

S Nordic Forest **statistics** **2023**

Resources, industry, trade, prices, environment and climate

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Preface

Nordic Forest Statistics 2023 is a compilation of vital statistical figures of the forest resources and the forest industry in the Nordic region – Denmark, Finland, Iceland, Norway and Sweden. The report is a follow-up and extended version of the pilot study Nordic Forest Statistics 2020. The initiative was based on the need to navigate among the mass of various international statistics. It focuses on a region which, by far, has the highest forest cover in Europe, and where the forest industry is one of the backbones of the economy.

The report was initiated and supported by Nordic Forest Research (SNS), a cooperating body financed with Nordic funds under the auspices of the Nordic Council of Ministers. The authors are responsible for the selection of statistics and text. The data are collected from a wide variety of sources, mainly from reports compiled by FAO, Forest Europe and UN-ECE. The advantage of those data is that they are harmonized among the reporting countries. For several data, such as trade, production and prices, we have been able to use the most recent published statistics, while information about the forest resources frequently have a lag-time of a few years.

The authors are grateful for advice from various experts, particularly representatives of the National Forest Inventories in the Nordic countries. In addition, Kjell Andersson (previous at Svebio) has provided valuable data for bioenergy.

Kalmar and Seattle March 2023

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1. Data sources

Sources referred to in tables and figures:

SoEF	State of Europe's Forest (Forest Europe)
FRA	Global Forest Resources Assessment (FAO)
FAO country reports	Country reports for FRA
UN-ECE	United Nations Economic Commission for Europe
WRI est	Wood Resources International, estimate from various sources
FSC	Forest Stewardship Council
PEFC	The Programme for the Endorsement of Forest Certification

Other sources are described under the respective figures and tables.

This report relies on various numbers of statistical sources. The data collected by international organisations have the advantage of being harmonised and thereby comparable among countries and regions. However, a disadvantage with those data is that they are not always up to date. For example, the Global Forest Resources Assessment (FRA) 2020 and State of Europe's Forests (SoEF) 2020 include data reported for 2018, and many are based on statistics from a few years earlier (reference year was set to 2016). Further on, many countries have missing data.

Data for forest products (production and trade) are on the other hand, predominantly based on 2021 information, while forest products prices (compiled by Wood Resources International) are for 2022.

Data sources for all tables and figures are referenced throughout the report.

When comparisons are made with Europe, we define it as in Figure 1. Belarus, Ukraine, Russia, and some other countries are excluded, although they are defined as Europe in the statistics from FAO and Forest Europe.

1.1 Global and transnational data

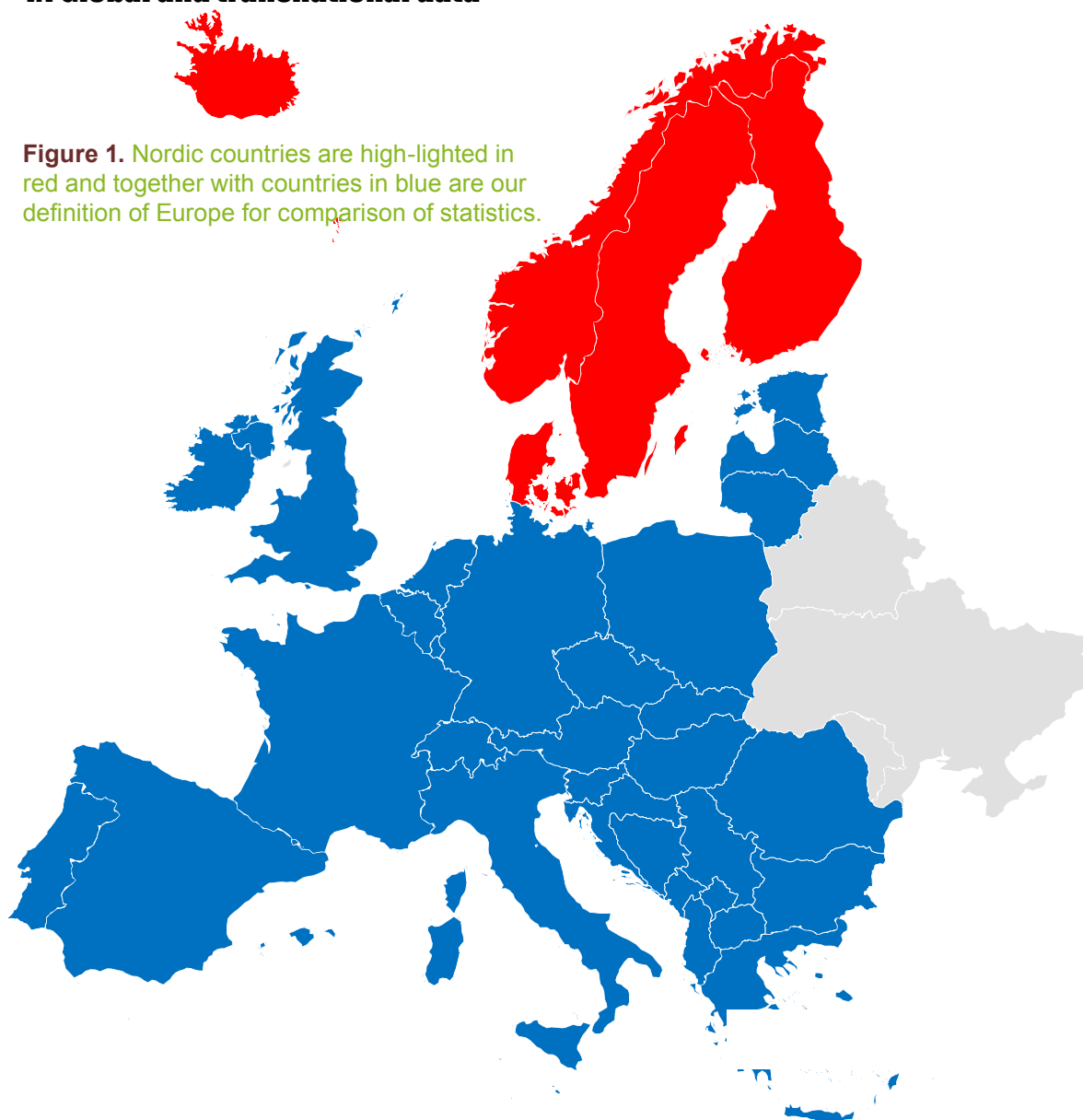


Figure 1. Nordic countries are high-lighted in red and together with countries in blue are our definition of Europe for comparison of statistics.

FAO completed its first assessment of the world's forest resources in 1948. Since then, the Global Forest Resources Assessment (FRA) has evolved into a comprehensive evaluation of forest resources around the globe. The latest of these assessments, FRA 2020¹, examines the status and trends of forest resources over the period 1990-2020. FRA relies mainly on country data provided by national correspondents, with a few exceptions where remote sensing data have been used. The data from FRA 2020¹ is publicly available on an online platform².

Forest Europe is the short name of Ministerial Conference on the Protection of Forests in Europe (MCPFE), a pan-European collaboration which extends outside the geographical Europe (Figure 2). Currently, Forest Europe present data for Europe's forests at the same interval as FRA. The first State of Europe's Forests (SoEF) report was issued in 2003. The latest issue SoEF 2020 is the fifth report³. The data is also available online⁴.

¹ FAO, 2020. [Global Forest Resources Assessment, main report](#).

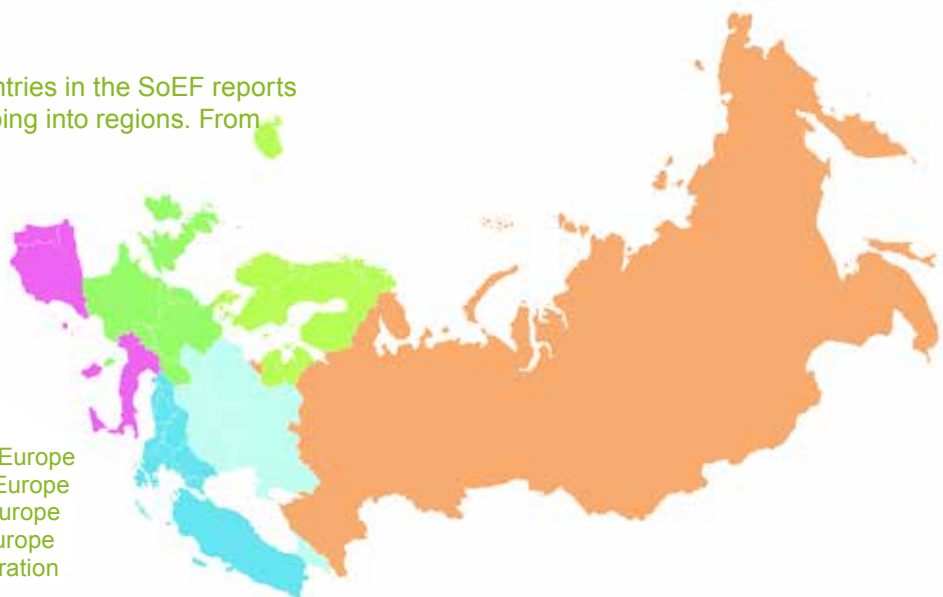
² FAO, 2020. [Global Forest Resources Assessment, online statistics](#).

³ Forest Europe, 2020. [State of Europe's Forests \(SoEF\)](#).

⁴ Forest Europe, [Joint Pan-European dataset](#).

Figure 2. Countries in the SoEF reports and their grouping into regions. From SoEF 2020.

■ North Europe
■ Central-West Europe
■ Central-East Europe
■ South-West Europe
■ South-East Europe
■ Russian Federation



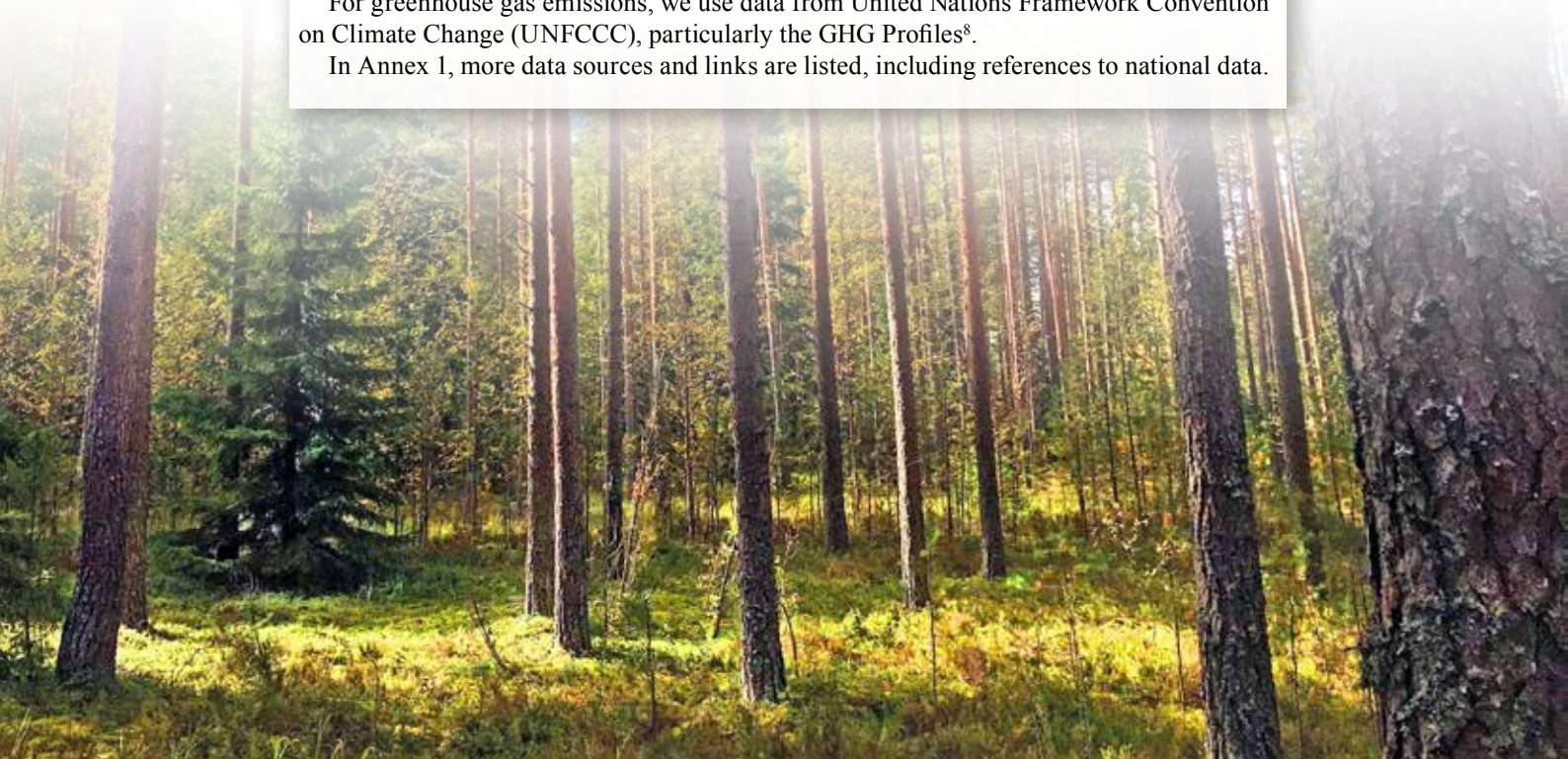
Since 2015, data for FRA and SoEF are gathered through a joint questionnaire sent to individual countries, where national providers fill in data for FAO, Forest Europe and UN Economic Commission for Europe (UN-ECE). Besides the national providers, several international organisations contribute with information.

UN-ECE compile data on forest products (wood raw materials, sawnwood, wood pellets, wood-based panels, pulp and paper), and issues the Forest Products Annual Market Review annually (with the latest version being 2021-2022)⁵. A corresponding compilation is made in FAO Yearbook of Forest Products (the latest version is 2019)⁶.

Eurostat present selected data in Agriculture, forestry and fishery statistics (the latest version from 2020)⁷.

For greenhouse gas emissions, we use data from United Nations Framework Convention on Climate Change (UNFCCC), particularly the GHG Profiles⁸.

In Annex 1, more data sources and links are listed, including references to national data.



⁵ UN-ECE. [Forest Products Annual Market Review, 2021-2022](#).

⁶ FAO, 2020. [FAO Yearbook of Forest Products](#).

⁷ Eurostat. [Agriculture, forestry and fishery statistics](#).

⁸ United Nations, [Climate change \(UNFCCC\). Greenhouse gas profiles](#).

2. In a nutshell

Nordic forests and forest industry in a nutshell

The Nordic region – Denmark, Finland, Iceland, Norway, and Sweden – is a group of small, sparsely populated, countries covering 1.1 million km² at the northernmost edge of Europe. Despite its remote location, with dark and cold winters, the inhabitants are satisfied with their lives. The global World Happiness Report, an initiative of the United Nations, ranks the five Nordic countries in the top ten, and has done so since 2013⁹. The rankings by OECD in the Better Life Index show a similar pattern, still with the Nordic countries among the top ten countries in the world¹⁰. Many explanations have been given to the "Nordic exceptionalism", such as low inequality, trust in institutions and a well-functioning democracy, and also its history without feudalism (Martela et al. 2020)¹¹.

Another area of exceptionalism is the region's crucial role of the forests, particularly in Sweden and Finland. In world rankings, Sweden and Finland rank number 3 and 5, respectively in the exportation of sawnwood, and number 3 and 4 in paper export. The total forest area of the five countries is only 1.6% of the global forest area. Still, the paper/paperboard and sawnwood exports account for 16% for both sectors of the global export. The Nordic forests are also a significant contributor to combat climate change, both as a provider of substitutes to fossil products and as a carbon sink in its growing stock. Besides, forests are home to thousands of species, some unique to the region, and they also constitute an appreciated recreation area for people throughout Europe.

Key figures for forest resources

	Land area, 1,000 ha	Forest area, 1,000 ha	Forest cover, %	Forest cover per capita, ha	Growing stock million m ³
Denmark	4,199	628	15.0	0.1	133
Finland	30,391	22,409	73.7	4.1	2,449
Iceland	10,025	51	0.5	0.2	1
Norway	30,413	12,180	40.0	2.3	1,233
Sweden	40,731	27,980	68.7	2.8	3,654
Nordic total	115,759	63,248	54.6	2.4	7,479
Europe total	441,404	183,466	41.6	0.3	30,995
Nordic share of Europe	26%	34%			24%
World total	12,994,928	4,058,931	31.2%	0.5	556,526
Nordic share of the world	0.9%	1.6%			1.3%

SoEF 2020, data for 2020. FRA 2020.

⁹WHR, 2022. [World Happiness Report](#).

¹⁰OECD. [Better Life Index](#).

¹¹Martela, F., Greve, B., Rothstein, B., Saari, J. 2020. The Nordic Exceptionalism: What explains why the Nordic countries are constantly among the happiest in the world? In: World Happiness Report 2020.

Key figures for the production of forest products

	Sawnwood, softwood, million m ³	Pellets, million tonnes	Pulp, million tonnes	Paper, million tonnes
Denmark	0.3	0.02	0	0
Finland	11.9	0.4	11.4	8.7
Iceland	0	0	0	0
Norway	2.8	0.2	1.0	1.0
Sweden	19.0	1.9	11.7	8.9
Nordic total	34.0	2.4	24.1	18.6
Europe total	118.2	21.2	40.0	96.9
Nordic share of Europe	29%	12%	60%	19%
World total	354	38.9	193	417
Nordic share of world	9.6%	6.2%	12.5%	4.4%

UN-ECE, European data for 2021 (World 2020)

Key figures for exports of forest products

	Sawnwood, softwood, million m ³	Pellets, million tonnes	Pulp, million tonnes	Paper, million tonnes
Denmark	0.1	1.45	0	0.2
Finland	8.7	0.01	4.5	8.4
Iceland	0	0	0	0
Norway	0.7	0.04	0.4	0.9
Sweden	12.6	0.28	4.2	9.1
Nordic total	22.1	1.78	9.0	18.6
Europe total	58.8	13.02	15.6	63.4
Nordic share of Europe	38%	14%	58%	29%
World total	134	26	63	113
Nordic share of the world	16%	7%	14%	16%

UN-ECE data for 2021

Key figures of forest protection

	Protected forest, all categories, 1,000 ha	Strict protected forests, 1,000 ha	Certified forest PEFC, 1,000 ha	Certified forest FSC, 1,000 ha
Denmark	131	18	324	228
Finland	3,740	2,542	18,985	2,254
Iceland	16	0	0	0
Norway	892	610	7,352	684
Sweden	2,270	1,976	16,832	19,610
Nordic total	7,048	5,146	43,494	22,776
Europe total	52,845	8,355	81,541	49,482
Nordic share of Europe	13%	62%	53%	46%

Footnote: Protected forest = all MCPFE categories (1-4), Strict protected forest = MCPFE categories 1.1-1.2 (no or minimum intervention). Source: SoEF 2020, FSC and PEFC. Data for 2020.

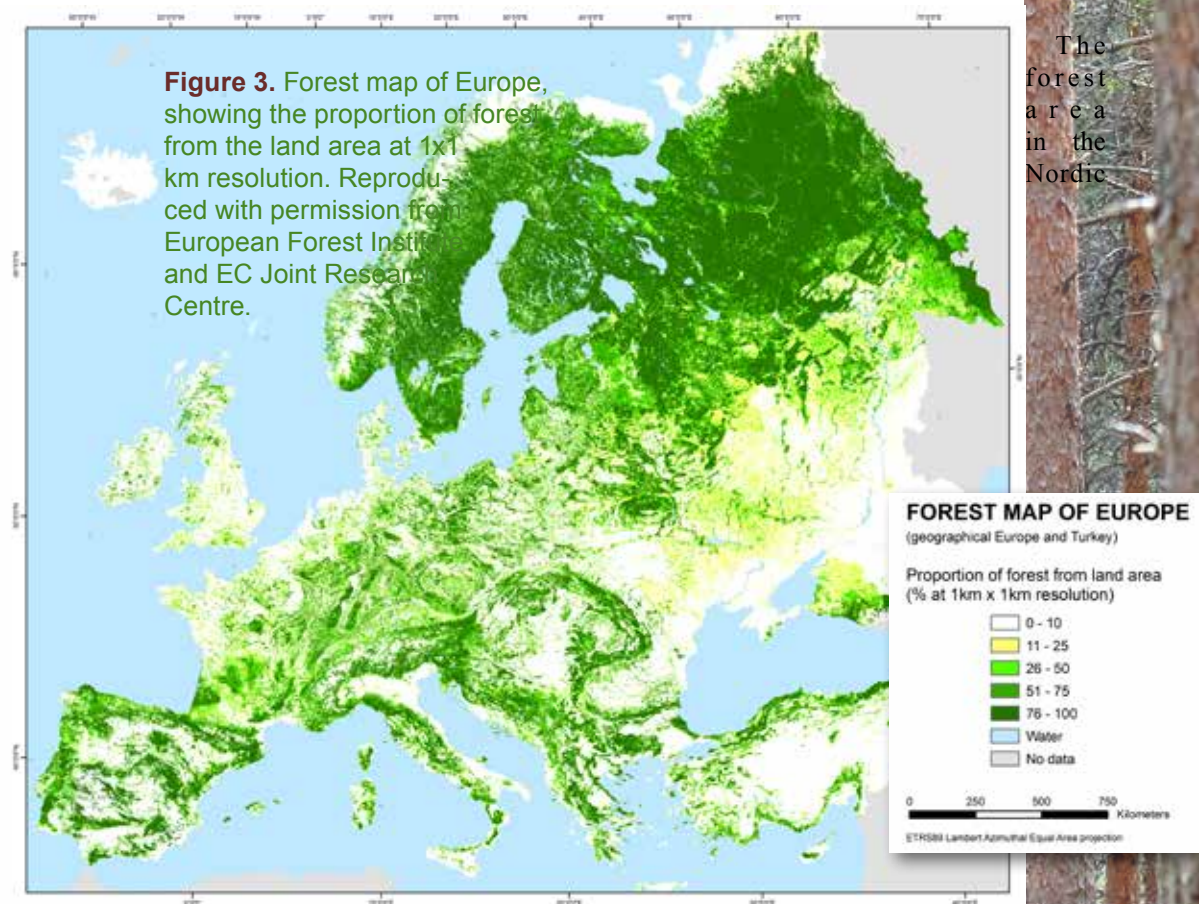
3. Forest Resources and people

What is a forest?

Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use. (Joint definition for Forest Europe and FAO.)

3.1. Forest Area

From a European perspective, the Nordic countries are rich in forests, as evident in the Forest Map of Europe produced by the European Forest Institute¹² (Figure 3).



¹²European Forest Institute. Forest map of Europe.

countries covers almost 55% of the total land area. Just over two-thirds of the land is forested in Finland and Sweden (74% and 69%, respectively), while the shares of forest land in Norway and Denmark are much smaller, (40% and 15%, respectively) (Table 1). The forest cover in Iceland is approximately 50,000 hectares; about 0.5% of the total land area.

The total forest area of Europe is 183 million hectares, out of which the Nordic countries constitute 34%, of which Sweden and Finland alone total 27% (Figure 4). The two countries have the largest areas of forest in Europe, followed by Spain, France, and Norway (Table 2). Sweden and Finland have also the largest share of land area covered by forest, followed by Slovenia, Montenegro, and Albania.

Since the Nordic countries are sparsely populated (Finland and Norway: 18 people per km², Sweden: 24 people per km²), they have by far the most forest area per inhabitant in Europe (Figure 5).

The forest area available for wood supply (i.e. forest with production capacity >1 m³ per hectare and year, and not set aside for protection) is 48 million hectares in the Nordic countries. Finland has the largest area (19.7 million hectares), closely followed by Sweden (19.5 million hectares) (Table 1).

Figure 4. Share of forest land area in Europe.

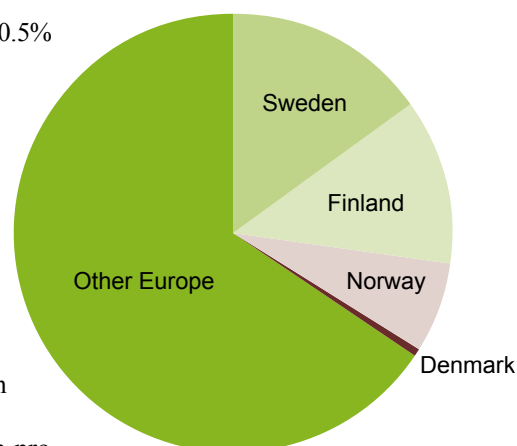


Table 1. Forest and land area 2020, million hectares

	Denmark	Finland	Iceland	Norway	Sweden	Nordic
Forest land	0.63	22.4	0.05	12.2	28.0	63
Other wooded land	0.04	0.75	0.15	2.1	2.36	5.4
Other land	3.53	7.24	9.8	16.1	10.4	47
Total land	4.20	30.4	10.0	30.4	40.7	116
Forest land share, %	15	74	0.5	40	69	55
Forest available for wood supply	0.61	19.7	0.03	8.3	19.6	48

Source: SoEF 2020

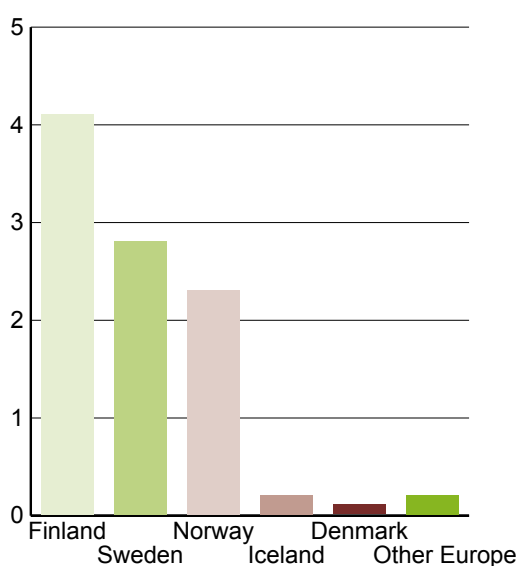


Figure 5. Forest land (hectare) per capita.
Source: SoEF 2020

Table 2. The 10 top countries in Europe with the largest forest land area.

Sorted by Forest land area, million hectares.

	Forest land area	Forest, share of total land, %
Sweden	28.0	68.7
Finland	22.4	73.7
Spain	18.6	37.2
France	17.2	31.5
Norway	12.2	40.0
Germany	11.4	32.7
Italy	9.6	32.5
Poland	9.5	31.0
Romania	6.9	30.1
Greece	3.9	30.3

Source: SoEF 2020

3.2. Growing stock

The growing stock on forest land (including protected forests) in the Nordic countries is 7.5 billion m³ (SoEF 2020). Sweden has the largest stock, 3.7 billion m³, followed by Finland, 2.4 billion m³. Since 2005, the growing stock has increased 16%, from 6.5 to 7.5 billion m³ (Table 3).

The growing stock of Europe amounted in 2020 to 31 billion m³, out of which the Nordic countries share was 24 %. Germany has the largest growing stock in Europe, closely followed by Sweden (Table 4).

The growing stock on forest land available for wood supply in the Nordic countries is 6.1 billion m³, 82% of the total growing stock on forest land.

Table 3. Growing stock on forest land Total amount in billion m³ 1990-2020, and m³ per hectare 2020

	Denmark	Finland	Iceland	Norway	Sweden	Nordic
1990	66	1,878	0	788	-	-
2000	92	2,078	0	898	-	-
2005	109	2,181	0	981	3,185	6,456
2010	117	2,343	0	1,069	3,295	6,824
2015	131	2,449	1	1,151	3,478	7,210
2020	133	2,449	1	1,233	3,654	7,470
2020 – m ³ per hectare	212	109	20	101	131	118

Source: SoEF 2020. Table 7.

Table 4. The top ten countries in Europe with the largest growing stock on forest land (2020) and on forest land available for wood supply (2015) Sorted by growing stock on forest land, billion m³

COUNTRY	GROWING STOCK, billion m ³	
	Forest land (2020)	Forest land available for wood supply (2015)
Germany	3,663	3,505
Sweden	3,654	2,734
France	3,056	2,716
Poland	2,730	2,197
Finland	2,449	2,203
Romania	2,344	1,755
Italy	1,385	1,286
Norway	1,233	1,028
Austria	1,166	1,116
Spain	1,109	976

Source: SoEF 2020. Tables 7 and 10



The growing stock in the Nordic countries has increased steadily since the national forest inventories started in the 1920s. In Sweden and Finland, the volume has doubled, and in Norway it has gone up three-fold (Figure 6). In Denmark, the growing stock has increased 32% since the inventory started in 2002, to a current 143 million m³.

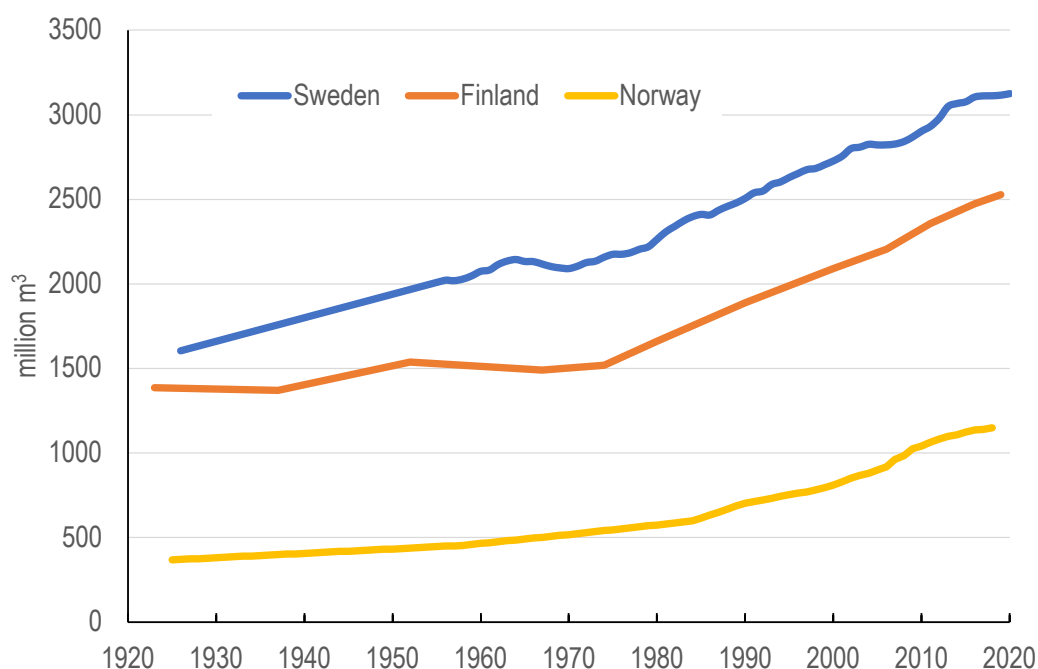


Figure 6. The growing stock has increased twofold in 100 years in Finland and Sweden, and threefold in Norway. The Finnish data is the growing stock on forest land including low-productive land ("tvinmark"). The Swedish data is on forest land excluding formally protected areas. The Norwegian data is on all forest land, with some exceptions for the period 1950-2006.

Sources: LUKE, SLU and NIBIO

3.3. Volume growth

The annual increment (volume growth) is reported to Forest Europe for forests available for wood supply (SoEF 2020). The total growth in the Nordic countries was 223 million m³ for 2015, the most recent reported data (Table 5). Several European countries with a high volume of forest lack data for the period, it is thus not possible to draw any conclusions about the Nordic countries' share of volume growth.

Table 5. Annual volume growth (increment) on forest available for wood supply 2015 Total volume growth in million m³, volume growth per hectare in m³

	Denmark	Finland	Iceland	Norway	Sweden	Nordic
Total volume growth/year	6.6	96.2	0.04	25.6	94.8	223.5
Volume growth/year, hectare	10.7	4.9	1.6	3.1	4.8	4.6

Source: SoEF 2020. Table 19.

The annual volume growth on productive forest land has increased at a similar pace as the growing stock, here illustrated for Finland, Sweden and Norway (Figure 7).

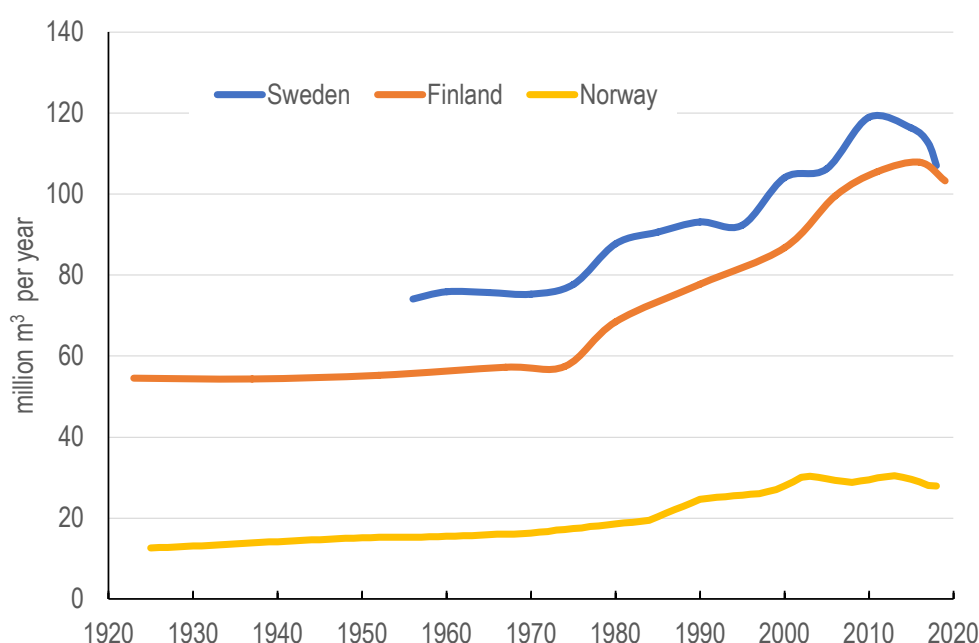


Figure 7. Annual gross growth on productive forest land in Sweden, productive land including low-productive land ("tvinmark") in Finland and all forest land in Norway (with some exceptions for the period 1950-2006).

Sources: SLU, LUKE and NIBIO

3.3.1 Tendencies to reduced growth

In the late half of 2010, a reduction in annual growth has become apparent both in Sweden and Finland. The total growing stock continues to increase but with a slower pace. In Sweden, the increase between 2005 and 2012 was 27 million m³ per year but between 2017 and 2019 only 8 million m³ per year. An analysis made by SLU in Sweden indicates that the reduced annual growth is mainly caused by weather conditions (drought and vapor pressure deficit), and that harvest and natural drain only have a marginal effect on the total annual increment (Fridman et al. 2022).

3.4. Tree species mixture

Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*) dominate the Nordic forests with 2.7 and 3.0 billion m³ respectively (Figure 8). These two species constitute 76% of the total growing volume. Birch (*Betula pubescens* and *B. pendula*) is the most common broad-leaf species group, with 16% of the volume.

Denmark has the most diverse tree species mixture, out of which 42% is introduced. The most common species is beech, followed by Norway spruce. Iceland has, for historical reasons, a high share of introduced tree species (89%). Most common are larch (*Larix sibirica*), lodgepole pine (*Pinus contorta*), Sitka spruce (*Picea sitchensis*), and black cottonwood (*Populus trichocarpa*). Finland has almost only native species (99.9%). Sweden and Norway have both slightly above 1% introduced tree species; in Sweden mainly lodgepole pine, in Norway Sitka spruce.

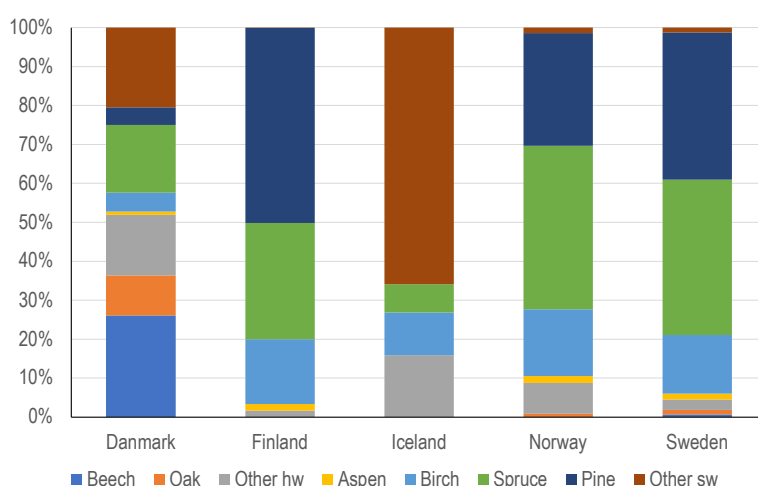


Figure 8. Tree species mixture in the Nordic forests

Data from FRA 2020, Country reports

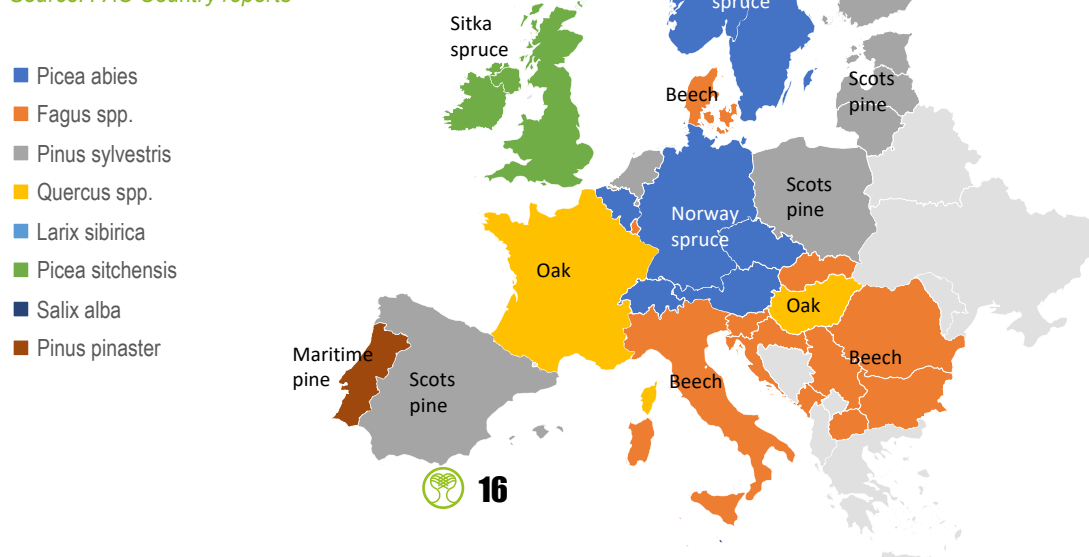
"Other hw"=other hardwoods (deciduous trees)

"Other sw"=other softwoods (coniferous trees)

In Europe, Norway spruce is the dominant tree species (in terms of volume in the production forest) in Norway, Sweden, Germany, Switzerland, the Czech Republic, Belgium, and Austria. Scots pine is dominant in north-eastern Europe and as well in Spain. The predominant tree species in south- and south-eastern Europe are oak (*Quercus robur*, *Q. petraea* and *Q. cerris*) and beech (*Fagus sylvatica* and *F. moesiaca*) (Figure 9).

Figure 9. The country-wise most common tree species in production forest as share of volume

Source: FAO Country reports



3.5. Deadwood volume

Standing and lying deadwood in various stages of decomposition is a crucial element for many insects and fungi. About 20-25% of the forest-dwelling species in Finland are assumed to be dependent on dead wood. The old-growth forests of southern Finland could have possessed 60-90 m³ of dead wood per hectare (Siitonen 2001). Further north, the amount decreases towards the timberline, but still some 20 m³ per hectare was common. In the current managed forests of the Nordic countries, the volumes are far lower than the values in the pristine forests, despite the large increase in managed forests during the last century. Table 6 shows the levels reported for 2015, on average 7.5 m³.

Table 6. Deadwood Volume per hectare, 2015, m³, all forest land

	Denmark	Finland	Iceland	Norway	Sweden	Nordic
Total deadwood	4.9	6.0	-	8.3	8.4	7.5
Standing deadwood	3.4	1.8	-	2.9	3.3	2.7
Lying deadwood	1.6	4.2	-	5.4	5.2	4.8

Source: SoEF 2020. Table 31

The levels of deadwood were low already 100 years ago, as is seen in the Swedish data (Skogsdata 2020, Figure 10).

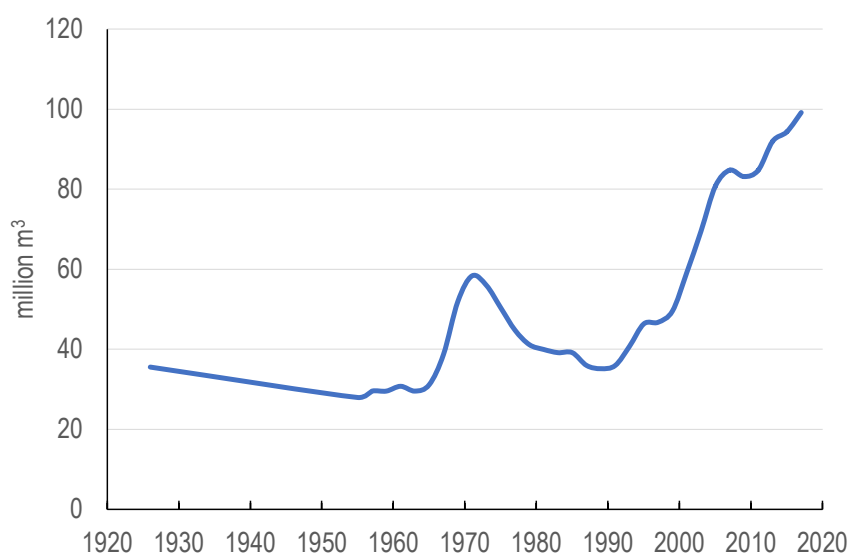


Figure 10. Deadwood volume, all forest land outside the mountain range in Sweden.

