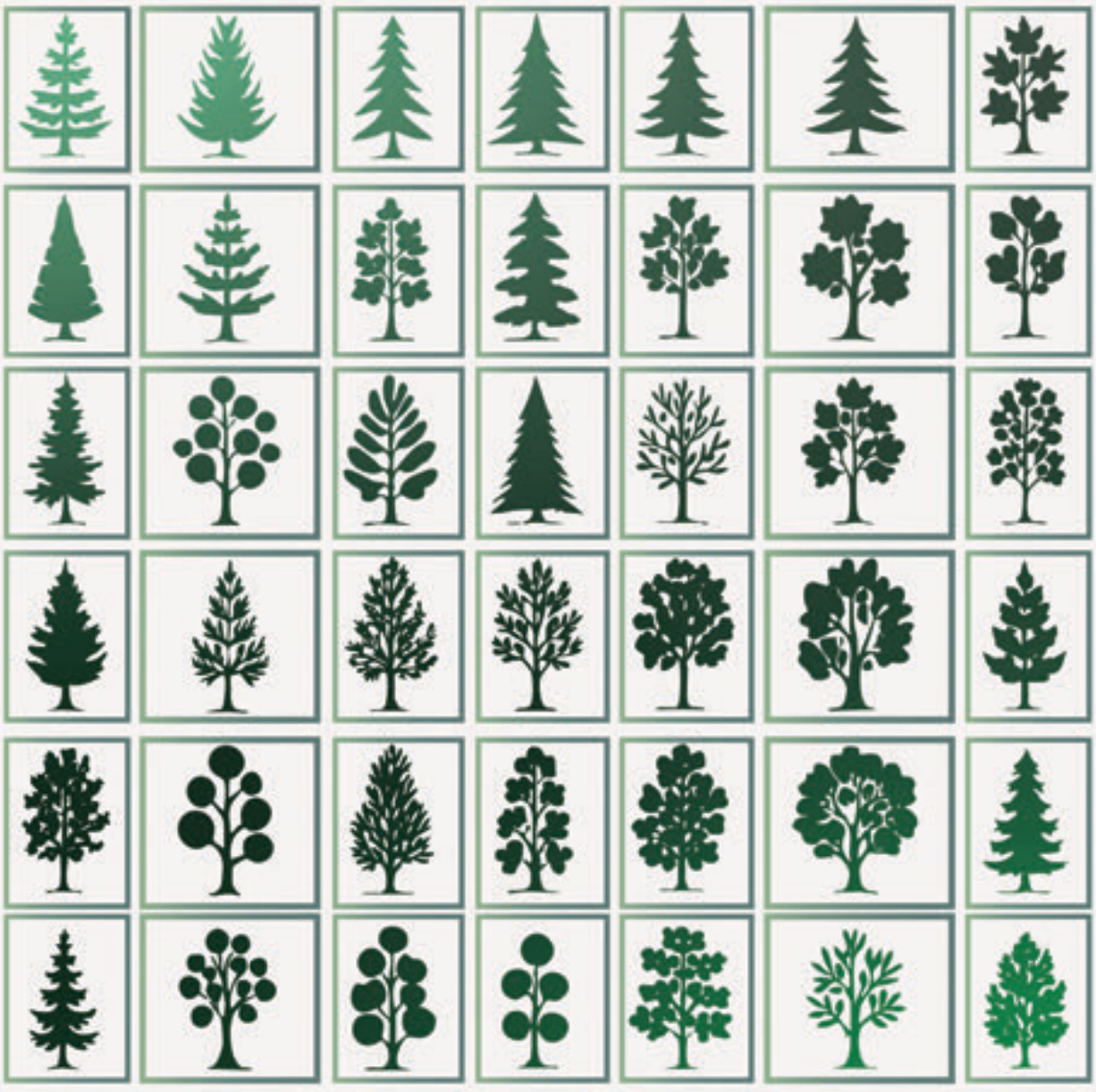
UNECE

2025 Forest Profile

for Europe, North America, Caucasus and Central Asia



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ECE/TIM/SP/65

2025 Forest Profile for Europe, North America, Caucasus and Central Asia

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Geneva, 2025

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Abstract

This publication provides an overview of the state of forests in Europe, North America, Caucasus and Central Asia, showing their importance for sustainable global development. Drawing on data from diverse sources, it explores important aspects of forest ecology and management, including the distribution, diversity and health of forests across the entire region. It shows how our forests are changing, how much wood is growing and being harvested, while also examining the crucial roles forests play in climate regulation, biodiversity conservation, and the crucial benefits they offer to people and our economies. Furthermore, the publication addresses the challenges forests face, including threats to their vitality and the importance of forest protection. By presenting a holistic assessment of UNECE forests, the report aims to inform the public, policymakers and stakeholders about the need for sustainable forest management and the importance of forest resources for people and the planet.

Specific aspects of forests in Europe, North America, Caucasus and Central Asia can be found in the UNECE publications at https://unece.org/publications/forests.

Acknowledgements

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The report is a joint effort of the author and the secretariat, and is based on the results of international reporting on forests and forest products[i,ii], general literature and data.

The UNECE would like to recognize the following experts for their contributions to the project and this report:

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i FAO Global Forest Resources Assessment

ii Joint ECE/ FAO/Eurostat/ITTO Forest Sector Questionnaire

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List of Abbreviations

AGB	aboveground biomass
BGB	belowground biomass
CM	centimeter(s)
CO_2	carbon dioxide
DWB	deadwood biomass
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GT	gigatonne(s)
HA	hectare(s)
IPM	integrated pest management
M^3	cubic meter(s)
NWFP	non-wood forest product(s)
OWL	other wooded land(s)
SEEA	System of Environmental-Economic Accounting
SFM	sustainable forest management
T	tonne(s)
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNEP-WCMC	United Nations Environment Programme World Conservation Monitoring Centre
%	percent

Introduction

Despite their continuing reduction worldwide, forests are still one of the most common types of land cover, covering around a third of the Earth's land surface. In 2025, the world had a total forest area of 4.14 billion ha[1]. Forests in the UNECE region, which includes 56 countries[iii] in Europe, North America, Caucasus and Central Asia, cover 1.76 billion ha, or 42.5% of the global total. The forest ecosystems of the UNECE region are vital for biodiversity, climate regulation, wood supply and human well-being, not only at the local or national level but also regionally and globally.

To ensure that future generations continue to receive these benefits, accurate forest assessment and reporting is vital. This means systematically measuring and monitoring the ecological, economic and socio-economic condition of forests. This information is used to inform people and support evidence-based policies. It also lets everyone track the progress made towards sustainability goals, and identifies places at risk from threats like deforestation, climate change and over-exploitation. Without regular checks and good data, it would be impossible to manage forests properly, create policies to improve their contributions to the environment, and make sure they contribute to a sustainable future.

Forests make a valuable contribution to national economies and well-being, but this varies a lot within and between countries. The same is true for the UNECE region, where forests cover 39% of the land on average, though this varies considerably from country to country (Figure 1).

This variation creates a challenge for forest reporting, so, to address this, this publication organizes countries in the UNECE region into four geographical groupings: ECE West[iv], ECE Central[v], ECE South-East[vi] and ECE East[vii]. These groupings were solely created based on their geographical location and degree of forest resources. They are not based upon economic, political or any other related criteria.

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iii https://unece.org/member-states

iv Canada and the United States of America.

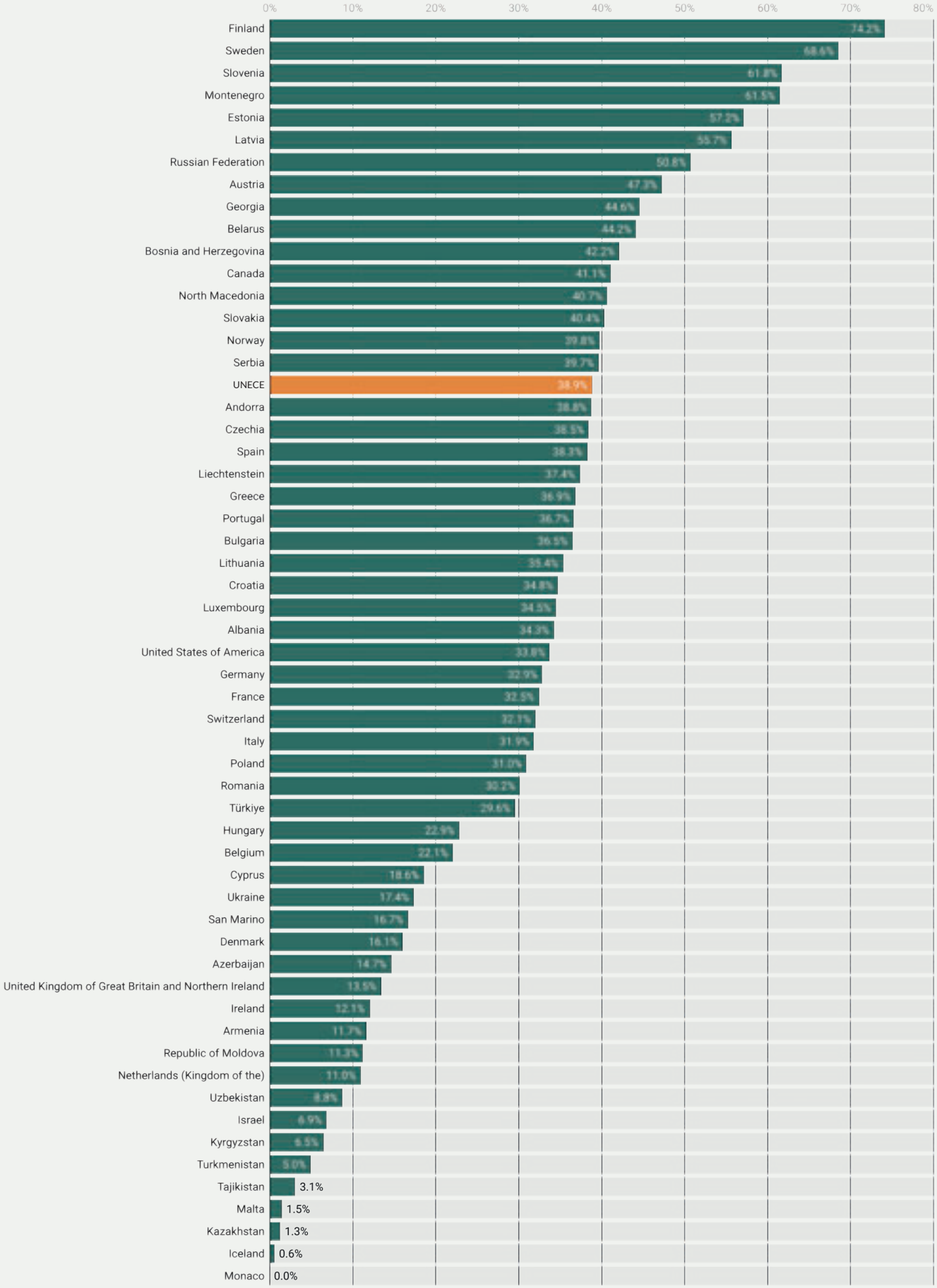
v Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, Netherlands (Kingdom of the), North Macedonia, Norway, Poland, Portugal, Republic of Moldova, Romania, San Marino, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine and the United Kingdom of Great Britain and Northern Ireland.

vi Armenia, Azerbaijan, Cyprus, Georgia, Israel, Kazakhstan, Kyrgyzstan, Tajikistan, Türkiye, Turkmenistan and Uzbekistan.

vii Russian Federation.

FIGURE 1

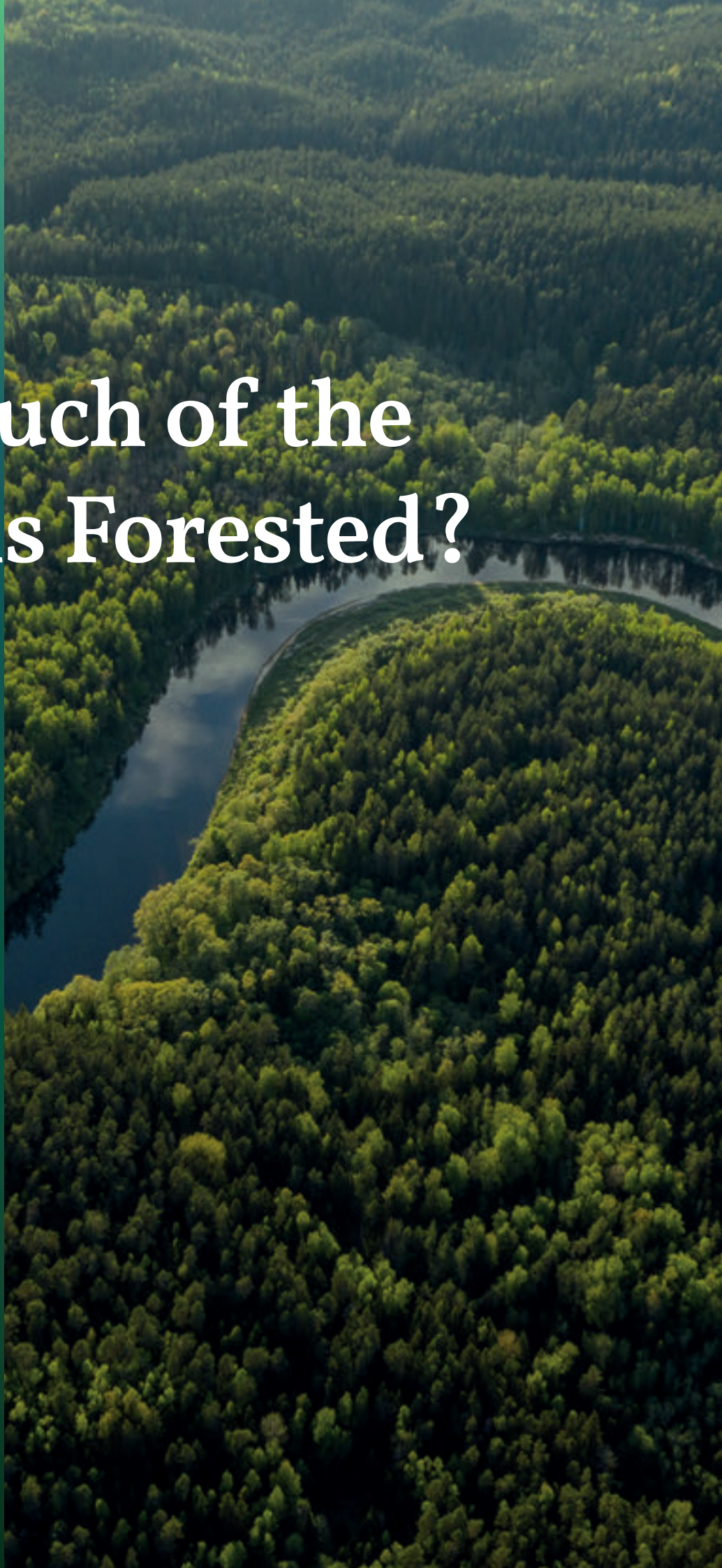
Share of forest area in total land area in 2025 (%), in the UNECE region



Source: Figure by the UNECE based on FAO data.[2]

01

How Much of the World is Forested?

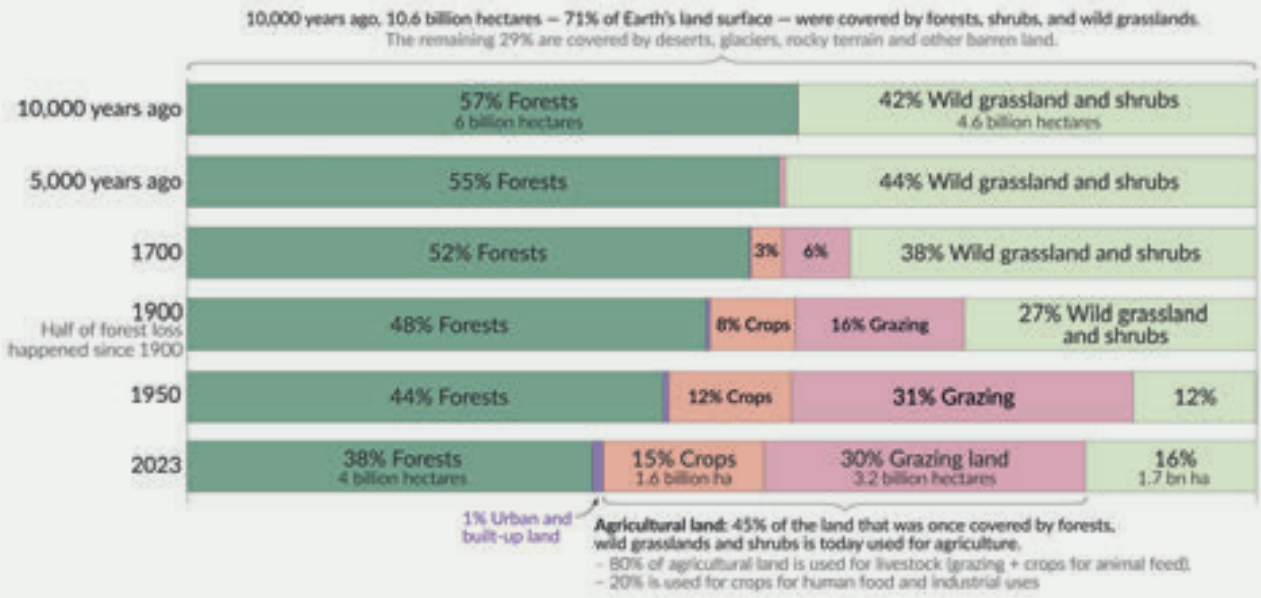


Forests are dynamic ecosystems, shaped by natural and human influences which constantly change. For example, much of the land that is now occupied by temperate and boreal forests was covered by ice sheets centuries ago[3]. In the future, climate change may lead to major shifts in the size and location of forests[4].

In recent millennia the main influence on forest cover has been human activity, with vast areas of forest converted for agricultural use, urbanization, and infrastructure development[5]. The world has lost an estimated one-third of its forest cover (Figure 2) since the last ice age[6,7].

