rushed, and the impression is that all had sufficient time to express their opinions. Before the interview started, the participants were told about the aim of this thesis and the interview process, and all gave their permission to be recorded.



Table 3. Overview of participants

	Steinkjer Municipal Forest	Private forest owner
Participant 1	X	
Participant 2		X
Participant 3		X
Participant 4		X
Participant 5		X
Participant 6		X

#### **4.4.2 Data analysis**

The next step after the interviews were conducted are the transcribing, coding, and analysis of the data. The transcribing was done after each interview, while the coding was completed after transcribing the last interview. As the aim of this thesis is to gain knowledge of the forest owners view and experiences on the forestry policy, and the discourses within forest conservation and logging. The method used for the data analysis were a combination of discourse and thematic analysis. The thematic analysis involves the development of an index consisting of main themes and secondary themes stemming from the research. The data that has been gathered is subsequently structured into the coding index via repetitive work (Bryman, 2016). The steps in a thematic analysis include reading the data, generate codes that reflect the initial themes of the research questions, then search and analyse the data for the themes and code the information into a coding table (see table 4). The coding process for this thesis started with predetermined codes derived from the research questions, while a few additional codes was found during the transcription process.

Table 4. Example of a coding table used for this thesis (“RR” refers to resource regimes).

Main Theme	Logging			
Subthemes	Method	Sustainability	Conflicts	Differences in RR
Participant 1				
Participant 2				
...				

## 4.5 Assessment and Limitations

The evaluation of qualitative research commonly distinguishes between credibility, transferability, dependability, and confirmability (Bryman, 2016). Credibility refers to the trustworthiness and acceptability of the researcher’s conclusions. This is accomplished by conducting research in accordance with good practices (Bryman, 2016). Transferability refers to the ability to apply the findings of a study to other contexts beyond the unique research setting (Bryman, 2016).

Dependability in qualitative research involves maintaining comprehensive and easily available records of all stages of the research process. Thus, enabling other researchers to assess the validity of the results (Bryman, 2016). Lastly, confirmability refers to ensuring that the researcher acted with good faith and has not knowingly allowed personal views or theoretical biases to influence the execution of the research and its subsequent findings. This is accomplished by ensuring that the researcher has consciously avoided allowing personal biases to impact the research (Bryman, 2016).

### 4.5.1 Limitations

Several limitations have been encountered in relation to this thesis. The first limitation was the study area, which included the entire Trøndelag county. However, to obtain a better understanding of private forest owners and considering the limited timeframe, it was more advantageous to narrow down the scope to a single municipality. The fact that there were over 1000 private forest owners in Steinkjer municipality alone served as the driving force behind this decision. A further limitation was the difficulty in recruiting participants, resulting in a lower number of conducted interviews compared to the initial plan. This means that the

results cannot be generalized to the general population of forest owners in Steinkjer. And, the transferability of this project is limited (Bryman, 2016).

Furthermore, all the interviews were conducted in Norwegian and required translation into English. This influences both the transferability and the dependability. The interviews were conducted in Norwegian, as all participants are Norwegian. This choice was made to enhance their comfort and facilitate comprehensive discussion of all interview topics. This imposes a limitation when dealing with the data, as it increases the potential for misinterpretation. To minimise confusion, the coding was initially done in Norwegian and subsequently translated into English. Enabling to instantly compare the codes for verification, rather than having to search through the transcripts.

#### ***4.5.2 Biases***

Lastly is the consideration of biases. There are several kinds of biases, some common examples are sample biases, confirmation biases and social desirability biases. Firstly, sample biases are related to the study design and sample, which affect how the study is carried out, what kinds of respondents are included, and—most importantly—which respondents are left out (Smith & Noble, 2014). This bias is not significant for this project. As sample bias mostly becomes an issue when the findings are generalised to a larger population when the sample is not "representative." The limited scope of this research means the findings cannot be generalised to a broader context.

According to Smith and Noble (2014) confirmation bias is the term used to describe a human error in which a researcher tends to skew the results in favour of their own viewpoint, or discourse, and so gives greater weight to data that reinforce this prior pattern of thinking. Confirmation bias is especially prevalent in qualitative research, as it is characterised by an overreliance on the researcher's subjective and frequently unsystematic perspectives of what is deemed noteworthy and important (Bryman, 2016). The research is on often conflicting forest management practises, and people have their own perspective on what is good management, including the researcher. As this thesis aims to look at the view and opinions of the forest owners, and compare public and private owned forests, there is no incentive for the researcher to inject their own bias on their opinions or make out some owners to be better than the other.

Social desirability bias is when respondents provide answers that they see as socially acceptable or desired, rather than the most precise or genuine responses (Bryman, 2016). Consequently, behaviours or attitudes that are considered socially desirable are frequently exaggerated in reporting, whereas behaviours or attitudes that are considered bad are downplayed or not reported at all (Bryman, 2016). This can affect this thesis, as the participants know that the researcher is from an environmental studies program. And can lead to them wanting to give answers that are viewed as more “socially acceptable.” To limit the effect of this bias, the participants were informed that the information they gave will be anonymised. Also, they were informed of the purpose of the interview, which was getting their experience of the forest governance, with special focus on the often conflicting practices of logging and conservation.



## 5 Discussion

The aim of this thesis is to get some insight into the forest governance and legitimacy, with emphasis on the discourses within the forestry policy, logging, and conservation. This thesis also focuses on and compares two specific types of forest property owners, the individual private owner, and a public owner which is a municipality forest owner in this project. Additionally, the aim is to get the view of forest owners on the current forestry policy, and the discourse around logging and conservation. When applying the EGS framework by Vatn, it helps identify the different elements of the governance system, and including the view forest owners have on the various aspects of forestry governance. The first part goes through the Governance Structure for the Norwegian forests, and then will move into legitimacy, including environmental outcome. The second part of the discussion limits the scope and examines the discourses within logging and conservation. The discussion is based on the view from forest owners from the study area Steinkjer. The discussion also involves comparing the perspectives of public forest owners and individual private forest owners. The case area for this thesis is Steinkjer municipality, and the participants were a representative from Steinkjer Municipal Forest (SMF), and individual forest owners with forest land in Steinkjer. Note that this thesis is not representative to all forest owners in Steinkjer, but rather a view on some of the perspectives and experiences within the Steinkjer forestry sector.

### 5.1 Governance Structure

This includes an analysis of the governance structures, policies, and stakeholder interactions that define the management of Norwegian forests. It offers a multi-dimensional perspective, considering environmental, economic, and social aspects, thus providing a comprehensive understanding of the challenges and opportunities in Norwegian forestry governance. The governance is discussed with the views and experiences of forest owners from Steinkjer Municipality. While also comparing the a public forest, Steinkjer Municipal Forest, and individual private forest owners with forest in Steinkjer.

#### ***5.1.1 The forest policy***

The forest policy (Chapter 2.2.2) in Norway demands sustainable resource management. And the forestry act is the pillar of the forestry policy in Norway. It states the demands for the forest owners on how they should manage the forest, including measures and instruments (2.2.3) that are mandatory for forest owners to comply to. These exists to make sure that the

Norwegian forests is managed sustainably, while also aiming to make it easier for a forest owner to achieve sustainable forestry practises.

The discussion around the forestry act is often whether it restricts forest owner too, much or if it is too lax. While most of the owners find the act to be good, especially when including certification. Som participants in this thesis mentioned that the forestry act is too mild, on some aspects and give forest owners too much freedom. As one participation said, "*The Forestry Act is great, but it completes a lot better with the certification scheme*". Such as felling young forest. As the act was simplified a few years ago, it opened for the felling of younger forests. Of course, the certification of PEFC have come with restrictions that states a minimum age for harvesting, which restricts this activity. But it is still legal, you just can't sell it with a PEFC certification, and thus may struggle selling your timber. One forest owner mentions that this limitation is needed, as it has been a big issue previously in Norway and Trøndelag, that owners felled too young forests. But that it is better now, as the buyers mostly want forest with PEFC certification. The report by Bergseng et al. (2018), explains that harvesting the forest before the minimum age of harvest has a negative impact on the CO2 uptake. Another limitation of the act is the duty of rejuvenation, this must be performed within 3 years. A few forest owners find this to be too long, especially in forest areas with high site index.

Further, one participant pointed at another weakness of the forest policy. It is that only the forest owner is held accountable if anything untoward happen in their forest. Even if it is other actors, such as timber-buyers, that destroy something important. It should be that the person who works in the forest also has a responsibility for what is done. If a timber-buyer cuts a goshawk nest, on the property, it is the forest owner that is held responsible. One owner said "*...the Forestry Act was probably made for the time when forest owners felled their forest themselves. So, it is not modernized enough. Changes in the Forest Act change late.*"

Other owners have different views and find the forestry policy, including the act and the complementing measures to be too big and complicated. There are a lot of information, and many considerations to take. Making harvesting in their own forest, feel like a much bigger task than it should be. They state that a lot of the forests are managed good, by good owners, and that all the implementations is not needed to cultivate a healthy forest. But these owners also acknowledge that the forest at times are impacted too hard, and that some take too little consideration to the condition of the forest. And therefore, all this may be needed. Further one

said *“It may be that it is a little too strict in many areas. I could have decided a bit more myself, but at the same time it is nice that there is a norm about this, which you must deal with. So don't see anything wrong with that”*.