Source: SLU, Riksskogstaxeringen

The volumes of dead wood per hectare are considerably higher in many Central-European countries compared to the Nordic countries (Table 7).

Table 7. Deadwood Volume per hectare, 2015, m³ in some central and eastern European countries with high volumes

	Slovakia	Czech Rep	Switzerland	Latvia	Austria	Slovenia	Germany
Total deadwood	28.0	25.2	25.0	23.6	21.8	22.3	20.6
Standing deadwood	8.7	8.7	11.8	9.2	8.5	6.1	4.7
Lying deadwood	19.3	16.5	13.2	14.4	13.3	16.2	15.9

Source: SoEF 2020. Table 31

3.6. Type of forest

In SoEF, the degree of naturalness is reported as the share of forests which are undisturbed by man, semi-natural forests, and plantations. In Europe, 93% is classified as semi-natural, 5% as plantations and 2.3% as undisturbed by man. The highest share of undisturbed forests is found in Liechtenstein (29%), Bulgaria (18%) and Montenegro (13%). On the other hand, the highest shares of plantations are found in United Kingdom (88%), Ireland (84%), Belgium (64%) and Denmark (38%).

Most of the forests in the Nordic countries (besides Denmark) are classified as semi-natural, with plantations accounting for only a small share (Figure 11).

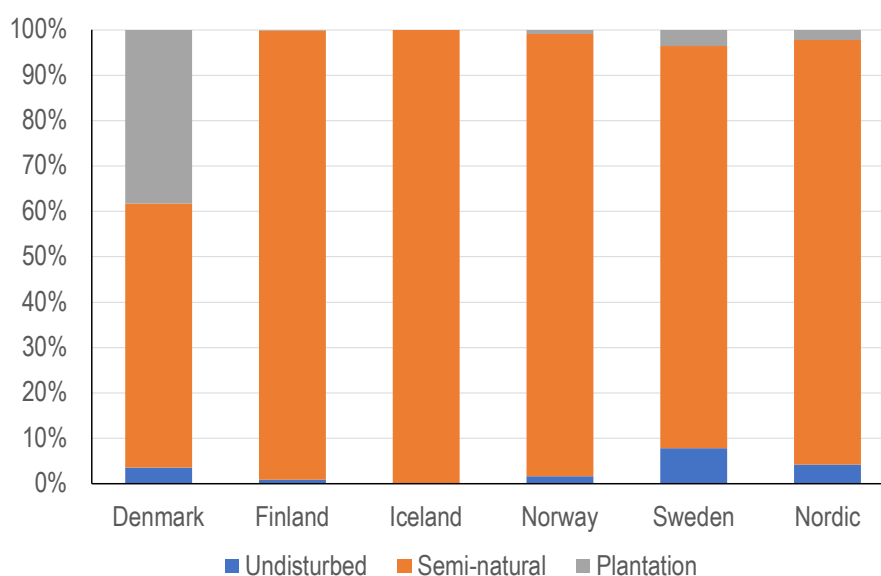


Figure 11. Share of forest in different naturalness classes

Source: SoEF 2020, Table 29



3.7. Forest regeneration

Compared to other parts of Europe, the Nordic countries use a large share of artificial regeneration methods (planting and seeding), 84% (Figure 12). Europe as an average, use artificial regeneration on 46% of its annual regeneration and afforestation area. Natural regeneration, which was common in Finland, Sweden, and Norway in the 1990s, has been reduced to 10% on average in the Nordic region. Afforestation, meaning expansion of the forest area, is essential in Iceland and Denmark.

A high share of natural regeneration is found in Switzerland (85%), Germany (75%) and Latvia (61%). Coppice as a reforestation method has a relatively high share in Bulgaria (31%), Hungary (28%), and France (20%).

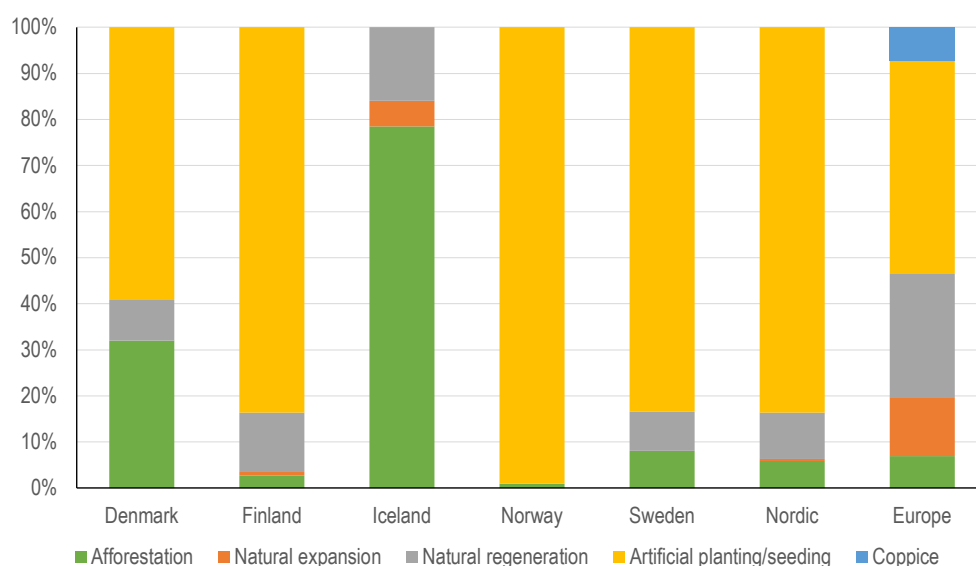


Figure 12. Share of methods for annual afforestation and reforestation in 2015. Source: SoEF 2020, Table 26

NordGen (Nordic Genetic Resource Center) produces statistics on seedling and seed production from the Nordic countries. Table 8 shows the number of produced seedlings delivered to forest owners in 2019.

Table 8. Number of seedlings delivered to forest owners in 2019

	Denmark	Finland	Iceland	Norway	Sweden
Seedlings x1000	na	174,510	3,523	44,456	380,900

Source: NordGen 2021¹³

¹³Solvin, T., Sundheim Fløistad, I., Bakkebø Fjellstad, K. 2021. Statistics: Forest seeds and plants in the Nordic region. NordGen Publication Series: 2021:03.

3.8. Ownership of forest land

The Nordic countries have a large share of privately owned forest land, with a majority being small-scale forest owners (Figure 13). Publicly owned forest area constitutes 43% in Europe, while only 24% in the Nordic countries. Among the privately owned forests, individuals (small-scale owners) dominate, with an average of 56% of the forest land (in Europe 42%).

The highest share of small-scale forest owners in Northern Europe is in Norway (66%), followed by Iceland (65%), Finland (59%), Denmark (58%), and finally Sweden (49%). Sweden has the highest share of forest land that is privately owned.

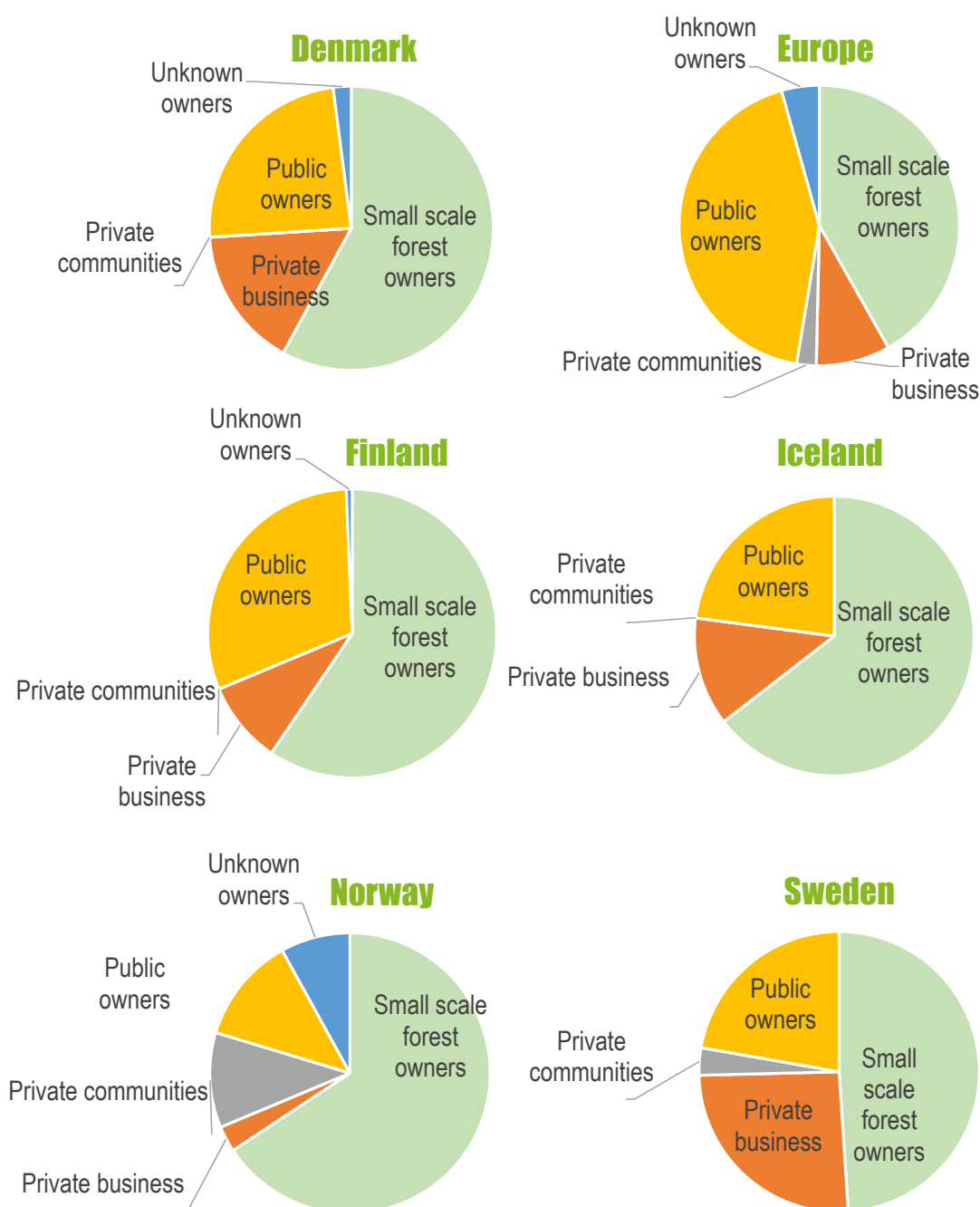


Figure 13. Share of forest land owned by small scale forest owners, private business, private communities and public owners.

Data for 2015 (Norway only 2010).

Source: FRA 2020, database

3.9. Gender equality

Forestry and forest industry is a male-dominated sector throughout Europe. Among the employed in forestry, 82% are men, and in manufacturing of wood 81% (SoEF 2020).

In the Nordic countries, 88% of those employed in forestry and logging in 2015 were men (Figure 14). The figures are still unbalanced but somewhat more equal when it comes to education. Of those with a master's or bachelor's degree in forestry in 2015, 65% were men (Figure 15).

Among the small-scale forest owners, the proportion of women are (data vary from 2003-2019) 14% (Denmark), 41% (Finland), 25% (Norway) and 39% (Sweden) (Vennesland et al. 2020).¹⁴

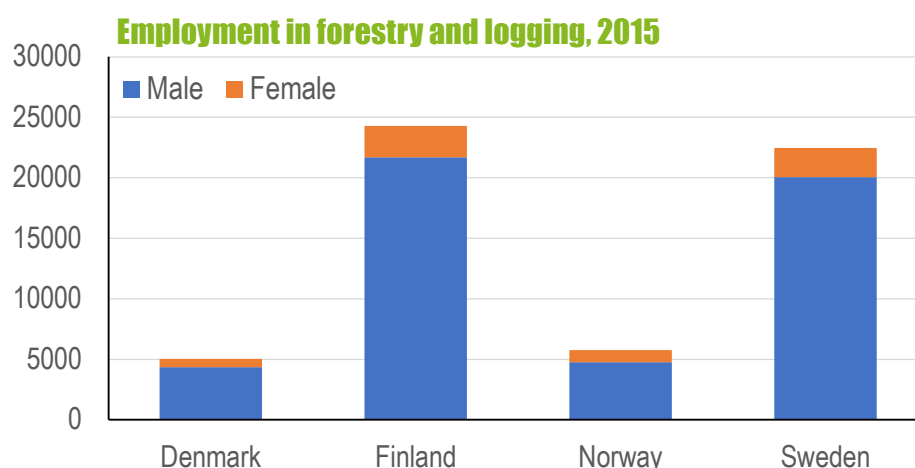


Figure 14. Employment in forestry and logging 2015, number of men and women Source: FRA 2020, database

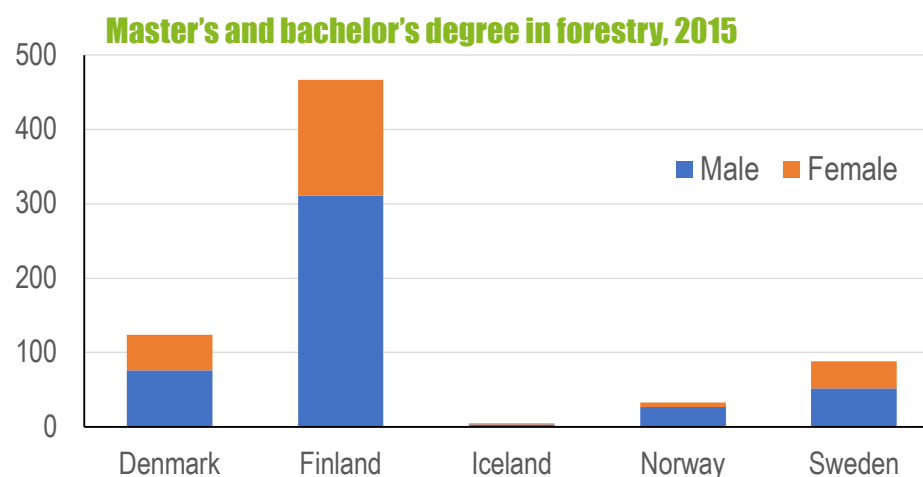


Figure 15. Master's and bachelor's degree in forestry 2015, number of men and women Source: FRA 2020, database

¹⁴Vennesland, B., Björnsdóttir, B., Dolling, A., Hujala, T., Nybakken, L., Strange, N., Hildebrand, S.M. 2020. Gender balance in the Nordic forest sector. SNS Nordic Forest Research.

3.10. Timber harvest

Timber harvests in the Nordic countries have trended upward for over a decade. In 2021, they reached their second-highest level on record at 149 million m³, substantially higher than their 30-average of 127 million m³ (Table 9, Figure 16). In 2021, removals of industrial roundwood in Sweden accounted for 52% of the total volume in the Nordics, followed by Finland (39%), Norway (8%) and Denmark (1%).

Harvest levels in Norway have jumped substantially in recent years with 2021 volumes being almost 30% higher than their 30-year average. Comparable increases in Finland and Sweden were 21% and 13%, respectively, while Denmark showed a slight decline.

Table 9. Timber harvests in the Nordic countries in 2021 and their 30-year average

	Harvest 2021 million m ³	30-y average million m ³	2021 vs. 30-y %
Denmark	1.6	1.6	-1
Finland	58.7	48.4	21
Norway	11.5	8.9	29
Sweden	77.0	68.1	13
Nordic	148.7	127.1	17

Note. Harvest data represents industrial roundwood removals (no logs for energy), measured as solid volume. Sources: Statistics Denmark, Statistics Norway, LUKE, Official Statistics of Sweden, UNECE and WRI est

Industrial roundwood supply from the Nordic countries accounted for about a third of Europe's total log supply in 2021. This share has been surprisingly stable over the past few decades despite substantial increases in timber harvests in Central Europe due to occasional storms and prolonged insect infestations for over 15 years.

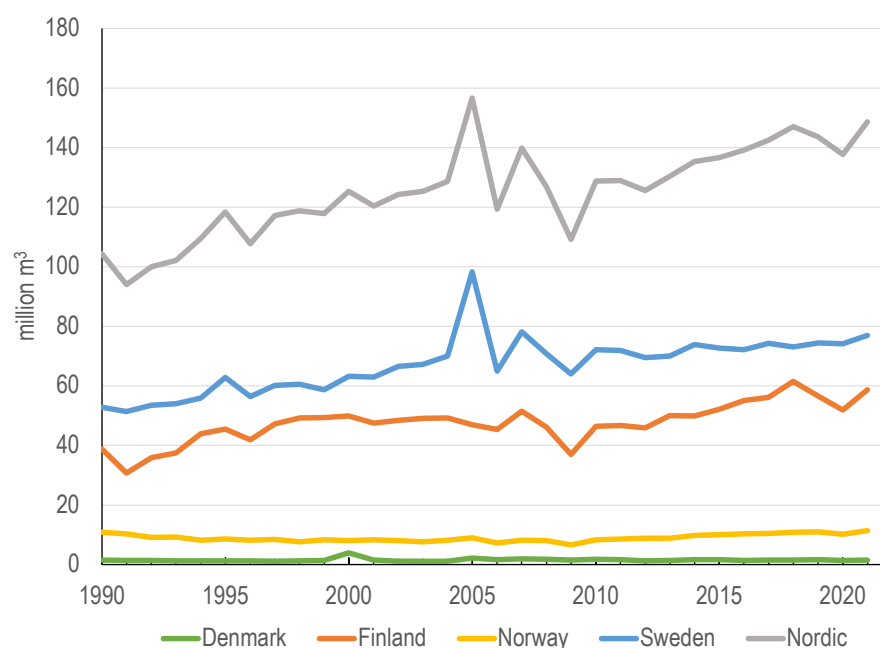


Figure 16. Timber harvest 1990-2021, solid volume. Sources: Statistics Denmark, Luke, Statistisk Sentralbyrå, Swedish Forest Agency, UN-ECE

3.11. Renewable and biomass energy

The Nordic countries all have a high share of consumed energy from renewable sources (hydropower, wind, solar, bioenergy and geothermal): In 2020, Iceland peaked with 84%, Norway with 77% and Sweden with 60%. In the EU, 22% of the consumed energy derived from renewable sources (Eurostat) (Figure 17).

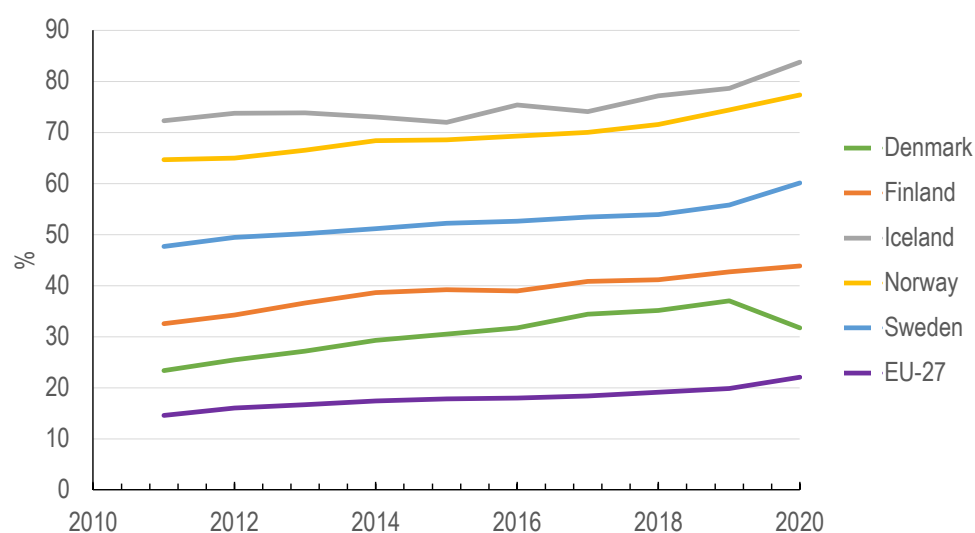


Figure 17. Share of energy consumption from renewable sources, all sectors.

