

# A systematic review of gender and forest ownership in the global north: Empirical trends and theoretical challenges

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## ABSTRACT

Research interest in gender and its implications for forest ownership in the Global North has increased over recent decades, contributing to a growing body of empirical studies. At the same time, the historical dominance of men and masculinities in forestry and forest management has shaped both policy and knowledge production, creating persistent biases in how forest ownership is understood. To assess the current state of scientific knowledge on gender and forest ownership in the Global North, this systematic literature review examines patterns of knowledge production, the nature of the knowledge produced, and remaining research gaps over the past 25 years. Following PRISMA guidelines, 103 studies were included after the search and screening processes. The results reveal a strong geographical concentration of research in the United States, Sweden, and Finland, and a clear methodological dominance of surveys, which constituted the primary method in 80% of the studies. Only 6% of the studies applied a mixed-methods approach. Consequently, gender is most often treated as an empirical variable used to identifying differences, rather than as a relational or institutional factor shaping forest ownership and management. Although approximately half of the studies explicitly focused on gender, many equate gender with women, reinforcing a narrow conceptualization. The limited integration of gender theory constrains the explanatory power and policy relevance of existing research. To strengthen future forest research and policy, this review highlights the need for more theoretically grounded and methodologically diverse analyses that conceptualize gender as a relational and meaning-making dimension of forest ownership.

## 1. Introduction

Internationally, forestry and forest management has historically been dominated by men (e.g. Colfer, 2021), and in terms of forest ownership, research has shown that the conditions for men and women differ (e.g. Lidestav, 2010; Follo et al., 2017). The fact that forestry, forest ownership and forest knowledge in various ways is shaped by gender inequalities, the dominance of men and strong masculine norms and values (e.g. Colfer, 2021; Colfer et al., 2016; Bergstén et al., 2020), creates specific challenges and biases for knowledge production, especially related to gender, which affects forests worldwide (Elias et al., 2017). This is partly due to differing expectations regarding actions and skills in a context historically dominated by men, which creates obstacles for women to engage as forest owners on equal terms and to develop their ownership based on their own interests and motivations (Andersson and Lidestav, 2016; Bergstén et al., 2020). The strong

masculine norms and structures contribute to that knowledge on forestry and agency is primarily associated with men (Bergstén et al., 2020). This is especially the case in the commercial forestry of the Global North (Arora-Jonsson, 2013). There, both forestry and related research are entwined with specific notions of rationality and neutrality, which tends to obscure unarticulated biases e.g. in terms of gender (Strelnyk et al., 2024; Koch and Matviichuk, 2021). The masculine association is dependent on specific meanings of forests, work and identities (e.g. Arora-Jonsson et al., 2021).

Nevertheless, research on gender in a forest context in the Global North has steadily grown over the past decades. Similarly, scientific knowledge on gender and private forest ownership has become more widespread in some countries like Sweden or the United States. This development is not covered in previous forest-related reviews on gender, which have centred on e.g. earlier work (Mai et al., 2011), methods to promote equity (Colfer and Minarchek, 2012a), a limited time period

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(Asher and Varley, 2018), forest landscape initiatives (Kristjanson, 2020), conservation and natural resource management (James et al., 2021), the bioeconomy (Sanz-Hernández et al., 2022), community forestry (Ota et al., 2024) and a wider Nordic focus (Katila et al., 2025). In fact, in the last decade smaller actors/organisations and private/family forest owners themselves have received less attention (Laszlo Ambjörnsson, 2020; Andersson and Lidestav, 2016; Kuhlman et al., 2023b), while larger forestry organisations and educational institutions have been prioritised in Northern gender studies (Johansson et al., 2023; Andersson and Johansson, 2025; Grubbström and Powell, 2020).

To better understand the current state of scientific knowledge on gender and private forest ownership in the Global North, a systematic review has been conducted based on three research questions:

1. How is scientific knowledge on gender and forest ownership produced in terms of topics, methodological approaches, materials, contexts, and theoretical frameworks?
2. What does current research reveal about how forest ownership is shaped by gender, and how does this influence the actions, relationships, and conditions of men and women as forest owners or as individuals becoming forest owners?
3. What knowledge gaps remain, and how can future studies be designed to contribute to a more comprehensive understanding of gender in relation to forest ownership?

Based on the review, opportunities for better integrating and theoretically advancing gender perspectives within forest owner research will be discussed, with particular attention to gaps and future studies. The shifting social, economic, political and environmental conditions and relations of forests and forest ownership are intertwined with gender in specific ways (Follo et al., 2017; Reed and Lidestav, 2023; Lidestav et al., 2019), which highlights the relevance of systemic and improved conceptualization of gender in specific contexts and its empirical and theoretical basis.

## 2. Theoretical framework

Sex (male/female) typically refers to biological differences related to reproduction, while gender refers to roles, behaviours, activities, and attributes considered appropriate for men and women in a specific social context and historical moment (West and Zimmerman, 1987). These expectations and norms are socially constructed and learned through socialisation, which (re)produces gender categories as differentiated and unequal. Inequalities are reflected in how responsibilities, activities, access to resources, and decision-making opportunities are distributed between men and women. These practices structure gender relations and create specific gendered meanings and understandings of e.g., places, positions, occupations, activities (Massey, 1994). When articulated and practiced, these meanings and structures contribute to the gendering of a phenomena e.g. through policy, organisations or research (Bacchi, 2017). In forest ownership, this could be different expectations of men and women as forest owners, in terms of knowledge, activities and interests, which shapes identity and agency of forest owners differently based on gender (e.g. Bergstén et al., 2020).

While gender often is viewed as binary, it can also be seen as a continuum, as some individuals do not fit into this binary. Also, it is important to underline that while gender always matters, it is not the only social aspect/category that matters. This means that gender intersects with other social categories such as race, class, age, and ethnicity, influencing gender relations. This approach is known as intersectionality (Colfer et al., 2018; Crenshaw, 1991).

Understanding gender as something 'done' rather than fixed allows for exploration of how gender is continuously created in social interactions and settings (Gunnarsson, 2003). These interactions, often perceived as gender-neutral, structure gender based on specific values, practices and belongings (Acker, 1990; Acker, 1992), which in turn

shape both the understanding of the setting and the knowledge produced within it (Acker, 2006).

## 3. Material and methods

To analyse present scientific knowledge and knowledge production on gender and forest ownership and to identify gaps in research and needs for future studies, a systematic literature review has been conducted (Petticrew and Roberts, 2006). Exploring the before mentioned research questions, the review process has followed the PRISMA 2020 statement and structure (Page et al., 2021).