To accomplish a sustainable forest management, the Norwegian government have given forest owners access to subsidies and payment scheme for conservation. The forest fund which includes a tax advantage is a saving fund for forest owners, this can be used on managing the forest property. To help manage the forest, the forest owners have a forest plan. This is a record of the resources and environmental values in the forest. Another measure for sustainable forestry is forest certification, this is a voluntary market-based instrument, and aims to make sure of traceability in all parts of the forestry sector. The forest report duty is when an forest owner must apply and get permission before starting felling, if the felling may affect valuable nature. There are also subsidies (Chapter 2.2.3.2) where forest owners can get financial subsidies for including in the management actions such as forest care, climate measures, building roads, and including specific management methods. Lastly, is the payment scheme that compensates forest owners for voluntary protecting their forest from harvest.

When it comes to measures and instruments the answer were divided up by the owners that did not know much about it, those who are quite happy with them and wishes more people take use of them, and one that found it lacking. One of the owners that did not take use of this offer said that as he has other full time work, he does not use this actively, as he probably should have.

One the other side, one said, as the tax benefit from the forest fund is really beneficial, he did not understand why there is not more activity, both with planting and young forest care, and not to mention road building. As he said *“When you get an 85% tax advantage in addition to using subsidies, that's, there are good money to save on that. So, I think it's strange that there isn't more activity. But, yes, again it's probably because I'm a little above average interested, so not everyone thinks alike”*. He further says that the subsidies could not be much higher, especially in Trøndelag, as he has compared Trøndelag' subsidies with the rest of Norway and concludes that it is good here in Trøndelag.

One of the participants pointed out that the forestry sector does not receive large sums for financial instruments, compared to crop production and other industries. And that more is used on protecting the forest that is spent on stimulating activity. He explains that there is a problem with the forestry planning process. In municipalities where a forestry planning

process is in place, every forest owner is required to apply for a grant individually. And then all the owners of the forest receive an equal percentage of support. And then it is necessary to include both environmental registration and forestry planning in that package. However, there are numerous forest owners who neglect to place their orders. If they don't act, neither the new registration nor the valuation of those properties will be completed. However, it is important to note that you can never gain the complete support of all forest owners. The percentage has fluctuated, reaching a high of about 95%, but also dropping as low as 50%. If the percentage is only 50%, then half of the municipality is affected. Shouldn't we do forestry in the last half then? Then to proceed, you will need to complete an additional registration.

This participant also mentions a suitable solution for this, by funding a joint project, which includes an overview of forest resources, environmental values, and MIS-figures, for the whole area (for example a municipality). This will give an overview of an entire area, without the holes of those owners that don't register for the current planning process. This should be done in regular intervals, so that the information is up to date. He then mentions that they have tried to mention this to Ministry of Agriculture and Food for years, but they won't listen.

#### *5.1.1.1 Habitats, recreation, and climate mitigation*

The forestry policy also underlines the importance of other attributes than timber volume and value creation. It also includes the importance of forests habitats for plants and animals, recreational arena, and as a carbon storage and capture.

The forest aims to mitigate climate change, and the Norwegian forestry policies facilitates to increasing the efficiency in the forest with subsidies (Chapter 2.2.3.2.2) aimed at climate measures such as fertilizing, planting in new areas, planting after felling. Similarly, there are environmental measures aimed at increasing value creation while also promoting and nurturing environmental values associated with biological diversity, landscape preservation, outdoor activities, and cultural heritage within the forest.

Most participants feel that the forestry act and the certification together, complement each other well. Like the previous discussion, the forest act is quite open and leaves much of the decision in the hands of the owner. But the certification put many more restrictions on the forest management. So, there are some agreements between the participants that the certification is the biggest driver for actions aimed at sustainable management. And all participants agreed that we must consider not just the economic value creation, but also climate and environment. Even though the environmental NGOs and the forestry sector often



disagree, on some of the priorities for a sustainable forestry. Most agree that we need a combination of harvest and protection. As one respondent mentions, “*it benefits the forestry sector to listen, not just do as you do... as we are dependent on people buying the products*”. He further mentioned that the certification was achieved through a collaborative effort, where various interest groups came together to discuss topics such as recreation, the forest, agriculture, and more, to reach an agreement.

While climate mitigation and forest use are seen as a good fit and complement each other (chapter 2.1.3). Forest as habitat for species are often in conflict with the forestry sector. This is often linked to the discourse between logging and conservation, this will be discussed further in Chapter 5.3.

## **5.1.2 Governance Structure**

### **5.1.2.1 Actors and Institutions**

Norwegian forest governance involves a variety of actors and institutions, each playing specific roles in managing and regulating forest resources. The actors can be divided between economic, political, and civil society actors. These actors work together to ensure sustainable forest management, environmental protection, and compliance with national and international standards. This thesis has a focus on the forest owners and includes the views of individual private forest owners in Steinkjer, and Steinkjer municipal forest. Furthermore, it should be noted that the forest owners who were interviewed had significant gaps in their knowledge of the forestry policy. Some of the respondents demonstrated a high level of expertise in forest policy, whereas the remaining respondents had less understanding. This was mostly attributed to the fact that the group of participants consisted of individuals who are employed full-time in the forestry sector and has said they are maybe extra interested in forestry. While the other individuals had less expertise and interests, as additional full-time employment and farming obligations took up most of their time.

Forest owners and their associations play a crucial role in the governance of Norwegian forests. In Norway, there are various types of forest owners as shown in table 1, and they are considered economic actors. The most abundant group consists of individual private forest owners. Public forests, including municipal and state forests, are managed by employees who have the responsibility of overseeing the forest property. Forest owners are responsible for managing their forests in accordance with national regulations, ensuring that sustainable forest management practices are implemented. Another important economic actor in the

Norwegian forestry sector is the timber buyer. Over time, this actor has taken on increased responsibilities and is now frequently tasked with performing the harvest.

Associations, who are political actors, frequently offer a range of services, advice, and support to individual forest owners. Local municipalities have additional responsibilities, such as local planning and development, which can have an impact on forest areas. They collaborate with higher levels of government to effectively implement forest and environmental policies. For example, the County Governor's Office. County Governors, also an political actor, serve as representatives of the central government at the regional level and play a crucial role in the implementation of forestry and environmental policies.

Other political actors include the Norwegian Environmental Agency (NEA), the Norwegian Institute of Bioeconomy Research (NIBIO), and the Ministry of Agriculture and Food (LMD). The Norwegian Environmental Agency is tasked with the responsibility of protecting the environment and ensuring that forestry practices adhere to environmental laws and regulations. Biodiversity conservation, climate policy, and pollution control all rely heavily on this. NIBIO conducts research on forestry, land resources, and related environmental issues. It offers valuable data, knowledge, and expertise that contribute to the development of forest policy and management practices. The LMD is primarily responsible for forest policy in Norway. The organisation oversees the management of forests, enforces regulations, and provides support for sustainable forestry practices.

Lastly, we have the NGOs and environmental groups, which are civil society actors. Non-governmental organisations (NGOs) and environmental groups have a crucial role in advocating for the protection of the environment, conservation of biodiversity, and promotion of sustainable forestry practices. They frequently collaborate with government agencies and actively engage in public discussions and policy development. Some examples of these civil society actors, that are relevant for the forestry sector, include the actors focused on forestry. Such as the Norwegian Forest Owners' Federation, Norskog and Allskog. Other actor that aims more at the protection of nature are World Wildlife Fund (WWF), Naturvernforbundet, and Sabima, as these are important drivers in the sustainable use and conservation discourses.

Some of the institutions involved in the governance of Norwegian forests include research and academic institutions. Universities and research institutions play a crucial role in forest governance through various means. They conduct extensive research, offer education and training programmes in forestry and environmental sciences, and provide valuable advice on

policy and management practices. Industry and trade associations are institutions that represent the interests of the forestry sector, which includes timber producers, processing industries, and related businesses. Their work involves promoting sustainable industry practices and actively participating in policy discussions.

These actors and institutions collectively contribute to a multi-faceted approach to forest governance in Norway, balancing economic interests, environmental conservation, and social values. These actor and institutions are the main drivers behind the current forestry policies. And there are several discourses between the different actor regarding a sustainable forestry, some of this will be discussed in chapter 5.3 and 5.4, on logging and conservation.

### ***5.1.3 Resource Regime***

#### ***5.1.3.1 Property and Use Rights***

In addition to determining who may access forest property, property and use rights also govern who may withdraw resources from the forest and, who may exercise exclusion or alienation.

The rules of access in the context of property and use rights refer to the guidelines and regulations that dictate who is allowed to enter a specific area or property. In the context of Norwegian forests, the traditional right of public access, known as 'allemannsretten', grants individuals the freedom to freely explore outlying areas (Miljødirektoratet, n.d.). In general, people can access most forest areas for activities such as hiking, skiing, and camping, as long as they do not cause any harm or disrupt the wildlife. The right to withdraw resources from forest properties varies depending on whether it pertains to forestry products, wood products, or other forest resources. The exclusive right to extract wood from a forest lies with the owner of the forest. However, under the rights of public access, individuals are entitled to harvest berries, mushrooms, and flowers, except for protected species.