Source: Eurostat



Forest bioenergy constitute a high share of the renewable energy in the Nordic countries, except in Iceland, which largely lack domestic bioenergy resources. Norway use relatively less bioenergy for a number of reasons: heating is primarily done with electrical power, the expansion of district heating is very modest, and the Norwegian forest industry is less developed than the forest industry in Sweden and Finland. In Denmark, Finland and Sweden, a large part of the bioenergy is used for district heating/cogeneration. In Denmark, condensation production with fossil fuels has also been converted to bioenergy, largely pellets. The forest industry in Finland and Sweden has a very large internal use of bioenergy, both solid by-products such as bark and shavings at sawmills, and black liquor in the pulp mills. All Nordic countries produce wood pellets but production is largest in Sweden, almost exclusively using sawdust and dry chips as raw material. Production of biofuels from forest raw materials is still in its infancy, apart from the production of biodiesel from tall oil in Sweden and Finland.

The share of bioenergy of final energy consumption is about the same in Sweden and Finland (41%), with Denmark in third place (33%) (Figure 18). The share of forest bioenergy is the largest in Finland (36%).

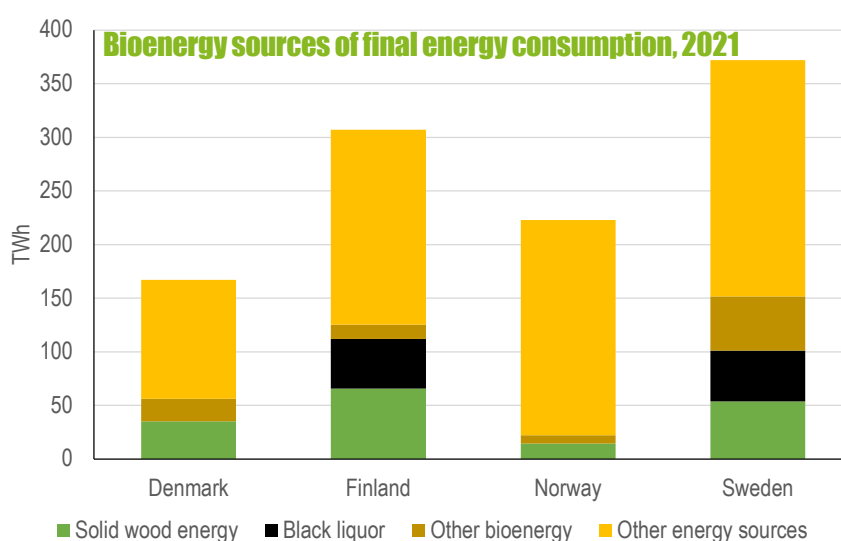


Figure 18. Final energy consumption in 2021, and the share of bioenergy.

Solid wood energy include primary forest energy (harvesting residues), biproducts from forest industry (sawdust), pellets and fuelwood. Black liquor is energy from pulpmills, mostly used in the forest industry itself. Sources: Swedish Energy Agency, Statistisk Sentralbyrå (Norway), Statistics Finland, Luke and Energistyrelsens energistatistik (Denmark).

In Finland and Sweden, a large share of the final energy consumption (15% and 13%, respectively) is composed of waste products in pulp production (black liquor). The solid wood energy is either forest industry biproducts (chips from e.g. sawmills) or primary wood energy (harvesting residues) (Table 10).

Table 10. Wood energy sources 2021, TWh

	Denmark	Finland	Norway	Sweden
Final energy consumption	167	307	223	372
Solid wood energy	35.2	65.7	14.4	53.6
- of which forest industry bi-products and pellets	18.4	29.2	5.6	29.2
- of which primary wood energy (residues and firewood)	16.8	36.2	8.2	23.2
Black liquor, forest industry	-	46.2	-	47.6
Recovered wood	2.0	2.2	?	8.6

Sources: see Figure 18

Figure 19 shows the share of energy sources of total energy supply (which is higher than the final consumptions as it includes e.g. heat losses from nuclear power) in each Nordic country and Europe. It shows that the role of bioenergy has increased at the expense of oil and coal.

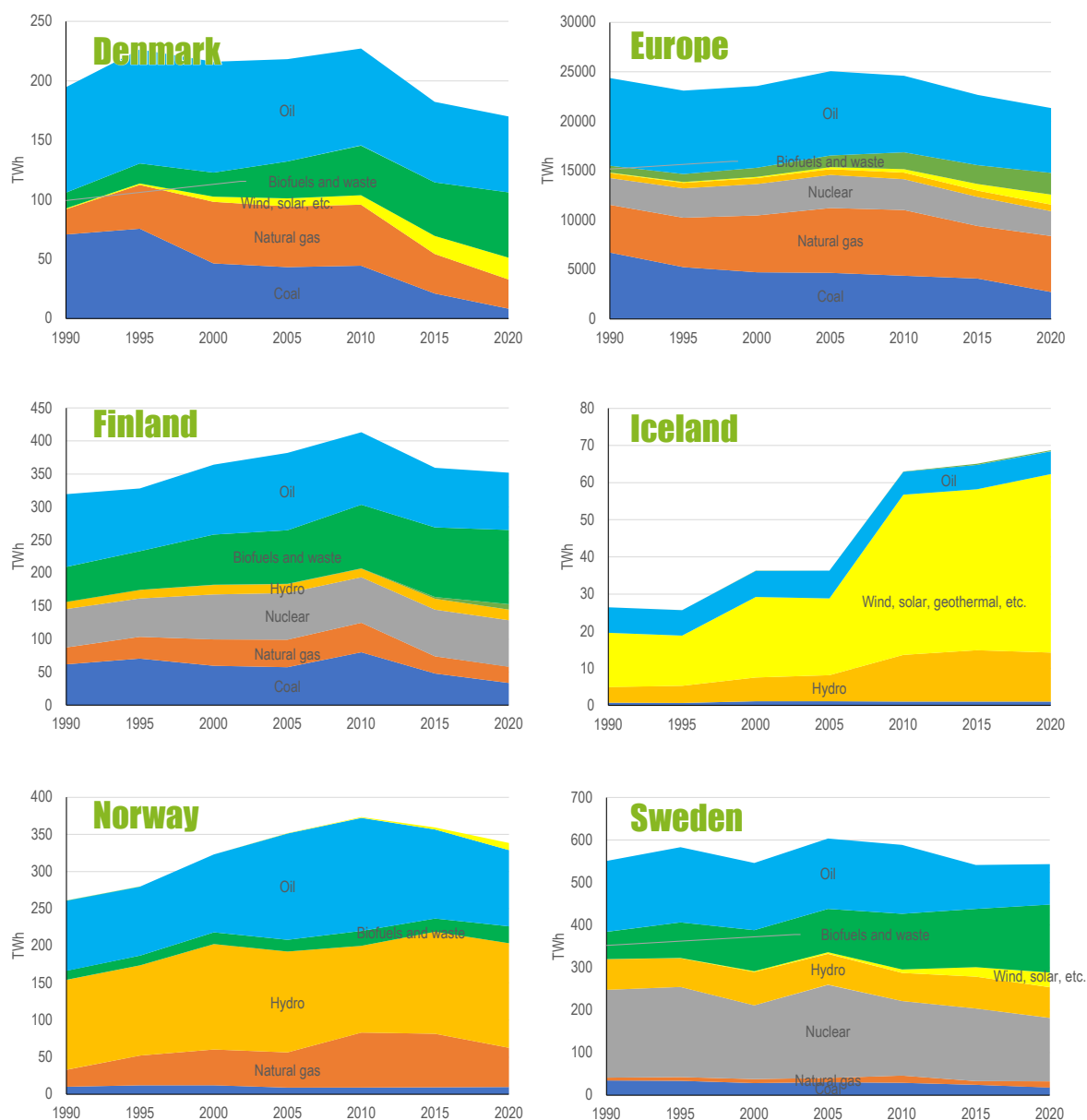
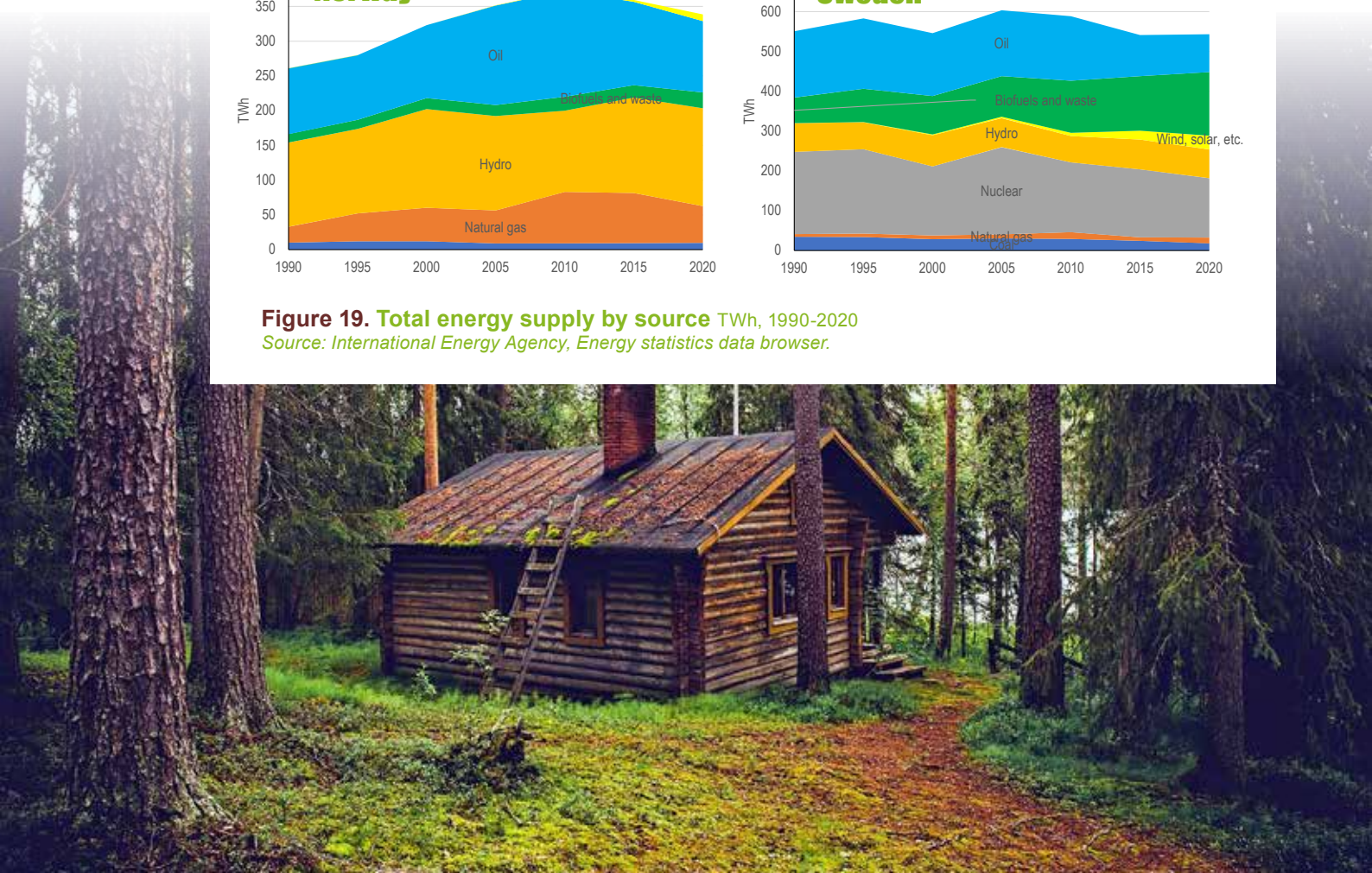


Figure 19. Total energy supply by source TWh, 1990-2020

Source: International Energy Agency, Energy statistics data browser.



4. Forest industry production, export and import

Global demand for forest products, including sawnwood, panels, pellets, pulp and paper is increasing and the forest industry in Northern Europe plays a vital role as a supplier of forest products to the rest of Europe and overseas markets in Asia, the US, northern Africa, and the Middle East. The Nordic countries account for about 16% of globally exported softwood sawnwood, 16% of exported paper products and 14% of exported wood pulp (higher share of softwood pulp). As a result of actively managed forests, efficient manufacturing facilities and competitive wood raw-material costs, pulp production levels and export volumes have increased faster in the Nordic countries than globally the past decade. Only pulp shipments from Latin America have grown more quickly.

Exports of softwood sawnwood has also gone up in the Nordic region but at a slower rate as compared to the global trend. From 2012 to 2021, the export volume from Finland, Norway and Sweden rose by 15%, as compared to Eastern Europe (+58%), Russia (+52%), Western Europe (+49%), Russia (+18%), and North America (-20%). Finland and Sweden both belong to an exclusive group of the top-7 biggest exporters of softwood sawnwood, wood pulp and paper products (Figure 21). Finland and Sweden are the world's third and fourth largest paper exporters, the fifth and third-ranked sawnwood exporter, and the fifth and sixth biggest pulp supplier.



4.1. Top-7 countries in the world

The USA had the highest production of sawnwood in 2021, but Russia and Canada had the largest export (Figure 20). Sweden was the third largest exporter of sawnwood. The USA is also the leading pulp producer in the world, followed by Brazil. However, Brazil was the largest pulp exporter in 2021. Finland and Sweden ranked fifth and sixth of the world's pulp manufacturers. Most paper is produced in China, followed by the USA. The highest paper export comes from Germany and USA, followed by Finland and Sweden. About 16% of the world's total paper export were shipped from Finland and Sweden.

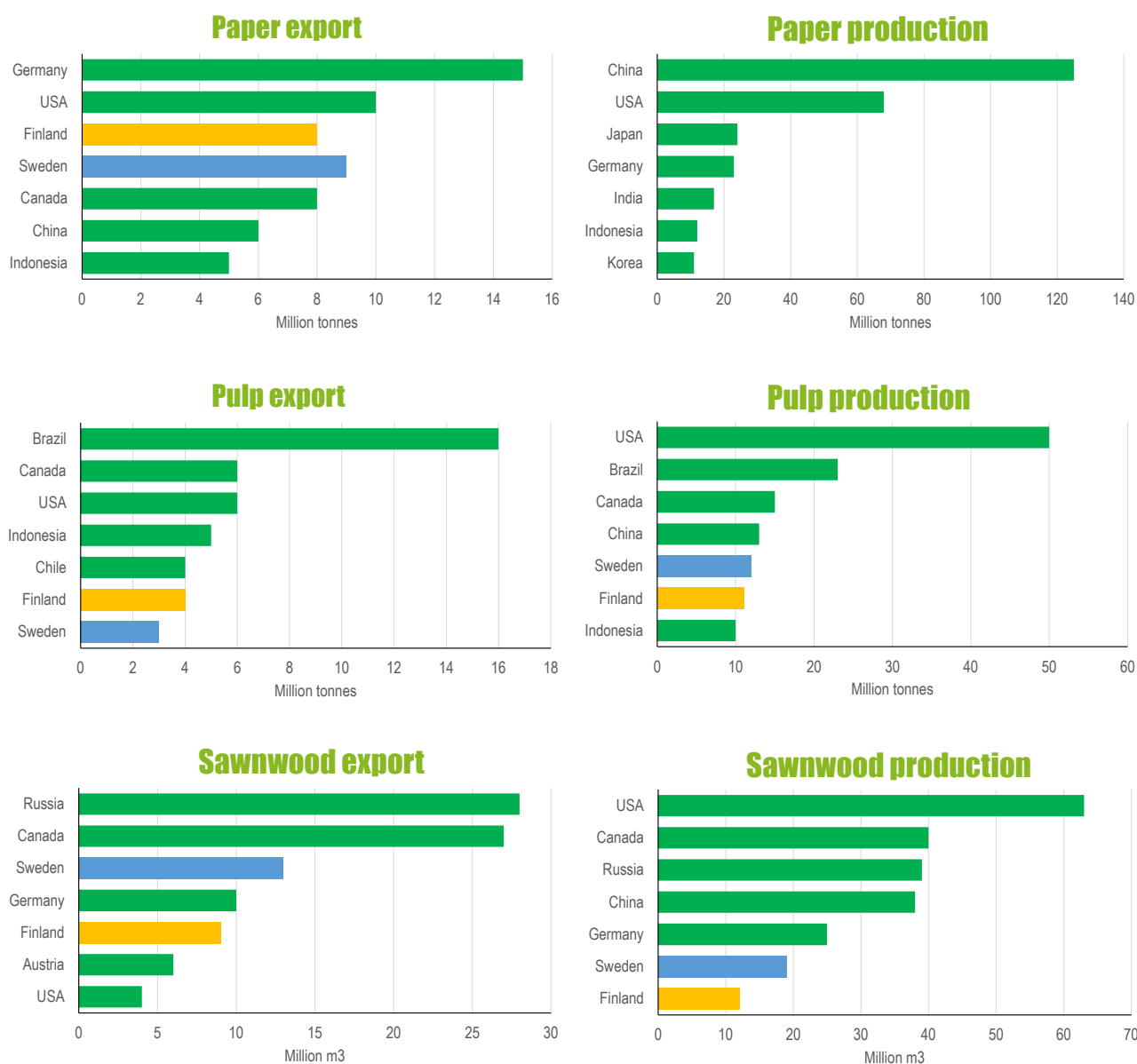


Figure 20. Top-7 countries in forest industry production and export in 2021

Source: UN-ECE and WRI



4.2. Softwood sawnwood production

The Nordic countries produced a record-high 34.0 million m³ of softwood sawnwood in 2021 (Figure 21-22). This can be compared with an average of 31.7 million m³ annually for the past ten years. Production levels were at all-time highs in Finland, Norway, and Sweden in 2021 with the Norwegian sawmill sector having increased the most the past decade. The production in Sweden reached 19.0 million m³, accounting for 56% of the total volume in the region, followed by Finland (35%), Norway (8%), and Denmark (1%). The shares have been practically unchanged over the past decade.

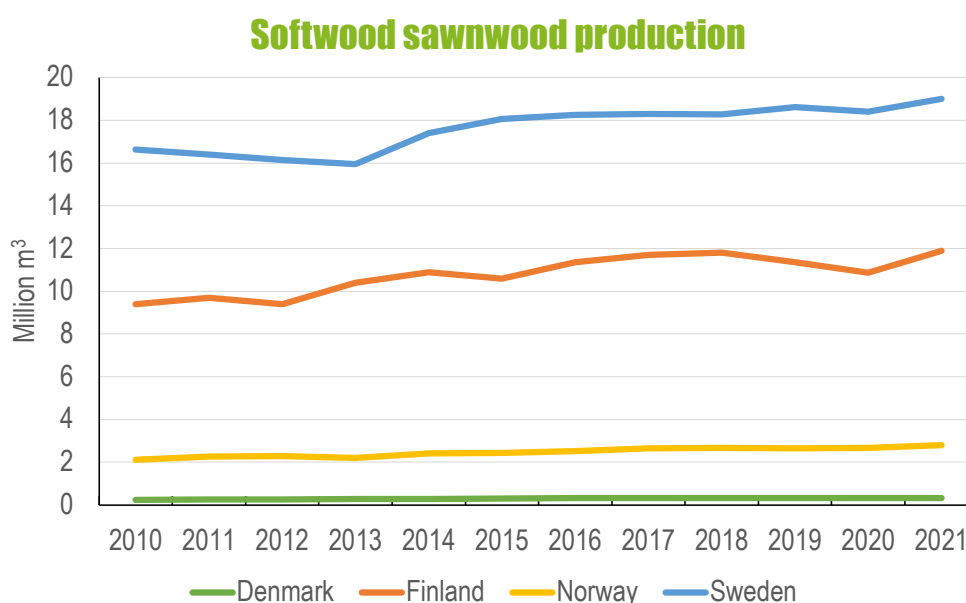


Figure 21. Softwood lumber production in the Nordic countries 2010-2021
Source: UN-ECE

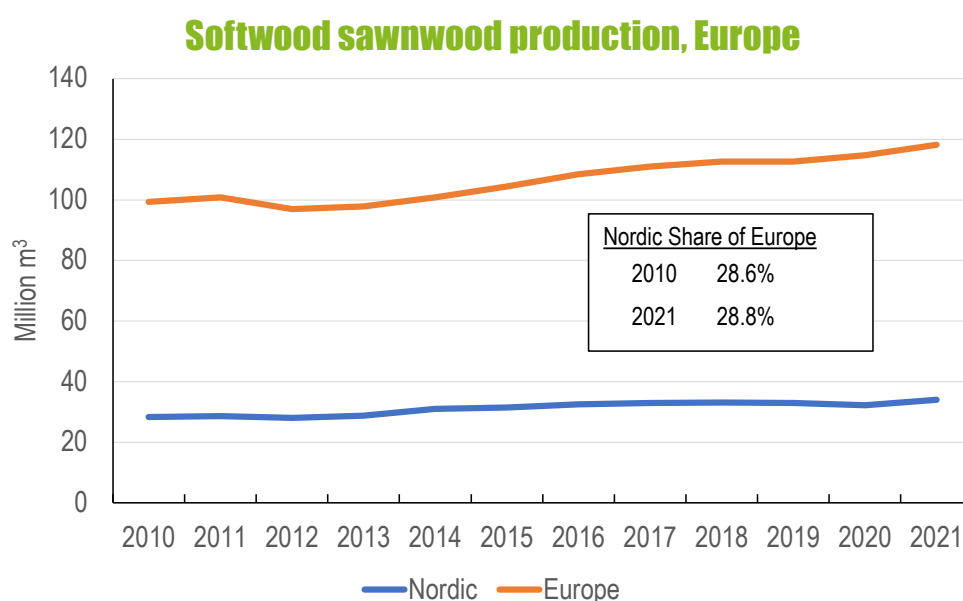


Figure 22. Total softwood sawn wood production in the Nordic countries and Europe, 2010-2021
Source: UN-ECE

4.3. Wood pellet production

Wood pellet production in the Nordic countries grew fast from 2012 to 2016 (up 53%), when it peaked at 2.4 million tonnes (Figure 23). During the following five years, output fell to 2.2 million tonnes annually and then climbed back to 2.4 million tonnes in 2021. Sweden remains the major pellet producer in Northern Europe, accounting for 78% of the total production in 2021.