FIGURE 2

Change of cover of the Earth's surface over the past 10,000 years

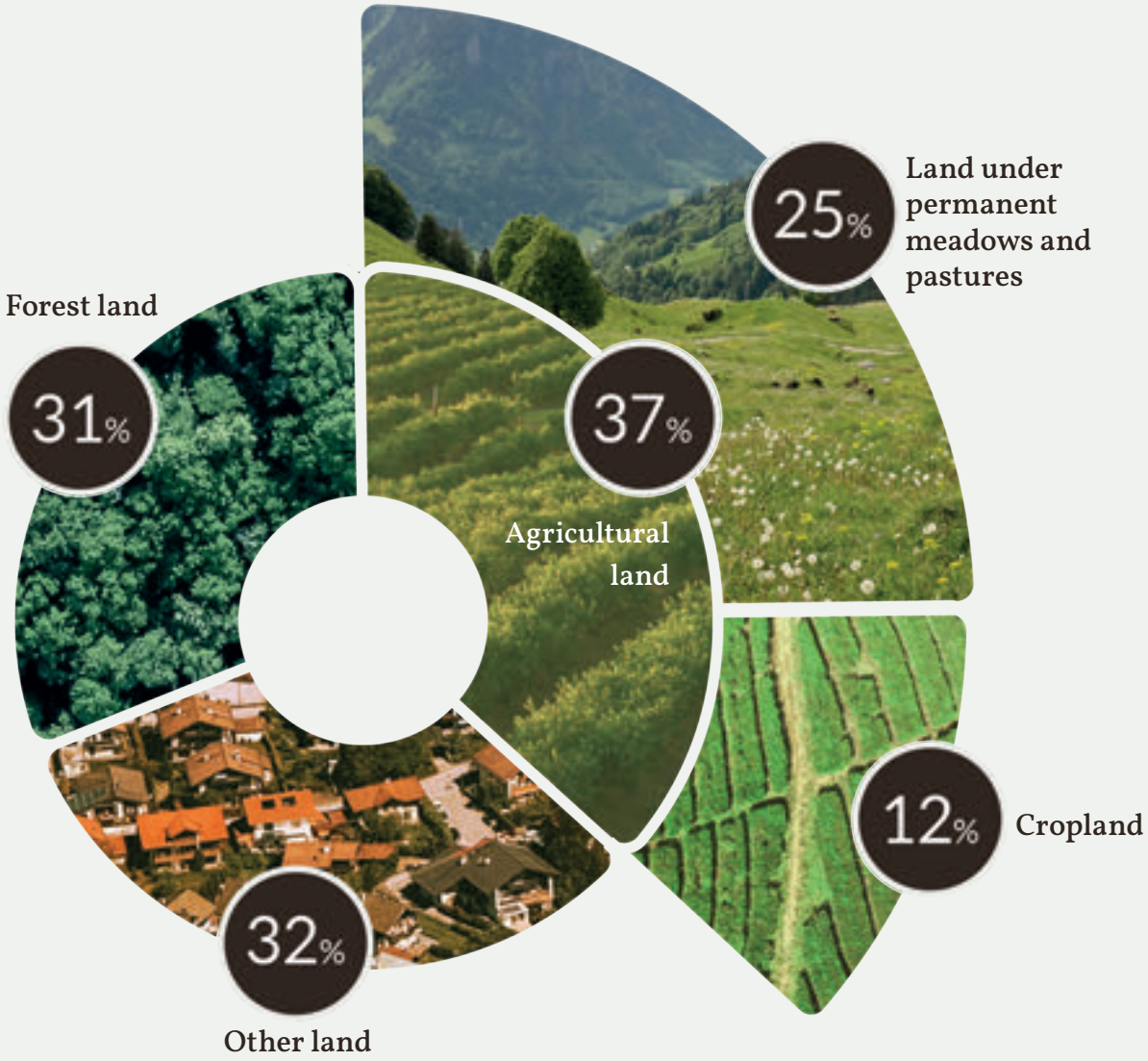


Source: Ritchie, H., 2021. The world has lost one-third of its forest, but an end of deforestation is possible. Published online at OurWorldinData.org. Retrieved June, 2025, from https://ourworldindata.org/world-lost-one-third-forests.[8]

Despite this continuing reduction in forests, they are still **one of the most common types of land use** (Figure 3), covering around a **third of the world's land surface**[9].

FIGURE 3

Global land area composition in 2019



Source: Figure by the UNECE based on FAO data.[16]

BOX 1. What is a Forest?

Definitions of what constitutes a **forest** are as diverse as forests themselves. The Food and Agriculture Organization of the United Nations (FAO) developed a widely-used definition:

Forest

A forest is a land area, not primarily of agricultural or urban use, of more than **0.5** ha. It must have a tree canopy cover, **10**% of which consists of trees of over **five** metres.

Other Wooded Land

A land with a canopy cover of **5-10**% of trees able to reach a height of 5m in situ; or a canopy cover of more than **10**% when smaller trees, shrubs and bushes are included[10].

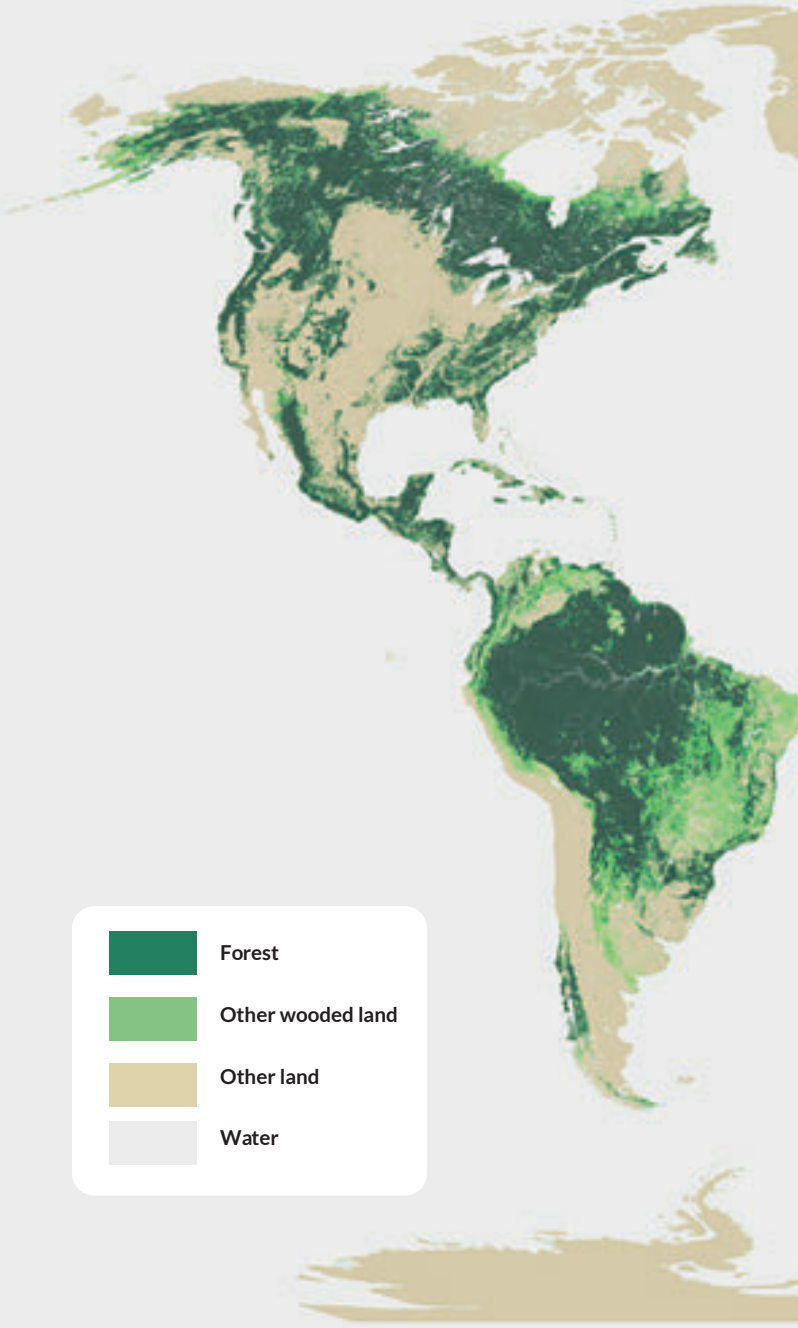
Figure 4 shows two large forest areas on a world map: the tropical rainforest and the boreal coniferous forest. These are bordered by deciduous forests in Europe, East Asia and western and eastern North America. Smaller deciduous forest areas are found in South America, Africa and Australia.

The world has a **total forest area of 4.14 billion ha**[12]. Fifty-four per cent of the world's forests are in only five countries – Brazil, Canada, China, the Russian Federation and the United States of America[13].

FIGURE 4

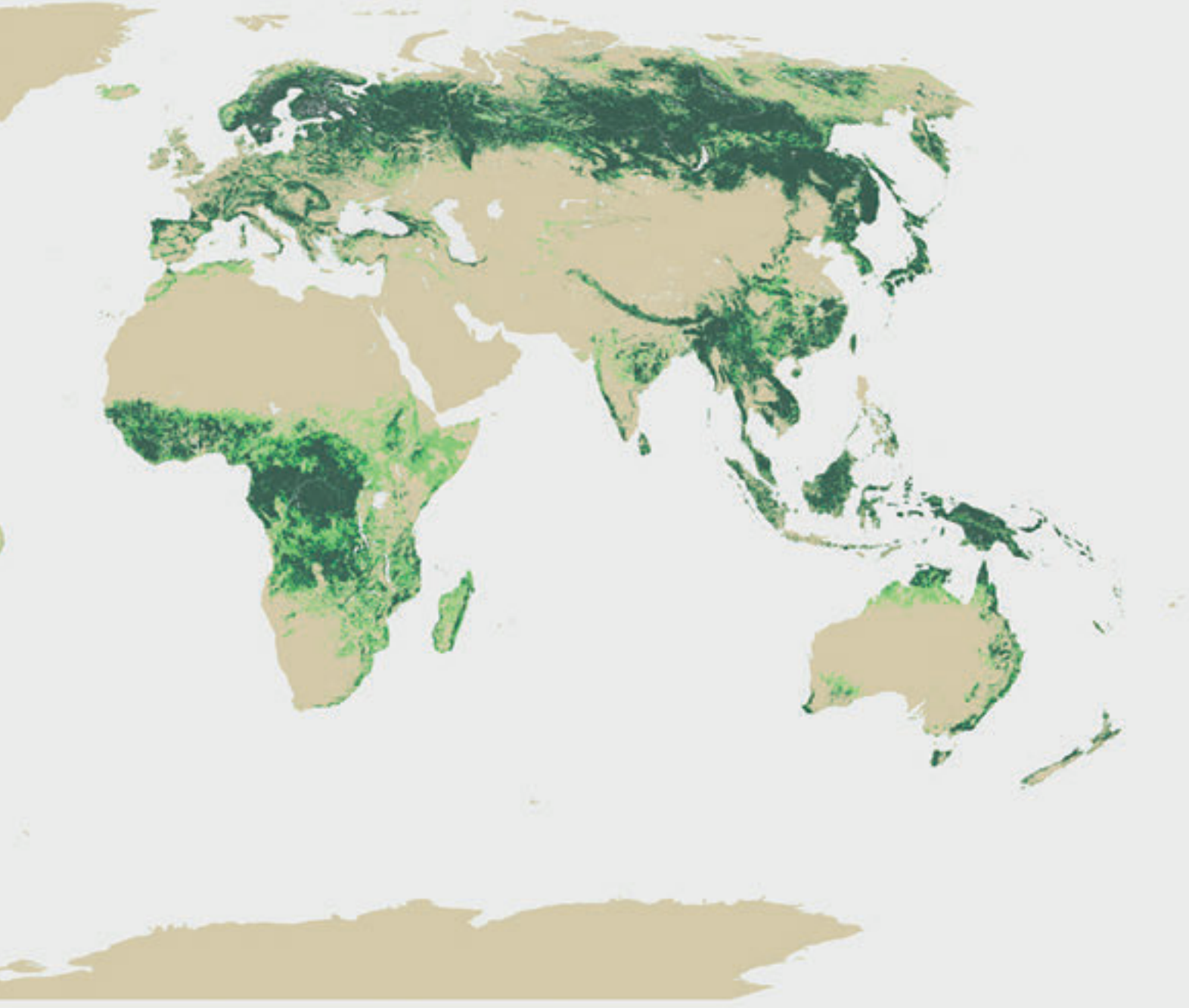
The world's forests

The boundaries and names shown and the designations used on this ma



Source: FAO, 2005. The world's forests. Retrieved June, 2025, from https://www.fao.o

p do not imply official endorsement or acceptance by the United Nations.



org/forest-resources-assessment/past-assessments/fra-2005/maps-and-figures/en/.[11]

02

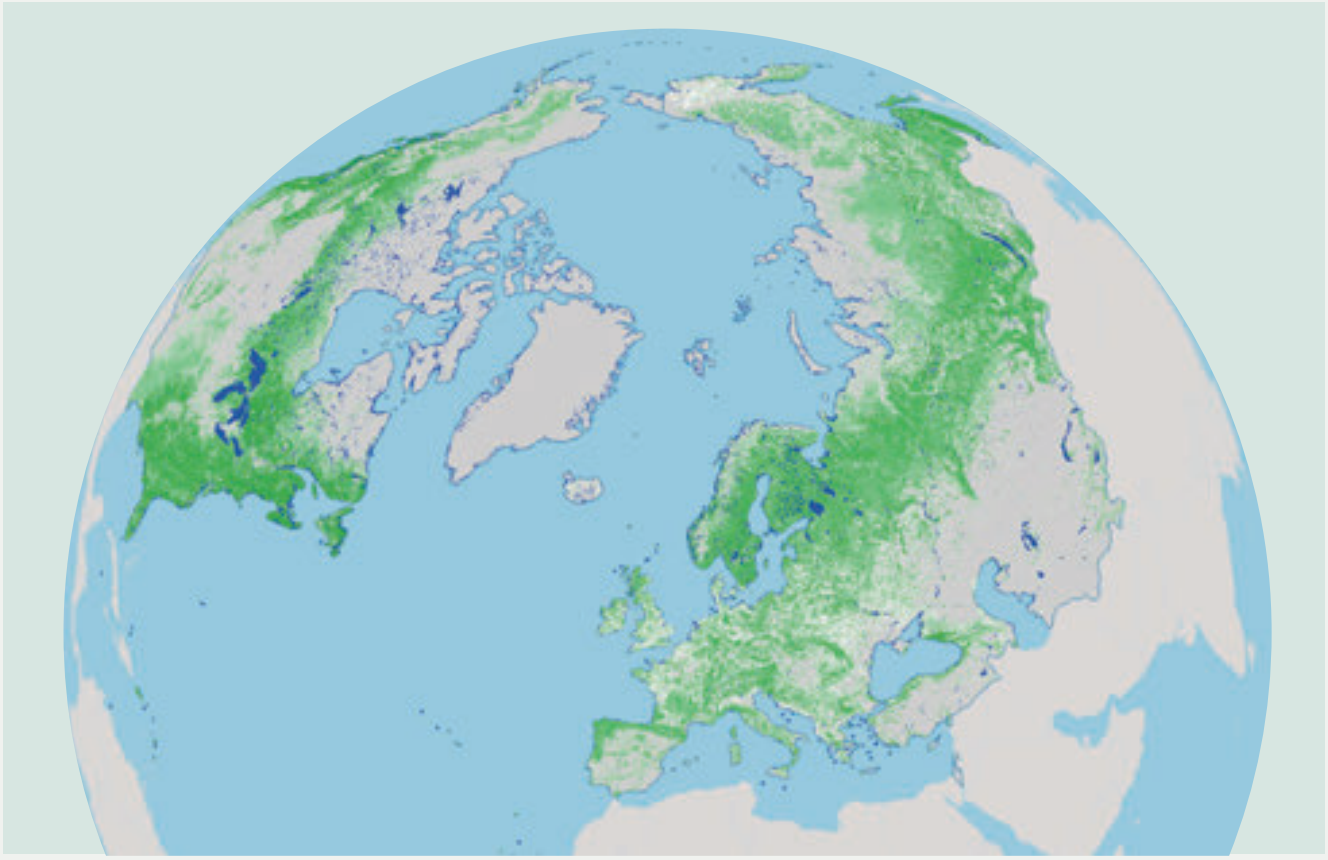
How Much of the World's Forests are in the UNECE Region?

In 2025, forests in the **UNECE region cover 1.76 billion ha, or 42.5% of the global total**[14]. At 39% (Figure 5), the region has a higher rate of forest cover than the global figure of 32%. This works out as **1.3 ha per person:** much higher than the global average of 0.5 ha (see section 15). The region also has 0.18 billion ha of wooded areas classified as Other Wooded Land (see Box 1).

FIGURE 5

Forest cover area in the UNECE region

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

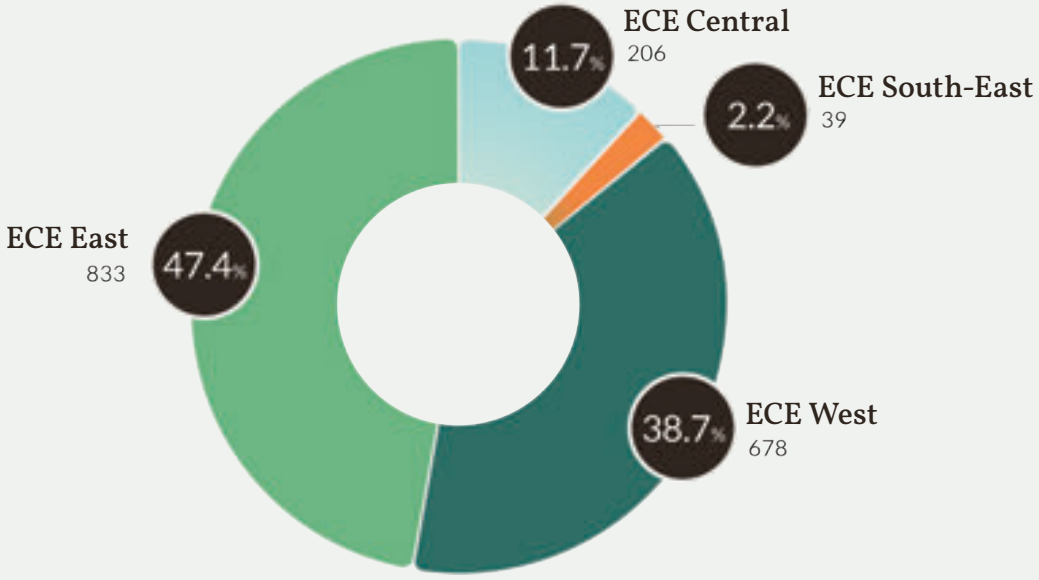


Source: Geospatial Information Authority of Japan, Chiba University and collaborating organizations, n.d. Retrieved June, 2025, from https://globalmaps.github.io/ptc.html.[15]

Eighty-six per cent of the UNECE region's forest area is **shared between three countries** - Canada, the Russian Federation and the United States of America. The largest portion of forest area, 47%, is in ECE East, followed by 39% in ECE West, 12% in ECE Central and 2% in ECE South-East (Figure 6).