The forest owner, whether public or private, has the right to manage their own forest. But the management must adhere to The Norwegian Forestry Policy (Chapter 2.2.2), and the legal and administrative instruments (Chapter 2.2.3.1) such as forest fund, plan, certification, and report duty. There may be exceptions if other agreements are made, such as voluntary conservation, then the forest owner has renounced their rights to manage the forest. The forest owner no longer holds the right to regulate and transform the resource as well as giving up the right to carry out logging or other technical interventions. But the forest owner can still take part in the management of the protected area, with the help of Forest owner organisations.

Further, forest owners have no right to exclude people to access the property, but they can exclude them from harvesting timber and other wood products. Alienation rights belong to forest owner, they have the right to sell or lease their land. A voluntary conservation can be linked to alienation, as the owner leases their land to the state, and gets a compensation that reflects the value of practicing forestry on the chosen property.

### *5.1.3.2 Rules of Interaction*

The rules of interaction within Norwegian forest governance are designed to promote sustainable and responsible use of forest resources. They involve a complex interplay of direct interactions among stakeholders, and indirect interactions that are shaped by regulatory, economic, and social factors. Vatn (2015) highlights four types of trade important to the EGS model, trade, command, community rules and no rules. Here I will discuss the first three interactions trade, command and community rules.

#### *5.1.3.2.1 Trade interaction*

Trade, within forestry, includes the most basic interaction. Forest owners have the right to harvest and sell timber and other forest products from their land. This interaction is affected by market dynamics such as price, quantity, and quality. The price of timber and other wooden products has been quite low for some time, but lately the price has had an substantial increase (Steinset, 2023). Also, higher quality products will often increase the price. Another impact on price is certification. As uncertified timber will not be attractive on the market, and therefore catch a lower price or even not be sold. As the market are asking for certified timber products. Overall, the products that can prove they are from sustainable managed forest, will have a better advantage.

#### *5.1.3.2.2 Command interaction*

Command interaction often include the use of hierarchical power structures. Such as governmental regulation and enforcement. As discussed previously in chapter 5.1.1, the Norwegian government, both state and municipality, has included many measures and instruments to make sure that the forest owners adhere to a sustainable management. This can be seen as a command interaction, as there are mandatory actions that the forest owners must adhere to. Some of the examples of this is reforestation and taking consideration for environmental values in your forests. Some command interaction can be a bit more indirect, such as subsidies and financial incentives. The Norwegian government utilises economic tools such as subsidies and grants to exercise control. The purpose of these financial incentives is to

promote sustainable forestry practices, including environmentally friendly harvesting techniques, reforestation, and conservation efforts.

#### *5.1.3.2.3 Community-based interaction*

The interactions within the Norwegian forestry sector are influenced by various factors such as social dynamics, local traditions, and cooperative behaviours. These elements shape the way individuals and groups engage in forest management and use. Community interactions can include interactions with the local community to environmental groups. People in local communities can feel a connection with the forest and interact with the forest property and the forest owner about the use and management of the forests. The Norwegian Forest also has free access to recreational activities, and utilisation of non-tree products. This will lead to many interactions with the local community. One of the participants said this about Steinkjer municipal forest, and the importance for the local community: *"They are very good, the municipal forest, here. Both in terms of facilitating for people in Ongdal going to the cabins and mountains, and they also own areas around the ski stadium in Steinkjer where they help in preparing ski tracks and hiking trails. It is much easier for the sports clubs, and such, when a positive landowner facilitates instead of being difficult"*.

### **5.1.4 Environmental Governance Systems**

#### *5.1.4.1 The environmental resources and processes*

Vatn (2015) mentions that environmental resources and processes are crucial aspects that directly influence management practices, policy decisions, and interactions among various actors. This can also be linked to the Ecosystem Services, see Chapter 2.1.1.

The forests' ability to provide timber, regenerate, and store and sequester CO<sub>2</sub> is a critical attribute, that influences policies and practices. For example, the Norwegian forestry governance offers subsidies to rejuvenate the forest, increase the growth of the forest, and thus increase CO<sub>2</sub> uptake and storage. These subsidies are for practices such as fertilizing, young forest care and tree planting. This will stimulate forestry activity, as one would want to grow forest until they are old and ready for harvest, then plant new trees. Further is the possibility to substitute fossil products with forest products. As one of the participants explained *"Old-growth forests breathe, while young forests capture CO<sub>2</sub>. If we only have old-growth forests in the end, they won't absorb enough CO<sub>2</sub>, so we need to have a cycle of both young and old forests. It's a balance that needs to be maintained. We should be building with wood, not with concrete and steel. Build more with wood, use more wood, and then we must*

*keep it going. Yes, there are more products we find that replace oil".* He also explained that fertilizing the forest 10 years before harvest, gives the trees a boost that increases the volume of the forest. This gives the owner more timber and wood-products, while the forest also takes up more CO<sub>2</sub>. Also, the certification which aims to put guidelines to a sustainable forestry, affects the management of forest, as forest owners must follow the rules of the certification if they want to have access to the market that wants certified timber and wood products.

Other attributes that affect the forest management are tree density, species diversity and habitat. These attributes will influence the decision on conservation areas or what harvesting methods can be used. Also, spatial distribution plays a role. For example, if the forest is close to a city or a densely populated place, it may affect the choices made concerning to the people living close to the forest. This was brought up by several of the participant, that forests closer to cities often must consider maintaining hiking trail, keep the forest tidy, and may be consider other logging methods than clear cutting in popular recreational areas.

Another attribute to consider is the role the forest play as a habitat for flora and fauna, see chapter 2.1.4. From this a conservation target has been set at 10%. The resolution demonstrates a comprehension of the environmental importance of forests and the necessity to strike a balance between conservation and other uses. As big impacts on forests, such as forestry, can have unintended impacts on the species living there. This have also brought up the debate on using other logging methods, see more in Chapters 2.1.5 and 5.3.

A further attribute of the forest is the use of it for recreation, hunting, education, or as a cultural and spiritual place. This can also affect how the planning and management of the forest resource is executed, as they may have to consider the impact forestry may have on the local community. By the participants, this was said to be the biggest difference between public and private forests. They mentioned that as a public forest, Steinkjer Municipal Forest, has a bigger responsibility to cater to the residents. SMF says *"There are different interests that walk in the forest and, there are many hiking paths that you will be involved in facilitating. You have more financial muscle too perhaps, but we leave them [trees] over there, as it was nice in relation to the hiking trails"*. SMF further said that, even though they only must keep within the certification scheme, they feel a responsibility to facilitate to the local residents. And, as mentioned previously, they have a good reputation for facilitating recreational activity. SMF also mention that they feel a responsibility to be a part of the drive

for progress, and be open to try out new management options, this will be discussed further in Chapter 5.3.

#### *5.1.4.2 Technologies and infrastructures*

Technologies and infrastructure are crucial in the Norwegian forestry sector as they shape governance systems, influence decisions made by different actors, and have a significant impact on the overall effectiveness and sustainability of forest management. This includes harvesting technologies, monitoring and management systems, transportations and logistics, processing technologies, digital communication tools, and infrastructure development.

Forest monitoring and management includes systems such as GIS and MIS-registrations, that help monitor the forest and give valuable information to the forestry plan. By giving accurate data, such as forest health, growth rates, and environmental values in forests. When using better technologies, the policy decisions can be better informed. Most of the forest owners did not talk about this, but the few who did, mentioned that they felt it worked well for them and they found the information practical. Those that talked about this, noted that they might be more than average interested through the fact that their jobs were in the forestry sector. They found the information useful, but it may be difficult to understand for those who does not have the experiences with the language used. Also, as mentioned before, not all forest owner orders these services and therefore it leaves holes in the information of the total forest area.

The rise in digital communication tools is also a result of society becoming more digitally connected. Most processes can be easily completed using a digital platform, such as applying for subsidies or accessing the forest fund. Most participants were aware of and some utilised the digital platforms provided by Steinkjer municipality. They found this approach to be significantly more efficient compared to scheduling in-person meetings with the municipality.

Technological advancements are also being made in the areas of harvesting, sawmills, and processing plants. These advancements aim to improve efficiency, reduce harm, and minimise waste in the timber processing industry. SMF expressed their difficulties with certain aspects of forest management, specifically when using oversized machinery that caused excessive impact on the forests. When they got access to smaller machines, they were able to carry out their intended tasks with reduced environmental impact. There are also subsidies to technologies, such as building roads.

#### 5.1.4.3 Pattern of Interaction

The patterns of interaction among various stakeholders in the Norwegian forestry sector are influenced by the choices made by individual economic actors, the number of actors involved, and the specific characteristics of forest resources (Vatn, 2015).