The Nordic countries' share of European pellet production has fallen from about 20% to 11% in ten years as expansion in pellet capacity has grown faster in the rest of Europe (Figure 24).

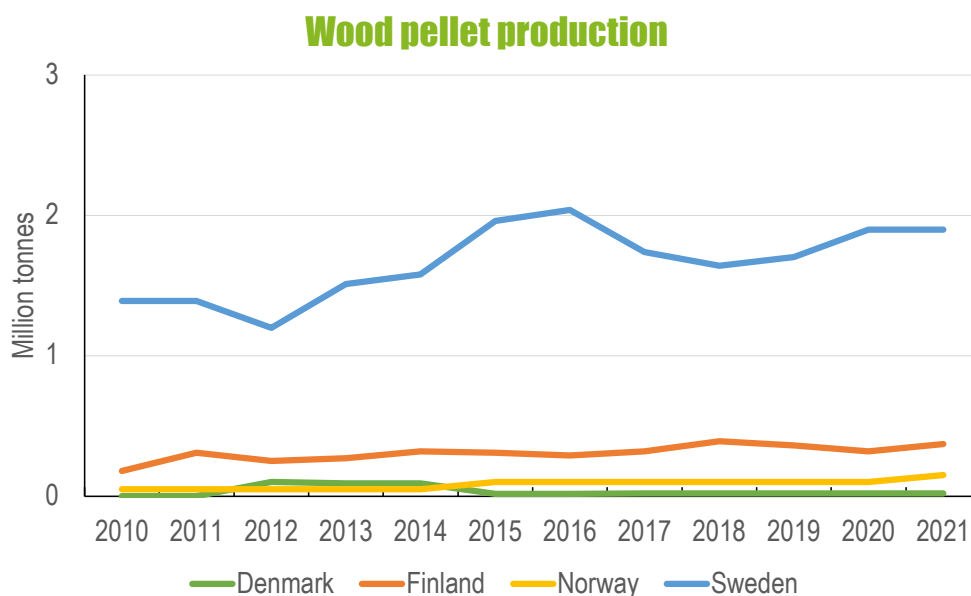


Figure 23. Wood pellet production in the Nordic countries, 2010-2021

Source: UN-ECE

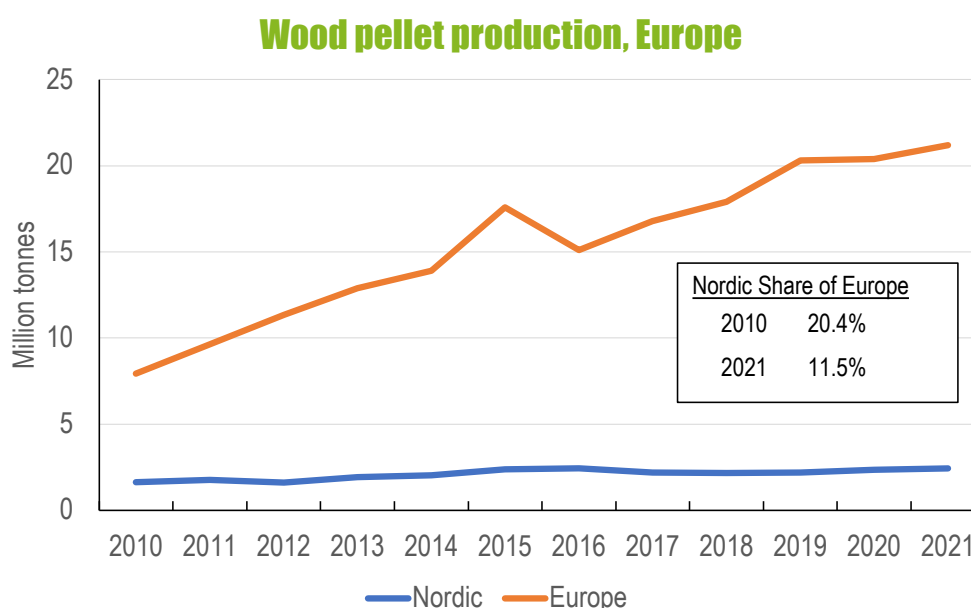


Figure 24. Total wood pellet production in the Nordic countries and Europe, 2010-2021

Source: UN-ECE

4.4. Wood-based panel production

Production of wood-based panels, including plywood, OSB, particle board, and fiberboard, increased 6% year-over-year in 2021 to 2.7 million m³ (Figure 25). This level was within the narrow range of the past ten years, that was 2.6 to 2.8 million m³ annually. The panel sector is relatively small in the Nordic countries, with the total production accounting for less than four percent of Europe's total panel production (Figure 26). Finland produces almost half of the volume manufactured in the Nordic region, most of which is plywood.

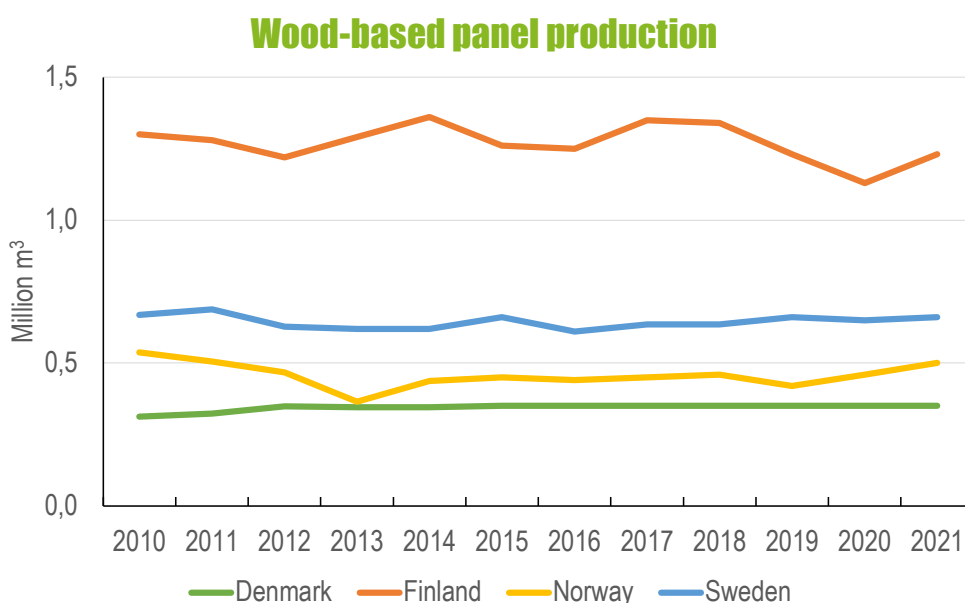


Figure 25. Wood-based panel production in the Nordic countries, 2010-2021
Source: UN-ECE

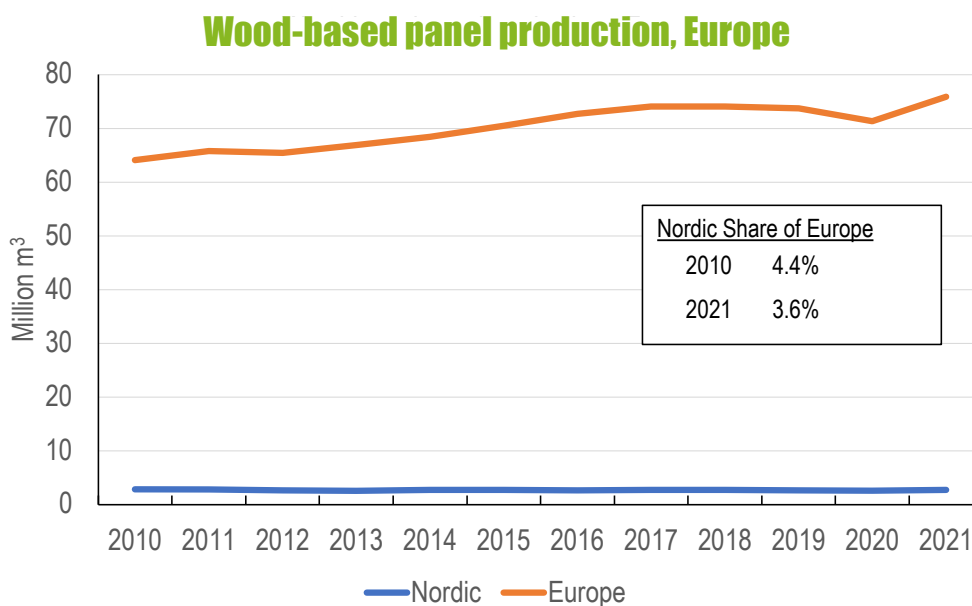


Figure 26. Total wood-based panel production in the Nordic countries and Europe, 2010-2021
Source: UN-ECE

4.5. Wood pulp production

As much as sixty percent of all pulp produced in Europe is made in the Nordic countries, predominantly in Finland and Sweden (Figure 27-28). In 2021, the region's output was 24.1 million tonnes, slightly higher than in 2020 and close to the annual average for the past decade. Production in Sweden has been close to 12 million tonnes annually for most of the past ten years, while Finland's pulp industry has manufactured about 11 million each year. Norway has seen a shrinking pulp sector mainly due to declining demand for newsprint. In 2010, pulp production in Norway was just over two million tonnes, and by 2021, it had declined by 50%.

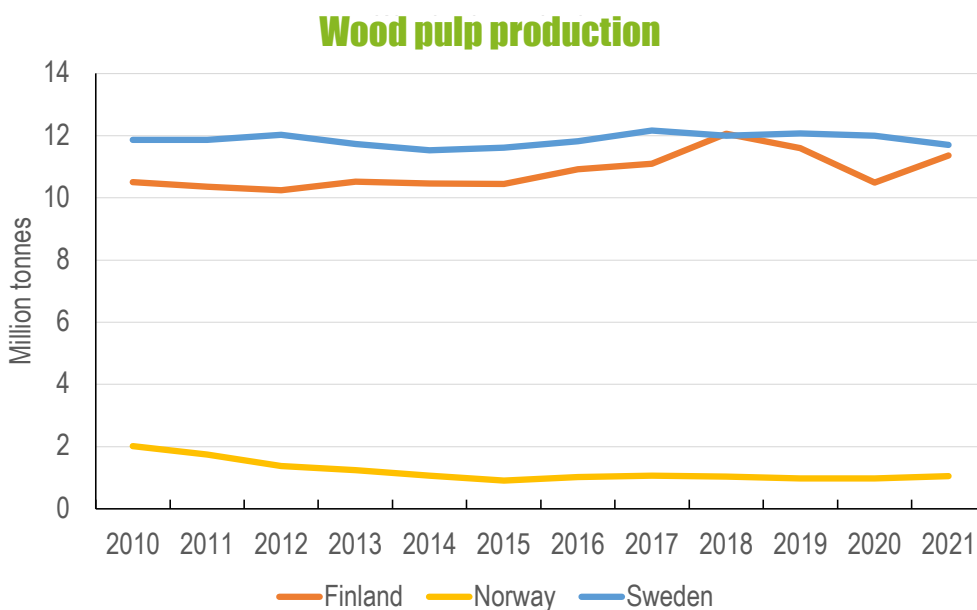


Figure 27. Wood pulp production in the Nordic countries, 2010-2021

Source: UN-ECE

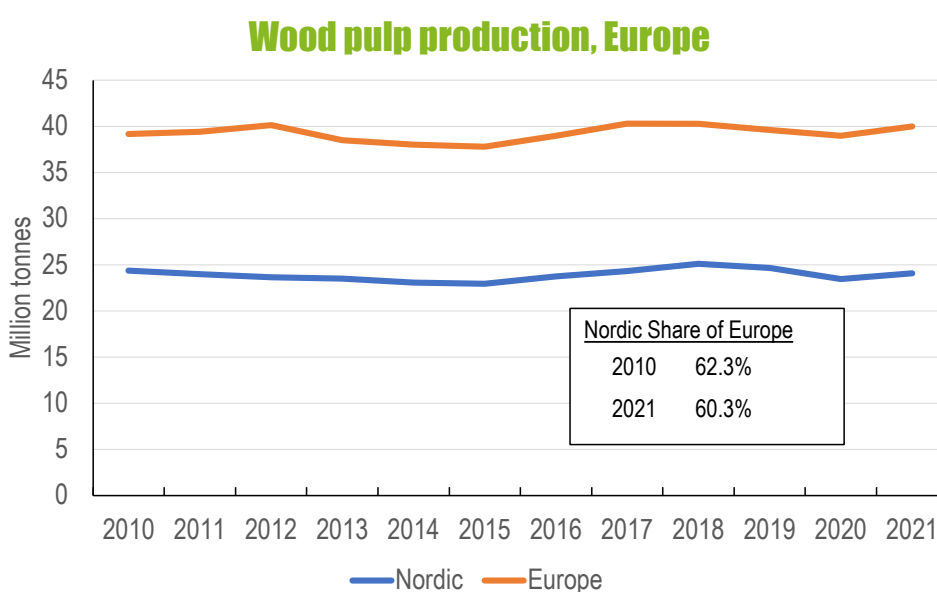


Figure 28. Total wood pulp production in the Nordic countries and Europe, 2010-2021

Source: UN-ECE

4.6. Paper production

Nordic production of paper and paperboard increased slightly in 2021 to 18.6 million tonnes, following a long-term downward trend (Figure 29-30). Most of the decline has been in newsprint and office papers, while the manufacturing of most hygiene and paperboard grades have increased. The year-over-year output was up in Finland and Norway by 6% and 9%, respectively, while manufacturing in Sweden was down by 4% to its lowest level in over ten years. The manufacturing of paper products has also fallen in the rest of Europe but not at the same pace as in the Nordic countries. As a result, the Nordic's share of the total paper production in Europe has fallen from about 24% to 19% over the past decade.

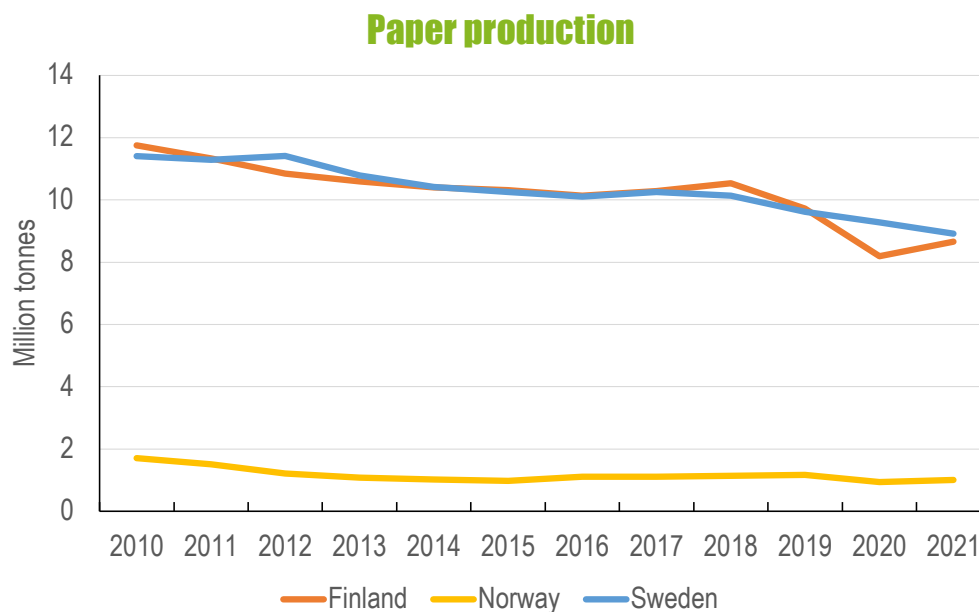


Figure 29. Paper production in the Nordic countries, 2010-2021
Source: UN-ECE

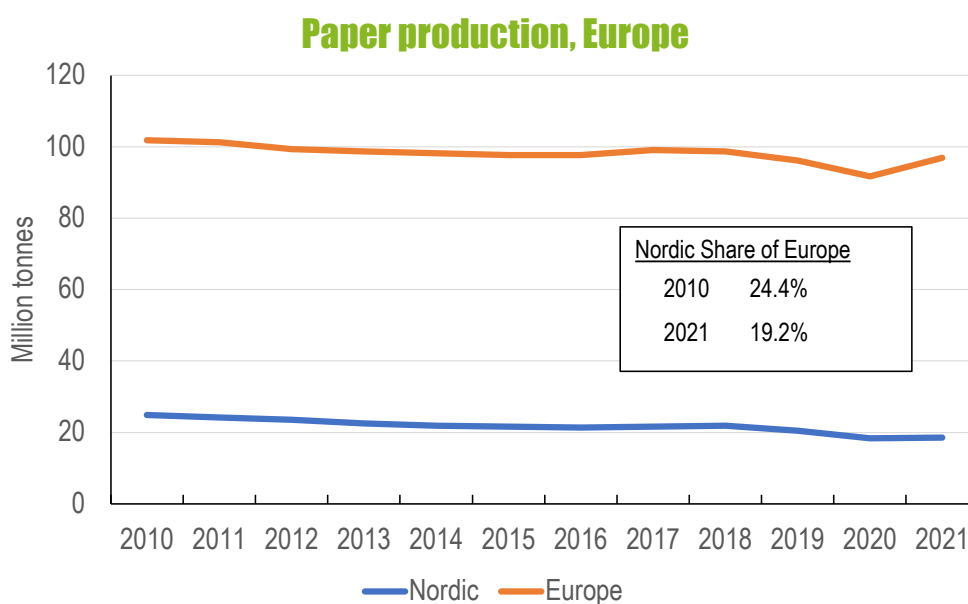


Figure 30. Total paper production in the Nordic countries and Europe, 2010-2021
Source: UN-ECE

4.7. Roundwood trade

The Nordic region has been a significant net importer of softwood and hardwood logs for a long time. In 2021, total log imports were 13.6 million m³, with hardwood species accounting for about 55%. The most significant intra-regional trade has been of logs from Russia to Finland and from Norway to Sweden. The primary log import flows to the Nordic countries in 2021 were:

- Hardwood logs to Finland from Russia (4.7 million m³)
- Softwood logs to Sweden from Norway (2.6 million m³)
- Hardwood logs to Sweden from Latvia (0.8 million m³)
- Softwood logs to Sweden from Finland (0.7 million m³)
- Hardwood logs to Sweden from Estonia (0.6 million m³)
- Softwood logs to Finland from Russia (0.6 million m³)

Finnish pulp mills and sawmills have long depended on imported wood raw materials to meet their wood fibre needs. In 2021, as much as 23% of the pulp sector relied on foreign logs and wood chips, predominantly from neighbouring countries. However, Finland's wood raw-material imports from Russia fell dramatically in 2022 following many years of active trade between the two countries. In 2021, Russia stopped softwood log exports in January 1, 2022, to support the domestic forest industry with lower-cost wood raw-material. Hardwood logs and wood chips were exempted from that export ban. However, when Russia invaded Ukraine, Finland, like most European countries, boycotted the importation of Russian goods, including forest products. As a result, trade started to dwindle between Russia and Finland and by the 3Q, shipments were down to zero. In 2022, the total imports will likely be down almost 60% from 2021, with hardwood log supply declining even more (a 70% drop).

Sweden is the biggest importing country in Northern Europe, which in 2021 imported almost 4.0 million m³ of softwood logs and 2.3 million m³ of hardwood logs (Figures 31-34). Most of the wood originated from countries in the Baltic Sea region. The largest trading partners in 2021 were Norway (44%), Latvia (19%), Estonia (12%), and Finland (12%).

Norway exported one-third of its harvest in unprocessed form to sawmills and pulp mills in neighboring countries in 2021 (Figures 35-36). No other country in Europe exported such a large share of its roundwood removals. Norway is currently Europe's third biggest log exporter, notwithstanding that it ranks only as the 13th largest log producer. In 2021, Norway increased softwood log exports by 10% y-o-y to 3.7 million m³, the second-highest level on record.