FIGURE 6

Forest area in 2025 (million ha and %), by geographical groupings in the UNECE region

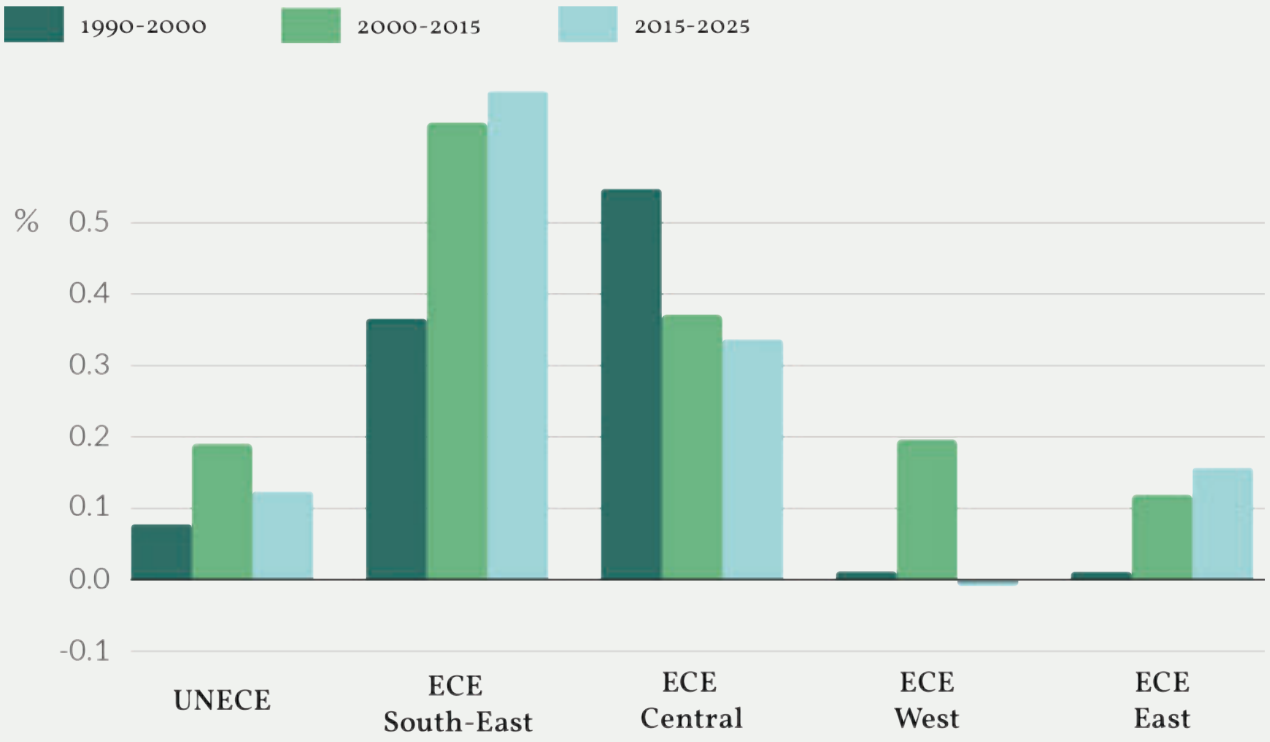


Source: Figure by the UNECE based on FAO data.[17]

Although the world's forest area has decreased by 203 million ha since 1990, the **forest area in the UNECE region has grown by around 60 million ha**: roughly the same area as France. This increase was in all UNECE geographical groupings between 1990 and 2025 (Figure 7). The largest absolute increase was in ECE East, with almost 21 million ha, while the smallest increase was in ECE South-East with around 5.2 million ha. However, given the low level of forest cover in ECE South-East, this geographical grouping recorded the highest relative increase in forest area, at 15%.

FIGURE 7

Annual forest area change (%), by geographical groupings in the UNECE region



Source: Figure by the UNECE based on FAO data.[18]

03

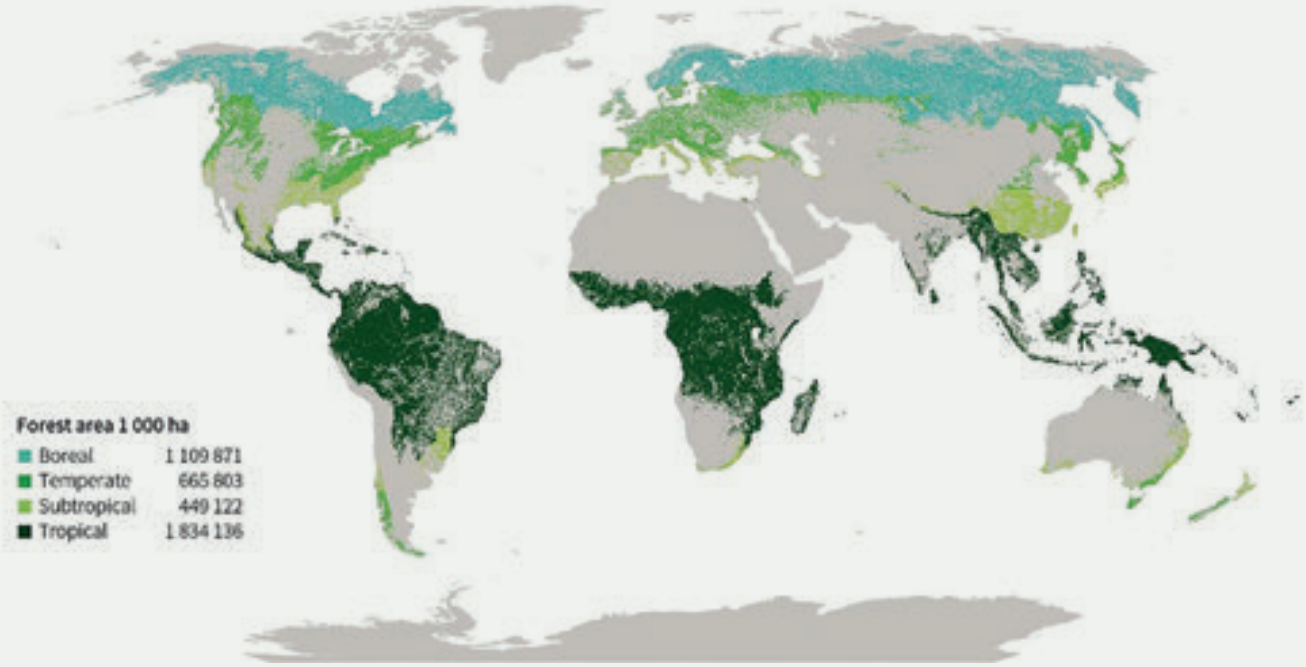
How Diverse are the UNECE Forests?

The UNECE region has a variety of forest types across three biomes: boreal (taiga), temperate and subtropical. Encircling the North Pole, the mainly coniferous boreal forest is part of the largest terrestrial biome on Earth. Temperate forests, dominated by broadleaf trees, are in the milder climate further south. The subtropical forests of the UNECE region are dry forests, located where tropical and temperate ecosystems overlap (Figure 8).

FIGURE 8

The global distribution of forests by climatic domain

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

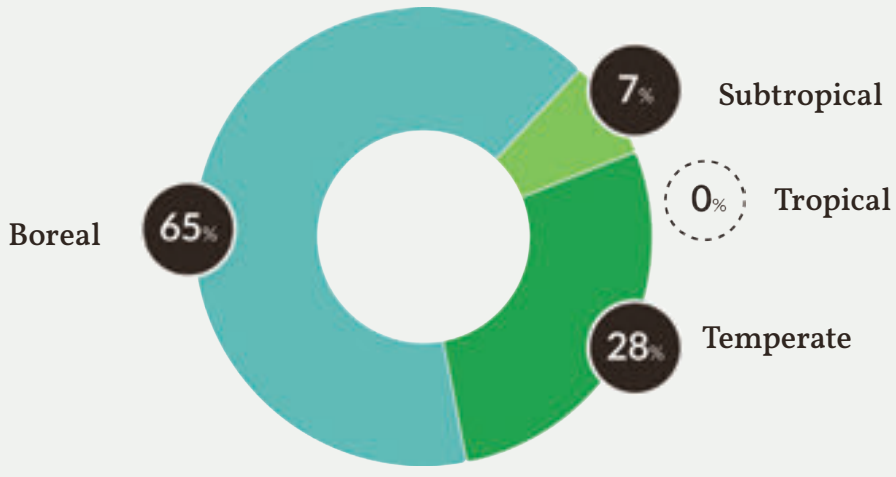


Source: FAO, 2020. Global Forest Resources Assessment 2020. Rome: Food and Agriculture Organization of the United Nations.[19]

As they represent 45% of the world's forests, tropical forests account for the highest share, but **boreal forests** are the most common in the UNECE region, occupying **65% of region's forest area**, followed by temperate forests with 28%. Only 7% of UNECE forests are sub-tropical (Figure 9).

FIGURE 9

Share of forest area in 2025 (%), by biomes in the UNECE region

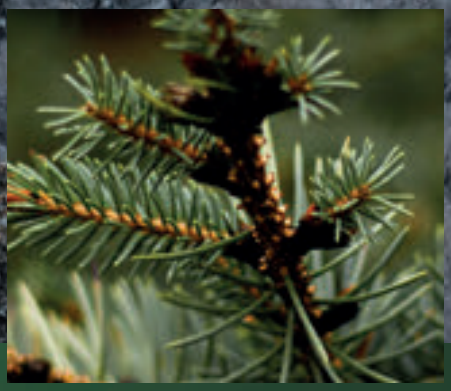


Source: Figure by the UNECE based on FAO data.[20]

Boreal Forests (Taiga)

42˚- 72˚
latitude

The boreal biome stretches across Europe, Asia and North America, between the latitudes of 42° and 72°N[21]. It has short, moist and fairly warm summers and long, cold and dry winters with freezing temperatures for 6 to 8 months[22]. These largely coniferous forests dominate the UNECE's northern parts and are not very diverse in terms of tree species: mostly spruce and larch, followed by pine, birch, poplar and fir[23]. However, they also have the highest tree densities of all types of forest - they are thought to contain over 24% of the world's individual trees[24, 25]. Boreal forests have abundant freshwater resources and carbon storage[26].



Temperate Forests

Annual precipitation
750-1,500 mm

Temperate biome forests grow in areas with four distinct seasons, including a warm summer and a cool to cold winter, with regular annual precipitation usually ranging from 750 mm to 1,500 mm[27]. Most are dominated by broad-leaved deciduous trees such as oak, maple and beech[28], but also contain evergreen needleleaf forests, such as pine, spruce and fir, especially at higher altitudes or less fertile places. In contrast to tropical rain forests, most biodiversity in temperate forests is found close to the forest floor[29].

Subtropical Forests

23.5˚- 35˚ latitude

Subtropical forests are usually found between 23° and 35° latitude and blend the qualities of tropical and temperate zones. These areas generally have year-round warm temperatures, averaging 20-25°C, but often with distinct wet and dry seasons[30, 31]. Subtropical forests are highly diverse, with evergreen and deciduous trees, often with dense canopies and a rich understory of shrubs, ferns and woody vines[32].

BOX 2. Focus on Dry Forests

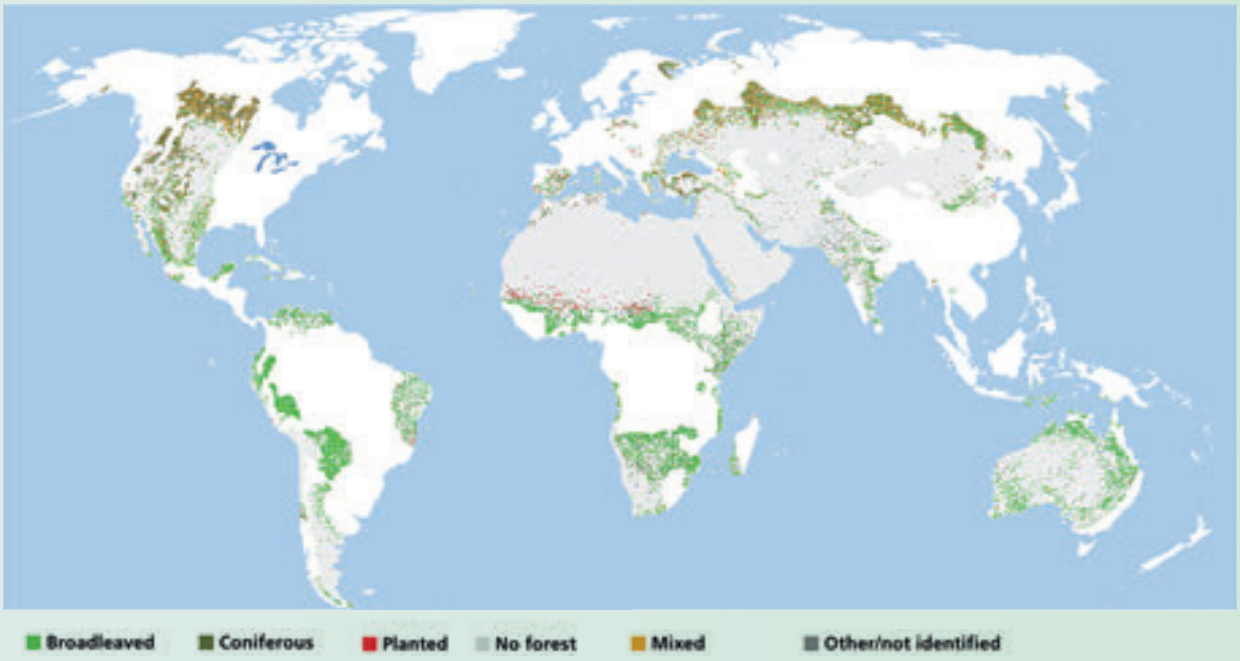
Of the world's 6.1 million ha of drylands, 1.1 million ha are covered by forests – about 18% - and a further 0.6 billion ha, 10%, are classified as other wooded land. **Dryland forests account for about 26% of the world's total forest area**[33].

Dryland forests are adapted to withstand drought, high temperatures and lower soil fertility, and contain drought-resistant tree species, shrubs and sparse undergrowth. In the UNECE region, examples include the dry forests of Central Asia, the North American southwest, and parts of the Mediterranean basin.

FIGURE 10

Global distribution of dryland forest by subtypes

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.



Source: UN. 2019. Geographic regions [online]. https://unstats.un.org/unsd/methodology/m49/. United Nations. Retrieved June, 2025, from https://openknowledge.fao.org/server/api/core/bitstreams/4db91cfa-6a0d-4e40-82ce-a7d2297c6a6c/content.[34]

Despite their challenging conditions, dryland forests are very significant ecologically. They provide habitats for birds, mammals, insects and plant species that can tolerate or thrive under dry conditions, influence local climate patterns by regulating temperature and humidity, and prevent soil erosion with their root systems. Their role in preventing desertification makes them vital for the health of larger environments. All these make dryland forests crucial in supporting climate regulation, biodiversity, livelihoods, water security and resilience.

Dryland forests provide local communities with sustainable resources such as timber, non-timber forest products and medicinal plants; these are often essential for supporting livelihoods. In some regions pastoral communities depend on these forests for grazing.

Dryland forests in the Northern Hemisphere are threatened by human activities and environmental changes. They are especially under threat from climate change, which increases temperatures, alters precipitation patterns and intensifies droughts[35].

04

What are the Different Trees in the UNECE Forests?

Trees are vital parts of our planet's ecosystems. Whilst people often enjoy them just for their beauty, they also create complex systems that **maintain** the lives of animals and plants. They therefore play a crucial role in **maintaining ecological balance, supporting biodiversity and stabilizing the climate**. Understanding the characteristics and needs of different tree species is essential for appreciating their importance for conservation and sustainable management.

Tree species differ greatly in their **ecological function, way of growing and economic value**. Different species also respond differently to pests, diseases and changing environmental conditions. **Having varied species in a forest makes it resilient**.

There are around 73,000 tree species in the world, several hundred of them in the UNECE region (Figure 11). Trees can be broadly classified into coniferous and broadleaved trees[36].

Coniferous trees are also known as evergreens, and include pine, spruce, fir and cedar: they typically produce cones and keep most of their needle-like leaves through the year though some, like larch, shed them in autumn and grow new ones in spring. Coniferous tree species are often found in colder regions, such as the boreal and temperate forests, and mountainous regions worldwide. They play a vital role in maintaining forest cover in these regions, as they are well-adapted to survive harsh winter conditions.

Most of the **broadleaved trees** in the UNECE region, including oak, maple, birch and beech, are deciduous, shedding all their leaves seasonally: usually in autumn. They are common in temperate regions with distinct seasonal changes. Their deciduous nature lets them conserve water in winter and maximize photosynthesis in spring and summer.

FIGURE 11

Major tree genera in the UNECE region by volume of growing stock (million m³)

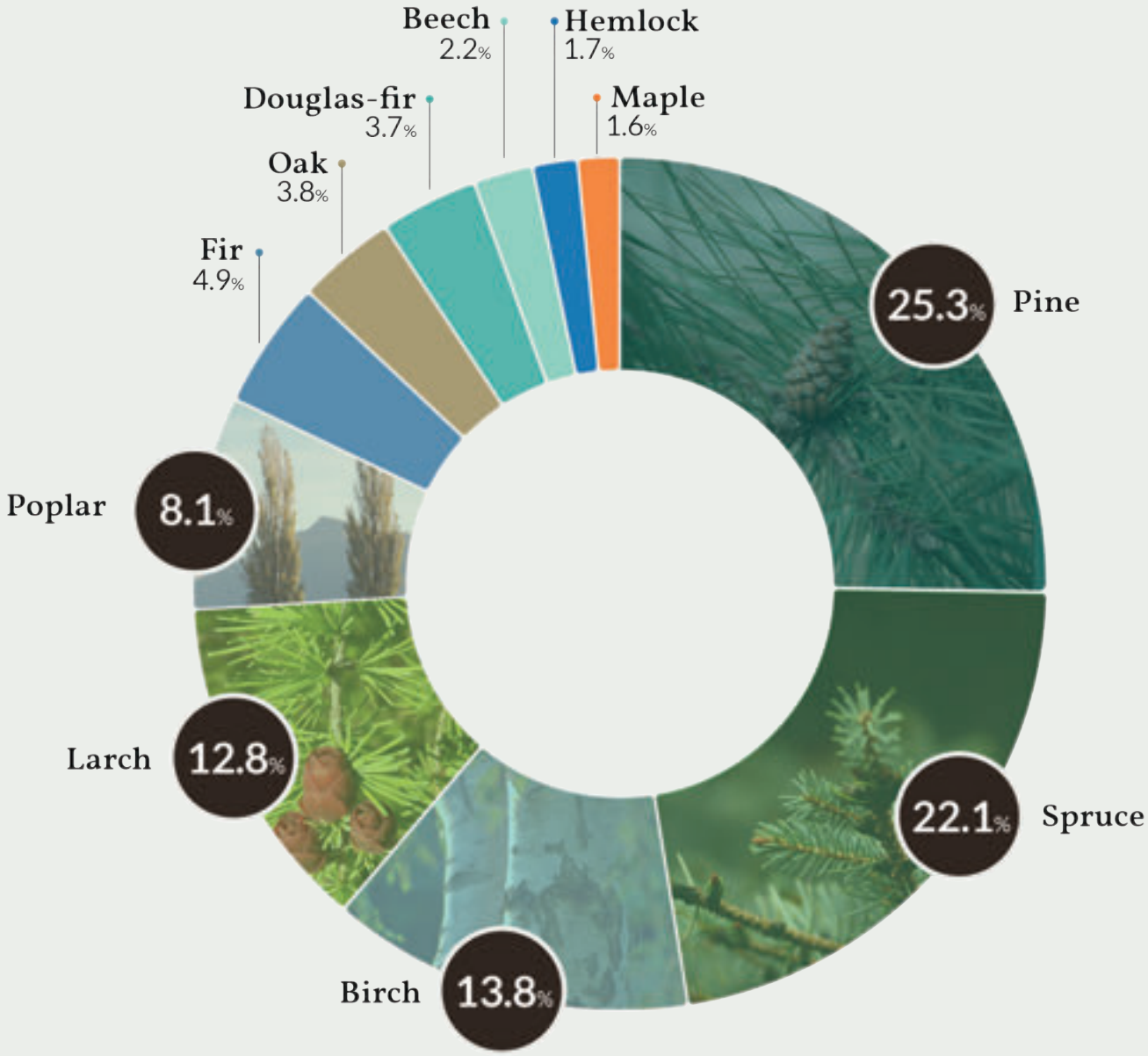
Genera	Sum of Growing Stock (million cubic Meter)	Genera	Sum of Growing Stock (million cubic Meter)
Pine	48,828.0	Juniper	47.1
Spruce	42,692.5	Cedar	26.9
Birch	26,556.3	Rowan	25.4
Larch	24,753.9	Tallow tree	24.2
Poplar	15,594.5	Ailanthus	19.3
Fir	9,397.9	Hazel	9.5
Oak	7,254.8	Saxaul	9.3
Douglas-fir	7,166.3	Walnut	6.5
Beech	4,335.6	Japanese cedar	6.5
Hemlock	3,292.1	Prunus	4.9
Maple	3,054.6	Hawthorn	4.0
Lime	1,921.2	Elm	2.3
Tulip tree	1,464.0	Pittosporum	1.4
Sweetgum	918.1	Pistachio	0.8
Alder	804.2	Holly	0.5
Hornbeam	554.5	Apple	0.5
Chestnut	351.1	Carob	0.4
Ash	236.6	Cypress	0.3
Locust	155.9	Acacia	0.1
Eucalyptus	114.8	Olive	0.1
Hop-hornbeam	61.1	Calligonum	0.1
Willow	53.3	Thuja	0.1

Source: Figure by the UNECE based on FAO data.[37]

As Figure 11 shows, the UNECE region has a wide variety of tree species, but a few dominate. **Pine (25%), spruce (22%), birch (14%) and larch (13%) account for around three quarters of the total growing stock** (Figure 12). This is because boreal forests predominate, and they tend to be made up of a smaller number of tree species.

