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An outlook on modalities in Nordic forest governance

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ABSTRACT

The 1990s were significant for several events promoting environmental protection and the sustainable use of natural resources. For instance, both the United Nations Conference on Environment and Development in 1992, which stressed the need to stop the overconsumption of natural resources and the United Nations Framework Convention on Climate Change endorsed a framework to combat climate change. Since then, national governments have been increasingly called upon to deliver various commitments that can strengthen sustainable use of forest resources. While we must assess the capacity of these commitments to achieve various policy targets, it is not entirely clear what modes of forest governance will emerge in this process. Using the case of Nordic Forest governance, we investigate its modalities and influence on forest use between 1970 and 2023, focusing on a shift from state-based to interactive governance. While state-based governance included the use of conventional state arrangements tackling environmental problems in active forestry, interactive governance consisted of policy mixes aimed at climate-smart and multi-use forest management. We discuss our findings using relevant forest policies identified in four Nordic countries; Finland, Sweden, Norway, and Denmark, drawn from qualitative interviews conducted in 2023. The conclusions suggest the future potential for policy mixes in which they play a vital role in promoting best synergies and setting priorities for sustainable Nordic forest management.

INTRODUCTION

Forest governance refers to multi-level engagements involving public-private actors to make and enforce decisions encouraging forest sustainability and fairness in distributing benefits derived from forest use (FAO 2018). It also concerns the institutional, policy and legal dimensions tackling direct and indirect drivers of forest loss and degradation (FAO 2018). Forest governance addresses the interactions between forest stakeholders, other sectors (private and public), and their equity concerns over forest use (Agarwal 2009; Arts et al. 2024; Arts 2014; Delabre et al. 2020).

In recent decades, forest governance has established itself as a specific environmental governance field, shaped by an array of policy processes. As examples, the United Nations Conference on Environment and Development in 1992 (UN 1999) and a series of International Arrangements on Forests in the 1990s were key forums for developing a broader global forest governance agenda. The expansion meant both involvement of a more diverse group of actors in the international forest governance discussions, as well as the ambition of broadening the priorities with attention to mitigating climate change through reducing forest-related greenhouse gas emissions (Rosendal 2001), safeguarding the rights of indigenous and local communities (Shrinkhal 2021; Carmenta et al. 2023), and halting biodiversity loss (Arts et al. 2024; Isbell et al. 2023).

In the EU, the forest sustainability agenda has been influenced in recent years by the European Green Deal (approved in 2019), the European Climate Law (enforced in 2021), the EU Biodiversity Strategy for 2030, the new EU Forest Strategy for 2030 (Lier et al. 2022), and the new EU Nature Restoration Law 2024/1991 (European Commission 2024). In the Nordic countries, this legitimation is shaping forest governance by emphasizing different aspects of sustainable development, multi-use forest management, stakeholder participation and various societal demands on forest resources beyond traditional forestry (Johansson 2016; Kröger and Raitio 2017; Fridén et al. 2024). In Finland, for instance, the Finnish Bioeconomy Strategy 2022–2035 was proposed to target the forest-based bioeconomy including consideration of resource efficiency and recycling.

In the Nordic countries, forests provide several ecosystem services, including carbon sinks, valuable ecosystems for flora and fauna, and a source of livelihood and recreational values. Meanwhile, forest management must consider the increasing effects of climate and biodiversity

crises, which bring about great uncertainties (Girona et al. 2023). Given the multiple demands, challenges, and opportunities tied to the forests and forest use in the Nordic countries, we must look beyond exemption-free command-and-control obligations to other supplementary schemes such as subsidies to optimize options for meeting sustainability targets (Stubenrauch et al. 2022). Nordic Forest governance is increasingly led by non-state actors and has been shown to comprise a mix of policies and instruments (Ayonghe et al. 2024). In this setting, analyzing the role and the development of policy mixes helps to make informed decisions when designing policies that aim to tackle persistent problems, such as sustainability challenges requiring more than one intervention across different sectors (Cejudo and Michel 2021). Hence, analyzing forest governance in the Nordic countries is a useful step towards revealing what policies and instruments should be adopted to address the various demands on forests.

However, to better prepare against the future uncertainties facing Nordic forests, decisions about their use require knowledge of the relevant changes in past and present modes of governance, and what subsequent path they might undertake towards meeting the sustainability agenda. Using four Nordic countries as cases, we ask the following two research questions:

(a) What were the prevailing modes of forest governance and their attributes in the 1970-2023 period?