In this process, forest ownership refers to "the legal right to freely and exclusively use, control, transfer, or otherwise benefit from a forest", which can be acquired through transfers such as inheritance, sales, or donations (FAO, 2018: 16). Gender refers to studies which deal with gender as a central part of their analysis, purpose and/or outcome – that is, where it serves as the primary focus (or one of the main focuses), rather than only as a variable. Additionally, gender concerns human gender, not gender or sex aspects of non-human species.

In terms of geographical scope, the focus of the study is on United States, Canada, Northern, Western, and Central Europe, excluding the Mediterranean and Balkan and countries east of Carpathians (Fig. 1). These regions show similar ecological and social conditions (e.g., an abundance of small private forest holdings; Zhang et al., 2005; UNECE/FAO, 2020), as well as comparable structures and traditions with regard to forest ownership (e.g., an increase in the number of women owning forest; Follo et al., 2017; Redmore and Tynon, 2011).

Based on the research questions, a search string was developed:

*(gender\* OR wom\*n OR female\* OR \*femini\* OR masculin\* OR male\* OR intersectional\*) AND (forest\* OR wood\*) AND (\*owner\* OR "property holder\*" OR NIPF\* OR non-industrial OR private) AND (sweden OR swedish OR denmark OR danish OR finland OR finnish OR norway OR norweg\* OR iceland\* OR nordic\* OR "united states\*" OR US OR USA OR U.S. OR canad\* OR german\* OR france\* OR luxemburg\* OR french OR netherland\* OR dutch OR "united kingdom\*" OR UK OR U.K. OR ireland\* OR irish OR austria\* OR switzerland\* OR swiss OR poland\* OR polish OR "czech republic\*" OR czech OR estonia\* OR latvia\* OR lithuania\* OR sloven\* OR slovak\* OR hungar\* OR belgi\*)*

The search term 'm\*n' was deliberately excluded since male dominance in the forestry sector often leads to studies naming or addressing

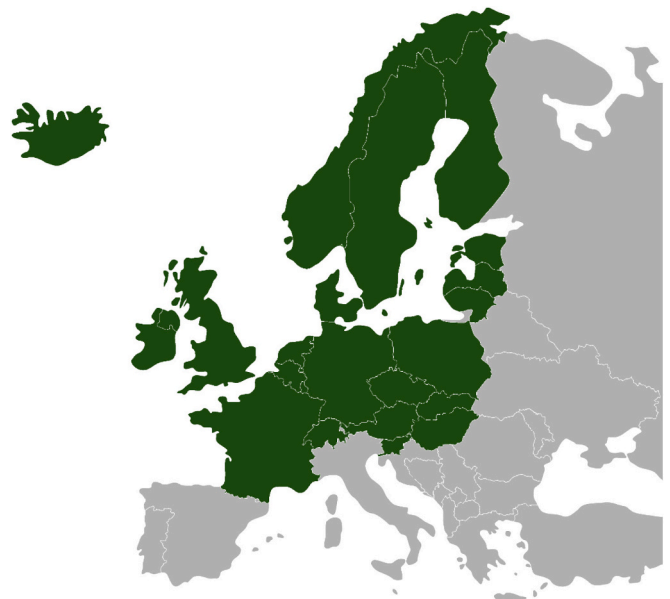


Fig. 1. Map of European countries included in the review.

men by default. To adequately cover the topic of forest ownership, we drew on a variety of synonyms for forest owners as used in different contexts and regions (e.g., NIPF).

The search string was then adapted to meet the requirements of the search engines of the databases used for our searches: Web of Science (core collection), Scopus, and GreenFILE. To mitigate the differing biases of the three databases, a triangulation strategy was applied to strengthen the alignment of the sample with the review's analytical focus. To improve the accuracy and reproducibility, the searches were limited to the search fields of title, abstract and keywords, which are standardised and indexed across most databases. Furthermore, the quality and reliability of the searches was assessed by testing the search results for key references and with the support of the AI-based research tool Research Rabbit. The search period covered the years 2000 to 2024 to reflect recent developments in the research field.

To ensure comprehensive coverage of relevant studies, two searches were conducted: one in February and one in April 2025. The searches yielded a total of 483 records. After duplicate removal, 315 records remained. These records were then included in the screening processes in accordance with the PRISMA 2020 guidelines (see Fig. 2) and imported into the online review software Rayyan, which was used for all stages of the review.

In the first step of the screening processes, the title, abstract, and keywords of each record were screened. Each record was screened independently by two reviewers. In case of conflict, it was discussed until consensus was reached or involved a third reviewer to resolve the disagreement. Reports were thereby deemed eligible if they did not meet any of the following exclusion criteria, which were assessed hierarchically in the order listed:

- (I) Written in a language other than English
- (II) Not published in a peer-reviewed journal
- (III) Not empirically based and using original data
- (IV) Not related to countries in the sample<sup>1</sup>
- (V) Addresses gender related to non-human species
- (VI) Does not address forest ownership
- (VII) Gender is not part of the empirical analysis

Gender was considered part of the empirical analysis if it was discussed within a paper's results, discussion, or conclusion sections. Reports that referred to gender solely in terms of the distribution of men and women among participants in a study were excluded.

After screening the title, abstract and keywords, 130 articles were read in full text and thereafter included or excluded in line with the above-mentioned criteria. All articles were independently screened by two reviewers.

For the data extraction, each report included in the review was independently read in full by one reviewer. All reviewers extracted data from the articles based on the following aspects: title; author; year; journal; country; empirical focus; theoretical framework; methodology/data; report's main conclusions about gender and forest ownership; other observations. The data was compiled in a shared spreadsheet, which served as the basis for the subsequent analysis. At this stage, an additional 27 articles were excluded based on the criteria.

In the final step, the dataset was analysed for descriptive characteristics to mainly address the first research question: the geographical contexts, the data collection methods, and theoretical frameworks of the studies. To address the second research question, the dataset was structured based on inductive coding by the first author to analyse the main thematic areas and results of the research. Structuring the result

section, the seven thematic areas identified were:

1. Forest ownership and acquiring,
2. Values, motives, and interests,
3. Forest planning and decision-making,
4. Practical forest management and work,
5. Knowledge, learning, and socialisation,
6. Forest service, relations, and support
7. Gendered structures, meanings and cultures.

