Food and Agriculture Organization of the United Nations

UNECE

Who owns our forests?

Forest ownership in the ECE region

UNITED NATIONS

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ABSTRACT

This study examines forest ownership in the ECE region. Based on data on 35 countries, and the first to include all forest ownership categories, this study investigates the changing nature and patterns of forest ownership, the ways in which governance and social structures influence forest owners and users, as well as forest management. Within the limits of data availability and harmonization, the publication provides an overview of, and a new baseline for, understanding the diversity and dynamics of forest ownership in the ECE region.

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FOREWORD BY UNECE AND FAO

Considering the critical role of forests in housing biodiversity, providing a source of livelihood for millions of people in our region, and combating catastrophic consequences of climate change, there is an important question that merits attention.

Who owns forests in the ECE region and why does it matter? There are important distinctions in the way in which forest ownership is defined, interpreted, and implemented across different contexts. The aim of this study is to unravel these distinctions and highlight their implications for sustainable forest management.

Our ambition is to encourage the reader to go beyond the simplistic public/private dichotomy and show that forest ownership is not written in stone. Neither as a definition, nor as an existing form of relations. Rather, the access to forest, its products and services, as well as related rights and duties, go beyond the traditional perception of forest ownership. And the topic merits much more attention than it has been previously given.

This study, based on data on 35 countries, and the first to include all forest ownership categories, looks at the changing nature of forest ownership, explores its causality, and sheds light on the ways in which governance and social structures affect both owners and users, as well as management of forests. Readers will benefit from a comprehensive overview of changes in ownership patterns in the ECE region. The ECE region, of course, has plenty of examples of changes in forest ownership and management policies, reflecting previous and recent social and political developments. Some notable examples include countries with economies in transition, where we witnessed radical changes in ownership patterns through restitution and privatisation.

The study also features a cross-comparison of major ownership trends in the ECE region with trends in other regions and provides historical insight into processes that led to contemporary patterns of forest ownership. Those insights, more than anything else, reveal the deeply political and economic dimension of changing ownership patterns. In order to better design and implement policies for sustainable forest management, we need to understand the context of changing forest ownership, but also the situation and needs of forest owners.

We cannot hope to manage our forests sustainably in accordance with the Sustainable Development Goal 15, without an in-depth understanding of who owns them, how duties and responsibilities are distributed among owners, users and the society at large, and what does that mean in the given context. Conceived at the request of UNECE/FAO member States and produced as the outcome of a partnership between UNECE/FAO Forestry and Timber Section and the European Cooperation in Science and Technology Action FP1201 on "*Forest Land Ownership Changes in Europe: Significance for Management and Policy*" (COST Action FACESMAP), this study is an important step in the right direction. We take this opportunity to thank everyone involved in the process of its preparation and we hope this study will inspire further discussion.

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FOREWORD BY COST ACTION FACESMAP

The issue of forest ownership has recently been receiving growing attention in research and policy for several reasons. On the one side, there is increasing awareness that for a number of unsolved current issues in forest policy and management the behaviour of the owners is a crucial factor. This is true for the policy aim in many countries to utilize better the sustained yield of wood from the forests as raw material for the forest-based industries. The values and goals of forest owners are similarly relevant when it comes to biodiversity conservation, particularly in integrated conservation concepts that aim to combine timber production and nature conservation. Finally, the challenges of the changing climate require a relatively fast reaction of the owners in adapting their forests to new climatic conditions.

On the other side, we observe changing ownership structures in various parts of the western world, due to multiple societal and political developments, including structural changes to agriculture, changes in lifestyles, as well as restitution, privatization and decentralization policies. In former socialist countries, restitution and privatisation has created a new ownership pattern and institutional frames are often still adapting to the new political and economic conditions. In some other countries, new community and private owners are bringing fresh interest and new objectives to forest management. Everywhere, a growing number of so-called "new forest owners" hold only small parcels, have no agricultural or forestry knowledge and no capacity or interest to manage their forests.

The interactions between ownership type, forest management approaches, and policy, are of fundamental importance in understanding and shaping forestry, but our knowledge on forest ownership is quite limited. The limited knowledge relates to official figures as well as research. For instance, differing national statistical systems make cross-country comparisons difficult. It also becomes apparent that we have a good understanding of the behaviour of classical forest holdings but we know much less about other forest owner types with their specific motives and preferences.

With the aim to give an account of the state-of-knowledge on such questions in Europe, a scientific networking project was launched, the European Cooperation in Science and Technology (COST) Action FP1201 on *"Forest Land Ownership Changes in Europe: Significance for Management and Policy"* (FACESMAP). From 2012 to 2016, experts from across Europe and beyond produced literature reviews, expert reports on country situations, specific topical analyzes, field visits, and knowledge exchange with stakeholders (for the results, see: http://facesmap.boku.ac.at/). Realizing that UNECE/FAO at the same was also about to start efforts to collect data for a regional overview of our knowledge on forest ownership, the COST Action FACESMAP and UNECE/FAO Forestry and Timber Section joined forces to conduct a survey and produce a joint study on the state of forest ownership in the ECE region. On the basis of previous work of UNECE and FAO and the expertise in the COST Action, a joint questionnaire was developed, administered and finally analyzed. We are very happy to present here the results of this intensive and productive collaboration.

As chair of FACESMAP I have to thank all those involved in this remarkable joint project from the side of the UNECE/FAO Forestry and Timber Section, the responding countries as well as the participants of the COST Action! Without the knowledge, engagement, creativity and professional working attitudes of so many, this state-of-art report would not have been accomplished. Many thanks!

Gerhard WEISS

Chair of COST Action FP1201
"FOREST LAND OWNERSHIP CHANGES IN EUROPE: SIGNIFICANCE FOR MANAGEMENT AND POLICY"

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1 2015 data on the Russian Federation are from 2010 or 2013 and are marked with an *.

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2 Data for the United States excludes interior Alaska and Hawaii.

LIST OF ACRONYMS

ATFS	American Tree Farm System
C&I	Criteria and Indicators
CAFO	Canadian Association of Forest Owners
CAP	Common Agriculture Policy
CEMR	Council of European Municipalities and Regions
CEPF	Confederation of European Forest Owners
CICES	Common International Classification of Ecosystem Services
COST	European Cooperation in Science and Technology Action
CSA	Canada's National Sustainable Forest Management Standard
CWA	Community Woodland Association
DFWR	German Forestry Council
DSTGB	German Association of Towns and Municipalities
ELO	European Landowners Organization
EU	European Union
EUSTAFOR	European State Forest Association
FACESMAP	Forest Land Ownership Changes in Europe: Significance for Management and Policy
FACESMAP/UNECE/ FAO ENQUIRY	Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region
FAO	Food and Agriculture Organization of the United Nations
FECOF	Fédération Européenne des Communes Forestières
FES	Forest Ecosystem Services
FMP	Forest Management Plan
FOA	Forest Owners' Association
FOO	Forest Owners' Organizations
FOREST EUROPE	Ministerial Conference on the Protection of Forests in Europe
FRA	Forest Resource Assessment
FSC	Forest Stewardship Council
FTS	Joint UNECE/FAO Forestry and Timber Section
HA	Hectare
LTD	Limited Company, Business Organization
MAES	Mapping and Assessment of Ecosystems and their Services
NAFO	National Alliance of Forest Owners
NGO	Non-Governmental Organization
NSE	Non-State Entity
NTFP	Non-Timber Forest Products
NWFP	Non-Wood Forest Products
PEFC	Programme for the Endorsement of Forest Certification

RDP	Rural Development Program
REIT	Real Estate Investment Trusts
RRI	Rights and Resources Initiative
SBF	State Budget Financed Organization/Units
SCIO	Scottish Charitable Incorporated Organization
SFI	Sustainable Forestry Initiative
SFIO	Integrated State Forest Organization
SFM	Sustainable Forest Management
SFMO	State Forest Management Organization
SFO	State Forest Organization
SGI	Services of General Interest
SOE	State Owned Enterprise
TEEB	Economics of Ecosystems and Biodiversity
TIMO	Timber Investment Management Organizations
UN	United Nations
UNECE	United Nations Economic Commission for Europe
USSE	Union of Foresters of Southern Europe
ZIF	Zones of Forest Intervention

Chapter 1

OVERVIEW

Anna Lawrence, Coordinating Lead Author

1. OVERVIEW

1.1 Introduction

Forest owners, and the people who they engage to manage their forests, constitute the interface between society and the goods and services provided by the forest. Policy regulates that interface, but ultimately the owners, their decisions and activities affect the kinds of forests that we live with. Forest ownership is complex, diverse and changing. So it is important to know and understand the forest owners, their rights, responsibilities, decisions and behaviours.

Forest ownership patterns in the ECE region are highly diversified and dynamic: political and economic factors including restitution, privatisation and land and timber markets underlie change. Information on forest ownership is still relatively under-documented and not often linked to analysis of forest condition, management and outcomes. This new study on forest ownership based on data from about 35 countries, is the first to include private and public forest owners, and to assess how and why forest ownership is changing, and how governance and social structures affect forest owners and management.

1.2 Background and process

This study represents the outcome of a partnership between UNECE/FAO Forestry and Timber Section and the European Cooperation in Science and Technology Action FP1201 on *"Forest Land Ownership Changes in Europe: Significance for Management and Policy"* (COST Action FACESMAP). This partnership initiated a Forest Ownership Project to seek information on the impact of forest ownership types on economic, ecologic and social aspects of forests. It builds on the 2010 UNECE/FAO study *"Private Forest Ownership in Europe"* and an expert survey on the situation and trends of forest ownership across Europe published as the FACESMAP Country Reports (Živojinović et al., 2015).

This report summarizes the UNECE/FACESMAP survey, providing an overview of 35 UNECE countries, supported by more detailed information from the 28 European countries that participated in FACESMAP. It is based on the information provided by survey responses and country reports, and supported by generally available data. Each section is based on an analysis by a specialist lead author and other authors. The section authors were free to choose which data to analyze and how, in order to address the key issues within their topics. This generates a multi-faceted report, which highlights the diverse questions and methodologies available to research.

This report marks a significant improvement in terms of availability of forest ownership information; however, it is appropriate to highlight two limitations about the data. The first is that, while this study is the most comprehensive of its kind, the data covers only 35 countries, many of which lacked some of the data requested, or the resources to analyze and report it. The second is to note that this report is not a review of the vast field that is forest ownership studies. Academic researchers have studied the motivations and actions of forest owners over many years, particularly in countries where much of the forest is privately owned, and where policy relies more on incentivising owners to manage, rather than enforcing regulation. Those studies provide pockets of great depth of knowledge, and there are many fine reviews of that knowledge in the academic literature. In contrast this study provides a comprehensive framework for understanding the topic in a more comparative overview, including public and private, forest quality, and policy and management outcomes.

1.3 The meaning of forest ownership

While the survey focused on forest owners, in the sense of the legal owners of forest land, the meaning of that ownership varies significantly between contexts. The FAO Forest Resources Assessment defines forest ownership as:

> *the legal right to freely and exclusively use, control, transfer, or otherwise benefit from a forest. Ownership can be acquired through transfers such as sales, donations, and inheritance (FAO, 2018, p.16).*

In fact, forest owners seldom have the full range of exclusive legal rights to *"use, control or transfer"* when it comes to benefiting from their forest. The rights of legally named owners are restricted by legal regulations and social customs associated with the forest land in question.

Instead, as discussed in Section 2., forest ownership is more usefully understood as a multi-layered system of relations between the legally entitled holder of the resource and the rights and duties involved in relation to the forest resource. Factors that affect these relations include the institutional setting, allocation of property rights, the character of the owning entity, and the regulation(s) and organization of forest management. History, culture and politics are mediated through the role of the State, in translating ownership into rights and responsibilities. The formal institutional framework for the regulation of forest ownership comprises policies, legislations, technical norms and operational guidelines which influence the distribution of rights with respect to different forest ecosystem goods and services.

The *"property rights"* framework (Schlager and Ostrom, 1992) helps to understand the complexities of ownership rights, and is an approach that has imbued all the sections of this report. Ownership is seen as a bundle of rights (access, harvest rights, management rights, exclusion rights and alienation rights), which are rarely all held by one entity.

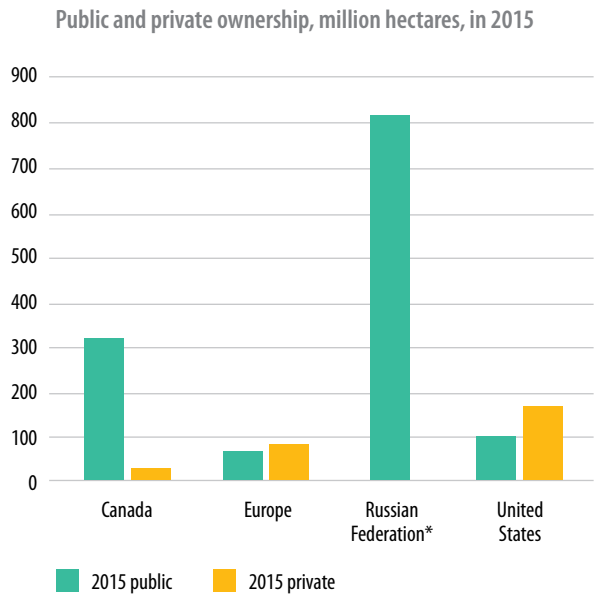
This report also addresses a second area of complexity of forest ownership, in the classification of ownership types. It goes beyond a simple binary of 'public' or 'private'. Public ownership has been analyzed at the level of national (State), regional (sub-national) and local government ownership, enabling a novel analysis of scale and governance. Likewise, the separation of private ownership into individual / family, business, institutions, tribal and other common property, permits valuable insights.

An important consequence of a study that embraces both public and private, is that it highlights areas where classification is inconsistent or difficult – thereby drawing attention to a third or 'in-between' category. Community forests, and forests owned by non-profit organizations, are examples of types that are sometimes considered in this middle ground. Municipal (local government) forests are often known as 'communal' forests in continental Europe, and treated as a public form of ownership, while community or common properties are treated as a private form of ownership. However, in some countries municipal forests are categorized as private. Representatives of municipal forests often claim that they should be seen as a distinct ownership category alongside public and private ownership. Community forests or forest commons vary widely in their definition, and some are more akin to local public forests than to private. Some are defined through customary rights; others, linked historically to a local community, may be defined and protected through law which provides them with a special status; still others are newly created forms of collective rights based on the adaptation of company law.

When data is collected through an international survey, common categories must be created and used for analysis. The owners referred to here are the legal holders of title, and ownership is classified as public or private. But it should be kept in mind that beyond the labels and high-level summaries, there is even greater diversity of ownership types and structures, and a wide range of arrangements for translating ownership into rights and responsibilities.

FIGURE 1

Forest area owned publicly and privately, 2015



1.4 Geographical patterns in forest ownership

1.4.1 Forest ownership and tenure in the ECE region

Total forest area in the ECE region is 1.7 billion ha which constitutes close to 38 per cent of the region. Three countries, the Russian Federation, Canada and the United States of America account for 1.5 billion ha, 87 per cent of the region's forest and other wooded land (FAO, 2015a).

The distribution of ownership types within this varies between Europe and North America (see Figure 1 and Figure 2). Overall forest ownership in Europe (excluding the Russian Federation, where all forests are publicly owned) is evenly split between public and private: 44 per cent of Europe's forest is public, whereas 56 per cent of forests are under private ownership. However, such averages hide a great range, from 100 per cent public ownership in countries such as Turkey, Georgia or Ukraine, through more evenly split ownership in countries such as Ireland, Germany and Luxembourg, to countries where private ownership predominates, such as the United Kingdom, Sweden, Austria and Portugal.

Turning to North America, ownership patterns and trends differ markedly between the United States of America and Canada. In the United States of America 37 per cent of forests are public and 63 per cent are private, while in Canada the share of public forests is 91 per cent, of which only 1.7 per cent is owned by the State at national level and 98 per cent is owned by sub-regional governments.

Patterns of public ownership reveal highly distinctive patterns (see Figure 3), from the predominance of local government ownership in European countries including

FIGURE 2

Forest area owned publicly and privately, 2015 (omitting the Russian Federation and North America)

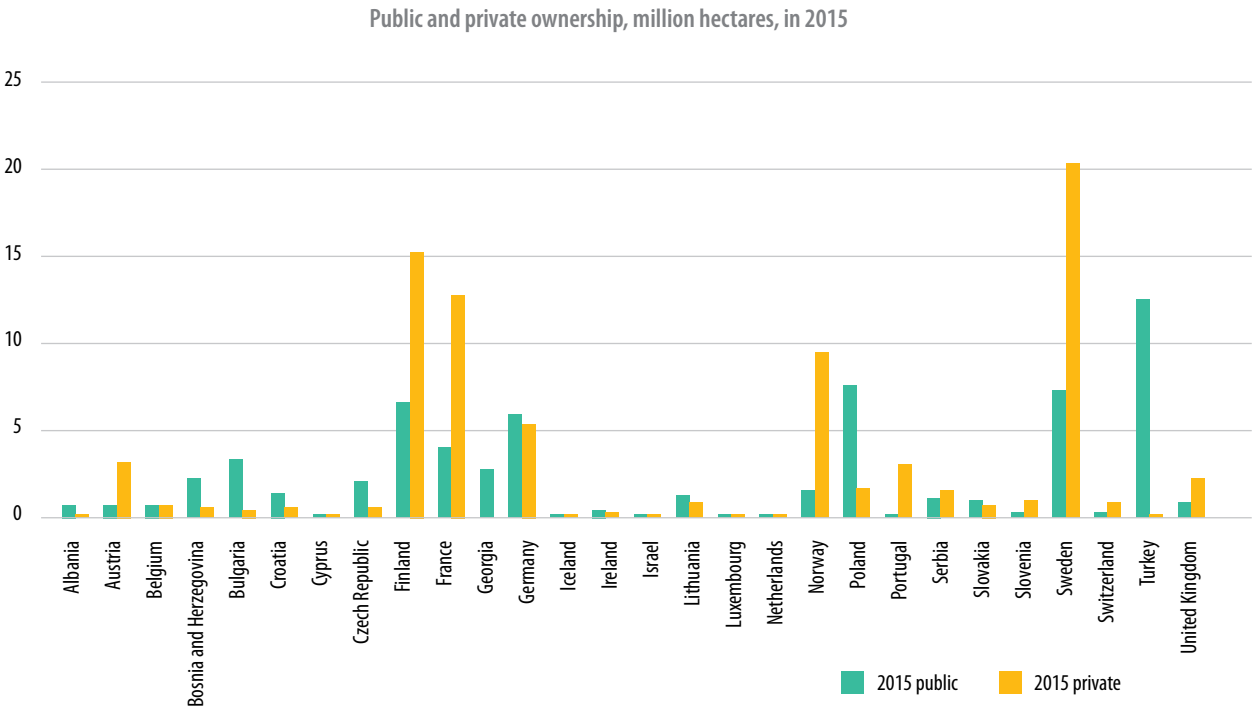


FIGURE 3

Distribution of types of public forest – ordered by local then sub-national

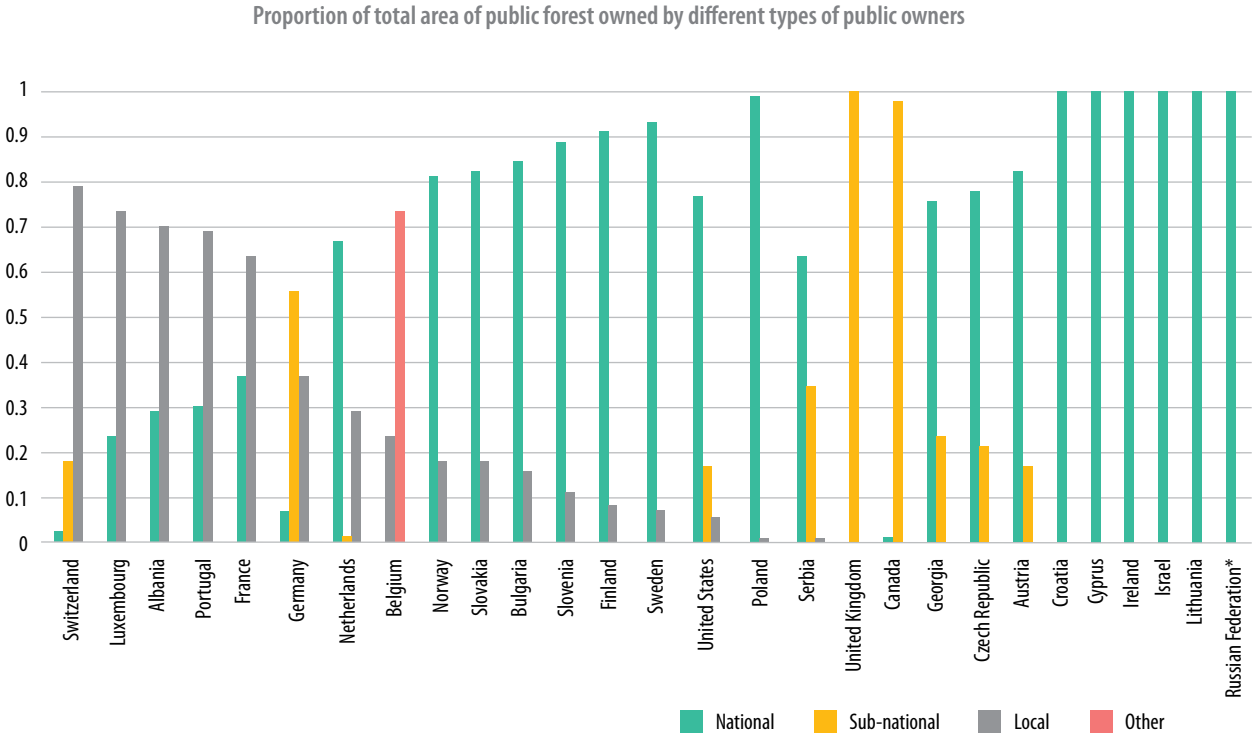
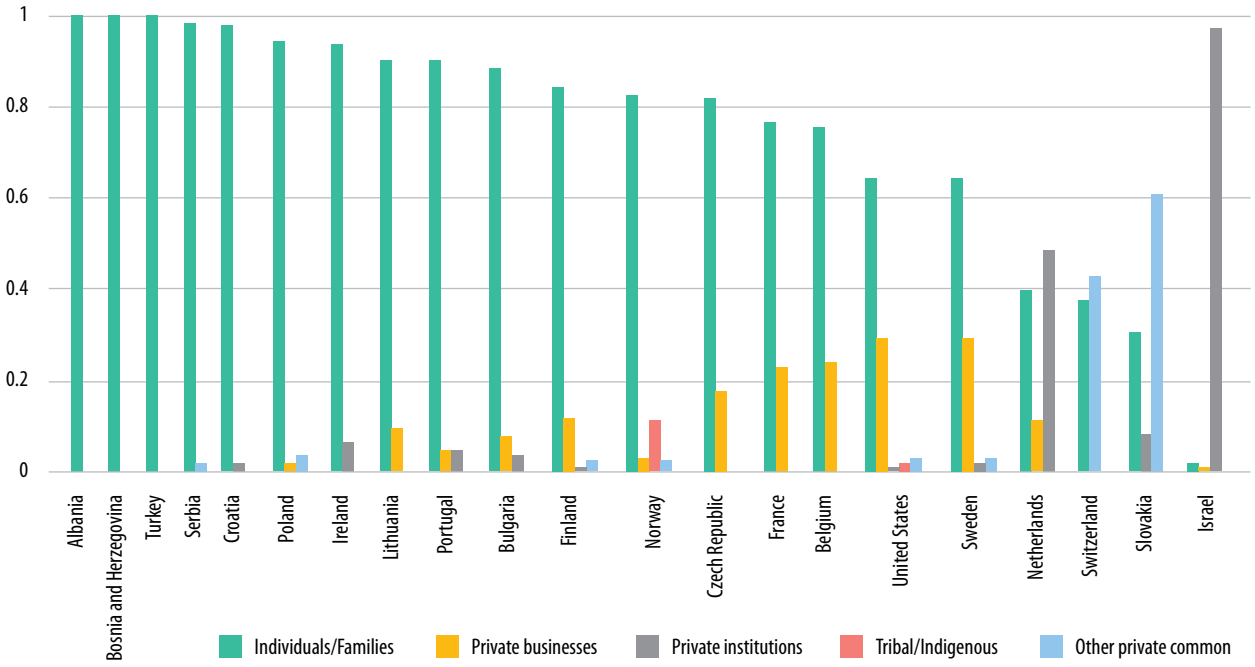


FIGURE 4

Distribution of types of private forest ownership categories – ordered by individual / family then by business



Switzerland, Luxembourg, Albania, Portugal and France, to the monopoly of State ownership in countries such as the Russian Federation, Lithuania, Israel, Ireland and Cyprus. Other countries reflect the federal nature of forest administration, with sub-national public ownership predominating in the United Kingdom, Canada and Germany. These differences are little studied in the academic literature and merit further exploration. They are likely to reflect historical trajectories and contribute to national and local narratives of forest important and attachment.

Types of private ownership also vary geographically (see Figure 4). In Europe, most private forest land is owned by individuals and families. Private common ownership is evident in some post-socialist countries, and also in Nordic countries. Business ownership is highest in the United States of America but also in several Western and Central European countries. Indigenous communities own only 2 per cent.

1.4.2 Size of forest properties

Property size affects management opportunities, and the scale at which policy interventions need to operate. The survey asked national experts to report on the number and size of properties, defining a property as *"forest area owned by one owner, including all parcels of forest land owned by an owner"*. Small scale land holdings prevail in European private forests, where 88 per cent of all forest holdings are smaller than 10 ha (see Figure 5).

FIGURE 5

Distribution of forest area and number of owners by size of holding for 24 UNECE countries

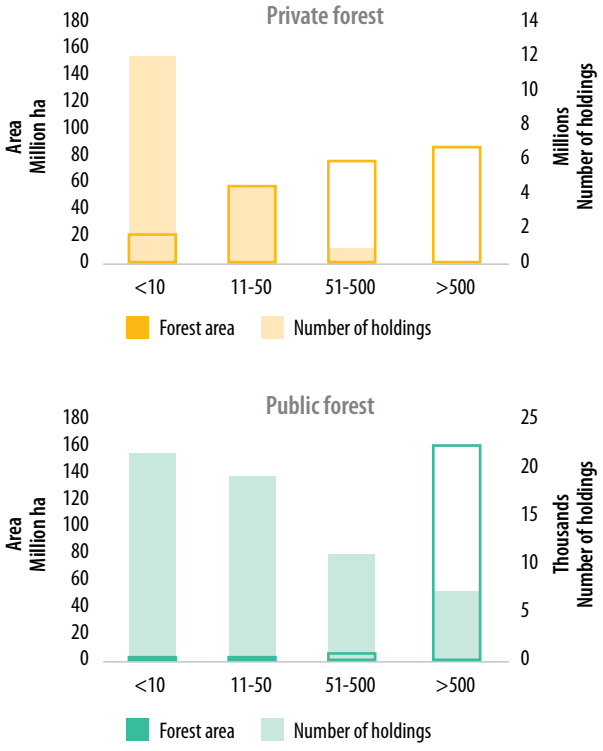


TABLE 1

Average property sizes for public and private forests, hectares, 2015

Country	Average public holding	Average private holding
Bulgaria	1669000	0.7
Serbia	1158000	1.5
Ireland	193100	14.0
Croatia	80353	1.1
United States of America	31206	14.8
Cyprus	29738	[data not available]
Lithuania	27957	3.1
Sweden	7453	87.1
Slovakia	4446	105.3
Poland	2812	1.5
Albania	1517	83.8
Norway	1238	65.3
Finland	940	27.8
Germany	766	2.7
Slovenia	730	3.1
Netherlands	350	6.9
Belgium	330	2.6
Czech Republic	263	2.2
France	241	[data does not include holdings under 10 ha]
Luxembourg	184	[data not available]
United Kingdom	80	5.7

Comparing average property sizes for public and private forests, some countries report a difference of up to six orders of magnitude. Several factors influence this. Some countries report their public forest holdings as a single, or very few, management units; some may result historically from the transfer of whole estates into public ownership. In contrast private forests show very much smaller average sizes, in some countries averaging only 1 ha per parcel. Private properties in many cases consist of multiple parcels of forest land, indicating that the average parcel size is even smaller.

This data illustrates a significant challenge for forest policy and administration, in supporting the private forest sector. Reference is often made to the complications of small parcel size, but another factor is the very large numbers of owners in some countries, and consequently the effort required to communicate and work with them. It does furthermore show a wide range of management challenges among the different countries. Western Europe for example has relatively small holdings in public ownership, perhaps reflecting high population densities and a long history of private land ownership and management.

1.5 Changing ownership in the ECE region

Overall the forest area in the region is increasing, and that increase is proportionally higher in the private sector. Afforestation has led to increase in both public and private ownership, while privatisation has also contributed to a higher proportional increase in private forest.

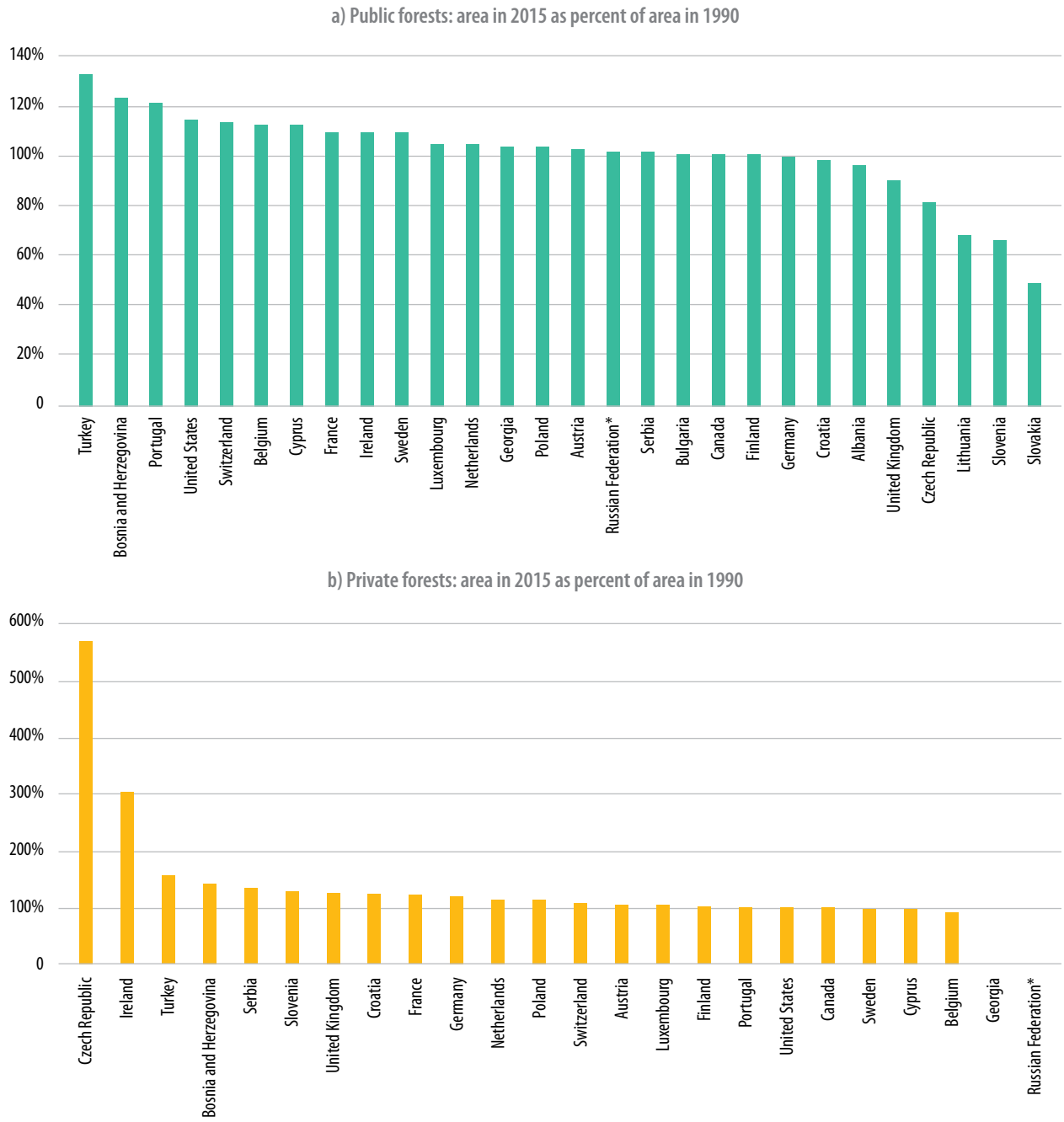
The situation in each country is distinct (see Figure 6), but some general patterns can be observed. The data show a proportional decrease in public forest and increase in private forest, in several post-socialist countries – many of which had only public or national forest, prior to 1990. Other (not formerly socialist) countries which show a proportional increase mainly in private forests, include France, Germany, Netherlands, Turkey and United Kingdom. Countries which

show an increase in public forests more than private forests include Belgium, Cyprus, Portugal, Sweden and the United States of America. These and other patterns are not easily explained by geographical or political factors, and more qualitative methods are needed to explore the factors behind changing ownership. Section 3.2. uses an innovative approach, which asks experts to assess the importance of factors affecting change in forest owners. These distinguish between areas where restitution and privatisation have taken place; highlight cases where fragmentation and decreasing parcel size are a concern; and draw attention to the changing values of owners as new social groups, and new generations, take ownership – or existing owners move away from inherited land and develop more urban lifestyles.

Four formerly socialist countries reported no private forest in 1990, with private forest appearing in 2010 (e.g.,

FIGURE 6

Forest area as percentage change from 1990-2015 (a) public (b) private



Albania, Bulgaria, Lithuania and Slovakia). Of these four, the appearance of private forest was accompanied by a decrease in public forest in all except Bulgaria.

1.5.1 Fragmentation

A theme that runs through many of the sections reflects a concern with fragmentation or parcelisation of forest properties. The qualitative approach used in Section 3.2. demonstrates that experts view this as a significant trend in many countries. Particularly in Central and Eastern Europe, there is a widespread perception that numbers of properties are increasing, while their size is decreasing, as properties are inherited and divided among multiple descendants, or through restitution processes following the end of centralized political regimes. The study was unable to test this quantitatively, as few data were provided for 1990 to analyze change in property size.

From the little data available, post-socialist countries report on change in number of owners from zero in 1990 to tens of thousands in 2015. Ireland also reported a dramatic increase in numbers, by a factor of more than seven, owing to government support for new planting. Several other countries reported small increases in numbers of owners (e.g., Belgium and United States of America), while other countries reported a decrease in numbers of private owners (e.g., Netherlands and the United Kingdom). Overall however, there is no indication of a large rate of increase of private owners, except in the post-socialist region.

1.6 Comparison with global patterns and trends

The ECE region contains a significant share of the world's forests: it covers 34.8 per cent of the planet's land area and contains 18.3 per cent of population, but it includes 41.4 per cent of the global forest area. Furthermore, the region's share of the world's forests has been growing (FAO, 2015a). The region is compared with global data, in Section 3.1. It is important to keep in mind that this is comparing averages: the ECE region is of course large and diverse, and three countries in the ECE region (Russian Federation, United States of America and Canada) account for a large proportion of this forest.

Compared with the rest of the world, the ECE region has a higher proportion of private ownership; and areas with very small property sizes. At global level, public forest ownership (nearly four billion ha, about 76 per cent of the total) is the largest ownership category, much of it under national State ownership. Only 20 per cent is under private ownership according to the latest estimates (FAO, 2015a, FAO, 2015b), of which 56 per cent is owned by individuals, 29 per cent is owned by private enterprises and 15 per cent is managed by local communities and indigenous peoples. However, across the planet, private forests are on the rise, increasing by about 3 per cent between 1990 and 2010, with most of the increase taking place in upper to middle income countries (FAO, 2015a). This contrasts with the greater proportions of more regional or local public ownership, smaller scale family ownership, and absence of indigenous ownership from most countries in the ECE region.

Change in ownership is a significant feature of this study of the ECE region. Forest tenure reforms are also taking place in other regions. In the past decade in the Asia-Pacific region, reforms include: (i) rapid expansion of smallholder forestry; (ii) recognition of indigenous peoples' right to own and manage land, including forests; and (iii) increase in the area of State forests that support different public participation regimes. Informal tenure systems are widespread in countries outside the ECE region, although they are often not recognized in State law. Over the past four decades, countries outside the ECE region have increasingly started to provide legal recognition to informal customary tenure systems. In parallel to the increasing recognition of community rights, many countries outside the ECE region have also been granting large land areas (including forests) to private entities, for example for large-scale agro-industrial enterprises. This contrasts with the ECE region where the proportion of private forest is increasing mainly because of ownership restitution and afforestation.

1.7 Forest management

A central objective of this study was to link ownership structures with the forest resources and further with the processes and outcomes of management decision-making. These topics are treated in three sections of the report, focusing on forest management (4.1), forest ecosystem services (4.2) and public forest organization (5.2). Here, they are discussed together to focus on the logical connection between objectives, management and outputs.

1.7.1 Owners' objectives and decisions

Forest owners manage their forests according to their values and objectives, and according to their decision-making processes. The survey indicated that national statistics do not currently offer a useful window on the range of values and objectives, although there is a large scholarly literature on the subject. Only five countries provided data on private owners' management objectives. Obtaining this level of detail requires a considerable investment by national statistics services and can be better found in in-depth academic studies. The data that was provided supported the wider literature, indicating that forest owners have multiple objectives which combine production, household economy and intangible benefits. In dominant forest

policy discourses, private forest owners are seen as being interested, first of all, in income and profit from their forests and in producing timber for the market. Research has repeatedly demonstrated that these are highly simplified assumptions which may be valid for larger or industrial forest holdings but apply much less to small-scale or non-industrial forest owners who hold a large portion of the privately-owned forest land in Europe.

In public forests the situation is different because management objectives are set in support of policy goals. Accordingly, most countries reported that decisions about management of public forests are made by the public body that is relevant to the spatial level (thus, national forests are managed by national government bodies; municipal forests are managed by local government bodies). Only a few countries reported that State-owned forests are managed by 'others', which may include State-owned companies, private management companies, and NGOs. A notable exception is the Russian Federation, where 29 per cent of state forests are leased, but they are also managed by government organizations in accordance with lease agreements. Operational decisions are undertaken by agency staff or, in many cases, by private contractors, in accordance with a forest management project.

Management decisions at strategic and operational levels are more diverse in private forests. As discussed above, forest owners must plan their forest activities within the opportunities and limitations of national (and sometimes regional) legislation. Patterns described in Section 4.1.7. indicate that small-scale private forest owners generally implement management decisions themselves, while medium to large-private forest owners often outsource such operations to forest contractors.

Qualitative data in FACESMAP country reports suggests that new forest owner types may feel that their forest skills are limited, and either outsource forest works to contractors, or become members of forest owners' organizations to access technical support. With increasing number of owners in the private sector, and fragmentation of parcels, such forest owner organizations are increasingly important. The analysis provided in Section 5.4. helps to disentangle the overlapping terminology that characterizes this topic. Forest owner organizations cover a range of structures, some with long traditions, some new and innovative. They include forest owners' associations, cooperatives, commons, community woodlands, corporations, municipality forests, joint properties, and communal land-owners. They all aim to support private forest owners in some collective way, through providing joint representation of owners' interests, and / or accessing services for forest management and marketing. The section highlights some geographical and cultural variations in the roles of owners' organizations: for example, in Fenno-Scandinavia many organizations are large and have considerable bargaining power. In contrast owners' organizations in post-socialist countries may emerge from traditional associations and / or may be unpopular because of negative historical experiences about enforced collective action.

1.7.2 Forest management outcomes

The provision of forest biomass and other forest ecosystem services for the products and services of the bioeconomy, to a reasonable extent, depends on the objectives and decisions of forest owners. The variation in condition and harvesting of forests in the public and private categories serves as an indicator of forest management outcomes.

At the most general level, forest management can be inferred from the proportion of forest classified as 'available for wood supply'. In many countries, a significant proportion of both private and (usually more so) public forest is not available for wood supply; in other words, the management objectives do not include timber harvest (see Figure 7). Furthermore, in most countries, that proportion is decreasing (see Figure 8) indicating an increase in forests excluded from harvest.

Growing stock (m^3/ha) and net annual increment (NAI) (m^3/year) can be used as indicators of forest conditions and quality, and a proxy indicator of ability to deliver ecosystem services, with some caution. For example, it would not be appropriate to compare these indicators between countries in different ecological zones, as growth rates are related to climate and soil. Furthermore, survey responses on growing stock and net annual increment were specific to 'forest available for wood supply' so they do not include protected forests.

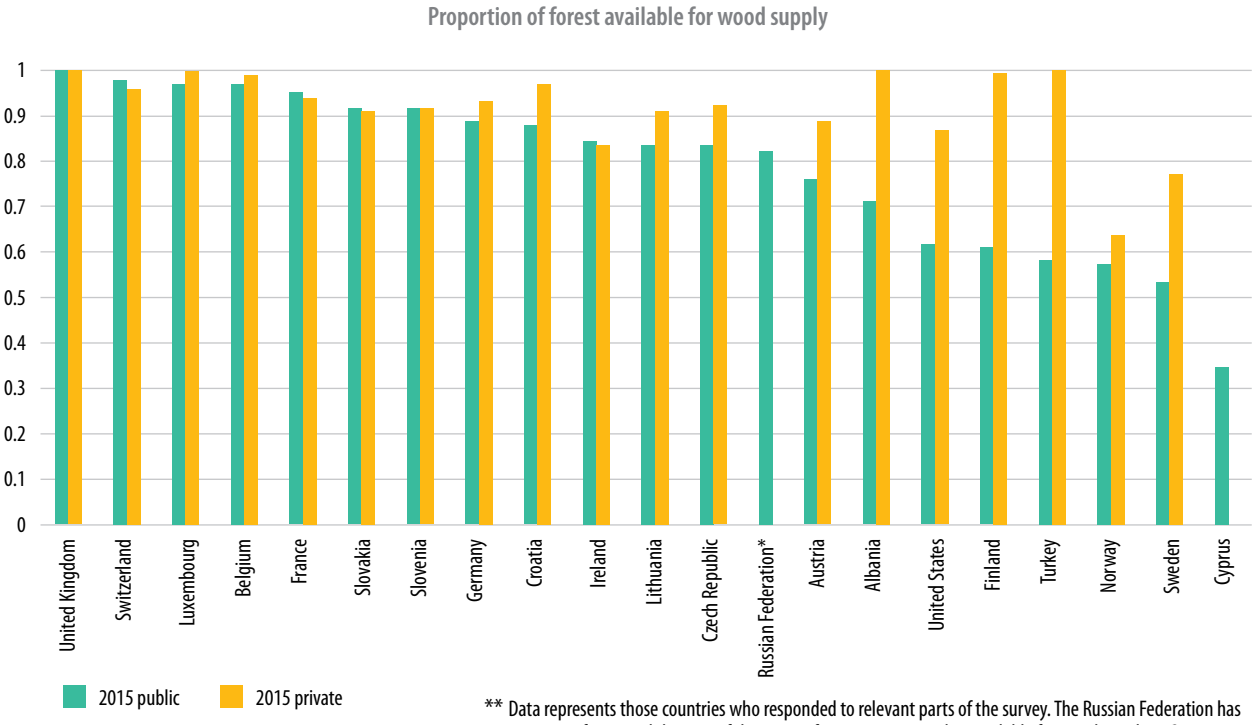
However, it is valid and useful to make comparisons between public and private forests, and across time, within each country. These analyzes show that that, in general, within each country, growing stock (m^3/ha) FAWS is higher in public forests than in private, and is increasing in both public and private forests (see Figure 9).

Further differences can be seen when NAI is taken into consideration (see Figure 10). This indicator reflects both natural conditions and management; for example production-oriented forests have shorter rotation ages, to optimize productivity. The analysis in Figure 10 shows that, for example, Finland and the United States of America both have higher NAI / ha in private forests than in public, which may reflect a private sector focused on production, and the possibility that public forests include more mature and old growth forests. In contrast, Serbia and the United Kingdom both have higher NAI /ha in public forests than in private, and may reflect a focus on commercial public forestry.

The indicators used so far reflect the condition of the forests, which are both characteristics of the ecology and outcomes of management. A stronger indicator of forest management

FIGURE 7

Proportion of public and private forest available for wood supply**



** Data represents those countries who responded to relevant parts of the survey. The Russian Federation has no private forests; while none of the private forests are reported as available for wood supply in Cyprus.

FIGURE 8

Change over time of forest available for wood supply (combined total of public and private)

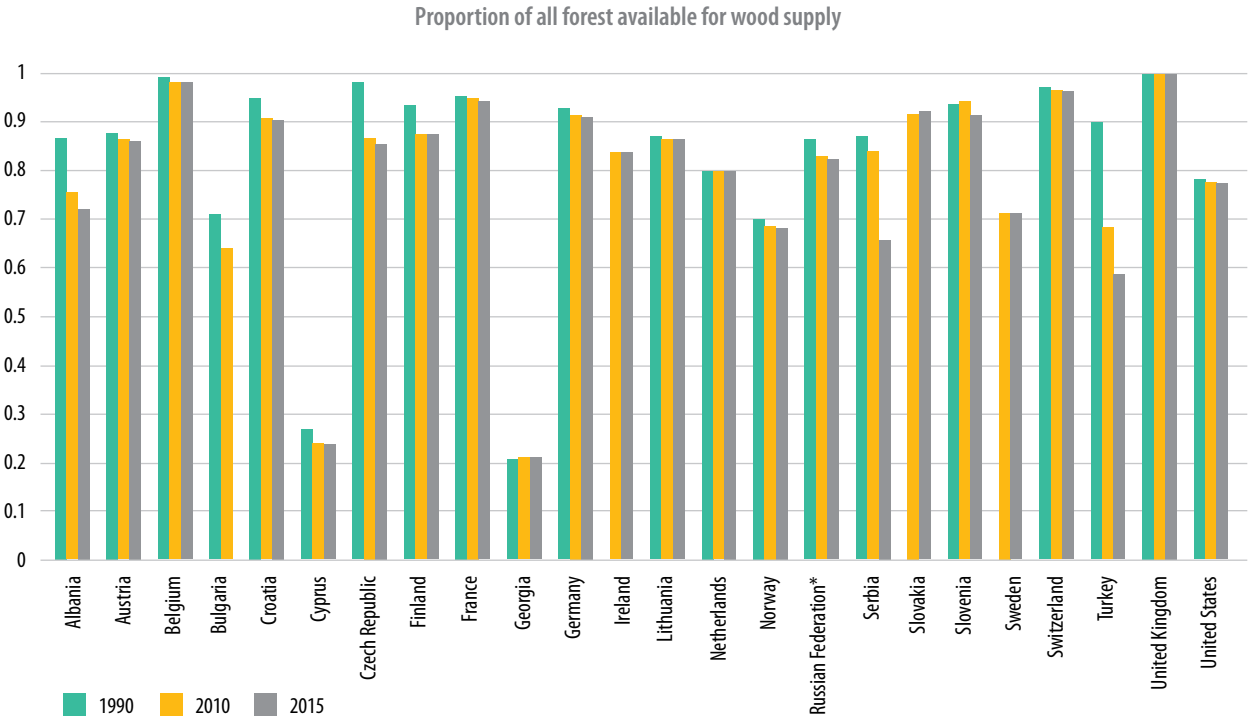
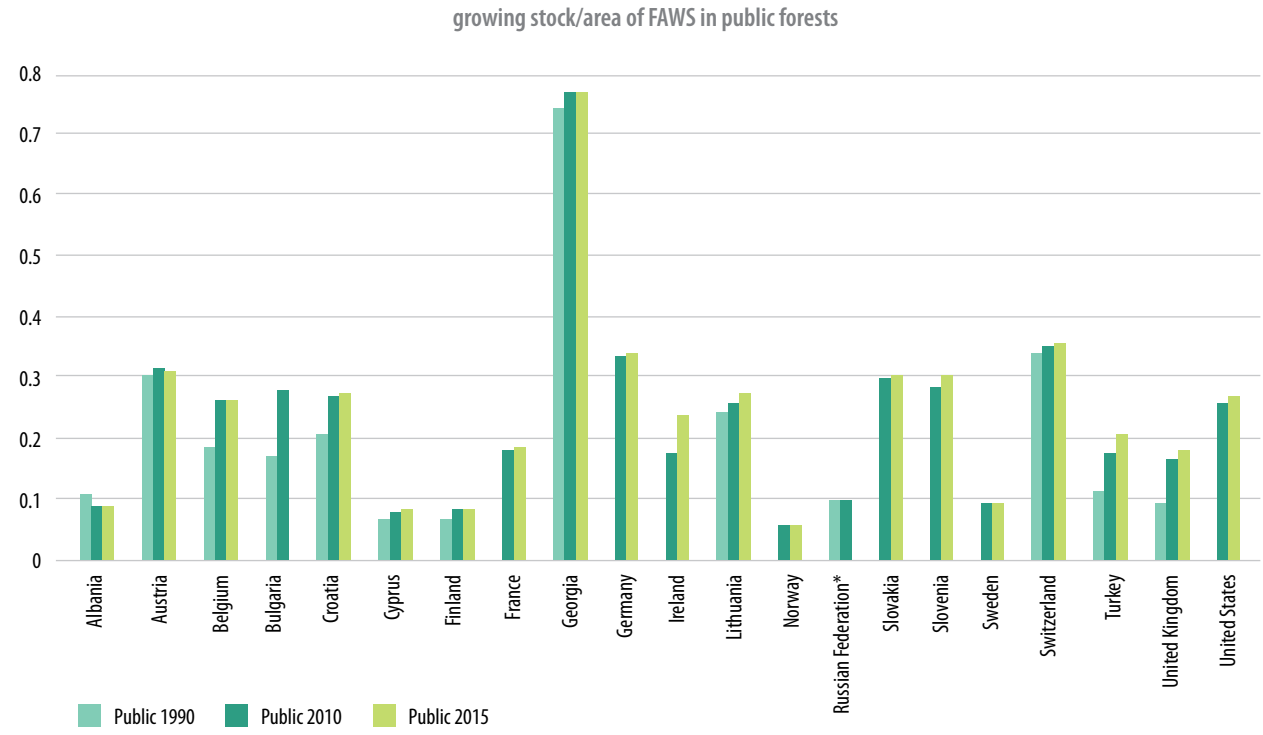
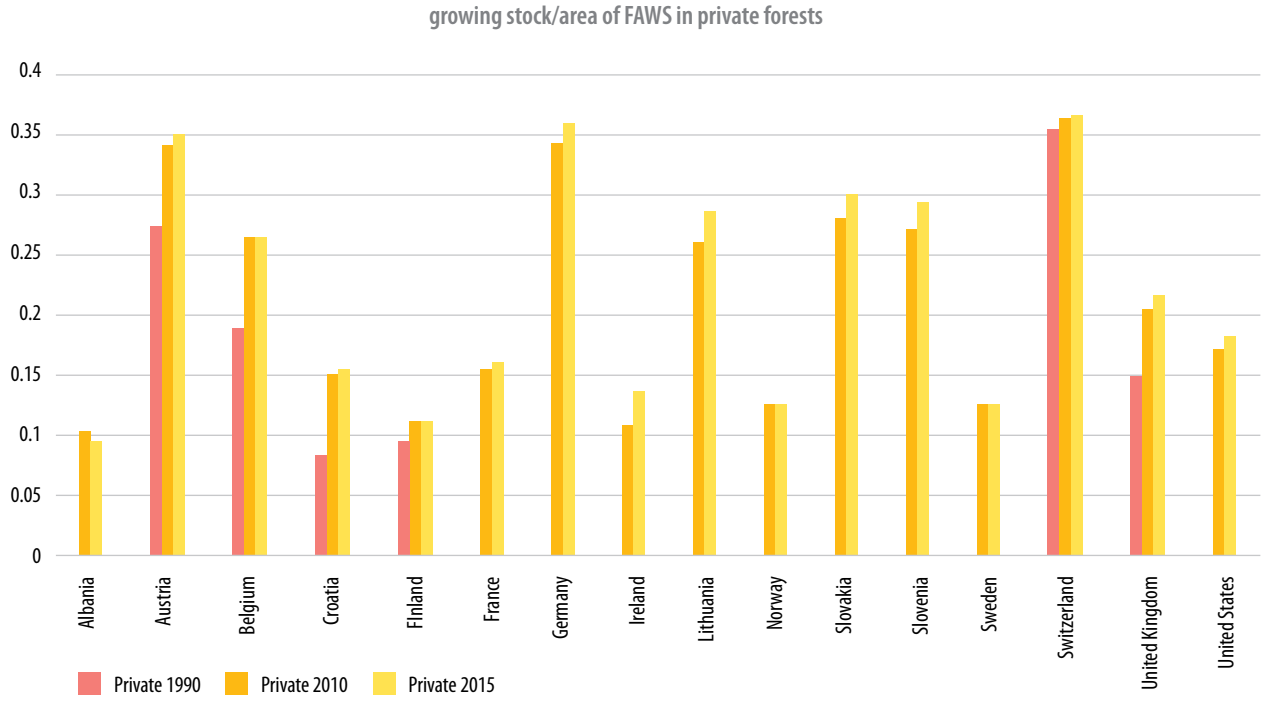


FIGURE 9

Growing stock in public and private forests (thousand m³ per ha of Forest Available for Wood Supply), in those countries that provided data





is found in harvesting activity, represented by the utilization rate, or volume harvested as a proportion of NAI (see Figure 11). In most countries, the utilization rate is considerably below the NAI (with the exception of public forests in Albania (and formerly in Austria and Cyprus), and private forests in Sweden). Furthermore, in many countries, there is evidence of an increase in utilization rate over the period 1990-2015, but this is not universal (Lithuania, Luxembourg and the United States of America being exceptions).

The comparison between public and private utilization rates is shown more clearly in Figure 12. In most countries, private forest is more intensively harvested than public. In some post-socialist countries (e.g., Serbia and Albania) public forests are more intensively harvested.

1.8 Forest policy and governance

This overview started with the observation that forest owners represent the interface between policy and forest goods and services. Policy aims to influence owners into managing forests in such a way that they provide what is considered best for wider society.

Policy influences owners in two broad areas: in the structure of forest ownership, and in the modes of management. These issues fall into a wide range of policy domains, above and beyond forest policy. Section 5.1 summarizes these comprehensively; other sections also relate to policy, including Section 3.2 on changing ownership.

FIGURE 10

Comparison of net annual increment (m^3 per ha), in public (x axis) and private (y axis) forests

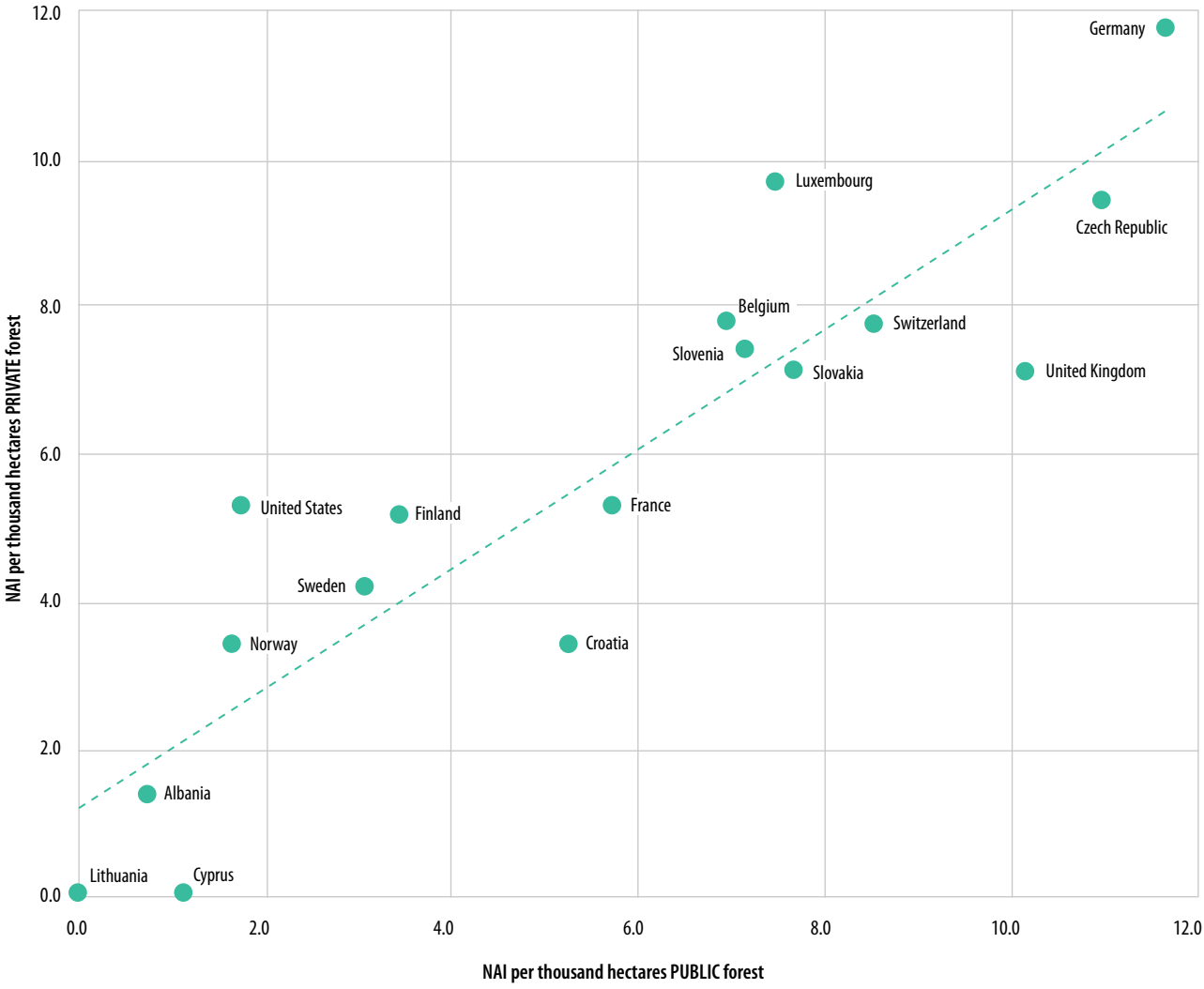


FIGURE 11

Forest utilization rate per country, by forest ownership category and year in public forests (green) and private forests (yellow)

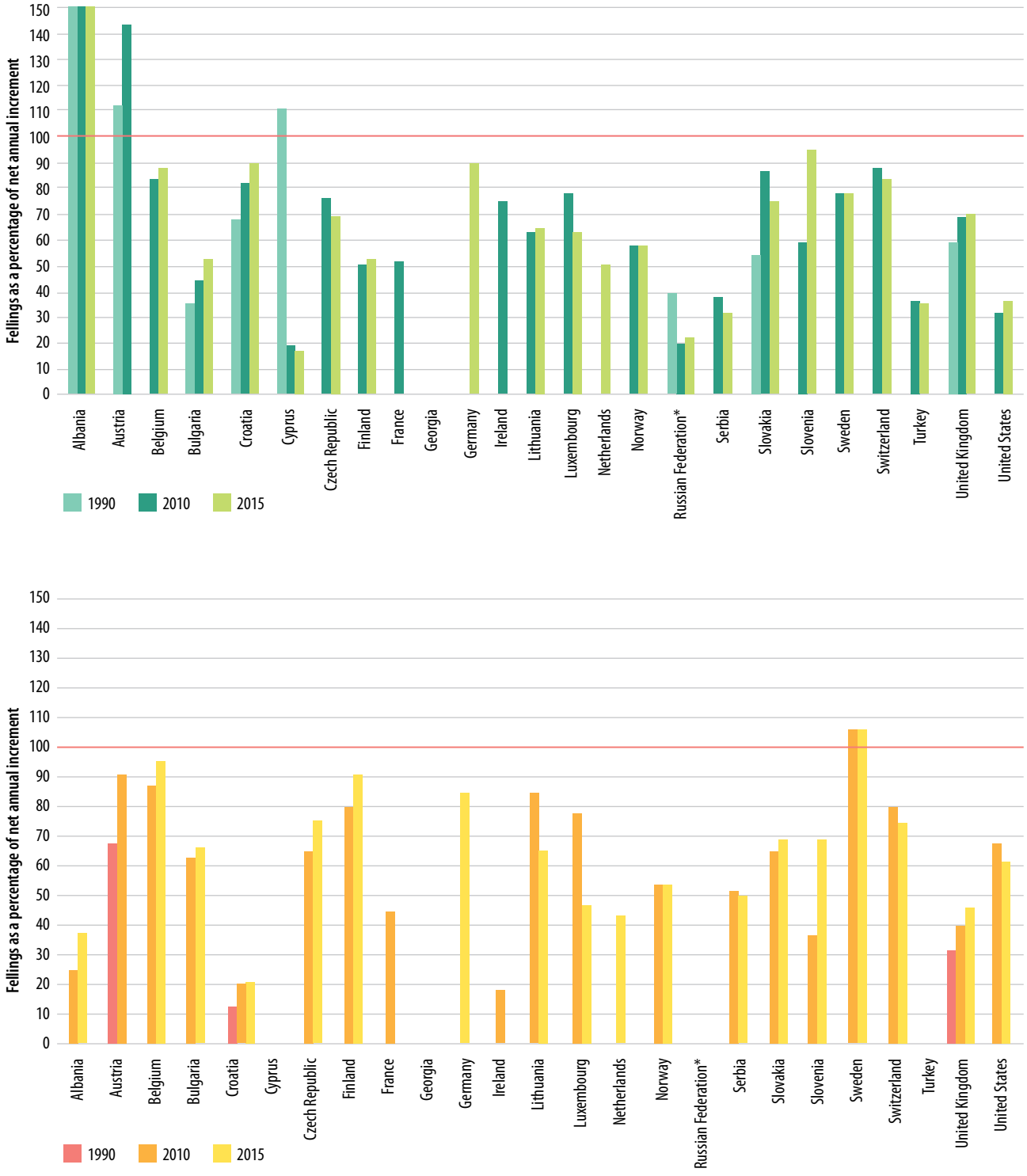
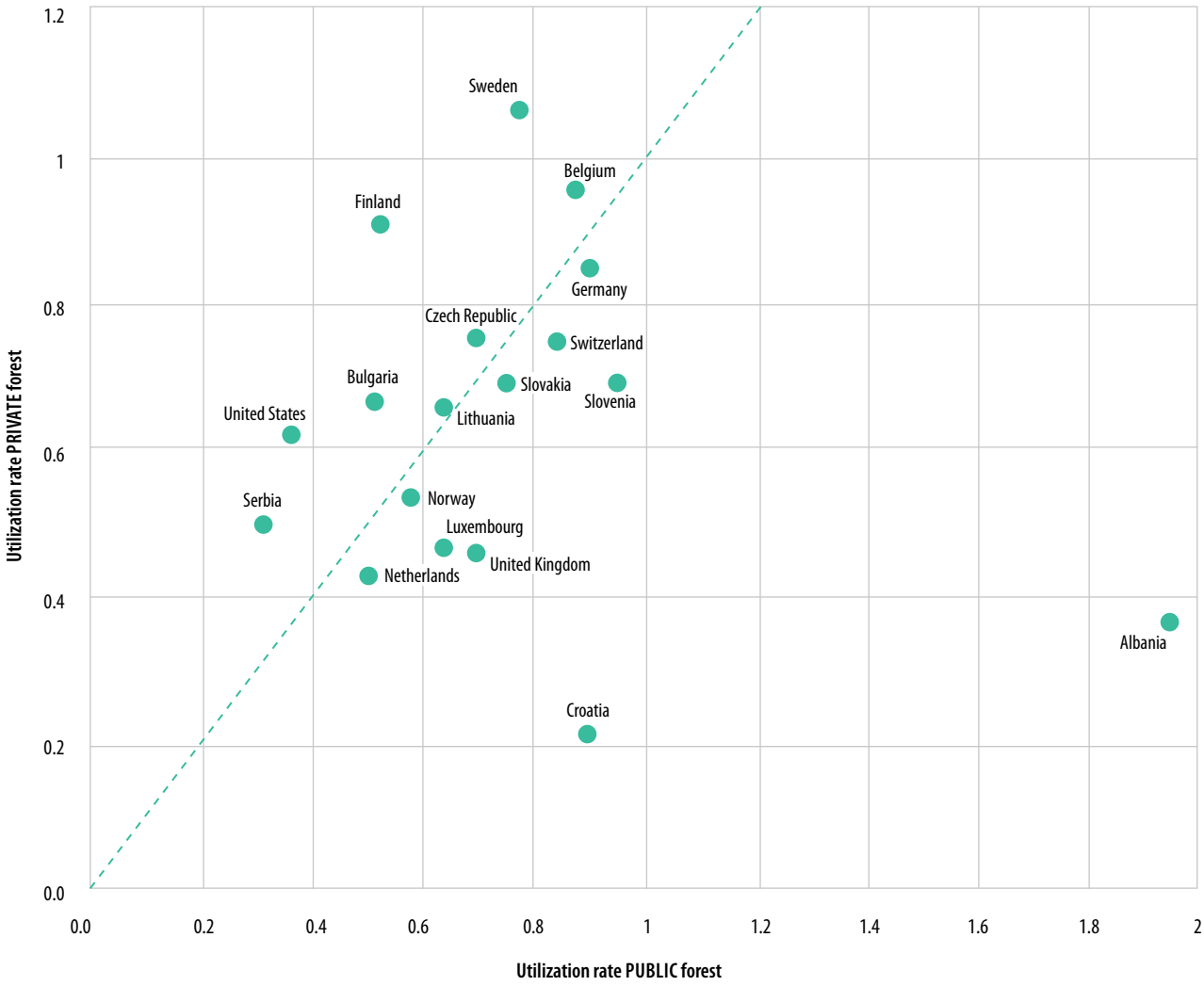


FIGURE 12

Comparison of forest utilization rate (fellings as a percentage of net annual increment) in public and private forests, 2015



1.8.1 Policy influence on structure of ownership

Considering first the influence of policy on ownership, three main approaches are land reform (change of ownership), land consolidation (reduction of fragmentation), and afforestation.

The ECE region includes many examples of radical change in forest ownership and management policies, reflecting social and political developments. This is most apparent in the former socialist countries in Eastern and South East Europe, the Caucasus and Central Asia, where the transition to free market economy brought diverse pathways of change in ownership, through restitution and privatisation. In Central Asia, most forests are held by the State although new tenure regimes allowing for private, communal and other types of use have been introduced. Land reform is not unique to the post-socialist States however. Other examples include a series of land reform laws implemented since 2003 in Scotland, as a devolved nation of the United Kingdom.

In Central European countries where fragmentation is a significant policy concern, policies incentivize owners to consolidate holdings or to avoid further fragmentation. In regions where policy views fragmentation or parcelisation as a problem, a range of governance mechanisms have been developed. Some countries have addressed inheritance laws to influence the extent to which property is subdivided among family members; other mechanisms seek to consolidate holdings, either by encouraging land sales or exchanges,

or by voluntary or mandatory channels for combining the management of multiple properties in a shared unit.

Many countries seek to increase forest area by motivating existing landowners to create forests, through offering subsidies or other incentives to plant trees. Figure 22 shows areas where experts consider this to be a significant factor in creating new woodland owners. Within the European Union (EU), the national rural development programmes support afforestation of agricultural land, notably in the Mediterranean region, the United Kingdom and Ireland. In other countries afforestation of agricultural land is not supported. Beyond the EU, a notable example is the United States of America, where program support results in new forests across millions of ha of marginal farmland. The overview provided in Section 5.1 is a useful context for the large body of academic and consultancy literature assessing the effectiveness of such policies and the choice of policy tools.

1.8.2 Policy influence on how owners manage forest

Turning to the influence of policy on forest management, a common approach to analyzing policy tools classifies them under three headings: regulation, incentivisation, and advice. The balance between regulation and incentives is neatly summarized in an important output from the FACESMAP project: the Property Rights Index in Forestry (PRIF). This provides a tool to compare the freedom of the owner under five domains of property rights: access, withdrawal, management, exclusion and alienation. Published analysis is based on Europe (Nichiforel et al., 2018), but provides valuable insights on broad patterns of variation in the legislative framework. While most countries allow owners to access their own forest, withdrawal rights are more tightly controlled, particularly in South-East Europe where a more centralized approach prevails. Likewise, in post-socialist countries there is a stronger tendency to require owners to use the services of forestry professionals to manage their forests. The freedom of owners to limit access and use by others varies in a different way, perhaps more related to cultural than to political history: forest owners in both South-East Europe and in northern Europe (Fenno-Scandinavia and Scotland) have fewer rights to prevent public access. The two ends of the property rights spectrum can be illustrated by Romania, where forest owners must adhere to the Silvicultural Code which prescribes thinning and felling regimes; and Sweden where a philosophy of 'freedom with responsibility' relies on low regulation, low financial support, and a strong communication campaign to encourage 'good' forest management.

Regulations, incentives and advisory programmes can be applied differently to different types of forest owner or proper, in order to prioritize policy goals. For example, financial instruments may focus on small-scale forest owners; management plans may only be required for properties above a threshold size; support for management planning may be offered free only to owners who are members of forest owner associations.

A soft form of regulation is often used whereby owners qualify for incentives if they comply with certain criteria or standards. Property tax represents a mode of balancing incentives with regulation. This approach is a significant tool in the United States of America, where reductions in property tax are available to owners who adopt forest management programmes. Certification is often presented as a form of 'voluntary regulation', and for example in Romania, forest owners who comply with certification schemes are exempt from paying property taxes. Public forests are almost all certified across almost all countries, but there is much wider variation in the proportion of private forests certified.

Policy and its enforcement are also reflected in the organization of forest administration; in this Section 5.1. provide a useful combined insight. Usually the same agency is responsible for monitoring compliance with regulation and programme incentives, in both state and private forests; often this agency is also responsible for administering fiscal incentives and providing advisory programmes. However, there is increasing diversity in the provision of such services.

1.8.3 Forest administration and management

Governments address forestry through a wide range of ministries and departments, which reflect policy and cultural expectations of forestry in the national context. Less than a quarter of countries explicitly include 'forestry' in the name of the ministry which governs the sector. More often, forests are assigned to a ministry with a more generic jurisdiction such as agriculture or environment.

Forest policy and laws are often implemented and enforced through State Forest Organizations (SFOs) which have two broad functions: forest management (of public forests), and forest regulation (of private forests). Some integrate the forest authority and forest management services within one organization, while others separate them. The range of information provided by member States, provides a valuable resource for understanding the diversity of organization and effectiveness of SFOs (explored further in Sections 5.2 and 5.3).

SFOs are financed either as State-owned enterprises (SOEs) or direct through the national budget, as State budget finance (SBF) organizations. SOEs predominate in Europe, while SBFs predominate elsewhere. The SBFs conform with World Trade Organization rules governing the involvement of the State in trade, while those within Europe

accommodate themselves to the Treaty on the Functioning of the European Union in 2007 (European Parliament, 2012) which protects the free market within the EU. Sections 5.2 and 5.3 provide other examples and suggest explanations which merit further research.

SFOs have to balance their interest in revenue, with the need to deliver a range of public goods. These multiple functions of SFOs represent a unique opportunity for the State to demonstrate and deliver sustainable forest management in State-owned forests. The survey shows that most are generally oriented toward market demands, supplying national and international markets with timber. In some countries, SFOs are competitive actors on the market, while others (e.g., with economies in transition) expressed a need to open markets and to improve the professional marketing activities of SFOs.

1.9 Conclusions

Analysis of data on 35 countries in the ECE region is informed by an approach that deconstructs ownership rights and responsibilities, and the broad binary division of public and private ownership. This leads to a report which highlights patterns and trends in ownership, with insight into subtleties of meaning and outcomes. Nevertheless, for many reasons most countries are not able to provide data at all levels of the inquiry, so the study also highlights the potential for further study and understanding. In particular, official categories cannot easily provide an overview of ownership by communities of place or interest, and non-profit non-state entities, which collectively might constitute a broad category of community forestry.

The study is most comprehensive at the level of understanding the distribution of different types of ownership, in particular differences in the balance between public and private ownership. These patterns do not easily map on to political or cultural criteria and vary between otherwise similar countries. Property size is also well documented, showing a prevalence of smaller properties in Europe, and that public forest holdings are larger (usually much larger) than private holdings.

Changes in ownership are explored through both quantitative and qualitative methods. Despite widespread concerns about property fragmentation, the available data does not demonstrate a general trend in property size. Overall, in post-socialist Europe, the total area of public forest has decreased while private forest has increased since 1990. The pattern is more mixed in other countries, where in many cases both public and private forest area is increasing. Expert opinion used to assess the importance of factors affecting changing forest owners highlights areas where restitution and privatisation have taken place, where fragmentation and decreasing parcel size are a concern, and where changing lifestyles of owners affect their values and interest in forest management.

Compared with the rest of the world, the ECE region has a higher proportion of private ownership; and areas with very small property sizes. Global patterns contrast with the greater proportions of more regional or local public ownership, smaller scale family ownership, and absence of indigenous ownership from most countries in the ECE region.

The processes and outcomes of forest management decision-making are explored through owners' objectives and decisions and reported forest condition and timber harvest. National statistics do not currently offer a useful window on the range of values and objectives, which in many cases is better addressed through academic studies. The study highlights owners' multiple objectives which combine production, household economy and intangible benefits, which contrast with stereotypes that focus on income and timber production.

In public forests, forest management decisions are generally made within the responsible public body although, in a few cases, these decisions are delegated. Operational decisions are often undertaken by agency staff or, in many cases, by private contractors. In private forests the situation is more diverse. Sources of advice for forest owners are not easily described through national statistics, and in-depth academic studies provide more insight. The study demonstrated however that small-scale private forest owners generally implement management decisions themselves, while medium to large-private forest owners are more likely outsource such operations to forest contractors. Newer owners are also more likely to outsource forest operations. Forest owner organizations are increasingly important in providing joint representation of owners' interests, and accessing services for forest management and marketing.