(b) During the study period, how did policy instruments and modes of governance interconnect?

We identify governance modes using interview data from four countries (Finland, Sweden, Norway, and Denmark) and compare how the different modes of governance ‘played out’ through policies. These countries share similarities in their forest policy development and governance approaches across the 19th and 20th centuries, such as their demands for multifunctional forest systems (Fridén et al. 2024). We focus on 1970-2023, a period which is significant to understanding the forest policy goals related to the sustainability agenda leading up to and following the 1992 Convention on Biological Diversity (CBD) (Prestre 2002).

In the following sections we discuss the study’s conceptual background and analytical framework, followed by study materials and methods, study findings, and finally discussion and conclusion.

CONCEPTUAL BACKGROUND AND ANALYTICS FRAMEWORK

In the environmental governance literature, forest governance consists of legal, political, organizational, and cultural frameworks that coordinate diverse forest resource interests (Cronkleton et al. 2008; Delgado et al. 2019). Forests are subject to many competing socio-economic demands (Winkel et al. 2021), while being impacted by global challenges such as climate change, biodiversity and ecosystem loss (Speth and Haas 2006; Esty 2008; Hogl et al. 2012; Haarstad 2014). Because such problems often transcend multiple sectors, jurisdictional borders, and complex causalities, the term 'new modes of governance' emerged to tackle these persistent environmental problems (Childs 2013). As policies adapted to changes in the national contexts and state-society relations in the 21st century, societal actors, interest groups, corporations, and firms increasingly influenced governance arrangements through mixed public-private forms of regulation distinct from hierarchical governance (Hogl et al. 2012). This mix consisted of shifts in policy-making approaches that included state and non-state actors, increased interdependencies in multi-level governance, self-regulatory modes, and larger sets of policy instruments (Hogl et al. 2012).

In this multi-level governance setting, political decisions are negotiated between private and state actors in new governance modes departing from conventional legislation (Böcher et al. 2008) towards a neo-liberal trend that scholars in earlier studies have argued focuses on privatization, individual incentives, and market creation (Arts and Visseren-Hamdkers 2012; Lemos and Agrawal 2006; Di Giminiani 2016; Vatn 2018). In this distinction then, new governance modes are conceptualized by different steering modes and combinations of public and private actors (Rikke et al. 2012), in which both non-governmental or private actors may equally be involved in governing public domains, making governance public in its objective, yet private in form (Arnouts et al. 2012). Examples of this can be found in existing forest governance literature (Table 1).

Table 1. Conceptualizing modes of governance.

Governance mode	Description	Source
Innovative, ENGO- and market-based governance	Incorporates market actors through campaigns on decision-making. It also includes decentralization processes, market-based tools, and participatory approaches, e.g., group certification schemes.	Hogl and Pülzl (2013); Sarkki (2011)
State-based governance	Where the state initiates participatory forest planning in collaboration with local interest groups.	
Self-organizing local governance	Includes how local communities participate in decision-making, creating innovative ways to challenge state-based governance.	
REDD+ (Reducing emissions from deforestation and forest degradation)	This implicitly combines economic, political, and governance reforms within and beyond the traditional forestry sector towards transformational change.	Moeliono et al. (2020)
Interactive governance	Mixing state action with that of other entities.	Jäntti et al. (2023); Santosa (2022); Torfing et al. (2012)
Contemporary global governance	Mixing market actors, social actors, and other government entities.	

Note. Various authors have classified modes of governance using varied terminologies and concepts that complement each other.

Existing literature also distinguishes between two overarching descriptions of governance. These include 'command-and-control' that incorporates state-dominated mechanisms of governing forests, and 'good forest governance' encompassing reforms of the public sector and corporate management according to criteria such as cost-effectiveness, accountability, and participation (Woods 2000; Kjaer 2004). Good forest governance may also be defined by other principles, like efficiency, transparency, equity and adaptiveness (FAO 2018; Makrickiene et al. 2019). Despite various concepts and descriptions of modes of governance (Table 1), the state remains a key strategic player in shaping decisions about forest use through mediums such as policy instruments, networking, and innovation (Sergent et al. 2018).

The analytical framework of this study considers the nexus between policy instruments and modes of governance (Zehavi 2012; Bouwma et al. 2015; Knodt 2023). Previous studies have shown that governance debates often focus on conceptualizing how governance is characterized by networks and how it relates to various theoretical traditions (Le Galès 2011). By contrast, we focused on how policy instruments and their goals operationalize the mode of governance. In this operation, policy instruments become a fundamental tool used by governments in directing the decisions and

actions of stakeholders through guidelines, approaches, assumptions and general postures referred to as governance modes (van Vught and de Boer 2015).