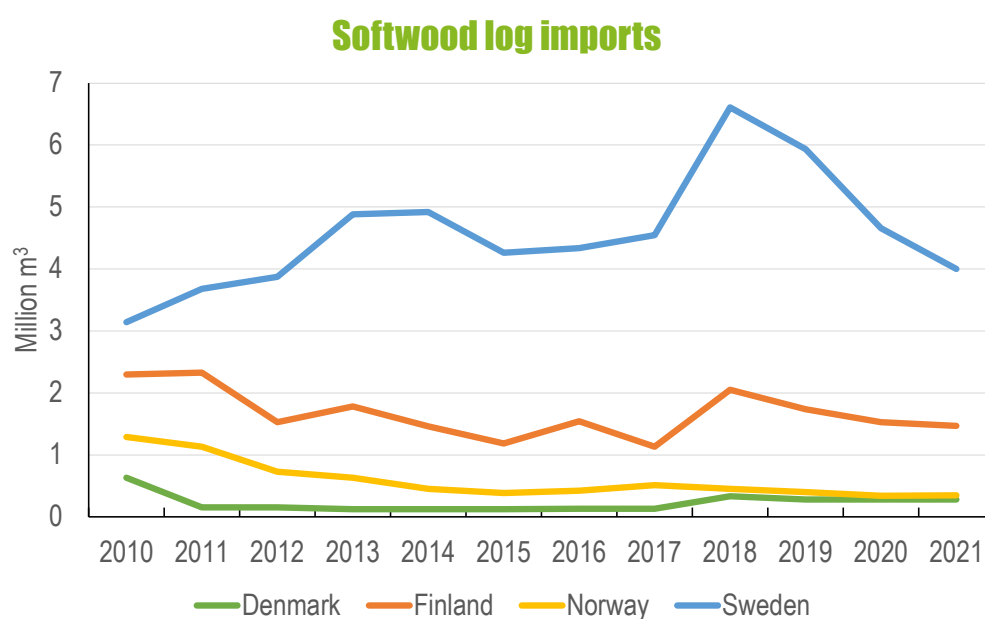


Figure 31. Softwood log imports in the Nordic countries, 2010-2021

Source: UN-ECE

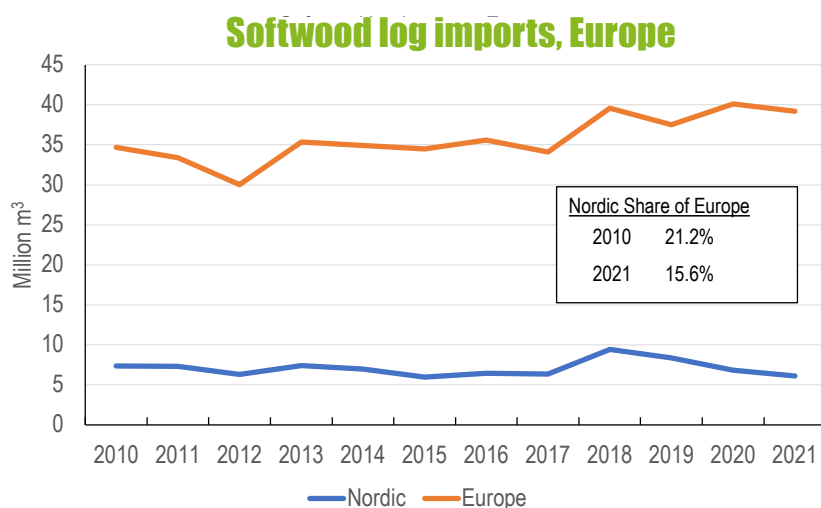


Figure 32. Total softwood log imports in the Nordic countries and Europe, 2010-2021 *Source: UN-ECE*

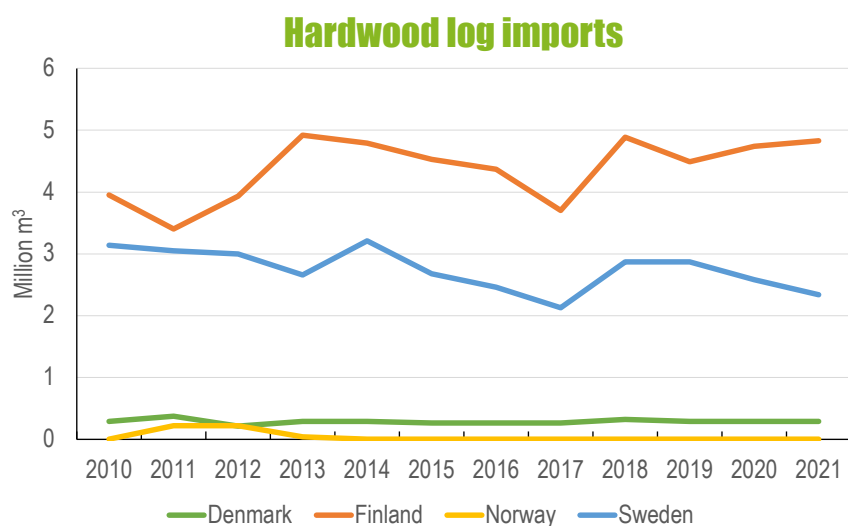


Figure 33. Hardwood log imports in the Nordic countries, 2010-2021 *Source: UN-ECE*

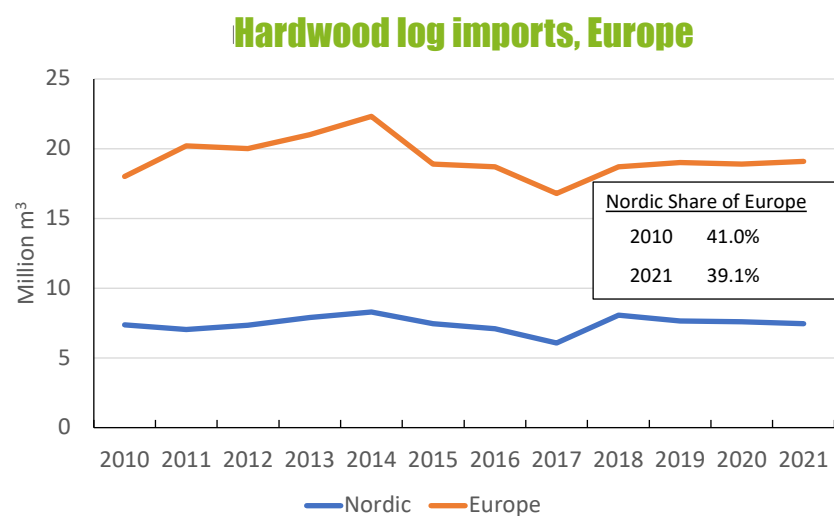


Figure 34. Total hardwood log imports in the Nordic countries and Europe, 2010-2021 *Source: UN-ECE*

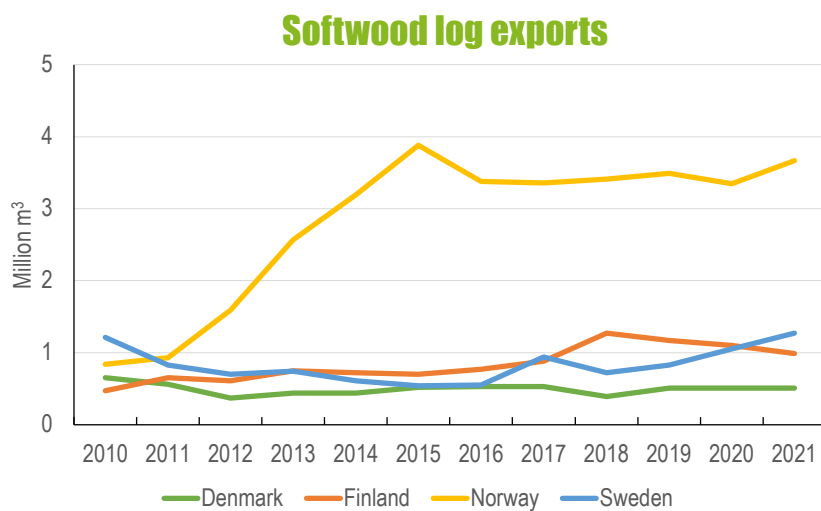


Figure 35. Softwood log exports in the Nordic countries, 2010-2021 *Source: UN-ECE*

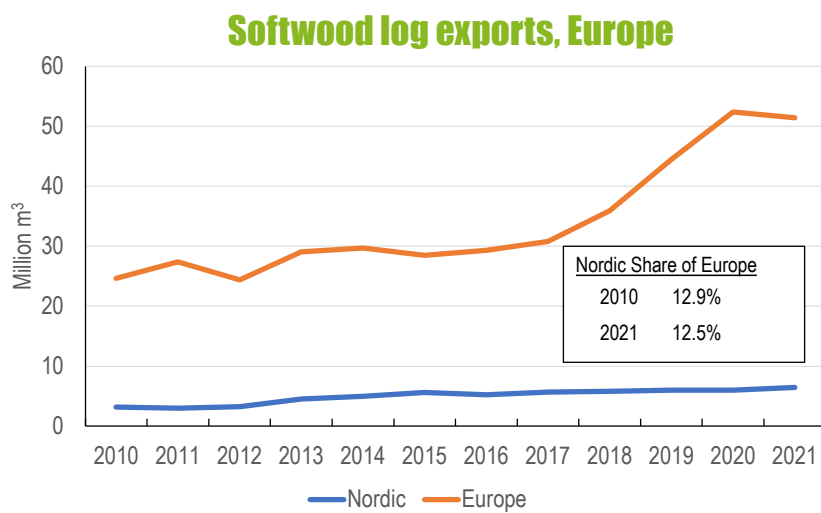


Figure 36. Total softwood log exports in the Nordic countries and Europe, 2010-2021 *Source: UN-ECE*



4.8. Softwood sawnwood exports

About 38% of European softwood lumber exports are from sawmills in the Nordic countries, down from a peak of 45% in 2016 (Figures 37-38). In 2021, the total volume from the sub-region reached 22.1 million m³, a decline of five percent from the previous year. Sweden shipped 12.6 million m³, Finland 8.7 million m³, Norway 700,000 m³, and Denmark an estimated 80,000 m³. Over the past seven years, exports from the four countries were fairly stable at between 22 and 23 million m³ annually. These volumes can be compared to the previous seven-year period when the range fluctuated between 18 and 20 million m³.

Sweden is the largest softwood lumber exporter in Europe. In 2020, a record 14 million m³ was shipped from the country, but volumes fell over 10% the following year as European demand weakened. During the first nine months of 2022, the export markets were mixed with strengthening demand for Swedish lumber in the US (+58% y-o-y), China (+47%), and the Middle East and North Africa region (+23%), while sales to Europe were down 9%.

Finland ranked third of the lumber-export countries in Europe and was the only country in northern Europe that expanded shipments in 2021. Export volumes grew 6.3% y-o-y to 8.7 million m³, higher than its 10-year average. Unlike Sweden, Finland increased shipments the most to European countries, including the United Kingdom, France, Germany, and Estonia.

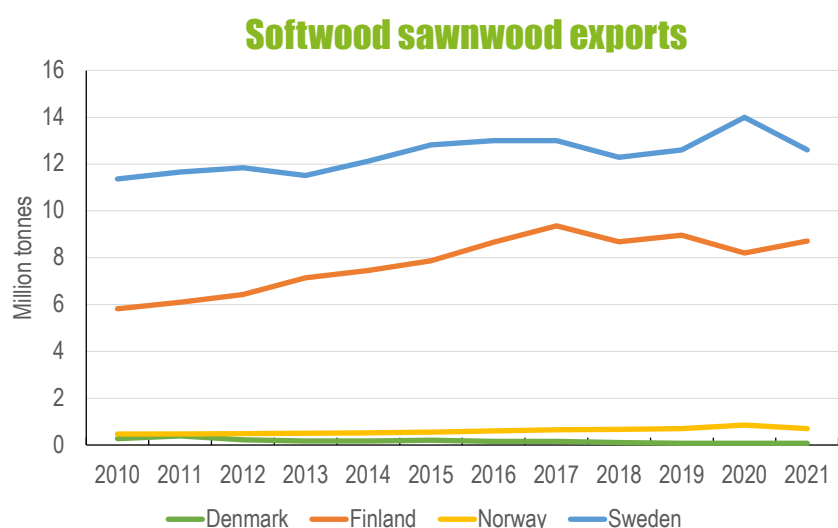


Figure 37. Softwood lumber exports in the Nordic countries, 2010-2021 Source: UN-ECE

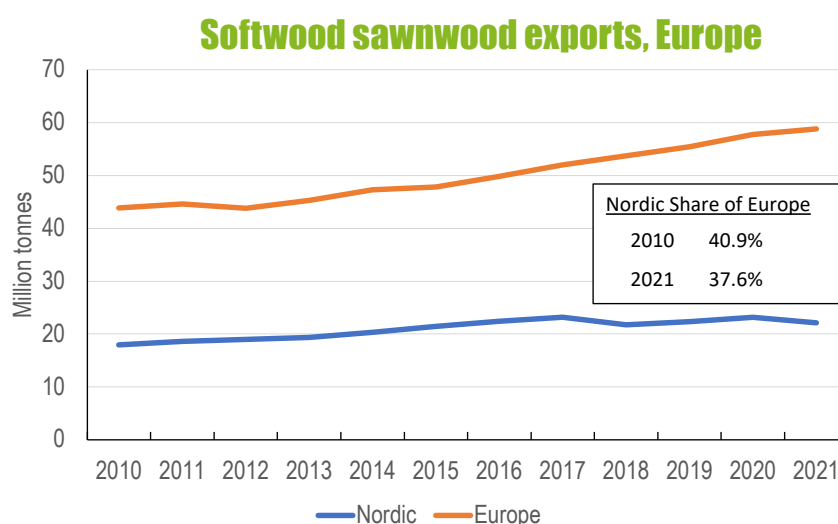


Figure 38. Total softwood lumber exports in the Nordic countries and Europe, 2010-2021 Source: UN-ECE

4.9. Wood pulp export

Pulp exports from Finland and Sweden have gone up 65% and 25%, respectively the past decade, while shipments from Norway fell 27% during the same period (Figures 39-40). Total pulp volumes from the Nordic countries rose from 6.6 million tonnes in 2012 to just over 9.0 million tonnes in 2021, close to the highest on record. The Nordic pulp industry has expanded not only in export volumes but also in its share of Europe's total shipments. In 2021, this share was 58%, up from 48% in 2012.

The most significant change in export sales came for Finland and Sweden in 2019 when the total shipments for the two countries jumped from an average of 6.4 million tonnes per year for the period 2010-2018 to 8.7 million tonnes annually during 2019-2021. Much of the recent increase has resulted from higher demand for softwood pulp in China and the US. In 2021, the major destinations for pulp from the Nordic countries were China (24%), the Netherlands (13%), Germany (12%), and Italy (6%).

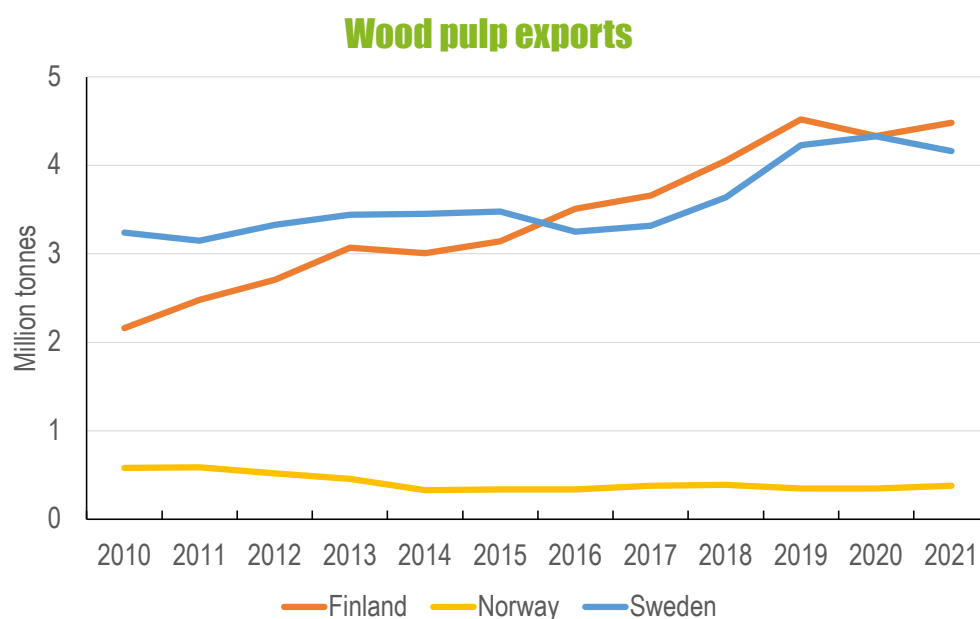


Figure 39. Wood pulp exports in the Nordic countries, 2010-2021 Source: UN-ECE

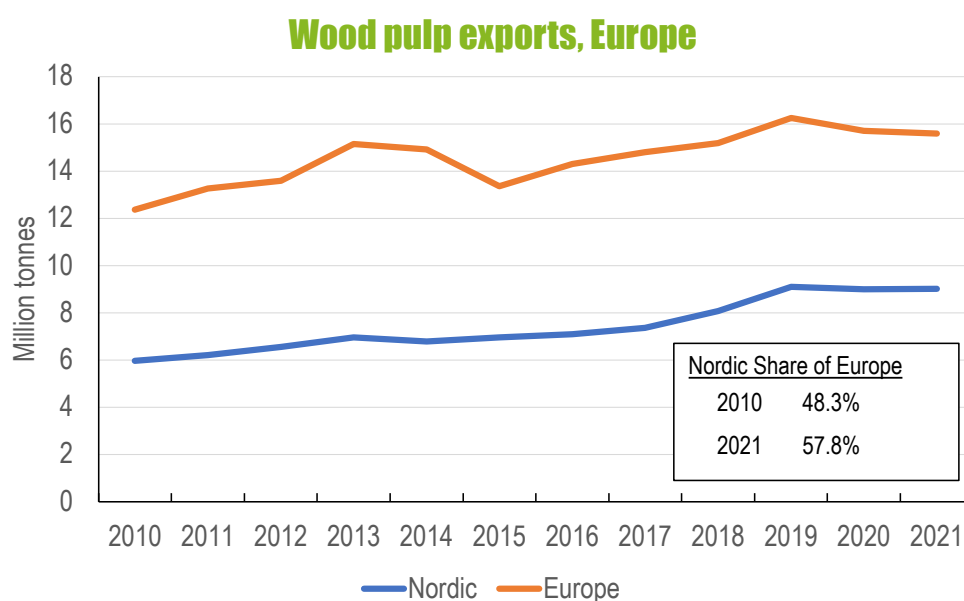


Figure 40. Total wood pulp exports in the Nordic countries and Europe, 2010-2021 Source: UN-ECE

4.10. Paper export

Paper producers in the Nordic countries have for a long time been major suppliers of paper products to the European market (Figures 41-42). In 2012, about 33% of Europe's paper exports were from Finland, Norway, and Sweden. Ten years later, the share had fallen to 29%, mainly driven by lower demand for newsprint, printing and writing paper. Although paper shipments from the Nordic countries increased y-o-y in 2021 to 18.6 million tonnes, they were still seven percent below their ten-year averages. The most significant declines during the past decade have been in Finland (-11%) and Norway (-5%).