The provision of forest biomass and other forest ecosystem services for the products and services of the bioeconomy in reasonable extent depends on the objectives and decisions of forest owners. The variation in condition and harvesting of forests in the public and private categories serves as an indicator of forest management outcomes. One indicator is the proportion of forest 'available for wood supply'. A higher (and increasing) proportion of public forest that is not available for wood supply indicating management objectives for these areas which protect forests from extraction. As an indicator of forest condition, growing stock (in the forests available for wood supply) is higher in public forests than in private, and is increasing in both public and private forests. In contrast, net annual increment is higher in private forests than in public, which may reflect a private sector focused on production, and the possibility that public forests include more mature and old growth

forests. There are exceptions to both these generalizations which illustrate the different histories, growing conditions, and policy priorities in each country.

Forest management is indicated by the utilization rate (volume harvested as a proportion of NAI). In most countries, utilization is considerably below the NAI, and in many countries, there is evidence of an increase in utilization rate over the period 1990-2015. In most countries, private forest is more intensively harvested than public. Again, exceptions to the generalization provide insights into the effect of particular histories and policies.

These policies include regulations and incentives to change the structure of ownership (land reform, land consolidation, and afforestation), and to influence forest management through regulation, incentivisation, and advice. The study provides an overview of a wide range of laws and policy approaches to moderate the interface between forest ownership and ecosystem services including voluntary regulation through certification.

Governments address forestry through a wide range of ministries and departments, which reflect policy and cultural expectations of forestry in the national context. Forest policy and laws are often implemented and enforced through State Forest Organizations (SFOs) which have two broad functions: forest management (of public forests), and forest regulation (of private forests). Some integrate the forest authority and forest management services within one organization, while others separate them. SFOs are financed either as state-owned enterprises (SOEs) or direct through the national budget, as State budget finance (SBF) organizations. SFOs have to balance their interest in revenue, with the need to deliver a range of public goods. These multiple functions of SFOs represent a unique opportunity for the State to demonstrate and deliver sustainable forest management in State-owned forests.

Within the constraints of data availability and harmonization, the study provides a new baseline for understanding the diversity and dynamics of forest ownership in the ECE region. This overview, and the following sections, provide vital analyzes of the interplay between public and private ownership, management, policy, and forest goods and services. The interactive database provides yet more data and is publicly available for further exploration and analysis.

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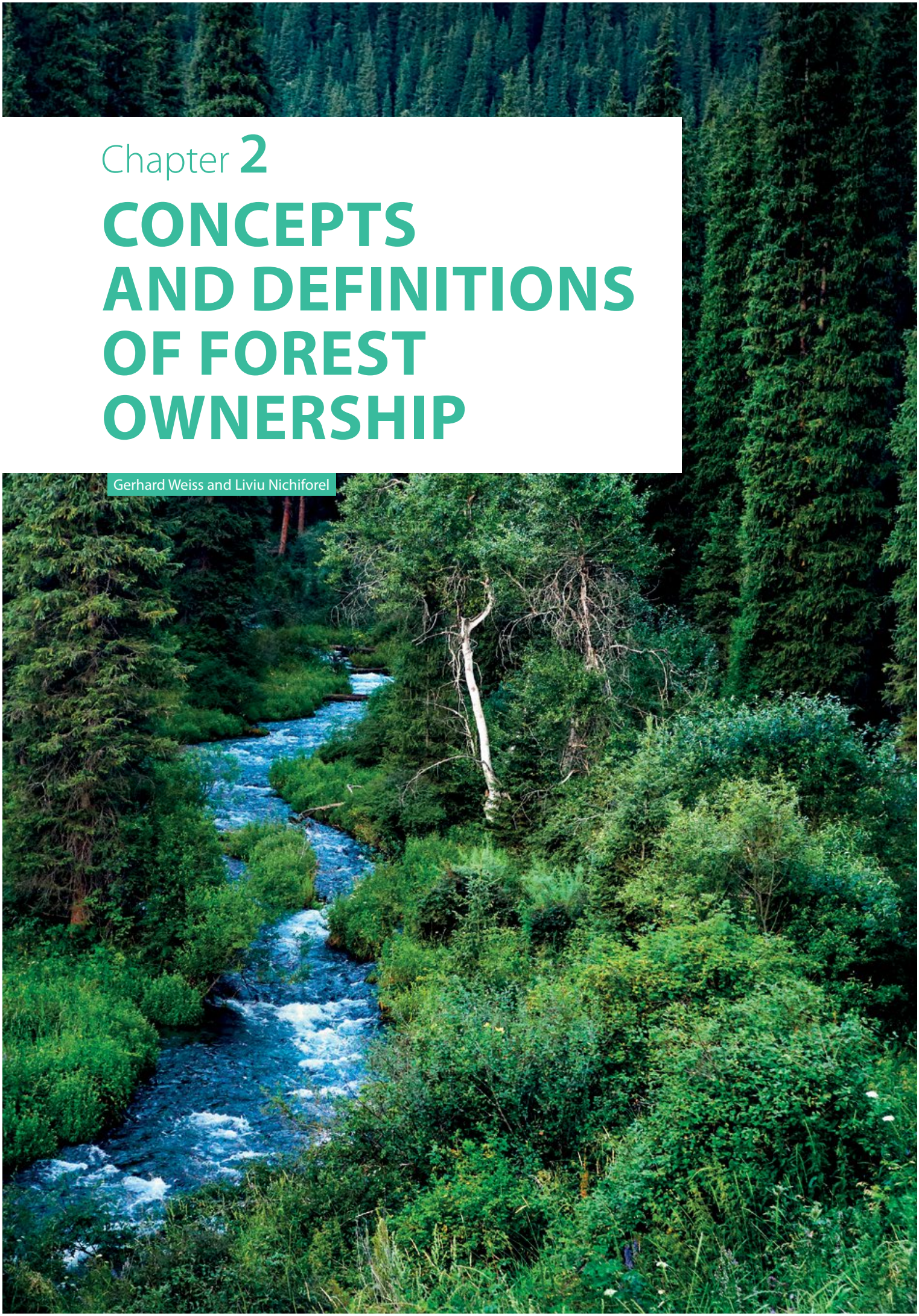
Chapter 2

CONCEPTS AND DEFINITIONS OF FOREST OWNERSHIP

Gerhard Weiss and Liviu Nichiforel



2. CONCEPTS AND DEFINITIONS OF FOREST OWNERSHIP

2.1 Introduction

Forest ownership may at first sight appear to be a straightforward concept, however, ownership is understood quite differently depending on the context, country and the purpose for which it is being used. There is consequently a need to clarify our understanding of forest ownership and to be aware that the concept is not always applied consistently, even in national or international forest ownership statistics.

This section sets out to review the definitions associated with forest ownership, tenure and property rights as well as to discuss the ways in which forest ownership categories have been defined for national and international data collection purposes. It furthermore highlights the areas where multiple interpretations of forest ownership remain and provides definitions of the basic terms and concepts that will be used throughout this report. This section accordingly serves as a guide for understanding the data categories and also addresses some of the challenges faced in interpreting the data for this study.

2.2 Defining forest ownership

According to the FAO Forest Resources Assessment,[3] forest ownership is defined as:

"[Forest ownership] generally refers to the legal right to freely and exclusively use, control, transfer, or otherwise benefit from a forest. Ownership can be acquired through transfers such as sales, donations, and inheritance" (FAO, 2018, p. 16).

FAO furthermore adds the following explanatory note to its definition:

"Forest ownership refers to the ownership of the trees growing on land classified as forest, regardless of whether or not the ownership of these trees coincides with the ownership of the land itself" (FAO, 2018, p. 16).

The FAO definition implies that forest ownership conveys exclusive legal rights over the forest resource, such as the right to fully utilize, control (manage) the forest, and/or transfer those rights to others. However, forest owners seldom have the full range of exclusive legal rights to *"use, control or transfer"* when it comes to benefiting from their forest, in particular, since ownership rights pertaining to forests are always, to a lesser or greater extent, restricted by legal regulations and social customs associated with the forest land in question.

This implies that forest ownership must rather be understood as a multi-layered system of relations between the legally entitled holder of the resource and the rights and duties involved in relation to the forest resource. It furthermore highlights the importance of considering the different components of forest ownership and disentangling the different concepts used for describing ownership, tenure, property rights and forest stewardship, including how the terms *"public"* and *"private"* ownership are used in different contexts.

Although these terms may be used in diverse ways, or sometimes interchangeably in colloquial language, the specific meaning is important when considering legal definitions and especially when comparing regulations across countries. The classification system presented below illustrates the complex interrelations between legal ownership, property rights and tenure arrangements and it intends to provide a framework for clarifying these terms.

2.3 Forest ownership, property rights and tenure

Forest ownership can be characterized as a system of interrelated but distinct features, which includes the institutional setting, the allocation of property rights, the nature of ownership, the character of the owning entity and the regulation(s) and organization of forest management (or stewardship). For all these aspects of ownership, the State has a role in conferring either a stronger or weaker public or private character, such as through regulatory laws or the allocation of jurisdictional powers (see Section 5.1.).

In this systems approach, forest ownership means that different tenure arrangements are based on various combinations of property rights, which can be attributed, formally or informally, to the legitimate holder of the resource or to other resource users. Forest ownership, property rights and tenure arrangements are consequently inter-related concepts that cannot be substituted for each other, although in practice, they are often understood and used synonymously.

The formal institutional framework for the regulation of forest ownership comprises policies, legislations, technical norms and operational guidelines that affect all levels of ownership. These refer not only to forest-related policy but also to cross-sectoral policies which influence the

3 See http://www.fao.org/forest-resources-assessment/en/.

distribution of rights with respect to different forest ecosystem goods and services (see Sections 4.1. and 4.2.). The regulatory setting of forest tenure therefore determines *"who can use what resource, for how long, and under what conditions"* (FAO, 2002), which effectively means that the assignment of legal property rights is attributed in various combinations depending on the international, national and/or regional context.

Customary tenure arrangements are often informal and based on locally recognized rights without formal State recognition. Local customs may provide sufficient protection for customary rights in countries where this is not formally regulated, such as access to non-wood forest products (NWFPs) on private land. Customary rights are less common in the United Nations Economic Commission for Europe (UNECE) region as compared with formally recognized rights. Nevertheless, many *de facto* rights still arise owing to the lack of enforcement of law, or owing to a lack of interest or capacity to implement legal rights, for example, imposing access restrictions on forest land where this right belongs to the owner. Other *de facto* rights may in fact constitute illegal use of forest resources, such as illegal fellings (see also Section 5.1.6. for more information).

The FAO definition of forest ownership implicitly indicates that ownership rights may be split into different elements, such as the ownership of the land, ownership of the trees, or ownership over other elements of the forest ecosystem. In the ECE region, land use policies generally provide the framework within which ownership titles are assigned to public or private entities. National laws and contracts between parties can then divide the property rights into its respective land use elements, which can be allocated to different resource users. For example, the choice of contractors for certain management practices (e.g., reforestation or timber harvesting) or the preparation of management plans (e.g., reserved for public authorities) may be regulated through national law. Other management practices can be influenced by voluntary contracts with private organizations, such as forest certification bodies or companies in the timber supply chain. This means that the right to decide about forest resource use is allocated differently to public authorities, legal owners or users of the forest, depending on the national context.

This also means that the user rights to the land and its respective resources can be split into various land rights or privileges that can be granted to specific right holders (e.g., land owners, hunters and neighbours) or to the general public (e.g., biodiversity conservation, recreation or access to NWFPs). Forest owners may also be in a position to grant user rights (in full or for specific services) through contractual arrangements (e.g., leases, licenses or permits) or other types of informal agreements.

Property rights are often allocated only in part to the land owner, other parts being allocated to public authorities and/or other stakeholders. The complexities of property ownership are often explained using the *"bundle of rights"* framework (Schlager and Ostrom, 1992). This framework explains how a property can be simultaneously owned by several entities and characterizes property rights within five categories:

1. **Access rights** (rights to enter forest land);
2. **Withdrawal rights** (rights to harvest or remove timber, firewood and NWFPs);
3. **Management rights** (rights to plan internal forest activities and transform the forest);
4. **Exclusion rights** (rights to prevent others from access and harvesting of wood or NWFPs);
5. **Alienation rights** (rights to sell forestland and forest products as well as to lease or sell management and exclusion rights).

Tenure is generically used to refer to a variety of formal and/or informal arrangements that allocate combinations of property rights categories (Siry et al., 2015, FAO, 2011). Different tenure arrangements are based on the level of control exercised by the legitimate holder of the resource. Tenure theory distinguishes the following types of right holders with different levels of property rights: *"owner"*, *"proprietor"*, *"claimant"*, *"authorized user"* and *"authorized entrant"* (Schlager and Ostrom, 1992, Ostrom and Hess, 2007). However, as there may be variations with regards to the formal and colloquial use of these terms, the following offers a brief explanation to clarify the use of these terms:

- **Owners:** The legitimate holder of a resource that is granted all property rights, including *"the authority to determine how, when, and where harvesting from a resource may occur, and whether and how the structure of the resource may be changed"* (Schlager and Ostrom, 1992, p.251).
- **Proprietors:** Do not hold alienation rights, which basically means they cannot sell the land. For example, members of a local forest community (common-property), are in fact proprietors if they have harvesting rights and can participate in management decisions, but they cannot sell their share of forestland and/or lease their management rights.
- **Claimants:** Do not hold exclusion or alienation rights but hold the authority to decide on management and withdrawal rules. This is a rare situation for forestry in the ECE region except when members of a local forest community for example have management and withdrawal rights (e.g., setting rules for mushroom

picking) but are not able to exclude external users from NWFP harvesting.

- **Authorized users:** Can only take advantage of resource benefits as granted by holders of exclusion and alienation rights. For instance, different user rights may be granted to farmers (e.g., grazing rights, right for fuel wood, or construction wood from public State forests) or to citizens (e.g., access to NWFPs in public forests).
- **Authorized entrants:** Users that are granted the right to enter a forestland to enjoy non-subtractive benefits, such as citizens that acquire a permit to enter a national park or for recreational activities, without having the rights to harvest wood or NWFPs.

2.4 Forest ownership categories

Property is understood as a forest area that is owned by a single holder, including all parcels of land (per country). A holder (or owner) is understood as any type of physical or legal entity having an ownership interest in a given property, regardless of the number of entities involved.

Forest ownership is commonly categorized either as public or private. However, to better understand this distinction, it is necessary to also look more closely at what is meant by private and public ownership. This is particularly important as forest ownership is often used in different contexts, applying different definitions (e.g., McKean, 2000, p. 30-31, Ostrom, 2000, p. 335-338, Cole and Grossman, 2002), which may ultimately lead to misinterpretations.

When considering public or private ownership, it is important to distinguish whether ownership is based on the alienable nature of the ownership, or on the nature of the entity that owns the forest. In the first case, public ownership is assigned to all citizens, which means that forest that is publicly owned cannot be sold (Bouriaud and Schmithüsen, 2005), and implies that the benefits generated by public land should remain available for future generations. This understanding of public ownership originates from ancient Roman property laws and is found in some countries in continental Europe; it takes the view that, if the law allows forests in State or municipal ownership to be sold, that forest should be seen as private. This explains why municipal ownership is categorized as private in some countries. In the second case, the distinction between public and private ownership is based on the nature of the *entity* and means that all forests in State or municipal ownership are considered as public.

The latter definition has been used as a basis to distinguish between private and public ownership in the FACESMAP survey as well as in an earlier UNECE/FAO survey on private forest ownership in Europe (UNECE, 2010). The Global Forest Resources Assessment (FRA) also defined public ownership as *"Forest owned by the State; or administrative units of the Public Administration; or by institutions or corporations owned by the Public Administration."* (FAO, 2018, p. 17).

With respect to the nature of the entity that owns the forest, five legal ownership categories, also described as *"resource regimes"*, are distinguished in property rights theory (Bromley, 1991, Hanna et al., 1996, Vatn, 2005, Bouriaud and Schmithüsen, 2005):

- **State property** (*res publicae*): Publicly owned forests that is managed by an agent of the government;
- **Municipal or communal property** (*res communalis*): Locally or regionally owned forests managed by communes, towns, municipalities or other administrative entities;
- **Common property** (*res communis*): Privately owned forests managed by a group of co-owners that have a governance structure responsible for assigning rights and duties;
- **Private property** (*res privatae*): Privately owned forests managed by a specific individual or private legal entity that holds the rights to control its use;
- **Open access property** (*res nullius*): Forests that are not owned by anyone and where consequently everyone has access. This is however a rare situation in the ECE region.

One source of confusion with regards to forest ownership categories is the fact that the above noted resource regimes are interpreted and used differently depending on the government, organization or researcher in question. Further problems arise in the understanding of specific categories and whether they should be classified as public or private. It is particularly common to find confusion between municipal or communal forests (as a public form of ownership) and community or common properties (as a private form of ownership). It is therefore relevant to take a closer look at these specific forms of ownership and how the respective resource regimes are applied across different countries (Živojinović et al., 2015). This is illustrated by the fact that municipal forests are categorized as private in Bulgaria, the Czech Republic and Latvia, whereas in Estonia, Poland and Romania municipal forests are classified as public. Moreover, representatives of municipal forests commonly claim that they should be seen as a distinct ownership category alongside public and private ownership. This view is, amongst other things, expressed in a position paper by the European federation of organizations representing forest municipalities (FECOF) on the EU Forest Strategy (FECOF, 2014).[4]

4 See http://www.fecof.eu.

In contrast to communal forests, which are owned by local governments (e.g., municipalities), common (or community) forests are owned by a group of co-owners (e.g., local communities). Community forests vary widely in their definition. Some are defined through customary rights; others, linked historically to a local community, may be defined and protected through law which provides it with a special status; still others are newly created forms of collective rights based on adaptation of company law. The regulations that govern community forests often provide that the land cannot be sold to anyone outside the defined group of owners, thus, giving it a public character, even though the owners are private entities (e.g., citizens within a specific community). They may consequently be referred to as either *"semi public"* or *"semi private"* forms of ownership, illustrating the ambivalent nature of some types of common forests. This also highlights that common forests may warrant a sub-category that helps to distinguish between these variations.

In line with this argumentation, many countries use different interpretations with respect to common forests – understanding them as either public or private. In most cases these are specific to their geographical and historical context. For instance, in Switzerland, *Burgergemeinden* are common ownership structures shared by individuals who have citizen rights in that municipality, but are considered a public category. In contrast, Austria, Norway and the United Kingdom simply distinguish between public communal / municipal forests and private common / community forests, while countries such as Portugal, Finland and France, classify their communal or municipal forests neither as public nor private (e.g., in the FRA, Portugal, Finland and France distinguish communal or municipal forests as an *"other type"* of ownership).

There is also a range of joint, philanthropic or charitable forms of ownership. This includes organizations or individuals that have the primary goal of delivering social and/or environmental benefits, rather than maximizing economic returns. These forms of ownerships may be seen as semi-public as they endeavour to provide public benefits (e.g., biodiversity conservation, amenity, recreation or community-related benefits), and they are sometimes recognized as charitable organizations. This is at times also done in exchange for tax exemptions and access to charitable funding, whereby these types of legal bodies in turn may have restricted rights as owners (e.g., in terms of using profits and the disposing of assets). In some countries in the ECE region, 'church forests' is another type of intermediate form of ownership, which is regarded as private in some countries (e.g., Austria, Czech Republic, Serbia, Greece, Bulgaria, Estonia), public (e.g., Belgium), or entirely separate in others (e.g., listed as charitable organizations in the United Kingdom).

2.5 Forest management

Another important component of forest ownership relates to the regulation and organizational structure of forest management. In the FACESMAP/UNECE/FAO Enquiry,[5] forest management was defined as follows:

"Forest management is a system of measures to protect, maintain, establish and tend forest; ensure provision of goods and services; protect forest against fire, pest and diseases; regulate forest production; check the use of forest resources; and monitor forests; as well as to plan, organize and carry out the above-mentioned measures."

Forest management is for the purpose of this report understood in a broader sense, including planning and decision-making as well as practical forestry operations. Regardless of the ownership categories noted earlier, the regulation and supervision of forest management has a significant impact on the property rights of the forest owners. State intervention affects property rights through for example legal restrictions or prescriptions of forest management, allocation of public responsibilities in forest management planning, and zoning of forest land into different protection categories that imply specific management restrictions in protected or special purpose forests.

The degree of freedom that forest owners have with regards to deciding on, and implementing forest management objectives, is a major factor that differentiates national regulatory frameworks throughout the ECE region (Nichiforel et al., 2018). Varied rules regarding forest management can be identified across the ECE region, including restrictions on changing forests to other types of land use and obligations to regenerate forests after clearcutting. There are furthermore significant disparities with respect to requirements for formally approved Forest Management Plans (FMPs) as well as the organizational structures assigned to control and implement their provisions (see Section 5.1).

Various organizational models for forest management are applied in the region. In the case of State property, these range from an integrated State forest service responsible for all public authority and management services (e.g., Turkey) to privately organized management of State property (e.g., Austria and Ireland), where management is carried out by State-owned companies, including companies that are registered on the stock market (see Section 4.1.3.). For private property, legal frameworks also differ with regards to how free forest owners are in choosing forest operational service providers, such as in designing management planning or in conducting harvesting operations, in addition to legal

5 See https://www.unece.org/forests/areas-of-work/forest-resources/methods-and-processes/forest-ownership.html.

restrictions in forest management (Živojinović et al., 2015) (see Section 4.1.7).

2.6 Key definitions of forest ownership

The FACESMAP/UNECE/FAO Enquiry applies definitions developed by, and included in, recent international reports on forests, such as the Global Forest Resources Assessment 2015 (FAO, 2015) and the State of Europe's Forests 2015 (FOREST EUROPE, 2015).

Definitions with respect to *"forests"*, *"other wooded land"* and *"forest availability for wood supply"* are discussed elsewhere and are not the focus of this study (Alberdi et al., 2016). However definitions related to *"forest"* and *"other wooded land"* have remained relatively stable, being based on the format introduced in 1990 (FAO, 2018). National datasets on the other hand largely continue to use their own definitions, thereby limiting opportunities for cross-country comparisons and overviews. Furthermore, forest ownership definitions and categories applied in this study have changed somewhat as compared to the UNECE/FAO study on Private Forest Ownership in Europe in 2010 (UNECE, 2010). While the new classification scheme has largely kept the same forest ownership categories, it applies different terms, simplifies some, and introduces new categories.

Table 2 provides a comparison of the categories across reporting periods.

TABLE 2

Comparison of categories of ownership as defined in the data sets from 2006 and 2016

Forest Ownership Study (2006)	Forest Ownership Study (2016)
Public ownership	
• State	• Public ownership by the State at national level
• Provincial	• Public ownership by the State at sub-national government scale
• Communal	• Public ownership by local government
Private ownership	
• Individual • Family • Cooperatives	• Private ownership by individuals and families
• Forest industry	• Private ownership by private business entities
• Religious institutions • Education institutions	• Private ownership by private institutions
• Other private institutions	• Private ownership by tribal and indigenous communities • Other private common ownership
Unknown ownership	

Given the varied interpretations of public and private forest ownership categories and associated property rights reviewed above, the definitions underlying this study are outlined below. These follow the definitions used by FAO (FAO, 2015), although not all countries could return data in forms that exactly fit these definitions.

2.6.1 Public ownership

- **Public ownership by the State at national level**. Forest owned by the State or by administrative units of the Public (State) Administration or by institutions or corporations owned by the Public (State) Administration at the national scale.
- **Public ownership by the State at sub-national government scale**. Forest owned by the State or by administrative units of the Public (State) Administration or by institutions or corporations owned by the Public (State) Administration at the sub-national government scale (e.g., Provinces and territories (Canada), Bundesländer (Germany), Regioni (Italy), Comunidades autónomas (Spain) and States (United States of America)).
- **Public ownership by local government**. Forest owned by a local government having a local sphere of competence. The legislative, judicial, and executive authority of local government units is restricted to the smallest geographic areas distinguished for administrative and political purposes (e.g., counties, municipalities, cities, towns, townships, boroughs, school districts, and water or sanitation districts).

2.6.2 Private ownership

- **Private ownership by individuals and families**. Forest owned by individuals and families.
- **Private ownership by private business entities**. Forest owned by private corporations, companies and other business entities etc.
- **Private ownership by private institutions**. Forest owned by private non-profit organizations such as NGOs, nature conservation associations, and private religious and educational institutions, etc.
- **Private ownership by tribal and indigenous communities**. Forest owned by communities of tribal

or indigenous people. The community members are co-owners that share exclusive rights and duties; and benefits contribute to the community development.

- **Other private common ownership**. Forest owned in common by a group of individuals or other private entities. The shareholders are co-owners with exclusive rights, duties and benefits associated with the ownership.

2.6.3 Unknown ownership

- Forest areas where ownership is unknown, including areas where ownership is unclear or disputed.

The public categories have not changed significantly between the reporting periods, but the applied definition have been somewhat improved, introducing a distinction between State and municipal public bodies. The private categories now focus more strongly on the division between personal ownership (including individuals and families, cooperatives and companies owned by individual or family owners), businesses and other private institutions, including the broad range of non-profit (non-business) organizations, such as religious or educational institutions, which were handled separately before. Communities of tribal or indigenous people are now a new and separate category, separate from other private common ownership. There is a distinction between cooperatives of freely associated individual owners (falling under individuals and families) and common ownership with specific management rules that are often specifically protected by law (communities of tribal or indigenous people). The latter include common property regimes that go back to historical commons but are not commonly referred to as tribal or indigenous.

2.7 Additional terms and concepts

In addition to basic definitions and ownership categories there is a need to clarify other concepts that have been applied throughout the report. This section therefore introduces the way the study understands customary and statutory forest tenure, new types of forest ownership, privatization and restitution, and fragmentation of forest properties. The reader is also referred to work carried out under the COST Action FACESMAP for more details (e.g., Živojinović et al., 2015, Weiss et al., 2019).

2.7.1 Formal (statutory) and informal (customary) forest tenure

Tenure rights include two forms: (a) the formal, statutory or *de jure* rights and (b) informal, customary or *de facto* rights, in practice. The former refers to rules established and protected by the State (e.g., registered land titles, concession contracts, forestry laws and regulations), the latter include community rules or regulations inherited from ancestors that are usually accepted, reinterpreted and enforced by local communities, and which may or may not be recognized officially by the State (Alden Wily, 2008). Customary tenure usually refers to traditional rights to land and other natural resources, often associated with indigenous communities, and, in developing countries, opposed to statutory tenure usually introduced during colonial periods (FAO, 2002). Scholars and international programmes call for a recognition of customary rights by the legal system in land reform processes to improve sustainable land management and the livelihood of rural populations, among others by the United Nations Declaration on the Rights of Indigenous Peoples from 2007 (FAO, 2011, Siry et al., 2015, RRI, 2014).

2.7.2 New owners and new ownership types

"New forest owners" is a commonly recurring concept in the literature related to changes in forest ownership types. However, *"new forest owners"* have also been characterized in various ways, referring on the one hand to the length of forest ownership (e.g., Newman et al., 1996) and on the other hand to changes in attitudes, values and/or behaviour of the forest owner (e.g., Hogl et al., 2005, Matilainen et al., 2015), where 'new' refers more specifically to a type of forest owner.

Forests can be acquired in a number of ways. New owners can for example acquire forests through an inheritance, as a gift, or by purchasing a plot of land. In some pan-European countries, restitution has also been a process through which previously nationalized forest land has been restituted to new owners. Restituted owners may however also be characterized as an old or former owner. This implies that the length of ownership may not always be an appropriate indicator for a *"new forest owner"*. For example, Newman et al. (1996) limits the period of ownership to 1.5 years, whereas Rämö and Toivonen (2009) set a 9 year time limit for new forest owners.

Research on forest ownership types principally focuses on whether the owners manage their forest land differently compared with other owners, for instance, due to different knowledge, goals or management practices. Ownership types are in these instances often characterized and based on the owners' backgrounds and goals, comparing for example traditional and new forest owners. New forest owners are commonly labelled as *"absentee"* or *"non-resident"* owners (e.g., people that live far away from their forest), *"urban"* owners (e.g., people that live in cities and/or urban areas) or *"non-farm"*, *"non-agricultural"*, *"non-traditional"* forest owners (e.g., people that have no connection to agriculture). These varied definitions suggest an increasing disconnection from forest and agricultural ownership which often results in the fragmentation of forest properties, alienation, increasing

landowner detachment from their forest land, absenteeism, and a reduced involvement in forest management (Weiss et al., 2019, Ficko et al., 2017; Ficko et al. 201).

2.7.3 Urbanization and urban forest ownership

New forest ownership types are often described in a continuum, ranging from traditional or rural forest owners to urban or non-traditional forest owners (Hogl et al., 2005). There are essentially three main interpretations with respect to "urban forest owners", namely, the owner's place of residence (e.g., in a rural or urban area), their social identity (Hujala and Tikkanen, 2008) or their lifestyle (Schraml and Memmler, 2005).

Urbanization in this context relates to recent structural changes in agriculture (e.g., modernization and rationalization) and to the observed trend that forest owners increasingly have professions other than being farmers. They consequently have more modern (or urban) values and live what is often referred to as an urban lifestyle (Ziegenspeck et al., 2004).

2.7.4 Privatization and restitution

There has been a considerable shift in forest ownership structures in Central-Eastern and South-Eastern Europe, principally due to the restitution and privatization processes, since the early 1990s. Restitution refers to the process of returning nationalized forest land to former owners (or their descendants) in former socialist countries. Former owners were often private persons, religious organizations or municipalities. Privatization corresponds to selling forest land that is in public ownership (often State ownership) to private entities, usually through sales contracts that are guided by public policy programmes. This implies a change of the entity that owns the forest. However, privatization may also refer to a change of ownership rights or to the form of management. The latter is usually related to the transformation of a State forest agency into a private entity that provide forest services. However, a private forest entity may still be in public ownership (e.g., federally owned stock companies).

Restitution processes have occurred differently across Europe, including different developments, over time. In some countries, restitution has been related to different types of former owners and different size classes (Bouriaud and Schmithüsen, 2005, Živojinović et al., 2015, UNECE, 2010), while in other countries, particularly the Baltic States, public forests have also been privatized to some extent. Due to privatisation and restitution, private and family-based forest ownership has as such increased significantly in Central-Eastern and South-Eastern Europe, even though these processes have not yet finished in many countries. However, in some cases, privatisation and restitution has also led large areas with unknown ownership.

In Western Europe, the privatization of State forests has only occurred to a minor extent. Many Western and Eastern European State forests organizations have however been re-organized into State forest companies (see also Section 5.3), including the commercialization of public forest management, such as the introduction of State-owned companies.

2.7.5 Fragmentation and parcelization

Across much of Europe, an increased fragmentation of forest properties has been observed, a fact which is often seen as problematic by many policymakers as it can make efficient forest management difficult and often leads to an underuse of timber resources. Conventionally, fragmented forest ownership refers to a split or divided property structure at the level of one forest holding (e.g., when parcels of one forest holding are located at a distance from each other). From a national perspective, it refers instead to a growing number of owners, such as when the average property size in a country or region becomes smaller (Stern et al., 2010).

Fragmentation of forest properties usually takes place in the form of parcelization (also parcellation) of the forest (e.g., the splitting of forest properties into smaller parcels). A specific form is the creation of joint ownership through inheritance, which leads to multiple owners of the same parcel and may also be problematic since decision-making processes may become complicated with several owners of the land. Fragmentation may occur through the process of inheritance or selling off land. Several countries have therefore issued policies to avoid or consolidate land fragmentation through inheritance laws or other land defragmentation or consolidation programmes (Živojinović et al., 2015, UNECE, 2010).

While the problem of lower utilization rates of the timber resources in small-scale forest properties is substantiated through forest inventories, the limited economic viability does not hold in all cases (e.g., when the owners have other preferences). Furthermore, the potential socio-cultural benefits of small ownerships have remained largely unexplored.

2.8 Conclusions

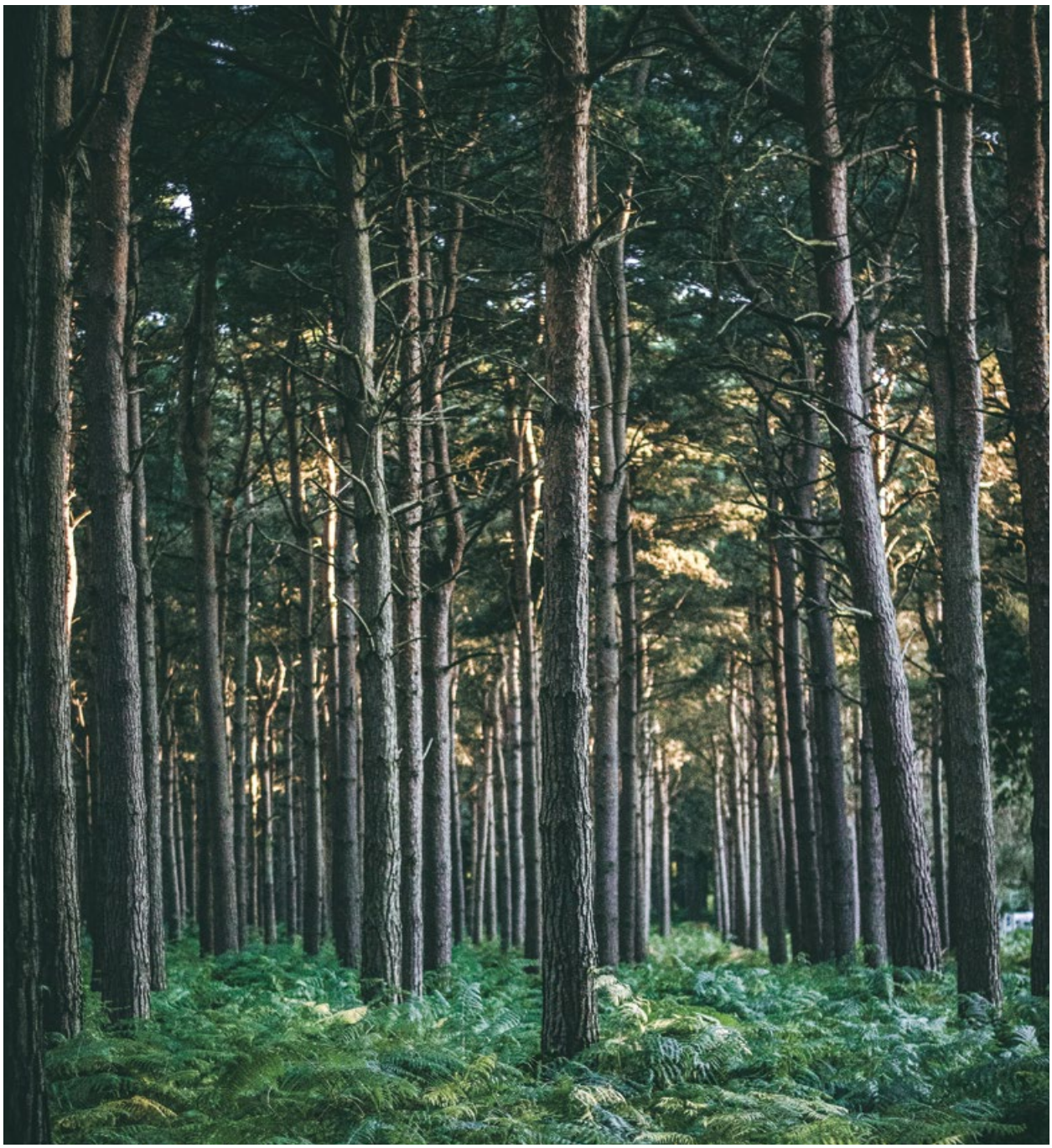
The review of the basic terms, concepts and classification schemes for forest ownership demonstrates that the related issues are complex and that a careful use of the terms is needed in order to avoid confusion, misunderstanding or the misuse of terms (Weiss et al., 2019).

It has furthermore been observed that relevant terms which characterize forest ownership are not always used

consistently across countries and institutions/organizations as well as by researchers. For the present study, this has restricted the comparison of statistical data and other information across countries, and the combination of results from different studies.

In conclusion, there needs to be a critical and clear reference to definitions when writing on forest ownership related topics. Any use of earlier studies would also need to be carefully reviewed. The same applies to the use of ownership data.

This furthermore implies that work on improving the availability, standardization and harmonization of official national statistics, as related to forest ownership, is urgently needed. Such efforts would also have to recognize the complexity of the field and the apparent challenges, which, amongst other things, reside in different national traditions and are not only related to statistics but to forest ownership and management in general.



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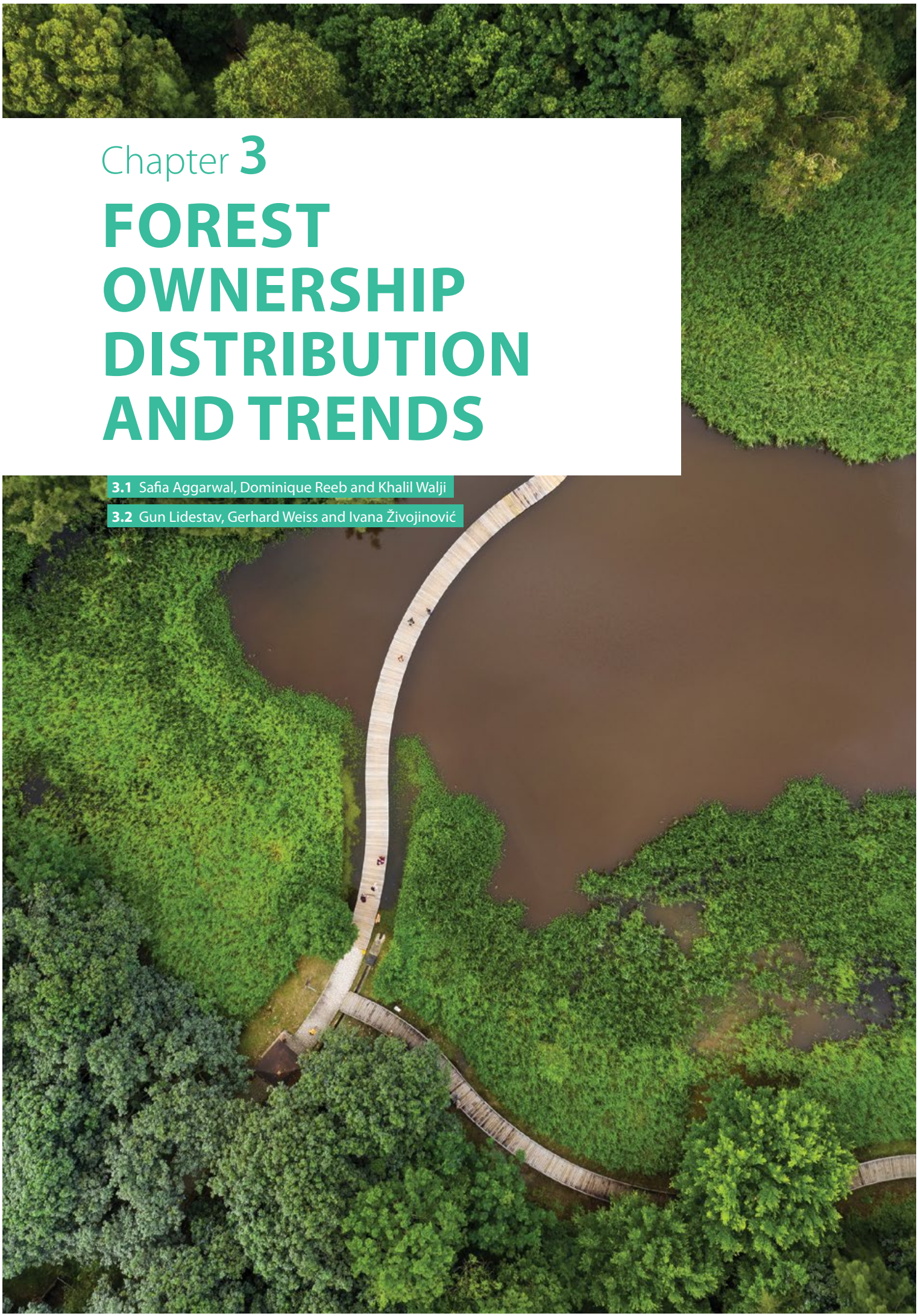
Chapter 3

FOREST OWNERSHIP DISTRIBUTION AND TRENDS



3. FOREST OWNERSHIP DISTRIBUTION AND TRENDS

3.1 Forest ownership and tenure in the world and the ECE region

3.1.1 Introduction

This section provides an overview of international forest ownership, tenure patterns and trends, focusing particularly on the situation within the United Nations Economic Commission for Europe (UNECE) region,[6] as compared to the wider global context. The section begins with an overview of available data sources, including notes on the coherency, compatibility and reliability of the data used. The section then provides analysis of data on public and private forest ownership. For the ECE region, for which greater data are available relative to other parts of the world, the section provides further detail including: breakdown of public forest ownership to the national, and sub-national levels; public forest management patterns; breakdown of private forest holding between individuals and families, private enterprises, institutions, and indigenous communities; and the trends in change in forest ownership since 1990.

Forest ownership and tenure patterns vary considerably from region to region, which is why it is also relevant to take a closer look at regional trends, using different approaches to analyze the ECE and other regions. Areas outside the ECE region are often characterized by parallel tenure systems, the statutory tenure system recognized through formal law and regulatory frameworks as well as prevailing informal tenure systems. Tenure systems in the ECE region, on the other hand, are largely statutory and include formally recognized customary tenure.

The analysis of areas outside the ECE region has been done separately for Africa, Latin America and the Caribbean, and Asia and the Pacific – three regions that demonstrate specific characteristics in terms of forest ownership and tenure. The analysis of the ECE region has been divided into distinct sub-regions, namely, Europe, Russian Federation and Central Asia, and North America. This section accordingly provides the foundation for other sections in this report, based on the best available data on forest tenure.

3.1.2 Methods and Data

In offering an international overview, it is worth noting that global (and especially non-UNECE) data availability on forest ownership and the distribution of forest land are limited, lacking both in terms of consistency and comparability.

The sections that cover Africa, Latin America and the Caribbean, and the Asia-Pacific region utilize two primary data sources to gain insights into forest ownership and management patterns, namely, the Food and Agriculture Organization of the United Nations (FAO) Global Forest Resource Assessment (FRA), and the Rights and Resources Initiative's (RRI) database on global forest ownership. The FRA is conducted every five years, providing country level data on public, private and other forests in 234 countries and/or territories. However the FRA 2015 uses data from 2010 (FAO, 2015a, FAO, 2015b), which implies a significant time-lag in data availability. The RRI is a collaborative network engaged in land and forest policy reforms as well as tenure tracking analyzes in Africa, Asia and Latin America. More specifically, the RRI monitors forest tenure data,[7] currently covering 52 countries that hold 90 per cent of the world's forest resources (RRI, 2014). Furthermore, the FAO publication *"Forty Years of Community-Based Forestry"* provides further validation of the data, as well as additional regional and local data (FAO, 2016a). No data are currently available about ownership distribution of public forests between national and sub-national levels for countries outside the ECE region.

Regarding data on management rights, the FRA only reports at the global level while the RRI provides national data for areas that are *"designated for indigenous peoples and local communities"*. In the latter case, this implies areas where management rights are distributed, which means that the RRI does not provide information on forest management by private households or businesses. It is also important to note that the data in this section does not take into account forest areas in dryland habitats (FAO, 2016c),[8] nor does it include other wooded lands[9] or farm forests that tend to fall under agricultural land categories. This is because forest ownership and tenure data are not available for these types

6 See http://www.unece.org/oes/nutshell/ecemap.html.

7 See https://rightsandresources.org/en/work-impact/tenure-data-tool/#.W0MiWNIzY2x.

8 Drylands contain 1.11 billion ha of forest land, or 27% of the global forest area, where two-thirds of the forest land in dryland habitats have a canopy that is greater than 40%. Additionally, 30% of croplands and grasslands and 60% of lands classified as settlements have some crown cover (FAO 2016c).

9 Total global area of wooded land is 1,204 million ha (FAO, 2015b).

of areas, whereas data on farm forestry is not available globally.

For the European and North American region, data are also available from other sources. This includes UNECE and FAO data from 1990, 2010 and 2015, based on national statistics provided by national correspondents.[10] The present data cover thirty-two countries and include information on the distribution between public and private forest ownership; ownership at the national and sub-national level; managing entities for public and private forests; and ownership by size.

Data on public and private ownership for the Central Asian region were principally taken from an FAO working paper on forest tenure in West and Central Asia (see FAO, 2010) as no other data on forest ownership or management patterns, at the national and sub-national level, were available.

3.1.3 Global forest ownership and tenure patterns

Forests cover approximately 3,999 million ha of the planet's total land surface. Public ownership of forest is the largest ownership category around the world, constituting approximately 76 per cent, while the area under private ownership is around 20 per cent according to the latest estimates of forest cover in 234 countries (FAO, 2015a, 2015b). The data also indicates that from forests under private ownership (approximately 720 million ha), 56 per cent is owned by individuals, 29 per cent is owned by private enterprises and 15 per cent is managed by local communities and indigenous peoples (see Figure 13 and Figure 14).

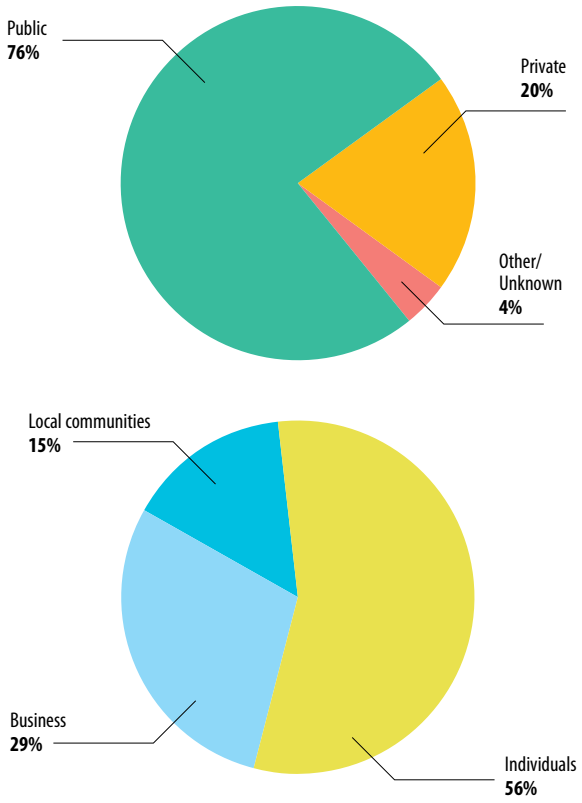
Private forests are on the rise, increasing by about 3 per cent in the 1990 to 2010 period, relative to the 1990 level, with most of the increase taking place in upper to middle income countries. The management of public forests by private companies has also increased from 6 per cent to 14 per cent in the same time period (FAO, 2015b).

3.1.4 Forest ownership and tenure in countries outside the ECE region

This section provides a discussion of both formal and informal forest tenure because informal forest tenure, while not encoded in public law, often constitutes a significant set of institutional rules and guidelines through which tenure is understood.

FIGURE 13

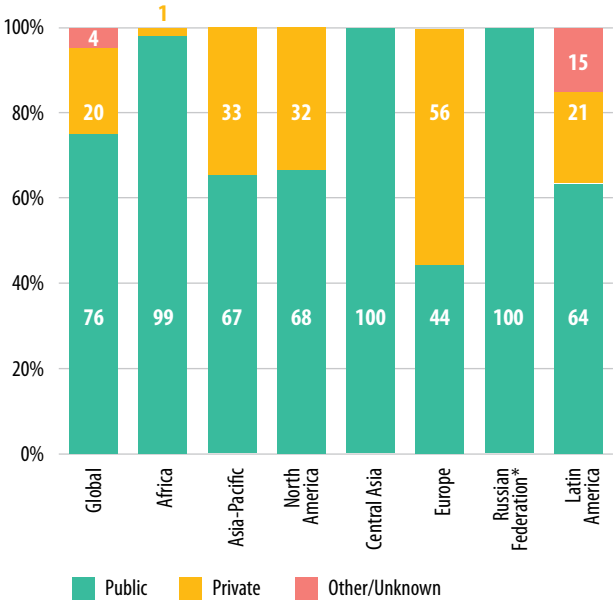
Global forest ownership and breakdown of private holders



Source: FAO 2015a.

FIGURE 14

Regional forest ownership patterns



10 Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. The 2010 data submitted by countries were mostly for the year 2005.

3.1.5 Formal forest tenure

In much of the African, Latin American and the Caribbean, and Asia-Pacific regions, public forests are the predominant form of forest tenure (see Figure 14). Forests in these regions were often regulated by customary laws before, for example by colonial or national powers and subsequently, to independent nation States. These large areas of publicly owned forests are accordingly now managed by the State, often through concession or concession agreements. Active participation of communities living in and around public forests is however also increasing in many countries. Community participation in forest management includes varied combinations of user rights, responsibilities and decision-making processes. These range from passive participation (e.g., government programmes) to active control by communities and individuals (FAO, 2016a). This trend can be traced back to the onset of colonization, from the sixteenth century and onwards, when forests that had traditionally been managed by communities under various customary regimes were taken over by the State to maximize timber production and when new user rights of the State were embedded in statutory laws. Thus, when countries started gaining independence, many chose to adopt the forest management laws and policies of the former colonial government whereas structured approaches to public participation[11] in State forest management only started to emerge in the 1970s and 1980s. This development was mainly in response to increasing deforestation, the importance of forests and trees in sustaining rural livelihoods (FAO, 1991), and the perceived failure of the forest-based industries in contributing to socio-economic development (Gilmour, 1989).

Private forests are less common in countries outside the ECE region, although there has been a rapid expansion of private, smallholder forestry in certain countries, such as China and Viet Nam, in the past decade. Private forestry is furthermore emerging as an increasingly important form of tenure in the Latin American and the Caribbean region, although it remains largely unrecognized in national policies (FAO, 2016a).

Similarly, there has been an increase in the decentralization[12] of forest management throughout the African, Latin American and the Caribbean, and Asia-Pacific region. While it is not possible to verify the extent of this trend, owing to lack of data, a significant transfer of decision-making powers (from national to local level) has occurred in Uganda, Mali, Senegal and Tanzania (among other countries). The rights to taxation and revenues have been transferred to local governments in Honduras, Bolivia, Nicaragua, Costa Rica and Indonesia, even though the implementation of legal provisions have been weak in many countries (Larson, 2004).

3.1.6 Regional patterns and trends

Africa

Africa's forests cover an estimated 624 million ha, of which 617 million ha (99 per cent) are public and 6 million ha (1 per cent) are private (FAO, 2015b). Customary tenure systems prevail, and public participation has only emerged in public forestry in the past decade, presently reported to be implemented in 24 million ha (6 per cent) of the total forest area (FAO, 2016a, RRI, 2014). Most community-based forestry initiatives in public forests aim to facilitate subsistence use of forest products, while a few allow for the commercialization of forest products, income generation and ecotourism. Only some initiatives have been institutionalized through government programmes, such as in the Gambia, Namibia and the United Republic of Tanzania (Blomley, 2013). For example the United Republic of Tanzania has 21 million ha of its public forest (67 per cent) under local community-based forest management (RRI, 2014).

RRI (2014) data furthermore demonstrates that private ownership has increased slightly (5 per cent) in Africa during the 2002 to 2013 period. This category is limited to forests owned by individuals and firms and does not include forests owned by communities and others. Areas designated for use by communities have also increased during this period, but no reliable data are presently available to verify the extent of this expansion.

Asia and the Pacific

In the Asia-Pacific region forests cover an estimated area of 758 million ha, of which 508 million ha (67 per cent) are publicly owned and 250 million ha (33 per cent) are privately-owned (FAO, 2015a). While most public forests are managed by the State, public participation in State forest management has been operationalized throughout most of the Asia-Pacific region to varying degrees; for example, Nepal has nearly 2 million ha (23 per cent) of its public forest under community management (CBS, 2014).

The Pacific subregion demonstrates some of the significant regional variation that can be found. In countries such as Fiji, Papua New Guinea, Solomon Islands and Vanuatu in Melanesia, 88-97 per cent of the land (including forests) have customary tenure systems recognized by statutory law (Ogle, 2012). In these cases, States retain important

11 Public participation refers in this case to the participation of local communities, user groups, or smallholders in forest management.

12 Decentralization refers to the transfer of powers from central government to lower levels of government. Decentralization may involve: political decentralization (transfer of decision-making powers), administrative decentralization (transfer of administrative functions) and fiscal decentralization (transfer of powers to tax and generate revenues) (adapted from the World Bank Group definition).

rights on customary lands, such as the right to issue Forest Management Agreements (e.g., commercial logging), overseeing harvesting operations and collecting royalty payments as for example in Papua New Guinea (Gilmour et al., 2013). Outside Melanesia, China has the largest share of forest land under private (community and smallholder) forestry tenure in the Asia-Pacific region corresponding to 108.9 million ha (60 per cent) of forest land in China (RECOFTC, 2013).

Three notable forest tenure reforms have occurred in the Asia-Pacific region in the past decade:

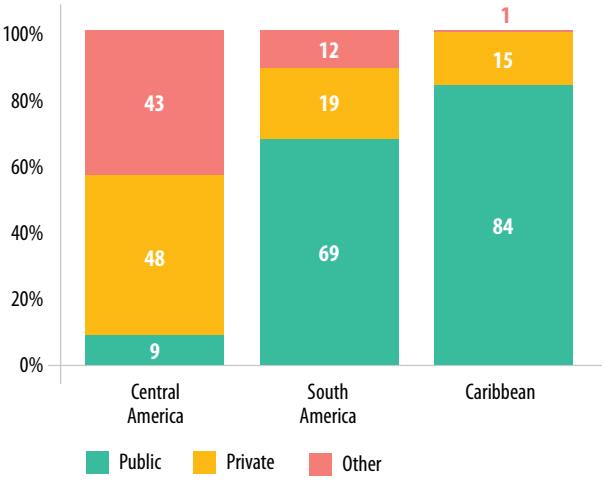
1. Rapid expansion of smallholder forestry, particularly in China and Viet Nam, with significant support from the State. Estimates suggest that China has about 4.4 million ha of eucalyptus plantations, of which approximately 40 per cent are owned by smallholders with less than 10 ha (FAO, 2016a). Smallholder plantations in China and Viet Nam have become an important source of raw materials for the construction sector and furniture industries, feeding small-scale processing plants and, increasingly, large-scale chip mills and paper plants.
2. Recognition of indigenous peoples' right to own and manage land, including forests. For instance, in Australia, 41.9 million ha (34 per cent) of the national forest land now fall under different indigenous regimes (ABARES, 2013). Other countries have also recognized such rights in law (e.g., the Philippines, Indonesia and India) but only a small portion of the national forest area is presently managed by indigenous peoples.
3. Increase in the total area of State forests that support different public participation regimes. The increase has however been somewhat modest (31 to 34 per cent) during the 2002 to 2012 period (FAO, 2016a, RECOFTC, 2013).

Latin America and the Caribbean

In the Latin American and Caribbean region forests cover an estimated area of 844 million ha, of which 537 million ha (64 per cent) are public, 180 million ha (21 per cent) are private and 127 million ha (15 per cent) falls under the *"Other"* category (see Figure 14) (FAO, 2015a).[13] The forest ownership patterns do however differ significantly across this region. For instance, in the Caribbean, 3.4 million ha (84 per cent) falls under public ownership and 0.6 million ha (15 per cent) are private, as compared to Central America, where 6.8 million ha (9 per cent) are public and 36 million ha

FIGURE 15

Forest ownership patterns in Latin America



Source: FAO 2015c.

(48 per cent) falls under private ownership. Another example is Mexico, where close to 80 per cent of the country's forests is under the legal jurisdiction of communities (Hodgdon et al., 2013), mostly held by indigenous people and/or local communities (FAO, 2015c). In South America, 526 million ha (69 per cent) are public and 143 million ha (19 per cent) are private (see Figure 15) (FAO, 2015c).[14]

Large areas of public forests in the Latin American region are consequently managed under varying community control and public participation. In South America, indigenous ownership presides over large areas, especially in the Amazon Basin (Hagen, 2014), where approximately one-third of the forest land is owned or controlled by indigenous people and/or local communities (Stevens et al., 2016). In Colombia, Ecuador and Bolivia, approximately 50 per cent of the forest land is under the control of communities while in French Guiana and Guatemala less than 15 per cent of the forest land is under some form of community control. Other tenure systems exist in public forests, such as long-term extractive reserves, (agro) extractive and forestry settlements as well as community forest concessions.

Smallholder plantation forests are becoming increasingly important for the timber industry in the Amazon region in the post-logging boom era, although limited data

13 Total forest area in the Latin America (Central and South) region extends to 946 million ha. The data provided here are based on 25 of the 49 countries, representing 89% of the regional forest land, for which data on public and private forest ownership is available (FAO 2015a).

14 Public and private ownership percentages are calculated for 11 of the 27 Caribbean countries, 3 of the 8 Central American countries, and 11 of the 14 South American countries that provided ownership data.

are available on this topic (Pinedo-Vasquez et al., 2001). Smallholders operate largely outside the mainstream market for forest products and are as such generally ignored by policymakers and development planners (Menton and Cronkleton, 2014).

3.1.7 Informal forest tenure

Informal tenure systems are widespread in countries outside the ECE region, although they are often not recognized in State law. For instance, according to Blomley (2013, p.4), a quarter of Africa's land area (approximately 740 million ha) is made up of common property, including forests and rangelands, accessed through customary institutions covering more than 90 per cent of all rural populations in Africa.[15]

Over the past four decades, countries outside the ECE region have increasingly started to provide legal recognition to informal customary tenure systems. The UN Declaration on the Rights of Indigenous Peoples (General Assembly resolution 61/295)[16] provided additional impetus to this movement. The declaration is, amongst other things, reflected in the RRI data, which reports that the global area of forest recognized as owned or controlled by indigenous peoples and communities (not including smallholders) increased from 11 to 15 per cent during the 2002 to 2013 period (RRI, 2014). In low- and middle-income countries, it increased from 21 to 31 per cent over the same period. The Latin American region has taken the lead in this trend, representing 97 per cent of the international increase in recognising community rights (RRI, 2014). The gradual, but noticeable, transfer of such rights is also taking place throughout the Asia-Pacific region (e.g., Australia and New Zealand) and African States are beginning to follow this trend as well.

In parallel to the increasing recognition of community rights, many countries have also been granting large land areas (including forests) to private entities, such as for large-scale agro-industrial enterprises, outside the ECE region. This includes land areas that have been recognized as belonging to indigenous peoples and local communities but where the rights have not been formalized yet (Foster, 2012). The effect has been an increase in the conversion of forest to agricultural land, and is a primary driver for deforestation in the tropics and subtropics (FAO, 2016b).

3.1.8 Forest ownership and tenure in the ECE region

Forest ownership and management patterns in the ECE region are substantially different from those in the rest of the world. Historically, rural communities in pre-industrial Europe depended on forest commons for livelihood, as an integral part of traditional agricultural systems. Customary management systems were in place to govern these common forests (Jeanrenaud, 2001, Wiersum et al., 2004). However, as Europe was industrialized and modernized, common lands were gradually enclosed and most customary rights were removed (FAO, 2016a). Nowadays, customary tenure, formally recognized in statutory law, remains in only a few countries in the ECE region.[17] Over the past century, Europe, Central Asia and North America have pursued forest tenure reforms responding to different historical, social and political developments.

Europe

In Europe (excluding the Russian Federation), smallholder forestry has been an integral part of forest ownership for many generations. The UNECE/FAO 2015 data for 28 countries in the region – see Annex 2 – demonstrate that the total forest area covers 149 million ha, of which 65 million ha (44 per cent) are public, 83 million ha (56 per cent) are private, and the remaining 1 million ha fall under the *"Other"* category. As indicated in Figure 16, countries with the highest percentage of public forests are Georgia and Turkey (100 per cent), Albania (96 per cent), Bulgaria (88 per cent), Poland (82 per cent) and Bosnia and Herzegovina (80 per cent).

For the 25 countries reporting on decentralized ownership – see Annex 2 – the State owns 48 million ha (78 per cent) while subnational governments hold 5 million ha (9 per cent) and local governments hold 8 million ha (13 per cent) (see Figure 16). A majority of these public forests are managed by the State itself (44 million ha or 72 per cent of the public forests) (see Figure 17).

Countries where State forests are managed by other entities include Croatia and Poland where state owned companies manage 100 per cent and 99 per cent of public forests respectively, and Belgium and Finland where private companies manage 73 per cent and 40 per cent of public forests respectively. In Europe, there are few examples of public participation in the management of State-owned forests (Wiersum et al., 2004), although there has been a

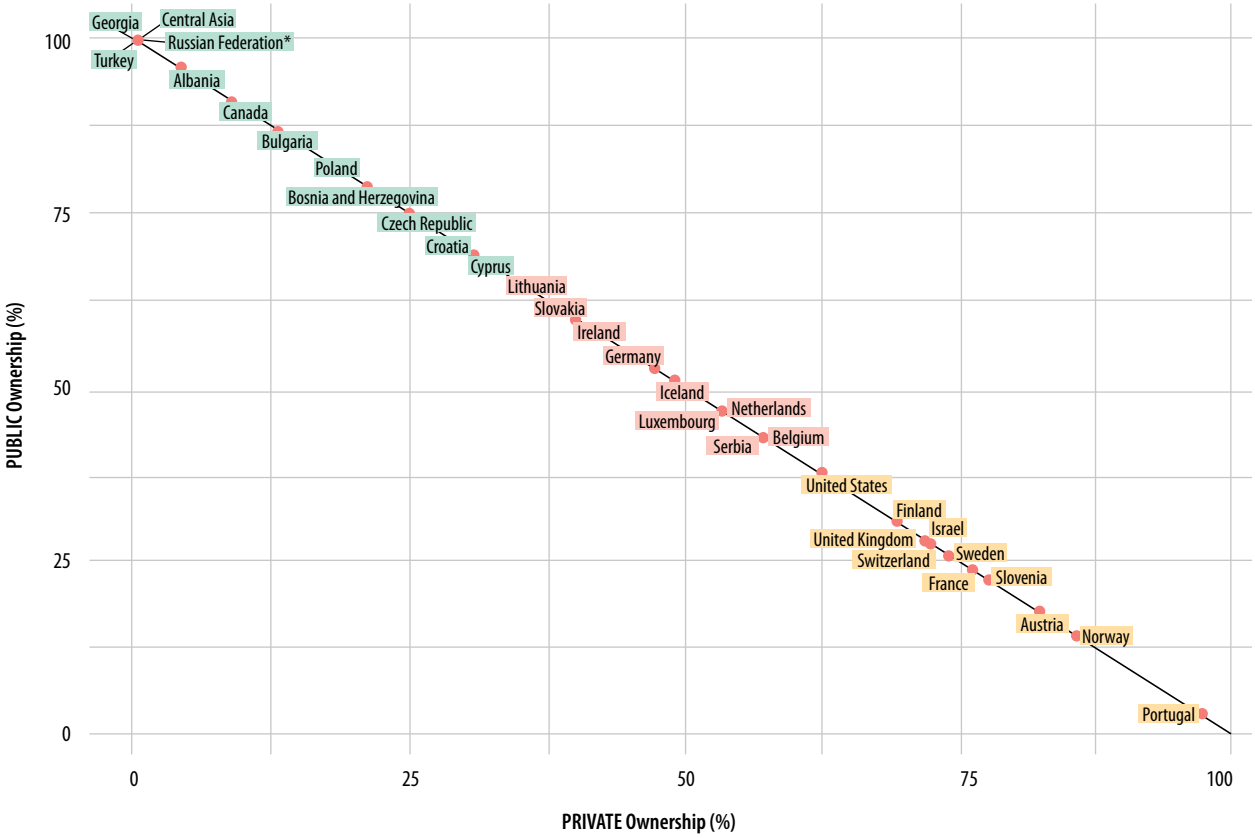
15 Common property refers here to land or natural resources owned or managed collectively, usually by communities. Customary institutions refer to local institutions (often non-state) enforcing customary tenure.

16 See http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf.

17 Customary tenure systems exist in Western Europe and North America, such as forest commons in Spain, Portugal, Italy and Switzerland, where indigenous minorities govern lands, fisheries and forests according to custom (Wily, 2012). Norway and Sweden provide additional examples.

FIGURE 16

Percentage of forest area under public and private forest ownership by country

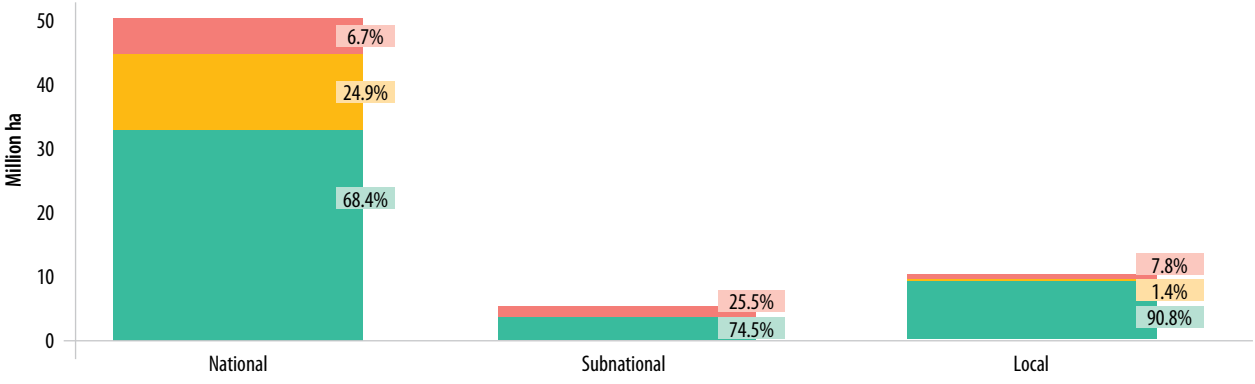


Source: FACESMAP/UNECE/FAO Enquiry.

Public Ownership Predominance | Private Ownership Predominance | Balanced Ownership

FIGURE 17

Public forest ownership and management patterns in Europe (excluding the Russian Federation) in hectares (ha) and per cent (%)

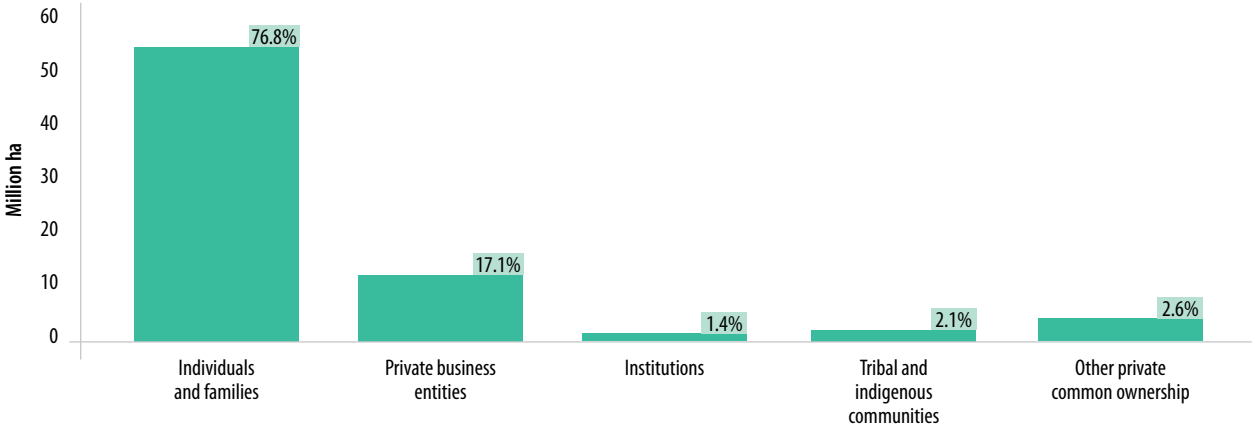


Source: FACESMAP/UNECE/FAO Enquiry.

Managed by owners | Managed by others | Unknown management

FIGURE 18

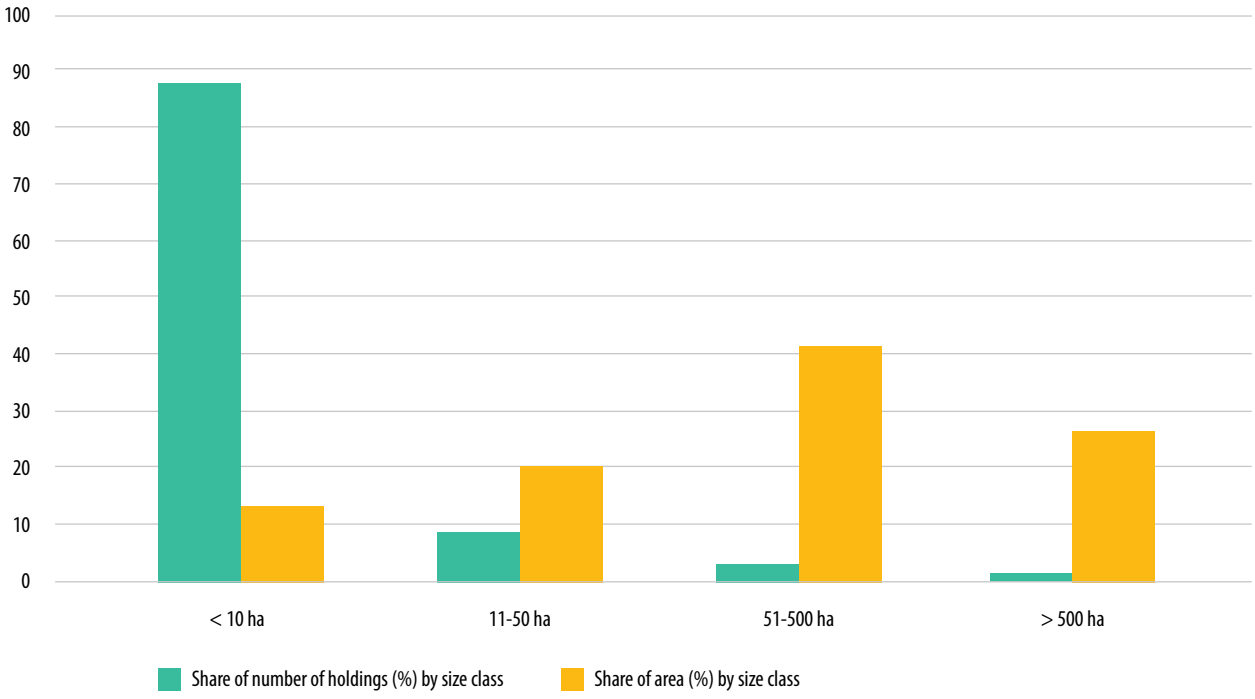
European private forest ownership patterns in hectares (ha) and per cent (%)



Source: FACESMAP/UNECE/FAO Enquiry.

FIGURE 19

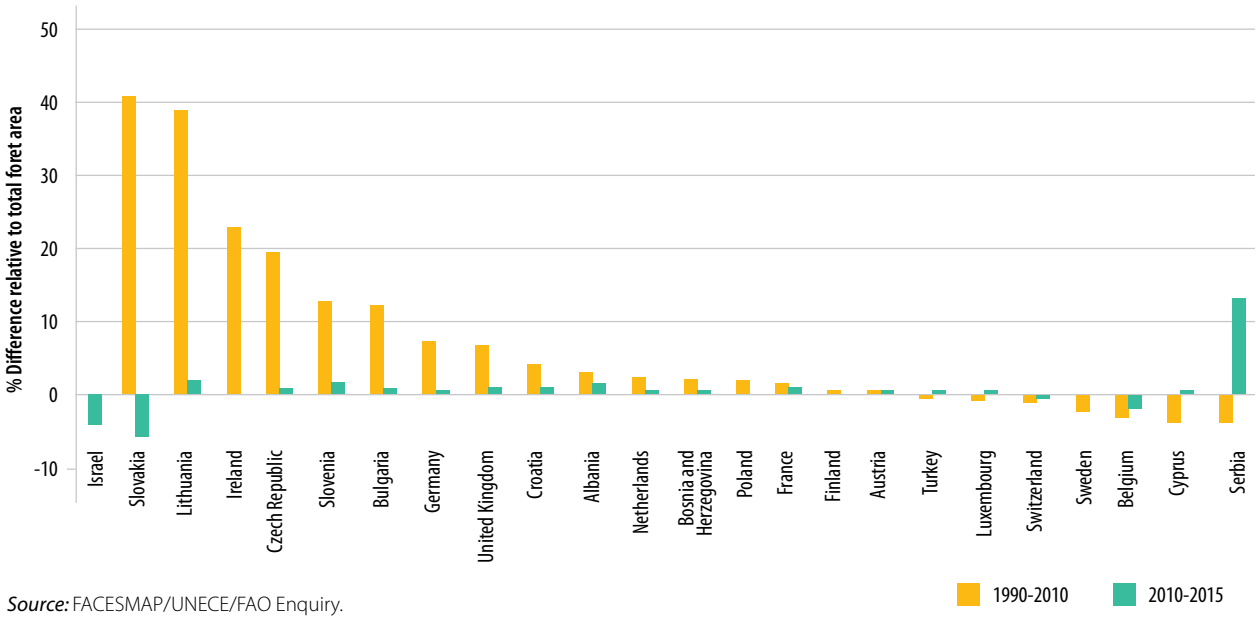
Share of private holdings across size classes and in relation to the total number of private holdings and forest area



Source: FACESMAP/UNECE/FAO Enquiry.

FIGURE 20

Changes in private forest ownership with respect to total forest area in selected countries for the 1990 to 2010 and 2010 to 2014 period



Source: FACESMAP/UNECE/FAO Enquiry.

significant increase of such practice in the past two decades. Only limited data is available on the extent to which this is happening. Public participation in the management of State forests has for instance emerged in the past 25 to 40 years in England, Scotland, Wales and Spain (Lawrence et al., 2009, Roberts and Gautam, 2003, Jeanrenaud, 2001).

Regarding private forest ownership, a majority of the forest land is owned by individuals and families. More specifically, 54 million ha (77 per cent) are private forest land in Europe (see Figure 18) while private enterprises own 12 million ha (16 per cent). Institutions own 1 million ha (1.5 per cent), principally in Israel with 97 per cent of its private forests under this regime, whereas indigenous communities own 1.5 million ha (2 per cent). In the latter case, this mainly concerns Norway (11 per cent of its private forests) and Switzerland (43.1 per cent of its private forests).