Different forest owners experience the forestry policy, and the accompanying measures and instruments, differently. As this thesis met people with different knowledge base and experience within the forestry policy, it impacts how they interact with other stakeholders. Those who had higher knowledge of the policies, often interacted with the municipalities to gain access to subsidies that increases the production of timber and increasing the value creating activity in the region. As increased timber production are also beneficial for other economical actors, such as timber-buyers, who are needed to sell the forest products. And as one of the respondents explained, timber-buyers need a steady amount of product every year to manage to provide stable employment. And as, these timber-buyers compete, with each other, on access to the forest resource, it can also affect when a forest is harvested. As another participant said *“They [timber-buyers] also know that if you have left the forest for another 10 years, then it has paid off for the forest owner, while the forest owners are interested in it being felled. Then the timber buyer does not say no, because then he [owner] would rather go to the competitor. That is why the certification has been introduced, with a minimum age”*.

While some respondents take use of the instruments within the forest policy, other do not interact with these opportunities. One respondent said *“should maybe be better at taking care of the forest. Would get a bit more out of it, I may have been bad at that, but at the same time I've had a steady job for all these years, which has been the priority... I think it's important to take care of the forest”*. As a few of the participants explains, the forestry instruments are beneficial for the forest owner, including instruments to help with sustainable management, and with subsidies to cultivate a more efficient forest. Why then, are private forest owners not taking advantage. When asked if the subsidies could be better, one of the respondents said that they, almost, cannot be higher. And that Trøndelag has quite good subsidies compared to other areas in Norway. When asked about the instruments, about the access and comprehension, a few said that they found it a bit difficult to know how apply for and understand the offers from the municipality. While a couple of other respondents explained that they found the forestry instruments to have an easy and understandable process. But they also conceded that they have an over average knowledge and interest, and that their experiences may not be representative of other forest owners' experiences. Maybe the



municipalities need to go through their systems. And see if there are adjustments that can be made to how forest owners find, learn and access about the opportunities that are on offer. If this does increase the participation, the question is then if it is time to change how a forest owner gains access to the instruments of the forest policy. One can, for example, follow the suggestion of one of the participants, mentioned in Chapter 5.1.1. And relocate funds to a joint project that will register the necessary information for all the forest in one area, for example a municipality, this will make sure that there are no holes in the important registration for the corresponding forest area.

The governance system aims to meet management targets or goals. If outcomes don't match these goals, the governing structure must be changed, establishing a better system. The resource and targets actors perceive most affect the desired outcomes. Different results serve different interests, hence actors have diverse views on resource system adaptation (Vatn, 2015).

### ***5.1.5 Summary***

In summary, the chapter on Governance Structure in this thesis offers an analysis of the approach to forest governance in Norway. It draws attention to how important it is for different parties and organizations—such as associations, governmental bodies, wood purchasers, forest owners, and non-governmental organizations—to work together to manage and regulate forest resources. Forestry policies are greatly influenced by environmental concerns, specifically those related to CO<sub>2</sub> uptake and habitat preservation. The recurring theme of balancing conservation efforts with economic activities often sparks debates among various stakeholders.

The Forestry Act plays a crucial role in shaping Norway's forestry policy, which is focused on promoting sustainable forest management. The policy requires the implementation of sustainable practices, while also providing forest owners with flexibility. The flexibility offered is counterbalanced by certification schemes that enforce more stringent guidelines, thereby ensuring the maintenance of sustainable practices. The Norwegian government provides additional support to promote sustainable forestry by offering subsidies, tax advantages, and conservation payments. These incentives are aimed at encouraging forest owners to adopt and maintain sustainable practices. Table 4 show a summary of the measures and instruments discussed here, and their overall effect.

Table 5. This table show the measures that contribute to sustainable forest management in Norway.

Measure/Instrument	Description	Overall Effect
<b>Certification Scheme (PEFC)</b>	Sets stricter sustainable practices	Enhances marketability and eco-friendliness
<b>Rejuvenation</b>	Requires timely reforestation, must be within 3 years according to PEFC.	Ensures forest renewal and CO2 absorption
<b>Forest Fund</b>	Tax advantages and savings for forest management	Encourages investment in forest care
<b>Forest Plan</b>	Management guide based on resources and values	Aids in effective and informed management
<b>Forest Report Duty</b>	Permission required for potentially harmful felling	Protects valuable natural areas
<b>Fertilization</b>	Use of nutrients to enhance forest growth	Improves forest productivity and health
<b>Planting</b>	Replanting trees in harvested or degraded areas	Ensures forest sustainability and regeneration
<b>Subsidies &amp; Payment Scheme</b>	Financial support for various forest-related actions. Ex. for conservation, forest care, climate measures, building roads, etc.	Incentivizes sustainable practices

However, there are challenges associated with the governance structure. There are concerns regarding the Forestry Act, specifically regarding its level of restrictiveness or leniency. Additionally, there is an issue with the unequal distribution of knowledge and engagement among forest owners when it comes to forestry policies. Some forest owners possess extensive knowledge and actively participate in utilising the available resources, while others, for reasons such as having other full-time jobs, are less involved.

Overall, this chapter explains the forest governance in Norway, emphasizing the need for a collaborative approach among various stakeholders. It underscores the importance of a governance structure that is flexible yet robust enough to ensure sustainable forest management while catering to economic, environmental, and social needs.

## 5.2 Legitimacy

### **5.2.1 Input Legitimacy**

Input legitimacy refers to the appropriateness and acceptability of the decision-making process, considering the main reasons and the interests of the various actors involved. The main concepts participation, transparency, and accountability (Vatn, 2015).

#### *5.2.1.1 Participation*

The participation within the forestry policy for forest owners includes taking part in reaching pre-conceived goals that aims at sustainable forestry. This participation approach is linked to participation development, which involves efficiency and effectiveness measures. This strategy assumes that involving people will boost development support. To succeed, people must be capable and ready to follow the instructions and maintain this over time (Vedeld, 2017).

As discussed previously, the forestry policy includes several measures and instruments where the goal is a sustainable forest management. Which includes increased forest volume and regrowth, and, to maintain environmental and recreational values. To accomplish these goals there are several forestry measures and instruments (chapter 2.2.3) available to forest owners, both public and private. These are there to help forest owners maintain a sustainable forest over time, and support efforts that facilitates value creation. Such as giving subsidies to forest culture, roads, planning. There are also subsidies for climate and environmental measures, as these are important parts of a sustainable forest. According to the respondents that have taken use of these measure, they find them very effective. Such as fertilizing, rejuvenation, and thinning. One mentioned that fertilizing the forest 10 year before harvest, the forest would gain a significant boost in both volume and quality. Thus, the state gave a grant up to 50% for fertilizing. And even though thinning is a long term investment, it gives results. But even if these measures give both increased volume and quality, and thus increased income. Several forest owners still don't participate. There are several suggested reasons for this, one is that most average forest owners just don't have time. They have other employment or a farm to take care of. Others mentions lack of knowledge and interest. A few of the participants, admitted that they lacked knowledge and time to take advantage of these measures, and acknowledged that they should be better at this.

To have more people take part in what is considered effective forestry measures, there must be an efficient system to help owners gain access. Similar to before, there was a divide

between the respondents. Some find the process of gaining access to these measures and instruments, efficient. While other do not. An explanation is that those that has a career in forestry, and those that have used these measures before, have the experience and thus the task will be less daunting. While for those that have not applied before, it can be a lot of work to gain the knowledge needed. Therefore, to include those that might be interested but find it difficult, the municipality and other governing bodies, should consider finding ways to make the information more accessible and understandable. One respondent brought up the need to make the information more understandable, as it is not pedagogical. He mentioned that the subsidy for denser planting is impossible for many to understand how much it amounts to. As it depends on several factors, such as how close you plant or what the site index is. If it had been 1nok per plant, it would be easy to understand and calculate. Now you have to make a excel sheet to find out.

So even if the measures are effective, the forest owners aren't participating, and it can be traced back to the need for better and more efficient information to owners. Of course, there are probably several forest owners that just don't want to take part. If this is seen to be a persistent issue, maybe the joint project method suggested by one of the respondents could be an option. A similar solution is proposed by Follo (2014), who suggest to have a forest coordinator. The coordinators work would entail organisation and supervision of collaborative efforts among multiple forest owners. The forest coordinator plays a vital role in managing the forest holdings of various property owners. This involves comprehensive planning for the entire forest, considering various factors such as the unique characteristics of the forest, the terrain, logging methods, and road networks. The goal is to identify the best possible solutions for the activities that will occur in the forest within a specific timeframe.

Another, solution could be cooperation between forest owners as suggested by Follo and Vennesland (2013). That forest owners should acknowledge the advantages of cooperating with one another. They should also have a clear understanding of the dynamics involved in multi-property cooperation. It is crucial for them to overcome the limitations of solely focusing on their own forest estate. By doing so, they can effectively promote successful collaborative management approaches (Follo & Vennesland, 2013). Several advantages to cooperation are pointed out, including increasing forestry knowledge and competence, lower costs and better prices, help with solutions and decision, and contributing to increased economic growth (Follo & Vennesland, 2013).

### *5.2.1.2 Transparency*

Transparency is the degree to which a process is open and accessible to the public. In order to ensure a transparent process, it is essential for the public to have access to information regarding the decisions being made and the arguments supporting them (Vatn, 2015).