Zehavi (2012) applied a similar framework through ‘Vedung's trichotomy’ to investigate the link between policy instruments and governance, emphasizing the need for analytical insights into governance that engage with policy instrument classifications. In response to this need, we explored other elements such as the policy instrument type, the corresponding policy goals, governance arrangements and their connection to the mode of governance (Table 2). In the next section, we describe the data collection process.

MATERIALS AND METHODS

The data collection was based on qualitative structured interviews in 2023 among 54 research experts specializing in forest policy and related fields in Finland (14), Sweden (15), Norway (13) and Denmark (12) (Ayonghe et al. 2024). Qualitative interviews enable the researcher to gather subjective experiences and attitudes about a study phenomenon through techniques that encourage participant reflection whilst maximizing careful interview planning and processing (Demirci 2023).

The basis for the interview guide was a previous document analysis of key policy changes in the Nordic countries (Fridén et al. 2024). This was used as a reference point when respondents were asked to identify the forest-related policies they observe as the most relevant in the countries considered in the 1970-2023 study period (Appendix 1). The interview guide's questions and structure were iteratively developed among the authors and further adjusted after a first round of pilot interviews with participants from each country. Following adjustments to the structure, we distinguished between two interval periods: (a) 1970-2000 with a rise in public regulations to tackle deforestation, and (b) 2000-2023 that experienced the increasing influence of globalization in national strategies to redesign forest management practices (Fridén et al. 2024). Although the focus of the interview was national forest policies in 1970-2023, respondents often also touched on international policies and commitments and instruments endorsed prior to the 1970s when deemed relevant to understanding changes in the forest governance modes. The interviews were

conducted in both Swedish and English and recorded and transcribed by an outsourced transcription service provider. To make sense of the governance arrangements, we applied inductive coding using ATLAS.ti 23[1], which enabled us to generate interpretive codes assigned to code groups (Figure 1). Inductive coding is particularly useful in uncovering patterns, concepts, themes, and their meanings in the data (Gupta 2023). An additional task involved thorough reading to familiarize oneself with excerpts from coded transcripts.

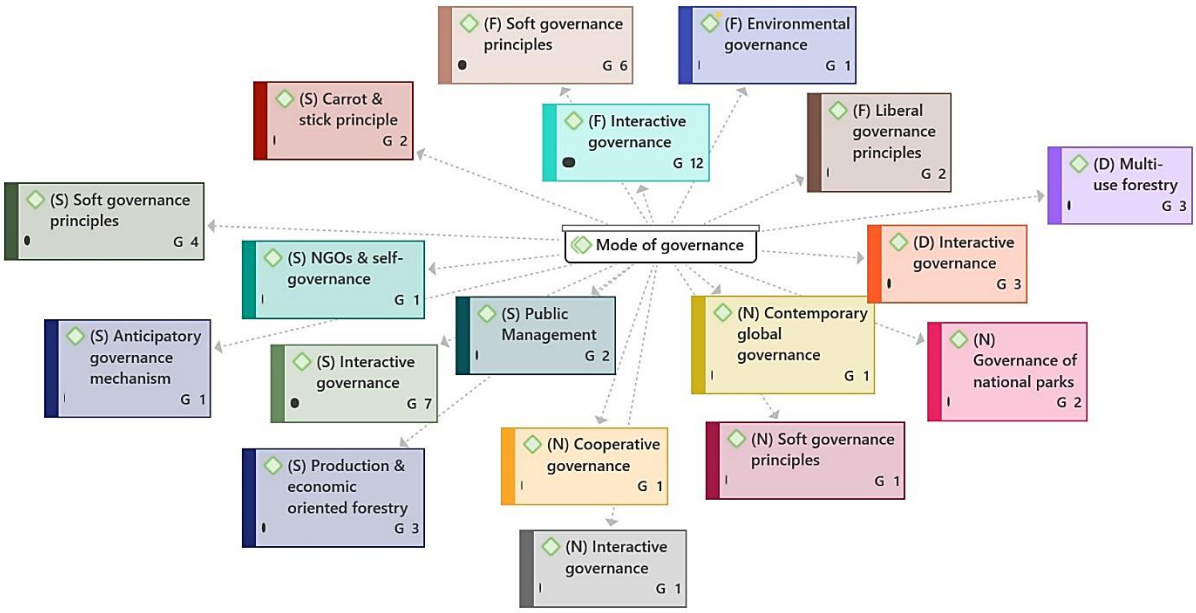

Figure 1. Initial codes and document frequencies from the inductive coding of empirical data in ATLAS.ti 23. Notes. Where indicated, Finland (F), Sweden (S), Norway (N), and Denmark (D).