There are large variations with regards to the proportion of forest land that is under private ownership. In nine out of 28 responding countries private ownership dominates, varying between 60 per cent to 100 per cent of the total forest area. These countries include Portugal, Norway, Austria, Slovenia and France. In nine countries, there is a more equal distribution between private and public forest land such as Belgium, Netherlands, Germany, Slovenia, Lithuania. In another 10 countries, private forest ownership constitutes less than 40 per cent of the forest area. This includes Albania, Bulgaria, Poland, Bosnia and Herzegovina, and Georgia and Turkey where private forestry is entirely absent.

Regarding the size of private forest holdings, small scale land holdings prevail in European forests. Figure 19 illustrates that 88 per cent of all private forest holdings are less than 10 ha in 15 countries, while the combined area of these holdings corresponds to 13 per cent of the total private forest land.[18] In addition, 86 per cent of all private forest holdings have an area of less than 5 ha whereas only 1 per cent of the forest owners have forest holdings that are over 50 ha (UNECE, 2010).[19]

In terms of trends, there has been an overall increase in forest areas that are privately-owned since the early 1990s. Significant changes in forest ownership have taken place in the former centrally planned economies in Central and Eastern Europe, through land restitution and privatization, aiming to reverse the nationalization of forests which took place in socialist countries during and after the Second

18 Forests are defined as more than 0.5 ha with trees higher than 5 meters and a canopy cover of more than 10%, or trees that reach these thresholds in situ (FACESMAP/UNECE/FAO Enquiry).

19 The data used for this report does not provide a breakdown of information on forest holdings that are below 10 ha (FACESMAP/UNECE/FAO Enquiry). The working paper by UNECE (2010), which provides an analysis of private forest ownership in Europe, was consequently used for this purpose.

World War (Hirsch et al., 2007). Restitution and privatization have resulted in the establishment of a large number of smallholdings in many countries, while in other countries, holdings have also been divided through inheritance, resulting in widespread fragmentation into smaller units (UNECE/FAO, 2015).

In 27 countries for which data are available, 16 countries indicated such an increase in private forest land, representing a change from 66 million ha to 83 million ha in the 1990 to 2014 period. In North and Western Europe, the increase in private forest land has principally been caused by reforestation or afforestation of marginal private agricultural and pasture land (e.g., Ireland and France). There has been some denationalization and fragmentation of forests in Central and Eastern Europe, largely owing to restitution but also through some privatization of State forests (e.g., Bulgaria, Czech Republic, Germany, Lithuania and Slovenia) (see Figure 20).

The Russian Federation and Central Asia

For the Russian Federation, all forests (815 million ha) are held by the State (UNECE/FAO, 2015) while countries in the Central Asian region[20] have undergone significant land reforms following independence in 1991. New tenure regimes that allow for private, communal and other types of property have been introduced in Central Asia. While forests largely remain State-owned and cannot be transferred to other users, private forests can be established through the development of forest plantations on private lands (land shares privatized under the land reform). However, owing to unclear procedures with regards to these land reforms (e.g., unclear registration procedures or legal norms) only a limited number of private forests have been established (FAO, 2010, RRI, 2014).

Regarding forest management, 578 million ha (71 per cent) of the forest land in the Russian Federation is managed by the State and 236 million ha (29 per cent) by others under lease arrangements (UNECE/FAO, 2015). In the Central Asian region, State forests are also primarily managed by the State (over 95 per cent). All countries in this region are undertaking steps to decentralize forest management. This process is however mainly limited to administrative decentralization, which implies a transfer of administrative responsibilities to lower-level central government authorities or other local authorities that are upwardly accountable to the central government. This has only involved fiscal decentralization or decentralization of decision-making in rare cases, which means that the central government retains control over forest management activities.

20 These include Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

There is an increasing interest in many of the Central Asian countries in allowing lease arrangements for forest land. This is seen as an alternative way to provide access to land for farming, access to non-wood forest products (NWFPs) and a source of additional income for rural communities (FAO, 2010). Countries such as Kyrgyzstan have also introduced joint forest management through partnerships between local governments, local families and/or communities living on State Forest Fund territory. This principally focuses on forest use, protection and regeneration (FAO, 2010).

North America

In the North American region, forests cover an estimated area of 613 million ha, of which 416 million ha (68 per cent) are State-owned and 195 million ha (32 per cent) are privately-owned.[21] Ownership patterns and trends are however significantly different between the United States of America and Canada. In the United States of America there is 265 million ha of forest land, of which 99 million ha (37 per cent) are public and 166 million ha (63 per cent) are private (UNECE/FAO, 2015). Approximately 77 per cent of the public forests is State-owned, 17 per cent is owned by sub-regional governments and 6 per cent by local governments. In Canada there is 347 million ha of forest land, of which approximately 317 million ha (91 per cent) are public and 28 million ha (8 per cent) are private. In contrast, only 1.7 per cent of the Canadian public forests is State-owned while 98 per cent is owned by sub-regional governments and none by local government. In both countries, all public forests are managed by the State.

Public participation in managing State-owned forests has principally emerged as either *"community forestry"* or *"community-based forestry"* during the past two decades. Only limited information is available to describe this development statistically. For instance, in the United States of America, McCarthy (2006) has noted that such public involvement began during the 1990s. This was perceived as a popular alternative to centralized State control, countering the industrial dominance over public forests, addressing low revenues from forestry and the significant impact that closing local mills were having on rural economies (UNECE/FAO, 2015). In Canada, Teitelbaum (2016) recorded 120 community forestry initiatives, mainly in the provinces of Quebec, British Columbia and Ontario. These community forests mostly function through local government organizations, covering

21 This analysis uses the FACESMAP/UNECE/FAO Enquiry data, which provide more detailed information as compared to the FAO data (FAO 2015b). However, the two data sets provide notably different figures for the United States of America. The FAO data suggest that forests cover an estimated area of 309 million ha as compared to 265 million ha in the UNECE/FAO 2015 data. This discrepancy is likely due to the inclusion of Native American territories/reserves in the former data set.

an area of nearly 1.6 million ha, of which 9 per cent involve indigenous peoples and communities.

As in Europe, smallholder forestry (privately-owned woodlots) has a relatively long history in the United States of America, where 64 per cent of private forests are owned by individuals and families, while 30 per cent by private enterprises. Other studies demonstrate that approximately 10.3 million individuals and families own private forests in the United States of America, contributing towards nearly 50 per cent of the country's timber production (Zhai and Harrison, 2000, Zhang et al., 2008). Smallholder forests likewise contribute to the maintenance of watershed functions and wildlife habitat, playing an important role in protecting landscape values and creating recreational opportunities. Regarding the size of private holdings, 62 per cent of the private holdings and 5 per cent of the area fall under the less than or equal to 10 ha category. In Canada, 84 per cent of the private forest land is owned by individuals and families (UNECE/FAO, 2015). The change in the total area of privately-owned forests in the past decade is negligible.

3.1.9 Conclusions

The analysis suggests that there are significant differences between reviewed regions, in particular:

1. Public forest ownership remains the predominant forest ownership category in the African (99 per cent), Latin American and the Caribbean (64 per cent), and Asia and the Pacific (67 per cent) region. Exceptions include Melanesia, China and certain countries in the Central and South American region.
2. Private forest ownership remains an important forest ownership category in Europe (56 per cent), excluding the Russian Federation and Central Asia, and the United States of America (63 per cent), as part of the North American region. Exceptions include the Russian Federation, which has no private forests, and Canada, where only 9 per cent of the forest land is private.
3. Informal tenure systems are more common in countries outside the ECE region, although not always legally recognized. The formalization of informal tenure has however been on the rise, particularly in Melanesia and Latin America. In comparison, most customary informal tenure systems in the ECE region have been removed. Only a few remain, formalized under statutory law, mostly before 1990 (e.g., Canada, Norway, Portugal, Switzerland and the United States of America).

There are also similarities between the regions:

1. Most public forests are primarily managed by the State. The data for the ECE region demonstrates that 80 per cent of the public forests are managed by the State, while official figures are not available for the countries outside the ECE region.
2. Management of public forests by private companies appears to be on the rise in countries outside the ECE region, even though no precise data are available. In the ECE region, it is either stable or increasing (e.g., France and Croatia).
3. Decentralization of forest management from central to local levels of government is on the rise in countries outside the ECE region. This includes changes in terms of administration, decision making or the right to collect taxes or benefits from forest revenues. Similar trends are evident in the ECE region. For instance, 25 countries reported on decentralized forest ownership in the UNECE member States. However, decentralization during the 1990 to 2015 periods has not been significant. Exceptions include countries such as Serbia and Albania, which decentralized 17 per cent and 28 per cent respectively of their State-owned forests to sub-national and local governments during the 2010 to 2015 period.
4. Public participation in State forest management is increasing moderately in countries outside the ECE region, in particular, with regards to collaborative forest management with indigenous peoples, local communities and user groups. There has also been a small increase in the ECE region.
5. Many countries outside the ECE region have undergone, or are undergoing, a shift in tenure arrangements from autocratic State management towards more collaborative forest management with local communities and user groups. Likewise, private smallholder forestry is increasing, particularly in China, Viet Nam and some upper-middle income countries. At the same time, the ECE region underwent a significant change in forest tenure from public to private (and some community) ownership, following the dissolution of the Soviet Union in 1991 but has remained stable since 2010.

Tenure transitions in countries outside the ECE region, involving decentralization, collaborative forestry with indigenous peoples, local communities and user groups, formalization of informal rights and smallholder forestry, has the potential to significantly improve forest governance. It should nevertheless be stressed that the decentralization of tenure rights to local governments, and collaborative forestry arrangements, have often meant a transfer of responsibilities but not associated rights. Moreover, smallholder and community forestry has rarely been accompanied by the necessary support to beneficiaries that can help to strengthen institutions and forest governance, nor to derive benefits from the forests, important exceptions being China, Viet Nam, and Nepal. The effect has been

that the performance of these tenure systems has been lower than expected. There is consequently a critical need to strengthen policy measures that support relevant institutions and improve economic benefits to beneficiaries. This is even more important when considering the extensive dryland forests, wooded lands, farm forests and trees outside of forests, which are managed by smallholders and communities but for which precise figures remain unavailable. Meanwhile, in the ECE region, decentralization, restitution and privatization policies have been supported through the formation of forest owner's cooperatives and associations, but there are emerging concerns (e.g., high levels of fragmentation of forest parcels) that presents formidable challenges for forest management.

Finally, more accessible and higher quality data are needed to inform national policymakers. Data are especially missing in countries outside the ECE region, including details on how State forests are being managed, the extent of decentralization and characteristics of private forestry and community-based forestry. For the ECE region, data collection efforts have improved the understanding of these trends, but it is essential to continue these efforts and to ensure that the results are considered more in policymaking.

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3.2 Changes in forest ownership

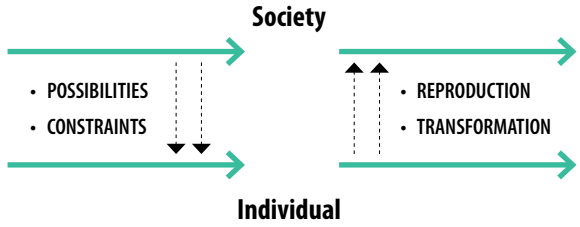
3.2.1 Introduction

The development and distribution of forest ownership can be considered as a reflection of how important forest resources are for a society at a given point in time. This includes societal perspectives regarding how and by whom forest resource should be managed (Westholm, 1992, Watkins, 1998, Sands, 2007). Our understanding of forests is as such fundamentally linked to the relationship between societies and individuals.

The focus of this section is on changes in forest ownership. To understand the meaning of these changes, it starts with a general model of the society/individual connection suggested by Bhaskar (see Figure 21) who states that *"society must be regarded as an ensemble of structures, practices and conventions which individuals reproduce or transform, but would not exist unless they did so"* (Bhaskar, 1998, p.36). This would imply that there are structures, practices and conventions within the concept of forest ownership that may be inducing, conserving and counteracting drivers of change.

FIGURE 21

The relation between society and the individual
(adapted from Bhaskar (1998))



3.2.1.1 Conceptualizing changes in forest ownership

Changes in forest ownership can be understood in three main ways. The first and most straightforward is to measure temporal and spatial changes within the respective forest ownership categories, such as changing shares of public and private forest land.

The second concerns changes in the meaning of forest ownership, in this case referring to legal frameworks and customary rules that restrict or encourage specific use of forest resources, such as the definition of property rights that differ substantially across the ECE region (see Section 2). For instance, one apparent issue is the role of the State in many Eastern and South Eastern European countries, where the preparation of forest management plans and procedures for the approval of harvesting is more controlled than in other regions (Nichiforel et al., 2018). Also, property rights granted to private owners differ between countries. In Scandinavia and Canada, the recognition of indigenous peoples' rights to their traditional land (tenure), has highlighted the conflicting interests between forestry and other types of land use, such as reindeer husbandry (Lindahl et al., 2017). Related to this change is the introduction of forest certification, where the Forest Stewardship Council (FSC) has made it compulsory for large scale forest owners to carry out consultations before undertaking any forestry measures that may severely affect conditions for reindeer grazing. FSC has in this regard strengthened indigenous peoples' tenure rights.

The third concerns changing values, or lifestyles, which may not be as easy to investigate as the preceding issues. For example, many countries in the ECE region, particularly in Europe, are experiencing declining employment in farming and forestry, which implies a decreasing dependence on income from the forest land. Residency outside the farmstead, in urban settings, increasing educational levels and wages, as well as higher appreciation for non-tangible goods and services from the property are some of the factors that underlie these changes in lifestyles (Westin et al., 2017). Moreover, numerous studies report that many forest owners regard the monetary yield as only one of several goods that forest ownership entail (Ní Dhubháin et al., 2007, Fischer et al., 2010, Lidestav and Arvidsson, 2012, Lähdesmäki and Matilainen, 2014). Another aspect of lifestyle change concerns the gender composition of forest ownership, which is changing in many countries (Follo et al., 2017). There are also several trends in forest ownership towards *"new types of owners"* or other qualitative changes, including a trend for stronger parcelization of forest land, absentee owners who live away from their forest land, or the emergence of new forests through afforestation (Živojinović, I. et al 2015).

Having these aspects in mind, this section analyzes major changes in forest ownership in the ECE region during the last 25 years. Following the three ways of understanding change, outlined above, the section summarizes the changes between, and within, public and private forest ownership including corresponding legal frameworks and customary rules, and the impact of changing values and lifestyle. Furthermore, geographical patterns are illustrated by maps.

3.2.2 Methods and Data

The FACESMAP/UNECE/FAO Enquiry is the main source of data for the analysis of forest ownership change. From the 32 National Data Reporting Forms of the FACESMAP/UNECE/

FAO Enquiry, 28 provided information that has been used throughout this section. Complementary qualitative data for six additional countries was taken from the FACESMAP Country Reports (Živojinović et al., 2015). These data sources include national statistical data on the distribution of forest ownership for 1990, 2010 and 2015, expert assessments of changes in forest ownership structures and management for the same time-period, and information on new types of forest ownership.

Public forest ownership is sub-divided into forest land owned by: (i) the State, at national level, (ii) the State, at sub-national government scale, and (iii) local government. **Private forest ownership** is sub-divided into forest owned by: (i) individuals and families, (ii) private institutions, (iii) tribal and (iv) indigenous communities, and other private common ownership, and (v) unknown forest ownership. Data about changes within these respective categories complement the analysis of qualitative factors on forest ownership changes that are assessed and described in later parts of the survey.

Because of the lack of quantitative data on the factors affecting changing forest ownership, the work described in this section uses a special method. For the qualitative part of the FACESMAP/UNECE/FAO Enquiry, national correspondents were asked to assess the significance of trends of change regarding public and private ownership (e.g., restitution, privatization and nationalization of forest land); changes within public forest ownership (e.g., privatization of public forest land and introduction of new forms of public ownerships); and changes within private forest ownership (e.g., afforestation/deforestation, changing life style, motivations and attitudes of forest owners, and the new forest ownership types). For the assessment, a scale was used with the options: 0 = not relevant, 1 = to some extent; 2 = rather important, and 4 = highly important.

It should be noted that the FACESMAP/UNECE/FAO Enquiry and the FACESMAP Country Reports differed somewhat with regards to data collection. For instance, the enquiry refers to a 25-year period (1990-2015) while the Country Reports covers a 30-year period (1985-2015). It has however been assumed that the data used are comparable.

TABLE 3

Changes in forest land 1990-2015, by ownership category

Ownership category	Countries with increased forest area	Countries with decreased forest area	Countries with no change
Public, total	Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Cyprus, Finland, France, Georgia, Iceland, Ireland, Luxembourg, Netherlands, Poland, Portugal, Russian Federation, Serbia, Sweden, Switzerland, Turkey, United States of America	Albania, Canada, Croatia, Czech Republic, Germany, Lithuania, Slovakia, Slovenia, United Kingdom	
State, at national level	Austria, Cyprus, Finland, France, Iceland, Ireland, Poland, Russian Federation, United States of America	Albania, Bulgaria, Canada, Croatia, Georgia, Germany, Lithuania, Portugal, Serbia, Slovakia	Switzerland
State, at sub-national level	Austria, Georgia, Iceland, Switzerland, United States of America	Canada, Germany, United Kingdom	Albania, Bulgaria, Croatia, Cyprus, Finland, Ireland, Lithuania, Slovakia, Slovenia
Local government	Belgium, Bulgaria, France, Germany, Iceland, Poland, Slovakia, Switzerland, Untied States of America	Finland	Croatia, Cyprus, Ireland, Lithuania
Private, total	Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Finland, France, Germany, Iceland, Ireland, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Serbia, Slovakia, Slovenia, Switzerland, Turkey, United Kingdom, Untied States of America	Belgium, Canada, Cyprus, Sweden,	Georgia, Russian Federation
Individuals and families	Albania, Bulgaria, Croatia, Finland, France, Iceland, Ireland, Lithuania, Poland, Portugal, Serbia, Slovakia, Switzerland	United States of America	
Business entities	Bulgaria, France, Iceland, Ireland, Lithuania, Poland, Portugal, United States of America	Finland	Albania, Croatia, Slovakia
Private institutions	Bulgaria, Croatia, Iceland, Portugal, Slovakia	United States of America	Albania, Belgium, Ireland, Lithuania
Private common ownership	Finland, Slovakia, United States of America	Poland	Albania, Belgium, Bulgaria, Croatia, Ireland, Lithuania

Source: FACESMAP/UNECE/FAO Enquiry.

3.2.3 Forest Ownership Change

3.2.3.1 Forest land increase

The total forest area in the ECE region has increased with regards to both public and private forest land during the 1990-2015 period. Public forest land has increased by 2 per cent (from 1,275 million ha to 1,297 million ha) and private forest land by 7 per cent (from 260 million ha to 278 million ha). However, since the total public forest area is more than four times larger than the privately-owned forest area, the increase in absolute terms (ha) is greater in public ownership while the increase is greater in private ownership, in relative terms (percentage of total owned).

Thirteen countries reported gains in both public and private and forest land while only Canada reported a decline in both (see Table 4). It should be noted that 87 per cent of the total forest area covered by this report is in Canada, the Russian Federation and the United States of America. As a result, certain patterns of change in these three countries may overshadow significant patterns in other countries. It is therefore important to move beyond the totals to also explore patterns in individual countries that can inform not only about certain changes but reveal how a driver of change plays out in different contexts. With this in mind, the experts' assessment of overall changes in forest ownership demonstrate a complex pattern of change. For instance, in Cyprus, Georgia, Israel and Turkey the ownership structure

TABLE 4

Overall changes in forest ownership in the ECE region, 1990 to 2015

	Changes between public and private forest ownership				Changes within public forest ownership				Changes within private forest ownership			
COUNTRIES	not relevant (0)	to some extent (1)	rather important (2)	highly important (3)	not relevant (0)	to some extent (1)	rather important (2)	highly important (3)	not relevant (0)	to some extent (1)	rather important (2)	highly important (3)
Austria			X			X					X	
Belgium			X			X						X
Bulgaria				X				X			X	
Croatia			X			X					X	
Cyprus	X				X					X		
Czech Republic				X			X			X		
Estonia*				X		X						X
Finland			X		X							X
France		X			X						X	
Georgia	X				X				X			
Germany				X		X				X		
Greece*	X				N/A					X		
Hungary*				X	X							X
Iceland	X				X						X	
Ireland	X					X						X
Israel	X				X					X		
Latvia*				X	X							X
Lithuania				X		X						X
Luxembourg			X				X		N/A			
Netherlands	X					X					X	
Norway		X			X					X		
Poland		X			X					X		
Portugal	X					X					X	
Romania*				X				X				X
Serbia		X						X			X	
Slovakia				X			X					X
Slovenia				X			X				X	
Sweden				X		X					X	
Switzerland	X						X					X
North Macedonia**			X				X				X	
Turkey	X				X					X		
Ukraine				X	X					X		
United Kingdom				X				X		X		
United States of America		X			X							X

* Additional countries studied in FACESMAP FP1201 COST Action.
** Data for North Macedonia originate from the first phase of the FACESMAP enquiry.

Source: FACESMAP/UNECE/FAO Enquiry and FACESMAP Country Reports.

is assessed as being stable while countries like Bulgaria, Estonia and Romania have experienced important changes in public as well as private ownership. No western countries assessed their situation as `no change´.

Public ownership has dropped significantly through restitution and privatization in many former socialist countries, such as Slovakia (from 100 per cent to 49 per cent) and Lithuania (from 100 per cent to 60 per cent). Increase in private forest area in Western European countries has principally occurred through afforestation and privatization. For example, forest areas in Iceland has tripled, from 16,000 ha to 49,000 ha and in Ireland from 465,000 ha to 726,000 ha. Since most of this increase has occurred on private land, there has been a significant shift in the balance between public and private ownership. In the United Kingdom, there has been some sale of public forest land to private entities, while an increase in public ownership and a corresponding decrease in private ownership has been reported in Belgium and Sweden. It can also be reported that a transfer of publicly owned forest from the State (federal) level to the sub-national level (incl. local government) has occurred in Georgia, Bulgaria, Germany and Slovakia. However, in the latter case, most of the publicly (State) owned forest land was in turn privatized. The most extensive change in terms of private ownership was reported by the United States of America, where ownership by individuals and families has decreased by 2.0 million ha while private entities have increased their ownership by 2.6 million ha.

3.2.3.2 Afforestation

The establishment of new forest land through afforestation is increasing the total area of private and public forests throughout the ECE region, which is in turn affecting forest ownership structures. Afforestation is effectively creating new forest owners when landowners (whether private or public) decide to convert land (e.g., agricultural) into forest. Having this in mind, afforestation has been addressed in terms of trends affecting the establishment of new forest land as well as new forest owners, focusing on the growing number of new forest owners because of afforestation (see Figure 22). One prominent example of both trends is Ireland, where afforestation has been identified as a highly important trend (see Box 1). Afforestation has also been identified as an important trend in Iceland, Portugal, Slovakia, Turkey and the United States of America (see Figure 22), while most other countries identified afforestation as being only slightly important. Exceptions are Croatia, Norway, Sweden and Switzerland, where afforestation is not seen as being of any relevance to changing forest ownership.

In Norway, for example, significant afforestation efforts (or the replacement of inferior stocking) were carried out in coastal districts during the 1950 to 1970 period. This forest is now starting to mature, but many of the forest owners that took part in this afforestation effort do not have any experience in forest management. Even though the forest owner (or their families) may have owned the land for a long period, the forest was not an issue of concern in the past. Currently, only a few hundred ha of land is being afforested each year.

Box 1. Afforestation in Ireland

The growing number of new forest owners in Ireland is principally the outcome of the afforestation of agricultural land, where EU financing (e.g., through its Rural Development Programme) as well as national funding instruments have been crucial (Alliance Environnement et al., 2017). EU and national instruments have in fact facilitated the afforestation of 261,290 ha since 1980, representing approximately 3 per cent of the total land area. It can be noted that Ireland, at its peak, afforested approximately 14,000 ha per year; however, there has been a decrease in the rate of afforestation since 2000 despite an increase in the availability of grants and premium rates. The Government of Ireland is nevertheless still committed to its ongoing afforestation programme. Recently it reiterated the commitment to afforest 10,000 ha per year, leading up to 2015, and 15,000 ha per year until 2045. It is for this reason expected that the number of forest owners in Ireland will continue to increase for the foreseeable future (Ní Dhubháin et al., 2015).

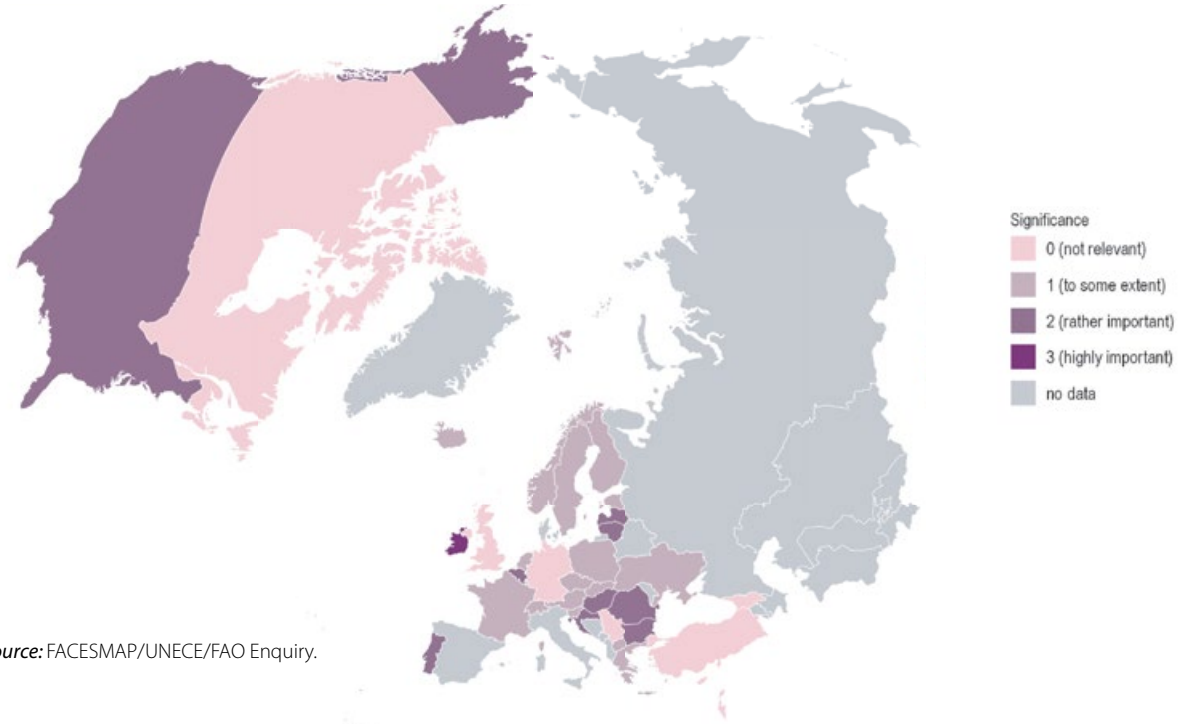
Other examples include Iceland, where State-funded afforestation of privately-owned land started in 1970. While the funding for afforestation was limited at the outset, Iceland launched its first regional afforestation program in 1990, followed by four more regional programmes in 2000 covering the reminder of the country. Afforestation of privately-owned land has, since this period, been the main factor for an increase in forest area. In this case there also appears to be increasing interest among urban populations to buy old farming estates, where cattle ranching was abandoned, and to afforest these lands. In the United Kingdom, there are also ongoing programmes to support afforestation, which has resulted in the afforestation of between 5,000 and 10,000 ha every year over the past ten years (Živojinović et al., 2015).

In comparison, the natural expansion of forest has been identified as more common than planned afforestation in Germany. This highlights significant national variations in the establishment of new forest land.

The increasing number of new forest owners through afforestation was identified as a 'rather important' trend

FIGURE 22

Appearance of new forest owners, through afforestation (1990-2014). National correspondents' assessment of the significance of afforestation, in contributing to new forest ownership



Source: FACESMAP/UNECE/FAO Enquiry.

in Belgium, Bulgaria, Croatia, Hungary, Latvia, Lithuania, Portugal, Romania and the United States of America (see Figure 22). In Portugal and the United States of America, most of the afforestation was in fact undertaken by new land owners. Nevertheless, most countries identified this trend as only being important 'to some extent', while Canada, Cyprus, Germany, Israel, Serbia, Turkey and the United Kingdom did not attach any relevance for afforestation contributing to change in forest owners. This may indicate in the latter case that afforestation was carried out by land owners that already owned forest land in these countries.

These outcomes are often achieved through targeted policy support. For example, during the past two decades, Bulgaria has implemented specific measures to transform abandoned agricultural land into forests through afforestation, such as providing support through its Rural Development Programme (RDP) for the 2007-2013 period and its National Strategic Plan for Agricultural and Rural Development 2007-2013. This has included measures to develop technological plans for afforestation, site preparation, obtaining seeds and planting, actions for guided natural succession and fencing. These activities are continued in the following National RDP period, 2014-2020, with 2 forest measures that support afforestation. In the Czech Republic, measures directed towards afforestation was financed by its Ministry of Agriculture until 2003, however, since joining the EU, support has also been provided through the EU's structural funds. For instance, during the period 2007-2010, approximately 2500 ha of non-forest land was afforested.

Afforestation of marginal and abandoned agricultural land in Portugal has been supported through the EU's aid scheme for forestry measures in agriculture in 1992 leading up to its more recent Programme for the Afforestation of Agricultural Land (RURIS). Approximately 200,000 ha was afforested during the 1992 to 2006 period. However, even though the increase in forest land can be used as an indicator, it is not known how many new forest owners there are in Portugal. More recently, it can also be noted that some regions in Portugal have been bought to plant Eucalyptus to produce certified wood. These new forest owners are quite important in some regions of the country, including for example the Lisbon and West/Oeste region. According to the preliminary results from the National Forest Inventory in 2010, the total land area covered by eucalyptus plantations increased by 13 per cent during the 1995 to 2010 period. This increase occurred partly on 13,000 ha of pasture land and 12,000 ha

of agricultural land. New cork oak stands were also planted on 18,000 ha of agricultural land.

3.2.4 Changes in the meaning of ownership

3.2.4.1 Commercialization of public forest management

New forms of management of publicly owned forest land have been introduced in several countries (see Figure 23). For instance, in Bulgaria, the Czech Republic, Finland and Germany, the management of State-owned forest land has been transferred to State enterprises, while forest management was outsourced to private enterprises in Lithuania and Slovakia. The commercialization of public forest management was considered the most significant trend in Romania where, owing to the restitution process, 15 per cent of the total forest area was restituted to municipalities. These municipalities have in turn established private administrative forest units (Nichiforel et al., 2015). The same trend has occurred in the Czech Republic following the transfer of ownership of State property to the municipal level.

In contrast, the management of public forest land is carried out by a public agency in the United States of America. Commercial use and management of forests are done in accordance with the mandates provided through laws, regulations and financial constraints.

Furthermore, there has been a general expansion of protected forests, which are predominantly publicly owned. Even though the measures and strictness of protection vary considerably depending on the management objectives and country, the forest area designated for conservation of biodiversity in the ECE region has increased from 116 to 132 million ha during the 2000 to 2010 period (UNECE/FAO, 2015). This reflects changing forest management practice that increasingly emphasizes multifunctional use, including biodiversity conservation (e.g., increasing use of natural regeneration and retention forestry). These developments, in terms of management practice, are expected to effect public forests as well, regardless of whether they are being managed by private or public entities.

3.2.4.2 Restitution and privatization

Changes in the prevalence of public versus private forest ownership was assessed as highly important for changing forest ownership; however, the underlying reasons for this shift vary across the ECE region. In the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia and Slovenia, changes in proportion of public and private forest ownership are principally based on the restitution process (see Figure 24), while in Sweden and the United Kingdom, they are based on privatization (see Figure 25). Restitution and privatization are for these reasons seen as significant processes that have triggered changes in forest ownership structures in these respective countries.

Major political and social changes in Eastern and South-Eastern Europe have triggered increased interest in the restitution and privatization of forest ownership since the 1990s. 'Restitution' acknowledges the continuation of private ownership rights of forest land in returning them to former land owners or their heirs, whether these are individuals, local communities or institutions, see Section 1.1 (Bouriaud and Schmithüsen, 2005). Except Belarus, Poland, the Russian Federation and Ukraine, restitution has occurred in most European countries with economies in transition (Lawrence et al., 2009, Bouriaud and Schmithüsen, 2005). This includes Romania, Bulgaria, Hungary, the Czech Republic, Slovakia, Estonia, Latvia, Lithuania, Slovenia, Serbia, Croatia, Albania and the former German Democratic Republic (see Figure 24). However, the restitution of publicly owned forests has had diverse objectives and is being implemented in different ways.

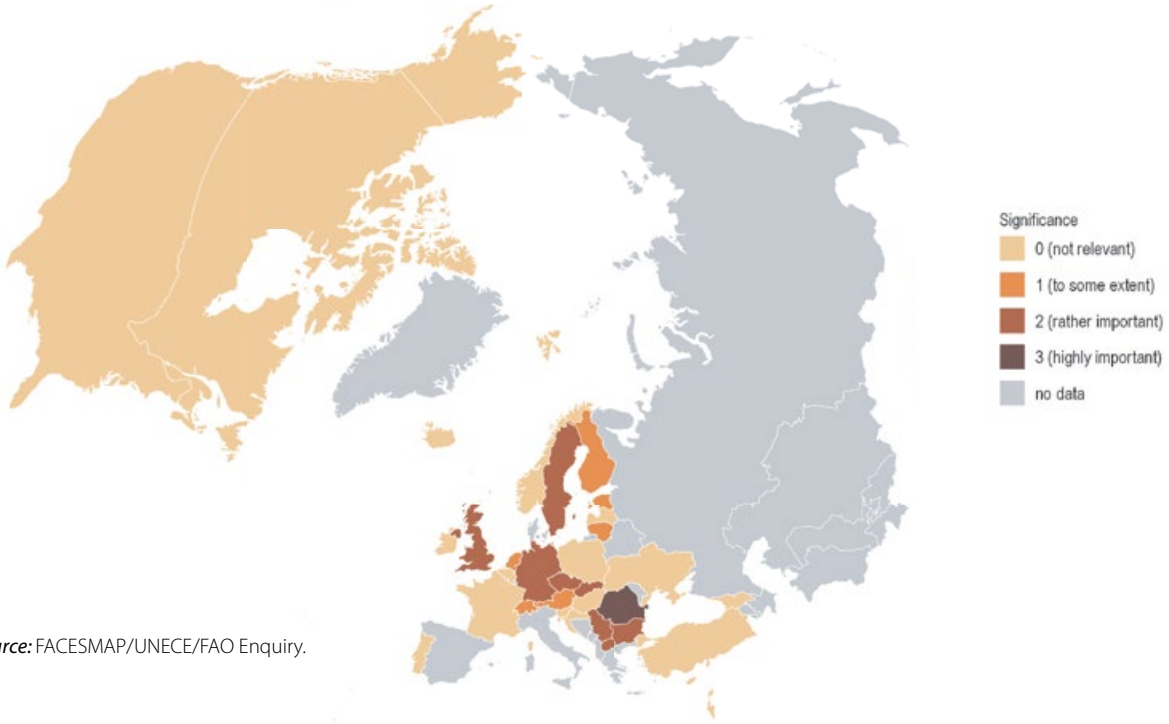
Even though the restitution process remains incomplete in many countries, it has triggered important changes in forest ownership structures in the ECE region. The share of private forest owners has risen in several countries, in some cases from zero to more than 50 per cent, such as in Romania, Lithuania and Slovakia. In other countries, such as Serbia and Croatia, the change has not been so significant, because not all private property was previously nationalized. For instance, during socialist times in Serbia, private individuals could still own up to 10 ha of forest land and, in the case of a monastery or church, up to 30 ha of forest land (Nonić et al., 2015). This means that the restitution process did not bring significant changes in terms of forest ownership structures in Serbia, but instead led to an increase in already pre-existing types of forest owners, such as the church and communes.

The restitution processes have furthermore been accompanied by changing regulatory frameworks, influenced by national and international interests, including the harmonization of national legislation in accordance with international rules and regulations (Živojinović et al., 2016).

The countries that have experienced a significant increase of new private forest owners have also faced challenges with regards to forest management. These include a general lack of experience and skills to manage forest resources and the establishment of small and fragmented forest holdings. The restitution processes have also revealed many underlying conflicts, resulting in unclear or disputed forest ownership, such as in the Czech Republic, Romania and Slovakia (see Box 2) (Živojinović et al., 2015). Outside Europe, restitution has occurred in Canada, where agreements with First Nation people have resulted in the transfer of ownership of over 770 thousand ha of land (see Box 3).

FIGURE 23

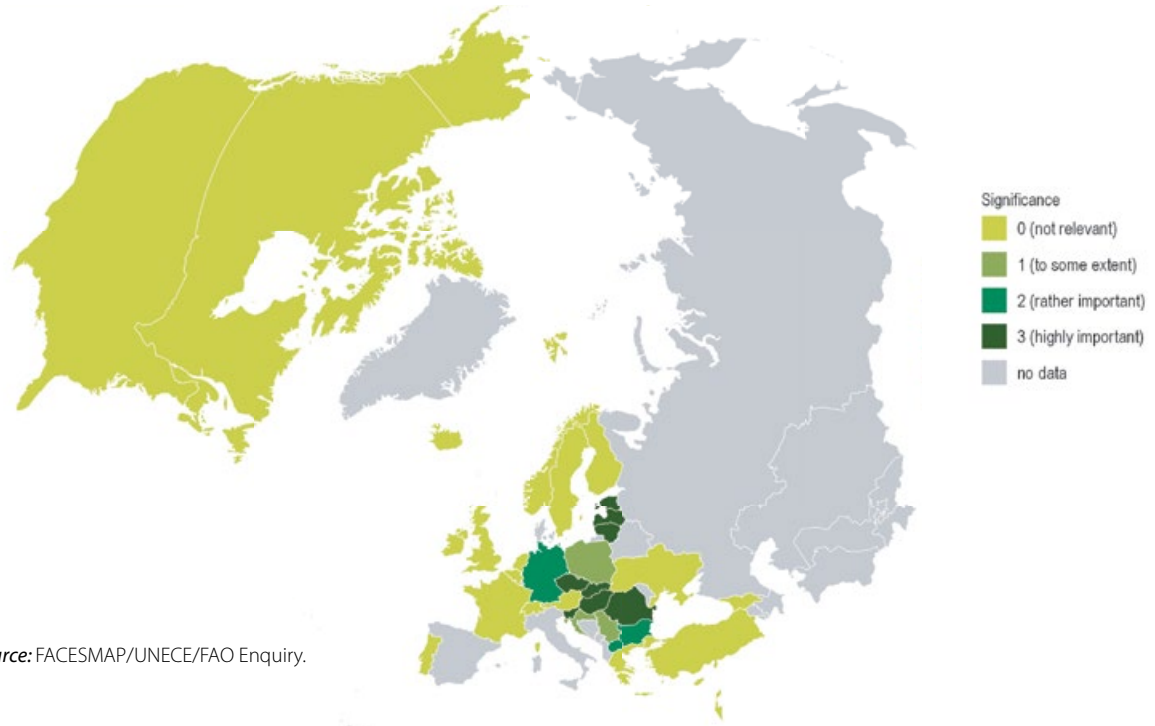
Change of structure/commercialization of public forest management (1990-2014). National correspondents' assessment of the significance of change within public forest ownership



Source: FACESMAP/UNECE/FAO Enquiry.

FIGURE 24

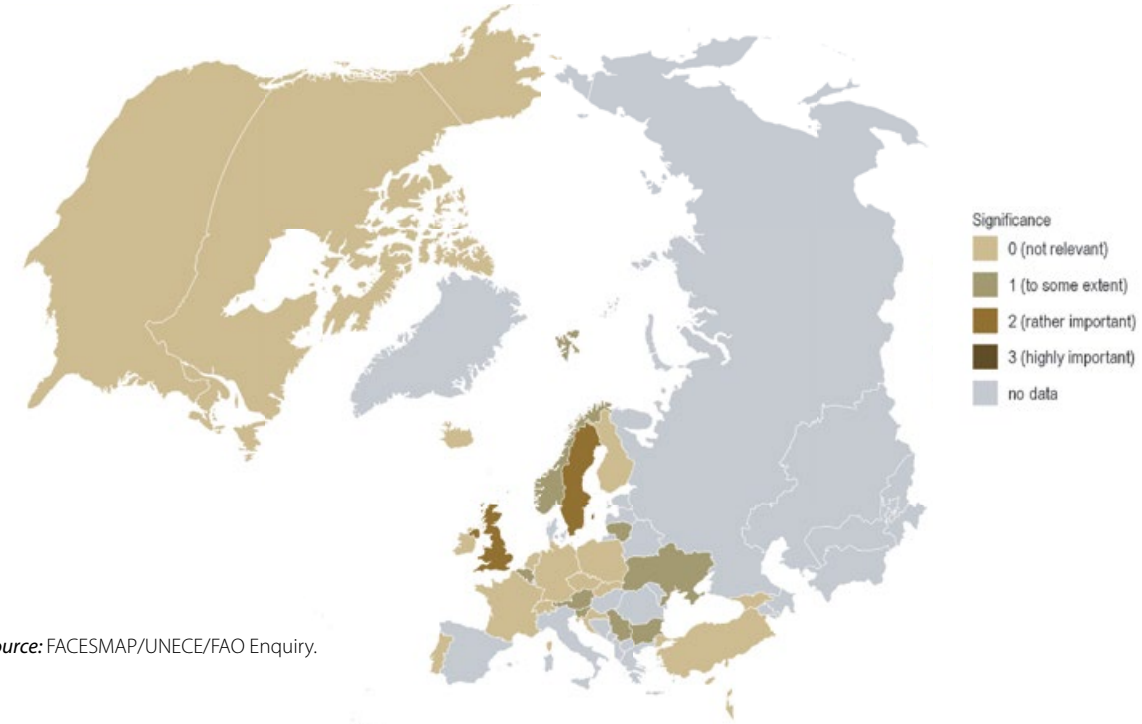
Restitution of forest land (1990-2014). National correspondents' assessment of the significance of restitution, in contributing to change in private forest ownership



Source: FACESMAP/UNECE/FAO Enquiry.

FIGURE 25

Privatization of forest land (1990-2014). National correspondents' assessment of the significance of privatization, in contribution to change in private forest ownership



Source: FACESMAP/UNECE/FAO Enquiry.

Box 2. Restitution in Slovakia – ongoing process and their implications (Ambrušová et al., 2015)

In Slovakia, approximately 100,000 former land owners have requested restitution of ownership and users' rights, covering a forest area of 1,044,177 ha. Of 1,161,782 ha of non-State forests, 961,110 ha has now been restituted. This means that nearly 18 per cent of the non-State forests remains to be restituted. In most of the unsettled cases, the property is derelict, owned by a group of shareholders, or on cadastral territories with insufficient descriptive and geodetic information. Problems include a general lack of information about the identity or residence of owners and missing forest owners' requests or documents required for the process. Overall, the forest ownership structure is now relatively stable, although some changes may yet occur due to the finalisation of the restitution process.

The restitution of forest land is furthermore related to other changes relevant to forest ownership. These include:

(i) Changes in policy, such as the recognition of ownership by Constitutional Law and the adoption of the *"Land Law"* (No. 229/1991 of the Coll.), which started the restitution process.

(ii) Decrease of the forest area managed by State forest management organizations. This means that the number of State enterprises and the number of employees has decreased. It also set in motion the emergence of new forms of management, such as outsourcing contracts to carry out regeneration, afforestation, harvesting, tending and forest protection activities.

(iii) Lack of knowledge about forest management. The restitution of forest land and the reappearance of private forest owners were preceded by a historical loss of knowledge and/or experience in forest management that now must be re-gained by new forest owners.

(iv) Establishment of forest ownership organization. New forest owners with no experience in administering and managing private forest holdings have in many cases established representative associations. These interest or stakeholder organizations contribute towards protecting and/or representing common interests in sub-national or national policymaking.

Privatization is an integral part of the transformation from centrally planned to free market systems (Bouriaud and Schmithüsen, 2005). It assumes the process of giving forest land that is publicly owned (often State ownership) into private hands, usually through sale or purchase contracts that are guided by public policy programmes (see Section 1.1). Privatization has taken place also in some parts of Western Europe (e.g., Sweden and United Kingdom), where it was assessed as a 'rather important' trend (see Figure 25). In Canada, Finland, France, Germany and Sweden, some State-owned forest land (existing or attained through new acquisition) was transferred to authorities with a specific commission (e.g., nature conservation) or as a compensation scheme for private forest owners (e.g., replacement land).

Box 3. Restitution in Canada

In Canada, indigenous people hold customary and legal rights to natural resources, derived from their historical occupation of the land and from treaties that are confirmed in the Canadian constitution. For example, the Canadian constitution recognizes three groups of indigenous people (First Nations, Inuit and Métis). About 89 per cent of Canada's land area is public, with overlapping rights held by indigenous people and by forest management and harvesting companies. Over the last 30 years, indigenous people, government agencies and forestry companies have established a wide range of arrangements concerning access to land, forest management, wood harvesting and processing (Wyatt, 2016). For example, the Ministry of Forests, Lands and Natural Resource Operations has signed forest tenure agreements with 175 of the 203 First Nations. These agreements provide resource revenue-sharing and access to 63,2 million m^3 of timber. The First Nations now hold approximately 10,4 per cent of the national wood supply, an increase of 7,5 million m^3 since 2007 (NAFA, 2015).

3.2.4.3 Fragmentation and consolidation

The common inheritance practice of transferring forest land from parents to multiple heirs has led to the increased fragmentation of forest land into smaller holdings in many UNECE member States (see Figure 26 and Figure 27). The significance of this splitting of properties is considered important to the changing ownership structure in Belgium, Croatia, Finland, the Netherlands, Serbia, Slovakia, Switzerland, the United Kingdom and the United States of America. Also in those countries where primogeniture has been common practice, gender equality policies have affected the way that family properties are being transferred, such as in Sweden, where more women are becoming forest owners but often in co-ownership with their siblings (Lidestav, 2010). The proportion of female versus male forest owners is generally equal throughout the former socialist countries (Follo et al., 2017).

Box 4. Costs of fragmentation and benefits of consolidation

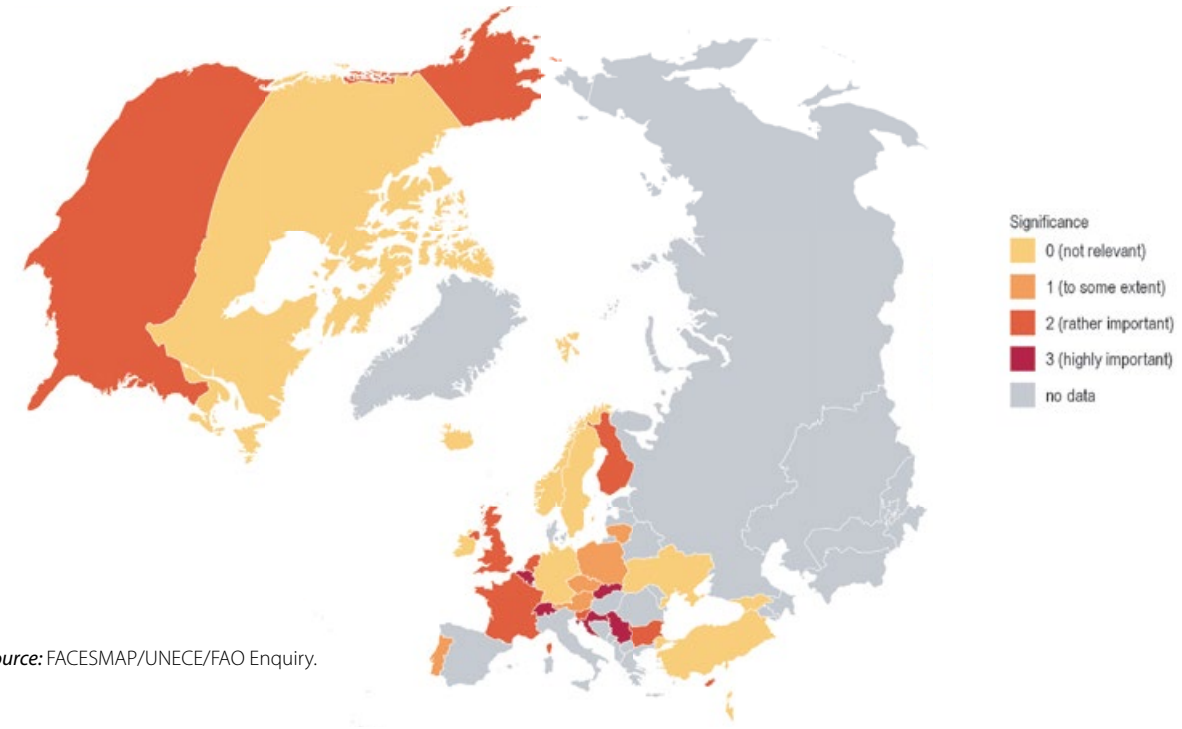
In the Swedish province of Dalarna, fragmentation has been considered a problem for several decades, which in turn has been addressed through several initiatives that aim towards land consolidation. In a recent analysis of the benefits related to consolidation, several aspects were assessed and discussed (Länsstyrelsen i Dalarnas län 2017). For example, 27 per cent (534,000 ha) of the total forest area has been identified as being fragmented. It is argued that if consolidated (e.g., from several strip shaped holdings to a few blocks per forest owner), the wood increment could increase by 320,000 m^3 per year. This increment represents 450,000 tons of sequestered CO_2 and, when translated into employment, 630 new jobs in forestry and processing. It is further argued that the improved structure could reduce the consumption of diesel, particularly as a significant amount of off-road transportation could be substituted with road transportation. From the forest owners' perspective, the consolidation would allow for more cost-efficient forest management, such as reducing the length of borders and off-road transportation as well as increased road accessibility and timber increment (e.g., estimated on average to 0.6 m^3 per ha and year). Taken together, this implies that consolidation could substantially increase the value of the forest holding (Länsstyrelsen i Dalarnas län, 2017). One example for a specific forest area, consisting of 1,800 ha of productive forest that is divided into 256 parcels, the net present value increment of consolidating this land into 26 parcels is estimated to 462,000 EUR (or 257 EUR per ha). 77 per cent of the increment refers to reduced harvesting costs, 9 per cent to reduced silvicultural costs and 14 per cent to maintenance costs (Andersson, 2016).

In an effort to counteract increased forest fragmentation, several countries have established different measures. For example, in:

- Slovenia, where a change in the Forest Law in 2007 prohibits splitting of forest holdings into units that are below 5 ha;
- Slovakia, where existing forest land can be divided into several parcels, whereas, if a new plot is smaller than 2 ha, a fee of 10 per cent of the value of the land is charged, and if less than 1 ha, a fee of 20 per cent is

FIGURE 26

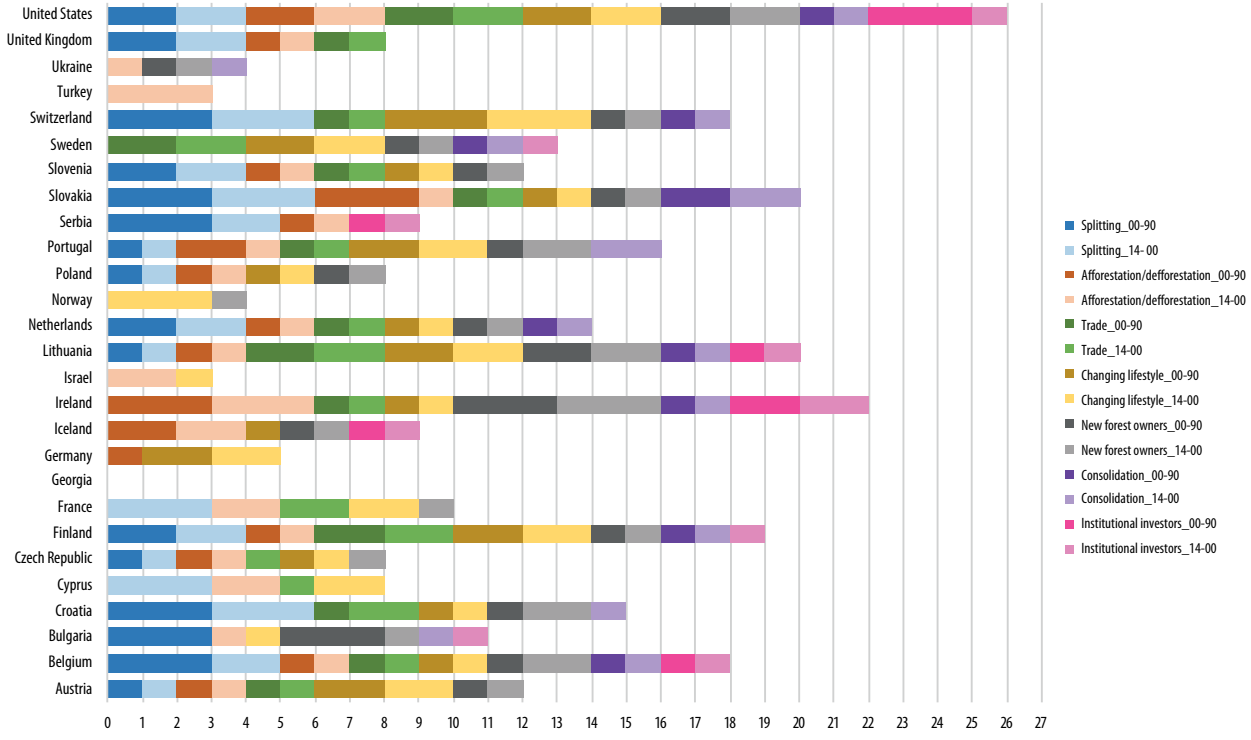
Fragmenting forest holdings through inheritance (1990-2014). National correspondents' assessment of the significance of fragmentation, in contributing to changing forest ownership



Source: FACESMAP/UNECE/FAO Enquiry.

FIGURE 27

Significance of change in private ownership for the 1990-2000 and 2000-2014 period



Source: FACESMAP/UNECE/FAO Enquiry.

Box 5. Contextualising lifestyle change

"Lifestyles", and the meaning thereof, depends to a large extent on the specific context, particularly when considering how and why lifestyles are changing. In relation to forest owners, lifestyles are often considered in connection with the means of livelihood (farming or not, employed or self-employed) and place of residence. In this context *"urban forest owners"* has become an often used, but not always defined concept. While some studies understand urban forest owners as individuals that live in urban areas, others mean forest owners with an urban lifestyle (Törnqvist 1995, Ziegenspeck et al. 2004).

In Switzerland, where changing lifestyles, motivations and attitudes of forest owners was rated as highly important, the following explanation was given: *"[…] historically many private forest owners grew up in an agricultural environment and therefore they have had some knowledge and skills related to managing a forest. While in Switzerland there is currently a decrease in the number of farms and of people who are active in agriculture, this type of forest owner might already have diminished prior to this trend. The projection is that the coming generations of private forest owners will have increasingly grown up in an urban setting and without any ties to agriculture"*. This implies that private forest owners will increasingly have less connection with and knowledge about forests and forestry. It also suggests that the use of forest contractors will continue to increase in the near to distant future.

charged. Heirs therefore tend to share the property through virtual shares and lease the management to private or State enterprises;

- Portugal, where the creation of non-profit foundations allows heirs to jointly own and manage their forest land;
- Belgium and Finland, where a new type of common property regime has been introduced, which makes it possible for heirs and other forest owners to combine their forest land into a new entity that is subject to special rules and taxes;
- In Sweden, where voluntary land consolidation initiatives have been introduced (see Box 2 for more details).

Another way to overcome fragmentation is through buying and selling forest holdings. This approach towards consolidation is reported in Belgium, Croatia, Finland, Ireland, Lithuania, Portugal, Sweden, the United Kingdom and the United States of America (see Box 4). The increase of forest land owned by private entities can also be regarded as part of a consolidation process. It should however be noted that this trend is dominated by changes in France and the United States of America, which account for 84 per cent of the reported increment of 4.5 million ha.

3.2.5 Changing values or lifestyles

3.2.5.1 Lifestyle change

Lifestyles, as a concept and as way of combining societal megatrends (e.g., globalization, urbanization and demographic changes) with material conditions, objectives, values and attitudes at the individual level, is frequently used in research to explain the increasing heterogeneity of private forest owners (Ficko et al., 2017). The importance of lifestyle choices is also apparent in the data obtained through the FACESMAP/UNECE/FAO Enquiry and the FACESMAP Country Reports (see Box 5). Changing lifestyles, motivations and attitudes among forest owners are scored to be important characteristics of change in 22 out of 27 countries, and in Germany, Norway and Switzerland the single most important (see Figure 27 and Figure 28).

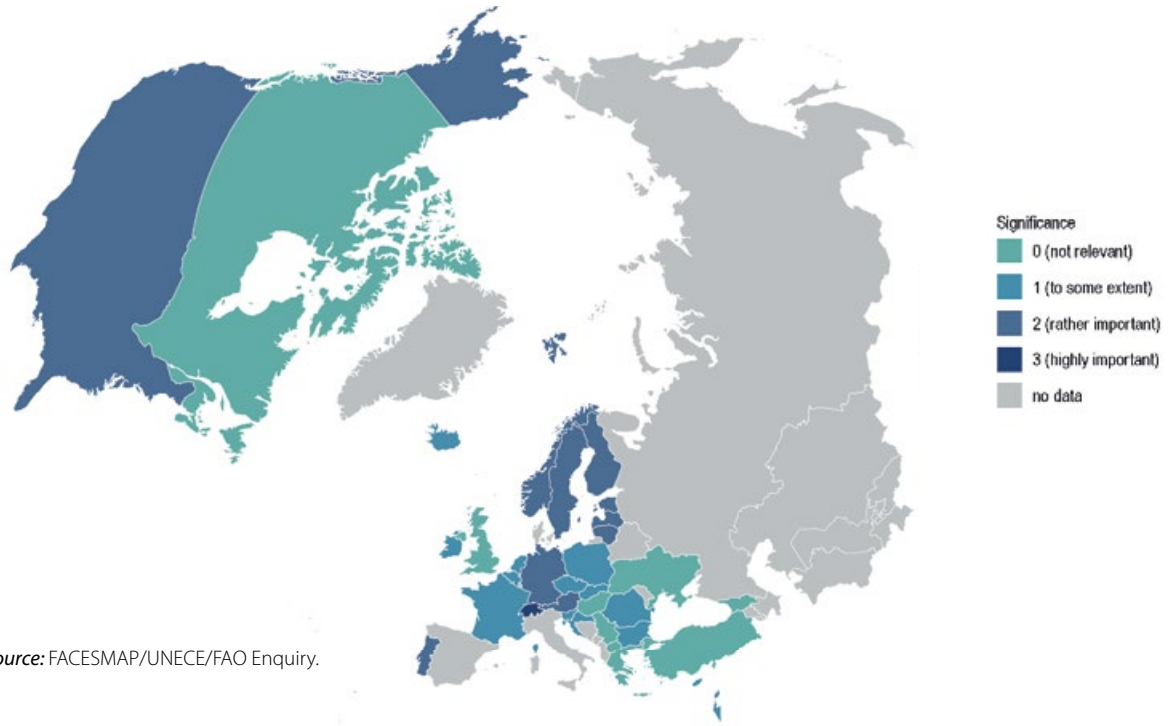
The main factors associated with changing lifestyles amongst forest owners concern the widespread reduction of small-scale farming and urbanization. These changes have, amongst other things, resulted in fewer forest owners having the time, skills and equipment needed to undertake forest operations. This furthermore presents a potential risk for wood mobilization, for example, due to a decreased economic dependence on forests or lack of production incentives (Ficko et al., 2017, Sten et al., 2010). In terms of lifestyles, it is also interesting to note the increasing proportion of female forest owners. It has been found that female owners, as a new category, are generally less experienced in forest management and have stronger environmental beliefs. This has implications not only with regards to forest management objectives and priorities but also in the type of outreach activities and services that would be necessary to address these new forest owners in the future (Lidestav and Berg Lejon 2013). The physical and material (e.g., economic) disconnection between forest owners and their forest land consequently poses a challenge for the management of an increasing number of privately-owned forest holdings. The availability of extension and service provision by forest professionals has for this reason become an increasingly important issue (see Section 4.5).

3.2.6 Discussion

The data shows that 87 per cent of the forest area in the ECE region is in three countries, namely, Canada, the Russian Federation and the United States of America,

FIGURE 28

Changing lifestyle, motivations and attitudes of forest owners (1990-2014). National correspondents' assessment of the significance of changing lifestyle, motivations and attitudes, in contributing to changing forest ownership



Source: FACESMAP/UNECE/FAO Enquiry.

where the relation between society and individuals regarding forest ownership has been rather stable. Overall, therefore, it appears that only minor changes have occurred during the period covered by this report. However, significant changes have taken place in the relationships between forest owners and society. For instance, in the case of the United States of America, socio-economic changes affecting lifestyles, new forest ownership types and fragmentation, showcase similar trends to those which can be observed in many countries in Europe. The varied changes regarding forest ownership in Europe demonstrate that the relationship between (individual) forest owners and society has changed markedly, presenting both new opportunities (e.g., introducing innovative forest management approaches) as well as challenges (e.g., new types of incentives needed) for the future. However, as these opportunities and challenges are significantly interlinked with national- and time-specific factors, it is difficult to provide any generalized conclusions.

Despite the importance of contextually specific factors, some overall trends can be noted. The total forest area in the ECE region has for example increased on both public and private land. There have also been changes in the proportion of public and private forest, through the purchase and sale of forest land by public entities. Privatization programmes are common in several countries (e.g., Sweden, United Kingdom and the Baltic States), the most significant change in forest ownership structures has occurred through restitution processes in Eastern and South-Eastern Europe over the last 25 years. Nationalized forest land has effectively been given back to private owners, municipalities and churches, although the extent to which forest lands have been restituted varies significantly across the region. Another trend relates to the administration and/or management of public forests. More specifically, many countries have transformed State forests into commercial entities (e.g., limited or stock companies in public ownership) and/or increasingly rely on the outsourcing of management services and forest operations to private enterprises.

Regarding private forest owners, one major trend has been the growing share of non-traditional, urban or absentee forest owners, often accompanied by a growing fragmentation of forest holdings. Consequently, a growing share of forest owners have no agricultural or forestry experience, education, skills and capacities. This has significant implications for forest management objectives and priorities, particularly the production of wood-based goods and services as well as opportunities to address risks facing forests such as loss of biodiversity and adaptation to climate change.

The growing number of urban or absentee forest owners has mostly been considered in connection with the decreasing utilization of timber yields. However, the underuse of biomass from private forests also happens in traditionally managed forests. The problem of decreasing market participation of forest owners and the growing demand for forest biomass for timber and energy purposes has led to growing research into forest ownership. While research has raised awareness about the role of non-traditional, urban, absentee owners and fragmented ownership, wood mobilization measures are often still directed towards traditional forest owner who can be reached more easily through existing policy instruments.

Increased fragmentation of forest holdings can especially be found in countries that have undergone (or are undergoing) a restitution process, including the establishment of a national regime for private forest management. This effect is magnified in countries where there are no restrictions with regards to splitting forest holdings, and where the dominant inheritance practice provides all offspring with a piece of land. These conditions are also apparent in other countries, such as Norway and Sweden, where legislation has been introduced to prevent continued fragmentation.

It is interesting to note that fragmentation has, to date, mainly been considered a problem in policy discourse, principally because it threatens the supply of raw materials (e.g., timber) to forest-based industries. However, possible positive effects from fragmentation have not been much studied – for example, the prevalence and impact of different forest ownership structures on forest management. Fragmentation may not be all negative; it could, for example, contribute to improved biodiversity conservation and/or forest resilience (Weiss et al., 2018).

There are other developments that follow from changes in forest ownership structures and lifestyles. The example presented in Box 4 is based on a situation where all the forest work is undertaken by employed personnel using mechanized harvesting methods. This is usually not the case for most private forest owners in Europe. Nevertheless, owing to ongoing lifestyle changes, it is less likely that forest owners will be able to carry out harvesting or silvicultural operations on their forest land. This implies increased reliance on forest contractors who carry out forest management activities, and attention to the reduction of costs associated with forestry operations. Even though most types of *"new"* forest owners do not rely financially on their forest land, it is unlikely they would accept a situation whereby the costs of forest operations and management exceed the generated income (Törnqvist 1995). The introduction of new types of common property regimes, as in Belgium and Finland, may present a solution in these cases, at least for those forest owners that prioritize some degree of income generation from their forest land (c.f. Westholm, 1992).

Finally, the lack of visibility and recognition of forest owners as individuals is particularly apparent when considering women (Follo et al., 2017). In this particular case, only 14 countries provided gender-related statistics on forest ownership. For instance, Finland was the only country that reported on gender in 1990 and 2015. This obviously makes it difficult to make any general assessment with regards to gender and forest ownership.

Furthermore, the results in this section imply that even though the relative importance of forest land has declined with regards to employment, value creation and power, it still constitutes a major source of income in rural areas as well as contributing towards the general economy throughout the ECE region. With the prospects of a major turn from a fossil-based to a bio-based economy, the importance of forest land and the availability of forest biomass and forest ecosystem services further emphasize the importance of improved knowledge about forest ownership (Weiß et al., 2017), particularly as it is up to the forest owners to decide on management priorities and objectives.

3.2.7 Conclusions

The analysis of changing forest ownership structures indicates that while the share of the main ownership categories (public and private) remains fairly stable in the ECE region, there are significant qualitative changes that deserve more attention. In summary, the forest area has expanded across all countries, for both publicly and privately-owned forests, although developments vary across the region. The main change that has affected forest ownership structures has been the restitution of forest land to (mostly private) owners in former socialist countries. Only a few Western countries have implemented privatization programmes. Even if the area of privatized forest is rather limited, such programmes may bring interesting results.

Implications related to the growing share of non-traditional forest owners for forest management and other policy goals emphasize the need further investigation (Weiss et al., 2018). It is especially necessary to improve our understanding of new forest management approaches that would take into account different management objectives, preferences, skills and capacities. These changes are also likely to affect the delivery and provision of other forest ecosystem services, such as biodiversity conservation or recreational services. Research has started to tackle such questions but a broader awareness of changing ownership is still lacking in forest policy debates. While this report represents a good start, more data and continued research would be needed to address these fundamental concerns and allow for

investigations into different forms of forest ownership, forest management and the supply of relevant goods and services.

The information collected for this report contributes to a better understanding of the scale of change and the main drivers behind these changes. However, comparison across countries inevitably points to gaps in data quality. Because of missing statistical data in some countries, specific issues have been based on expert estimates. This suggests that focused studies on selected trends might be able to further address data quality concerns, such as demonstrating how changes in lifestyles relates to fragmentation and consolidation. Furthermore, better comparability and harmonization could be gained through improved national statistics or surveys as well as relevant international processes, such as the pan-European data reporting or the Global Forest Resources Assessments (FRA).

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Chapter 4

FOREST MANAGEMENT AND BENEFITS

4. FOREST MANAGEMENT AND BENEFITS

4.1 The impact of ownership type on the implementation of forest management

4.1.1 Introduction

This section is concerned with operational forest management as defined in Section 1. It focuses on the processes of decision-making and planning of forest management, and arrangements for forest operations; together these constitute the practices required for active stewardship of forest land. The section does not address the details of prescriptions within the management plans.

The processes and implementation of forest management depend on both the forest ownership, and the regulatory systems in place within a country (see Section 5.1). In the case of public owners, regulation and direct instruction are intended to ensure forest management will fulfil national policy and thus meet society's needs. For private owners, regulation varies considerably from *laisse faire* (owners can do as they wish) through minimal regulation with incentives to the imposition of legal requirements to conform with detailed management procedures and prescriptions. In this way, to varying degrees, the state reserves to itself the right to determine or influence the management of private forests. The emergence of new owners and ownership types (see Section 3.2), particularly in the private sector, challenges preconceptions about the practice of forest management. Changing societal demands have also engendered adaptation in public forest management procedures and regulation.

4.1.2 Methods and data

This section examines patterns and emerging trends in the interplay between forest ownership and forest management. The qualitative and quantitative data that are presented and discussed in the following sections of this section were principally collected through the FACESMAP/UNECE/FAO Enquiry. In addition, data from the FACESMAP Country Reports (Živojinović et al., 2015), which covers 28 countries (22 EU and 6 non-EU countries),[22] have been utilized to complement and expand on information provided through the enquiry.

4.1.3 Management of public forest land

In 2015, 82 per cent of forest land in the ECE region was owned by the state with 17 per cent in private ownership. However, aggregation at UNECE level hides a lot of variation in the proportions of forest which are public and private as shown in Figure 29.

There are no obvious patterns in the location or nature of countries having more or less public ownership. However, it is worth noting than the three countries (Canada, Russian Federation, Turkey) with > 90 per cent public ownership have between them 1.145 million ha of public forest which is 75 per cent of all UNECE forest and thus will dominate any UNECE-level statistics.

Public forests can be owned by state institutions at national, sub-national (e.g., federal level) or local levels. The distribution of the public forest to these different levels varies considerably. In countries with long-established federated administrations (e.g., Germany, Spain, Italy) there can be considerable variation in the regulation and practice of forestry between sub-national administrations though usually under unified national goals and regulation. In countries which have more recently transferred the governance of forest to a regional level (e.g., United Kingdom) the process of devolving forest land and regulation has resulted in divergence in policy and practice and has resulted in new public forest owners. In both cases there is a need to consider sub-national forest owners as being distinct. Likewise, there can be considerable variation in the management of forests belonging to a local government. However, a local government ownership is of interest as it can serve as the legal entity holding the title for common land on behalf of the local community.

Public forests, whatever the scale, are almost entirely reported as being managed by the owner (see Figure 30).

4.1.4 National forests

Closer consideration of the nature of the institutions which serve as public forest agencies reported as 'managed by owner' reveals a great plethora of forms of parastatal organizations. This is not apparent in the FACESMAP/UNECE/FAO Enquiry because many respondents interpreted the question as referring to who is ultimately responsible for forest management and this is the state as the owner of the forest though day-to-day operations can be undertaken by a variety of agencies. At the national level, agencies which have the responsibility for public forest management can be government departments and operate directly under the appropriate ministry. It is notable that this is the case

22 See http://facesmap.boku.ac.at/index.php/activities-and-outputs/country-reports.

FIGURE 29

Representation of public ownership of forest in 30 UNECE countries

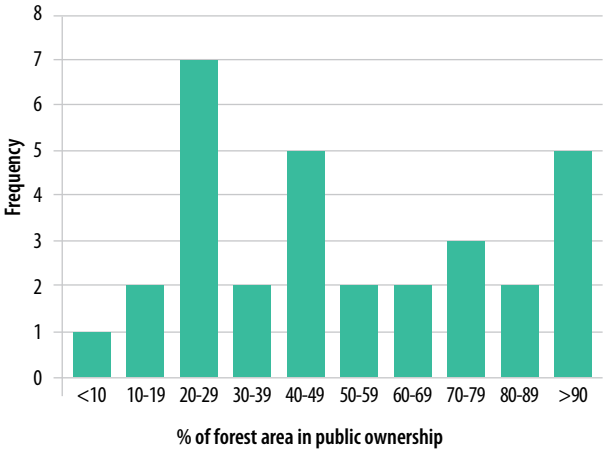
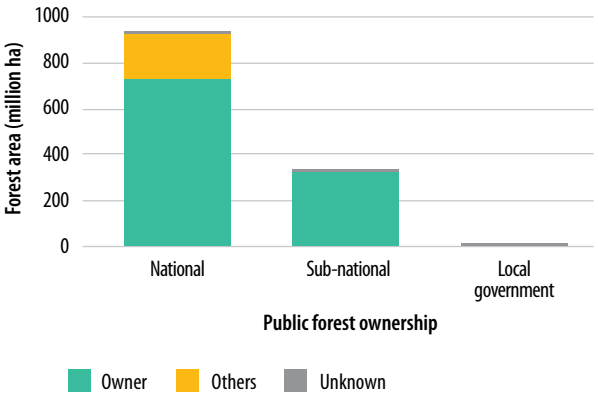


FIGURE 30

Assignment of management decision making in public forest, 2010



in many of the UNECE countries with large areas of public forest and is the case in the United States of America, Turkey, Russian Federation, Greece and France. Within Europe, transitioning from direct state management to arms-length or parastatal organizations is a notable trend, exemplified by the change in constitution of the Finnish Metsähallitus to a limited company (Živojinović et al., 2015). These semi-public bodies represent a type of new forest owner which is poorly represented in the FACESMAP/UNECE/FAO Enquiry. The state may also outsource forest management from the private sector; for example, in Israel, Keren Kayemeth Lelsrael, a non-governmental organization, signed a convention with the State and is commissioned with forest management.

In Figure 30 only a few countries reported that national public forests were managed by *"Others"*. In Croatia, Hrvatske Šume d.o.o. and Ireland's Collite are state-owned companies acting under instruction from the state and constrained by regulations. In Poland, management is by Państwowe Gospodarstwo Leśne *Lasy Państwowe* which is not a separate legal entity from the government, but is financially self-sufficient and manages state forest on behalf of the Treasury.

Canada is unusual within the ECE region in that it operates a system similar to the concession systems used in tropical forests. The Canadian constitution gives specific roles to the federal and provincial/territorial governments in the management of public forest lands. Under strict laws and regulations governing forest practices the state provides for the transfer of harvesting rights and forest management responsibilities to the private sector through agreements known as *"forest tenures"* (see Box 6).

4.1.5 Sub-national forests

Sub-national administrations may be administrative regions, autonomous regions, devolved administrations or federated. Forests owned by such bodies are public and can be subject to national regulation, regulations enacted by the sub-national administration or a mix of both. They can be managed directly by the owner e.g., directly by the sub-national administration, by forest companies owned by the administration (e.g., Bulgaria has six regional State Forest Companies) or management can be outsourced from national forest agencies or private companies. Even when the national public forest agency manages sub-national forest they may defer to the owner as in France where the Office National des Forêts can be requested to prepare management plans for approval by the Département. In some cases, devolution may create new forest owners as

Box 6. Case study: Forest tenures in Canada

Provincial and territorial governments grant private forest companies rights to harvest timber on public land and stipulate the responsibilities tied to those rights. These arrangements, also known as *tenures*, don't automatically give companies the authority to harvest timber. By law, governments must first approve forest management plans and authorize the proposed harvesting before any trees are felled.