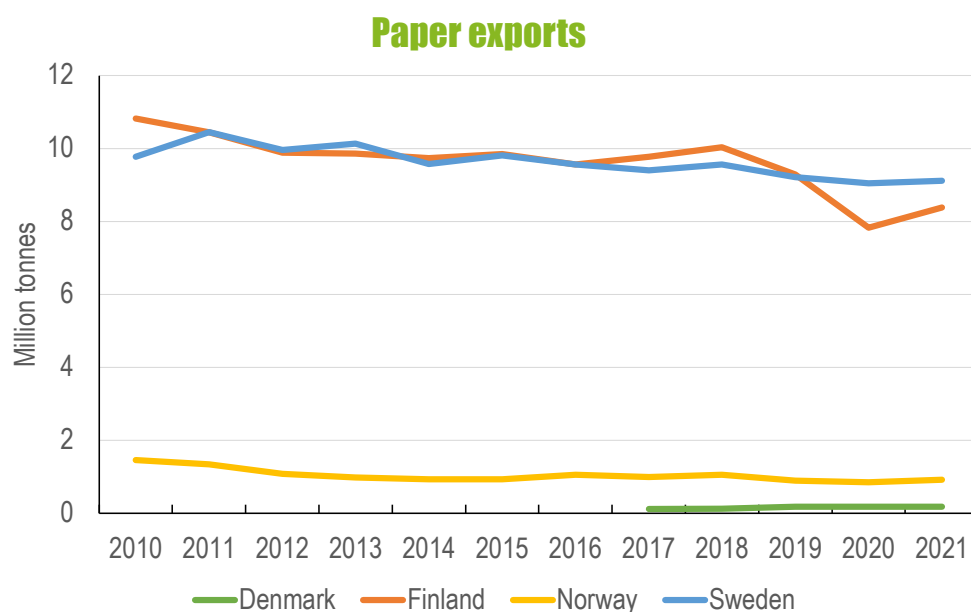


Figure 41. Paper exports in the Nordic countries, 2010-2021 Source: UN-ECE

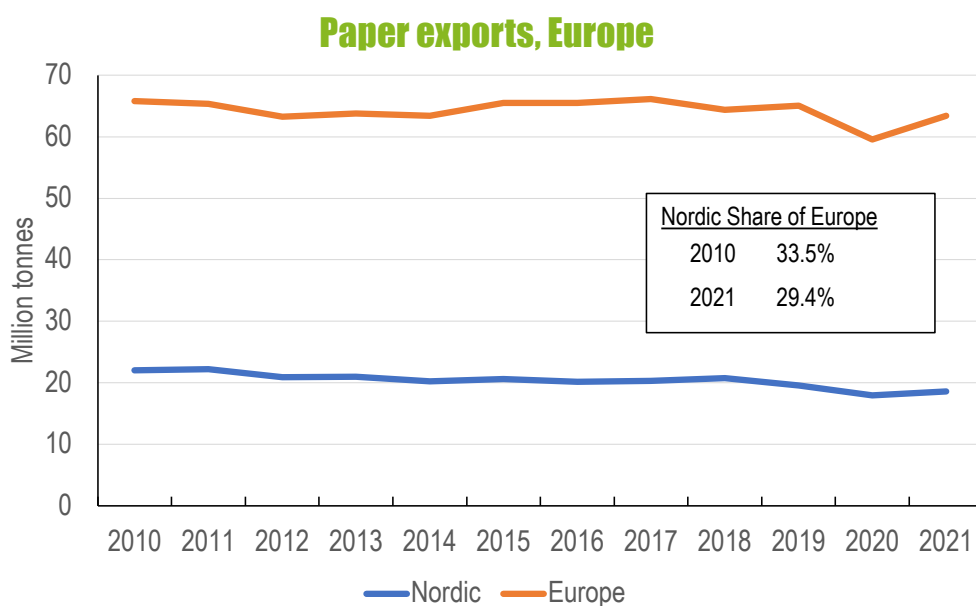


Figure 42. Total paper exports in the Nordic countries and Europe, 2010-2021 Source: UN-ECE

5. Wood raw-material prices

The cost of wood raw material is the factor that often determines the competitiveness of a pulp manufacturing plant or a sawmill. Depending on the product grade and market conditions, these costs vary between 45-75% of the total production cost. This section reports prices for sawlogs and pulplogs delivered to manufacturing plants for the major producing countries over the past decade. The country-wise average prices are compared to the European Sawlog Prices Index (ESPI) and the Global Wood Fiber Prices Indices for softwood and hardwood fiber.



5.1. Softwood sawlog prices

European sawlog prices have seen unprecedented increases over the past few years. In 2019, log prices converged throughout Europe and ranged between €70-80/m³. Some of the recent drastic shifts in pricing can be explained by the Covid-19 pandemic beginning in 2020 and the fact that 2019 was the harvest peak of beetle-killed forests in Central Europe. With strong demand and high prices of lumber during the COVID pandemic, sawlog prices surged, and all-time highs were reached in late 2021 and early 2022 (Figure 43). The log costs have increased at different paces over the past few years, with the most significant increase occurring in Central and Eastern Europe. At the same time, the sawmills in the Nordic countries experienced more modest log cost gains. The price discrepancy between the lowest and highest cost regions has risen from just over €10/m³ in 2020 to about €50/m³ in 2022, with Central Europe consistently having the highest log prices, averaging ~€130/m³ in 2022, and the Nordic countries the lowest on the continent at about €85/m³.

Sawlog prices in countries around the Baltic Sea have tracked each other closely for most of the past 20 years. In the first decade, sawlog prices in the Nordic countries were paid at a premium over other regions, and in the following decade, the Southeastern markets (the Baltic States and Poland) had the highest log costs. However, in 2021 the relatively small price discrepancy between the countries in the Baltic Sea region changed when the log costs in the south-eastern countries rose considerably to record high levels, while the price increases in the Nordic countries were more modest.

Of all the timber markets in Europe, Finland and Sweden have experienced the smallest price increases in their local currencies in the past two years. The two countries saw increases of about 20%, unlike the Baltic States and Central Europe, where they grew by about 70% and 90%, respectively.

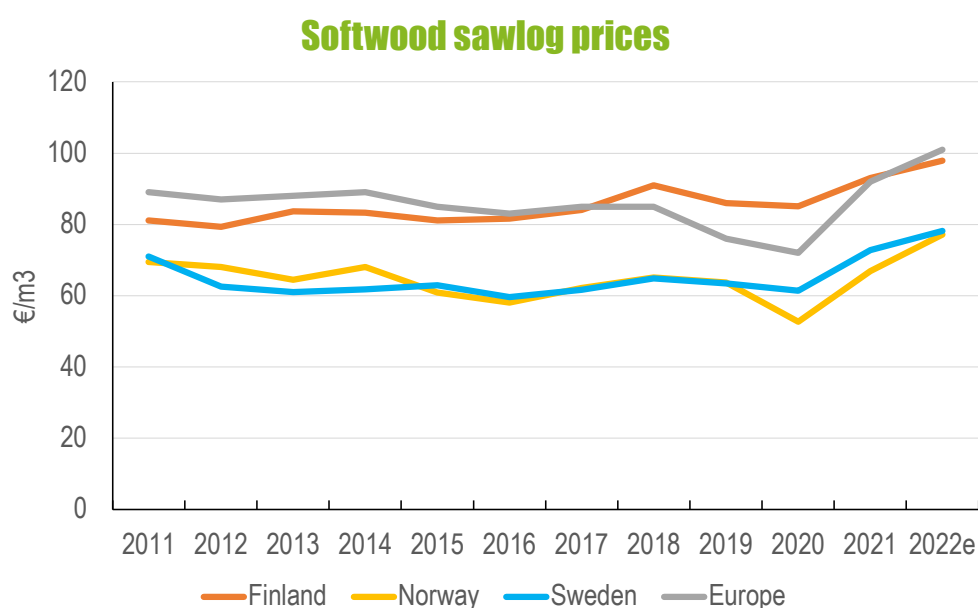


Figure 43. Softwood sawlog prices, €/m³, in the Nordic countries and Europe. 2022 based on Q1-Q3 *Source: Wood Resource Quarterly*

5.2. Pulpwood prices

The costs of wood fibre for pulp manufacturing have trended upward worldwide in 2021 and 2022 (Figures 44-45). Tight wood fibre supply, low pulp inventories, and record high market pulp prices have pushed the prices for pulplogs and wood chips up to the highest in almost ten years.

From early 2021 to late 2022, the two global wood fibre price indices, the Softwood Fiber Price Index (SFPI) and the Hardwood Fiber Price Index (HFPI), did go up by 14% and 20%, respectively. The biggest jumps in softwood fibre costs have occurred in Western North America, Central Europe, and Latin America, while hardwood fibre costs have gone up the most in Europe and Latin America. Pulplog prices have also gone in the Nordic countries but at a slower rate than the global price indices. In 2022, average softwood and hardwood prices (in Euros) in Finland and Sweden were at the highest levels in about ten years. Prices in Norway were the lowest in the Nordic countries but still above the country's average for the past decade.

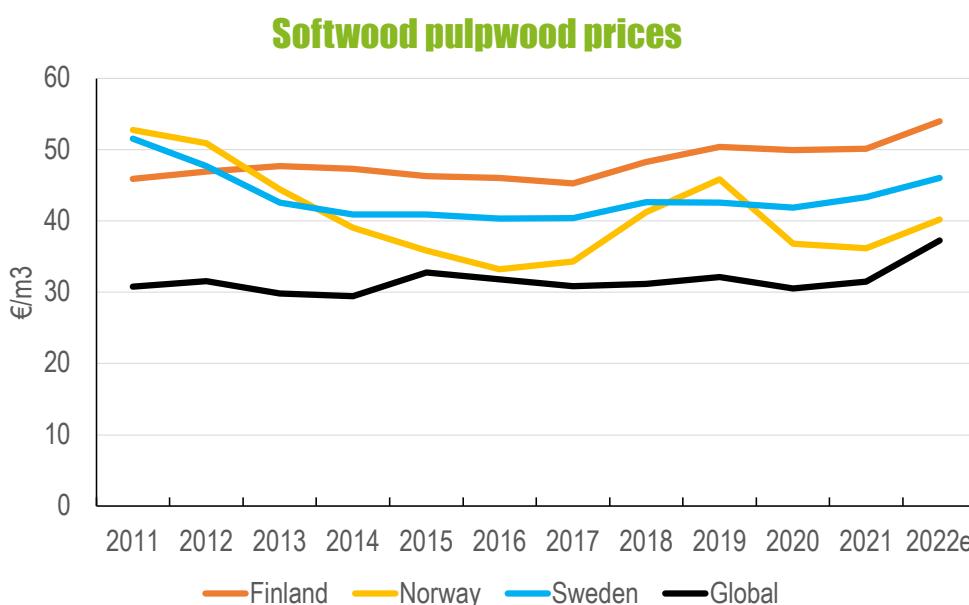


Figure 44. Softwood pulpwood prices, €/m³, in the Nordic countries and globally. 2022 based on Q1-Q3 Source: Wood Resource Quarterly

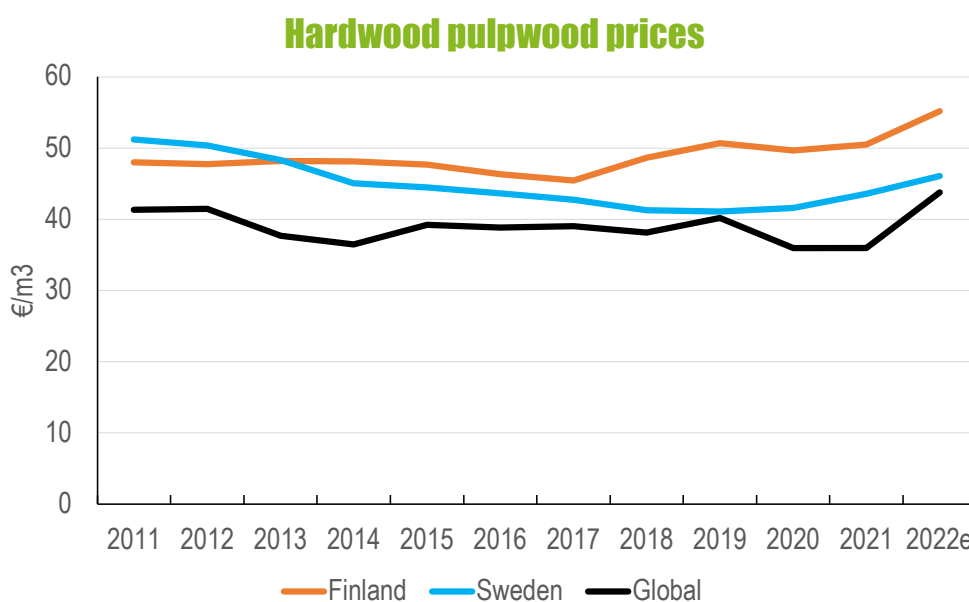


Figure 45. Hardwood pulpwood prices, €/m³, in Finland, Sweden and globally. 2022 based on Q1-Q3 Source: Wood Resource Quarterly



6. Climate and environment

6.1. Protected nature

The former Aichi target (adopted in Nagoya, Japan in 2010 within the framework of Convention on Biological Diversity) for protected nature worldwide was 17% of land- and freshwater area. A current aim, adopted by COP15 in Montreal in December 2022, raised the goal to 30%. The International Union for Conservation of Nature is responsible for assembling statistics on protected nature, either formally protected (nature reserves, national parks etc.) or other effective area-based conservation measures (OECMs). Data and interactive maps of protected nature are publicly available on the service Protected planet (protectedplanet.net).

Finland and Sweden fall below the 17% target, and Norway is the only Nordic country above the new target of 30% (Figure 46, next page).

Protected land and freshwater, %

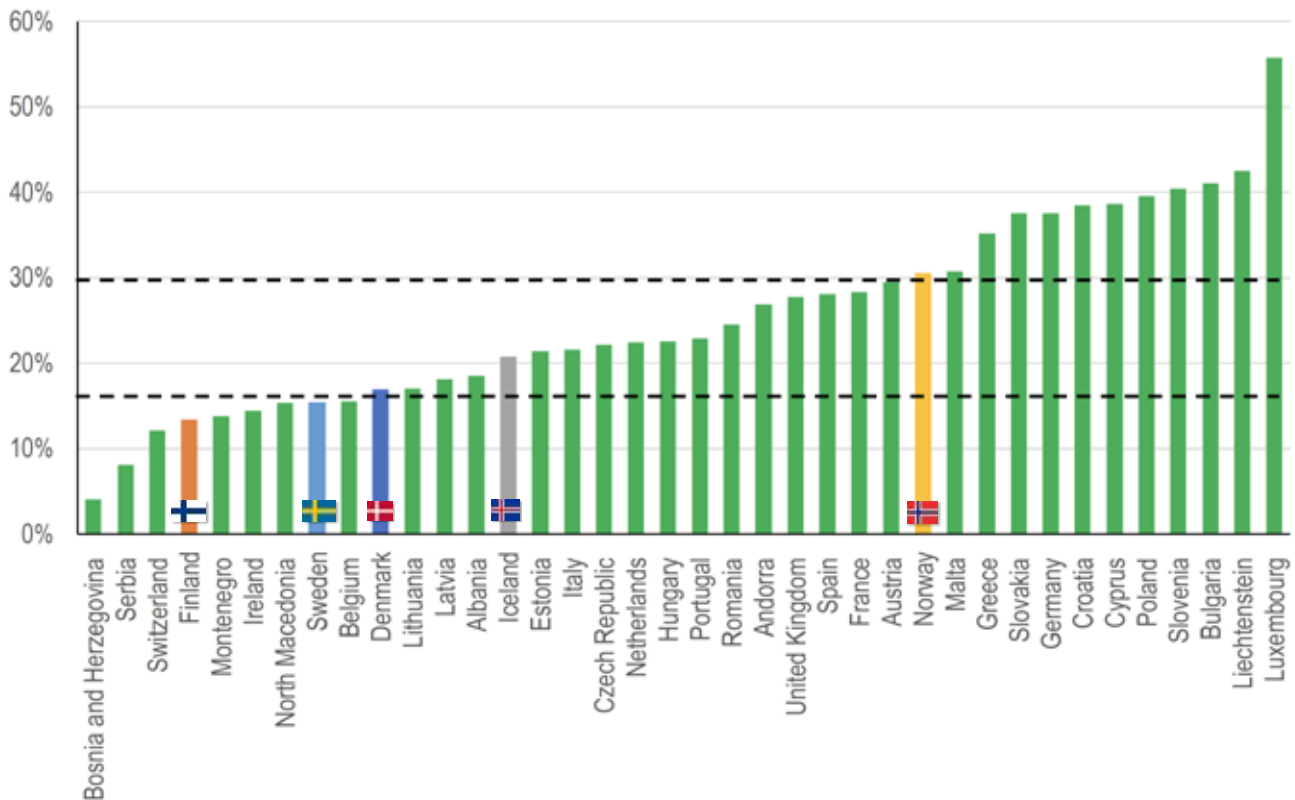


Figure 46. Protected nature according to Protected Planet, updated in November 2022. The lines are the Aichi target of 17% and the COP15 target of 30% protected nature
Source: protectedplanet.net

6.2. Protected forests

FAO and Forest Europe assemble data of protected forests every fifth year in line with the Ministerial Conference on the Protection of Forests in Europe (MCPFE). Each country reports its protected forest area in one of five categories:

- 1.1 No intervention (no direct human intervention, limited public access)
- 1.2 Minimum intervention (human intervention is limited)
- 1.3 Conservation through active management (active interventions to achieve specific conservation goals)
2. Protection of landscapes and specific natural elements (restricted use of forest resources, management goals to preserve landscape diversity, cultural, aesthetic, spiritual and historical values, recreation, or specific natural elements.
3. Protective functions (management to protect soil or water quality, ecosystem functions, infrastructure, and manage natural resources against natural hazards)

The total European area of protected forest in all categories was 53 million hectares in 2020, out of which the Nordic countries share was 7.0 million hectares. If only the strict categories are included (1.1 and 1.2), the total area of protected forest was 8.4 million hectares, and the Nordic share was 5.1 million hectares (62% of all strictly protected forest in Europe).

The share of protected forests in all categories (2020) varies from 7.3% in Norway to 30.6% in Iceland, compared to the total forest land area. The share of strict protection (category 1.1-1.2) varies from 0% in Iceland to 11.3% in Finland (Figure 47, Table 11). Finland, Sweden and Norway have a high share of strict protection. Denmark has a high percentage of landscape protection (category 2), and Iceland has most of its protected area in the category Protection of soil, water and ecosystem functions.

Table 11. Area of protected forest in the Nordic countries 2020 per category according to Forest Europe 1,000 hectares

	Denmark	Finland	Iceland	Norway	Sweden	Nordic	Europe
1.1 No intervention	0.1	1913	0	0	361	2274	3007
1.2 Minimum intervention	17.8	629	0	610	1616	2872	5348
1.3. Conservation, active management	37.8	276	0.6	0	190	504	10567
2. Protection of landscapes	75.3	922	0	282	104	1383	10923
3a. Protective functions (soil, water, ecosystem)	0	0	15	0	0	15	21825
3b. Protective functions (infrastructure, managed natural resources)	0	0	0	0	0	0	1175

Sources: SoEF 2020. Tables 37 and 39. Europe except Portugal, Greece and some smaller countries

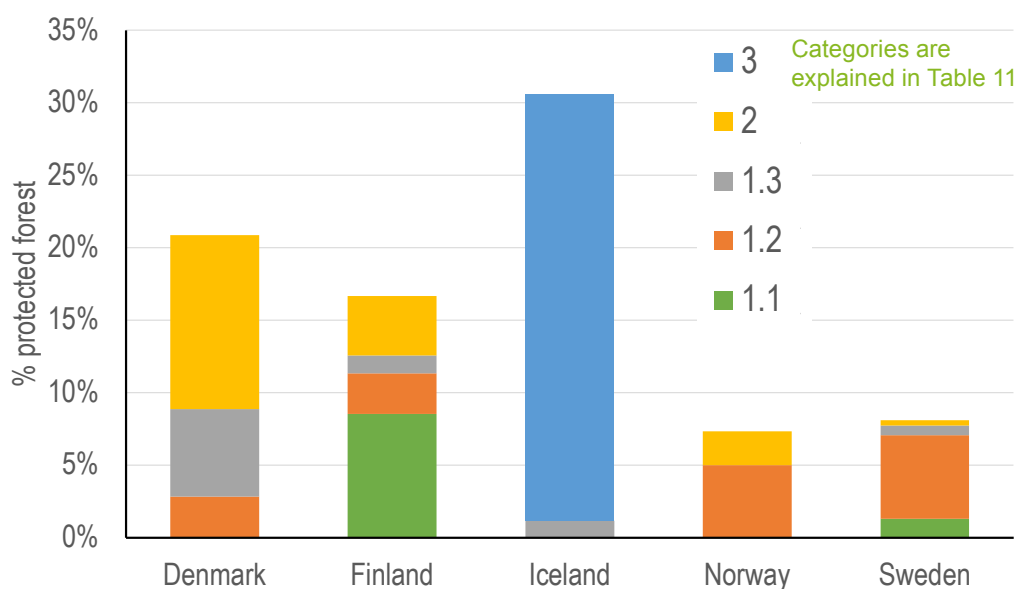


Figure 47. Protected forests in the Nordic countries 2020 in categories according to Forest Europe

Source: SoEF 2020, Table 38-39

6.3. Certified production forests

Forest certification is a voluntary process whereby an independent third party (the "certifier") assesses forest management and production quality against a set of standards. There are two types of certifications: 1) forest management, which assesses whether forests are managed sustainably and responsibly, and 2) chain of custody, which verifies that certified material is identified and kept separate from non-certified or non-controlled material from the forest to the final consumer.

Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) are the two primary certification schemes. Globally, the certified forest area in 2022 was 286 million hectares (PEFC) and 205 million hectares (FSC). Many forests are certified in Sweden according to both systems (Figure 48).