FIGURE 12

Top 11 tree genera in the UNECE region, shares [%] by volume of growing stock



Source: Figure by the UNECE based on FAO data.[38]

05

How Natural are the UNECE Forests?

Depending on its origin and development, FAO distinguishes two main types of forest: **naturally regenerating forests**, including primary forests, and **planted forests**, including plantations[39].

Naturally Regenerating Forests

Naturally Regenerating Forests recover and develop through natural processes without planting by humans. These forests grow by dispersing seeds or sprouting from existing root systems. Naturally regenerating forests play a vital role in biodiversity, ecological stability and climate regulation.

Primary Forests are a type of naturally regenerating forest of native tree species, with no human intervention, or done so long ago that the original forest has reestablished itself. Primary forests show natural forest dynamics, such as tree species makeup, amount of dead wood, age structure and regeneration processes.

Planted Forests

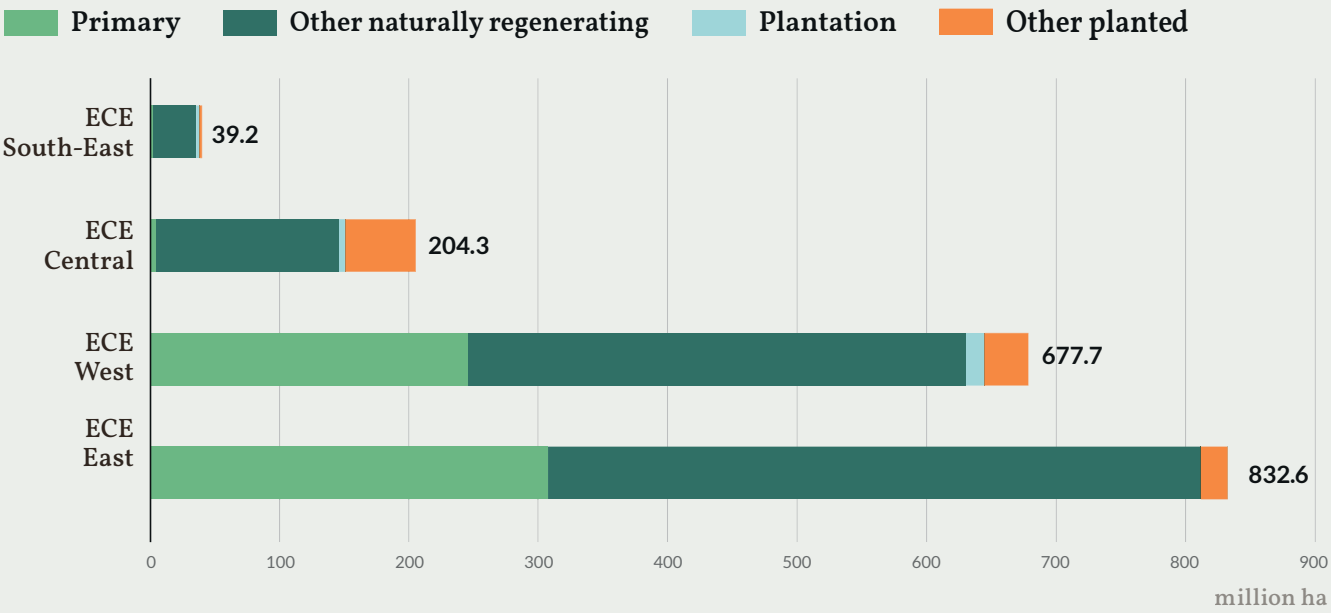
Planted Forests have had over half their growing stock planted or seeded by people. They are important for producing resources sustainably, restoring land and forest management strategies.

A **Plantation Forest** is a planted forest which has been established and intensively managed to commercially produce timber, emphasizing rapid growth and high yield. Typically, they have a small number of fast-growing or economically valuable tree species, often in monocultures or simple mixtures.

Over 1.62 billion ha **(92%) of UNECE forests are naturally regenerating** (Figure 13); an increase of 1% since 1990. The ECE South-East saw the biggest increase, at 13%. **Almost half of the world's primary forests are located in the UNECE region**: 560 million ha. Two UNECE geographical groupings contribute significantly to this: ECE West with 250 million ha and ECE East with 310 million ha. However, the area of primary forest has decreased by 15.7 million ha since 1990, due to a decrease of over 10% of in the ECE West region. Their area increased slightly in all three other UNECE geographical groupings.

FIGURE 13

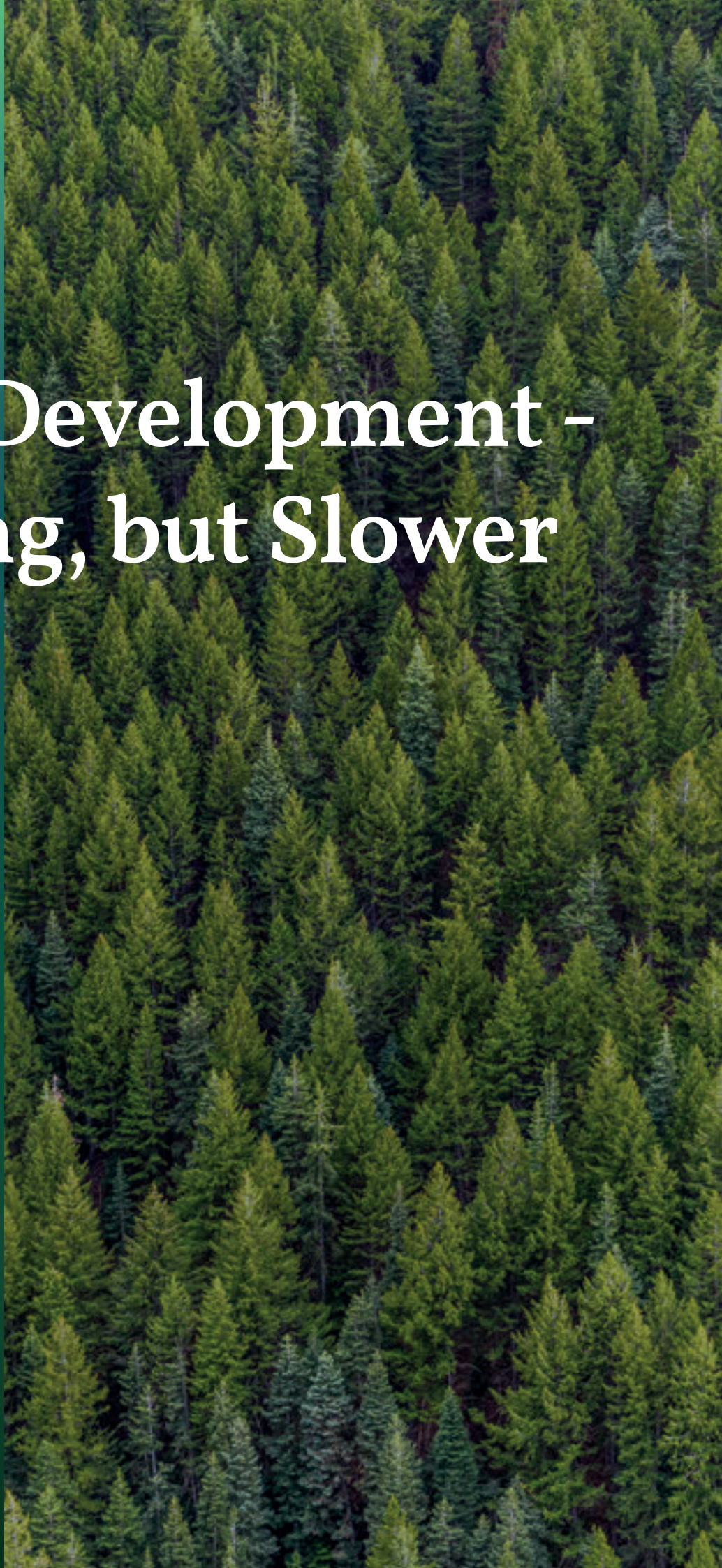
Forest naturalness in 2025 (million ha), by geographical groupings in the UNECE region



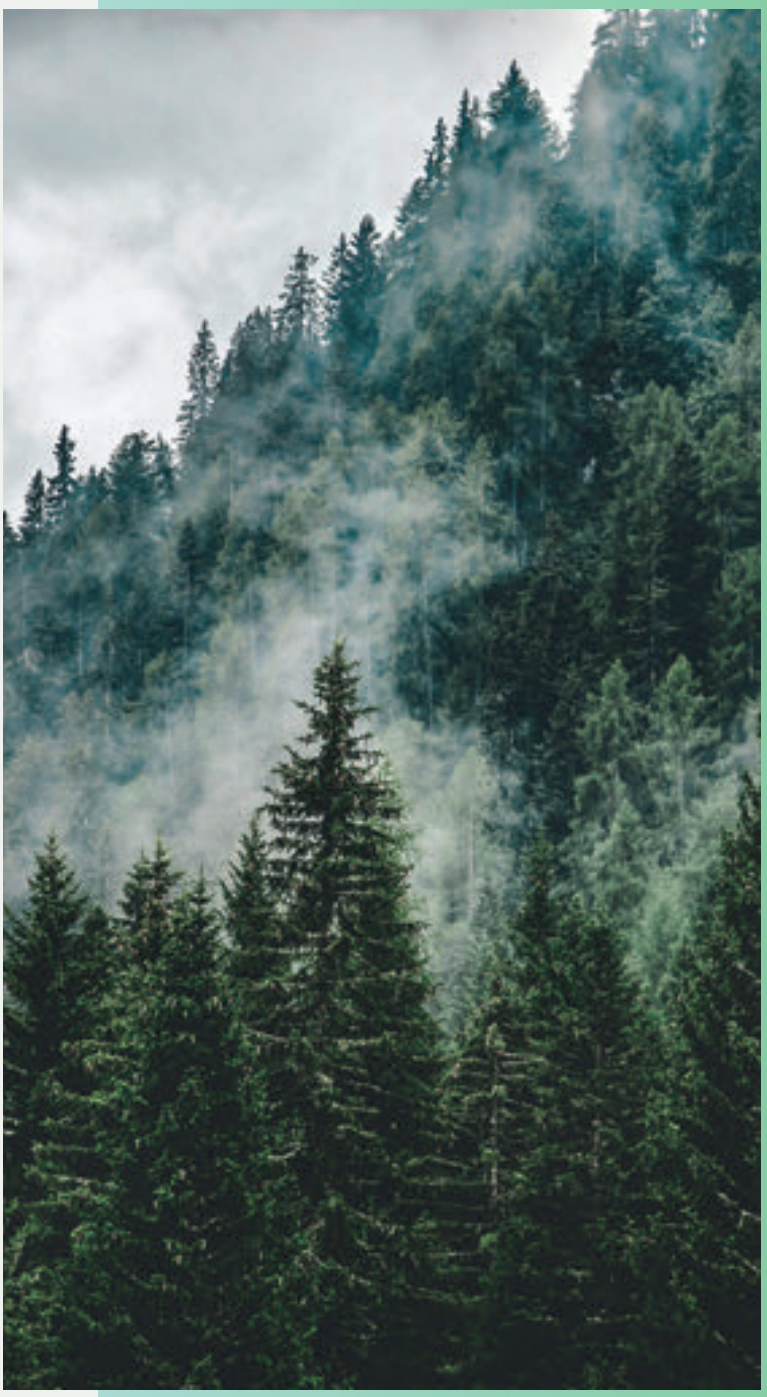
Source: Figure by the UNECE based on FAO data.[40]

06

Forest Development - Growing, but Slower



Forest's Growing Stock



The **volume of wood** contained within a forest's living trees is known as its growing stock, and is usually measured in cubic meters (m^3). This is an **important measure for forest management** because it provides information on forest health, productivity and timber production potential. Growing stock is also an **important indicator of sustainability, carbon stock, biodiversity and ecosystem services.** Regular assessments of growing stock help informed decision making about land-use planning, conservation and harvesting.

The average growing stock per hectare is a useful indicator of local productivity and biodiversity. This can vary greatly within regions and countries, depending on the local soil and climate, the type and age of tree species, as well as local management practices.

The **total growing stock of the UNECE region is 261 billion m^3**; enough to fill almost eight billion shipping containers. Lined up, these containers would span the equator 12,000 times. ECE East has the highest growing stock, at 125 billion m^3, which is 48% of the UNECE total. The lowest amount, 3.2 billion m^3, is in the ECE South-East: just 1% of the total (Figure 14).

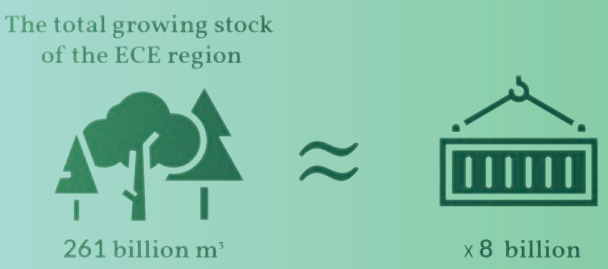
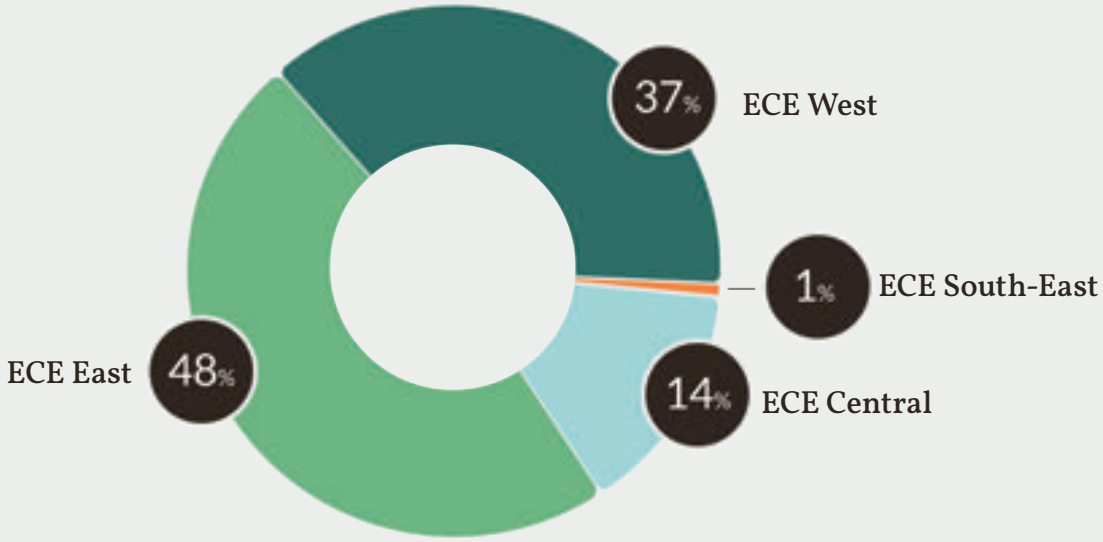


FIGURE 14

Growing stock shares in 2025 (%), by geographical groupings in the UNECE region

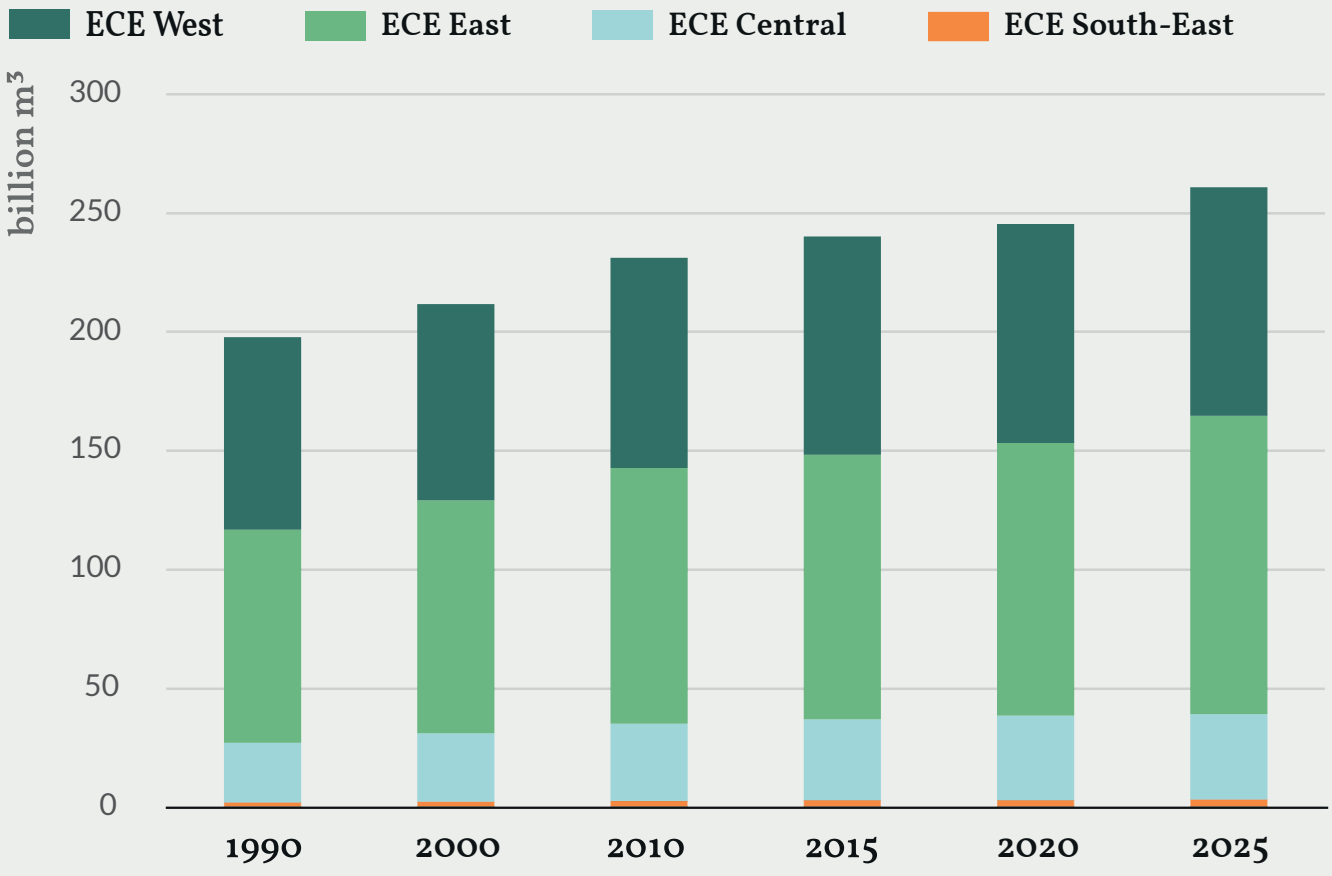


Source: Figure by the UNECE based on FAO data.[41]

Since 1990 the total growing stock volume of the UNECE has increased by 63.2 billion m³ (Figure 15). That is equivalent to a chain of shipping containers that could encircle the equator 300 times.