[1] Refer to https://atlasti.com

RESULTS

This section presents the modes of forest governance resulting from the analysis of the policy instruments highlighted by the research experts interviewed (Figure 1, Table 2). We divide our results into two parts; state-based and interactive modes of governance.

Table 2. Common attributes of forest governance across the studied countries.

Governance mode	State-based	Interactive
Study period	1970-2000	2000-2023
Type of governance arrangements included	Mostly use of conventional state-arrangements	Use of public-private and voluntary arrangements
Policy instrument types	Mainly regulatory (but with other) policy	Regulatory, social and information-based, customary, payment for ecosystem services, certification schemes
Source of influence	International events and national demands	State, market actors, networks, ENGOs, forest associations, international governments (e.g., EU)
Overarching policy goals	Sustainable forest management, active forestry, and afforestation	Climate-smart and multi-use forest management

Note. Authors' illustration defined based on Cubbage et al. (2007), IPBES (2018), and OECD (2020).

We further elaborate on the two different governance modes and their presence in each country based on comparisons across the countries (Table 3).

Table 3. Cross-country comparisons of forest cover, ownership, and governance modes.

Country	Finland	Sweden	Norway	Denmark
Approximated forest cover of country land	75% (Finnish Natural Resource Institute 2023)	86% (Statistics Sweden 2023)	37% (Statistics Norway 2023)	13.4% (Statistics Denmark 2021)
Forest ownership structure	Public 31%, Private 59%, private businesses/institutions 9%, and others 1% (Lappalainen 2024)	Public 20.3%, private companies 24.9% Non-industrial private forest owners 48.6%, and others 6.2% (Swedish Forest Agency 2023)	Public 14.3%, private companies 6.6%, Non-industrial private forest owners 79%, and others 0.1% (Statistics Norway 2022)	Public 22%, non-industrial private forest owners 76%, and others 2% (Nord-Larsen et al. 2023)
Description of governance mode				
State-based	Considerations of nature protection and restoration	Aiming for equivalent policy goals for environmental protection and active forestry	Adopting measures to ensure forest yield through policies to secure the production potential of forests	Changes from agricultural-focus to more forestry-oriented management
Interactive	Towards a 'freedom of choice' principle for forest owners in forest use, and the transition towards a forest bioeconomy	Emergence of a 'more of everything' forestry model aimed at tackling new sustainability challenges	Influence of the Living Forests initiative aimed at setting performance standards for sustainable forestry	Incorporating close-to-nature management and principles for untouched forests

State-based governance mode

We observed that before 2000, forest policies were mainly aimed at sustainable forest management, afforestation, and active forestry in all the study countries (Table 2). Despite some national differences, state-based governance dominated in all our countries, and was manifested through regulatory policy instruments such as forest acts and other legislative frameworks. For instance, the Finnish Forest Act (No. 1093/96), which concerns sustainable forest resource use and preservation of biodiversity, set requirements for buffer zones and obliged forest owners to submit a forest use declaration to the appropriate Forestry Centre. Another relevant policy identified by the respondents was the Finnish Nature Conservation Act (No. 1096 of 1996) designed to maintain and restore the favourable conservation status of nature habitats and native species, with requirements for the temporal protection of sensitive areas and the designation of permanent nature reserves.

For Sweden, respondents contrasted two eras with respect to state-based governance. The Swedish Forestry Act of 1979 (1979:429) put emphasis on state-based forest governance in requiring forest management as a national resource to provide valuable yield while preserving biodiversity and recognizing other public interests. This broadened focus, which respondents also associated with discussions in the international arena, continued in the revision of the Forestry Act in 1993, which

sought to establish equivalent goals for production and environmental protection. The approach to achieving this was however shifted in what respondents describe as deregulation. Public-private partnerships, voluntary agreements and information-based policy instruments were now highlighted. At the same time, the Swedish Environmental Code (Miljöbalken 1998:808) consolidated environmental laws into a single section designed to strengthen nature protection. So, in the Swedish case, interactive governance modes had already dominated since the 1990s. However, regulatory interventions were still used but to a lesser degree. Examples of regulatory interventions are the Swedish Species Protection Ordinance (2007:845) which set out rules for specifying species protection, and arrangements to reduce carbon emissions in forestry under the Swedish LULUCF Regulation (2021) implemented through legally binding net removal national targets.