Within forestry, a lot of information is made public, Statistics Norway publishes numbers, tables and summaries both quarterly and yearly. The information includes many facts about the forest and its properties, and they update facts from the forestry sector, such as how much forest is harvested, planted, and sold. Also, webpages by NIBIO, the government, the county governance office, and the municipalities publish information concerning the forestry sector. For example, the Steinkjer Municipality webpage has a dedicated forest page where you can get in contact with people working within forestry. And the PEFC requires that data from environmental registrations or other types of environmental information must be provided when it becomes necessary. The necessary information should be provided promptly, within one month of receiving the claim (PEFC Norge, 2015).

The Norwegian government also provides updates on policy changes. If you are seeking information, a significant amount of it can be found through an online search. Certainly, some data can be more challenging to obtain, such as the specific ownership details, as these details can be considered private information. Additionally, certain information may be deemed inaccessible due to its lack of clarity and comprehensibility.

Accessing information about the forest policy is relatively easy, although some of the information may lack clarity due to its extensive nature. The issue of forest policy complexity has been previously discussed, with some forest owners expressing difficulty in understanding the information provided. It is concerning to observe that numerous forest owners are not actively engaging in sustainable forestry practices that can bring benefits to themselves, timber-buyers, and local communities. This limits transparency in the forestry sector. However, it is important to note that not everyone struggles to find this information, and the ease of access may vary depending on generational differences. This is primarily due to the fact that a significant portion of the information is now readily available online. Therefore, a lack of knowledge about technology becomes another obstacle for certain individuals. One participant observes that the systems have become significantly simpler. Today, webpages offer a wide range of facilitation and accessibility options. The user mentions that nearly everyone has a webpage, making it easy to find the required information by conducting a

simple search. The forest fund can be accessed through a digital portal. This portal allows you to view the historical records of activities conducted on your property over the years. You have the convenience of applying for grants from the comfort of your own home, eliminating the need to visit the agricultural office in person. For those who are interested in using the older method, they have the option to go directly to the office. Both options are possible. Previously, there was a method that is no longer widely utilised. In order to engage forest owners who may find the process challenging or lack motivation, an outreach operation was conducted. While it may be seen as an outdated approach, it can still serve as a viable means to connect with individuals who face challenges in participating.

Similarly, Follo and Kristiansen (2021) recommends there should be increased collaboration among forestry actors in order to make knowledge and competence resources more accessible and understandable to forest owners. One potential improvement they mentioned is the addition of easily visible internet links to beginner training programs. Furthermore, the text implies that effectively reaching forest owners who have limited knowledge about forestry may necessitate personalised interactions, easily comprehensible brochures, and dedicated web addresses that provide beginner-friendly information. This highlights the importance of employing customised strategies to engage with various groups of forest owners.

### *5.2.1.3 Accountability*

Accountability plays a crucial role in establishing the legitimacy of a process. It pertains to the connections and interactions among various actors involved (Vatn, 2015). Forest owners are held accountable for complying with forestry laws and regulations. This includes to adhere to sustainable forest management policies. Such as MIS-registrations, rejuvenate the forest, only harvest mature forest, etc. Today, to get the PEFC certification, forest owners cannot harvest the forest before it reaches maturity. For this regulation to be considered legitimate, it is essential that forest owners are held accountable for any violations of this rule. Otherwise, one may risk repetition of the offence.

One participant, explains how he and timber-buyers, discovered a grouse (*'tiurleik'*) on his property. When they found out they had to find where they were and make corridors for them. There were likely more than 100 cubic metres of material that remained uncut, as the birds were there. The forest owner still enjoys the sight of the grouse, about 7 years later. This is a method in taking accountability of valuable species on the forest property, by making sure the bird has a good amount of space and forest cover. Further, another respondent mentioned that

if such a thing went wrong, and the entrepreneur removed the nest without the forest owner's knowledge. Only the forest owner would be held accountable. He mentions that *"it should not only be the forest owner who is responsible for what happens in the forest. Everyone who does something with the forest should be held accountable"*. As modern forestry often includes other actors than just the forest owners, there should be an update to the policy. An update that gives accountability to all actors that take part in the forestry process.

The differences found for transparency are not found between public or private forest owners, but rather the owners' experiences and knowledge of the forestry and the forest policy. When it comes to accountability, the public forest Steinkjer Municipality Forest, shows a clear difference from private forest owners. As, expected by most of the respondents. SMF mentions that they feel a accountability to provide a stable extraction of timber for local economic actors. Including, supplying timber-buyers and sawmills with work, so that they again can provide a stable work for their employees. Another part they feel accountable for, is to be forward thinking and be curious, and take responsibility for furthering research. As they have more finances to support entrepreneurs and conduct research, compared to the average forest owner.

## ***5.2.2 Output Legitimacy***

In contrast to input legitimacy, which focuses on policy formulation, output legitimacy is concerned with the outcome of the policy. The main focus will be on three key concepts: distributive justice, effectiveness, and efficiency (Vatn, 2015).

### ***5.2.2.1 Distributive justice***

Disruptive justice concerns how the benefits and burdens are distributed across society (Vatn, 2015). The access to the forest and non-wood products are a benefit that is regulated by the right of public access policy, giving members of society the benefit of enjoying the forest regardless of ownership. Further, disruptive justice aims to guarantee a fair distribution of economic benefits derived from forestry, including profits from timber sales and employment opportunities. This involves providing support to owners of both small and large forest properties and ensuring that local communities derive benefits from local forestry activities. This touches upon what SMF mentioned in the previous chapter, where they felt responsible to give a stable flow of work to other entrepreneurs working in locally in Steinkjer. The SMF, further mentioned that Steinkjer is currently in a bit of a predicted slump when it comes to the

harvest of timber and wood-products. So, they have made a plan that include stable harvest for the years to come, and this also allows for more stabilities for timber-buyers and sawmills.

On the environmental side, disruptive justice necessitates minimising environmental impacts and ensuring that no specific community or group unfairly bears the brunt of these burdens. Strict environmental regulations and sustainable forest management practices are how this issue is addressed. To put all forest owner up to a similar standard, the certification system regulates how the forest owners can manage the forest through demand of the market. Thus, encouraging those working in forests to make sure to care for key habitats, threatened species and other special interests important for the forest ecosystem. Furthermore, is the importance of sustainable management for carbon uptake and storage.

Lastly, it is important to ensure that all stakeholders have a voice in the development of forest policy. Transparency is crucial for the public to be well-informed about the decisions being made and the supporting arguments, as discussed in Chapter 5.2.1.2. While also making sure that people can communicate their opinions and grievances on the forestry policy, and possible changes.

#### *5.2.2.2 Effectiveness*

Effectiveness evaluates how well a policy meets its goal. Effective forestry policies are designed to maintain or enhance the forest ecosystem's health while also considering the economic needs of those who depend on forest resources. This involves careful planning, implementation, and monitoring to ensure that the desired outcomes are achieved without unintended negative consequences. Also, make sure of the availability of funding and the motivation of stakeholders.

An effective forestry policy recognizes the dual role of forests in CO<sub>2</sub> sequestration and timber production. It is crucial for policy effectiveness to consider that forest utilisation should be balanced with its role in the carbon cycle. This alignment of timber production with climate goals showcases the potential for forestry policies to contribute to environmental objectives and economic needs simultaneously.

Lobbying efforts often play a significant role in shaping conservation targets, such as the goal of protecting 10% of forest areas. The effectiveness of these policies depends on carefully choosing conservation areas, with a focus on those that have high levels of biodiversity and are home to important species. To effectively address this issue, it is crucial to have a



thorough understanding of which forests play a vital role in providing different ecosystem services, as well as determining whether these forests may have limited economic viability for the forestry sector. As several of the respondents have pointed out. Protecting forests is important, but when selecting areas to exclude from harvesting opportunities, it is advisable to prioritise less economically viable regions. This approach helps minimise the impact on other stakeholders and local communities. Protecting such forests will also result in lower costs.

Further, several of the forest owners noted that the effectiveness of forestry policy is being challenged by various competing land use pressures. These pressures include the conversion of forest lands into roads, industrial areas, or residential developments. To effectively address these pressures, policies should prioritise the protection of high-quality forest lands and incorporate the ecological value of these areas into land use planning.

The effectiveness of forestry policies in achieving sustainability is highly dependent on the availability of funding and the motivation of stakeholders. Funding to sustainable forestry, or funding to preserve forests, require adequate financial resources and incentives to encourage participation and compliance among forest owners and other stakeholders.

The participants held varying opinions on the effectiveness of the incentives offered in Norway. One respondent mentioned that there are various incentives available, such as 85% tax benefits offered through the forestry fund, as well as other subsidies. He also finds that investing in subsidised activities such as planting, young forest care, and building roads is beneficial and efficient in gaining value to the forest. So, it is surprising that there isn't more activity happening. This perspective suggests that even though there are financial incentives, the level of activity may not align with the available opportunities. This could be because forest owners have different levels of knowledge, interest, and commitment. Another participant pointed out that the funding to cultivate the forestry sector was much less than other agricultural sectors. And that more attention and funds were going to preserving forest. Additionally, it was noted that promoting shared responsibility among all stakeholders in forestry, including contractors and forest owners, can significantly improve the effectiveness of policies. This approach guarantees that all individuals engaged in forest management and operations are held responsible for implementing sustainable practices.