The provinces and territories closely monitor forestry companies operating in publicly owned forests, through several means. Government agencies responsible for monitoring and enforcement:

- require all forest companies to report formally on their operations
- carry out audits to ensure the companies comply with laws and regulations
- carry out more detailed investigations if there is evidence that infractions have occurred
- issue warnings, fines and other penalties
- prosecute the most serious infractions through the court system

For example, if a forest company fails to comply with approved forest management plans or with the conditions of a harvesting permit, it may face any of several stiff penalties – from fines or the suspension of harvesting rights to seizure of timber or even imprisonment.

Forestry activities are also monitored to keep track of the royalties that companies must pay to governments for being allowed to harvest timber from public lands. Provinces and territories use many checks and controls to track timber removed from public lands.

in the United Kingdom where Natural Resources Wales was created as a government sponsored body to manage forests transferred to the ownership of the local government.

4.1.6 Local government forests

Only in Europe has the ownership of public forest at local level been reported. In most of these countries municipal forests are more similar to private forests than to national public forests in that the municipalities are usually free to operate autonomously, may be able to sell the land (even if nationally owned state land is inalienable as is the case in Germany, Koch & Maier 2015) and can keep the profits derived from timber sales (as in Greece). Indeed, in some countries (e.g., Slovakia, Slovenia, Spain and Austria) municipal forests are classified in national statistics as private forests while in Hungary they are considered to be a third category of forest ownership.

Local government bodies may also own the forest directly (the forest belongs to the institution) or serve as the legal entity holding the title of forest land on behalf of the community (as in Switzerland). Many municipalities are the inheritors of historic commons but there are also a number of ways they can acquire land in modern times. In Spain, following land abandonment in the mid-twentieth century, the Town Halls led a process of appropriation of communal lands (montes comunales) and they became municipality forests (montes de propios). In Germany, the municipality may purchase land from owners who are no longer interested in forestry, or who have inherited but are not interested; or intestate land especially when the parcels serve to fill out existing holdings or no private purchaser comes forward. Post-Soviet restitution to municipalities is also significant. Municipal ownership of land is particularly prevalent in Europe especially since restitution and can be a significant form of forest ownership (see Figure 24). For example; in Bulgaria 237 of the 266 municipalities own forest while in Wallonia (Belgium) 35.5 per cent of forest belongs to municipalities.

In some countries, municipal forests are managed by the state forest agency – either directly as in Poland and France. Nevertheless, some French municipalities are contesting this monopoly and wish to be able to engage their own private forestry experts. More generally, in Europe municipalities are usually free to manage their forests at their own discretion, and use a gamut of arrangements from employing their own staff, owning their own forest companies, outsourcing management to the state forest agency or private companies; sometimes all in one country. The many aspirations for municipal forest and their management are illustrated in a case study for Sweden (see Box 7).

The more intimate scale of local administrations means that municipal forests, more so than other public forests, can be managed with the involvement of the community in decision-making. This involvement may take the form of special forestry committees with community representatives, or the rights to manage may be devolved directly to the community or a community-owed enterprise, as is the case in Ukraine where the rights to municipal forests are exercised directly by territorial communities or through local self-governing bodies formed by territorial communities.

In countries without common forest there may be arrangements where communities can be granted rights to manage and use a portion of the national forest estate, as is the case in the United Kingdom where recent innovations in management agreements permit local communities to access state forest (Wong et al., 2015).

Box 7. Case study: Municipal forest in Sweden

Municipal forest lands can be found in most of Sweden's municipalities and their origins vary considerably. There are lands that originate from royal donations as well as donations from farmers as compensation for their elder-care or for poor relief. During the first part of the 20th century the number of holdings and the total area expanded considerably for a number of reasons:

i. a widespread concern about poor forest condition, particularly in southern Sweden;
ii. expectations of a positive impact on the municipal economy;
iii. as means of providing employment;
iv. securing land (including forest land) for future need of housing, infrastructure and recreational areas.

Nevertheless, around three-quarters of the total area, estimated to be about 321 000 ha, is treated as regular forest land, with the remaining quarter primarily managed for outdoor life, nature conservation or future building sites.

Although it could be expected that municipalities would have goals and management practices based on the wishes and needs of their citizens, expressed through a process of participatory planning, this rarely seems to be the case. Generally, there is little integration of citizens in overall municipal planning and even involvement of civil servants, and many municipal forests are more or less managed by external forest organizations (Lidestav, 1994). However, there are exceptions. Participatory planning tools have been tested in Sala and Säter municipalities (Lidestav 1994), and more recently in Linköping municipality, and in urban forest planning for Lycksele municipality (Nordström et al 2010; Nordström et al 2013).

4.1.7 Management of private forest land

We now turn to the management of privately-owned forest. As shown in Figure 29, around half the countries in the ECE region have a greater proportion of private forest than public, and this form of ownership is particularly prevalent in Western Europe, and in the United States of America.

Figure 31 illustrates the assignment of management decisions for the countries which provided data by private ownership categories. This indicates that management decision-making in private forest is more diverse than for public forest. Several countries (e.g., Canada, Sweden and Germany) reasoned that the owners of private forest are ultimately responsible for their property and reported all private forest as being managed by the *"Owners"*. Others, including the United States of America, do not collect data on private forest management planning and assigned all private forest to the *"Unknown"* category. As evident in Figure 32, overall there is an interesting difference between individual and family forests, which are generally reported as being managed by the owner, and forests belonging to businesses, which are reported as unknown. It is not possible to discern how far this is a consequence of a lack of data or assumptions concerning management of farm forests.

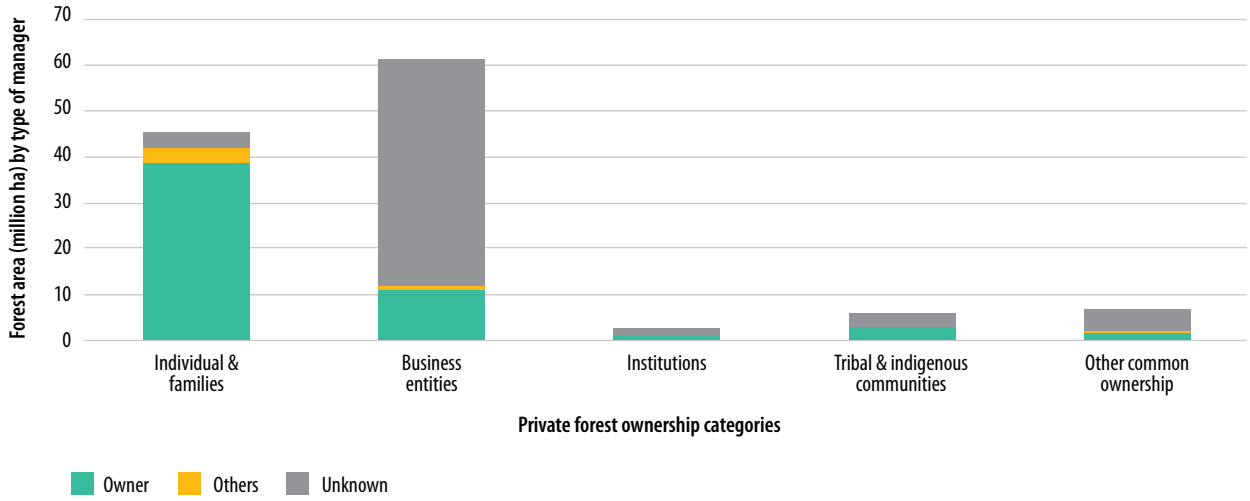
The management status of private forests is a major preoccupation of the forestry sector in those countries with significant areas in individual private ownership. These concerns focus on the fragmented nature of the holdings, the large numbers of owners, and their perceived disinterest in forest management and formal wood supply. This is addressed in several ways on a continuum from *laisse faire* to abrogation of owners' rights to manage by the state.

The freedom of forest owners to make their own decisions about forest management varies across the ECE region. Within Europe, the main differences between countries is the extent of regulation concerning the preparation and implementation of management plans. In countries where forest owners are largely free to do as they please in their forests, the state may provide advisory services (e.g., United States of America) and incentives in the form of grants for forest management planning (e.g., United Kingdom and Ireland). In other countries, governments require private owners to have management plans drawn up by professional foresters (e.g., Slovakia) or to engage a professional forest manager (e.g., Czech Republic). In France, the forest management plan is approved by a regional public office and steered by forest owners' representatives from the Centre Régional de la Propriété Forestière (CRPF). When a forest management plan is required there are usually area thresholds for these regulations; for example, in Switzerland, most of the cantons require owners with forests over 15-50 ha to develop a forest management plan though thresholds are more often smaller at 5 ha (Brukas and Sallnäs, 2012). The objectives and silvicultural systems of these plans may be at the discretion of the owner or constrained by law to favour timber management and mobilization (e.g., Romania). Then there are countries which oblige forest owners to join an owners' association (e.g., Austria). In other countries, forest management plans are mandatory or prepared on behalf of the owner by the state forest agencies.

Management of forest commons is a special case. These areas are often managed on behalf of a territorial community and involve representatives of the community in management planning and implementation. An example is described in the case study for Portugal (see Box 8).

FIGURE 31

Management decision making in private forest in 21 UNECE countries, 2015



Business entities which own forest may be financial corporations looking for a return on an investment in forestry, wood-using companies and other businesses. They may have in-house forestry expertise but will often contract management from specialist forest management enterprises. Although business entities apparently own large areas of forest land the management arrangements are generally little known or reported.

Institutions are non-profit organizations such as nature conservation NGOs and the church and represent a wide range of competencies for forest management. Some are likely to be highly skilled and innovative while others will outsource management.

4.1.7.1 Forest operations

According to the responses provided to the FACESMAP/UNECE/FAO Enquiry, small private forest owners generally undertake forest operations themselves while medium to large-private forest owners usually outsource operations to other companies. New forest owner types generally have limited forest skills and usually outsource operations to companies or become members of forest owners' associations. In Slovakia, for example, new forest owners who received their forests through restitution are reported to have no experience of private forest management. Investment companies such as Timber Investment Management Organizations (TIMOs) in the United States of America also outsource the work due to little expertise in forestry. In some Eastern European countries (e.g., the Czech Republic, Bulgaria and Slovakia) forest operations are mainly undertaken by the forest owners while in some Western European countries (e.g., Ireland, Norway, Belgium and Switzerland) work is mainly carried out by forest contractors. Forest owners may hire different types of contractors according to the type of operations required for which a company may need to be licensed as in Croatia (see Box 9) or may be encouraged to take out a long-term contract with a forest management company as in Lithuania.

Box 8. Case study: Management of communal forests in Portugal

Communal forests are an example of *"common property"*: the resource has physical and social bounds and it is managed according to formal and informal rules by a well-defined group of users who are all the members of the local community which owns the communal forest. To make decisions about the use of the commons (*"baldios"*), the members meet in assembly, called the Assembly of Commoners (*"Assembleia de Compartes"*). The decisions are taken by majority rule and are implemented by a Directive Council elected by the commoners. Forest management operations can be conducted directly by the Directive Council representing the commoners, or by the village council. The alternative regime, which is used much more frequently, is to delegate this responsibility to the Forest Services. In this case, the Forest Services can keep 40 per cent of the revenues of plantations they have planted and 20 per cent of existing forest revenues (Mendes et al., 2004).

Box 9. Case study: Emergence of private forest entrepreneurs in Croatia

Forestry Act (OG 140/05, 82/06, 129/08, 80/10, 124/10, 25/12, 68/12, 148/13, 94/14) prescribes that private forest owner can perform manual labour related to habitat preparation, reforestation, thinning, logging and other types of labour for which he/she is qualified. The types of activities for which private owners are not qualified must be performed by a licensed forestry entrepreneur. The process of licensing is prescribed by the Ordinance on issuing, renewal and revoking of licenses for operations in forestry, hunting and wood processing technology.

The process of licensing of private entrepreneurs in forestry of Croatia began by 1 October 2007. Up to 2015 356 companies of different kinds have been licensed, out of which 80.34 per cent are active and 19.66 per cent have had their license revoked due to non-compliance. Of the 286 active companies that have complete or partial licenses for at least one of the nine types of forestry operations, 229 of them (80.07 per cent of all active companies) hold licenses for harvesting and 135 licenses (47.20 per cent of active companies) have been issued for performing silvicultural operations. Companies registered as sole proprietorship are mostly holders of licenses for operations of direct forestry production (harvesting and silviculture), and the limited companies (Ltd) have licenses related to tree marking, urban forestry, management of private forest estates and for making forest and hunting management plans.

4.1.7.2 Management rights of indigenous and local communities

As shown in Section 3.1.7. the global agenda on forest governance is increasingly concerned with the allocation of management rights to local communities as a matter of social justice, community empowerment and economic development. The Rights and Resources Initiative (RRI) tracks forest tenure data for tropical countries to highlight the extent to which local communities have access to forests. There are few data for UNECE countries in the RRI dataset and this gives the mistaken impression that local control of forests is not an issue or does not occur in the UNECE. However, as our data reveals, within the UNECE there are forests which can be deemed to be *"designated for indigenous peoples and local communities"* by virtue of belonging to tribal & indigenous communities (e.g., in Canada, United States of America and Scandinavia) and also forest commons which are owned or managed by local communities as well as (at least in principle) much of the municipal forests.

A first estimate of land available to local communities through ownership, common property or by virtue of being owned by Local government comes to 42,853 thousand ha just less than 2 per cent of forest land in the ECE region. Compared to global figures, this is a relatively small proportion of forest but has management systems based on rich traditions and local adaptations and deserves greater inclusion in global discourse related to community use of forests.

4.1.7.3 Objectives of forest owners

A major challenge facing forest policy and forestry is how to adequately account for the wide range of preferences and motives articulated by private (and public) forest owners (Bengston et al., 2011). To design effective policy instruments that not only ensure the economic viability of forestry but also the provision of other social and environmental services, policymakers need to be better informed about forest owners management objectives.

The data provided to the FACESMAP/UNECE/FAO Enquiry for the objectives of management for private individual forest owners is very sparse and was only provided by five countries as shown in Figure 32. Even these data appear incomplete especially for French farm woodland and the agroforestry cork areas of Portugal. Nevertheless, these data do illustrate that owners have multiple objectives which are a mix of production, household economy and intangible benefits.

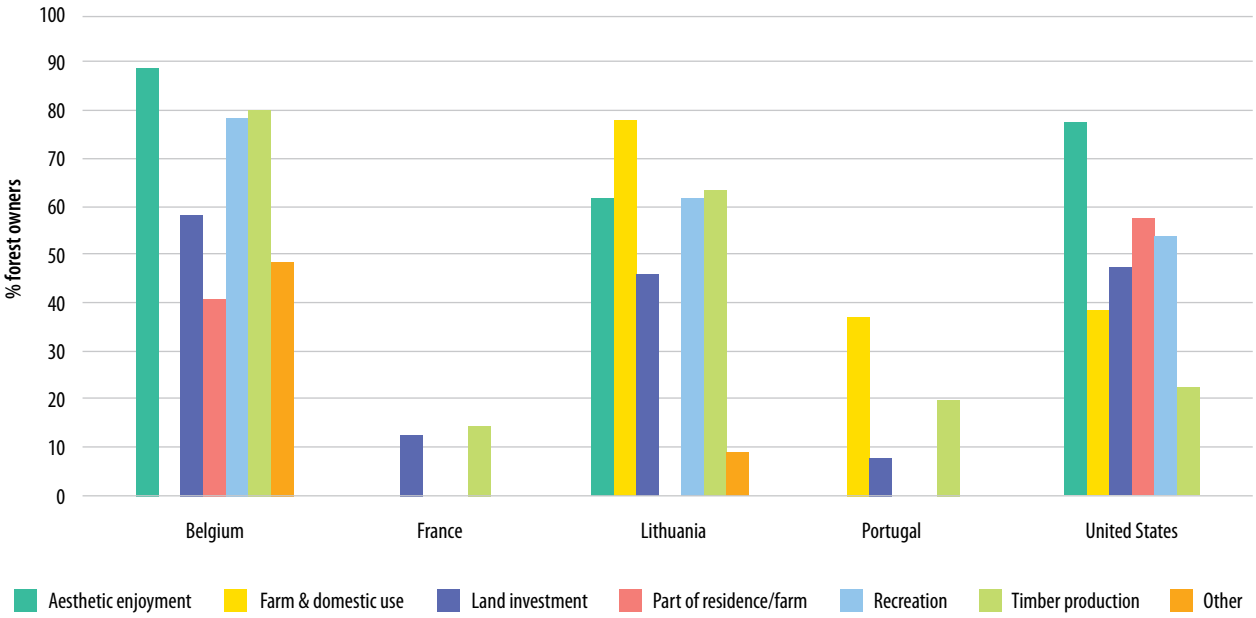
The management objectives of private owners may differ from those established in national policy. sometimes, the transfer of national objectives onto private owners is heavily regulated while in others it operates through advisory services and incentives. The choice of silvicultural prescriptions may also be restricted by regulation, usually intended to maximize timber production and mobilization. There is a countermovement to the standardization of forest management and some liberalisation of private forest management as is the case in Finland (see Box 10).

4.1.8 Availability of wood supply by ownership type

Forest management serves environmental, economic, social and cultural objectives (FAO 2016) and these place restrictions on the area of forest available for wood supply. Nevertheless, the discourse in forestry is still often dominated by wood production. This is partially a consequence of the significance of wood fibre as a resource for the bioeconomy, but also because revenues derived from wood sales is still the most available source of funding forest management. The area available for wood supply is therefore a useful indicator of the extent to which forest management can include wood production and financed from this type of activity. We therefore examine how this function and related source of income is distributed among ownership types.

FIGURE 32

Objectives of individual forest owners, 2015



Box 10. Case study: Liberalisation of private forest management in Finland

Recent changes in Finnish forest legislation provide new approaches in addition to the traditional even-aged forest management, which was imposed by regulation on private forest owners. According to Kumela and Hänninen (2011), one sixth of the forest owners view current forest management activities, e.g., clear-cuts and use of heavy logging machines, as unsatisfactory. The reform of forest law in 2011 aimed to increase forest owners' freedom of choice and to widen forest management possibilities. Furthermore, because forest ownership is a business activity, it was seen as desirable to decrease control in order to promote innovation. New approaches might also satisfy the objectives of the individuals or organizations that previously have not owned forestland or traditional forest owners who have changed motives or introduced new goals or management practices for their forests. Forest owners are clearly and broadly interested in the diversification of forest management and in testing alternative forest management practices. Forest owners often indicated a preference for uneven-sized forest management as the most pleasing alternative when aiming at good forest management and preserving environmental values (Asikainen 2013).

In the FACESMAP/UNECE/FAO Enquiry each country was asked to provide total forest area and that available for wood supply by ownership category for 1990, 2010 and 2015. The returns are relatively static over this period with only a few changes to minor categories due to restitution or missing data. We therefore examined just the data for 2015. The breakdown of forest area available for wood supply by ownership categories is incomplete and was only provided in sufficient detail for a few countries as shown in Figure 33.

Availability for wood supply does not mean the forest is actively logged but that there are no constraints[23] or restrictions on cutting trees. Overall, around 80 per cent of all forest could be managed for wood supply with some interesting variations by ownership and country. These data indicate who is best placed to manage for wood production and on whom falls the burden of management of 'unproductive' forest. There are some country-level variations related to geography; Georgia, Cyprus and Norway have relatively low availability of forest for wood supply management. There are also interesting variations between ownerships within a country. For example, in the United States of America the lowest availability for wood supply is in public forest held at national level and in Tribal

23 Forest where any legal, economic, environmental or other specific restrictions do not have a significant impact on the supply of wood.

FIGURE 33

Proportion of forest available for wood supply in different ownership categories

and indigenous community and Other common forests. The Finnmark Estate (Tribal and indigenous community) stands out in Norway as having the greatest responsibility for management of forest with low economic potential. It appears that the forest more suited to management for wood production is owned by local people in the form of Local government and Individuals and families.

4.1.9 Obstacles to sustainable forest management in the ECE region

According to the UN (2015), forests in the ECE region face several challenges whose intensity may be increasing due to climate change. These include forest fires, insect damage and wind throw. Živojinović et al. (2015) compiled a comprehensive list of obstacles for innovative forest management in the 28 countries covered by COST Action 1201 – FACESMAP. The most common obstacles include:

- Lack of incentives and/or financial support for the implementation of innovative practices (reported by 11 countries);
- Fragmentation of forest land (reported by 10 countries);
- Insufficient profit from forest management (reported by 9 countries);
- Restrictive forest policy framework (reported by 9 countries).

In addition to fragmentation of forest land, there are several country-specific obstacles that have been previously reported as key challenges to the implementation of sustainable forest management (Töpfer et al., 2000, SFC, 2015). These obstacles have also been described by several countries in their response to the FACESMAP/UNECE/FAO Enquiry:

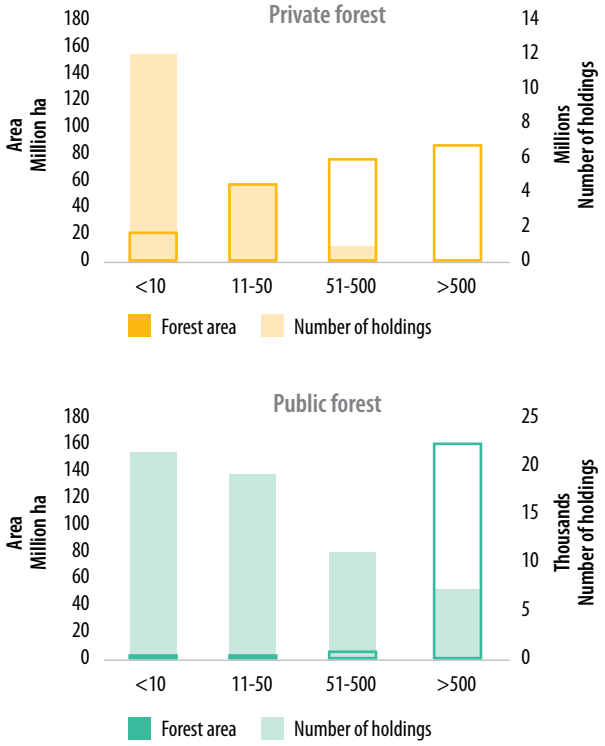
1. Illegal logging (Georgia, Cyprus, Slovenia, Greece, Romania);
2. Fragmentation of forests (Bulgaria, Croatia, Serbia, Slovenia, Cyprus, Portugal, Poland);
3. Limited or absent cadastral survey or land registry of forest holdings (Portugal, United Kingdom);
4. Forest fires (Portugal).

4.1.9.1 Managing fragmented forests

Land fragmentation, resulting in small scale forestry, can lead to negative externalities, such as low economic efficiency in forest management, disincentives for investment in forest practices, and low incentives for the provision of ecosystem services, including wildlife, water, recreation and soil security (Hatcher et al., 2013), all of which can hinder sustainable forest management.

FIGURE 34

Distribution of forest area and number of owners by size of holding for 24 UNECE countries

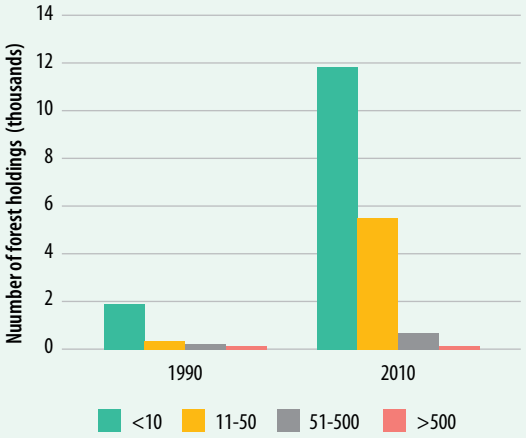


Twenty-three countries provided data for the number and area of ownerships according to size of the holding for 1990, 2010 and 2015, but most of this was too incomplete to draw any conclusions regarding changes in ownership. Figure 34 shows forest ownership area and the numbers of owners by the area of forest owned. The lion's share of UNECE forest is held by a small number of owners and that most of these are public owners. Private owners tend to have smaller areas of forest but there are a great many of them. Thus, the outlook of public and private owners are quite different. Public owners manage large tracts of forest using a standardized approach to management while private owners are, in comparison, chaotic with varying objectives, approaches and commitment to forest management. Public forest agencies often hold both management responsibility for the public forests and regulation or oversight of private forests.

Fragmentation is the process of division of large forest holdings with a single owner into smaller forest holdings with multiple owners. This process can result from various institutional, political and sociological factors such as urbanization, property restitution, transaction costs in land markets or by the death of the forest owners and subsequent distribution of land for inheritance purposes.

Box 11. Case study – New forest owners in Ireland

Owing to the low forest cover, in the late 1980's Ireland embarked on a programme of grant-aided tree planting, targeted at farmers. This created a large number of new very small farm woodlands. Forest operations within 1-4 years of planting are carried out by private professionals/consultants. Grants are paid in two tranches: 75 per cent is paid after planting and the remaining 25 per cent after year 4, at which point the farmer takes over management.



It was found that few of the forests were being thinned as the quantities were small and the owners inexperienced in harvesting, processing and selling small roundwood. The response to this from Teagasc (Irish Agriculture and Food Development Authority) was to initiate the establishment of Forest Owner Groups in 2007. The formation of the groups, training and mentoring is provided by Teagasc while the groups themselves co-operate to organize production and sale of wood from members' forests.

In Portugal, an additional problem is the lack of comprehensive cadastral survey of these forest properties. For a significant part of the national territory there is no published information about who owns the land, and as a result it is almost impossible to endorse laws and regulations related to the implementation sustainable forest management. In addition, many forest holdings are abandoned due to intense rural outmigration during the 1960s, 1970s and 1980s. The policy makers acknowledge that the highly fragmented forest area, in combination with a strong rural depopulation and land abandonment, has been an enormous barrier to the sustainable growth of rural areas.

A common approach to effective management of fragmented forest holdings is to implement management across multiple ownerships through regulation or through membership of forest associations. This applies even in the case of the creation of new, numerous, small forest plantings. An example is illustrated in the case study of Ireland (see Box 11).

4.1.10 Governance mechanisms for implementation of sustainable forest management in the ECE region

Given the diversity of ownership, and increasing fragmentation and urbanization, there is a need to consider questions of scale and access to technical knowledge to ensure that forests are managed according to the standards of sustainable forest management. Forest management models that aim at ensuring forest sustainability include joint management and cooperation, and forest certification. New approaches reported, include payments for environmental services, long-term management agreements and implementation of advisory services.

One way of addressing management challenges of fragmentation, is through joint management, such as forest owners' associations, cooperatives (discussed in detail in Section 5.4.). The objective of joint management is to organize forest owners, so the problems caused by fragmentation of forest properties are overcome. In some countries (several Balkan countries, Romania, Bulgaria, Portugal, several Baltic countries) joint management is a recent model to manage forests, whereas in other countries (Austria, Norway) it was introduced in the beginning of the 20th century (Mendes and Feliciano, 2005). In Portugal, Forest Intervention Zones (ZIFs in the Portuguese acronym) have been promoted in 2005 with the objective of coordinating private forest owners' responses to the increasing risk of forest fire and towards sustainable forest management , through forest management plans approved by the general assembly of the ZIF (Valente et al., 2013). Currently, these zones cover approximately 8 per cent of the Portugal mainland. In Bulgaria, a memorandum of understanding between the Ministry of Agriculture and Food and the Association of Municipal Forests ensures that municipalities support the creation of forest management structures and forest owners' associations, and that private forest owners are informed and trained on sustainable forest management practices.

Forest certification is recognized as one of the most important initiatives of the last two decades to promote better forest management. This mechanism is well established across the ECE region with several countries (e.g., Norway, Sweden, Belgium, Portugal, Switzerland, Romania and Croatia) active in implementing PEFC (Programme for the Endorsement of Forest Certification) and FSC (Forest Stewardship Council)

Box 12. Case study: PES in France

Examples of municipalities who manage watershed forests for PES.

Example 1: The city of Masevaux (Haut-Rhin) owns forest lands supplying catchments and manages the water service. To protect the sources captured in mountain, the city has an adapted forest management through forestry actions dedicated to drinking water: removing dead wood in the upstream catchments, cable skidding, *"kits loggers"* against accidental pollution, etc. (Fiquepron et Picard, 2011).

Example 2: Numerous local authorities have invested in afforestation of lands near drinking water catchments. For example, since 2000 the city of Rennes afforested more than 70 ha of land around one of its water catchment areas. This afforestation has contributed to the decline in nitrates levels of waters and avoided an expensive change of resource (Formery et Persuy, 2010).

Other experiences are related to biodiversity. For example, the Conseil général de l'Aude (a county council in the Southern France) has established a policy in favour of sensitive natural areas to preserve and to enhance biodiversity and finances several actions such as naturalist inventories. The forestry group of Sambres (Aude) owns peat bogs and 700 ha of forests and benefits of this policy in offering guarantees of sustainable management through its forest management plan. This is an example of an owner of an endangered peat land who receives a contribution for its maintenance (CRPF Languedoc Roussillon, 2013).

certification schemes as a way of ensuring sustainable forest management.

Other approaches to ensure sustainable forest management have emerged. These approaches were reported for France, Lithuania and Croatia. Payments for Environmental Services (PES) is an economic tool related to multifunctional forest management and the provision, management and maintenance of ecosystem services by forest owners. This approach has led to the emergence of a new forest owner type in France, namely the *"environmental services provider"* who is paid to provide environmental services (see case study). The implementation of PES depends on several factors such as the nature of the ecosystem service provided, the relationship between forest practices and the ecosystem service, or the scale of the provision (see Box 12).

Long-term forest management agreements are used in Lithuania to ensure sustainable forest management in private forest holdings. These long-term agreements are made between private forest owners, especially new forest owners, and companies which are thereby enabled to implement sustainable forest management instead of the owner. The companies have responsibility for managing forest holdings in a multifunctional, economic and efficient way, and they undertake the main forest services such as reforestation, forest felling, and forest maintenance and forest protection.

Advisory Services were established in Croatia in 2014 to support sustainable forest management in private forests. The Advisory Services encourage the participation of private forest owners in forest fire protection, collect and compile data on forest fires, advise on the purchase of new seedlings and reforestations, prepare documents for forest roads, forest fire breaks and other infrastructure building, and organize and prepare of the procurement of forest reproductive material for biological regeneration of private forests.

Forest management systems, including sustainable forest management are mainly supported by the forest strategies, laws and acts established by countries in the ECE region. In EU countries, the Rural Development Programmes are the main policy supporting forest management systems. In Croatia and the Czech Republic advisory services are considered an important tool to assist sustainable forest management with the Czech Republic privileging the dissemination of information via several information channels.

An important tool that supports forest management is the Forest Management Plan. This is usually compulsory for medium and larger scale forests in most UNECE countries while it is only voluntary for small scale and especially private forests. In order to support the implementation of sustainable forest management, most countries have chosen to undertake a *"stick approach"*, e.g., the implementation of regulations and laws, while others have chosen *"carrot approach"* e.g., softer mechanisms such as advisory services and demonstration forests.

4.1.11 Conclusions

This section presents forest management in the ECE region and highlights the approaches used in a range of countries to implement operational forest management. Important insights come from comparing public and private ownership, and the subcategories within that division. The high proportion of local government ownership in some countries can blur the boundary between private and public, and lead to management processes which are more closely aligned to the needs of the local population. Several countries highlighted fragmentation of forest as a management concern, and the data shows that there is a predominance of many very small properties in the private

sector, whereas holdings are fewer and generally much larger in the public sector.

Insufficient data was provided to indicate an increasing trend of declining parcel size, although this was highlighted in narratives. The framing of parcel size as 'problematic' depends on the perspective of the stakeholder, but is likely to underlie economic inefficiency in forest management (higher harvesting and transaction costs), disincentives for investment in forest practices, and greater management problems related to the provision of ecosystem services, including wildlife, water, recreational opportunities and soil security. Various approaches are taken to address these disadvantages, including joint management which maybe voluntary, imposed by regulation or incentives and often takes the form of private forest associations, forest certification initiatives and advisory services.

The survey explored the distinction between ownership and management. State agencies generally manage public forests directly but also (and increasingly) outsource some work to private companies. Private forest owners use a range of approaches to management planning and operations, with one important distinction being the extent to which the owner undertakes work in the forest themselves or devolves this to contractors, advisors or forest owners' associations.

While a large body of academic research has explored the management objectives of private forest owners, little of this compares across multiple countries. This survey attempted to do so, although national experts appear not to have this information readily to hand. Forest owners usually have management objectives other than wood production.

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4.2 Forest ownership and the provision of wood and other forest ecosystem services

4.2.1 Introduction

Ecosystem goods and services are commonly used to conceptualize the diverse outputs and values provided by forests. What characterizes different types of ecosystem goods and services are however not always a clear-cut issue. For instance, the Millennium Ecosystem Assessment, classify ecosystem goods and services into four main types, namely, **provisioning**, **regulating**, **cultural** and **supporting** services as direct and indirect contributions from ecosystems (Alcamo et al., 2005), while similarly, the Economics of Ecosystems and Biodiversity (TEEB) distinguish between **provisioning**, **regulating**, **habitat** and **cultural** services (TEEB, 2008, 2010). Additional distinctions are also provided through the European Commission initiative on Mapping and Assessment of Ecosystems and their Services (MAES) and the Common International Classification of Ecosystem Services (CICES), which are rather tailored towards accounting (European Commission, 2013, 2014, FOREST EUROPE, 2014).[24] For the purpose of having a common language for this section, the Millennium Ecosystem Assessment classification will be used as it provides globally recognised categories (see Box 13).

In addition to the broader categories coming from the Millennium Ecosystem Assessment it is further relevant to characterize what is meant by Forest Ecosystem Services (FES) as well as wood and Non-Wood Forest Products (NWFP):

4.2.1.1 Forest Ecosystem Services (FES)

Ecosystem goods and services is in this instance synonymous with ecosystem services. Forest Ecosystem Services (FES) are basically limited to those *"goods and services"* provided by *"forest ecosystems"*. It should nevertheless be recognized that FES classifications also vary across classification schemes. For instance, in a recent review, five FES classifications schemes were considered, covering the Millennium Ecosystem Assessment, MAES, CICES, FORVALUE and TEEB (FOREST EUROPE, 2014). Similarities between the schemes include wood products, which are usually included in a category that facilitates accounting for market products, and non-market products, which are often classified as regulating services. Cultural services similarly include those services related to recreational, cultural and educational aspects provided by forest ecosystems.

Box 13. Categories from the Millennium Ecosystem Assessment (Alcamo et al., 2005)

- **Provisioning services**: Products obtained from ecosystems (e.g., food, fresh water, fuelwood, fibre, biochemicals and genetic resources).
- **Regulating services**: Benefits derived from the regulation of ecosystem processes (e.g., climate, disease and water regulation as well as carbon sequestration, water purification, erosion prevention, flood mitigation and pollination).
- **Cultural services**: Nonmaterial benefits derived from ecosystems (e.g., spiritual and religious, recreation and ecotourism, aesthetics, inspirational, educational, sense of place, cultural heritage).
- **Supporting services**: Services necessary for the production of all other ecosystem services (e.g., soil formation, species habitats, nutrient cycling and primary production).

4.2.1.2 Wood and Non-Wood Forest Products (NWFP)

Wood and Non-Wood Forest Products (NWFPs) are typically included amongst provisioning services. The classification scope for wood and wood-based products typically cover the initial felling of the tree to the manufacture of primary and secondary products. For instance, timber is used as a primary product in construction, the paper industry relies on secondary products (e.g., wood pulp), and the energy sector relies on biomass for energy production (e.g., pellets). Wood and wood-based products are also increasingly used for innovative products outside the traditional forest-based sector (e.g., biochemicals and textiles). The Food and Agriculture Organization of the United Nations (FAO) defines NWFP as *"goods of biological origin other than wood derived from forests, other wooded land and trees outside forests"* (FAO, 1999). Different terms, such as non-timber forest products (NTFP), are also in common use. NWFP cover both animal and plant products (other than wood) derived from forest ecosystems and/or forest tree species.

4.2.1.3 Provision of Forest Ecosystem Services (FES) and Forest Ownership

Forest Ecosystem Services (FES) are to some extent generated simply through the existence of forests, irrespective of whether the forest land is managed or not. However, the degree to which the respective FES are provided is significantly interlinked with forest ownership. It is ultimately the forest owner (public or private) who

24 See https://cices.eu/.

determines how the forest land is managed and utilized under different political, legislative and socio-economic conditions. This, in turn, effectively means that the forest owner's attitude, behaviour, priorities and intentions play a significant role in determining forest use and FES provision. For instance, new and/or urban forest owners, who may not depend economically on their forest land, would not necessarily prioritize timber production, while traditional forest owners may. This means that, if the physical and biological attributes and/or features which frame FES provision are set aside, forest use depends on the forest owner's perspectives, obligations and relationship with the forest land; forest ownership is therefore an important factor affecting the provision of FES (Irvine et al., 2016, Matilainen et al., 2019).

Forest ownership structures gain even more relevance in the context of social and demographic changes, including those that have emerged after restitution in Central and Eastern European countries (see Section 3.2.4.2.). Even more so when also considering NWFP: the provision of non-market products and services can be inextricably connected with different types of forest owners (Vedel et al., 2015). These generalizations do not take into account legislative variations across the ECE region, which further affect the provision of such FES (Nichiforel et al., 2018).

Forest ownership structures consequently play an important role in the actual delivery of FES, so information about the forest owner and their forest land (e.g., forest management attitudes) can help to better understand the impact of different types of forest ownership types on forest use. For instance, the transfer of forest ownership through the restitution process in certain UNECE member States has not only changed national patterns of ownership but also affected how forests are being managed and utilized (Weiss et al., 2018). Improving our knowledge about the relation between FES and forest ownership, public and private, can thus help to better understand the implications of these types of changes.

Equally important for the provision of FES is the role of the State in defining how forests can be managed. Legal frameworks, ranging from implementing regulations, which for example set out property rights and tenure, and institutional regulations, which characterize the authorities/institutions that manage public and private forests, are critical in defining forest ownership and use. The State and associated legal frameworks establish a framework for the operation of FES and represent an important part of understanding the relationship between forest ownership structures and FES provision (Aggestam, 2015, Aggestam and Pülzl, 2018).

Having these aspects in mind, this section analyzes the relationship between FES provision and forest ownership. Owing to a lack of quantitative data regarding the relationship between FES, NWFP and forest ownership structures, the section principally focuses on the analysis of forest available for wood supply, forest ownership and forest production (e.g., net increments and fellings) in relation to ownership.

4.2.2 Methods and Data

The FACESMAP/UNECE/FAO Enquiry is the principal source of data for the analysis of forest ownership structures and FES provision. The Enquiry provides quantitative and qualitative data on 32 UNECE member States that are used for this section. Complementary qualitative data was taken from the FACESMAP Country Reports (Živojinović et al., 2015). Data availability is however not homogeneous as figures as missing for many countries.

It should moreover be noted that this section initially aimed to consider how forest ownership relates to FES provision. The FACESMAP/UNECE/FAO Enquiry asked countries about wood removals, growing stock, FES and NWFPs. However national experts provided data which only allows for a comparison of wood removal and growing stocks. There is insufficient data available to compare forest ownership in relation to FES and NWFPs across the ECE region. Some quantitative data on the production of FES and NWFPs are provided based on country reports in the Global Forest Resources Assessment (FAO, 2015a, 2015b).

This means two things. First, while quantitative data is available on wood removal and growing stock, information on FES and NWFPs is limited to qualitative information, principally taken from the FACESMAP Country Reports and the Global Forest Resources Assessment. Second, as a general message, there is a need for comprehensive, high-quality and reliable quantitative data on FES and NWFPs in relation to forest ownership types, related duties and preferences.

4.2.3 Forest available for wood supply, forest ownership and the production of wood

4.2.3.1 Forest available for wood supply

Of the UNECE countries that reported in the FACESMAP/UNECE/FAO Enquiry, the total forest area in the ECE region amounted to 1,577 million ha while the total area of forest available for wood supply amounted to 1,107 million ha in 2015. This implies that approximately 70 per cent of the total forest area is available for wood supply. This does however vary between countries (see Figure 35). Moreover, where forest ownership is also reported, approximately 765 million ha (81.5 per cent) is publicly owned, 209 million ha (18.3 per cent) is privately-owned, and 1.61 million ha (or 0.2 per cent) is unknown (see Figure 36).

FIGURE 35

Percentage of total forest area available for wood supply

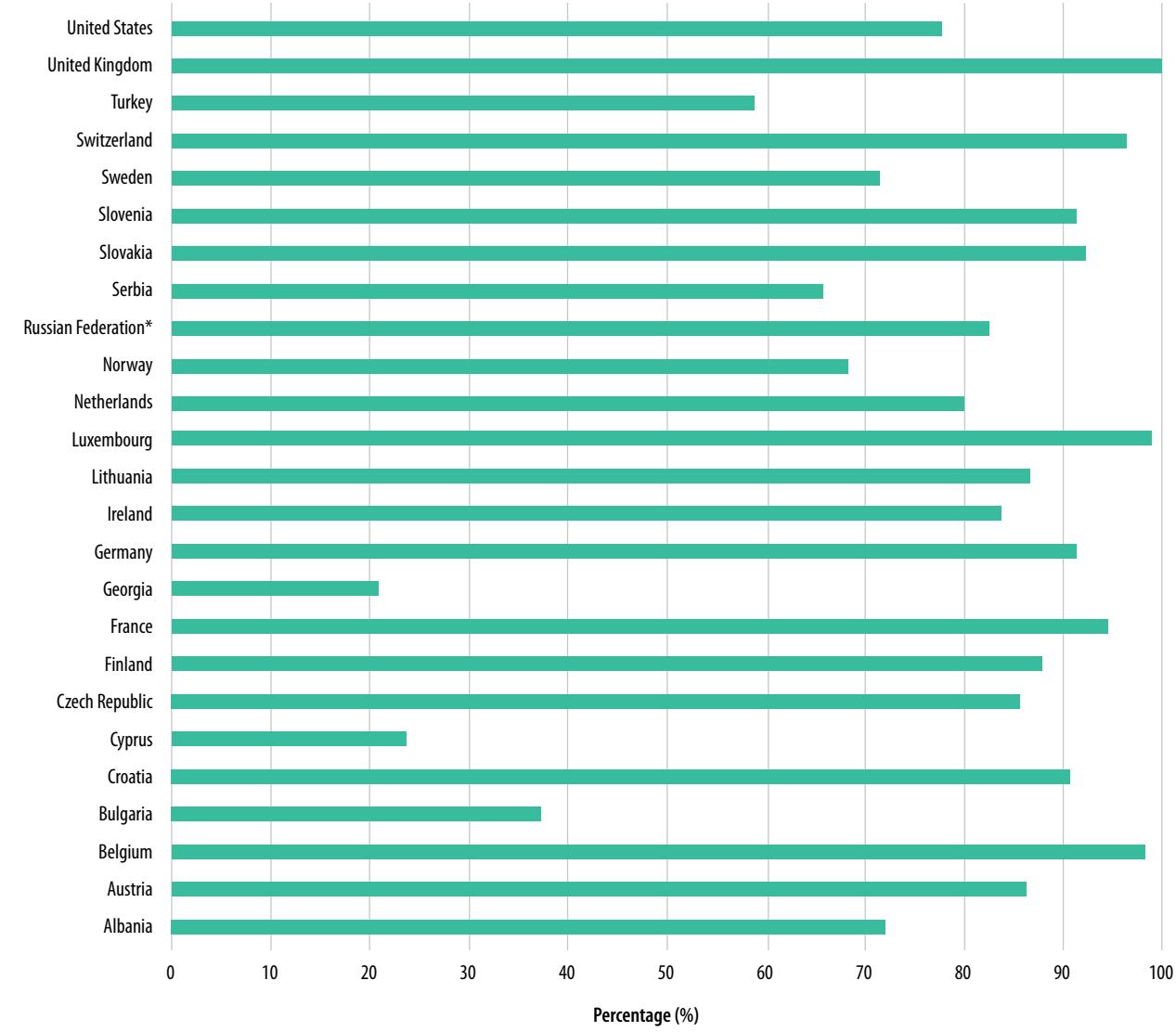


FIGURE 36

Total area of forest available for wood supply, by forest ownership category

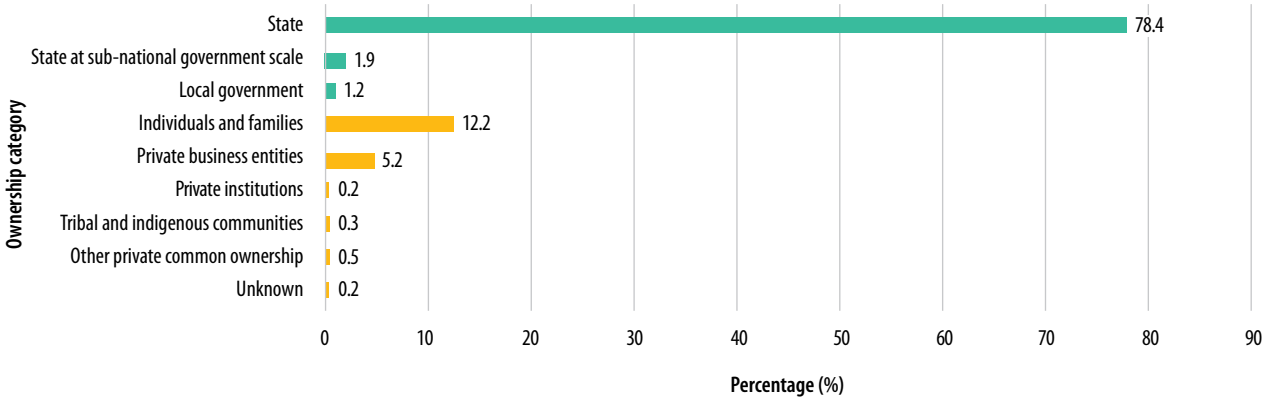
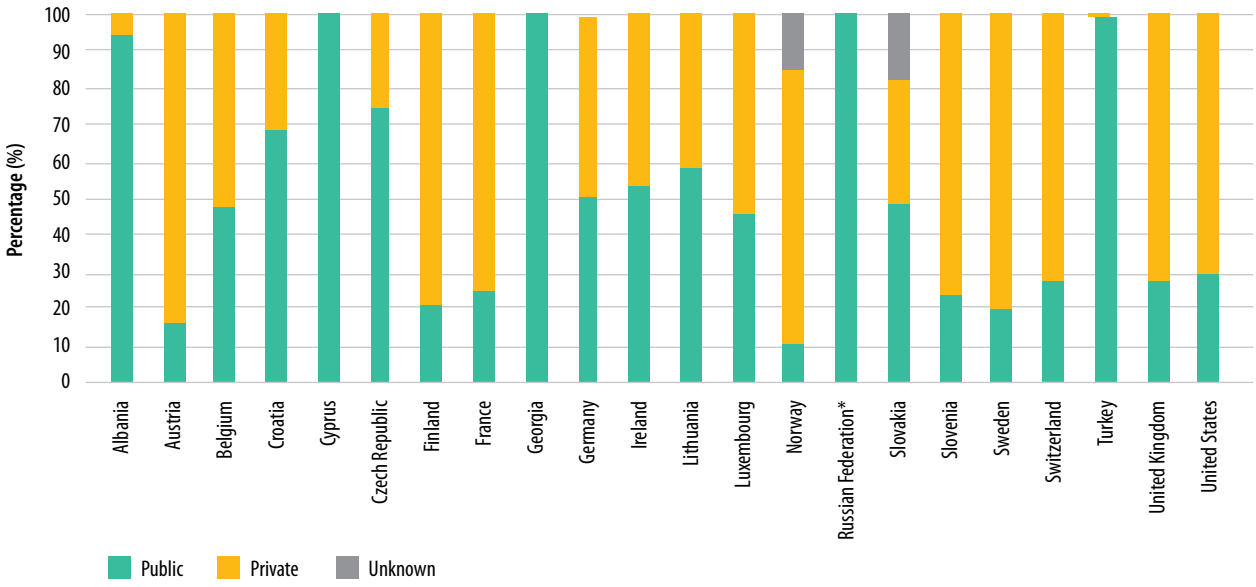


FIGURE 37

Area of forest available for wood supply, by forest ownership category and country



Furthermore, the distribution of forest available for wood supply varies significantly according to ownership categories across the ECE region. For instance, the Russian Federation, Cyprus and Turkey, where all forests are publicly owned, account for 69.4 per cent of the total area reported on. This affects aggregate results on felling rates related to forest ownership, as countries vary significantly across the ECE region (see Figure 37).

During the 1990 to 2015 period, trends indicate a reduction in the forest area available for wood supply from public forest owners, and an increase in the forest area available for wood supply from private forest owners. This trend is an average across the ECE region but does not apply to all countries individually. Forest area available for wood supply has increased, over time, for both public and private forest owners in some countries (e.g., the Czech Republic, France, Germany, Norway, Slovakia and Sweden). However, taken together, these variations emphasize that important differences exist between countries in terms of wood supply in the context of varied forest ownership structures. They suggest a need for tailored strategies to incentivize the production of wood and/or NWFP across the region. For instance, price elasticity is often linked to forest ownership categories, with supply from public forests often less price elastic (Favada et al., 2009, Koch et al., 2013).

This means in turn that the demand and supply vary significantly between forest owner categories and countries. It also means that forest ownership categories have a central role to play when we consider the potential for providing different types of FES.

Provisioning services may furthermore be more prevalent in private forests while regulating, cultural and support services may be more common in public forest. However, if most of the forest land is under public ownership, it would be safe to assume that public forests also provide provisioning services. This alludes to the point that the balance between private versus public forests in a country has an impact on the types of FES being provided, not only the ownership structures themselves. These arguments can however not be substantiated with the data for this report.

4.2.3.2 Growing stock, annual fellings and wood removal

The total volume of growing stock is another factor that varies significantly across private and public ownership. Figure 38 illustrates some of the variations that were found across the ECE region. It can be noted that large shares of the growing stock in countries like the United States of America, France, Sweden, Finland, Austria and Norway are on private forest land, whereas countries like Canada, the Russian Federation, Turkey, the Czech Republic, Bulgaria and Slovakia have a high proportion of the growing stock on public forest land. It should be noted that the Russian Federation, the United States of America and Canada account for 88.7 per cent of the total growing stock; they have however been excluded from Figure 38 to make it readable.

FIGURE 38

Growing stock of forest and other wooded land by ownership categories (million m³) in 2015

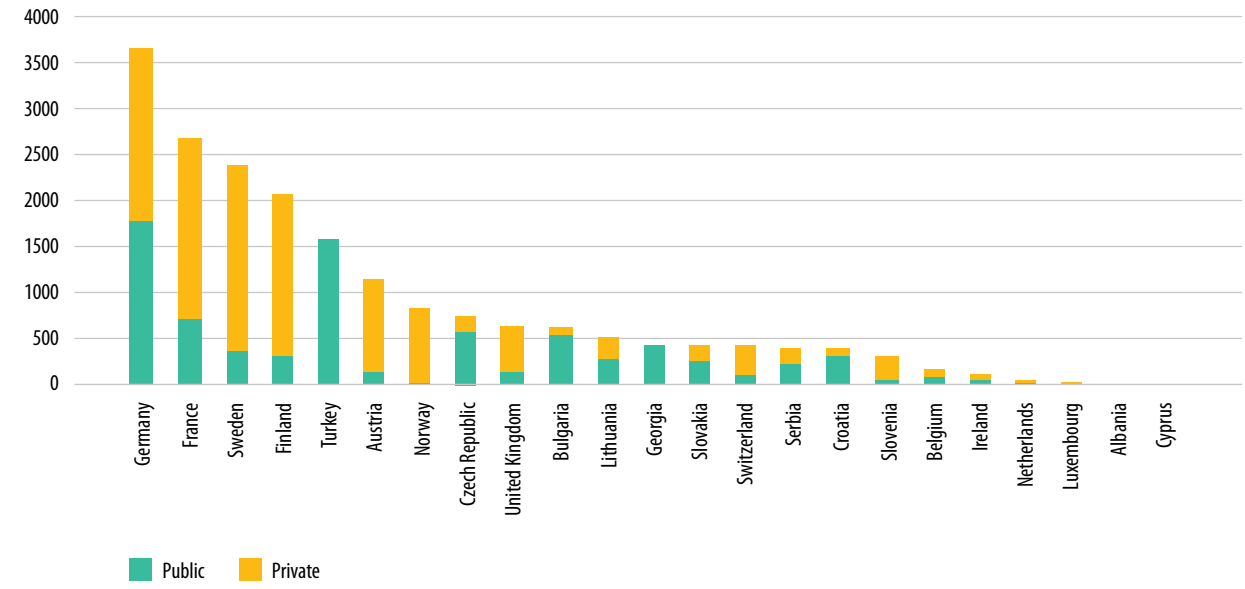


FIGURE 39

Annual fellings on forest and other wooded land by ownership categories (1000 m³ over bark) in 2015

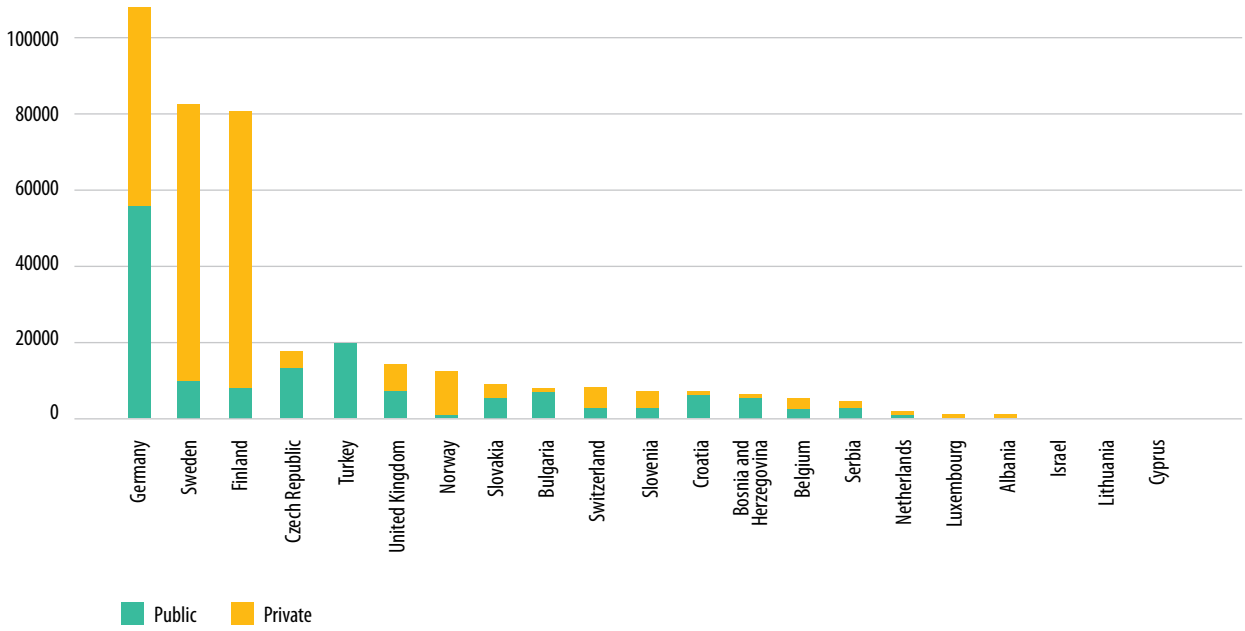
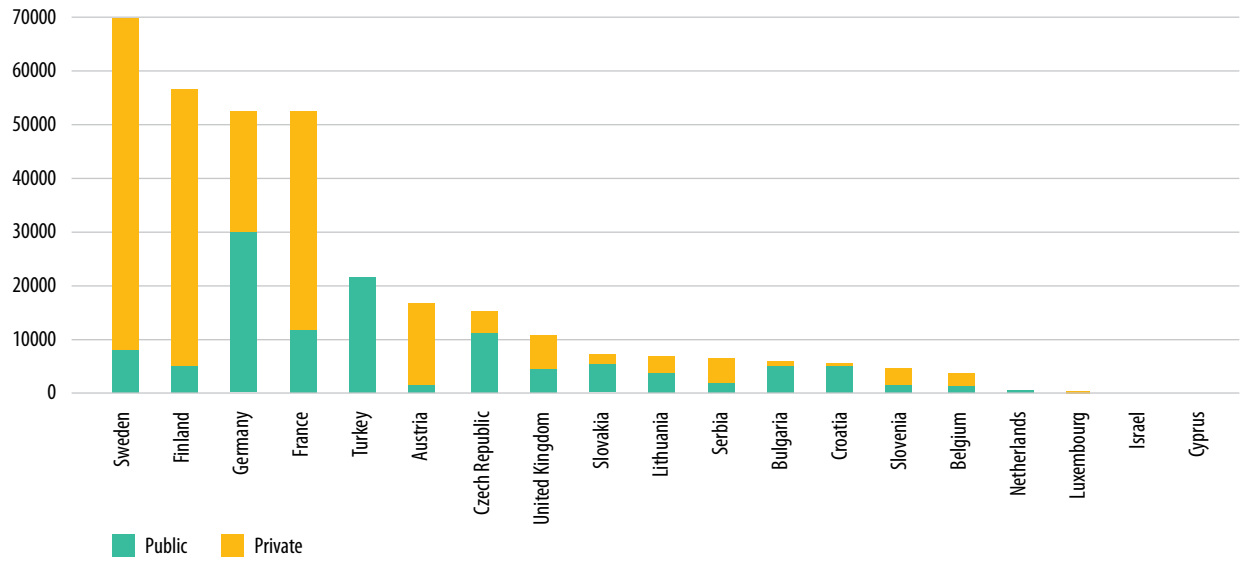


FIGURE 40

Total wood removals by ownership categories (1000 m³ under bark) in 2015



Total annual fellings, in terms of private and public ownership, demonstrate a pattern similar to the distribution of the growing stock (see Figure 39). The total annual fellings of forest and other wooded land is principally from private forest land (63 per cent), if the Russian Federation is not included. This can be clearly seen from the figure where private forest owners in Sweden account for 71.2 million m³, Finland 71.8 million m³, and Germany 51.3 million m³ out of a total of 375 million m³ in 2015. Also in this case the Russian Federation and the United States of America have been excluded from the figure.

In the context of wood supply, similar patterns prevail across forest ownership categories. Figure 40 demonstrates that total wood removals by private forest owners in Sweden, Finland, Germany and France account for 52.7 per cent. All in all, private forest owners account for approximately 65.4 per cent. However, when the Russian Federation and Canada are factored in, 64.2 per cent of the total wood removals come from public forest owners.

4.2.4 Forest utilization and ownership

Forest utilization (expressed as felling as a proportion of net annual increment) is another important factor to consider. Changes in felling rates reflect changing forest management practice, which in turn affect prospects for the provision of FES. Net annual increment depends mainly on a variety of factors, such as climate, forest type, biodiversity, age structure, with forest area extension being one of the most important.

Results from the FACESMAP/UNECE/FAO Enquiry demonstrate that most countries report felling rates between 50 and 100 per cent (for both private and public forest owners), with the exception being Albania (see Figure 41 and Figure 42). The figures provide an overview of the variations across countries. These differences represent varying climatic conditions and tree species composition, which under each type of ownership can be observed in the varying net increment and felling rates.

The FACESMAP/UNECE/FAO Enquiry reveals significant variations in the utilization rate of the net annual increment depending on whether the forest land is privately or publicly owned. In this case, it can for example be noted that Austrian and Slovenian public forests show the highest felling rates, while, in the case of private forest owners, other countries, such as Sweden and Belgium, present high felling rates. In general, this indicator is substantially higher amongst private forest owners (68.9 per cent) compared with publicly owned forests (29.9 per cent). However, if the Russian Federation is excluded, the felling rates in publicly owned forests increase substantially (61.2 per cent). The data also reveal differences between countries, in the way that felling rates have changed over time (see Figure 41 and Figure 42). For instance, for the 1990 to 2015 period, there are no significant changes in the Nordic region (e.g., Norway, Finland and Sweden) and in Luxembourg. However, amongst Central and Western European countries, changes in felling rates across private and public ownership can be seen (e.g., Austria and the United Kingdom). For Eastern European countries there are no specific trends, excluding

cases such as Albania which experienced sharp changes during the 1990 to 2015 period.

4.2.4.1 Sub-regional differences in utilization rates

The trend from the 1990 to 2015 period indicates that there has been a general increase in felling rates over time, in particular, amongst private forest owners, despite some variations across countries (see Figure 43). Nevertheless, there appear to be no regional patterns in terms of forest felling trends by forest ownership categories. It rather appears as if nationally specific conditions (e.g., restitution processes and the importance of the forest-based sector) influence changes in forest utilization. For instance, according to the data on growth rates from the FACESMAP/UNECE/FAO Enquiry, there are no significant changes in the Nordic region (Norway, Finland and Sweden) and in Luxembourg during the 1990 to 2015 period. Amongst Central Western European countries, the highest degree of change was registered by the United Kingdom, where net increment grew by 29.4 per cent in public forests and by 14.6 per cent in private forests in the 1990 to 2010 period. This was followed by a second period of rapid growth (12.3 per cent) in the 2010-2015 period. These examples serve to highlight that there are no specific regional patterns but rather country-specific variations, due to specific conditions. In the United Kingdom, the explanation may be found in reforestation efforts carried out in the mid-1990s, which increased forest cover from 5 to 12 per cent. For Eastern European countries there is no region-wide trend either, even though there are extreme cases, such as Albania, which experienced sharp changes as well as a reverse of the trend during the same period.

Felling rates (whether viewed as a percentage of the net increment or in absolute terms) have been increasing across the ECE region over the 1990 to 2015 period, especially from privately-owned forests (see Figure 43). Total annual fellings increased by 7.5 percent during the 2010 to 2015 period. Privately-owned forests increased their annual fellings by 8.4 per cent and publicly-owned forests reduced theirs by 4.3 per cent during the same period. Publicly-owned forests do however show a slightly more mixed picture as many public forests appear to be harvesting more, over time (exceptions being Albania, Cyprus, Czech Republic, Luxembourg, Russian Federation, Serbia, Switzerland and Turkey). It should also be noted that data availability for the complete 1990 to 2015 period is scarce, particularly for private forest ownership. The available data from the FACESMAP/UNECE/FAO Enquiry therefore provide a somewhat patchy picture for the ECE region.

South Eastern Europe demonstrates the most significant changes in terms of private felling rates during the 1990 to 2015 period. An interesting exception is Bulgaria, where felling rates in publicly-owned forests grew more than those from privately-owned forests. Most of the countries in the South Eastern European region have experienced more significant changes in terms of privately-owned forests. For instance, in Albania, while private felling rates increased by 11.9 per cent in public forests, publicly-owned forests decreased fellings by 38.9 per cent during the 1990 to 2015 period. Croatia increased fellings in both privately and publicly owned forests, 23 and 8.2 per cent respectively. Slovenia also increased felling in both private and public forests. In this case, public felling rates increased by 35.1 per cent and private rate increased 32.6 per cent. Serbia, on the contrary, reduced its intensity levels for both public and private forests, by 5.7 and by 1.8 respectively. It is important to note that these percentages are expressed as actual proportion felled of the net increment (see Figure 43).

Central and Eastern Europe demonstrate a similar trend with the one exception that publicly owned forests tend to see a decline in felling rates. For instance, the Czech Republic and Slovakia both see increased private felling rates while publicly owned forests see reduced felling rates during the 2010 to 2015 period (for Slovakia, there was a 21.2 per cent decrease versus 4.3 per cent increase and for the Czech Republic a 6.9 per cent decrease versus 10.6 per cent increase). Austria on the other hand sees an increase from both publicly- and privately-owned forests, 31.8 and 23.6 per cent respectively.

Northern Europe has principally remained the same over the last 5 years. In Sweden and Norway, the reported fellings rates have not changed at all, while in Finland we see a slight increase (2 per cent for public and 11 for private). In Lithuania we surprisingly see a reduction in fellings from private forest owners by 18.8 per cent and a slight increase from public forest owners by 1.3 per cent. No significant difference between private and public forest owners are found in **Western Europe**.

Taking these observations together, it should not be forgotten that the actual impact of any sub-regional variation reported on above may have varied effects when considering the entirety of the ECE region. Going back to Figure 37, it is worthwhile recalling that the total area of forest available for wood supply, as owned by private versus public owners, varies substantially from country to country. This would also imply that variations between private and publicly owned forests can be substantial at the national level but account for only a limited part of the regional annual felling. For instance, in the case of Slovakia, the national annual felling only accounts for 1.5 per cent of the regional total, while the Russian Federation accounts for 31.7 per cent (if Canada and the United States of America are excluded). This highlights the importance of scale.

FIGURE 41

Private forest utilization rate per country, by forest ownership category and year

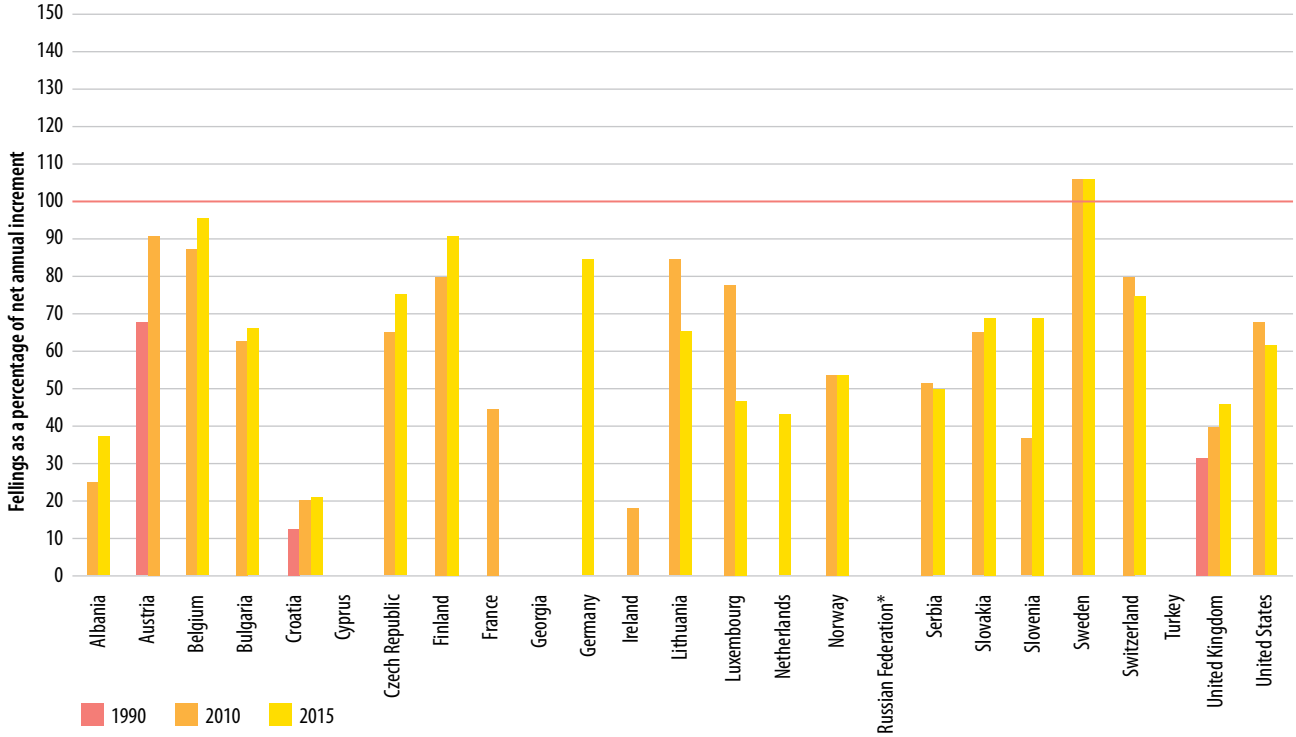
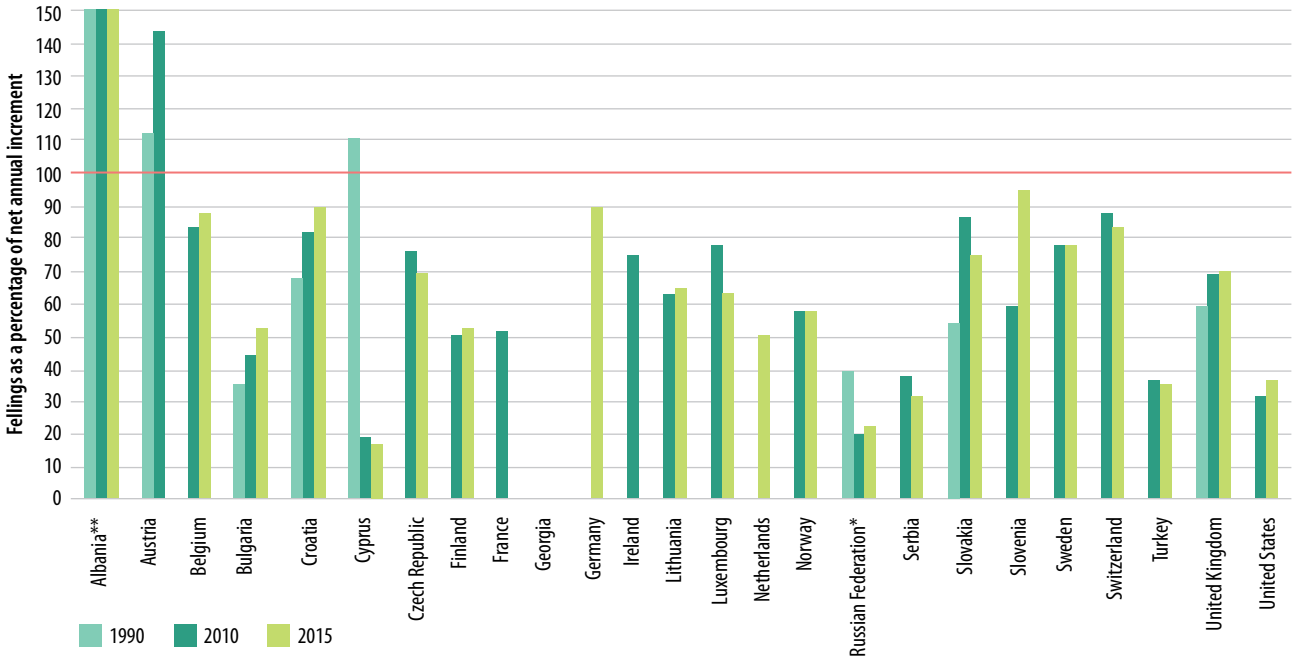


FIGURE 42

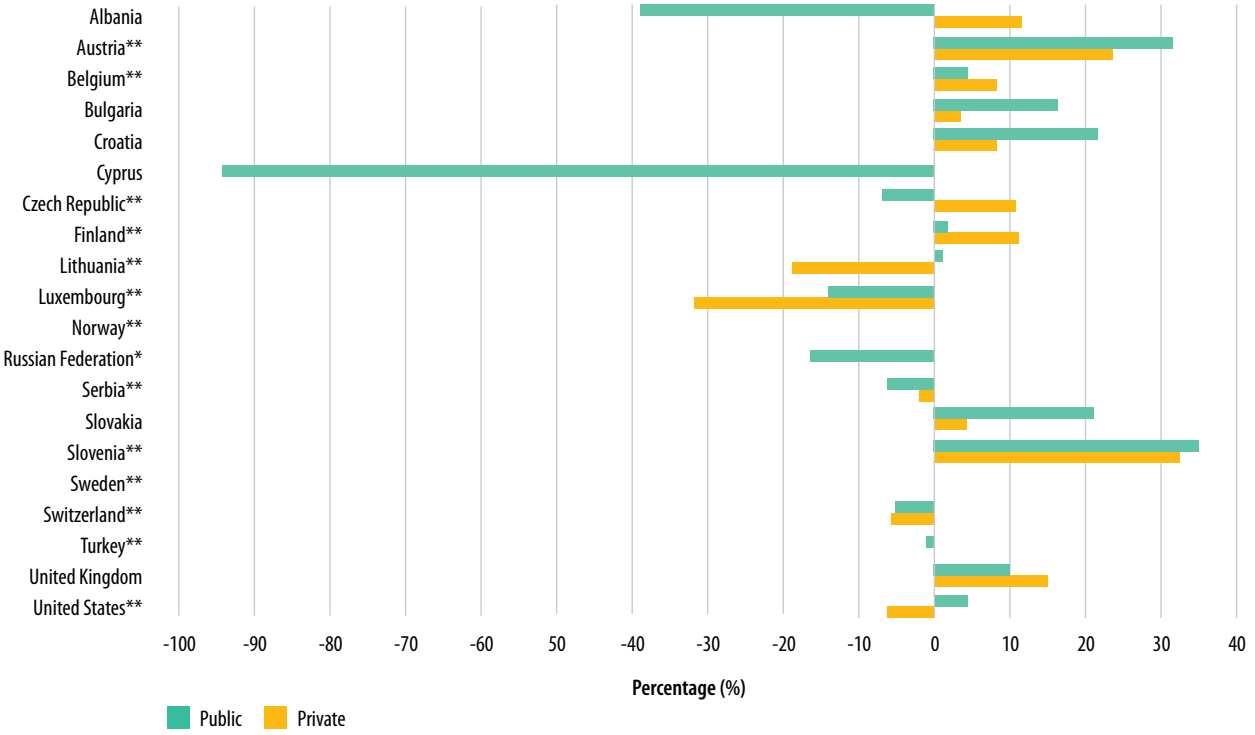
Public forest utilization rate per country, by forest ownership category and year



** Albania reported on public felling rates as follows, 1990: 194,6%, 2010: 717,8 and 2015: 233,5%.

FIGURE 43

Changes in felling rates of the net increment, by forest ownership category, 1990-2015



** Data missing for 1990, covering the 2010 to 2015 period.

Sub-regional differences are nevertheless important and may be explained by contextual differences in climate, culture and policies, amongst other things. For instance, the restitutions process in Central and Eastern Europe has had a relevant impact on national forest management strategies and priorities, which has resulted in some of the variations that can be found today between private and public forest owners. There are also varied historical and cultural traditions associated with forestry, which shape how and why forest land is owned by the State (local or national), individuals and families, private business entities/ institutions, tribal and indigenous communities or other private common ownership across the ECE region.