On the basis of the result section, the third research question will be elaborated upon in the discussion section to conclude recommendations for future research, knowledge production and theoretical development. As a result of the limited and specific findings in terms of gender and focus — for example, interest in particular measures or orientations such as hybrid sweetgum plantations, whole-tree harvesting, or harvest residues for bioenergy — a number of studies have fallen outside the identified research themes (Lenning et al., 2024a; Goyke and Dwivedi, 2021; Kronholm et al., 2020; Brough et al., 2013; Lindroos and Burström, 2010; Vulturius et al., 2018; Škëma et al., 2024; Van Herzele and Van Gossum, 2009; Lenning et al., 2024b; Hartter et al., 2015).

## 4. Results

The overall results of the material show that the number of published articles in the last 25 years has steadily increased. From less than an article per year on average in the first decade of the 21st century, an average of four papers per year in the second decade, to an average of more than 10 studies per year over the last five years. The latter increase in publications mainly relates to an increase in studies in the United States (24 out of 52 articles).

Most of the studies were published in forest science journals. Publications on the topic were most frequent in *Scandinavian Journal of Forest Research* (16) followed by *Forest Policy and Economics* (14), *Forests* (11), *Small-scale Forestry* (9) and *Journal of Forestry* (8). The remaining publications are divided between six journals that had a few publications each (3–5), and 24 publications that were published in journals with 1–2 publications each. *Scandinavian Journal of Forest Research* has published almost one paper per year in the last ten years, while *Forest Policy and Economics* has published 1.5 papers per year in the last six years. About ten articles were published in environmental science journals. Only one paper is published in a journal of gender studies (*Gender, Place and Culture*).

### 4.1. Geographical contexts, research methods and theory

With 40 out of 103 papers in the sample, the United States was the most prominent research context in the studies. The second most frequently studied country was Sweden with 33 studies followed by Finland with 15 studies (Fig. 3). In general, European based studies are at majority. Only two out of the total 103 studies focused on more than one country (Larasatie et al., 2022; Pezdevšek Malovrh et al., 2011). Besides Norway (5), the remaining countries in the review are represented by one study or two studies.

Surveys constitute the data collection method that massively dominates this research field, included in 80% of the studies (Fig. 4). The great majority of these constitute various forms of forest owner survey. The second most common method is interviews (15%), followed by quantitative analysis based on databases or registers (9%). Most studies used only one method of collecting information and only eight studies used two methods. Of these were half mixed-methods (quant/qual), while the remaining half was divided into studies that either combined quantitative or qualitative methods. Unsurprisingly, surveys were often one of the two methods. Surveys were also more frequently used in research originating from the United States, with 37 out of 40 studies using surveys as an empirical method (92.5%).

<sup>1</sup> Denmark, Finland, Iceland, Norway, Sweden, the United States, Canada, Germany, France, Belgium, the Netherlands, Luxemburg, UK, Ireland, Austria, Switzerland, Poland, Czech Republic, Estonia, Latvia, Lithuania, Slovenia, Slovakia, and Hungary.

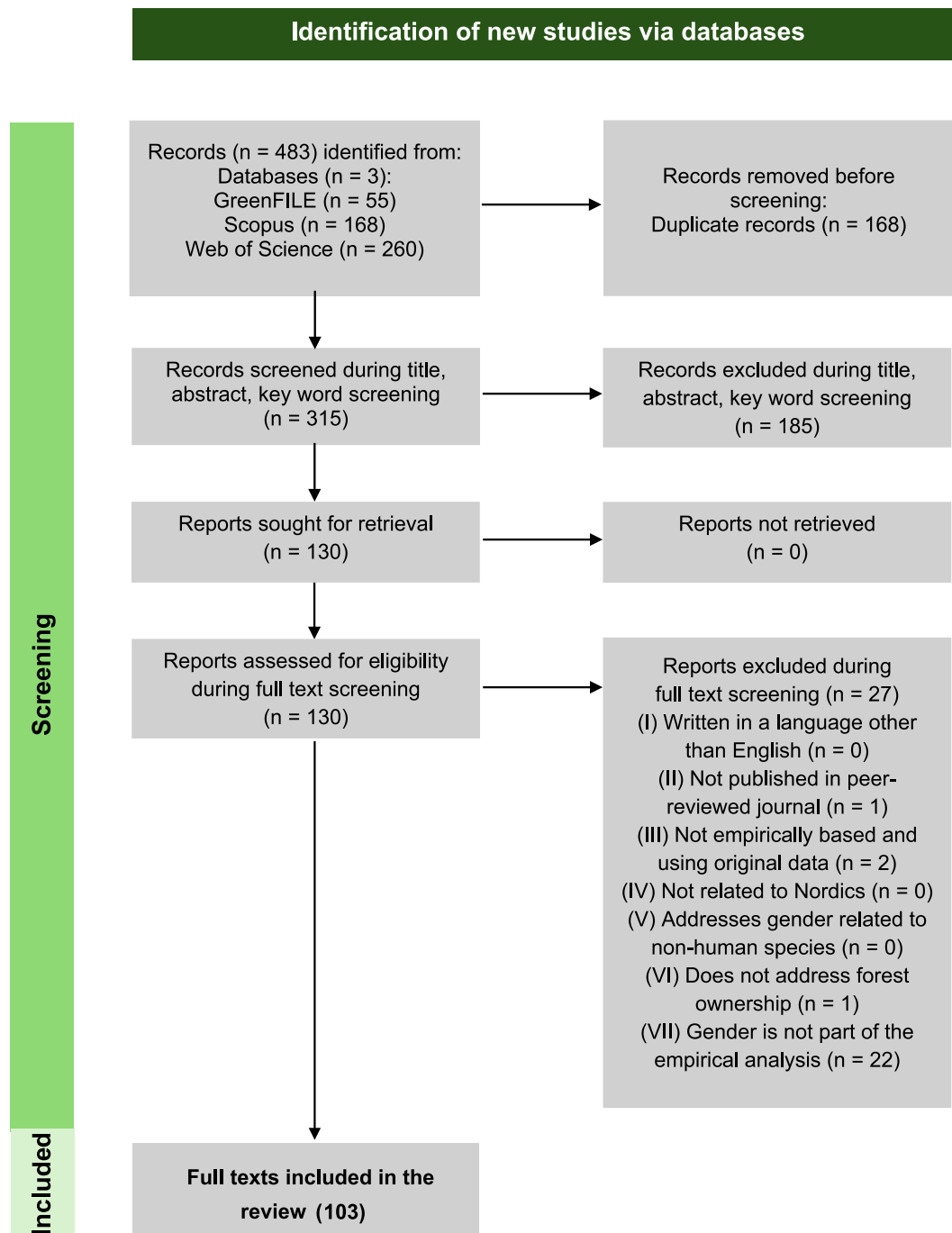


Fig. 2. Review process according to the PRISMA 2020 flow diagram template (Haddaway et al., 2022; Page et al., 2021) for the systematic literature review on gender and forest ownership.