Even though the forest policy in Norway is often considered to be quite sustainable. There are still numerous concerns regarding the outcomes of the policy and the measures being implemented to ensure alignment. Some suggestions to improve the outcomes of these

policies include tightening regulations regarding logging age, implementing reforestation obligations, and closing loopholes in forestry laws. It also promotes the idea of shared responsibility among all parties engaged in forest activities, which helps to improve compliance and sustainability. Additionally, it is important to explore methods of motivating and involving forest owners and other stakeholders in collaborative efforts to promote sustainable forestry practices.

### *5.2.2.3 Efficiency*

Efficiency for the forest policy requires carefully balancing economic and environmental factors. A comprehensive approach is necessary, which goes beyond simple cost analysis and includes considerations of ecological, social, and distributive justice aspects. The goal of this broader perspective on efficiency is to ensure that forest conservation and management strategies are not only cost-effective, but also fair, sustainable, and in line with wider societal and environmental objectives.

When determining whether an area should be managed for forestry or protection, all participants emphasised the significance of considering economic, ecological, and social factors. When forests are protected from logging or other economic activities, there is a potential loss of income from these activities. To develop an effective forest policy, it is crucial to consider the opportunity costs involved. This means carefully considering what is sacrificed when we prioritise conservation over exploitation.

One respondent's opinion expresses a positive perspective on the importance of protecting forests, particularly in marginal areas where the economic impact of conservation is relatively low. However, there is a contrasting viewpoint regarding high-productive areas that are easily accessible and have valuable timber resources. Most respondents suggest a reluctance to conserve high-productive areas due to the significant economic opportunities they present. This highlights a key efficiency challenge: balancing ecological benefits with economic losses, particularly in areas where forestry is a major economic driver.

Furthermore, some of the participants discussed the wider socioeconomic implications of extensive forest conservation. Excessive protection of forests may result in job losses within the forestry sector, which can have a negative impact on workers' livelihoods and cause economic difficulties within local communities. The statement highlights the importance of adopting a sustainable approach that considers the livelihoods of those dependent on the forestry industry. The argument presented here emphasises the importance of finding a

balance between conservation efforts and the economic well-being of communities. It suggests that an excessively aggressive conservation strategy may not be socially or economically sustainable.

Another perspective that was brought up is the presence of substantial forested areas that, although not formally designated as protected, remain untouched because it is economically unfeasible to engage in logging activities. This scenario inadvertently contributes to conservation, as these areas remain forested simply because it's not economically viable to exploit them. This aspect of efficiency demonstrates how conservation can be achieved without the need for formal protection measures, as it is driven by market forces and economic feasibility.

Efficiency in forest protection isn't just about the cost of conservation but also about its impact on local economies and communities. It requires a nuanced approach that acknowledges the economic realities of forestry-dependent regions, the socio-economic implications of conservation, and the potential for market-driven natural preservation in economically unviable areas.

### ***5.2.3 Summary***

To improve the input legitimacy, it is important to address the issue of certain forest owners not being actively involved, despite the proven effectiveness of policy measures. There are several key reasons for this, including a lack of time, knowledge, and interest. In order to address this issue, it is crucial to simplify access to forestry measures and improve the accessibility and comprehensibility of information. There are a couple of proposed solutions to address this issue. One option is to establish a joint project that involves multiple forest owners in a specific area or appointing a forest coordinator to manage collaboration among multiple forest owners and encouraging cooperation between them, which could lead to increased knowledge, lower costs, and economic growth. Further, although a considerable amount of forestry information is publicly available, there is a problem with its clarity and comprehensibility, limiting transparency in the sector. Some forest owners struggle to understand the complex information, and generational differences in technological literacy exacerbate this issue. Recommendations include increasing collaboration among forestry actors to make information more accessible and providing beginner-friendly resources and personalized interactions to engage various groups of forest owners effectively. Also, The current system places most accountability on forest owners for adhering to sustainable forest

management policies. However, as modern forestry involves multiple actors, there's a need to extend accountability to all participants in the forestry process. This would ensure a more comprehensive approach to maintaining sustainable practices.

To achieve output legitimacy for the forest policy, it is crucial to tackle challenges by engaging stakeholders inclusively, making decisions based on evidence, and implementing strategies that are adapted to local contexts. The main challenge in achieving distributive justice is to ensure fair access and equitable sharing of benefits from forest resources. The proposed solution involves actively involving all stakeholders in the development and implementation of policies, while also ensuring transparency and fairness in the distribution process. When considering effectiveness, the challenge lies in finding a balance between CO<sub>2</sub> sequestration and timber production, and biodiversity conservation. While also limiting land use pressures, on high-value forest. The solution requires the integration of scientific data and local knowledge to determine which areas should be prioritised for conservation, and what areas should be reserved for forestry. Additionally, it is important to customise policy implementation based on the motivations and capabilities of stakeholders, recognising the diversity in their priorities and knowledge. Efficiency presents the challenge of balancing economic losses with ecological benefits. The forest policy should consider a nuanced approach that considers local economic realities and explores conservation strategies includes both thorough ecological and cost-efficiency considerations. Thereby achieving a sustainable balance between economic, ecological, and social factors.

## 5.3 Logging and Conservation

This chapter explores the interplay between logging practices, forest management, and conservation efforts, highlighting differences in approach and philosophy between public entities like Steinkjer Municipal Forest and individual private forest owners.

### ***5.3.1 Logging***

Logging is an essential aspect of forest management that encompasses various methods, each possessing distinct characteristics, advantages, and limitations (see chapter 2.1.5). The choice of a logging method is influenced by various factors such as ecological impact, economic viability, forest type, and management objectives. The purpose of this discussion is to discuss common logging methods and understand the reasons behind their selection, offering insights into the management decisions of a few forest owners in Steinkjer. While also, looking into the differences between a public forest and individual forest owners.

### *5.3.1.1 Forest owners' perception and experiences with logging*

The participant for this thesis has a quite similar perception of logging as sustainable management. But there are big differences in experiences and how they manage their forests. All participants see logging as a sustainable management, as it consists of harvesting a renewable resource. They describe forestry as a big part of Norway's contribution to the green shift. As mentioned earlier, the forest is considered an important ecosystem for carbon storage and capture. This cycle of harvesting mature trees and replanting new ones not only maintains the forest's carbon capture ability, but also supports the production of renewable resources. Resources that are used as substitutes for carbon-intensive materials like concrete and steel. Innovations in using wood and other forest-derived materials for products traditionally made from fossil fuels, such as plastics or even in everyday items like toothpaste and clothing, further emphasize the versatility and environmental benefits of forest resources.

A few participants also point out some practices in forest management that can further enhance both environmental and ecological benefits. Practices like fertilizing forests before harvesting can significantly increase growth rates and quality, demonstrating a practical approach to enhancing forest productivity. The mandatory nature of replanting after logging, ensures the continuity of forest resources. Furthermore, by focusing on harvesting trees that are at the optimal age for logging, managing the planting cycles to avoid large-scale simultaneous harvesting, and continually seeking innovative uses for forest products, forestry can be a model of sustainability, offering a win-win situation for the environment, economy, and society.

All participants said that clear-cutting is their chosen method. The forestowner with smaller forest properties, mentioned that their main use of the forest was to harvest a few trees to use as firewood and products to fix structures around the farm. While one of them mentioned that they had previously had a felling on their property that was done by a timber-buyer, and the method used was clear-cutting. Those with larger forest also said that they had clear-cutting managed by a timber-buyer. They underline that clear cutting is the only economically viable option, as private forest owners usually only perform felling once in a generation. As it can take between 60-100 years before the trees are mature. All the participant also understands the importance of key habitats and vulnerable species, and is positive to make adaptations, such as corridors, and large edge zones with limited felling.

The public forest, Steinkjer Municipal Forest, owner describes that they see importance in considering alternative logging methods to clear-cutting, especially taking into account various environmental factors such as bird habitats, soil erosion, and landslide risks. The concept of edge zones has become more common, ensuring that certain areas are preserved for ecological balance. Further, there is a growing focus on selective logging, especially in more urban and vulnerable areas like mountain forests. In these cases, extra care is taken due to the slower recovery and higher vulnerability of these forests. Decisions around logging are not taken lightly, with considerations given to leaving strips of trees to preserve key species or biotopes, and understanding the dynamics of different tree species, like the propensity of spruce forests to suffer blowdowns. The municipality is willing to take a lead in trying new methods and being open to innovation in forestry practices. This involves experimenting and keeping up with new developments in the field.

SMF further explains that these considerations are important, and they are giving more attention to such measures. Their main mission is still a forestry that is economically viable, both for the municipality and for the local community. They highlight the importance of ensuring predictability to other economic actors in the municipality, by supplying a certain amount of local timber. They also find clear-cutting to be a cost effective and sustainable method. They do clarify that you need to manage your forest by being active throughout its rejuvenation and growth period, by using the previously discussed measures and instruments that are a part of the forestry policy. If you manage your forest well, clear cutting can be both economically and environmentally viable.