In Norway, a new forestry act was put in place in 1965, which primarily aimed at securing production potential and the annual forest yield. An important aim in the state governance of forests during the early 1970s was to promote afforestation. This included the use of even-age forest management. By the 1990s, the state incorporated sustainability measures in forest governance as an important step towards mitigating climate change. Plans also emerged for protecting coniferous forests. For instance, the Living Forests initiative with contributions to the FOREST EUROPE Pan-European voluntary forest policy process aimed at developing common strategies for sustainable forest management came in 1998. While the promotion of afforestation practices remained important, governance plans to protect coniferous forests emerged. Following Norway's adoption of the Habitats Directive (Council Directive 92/43/EEC) in 1992, goals were designed to ensure biodiversity by conserving natural wild fauna and flora habitats. Pursuant to this Directive, a coherent European ecological network of special conservation areas was developed under the title Natura 2000. This comprises special protection areas, strictly protected, the surveillance of natural habitats and species, with priority for natural habitat types and species. One respondent highlighted the institutional arrangements as important for how new policy instruments were received. Traditionally, Norwegian forest owners were shareholders of a local forestry cooperative through which they were obliged to sell their timber. As Norway entered the European Economic Area Agreement, regulations for opening up the market were put in place.

In Denmark, interviews showed that the state governance of forests following the 1970s was predominantly aimed at combatting deforestation. With the overproduction of agricultural

products in Europe during the 1970s, marginal lands in Denmark were transformed from agricultural production to forest. This led to land use changes towards more forestry-oriented management. In responding to the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil, 1992, the state implemented national government arrangements to safeguard and conserve Danish forests while improving their productivity. For instance, approximately 90% of the Danish forests were allocated for wood production following the Danish Forest Act (No. 383 of 1989). The Act aimed to conserve the Danish forests, improve forest productivity, and increase the total forest area. The government further adopted policy goals to combat deforestation through the National Implementation of Agenda 21, Chapter 11: Combating deforestation (Information Provided by the Government of Denmark to the United Nations Commission on Sustainable Development, Fifth Session 7-25 April 1997, New York) as part of the commitment towards achieving the UNCED sustainability demands.

Interactive governance mode

The results also showed that in the post-2000 period, forest policies trended more towards multi-use forestry and climate-smart forest management (Table 2; Table 3). For instance, in Finland, the involvement of economic and market-based certification instruments increased following the naming of the PEFC (Programme for the Endorsement of Forest Certification) Finland – Finnish Forest Certification Council in 2008, and the first meeting of the Finnish FSC (Forest Stewardship Council) working group in 2000. Both PEFC and FSC are international non-profit, multistakeholder organizations that promote responsible forest management via timber certification. Another significant governance arrangement that emerged in Finland after 2000 was the Forest Biodiversity Programme for Southern Finland METSO (2008-2025), a payment for ecosystem services (PES) instrument that subsidised voluntary conservation as a competitive option for logging in privately owned forests.

With sustainable forest management assimilated into the policy goals, forest policy aimed for the transition towards a forest bioeconomy mandated through the Finnish Bioeconomy Strategy 2014 (updated in 2022). Following the trend towards increasing interactive governance modes, governmental arrangements gave forest owners more freedom in decision-making about their own forests with the revision of the Finnish Forest Act (567/2014). The Act also emphasized the need to improve forest profitability and conditions for wood production, enhance biodiversity, and allow

uneven-aged forest stands, eliminating the age and diameter limits in regeneration, as well as allowing a more diverse range of tree species and valuable habitats. An important goal was to allow a more equitable operating environment for commercial service providers. The Forest Management Association Act (1142/2003) was designed to promote the profitability of forestry among forest owners, while providing them with services related to forest ownership and forest management. Furthermore, international government arrangements mandated through the EU legislation also influenced the national forest governance. For instance, the EU Biodiversity Strategy for 2030, which emphasized the need for climate-smart management approaches among other issues, advocated sustainable forest management.