A majority of the studies used no defined theoretical framework for their study or analyses other than describing the previous research on the topic. The most frequent and clearly defined framework is that of Theory of Planned Behaviour, which is mainly utilised to survey how various factors (e.g. gender) affect behaviours, values and interests among forest owners. Although with variations in implementation and depth, 18 of the publications employed what can be defined as a gender theoretical framework (e.g. ecofeminism, doing gender/gendering, feminist political ecology, gender system/order/contract).

#### 4.2. Central research themes and results

In addition to the analysis of the basis of the state of knowledge, the

articles were analysed to assess and summarise their empirical contribution to the understanding of how forest ownership is shaped by gender, and vice versa. The results were structured according to inductive qualitative thematic coding based on commonalities in the research. This was done to provide an overview of the research in the last 25 years, to identify the gaps and to better understand existing knowledge on the topic.

##### 4.2.1. Forest ownership, acquiring and structures

Gendered expectations and structures of forest ownership, e.g. in division of responsibilities and values (Bergstén et al., 2020) is in various ways manifested in the research. One of the central aspects of this is that men own more forest than women (Lidestav and Ekström, 2000; Haugen

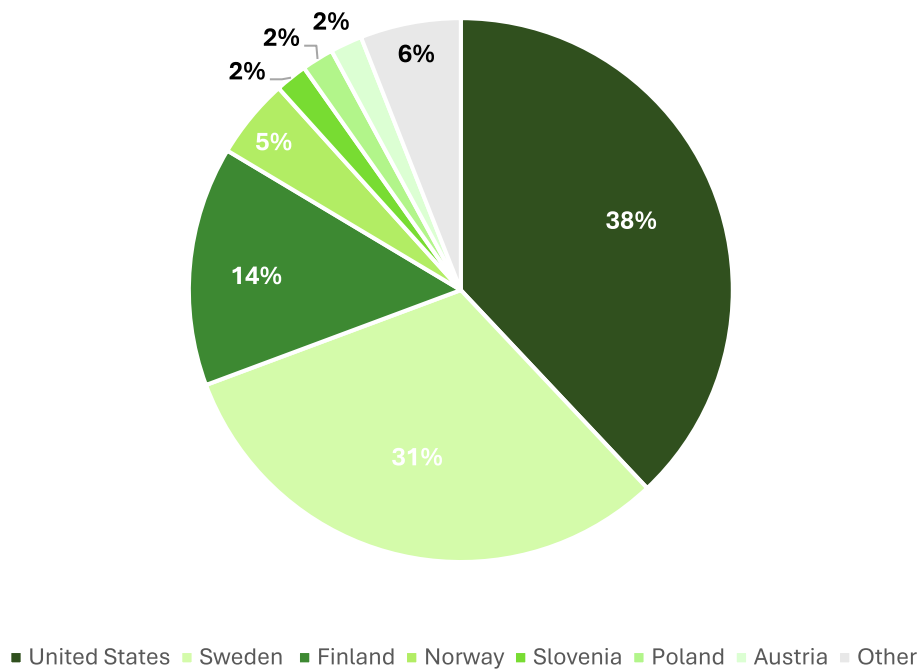


Fig. 3. The national contexts of the existing research (n = 103, two articles combined the focus on two countries).

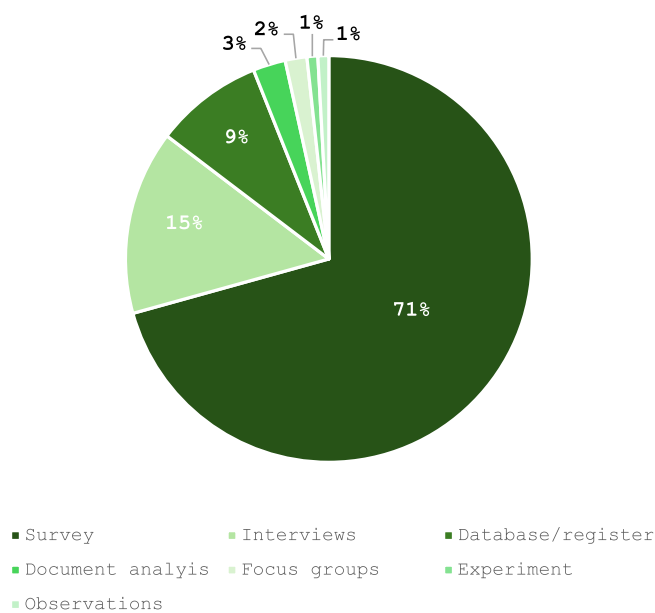


Fig. 4. The distribution of data collection methods used in the reviewed research (n = 116, with 13 publications that combined two methods).

et al., 2016; Mook et al., 2022; Mishra et al., 2023; Berget et al., 2024) and are more likely to be the primary decisionmakers (Butler et al., 2016; Umaerus et al., 2019). This contributes to that resources from forest holdings more frequently benefit the economic performance of private firms owned by men, mainly older (Haugen and Lindgren, 2013).

Men to a larger extent bought forest land/the property (Berget et al., 2023; Umaerus et al., 2019), while women more frequently have become forest owners by inheritance or gift (Umaerus et al., 2019; Nordlund and Westin, 2011; Mook et al., 2022), particularly from a spouse (Butler et al., 2018; Markowski-Lindsay et al., 2020). This latter aspect relates to that older women in one study are identified as more likely to be single owners (Markowski-Lindsay et al., 2020), while other studies show that women are more likely to be the second owner (Butler

et al., 2016) and/or manage together with a partner or family (Eggers et al., 2014). Men are more often involved in forestry activities from a young age (Staal Wästerlund, 2018; Häggqvist et al., 2014; Bergstén et al., 2020), which has implications both for succession, engagement and knowledge, and adds to that they are more likely to express interest in forest succession (Staal Wästerlund, 2018). In a Swedish context, Lidestav (2010) stresses that women can compete for forest ownership/inheritance with relatives that are men, but that asymmetries in ownership based on traditional gender norms and roles still influence the process. Staal Wästerlund (2018) highlights an underrepresentation of women interested in succession, not necessarily due to lack of interest, but due to less involvement and encouragement.