FIGURE 15

Change of growing stock (billion m³), by geographical groupings in the UNECE region

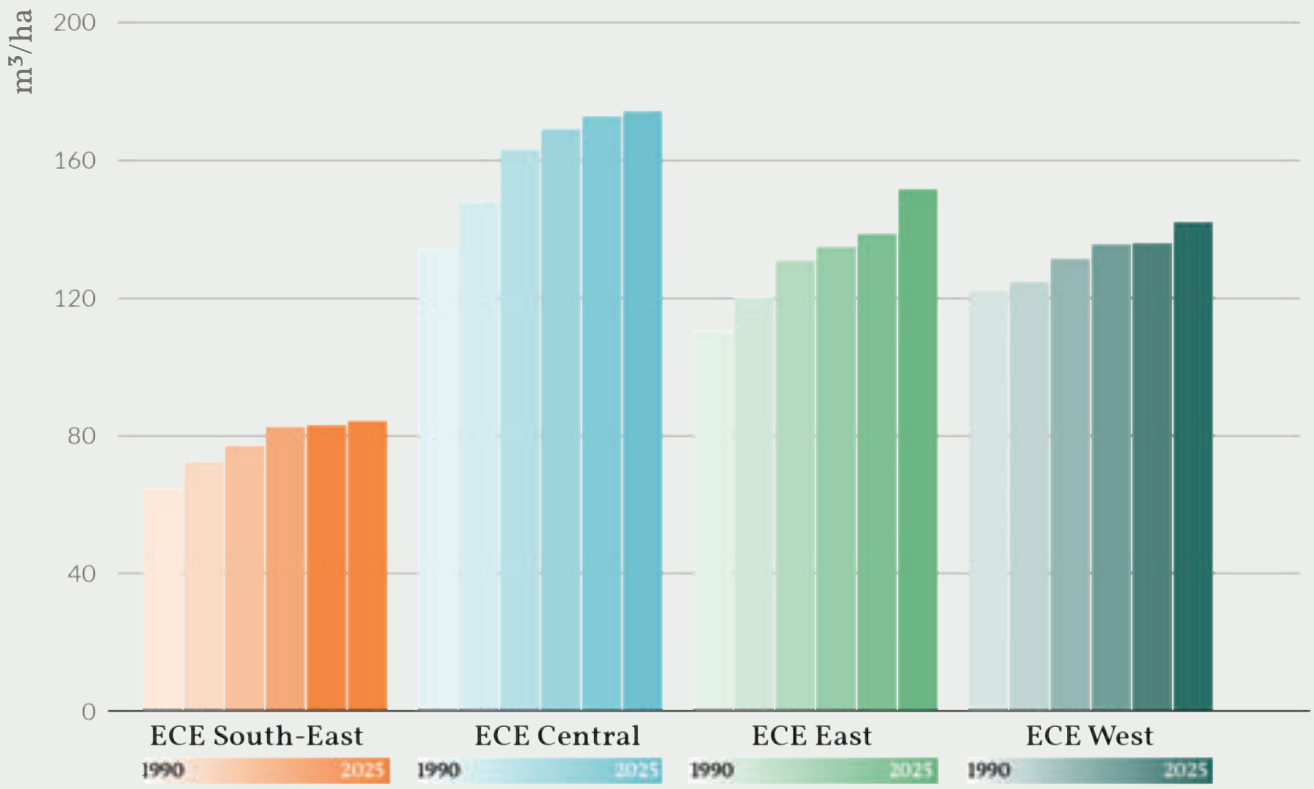


Source: Figure by the UNECE based on FAO data.[42]

The average growing stock per hectare varies considerably: from 84 m^3/ha in ECE South-East to 174 m^3/ha in ECE Central. **In 1990, the average stock per hectare in the UNECE region was 117 m^3/ha, growing to 149 m^3/ha by 2025** (Figure 16).

FIGURE 16

Change of average growing stock (m^3 per ha), by geographical groupings in the UNECE region



Source: Figure by the UNECE based on FAO data.[43]

These positive figures suggest that timber harvesting in the UNECE region is sustainable and the forest is not being overexploited. Of course, the real picture is more complex, influenced by a variety of factors such as forest age, harvesting intensity and natural mortality, including from catastrophic damage. So, while we try to avoid depleting forests with sustainable management practices, the actual volume can fluctuate based on human and natural factors.

07

Forest Health and Vitality - Persevering but Threatened

Forest ecosystem health is vital for biodiversity, climate regulation, wood supply and human wellbeing. To make forests **sustainable and resilient**, we need to know their health status and the influences on their vitality.

Forest health is the general condition of a forest ecosystem, including whether it can carry out ecological functions, withstand pests and diseases, resist environmental stresses and regenerate naturally. Vitality is about the vigor and resilience of tree and plant communities within the forest, their capacity to grow, reproduce and adapt to changing conditions. **A healthy, vital forest is more resistant to threats but also can recover quickly from disturbances and continue to provide vital ecosystem services.**

BOX 3. Does Disturbance Equal Damage?

Disturbance and damage are external influences on forest ecosystems. Disturbance describes changes in ecological functions and interactions, whereas damage is usually about economic loss, often expressed in monetary terms. However, damage can also mean ecological damage, such as the loss of a forest habitat.

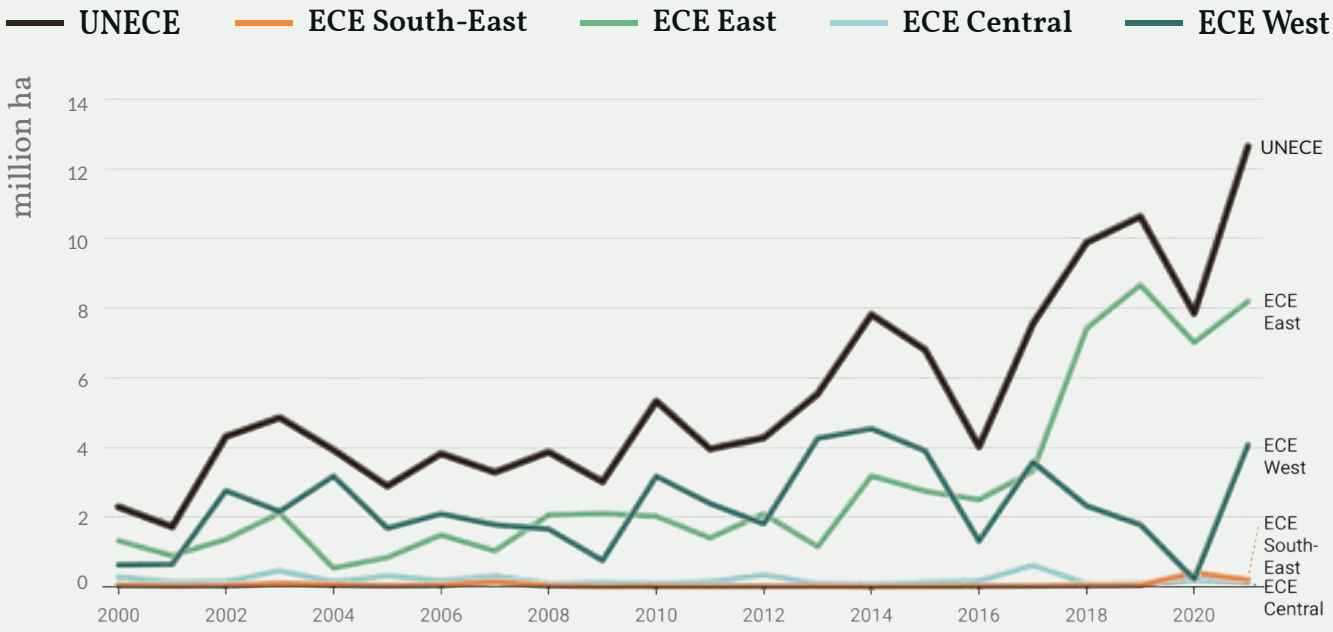
Disturbance is an everyday part of a forest ecosystem's life. In fact, the presence of stressors such as insects, fungi, birds and mammals can be vital to a forest ecosystem. **Maintaining forest health is about balancing an ecosystem's naturalness with the services it provides to people.** Finding this balance is crucial to forest policy and management.

Many complex threats have challenged forests in the UNECE region in recent decades, most of them worsened by **climate change**[44]. Since the 1980s, there has been widespread loss of health and vitality in European forests, largely caused by widespread **air pollution**[45]. The region has also seen an increase in frequency and intensity of **extreme weather events**, including a devastating series of **storms** across Europe and North America, leading to significant economic losses[46]. **Wildfires**, particularly in boreal and semi-tropical forests, have become more severe and common, fueled by rising temperatures and drier conditions[47, 48]. Finally, **insect outbreaks**, like the unprecedented mountain pine beetle epidemic in western North America, have severely damaged millions of hectares of forests, altering ecosystems and leading to increased risk of wildfires[49].

Forest fires are a serious threat to forests worldwide, and the UNECE region is no exception. The overall trend has increased, with 2021 being the worst year on record with 12.6 million ha of forests affected by fires (Figure 17). This trend was mainly driven by fire damage in ECE East; in the other geographical groupings the area affected by fire varies around a long-term average. However, there is also evidence of a tendency towards more fires in these geographical groupings in recent years.

FIGURE 17

Change of area of forests affected by fires (million ha), by geographical groupings in the UNECE region

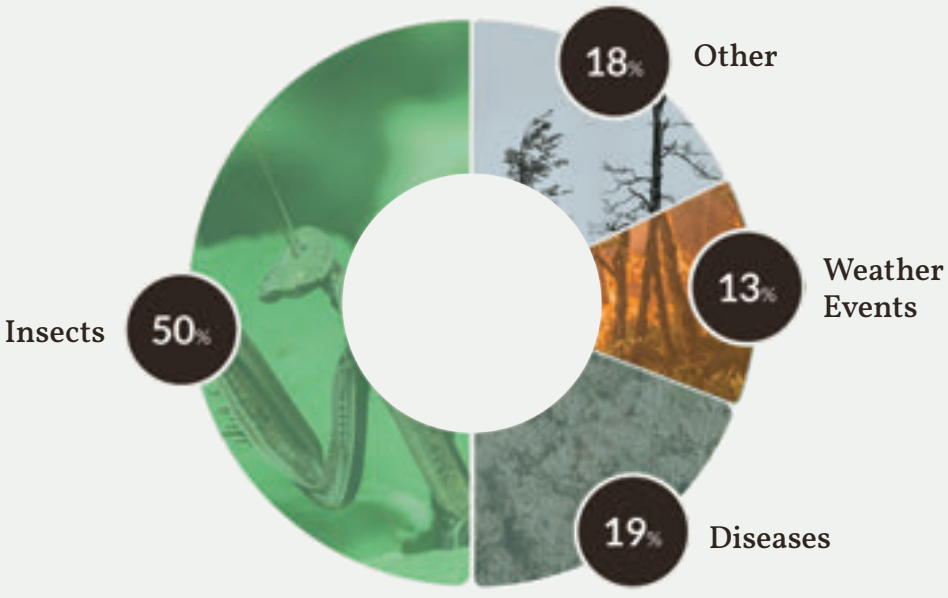


Source: Figure by the UNECE based on FAO data.[50]

Forests damaged by **insects, diseases and severe weather** are part of a growing long-term trend in the UNECE region. The **highest damaged area** recorded so far, over 73 million ha or about 5% of the UNECE region's forest area, was **reported in 2019**. Of this total, 37 million ha was caused by insects, 14 million ha by diseases, 9 million ha by extreme weather events, and 13 million by other causes. Of the damaged 73 million ha, most of it, almost 67 million ha, was reported by the ECE West (Figure 18).

FIGURE 18

Shares of total damaged forest area in 2019 (%), by damaging agents in the UNECE region



Source: Figure by the UNECE based on FAO data.[51]

08

Who Owns the Forests in the UNECE Region?

Forest Ownership

> "The legal right to freely and exclusively use, control, transfer, or otherwise benefit from a forest."[52]
>
> —— FAO

Forest owners rarely have the full range of exclusive legal rights to 'use, control or transfer'.

Owning a forest does not always mean having exclusive use of it, especially as some ownership rights can be transferred to other public or private bodies, or whole societies[53]. Forest property ownership can be divided into the following **specific property rights**:

ACCESS RIGHTS
The right to enter forest land

WITHDRAWAL RIGHTS
The right to harvest or remove timber, firewood and non-wood forest products

MANAGEMENT RIGHTS
The right to plan internal forest activities and transform the forest

EXCLUSION RIGHTS
The right to prevent others from access and harvesting of wood or non-wood forest products

ALIENATION RIGHTS
The right to sell forest land and forest products as well as to lease or sell management and exclusion rights[54]

Property rights are often only partially allocated to the landowner, with other parts allocated to public authorities and other stakeholders. So, forest ownership is a multi-layered relationship between stakeholders, and involves not only rights to use forests but also the responsibilities of all users.

Forest ownership differs, while it is guided by sustainable forest management, each national pattern of ownership is shaped by policies, historical land rights and economic factors, all of which influence forest management and conservation efforts. Furthermore, different owners will have different goals, depending on economic situations, individual preferences, forest service markets, policy restrictions and incentives, as well as local culture and traditions.

In general, **forest ownership is usually either public or private**, but in practice this simple division includes many forms of ownership such as government agencies, private individuals, businesses, families, communities and Indigenous Peoples (Figure 19).

FIGURE 19

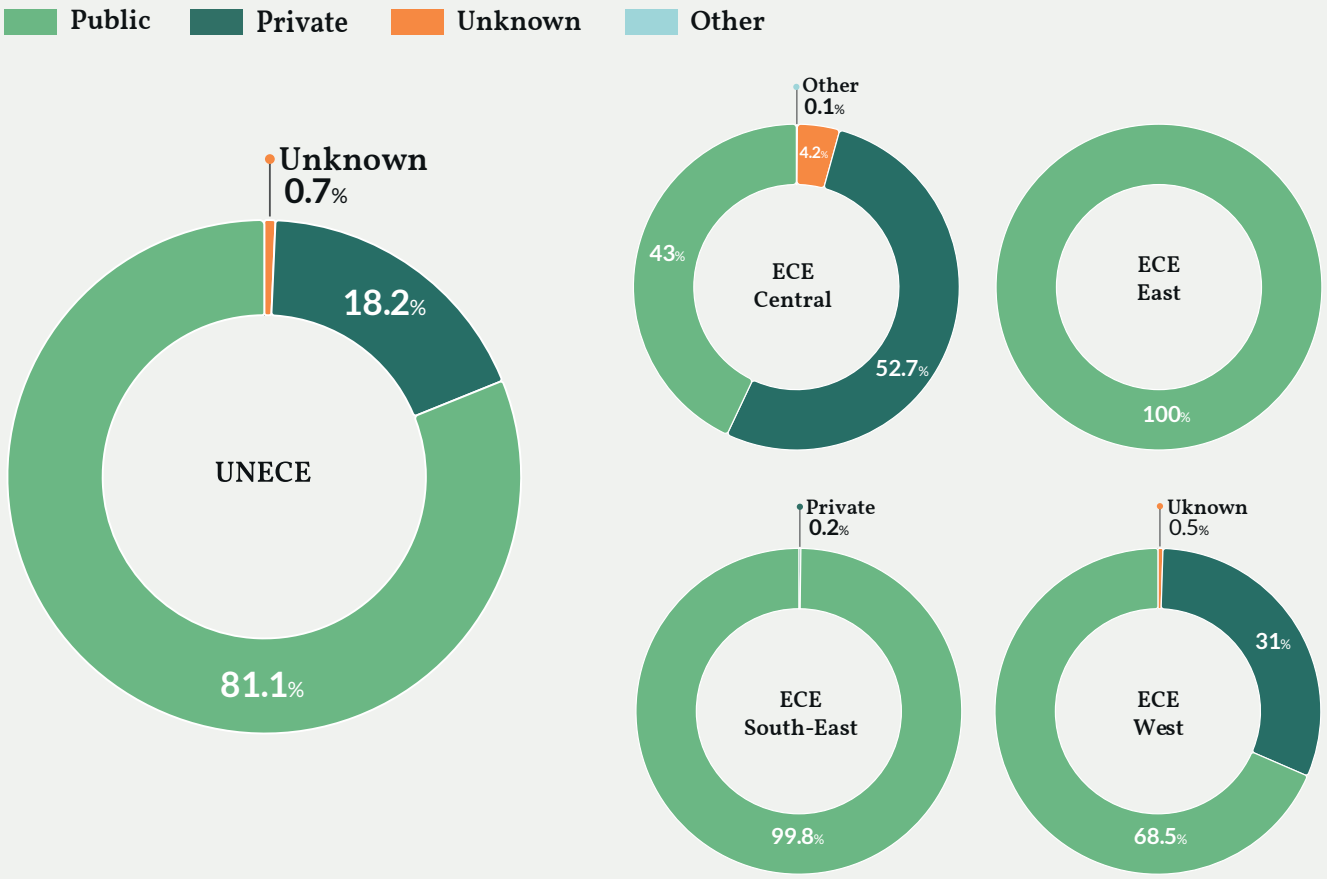
Major forest ownership categories

Source: UNECE/FAO, 2020. Who owns our forests? Forest ownership in the ECE region. Geneva: Economic Commission for Europe and Food and Agriculture Organization of the United Nations. Retrieved June, 2025, from https://unece.org/info/Forests/pub/400586.[55]

The share of **publicly-owned forests** in the UNECE region is **over 81%**; higher than the global average (71%), but the ownership structure varies widely across regions (Figure 20). In ECE East and ECE South-East, public ownership is more common, while in the ECE Central and ECE West there is more private ownership. In absolute values, the area of both public and private forests has increased, by 33 and 31 million ha respectively, since 1990.

FIGURE 20

Shares of forest ownership types in 2020 (%), by geographical groupings in the UNECE region



Source: Figure by the UNECE based on FAO data.[56]

09

How are UNECE Forests Managed?

Sustainable Forest Management

A dynamic and evolving concept, which aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations.