As mentioned above for Sweden, the revision of the Forestry Act in 1993 (The Swedish Forestry Act 1993, No. 15 of 1994) explicitly stressed interactive modes of governance. For instance, it emphasized a 'more of everything' forestry model to address new sustainability challenges and new goals while seeking ways to introduce new management approaches and promote policy across sectors. It specifies forest as a renewable resource to be managed sustainably for good revenue whilst recognizing nature protection and other interests such as cultural heritage and reindeer husbandry. Several schemes were developed to shape the 'more of everything' forestry model. For instance, with the adoption of the Swedish FSC (Forest Stewardship Council) standard for forest certification in 1998, forest owners, forest associations, and other establishments were encouraged to adopt national standards to ensure that forest-based products were sourced from sustainably managed forests. The Swedish National Environmental Objectives (2001/02:130) articulated fundamental values to protect biodiversity and the natural environment, maintain long-term ecosystem productivity, preserve the cultural environment and cultural heritage, and ensure wise natural resource management. Moreover, the Swedish Species Protection Ordinance (2007:845) set out rules specifying what species were protected. We also find arrangements to reduce carbon emissions in forestry set out under the Swedish LULUCF Regulation (2021) implemented through legally binding national net removal targets.

For Norway, a collaborative initiative for sustainable forestry called The Living Forests was brought up by respondents as an example of interactive governance. The project started in the late 1990s and involved environmental NGOs and stakeholders from the forest sector who jointly developed a national set of performance standards for sustainable forestry. Just as in Finland and Sweden, market-based certification systems like the PEFC were adopted to reduce the negative

impacts of forestry on landscapes with high biodiversity values (e.g., PEFC N 02:2015 Norwegian PEFC Forest Standard). The pressure from national and international Non-Governmental Organisations targeting the paper industry played a major role in advocating for the need for certified forest resources. Two respondents mentioned that core aspects of interactive governance like cooperation and dialogue between actors were strongest when certification was first introduced in Norway.

Over the course of the years, the process has become less transparent according to the interviewee. Certification processes developed with the establishment of PEFC Norway in 1999 ensured that forests were sustainably managed. Governance arrangements also targeted the protection of biodiversity through forest inventories set forth via MiS — Environmental Inventories in Forests (2002), involving information, research and advisory services for supporting the sectorial responsibility in achieving biodiversity targets. The target of reducing greenhouse gas emission by 55% by 2030 compared to 1990 is an important goal under Norway's Climate Action Plan for 2021–2030. We also note modalities aligning national carbon reduction plans with EU climate targets and the Paris Agreement through the LULUCF Regulation (Decision No 269/2019).

Danish forestry governance arrangements between 2000 and 2023 were directed towards close-to-nature management principles, untouched forests and urban forestry through the Danish Forest Act (No. 453 of 2004) and the Danish Nature Package of 2016. The results also indicate a mix between regulatory, social, and information-based, market-based certification systems, and PES policy instruments during the post-2000 period. In connection with this mix, respondents saw Order No. 520 on subsidies for Natura 2000 of overgrown area clearing projects for the preparation of pasture (2015) as having been particularly useful to forest owners in retaining their compensation rights and protecting valuable habitats under Natura 2000 projects. Along with this arrangement, the motives of certification policies also aligned with market pressure from ENGOs that emphasized sustainable forest management with the likelihood of forest owners documenting that they were managing their forests sustainably.

DISCUSSION

This paper analyses the relevant modes of governance instituted between 1970 and 2023, what has changed over time and how these modes vary between the countries researched. Our study is limited to the views of research experts only, despite the relevance of other groups, such as policymakers, forest owner associations and NGOs, which play an instrumental role in forest policy processes. Regardless of this constraint, our analysis revealed insights into the changing nature of forest governance in the countries studied in the past five decades. Between 1970 and 2000, the forest policy instruments assessed by respondents were mainly regulatory and correspond to state-based governance modalities intended to ensure forest productivity, afforestation, and sustainable forest management, while we find mostly policies that show interactive forest governance modalities between 2000 and 2023. Such interaction includes the actions of ENGOs, forest associations, market actors, and international governmental bodies. This view supports previous studies that connect interactive governance with the governing roles of state, market and civil society (Kooiman and Bavinck 2013; Conway 2020).

Thus, between 1970 and 2023, we find that there were fundamental shifts from conventional state arrangements tackling the environmental problems posed by active forestry to interactive governance and policy mixes aimed at promoting climate-friendly and multi-use forest management. This is in line with Wolfslehner et al.'s (2020) analysis of the post-2020 scenario of a multi-sectoral governance system where there is an increasing cross-sectoral mix in policies and an integration of different forest services for multiple interests at the various levels of governance. What seemed to differ, however, was domestic differences in their shifts in forest governance mode following amendments to some regulatory policies. For instance, in Sweden and Finland, the Forest Acts, initially endorsed as regulatory instruments, were later amended to promote the voluntary protection of forests. Based on this development, forest owners could suggest areas to be protected by law and receive economic compensation upon state approval to set aside as a formal protected area on a permanent basis. It can also be argued that, even with modes of interactive governance, the degree of interactivity varies, as observed in the case of the PEFC N 02:2015 Norwegian PEFC Forest Standard for forest certification in Norway, wherein cooperation and dialogue were crucial among ENGOs in recommending certified forests.