A study from the United States reported that men are more unlikely to sell or give away forest land within five years, while women that are older and own more land, are more positive towards transferring plans if its “reasonable” priced (Markowski-Lindsay et al., 2017).

#### 4.2.2. Values, motives and interests

Values and focus of forest ownership are two of the most recurring and highlighted gender differences in research. Women are shown to rather value environmental, social and recreational aspects of forest ownership (incl. mushrooms and berries) (Olofsson and Jakobsson, 2023; Umaerus et al., 2019; Nordlund and Westin, 2011; Bjärstig and Kvastegård, 2016; Markowski-Lindsay et al., 2020; Balasubramanian and Dwivedi, 2024), while men are more focused on economic/financial and (timber) production-oriented aspects (Olofsson and Jakobsson, 2023; Vedeld et al., 2023; Umaerus et al., 2019; Nordlund and Westin, 2011; Butler et al., 2018; Mook and Dwivedi, 2023), with are larger focus on future economic security (retirement) (Bjärstig and Kvastegård, 2016). Among women, some studies show that this partly intersects with age, where both younger (Lähdesmäki and Matilainen, 2021) and older women (Mook and Dwivedi, 2023) stand out in relation to men in their higher interests in environmental aspects. Other studies, mainly from the Nordics, haven't seen any gender differences related to economic interests of forest owners (Eggers et al., 2014; Lähdesmäki and Matilainen, 2021).

The motives of men are also manifested in that they both have will to, and supply more timber than women (Bashir et al., 2020; Kuuluvainen et al., 2014; Aguilar et al., 2017; Stockmann et al., 2024), which also

makes them more concerned about the timber market (Berget and Dwivedi, 2024). Other values that more frequently are prioritised in forest ownership of men are hunting and fishing (Staal Wästerlund, 2018; Umaerus et al., 2019; Nordlund and Westin, 2011; Eggers et al., 2014), as well as firewood (Pröbstl-Haider et al., 2020), which they in various ways also manage for (Butler et al., 2018; Mook et al., 2022). This contributes to that they are more interested in learning more about wildlife management and timber stand establishment (Balasubramanian et al., 2024), but also that they show a higher willingness to clear forest tracks for forest visitors (Stockmann et al., 2024).

In addition to the different values of men and women forest owners, studies also highlight that there are differences between forest owning and non-forest owning women e.g. in relational values (Vedeld et al., 2023; Karppinen and Korhonen, 2013). In line with the environmental focus, women also more often highlight values associated with forest landscape (Palander et al., 2009; Pröbstl-Haider et al., 2020) and prioritise ecological sustainability and related forest practices (Kosenius, 2024; Mook et al., 2022; Lukacic et al., 2023).

Forest owning women have shown to value universalism, tradition and benevolence (helpfulness, honesty, forgiveness, loyalty, responsibility) higher (Karppinen and Korhonen, 2013) and have a stronger emotional connection to the land than men (Lukacic et al., 2023). Related to this, numerous studies show that women are more motivated by family (incl. responsibility for next generation) in their forest ownership (Kuhlman et al., 2024; Nordlund and Westin, 2011; Mook et al., 2022; Urcuqui-Bustamante et al., 2024; Balasubramanian and Dwivedi, 2024; Miner et al., 2022; Redmore and Tynon, 2011).

However, studies also show that preservation of family tradition and nature-related experiences were general motives among all forest owners (Pröbstl-Haider et al., 2020), and that men more often manage on the basis of legacy goals (Goyke et al., 2019). In addition, men relate to traditional place attachment dimensions (dependence, identity, satisfaction etc.) more strongly than women (Mook et al., 2022). This might stress that both family and place are important for forest owning men and women, but in different ways. Partly reflecting the above results, women often tend to have more diverse objectives (Kuhlman et al., 2023b; Kuhlman et al., 2024) and managed based on these (Umaerus et al., 2019).

#### 4.2.3. Forest planning and decision-making

Compared to women, men are more self-active and involved in forest management, especially in physically demanding forestry tasks and planning (Hägqvist et al., 2014; Eriksson and Fries, 2021; Lidestav and Berg Lejon, 2013; Eriksson, 2018b; Bashir et al., 2020; Lidestav and Ekström, 2000; Eriksson and Fries, 2020; Butler et al., 2018; Pröbstl-Haider et al., 2020; Mook and Dwivedi, 2023), which partly contributes to that they are more confident in management and decision making (Berget et al., 2024) and are more likely to have a forest management plan (Smith et al., 2024). For men, cost is often not considered an obstacle to engage in active management (Mishra et al., 2023) and they are more willing to pay for forest certification (Tian et al., 2022).

On the other hand, women show a more diverse understanding of what it means to be an active forest owner (Kuhlman et al., 2024) and are more likely to take on service-oriented and diversified business activities beyond traditional forestry (Umaerus et al., 2013). Women both prefer less intensive management (Eggers et al., 2014) and are less intense in their management in terms of frequency (Lidestav and Berg Lejon, 2013). They have a larger focus on keeping their land forested (Markowski-Lindsay et al., 2020), which turns to that they prefer selective felling (Stockmann et al., 2024), are more positive towards continuous cover forestry (CCF) (Kronholm, 2024) and less likely to use pesticides on their property (Urcuqui-Bustamante et al., 2024).

These preferences interlink with a lower level of harvesting and less willingness to increase harvest, with no or little influence of price (Sjölöe et al., 2018). Women often had moderate harvesting or no harvesting, despite resembling size of holding as men (Côté et al., 2016). A Finnish

study showed that although women harvest lower volumes in total and less frequently, their quantities were larger when harvesting (Kuuluvainen et al., 2014). Among passive forest owners and forest owners that have already taken the decision to sell timber, there were no gender differences in getting them to harvest more (Sjölöe et al., 2018). In addition, a United States study concluded that gender is not a predictor of management/timber harvest behaviours and intentions (incl. land transfer) (Butler et al., 2018). While a Finnish study shows greater support for measures like increasing reserves and reducing logging among women (Kosenius, 2024), a Polish study reported that women expected more compensation for timber harvesting restrictions than men (Golos et al., 2021).

In relation to timber harvesting and economy, men are reported to be more willing/interested in participating in mushroom cultivation on stumps in connection with timber harvesting (Miina et al., 2023), have a more positive perception of stump harvesting (Rahman et al., 2017), are more interested in participating in selling forest carbon credits/carbon offset project (Miller et al., 2012), but also less active if they have a sense of economic security (Kuhlman et al., 2023a).