When asked about conflicts most participants answered that they had no experience with conflicts of any kind. A couple of the respondents mentioned they had one or two conflicts, and they were quickly solved. One of the complaints were not really because of the logging activities, but SMF had a complaint on a recreational area that was left in a bad state after logging. But when inspecting, the employee, found the path to be tidy and there was even left trees close to the path, so it looked nicer for those who used the hiking-path. That was the end of the episode.

The forest owners that were interviewed for this thesis, all had similar ideas to when a forest is ready for harvest. And that it was important to not fell trees that had not yet reach maturity. Some also noted that this have been a big issue, felling young forests. But that it has improved since the PEFC certification now has a criterion for minimum age.

The consensus from the forest owners that participated in this thesis is that with the use of good practice and following the criteria of the certification, clearcutting, in general, is the best option. As it is the method that is most cost-effective and gives good value creation for the local community. They also find selective cutting to be a good alternative in special areas that may have key habitats or species that need consideration, then one can both take care of the ecological values while also get some timber felled. All of the participant were also positive to conservation, but that one should not protect too much of areas with high site index and good accessibility, as this will lead to losing valuable timber. Conservation will be discussed further in chapter 5.3.2.

#### *5.3.1.2 Differences between public and private sector*

When talking to SMF and the individual forest owners, there were several differences highlighted. Firstly, SMF demonstrates a willingness and a sense of responsibility when it comes to trying out new logging methods, participating in research, and engaging in activities that can be considered expensive and time-consuming. They said that as they have more economical power, and they sit with a lot of knowledge and experience they should be open to try out new things. Comparatively, private forest owners have smaller properties and less economic power and does not see much profit from standard practises. Another difference is that when private owners they execute a felling on their property, it will probably be the only fell once every decade or with longer intervals. While SMF aims to fell at least 2000 cubic meters, every year, as they feel a responsibility to provide local timber for the local actors in the forestry sector so they can have a certain stability. The SMF have a management approach that is much more community-oriented, they also take much more responsibility to provide and maintain recreational areas. Which, after talking to the participants, was expected of a public forest.

#### **5.3.2 Conservation**

Forests serve as the natural habitat for a vast majority of terrestrial biodiversity, encompassing more than 80% of the Earth's diverse species. Conserving the balance of ecosystems is crucial, as disturbance can lead to far-reaching and potentially irreversible effects. In addition, forests serve as carbon sinks by absorbing substantial amounts of CO<sub>2</sub> from the atmosphere. This contributes to the mitigation of climate change. However, the objectives of forest conservation often come into conflict with the interests of forest owners and the forestry industry. Forests hold significant economic value for numerous forest owners. The timber industry plays a crucial role in many regions, serving as a major economic sector that

generates employment opportunities and contributes significantly to both local and national economies. While also being important for the green transition. Hence, implementing conservation measures that limit logging or establish specific areas as off-limits for economic exploitation can be perceived as a direct challenge to the livelihoods of both individuals and businesses.

#### *5.3.2.1 Forest owners' perception and experiences with conservation*

All participants support conservation and support the goal of 10% of the forest being protected from significant impacts, including forestry. But they all underlined that it had to be under a voluntary agreement, as they saw quite negatively on being forced to give a part of their forest. They also agreed that one should prioritise areas that were less valuable, such as areas that have no access roads or are unproductive. And some mentioned that much of the less accessible forest are considered mature and old, but it will cost more than the timber is worth to take it out. Leaving such areas protected without an agreement, and thus providing a form of forest conservation. Some also believes that if such forest areas are to be included, the goal of 10% is already reach.

They also note that, as mentioned in the last chapter, it is important to have value creating in forestry and to produce local timber to local stakeholders. Therefore some of the participant find the prospect of conserving much more of the forest unsustainable, for the local community. There is also an increased need for timber and wood-products, and if we preserve too much forest from harvest, it can affect the forests contribution to the green transition.

Several of the forest owner mentioned that they wanted more focus on protecting forest areas against other land use. As one participant said *"The forest should be protected against other types of development such as cabin and real estate development, deforestation. There is nothing that really prevents you, yes you have the obligation to regenerate, but then so much land is repurposed for other purposes. That's what I call deforestation. Yes, then it is no longer a forest area. No, it's taken for other purposes. And so there, the forest would have needed protection against this assault from other instances."*

They want more of the discourse on conservation to discuss and lobby the need to protect forest areas against land use change, or deforestation. Especially if the land is productive or has a high site index, as this means that you lose a lot more than if it was unproductive forest, or low site index.



Of the forest owners that participated in this thesis, only SMF are participating in forest conservation. They are participating in the volunteer agreement, and they have not experienced any conflicts. SMF vocalised an positive attitude and felt it was an exciting project to be part of, while at the same time get some financial compensation.

### *5.3.2.2 Differences between public and private sector*

As seen by the discussion above, there are no differences between public and private sector concerning attitude towards forest conservation. The one difference is that SMF is participation in forest conservation.

### **5.3.3 Summary**

This chapter focuses on the discussion of sustainable forest management practices in Steinkjer. This text highlights the contrasting approaches between public forests and individual forest owners. Logging is considered a vital component of sustainable management, and it is approached differently by private and public owners. Both SMF and private forest owners primarily rely on clear-cutting as a means of ensuring economic sustainability. Steinkjer Municipal Forest (SMF) are also more open to experimenting with alternative methods, that prioritise nature and recreation. The difference between the SMF and the private owners can be attributed to several factors. One of the main reasons is the SMF's stronger economic position and their community-oriented management approach. In contrast, the private owners have limited economic resources and engage in logging activities less frequently.

The chapter also explores the significance of forests as ecosystems for biodiversity and carbon sinks. It addresses the conflict between conservation efforts and economic interests. Both the public and private sectors actively support conservation efforts through voluntary agreements, with a focus on protecting areas that may have less economic value. Nevertheless, there is a common concern regarding excessive conservation of productive forests, as it may have an adverse effect on timber supply and hinder the progress towards a greener future. There is also a wish for more focus on forest land changing use.

## **5.4 Final Critique and Assessment**

Before going into the conclusion, I will go through the assessment criteria of dependability and validity. in relation to this thesis. According to Bryman (2016) dependability relates to whether the study is repeatable. This project should be possible to repeat, as both an description on the sampling and the interview guide is included. Because of privacy reasons,

the participants names are not included. Should also note that the interviews gathered the respondents' personal opinions, thus if this study is repeated it may provide different views, perceptions and experiences.

Validity encompasses credibility, which pertains to the consistency between the results and the conclusions. And transferability, that refers to the ability to apply research findings beyond the specific context in which they were obtained (Bryman, 2016). Here there are some limitations. The first limitation is the limitation on the number of participants. This means that these results cannot be generalised to all forest owners in Steinkjer, but rather it gives a view of the perception and experience of some of the stakeholders in the forestry sector in Norway. There was never a plan to generalise the data, but to get perspectives from specific forest owners. There are a few causes for the low number of participants, the first is the time limitation made it difficult to plan for many respondents, seeing as each interview would last between 30-60 minutes, and then adding the transcribing and coding, too many participants would not be feasible. Another limitation, came from the lack of response, most people did not answer the phone/email, and many that answered declined. The last cause is personal difficulties that disrupted the research progress. Lastly, is the limitation on primary research regarding objective two, legitimacy, especially output legitimacy. Here there could be more direct information on how the participants find the outcomes of the forestry policy.



## 6 Conclusion

The governance structure for the forest in Norway, emphasizing the role of various actors and institutions in managing forest resources. The Norwegian Forest policy emphasizes sustainable resource management. Underscored by the Forestry Act, which is central to this policy, mandates sustainable forest practices and includes certification schemes to ensure compliance. The findings show that there's a debate between the participants about whether the Forestry Act is too restrictive or too lenient, with some owners feeling it's effective, but only when combined with certification, while others view it as overly complex. Further, the Norwegian government provides measures such as subsidies, tax advantages, and conservation payments to support sustainable forest management. This includes mechanisms like the forest fund, forest plan, forest certification, and forest report duty. The findings also show variations between the participants here, with some actively using these measures and finding them beneficial, while others are less engaged, often due to lack of knowledge, time, or interest. The data shows a big difference between the participants knowledge about the forest policy, measures, and instruments. To tackle lack of knowledge, or interest, it is suggested to create spaces where information is more accessible and understandable for the

average forest owners. The findings also show that it may be feasible to create a joint project or a collaboration, to combat the lack of participation. A space where knowledge, experience, and even expenses can be shared. There are many good sides to the governance structure, the problem lays in execution and accessibility. This affects the outcome of the police.

The legitimacy of forest governance is examined through the lens of input and output legitimacy. Legitimacy is established by promoting participation, transparency, and accountability. Although forestry policies are generally effective, there is a noticeable lack of participation from some forest owners. This lack of involvement can be attributed to limited time, knowledge, or interest. Therefore, it is crucial to address this issue by providing more accessible and comprehensible information to ensure that all forest owners can actively engage in forestry practices. This highlights the importance of considering projects that involve cooperation, as they can help alleviate some of the burden on individual forest owners. Public accessibility to forestry information effectively addresses transparency, although the complexity of the information can sometimes impede comprehension. This emphasises the necessity for developing new methods to deliver information that is easily comprehensible. To ensure more comprehensive and sustainable management, it is necessary to expand accountability beyond just forest owners and include all actors involved in the forestry process.