Our findings make it relevant to ask what factors have contributed to these shifts in governance modalities, as well as the positive lessons and challenges they inform. First, in comparing the governances across the study countries, we observed an increase in what Corbera et al. (2021) and Humphreys (2009) refer to as a dominating neo-liberal discourse that advocates more self-regulation and voluntary agreements (Miljand et al. 2021; Nichiforel et al. 2020). In this neoliberal governance setting, various actors, the industries, and forest owners increasingly request policies that can meet multiple demands while granting them the required freedom to decide on forest use (Deuffic et al. 2018; Nichiforel et al. 2018; Juutinen et al. 2022). Such demands are often between intensifying wood production, preserving valuable habitats, and adapting to the impacts of climate change through carbon accounting to leverage mitigation efforts. This may also trigger positive developments with greater awareness of adopting more sustainable forest management measures. This view supports existing debates (Korhonen et al. 2018; Hetemäki and Kangas 2022; Mosley and Brusselen 2024; Wilde and Hermans 2024) on the need for diverse actor-involvement in designing and implementing forest use and management policies. However, while shifts towards interactive governance and policy mixes invite more stakeholders into decision-making, interviewees suggest that these more democratic and participatory developments do not necessarily lead to more representative outcomes. The Swedish case, where the economic interests of private owners, the forest industry and state-owned companies appear to dominate over conservation efforts and the safeguarding of cultural heritage, exemplifies this.

Second, these governance shifts involve challenges in that the effectiveness of inclining towards policy mixes and interactive arrangements remains contested and contrasted by case. As Pecurul-Botines et al. (2023) put it: “In sum, the move towards more participatory ways of designing and implementing forest policy is partially seen as promising but plays out quite differently depending on the context and commitment” (p. 37). One explanation is that the influence of EU forest policies has not been entirely welcomed among national stakeholders and policymakers in all the four countries we studied. This has led to a lack of political will (as in Finland and Sweden) to align with certain policies, as well as a divergence of opinions and attitudes towards forest policy that has led to small-scale forest owners in Denmark being sidelined (Pecurul-Botines et al. 2023).

Forest protection is also under increasing risk of conflict and lack of consensus among domestic actors (Jakobsson et al. 2021). While addressing different priorities in most cases can be challenging facing inadequate mechanisms to deal with conflicts, implementing sustainability

measures may depend on distinctive national characteristics, their path-dependencies, and prepollent policy decision-making characteristics (Pecurul-Botines et al. 2023). These Nordic countries also face policy coherence challenges in implementing climate policies. In Norway and Finland, for example, there is increasing political contention over how to achieve the LULUCF net carbon dioxide removal targets. With policymakers confronted by trade-offs, conflicting targets, and time inconsistency problems rather than synergies, forest carbon sink policies remain hard to address (Gulbrandsen 2024).

CONCLUSIONS

This study offered an outlook on the forest policies and modes of governance identified in Denmark, Sweden, Norway, and Finland. The results contribute to increased understanding of policy dynamics in a region where countries share many political dimensions, by shedding light on both similarities and differences in the interplay between governance trends and preferred policy types. We distinguish between the state-based mode, where the state takes a leading role in initiating the participatory forest planning processes in collaboration with local interest groups, and the interactive mode, which implies mixing state action with that of other entities. We found that state-led forest governance arrangements dominated the period between 1970 and 2000, with an increase in the use of interactive arrangements and policy mixes post-2000 aimed at multi-purpose and climate-smart forest management. This governance shift is, however, faced with challenges of policy incoherence and the lack of political will to adopt measures deemed necessary to tackle global challenges, such as climate change and biodiversity loss. Given these challenges in Nordic Forest governance, there is a need to assess the future potential of policy mixes within interactive modes of governance, their positive spillover effects, and the capacity to deliver options for sustaining valuable forest ecosystems in the Nordic countries. Ultimately, with expectations of hybridizing policies in forest governance to meet the demands of multiple actors, it is critical to also recognize the synergistic impacts of policy mixes, with comparisons across the Nordic countries that could usefully inform their effectiveness for the sustainable management of Nordic forests. In this recognition, one must pay attention to which forest ecosystem type and management

policy mixes effectively achieve their optimal outcomes for the efficient delivery of multiple ecosystem services.