This section has principally reported on national utilization rates regarding the UNECE forest stock, highlighting variations across forest ownership structures and countries. In a nutshell, this means provisioning services in terms of wood products. Additional data would be needed for more in-depth analysis as to why different types of forest owners (whether private or public) might choose to harvest more or less, including underlying decision factors for timber production.

4.2.5 Other Forest Ecosystem Services (FES) and Ownership

Despite increasing felling rates, it can be noted that the overall forest stock continues to increase in the ECE region. This suggests that there are prospects for other types of FES, such as carbon sequestration and water protection. For instance, NWFP represent approximately 15 per cent of all forest products worldwide in terms of total value (FAO, 2010, FAO, 2015a). A range of NWFP have been identified as relevant when considering forest management in the ECE region, including mushrooms, fruits, medicinal plants, hunting and fishing. Europe, North America and Northern Africa are regions where more information on these products are available. According to available data, Europe represented almost half of the global NWFP production in 2005 (FAO, 2010).

Several NWFPs are nevertheless reported on by UNECE member States. Mushrooms are for example considered relevant in Bulgaria, Czech Republic, Finland, France, Greece, Italy, Lithuania, Slovenia, Spain and Switzerland. In the Czech Republic mushrooms accounted for as much as two thirds of the total mass of edibles collected in the country in

2012 and as much as 60 per cent of the commercial value of NWFP in 2010 (FAO, 2014b).

Hunting and fishing are accounted for, not only in the Czech Republic but in other countries, among them Bulgaria, Estonia, France, Greece, Latvia, Serbia, Spain or the United Kingdom. In the case of France, venison represents almost 80 per cent of the accounted value (FAO, 2014c). Other edibles classified as NWFP relevant are fruits, honey and maple products, which represent almost three quarters of the Canadian NFWP by value (FAO, 2014a).

NWFP represent almost half or the Portuguese forest production. Cork production is one of the main activities, involving 26 per cent of the gross total value (Mendes et al., 2004). Cork can be also found in other countries, including Spain, France and Ireland. Resin is also produced in Portuguese forest land, as well as in countries such as Slovenia and Greece. Alpine and Northern European countries count Christmas trees among their NWFP. Different nuts are collected in countries such as Bulgaria Switzerland as well as in the Caucasus and Central Asian region, Spanish chestnuts being the one appearing to have the highest relative relevance in the category. The last common NWFP categories are medicinal and aromatic plants. Turkey's major NWFPs is within this category with a total value added of 95 million $ in 2010. Anise, sage, thyme and rosemary are some examples of medicinal and aromatic plants.

Limited data is available regarding the relationship between forest ownership structures and FES provision. The qualitative and quantitative information available in the FACESMAP Country Reports (Živojinović et al., 2015) and the Global Forest Resources Assessment 2010 (FAO, 2010) do offer some insights into forest ownership and FES. One example is the acquisition of forest land by NGOs, charities and associations to protect biodiversity, or other related objectives, such as the protection of regulatory ecosystem services (Živojinović et al., 2015). For instance, in Slovakia, the WOLF Forest Protection Movement has established a reserve that is 1,037 ha (Živojinović et al., 2015), and in the United Kingdom, charitable organizations own 3.5 per cent of the woodland area (Živojinović et al., 2015). These cases represent NGOs and charities that have purchased forest land in order to provide specific FES other than wood production. Further examples include the conservation of cultural heritage sites, as some historic estates possess forest areas, or efforts to boost local communities by creating jobs for vulnerable population groups (FAO, 2010, FAO, 2015a). Highlighting that forest lands are also being managed according to explicit social goals.

Other forest-related services include climate change mitigation, which implies that FES delivery and climate change-related services are interlinked. Arguably the growing forest cover in the ECE region contributes towards increased carbon sequestration. Countries such as Serbia, Switzerland and Luxembourg (see Figure 43), where lowering felling rates have been reported over the last 25 years, have thus arguably contributed, whether intentional or not, to the enhanced uptake of carbon by forests. There are also ongoing efforts in Europe towards climate smart forestry and Land Use, Land-Use Change and Forestry (LULUCF) as part of a wider set of efforts to offset emissions. Water management is yet another forest-related service that is actively prioritized, especially by many municipalities. Forests provide the tool for municipalities to deliver important water services to society (e.g., water quality, water provision and flood regulation). Forests, whether private or public, consequently support multiple ecosystem functions and provide essential services beyond the provision of wood and NWFPs.

While not applicable across all countries and forest owners, it can be noted that publicly-owned forests may at times account for a wider set of forest management objectives than found in privately-owned forests. This would imply that alternative FES are at times prioritized, such as biodiversity conservation, public health or recreation, over timber production. Public forests may also promote other services, such as mushroom and/or fruit production. This is however not to say that private forest owners do not focus on the provision of FES as privately-owned forests are often used for collecting and producing NWFPs. One common example is the use of private forest land for hunting. For instance, in Belgium, many new forest owners have purchased forest lands, amongst other things, to be able to hunt. This illustrates that the management and use of FES are ultimately subject to national forest ownership and user rights systems. Access rights are for example a fundamental aspect of the NWFP sector, reflecting historical institutional developments, land use patterns and the availability of forest resource. Another example are countries that have more small-scale private forest owners, which often implies less intensive and more diverse forest management that is driven by different objectives and management schemes. The extent to which a country's forest ownership structure is dominated by large, medium or small-scale forest owners consequently plays an important role.

4.2.6 Discussion and conclusions

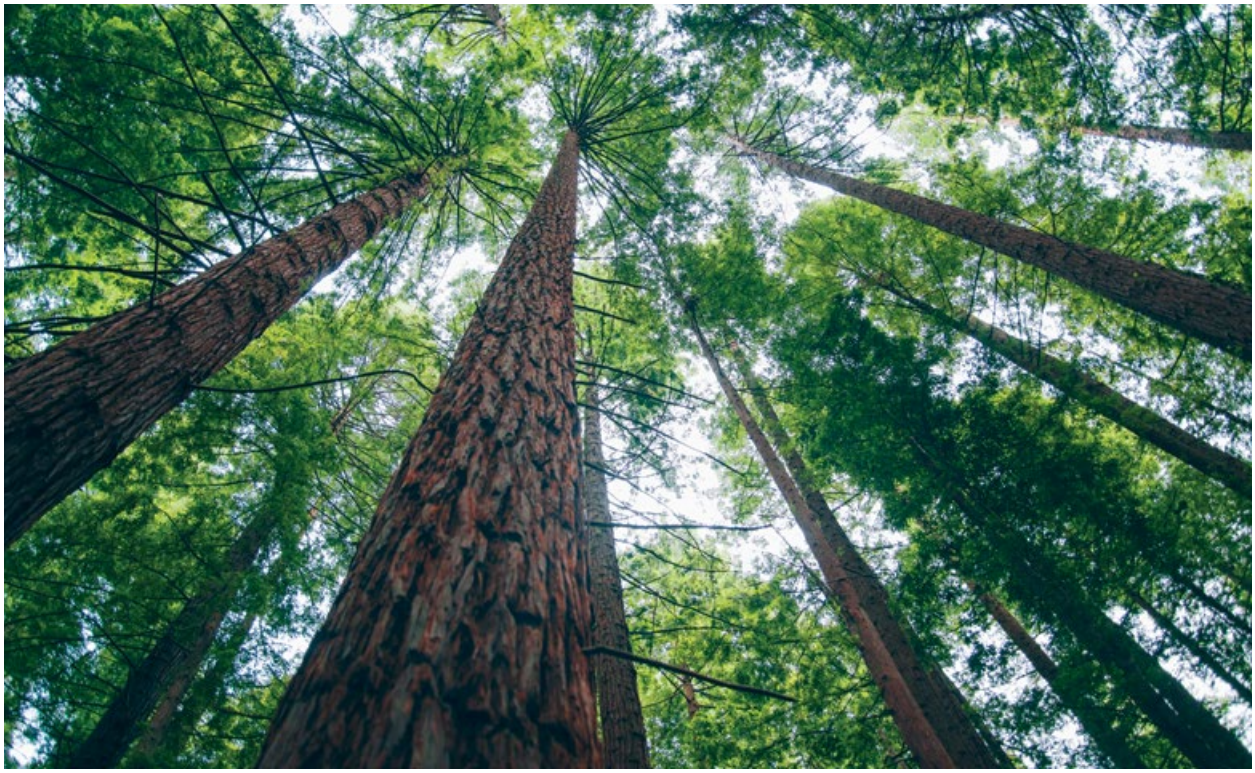
Wood products are those most closely associated with forest production, as approximately 70 per cent of the forest land in the ECE region is available for its provision (EEA, 2016, FAO, 2015a, FOREST EUROPE, 2015). Having this in mind, the ratio of forest fellings to increment has stayed rather stable and remains under 80 per cent for most UNECE member States during the 1990 to 2015 period. More importantly, it is encouraging that the utilization rate has allowed the forest stock to continue to increase. Many factors affect the relationship between increment and fellings for countries

and forest ownership structures. It is therefore important to consider utilization rates.

Fellings rates, and changes thereof, are of relevance not only in terms of forest management, but also when considering the sustainability of forest management. The FACESMAP/UNECE/FAO Enquiry shows that changes in the intensity of forest resource extraction have been different in each country (see Figure 43). The utilization rate, as an indicator, can tell quite a lot about each country and its ownership categories. For instance, as noted earlier, the reasons for these variations may vary as part of the restitution process and changing ownership structures, or new legislative and policy frameworks affecting FES provision, or the balance between private versus public forest owners in individual countries over time, etc. Utilization rates consequently represent some of the natural and socio-economic factors affecting the forest-based sector at the country-level. However, as can also be seen in the analysis, the results cannot be generalized across the ECE region and there are multiple country-specific answers to the variations affecting forest management and forest resource development. Utilization rates are also somewhat limiting in that they do not inform about any other FES, including products such as other types of biomass, or NWFP. Nor can they tell us much about how sustainable the forest-based sector actually is over time.

From the results it can be noted that there is a general lack of comprehensive information and/or data on forest ownership structures and FES provision. This is emphasized by the absence of any in-depth analysis of forest ownership and FES other than wood production in this section. The problem is not limited to lack of data but also to the absence of common classification schemes across countries, both in terms of forest ownership categories and FES. This has consequently limited the ability of this section to analyze the relation between ownership structures and FES provision. There is in principle not much comparable data available. This have implications for the overall production of data on private and public ownership structures. There is thus a continued need for harmonization in terms of how to classify and collect data on forest ownership structures as well as FES across the ECE region.

Many methodological difficulties remain in this important field of research. There are challenges not only with the classification of forest ownership, but also with the classification and measurement of FES (e.g., according to internationally agreed standards). Furthermore, it may prove difficult to assign specific services to specific forms of forest ownership. A critical area for future research therefore concerns the impacts and benefits of different types of forest ownership structures on FES provision, in particular, for services where there is presently no good data available (official or otherwise). There is consequently a continued need for research.



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Chapter 5

ORGANIZATION OF PUBLIC AND PRIVATE FOREST OWNERSHIP AND TENURE

5. ORGANIZATION OF PUBLIC AND PRIVATE FOREST OWNERSHIP AND TENURE

5.1 Policy instruments and legislation to govern forest ownership

5.1.1 Introduction

Forests are complex ecosystems that provide a range of goods and services (Alcamo et al., 2005). Besides their provisioning role (e.g., wood and non-wood forest products), forests are the source of important supporting services (e.g., soil formation and nutrient cycling), regulating services (e.g., climate regulation and soil protection) and cultural services (e.g., recreational, spiritual and educational). Safeguarding these services and ensuring a fair balance between them is an increasingly important justification for State intervention in forest ownership by means of regulation, incentives, advice and information.

The intricacy of forest ecosystems requires complex governance systems that are attuned to ownership patterns concerning these services. Forest ownership is a multi-level governance system of relations between the legal holder of the resource, stakeholders and society at large, and the State, in terms of the rights and duties involved in relation to the forest resource (see Section 2). The characteristics associated with property rights are the result of formal and informal institutions that create these spoken or unspoken *"rules of the game"*. These rules are in turn formally reflected in national or sub-national regulatory frameworks that have an impact on forest management. They contextualize what a forest owner, manager or resource user can do with respect to a forest holding and related forest ecosystem services.

The formation, implementation and enforcement of these rules, whether formal or informal, depend on interactions between different levels and components that make up the multi-level governance system (see Box 14).

The real capacity of the State to enforce legal requirements, combined with informal norms (e.g., local customs), represents the difference between *de jure* and *de facto* property rights. The efficiency of the governance system is ultimately reflected in the degree to which overarching policy objectives are implemented and not necessarily in the proficiency of the regulatory framework.

International and cross-sectoral policy objectives and commitments, as adopted at the national and/or regional level, are also set within this multi-level governance system. This implies that the adoption of international conventions can be both similar and unique across countries, depending on the national context. Moreover, the behaviour of forest owners and national forest policy is ultimately the result of cultural and historical developments, including forest ownership structures, the economic importance of forestry and the influence of different stakeholders. These examples demonstrate that forest policy, legislation and administration are adapted to the national specificities of each country.

In this section, the multi-level governance system introduced above will be used to provide an overview of these variations, and present how different policies aim at shaping forest ownership. The section includes the organization and development of forest ownership, policy instruments addressing different ownership categories, formal distribution of property rights and the mechanisms used for enforcement.

5.1.2 Methods and Data

This section largely builds on the data provided for the FACESMAP/UNECE/FAO Enquiry on forest ownership in the ECE region (see Section 1.2.). The Enquiry provides country level data, both quantitative and qualitative, on 32 UNECE member States that are used as a source of data for this section (see Section 1.2.). Qualitative answers in the FACESMAP/UNECE/FAO Enquiry represent the views of national FACESMAP/UNECE/FAO correspondents. For countries that have not replied to the Enquiry (e.g., Romania), or in cases of incomplete information, additional data from the COST FP1201 FACESMAP country reports (Živojinović et al., 2015) and FACESMAP background papers (Quiroga et al., 2015, Weiss et al., 2019) have been used to complement the FACESMAP/UNECE/FAO Enquiry. For ensuring the quality of information given in country-specific examples, a couple of additional contacts were made with the prime authors of the FACESMAP country reports to verify and refine the respective policy instrument descriptions.

The above-noted sources of data are utilized to review the influence of forest policy on the development of forest ownership (Section 5.1.3.); the role of alternative policy instruments in directing different types of forest owners towards specific policy objectives (Section 5.1.5.); reviewing the administrative level in terms of the enforcement of regulatory frameworks and the efficiency of the enforcement mechanisms (Section 5.1.6.); and the role of forest certification (Section 5.1.7.) The review of effects that regulatory frameworks are having on property

Box 14. The multi-level governance system

Policies: The policy level is the strategic level where policy objectives are set, usually through forest policies and other forest-related policies that have an international, national or regional setting. Forest policies generally take the form of strategies or action plans, such as the EU Forest Strategy (European Commission, 2013). Different types of forest ownership can be addressed via specific policy instruments (e.g., through forest laws and financial instruments) that direct forest owners' management actions towards specific policy objectives, taking into account contextually specific challenges (Bemelmans-Videc et al., 2011). In addition to traditional forest policies, other policies affecting forests have also increased. This reflects the increasingly important role of forests in rural development, climate change mitigation and adaptation, biodiversity, nature conservation and the bio-economy.

Regulations: The regulatory framework represents formal legal requirements (e.g., command and control instruments), often derived from the policy level, which amongst other things establish *de jure* property rights. Some forest-related legislation is set at the constitutional level, such as the forms of forest ownership (public or private) and rules concerning forest ownership. The procedural aspects related to forest management are normally addressed through forest-specific legislation, such as forest codes, forest acts, and forest decrees as well as technical prescriptions and operational guidelines, or through forest-related legal acts. These rules are subject to more frequent changes, for example because of the interactions between interest groups and changing policy priorities. There is furthermore an increasing impact from forest-related legal acts from outside the traditional forestry policy sector. One example is the transposition of the EU Habitats Directive (Directive, 92/43/EEC) into national legislation, where, in some countries, forest laws have been integrated into nature conservation laws (e.g., Netherlands and Denmark).

Administration: The administrative level consists of the organizations implementing, monitoring and controlling the regulatory framework across different forms of forest ownership. While the implementation of operational forest management practices is based on different arrangements between forest owners, the State or private administrators, the enforcement of the regulatory framework is usually assigned to State forest agencies.

Informal rules: The informal level consists of relations between forest owners and forest resource users, based on informal institutions, such as local norms and traditions. For example, in Romania non-wood forest products (NWFPs) are legally defined as belonging to the owners, but according to local custom, citizens still feel entitled to collect NWFPs. In some countries (e.g., Sweden, Finland, Czech Republic and Slovakia), the informal and historical tradition of free access to NWFPs are recognised through formal rules and regulations (e.g., freedom to roam or *"everyman's right"*) which provide the public access to public- or privately-owned forest land for recreation, exercise and/or NWFPs.

Markets: Market-driven governance structures, such as forest certification and voluntary guidelines, are increasingly being adopted by forest owners and forest-based industries. Non-governmental organizations (NGOs) are also actively advocating these types of market-driven instruments. Implementing organizations (such as the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification) define standards for responsible forest management, which take the form of contractual and/or sanctioned agreements that can be more coercive than legal rules. However, despite the voluntary nature of these contracts and/or agreements, it can be noted that forest owners sometimes consider these arrangements as overly restrictive, particularly as compliance is often needed to access wood markets and/or to get a higher price for timber.

rights distribution across European countries (see (Section 5.1.4.) is based on a comparative analysis conducted as part of the FACESMAP F1201 Cost Action for 30 countries. The methodology behind this study, and more detailed results, can be found in Nichiforel et al. (2018).

5.1.3 Policies addressing forest ownership development

The FACESMAP/UNECE/FAO Enquiry and the FACESMAP country reports (Živojinović et al., 2015) reveal that some countries (e.g., Austria, Lithuania, Norway and Slovenia) have policy instruments that explicitly aim to influence the evolution of socio-spatial forest ownership structures in the landscape, while other countries (e.g., Georgia, Israel, Netherlands and the Russian Federation) report having no such policy instruments. One common concern regarding forest ownership development is parcelization, considered as reducing the profitability of forestry, reducing the interest in good stewardship and/or causing land abandonment. These perceived effects lead to policies that aim to safeguard forests from such fragmentation. Meanwhile, some policies address the creation of new forest ownerships, while others

support existing ownership patterns, or set regulations to distribute property rights for legal owners and other users. The following subsections will provide more details and examples of those kind of policies.

5.1.3.1 Policies that support the creation of new forest owners

Countries have reported on policy objectives and instruments that create opportunities for people to become new forest owners:

Property restitution in Central and Eastern Europe (e.g., the Czech Republic, Slovakia, Bulgaria, Romania, the Baltic States and States of former Yugoslavia) has enabled private individuals to regain forest holdings that used to belong to them or their ancestors. Ukraine has also completed a process of dividing its publicly owned land between the State and municipalities (communities). These processes, which are at different phases across Europe, have altered the share of public versus private forest land over the last 25 years, which in turn have resulted in a number of *"new"* forest owners (see Section 3.2.4.2.). Moreover, land reforms in some countries and regions (e.g., Scotland (as a devolved nation of the United Kingdom)) have also created opportunities for communities to own and manage forest land.

Afforestation subsidies have contributed towards the creation of new forest land, which has resulted in changes with regards to ownership categories, such as in the share of forest land (see Section 3.2.3.2.). Differences do however exist between EU policy instruments, such as the EU Common Agriculture Policy (CAP) and its Rural Development Programmes (RDPs) in different member States, and other national subsidy schemes that support afforestation. In the EU, the CAP has been providing supports towards the forest sector and the afforestation of agricultural land has been one of the implemented measures since 1990 (Regulation, 2080/92). Afforestation measures have for example been adopted across the Mediterranean region (e.g., Spain, Italy and Portugal) and in Ireland and the United Kingdom. Countries from Central and Eastern Europe have developed similar forestry measures as part of their RDPs (e.g., Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Slovakia Poland and Romania) following their accession to the EU. It can however be reported that while the afforestation of agricultural land is common practice in the Czech Republic, Hungary and Poland, there has been little interest in accessing financial incentives for afforestation via RDP in Romania[25]. Some countries have also reported on national financial schemes outside RDP that are directed towards afforestation. For example, Iceland has prioritized the afforestation of private land by funding 97 per cent of all afforestation costs and 100 per cent of the services provided through regional afforestation programmes. In Germany, nearly all federal states offer afforestation subsidies as part of the aim to improve agricultural structures and coastal protection. However, only a limited area has been afforested in recent years. In the United States of America, policies such as the Conservation Reserve Program have resulted in the planting of forests across millions of ha of marginal farmland.

Exceptions include Croatia, where the afforestation of agricultural land is not allowed, and France, where afforestation has not been financially supported by the state since 1999. Furthermore, Norway, Sweden and Switzerland have no specific instruments directed towards the afforestation of agricultural land. However, this situation cannot be directly seen as a sign of irrelevance of afforestation as a policy objective. Rather, it reflects different national approaches towards governing the forest sector: for example in Sweden, in the more market-based policy regime, afforestation cannot be financially supported, because that would affect competitiveness. In the case of Switzerland, the absence of afforestation subsidies is associated with the increase of national forest area by 7 per cent since 1995 owing to the natural conversion of abandoned agricultural land, thus there is no fiscal rationality to incentivise the ongoing development. A shift from state support to market-based approaches is seen in the United Kingdom, where afforestation has long been a focus of policy supported through grants. Recently, the aim is to develop the voluntary carbon markets (in addition to state support) and thus to motivate land owners to afforest their lands using the corporate social responsibility approach.

5.1.3.2 Policies that support current forest ownership structures

In addition to policy instruments that have accelerated change, there are also policies that maintain current forest ownership structures. This is for example the case with policies that aim to maintain current holding structure, for example to prevent the fragmentation of large parcels, which is considered a threat to efficient production systems. The side effect of these policies is that they, explicitly or implicitly, favour existing and/or more traditional types of forest owners. This principally refers to instruments that regulate inheritance and land sales (see Section 3.2.4), however when holding structures are less strictly regulated, policies potentially allow the emergence of more diverse forest ownership. Whether the holding structure after all diversifies in the less regulated circumstances, will depend on the functioning of land market and on how new types of

25 The outcome indicators of implementing the Measure 221: First afforestation of agricultural land in the RDP 2007-2013 can be found at https://enrd.ec.europa.eu/sites/enrd/files/assets/pdf/measure-level-2013/Measure_O.221.pdf

forest owners are accepted, served, and supported (Weiss et al., 2017).

Inheritance laws are relevant in the sense that they have affected forest ownership structures for decades. In many countries throughout the ECE region, the general effect has been an increase of individual forest owners and parcelization. For example, in Belgium, inheritance laws have increased the number of private forest owners by about 10 per cent (Schmithüsen and Hirsch, 2010). Similarly, inheritance laws in Croatia and Romania do not prevent fragmentation. This is also the case in Switzerland, where inheritance laws support the subdivision of land, contributing further to fragmentation of the landholding structure. In contrast, traditional farm holdings must be passed as a whole to only one heir in Austria. Another example is Slovakia, where a parcelization *"decelerator"* instrument has been developed. This essentially means that inheritance laws allow for dividing land into several parcels between heirs, however, in cases of very small parcels, the heir needs to pay a fee relative to the value of the land (e.g., 20 per cent for parcels that are under 1 ha). Sweden also has regulations that prevent properties from being subdivided below 50 ha.

Traditional or special types of **shared ownership**, which address the issue of parcelization, can be found in some countries. For example, in Hungary and Slovakia, inheritance laws allow heirs to share the forest, whereby the property is owned by a group of individuals (Ambrušová et al., 2015). In Flanders, Belgium, a specific form of co-owned forests has been piloted to provide ecosystem services via a new ownership form, a statutory partnership of several public forest owners and stakeholders (Vangansbeke et al., 2015).

Defragmentation policies are often linked to inheritance laws but form a separate type of policy instrument, primarily applied during land sales. These policies typically restrict the division of land into smaller plots or regulate the sale to limit further fragmentation. Both approaches may be seen as decelerating changes in forest ownership (e.g., in terms of who are the owners and what is the spatial holding structure) that would otherwise take place. For example, in Lithuania, the forest law does not permit forest holdings to be divided into parcels smaller than 5 ha. In Slovenia, forests that are smaller than 5 ha may only be divided under special circumstances (e.g., for building public infrastructure or if the land is publicly owned). Other countries prescribe pre-emptive rights, giving priority to neighbouring land owners who may wish to buy the forest (e.g., Austria, France, Lithuania, Slovenia and Romania) or to buyers that have knowledge and experience with forest management (e.g., Austria and Estonia).

Land consolidation to remove effects of fragmentation have furthermore been conducted in Finland and Germany in an effort to address unfavourable effects of land division, such as transaction costs of logistics, and to enable economically viable parcel sizes and forms (Vitikainen, 2004/2014). Land consolidation is more common with agricultural land than with forest land, but forest land may be part of agriculture-driven consolidation projects. Typically, a land consolidation project gathers landowners from a certain continuous area, assesses the economic values of the ownerships, and spatially reorganizes the parcels to more unified entities maintaining the original values of ownerships, complemented with necessary monetary compensations to achieve a balance. During the process, improvements to drainage and road networks may be done as well. A land consolidation process, if managed in large scale, contains consultations with interest groups and assessment of environmental impacts (Vitikainen, 2004/2014). It is interesting to note that the procedures for land consolidation in Bavaria demonstrate evidence of decelerating forest ownership change, or even the de-urbanization of forest owners. This implies that efforts to tackle fragmentation through land consolidation may lead to an increase of *"traditional"* agricultural forest owners (Koch and Gaggermeier, 2011).

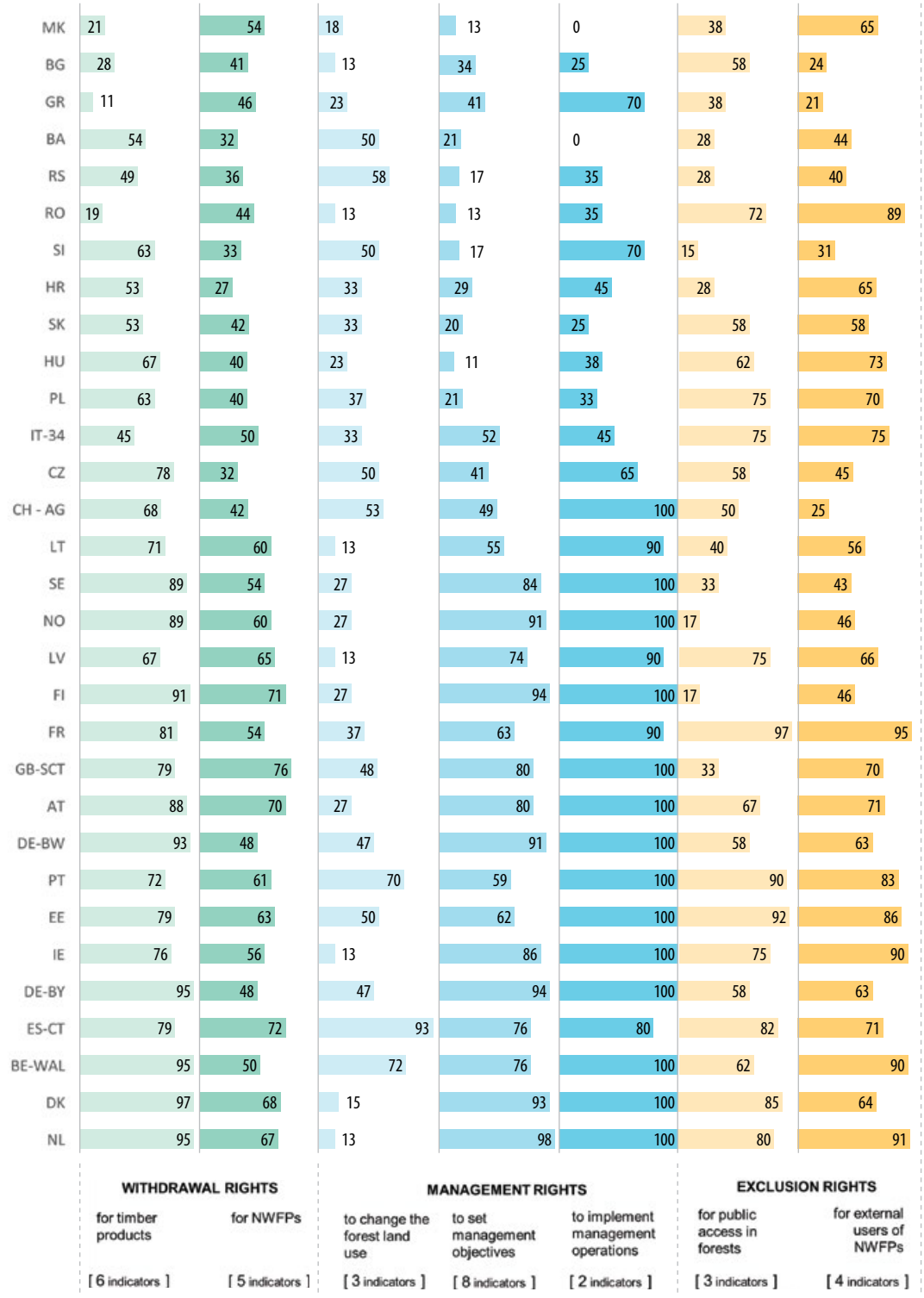
5.1.4 Property rights patterns in Europe

Regulatory frameworks are often designed to set, prioritize or encourage forest owners, managers and resource users in order to achieve desired policy objectives. This may include the provision of more freedom for forest owners in order for the State to establish stronger incentives for the production of certain forest-related goods and services. For instance, forest owners could be provided more rights to decide on how to manage their forests (e.g., what trees to plant) or decide on commercial harvesting of non-wood forest products (NWFPs) or hunting rights. It should however be recognised that there are inherent trade-offs in attempting to achieve certain policy objectives. This includes, but is not limited to, negative impacts on other public goods and services, such as the maintenance of biodiversity. The State may for example have an interest in protecting public and private economic benefits derived from timber production and while doing so be less effective in placing necessary regulations that would help maintaining e.g., water quality in affected areas. In the same way, ecologically efficient implementation of nature conservation policies may constrain local opportunities for profitable timber production. Thus, the distribution of various property rights and regulations makes a difference to the economic, ecological, and social sustainability of forest use.

This is reflected in different settings of the national or regional regulatory frameworks defining what a forest owner may or may not do in relation to their forest resource. Under the auspices of the FACESMAP COST Action, a framework for cross-country analysis of the variations in

FIGURE 44

Overview of the property rights distribution in private forestry across Europe*



* The mean values of the indicators for three property rights categories are presented, with the scores ranging from zero (meaning forest owners have no freedom to decide) to 100 (meaning forest owners have completed freedom to decide). The countries and regions are presented in the figure in the order of the increasing scope of decision making, from top-down. The abbreviations of the countries and regions are defined according to the ISO 3166 standard. More details on the methodology is available in Nichiforel et al. (2018).

the distribution of property rights in forests was designed (Nichiforel et al., 2018). The analysis used a conceptual schema introduced by Schlager and Ostrom (1992) whereby property-rights regimes are distinguished into five types of property rights associated with forest production, namely, (physical) access, withdrawal, management, exclusion and alienation (see Section 2.2.1). These bundles of rights were characterized through 37 indicators that were used to identify the capacity of forest owners to decide on access rights, withdrawal rights for timber, withdrawal rights for NWFPs, rights to change the land-use, rights to decide on the management objectives, rights to implement forest management measures, rights to exclude the public access from forests, rights to exclude users of NWFPs and alienation rights. Each indicator was further assessed using expert analysis and by analyzing national/regional legislation. The aggregated value for each category of indicators represent the degree of decision-making power attributed to private forest owners within each bundle of rights (see Figure 44).

The main factor differentiating regulatory frameworks across Europe principally relates to the degree of freedom that forest owners have to decide and implement forest management objectives. Some basic rules regarding forest land management can nevertheless be found in nearly all countries. For example, restrictions in terms of changing land-use apply almost universally. This concerns efforts to prevent the conversion of forests into other forms of land-use, and to ensure that forest land is reforested after felling. However, there are significant disparities with regards to regulations concerning the preparation and implementation of Forest Management Plans (FMPs). In countries with less restrictive legal frameworks, FMPs are not compulsory or only requested in specific cases (e.g., as a qualification for subsidies, forest certification or large-scale clear-cuts). In countries with highly restrictive legal frameworks, FMPs are mandatory or even prescribed by public authorities. These stricter regimes are typically found in former socialist countries, with the exception of the Baltic states.

Exclusion rights are also an important factor that differs across countries. In some countries forest owners have the right to prevent access to their land, including the collection of NWFPs by the public (e.g., France, Romania and Poland), while in other countries this follows under the category of *"right to roam"* or *"everyman's right"* whereby the public has the right to collect NWFPs on privately-owned land (e.g., Finland, Sweden and Norway).

The varied combination of different rights and duties of private forest owners, according to the provision of legal requirements applicable in each country, generates a diverse picture of different legal approaches used to regulate private forest management.

It should be noted that the study behind this section did not cover the entire ECE region. Other studies (Siry et al., 2015) have indicated that private forest owners in Europe have a more limited bundle of property rights than those in the United States of America. It has, amongst other things, been argued that private forest owners in Europe often have to defer to broader public interests, such as allowing public access to private forests. Forest management furthermore tends to be much more regulated in Europe as compared to the United States of America.

5.1.5 Policy instruments addressing different ownership situations

5.1.5.1 Financial instruments

Most forest-related financial instruments in the ECE region refer to policies that differentiate forest ownership categories based on the size of forest holding, often with a specific focus on small-scale forest owners. In Austria, for example, **co-operation** between small-scale forest owners is financially supported, in accordance with the Austrian Forest Act. The support has been used as co-financing for the formation of forest owners' associations/groups, their forest management planning activity, and purchases of forest management equipment for joint or coordinated management. This type of financial support towards cooperation between small-scale forest owners also exists in Switzerland, the Czech Republic, Portugal, and Slovenia, for example. A further example is in France, where the 2014 Forest Act has introduced a new type of association for forest owners, which is called GIEEF (Groupement d'Interêt Économique et Environnemental Forestier). GIEEFs are defined as associations with more than 20 forest owners that bring together more than 300 ha under a shared and concerted FMP. Forest owners in such associations are eligible for increased financial incentives (e.g., additional tax exemptions and/or subsidies). In the EU, sixteen member States have accessed the measure 124 of the Rural Development Programmes 2007-2013 regarding the cooperation for the development of new products and techniques, cooperation initiatives relating to forest being created in Austria, Germany, Denmark, Estonia, Finland, Italy, Sweden, Spain and the United Kingdom.

Another type of support relates to policy instruments that focus on **specific forest management activities**, such as supporting management planning by forest associations or investing in forest technologies. In the EU, support to small forest holders to draw up forest management plans has been programmed in six member States (Austria, Germany, Spain, France, Italy and the United Kingdom) within the framework of the Measure 16 of the 2014-2020 RDP. Other financial measures are included in the EU RDP which allows member States to program support for different forest

activities such as investments improving the resilience and environmental value of forest ecosystems or investments in forestry technologies and in processing, mobilizing and marketing of forest products[26]. Financial incentives for forest management (e.g., silvicultural improvements) exist also outside RDP, for example in Finland (for individual private owners) and the Netherlands. In the Czech Republic, the State provides free services that are, by their scope, beyond the capabilities of individual forest owners, such as aerial liming and fertilization, aerial fire control services, large-scale protection measures in forests. In Ireland, support provided to private forest owners relates only to subsidies for afforestation, thinning and forest road construction.

Yet another key issue concerns **taxation**. More specifically, property tax in the United States of America is reported as having a significant impact on private forest owners, even though these vary substantially between states. However, incentive programs, which offer some kind of tax reductions for landowners committing to certain forest management, are used by only a minority of forest owners in United States of America. Other examples of taxation policies have been reported in the United Kingdom, where forests provide a way of sheltering wealth from taxation through for example income tax relief, corporation tax, and inheritance tax (payable on death) and aspects of capital-gains tax. In Romania, forest owners that adhere to specific certification schemes (e.g., Forest Stewardship Council) are exempt from paying property taxes, while in Lithuania, private forest owners and enterprises have to pay an additional 5 per cent tax on proceeds from the sale of roundwood and stumpage since 2014. As further illustrated in Box 15, Croatia and Portugal provide additional examples of the varied use of taxation to influence forest management practices.

Financial instruments are also used to **support the implementation of regulatory frameworks**. In countries where there are few legal requirements that affect private forest owners, States often rely on subsidy schemes to influence forest management practices. For example, setting stricter requirements for forest management in order to get a subsidy, such as in the Netherlands and Austria, is one approach to do this. In Lithuania, financial incentives are used to encourage private forest owners to engage in environmentally sound forestry. In contrast, in countries where the State regulates private forest ownership more strictly, the implementation of legal requirements is supported directly by the State. For example, in Bosnia-Herzegovina, Croatia, Hungary, Slovenia, Serbia and Slovakia, forest owners are obliged to have an FMP, regardless of the

26 The comprehensive review of the integration of the forestry measures under the EU Rural Development program are available at: https://ec.europa.eu/agriculture/sites/agriculture/files/forest/publications/pdf/eval-study-forestry-measures-report_en.pdf

Box 15. Taxes and forest management

Green Taxation in Croatia

The Croatian Green Tax is a financial instrument that was established in the early 1990s in the country's Mediterranean region in support of forests on karst. This is a type of limestone-based landscape which has a high value in terms of ecosystem services but a low value in terms of wood production. Thus, it became obligatory for all registered companies, regardless of their business domain, to pay for forest ecosystem services (0.07 per cent of their annual turnover) as support for the restoration of degraded forests in the karst region. Today, according to the Forestry Act (amended OG 25/2012) and Rulebook on Method of Calculation, Forms and Deadlines for Green Taxes Payments (OG 84/2010 and 39/2012), the amount for forest ecosystem services corresponds to 0,0265 per cent of annual turnover. The use of revenues generated by the Green Tax is dedicated towards forest management, such as providing funding for the development of FMPs for private forest owners, forest roads construction and afforestation. Approximately 20 per cent of the green tax is presently used annually to support private forest owners and related forest management activities while the rest is used in public forests (Paladinić et al., 2008).

The Portuguese Forest Fund

The Permanent Forest Fund (*"Fundo Florestal Permanente"*) in Portugal is a policy instrument that specifically addresses private forest owners. More precisely, it is a financial resource created by the Government in 2004, funded by a tax on fuel consumption (gasoline and diesel), to promote Sustainable Forest Management (SFM), increase the size and concentration of forest holdings and carry out actions to prevent forest fires. It is available in the form of grants to public, private and common forests, and it is the only instrument that pays forest owners for the services they provide. For example, in the 2009-2012 period, 20 per cent of the funding provided through the Permanent Forest Fund was allocated to the provision of forest public goods, monitoring of forest health and biotic risks. This fund is, amongst other things, used to motivate new private forest owners to become members of forest owners' associations or other form of collective action in order to provide relevant ecosystem services. It can, however, also be noted that the Permanent Forest Fund is experiencing several shortcomings. One problem relates to the fact that grants are only paid after expenditures take place and required documents have been verified and validated. The fund has furthermore been responsible for long delays in making payments and frequent changes in priorities and criteria regarding the allocation of funds (Mendes, 2012).

size of the forest holding. However, the State pays for the costs of developing an FMP. Another example is Romania, where there is an emphasis on combating illegal logging, whereby the State subsidise the costs of monitoring forests against illegal logging for parcels that are smaller than 30 ha. In Serbia, indirect support is provided through State-owned forest enterprises to private forest owners, mainly in terms of providing seedlings for afforestation, marking trees for cutting and completing documentation for sale and transport.

5.1.5.2 Information instruments

Information instruments are used to provide information, advisory and/or educational services to forest owners, as an alternative or complement to command-and-control instruments. For example, in Sweden, the *"freedom with responsibility"* principle was integrated into forest law in 1993, leading to the abandonment of compulsory FMPs for private forest owners. Nevertheless, whereas forest owners in Sweden are free to manage their forests as they want, they may be prosecuted by the Swedish Forest Agency for mismanagement, such as in terms of inadequate biodiversity protection (Löfmarck et al., 2017). Having this in mind, the Swedish Forest Agency has developed interactive internet services that aim to inform private forest owners about relevant environmental legislation and associated legal obligations. Informational instruments have been reported as being the responsibilities of State-run forest agencies for example in Austria, Finland, Germany and Bulgaria. In the Czech Republic, following a legal requirement for an FMP in private forests over 50 ha, information-driven activities over the last ten years have targeted forest owners with less than 50 ha, who do not have to develop an FMP anymore, in an effort to increase the awareness on the management measures needed in their forests.

5.1.5.3 Policy instruments that target new forest owners

Policy instruments that specifically address new forest owners are rare. Exceptions include Germany (Bavaria), Finland, Austria and Sweden, where new individuals in the forest ownership registers receive special attention in terms of receiving information (e.g.., written or different types of seminars). Some specific policy instruments relating to new forest owners, as identified by the FACESMAP/UNECE/FAO Enquiry, are described in Box 16.

5.1.5.4 Policy instruments that address private forests in protected areas

Depending on the designated level of protection in an area and/or region, commercial activities may be partially or totally restricted, thus, limiting its financial profitability. In cases where protection reduce revenues, compensation mechanisms that rely on national or European funds may

Box 16. Policy instruments addressing new forest owners

Media campaign for new forest owners in Austria

"Who do you want to manage your forest? The bark beetle or a forest expert?" This was the slogan for a media campaign that was developed in 2011 by the Austrian collaboration platform Forst Holz Papier and the marketing organization for wood industry proHolz Austria. It aimed at facilitating SFM and increased wood mobilization. The campaign was mainly targeting inactive and new forest owners and aimed at providing information on existing advisory systems provided by forest consultants to forest owners.

Pilot-project for new forest owners in Bavaria, Germany

Forest owners that have owned their forest land for less than two years were contacted by local Forest Services in Bavaria with an offer to get advice how to manage their forest holding. This pilot-project was based on the assumption that new forest owners can be made aware of the need for forest management during the initial phase of ownership (Koch and Maier, 2015).

The Land Bank (*"Bolsa Nacional de Terras"*) in Portugal

The Portuguese Land Bank (*"Bolsa Nacional de Terras"*), which covers both forest and agricultural land, aims to facilitate access to unused land as well as reduce land fragmentation. It was established by the Government in 2012 (Law nº 62/2012, 10 December)[27] with the objective of promoting access to agricultural, forest and agroforestry land through the identification and advertisement of available land, particularly if this land is not being used. The land is in turn made available for lease, sale or other transfer models by the State, local councils or other public or private entities. The Land Bank also offers communal land, in accordance with the Law of the Commons. Information about available holdings is centralized and disseminated through the Land Bank Information System (SIBT). Information includes the size of the holding, land-use, soil characteristics, land-use restrictions, type of transfer (sale, lease) and desired value. Apart from disseminating information about land availability, SIBT aim to undertake statistical analysis of rural land market developments and mobilization, and to produce indicators regarding price and market dynamics at regional and sub-regional level.

and frequent changes in priorities and criteria regarding the allocation of funds (Mendes, 2012).

27 The legislation associated with the Land Bank can be found here: www.bolsanacionaldeterras.pt/quem.php

be found. Countries have for example developed specific compensation mechanisms, such as the Austrian Forest Reserves programme, the Estonian Woodland Key Habitats or the Romanian forest compensation mechanism. In the case of the Austrian program, the owner has to submit an explicit request for the inclusion of the forest as a natural forest reserve. If the area is found suitable for this purpose, a 20 year contract is established by which the owner commits to abstaining from harvesting in exchange for an annual financial compensation. A similar approach is used since 1999 in Estonia, for protecting woodland key habitats in private ownership, based on 20 years' contracts setting aside the key habitats from harvesting. According to the expert opinion, the value of the compensation is not very large and consequently Estonian forest owners are quite cautious in using this scheme. In the Romanian case the approach is different. Forests providing key protection functions are identified during the forest management planning process, which is mandatory in all forests above 10 ha. Since 2008, the Romanian Forest Code has stated that compensations have to be payed to private forest owners in the case the management plan impose harvesting restrictions. Nevertheless, only in 2015 a financial compensation scheme has been designed by the Romanian government for the restrictions imposed in private forests when timber harvesting is restricted. For the EU Natura 2000 network, compensation mechanisms are available via RDP, but these have only been taken up by a limited number of EU member States under the measure 224 of the RDP 2007-2013 (e.g., Austria, Belgium, Czech Republic, Germany, Estonia, Hungary, Lithuania, Latvia, Portugal and Slovakia). Besides their traditional role in providing awareness-raising, compiling guidelines and brochures and training of forest owners, NGO involvement has developed also towards direct investments in protected areas (e.g., buying the protected forest area directly as in Slovakia, Greece and Romania). Another example is the Czech Republic and Croatia, where the State has the pre-emptive right to buy land in protected natural area in case the owner decides to sell. In Bulgaria, private forest owners that own a protected area have the opportunity to exchange it for land outside the protected zone (Vodde, 2007).

5.1.6 Regulatory Enforcement

The successful implementation of any law or policy depends not only on how it is designed but also on how compliance is monitored and/or enforced by relevant authorities. For example, we might expect that enforcement of a regulatory environment that is defined by many rules and obligations would require more financial and/or human resources. It may also be expected that the use of other policy instruments, such as subsidies or information tools, can help to reduce the need for command-and-control mechanisms (or enforcement mechanisms) but increase the financial and/or human resources needed for communication and advisory services.

Having these variations in mind, the following subsections will briefly review approaches taken to monitor compliance of existing laws or policies, in particular, using the case of illegal logging to demonstrate different enforcement mechanisms across the ECE region.

5.1.6.1 Agencies in charge of enforcement

The supervision of forest-related regulatory frameworks is, in most countries, undertaken by State-run forest agencies. These are in turn linked to ministries in charge of forest activities, which act at the national, regional or local level. In most countries in the ECE region, the same entity is in charge of monitoring both public and private forests (e.g., Austria, Belgium, Bulgaria, Cyprus, Finland, Germany, Ireland, Norway, Poland, Portugal, Romania, Serbia and Slovakia). Furthermore, in most countries, the role of these agencies include not only monitoring forest and forest management, but the provision of advisory and educational services as well as subsidies. Forests in nature protection areas may also be subject to monitoring by environmental agencies, such as in France and the Czech Republic.

In some of the former socialist countries, the management and control functions associated with enforcement were until recently performed by State forest administrations that have only recently been separated. Changes in forest ownership patterns, following the restitution process, have as such been accompanied by the separation of management and control functions in most cases (e.g., in Romania since 1999 and Bulgaria in 2011). This has been achieved by establishing an independent executive forest agency that perform control functions both in State and non-State forests. These State forest agencies in Bulgaria, Lithuania, Romania and Slovakia furthermore provide advisory services to forest owners that have taken part in the restitution process. There are also exceptions. For example, in Croatia, a dedicated Advisory Service, which was established in 2014, is only responsible for the implementation of SFM in private forests.

Other countries have different approaches to monitoring compliance and enforcement with respect to the type of ownership. For example, in Canada, forestry companies operating in publicly owned forests are closely monitored. Failure to comply with approved FMPs or with the conditions of a harvesting permit result in severe penalties, ranging from monetary fines to the suspension of harvesting rights to the seizure of timber and/or even imprisonment. However, the management of private forest land in Canada is governed by municipal regulations, most often supported by soft policy instruments such as guidelines and voluntary programs. In the United Kingdom, forest-related regulations

and the supervision of non-State forests is mainly carried out at the county-level. Nevertheless, all regulations must comply with the United Kingdom Forestry Standard that provides a common approach to SFM and to meeting international commitments (e.g., FOREST EUROPE).

5.1.6.2 Enforcement and illegal logging

Countries throughout the ECE region report different levels of risk associated with illegal logging:

1. Countries report that illegal logging constitute a *"negligible risks"*: Belgium, Canada, Finland, France, Germany, Iceland, Ireland, Israel, Luxembourg, Netherlands, Norway, Sweden, Switzerland, Turkey, United Kingdom and the United States of America.
2. Countries report some cases of illegal logging in private forests: Bulgaria, Croatia, Czech Republic, Lithuania, Serbia, Slovakia and Slovenia.
3. Countries report that illegal logging is a problem in both public and private forests: Cyprus, Georgia and Romania.

In countries reporting negligible risks, enforcement problems principally relate to unclear property boundaries (e.g., Finland), forest owners that are ignorant of administrative prescriptions (e.g., Luxemburg, Switzerland and the United Kingdom), wrong declarations of income-tax (e.g., Switzerland) and forest contractors harvesting more timber than what is agreed with the forest owner (e.g., Netherlands, Slovenia and the United Kingdom).

More serious cases of illegal logging and associated enforcement problems take various forms. One example is when socially disadvantaged rural population satisfy their need for fuelwood by stealing wood from private forests (e.g., Bulgaria, Croatia and Serbia) or from both public and private forests (e.g., Cyprus, Georgia and Romania). This can be classified as timber theft. For instance, in the Czech Republic, timber theft from forest roads (where the timber is being stacked) occasionally occurs. Another form of illegal logging is found in countries where the regulatory framework imposes higher restrictions in relation to timber removal in private forests (see Figure 44). In such cases, private forest owners may take steps to satisfy domestic demands, especially for fuelwood. It has for example been reported that forest owners harvest timber from their own forests, without legal permission, because the procedure to obtain permission is considered as too complicated (e.g., Bulgaria, Croatia, Serbia and Romania).

Different forms of illegal logging are also addressed through different enforcement actions. In Iceland, for example, concerns about domestic illegal logging are so low that no official system to record timber removals exists, thus no official figures of logging and commercial timber utilization can be provided. In Canada, it is reported that the negligible risk is due to the development and enforcement of strict rules in the context of predominantly public ownership. On the other hand, in countries where illegal logging is a serious concern, forest owners are required by law to guard their forests (e.g., Bulgaria and Romania), even though it is difficult to enforce this requirement in practice. It can furthermore be highlighted that an official on-line system for timber traceability has been implemented in Romania since 2008, preceding European requirements for timber traceability, with the aim to address the concerns about domestic illegal logging in public and private forests.

The different level of risks associated with domestic illegal logging are relevant for the implementation of the EU Timber Trade Regulation (EUTR), a unitary supranational regulation which came into force in 2013. The regulation requires economic operators to prohibit the placement of illegal timber on the EU market and to implement a due diligence system. Countries that report negligible risks of domestic illegal logging are more concerned with the implementation of the EU Timber Regulation in respect to the imports of timber (e.g., Belgium and France). On the other hand, countries that have identified specified risks for domestic illegal logging are concerned to implement measures to address these risks. This implies new interactions between the use of the national specific regulatory framework and of voluntary market-based approaches to perform the risk assessment and to implement mitigation measures.

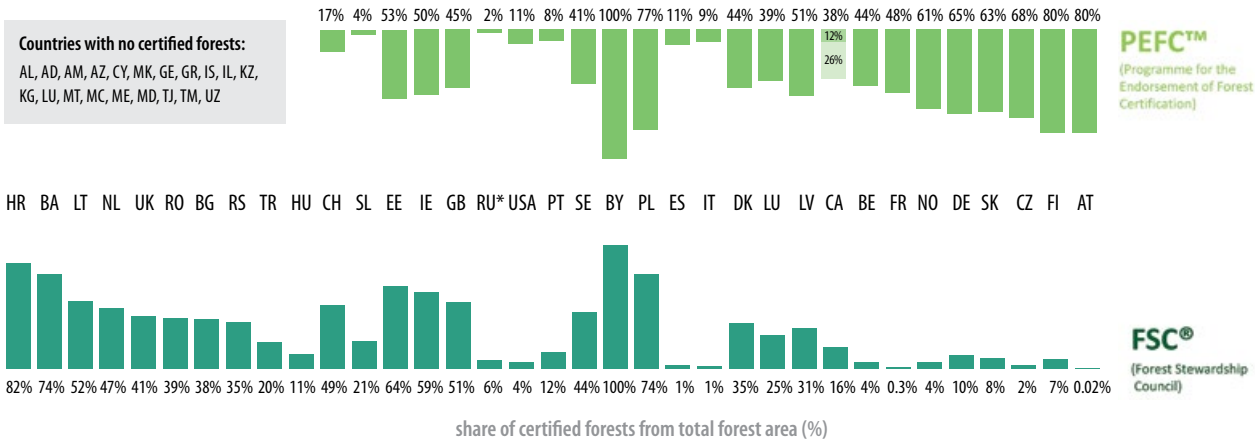
5.1.7 Forest certification schemes

Market-driven forest certification schemes play an increasingly important role in promoting responsible forest management and governance. In EU, the impact of market-driven, voluntary certification has risen, not only because of increased consumer demands but also due to EU public green procurement policy, which supports the acquisition of certified products. There are two main, internationally recognized, certification schemes in the ECE region, namely, the Forest Stewardship Council (FSC) Certification and the Programme for the Endorsement of Forest Certification (PEFC). In North America, three additional certification schemes can be found. These are the Sustainable Forestry Initiative (SFI), Canada's National Sustainable Forest Management Standard (CSA) and the American Tree Farm System (ATFS).

Forest certification schemes contribute towards common standards in forestry throughout the ECE region and globally, mainly through the introduction of internationally recognized principles for SFM. However, FSC and PEFC differ at the national level with regards to the adaptation of their certification schemes. For instance, FSC works with an international standard for forest management certification, providing a set of principles and criteria that can be interpreted at the national level while PEFC provide a sustainability benchmark

FIGURE 45

Share of certified forest areas from total forests, by certification scheme and country



* The country abbreviations are based on the ISO 3166 categorisation.

Source: own elaboration using the information of certified areas provided at https://www.pefc.org/about-pefc/who-we-are/facts-a-figures and https://ic.fsc.org/en/facts-and-figures as of January 2018. The sources for total forest area were derived from EUROSTAT (2017) and FRA (2015). For Croatia (HR) the certified area is reported to the category *"forest and other wooded land"* as *"other wooded land"* are also included in the scope of certification. For Canada, the PEFC percentages represent forest area certified by CSA (12 per cent) and SFI (26 per cent) that are considered PEFC endorsed standard. Similarly, for United States of America the percentage for PEFC represents forest certified by ATFS (2.5 per cent) and SFI (8.5 per cent), certification systems endorsed by PEFC.

TABLE 5

Proportion of certified forest land based on type of forest ownership and country, 2015

Country	Public forests from total (%)	Certified public forest (%)	Certified private forests (%)	Certification systems
Austria	18	72	74	PEFC and FSC
Belgium	48	87	11	PEFC and FSC
Bulgaria	88	24	1	FSC
Croatia	71	95	0	FSC
Finland	30	72	90	PEFC and FSC
France	24	82	18	PEFC and FSC
Luxembourg	47	87	6	FSC
Netherlands	49	62	28	FSC
Russian Federation*	100	5	0	FSC and PEFC
Romania	49	72	9	FSC
Serbia	43	88	0	FSC
Slovakia	49	96	37	PEFC and FSC
Slovenia	23	82	6	FSC and PEFC
Switzerland	27	86	44	FSC and PEFC
Turkey	100	19	0	FSC
United Kingdom	28	100	22	PEFC and FSC

Source: FACESMAP/UNECE/FAO Enquiry.

that include over 300 criteria that form the basis against which national certification systems are assessed. This implies fundamentally different approaches regarding the effects these schemes would have on national systems.

Both FSC and PEFC publish official statistics on certified forests at country level (see Figure 45). Forests are certified in 35 out of the 56 UNECE countries, covering a total area of 428 million ha at the end of 2017. This represents approximately 25 per cent (10 per cent FSC and 15 per cent PEFC) of the total forest area in the ECE region. It has however been recognised that double certification occurs, an issue that has been acknowledged by both FSC and PEFC that nowadays provide a common report on double certification since 2017.[28] Having this in mind, double certification applies to almost 65 million ha (15 per cent of the total certified area) in the ECE region. This means that the net certified forest area was 363 million ha in 2017, representing 21.4 per cent of the total forest area in the ECE region.

The implementation of FSC and PEFC at country-level vary:

1. FSC certification is more prevalent in countries that have more stringent regulatory frameworks and a higher share of State-owned forests (e.g., Croatia, Bosnia and Herzegovina, Lithuania, Ukraine, Romania, Bulgaria, Serbia and Hungary)
2. PEFC certification is more prevalent in countries where the share of privately-owned forests is higher, and where the regulatory frameworks provide for more flexibility in terms of forest management (e.g., Denmark, Luxembourg, Latvia, Belgium, France, Norway, Germany, Slovakia, Czech Republic, Finland and Austria).
3. Double certification occurs in most of the countries, for example, more than 90 per cent of the FSC certified forests in Belarus, Czech Republic, Denmark, Finland, Norway and Poland are also PEFC certified, while all PEFC forests in Ireland, United Kingdom and Switzerland are also FSC certified.

Precise data on market shares, differentiated by the type of forest ownership, are difficult to obtain without country-specific expertise. This highlights the added value of information collected through the FACESMAP/UNECE/FAO Enquiry, even though only a limited number of countries have provided data regarding market shares.

Public forests were largely certified in all the 16 reporting countries, except for the Russian Federation (5 per cent), Turkey (19 per cent) and Bulgaria (24 per cent) in 2015 (see Table 5). For private forests, Finland (90 per cent) and Austria (73 per cent) have significant shares of certified forests (mostly PEFC). In the Netherlands (28 per cent), the United Kingdom (22 per cent), France (18 per cent) and Belgium (10 per cent), where most of the forest is privately-owned, certification of private forests is implemented to some extent.

5.1.8 Conclusions

Forest governance and types of forest ownership vary significantly across the ECE region. These variations reflect socio-economic and cultural developments over time, such as the role of the State, markets and private versus public forestry. These historical differences are in turn evident in the distribution of access, management and exclusion rights between forest owners, forest administrators or professional foresters, and other users. For example, forest owners' rights may be shaped by the *"right to roam"* (such as in the Nordic countries and in Scotland) or by the strong position of public forest agencies (such as in former socialist countries). Forest governance is also characterized by different types of policy instruments, such as regulations, subsidies, information tools and market-based mechanisms. National forest governance consequently varies from soft policy approaches, such as the Swedish *"freedom with responsibility"* approach, to strict regulatory frameworks and norms, such as in Romania. Most forest governance systems do however reflect a spectrum of different policy instruments, whereby regulations, subsidies and information tools are used in different combinations depending on the history of forestry and forest management objectives in the country.

Forest-related policy objectives are furthermore usually connected to the economic viability of forestry. In many cases, this means that the issue of forest fragmentation is high on the policy agenda, particularly as the economic viability of forestry depends on the scale of the managed area. Thus, a common policy objective in many UNECE member States relates to defragmentation, which is supported through a variety of national instruments, such as regulations that target inheritance and land sales. With the same motivation of economic viability of forestry, important efforts are identified to provide financial incentives and informational support for the creation of forest owners' associations and collective forest management, which are recognized as vehicles to reduce transaction costs and provide on-demand assistance as well as coordination and economies of scale to the management of small-scale forest properties.

There has been a shift away from the traditional perception of forestry as an isolated sector in many countries to also incorporate other sectoral interests. More specifically, the forest-based sector is increasingly affected by policy instruments outside the forest. These instruments are not only re-shaping public and private forest governance but also leading to a diversification of policy instruments affecting forests. Examples include regulatory frameworks

28 See https://ic.fsc.org/en/news-updates/technical-updates/id/2040.

that relate to climate change, energy and biodiversity. This highlights the increasing importance of cross-sectoral interactions in forest governance.

On the one hand, forest policy in most of the former socialist countries remains largely based on stringent (command-and-control) regulatory frameworks. These regulatory frameworks were designed to perform in the context of a predominant share of public ownership and centralized economic systems. The changes in ownership patterns, resulting from forest restitution and privatisation, were followed by different changes in the regulatory framework and in the diversification of the policy instruments. Nevertheless, developments in these countries can by no means be seen as homogenous as demonstrated by the analysis of property rights distribution (Section 5.1.4.). The main financial instruments in these countries are often related to Natura 2000 and subsidies that support afforestation (both regularly implemented through RDPs). States may also provide financial support towards the implementation of mandatory requirements, such as FMPs for small-scale forest owners. Besides former socialist countries, Canada also has a forest policy system which is based on the development and enforcement of strict rules, a system which is adapted to the context of predominantly public ownership.

On the other hand, countries that are characterized by a higher share of private forest ownership (such as the Nordic and Western European countries) and soft policy approaches often rely on a more varied set of policy instruments. For instance, examples of subsidies are found here for implementing forest management planning in private forests, an issue that is addressed in most of the former socialist countries by the regulatory framework. The different subsidies schemes are complemented and mixed with information instruments not only to increase the effectiveness of financial instruments but also to address absentee and new forest owners. In these less regulated forestry settings, more emphasis is placed on offering opportunities with market-driven and informing approaches. The increasing use of market-based instruments, such as forest certification and voluntary guidelines, demonstrate the diversification of forest governance systems. Adoption of those types of instruments as a prominent part of the forest policy toolbox provides evidence on regional capabilities to respond to societal challenges, such as raising consumer awareness and demands for overall sustainability and corporate responsibility, which public policy instruments alone are insufficient to address.

The drawback with weaker regulation and reliance on market-driven and information tools is that steering towards some specific policy objectives becomes more complex. When freedom does not lead to desired outcomes, policymakers blame *"passive"* or *"negligent"* landowners and call for new policy instruments that would engage landowners to wood mobilization, climate-friendly forestry, or provision of public goods and multiple ecosystem services, etc. It remains to be seen whether a partial increase in regulation is to take place in some of the UNECE countries in the next two decades.

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5.2 Public ownership of forests

5.2.1 Introduction

As discussed in previous sections, public forest is distinguished from private forest according to the nature of the entity which holds title. Public entities are deemed to be the State, represented by national and sub-national governments, local government, and institutions and corporations owned by the state or local government. Although often presented as monolithic ownership by the State there are many nuances in the configuration of, and precedents for, public forest ownership. Management of public forests is the general responsibility of government, but planning, operations and enterprise activity on the public estate can be undertaken by multifarious agencies with varying degrees of government involvement.

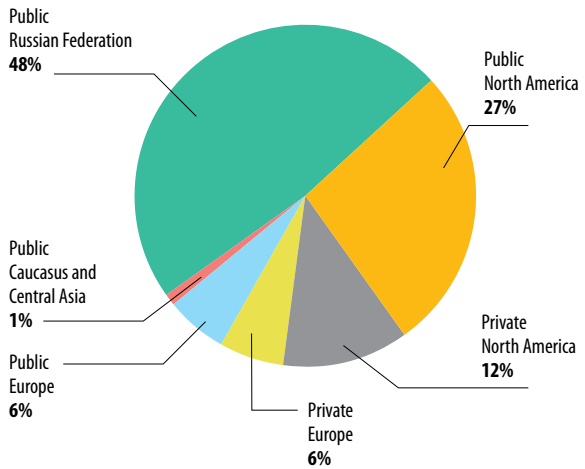
This section starts by describing public forests within the ECE region in terms of the size and number of holdings and the use of this resource for wood supply. It then examines the context of public forests with a focus on local government forests. The nature of institutions charged with stewardship and management of public forests is then briefly examined.

5.2.2 Methods and Data

Public institutions own the majority of forest in the ECE region and for this section it was particularly important to locate sources of data which could represent the whole region. The FACESMAP/UNECE/FAO Enquiry included data for 32 of the 56 countries within the region. Most notably, the enquiry did not contain data for any of the five countries of Central Asia. Data to fill this gap data was drawn from a separate UNECE report on the forests of Caucasus and Central Asia (UNECE/FAO, 2019). The FACESMAP Country Reports were also used to fill gaps for European countries (e.g., Spain) which had not completed the FACESMAP/UNECE/FAO Enquiry. This still left a few gaps, so statistics were used from data provided to the Global Forest Resources Assessment 2015 (FAO, 2015), which provides a complete dataset for all 56 UNECE countries. In addition to these data, this section draws on the qualitative comments provided to the FACESMAP/UNECE/FAO Enquiry as context for the data and responses to the open questions. Further detail, particularly for the case studies, was taken from the FACESMAP Country reports and the Global Forest Resources 2015 Country Reports.

FIGURE 46

Proportion of public and private forest ownership in ECE region by area, 2010



Source: FAO (2016)

5.2.3 Characteristics of public forest ownership

As shown in Figure 46, public forest ownership accounts for 80 per cent of forest in the ECE region with private forest ownership restricted to Europe and North America.

In general statistics, many countries present data which suggest that all public forest is owned and managed by a single, national institution. However, a closer examination often reveals more complexity. For example, in the case of countries with legally defined land use categories, some apparent inconsistencies arise where 'forest' statistics refer to land allocated to forest land use and do not include data for forest cover (according to FAO definition) on lands allocated to other uses, such as where forests have naturally regenerated on abandoned agricultural land. This is not an uncommon situation and accounts for forest expansion in several countries e.g., the Russian Federation and some former socialist countries (see Box 17).

5.2.3.1 Different scales of public owners

The FACESMAP/UNECE/FAO Enquiry breaks down public ownership into forests owned by national, sub-national and local government. Figure 47 illustrates the proportions of public forest at each scale, which clearly shows that public forest is mainly owned by national government. Ownership by sub-national government is present in only a few countries, most notably in Canada's Provincial Crown forests, and also accounting for significant areas of public forest in Germany and the United Kingdom. Ownership by local government (e.g., municipalities) was only reported in Europe, where it represents around 22 per cent of public forest (see Figure 48). Considering the global context provided in Section 3.1, it is evident that local government ownership is most prominent in Europe.

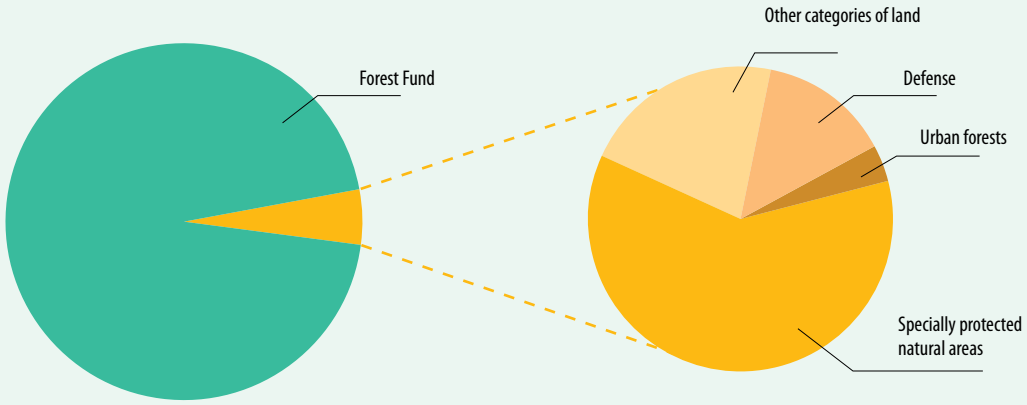
Also, as shown in the Russian Federation (see Box 17), this picture may change considerably, when it comes to the

Box 17. Case study: Forest ownership in the Russian Federation

The territory of the Russian Federation is termed the *"Land Fund"*. This fund is divided into categories distinguished by two characteristics: the main purpose and the legal regime of use and protection despite being distributed among various landowners and land users. The main categories of land are:

- agricultural land;
- settlements;
- land of industry, energy, transport, communications, broadcasting, television, computer science, land for the provision of space activities, land of defense, security and lands of other special purpose;
- lands of specially protected territories and objects (protected areas);
- lands of the forest fund;
- lands of the water fund;
- reserve land.

Forest statistics refer mainly to the total forest area which is the sum of forest lands of all categories. In 2013 this total forest area was estimated as 890.9 million ha which was made up of the components shown in the following diagram:



Although designated within the Russian Federation as forest land, under the FAO classification of *"Forest"*, 74.9 million ha of shrubland are classed as *"Other wooded land"* (OWL) and 1.1 million ha of urban forest are classed as *"Other land with tree cover"* (OLWTC). These urban forests are owned by local government (cities, town and villages) and not by the state at national level and are omitted from statistics provided to FAO.

According to the Forest Code of the Russian Federation of 1997 and 2006, all forest resources and land in the Forest Fund are owned by the state at national level. However, the Forest Code of 2006 made several changes including the transfer of forest management authority to sub-national 'subjects' (regions) and allows forest resources on rented land to be owned by private companies and other users. Since the implementation of the 2006 Forest Code, the Ministry of Natural Resources and Environment of the Russian Federation and the Federal Forestry Agency (Rosleskhoz) finance and monitor the implementation of forest management by the subjects of the Russian Federation.

In addition, to the established forests, there is a considerable amount of forest on agricultural land, which can be privately-owned. This arose from natural expansion of forest after the collapse of the collective farm system. These forests are not recognized by the national land cadaster and are not included in formal national/international statistics. Estimates provided to the Global Forest Resources Assessment for 2015 indicate that between 2003 and 2008 at least 20 million ha of new forest had emerged on agricultural land.

Sources: Ministry of Natural Resources and Environment of the Russian Federation (2013); Filipchuk et al 2014, Prof. Andrey Filipchuk pers comm.

allocation of management rights with responsibilities devolved to sub-national level without a change in title which remains at national level.

5.2.3.2 Change in area of public forest

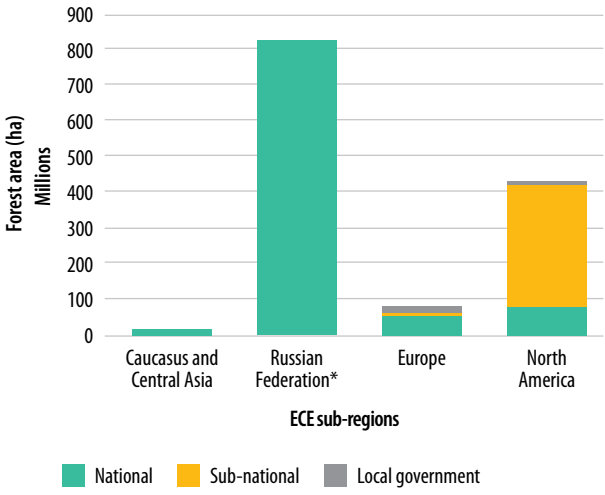
As noted in Section 3.1.8., the total area of public forest in the region has increased since 1990. This increase is not experienced in all countries. Figure 49 shows the relationship between public forest area in 2015, as a proportion of the area in 1990, for those countries that provided data. This shows that several, but not all, post-socialist countries in Central and Eastern Europe have experienced considerable decline in public forest area as a result of restitution and privatisation of formerly nationalized forest.

5.2.3.3 Area and number of public forest holdings

The survey asked for data on the size and number of forest holdings. Only 18 European countries provided sufficiently detailed data to the FACESMAP/UNECE/FAO Enquiry to breakdown of the area and number of holdings owned by national government. Figure 50 pools data from these. This shows many small forests and few large forests with the

FIGURE 47

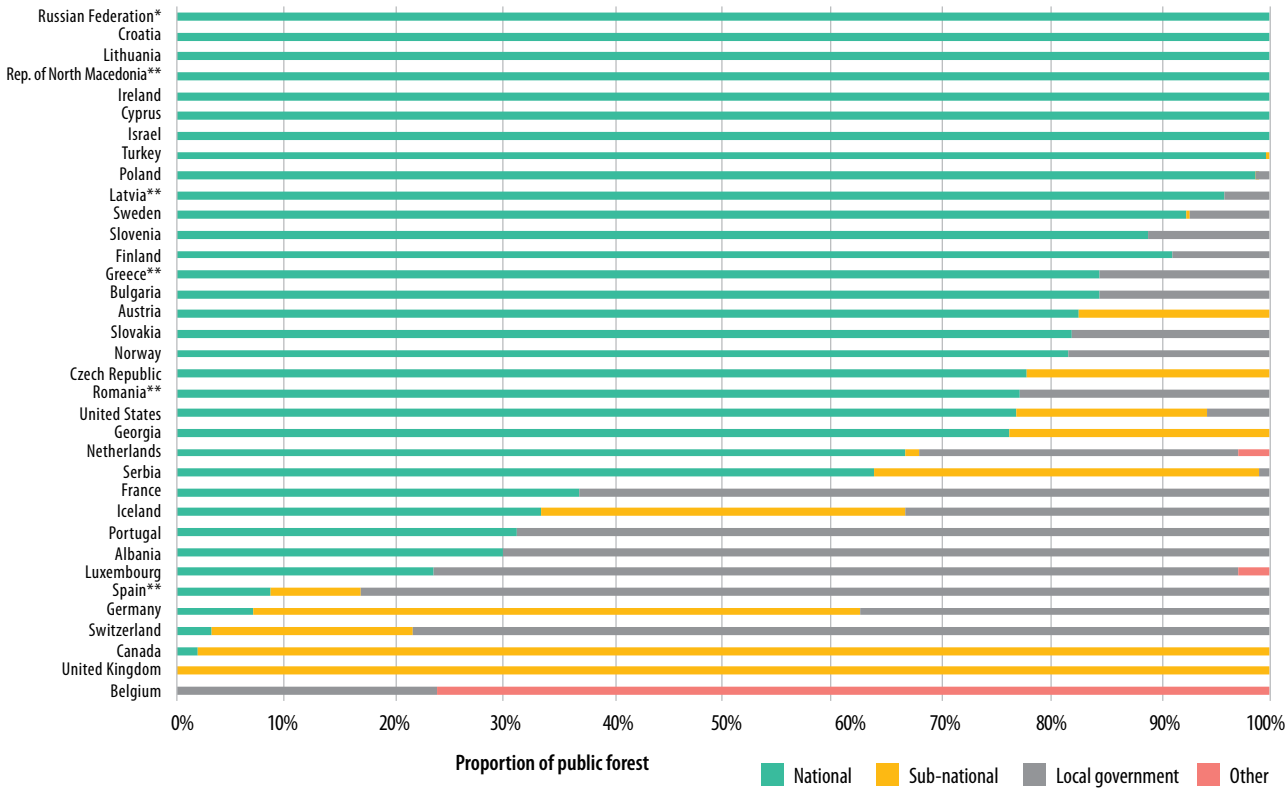
Area of public forest owned at national, sub-national and local levels in the ECE region



Source: FACESMAP/UNECE/FAO Enquiry, FACESMAP Country Reports and UNECE/FAO 2019.