In general, women are reported to be more nature conservation oriented (Bakx et al., 2024; Welsh et al., 2018; Pröbstl-Haider et al., 2020), especially younger, with higher formal education (Uliczka et al., 2004; Mook et al., 2022) and older (Mook and Dwivedi, 2023). Accordingly, they are more willing to participate in conservation programs (Mook et al., 2022), to set aside land both without (Welsh et al., 2018) and with financial compensation (Boon et al., 2010) and are more likely to retain measures (buffers) after the time of compensation expires (Commender et al., 2020). Conservation ethics and to 'showcase' this for family and community members were the main motivators for enrolling in wetland conservation programs without compensation (Welsh et al., 2018). Although having the will, women are less familiar with, and enrolled in, conservation programs (Berget et al., 2023). This is mainly related to that they less often attend training or information sessions related to the topic.

While a study from the United States found no gender differences in agreement with permanent conservation easement scenarios, men were more likely to agree to temporary conservation easement scenarios (Catanzaro and Markowski-Lindsay, 2022). However, a Finnish study indicated that the endorsement of nature conservation preferences was associated with increased willingness to conserve forests only among men (Vainio and Paloniemi, 2013). Other studies from the United States also reported no gender difference in forest management intentions or prioritising conservation, but the difference related to level of education (Mook and Dwivedi, 2022; Mook et al., 2022).

In their forest ownership and management, women are described to be more concerned regarding both common and novel threats (Eriksson, 2018a), more likely to buy wildfire insurance (Jarrett et al., 2009; Gan et al., 2014) and more frequently stress the importance of reducing the moose population to reduce forest damage (Kronholm, 2024). In terms of the likeliness to manage invasive species (Clarke et al., 2021) or engage in sanitary felling (de Groot et al., 2021), no gender differences were found.

In terms of risk, studies have both described women to be more risk-seeking or tolerant to financial risk if they are dependent on forest income (Andersson et al., 2010; Andersson, 2012) and they are practicing less risk management (Eriksson, 2018b). The latter case was shown to be more related to structural and social-psychological variables, but mainly the level of involvement in forest planning and forestry work, which all also intersects with gender. The fact that women in addition reported a more positive view of risk governance, e.g. by displaying a higher acceptability of economic incentives and regulations to reduce long-term damage, stresses the potential relationship between practice and perception (Eriksson, 2018a).

#### 4.2.4. Practical forest management and work

Men are reported to be more self-active and involved in forest

management, especially in physically demanding forestry tasks and planning (Häggqvist et al., 2014; Eriksson and Fries, 2021; Lidestav and Berg Lejon, 2013; Eriksson, 2018b; Bashir et al., 2020; Lidestav and Ekström, 2000; Eriksson and Fries, 2020; Butler et al., 2018; Pröbstl-Haider et al., 2020; Mook and Dwivedi, 2023), while women are less active/engaged (Uliczka et al., 2004; Kuhlman et al., 2022), value nature and recreation higher (Kuhlman et al., 2022) and perceive management as a burden (Pröbstl-Haider et al., 2020). This leads to that men visit their forest more often (Pröbstl-Haider et al., 2020) and are more specifically experienced in prescribed burning (Berget et al., 2024), while women are more involved in administrative work (Häggqvist et al., 2014) or other tasks directly or indirectly related to forestry work (Bergstén et al., 2020).

In their role as forest owners, studies show that women in various ways adapt to masculine norms of forestry and forest ownership (Vainio and Paloniemi, 2013; Brandth et al., 2004; Laszlo Ambjörnsson, 2020), challenge the assumption of gender roles in forest management (Berget et al., 2024), while also play down the relevance of gender (Bergstén et al., 2020).

#### 4.2.5. Knowledge, learning and socialisation

Overall, women perceive themselves as less knowledgeable and self-confident about forest management (Eggers et al., 2014; Markowski-Lindsay et al., 2020; Miner et al., 2021; Berget et al., 2024; Balasubramanian et al., 2024; Larasatie et al., 2022), their property and management (Pröbstl-Haider et al., 2020) and forest damages (Kronholm, 2024), which e.g. leads to that they are more uncertain about the impact of climate change on their forest (Pröbstl-Haider et al., 2020).

On the other end, men are more frequently rating their forestry knowledge higher (Häggqvist et al., 2014; Eriksson and Fries, 2021; Eggers et al., 2014; Berget et al., 2024), and are more often perceived/articulated as experts (Häggqvist et al., 2010). However, a Swedish study reported that when women and men are equally involved in forest management and decision-making their knowledge levels are comparable (Eriksson and Fries, 2021).

Men more often have a higher formal forestry education (Uliczka et al., 2004), are more inclined to receive information from state agencies or neighbours (e.g. on wildfires) (Jarrett et al., 2009), and are more likely to get information through media sources (Berget et al., 2023). This contributes to that men, e.g. through membership in forestry associations and self-involvement, have a higher awareness and knowledge of regeneration in practice and regeneration programs (Sun et al., 2009), wood-based bioenergy/biomass (Joshi et al., 2013), conservation programs (membership in forestry/conservation organisation, written FMP, size) (Mutandwa et al., 2016) and participate in more programs (cost-share, conservation, tax incentive etc.) (Butler et al., 2018).

Partly due to the lower self-confident/knowledge, women more frequently cite their husbands and fathers as key knowledge sources (Häggqvist et al., 2014), are more likely to obtain information from friends and family (Berget et al., 2023; Karppinen and Berghäll, 2015) and more responsive to professional advice (Karppinen and Berghäll, 2015). They also prefer informational pamphlets, desire state interventions and technical assistance (Jarrett et al., 2009), seek more information in logging reports (Kärhä et al., 2020) and are inclined to learn more at forest days (Häggqvist et al., 2010).

Based on that women often feel uncertain about their capabilities/knowledge, which in various ways affects their participation in traditional forestry events/channels, they often are reported to have a strong interest in learning (Hamunen et al., 2020; Andersson and Lidestav, 2016; Eggers et al., 2014; Lukacic et al., 2023; Mook and Dwivedi, 2023; Berget and Dwivedi, 2024; Balasubramanian et al., 2024; Larasatie et al., 2022; Redmore and Tynon, 2011) and are more open to information (Eriksson, 2018a). In relation to traditional forestry events/channels, separate peer-learning groups for women are recurring in

many countries and have shown to provide a supportive environment for forest owning women, which helps them to build self-efficacy and confidence (Hamunen et al., 2020; Andersson and Lidestav, 2016; Lukacic et al., 2023; Larasatie et al., 2022).