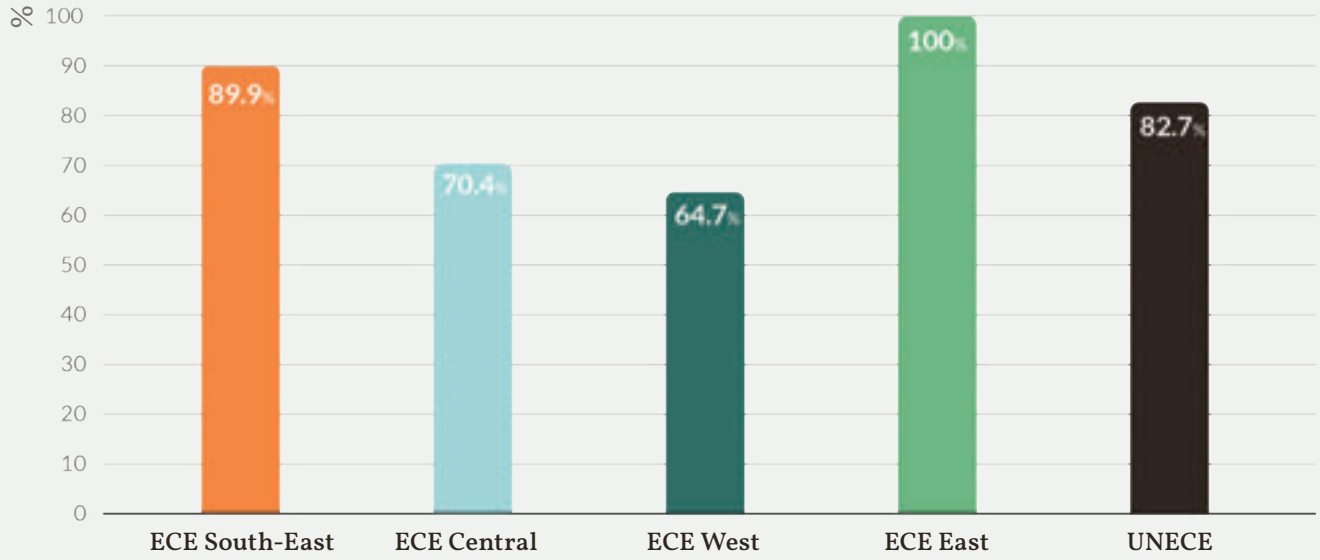
Although forests have been used for thousands of years, the idea of managing forests in a sustainable way, i.e. ensuring the durability of forests and their ability to provide products and services in a balanced way, is relatively new. It started in Germany around three centuries ago when forests were degraded by overexploitation and the timber supply was under threat [57]. Today, sustainable forest management means much more than just ensuring that timber harvesting does not exceed timber growth.

Modern sustainable forest management balances environmental, economic and socio-economic factors. The United Nations defines sustainable forest management as a "dynamic and evolving concept, which aims to maintain and enhance the economic, social and environmental values of all types of forests, for the benefit of present and future generations"[58]. Because of the wide range of natural, social and economic conditions, this concept is implemented in different ways and carried out through forest management and protection plans. These turn policy and owner objectives into action.

The presence of a management or protection plan is indication that forests are managed sustainably. Over two billion ha of global forests are under management or protection plans, and the majority are in the UNECE region. Almost **83% of forests** in the UNECE region, or 1.44 billion ha, **have management/ protection plans**. In ECE East, all forests have management plans, ECE South-East has 90%, ECE Central 70% and ECE West 65%, (Figure 21). The area of forests covered by management plans has risen by 62.1 million ha since 1990; most of this is due to increases of 26.4 million ha in ECE West and 21.0 million ha in ECE East.

FIGURE 21

Proportion of forests with management plans in 2025 (%), by geographical groupings in the UNECE region



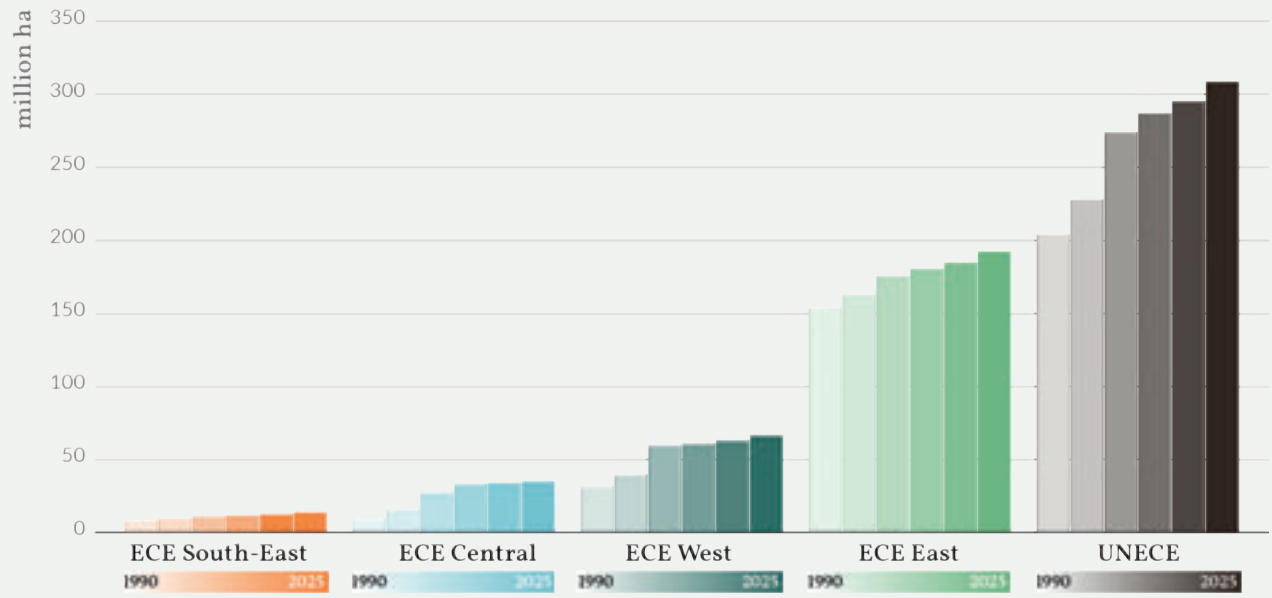
Source: Figure by the UNECE based on FAO data.[59]

Sustainable forest management involves more than sustainable timber production (see Box 4). The most important part of it is about how different parts of the forest are used, and **range from strict protection to intensive production** (see section 9). Protected areas, including national and landscape parks and nature reserves, are a vital part of this.

Of the over 800 million ha of forests worldwide that are legally protected, 317 million ha are in the UNECE region, 192 million ha (18%) of which are in ECE East. The highest share of protected areas in the UNECE region has ECE South-East (39%), while the lowest share (10%) is in ECE West. Since 1990, the area of protected forests in the UNECE has grown by more than 100 million ha, reaching 317 million ha today (Figure 22), with constant growth in all UNECE geographical groupings.

FIGURE 22

Change of area of protected forests (million ha), by geographical groupings in the UNECE region



Source: Figure by the UNECE based on FAO data.[60]

BOX 4 . How Sustainable Forest Management can Support Forest Health and Vitality

MONITORING AND ASSESSMENT

Regularly measuring forest conditions helps detect early signs of stress, enabling prompt interventions.

ADDRESSING CLIMATE CHANGE

Forests can be helped to cope with climate change by mitigating greenhouse gas emissions, increasing forest resilience and adopting forest composition to predicted climate conditions.

RESTORATION AND REFORESTATION

Enhancing biodiversity means promoting close-to-nature species composition and structures, restoring degraded areas, improving soil and water conditions and revitalizing ecosystem functions.

CONTROLLING FIRES, PESTS AND DISEASES

This includes promoting fire-resistant forests and suppressing forest fires. Pest outbreaks can also be reduced by an integrated pest management (IPM), along with promoting resistant tree species.

SUSTAINABLE MANAGEMENT PRACTICES

Ecosystem resilience is helped by selective logging, removal of excessive deadwood, promoting mixed-species planting and allowing natural regeneration processes.

CONTROLLING HUMAN PRESSURE ON FORESTS

This can be done by reducing industrial air pollution, controlling agricultural soil fertilization, improving water management, and reducing flood risk.

10

Forest Functions and Services

Forest services are the benefits, such as cleaner air, fresh water, timber and recreation, derived from different functions of the forests[61]. In the Millennium Ecosystem Assessment, ecosystem services are divided into four main categories: provisioning, regulating, supporting, and cultural[62] (Figure 23).

FIGURE 23

Major classes of forest services

Source: WWF, 2016. Living planet report 2016. Risk and resilience in a new era. WWF International, Gland, Switzerland. [63]

Forest functions are the forest processes and components which provide these services. They can be naturally provided by forests, such as carbon sequestration, water regulation or habitat provision, or induced by humans, like timber production[64]. Functions can be broadly categorized into three groups: utilization, protective and social. Good forest management aims for all these functions to be done sustainably, so that forests can continue to provide their vital services for current and future generations[65].

Utilization Function

Utilization means using the forest as a source of raw materials and products. The main product is wood, which is mostly used for construction, paper production and furniture-making. Other forest products include mushrooms, berries, herbs and game meat. Sustainable forest management makes sure these are provided in a way that does not deplete forests in the long term.

Protective Function

Forests play an important role in protecting soil and water. Trees and their roots prevent erosion and protect against rockfalls or avalanches, and forest soil stores and filters water, which raises the quality of drinking water. Forests also help climate regulation by absorbing atmospheric carbon dioxide and reducing the severity of climate change. They also provide habitats for many animals and plants, adding to biodiversity preservation.

Social Function

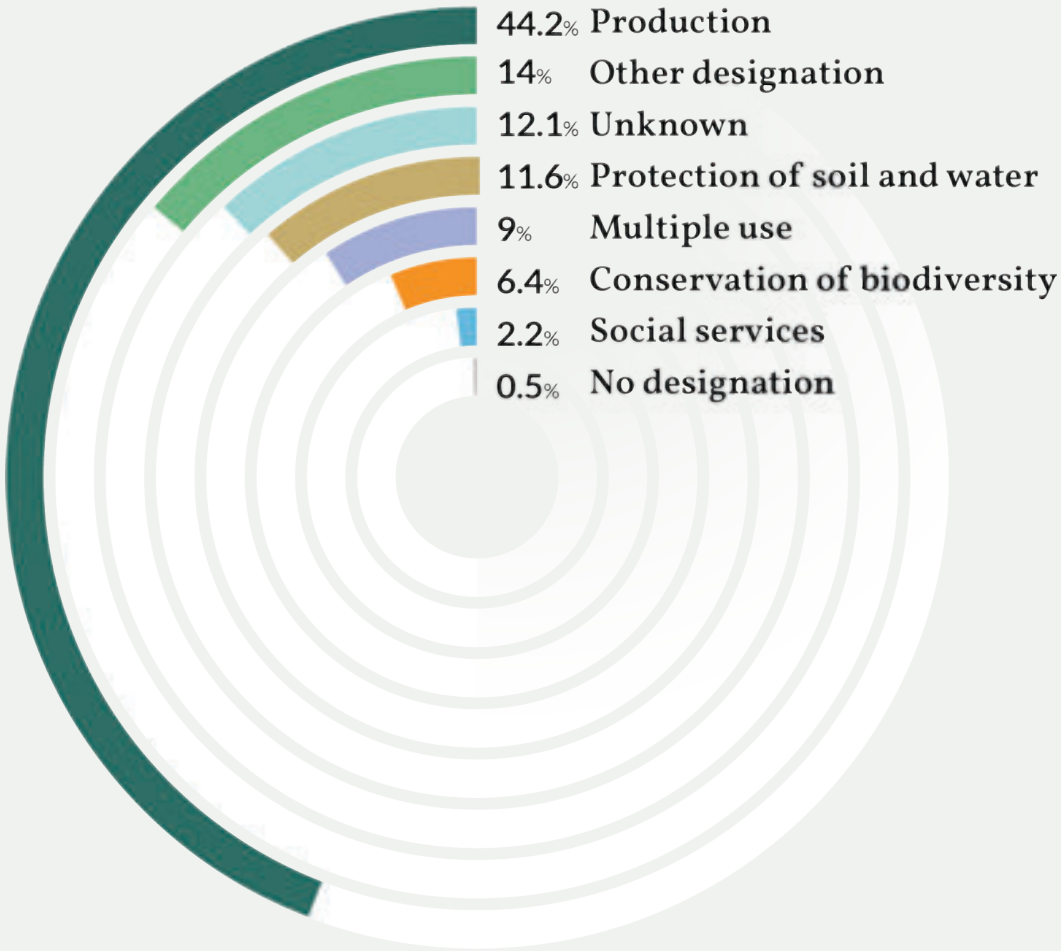
A forest is a valuable place for leisure activities. People can walk in the forest, relax on the banks of a stream or enjoy sports, promoting health and well-being. Forests are also a source of spiritual values, offering sanctuary for relaxation and adventure as well as a source of inspiration for artistic and cultural activities.

One forest area can serve multiple functions: people can walk on roads established for forest management or gather mushrooms in productive forests. Good sustainable forest management gives the right function to the right forest areas, to make best use of them and prevent conflicts.

In the UNECE region, around 780 million ha of forests, **44% of the total forest area, are managed mainly to produce wood and non-wood forest products** (Figure 24). A further 158 million ha of forest are designated for multiple use. Of the UNECE region's forests, 112 million ha or **6% are dedicated to biodiversity conservation**, over 203 million ha or **11% are designated especially for soil and water protection**, and approximately 39 million ha are managed primarily for social services.

FIGURE 24

Primary designation of forest in 2025, shares (%) in the UNECE region



Source: Figure by the UNECE based on FAO data.[66]

11

Forests and Biodiversity - a Sanctuary for Species

Biodiversity

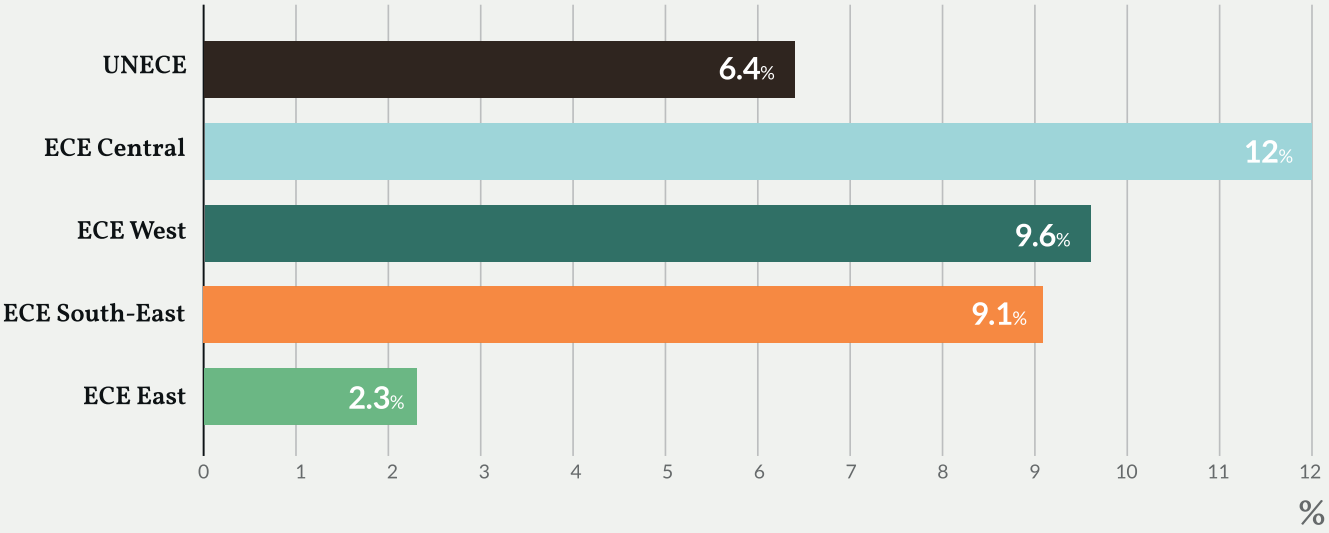
Biodiversity refers to the variety of living things and is the foundation of healthy ecosystems, necessary for keeping an ecological balance and supporting human well-being, economic development and cultural heritage. **Forests are the most biologically diverse terrestrial ecosystems**, creating homes for more than 80% of species of land animals, plants, fungi and microorganisms, despite covering only about 32% of the world's land area[67]. The complex, multi-layered structure of forest ecosystems creates many niches for the vast array of living things found there, from treetops to forest floor.

Forests are important for all kinds of biodiversity, from their numerous ecosystems to supporting genetic diversity among and within species. Genetic variation among trees, shrubs and other organisms allows forests to adapt to threats like drought, pests and changing climate, strengthening their resilience. The rich species diversity in forests creates complex food webs and interactions, ensuring ecosystem stability and health.

Over 6% of the UNECE region, 112 million ha, is designated for conservation biodiversity, and this **has doubled since 1990**, while other forest use has not changed significantly (Figure 25). Biodiversity is also protected or even restored in other types of forests, such as production forests, where biodiversity protection issues must be considered while using wood.

FIGURE 25

Forest primarily designated for conservation of biodiversity in 2025 (%), by geographical groupings in the UNECE region



Source: Figure by the UNECE based on FAO data.[68]

Losing biodiversity can lead to ecosystem degradation, reduced resilience, and even the collapse of some ecological processes. Climate change and other environmental pressures make forest and biodiversity conservation more urgent than ever.

The decline of biodiversity in forests is usually caused by human activities and environmental changes. The decline of species and habitats is caused by illegal and unsustainable logging, land-use conversion leading to deforestation, invasive species, climate change, pollution and pests.

To conserve biodiversity, there are three strategic approaches which combine sustainable forest management, habitat restoration, invasive species control, climate change mitigation and adaptation. These are:

- Establishment of areas excluded from active management
- Promotion of natural development within other protected forests
- Protection of biodiversity in forests designated for other uses

All three approaches preserve ecosystems and species by managing peoples' intervention, supporting ecological processes, and allowing nature to take its course.

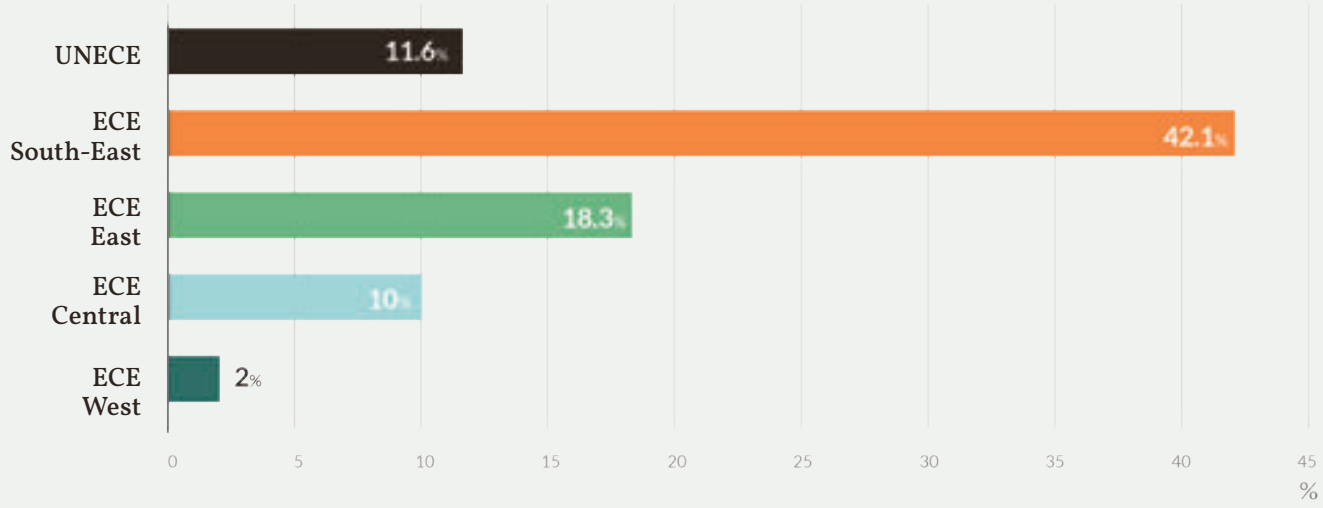
12

Forests - Protecting People and the Planet

One of the most vital forest roles is protection: guarding the environment, human wellbeing and infrastructure from natural hazards. Over half of the world's forests designated mainly for soil and water protection are in the UNECE region: 203 million ha, 152 million ha of them located in ECE East. However, the geographical grouping with the highest proportion (40%) of forest earmarked for protection is ECE South-East (Figure 26).