FIGURE 48

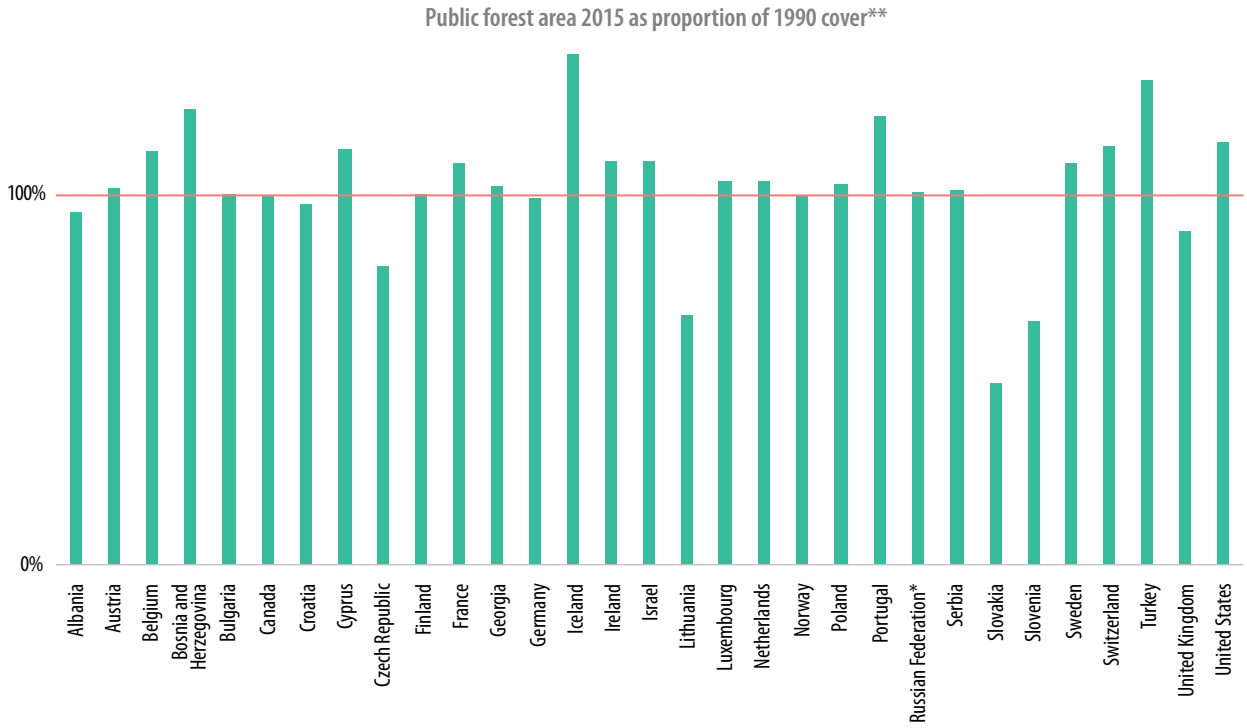
Proportion of public forest area owned at national, sub-national and local levels in Europe and North America



Source: FACESMAP/UNECE/FAO Enquiry and FACESMAP Country Reports (marked with **).

FIGURE 49

Relative change in public forest area



Source: FACESMAP/UNECE/FAO Enquiry, FACESMAP Country Reports.

** Norway and Russian Federation did not provide data for 1990 so the change represented is between 2010-2015.

FIGURE 50

Area and size of public forest holdings in Europe

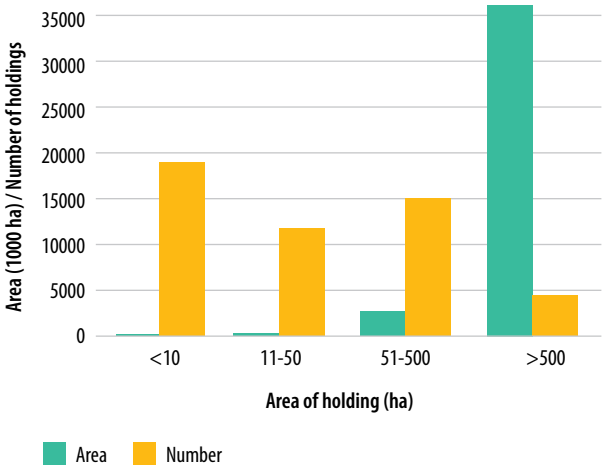
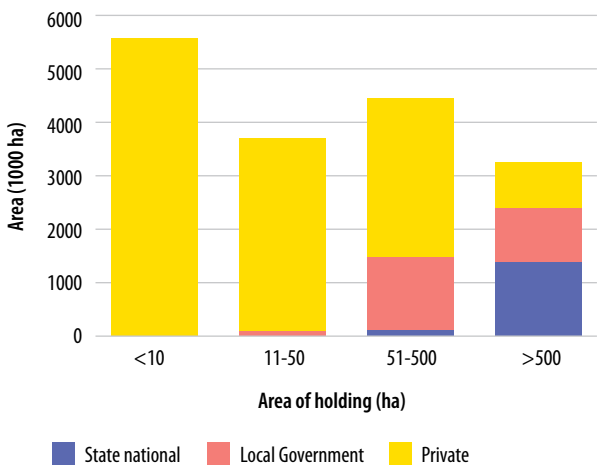


FIGURE 51

Area of forest holdings by size in France



Source: FACESMAP/UNECE/FAO Enquiry (18 countries).

bulk of the area in large holdings. This profile is markedly different from that of private forest – the size of public forest holdings is generally much larger than that of private holdings.

Very few data were provided for the sizes of public forests below national scale. However, data provided for France (see Figure 51) provides a case study of the sizes of forests owned by different public and private owners. Forests below 10 ha are almost all private and are very numerous. Mid-sized forests (11-50 ha and 50-500 ha in size) are also dominated by private holdings with large forests (> 500 ha) mostly public. So, to generalize, in France there are numerous, small private forests, mid-sized local government forests and large state-owned forests. Comparison with the handful of other countries which provided data suggests that a similar pattern is likely to be found elsewhere.

5.2.3.4 Wood supply

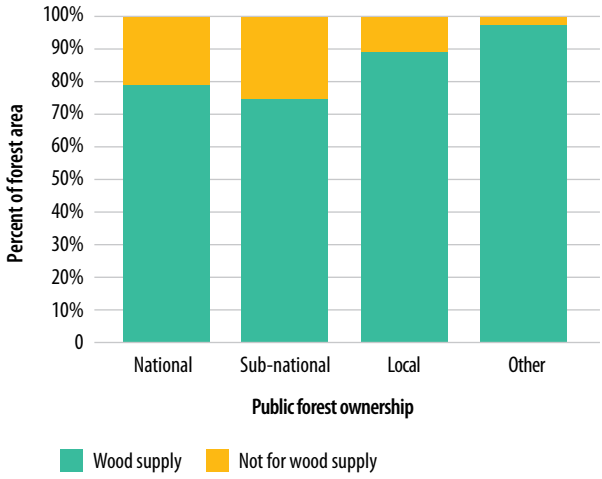
Only 20 countries provided useful data to the FACESMAP/UNECE/FAO Enquiry on the area of public forest which is available for wood supply; this is analyzed according to the type of public owner in Figure 52. This reveals that around 75-80 per cent of national and sub-national public forest is available for wood supply with the proportion rising to 90 per cent for local public forest, and to nearly 100 per cent of forest in other forms of public ownership. These differences can be explained by the fact that protected areas are generally considered as not available for wood supply and they are often owned at national or sub national level.

The FACESMAP/UNECE/FAO Enquiry requested estimates for growing stock and net annual increment along with recorded fellings; these figures are collated in Table 6. To compare countries, two indices have been calculated in this table:

1. Growing stock divided by forest area to give average stocking density, which is a rough measure of the site productivity but also commercial quality of the forest. Stocking density varies widely between countries from averages of 10 to 300 m^3 ha-1. All the countries that extend into the far north have stocking densities below 100 m^3 ha-1 reflecting the less-favourable growing conditions. Generally, higher volumes are found in countries with better growing conditions and with strong productive dimension of forest management.
2. Annual felling volumes divided by net annual increment, which provides an indication of intensity of harvesting. To be sustainable, it is generally considered that fellings should not exceed the increment. Fellings appear to be almost twice the increment in Albania which signal net growing stock loss while there are almost no fellings in Georgia.

FIGURE 52

Proportion of public forest available for wood production



A low overall utilization rate could be caused by national policy and dominance by private wood-oriented forest ownership (United States of America), abundance of resource (Russian Federation), or unfavourable growing conditions (Southern Europe).

5.2.4 Public forests in context

5.2.4.1 Historical perspective

An interesting, but often overlooked, question concerns the antecedents and context of State and local government ownership of forests. In Section 2.1 the predominance of public forest outside the ECE region is attributed to the influence of largely European colonialism. However, essentially similar styles of European colonialism also influence current forest ownership in UNECE areas outside Europe, for example the Crown lands of Canada.

Europe exhibits a great range of public and private forms of forest ownership which requires some explanation. European history is dominated by feudalism overlaid by imperialism and revolution. As shown in the case of Bosnia and Herzegovina, these regime changes often made profound changes to the balance between state and private forest ownership and shape current forest ownership and use rights. This historical continuity of ownership in Europe carries ancient use rights into the modern day and blurs many of the boundaries between community and public forests especially at local government level. For example, in Poland commons are a relic of feudal relationships and represent a traditional and archaic form of collective land ownership and management. In the present day, there

TABLE 6

Growing stock, growth and drain for public forest

Country	Growing stock (millionm^3 over bark)	Average stocking density (m^3 ha-1)	Net annual increment (1000 m^3 over bark)	Annual fellings (1000 m^3 over bark)	Fellings as % of annual increment	Felling intensity over forest available for wood supply (m^3 ha-1)
Albania	7	9.3	185	360	194	0.67
Belgium	85.5	259.9	2224	1948	87	
Bulgaria	572	171.4	12628	6516	51	6.11
Croatia	330.2	241.7	6335	5671	89	4.72
Cyprus	3.56	29.9	47.3	8	17	0.19
Czech Republic	589	288.6	18688	12969	69	7.60
Finland	342.9	48.9	14116	7385	52	1.81
France	736	180.5	22284	..		
Georgia	454.5	161.0	5188.3	0.69	> 1	> 0.01
Germany	1806	304.4	61225	55054	90	10.46
Ireland	78.58	203.4	..	..		
Israel	..		..	7		
Lithuania	304.7	231.9	8.3	5.33	64	>0.01
Luxembourg	15	361.4	301	191	63	4.73
Netherlands	38.2	208.4	1361	681	50	
Norway	51	34.3	1439	833	58	0.98
Russian Federation*	67670	83.0	884 566	194000	22	0.29
Serbia	235	202.9	6 462	2023	31	
Slovakia	264.9	279.7	6 689	5011	75	5.76
Slovenia	81.5	279.1	1 907	1802	94	6.75
Sweden	381	51.2	12 281	9642	78	2.41
Switzerland	119	347.9	2 843	2365	83	7.08
Turkey	1538.6	121.7	41 549	14786.1	35	1.99
United Kingdom	158	181.4	8 860	6183	70	7.09
United States of America	16497	166.3	109668	39848	36	0.65

Source: FACESMAP/UNECE/FAO Enquiry figures for 2015.

are over 700 forest commons, with an area of 67,000 ha (Adamczyk et al., 2015). However, not all forests are ancient as evident in the United Kingdom and Ireland where land for afforestation was purchased by the state in the 20th century.

5.2.4.2 Legal protections for public forest

As discussed in Section 1.2.2., public ownership (*res publicae*) implies that land is owned by government in the name of citizens, and this is often considered to render the property inalienable. However, it is also clear from history that government at national and local level can and does transfer land in and out of public ownership. In many countries various legal protections are extended to public forest intended to render them inalienable. These range from protection in the constitution, in law, national policy or as norms negotiated between government and civil society.

In several countries which own large areas of forest all state forest land is afforded constitutional protection. For example, in Turkey the Constitution prohibits the transfer of all State forests, including those not registered in the

Box 18. Case study: A brief history of public forests in Bosnia and Herzegovina

The period of the Ottoman Empire introduced a completely new forest ownership pattern in Bosnia and Herzegovina (B-H). During this period the legal base for forest land tenure was Islamic canonical law (the Shariat). In this regime, forests were considered as a public good and could not be privately-owned. Some forests, called *"baltalici"*, were designated for the satisfaction of the local population's needs with complex use rights which evolved in other European countries into community and common forests. In addition, the local population was allowed 'free use' (no charges even for commercial use) of some remote forests, called *"džiboli-mubah"*.

Immediately after the annexation of B-H by the Austro-Hungarian monarchy in 1878, the first cadastre was conducted (1880-1885) and forest ownership issues were regulated in accordance with *"Ševal's Law on Forests"* from 1869. *"Baltalici"* remained the property of the State although with some restrictions on use rights of the local population (the *"meremat"* right of local rural population). In this way, community forests, as a special type of forest ownership, was abolished. The Austro-Hungarian authorities also sought to achieve political aims through gifts of forest areas were given to private owners who were mainly powerful local feudalists. By the end of the XIX century, privately-owned forests in B-H amounted to about 550.000 ha. Subsequent regimes; the Yugoslavian monarchy and Socialistic Federal Republic of Yugoslavia completely marginalized private ownership and returned all forest to state control. At the present time, 80 per cent of forest in B-H is public and it is strictly forbidden to sell state forest with a few exceptions to provide for consolidation of holdings according to the spatial plan.

Through these changes, traditional usage rights of forests remained as heritage right of local populations in B-H. However, many of these traditional rights are not recognized as legitimate in modern law. For example, in the Laws on Forests of both Bosnia and Herzegovina, grazing is strictly forbidden and treated as an illegal activity. Furthermore, these traditional usage rights are perceived as the main cause of small-scale illegal activities in forestry.

Source: Avdibegović et al. (2015).

cadastral process to any other owner (Gubbuk et al., 2015). Restrictions exist in relation to selling State forests (e.g., in Serbia and Bosnia and Herzegovina it is strictly forbidden to sell state forest land, and in *Croatia* public forests cannot be sold but they can be let through long-term leases, etc. (Živojinović et al., 2015).

Similar protections are afforded to public forest properties of the United States of America and Canada with the proviso that modest sales for community or public benefit can be made as an exception, with the approval of legislators or Ministers. In Europe high value public forests are usually afforded some protection from alienation. In Bosnia and Herzegovina and Bulgaria this extends to formal distinctions between State public forests which provide direct public benefits such as national security, health, education or humanitarian activities, or water protection, and State private forest which can be alienated.

Generally, where forest land can be traded by public owners, there are restrictions on the area, composition or purposes for which forest can be sold. In some countries (e.g., Germany), public forest institutions provide a service as forest land agents taking on intestate land or purchasing forest land offered on the open market which remains unsold. In contrast, intestate land in Norway sits in limbo as dødsbo (belonging to dead people) while in Slovakia the State takes on the management of unclaimed land but does not own it. Such land can then be sold to neighbouring landowners to consolidate or rationalize private holdings. Rationalization of land holdings by exchanges of forest land is also allowed in several post-socialist countries (e.g., Poland and Hungary). Land swops for conservation are also permitted in Sweden with a reserve of state forest land earmarked for this purpose.

In Greece, alienation of public land requires explicit consent of the Minister. The State also has first refusal (at local level) on the purchase of any private forest land offered for sale (Spanos et al., 2015).

Citizens and civil society are increasingly taking an interest in the fate of public forest, and in some countries sales of public forest land are contested and constrained by public expectations as shown in the case study for the United Kingdom (see Box 19).

5.2.4.3 State forest ownership at sub-national level

Sub-national forest ownership reported to the FACESMAP/UNECE/FAO Enquiry relates to forest ownership by autonomous regional governments. The principal federated or countries with devolved responsibility for forestry are: Canada, Belgium, Germany, United Kingdom, Russian Federation, Serbia, and the United States of America. In some of these, State-owned forest is held and managed at federal level (United States of America), while in others

Box 19. Case study: Civil society and sales of state-owned forest in the United Kingdom

Before 1980 the Forestry Act (1967) did not permit the Forestry Commission (FC) to sell any capital assets (buildings or land). Following a review of forest policy in 1980, the United Kingdom government decided that a proportion of the public estate should be sold to facilitate the expansion of the private forestry sector and offset the costs of maintaining the forest estate. The subsequent revision of the Forestry Act (1981) provided forestry Ministers with *"the powers to dispose, for any purpose, of land acquired for purposes connected with forestry"*. However, large scale sales for any purpose proved deeply unpopular with the public, and after civil protests, sales were limited to not more than 15 per cent of the total area in any four-year accounting period. Subsequent sales in the 1980s and early 1990s amounted to 18,000 ha of State-owned forest land in Wales and 73,000 ha of land and forests in Scotland. There continued to be considerable public disquiet about this erosion of the forest estate and a further proposal to sell a large portion of the estate in 1993 was opposed by conservation NGOs. In 1994, the government backed down and announced that FC woodland would remain in the public sector. In 1997 the 1981 policy was rescinded and replaced with what is termed the 'repositioning' policy which meant that the FC could:

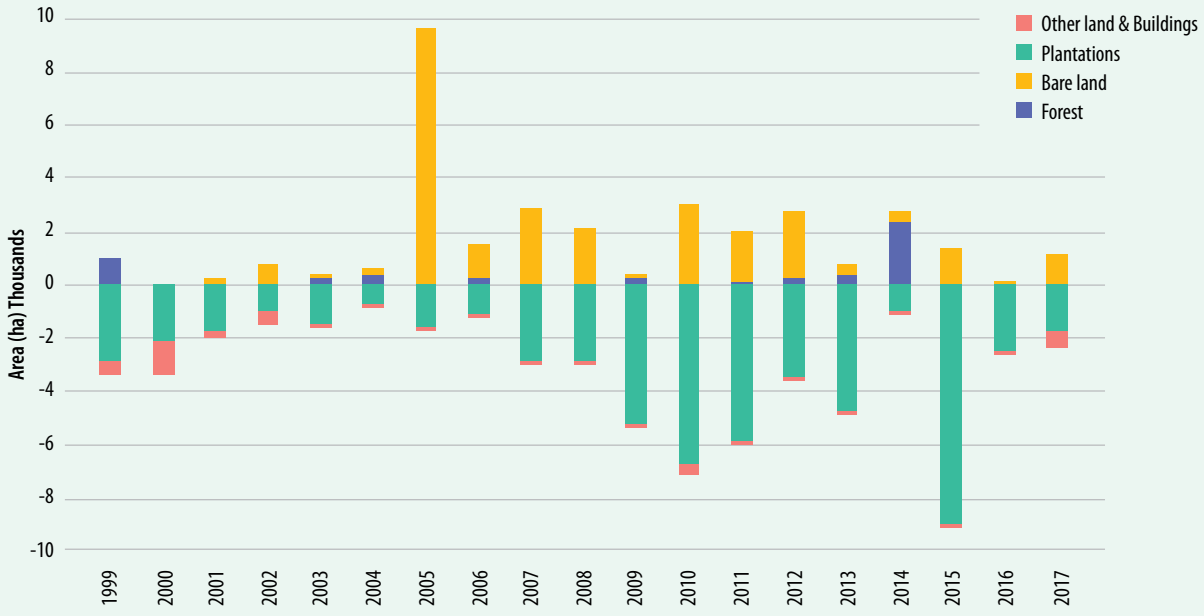
- *"only sell agricultural land, land associated with houses and other buildings, unplantable land and relatively small and isolated blocks of forest land which do not make a significant contribution to its objectives and which are surplus to its requirements."*
- *"sell areas for development where this is in the public interest. Areas of forest land which are important for public access will not be sold unless an access agreement is in place."*

In 2003 responsibility for forest policy and ownership of forest land were devolved to the governments of Scotland and Wales (established in 1999). Policy regarding sale of these lands then diverged with different outcomes in each country.

Scotland

In 2009 the Scottish Government made a proposal to lease the most productive 25 per cent of the public forest estate to private companies. This was intended to be a contribution to the Scottish Government target to reduce greenhouse gas emissions by 80 per cent by 2050. The money raised by selling the 75 year leases was to be used to fund tree planting to sequester carbon. A public protest citing the damage this proposal would have on public access, wildlife and the integrity of the estate provoked a retraction of this proposal. Nevertheless, the 're-positioning' policy which permitted sales continued to become the New Woodland Investment Programme which between 1999 and 2017 has sold the freehold of 59,393 ha of land raising £147.1 million and purchased 34,284 ha of land (mostly bare land for afforestation) for £79.6 million[29].

Changes in Forestry Commission Scotland land holdings 1999-2017



29 See https://scotland.forestry.gov.uk/managing/work-on-scotlands-national-forest-estate/land-and-building-sales/new-woodland-investment-programme#facts (accessed December 2018).

England

In 2011 the government proposed selling off at least 15 per cent of England's public forest estate, raising around £100 million for the Treasury. There was widespread public outcry leading to the resignation of the Environment Minister and the establishment of an independent panel on forestry chaired by the Bishop of Liverpool to *"advise Government on the future direction of forestry and woodland policy in England, and on the role of the Forestry Commission in implementing it"*. In early 2013 the Government responded to the panel's findings with a *Forestry and Woodlands Policy Statement* which accepted some of the IPF recommendations including *"Establishing via legislation a new, operationally-independent Public Forest Estate management body to hold the Estate in trust for the nation. It will be charged with generating a greater proportion of its income through appropriate commercial activity and with maximizing the social, environmental and economic value of the assets under its care"*. Progress with this has been slow with much dissent on exactly how to move forward; a parliamentary review of five-year progress on forestry published in 2017[30] did not include this issue.

Wales

After devolution, the ad hoc sale of land under the Re-positioning policy continued but sales slowed to only a few transactions in 2011. The 2018 statement of the Purpose and role of the Welsh Government Woodland Estate (WGWE) includes a *"commitment to retaining and investing in the WGWE as a key publicly owned asset to be used for public good"*. This has generally been interpreted as rendering the forest estate inalienable.

Northern Ireland

This has had a devolved administration since the 1920's and forestry there developed in parallel with that in Great Britain. There is no statement in the NI Forest strategy concerning sale of forest land.

Note that in all cases the position on sale of government owned forest land is a matter of governance not of legislation and could be overturned in the future.

Source: Wong et al. (2015).

30 See https://www.parliament.uk/business/committees/committees-a-z/commons-select/environment-food-and-rural-affairs-committee/environment-food-and-rural-affairs-sub-committee/inquiries/parliament-2015/forestry-inquiry-16-17/publications/ (accessed December 2018).

it is fully devolved (Canada, Germany, United Kingdom, Belgium and Serbia). Between these two extremes are States which retain tenure and management oversight at national level and devolve forest operations to sub-national level (e.g., Bulgaria) or local level (e.g., Kazakhstan) (UNECE/FAO, 2019). It is also quite common for productive forest management to be devolved while management of forests for conservation and by the military is retained at national level (e.g., Canada, Russian Federation); in contrast, in other countries conservation is also devolved (e.g., United Kingdom). It appears that in all cases management of military forests are retained at national level.

5.2.4.4 Local government forest ownership

As discussed in Section 1.2.2 there are several conceptual bases for public forest governance: ownership by the State at national and sub-national levels is usually considered *res publicae* with officials serving public policy. However, forest ownership at local level can be considered *res communalis*, and often more explicitly includes citizens in decision-making and benefit distribution. This distinction is recognised in some countries (e.g., Ukraine) as representing a third category of ownership between the state and private (Ukraine, FACESMAP/UNECE/FAO Enquiry).

At local level there is also a legal distinction between public and private forms of community ownership. *Res communalis* is the property of the citizens of a geographical location (e.g., a municipality) while *res communis* is the property of a group of commoners – the former is usually considered public while the latter is private. However, there is some fluidity in these distinctions with a lot of exchange on land title, governance and management rights between commoners and municipality. This is especially apparent in the case of abandoned common land (see Box 20). There are also instances where municipalities hold title to land which is managed as a common and where municipalities assist with management of a private common. Furthermore, in some countries, municipalities seek opportunities to invite community involvement in management (e.g., United Kingdom).

5.2.5 Institutional framework for public forests

Question 5 of the FACESMAP/UNECE/FAO Enquiry asked about the major Ministry managing public forests and provided space to report on up to two other Ministries which also manage public forest. Question 6 enquired about the nature of State forest management organizations and

Box 20. Case study: Municipality acquisition of forests in Spain

In the beginning of the 19th century the forestland property and use rights were an essential component of the feudal manors. It was through the Desamortización process (when church ownership was passed to public institutions) that the basis for modern Spanish land tenure was defined. Most of the forests proceeding from lordship domains were bought by individuals or collective people, thereby becoming private or communal forests.

During the rural crisis of the 1950s and 1960s much forestland was abandoned and forest owners migrated to cities. Therefore, the Town Halls led a process of appropriation of communal lands (montes comunales) and they became municipality forests (montes de propios). As a result, most of the Spanish public forests are owned by the local governments instead of the State at the national level.

Source: Quiroga et al. (2015).

defined State budget financed (SBF) organizations, State-owned organizations/enterprises/companies (SOE) and non-state entities (NSE). The responses to these questions are collated in Annex II (Table A2-9) and discussed in the following subsections.

5.2.5.1 Ministries responsible for forests

Oversight of State-owned forest at national level is assigned to one or more ministries. Usually one ministry is responsible for most of the forest land as a part of a wider remit. The areas of responsibility of ministries responsible for forests are summarized in Figure 53, which shows how forests are seen to contribute to the achievement of State goals and responsibilities. Of the 31 countries which provided information on ministries, seven explicitly included forestry in the name of the ministry, and two of these (Turkey and Romania) have Ministries which combine responsibility for water alongside forests. More often, forests are assigned to a ministry with a more generic jurisdiction (agriculture or environment) or include several domains (e.g., the Austrian Federal Ministry for Sustainability and Tourism).

Figure 54 maps the overlaps between the four most common domains as a Venn diagram (the size of the circles and overlaps represents the number of countries). This shows a separation between countries which place forests into *"agriculture"* and those which place it within *"environment"*. Placing forests within agriculture may indicate a more productionist outlook and appears more often in Western Europe and the United States of America[31], while placing it within an environment ministry may indicate a more protectionist outlook and is more prevalent in Eastern Europe[32], the Russian Federation, Canada (at sub-national level), Central Asia and countries with very small forest areas. Alternatively, this pattern could be associated with the ownership structure, whereby forests could be covered by a ministry of agriculture in countries with a strong private ownership of (probably mainly) agricultural land. These hypotheses would merit further exploration.

Within the UNECE, in each country some proportion of the forests is specially protected for biodiversity or environmental protection. These areas are generally both owned and managed directly by the State at national level. Responsibility for this forest can be allocated to either a separate ministry, usually the Ministry of Environment (e.g., in Bulgaria, Czech Republic, Croatia, Finland, Latvia and the North Macedonia) or a specialized unit within the same ministry (e.g., in the Russian Federation). In both scenarios, there are usually different entities managing conservation and production. Finally, in a few cases, a forest management agency for all forest reports to both the ministries of agriculture and environment (e.g., France).

Forests also occur on land allocated for other purposes such as education or for military defence and training. Ten countries reported forest on state-owned land allocated to the Ministry of Defence. In the Czech Republic these forests are managed by the Military Forests and Farms, which is a forestry state owned enterprise (SOE) while in other countries military forests are reported to make a significant contribution to nature conservation. Other ministries which may hold small areas of forest include: transport, innovation, technology, finance, culture, industry, trade and departments of the interior.

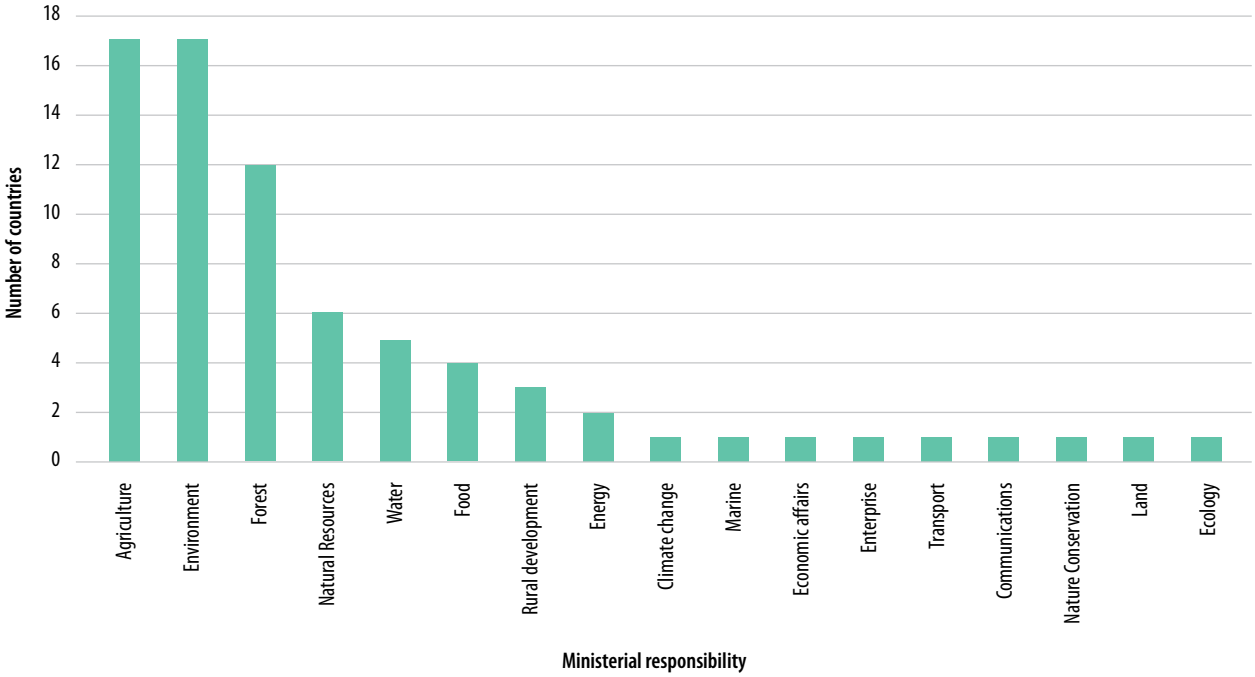
In a few countries, large areas of public land are not formally managed for agriculture or forestry. These tracts of land are often remote and comprise tundra, deserts and mountains. As such they contain areas of forest and other wooded land but are usually not considered part of the productive forest estate, and are therefore often not reflected in official forest statistics, but were referenced in qualitative parts of this study. In former USSR countries the land allocated to forest land use (Forest Fund) contains both productive forest, non-productive forest and wild land. In the United States of America, the Bureau of Lands of the Ministry of the Interior

31 France, Bulgaria, Croatia, Czech Republic., Ireland, United States of America, Latvia, Norway, Portugal, Serbia and Slovakia.

32 Albania, Estonia, Israel, Lithuania, Luxembourg, Poland, Switzerland, Russian Federation and Ukraine.

FIGURE 53

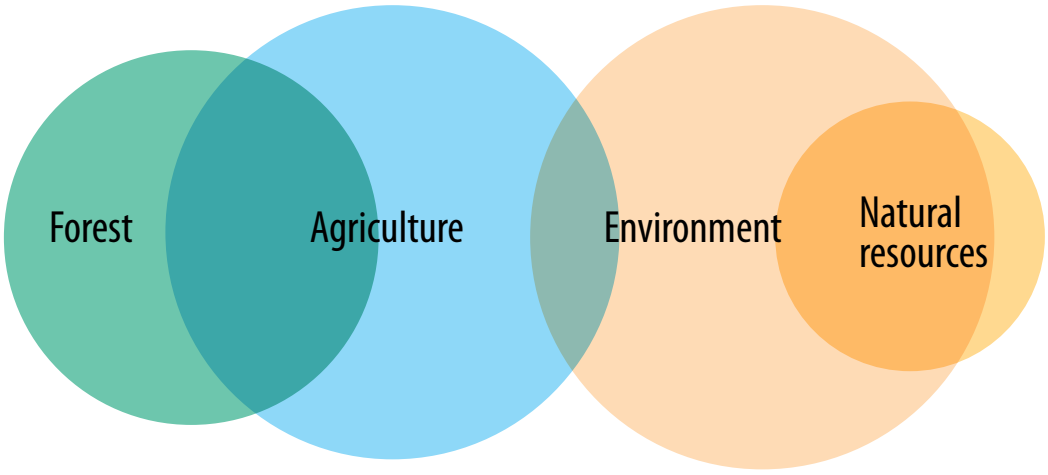
Areas of responsibility of the main Ministries responsible for forests



Source: FACESMAP/UNECE/FAO Enquiry, FACESMAP Country Reports and UNECE/FAO 2019 (data for 38 countries which provided this information).

FIGURE 54

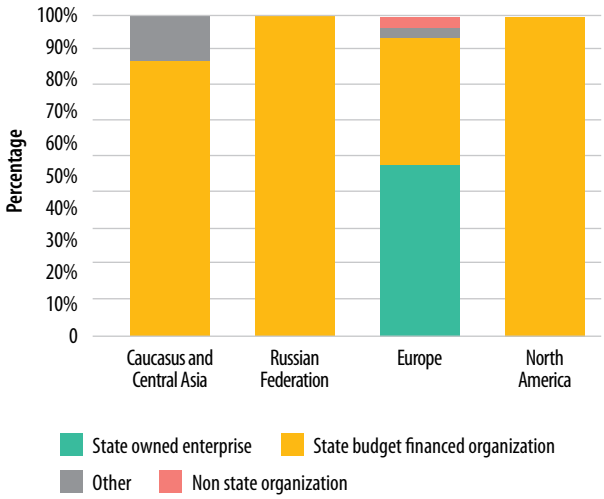
Venn diagram showing jurisdiction of main Ministry responsible for forestry



Source: FACESMAP/UNECE/FAO Enquiry, FACESMAP Country reports and UNECE/FAO 2019 data for 37 countries, area of circles proportional to the number of responses.

FIGURE 55

Constitution of main public forest management organizations



Source: FACESMAP/UNECE/FAO Enquiry, FACESMAP country reports, UNECE/FAO 2019.

oversees 100.1 million ha of land of which 13.5 million ha are forested and *"managed in accordance with multiple-use, sustained yield which includes timber harvesting"*. Forests may also be owned by the Treasury or Ministry of Finance. For example, in Sweden, the Ministry of Finance National Property Board manages about 2 million ha of forest close to the Fennoscandian mountains as part of a portfolio mostly made up of historical buildings.

5.2.5.2 Constitution of state forest management organizations

The management of national State-owned forest is undertaken by a range of organizational types, which may or may not trade in goods or services while also serving as an agent for delivery of government environmental or social policy. The enquiry recognised three basic types of legal entity: state budget financed (SBF) organizations; state-owned enterprises (SOE) and non-state entities (NSE). The forest management organizations for each country are presented in Section 4.3 of this study and the relative proportions of each type in the ECE region is given in Figure 55.

State budget finance (SBF) organizations are state agencies, units or departments which are part of the government and financed directly from the state budget finance. Examples at national level are the United States Department of Agriculture Forest Service and the Turkish General Directorate of Forestry. Examples at sub-national level are the six regional forestry directorates in Bulgaria and at local level the Akimats (counties) of Kazakhstan. SBF are the commonest form of agency undertaking management of public forests outside Europe. Protected forests are also generally managed by SBF.

State-owned enterprises (SOE) are corporations or companies where the State owns a majority of shares (often as the single shareholder). The state provides policy direction to the SOE but does not interfere with day-to-day operations or commercial decisions. SOE are often funded by a combination of revenues from enterprise and State grants to deliver public benefits or environmental and social government policies. As shown in Figure 56 this form of legal entity is most often found in Europe and largely within the EU.

Non-state entities (NSE) are forest management organizations that manage State-owned forest land based on lease or rental contracts; they provide services to private business entities and receive funding in return. This is uncommon with the most notable example being Keren Kayemeth LeIsrael (which is a not-for-profit) in Israel.

SOEs are the preferred vehicle for state forest management within the EU, while outside the EU SBFs are favoured. This is, at least in part, owing to consideration of rules governing the involvement of the State in trade (in timber), such as WTO rules outside the EU and the Treaty of on the Functioning of the European Union in 2007 (European Parliament, 2012), which protect the free market within the EU. WTO and EU treaties are fundamentally different forms of rules; WTO is an international agreement while EU treaties establish a legal code upheld by the European Court of Justice (ECJ). Nevertheless, both require that free trade is protected by ensuring that commercial decisions are independent of State intervention and that State aid is applied only in ways which do not distort competition (Lallemand-Kirche et al., 2017, Donato, 2016). Within the EU, Donato (2016) noted that trade rules *"reflect the economic ideas that have characterized the process of European integration in a direction markedly in favour of free market economy"*. In response, several EU former SBF bodies were re-formed as SOE in the 1990's (e.g., Metsähallitus in Finland). On the other hand, it is possible to meet the rules with other forms, as demonstrated by Lasy Państwowe of Poland. Lasy Państwowe is neither a company nor administrative unit and although it manages forests belonging to the State treasury it is not a public budget entity but runs on its own budget and is organizationally separate from government. Competition rules are respected as Lasy Państwowe is not in receipt of State aid and none of its commercial operations are subsidised by the State. Bodies which look after national parks and other conservation forests do not generally engage in large scale trade. They are not therefore as subject to rules governing

trade, are more dependent on State budget financing, and generally take the form of government departments or agencies within the EU countries.

Outside the EU, WTO rules do not apply the same pressure for SOEs, and SBF are the usual arrangement for public forest management. Nevertheless, WTO rules still require that commercial decisions are protected from direct government interference.

5.2.5.3 Local government forest management institutions

Local governments arrange management of their forests in many ways. They may be managed directly by the municipality (as a SBF), by a municipality SOE, by a national SOE, by private contractors, by commoners, utilizing citizens as volunteers, or by NGOs. There are generally few restrictions on options available to municipalities other than adherence to national laws and regulations which also apply to the private sector. In several countries, forest ownership by municipalities is very widespread and ownership is relatively new having been derived from recent restitution processes. In many such cases, municipal forest owners' associations have been formed e.g., the Association of Municipal Forests in Slovakia has 60 members which between them manage 146,125 ha of forest. Municipality forest owners are represented at European level by Federation Europenne des Communes Forestieres (FECOF) who point out that within the EU there are 20 million ha of municipal forest.

5.2.6 Conclusions

By bringing together different sources of quantitative and qualitative data this section has created an overview of public forest ownership in the UNECE. Public ownership at national or sub-national level is the largest repository of forest land and merits adequate attention. The section shows that public forests are most often held in relatively few, large holdings in contrast to the pattern of numerous, small holdings found in the private sector. This creates some challenges in the achievement of forest policy as the government can determine management of the public forests but can only advise or offer incentives to private owners. Leading by example is problematic as management of a few large forests is quite different from co-ordination of many independent holdings.

Public forests have experienced various structural changes, some of them quite radical, for example the restitution of nationalized properties in former socialist countries and devolution to sub-regional authorities. However, there is general acceptance of the need for public forest holdings and their important role in safeguarding public benefits to meet the general needs of society. The protection of public forests from privatization is approached in different ways in different countries. In some, protections are provided in the constitution or law while in others this is a matter of policy or norms. Civil society has an interest in the ownership of public forests and may act to prevent sale of forests by the State.

Only in Europe is there significant forest ownership at local government level. Europe is also unique in having forest management organizations which are independent State-owned enterprises while outside Europe forest management is done by government departments operating on State budget financing. This may reflect the differing obligations for meeting EU and WTO anti-competition rules.

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5.3 State Forest Organizations (SFOs)

5.3.1 Introduction

As discussed in earlier sections of this report, public forest ownership plays a significant role in the ECE region. Public forests are owned and managed through a variety of tenure and institutional arrangements, such as State and local government organizations. This section focuses largely on State-owned forest, as they have particular modes of organization distinct from those of local government forests. The section takes a particular approach in applying an evaluation methodology to data derived from wider data sources to compare the functions and outcomes of State Forest Organizations (SFOs).

The organization of public forest ownership varies. Public forests can be entirely State-owned at the national level (e.g., Croatia, Lithuania or Turkey), or partially, such as at the regional level (e.g., 56 per cent by German Bundesländer or 98 per cent by the Canadian provinces and territories) or local level (e.g., 69 per cent in Portugal). In several countries (e.g., Germany) all three types of public forest ownership co-exist. The share of publicly owned forest, of the total national forest area, varies from a few percent in Portugal to 100 per cent in Belarus, Georgia, the Russian Federation, Turkey and Ukraine.

The purpose of State Forest Organizations (SFOs) is the management of State-owned forests to ensure the provision of forest goods and services that are of general interest to the public,[33] which go beyond timber and include the provision of non-wood forest products (NWFP), as well as other services. Most SFOs are ultimately complex organizations that address multi-resource issues involving multiple objectives forest management. This means they are obliged to meet high economic, social and environmental standards. The challenge for SFOs, as compared to privately-owned forests, consequently resides in the achievement of sustainable forest management (SFM), balancing market demands with the provision of public goods and services. In addition to forest management, SFOs are also obliged to implement national forest laws and provide professional expertise to the public and to policymaking processes as forest authority tasks, at the international, regional and national level. In turn, the goals and management objectives, including the financing of SFOs are determined through public law. The following section outlines some SFO-related achievements in different countries.

Data from the ECE region demonstrate varied organizational models for SFOs used to provide all types of services. SFOs, in general terms, either integrate forest authority and forest management services within one organization, which refers to an Integrated State Forest Organization (SFIO), or separate them so that State Forest Management Organization (SFMO) exclusively provide forest management services. Despite the varied organizational models, all SFOs are focused on providing political and management related forest objectives. Having this in mind, the subsection focuses on the multiple objectives pursued by SFOs and showcases how these are being achieved in different countries.

SFOs are principally financed through revenues, such as timber sales or public funds. This depends on the organizational form and legal status of SFOs. For instance, the State-owned Austrian Federal Forests (*"Österreichische Bundesforste"* (ÖBf))[34] is financially independent from the State budget. This means that it is obliged to deliver annual contributions to its owner (the State), both as usufructure (50 per cent of annual profits) and as a dividend. Other examples include the Czech State Forests (*"Lesy Ceske Republiky"*),[35] the Coillte (Irish commercial forestry enterprise owned by the State),[36] and Polish State Forests (*"Lasy Państwowe"*),[37] which are all also financially independent from the State. Yet another example is the state-owned enterprise Metasehallitus in Finland.[38] Based on a recent Act, approved in 2016, the Finnish State enterprise transformed its Forestry profit center into Metsaehallitus Forestry Ltd. This profit-oriented enterprise has the exclusive right to engage in forestry activities in forest lands that are owned by the Finnish government (Metsaehallitus, 2016). The purpose of this arrangement was to make the forestry business *"competition-neutral"*, and to comply with EU regulations, so that it could remain in State ownership. This means that National Parks and Wildlife Services continue to be managed by Metsaehallitus under the guidance of the Environment Ministry, receiving specific financing from the national government budget for the provision of forest goods and services (Metsaehallitus, 2016).

33 Services of General Interest (SGI), as defined by the European Commission (2011) are services that public authorities classify as being of general interest and, therefore, subject to specific public service obligations. The term covers both economic activities and non-economic services.

34 See https://www.bundesforste.at/english.html.

35 See https://lesycr.cz/.

36 See https://www.coillte.ie/.

37 See https://www.lasy.gov.pl/en.

38 See http://www.metsa.fi/.

5.3.2 Methods and Data

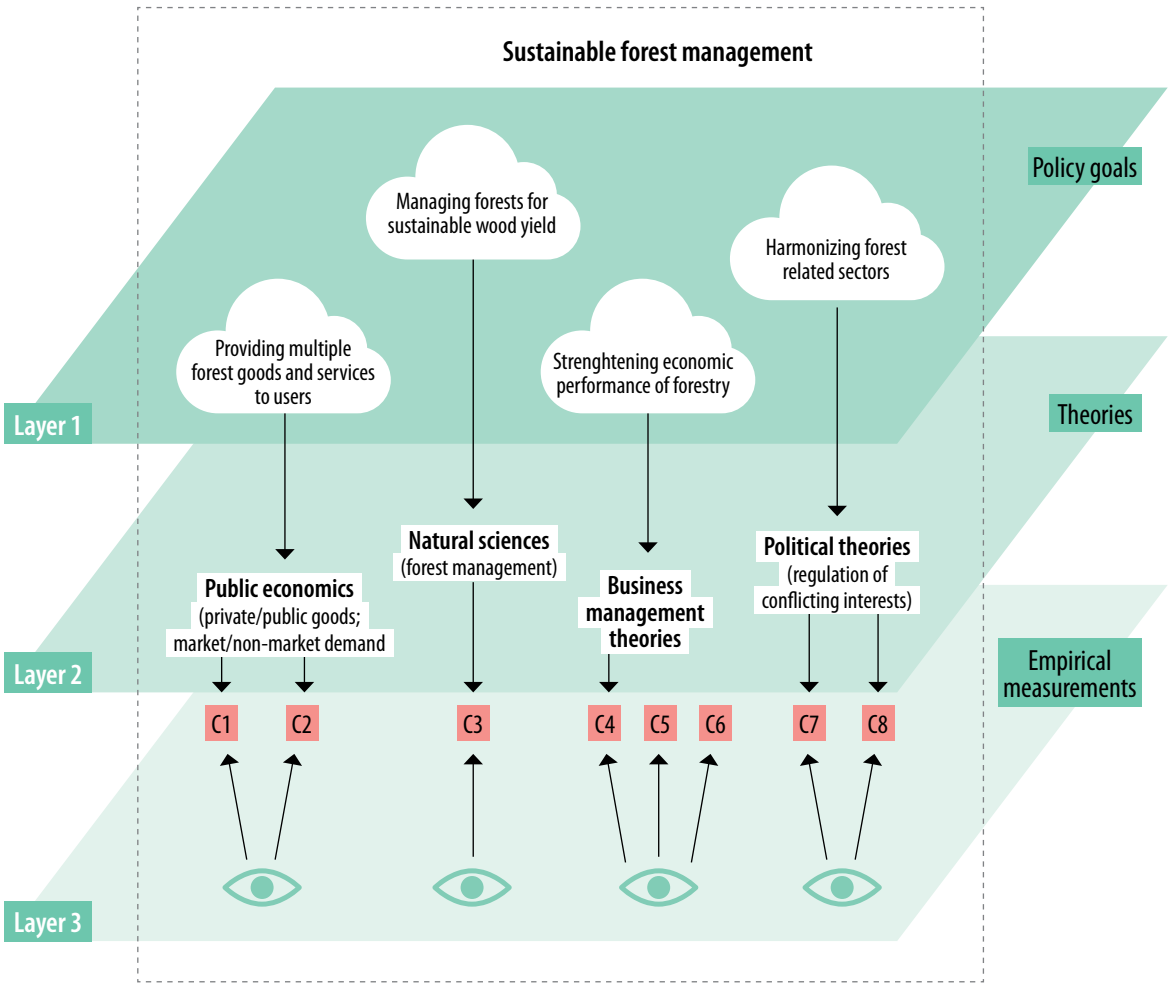
5.3.2.1 The 3L model

To reflect the multiple objectives pursued by SFOs and to demonstrate the variety of approaches used in balancing the provision of public forest goods and services, an approach known as the *"3L model"* was applied in a comparative evaluation. The 3L Model, developed in 2008 (Stevanov and Krott, 2013, Krott and Stevanov, 2008) and successfully tested in 2018 (Stevanov et al., 2018, Chudy et al., 2016), has been designed to evaluate the performance of SFOs (hereinafter referring to both SFIOs and SFMOs).

The 3L reviews three layers, namely, policy goals, theories and empirics (see Figure 56). Linking these layers have resulted in a set of criteria and indicators (C&I) that have been applied to evaluate SFOs (see Table 7). The 3L Model is in this case based on policy goals that are based on SFM principles as the most important standard for assessing SFOs (Layer 1). The model furthermore translates these goals into theory-based criteria (Layer 2) before any empirical measurements are made (Layer 3). This approach allows for more precision in evaluating the performance of SFO's, to otherwise vaguely formulated policy goals and/or objectives.

FIGURE 56

3L Model



Source: Krott and Stevanov 2008; Stevanov and Krott 2013.

TABLE 7

The C&I used to evaluate SFOs

Criteria		Indicators
1	Orientation toward market demand	(1) Market revenue, (2) Marketing competence (decision ability included)
2	Orientation toward non-market demand	(1) Plans for production/provision of public/merit goods, (2) Financial inflow for public/merit good production, (3) Auditing
3	Sustainable forests	(1) Obligation to sustain forest stands, (2) Existence of forest management plans, (3) Fulfilment of requirements for sustaining forest stands
4	Technical efficiency	(1) Technical productivity of work (relative, m^3/person), (2) Managerial accounting
5	Profits from forests	(1) Annual surplus of revenue over costs, after tax (relative*, Euro/ha)
6	Orientation toward new forest goods	(1) Professional market information, (2) Investments into new forest goods, (3) New external partners
7	Advocate of forestry	(1) Trustful cooperation with wood-based actors, (2) Aspiration of advocate´s role, (3) Acceptance of SFO advocate´s role by other actors
8	Mediator of all interests in forests	(1) Trustful cooperation with actors from many different sectors, (2) Aspiration of mediator's role, (3) Acceptance of mediator's role by others

Source: Stevanov and Krott (2013).

* The difference between the highest and the lowest value is divided by three and added once and twice to the lowest value, so that three equal intervals are created. Together with the loss (which means zero or negative financial result) these intervals are transformed into the (3) uppermost, (2) middle, (1) bottom third and (0) no profit. SFOs are assigned into one of these according to the value of its profit per ha of forest, that corresponds to the 3 to 0 ordinal scale.

TABLE 8

Evaluation example

Criterion	Ordinal scale	Combination of indicator manifestations
Orientation toward market demand	**3 (strong)**	Market revenue substantial* AND professional marketing competence exists (decision ability included)
	2 (moderate)	Market revenue substantial AND no professional marketing competence
	1 (weak)	Market revenue not substantial AND professional marketing competence exists (decision ability included)
	0 (zero performance)	Market revenue not substantial AND no professional marketing competence

Note: (3) strong, (2) moderate, (1) weak, (0) zero performance.

* From the total revenue ≥ 70 per cent comes from selling goods and services on markets.

The C&I (see Table 7) are used for a comparative evaluation of 18 SFOs from 14 European countries (Austria, Bosnia and Herzegovina, Bulgaria, Czech Republic, Croatia, Finland, Germany, Ireland, Lithuania, Poland, the Russian Federation, Serbia, Slovenia and Turkey), including North America (Canada and the United States of America).

Quantitative and qualitative data from the FACESMAP/UNECE/FAO Enquiry and the FACESMAP Country Reports (Živojinović et al., 2015) were used in combination with information collected from annual reports of forest enterprises (e.g., Metsaehallitus, 2016), the internal database of the European State Forest Association (EUSTAFOR), research papers (e.g., Liubachyna et al., 2017) and reports (e.g., Sotirov, 2014). The comparative evaluation of the respective SFOs followed a detailed and pre-defined procedure (see Table 9), which has been captured in internal country reports (Stevanov and Krott, 2017).

The subsection demonstrates results from the evaluation of SFIOs and SFMOs, which are compared using the C&I and the respective performance for each indicator. The performance is assessed using an ordinal scale from strong (3), moderate (2), weak (1) to zero performance (0). More details on the applied approach can be found in Stevanov and Krott (2013).

5.3.3 Representing the interests of publicly-owned forests

5.3.3.1 Public interests in forests

SFOs may take one of two alternative roles, they can either be an advocate for the whole forest, opting for a perpetual timber yield, or act as a mediator between diverse and often conflicting stakeholder interests in forests (Krott and Stevanov, 2008).

The first role is assessed through the seventh criterion of the 3L Model, *"Advocate of forestry"* (see Table 7), refers to SFOs that advocate and/or prioritize sustainable wood yield in public policy (e.g., through inputs to parliamentary recommendations and consulting with political parties and members of parliament). For example, results indicate that the Polish State Forest (Chudy et al., 2016) and the Turkish General Directorate of Forestry OGM[39] (Stevanov et al., 2018) have a strong emphasis on sustainable timber production (see Figure 57 and Figure 58). This may be expected from SFIOs, such as in Turkey, but it can also be found in SFMO, such as in Poland.

After restitution processes and forestry reforms in many UNECE countries, the market orientation of several SFOs have been strengthened since 2000. This has been done either through the organizational separation of forest management and forest authority or through a stronger emphasis on profitability amongst SFIOs (Brukas, 2010, Sotirov, 2014, Stevanov and Krott, 2017). In cases where forest management was assigned to recently established enterprises (e.g., SFMOs in Austria, Bulgaria, Czech Republic, Lower Saxony and Serbia) their focus commonly switched to economic priorities. Most SFMOs furthermore retreated from an active advocate´s role that threated to disturb the timber market, such as for Metsaehallitus noted above.

The eighth criterion, *"Mediator of all interests in forests"* (see Table 7), relates to governance that goes beyond the implementation of legal regulations. It implies that SFOs act as mediators between stakeholder groups, for example, to address conflicting interests (e.g., between recreational and conservation interest). The data analyzed here suggests that this goal is successfully achieved by SFIOs (Stevanov and Krott, 2017), such as the USDA Forest Service,[40] the Federal Canadian Forests Service[41] or German ThüringenForst[42] (see Figure 58). Mediators furthermore often attempt to balance market and non-market orientations, such as the Canadian Forest Service and German ThüringenForst, or to even focus more on non-market goods, in accordance with stakeholder interests, such as by the USDA Forest Service (see Figure 58).

5.3.3.2 International representation of interest

At the international level, most SFOs that manage State-owned forests in Europe are also members of the European State Forest Association (EUSTAFOR), which currently consists of 33 State forest companies, enterprises and agencies from 22 European countries. EUSTAFOR represent, approximately one third of the forest area in Europe.[43] In combination, their annual harvest amounts to approximately 123 million m^3 of round timber and the forests provide employment for more than 100,000 people. The main objective of EUSTAFOR is to support and strengthen the capacity of its members to manage forests sustainably, to maintain and enhance the economic viability of forests, make forests more socially beneficial and culturally valuable, and promote ecologically responsible practices.

5.3.3.3 National representation of interest

At the national level, one example of a comprehensive umbrella association is the German Forestry Council (DFWR), which brings together SFOs at the State and federal level. This includes State and federal Ministries, State-owned

39 See https://www.ogm.gov.tr.

40 See https://www.fs.fed.us/.

41 See https://www.nrcan.gc.ca/forests.

42 See https://www.thueringenforst.de/startseite/.

43 See https://www.eustafor.eu.

TABLE 9

Cases of two types of State Forest Organizations

State Forest Organizations - SFOs	
State Forest Management Organizations **– SFMOs -** *Activities are restricted to the management of state-owned forests only*	Integrated State Forest Organizations **- SFIOs -** *Forest management and forest authority tasks combined*
Bulgaria, Croatia, Czech Republic, Lithuania, Poland, Bosnia and Herzegovina (Republika Srpska), Slovenia, Serbia, Ireland, Finland, Austria and Germany (Lower Saxony).	Turkey, United States of America, Canada, Russian Federation (2), Germany (Thuringia)

SFOs, as well as representatives of municipal and urban forests (e.g., German Association of Towns and Municipalities (DStGB)) and private forestry (e.g., German Forest Owners Associations (AGDW)). The DFWR furthermore include academia (e.g., forest faculties/colleges), the Association of German Foresters (BDF), IG Bauen-Agrar-Umwelt IG BAU, the German Farmers Association DBV, and many more.[44]

In North America, the directors of State Forestry Agencies from all 50 states in the United States of America are represented within their National Association of State Foresters (NASF).[45] NASF generate approximately a net annual asset of 1.7 million US Dollars, mainly from grants and fees, which is spent on several forestry programs. In Canada, the Canadian Association of Forest Owners (CAFO), is an actor that brings together members that manage over 15 million ha of public (Crown) forest and privately-owned forest land (covering 3 million ha). CAFO principally act as a lobby organization for the forest-based sector.[46]

5.3.4 Supporting forest management

SFOs perform forest management and forest authority tasks within two main organizational types in the ECE region. SFMOs includes the management of forests and State assets (e.g., land and mineral resources) to provide wood and NWFP, whereas SFIOs integrates policy formulation, law implementation and the provision of information and economic support. From the noted cases, 12 have been categorized as SFMOs and 6 as SFIOs. It should nevertheless be noted that no clear-cut distinction between SFMOs and SFIOs exists. For example, SFMOs are sometimes assigned to implementation forest authority tasks, such as advising private small-scale forest owners.

The commitment of both SFIOs and SFMOs to SFM, as noted in forest laws and other national and international policies, includes the provision of multiple benefits from State-owned forest to satisfy both the market and non-market demand. By doing so, all activities must be within the frame of sustainable forests. Additional requirement is economic viability. Finally, inter/cross-sectoral coordination and harmonization of forest-based issues is required and this political role is discussed under the aspect of interest representation.

5.3.4.1 Market demands

The first criterion, *"Orientation toward market demand"*, focuses on timber as the main product but includes traditional goods and services, such as hunting or renting State assets. A strong orientation toward market demand implies substantial market revenues generated by the organization (from 100 to 70 per cent of the total revenue comes from the market) and a strong marketing competence which consist of experts knowledgeable in domestic and export markets.

When these indicators, *"market revenue"* and *"marketing competence (decision ability included)"*, are applied to the empirical data, the orientation of all examined SFMOs varies between strong to moderate (see Figure 57). This implies that all SFMOs are significant and active suppliers to the national and international timber markets. Countries, such as Austria, the Czech Republic, Finland, Germany and Ireland, have established professional marketing competence and achieve substantial market revenues (see Figure 57). The Czech SFMO builds on short-term concessions for harvesting and wood, where a competitive bidding system supports market orientation (Stevanov and Krott, 2017).

44 See http://www.dfwr.de/index.php/about/mitglieder.

45 See http://www.stateforesters.org/.

46 See http://www.cafo-acpf.ca/.

For the SFIOs, the goal to satisfy market demand and generate profits are integrated into a broader set of objectives and functions. For instance, cases like the German *"ThüringenForst"* demonstrate that reasonable profits can still be achieved (see Figure 58), however, SFIOs will also accept lower profits resulting from legal obligations to provide non-market goods and services to the public. Examples include the United States Department of Agriculture (USDA) Forest Service and the Canadian Forest Service.

5.3.4.2 Non-market demands

Most NWFPs are not included in market demand. Recreation and public health, biodiversity conservation, clean water, protection from natural hazards (e.g., flooding and avalanches) and soil erosion are all important non-timber services provided by forests. According to legislation that exists in most of the European countries, State-owned forests, managed through SFOs, are obliged to provide these services to the public.

Optimized non-market supply needs precise decision criteria and comprehensive planning as a substitute for missing market signals (Stevanov and Krott, 2013). This in turn requires complex, technical expertise, which exists in many SFOs. Aside from optimal steering there is also the demand for specific budgets for non-market goods and services (meaning ≥ 30 per cent of total revenues). For example, establishing the right amount of tourist facilities in a forest requires sound planning and specific budgets, otherwise, the danger of internal cross-subsidizing is high. Cross-subsidizing means that revenues from timber sale would be used to cover the cost of non-timber services provision, which is neither sufficient (e.g., high costs associated with establishing tourist facilities) nor without impacts (e.g., potential effects on timber prices). Finally, supply of non-market goods and services needs independent auditing to account for any long-term effects.

Three mentioned indicators, *"plans for production/provision of public/merit goods"*, *"financial inflow for public/merit good production"* and *"auditing"*, are used to assess and compare non-market orientation of the SFIOs. Figure 57 and Figure 58 illustrate that SFIOs, in practice, achieve a higher supply of non-market goods than do SFMOs. One example is the USDA Forest Service. In contrast, the SFMOs' orientation varies between weak and moderate (see Figure 57). However, an example of an SFMO that is a significant supplier of non-market goods is Metsaehallitus in Finland. Metsaehallitus has profit centres for different types of forest goods and services, with specific and separate financing. Cross-subsidizing is not possible under these conditions, as deficits in non-market supplies must be financed by credits (Metsaehallitus, 2016).

5.3.4.3 Sustainable forests

The third criterion, *"Sustainable forests"*, means that healthy and vital trees are grown on healthy soils and that the productive capacity of the forest is maintained for sustainable timber production and the provision of related forest goods and services. Harvesting is as such an integral part of the concept insofar it stays within strict ecological limits, comprising soil condition, stands (e.g., defoliation, damages by biotic/abiotic/human agents), sustained yield (increment and felling) and harvesting techniques.

SFM is a key feature of modern forest governance and a prerequisite for the long-term provision of all forest goods and services. The overarching goal of SFM is formulated in national or sub-national forest laws in all UNECE countries (Krott and Stevanov, 2008, Živojinović et al., 2015, Meidinger et al., 2018). While all SFMOs follow these laws, SFIOs also have to control and/or monitor national implementation. A strong means for fulfilling this obligation in practice is a well-developed forest management planning system. All SFOs have maintained such planning systems for decades (or even centuries), integrated with continuously modernized inventory techniques. Differently from private forests, forest management plans in State-owned forests cover the total forest area (Stevanov and Krott, 2017).

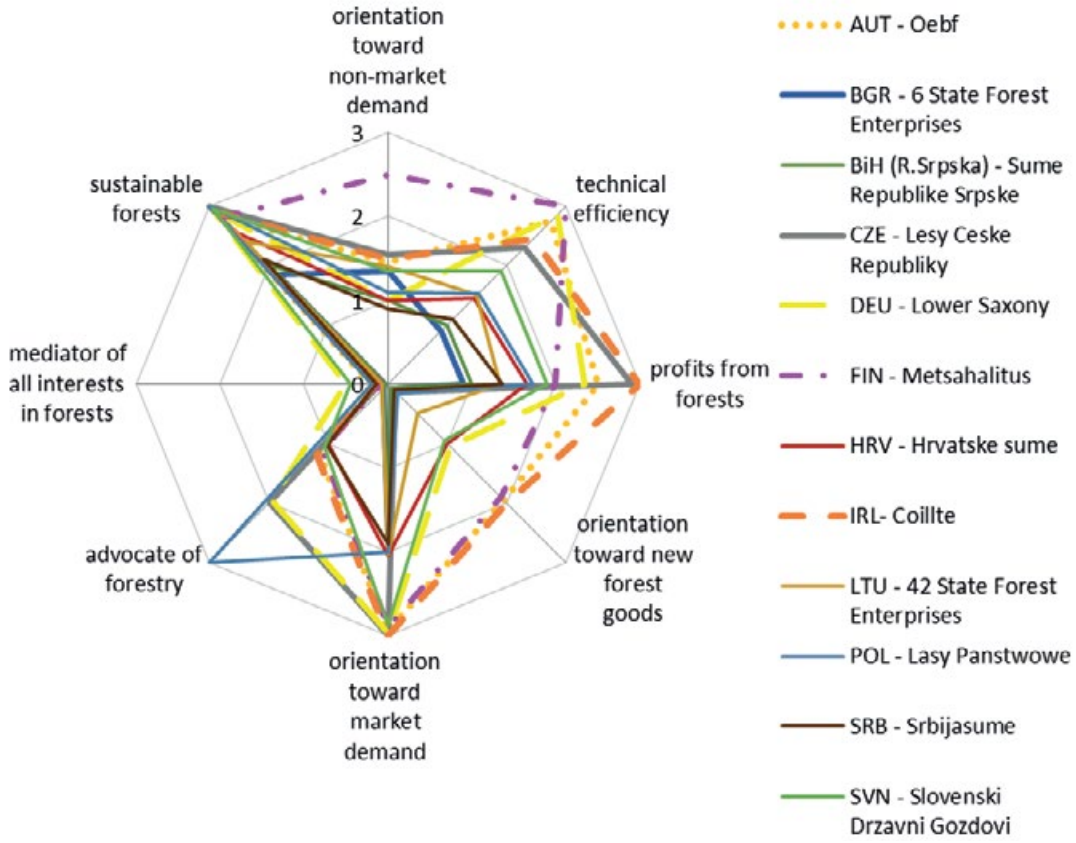
The sustainability of forests can be monitored through forest inventory. Important basic inventory indicators are changes in forest area, standing volume and increment. Recent data from the countries examined in this study indicate that forests on state-owned land are sustainable at the national level (Stevanov and Krott, 2017). Even if forests are sustainable in the ECE region, regional imbalances can be observed in some countries. Forest stands in technically inaccessible places cannot be harvested in an economic feasible way, for example because of a lack of infrastructure such as roads (Stevanov and Krott, 2013). The overall wood demand is accordingly covered by relying on the resources of accessible forests, often driving the harvesting beyond the regional limit (e.g., Serbia, Bosnia and Herzegovina - Republika Srpska) (Stevanov and Krott, 2013, Stevanov et al., 2018). This presents a problem which is not easily solved when financial resources are insufficient to construct the necessary forest infrastructure.

5.3.4.4 Economic viability

The criterion of economic viability comprises technical efficiency of production, designing new forest goods and services and achieving optimum profits. Priority of achieving profits depends on SFO´s orientation toward markets, whereas profitability is not a meaningful goal within the orientation toward non-market demand (e.g., services of general interests cannot be fulfilled due to a profit-making concept).

FIGURE 57

Performance of State Forest Management Organizations (SFMOs)



Legend: ordinal scale (3) strong, (2) moderate, (1) weak, (0) zero performance.

Technical efficiency

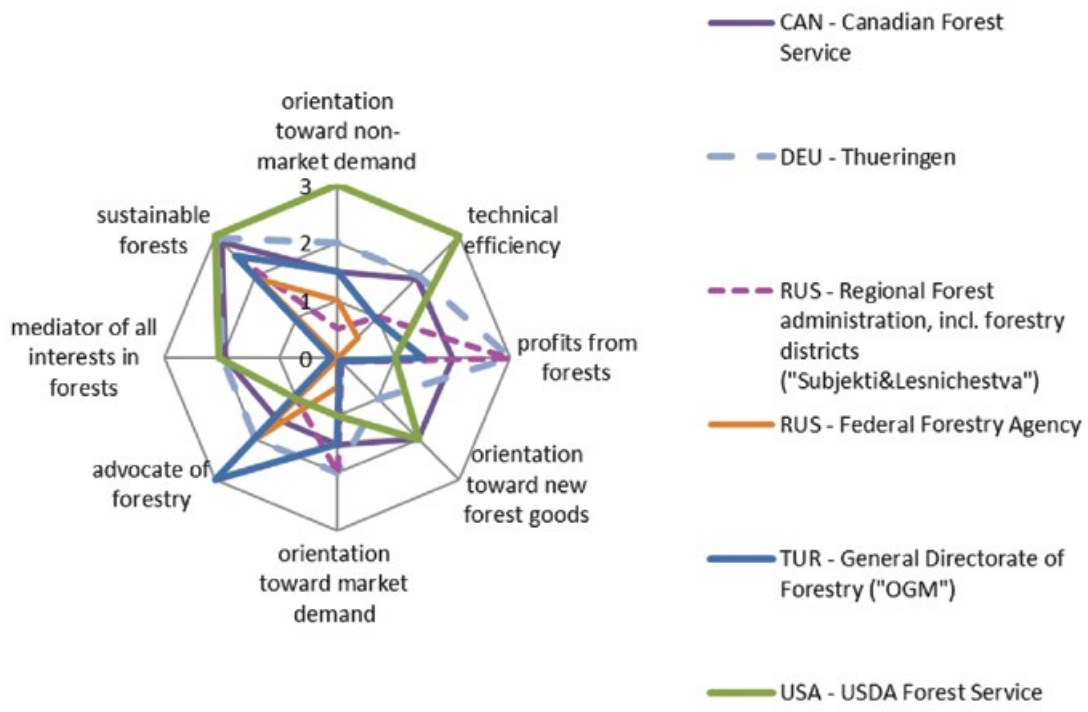
Technical efficiency implies meeting production goals with minimum inputs. Regarding timber production, the indicator *"technical productivity of work (relative, m³/person)"* demonstrate significantly different work productivity between SFMOs (see Annex II). These differences are, in part, caused by natural conditions (e.g., mountain to lowland forests cannot be equalized) as well as by different forest management approaches (e.g., different silvicultural techniques) and infrastructure (e.g., forest roads and machinery). The leading SFMOs in terms of work productivity are Finland, Austria, Germany and the Czech Republic (see Annex II). Weak productivity is found especially in countries where there is high unemployment and low salaries (e.g., Bulgaria, Lithuania, and Serbia) for both SFMOs and SFIOs (Stevanov and Krott, 2017, Stevanov et al., 2018).

Contracting and outsourcing work, including long term tenures and licenses, is an important step to increase technical efficiency. Private firms claim to be efficient forest operations. Their share in operations in State-owned forests vary significantly. For example, in Slovenia, which use 100 per cent contractors with tenures for all the operations on State-owned forest, show that high technical efficiency is achieved. However, contracting and leasing requires comprehensive control by SFOs. Leaseholders and contractors can rarely be forced to fulfil all SFM requirements in practice, such as reforestation or sustainable harvesting. Successful and environmentally sound technical efficiency can for this reason only be guaranteed when SFMOs or SFIOs are able to adequately oversee forest operations.

Technical efficiency related to non-market demand cannot be measured by simple indicators, however, proxies can be used, such as the existence of comprehensive managerial accounting systems. For example, without comprehensive internal accounting, the SFOs would not know the cost of producing specific products and/or services. This would mean that the SFO is unable to facilitate improved technical

FIGURE 58

Performance of Integrated State Forest Organizations (SFIOs)



Legend: ordinal scale: (3) strong, (2) moderate, (1) week, (0) zero performance.

efficiency. Whereas missing information related to costs and inputs is a general weakness amongst State organizations, SFOs dealing with timber production generally have long standing experiences with accounting. These experiences can be used to build comprehensive accounting systems that cover both market and non-market functions. Nevertheless, the results indicate significant variations in the standard of SFOs´ accounting systems throughout the ECE region (Stevanov and Krott, 2017). While most SFOs have renewed their accounting systems, only some meet a high standard by also including non-market goods and services (e.g., Austrian, Finish and United States of America SFOs). In other cases, countries perform worse due to inflexible bureaucratic rules (red tape) and/or disincentives caused by corruption.

Profits from forests

All the SFMOs in this report make profits from the forests that they manage (see Figure 57). Profits vary between 2 and 130 EUR per ha/year. This depends on the natural and economic conditions of the forest in question but also on the SFOs production efficiency and marketing. In general, SFOs have become more profit-oriented over the last decade and have consequently increased associated competences needed to increase profitability (Stevanov and Krott, 2017).

One general characteristic of all SFOs is that profits must be shared with the forest owner, in this case, the State. The amount, such as the share of the profits that SFO must transfer to the State, varies significantly. For example, in 2014 and 2015, the Polish State Forests (Lasy Państwowe) transferred 193 million EUR, the Austrian Oebf transferred half of its annual profit as usufructure, and the Finnish Metsaehallitus transferred more than 100 per cent due to property sales. In cases where the legal framework allows the SFO to retain large parts of its profits, this creates an incentive to push the profitability goal forward. For example, the Polish State Forests (Lasy Państwowe) has acquired considerable economic strength through profitable forestry (Chudy et al., 2016). Conversely, when most of the surplus is delivered to the State, this is experienced as a disincentive for SFOs. Recent data furthermore demonstrate that SFIOs also support profit-making in State-owned forest (see Figure 58), even though, SFIOs must provide public goods and services that are of public interest, without generating revenues.

New forest goods and services

Making use of the forest as a natural resource requires continuous investments into innovation to develop new forest goods and services. SFOs, due to their significant capacities in terms of organizational, financial and human resource, have a significant potential for innovation. Thus, in many countries, innovation in forestry is not possible without the support from SFOs.

New forest goods and services may involve either the transformation of exiting goods and services or the creation of fully novel products. This implies that the development of new forest goods and services also require market knowledge, related to both existing and emerging markets. The results do however suggest that SFOs rarely develop knowledge and marketing related competencies that can help to facilitate the uptake of new products and/or services (Stevanov and Krott, 2017). For example, the Austrian SFMO demonstrate that the work it carries out on nature-images (*"Wald ist Natur"*) has a lot of innovation potential, such as new services, but that it requires strong marketing competencies to implement in practice.

Research and development also imply high risks, as many innovative ideas will never be taken up by the market. Innovation therefore not only require significant investments but also the willingness to accept risks associated with unsuccessful goods and/or services. In principle, SFOs, as State-controlled entities, do however have the potential to take on higher risks associated with the innovation process. In practice, however, formal budgeting processes (e.g., red tape) often tend to hinder the ability to invest into new and innovative ideas. The result is that new and innovative grassroots ideas rarely make it into financed innovation projects.

The engagement of external partners is an important factor that can help stimulate innovation such as the financing and development of new and innovative goods and services. However, the evaluation (Stevanov and Krott, 2017) suggest that SFOs are not very active and successful in gaining new partners, to date (see Figure 57 and Figure 58). Only the USDA Forest Service takes the lead in innovative networking based, in part, on well-developed communication through new media channels. Using social media, the USDA Forest Service is providing specific information for target groups within civil society aiming to involve them into SFM of State-owned land.

Developing new forest goods and services should be an important area of work for SFOs, however, when reviewing the indicators *"professional market information"*, *"investments into new forest goods"* and *"new external partners"*, SFOs demonstrate limited progress in most countries, despite a significant potential for innovation.