#### 4.2.6. Forest service, relations and support

Women more frequently experience less satisfaction with communication and the work of the timber buyer (Kronholm and Staal Wästerlund, 2021) and with service quality (Berget and Dwivedi, 2024), which contributes to that they more often turn to separate organisation/networks of women to get support and develop other relationships (Brandth et al., 2004; Andersson and Lidestav, 2016; Laszlo Ambjörnsson, 2020). Women were, both in studies and in policies on extension/outreach efforts, identified as an underserved segment, which has led to their constituting the focus of one-fourth of the extension programs in the United States (Kueper et al., 2014) and are perceived as less of experts in forestry (Häggqvist et al., 2010). Mainly in policy, the expectation on women to improve social environments and contribute to the sector's profitability/growth and sustainability is more frequently articulated (Ville et al., 2023; Holmgren and Arora-Jonsson, 2015).

In Finnish studies, women showed a larger and diverse interest in different types of visualisations of post-harvesting landscapes (Palander et al., 2009) as well as an interest in economic information for decision-making on service offers (Lähdesmäki and Matilainen, 2021). In terms of organisations, women mostly prefer an independent central forestry organisation and local and regional offices (Golos et al., 2023), and, in Sweden, have a higher trust in the Forest Agency (Eriksson, 2018a).

Men on the other hand, mostly prefer a community-based forest association (Golos et al., 2023) and are more likely to be members of Forest Owners' Associations (Khanal et al., 2020). However, in Slovenia, a study reported no gender difference in expectation of associations (Pezdevšek Malovrh et al., 2011). Also, no gender differences in forestry outreach needs were found where print media and in-person workshops were the generally preferred forms of outreach both among women and men (Starr et al., 2015). The need for more forest management programs and resources as support were more frequently expressed by men (Berget and Dwivedi, 2024).

### 4.3. Gendered structures, meanings and cultures

While gender is primarily studied with a focus on differences between men and women, e.g. in terms of interests, values, behaviours and experiences, in the material, gender is also explored based on the understanding of gender as a meaning-making and structuring category and process. These often derive from the conception of forest ownership and gender as interlinked, which means that how forest ownership dominantly is understood and practiced, in e.g. policy, communication, social settings (e.g. Holmgren and Arora-Jonsson, 2015; Häggqvist et al., 2014), is shaped by values, relations and interests that are primarily associated with men and specific forms of masculinities (e.g. Laszlo Ambjörnsson, 2020). This contributes to the fact that forest ownership in various contexts is understood in specific ways, favouring certain values and interests in a way that they are perceived as given and natural (Andersson and Lidestav, 2016). An example of this is the conception and understanding of an "active forest owner" in contrast to a "passive" one. An active forest owner often engages in activities associated with masculinity, timber production and practical forestry while activities associated with femininity and other forest values are more often overlooked and therefore understood as passive (Holmgren and Arora-Jonsson, 2015; Kuhlman et al., 2024; Bergstén et al., 2020).

Studies describe that normative and gendered values, structures and understandings guide what is perceived as good and positive in relation to forest ownership. This has gendered implications, e.g. that women perceive themselves as less knowledgeable and self-confident about forest management (e.g. Berget et al., 2024; Larasatie et al., 2022). Bergstén et al. (2020) highlight how the gendered and spatial division

and association of labour, bodies and values (e.g. household/forest, domestic labour/manual forest labour, caring/strong and ecological/economic), leads to different aspects of forest ownership becoming associated with different genders. This type of gendering is mainly based on emphasising differences through a complementary or dichotomy-related understanding of gender. Besides the public spaces of forestry, the gendering of forest ownership, as well as relations of inheritance, often takes place in the intergenerational socialisation processes, where forest practices and knowledge are often being acquired (Lidestav, 2010; Bergstén et al., 2020). In the marginalisation of femininity in forestry, forest owning women seem to adapt to dominant masculine norms or negotiate femininities through the performance of female masculinities to create space and agency (Vainio and Paloniemi, 2013; Brandth et al., 2004; Laszlo Ambjörnsson, 2020; Andersson and Lidestav, 2016). Networks of forest owning women constitute central platforms for this and provide access to both symbolic and material spaces and identities (e.g. Larasatie et al., 2022).

## 5. Discussion

The results reveal that the topic of gender and forest ownership has been gaining increasing interest in research, mainly in the last 15 years but with an additional increase in publications in the last five years. Given that research on gender and forest ownership is dominated by the three countries of the United States, Sweden and Finland, it's reasonable to assume that the general understanding and conceptualisation of the topic is shaped by these national contexts and their specific conditions of forest ownership and gender relations. For example, in all these countries, forestry has a high degree of institutionalisation which partly manifests in strong normative values on e.g. forest management and active ownership (cf. Vainio and Paloniemi, 2013; Laszlo Ambjörnsson, 2020; Bergstén et al., 2020; Kuhlman et al., 2024). In relation to gender, this can be seen in the substantial number of articles focused on understanding the motives, drivers and management of women in relation to e.g. increasing harvesting of timber and other forest-based resources (cf. Bitzer et al., 2024).

The dominant method in the research constitutes surveys, which are used in 80% of the publications. In the context of the United States, with the most studies in the review, the frequency is more than nine out of ten studies. This can mainly be seen as a product of that forest owner research in both the European and United States context is quantitatively oriented with a strong tradition of forest owner surveys (Butler et al., 2023; Ficko et al., 2019). The dominance of surveys and quantitative methods, in combination with the strong focus on identifying the influence of various variables/drivers/predictors for motives, interests and behaviour among forest owners, e.g. in management, activities, timber harvest and decision-making, adds to that gender is foremost analysed as an empirical variable. On this basis, typologies, segments or clusters of forest owners are often developed based on different characteristics and behaviours (cf. Ficko et al., 2019), e.g. level of activity in forest management, willingness to harvest timber and information/extension needs.