Output legitimacy focuses on the effectiveness, efficiency, and distributive justice of forestry policies. Distributive justice involves fair access and sharing of forestry benefits, highlighting the need for policies that consider local economic realities and the socio-economic implications of conservation. Effectiveness is a measure of how well forestry policies achieve their objectives, with a specific focus on maintaining or improving the health of forest ecosystems. It also takes into account the economic requirements of individuals who rely on forest resources. This involves finding a balance between timber production, CO<sub>2</sub> sequestration, and biodiversity conservation. It also involves addressing the pressures of other land use on forest areas that hold high value. The availability of funding and the motivation of stakeholders are factors that influence the effectiveness of these policies. Efficiency in forest management and conservation strategies encompasses more than simply analysing costs. It also takes into account ecological, social, and distributive justice factors. Efficiency in forest conservation involves considering the opportunity costs of preserving forests instead of using them for economic purposes. Additionally, it is important to examine

the socio-economic consequences of extensive forest conservation, particularly in regions that rely heavily on forestry.

Both public and private forest owners who participated in this project share the view that logging is a sustainable management practice that plays a crucial role in the green transition. Clear-cutting is the primary method used for logging, but in certain sensitive areas, some people choose to supplement it with less invasive methods like selective cutting. The findings show that Steinkjer Municipal Forest is more community-oriented, open to experimenting with new logging methods, and possesses stronger economic resources. Private forest owners, with smaller properties and less economic power, engage in logging activities less frequently and are more limited in their practices.

All participants supported the idea of conservation and shared the common goal of protecting 10% of forested areas from any significant impacts, including those caused by forestry activities. However, they emphasised the importance of voluntary conservation agreements. There was a common concern that excessive conservation efforts in productive forests could have a negative impact on the production of local timber for stakeholders in the area, as well as hinder the forestry sector's contribution to the green transition. Therefore, it is crucial to give priority to conservation efforts in areas that have lower economic value, such as lands that are less accessible or unproductive. The respondents also agree that forest land that is less accessible is already playing a role in conservation, even without formal agreements.

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## 8 Appendix

### 8.1 Interview Guide in Norwegian

#### **Kvalitativt intervjuguide**

##### **1. Introduksjon**

- 1.1. Hvem er du
- 1.2. Historie om gården og skogen, hvordan ble du skogeier?

##### **2. Skogen og skogbruk**

- 2.1. Hva er ditt forhold til skog, og hvordan bruker du den?
  - 2.1.1. Hva synes du er viktig med skogen?
- 2.2. Hva er prioritene dine for skogen? (Hoved/delmål)
- 2.3. Hva er for deg den beste måten å forvalte skogen på?
  - 2.3.1. Når anser du at skogen er klar for hogst?
  - 2.3.2. Påvirker prisen på tømmer hogstplanene?
- 2.4. Hva anser du som bærekraftig skogbruk?
- 2.5. Mener du det er forskjeller mellom privat skogeiendom og kommunal eid skog? Hvis ja, hva er forskjellene?

##### **3. Skogpolitikken**

- 3.1. Hva er dine meninger om skogbruksloven?
- 3.2. Hva tenker du om endringene i skogpolitikken og skogforvaltningen?
- 3.3. Skogpolitikken i Norge ønsker et skogbruk som har bærekraftig økonomi, natur og klima. Hvordan mener du disse interessene er vektlagt? Synes du at disse interessene er compatible?
- 3.4. Opplever du at informasjonen om skogpolitikken er enkel å forstå og godt tilgjengelig?
- 3.5. Finner du at det er en felles forståelse for skogbrukspolitikken mellom forskjellige aktører? Er det noen du føler handler i strid med hva du oppfatter som riktig?

3.5.1. Hvordan er samarbeidet mellom ulike aktører?

3.6. Hvordan opplever du din bestemmelses rett? Og synes du at dagens skog politikk reflekterer dine holdninger/meninger?

#### **4. Tiltak og virkemidler**

(Tiltak og virkemidler: Skogbruksplan, sertifisering, meldeplikt, skogkultur (ungskogpleie, landpleie), klima og miljø virkemidler, veier, skattefordel fra skogfondet, andre forvaltningsmetoder (taubane, hest) og frivillig vern)

4.1. Opplever du at informasjonen om tiltak og virkemidler er enkelt å forstå og godt tilgjengelig?

4.2. Hvilke av tiltakene/virkemidlene er du enig eller uenig med? (Hvorfor?)

4.3. Hva er din opplevelse ved bruk av forskjellige tiltak og virkemidler?

4.4. Fungerer virkemidlene og tiltakene som ønsket?

#### **5. Hogst**

5.1. Hva er din mening om de forskjellige hogstmetodene? (flatehogst, plukkhogst, etc.)

5.2. Hvilken hogstmetode har du brukt, og hva tenker du å gjøre i fremtiden?

5.3. Tar du hensyn til det lokale samfunnet når du velger hogst metode? Hvis ja, hvilke hensyn?

5.4. Opplever du konflikter rundt hogst? Hvis ja, hvilke konflikter og med hvem.

5.5. Hvordan håndterer du konfliktene?

#### **6. Vern av skog**

6.1. Hva er dine tanker rundt vern av skog?

6.1.1. Mener du prosessen er rettferdig?

6.1.2. Hva er fordelene og/eller ulempene med å verne skog?

6.2. Verner du skog?

6.2.1. Hvis ja: Hvordan opplevdes prosessen med å verne skogen? Hvordan forvalter du skogen som er vernet?

6.2.2. Kunne du tenkt deg å verne/ verne mer?

6.2.3. Hva er påvirkningen på om du vil verne/ ikke vil verne?

6.3. Hva tenker du om at Norge har vedtatt å verne 10% av skogen?

6.4. Norge har signert en ny internasjonal avtale (), der målet er å bevare 30% av arealene på land og i vann og fremme bærekraftig forvaltning av naturressurser.

6.4.1. Hva tenker du om denne avtalen? Tror du denne avtalen vil påvirke skogbruket, og vernemålene til skog?

## 8.2 Interview Guide English translation

### Qualitative Interview Guide

#### **1. Introduction**

1.1. Who are you?

1.2. Tell the history of the farm and the forest. How did you become a forest owner?

#### **2. The Forest and Forestry**

2.1. What is your relationship with the forest, and how do you use it?

2.1.1. What do you think is important about the forest?

2.2. What are your priorities for the forest? (Main/sub-goals)

2.3. What do you consider the best way to manage the forest?

2.3.1. When do you consider the forest ready for logging?

2.3.2. Does the price of timber affect your logging plans?

2.4. What do you consider sustainable forestry?

2.5. Do you think there are differences between private forest ownership and municipally owned forests? If yes, what are the differences?

#### **3. Forest Policy**

3.1. What are your opinions about the forestry act?

3.2. Norwegian forest policy aims for a forestry that is sustainable economically, naturally, and climatically. How do you think these interests are balanced? Do you think these interests are compatible?

3.3. Do you find the information about forest policy easy to understand and accessible?

- 3.4. Do you find that there is a mutual understanding of forest policy among different actors? Are there any you feel act contrary to what you perceive as correct?
- 3.5. How is the cooperation between different actors?
- 3.6. How do you experience your decision-making authority? Do you think current forest policy reflects your attitudes/opinions?

**4. Measures and Instruments** (Measures and Instruments: Forest management plan, certification, duty to report, forest culture (young forest care, land care), climate and environmental measures, roads, tax benefits from the forest fund, other management methods (cableway, horse), and voluntary protection)

- 4.1. Do you find the information about measures and instruments easy to understand and accessible?
- 4.2. Which of the measures/instruments do you agree or disagree with? (Why?)
- 4.3. What are your experiences using different measures and instruments?
- 4.4. Do the measures and instruments work as intended?

**5. Logging**

- 5.1. What is your opinion on different logging methods? (clear-cutting, selective logging, etc.)
- 5.2. Which logging method have you used and what do you plan to do in the future?
- 5.3. Do you consider the local community when choosing a logging method? If yes, what considerations?
- 5.4. Do you experience conflicts around logging? If yes, what conflicts and with whom.
- 5.5. How do you manage these conflicts?

**6. Forest Conservation 28.**

- 6.1. What are your thoughts on forest conservation?
  - 6.1.1. Do you think the process is fair?
  - 6.1.2. What are the advantages and/or disadvantages of conserving forests?
- 6.2. Do you conserve forests?
  - 6.2.1. If yes: How was the process of conserving the forest experienced? How do you manage the conserved forest?
  - 6.2.2. Would you consider conserving more?
  - 6.2.3. What influences your decision to conserve or not conserve?
- 6.3. What do you think about Norway's decision to conserve 10% of its forests?



6.4. Norway has signed a new international agreement aiming to preserve 30% of land and water areas and promote sustainable management of natural resources.

6.4.1. What are your thoughts on this agreement?

6.4.2. Do you think this agreement will affect forestry and forest conservation goals?



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