CONFLICTS OF INTEREST

The authors confirm there are no conflicts of interest.

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APPENDIX 1. *Relevant forest policies in the Nordic countries.*

Finland	Sweden	Norway	Denmark
The Forest Act (No. 1093/96)	The Swedish Forest Act (1903:553)	Act on Forestry and Forest Protection (1965-05-21 no. 00)	The Danish Forest Act 1805
Finnish Nature Conservation Act (No. 1096 of 1996)	The Swedish Forestry Act (1979:429)	The Living Forests (1995-2006)	
National Forest Programme 2010 (2/1999)	The Swedish Forestry Act 1993 (No. 15 of 1994)	PEFC Norway (established 1999)	The Danish Forest Act (No. 383 of 1989)
Act on Metsähallitus (1378/2004)	Miljöbalk (1998:808)	The Habitats Directive (Council Directive 92/43/EEC)	The 1992 Convention on Biological Diversity (CBD)
The Forest Biodiversity Programme for Southern Finland METSO (2008-2025)	The Swedish FSC1998 standard for forest certification	MiS — Environmental Inventories in Forests (2002) MiS — Environmental Inventories in Forests (2002)	National Implementation of Agenda 21, Chapter 11: Combating deforestation Information Provided by the Government of Denmark to the United Nations Commission on Sustainable Development, Fifth Session 7-25 April 1997, New York
PEFC FI 1002:2014 **Metsäsertifioinnin kriteerit**	PEFC SWE 002 – Swedish PEFC forest standard (first endorsed in 2000)		PEFC ST 2002:2020 (Updated 2020) The Danish National Forest Programme 2002
Act on the Finnish Forestry Center 418/2011	The Nordic Saami Convention (2017)	The Forestry Act (2005-05-27 No. 31)	The Danish Action Plan for Biodiversity and Nature Conservation 2004-2009
Saving nature for people – National action plan for the conservation and sustainable use of biodiversity in Finland 2013–2020	The Swedish National Environmental Objectives (2001/02:130)	The Nature Diversity Act (2009-06-19 No.100)	The Danish Forest Act (No. 453 of 2004)
Forest Management Association Act (1142/2003)	Swedish Government Bill 2004/05:150 The Environmental Quality Objectives – A shared responsibility	The Norwegian Climate Policy White Paper Report No. 21 (2011–2012)	
The Finnish Bioeconomy Strategy 2014 (Updated 2022)	The Swedish Species Protection Ordinance (2007:845)	FOREST 22 (SKOG 22) - National strategy for forests – and the wood industry (2015)	Order No. 907 on subsidy subsidies for Natura 2000 projects on the clearing of overgrown areas and for their grazing (2011)
The Forest Act (567/2014)	Swedish Government Bill 2007/08:108 A forest policy in line with the times	PEFC N 02:2015 Norwegian PEFC Forest Standard	The Danish Nature Package 2016
Finland's National Forest Programme 2015 (adopted in 2008)	Strategic Plan for Biodiversity 2011–2020 and the Aichi Targets	LULUCF Regulation (Decision No. 269/2019) (entered into force 2020)	The FSC National Forest Stewardship Standard of Denmark (FSC-STD-DNK-02-2018)
Helmi Habitats Programme 2021-2030	The Forest Kingdom – with values for the world 2011	FSC Global Strategy 2021-2026	The Climate Act (No. 965 of 26 June 2020)
EU Biodiversity Strategy for 2030 **New EU Forest Strategy for 2030**	Swedish Government Bill 2013/14:141 A Swedish strategy for biodiversity and ecosystems		
	PEFC SWE 002 – Swedish PEFC forest standard (updated 2016)	Norway's Climate Action Plan for 2021–2030	
	Greenhouse gas reduction mandate (2017:1201)	National Forestry Accounting Plan 2021-2025	

The Swedish National Forest Programme (No. N2018/03142/SK)	PEFC N 02:2022 Norwegian PEFC Forest Standard
Government decision 2018-05-17 N2018/03141/SK to carry out a Nationwide Inventory of key biotopes	New EU Forest Strategy for 2030
National inventory of key biotopes (2019)	
The FSC National Forest Stewardship Standard of Sweden (FSC-STD-SWE-03-2019)	
Swedish LULUCF Regulation (2021)	
New EU Forest Strategy for 2030	

Source: Adapted from Ayonghe et al. (2024).