FIGURE 26

Forest primary designated for protection of soil and water in 2025 (%), by geographical groupings in the UNECE region



Source: Figure by the UNECE based on FAO data.[69]

The protection role is achieved by:

Soil Erosion Control

The dense root systems of trees and lower vegetation stabilize the soil, reducing runoff during heavy rains and stopping fertile topsoil from being washed away. This is particularly important on slopes and hilly regions, where erosion can lead to degraded land, landslides and sediment-filled water bodies. Forests are natural barriers which help keep land productive, protect agricultural land and preserve water quality.

Protection Against Natural Disasters

Forests play a vital role in mitigating the impact of natural disasters such as floods, landslides and avalanches. They slow down the rate at which water runs off, reducing flooding. In mountainous regions, they stabilize slopes and prevent landslides, saving lives and infrastructure. In snow-rich areas, forests can prevent avalanches by anchoring snow on slopes, reducing the risk of sudden release.

Water Regulation and Quality

Forests are natural water filters, improving water quality by trapping pollutants, sediments and nutrients in their canopies and leaf litter before they reach water. They also regulate stream flow, ensuring a supply of clean water during droughts and reducing flood risk during times of heavy rainfall. This hydrological regulation is vital for maintaining the ecological balance of rivers, lakes and wetlands.

Air Pollution Control and Climate Regulation

Forests contribute to air quality by absorbing pollutants and releasing oxygen during photosynthesis. Trees are vital in creating microclimates and improving quality of life, particularly in urban areas. They act as natural air filters, reducing airborne particulates and gases like sulfur dioxide and nitrogen oxides, thereby reducing air pollution. Finally, forests sequester carbon dioxide, reducing the pace of global warming.

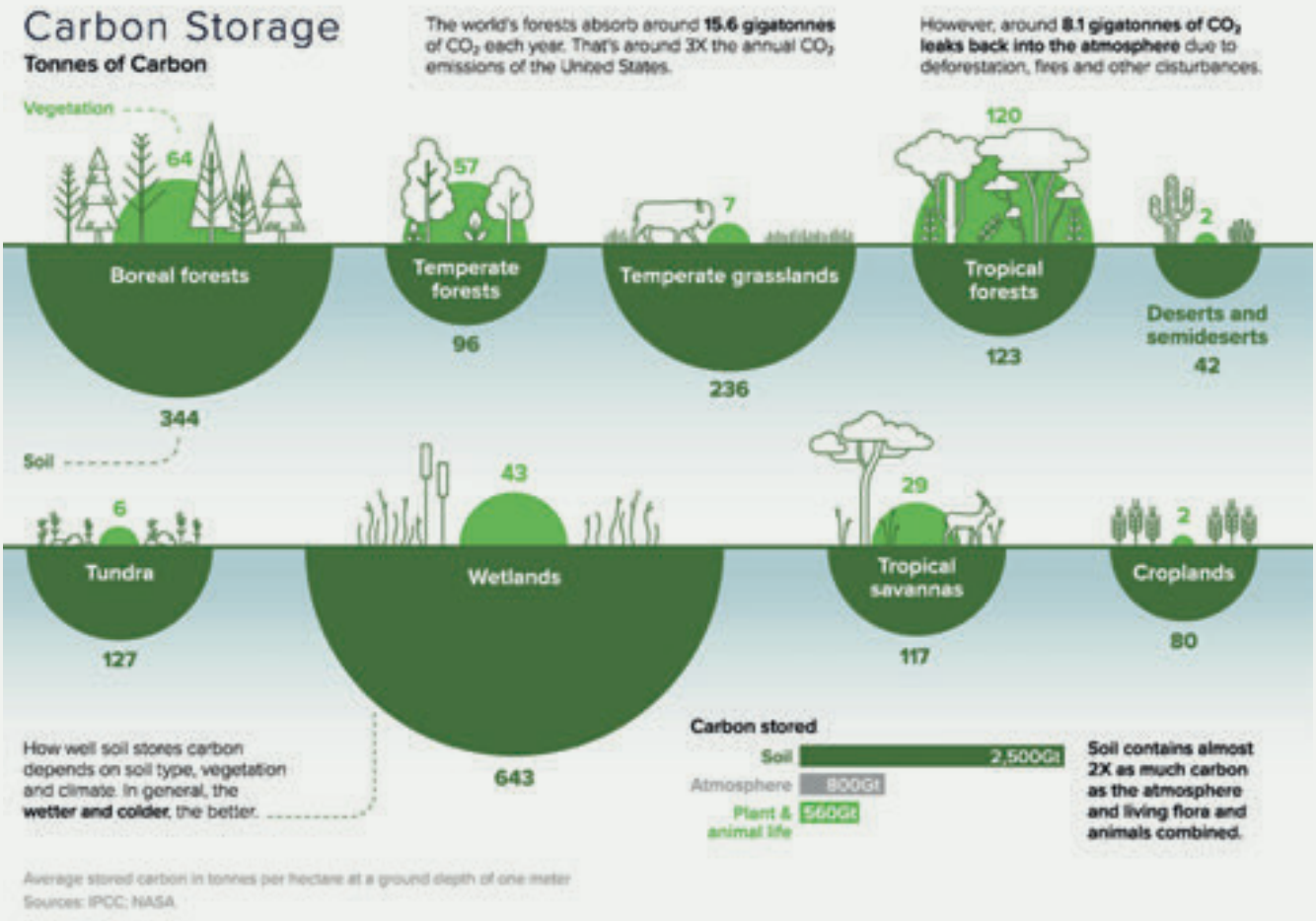
13

Forests and Carbon – a Global Reservoir

Forests account for 92% of all terrestrial biomass[70] and are a significant natural storage place for carbon. **As large, dynamic ecosystems, forests absorb, store and release carbon, influencing global carbon cycles and climate change**. Forests perform these roles naturally, but sustainable forest management influences the relationships among these processes, supporting forests' long-term capacity to store carbon while still producing wood for human use. **Much of this wood production has the added benefit of replacing fossil-based products.**

Forests store carbon in five pools: living biological matter above and below ground, dead wood, litter and forest soil. These are affected by soil type, vegetation and climate zone. For example, colder and wetter climates promote carbon storage in soil (Figure 27).

FIGURE 27
Carbon storage (t/ha) in Earth's ecosystems



Source: Neufeld, D., Smith, M., 2022. Visualizing Carbon Storage in Earth's Ecosystems. Visual Capitalist. Retrieved June, 2025, from https://www.visualcapitalist.com/sp/visualizing-carbon-storage-in-earths-ecosystems/.[71]

Mature forests store a large amount of carbon, often accumulated over centuries. This can remain stored for decades or even centuries, particularly in woody biomass and soils. However, **younger forests, despite having a lower level of stored carbon, are better at capturing atmospheric carbon dioxide** – through carbon sequestration – than mature forests. Therefore, **a balance of different forest types is needed to make best use of carbon absorption and storage.**

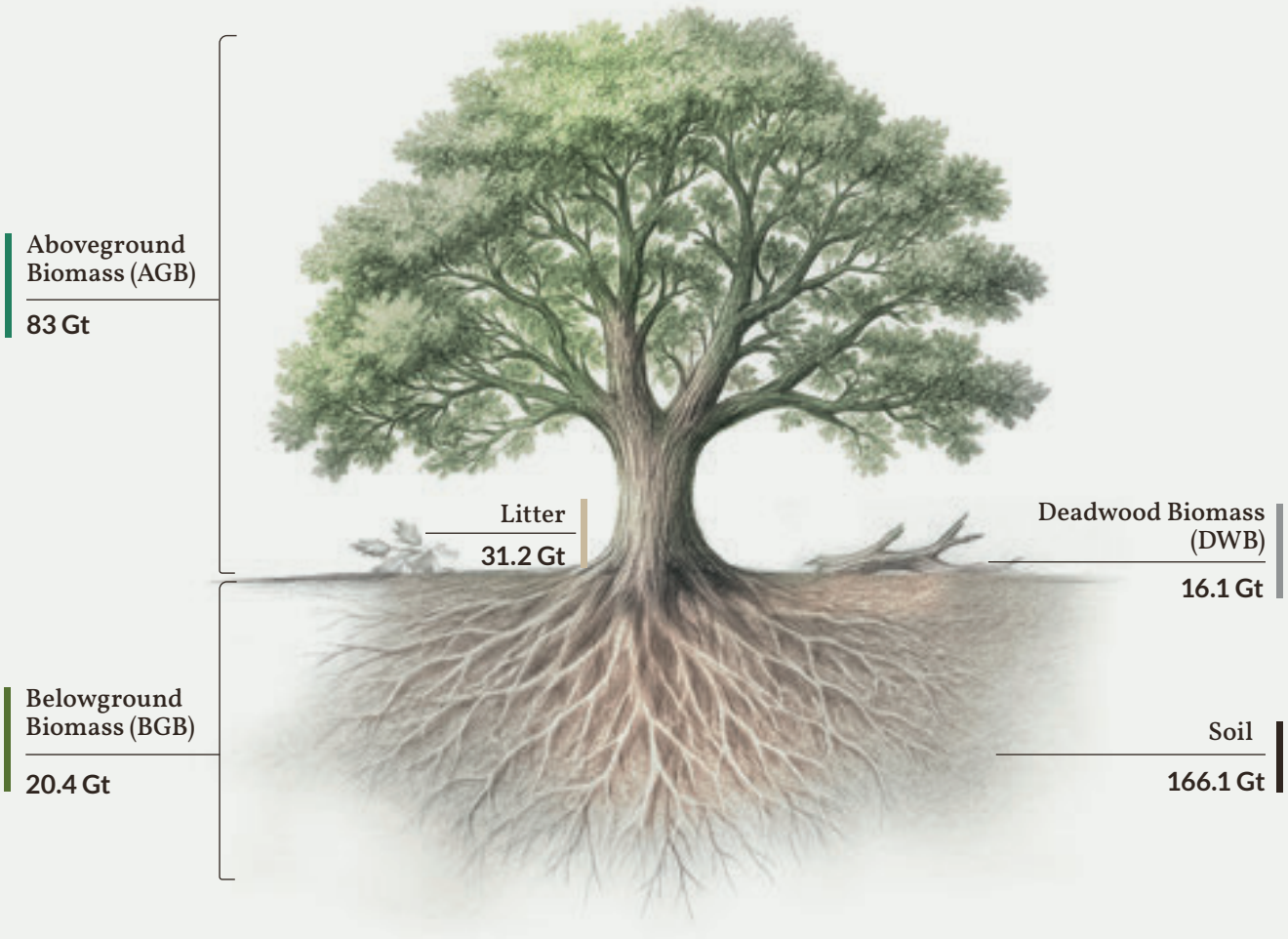
Forests' ability to store carbon depends on their health, vitality, protection and management. Tree mortality, whether caused by **biotic agents** like insects and disease or **abiotic agents** such as storms and droughts, **releases stored carbon back into the atmosphere** when dead wood decomposes[72]. Climate change increases the risks of droughts, insect outbreaks, and storm occurrences, leading to declining wood growth and increased tree mortality. This could significantly

impact the future balance between sequestration and the release of carbon by forests.

The carbon sequestration and storage capacity of forests is vital for offsetting human-produced CO_2 emissions arising from the use of fossil fuels, deforestation, and changes in land-use. Forests in the UNECE region store 317 gigatonnes (Gt) [xii] of carbon, accounting for around half of all the carbon stored in global forests. More than half is stored in soil, about one third in living wood biomass of tree roots and above-ground wood (Figure 28). Much less carbon is stored in litter and dead wood. The carbon stock in UNECE forests has steadily increased since 1990, although some countries have recently reported a decline[73,74].

FIGURE 28

Carbon stock in 2025 (gigatonnes), by carbon pools in the UNECE region



Source: Figure by the UNECE based on FAO data.[75]

Harvested wood products can also contribute to reducing CO_2 emissions. Wood products naturally store carbon, and their production process emits less CO_2 than producing similar products from fossil and other non-renewable raw materials. Furthermore, in sustainably managed forests, the wood removed is replaced by forest growth (see section 9). In contrast to fossil fuels, when wood is used for energy, only the amount of CO_2 removed from the atmosphere by tree growth is put back into it.

xiii 1 Gt = 1,000,000,000 tonnes

14

Forests and Wood – the Great Green Engine

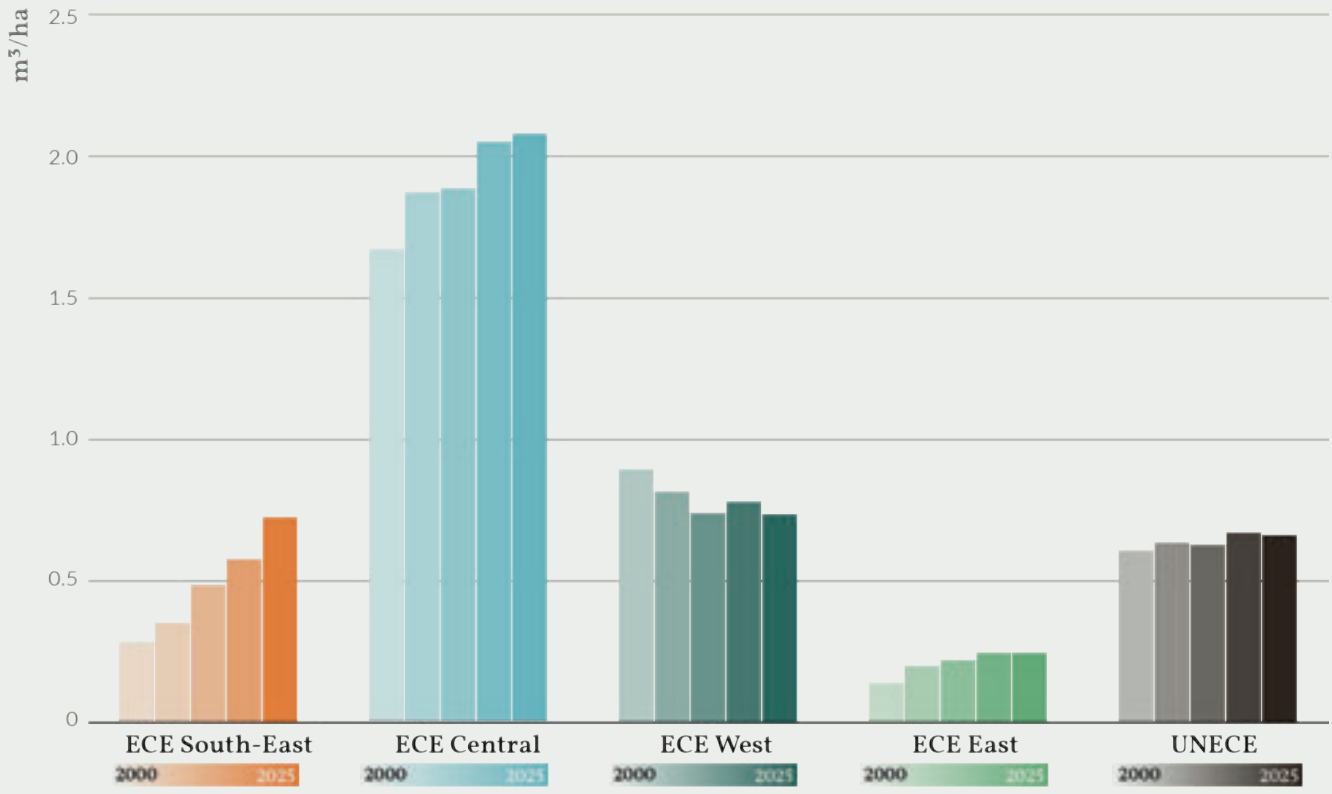
In early human history, wood harvested from forests was a vital source of energy, tools, utensils, furniture, shelter and construction materials. Later, using wood for energy in **the early stages of industrialization led to severe forest depletion and destruction, prompting the invention of sustainable forest management** (see section 9) to address this issue. The use of forests for their wood has changed tremendously in the years since then.

In total, 44.5 billion m^3 of wood was removed from forests in the UNECE region between 1990 and 2023. Wood fuel accounted for 7.2 billion m^3 of this and a further 37.3 billion m^3 was used in forest-based industries. **Despite the removal of such amounts of wood, over the same period forests in the UNECE still increased in volume** (see section 6) by 63.2 billion m^3, and area (see section 2) by 60 million ha. Wood from the UNECE is truly renewable and thus perfectly suited for the bio-based circular economy.

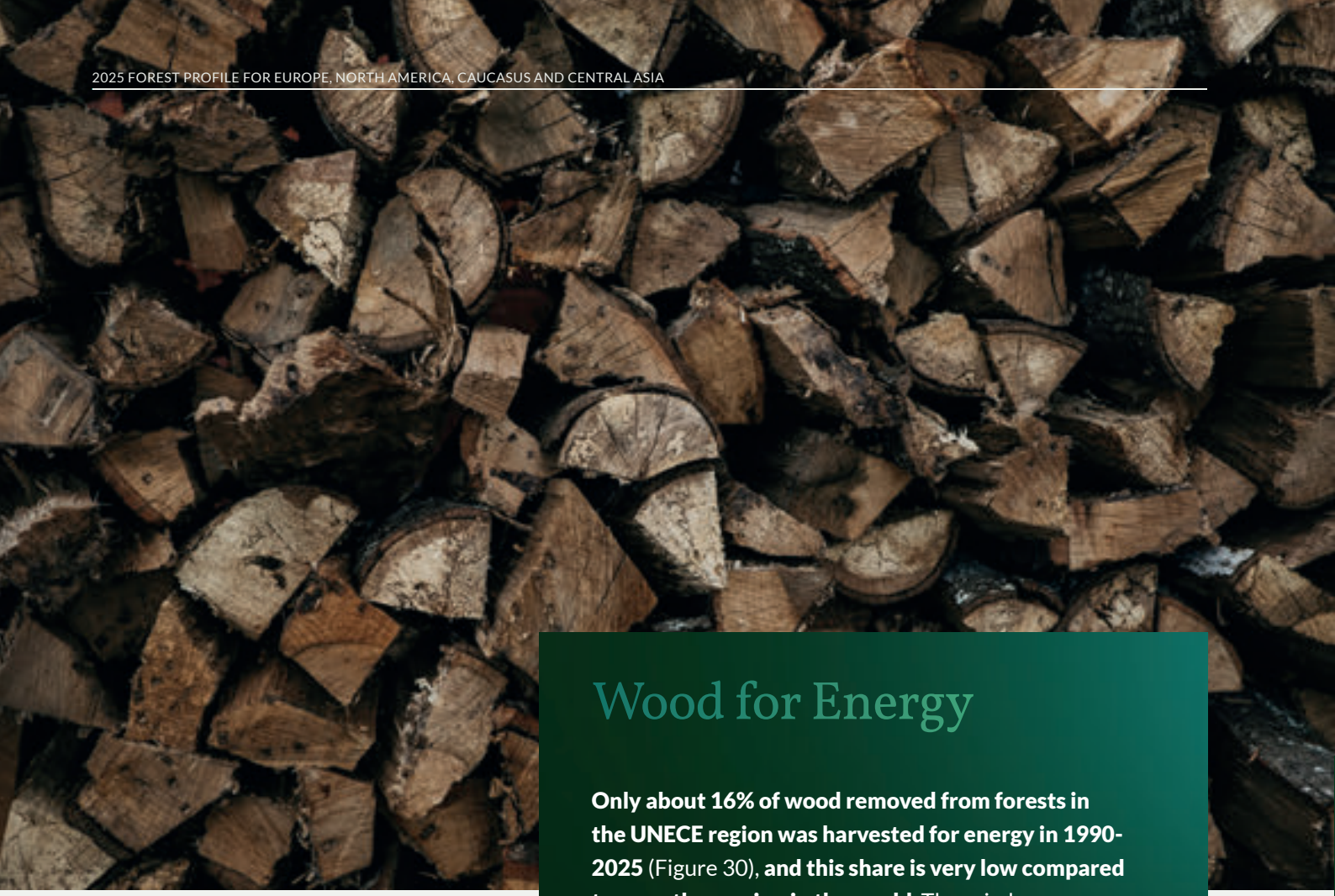
How forests in the UNECE region are used varies significantly by region (Figure 29), mainly affected by how accessible they are. Other factors include the level of demand for wood and wood products, consumption levels, and domestic wood processing industries or trade relationships. Naturally, the national regulatory and legislative framework also influences how forests are managed (see section 9).