5.3.5 Conclusions

Guaranteeing services of public interest

Forests are a key natural resource that contributes to public welfare and health through the provision of goods and services that are of public interest. The State consequently has a responsibility to ensure the implementation of SFM in State-owned forests. SFOs contribute towards achieving SFM, in practice, through multifunctional forest management that helps to satisfy demand for market and non-market goods and services, providing economically sound management of State-owned forests and playing an active role in the use and protection of forests.

Professional public and market-based financing of State forests

State-owned forests principally have two different sources of financing available, namely, market-based and/or State-based financing. The cases in this report showcase that the separation of the two inflows increases efficiency and removes obstacles for receiving financial support from international financial programs. Preventing cross-subsidizing helps to ensure that there is no economic bias, if State-owned forests are allowed to receive financial subsidies for the provision of non-market goods and services in the same way that private forests are.

Gap in public financial support for sustainable forests

Sustainable forests require infrastructure, such as forest roads and transport infrastructure. Results presented in Section 5.3.4.4 demonstrate that in countries where the infrastructure is not adequate, the forest-based sector is often unable to meet the minimum standards of SFM. This issue is relevant for both private and public forests.

Strong market supply of the timber from State-owned forests

The assessment carried out for this report indicates that SFOs are significantly oriented toward market demands, supplying national and international markets with timber. In some countries, SFOs are in fact competitive actors on the market, while in other countries (e.g., with economies in transition) there is a need to reduce timber market restrictions and to improve (professional) marketing activities of SFOs.

Economically viable management of State forests

All SFMOs generate some profit, while in some countries SFMOs even generate substantial revenues and take the lead in technical efficiency. Due to the provision of goods and services that are of public interests, profitability is not always a priority for SFOs. In countries with high unemployment, employment security provided by SFMOs can limit progress in technical efficiency.

Underused potential in innovative forest products and services

The analysis suggests that SFOs are not particularly successful in developing new forest products and services. Despite great innovation potential and available capital, including long-standing experience and access to expertise, flexible projects that focus on innovation are rare. New partners that have the expertise and can provide financial support is the most promising strategy to push SFOs towards innovation.

Underused potential as a mediator of all interests in the forest

Forests are the focus of multiple interests, from timber production to biodiversity and recreation to climate mitigation and protection. These sometimes opposing interests can generate conflicts on the ground. SFOs are however in a unique position whereby they can help to resolve ongoing conflicts through mediation. The analysis does however suggest that relatively few SFOs are active in terms of successfully mediating different interests. There is as such a high potential for most SFOs to mediate significant forest-related conflicts in the future.

Best practice of optimizing multiple tasks through profit centres

Multiple functions of SFOs, market based and non-market based, represents a unique ability for the State to guarantee SFM in State-owned forests. At the same time, the complex range of activities carried out by SFOs creates a challenge in terms of optimizing organizational and management related activities. Best practice cases exemplify that identifying and specifying different tasks clearly and organizing management activities through (financially) independent organizational units (profit centres) can help to improve organization performance.

Best practice cases of financially unbiased competition between State-owned forests and other owners' forest

Best practice cases (e.g., Austria and Finland) show that the clear specification of otherwise complex and diverse tasks in State forests provides the basis for fair competition amongst all forest owners (or those otherwise in charge of forest management). It helps to prevents cross-subsidizing of production/provision of non-market goods from State forests by revenues generated from selling market goods, and it enables SFOs to obtain financial support from public sources needed for the production/provision of non-market goods and services demanded by the public.

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5.4 Private forest owners organizations in the ECE region

5.4.1 Introduction

Private forest owners in the ECE region can be numbered in the millions, however, more than 60 per cent of these forest owners have forest land that is considered too small for sustainable and economically viable forest management, including prospects for innovation and investment. In comparison, large private forest owners manage thousands of hectares (ha), in many cases even including their own wood processing companies. Given the varied economic importance depending on the size of the forest holding, private forest owners, particularly those on the small scale, are often overlooked by policy makers and organizations. Small-scale forest owners consequently find it more difficult to reach markets and gain access to relevant advisory services. Having this in mind, this section will explore the value of joint action and forest owners' organizations.

Forest owners' organizations (FOOs) are a diverse group of associations that have the common objective of facilitating forest ownership and management. Membership in a FOO is generally voluntary, but mandatory in a few cases (e.g., Austria). FOOs have been formed through bottom up approaches (e.g., Sweden) or through top down processes (e.g., Latvia and Slovakia). Target groups range from individual forest owners to municipalities and commons to large scale forest enterprises. There are also organizations that bring together smaller organizations at the national or international levels, such as the Confederation of European Forest Owners in Europe (CEPF)[47] and the Union of Foresters of Southern Europe (USSE)[48], or that organize trade for corporations, such as the National Alliance of Forest Owners in the United States of America.[49]

Using available data on private FOOs in the ECE region, this section aims to explain why and how private forest owners are organized, and how such organizations are evolving. It will also consider the wide variety of FOOs that presently exist as well as their main functions.

5.4.2 Methods and Data

The data used for this section is based on information provided by national correspondent for the FACESMAP/ UNECE/FAO Enquiry and the FACESMAP Country Reports. Data on the organization of forest ownership, joint actions

for private forest owners and FOOs from both the enquiry and country reports were combined and contrasted through a comparative analysis (see Table 10).

Quantitative data regarding forest ownership structures and the size of forest areas were used to assess the importance of the private forest sector and the potential for establishing FOOs at country level. Qualitative data were also considered when joint action of forest owners was mentioned in the responses provided either to the enquiry or in the country reports.

Different terminology is used to describe and analyze FOOs across the ECE region. Expressions that are used in the country reports include: forest owners associations (FOA), cooperatives (FOC), commons, community woodlands, corporations, municipality forests, joint properties, communal land-owners, small-scale forest owners, etc. Figure 59 demonstrates how these terms are derived and used.

Forest owners' organization (FOO) is used here as a general term for any institution where members are forest owners. Depending on the country, other terms for FOOs are:

Forest owners' associations (FOA) - usually understood more generally as voluntary organizations, with open membership which depend on fees or other financial support.

Forest owners' cooperatives (FOC) - members own forest or shares and usually have common business interests.

47 See http://www.cepf-eu.org/.

48 See http://www.usse-eu.org/en/inicio.

49 See https://nafoalliance.org/.

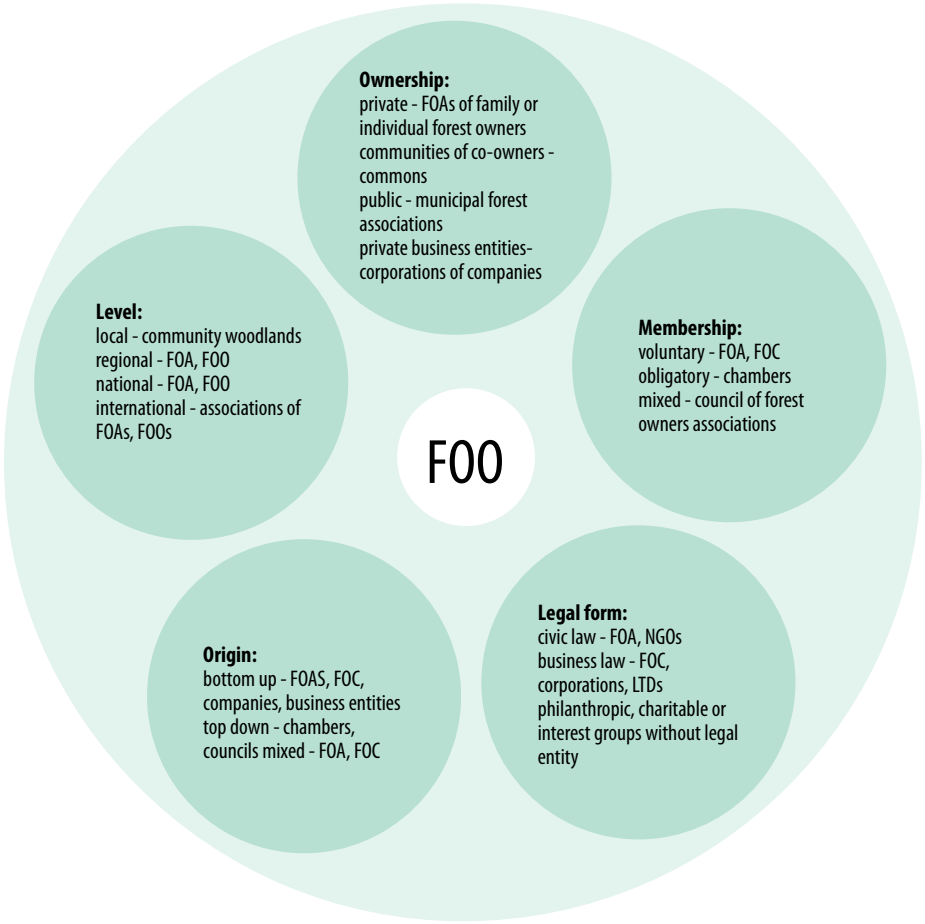
TABLE 10

Data sources

Forest Ownership – National Data Reporting Forms		FACESMAP Country Reports
Quantitative	**Qualitative**	
• Area of forests and forests available for wood supply (FAWS)	• Forest management (supervision of forest management)	• Forest ownership structure
• Area of forest by management status	• Illegal logging (effect of illegal logging on ownership)	• Changes of the forest ownership structure in last three decades
• Area and number of forest properties	• Policy questions (policy influence on the development of forest ownership)	• Charitable, NGO or not-for profit ownership of the forests
		• Common pool resource regimes
		• Forest management approaches for new forest owner types

FIGURE 59

A map of terminology for FOOs in the ECE region



Abbreviations: Forest owners' associations (FOAs); Forest owners' cooperatives (FOC, Non-governmental organization (NGO); and Limited company, business organization (LTD).

5.4.3 Purpose and function of private forest owners' organizations

5.4.3.1 Why do private forest owners organize?

Motives for private forest owners to organize are driven by changes in social, economic and political environments. FOOs have mainly been established for the joint marketing of timber, the coordination of joint forest management and investments activities, or the representation of forest owners' interests (Mendes et al., 2011). For example, many private forest owners in South Eastern Europe are supported by associations that help them in managing their forests (e.g., silviculture, harvesting operations and access to timber markets) and to represent their interests by lobbying political parties, civil servants in ministries/governments. These developments have occurred in order to improve the social and economic situation of private forest owners (Glück et al., 2010).

In the ECE region, it has been reported that the main purposes for FOOs are to:

- Promote the visibility of private forests and encourage dialogue with public agencies;
- Increase the bargaining power of forest owners;
- Facilitate access to forest products markets, including better prices for timber;
- Increase profits by adding value to forest products down-stream, such as running own wood processing industries;
- Jointly develop forest management plans;
- Facilitate access to forest technologies, including modern technical systems and marketing support;
- Improve forest management practices and increase wood mobilization;
- Share costs of improvements and investments, such as forest roads, technologies and rural development projects;
- Access information and know-how;
- Ensure common forest protection, such as forest fires and biodiversity maintenance;
- Arrange certification of forest management;
- Reduce transaction costs (bureaucracy).

5.4.3.2 How are FOOs established?

Most of the FOOs operate on a voluntary basis, however, as participation is mandatory in some countries (e.g., Austria and Hungary), FOOs are occasionally also initiated by the State. This implies that their establishment and management is supported through legislation and/or public subsidies. For instance, in some Central Eastern European countries, States have supported the creation of forest owners associations and co-operatives by using economic tools (e.g., rural development measures in the Czech Republic) or through regulatory instruments (e.g., restitution laws in Romania) (Sarvašová et al., 2015, Weiss et al., 2012). Financial incentives provided by the EU were an important factor affecting the formation of FOOs and co-operatives in Portugal (Mendes et al., 2006). There are furthermore examples where the establishment of FOOs were primarily driven by international cooperation, such as the case of Food and Agriculture Organization of the United Nations (FAO projects) in Serbia, the North Macedonia, or Phare-funded projects[50] in Slovakia (Weiss et al., 2012).

5.4.3.3 Why do some forest owners not join FOOs?

Many private forest owners in the ECE region do not belong to any FOO. It has been reported that private forest owners are reluctant to join FOOs for a number of reasons. These include, amongst other things, the legacy of imposed cooperatives during the socialist period in Eastern Europe, lack of trust, conflicts with other interest groups and high transaction costs. At the other end of the spectrum, it has also been noted that *"free rider"* problems occur in countries where the FOOs have become influential. For instance, in some cases forest owners choose not to join or contribute because they can still benefit from the FOO, through for example access to markets, services and know-how, without paying for the membership.

5.4.3.4 Functions of private FOOs

Data from the FACESMAP/UNECE/FAO Enquiry and the FACESMAP Country Reports indicate two prevalent types of private FOOs that have distinct functions:

1. **Interest groups**: These have the primary function of representing the interests of private forest owners in the public domain (e.g., advocating and influencing policymaking). These organizations have become important actors of the forest-based sector that principally act as lobby groups.
2. **Management organizations/service providers**: These have the primary function of providing services and support to forest owners. They focus on joint or cooperative business, forest management, and the provision of technical, financial, information and marketing support as well as knowledge sharing.

50 The Phare programme is one of three pre-accession instruments financed by the EU to assist countries of Central and Eastern Europe in their preparations for joining the EU.

Many FOOs are able to provide both functions. For example, Swedish FOOs display the general characteristics of a cooperative (e.g., cooperative constitutes an economic business with joint actions between members) and acts a democratic association that engage policymakers. Forest owners are assumed to become members for social and other reasons, but their interests are often linked to their individual activities and benefits. To deal with this duality, FOOs in Sweden have introduced other services, such as management planning and tax advice services, silvicultural operations at the forest owner´s request, as well as events (e.g., forest-days and evenings) for their members. This ultimately means that employees of the cooperative represent the private forest owners not only in the dialogue with authorities but they also advocate for policies concerning business in the timber market and in various forest-related fora. Lobbying of government and other authorities is however mostly handled by the Federation of Swedish Family Forest Owners (LRF Forest), an umbrella organization for the Swedish private forest owners.

5.4.4 Organizational levels

Typically, next to international organizations, there are also umbrella organizations at the State and national (federal) level as well as FOOs at the regional and/or local level.

5.4.4.1 International organizations

Several organizations actively represent forest owners' interests at the international level. Examples include the European Landowners Organization (ELO),[51] which is an umbrella organization of forest, agricultural and fishpond owners. There is also CEPF, which is the umbrella association for 19 national FOOs in Europe (covering 60 per cent of the total forest land in Europe), and USSE, which represents regional or national FOOs from Portugal, Spain, the Basque Country, Aquitaine and Greece.

Other organizations that represent family forestry in specific regions of Europe include the Federation of European Communal Forests (FECOF),[52] the Confederation of Forest Owners from the Iberian Peninsula (CONFI)[53] and the Association of Mediterranean Forests Owners.[54] It is also worth noting an Agreement on Cooperation between FOOs from South-Eastern Europe (covering Bosnia and Herzegovina, Croatia, Montenegro, the North Macedonia, Serbia and Slovenia). This agreement covers a regional consensus on mutual cooperation, networking, project preparation, exchange of information and experiences, as well as possibilities for certification and standardization.

5.4.4.2 National organizations

The data demonstrate a considerable variety of FOOs that are typically active at the national level, representing all types of private forest owners. FOOs can be found organized into regional sub-units (such as the Irish Farmers' Association,[55] which has 946 branches and more than 88,000 members), representative and collaborative bodies (such as the Romanian Association of the Forest Owners and Managers from the East of Transylvania, which unites seven independent forest management enterprises and five forest owners unions) or nationwide umbrella organizations (such as the Council of FOAs, which unite 4 largest Non-state Forest Owners Associations in Slovakia). There are also cases where FOOs have developed to become national organizations with the objective to support other FOOs (such as FORESTIS,[56] founded in 1992, which has developed into a non-governmental organization (NGO) that represent 31 FOOs and approximately 15,000 forest owners in Portugal).

There is generally only limited support for FOOs provided by States or local authorities, particularly with regards to administrative costs. This means that for forest owners that have small forest holdings, the transaction costs related to joining a FOO can be higher than the benefits. Nevertheless, in cases where forest owners do get external support, such as financial and/or in-kind contributions (e.g., technical support), FOOs can fulfil and ensure the provision of relevant services. Access to external support is however often temporary. This means that when it is withdrawn, many FOOs end up having to stop their activities, such as in Serbia and the North Macedonia. This would imply that long-term FOO survival depends on having sustained support at the State-level, either through monetary incentives (such as in South-Eastern Europe), supportive legislative frameworks (such as in the Czech Republic), or through States having a single representative body for policy negotiations (such as in Poland and Slovakia).

The main aim for national umbrella organizations tends to be interest representation, as stakeholders and political actors, and the provision of technical support and information. The dissemination of information generally occurs through internal information sharing, public information services (e.g., awareness raising), and education and knowledge transfer for members, as facilitated by the FOO or in collaboration with governments, academia and/or through other joint ventures.

51 See https://www.europeanlandowners.org/.

52 See http://www.fecof.eu/fecof/en/About%20us/.

53 See http://www.cepf-eu.org/page/confi.

54 See http://www.arcmed.eu/.

55 See https://www.ifa.ie/.

56 See http://forestis.pt/.

5.4.4.3 Local organizations

According to the FACESMAP Country Reports, representative organizations at the local (or municipal) level tend to focus on joint work in the forest, joint purchase/use of forest machines, road construction and/or other services for its members (Živojinović et al., 2015). Regional communities or associations furthermore tend to focus on joint marketing of timber and the organization of training courses, information events and excursions (e.g., Austria, Slovakia and Slovenia).

5.4.5 A regional overview

5.4.5.1 Northern, Western and Central Europe

Although we find a wide range of FOOs throughout the ECE region, many countries have reported that private forest owners are generally not inclined to create or engage in cooperative and/or joint actions. FOOs are nevertheless more developed in certain regions, covering Northern, Western and Central European countries (e.g., Austria, France, Finland, Germany, Norway, Sweden and Switzerland).

In **Northern Europe**, private forest owners started to organize themselves into forest owner cooperatives and associations already at the beginning of the twentieth century. For example, according to the survey data, in Finland 79 forest management associations (representing 74 per cent of forest owners) covered 84 per cent of the private forest land in 2015. There are moreover a growing number of FOAs in larger Finnish cities that lobby for improved services and outreach activities directed towards absentee and urban forest owners (Hamunen et al., 2015).

Another example is the four main FOAs in Sweden, which include 111,000 members, covering a total area of 6,15 million ha. This corresponds to 53 per cent of the privately-owned forest land in Sweden (Kronholm, 2015). There are also a few smaller FOCs, which have refrained from merging, as well as some local FOOs based on other types of principles, such as forest commons and women's networks (Andersson and Lidestav, 2016). In Norway, the forest is typically managed by the forest owners themselves. Active forest owners are often members of one of the two national FOOs, Norskog[57] or the Norwegian Forest Owners' Federation.[58] There are also two active FOOs in Iceland, the Icelandic Forest Owners Association,[59] an umbrella organization for 5 regional associations, and the Icelandic Forestry Association (IFA),[60] covering 61 local FOAs.

In **Western Europe**, a long tradition of FOOs means that they are well represented. For instance, in France, there are 20 regional FOCs, which are represented at the national level by the French Forest Union.[61] In total, the FOOs have 120,000 members, covering a total of area of 2.2 million ha.

In **Central Europe**, different types of FOOs are evident throughout the region. In Austria there are three main FOOs that are active at the federal level. The Austrian Chamber of Agriculture represents all forest owners as membership is compulsory by law. The Austrian Forest Owner Cooperative has eight provincial organizations, which are organized into 234 local forest owner cooperatives. These FOOs represent 43 per cent of the forest owners. The Austrian Association of Farm and Forest Owners consist of six member organizations that represent approximately 700 large forest owners and farmers, covering about 33 per cent of forest area. In the state of Baden-Württemberg in Germany, one in four urban forest owners hire the forest administration to manage their forests. Bavaria has an old tradition for forest owner associations where the number of paying members have been steady for a long time.

In other parts of Central Europe, the restitution and privatization processes, which started in the 1990s, have resulted in heterogeneous forest ownership structures, a large number of private forest owners, and a wide range of forest owners' associations. For example, in the Czech Republic, there are nowadays 530 members, covering 377,000 ha of forest land, associated with the Association of Municipal and Private Forest Owners.[62] In Poland, six associations of private forest owners are represented by the Polish Union of Private Forest Owners,[63] which was established in 2011. In comparison, Slovenia, with the highest share of private forest owners in Europe, has 86 cooperatives that support private forest owners in their forest management. The Forest Owners' Association of Lithuania[64] has 29 regional units, in 13 districts. It has two types of membership, more than 6,500 private forest owners, and 39 forest companies that provide services to forest owners. The Latvian Forest Owners Association[65] reports that there are about 10 active organizations in Latvia today. At the local level, relatively small organizations are active, having between 10 to 50 members (Vilkriste, 2011). In Estonia, approximately 8 per cent of forest owners (usually larger forest owners) are members of FOOs, covering roughly a quarter of the total private forest land.

57 https://norskog.no/.

58 See https://www.skog.no/.

59 See https://www.skogarbondi.is/english.

60 See http://www.skog.is/forest/.

61 See https://www.ucff.asso.fr/.

62 See http://www.svol.cz/english/.

63 https://pzzl.pl/eng/.

64 See https://forest.lt/go.php/eng/About-FOAL/80/3/46.

65 See http://www.mezaipasnieki.lv/.

5.4.5.2 Eastern, South-Eastern and Southern Europe

The development of forest owners' organization in **South-Eastern Europe** started later as compared to other areas in the ECE region. Examples include Croatia, where only a few private forest owners' associations existed prior to 2005 but where the number increased to 49 by 2014 (Posavec et al., 2011). The opposite trend has been reported in Serbia, where 22 local associations had been launched by 2006 but where only three of them are still active today.

In **Southern Europe**, FOOs have started earlier in the twentieth century. In Spain, the first FOO was established in the 1980s, in Portugal 19 FOOs emerged in 1977, and in Greece, the main actor for non-state forests was founded already in 1926. For instance, in Greece, where only 8 per cent of the forest land is private, the FOO has about 120 members, although the total number of private forest holdings is close to 3,000.

The extent to which private forest owners are organized is, generally speaking, notably lower in Eastern and South-Eastern Europe owing to the prevalence of State-owned forests. Similarly there is no evidence of FOOs in the Russian Federation, Ukraine, Georgia and Turkey, as all forests in these countries remain State-owned.

5.4.5.3 North America

Most private forest owners in North America do not belong to a FOO. According to the FACESMAP/UNECE/FAO Enquiry, there are approximately 450,000 forest owners, farmers, families and companies that own 6 per cent of the forest land in Canada. The Canadian Association of Forest Owners[66] represent everything from the largest private timberland company in British Columbia, with 325,000 ha, to small-scale forest companies (e.g., Christmas trees and maple syrup production), with 45 ha.

There is one national organization in the United States of America, namely, the American Tree Farm System,[67] which has 44,000 members, covering 8,9 million ha of forests. There are furthermore many state-level FOOs. In the United States of America, most forest-related laws and regulations are at the state-level, which implies that the representation of forest owners can vary substantially across the 50 states. There are also several large trade organizations for corporations, such as the National Alliance of Forest Owners (NAFO),[68] which has 80 members, covering 32,4 million ha.

5.4.6 FOOs according to types of ownership

The organization of private forest owners is ultimately determined by the tenure structure and legislative framework at the national level. For instance, legislative reforms in Central Europe has brought considerable

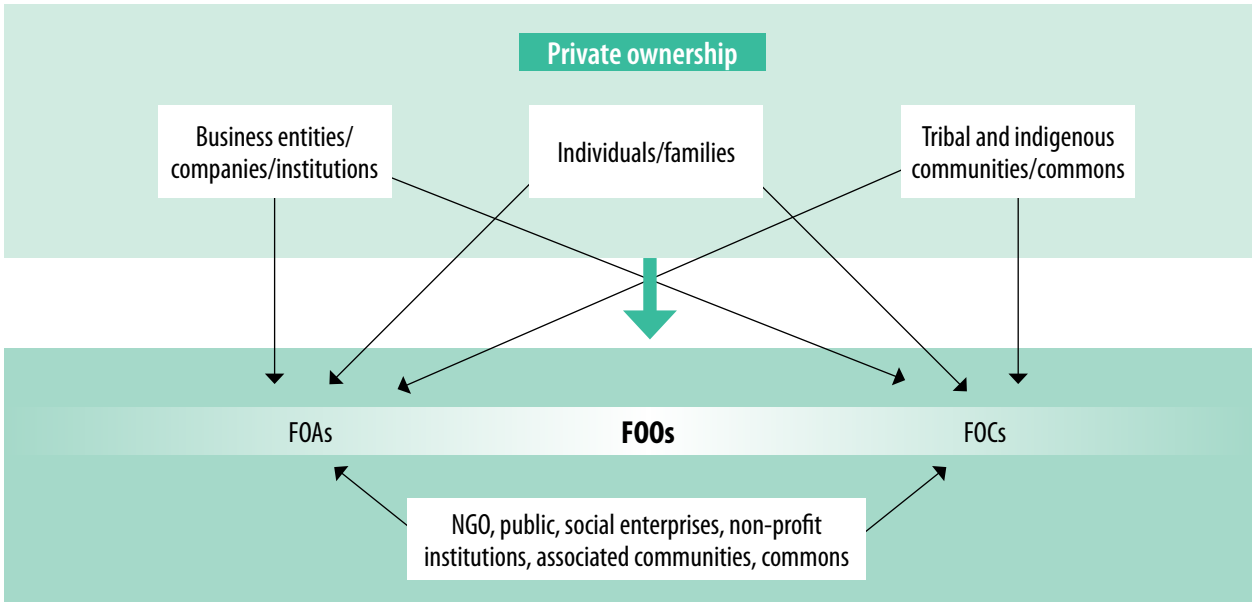
66 See http://www.cafo-acpf.ca/.

67 See https://www.forestfoundation.org/american-tree-farm-system

68 See https://nafoalliance.org/about/.

FIGURE 60

Links between FOO and private ownership



changes to forest ownership structures, including the rise of several FOOs in the ECE region. Examples include Hungary, where forest owners had to jointly manage their forest land (if it was during socialist period connected and formed as a single forest area or belonged to a single forest management) after privatisation in 1998. Or Estonia, where its National Forestry Development Programme has fostered joint wood sales through FOOs, which in turn has stimulated the establishment and continued development of FOOs.

Most private forest holdings across the ECE region belong to individuals or groups that own small estates, often fragmented into several plots. While it might be expected that this group of **small forest owners** has the most to gain from membership in a FOO, this is not the case. Many small forest owners simply consider their forest holding as being too small, or they do not know about FOOs, do not trust them, or they are not interested in forest management. For instance, in Austria, only 16 per cent of forest owners with holdings that are less than 10 ha are part of a FOO (Rametsteiner and Kubeczko, 2003).

Other types of forest owners (municipal or church) create their own organizations (such as in Central Europe). For example, in the Czech Republic about 60 municipalities decided to establish an association of municipal forests in 1992. It aimed to provide assistance and facilitate information and experience exchange between its members. Similarly, in Belgium, family forest associations were created in 1999, to allow better fiscal conditions and to avoid further land fragmentation (Živojinović et al., 2015).

From a legal perspective, there are several basic categories of private forest ownership that affect the prospects for FOOs, including private ownership by individuals and families, private business entities, private institutions, tribal and indigenous communities, and common forms of forest ownership. For instance, depending on the national legislative framework, types of common forest ownership could be characterized as a type of FOO (see Figure 60).

5.4.6.1 FOOs formed by individuals, families and private business entities

Private forest ownership can take several forms. Different FOOs are formed in this group of forest owners:

- The forest owner is a natural person or group (e.g., individual or family) but not a legal entity. The main focus of ownership is subsistence (wood supply for personal consumption) and/or supplying local markets with wood. These owners join FOOs as individual entities (e.g., FOAs in Serbia);
- The forest owner is a legal entity (e.g., entrepreneur, LTD or stock company). This includes also municipal forest enterprises, which become members of FOOs as single entities;
- The forest owner is represented by a large corporation of companies active in forest management and the wood processing industry (e.g., NAFO in the United States of America and forest industry organizations in Finland). These forest owners might be members of several FOOs.

5.4.6.2 FOOs in common property

The most regular form of common forest ownership are forest cooperatives, forest owners' associations and corporations. These can sometimes have the status of an NGOs (e.g., Croatia) or a public institution (e.g., France).

One type is a **contractual association**, or co-operative, of forest owners. This legal entity does not own the forest land itself as the ownership of the forest land remains with the members (e.g., Ireland). Decision-making can also vary. In some cases, decisions are proportional to the area owned by the member (e.g., France) or in other cases the *"one member - one vote"* principle is applied (e.g., Finland). These organizations are commonly not allowed to restrict or contradict members' economic interests (e.g., participation in the timber market in Sweden). In addition to organising and supporting members (e.g., through lobbying), large forest owner associations in Sweden also run processing industries. This means that the forest owner is a member, owner, customer and supplier (Lidestav and Arvidsson, 2012).

Another form of common forest ownership is when the forest owner has **transferred the individual user rights** to the cooperative or association. In turn, the members own shares of a common forest holding. These associations have special management bodies with decision rights and they are usually managed by forest professionals (e.g., Switzerland).

Yet another type of ownership can be found in Scotland where **geographical communities own land** under new rights created through the Land Reform Act in 2003. The land itself is owned by a legal entity that can be either a 'company limited by guarantee' or a Scottish Charitable Incorporated Organization (SCIO). Community members (e.g., residents and associates) can join the company or SCIO, however, the legal responsibilities and liabilities rest with the company. Benefits derived from the forest land are usually transferred to community facilities, such as schools, heating systems and affordable rural housing.

5.4.6.3 Other forms of FOOs as a common/shared ownership

Whereas the previous section covers forest ownership in terms of organizations that represent their members, other types of common forms of ownership can be distinguished. In this case, a group of individuals or entities can own a forest property in common. The shareholders are co-owners with exclusive rights, duties and benefits associated with the ownership.

A special type of shared forest ownership includes forest commons. In Central Europe, various forms of shared forest ownership have persisted over time. For instance, historically, peasants who used to manage state or aristocratic forests were often given user rights in those forests, sometimes even with full ownership rights in certain areas. This type of joint agrarian ownership still exists and is regulated by special laws in countries such as Austria, Hungary, Italy, Romania and Slovakia (known as urbar or composesorat). These traditional agrarian and forest communities are a form of collective ownership, legally recorded in the land register and with specific rules regarding forest management.

New types of commons have also been established (e.g., in Germany) whereby individual management rights are transferred to a forest owners' association (FOA). The associations make all decisions concerning forest management activities for their members forest holdings. However, the right to sell the property (alienation) remains with the individual forest owner and no changes are made to the land register.

Different FOOs also exist depending on the types of forest ownership noted above. FOAs and FOCs are for example supportive structures for forest owners, usually defined in national legislation, that have specific rules and functions for their members. Self-organized community-based institutions in forestry, such as NGOs (e.g., nature conservation associations that purchase forest land to extend nature reserve areas) as well as public and social enterprises (e.g., charitable organizations that focus on public benefits, local communities or the employment for disadvantaged people) may act as FOOs (Živojinović et al., 2015).

Other FOOs have been established based on specific interests. Examples include associations that support the development and expansion of private sector forestry in Central and Eastern Europe, afforestation of agrarian land in Ireland, women's networks in Sweden and Norway, protection against natural hazards in Switzerland or Portugal, PEFC certification in the Czech Republic, or association of church forest enterprises in Slovakia. In the United Kingdom, yet another type of association is emerging, namely, national associations that support people who have recently acquired woodland. Unlike place-based associations that have a strong connection to a particular area, these groups share information and experiences across the whole country.

5.4.7 Activities of private FOOs

Two general trends relating to activities carried out by FOOs can be found in the ECE region. There correspond with the functions of FOOs to:

1. represent forest owners' interests (e.g., political lobbying at national and international levels).
2. offer specialized support services for their members (e.g., business operations and/or forest management).

The representation of interests is based on advocacy and lobbying. FOOs furthermore offer education and advisory services to their members. More importantly is perhaps their work regarding public relations as well as networking and cooperation with other FOOs and State administrations. Business-related services are most often focused on joint markets, forestry operations and forest management plans. Additionally, forest certification or forest roads are common objectives of FOOs at the regional and/or local level

These functions often overlap. Some FOOs offer both management support and are active in lobbying. Information and training are usually also offered together. Countries in the ECE region reported several examples of FOOs active at different levels (national and regional) and in various fields. Reporting was incomplete, so lack of reference in Table 11 does not mean that particular activity does not exist in a country, or any FOOs do not provide it.

5.4.7.1 Representation of interests

FOOs which represent forest owners´ interests are known in many European countries (see Table 11). Even in the United Kingdom, where small forest owners associations are less dominant than in other European countries, there are specialized forest owner representative bodies, such as the Timber Growers Association which represents forest owners' interests in the Confederation of Forest Industries[69] (a body which represents large forest corporations and forest management companies more broadly) (Wightman, 2012).

Perhaps the highest development of providing support in representation of interests is observed in the Central European and Balkan countries. Even though private forest ownership is a rather new phenomenon in this part of Europe and owners are reported to be reluctant to organize themselves because of negative experiences of the former political system, there are a lot of private forests owners who call for protection of their needs and interests. Organizations,

69 See http://www.confor.org.uk/.

TABLE 11

Activities of forest owners organizations according to ECE sub-regions*

	Forest owners' interests	Forest management services
United States of America		• Joint marketing of timber
UNECE Central North Europe		
Finland	• Lobbying	• Joint marketing of timber • Forestry operations
Norway		• Joint marketing of timber • Forestry operations
Sweden	• Advocacy • Lobbying • Public relations • Tax advice • Education	• Joint processing and marketing of timber and wood-based products • Management plans • Forestry operations • Forest certification
West Europe		
Austria	• Advocacy • Education • Advisory services	• Joint marketing of timber • Joint forest roads • Management plans • Plans for biomass use
Belgium	• Advocacy • Advisory services	• Forestry operation • Joint harvesting
France	• Advocacy • Advisory services	• Joint marketing of timber • Management plans • NWFP market
Germany	• Advocacy • Education	• Forestry operation
Ireland		• Joint marketing of timber
Switzerland		• Forestry operations • Wood mobilization • Protection against natural hazards
United Kingdom	• Advocacy • Advisory services • Education • Networking	

	Forest owners' interests	Forest management services
Baltic countries		
Estonia	• Advocacy • Networking	• Joint marketing of timber • Forestry operations
Latvia		• Forestry operation • Fire wood market
Lithuania	• Advocacy • Education • Advisory services	• Joint marketing of timber • Management plans • Forestry operations • Hunting • Recreation
Central Europe		
Czech Republic	• Advocacy • Lobbying • Public relations	Certification
Hungary	Lobbying	Forestry operations
Poland	• Advocacy • Education • Public relations	
Slovakia	• Advocacy • Lobbying • Education • Advisory services • Public relations	
Balkans		
Bosnia and Herzegovina	• Advocacy • Lobbying • Advisory services	• Forestry operations • Joint marketing of timber • NWFP market • Certification
Bulgaria	• Advocacy	Forestry operations
Croatia	• Advocacy • Lobbying • Education • Advisory services • Networking	• Management plans • Joint forest roads • Fire wood market

	Forest owners' interests	Forest management services
North Macedonia	• Advocacy • Advisory services • Education • Public relations • Networking	• Forestry operations • Investments • Joint forest roads
Serbia	• Advocacy • Lobbying • Education • Public relations	• Joint marketing of timber • Forestry operations • Joint forest roads
Slovenia	• Education • Networking	• Joint marketing of timber • Forestry operations • Joint forest roads
Romania	• Advocacy • Lobby • Networking	• Forestry operations • Certification • Illegal logging prevention
South Europe		
Greece	• Advocacy	• Forestry operations
Portugal	• Advocacy • Advisory services	• Protection against natural hazards • Certification
Spain	• Lobbying • Advisory services • Insurance	• Management plans
UNECE South-East West		
Israel		• Forestry operations • Research

*No data is available for countries that are not listed.

usually known as forest owners' associations, were created to represent members' interests during the restitution and reprivatisation processes after the fall of socialist regimes. They established themselves as interest groups (economically inactive, dependant on external support) and have not always developed additional functions, especially in cases when they are active only as umbrella organizations at the national level. In general, the number of organizations representing owners in this region could still be considered weak because of barriers including lack of financial funds and legal basis for their activity, attitudinal issues, and the ageing of the rural population. Typically, they organize knowledge transfer and mediate different support measures between forest owners and supporting institutions.

In some countries (e.g., Austria, Belgium and Spain), national forest owners organizations focus on political representation (e.g., lobbying), but they also provide special services (e.g., insurance and certification) and technical support (e.g., assistance with claims for donations, advisory services and access to information). In Finland, the prevalent role of FOOs is to work actively towards improving the forest owners' position in the wood market.

5.4.7.2 Supporting forest management

One reason why private forest owners organize themselves is to obtain knowledge about how to manage their forests and to acquire the technological know-how and the necessary equipment and tools (Weiss et al., 2011). Most FOOs consequently support forest management activities and offer a range of management-related services. Some FOOs (e.g., cooperatives and corporations) principally address the business, economic and social needs of their members. These FOOs play a particularly important role in Northern Europe, especially in relation to timber harvesting and sale.

FOOs in Finland are often providing sellers' views on wood supply and demand, keeping records on cut-to-length distributions of different buyers, or are asking and comparing bids on behalf of owners). In Sweden, FOOs were initially established to facilitate the collection of timber in order to bring larger volumes of timber to the market. When the cooperatives could no longer reach their economic target by trading timber, some cooperatives started buying or established new sawmills and other wood processing industries. The Swedish FOOs have in this manner developed into cooperative enterprises (corporations). At present, the four main cooperatives in Sweden employ 4,400 people and have a combined annual turnover of 24 billion SEK (or 2.5 billion euro). The cooperatives have different systems for the distribution of profits; for instance, the biggest cooperative (Södra) applies a system whereby members are paid interest as well as extra payments when they deliver timber (Kronholm, 2015).

The type of support provided by FOOs across the ECE region do however vary significantly. In France, forest owners may collectively implement forest management plans or create infrastructure, execute prevention of natural disasters and ensure preservation, restoration and exploitation of natural resources. In Austria, cooperatives have been established to run biomass-based district heating plants (Weiss, 2004). In South-Eastern Europe, FOOs principally coordinate common activities, such as investments into infrastructure and marketing activities, to improve the economic viability and profitability of small forest holdings. This takes into account the significant fragmentation of forest properties in for example Serbia or the North Macedonia. It is typical for this type of FOO that the forest owners themselves perform all other forest management and silviculture operations (Nonić and Milijić, 2009).

In Portugal, FOOs principally provide important services through the provision of technical information about forest management operations, technical information about public incentive schemes for forest investment, preparation and monitoring of forest plans and afforestation works carried out by private contractors (Mendes, 2012). FOOs furthermore act as the management entities of Forest Intervention Areas,[70] where cooperative forest management is done to obtain economies of scale and to reduce the risk and severity of forest fires (Valente, et al., 2013).

In Lithuania, FOOs provide information, advisory services, teaching and education for their members. They also support timber trade, forest management plans, afforestation, forest cutting, improvement of recreational areas, marketing of forest products, evaluation of timber volume, sawn timber production, organization of hunting and agrotourism. Private forest owners can participate in various ways, from being full members to signing agreements that provide access to specific services.

In Scotland, there is a new type of FOO, which combines both representation, advocacy and services. The Community Woodland Association (CWA),[71] which was founded in 2003 by Scottish community woodland groups involve all sections of the community in planning and decision-making. Now with more than 200 community woodland groups, the CWA supports members in achieving their aspirations and potential, representing and promoting community woodlands on an international level, helping to restore native woodlands, and increasing the economic value of forestry to local communities.

5.4.8 Conclusions

FOOs are an important mode of forest governance that supports the sustainable management of private forests. They are often supported by governments as an effective tool to address challenges in the forest-based sector, such as increasing wood supply, climate change mitigation, rural development and biodiversity conservation.

The main objective for the majority of FOOs is to represent the interests of their members, such as in policymaking. FOOs furthermore play an important role in the provision of educational and advisory services, joint timber trade schemes, as well as services that aim to resolve specific environmental challenges. Some services are available for members only (e.g., certification schemes), some have positive effects for all forest owners (e.g., lobbying), and some are beneficial for the entire forest-based sector (e.g., wood mobilization and awareness building).

Most FOOs have developed similarly over time. For example, many smaller FOOs that were created for cooperation in business operations have since developed additional functions and services. This is also the case for many FOOs

70 Forest Intervention Areas were introduced into the Portuguese legal and institutional framework for forest management and forest protection against fires after the 2003 wildfires.

71 See http://www.communitywoods.org/.

which have the main aim of political representation, as these have also added management services.

The problems facing FOOs throughout the ECE region are also similar. They include limited interest among members in forest management, complex forest ownership structures, weak participation of forest owners, insufficient forestry knowledge and technical capacities, missing administrative and organizational structures as well as restricted financial resources. The success of FOOs consequently depends on the provision of relevant services and interest from their members. However, many FOOs also depend on public funds. This would suggest the need for a mechanism that can assess the effectiveness of FOOs and ensure that successful organizations are rewarded. It furthermore suggests the need for improved public awareness on the work being carried out by FOOs and their contribution to the provision of private and public goods.

Organizational weaknesses of the FOOs have led to a gap in forest policy, where the interests of private forest owners are not considered and where the State does not recognize the potential of forest owners to contribute to sustainable forests management. Despite these constraints, many FOOs have been successful in introducing measures that support a more efficient management and administration of forests, in lobbying for financial instruments (e.g., compensations and exemption from land taxes) and the certification of private forests.

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Annex I

CURRENT RESEARCH TOPICS IN FOREST OWNERSHIP IN THE ECE REGION

Contents

A1-1 MAPPING THE SPACE BETWEEN PRIVATE AND PUBLIC FOREST OWNERSHIP IN EUROPE

***Authors**: Jenny Wong, Stjepan Posavec & Nevenka Bogataj*

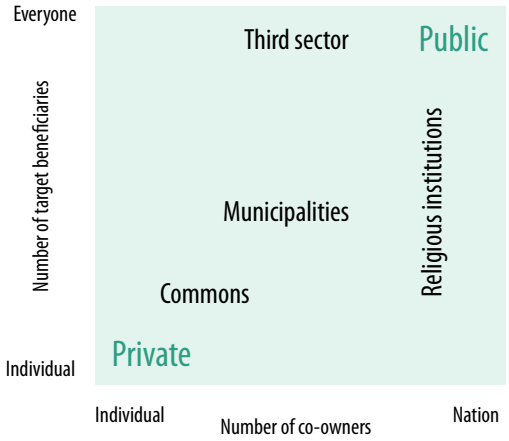
Much of the discourse on forest ownership is dominated by distinguishing private from public ownership and treating these as distinct from each other. Within the UNECE this is a particular issue in Europe which contain diverse types of private forest ownership, local government ownership (as exemplified by municipality owners) (see Section 5.2) and with a great variety of governance arrangements. Within this complexity there are many suggestions that the simple dichotomy between public and private is insufficient, for example the European Federation of Municipal Forest Owners suggest a third type of ownership between public and private is needed for their members. While in Section 2.4 several forms of private ownership such as church forests and forest commons are classed as private in some countries and public in others which suggest they may also be considered falling into the gap between them. Many of these problematic types of ownership have roots deep in European history and traditions as shown in the case study for Witów (Box A1-1).

New forms of ownership are arising from civil society engagement in forests. Civil society refers to all forms of social action carried out by individuals or groups who are neither connected to, nor managed by, the State.[72] This definition covers a great many diverse forms of forest ownership types from traditional commons and modern non-governmental organizations (NGOs). Such organizations are increasing viewed as representing a 'third sector'. A pan-European definition of the third sector has it as *"consisting of private associations and foundations; non-commercial cooperatives, mutuals, and social enterprises; and individual activities undertaken without pay or compulsion primarily to benefit society or persons outside of one's household or next of kin"* (Salamon & Sokolowski 2015). The conceptualisation of a 'third sector' is perhaps useful approach for forest ownership categorization as it explicitly includes conservation NGOs, modern forms of forest-based social enterprise and volunteer-based community groups. However, older institutions that may own and manage forest such as the church, forest commons and community forests owned by local administrations (municipalities) are not such a good fit with the 'third sector' as defined above. For example, in the case of commons, membership maybe restricted by residence, inheritance or kinship which would violate the definition proposed by Salamon & Sokolowski (2015).

There are also several criteria which are often apply associated with these intermediate forms of ownership which make them eligible for public funding and secure the benefits they provide in the long term. Thus, intermediate forms often deliver public benefits; are indivisible or inalienable, can have charitable status (e.g. registration with the Charity Commission in the UK)[73] and may be granted exemption from taxation (e.g. in Italy[74]) in recognition of the delivery of public benefits. The number of co-owners is also significant. Public forest belongs to all citizens and is managed to benefit everyone while private forest belongs to just one individual who is the sole beneficiary. Derived from this we propose that the number of forest owners and beneficiaries can be used to frame the space between public and private ownership (Figure A1-1). Into this hypothetical space we can place some of the recognised forms of forest ownership from the FACESMAP country reports (Živojinović et al 2015).

A brief description of the main categories of forest owners we identify as falling between public and private, is given in Table A1-1. For each category an indicative map has been prepared based on the UNECE enquiry[75] and the FACESMAP country reports, often containing more nuanced information (e.g. functioning of examples) as it is based on expert evaluation.

Figure A1-1 Conceptualized space between public and private forest ownership



72 https://eur-lex.europa.eu/summary/glossary/civil_society_organisation.html

73 https://www.gov.uk/government/organisations/charity-commission

74 https://uk.practicallaw.thomsonreuters.com/7-633-2622?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1

75 https://www.unece.org/forests/fr/outputs/privateforest.html

Box A1-1 Case study of the Community of eight Entitled Villages in Witów

The largest forest common in Poland is the Community of eight Entitled Villages in Witów region in the Tatra Mountains (Carpathians) which extends to 3080 ha with 2230 ha within the area of the Tatra National Park. The Community includes 2900 owners, who are residents of eight villages located at the foot of the mountains. Community ownership of this land was established in 1819, when the Austrian Monarchy sold the forest to a count who decided to sell it to the highlanders who could in this way become free men as owners of land. After the Second World War the Community prepared its first statute, part of which was the list of persons entitled to make use of the property. All shares in the forest used to be equal and each entitled person was allowed to have only one share. This situation was considered unfair because of inheritance matters and the family situations of particular heirs. At present ownership shares can vary in size in three of the villages, while in the others shares remain equal. The Witów Community is an example of good forest management. It was from the beginning a self-financing entity independent of State donations. And this has continued despite being incorporated within the nature protection area of the Tatras National Park. However, thanks to an agreement with the park, the income from tourism now surpasses that from the sale of wood.

The main income to the community is fees for entering the forest, rent obtained from lease and land and buildings and sale of timber. The harvested timber is sold only to the owners. The common income is ascribed to all the village members depending of their shares. Any budget surplus is allocated for local benefits such as building roads, forest fire protection equipment, local schools or a benevolent fund to help in case of farmers accidents (burned house, livestock death etc..).

Governance of the forest which includes the distribution and use of proceeds has evolved along democratic principles with strict rules design to prevent corruption with inbuilt checks and balances. The rules are laid out in the Community Statute which provides for: General Assembly of the Entitled Villagers with a Forest Commission and Revisory Commission. Day to day administration is done through The Supervisory Board, the Management of the Community and the Community Revisory Commission. In this way the forest is managed for multiple objectives with many of these being public goods (biodiversity, amenity etc.) using democratic and transparent governance. In Poland Witów is counted as a private forest but it exhibits many features commonly associated with public ownership.

Source: Forest Communities of Entitled 8 villages in Witów (undated leaflet provided to accompany FACESMAP field visit in 2015).

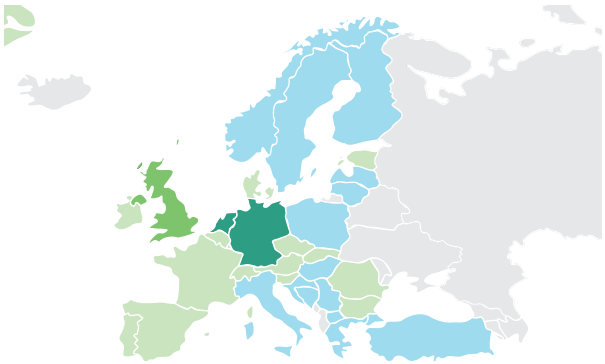
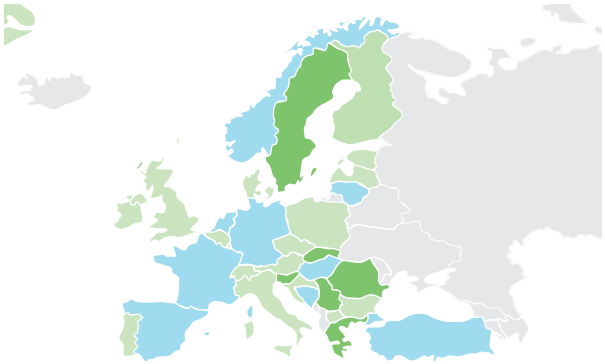
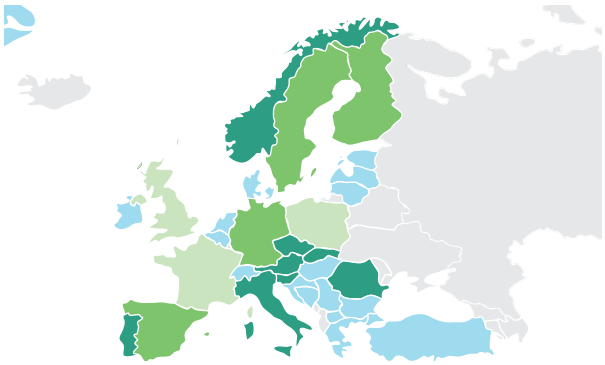
A1-**1.1** Concluding remarks

A more nuanced evaluation of examples and criteria for forest ownership confirms the highly variable nature and purpose of forest ownership in Europe. A high degree of observed complexity often deserves further research. The schema outlined in Figure A1-1 represents a hypothetical space which can be populated with real data based on legal status, benefit flows, formal objectives, membership and accounts of forest owning institutions. Furthermore, as indicated in Table A1-1, governance, particularly in the case of forest commons and other forms of collective forest ownership can be as significant as tenure. Governance elements indicate not only structures but also functions which are not considered here. A lot of supporting and impeding factors influence forest ownership development and the strong influence of historical, cultural and political factors should be taken into account.

Globally there is increasing interest in a 'rights-based' approach to forest management and recognition of collective and community-controlled forests (Section 3.1, Rights & Resources Initiative, 2017). At present European experience has contributed very little to this discourse and is not represented in global statistics (e.g. the RRI tenure dataset[76]). This is a notable gap as alongside numerous examples throughout Europe, there is a revival of commons in Eastern Europe and the expansion of NGOs as forest owners. The emergence of third sector forestry is also of global relevance as a source of innovation and entrepreneurship in the forest sector with significance for rural development and future EU bioeconomy strategies and last but not least a rich heritage of social organization and labour at the meso- and micro levels (De Moor, 2015). Examination of non-State collective forest owners´ institutions is needed to contextualize and better appreciate the increasing role of civil society in the management of European forests.

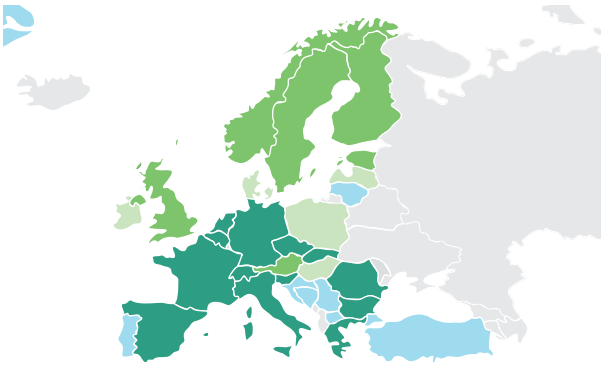
76 https://rightsandresources.org/en/work-impact/tenure-data-tool/

Table A1-1 Summary description of categories of forest ownership which mix characteristics of public and private property in FACESMAP country reports

CATEGORY	DISTRIBUTION IN EUROPE
Third sector Forests owned by voluntary organizations e.g. environmental NGOs for public benefit (especially biodiversity conservation) with unrestricted subscription-based membership with one man one vote governance systems. Can take several legal forms including Trust, Foundation with all considered **private**. Usually receive State assistance in the form of tax relief and are eligible for grants. In the UK there are example dating from the 1880's with millions of members (e.g. National Trust) but this is more often a new form of forest ownership in many countries.	 Forests owned by environmental NGOs AREA > 5% 1- 5% < 1% Not present
Religious institutions Forests owned by churches (Lutheran, Roman catholic, Orthodox, Anglican etc.). Sometimes used to fulfil private needs of clergy and church institutions but also to provide for public services (schooling, elder care, burial grounds, sacred sites, etc.). Afforded charitable or special status in most countries e.g. in Serbia forests owned by church, is sometimes exempt from management restrictions applied to other private owners. Mostly considered **private** but **public** in Belgium and Hungary and **other** in Greece; Subsumed into State ownership in CEE countries – restituted in most countries but retained as State in some (as appears to be the case in Lithuania). Disputed restitution in Czech Rep. (resolved 2012) and Romania (unresolved) related to separation of church from State.	 Forests owned by established churches AREA > 5% 1- 5% < 1% Not present
Forest commons Forests owned by constituted groups of people mostly for mutual but also public benefit. There is the parallel existence of ancient and modern forms of collective forest management. Ancient forms are based on provision of subsistence needs of people within communities defined by residence and/or kinship and were often originally privately-owned by the aristocracy or church but now may have passed into municipality ownership. Modern forms more often have voluntary membership organized around mutual interests and public benefits and may take the form of co-operatives, trusts or companies. The governance and ownership of commons takes many legal forms but are characterized by collective action and governance (Ostrom 1990) as exemplified Slovenia (Bogataj & Krč 2014). Commons, in Italy are classified according to the ultimate owner of the land so can appear as **private**, **public**, **indigenous**, **joint** or **other** (Paletto A. personal communication).	 Forests governed as commons including: Urbariat, Komposesorat, Obsti, Agrargemeinschaften, Urbarialgemeinschaften, Erdöbirtokosság, Zemljišna zajednica, Imovna općina, Baldio, Montes comunales, Häradsallmänningar, Sockenallmänningar, Allmenning, Bygdeallmenninger, Realsameige AREA > 5% 1- 5% < 1% Not present

Municipality forests

Forests owned by local administrations are generally classed as **public** but with some ambiguity e.g. Slovakia, Slovenia, Spain and Austria. A municipality as a forest owner may own and manage forest on behalf of the community but can also delegate forest management to national State forest institutions or to community representatives. It can also acquire 'orphaned' private land (e.g. without heirs). As such municipalities can support a wide range of governance regimes.



Forests owned by municipalities – usually EU NUTS3 level or lower

AREA > 5% 1- 5% < 1% Not present

A1-**1.2** References

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A1-2 IS SMALL A PROBLEM?

Authors: Teppo Hujala, Tuomo Takala, Jukka Tikkanen

A1-**2.1** Background

Across Europe, a variety of policy measures and research efforts have targeted private families to prevent a decrease in forest plot size and parcelization of forests (see Section 3.2). Such measures are justified in forest owner studies due to the role of private forests in timber supply. Inevitably, parcelization of forest landscape may also cause problems for the provision of many other forest products, such as biodiversity and/or landscape-amenities. Nevertheless, widening the approach from timber towards non-tangible ecosystem services makes the relationship between forest ownership distribution within the landscape and its societal impacts less linear. In this section it is hypothesized, like Weiss et al. (2019), that when considering the role of private forests in transition towards post-carbon society, small-scale forest plots could also be seen as assets, alongside simultaneously emerging larger tenures.

A1-**2.2** Objectives

This section looks at small-scale forest ownership, especially the perceptions that are present in different European countries concerning small-scale family forestry. Further, it will consider the possible policy measures that could either tackle the problems or enhance the assets related to small-scale forest plots.

A1-**2.3** Material and methods

For a general stocktaking of policy arguments concerning small-scale forest ownership, a qualitative review of the FACESMAP Country Reports (Živojinović et al., 2015) was conducted. For this analysis, the 28 FACEMAP Country Reports were reviewed to identify cases where "small", "fragment" and "parcel" were noted. Each mention of "small", "fragment" and "parcel" was exported into an Excel spreadsheet and analyzed in terms of its meaning. This was followed by an overall review of how small-scale forest ownership was being construed in the respective country reports. Altogether 332 quotations were analyzed by the authors.

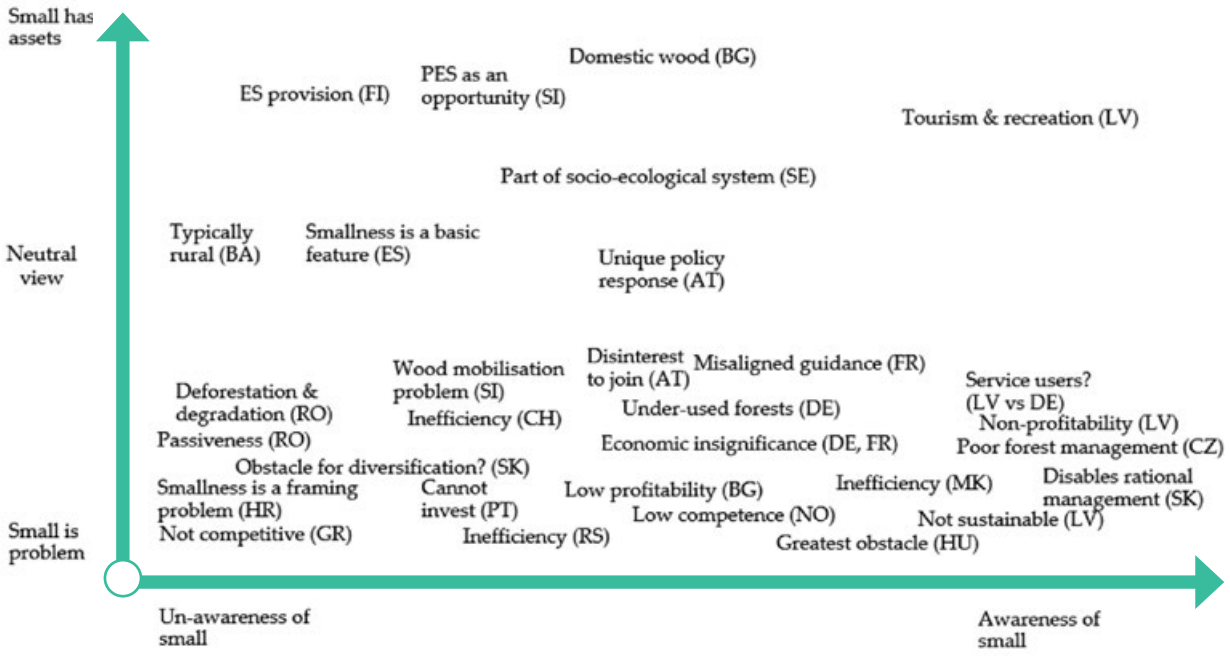
A1-**2.4** Results

One observation from the FACESMAP Country Reports relates to the fact that "small" within small-scale forests was rarely explicitly defined. Small-scale forest ownership was instead used as a synonym for non-industrial, private, individual and family ownership. Moreover, there were varying thresholds for small-scale forest owners (even in the same country) depending on the purpose, ranging from 0.1 ha up to 100 ha. All the country reports mention smallness, but the frequency varies significantly between the reports. When smallness is explicitly mentioned, economy and timber production dominates the argumentation. Often smallness was also connected with urbanization and forest owners' increasing geographical and psychological distance from their forest land. The overall view was that smallness (especially alongside fragmentation and alienation) is regarded as a (major) problem or as a neutral state of affairs; it was only mentioned or interpreted as an asset a few times. The main problems were repeated in several country reports; however, it is notable that some potential advantages were not mentioned in any of the country reports (see Table A1-2).

Table A1-2 Main problems and advantages (observed and non-observed) of smallness in FACESMAP Country Reports

Problems	Advantages (observed)	Advantages (non-observed)
Owners (because of smallness) • Passive in forest management and timber sales • Lack of knowledge	Owners as active agents • Possible providers of certain ecosystem services (energy wood, recreation, NTFPs, biodiversity), which are not focused on in "real" forests	Intangible socio-cultural advantages • Owners' nature relationship • Attachment to local community
Estate structure (associating issue) • Increase in unit/transaction costs of forest management • Low economic productivity • Problematic landscape ecology/ biodiversity provision	Small-scale forests • Part of socio-ecological system	Legitimacy of forest-use policies

Figure A1-2 Perceptions of small-scale forests in different European countries according to the FACESMAP Country Reports



Note: the vertical dimension differentiates problematic, neutral, and beneficial features, and the horizontal dimension indicates how small-scale forests were explicitly perceived.

While the argumentation concerning small-scale forests, especially its problematic features (see Figure A1-2), was relatively coherent across the 28 country reports, there was notably no explicit scientific evidence supporting the policy perceptions. This indicates a need to do more research on small-scale forests and their owners, because there might be some problems that have been overemphasized and/or unobserved benefits with regards to small-scale forest ownership.

The most common policy measures to tackle problems associated with small-scale forests were regulations concerning inheritance and land sales (see Section 3.2). Several countries also reported other tools and strategies to keep family forests in active use. Measures affecting ownership structures included enhancing joint ownership in the form of commonly owned forests or cooperatives, and land-consolidation projects. Other types of measures included enhancing cooperation (e.g., advisory and educational programmes), support for forest owners' associations and "machine rings", and mandatory measures for cooperation across property boundaries. The overall picture across Europe indicates a trend from regulatory instruments towards voluntary motivational measures. Those motivational measures appear to carry increasingly diverse objectives for the cooperative actions.

A1-**2.5** Discussion

It is evident from the preceding analysis that small-scale forests are widely perceived as a problem across Europe and that potential assets and benefits are poorly recognized. While it is plausible that very small and fragmented forest properties are not suitable for economically viable and profitable timber production, small forest plots may still provide other benefits to their owners and society. When recognizing smallest-scale forests and their owners as a part of socio-ecological system, small-scale forests may also contribute to the co-production of multiple ecosystem services, be arenas for new types of goods and services other than timber-oriented forest-based businesses, promote healthy relationships to nature among urbanizing populations, and foster legitimacy of forest-use policies. We propose that policy actors adopt a new mindset to identify a range of advantages for small-scale forests, alongside emerging owner-defined problems (see Table A1-3).

For scientific research, practical development, policies and businesses, the changing roles of small-scale forest owners may offer several opportunities. Harnessing these

Table A1-3 New possible advantages for small-scale forestry and emerging forest-owner-driven problems

New possible assets	Emerging problems from owners' view
As many people as possible have strong personal relationship with nature	Distance
Psychological wellbeing	Service interface
Healthy lifestyle practices	Lack of peer support
Creative local economies	Institutional discouragement
Source for social innovations	

opportunities would however, as a first step, require more extensive public dialogue among researchers, policymakers, and practitioners towards understanding smallness from a novel and wider perspective. Approaching resilience of parcelized and fragmented forest landscapes will require better cooperation across estate borders. A more dynamic and adaptive socio-ecological forest system, incorporating also small-scale forest owners, could focus on building stronger linkages between public, community and individual/family ownerships. Co-management approaches may provide solutions for small-scale forest owners who lack the individual and financial capacity to practice active forest management. Moreover, considering psychological features of forest ownership may liberate both owners and non-owners from strict ownership categories without violating basic property rights. One suggested way forward is the development of "empowering" consultancy approaches and tools for policy and business practices.

A1-**2.6** References

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A1-3 FORESTRY EXTENSION AND ADVICE - DIVERSITY AND CHANGE ACROSS EUROPE

***Authors**: Anna Lawrence, Teppo Hujala, Philippe Deuffic & Liviu Nichiforel*

A1-**3.1** Introduction

Changes in forest management are facilitated through communication between stakeholders. In particular, advice, education and information form one of the main groups of policy tools available to encourage particular forms of behaviour (such as forest management and timber harvesting) in line with policy goals. Traditionally in most countries, communication in non-industrial private forestry has been channelled through government extension officers, who have advised and instructed private forest owners (PFOs). As in agriculture, however, the range of sources and processes of information flow is increasing in forest management decision-making.

To analyze this, an approach developed in agricultural policy and practice has been adapted. Moving beyond the conventional idea of a linear information flow from scientist to agricultural extension officer to farmer, researchers have proposed a more inclusive approach: the Agricultural Knowledge and Information Systems (AKIS), which aimed to integrate different sources of knowledge, recognising that information flows in multiple directions, not only from scientists to farmers. The approach of thinking about advice and knowledge exchange as a system of actors and processes is a helpful one, as it fosters inclusivity and avoids prejudging outcomes. By adapting this idea to forestry, the concept of the FOKIS (FOrestry Knowledge and Information System) be applied to a concept which includes the stakeholders and their interactions, in forestry advice. The FOKIS is thus more than the conventional extension model, and involves a range of private, public and NGO stakeholders who may or may not be collaborating with each other.

This section draws on work conducted as part of FACESMAP, analysis of country reports, and conceptual discussions, to propose ways of analyzing the FOKIS, and to explore the ways in which FOKIS are developing, and the implications in the context of private forest ownership described in this study. More detail and empirical examples are available in Lawrence et al. (2020).

A1-**3.2** Four dimensions of the FOKIS

By analyzing examples of forestry extension and advice, it is concluded that a FOKIS can be described by paying attention to four components: the forest owner, the policy motivation for providing advice, the providers of advice, and the tools and methods that they use.

A1-**3.3** Discussion

FOKIS are developing and adapting to changing forest ownership structures and policy. Across the countries participating in FACESMAP, none were found where a traditional forest extension service exists; instead, forestry advice is provided by a mix of actors from the State, private and NGO sectors.

In particular 'new' owners and owner types are prompting a push for new advisory tools and approaches. Policy makers are concerned that forest owners who have recently acquired land will not conform with sustainable forest management guidelines, whether because they believe that the new forest owners do not have the knowledge, values or motivation. The response of policy, and the role of the FOKIS, varies. In some post-socialist countries, government and NGOs meet these concerns with a focus on strong regulation of forest management, and advisory processes concentrate on informing forest owners about their legal responsibilities. In some Western European countries, forest owners have much more freedom to decide whether and how to manage their forests, and the FOKIS is then more diverse, with a wider range of providers and tools, and with the aim of informing and motivating owners to conform with policy goals.

Overall, FOKIS are tending to move from a top-down approach to include a wider range of stakeholders, and more horizontal communication (such as peer networks) in addition to the more traditional vertical communication (from government to forest owner). The content of advisory programmes has evolved from a focus on timber production to include ecosystem services such as biodiversity and recreation. There is a move from public to private sector funding, and an expectation that owners will pay for services such as forest inventory, preparation of management plans, and harvesting plans. Providers increasingly include NGOs, forest owner associations, and (particularly in Northern Europe) forest harvesting companies. The panel of tools have enlarged with the emergence of information technologies which increase the possibilities for decision support systems and interactivity.

In shifting from a top down approach, and in contrast to the classical concept of extension systems which provided a standardized set of advice, some forestry advisory systems now try to take into account diversity of forest owner

Table A1-4 Summary of current situation, observed trends and examples

Current situation	Trends	Example
Profile of owners		
• High variation in "pre-knowledge" (from basic notion to quasi-expertise) • High variation in primary and secondary socialisation (identity, community) • High variation in the interest of owners (from short term profit seekers to indifferent or absentees' owners)	• Traditional PFOs are more often challenging prevailing management norms • Some call for information on alternative management approaches; some find their own approaches by themselves • New or absentee PFO are targeted with informational instruments to increase their awareness on management options	In **France**, the demand for basic/initiation courses has been stabilizing for the last 6 years (CNPF, 2012). This trend may be interpreted as a transfer of the new forest owners' demands towards mid of high level or a real of new forest owners in forestry education, possibly reflecting a total delegation of the forest management to experts and co-op foresters.
Policy objectives of advice		
• Influencing PFOs' forestry practices/ behaviour and values • Increasing awareness of options and innovations • Ensuring compliance with regulation • Making PFOs more autonomous in their decision making	• More emphasis on specific aims rather than general awareness raising; e.g., profitability, biodiversity, afforestation, cooperation • New challenges are coming from the environmental regulations (e.g., Natura 2000 sites) which require new tools for advice	In **Finland**, specific programs, projects and campaigns have been launched to focus advisory work on generational transfers of private forest estates (with a further aim to increase wood supply and promote active and more diverse use of forests)
Providers of advice		
• Government training bodies (generally centrally organized) • Professional advisors and consultants (often very diverse and more or less specialized on specific topics), in some countries accredited by the State or within the organization • Peer-to peer self-help networks (within forest owners' associations or in even less informal ways)	• Weakening/disappearance of public advisory services, in particular in Eastern European countries where the forest advisory system becomes less and less centralized • Emergence of private forest advisors and NGOs providing advice to PFOs	In **Romania**, the governmental agency supervises compliance with the law, while most trainings for PFOs are organized with the involvement of ENGOs. Such trainings highlight the need to respect the forestry regime, which aims to ensure diversification of forest structure, and biodiversity. NGOs and private consultants hired by industry have also provided support for the implementation of forest certification in private forests. The public consultations organized in the framework of forest certification are an important communication tool between PFOs, ENGOs and forest administrators
Approaches and tools		
• Wide variety of communication channels, and diversity supporting: – Agent-based tools (through education and training sessions) – Traditional publications (magazines, leaflets, journals…) – New communication and information tools (web, smartphones, e-newsletters, virtual communities) • Cost-sharing varies	• From agents-based support to technical-devices support (during field visits and face to face communication, in demonstration forests and workshops) • Reliance on PFO's cooperatives, clubs and networks as platforms for peer-to-peer advice is increasing to complement professional guidance	In **Scotland** the increase in community groups owning woodlands has supported grassroots demand for workshops and conferences delivered through their own association, the Community Woodland Association

profiles in order to adapt advisory offer and demand. One constraint is that in many countries, the providers of advice do not know the owners and their objectives very well.

Overall these changes represent a diversification and liberalisation of information, and an open market in terms of advice. This raises new questions of expertise, reliability and accuracy of information, and trust between actors. PFOs are often characterized as passive, traditional, lacking in technical and policy knowledge, but owners have common-sense and practice-based knowledge, experience in their own forests. It also means the advisory system needs stability and skilful educated personnel. Some countries have reacted with a tightening of accreditation methods (e.g., Estonia) and importance attached to chartered status (e.g., United Kingdom).

In conclusion, the concept of FOKIS helps to analyze the stakeholders, processes and tools that are being used to share information and develop knowledge about forestry. More desirable still would be to see the actors and processes working together as part of a system, understanding their complementarities and synergies. This awareness is growing, but the components do not yet work as an integrated whole.

A1-**3.4** References

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A1-4 GENDER BY NUMBERS - AND BEYOND

Author: *Gun Lidestav*

In a recent paper on gender in European forest ownership and management (Follo et al., 2017), the authors claim that "numbers matter" as it increases the visibility of women and thereby also the actual existence of gendered differences between men and women as forest owners. The lack of numbers, such as in national statistics, conveys something about how forest ownership and management is perceived in the particular context. Yet the first question to be asked is: does the lack of numbers reflect a lack of women involved, or is it that gender disaggregated data is not recorded? Based on the figures that actually exist (Table A1-5), the latter condition appears more likely, and when looking into the still scarce but growing literature on gender and forest ownership this assumption is strengthened. The subsequent question then becomes why the breakdown on gender has not been considered important and finally why and for whom this lack of data and knowledge might be a problem.

In most European countries private forest ownership has been regarded as forest ownership held by families, usually in connection to farm land and agricultural production. This farm-forest property has constituted the basis for the residence and livelihood of one household (nuclear or

Table A1-5 Proportion of female primary owners according to the FACESMAP/UNECE/FAO Enquiry (14 countries) and reported in Follo et al. (2017) [the latter in *italics*].

Share of female primary owners							
	BY YEAR			BY AGE CLASS (2015)			SHARE OF FEMALE OWNERS (%)*
	1990 %	2010 %	2015 %	40 YR	40 -60 YR	60 + YRS	
Austria		32	32	30	30	30	*31*
Bosnia-Herzegovina							*3*
Croatia			22.4	12.7	21	24.5	*7*
Estonia							*44*
Finland	25	25		22	22	29	*38*
France		30	30	32	21	35	*30*
Germany (Bavaria)							*39*
Germany (Thuringen, B-W, NRW)							*CA 20*
Iceland			26				
Ireland							*CA 17*
Latvia							*44*
Lithuania			29.2				*52*
North Macedonia							*4-8*
Netherlands			23	22	20	25	
Norway		29	29	28	26	32	*25*
Portugal		26					
Slovakia		36.7	35.4				
Slovenia		49	49	43	45	53	*49*
Sweden		38	38	39	38	38	*38*
Switzerland		20					*CA 20*
United Kingdom							*17-27*
United States of America		11.3	21.3	21.4	20.4	22.0	

Sources: FACESMAP/UNECE/FAO Enquiry, * According to Follo, et al 2017.

extended family), sometimes as the single or major resource for subsistence together with the input of family labour, sometimes as a complement (Almås, 2002, Lidestav and Nordfjell, 2005, Hänninen and Karppinen, 2010, Hänninen et al., 2011). According to predominant patriarchal norms, the head of the household/family was a man, and only in the absence of a man, a woman could become the head of the household (Flygare, 1999). Because of this understanding of the "traditional forest owner" (e.g., family/household headed by a man) there has been no apparent need for identifying the gender of the individuals that constitutes the family/household. Besides, empirical evidence from Finland suggests that owning forest and managing it with economic principles is considered a masculine activity regardless of the gender of the owner (Vainio and Paloniemi, 2009). Further, traditional forest ownership suggests living on and working with the farm-forest. To be self-active in harvesting and silvicultural operations has been (see e.g., Järveläinen, 1974) and still is somewhere therefore considered as a main feature of a "proper" forest owner (Törnqvist, 1995).