In relation to the purpose of developing and defining typologies, segments or clusters, it can be argued that these practices are value-based and normative by sorting forest owners in specific ways. From a gender perspective, this specific form of knowledge production also contributes to constructing gender and gendering of forest ownership (e.g. "active" and "passive") (cf. Kuhlman et al., 2024). This is further emphasised when different measures and recommendations are proposed, sometimes based on empirical evidence, but more frequently as general recommendations, typically with a focus on outreach and support. Similar to forest owner research in general, little empirical focus is placed on what forest owners actually want or need and more related to normative values e.g. based on policy goals/implementation or to justify the need for research (cf. Matilainen et al., 2023). In relation to gender, the general conclusion of these more normatively oriented studies could

be summarised as that women constitute an underserved segment and that various measures need to be implemented to better include them to reach a policy goal/tailor services/extension based on difference (cf. Holmgren and Arora-Jonsson, 2015; Ville et al., 2023).

However, this also highlights the critical need to analyse how and why institutionalised norms themselves are gendered (e.g., active forest ownership) in order to transcend gendered understandings in forest research and create space for alternative meanings and practices of forest ownership. The review stresses the importance of adopting a critical perspective on the empirical and methodological foundations of forest research, as these often imply gendered meanings and produce gendering effects. Empirical findings must be understood within their social and material contexts, given that what we know about forest ownership and how we know it, is shaped by gendered conditions and relationships. Particularly in survey research, the language and concepts used in questionnaires, the reliance on self-reporting, and potential response biases further underscore these challenges. As half of the explicit gender studies focused on women, gender was predominantly constructed and conceptualized as women as a minority. In contexts dominated by men, such focus can provide valuable insights and perspectives that have been traditionally overlooked. Yet, this approach underscores the embeddedness of masculinity and the perspectives and experiences of men as the norm, and what is taken for granted needless to problematise in gendered terms (cf. Collinson and Hearn, 1994; Colfer, 2021). Especially in combination with that definitions of forest owners' "needs" in many studies align with these dominant values (e.g. Joshi et al., 2013) and that women more frequently are constructed as "disadvantaged", less knowledgeable and requiring more public support, assistance or "special attention" (e.g. Sun et al., 2009; Bashir et al., 2020) and "may have a negative effect on timber procurement opportunities" (Palander et al., 2009: 229). To assess how gender matters based on observations of gender differences without a thorough analysis of the societal and cultural context that has led to these patterns, risks reproducing ideas of men and women as inherently different. Furthermore, it also prevents more nuanced knowledge on why and how gender matters in forest ownership, and when other aspects might matter more (e.g. Hansen et al., 2025).

The lack of theoretically grounded studies in existing empirical research is evident, both overall and, more specifically, in relation to gender. This is also a general characteristic of forest owner research (Butler et al., 2023; Ficko et al., 2019; Matilainen et al., 2023). However, over the last years there are indications that the use of more theory-driven research is increasing, especially related to gender. In most social science discipline and research, a theoretical approach and basis is crucial for both individual studies and for the general development of the state of knowledge on a topic. To expand the understanding of gender and its influence, more in-depth and theoretically infused gender analyses are likely to stimulate a conversation between studies of gender in forest owner research and the theoretical and empirical debates of gender at large, that now are quite limited with only one study published in a gender studies journal. Similarly, more research is needed on the construction and embeddedness of masculinity in forest ownership (e.g. Laszlo Ambjörnsson, 2020; Vainio and Paloniemi, 2013), as the focus on women in existing studies limits the understanding of the broader gender dynamics at play, as well as the understanding of how gender intersects with other power relations (e.g. Ville et al., 2023; Holmgren and Arora-Jonsson, 2015).

With its focus on the current state of scientific knowledge on gender and private forest ownership in the Global North, this review does not include research published in languages other than English or studies published outside peer-reviewed journals. Furthermore, its emphasis on empirically grounded research within specific national contexts limits the inclusion of purely theoretical contributions, as well as comparative studies that focus on transnational regions (e.g. Danube region: Popova-Terziyska et al., 2023).

## 6. Conclusions

The vast majority of reviewed publications on gender and forest ownership relied on a single data collection method, primarily surveys, and only a small portion (6%) used a mixed-methods approach. Combined with the limited number of gender-theoretically grounded studies, the epistemic dominance of quantitative methods leads to a restricted (at best) or misleading (at worst) understanding and conceptualisation of gender and forest ownership. The limited qualitative basis in the state of knowledge, makes for less focus on gender as meaning category and constrains insights on how concepts in themselves are gendered. Hence, moving beyond treating gender as a variable requires more in-depth gender analyses, which in turn call for more qualitative methodological approaches, drawing more on interviews, observations, and participatory methods (cf. Colfer and Minarchek, 2012b). Without grounding empirical studies in gender theory, researchers risk reinscribing or reinforcing traditional gender ideologies in the production of academic knowledge of forest ownership. Despite the expansion of gender-related studies in the last decade, it is hard to identify an expansion of qualitative and more theoretically driven gender analyses given the persisting dominance of quantitative forest owner surveys and the overall low share of studies that utilise a gender-focused theoretical framework. By addressing these research gaps, future research on gender and forest ownership can contribute to not only more contextualised understandings of the ways in which gender matters but also promote more inclusive and socially just policies and practices. This also includes more thorough focuses and inquiries on how gender intersects with other social dimensions and relationships, where the material shows interlinkage with e.g. age, class and ethnicity.

The limited number of studies empirically addressing the relationship between forest owners and forest professionals constitute a challenge for both understanding how forest organisations and professionals potentially contribute to the gendering of forest ownership and how this could be changed to develop more inclusive and adapted services and support based on actual needs of forest owners beyond gendered norms and expectations (cf. Lidestav et al., 2019; Matilainen et al., 2023). Studies on gender and forestry organisations, working life, forest policy or research, which are not directly included in the review, could provide additional understanding of gender within forestry more broadly (e.g. Katila et al., 2025; Andersson and Johansson, 2025; Ludvig et al., 2024; Johansson et al., 2023; Coutinho-Sledge, 2015; Koch and Matviichuk, 2021; Strelnyk et al., 2024).

### Declaration of generative AI use

During the preparation of this work the author(s) used ChatGPT in order to verify the grammar and Research Rabbit to identify key articles. After using these tools/services, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

### CRedit authorship contribution statement

**Elias Andersson:** Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Conceptualization, Writing – review & editing. **Miriam Knödler:** Methodology, Investigation, Formal analysis. **Maria Johansson:** Validation, Methodology, Investigation, Formal analysis, Conceptualization. **Kristina Johansson:** Validation, Methodology, Formal analysis, Conceptualization.

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The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Elias Andersson reports financial support was provided by Swedish Research Council Formas. Elias Andersson is associate editor of Forest

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### Data availability

Data will be made available on request.

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