FIGURE 29

Average annual wood removals per hectare (m^3/ha), by geographical groupings in the UNECE region



Source: UNECE, 2025. Joint ECE/FAO/Eurostat/ITTO Forest Sector Questionnaire. Geneva. United Nations Economic Commission for Europe.[76]



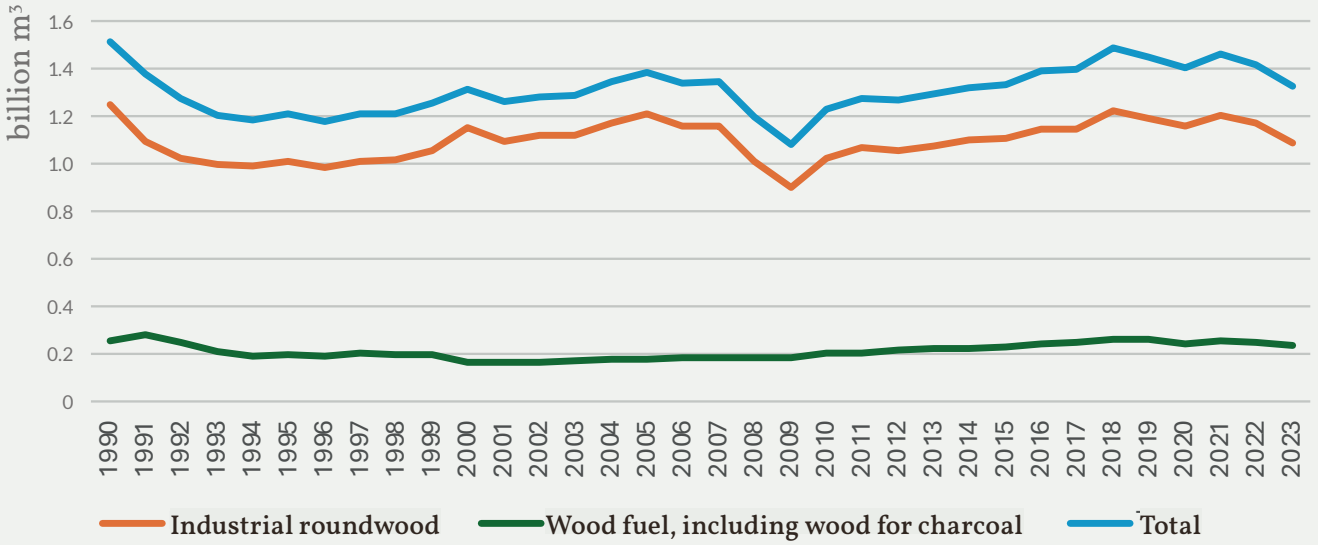
The UNECE region is fully self-sufficient in wood, except for products derived from tropical wood, and has a large trade surplus in industrial roundwood. **In fact, the UNECE is the wood basket of the world. Forests from the UNECE region provide about 55% of the industrial roundwood produced in the world**, and they provide 60% of the global export value of wood, pulp and paper products and furniture exports[77].

Wood for Energy

Only about 16% of wood removed from forests in the UNECE region was harvested for energy in 1990-2025 (Figure 30), **and this share is very low compared to any other region in the world**. There is, however, much more wood used for energy than this figure implies. Most wood used for heat and power production in the UNECE region no longer comes directly from forests, since wood energy production has become an integral part of wood processing industries. The Joint Wood Energy Enquiry[78] has shown that **wood processing co-products and residues, make up 46.5% of the wood used for energy generation – slightly more than wood directly removed from forests: 46.2%**. All these sources of wood energy combined still lead the production of renewable energy in the UNECE region today[79]. Wood energy markets are less influenced by short-term economic trends than other wood sales (Figure 30) and **selling wood for energy is still an important source of income for forest owners**. Fuelwood is the predominant use of wood in most of the countries in ECE South-East[80].

FIGURE 30

Annual wood removals (billion m³) for energy and material use in the UNECE region



Source: UNECE, 2025. Joint ECE/ FAO/Eurostat/ITTO Forest Sector Questionnaire. Geneva. United Nations Economic Commission for Europe.[81]

Forests - Providing Material of the Future

Wood has become an essential renewable material from local sources. Thanks to its very low or even carbon negative possibilities, wood from the UNECE region has great potential to be a substitute for many carbon and energy intensive materials.

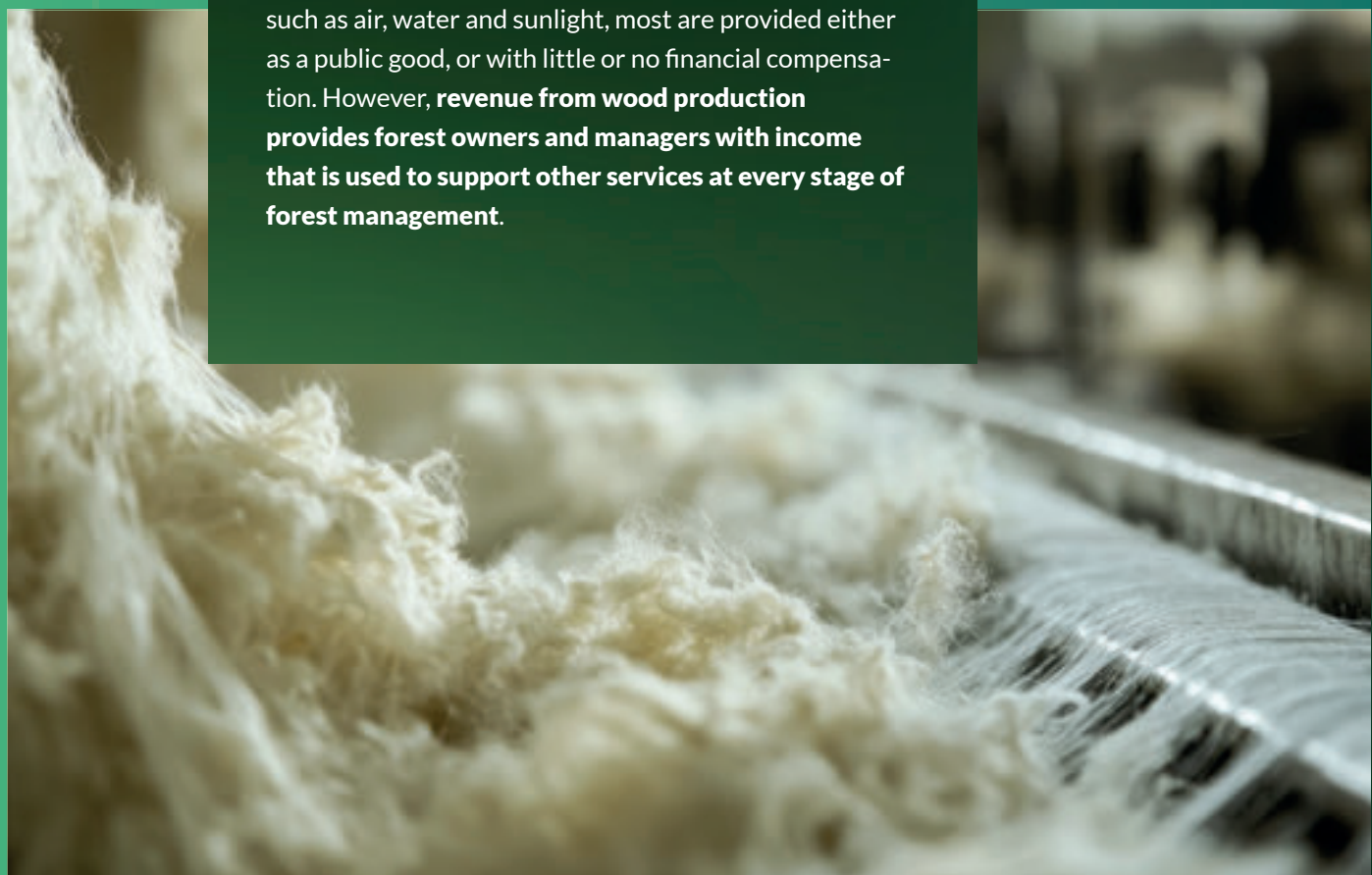
Low-carbon Construction

In particular, modern low-carbon construction has great potential to lock away carbon stored in wood, as highlighted in the UNECE's "Policy guidelines: Low carbon construction in cities"[82]. The current trend of wood construction of high-rise buildings is only one example of using more wood in construction. It is very likely that an increased use of wood for low carbon construction will lead to further **efficiency gains throughout the production chain that will lead to more buildings with a lower material and energy footprint**. Promising innovative ways in which wood can contribute to low-carbon construction already today include wood-hybrid materials and constructions. Other encouraging trends include new construction technologies, modular construction, an increased use of prefabrication, and advanced approaches for re-use and recycling.

Beyond Timber

Wood's Transformation. There is increased research into uses for the various components of wood; for example, **cellulose, hemi-cellulose and lignin can replace many petrol-based materials**. Furthermore, freshly harvested fibres are not needed to produce these products: once-used products such as paper can also be used, as well as co-products at other points along the production chain. There is **increased innovation in 'cascading' use of wood fibres in this way, leading to decreased pressure on forests, which in turn extends the time that carbon is locked away in harvested wood products**. Chemically transforming wood to create fibres for fashion is just one example of wood replacing fossil materials like polyester. Cellulose-derived fibres represent about 6% of the total fibres produced in 2024[83].

Despite the high value of non-wood goods and services such as air, water and sunlight, most are provided either as a public good, or with little or no financial compensation. However, **revenue from wood production provides forest owners and managers with income that is used to support other services at every stage of forest management**.



15

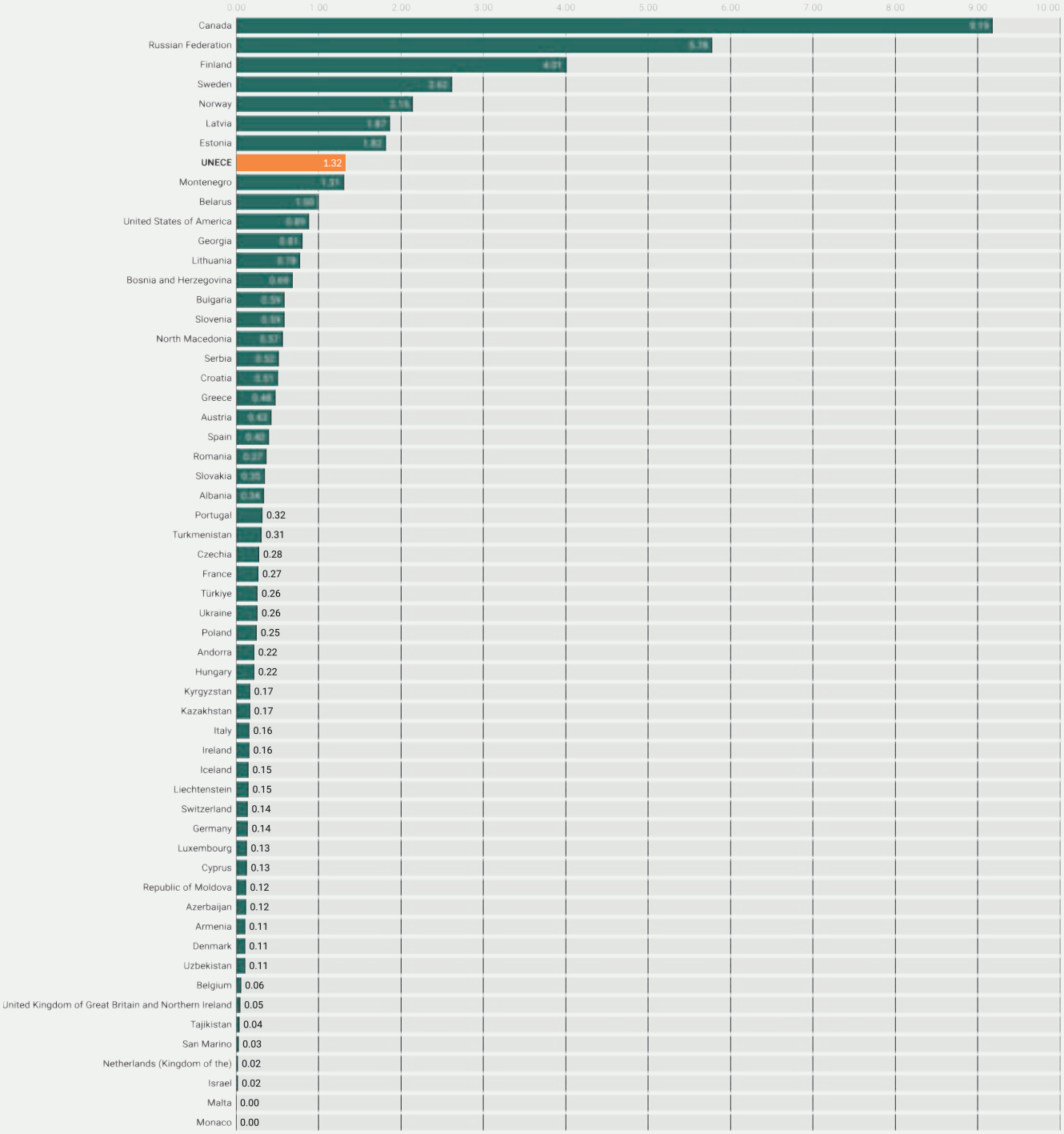
Forests - Social and Economic Benefits

Forests are more than the sum of their wood, non-wood products and environmental services. In all parts of the UNECE region they have played an essential role in shaping societies, beliefs and cultural practices over centuries. This rich cultural heritage shows a **deep-rooted relationship between humans and nature, celebrated through legends, rituals, art, and heritage sites**.

Forests contribute to national economies and population well-being in many ways, depending on abundance and location. This is particularly true for the **UNECE region, where, on average, forests cover 39% of the land and represent approximately 1.3 ha per person.** However, this varies significantly from one place to another (Figure 31). Protective and social aspects of forests may dominate in some countries, while in others, productive functions may play a more important role.

FIGURE 31

Forest area per capita in 2025 (ha), in the UNECE region



Source: Figure by the UNECE based on FAO data.[84]

Forests and forest-based industries contribute greatly to national economies through their direct and indirect economic activities. In many countries, **forest sector activities form an important part of the Gross Domestic Products (GDP) and are important sources of employment. These include timber production, pulp and paper manufacturing, furniture making, and non-wood forest products**[85, 86] (see Box 5). For example, countries rich in forest resources earn substantial revenue from their forest sectors. Additionally, ecosystem services provided by forests—such as water regulation, climate regulation and soil fertility—support urban and rural livelihood, as well as other sectors like agriculture and energy, further contributing to national income.

More than 220 million ha forests worldwide are primarily used for social services. Of these, 39 million ha are located in the UNECE region and are managed mainly for this purpose. This area decreased between 1990 and 2000 but has grown again since then [87]. These statistics refer to forests that are specifically managed for social purposes, but in the UNECE region the public usually has free access to forests managed for other purposes, such as recreational and leisure activities, as well as non-commercial collection of fruits, nuts and mushrooms.

BOX 5 . Accounting for the Unaccounted

Helping policy makers, decision takers and forest owners make well-informed decisions is a challenge since many of the services provided by forests are not monetized. In the ECE region, there has been a growing movement to quantify and monetize these services to inform policy and investment decisions. Forest Accounts, a subset of the System of Environmental-Economic Accounting (SEEA) can play a useful role by systematically tracking forest-related assets, production, and ecosystem services. These accounts measure the physical and monetary value of forest resources like timber stocks, biomass, carbon sequestration, and biodiversity. **By aligning forest data with economic indicators, forest accounts can help policymakers assess sustainability and monitor changes in forest health and coverage. This helps them design more balanced environmental-economic strategies, especially concerning climate targets and land-use planning**.

Forests for Health and Wellbeing

Forests significantly benefit human health by improving air quality and providing medicinal resources. Spending time in forests in rural and urban settings, can contribute to reducing stress, boosts mood, and supports overall physical and mental well-being by immersing people in nature's calming atmosphere[88].

As urbanization increases in the Northern Hemisphere, urban forests have gained prominence as vital components of sustainable city planning. Urban trees and green belts improve air quality, alleviate urban heat islands, enhance biodiversity, and provide recreational spaces. In an increasingly urbanized world, free access to forests for recreation is essential for a sustainable, balanced relationship between humans and nature.

Forests have long been regarded as vital spaces for recreation, offering a sanctuary for relaxation, adventure and spiritual renewal. Forest landscapes are the settings for folklore, literature and national mythology. Indigenous communities in North America, northern Europe and Asia maintain spiritual and cultural ties to forest lands, even in industrialized contexts.

People in the UNECE region have a strong emotional bond to their forests, and this may become a challenge in balancing demands on forests. **Creating a supportive public perception that understands evidence and science-based policy measures for sustainable forest management will be vital to unlock the multidimensional potential of forests and secure their existence today and in the future**.

BOX 6. Non-wood Forest Products

Non-wood forest products (NWFPs) are valuable resources from forests other than timber or wood-based materials. These products include, medicinal plants, herbs, resin, honey and wild game. FAO Forest Resources Assessment includes several different and diverse types of NWFPs, ranging from food (e.g. fruit, nuts, mushrooms, game, or honey) and fodder to raw materials for medicine and aromatic products, colorants and dyes, utensils, handicrafts and construction but also gums, resins and oils.

The importance of non-wood products is often underestimated in monetary terms, but it can be similar to that of timber. They play a crucial role in supporting local livelihoods, promoting biodiversity and contributing to economic development. NWFPs are widely used in traditional medicine, the food industry and crafts. Additionally, collecting berries and mushrooms is highly valued by societies as a recreational activity, making these products an important sustainable resource within forest ecosystems.

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2025 Forest Profile for Europe, North America, Caucasus and Central Asia

Forests in the United Nations Economic Commission for Europe (UNECE) region cover 1.76 billion ha, or 42.5% of global forest cover. They are vital for biodiversity, climate regulation, wood supply and human well-being, not only locally or nationally, but also regionally and globally. This publication gives a comprehensive overview of the state of forests in the ECE region, highlighting their significance for global sustainable development.

Drawing from a variety of sources, the report explores key aspects of forest ecology and management, including the distribution, diversity, and health of forests across the region. It explains trends in forest development, like the volume of growing stock and timber harvesting, and examines the crucial roles forests play in climate regulation, biodiversity conservation, and providing essential social and economic services. It also addresses the challenges forests face, including threats to their vitality and the importance of forest protection.

By presenting a holistic assessment of UNECE forests, the report aims to inform the public, policymakers and stakeholders on the crucial need for sustainable forest management and the importance of forest resources for people and the planet.

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