However, as underlined in previous sections of this report, ongoing changes in European life are challenging the family/household as the unit of farm-forest ownership. With a modern understanding of ownership, such as goods and (property) rights held by individuals, the individual woman and man must be identified as owners. Further, there has been a general process of individualization going on in the modern and postmodern society (Beck, 1992, Larsen, 1998, Taylor, 1998). This modernization process includes changes in the Western humans' identity and mentality, from being just a diminutive part in a diverse and great chain of beings or in a much smaller system of human kin, toward a quest to be oneself standing solely fulfilling his/her own potential. Adding to this, the concept of "family/household", at least in the Nordic countries, has changed dramatically during the last 50 years, with single parents, couples with mine, yours and our children, same-sex marriage, etc. (Kautto, 2002, Blanc, 1987, Andersson et al., 2006). With these changes, family/household understandings are under pressure, the individual is emerging as the main unit, and obviously gender then becomes an issue. This is reflected in publications as for instance the "Global Forest Resources Assessment" (FAO, 2010, 2015) where the percentage of women in public forest institution (2000-2008), percentage of women graduated in forest related education (2008), and percentage of women working in research centres (2008), are presented. However, this does not imply that it is a national focus in all countries, and we are still very far away from fulfilling the declaration from the United Nations Women's Conference in 1995 (UN, 1996).

However, through the adoption of the Sustainable Development Goals as defined in Transforming Our World - the 2030 Agenda for Sustainable Development, countries have committed themselves to *"Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws"* (SDG #5a). The basic rationale for this declaration is justice, and the lack of compliance displayed by numbers and shares tells the world that this sector and industry has a sustainability problem, which also may impair its legitimacy. How this problem plays out at an individual level may differ largely. In the worst case, women as wives and daughters are consciously discriminated against, and left with fewer resources and influence. A more likely approach with regards to the children is to provide daughters with other economic resources than forest land, or an education for a profession. Another strategy for parents to deal with the matter of fairness and justice within an inheritance practice that prioritizes sons as heirs to the forest, is to give daughters a minor piece of land (Posch, 2000) that can be used for second home purposes. In countries where subdivision of forest land is restricted, like in Sweden, the previous primogeniture practice has commonly been replaced by handing over the forest property to all children to be jointly owned and managed (Lidestav, 2010). Thereby, forest ownership is still family based but divided on several households. In this case, the quest for gender equality and justice has resulted in higher numbers (at present 38 per cent of Swedish forest owners are women) but possibly at the price of more complicated decision-making regarding forest management – or in economic terms, increased transaction costs.

From the perspective of forest industry and a forest policy that promotes timber production, increased transaction costs, or even the risk of reduced disposition among private owners to produce and sell timber has become a general concern (Ficko et al., 2017). The issue of gender equality may therefore be in conflict with the issue of wood mobilization. Empirical studies in different contexts also indicate that harvesting activities are less frequent, or the volume for sale is lower, on forest properties owned by female forest owner, even when taking into account that their properties in general are smaller than forest properties owned by men (Mizaraite 2005, Kuuluvainen et al 2014, Lidestav and Berg Lejon 2013). Female forest owners' knowledge in forest management and experience of carrying out related practical and administrative work is also reported to be lower (Follo, 2008, Häggqvist et al., 2014, Vilkriste, 2003).

To deal with this "conflict", the Swedish forestry sector has developed a National Gender Equality Strategy (NGES) that was launched by the Swedish Ministry of Rural Affairs in 2011. The headline of the strategy document is "Competitiveness requires gender equality" showing that the relationship between gender equality and competitiveness, profitability and sustainability has become evident in the gender equality policy debate (Appelstrand and Lidestav, 2015).

Thus, the basis for gender equality has moved from matters of justice, democracy, inclusiveness and legitimacy to increasingly being regarded as a matter of business interest. The overall vision of the NGES is to ensure that women and men are given the same opportunities to own and profit from their forests and run or work in enterprises in the forest-based sector. Further, gender inequality (lack of numbers) is recognized as a joint problem for the sector at large, partly because of the failure to attract and recruit competent co-workers from the entire population, partly because gender inequality indicates a policy failure. Therefore all major stakeholders in the Swedish forest-based sector have been involved in the development and implementation of the strategy. It can also be claimed that the strategy provides important incentives for the sector to begin a comprehensive effort of development and change by increased gender equality (Appelstrand and Lidestav, 2015). However, the strategy should be regarded as a form of voluntary "contract" between the State and the sector at large. Thus, it is in line with the current deregulated forest policy in Sweden, which emphasizes a governance-oriented steering approach and focuses on "soft" steering methods with few or no sanctions in case of noncompliance.

Irrespective of whether gender equality is based on arguments of justice, legitimacy, sustainability or competitiveness and profitability, the call by Follo et al. (2017, p. 181) to "make sure that official registers and statistics provide gender-disaggregated data, both for researchers and for forest agencies and forest service providers, is applicable.

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A1-5 MUNICIPAL FORESTS

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The Food and Agriculture Organization of the United Nations (FAO) characterizes public ownership as forests *"owned by the State; or administrative units of the Public Administration; or by institutions or corporations owned by the public administration"* (FAO, 2018, p. 17). This includes all the levels of a public administration, such as the State, provinces and municipalities. Municipal forests (e.g., forests that are owned by a town or city) are for this reason principally considered as part of public forests.

Municipal forests are common across the ECE region and have a long history with regards to forest management (Mattila et al., 2015). However, it is noted that the overall focus of managing municipal forest areas has shifted away from being primarily productive forests towards different degrees of multi-functionality (e.g., including public health, conservation of biodiversity, provision of non-wood goods and services as well as protective functions) (FAO, 2015). This presents new challenges when considering the management of municipal forests. For instance, urbanization is commonly highlighted as a significant driving factor affecting municipal forests as well as enhancing ecosystem services as part of managing public forests (DeFries et al., 2010). This demonstrates one of the challenges facing municipal decision-makers in terms of balancing multiple objectives, and highlights the need to improve our understanding of the current state of municipal forests.

Moreover, while municipal forests are defined as publicly owned in most countries, significant variations exist. For instance, in some countries (e.g., Bulgaria, the Czech Republic and Slovenia) municipal forests are categorized as private forests. These national variations have implications when reviewing overall forest ownership structures and statistics across the ECE region, in general terms as well as for this report.

A1-**5.1** Municipal forests in the ECE region

The European Federation of Forest-Owning Communities (FECOF) has reported that an estimated area of 15 to 20 per cent of the forest area in the European Union (EU) is owned by municipalities, making municipal forests the third biggest category of forest ownership in the EU (after private and State forests).[77] However, for the ECE region, only a few countries provide data on the forest area that is owned by municipalities (FACESMAP/UNECE/FAO Enquiry); these include the Czech Republic, which reported that 377,000 ha (or 17 per cent) were municipally-owned, and Bulgaria, which reported that 518,000 ha (or 13 per cent) of its forest area was municipally-owned (see Section 5.2).

Municipal forests in Europe are principally concentrated in Spain, France, Germany, Italy, the Czech Republic, Bulgaria and Slovakia, where the proportion of communal forests reaches significant levels. For instance, in Spain, Germany and Italy, it amounts to 20 per cent (Kommunale Spitzenverbände RLP, 2014). There are also some countries where communal forests clearly dominate. It can for example be noted that communal forests in Germany are particularly significant as corporate forests in the federal States of Rhineland-Palatinate, Baden-Württemberg and Hesse. Also in the Rhineland-Palatinate, nearly 50 per cent of the forest land is owned by municipalities (Boehnke-Foerster, 2013). However, due to the problem of differentiation previously outlined, official surveys of the EU only consider private and public forest ownership. Thus, there is no exact information about the total area of municipal forest ownership in Europe. However, in some countries, there is data about volume increment and wood harvesting in communal forests.

In terms of the area available for wood supply, data from the FACESMAP/UNECE/FAO Enquiry suggests that 13.52 million ha of forest land is presently owned by local governments in the ECE region (see Table A1-6). This is from a sample covering 414.96 million ha of publicly-owned forest land, whereby 3.25 per cent corresponds to municipal forests (excluding the Russian Federation and Canada).

A1-**5.2** Managing Municipal Forests

Municipal forests are, as noted above, owned by public administrations below the State level, depending somewhat on the governance structure of the country. This can range from forests being owned by municipal cooperatives to forests being owned by cities, towns, small villages or local communities (based on geographically defined communities). In addition to forest ownership of municipalities and cities, there is also forest ownership of, cooperatives and various associations with municipal reference. There is consequently a high variety of management structures in the EU. For example, communal forests can be supervised and managed by governmental organizations (e.g., Office National des Forets (ONF) in France[78] and Landesforsten in Rhineland-Palatinate[79]). In some countries (or regions) the municipality itself oversees the management of municipal forests (e.g., Spain), while in other cases, private companies or public-private

77 See http://www.fecof.eu.

78 See http://www1.onf.fr/.

79 See https://www.wald-rlp.de/de/start-landesforsten-rheinland-pfalz/.

Table A1-6 Publicly-owned forest areas available for wood supply, 1000 ha

	Public ownership		Owned by local government		Total	
	2010	2015	2010	2015	2010	2015
Albania	753.30	754.00	320.00	529.00	776.30	785.00
Austria	688.00	686.00	..	..	3,860.00	3,869.00
Belgium	317.00	329.00	77.00	78.00	681.00	683.00
Bosnia and Herzegovina	2,223.00	2,229.50	..	..	2,778.20	2,800.60
Bulgaria	3,286.00	3,338.00	465.00	518.00	3,737.00	3,812.00
Canada	317,402.00		..		347,302.00	...
Croatia	1,376.00	1,366.00	0.00	0.00	1,920.00	1,922.00
Cyprus	118.90	118.95	0.00	0.00	172.80	172.70
Czechia	2,036.00	2,041.00	0.00	0.00	2,657.00	2,666.00
Finland	6,744.00	6,744.00	595.00	595.00	22,218.00	22,218.00
France	4,064.00	4,077.00	2,557.00	2,574.00	16,424.00	16,988.00
Georgia	2,822.40	2,822.40	..	..	2,822.40	2,822.40
Germany	5,932.00	5,933.00	2,214.00	2,220.00	11,409.00	11,419.00
Iceland	14.50	14.50	3.90	14.50	42.70	49.10
Ireland	386.00	386.00	0.00	0.00	726.00	726.00
Israel	36.00	39.40	0.00	0.00	154.00	142.90
Lithuania	1,333.00	1,314.00	0.00	0.00	2,170.00	2,180.00
Luxembourg	41.00	41.50	..	30.70	87.00	88.70
Netherlands	181.80	183.20	53.50	54.00	373.50	376.50
Norway	1,488.00	1,488.00	274.00	274.00	12,102.00	12,112.00
Poland	7,643.00	7,643.00	84.00	84.00	9,329.00	9,329.00
Portugal	64.00	64.00	44.20	44.20	3,200.00	3,200.00
Russian Federation	815,135.60	..	..	..	815,135.60	…
Serbia	1,382.00	1,158.00	8.00	8.00	2,713.00	2,720.00
Slovakia	974.00	947.00	181.00	170.00	1,939.00	1,942.00
Slovenia	309.00	292.00	33.00	33.00	1,247.00	1,248.00
Sweden	7,438.00	7,438.00	543.00	543.00	28,073.00	28,073.00
Switzerland	336.00	342.00	267.00	269.00	1,236.00	1,254.00
Turkey	11,193.10	12,642.90	..	..	11,203.00	12,666.20
Ukraine	..	..	..	..	..	..
United Kingdom	868.00	871.00	..	..	3,059.00	3,154.00
United States	98,547.00	99,235.00	5,212.00	5,483.00	264,806.00	265,545.00
Total		**164,538.35**		**13,521.40**		**414,964.10**

cooperatives oversee the management (e.g., Bavaria). In Central Europe, the State is increasingly withdrawing from its previous role in managing municipal forests (e.g. owing to competition law). This may, on the one hand, lead to stronger self-management by municipalities; on the other hand, it may also lead to an increasing role for external companies (e.g. leasing and/or sale of communal forests). These types of structural changes are widely observed in Central Europe.

The decision-making processes underlying management of municipal forests is often determined by elected officials. This may imply that changing political landscape at the local level can affect management (e.g., negotiation processes). Therefore, organizations in charge of municipal forests often act as mediators between public and private interests that call for different types of forest use (e.g., recreation and conservation) and political parties in local governments (Weiss et al., 2012). In many regions, it can also be noted that organizations that represent municipal forests are often trusted by environmental interest groups and contribute to the welfare and image of the respective towns and regions (Ottitsch and Krott, 2005).

These differences highlight that municipal forests have a special status as compared with State-owned and privately-owned forests. Furthermore, the range of organizational structures of municipal forest in Europe is more diverse and heterogeneous than those of State- or privately-owned forests. There are also diverse structures, intermediate between communal and private forms of forest ownership (see Section 2.6). Moreover, municipal forestry appears to be increasingly shifting from the economic towards the multifunctional, including the provision of social and ecological goods and services. These goods and service may, however, only be delivered if the management of the forests is economically viable for municipalities. For example, in poor rural areas, Sustainable Forest Management (SFM) is an important economic factor for municipalities (e.g., sale of forest products, hunting, tourism and job creation). Management objectives consequently vary (e.g., economic versus recreational objectives) from each other and are specific to the national context and governance structures in place.

A1-**5.3** Representing Municipal Forests

There are many organizations at the international, regional and local level that represent the interests of municipal forest owners, including by representing municipal forest owners in policy processes. For example, in the EU, there are several national associations and organization that represent municipal forests, either coupled with private forest ownership (e.g., Czech Republic) or independently (e.g., France). In some countries, these types of representative associations also occur at a regional level (e.g., Spain and Germany). Depending on national and regional peculiarities, various types of interest representation are associated with municipal forest ownership. Furthermore, in regions with a low share of municipal forest, there are not always any umbrella organizations that represent municipal forest owners, but that does not necessarily mean that there is no representation of municipal interests.

Representative organizations at the national level: some examples

- In Germany, the German Association of Towns and Municipalities (DStGB)[80] is the largest national association in Europe, representing local government. DStGB was established in 1973 and represents more than 11,000 municipalities, towns and village councils (covering 50 million inhabitants) at national (and EU) level. The "Gemeinsamer Forstauschuss" (Common Forest Committee) represents the interests of municipal forest ownership within this association.
- In France, municipal forest ownership also has a significant role. The Association of National Municipal Forest Owners (FNCOFOR)[81] represents the interests of 6,000 members, mostly forest owning municipalities. The objective of FNCOFOR is not only political representation, as the association offers courses of education and training for elected representatives of its member communities in the field of forest ecology and management. Moreover, FNCOFOR supports the municipalities in implementing forest-related projects, such as regional planning, renewable energy projects, wood constructing projects or reforestation.
- In Bulgaria, another example is the Bulgarian Municipal Forest Association, established in 2008. It has 97 member-communities, covering 290,000 ha of forests, and assists in the management of municipal forests (e.g., increasing the capacity of forest workers in municipal forest management as well as preparing projects under the Rural Development Program (RDP) and other EU programmes) (Stoyanov et al., 2015).
- In the Czech Republic, the Association of Municipal and Private Forest Owners (SVOL)[82] is an organization associating non-State forest owners and managers. The main reason for creating SVOL was originally to support and assist 60 municipalities in the restitution process, by providing members with information and experience exchange (Weiss et al., 2012). At present SVOL represents approximately 1,300 non-State

80 See https://www.dstgb.de.

81 See http://www.fncofor.fr.

82 See http://www.svol.cz.

forest owners (communities, towns, private forests, forest co-operatives, church, unions of small-scale owners) and manages 532,000 ha of woodlands which corresponds to nearly 20 per cent of the total forest area in the Czech Republic.

- In Slovakia, the Association of Municipal Forests in Slovakia (ZOL)[83] is an association of 64 municipal forest owners or managers, established in 1994 and open to all non-State actors. ZOL presently covers 146,125 ha, representing 73 per cent of the total area held by municipal forests in Slovakia.
- In North America, the Society of Municipal Arborists[84] is active in cities and communities in the United States of America, while in Canada provincial associations, such as the British Columbia Community Forests Association,[85] represent municipal forest owners.
- Other examples include regional associations, such as the Association of Forest Municipalities of the Comunitat Valenciana (AMUFOR) and the Catalan Association of Forest Municipalities (ELFOCAT)[86] in Spain, as well as the Italian Federation of Forest Communities (FEDERFORESTE).[87]

International level

- The Fédération Européenne des Communes Forestières (FECOF) is an umbrella organization for European municipal forests. FECOF comprises national organizations from countries including France, Germany, Spain, Bulgaria and the Czech Republic. The aim of FECOF is to accompany all important decision-making processes that are of relevance to EU forests, to articulate the specific interests of municipal forest, considering its differentiated and heterogeneous structure, and to propose comprehensive solutions. The European Charter of Municipal Forests is FECOF's commitment to SFM, taking into account the economic, ecological and social functions of forests. However, according to Kommunale Spitzenverbände RLP (2014), the work being carried out by FECOF will have to be intensified in the future, particularly to draw attention to the special interests of municipal forests in the EU.
- Another organization that is of relevance for municipal forests is the Council of European Municipalities and Regions (CEMR),[88] established in 1951. CEMR provides a forum for debate and aims to influence European policy and legislation on behalf of local authorities and their associations from 42 countries.

A1-**5.4** Discussion

Although the wood supply from municipal forests covers only a small (3.25 per cent) share of the available wood supply in the ECE region, municipal forests have a much larger role to play in terms of the wellbeing of the general public, for example by providing non-wood forest products and services as well as health and recreational opportunities. Municipal forests should for this reason be considered in the bigger picture, reflecting changing forest management practices and a gradual shift towards more wide-ranging multifunctional objectives.

From a practical perspective, communal and/or municipal forests are clearly closer to citizens of relevant communes/towns not only through the type of forest ownership but also through the daily use and management of the forests in question. These forests consequently offer unique potential for participative procedures as well as the development and use of innovative non-market forest goods and services that are tailored to citizen needs, not only in the area of forest economics and management, but also in the analysis of new business models related to these new markets.

Moreover, given the close link between communal and/or municipal forests and relevant citizens and politicians in local governments, municipal forests can furthermore take the lead in providing learning centres for politicians and citizens. Municipal forests can essentially serve as learning processes and/or instruments, to demonstrate the potential but also the limits in providing multiple forest goods and services.

83 See http://www.zolsr.sk.

84 See https://www.urban-forestry.com.

85 See http://bccfa.ca.

86 See http://www.elfocat.cat.

87 See https://www.federforeste.it.

88 See https://www.ccre.org.

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A1-6 FAMILY FOREST OWNER ATTITUDES & VALUES

Author: Brett J. Butler

In order to understand the past, current and future states of forests, it is necessary to understand those who most directly control the resource, namely, the forest owners. Attitudes and values represent what is important to the owner with regards to their forest land and influence what they do in terms of forest management.

Attitudes and values have different connotations when considering public versus private ownership. The values associated with public forest land are largely set by national policies. Most, if not all, policies for public forest lands stress the importance of stewardship, but some will focus more on recreation, wildlife, timber production, or the pursuit of multiple objectives. Naturally, there can be large differences between stated objectives and how those objectives manifest, owing to how national policies are interpreted and the resources that are available for implementing the actions.

Within the broad category of private ownership, the dominant categories are corporate and family (including individual) forest owners. Corporate ownership is largely characterized by a wish to maximize profits and these owners tend to behave like "rational" economic actors (Newman and Wear, 1993). Profits are however not the only values influencing corporate ownership, for example, forest certification requires forest owners to also consider ecological and social impacts (Holvoet and Muys, 2004).

It however is among family and individual forest owners that attitudes and values are most diverse, and which have received most attention. The focus on this category is related to the diversity and complexity of this group, how these values influence forest management actions, and the implications for policies, programs, and services.

Family and individual forest owners value their land for different reasons, ranging from aesthetics to wildlife to timber production, and most family forest owners manage their forests based on multiple objectives. In the United States of America, as in many UNECE countries, the most common objectives are related to amenity values associated with the land (see Figure A1-3). Among the financial values, family forest owners in the United States more commonly cite land investments as of higher financial value than timber production. This does not mean that forest owners are unwilling to harvest trees, but it shows that financial objectives, and timber production, are not necessarily at the forefront of the forest owner's mind. This results in a critical discordance between the implicit, or explicit, assumptions associated with many policies and services and the objectives of family forest owners.

Owing to the diversity of forest ownership objectives, exploratory and confirmatory classification methods have been used to segment or group landowners. Most classifications have resulted in typologies, commonly with three to four categories. Amenity owners, referred to as amenity (Khanal et al., 2017), resident (Nielsen-Pincus et al., 2015) or passive (Blanco et al., 2015, Malovrh et al., 2015) forest owners, are primarily interested in the privacy, nature/wildlife and aesthetics that the forests provide. Financial owners, referred to as timber (Khanal et al., 2017), forester (Nielsen-Pincus et al., 2015), active (Malovrh et al., 2015) and profit-maximizing (Blanco et al., 2015) forest owners, are primarily interested in the financial returns that the forest land can provide, through the extraction of forest resources, conversion of the forestland to other uses (where this is permissible) or through appreciation in the value of the land. Multiple-objective forest owners, referred to as multiple-objective (Blanco et al., 2015, Khanal et al., 2017, Malovrh et al., 2015) and multipurpose (Nielsen-Pincus et al., 2015) forest owners, place high value on both amenity and financial benefits. The missing group is the apparently uninterested forest owners (Malovrh et al., 2015) who do not have strong ties to the forest land, at least to those values typically queried. Knowing the distribution among these categories is the next step in understanding family forest owners.

Although we are often interested in attitudes and values to understand behaviours, it is important to remember that attitudes and values are not perfect predictors of behaviours. When looking at forest owner behaviour, reasons for owning forest land have been shown to be significantly correlated with this behaviour, but so have stumpage prices, size of forest holdings, and numerous other factors (Silver et al., 2015). According to the Theory of Planned Behaviour (Ajzen, 1991), behavioural intent is a function of interactions between attitudes, norms, and controls. This theory has been applied to family forest owners in at least one instance (Karppinen and Berghäll, 2015).

The forest owners' attitudes and values have implications other than just forest management behaviours. The adoption of forest policies (Kilgore et al., 2014, Ruseva et al., 2015), programs (Tian et al., 2018, Kelly et al., 2017) and outreach (Davis et al., 2014, Metcalf et al., 2015) are influenced by attitudes. Tailoring programs and services for each group will be more effective than the more common "one-size-fits-all" model (Butler et al., 2007).

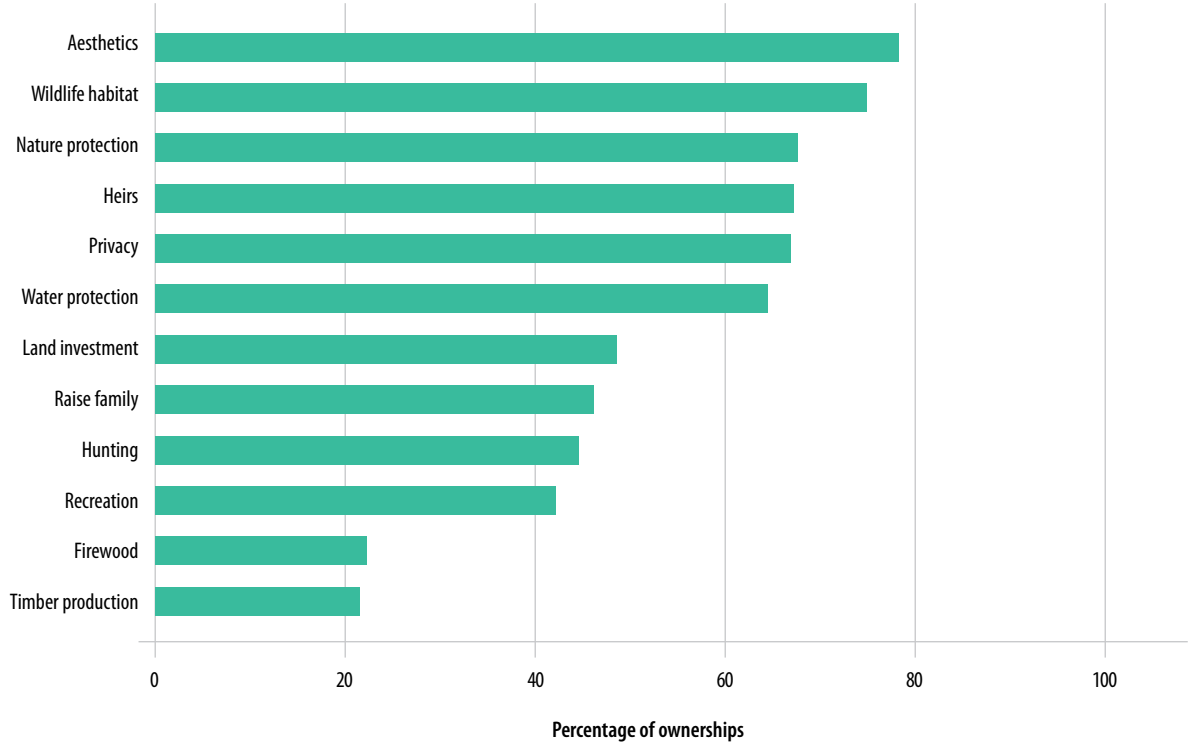
Ownership attitudes and values are not static. Attitudes may change, for example, as a result of a land owner getting older (Butler et al., 2017). The land owner lifecycle follows

an arc from initial acquisition to final disposition with many chapters in between. The initial reasons for ownership may vary due to changes in the forest owner's worldview, their personal/familial needs, and even their physical condition (e.g., changes in their ability to recreate or otherwise interact with their land).

Despite all the work describing these attitudes and values of forest owner, their links to behaviours and the implications for programs, policies and service, there is much that is still unknown and much work yet to be done. Although a few authors have attempted to apply some theoretical frameworks to land owner attitudes and their behaviours (Blanco et al., 2015, Karppinen and Berghäll, 2015, Takala et al., 2017), there is a need for a stronger, unifying theory of forest land owner attitudes and behaviours. There is also the need for more robust empirical data. The traditional surveys have been very powerful, but there is a need for more longitudinal studies and research that take more of an evidence-based approach. Longitudinal studies, such as large-scale cohort studies, would allow for significant insights into ownership dynamics and the factors impacting these dynamics. Evidenced-based approaches will help ensure the results are practical and that the scientific community can answer questions regarding the design of policies and programs. Through international comparisons, like this report, and increased harmonization, such as through FACESMAP,[89] new and broader insights into these topics will be made.

89 See http://facesmap.boku.ac.at/.

Figure A1-3 Reasons for owning family forestland in the United States



Note: Percentages include family forest ownership with 4+ ha (10+ ac) that cited an objective as important or very important on a 5-point Likert scale.
Source: (Butler et al., 2016).

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Annex II

SOURCE DATA TABLES

Contents

This Annex mainly presents selected data provided through the "FACESMAP/UNECE/FAO Enquiry survey on forest ownership in the UNECE region. The complete results of this survey are available at:
https://w3.unece.org/PXWeb2015/pxweb/en/STAT/STAT__26-TMSTAT1__080-FO17_FO in English, and at:
https://w3.unece.org/PXWeb2015/pxweb/ru/STAT/STAT__26-TMSTAT1__080-FO17_FO/ in Russian.

Table A2-1 Area of forest by ownership category, 2015, 1000 ha

Country	TOTAL	Public ownership					Private ownership							Unknown ownership
		Total	Owned by the state at national level	Owned by the state at sub-national government scale	Owned by local government	Other	Total	Owned by individuals and families	Owned by private business entities	Owned by private institutions	Owned by tribal and indigenous communities	Owned by other private common ownership	Other	Total
Albania	785.0	754.0	225.0	0.0	529.0	..	31.0	31.0	0.0	0.0	0.0	0.0	..	0.0
Austria	3,869.0	686.0	566.0	120.0	..	0.0	3,183.0	..	..	..	0.0	..	..	0.0
Belgium	683.0	329.0	..	..	78.0	250.0	354.0	268.0	86.0	0.0	0.0	0.0	0.0	0.0
Bosnia and Herzegovina	2,800.6	2,229.5	..	..	..	..	571.1	571.1	..	..	..	..	..	..
Bulgaria	3,812.0	3,338.0	2,820.0	0.0	518.0	..	474.0	418.0	38.0	18.0	0.0	0.0	0.0	0.0
Canada	347,069.0	317,189.0	5,389.0	311,800.0	..	..	28,426.0	..	..	..	..	..	..	1,454.0
Croatia	1,922.0	1,366.0	1,366.0	0.0	0.0	0.0	556.0	545.0	0.0	11.0	0.0	0.0	0.0	0.0
Cyprus	172.7	119.0	119.0	0.0	0.0	0.0	53.8	..	..	..	0.0	..	..	0.0
Czech Republic	2,666.0	2,041.0	1,590.0	451.0	0.0	0.0	626.0	513.0	111.0	2.0	0.0	0.0	0.0	0.0
Finland	22,218.0	6,744.0	6,149.0	0.0	595.0	0.0	15,474.0	13,099.0	1,809.0	138.0	0.0	427.0	0.0	0.0
France	16,988.0	4,077.0	1,503.0	..	2,574.0	..	12,911.0	9,925.0	2,986.0	..	..	..	..	..
Georgia	2,822.4	2,822.4	2,154.1	668.3	..	..	0.0	..	..	..	..	..	..	0.0
Germany	11,419.0	5,933.0	403.0	3,310.0	2,220.0	0.0	5,486.0	..	..	..	..	..	..	0.0
Iceland	49.1	14.5	..	..	..	..	34.6	..	..	..	..	..	..	0.0
Ireland	726.0	386.0	386.0	0.0	0.0	0.0	339.0	317.0	22.4	0.0	0.0	0.0	0.0	0.0
Israel	142.9	39.4	39.4	0.0	0.0	0.0	103.5	2.0	1.0	100.5	0.0	0.0	0.0	0.0
Lithuania	2,180.0	1,314.0	1,314.0	0.0	0.0	0.0	866.0	783.0	83.0	0.0	0.0	0.0	0.0	0.0
Luxembourg	88.7	41.5	9.7	..	30.7	1.2	47.2	..	..	..	..	..	47.2	0.0
Netherlands	376.5	183.2	122.2	2.3	54.0	4.7	193.3	77.5	21.5	94.3	0.0	0.0	0.0	0.0
Norway	12,112.0	1,488.0	1,214.0	0.0	274.0	0.0	9,642.0	7,952.0	329.0	24.0	1,106.0	231.0	0.0	972.0
Poland	9,329.0	7,643.0	7,552.0	7.0	84.0	..	1,686.0	1,587.0	32.0	..	..	67.0	..	0.0
Portugal	3,200.0	64.0	19.8	..	44.2	..	3,140.0	2,826.0	157.0	157.0	..	..	..	..
Russian Federation*	814,930.5	814,930.5	814,930.5	..	..	..	0.0	..	..	..	..	..	..	0.0
Serbia	2,720.0	1,158.0	741.0	409.0	8.0	..	1,562.0	1,538.0	..	..	..	..	23.0	0.0
Slovakia	1,942.0	947.0	777.0	0.0	170.0	0.0	668.0	206.0	0.0	55.0	0.0	407.0	0.0	327.0
Slovenia	1,248.0	292.0	269.0	0.0	33.0	0.0	956.0	..	..	..	..	..	..	0.0
Sweden	28,073.0	7,438.0	6,881.0	13.0	543.0	0.0	20,635.0	13,276.0	6,027.0	436.0	..	695.0	202.0	0.0
Switzerland	1,254.0	342.0	10.0	63.0	269.0	0.0	912.0	344.0	..	..	..	393.0	..	0.0
Turkey	12,666.2	12,642.9	..	..	..	..	23.3	23.3	..	..	..	..	..	0.0
Ukraine	..	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	3,154.0	871.0	..	871.0	..	..	2,283.0	..	..	..	..	..	..	..
United States of America	265,545.0	99,235.0	76,204.0	17,548.0	5,483.0	..	166,310.0	107,148.0	49,425.0	1,468.0	3,283.0	4,982.0	4.0	..

Source: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. To view the original national data please open the questionnaires. - * 2015 data on the Russian Federation refer to 2010 or 2013

Table A2-2 Change of area of forest by ownership category, 1990-2015, 1000 ha

	TOTAL			Public ownership			Private ownership			Unknown ownership		
	FOREST											
	1990	2010	2015	1990	2010	2015	1990	2010	2015	1990	2010	2015
Albania	788.8	776.3	785.0	788.8	753.3	754.0	0.0	23.0	31.0	0.0	0.0	0.0
Austria	3,776.0	3,860.0	3,869.0	674.0	688.0	686.0	3,102.0	3,172.0	3,183.0	0.0	0.0	0.0
Belgium	677.0	681.0	683.0	294.0	317.0	329.0	383.0	364.0	354.0	0.0	0.0	0.0
Bosnia and Herzegovina	2,210.0	2,778.2	2,800.6	1,807.0	2,223.0	2,229.5	403.0	555.2	571.1	0.0	0.0	..
Bulgaria	3,327.0	3,737.0	3,812.0	3,327.0	3,286.0	3,338.0	0.0	451.0	474.0	0.0	0.0	0.0
Canada	348,273.0	347,302.0	347,069.0	318,289.0	317,402.0	317,189.0	28,525.0	28,445.0	28,426.0	1,459.0	1,455.0	1,454.0
Croatia	1,850.0	1,920.0	1,922.0	1,400.0	1,376.0	1,366.0	450.0	544.0	556.0	0.0	0.0	0.0
Cyprus	161.1	172.8	172.7	105.8	118.9	119.0	55.3	53.9	53.8	0.0	0.0	0.0
Czech Republic	2,629.0	2,657.0	2,666.0	2,519.0	2,036.0	2,041.0	110.0	621.0	626.0	0.0	0.0	0.0
Finland	21,897.0	22,218.0	22,218.0	6,728.0	6,744.0	6,744.0	15,168.0	15,474.0	15,474.0	0.0	0.0	0.0
France	14,436.0	16,424.0	16,988.0	3,755.0	4,064.0	4,077.0	10,681.0	12,360.0	12,911.0	..	..	..
Georgia	2,752.3	2,822.4	2,822.4	2,752.3	2,822.4	2,822.4	0.0	0.0	0.0	0.0	0.0	0.0
Germany	11,300.0	11,409.0	11,419.0	5,987.0	5,932.0	5,933.0	4,606.0	5,477.0	5,486.0	707.0	0.0	0.0
Iceland	16.1	42.7	49.1	10.5	14.5	..	5.6	28.2	..	0.0	0.0	0.0
Ireland	465.0	726.0	726.0	353.0	386.0	386.0	112.0	339.0	339.0	0.0	0.0	0.0
Israel	132.0	154.0	142.9	..	36.0	39.4	..	118.0	103.5	..	0.0	0.0
Lithuania	1,945.0	2,170.0	2,180.0	1,945.0	1,333.0	1,314.0	0.0	837.0	866.0	0.0	0.0	0.0
Luxembourg	86.0	87.0	88.7	40.0	41.0	41.5	46.0	46.0	47.2	0.0	0.0	0.0
Netherlands	345.0	373.5	376.5	176.0	181.8	183.2	169.0	191.7	193.3	0.0	0.0	0.0
Norway	12,132.0	12,102.0	12,112.0	..	1,488.0	1,488.0	..	9,642.0	9,642.0	..	972.0	972.0
Poland	8,881.0	9,329.0	9,329.0	7,406.0	7,643.0	7,643.0	1,475.0	1,686.0	1,686.0	0.0	0.0	0.0
Portugal	3,181.8	3,200.0	3,200.0	52.8	64.0	64.0	3,129.0	3,140.0	3,140.0	..	..	..
Russian Federation*	808,949.9	815,135.6	814,930.5	808,949.9	815,135.6	814,930.5	0.0	0.0	0.0	0.0	0.0	0.0
Serbia	2,313.0	2,713.0	2,720.0	1,143.0	1,382.0	1,158.0	1,170.0	1,213.0	1,562.0	0.0	118.0	0.0
Slovakia	1,922.0	1,939.0	1,942.0	1,922.0	974.0	947.0	0.0	786.0	668.0	0.0	179.0	327.0
Slovenia	1,188.0	1,247.0	1,248.0	442.0	309.0	292.0	746.0	938.0	956.0	0.0	0.0	0.0
Sweden	28,063.0	28,073.0	28,073.0	6,837.0	7,438.0	7,438.0	21,226.0	20,635.0	20,635.0	0.0	0.0	0.0
Switzerland	1,150.0	1,236.0	1,254.0	302.0	336.0	342.0	848.0	900.0	912.0	0.0	0.0	0.0
Turkey	9,622.0	11,203.0	12,666.2	9,607.0	11,193.1	12,642.9	15.0	9.9	23.3	0.0	0.0	0.0
Ukraine	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	2,778.0	3,059.0	3,154.0	963.0	868.0	871.0	1,816.0	2,191.0	2,283.0	..	..	..
United States of America	252,907.0	264,806.0	265,545.0	86,801.0	98,547.0	99,235.0	166,107.0	166,259.0	166,310.0	..	..	..

Source: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. To view the original national data please open the questionnaires. - * 2015 data on the Russian Federation refer to 2010 or 2013

Table A2-3 Area of forest properties by size, 2015, 1000 ha

	TOTAL					Public ownership (total)					…of which owned by local government					Private ownership (total)				
	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha
	AREA (1000 HA)																			
Albania	785.0	1.0	8.0	17.0	759.0	754.0	..	..	..	754.0	529.0	0.0	0.0	0.0	529.0	31.0	1.0	8.0	17.0	5.0
Austria	3,869.0	..	..	..	..	..	..	..	..	7,291.0	..	..	..	..	..	..	..	..	..	..
Belgium	683.0	139.0	107.6	121.2	314.3	329.0	1.0	1.6	26.2	300.3	78.0	0.0	0.0	0.0	78.0	354.0	138.0	106.0	95.0	14.0
Bosnia and Herzegovina	2,185.0	..	..	..	..	1,718.0	..	..	..	..	..	..	..	..	..	467.0	..	..	..	..
Bulgaria	3,812.0	0.0	0.0	0.0	3,338.0	3,338.0	0.0	0.0	0.0	3,338.0	..	..	..	..	..	474.0	..	..	..	..
Canada	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Croatia	1,922.0	502.0	4.1	20.6	1,395.3	1,366.0	0.0	0.1	0.6	1,365.3	0.0	0.0	0.0	0.0	0.0	556.0	502.0	4.0	20.0	30.0
Cyprus	172.7	..	..	..	..	119.0	0.0	0.0	0.0	119.0	0.0	0.0	0.0	0.0	0.0	53.8	..	..	..	..
Czech Republic	2,666.0	298.0	97.0	316.0	1,955.0	2,041.0	9.0	43.0	232.0	1,756.0	0.0	0.0	0.0	0.0	0.0	626.0	289.0	53.0	84.0	199.0
Finland	17,487.0	716.0	3,922.0	5,821.0	7,028.0	7,013.0	15.0	46.0	216.0	6,737.0	363.0	0.0	1.0	35.0	327.0	10,473.0	701.0	3,876.0	5,605.0	291.0
France	16,988.0	5,593.0	3,682.0	4,438.0	3,275.0	4,077.0	10.0	130.0	1,530.0	2,407.0	2,574.0	10.0	120.0	1,390.0	1,054.0	12,911.0	5,583.0	3,552.0	2,908.0	868.0
Georgia	2,822.4	..	..	..	2,822.4	2,822.4	..	..	..	2,822.4	668.3	..	..	..	..	..	..	..	..	..
Germany	11,419.0	..	..	..	..	5,933.0	..	..	..	5,933.0	2,220.0	..	..	..	..	5,486.0	..	..	1,085.0	1,033.0
Iceland	49.1	..	..	..	..	..	..	..	..	..	2.8	0.0	0.0	0.2	2.6	28.2	1.2	6.2	15.1	5.7
Ireland	638.6	59.3	113.3	67.8	398.0	386.2	0.0	0.0	0.0	386.0	0.0	0.0	0.0	0.0	0.0	252.4	59.0	113.0	67.8	12.0
Israel	142.9	..	..	..	..	39.4	..	..	..	..	0.0	..	..	..	..	103.5	..	..	..	..
Lithuania	2,180.0	504.0	213.0	93.0	1,370.0	1,314.0	0.0	0.0	0.0	1,314.0	0.0	0.0	0.0	0.0	0.0	866.0	504.0	213.0	93.0	56.0
Luxembourg	88.7	..	..	..	..	41.5	0.3	0.6	24.8	15.8	30.7	0.1	0.1	18.3	10.4	47.2	..	..	..	..
Netherlands	376.5	47.1	29.9	69.4	230.1	183.3	0.6	4.0	34.6	144.1	68.0	0.5	3.9	34.5	29.1	193.2	46.5	25.9	34.8	86.0
Norway	12,112.0	..	..	..	..	1,488.0	1.0	7.0	92.0	1,388.0	..	..	..	..	..	9,642.0	234.0	1,368.0	4,673.0	3,367.0
Poland	9,329.0	1,291.0	230.0	93.0	7,715.0	7,643.0	5.0	17.0	43.0	7,578.0	85.0	4.0	14.0	31.0	36.0	1,686.0	1,286.0	212.0	50.0	137.0
Portugal	3,200.0	713.0	518.0	2,008.0	..	64.0	..	..	..	..	..	..	..	..	..	3,140.7	..	..	..	..
Russian Federation*	814,930.5	..	..	..	..	814,930.5	..	..	..	..	..	..	..	..	..	0.0	..	..	..	..
Serbia	2,720.0	1,317.0	245.0	0.0	1,158.0	1,158.0	..	..	..	1,158.0	..	..	..	..	..	1,562.0	1,317.0	245.0	0.0	0.0
Slovakia	1,942.0	..	..	..	..	947.0	..	..	..	..	170.0	..	..	..	..	668.0	..	..	..	..
Slovenia	1,248.0	541.5	350.5	91.0	278.0	292.0	7.5	7.5	18.0	269.0	33.0	7.5	7.5	18.0	0.0	956.0	534.0	343.0	73.0	9.0
Sweden	28,073.0	461.0	2,791.0	8,952.0	15,869.0	7,438.0	1.0	6.0	139.0	7,291.0	543.0	0.0	2.0	50.0	491.0	20,635.0	460.0	2,785.0	8,813.0	8,579.0
Switzerland	1,254.0	..	..	..	..	342.0	..	..	..	..	269.0	..	..	..	..	912.0	..	..	..	..
Turkey	12,666.2	..	..	..	..	12,642.9	..	..	..	..	..	..	..	..	..	23.3	..	..	..	..
Ukraine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	3,154.0	628.0	592.0	1,055.0	880.0	871.0	11.0	45.0	279.0	537.0	..	..	..	..	..	2,283.0	618.0	547.0	776.0	343.0
United States of America	265,545.0	7,899.0	41,356.0	48,544.0	167,746.0	99,235.0	2.0	38.0	344.0	98,851.0	5,483.0	2.0	36.0	327.0	5,119.0	166,310.0	7,897.0	41,318.0	48,200.0	68,895.0

Source: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. To view the original national data please open the questionnaires. - * 2015 data on the Russian Federation refer to 2010 or 2013

Table A2-4 Number of forest properties by size, 2015

	TOTAL					Public ownership (total)					…of which owned by local government					Private ownership (total)				
	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha	TOTAL	<= 10 ha	11-50 ha	51-500 ha	> 500 ha
	NUMBER																			
Albania	867	110	210	44	67	497	..	..	..	..	61	0	0	0	61	370	110	210	44	6
Austria	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Belgium	138902	132729	5064	926	183	996	567	114	150	165	3	0	0	0	3	137906	132162	4950	776	18
Bosnia and Herzegovina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Bulgaria	676761	629386	0	33838	13538	2	0	0	0	2	..	..	..	..	..	676759	629386	..	33838	13536
Canada	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Croatia	500112	500001	57	34	20	17	1	2	4	10	0	0	0	0	0	500095	500000	55	30	10
Cyprus	..	..	..	..	..	4	0	0	0	4	0	0	0	0	0	..	..	..	..	..
Czech Republic	293111	285780	4757	2131	443	7746	4116	1697	1613	320	0	0	0	0	0	285365	281664	3060	518	123
Finland	383643	159670	163505	59616	852	7457	3623	1991	1330	513	363	12	22	132	197	376186	156047	161514	58286	339
France	..	..	152088	32943	2780	16930	1840	4630	8660	1800	15630	1830	4530	8140	1130	..	..	147458	24283	980
Georgia	1	..	..	..	1	1	..	..	..	1	1	..	..	..	..	..	..	..	..	..
Germany	2007744	..	..	..	..	7744	..	..	..	..	..	..	..	..	..	2000000	..	..	..	..
Iceland	..	..	..	..	..	..	..	..	..	..	3	0	0	1	2	1562	677	529	309	47
Ireland	17981	11863	5484	621	13	2	0	0	0	2	0	0	0	0	0	17979	11863	5484	621	11
Israel	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Lithuania	280872	267672	12292	818	90	47	0	0	0	47	0	0	0	0	0	280825	267672	12292	818	43
Luxembourg	..	..	..	..	..	225	114	15	81	19	105	4	6	79	16	..	..	..	..	..
Netherlands	28441	26601	1325	450	65	524	128	155	204	37	510	124	152	203	31	27917	26473	1170	246	28
Norway	..	..	..	..	..	1202	158	270	491	283	..	..	..	..	..	147742	54660	55449	35950	1683
Poland	1125258	1110327	13542	833	556	2718	1171	713	307	527	1876	1020	600	220	36	1122540	1109156	12829	526	29
Portugal	10700000	9950000	535000	214000	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Russian Federation*	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Serbia	1011727	999902	11825	0	1	1	..	..	..	1	..	..	..	..	..	1011726	999902	11825	0	0
Slovakia	6559	..	..	..	..	213	53	85	..	64	210	53	85	..	59	6346	2813	3263	..	270
Slovenia	313414	299725	13128	552	9	400	353	33	13	1	399	353	33	13	0	313014	299372	13095	539	8
Sweden	237782	83624	90059	61372	2727	998	101	130	346	421	320	23	39	110	148	236784	83523	89929	61026	2306
Switzerland	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Turkey	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ukraine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	410952	374063	28008	8207	674	10833	6913	1811	1756	353	..	..	..	..	..	400119	367150	26197	6451	321
United States of America	11217180	6971431	3618385	592080	34556	3180	431	1039	1080	630	2993	431	1032	1076	454	11214000	6971000	3617346	591000	33926

Source: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. To view the original national data please open the questionnaires. - * 2015 data on the Russian Federation refer to 2010 or 2013

Table A2-5 Growing stock, growth and drain by ownership category, 2015, 1000 m³ over bark

	TOTAL			Public ownership (total)			…of which owned by local government			Private ownership (total)		
	Growing stock	Net annual increment	Annual fellings	Growing stock	Net annual increment	Annual fellings	Growing stock	Net annual increment	Annual fellings	Growing stock	Net annual increment	Annual fellings
Albania	52.0	440.0	896.0	49.0	396.6	880.0	42.0	211.6	520.0	3.0	43.4	16.0
Austria	1,155.0	..	..	163.0	..	..	..	..	..	992.0	..	..
Belgium	179.6	4,867.0	4,552.0	85.5	2,224.0	1,948.0	20.1	523.0	470.0	94.1	2,718.0	2,594.0
Bosnia and Herzegovina	352.7	9,530.0	5,629.7	..	..	5,246.3	..	..	..	..	..	383.4
Bulgaria	699.0	..	7,668.0	572.0	12,628.0	6,516.0	69.0	1,787.0	826.0	73.0	1,733.0	1,152.0
Canada	47,320.0	..	..	42,939.0	..	..	41,843.0	..	..	4,114.0	..	..
Croatia	414.9	8,180.0	6,053.0	330.2	6,335.0	5,671.0	0.0	0.0	0.0	84.7	1,845.0	382.0
Cyprus	3.6	47.3	8.0	3.6	47.3	8.0	0.0	0.0	0.0	0.0	0.0	0.0
Czech Republic	791.2	24,140.0	17,072.0	589.0	18,688.0	12,969.0	0.0	0.0	0.0	175.0	5,452.0	4,103.0
Finland	2,099.4	93,379.0	79,169.0	342.9	14,116.0	7,385.0	..	..	..	1,756.2	79,253.0	71,784.0
France	2,697.0	86,955.0	37,073.0	736.0	22,284.0	..	..	..	..	1,961.0	64,671.0	..
Georgia	454.5	5,188.3	0.7	454.5	5,188.3	0.7	133.6	1,202.9	0.1	0.0	..	..
Germany	3,663.0	121,602.0	106,341.0	1,806.0	61,225.0	55,054.0	692.0	23,261.0	21.3	1,857.0	60,377.0	51,287.0
Iceland	0.5	..	..	..	..	..	..	..	..	..	..	..
Ireland	116.8	..	..	78.6	..	..	0.0	0.0	0.0	38.2	..	..
Israel	5.9	..	50.0	..	..	7.0	..	..	0.0	..	..	43.0
Lithuania	528.9	15.0	9.7	304.7	8.3	5.3	0.0	0.0	0.0	224.2	6.7	4.4
Luxembourg	31.0	758.0	405.0	15.0	301.0	191.0	..	222.0	..	16.0	457.0	214.0
Netherlands	80.9	2,725.0	1,267.0	38.2	1,361.0	681.0	11.2	377.0	163.0	42.7	1,364.0	586.0
Norway	1,033.0	25,750.0	12,902.0	51.0	1,439.0	833.0	17.0	536.0	450.0	784.0	20,972.0	11,301.0
Poland	2,540.0	..	..	..	..	..	..	..	..	..	..	..
Portugal	..	..	..	..	..	..	..	..	..	..	..	..
Russian Federation*	67,670.0	884,566.3	194,000.0	67,670.0	884,566.3	194,000.0	..	..	..	..	..	..
Serbia	418.0	10,878.0	5,606.0	235.0	6,462.0	2,023.0	..	..	..	183.0	4,416.0	2,203.0
Slovakia	532.1	13,369.0	9,307.0	264.9	6,689.0	5,011.0	48.6	1,180.0	1.0	182.1	4,368.0	3,016.0
Slovenia	346.1	8,582.0	6,350.0	81.5	1,907.0	1,802.0	..	..	..	257.2	6,508.0	4,500.0
Sweden	2,414.0	79,347.0	80,800.0	381.0	12,281.0	9,642.0	56.0	1,709.0	1,807.0	2,033.0	67,066.0	71,158.0
Switzerland	442.0	9,620.0	7,429.0	119.0	2,843.0	2,365.0	95.0	2,060.0	1.9	322.0	6,778.0	5,065.0
Turkey	1,538.6	41,549.0	14,786.1	1,538.6	41,549.0	14,786.1	..	..	..	..	..	..
Ukraine	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	652.0	25,133.0	13,702.0	158.0	8,860.0	6,183.0	..	..	..	494.0	16,272.0	7,520.0
United States of America	42,807.8	885,181.1	518,140.0	16,497.8	109,668.9	39,848.2	832.9	27,204.3	9,533.8	26,310.0	775,512.2	478,292.8

Source: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. To view the original national data please open the questionnaires. - * 2015 data on the Russian Federation refer to 2010 or 2013

Table A2-6 Wood removals – volume by ownership category, 1990-2015, 1000 m³ under bark

	TOTAL			Public ownership (total)			…of which owned by local government			Private ownership (total)		
	TOTAL WOOD REMOVALS: VOLUME (1000 M³)											
	1990	2010	2015	1990	2010	2015	1990	2010	2015	1990	2010	2015
Albania	2,076.0	430.0	133.6	..	..	..	..	..	..	..	..	..
Austria	15,733.0	17,831.0	17,089.0	2,044.0	1,820.0	1,631.0	..	..	..	13,689.0	16,011.0	15,458.0
Belgium	6,351.0	3,996.0	3,872.0	2,786.0	1,705.0	1,629.0	1,032.0	417.0	352.0	3,565.0	2,291.0	2,244.0
Bosnia and Herzegovina	..	3,615.0	3,797.0	..	..	..	..	..	..	..	..	..
Bulgaria	4,089.0	5,668.0	6,191.0	4,089.0	4,879.0	5,287.0	0.0	552.0	678.0	0.0	789.0	904.0
Canada	162,567.0	141,937.0	154,645.0	129,645.0	120,959.0	132,338.0	128,698.0	120,877.0	132,296.0	32,922.0	20,978.0	22,307.0
Croatia	4,001.0	4,913.0	5,448.0	3,875.0	4,765.0	5,104.0	0.0	0.0	0.0	126.0	148.0	344.0
Cyprus	58.8	10.3	8.8	55.4	7.7	6.5	0.0	0.0	0.0	3.5	2.6	2.3
Czech Republic	13,332.0	16,736.0	15,476.0	..	12,641.0	11,672.0	..	..	..	..	4,095.0	3,804.0
Finland	42,757.0	52,124.0	57,033.0	3,528.0	5,335.0	5,297.0	..	..	..	39,229.0	46,789.0	51,737.0
France	62,600.0	55,700.0	52,800.0	..	12,100.0	11,700.0	..	6,900.0	6,600.0	..	43,600.0	41,100.0
Georgia	..	660.0	640.0	..	660.0	640.0	..	..	..	..	..	..
Germany	75,021.0	54,418.4	53,207.4	49,908.0	32,519.5	30,267.2	20,700.0	12,679.3	10,400.7	25,113.0	21,838.9	22,940.2
Iceland	..	3.6	..	..	3.3	..	..	..	..	..	0.4	..
Ireland	1,625.0	2,618.0	..	1,484.0	2,166.0	..	0.0	0.0	0.0	141.0	452.3	..
Israel	113.0	27.0	50.0	..	..	7.0	..	..	..	..	..	43.0
Lithuania	..	7,097.0	6,921.0	..	3,630.0	3,657.0	..	..	..	..	3,467.0	3,264.0
Luxembourg	706.0	590.0	405.0	484.0	233.0	191.0	..	..	..	222.0	357.0	214.0
Netherlands	1,420.0	1,081.0	1,273.0	..	..	613.0	..	..	159.0	..	..	660.0
Norway	11,747.0	10,891.0	11,222.0	..	553.0	..	..	267.0	..	..	7,788.0	..
Poland	20,023.0	36,550.0	38,163.0	18,678.0	35,306.0	..	41.0	131.0	..	1,345.0	1,244.0	..
Portugal	11,205.0	9,648.4	10,710.8	..	..	..	..	..	..	..	..	..
Russian Federation*	325,300.0	175,000.0	194,000.0	325,300.0	175,000.0	194,000.0	..	..	..	..	..	..
Serbia	3,657.0	7,636.0	7,706.0	2,490.0	2,169.0	2,023.0	..	..	..	1,167.0	4,026.0	4,303.0
Slovakia	5,276.0	9,599.1	8,201.7	5,276.0	5,473.0	5,470.9	0.0	1,037.5	1,078.7	0.0	3,203.7	1,917.0
Slovenia	2,100.0	2,945.0	4,866.0	..	1,050.0	1,424.0	..	20.0	36.0	..	1,896.0	3,442.0
Sweden	53,700.0	72,200.0	69,500.0	..	8,394.0	..	..	1,599.0	..	..	62,207.0	..
Switzerland	6,332.0	4,938.0	4,861.0	..	..	..	..	..	..	..	..	..
Turkey	15,756.0	20,597.0	21,959.0	15,756.0	20,597.0	21,959.0	..	..	..	..	..	..
Ukraine	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	6,354.0	9,571.0	11,184.0	2,867.0	4,604.0	4,874.0	..	..	..	3,487.0	4,967.0	6,310.0
United States of America	..	..	518,141.0	..	..	39,848.2	..	..	9,533.8	..	..	478,292.8

Source: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. To view the original national data please open the questionnaires. - * 2015 data on the Russian Federation refer to 2010 or 2013

Table A2-7 Area and number of public forest holdings by size, 2015, 1000 ha

	Public ownership											
	TOTAL	<= 10 ha	11-500 ha	501- 0,000 ha	10,001-100,000 ha	> 100,000 ha	Total	<= 10 ha	11-500 ha	501-10,000 ha	10,001-100,000 ha	> 100,000 ha
	AREA (1000 HA)						NUMBER					
Albania	785.0	0.0	0.0	289.0	240.0	0.0	426	0	10	340	76	0
Austria	878.5	3.6	82.1	238.3	22.4	532.0	1906	628	1158	117	..	..
Belgium	329.0	1.0	18.9	232.8	76.3	0.0	996	567	264	163	2	0
Bosnia and Herzegovina	..	..	..	..	..	..	..	..	..	..	..	..
Bulgaria	3,286.0	0.1	24.0	3,262.0	..	..	535	13	133	389	..	..
Canada	..	..	..	..	..	..	..	..	..	..	..	..
Croatia	1,366.0	0.0	33.0	1,300.0	33.0	0.0	678	7	144	525	2	0
Cyprus	118.9	0.0	0.0	2.3	116.6	0.0	4	0	0	1	3	0
Czech Republic	2,041.0	9.0	275.0	798.0	958.0	0.0	7746	4116	3310	253	67	0
Finland	6,744.0	..	..	..	..	..	..	..	..	..	..	..
France	4,077.0	10.0	1,645.0	2,254.0	168.0	0.0	16930	1845	13290	1785	10	0
Georgia	2,010.2	..	..	..	2,010.2	..	52	..	..	..	52	..
Germany	5,932.0	..	..	..	..	..	8591	0	..	..	..	..
Iceland	14.5	0.2	8.1	6.2	0.0	0.0	261	89	125	25	0	0
Ireland	386.2	0.0	22.3	363.9	0.0	0.0	319	0	70	249	0	0
Israel	39.4	..	..	..	..	..	..	..	..	..	..	..
Lithuania	1,314.0	0.0	0.0	24.0	1,290.0	0.0	47	0	0	5	42	0
Luxembourg	41.5	0.3	26.3	16.1	0.0	0.0	293	126	143	24	0	0
Netherlands	181.0	..	..	..	..	..	..	..	..	..	..	..
Norway	1,488.0	0.9	109.5	585.9	791.7	0.0	1339	190	846	270	33	0
Poland	7,643.0	5.0	60.0	..	..	..	2718	1171	1020	..	..	..
Portugal	64.0	..	..	..	..	..	..	..	..	..	..	..
Russian Federation*	814,930.5	0.0	0.0	624.9	26,749.2	787,556.4	1460	0	0	93	584	783
Serbia	1,158.0	..	..	23.0	1,135.0	..	507	..	..	11	496	..
Slovakia	947.0	0.0	0.0	7.4	129.5	640.1	5	0	0	1	3	1
Slovenia	292.0	7.5	25.5	0.0	0.0	259.0	400	353	46	0	0	1
Sweden	7,438.0	1.0	146.0	1,418.0	3,011.0	2,861.0	998	101	476	359	52	10
Switzerland	342.0	..	..	..	..	..	..	..	..	..	..	..
Turkey	12,642.9	..	..	..	..	..	..	..	..	..	..	..
Ukraine	..	..	..	..	..	..	..	..	..	..	..	..
United Kingdom	871.0	11.0	324.0	..	..	..	10833	6913	3567	..	..	..
United States of America	..	..	..	..	..	..	..	..	..	..	..	..

Source: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region. To view the original national data please open the questionnaires. - * 2015 data on the Russian Federation refer to 2010 or 2013

Table A2-8 Data on European state forest management organizations (SFMOs) for 2016

	Country	Austria	Bosnia and Herzegovina	Bulgaria	Croatia	Czech Republic	Finland	Germany	Ireland	Lithuania	Poland	Serbia
	Name of the SFMO	Österreische Bundesforste - Öbf	Šume R. Srpske	Bulgarian state forests (6 enterprises)	Hrvatske šume	Lesy Ceske Republiky	Metsaehallitus	Niedersae-chsische Landesforsten	Coillte	Lithuanian state forests (42 enterprises)	Lasy Panstwowe	Srbijašume
1	Year of establishment	1997	1993	2007	1991	1992	1994	2005	1989	1996	1924	1991
2	State-owned forest area under SFMO management and protection (000 ha)	510	738	2,641	1,831	1,166	4,900	315	390	982	7,107	767
3	Annual wood harvesting (1000 m^3)	1,515	2,047	5,240	5,144	8,100	6,060	1,611	2,600	3,800	38,408	1 328
4	Total annual profit after tax (1000 EUR)	39,391	2,315	6,239	23,188	154,045	92,513	17,080	48,225	7,228	91,057	4 152
5	SFMO´s own employees and workers	1,045	4,764	7,500	7,079	3,475	1,549	1,222	900	4,008	25,980	3 073
6	Contractors *(estimation)*	750	1,500	6,500	1,800	3,000	1,000	600	2,200	4,000	24,000	1 200
7	In Full Time Equivalents (FTE) (7) = (5) + (6)	1,795	6,264	14,000	8,879	6,475	2,549	1,822	3,100	8,008	49,980	4 273
8	Harvesting / FTE (8) = (3) / (7)	0.84	0.33	0.37	0.57	1.25	2.38	0.88	0.83	0.47	0.76	0.31
9	FTE / 1000 ha of forest area (9) = (7) / (2)	3.5	8.4	5.3	4.8	5.5	0.5	5.7	7.9	8.1	7.0	5.5
10	EUR/ha (10) = (4) / (2)	77.2	3.1	2.4	12.6	132	18.8	56.5	123.6	7.3	12.8	5.4

Sources: EUSTAFOR (European State Forest Association) internal database; Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region; Annual reports of enterprises for 2016 (2015 for Poland, Lithuania, Bulgaria and Germany); Liubachyna et al., 2017.

Table A2-9 National level public forest institutions

This table has been compiled from several different questions and various data sources used in this study. It should be noted that the legal forms of organizations have been surmised and generalized from information provided in notes to questions and should not be treated as definitive. Missing records for management organizations and forest area indicate where sources did not provide further details – generally these areas are presumed to be small.

Legal forms:

SOE – State-owned enterprise

SBF – State budget financed organization

NSO – non-state organization

Country	National authority	Organization undertaking management operations	Area (1000 ha)	Legal form
EUROPE				
Albania	Environment Ministry		785	
Austria	Federal Ministry of Agriculture, Forestry, Environment and Water Management	Österreichische Bundesforste AG	566	SOE
	Federal Ministry of Defence and Sports		11	
	Other including Federal Ministry for Transport, Innovation and Technology	Several small private companies managing smaller forest areas alongside transport infrastructure		
Belgium	Devolved (Flanders, Wallonia, Brussels)			
Bosnia and Herzegovina	Devolved (Federation of Bosnia and Herzegovina, Republic of Srpska and Brčko District)			
Bulgaria	Ministry of Agriculture and Food	Six Regional Forestry Directorates, State enterprises, State forest enterprises and State hunting enterprises	2,702	SOE
	Ministry of Environment and Water		109	
	Ministry of Education		9	
Croatia*	Ministry of Agriculture	Croatian Forests Ltd.	1,319	SOE
	Ministry of Environmental and Nature Protection	State Institute for Nature Protection		SBF
		Croatian Waters Company		
	Other	Croatian Electricity Company		
Cyprus	Ministry of Agriculture, Rural Development and Environment	Department of Forests	107.15	SBF
	Ministry of Interior		11.8	
Czech Republic	Ministry of Agriculture	Forest of the Czech Republic	1,337	SOE
	Office of the President of the Republic		6	
	Ministry of Defence	Military Forests and Farms	127	SOE
	Ministry of environment	3 x National Park Administrations	99	SBF
		National Conservation Agency		SBF

Country	National authority	Organization undertaking management operations	Area (1000 ha)	Legal form
Estonia*	Ministry of Environment	State Forest Management Centre	849	SBF
Finland*	Ministry of Agriculture and Forestry	Metsähallitus	6,550	SOE
	Ministry of Environment			
France	Ministère chargé de l'Agriculture et des Forêts Ministry of the Environment	Office National des Forêts	4,077	SOE
Germany*	Devolved to Lander			
	Ministry of Finance	Bundesanstalt für Immobilienaufgaben	403	SOE
Greece*	Ministry of Environment, Energy and Climate Change	Forest Service (General Secretariat of Development and Protection of Forests and Natural Environment)	1,644	SBF
Iceland	Ministry for the Environment and Natural Resources	Icelandic Forest Service	11.7	SBF
Ireland	Department of Agriculture, Food and the Marine	Coillte Teoranta	382	SOE
Israel	Ministry of Agriculture	Keren Kayemeth Lelsrael	100.5	NSO
	Ministry of Environmental Protection	Nature and Parks Authority	39.4	SBF
Latvia*	Ministry of Agriculture	LVM	1,470	SOE
	Ministry of Environmental Protection and Rural Development	Nature Conservation Agency		
	Ministry of Education and Science	University of Agriculture of Latvia and Latvian State Forest Research Institute "Silava"		
Lithuania*	Ministry of Environment	Directorate General of State Forests (overseeing 42 state forest enterprises)	1,314	SBF
	Ministry of Finance	Directorates of National and Regional Parks and Strict Nature Reserves		
Luxembourg	Ministère de l'Environnement	Administration de la nature et des forêts	41.5	SBF
Netherlands	Ministry of Economic Affairs	Staatsbosbeheer	98.6	SBF
	Ministry of Finance		9	
	Ministry of Defence		8.3	
North Macedonia*	Ministry for Agriculture, Forestry and Water Economy	Macedonian Forest	792.9	SOE
	Ministry of Environment and Physical Planning	National Parks	88.1	SBF
Norway	Ministry of Agriculture and Food	Statskog SF	1,214	SOE
	Ministry of Culture	Includes Church endowment fund	60	
	Ministry of Defence		33	

Country	National authority	Organization undertaking management operations	Area (1000 ha)	Legal form
Poland	Ministry of the Environment	State Forests National Forest Holding	7,079	Other
		National Parks	185	SBF
	Ministry of Agriculture and Rural Development	Agricultural Real Estate Agency	32	SBF
	Ministry of Science and Higher Education	Agriculture or Life Sciences Universities	20	SBF
	Other including Ministry of Defence			
Portugal	Ministry of Agriculture, Forestry and Rural Development	Institute for Nature Conservation and Forestry	64	SBF
Romania*	Ministry of Waters and Forests	National Forestry Registry - Romsilva	3,350	SOE
Serbia*	Ministry of Agriculture, Forestry and Water Management	Devolved (Srbijasume / Vojvodinasume / Borjak)	891	SOE
	Ministry of Environmental Protection	National Parks	80	SOE
	Ministry of Education, Science and Technological Development	Faculty of Forestry	6	
	Other including Ministry of Defence		23	
Slovakia	Ministry of Agriculture and Rural Development	Lesy Slovenskej Republiky	902	SOE
		Forest-agricultural Estate Ulič	63.6	SOE
		State Forests TANAP		
	Ministry of Defence	Military Forests and Estates	63.4	SOE
Slovenia*	Ministry of Agriculture, Forestry and Food	Slovenia Forest Service	251	SBF
Spain*	Devolved to 17 autonomous regions			
Sweden	Ministry of Enterprise and Innovation	Sveaskog	3,975	SOE
	Ministry of Finance	National Property Board	1,984	SBF
	Ministry of Environment and Energy	Management of National Parks and nature reserves undertaken by 21 county administrative boards and special trusts	502	SBF / NSO
Switzerland	Federal Department of the Environment, Transport, Energy and Communications	Forest Division	198.4	SBF
		Hazard Prevention Division	143.6	SBF
Turkey	Ministry of Forestry and Water Affairs	General Directorate of Forestry	12,023.9	SBF
	General Directorate of Nature Conservation and National Parks		< 1000	
Ukraine	Ministry of Environment and Natural Resources	State Forest Resources Agency		SOE
United Kingdom	Devolved (England, Wales, Scotland, Northern Ireland)			

Country	National authority	Organization undertaking management operations	Area (1000 ha)	Legal form
RUSSIAN FEDERATION				
Russian Federation	Ministry of Natural Resources and Environment	Federal Forestry Agency	814,930.5	SBF
		Federal Supervisory Natural Resources Management Service		SBF
	Ministry of Industry and Trade of the Russian Federation		6,814.4	SBF
	Ministry of Defence			SBF
NORTH AMERICA				
USA	Department of Agriculture	Forest Service	63,052	SBF
	Department of the Interior	Bureau of Land Management	13,463	SBF
		National Park Service	3,045	SBF
Canada	Devolved to 13 Provinces and Territories			
	Parks Canada			SBF
	Department of National Defence			SBF
CAUCASUS AND CENTRAL ASIA				
Armenia+	Ministry of Nature Conservation	Armles	271	SOE
		Bioresources Management Agency		
Azerbaijan+	Ministry of Ecology and Natural Resources	Forestry Development Department	1,139	SBF
Georgia	Ministry of Environment and Natural Resources Protection	National Forestry Agency	1,800	SBF
		Agency for Protected Areas	267	
		Tusheti protected landscape	5	
	Devolved to Autonomous Republics of Adjara and Abkhazia			
		Forestry Agency of the AR Adjara	150	
Kazakhstan+	Ministry of Agriculture	Akimats (local forest enterprises, answering to local authorities)	2 ,649.7	SBF
		Committee on Forestry and Wildlife (CFW)	713.4	SBF
Kyrgyzstan+	State Agency for Environmental Protection and Forestry	Leskhoz (Local level forest enterprises)	1,252	SBF
Tajikistan+	State Forestry Agency	Leskhoz (District level forest enterprises)	421	SBF
		State Administration of Protected Areas		
	Academy of Sciences	Scientific Research Institute of Forestry		
Turkmenistan+	State Committee of Turkmenistan for Environmental Protection and Land Resources	Department of Forestry	4,127	SBF
Uzbekistan+	Goskomles (State Committee on Forestry)	Goskomles	3,254	SBF

Sources: Joint COST Action FACESMAP/UNECE/FAO Enquiry on Forest Ownership in the ECE Region

* FACESMAP country reports

\+ UNECE/FAO State of Forests of the Caucasus and Central Asia 2019

SOME FACTS ABOUT THE EUROPEAN FORESTRY COMMISSION

The European Forestry Commission (EFC), which was created in 1947, is one of six Regional Forestry Commissions established by the Food and Agriculture Organization of the United Nations (FAO) to provide a policy and technical forum for countries to discuss and address forest issues on a regional basis.

The purpose of EFC is to advise on the formulation of forest policy and to review and coordinate its implementation at the regional level; to exchange information; to advise on suitable practices and actions to address technical and economic problems (generally through special Subsidiary Bodies); and to make appropriate recommendations in relation to the foregoing. The EFC meets every two years and its official languages are English, French and Spanish.

The EFC has a number of associated subsidiary bodies, including the Working Party on the Management of Mountain Watersheds and the Working Party on Mediterranean forestry issues (Silva Mediterranea). It shares with the United Nations Economic Commission for Europe (UNECE) the ECE/FAO Working Party on Forest Statistics, Economics and Management.

FAO encourages the wide participation of government officials from forestry and other sectors as well as representatives of international, regional and subregional organizations that deal with forest-related issues in the region, including non-governmental organizations and the private sector. Accordingly, the EFC is open to all Members and Associate Members whose territories are situated wholly or in part in the European Region or who are responsible for the international relations of any non-self-governing territory in that region. Membership comprises such eligible Member Nations as have notified the Director-General of their desire to be considered as Members.

The EFC is one of the technical commissions serving the FAO Regional Office for Europe and Central Asia (REU), and the EFC Secretary is based in Geneva. EFC work is regulated by its Rules of Procedures, which were adopted by the FAO Conference in 1961 and amended at the Eighteenth Session of the EFC in 1977.

More information about the work of the EFC and COFFI may be obtained by contacting:

UNECE/FAO Forestry and Timber Section
Forests, Land and Housing Division
United Nations Economic Commission for Europe/
Food and Agriculture Organization of the United Nations
Palais des Nations
CH-1211 Geneva 10, Switzerland

info.ECE-FAOforests@un.org

www.unece.org/forests

SOME FACTS ABOUT THE COMMITTEE ON FORESTS AND THE FOREST INDUSTRY

The UNECE Committee on Forests and the Forest Industry (COFFI) is a principal subsidiary body of the United Nations Economic Commission for Europe (UNECE) based in Geneva. It constitutes a forum for cooperation and consultation between member countries on forestry, the forest industry and forest product matters. All countries of Europe, the Commonwealth of Independent States, the United States of America, Canada and Israel are members of the UNECE and participate in its work.

The UNECE Committee on Forests and the Forest Industry shall, within the context of sustainable development, provide member countries with the information and services needed for policymaking and decision-making with regard to their forest and forest industry sectors, including the trade and use of forest products and, where appropriate, it will formulate recommendations addressed to member governments and interested organizations. To this end, it shall:

1. With the active participation of member countries, undertake short-, medium- and long-term analyzes of developments in, and having an impact on, the sector, including those developments offering possibilities for facilitating international trade and for enhancing the protection of the environment;
2. In support of these analyzes, collect, store and disseminate statistics relating to the sector, and carry out activities to improve their quality and comparability;
3. Provide a framework for cooperation, for example by organizing seminars, workshops and ad hoc meetings and setting up time-limited ad hoc groups, for the exchange of economic, environmental and technical information between governments and other institutions of member countries required for the development and implementation of policies leading to the sustainable development of the sector and the protection of the environment in their respective countries;
4. Carry out tasks identified by the UNECE or the Committee on Forests and the Forest Industry as being of priority, including the facilitation of subregional cooperation and activities in support of the economies in transition of central and eastern Europe and of the countries of the region that are developing from an economic perspective; and
5. Keep under review its structure and priorities and cooperate with other international and intergovernmental organizations active in the sector, and in particular with FAO (the Food and Agriculture Organization of the United Nations) and its European Forestry Commission, and with the International Labour Organization, in order to ensure complementarity and to avoid duplication, thereby optimizing the use of resources.

More information about the work of the EFC and COFFI may be obtained by contacting:

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Who owns our forests?
Forest ownership in the ECE region

This study examines forest ownership in the ECE region. Based on data on 35 countries, and the first to include all forest ownership categories, this study investigates the changing nature and patterns of forest ownership, the ways in which governance and social structures influence forest owners and users, as well as forest management. Within the limits of data availability and harmonization, the publication provides an overview of, and a new baseline for, understanding the diversity and dynamics of forest ownership in the ECE region.

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