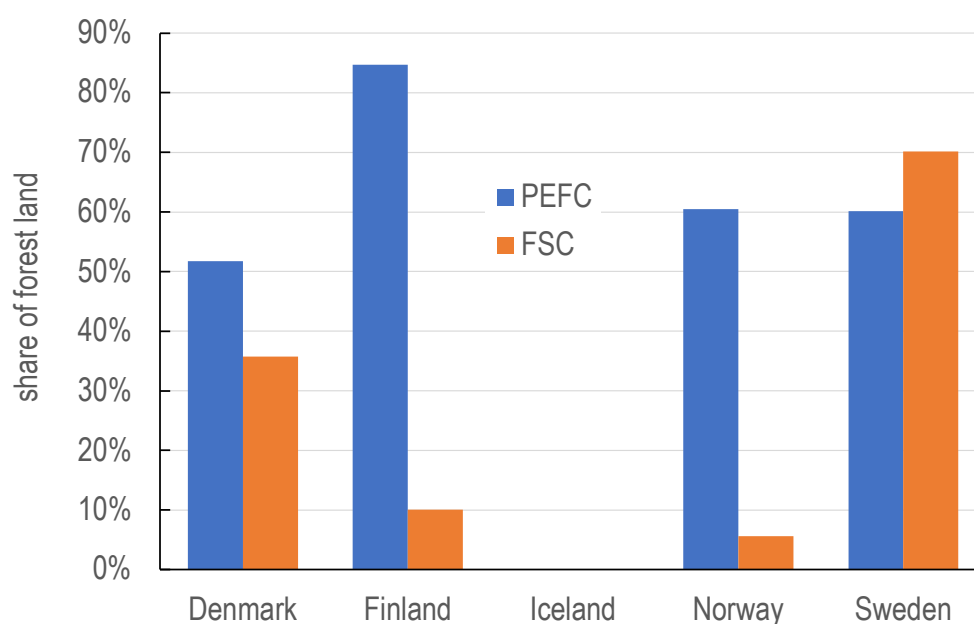


Figure 48. Certified forest share of total forest area in the Nordic countries, December 2022 Source: FSC.org and PEFC.org



6.4. Red-listed species

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species was founded in 1964 and is a comprehensive inventory of biological species' conservation status. It uses a set of criteria to evaluate the extinction risk of thousands of species and subspecies (Figure 49). IUCN has a global list, but each country produces its own national list. Iceland's Red List is incomplete for all organism groups; therefore, it is excluded from the diagram below (Figure 50).

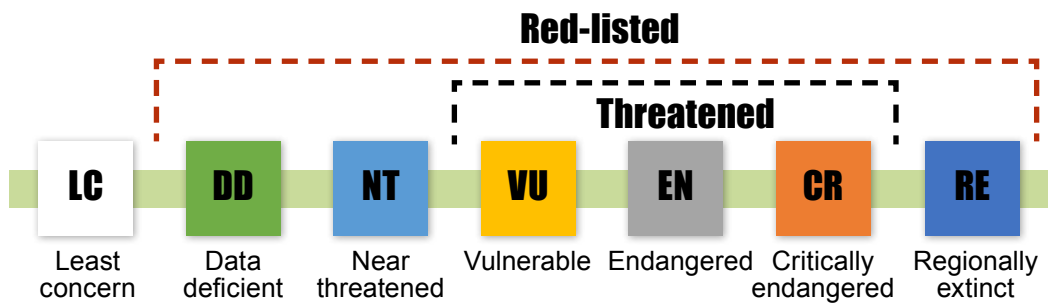


Figure 49. Categories of species in the Red Lists:

DD (data deficient), **NT** (near threatened), **VU** (vulnerable), **EN** (endangered), **CR** (critically endangered) and **RE** (regionally extinct). Threatened species are included in the **VU**, **EN** and **CR** categories.

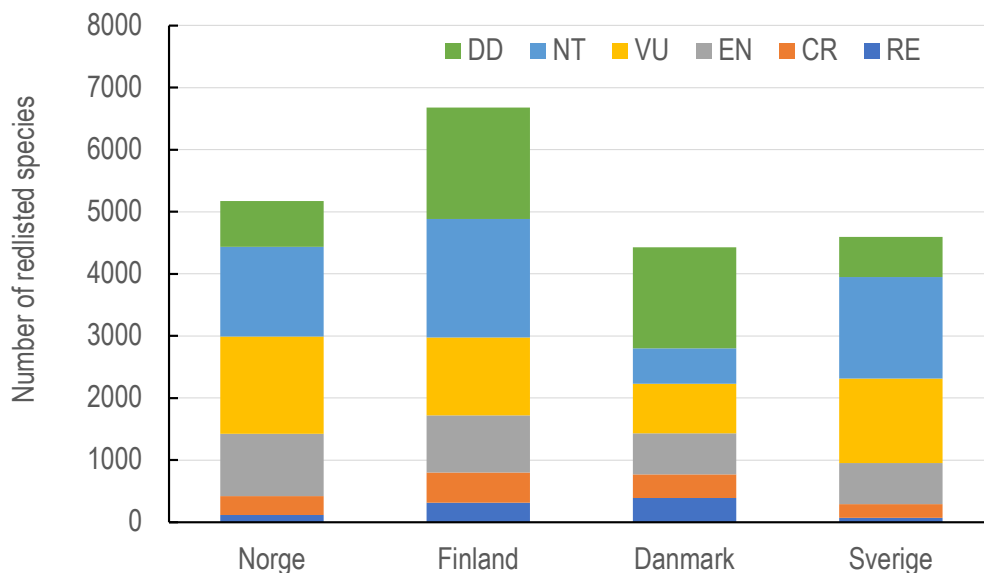


Figure 50. The number of red-listed species collected from the national red lists (Norway 2021, Finland and Denmark 2019, Sweden 2020). Categories are explained in Figure 49.

6.5. Habitat directive reporting

The European Union countries must report the conservation status according to the Habitats Directive, adopted in 1992 (EEA, the Council Directive 92/43/EEC.). A set of 230 specified natural habitats are monitored throughout the EU. Many are designated to Natura 2000-areas (a network of protected sites in Europe) to secure their conservation. Several habitats are present in the Nordic countries, in Sweden for example, there are 89 habitats and 4000 Natura 2000-areas.

Four of the nine biogeographical regions in the EU are present in the Nordic countries: Alpine and Boreal in Finland and Sweden, Continental in Denmark, Finland and Sweden, and Atlantic in Denmark. The status of the habitats is reported as being Good (favourable), Poor (unfavourable-inadequate) or Bad (unfavourable). Figure 51 shows the status of the habitats in the group Forests. In Denmark, none of the forest habitats is deemed Favourable. In Sweden, subalpine birch forest and alpine bog woodland are the only forest habitats with Favourable status. In Finland, the only Favourable status are found in the Alpine region: Western taiga and bog woodland.

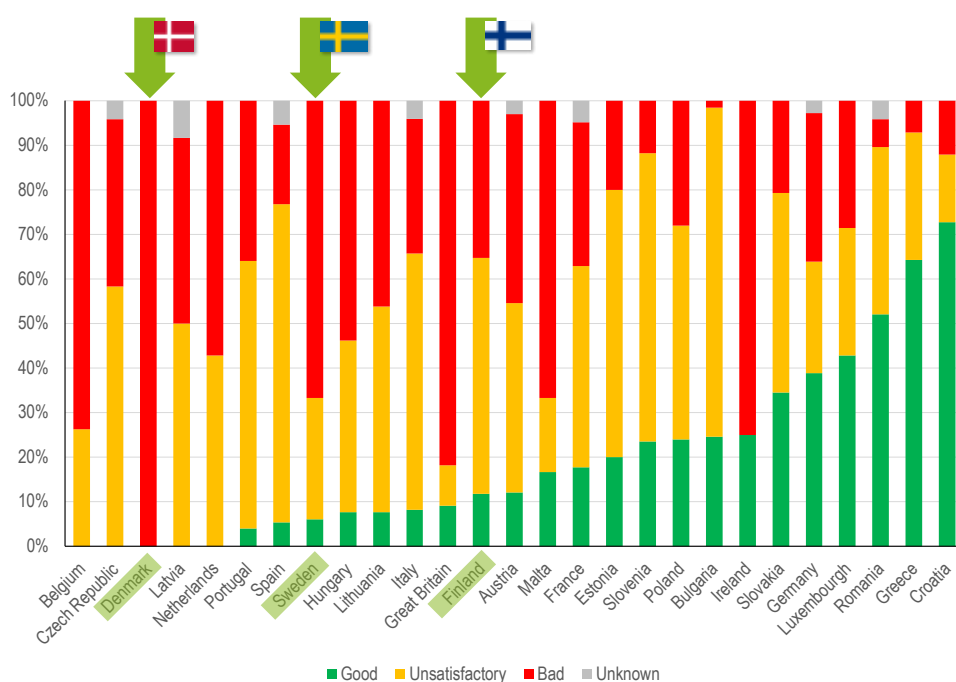


Figure 51. Conservation status of habitats belonging to the forest group in EU countries, report period 2013-2018. Denmark, Sweden and Finland are marked.

6.6. Biodiversity Intactness Index

Biodiversity Intactness Index (BII) displays how much of a region's original natural biodiversity that remains. The index, available as a tool from the Natural History Museum in London, summarizes the change in ecological communities in response to human pressures¹⁵. BII uses data from ecological studies representing more than 54,000 species worldwide, and the baseline is the number and diversity of species in near-undisturbed sites.

Figure 52 shows the calculated Biodiversity Intactness Index for European countries. The 90% limit is considered a bottom line for the index to be within the planet's boundaries for biodiversity. Finland, Sweden and Norway are the only European countries above this limit. The global average is 77% and the European average is 84%.

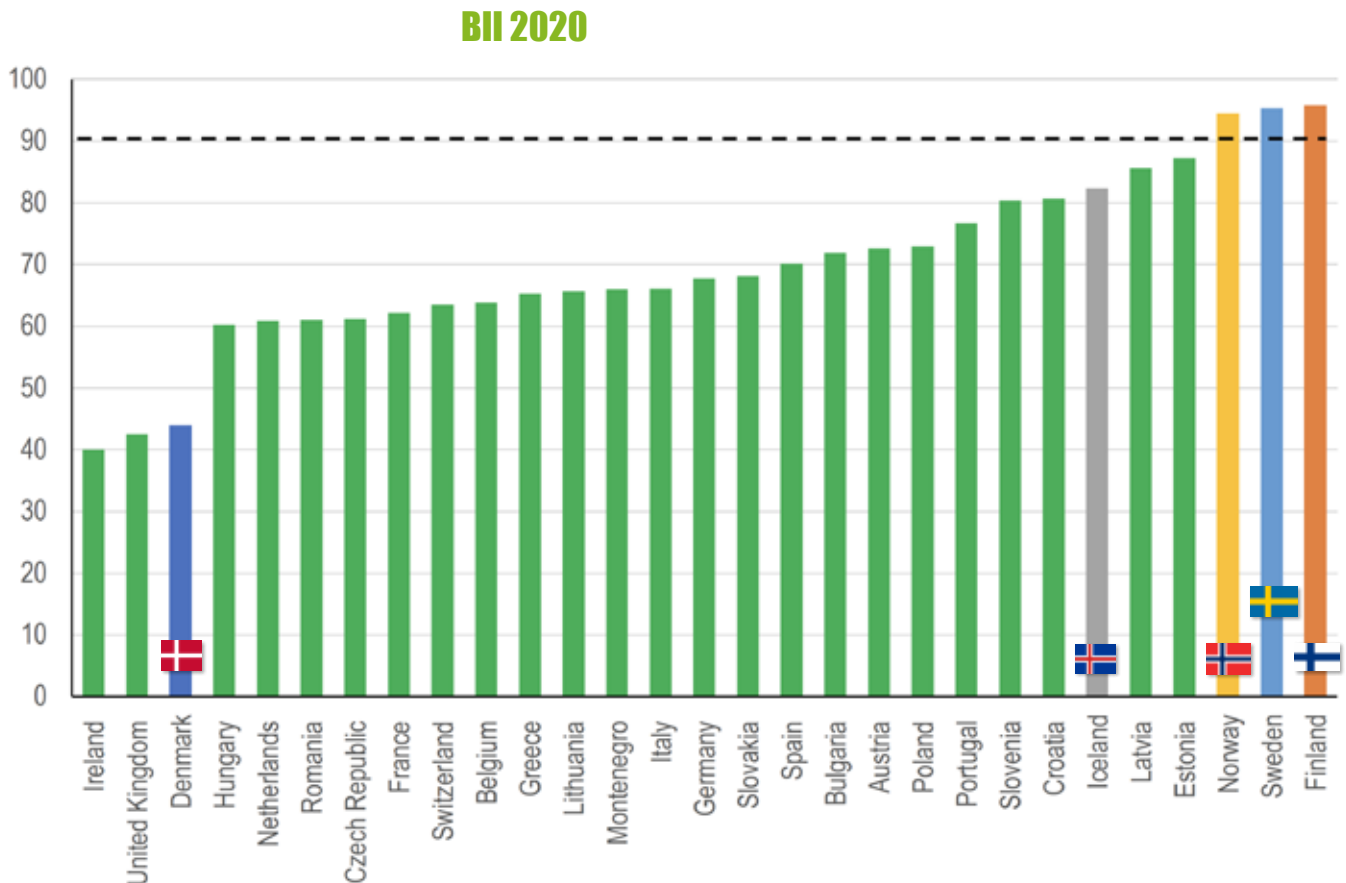


Figure 52. Biodiversity Intactness Index 2020 of countries in Europe. The Nordic countries are in red. The dashed line shows the limit for the planet boundary for biodiversity. Source: Natural History Museum, Biodiversity Trends Explorer

¹⁵Natural History Museum, [Biodiversity Intactness Index](#) [Biodiversity Trends Explorer]

6.7. Greenhouse gas emissions and LULUCF

All countries ratifying the United Nations Framework Convention on Climate Change (UNFCCC) report climate impact data. Here we show total greenhouse emissions in kilotonne CO₂-equivalents and LULUCF (Land use, land-use change, and forestry). LULUCF is defined by the United Nations Climate Change Secretariat as a "greenhouse gas inventory sector that covers emissions and removals of greenhouse gases resulting from direct human-induced land use such as settlements and commercial uses, land-use change, and forestry activities." LULUCF impacts the global carbon cycle, and land-use activities can add or remove carbon from the atmosphere. Forest land usually removes carbon, thereby lowering the climate impact.

All countries except Iceland have reduced greenhouse gas emissions since 1990, when the LULUCF factor is included (Figure 53). Sweden lowered its emissions (including LULUCF) by 81%, while the European Union average dropped 36% (Figure 54).

Figure 55 shows the impact of the various land-use activities, adding to the total LULUCF. The statistics demonstrate the positive effect, displayed as negative figures in LULUCF, of forest land in Norway, Finland, and Sweden and the negative impact of Grassland and Cropland. Detailed data and time series of greenhouse gas emissions divided by gas and sector per country can be downloaded from UNFCCC's webpage.

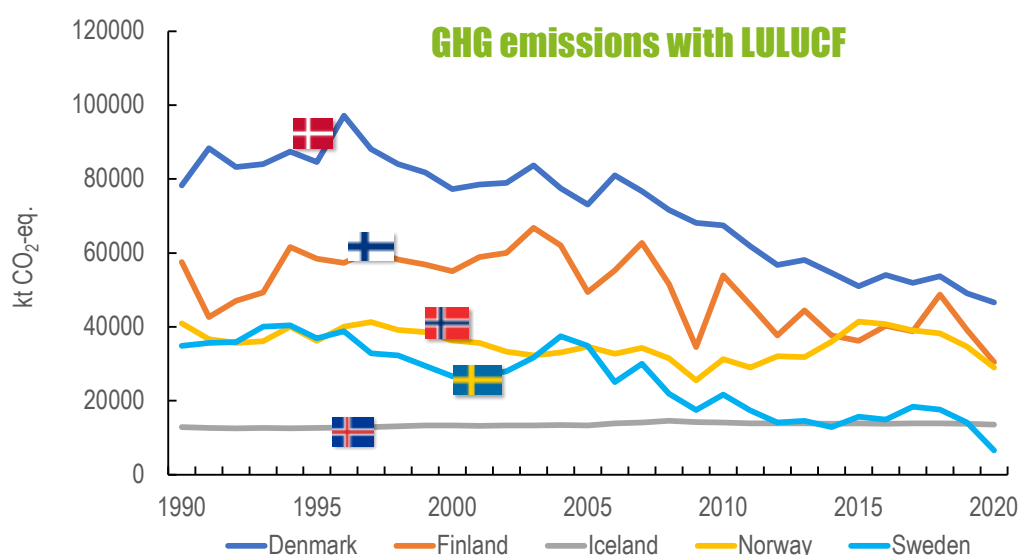


Figure 53. Greenhouse gas net emissions with LULUCF emissions/removals

Source: UNFCCC, greenhouse gas profiles, annex 1¹⁶



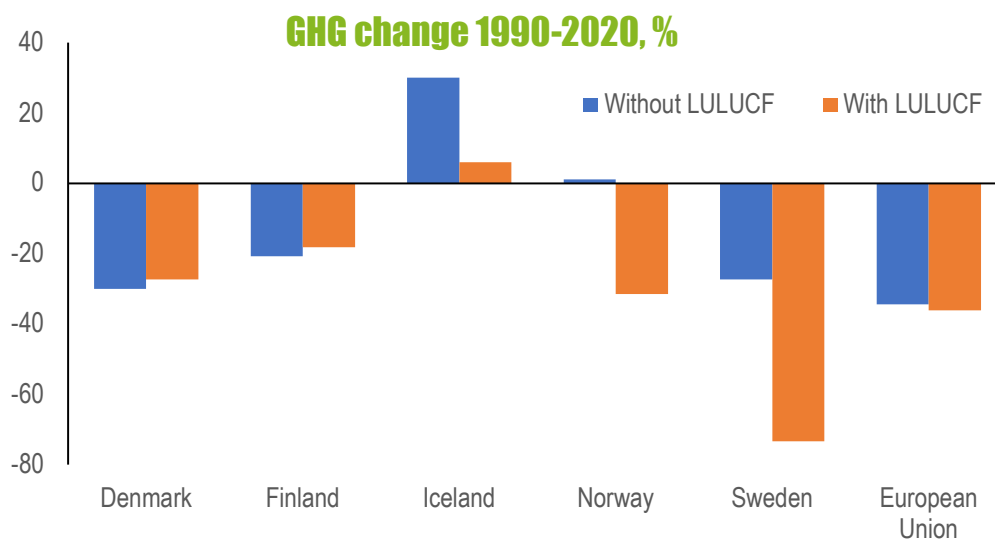


Figure 54. Changes in greenhouse gas net emission 1990-2020, %
Source: UNFCCC, greenhouse gas profiles, annex 1. https://di.unfccc.int/ghg_profile_annex1¹⁷

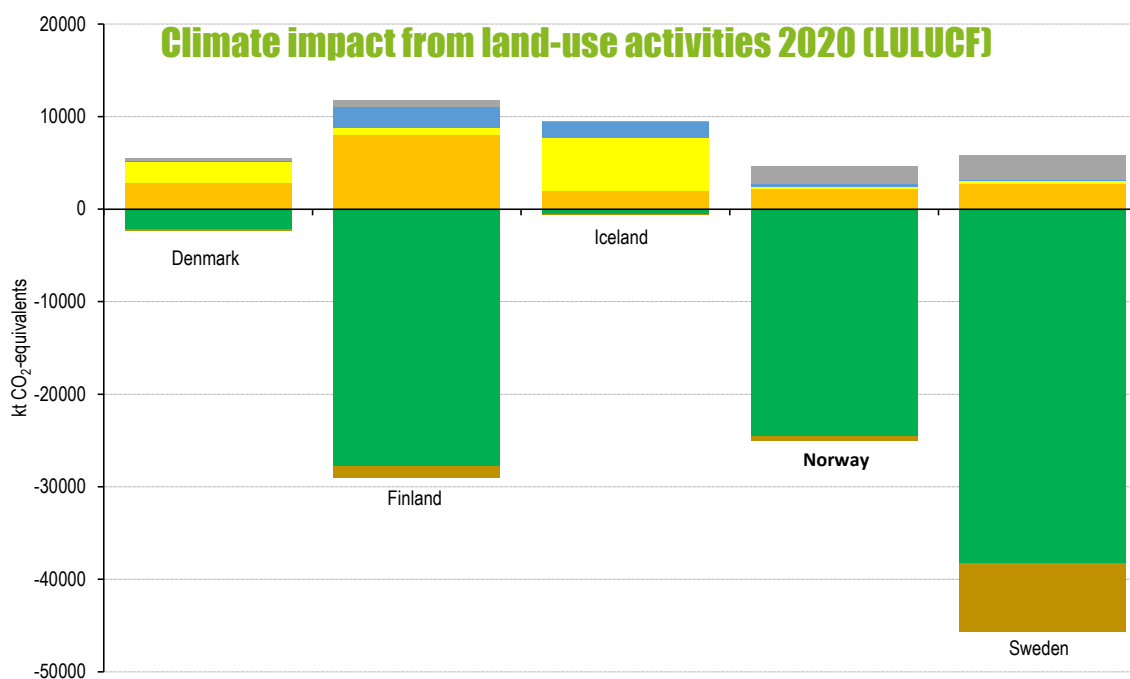


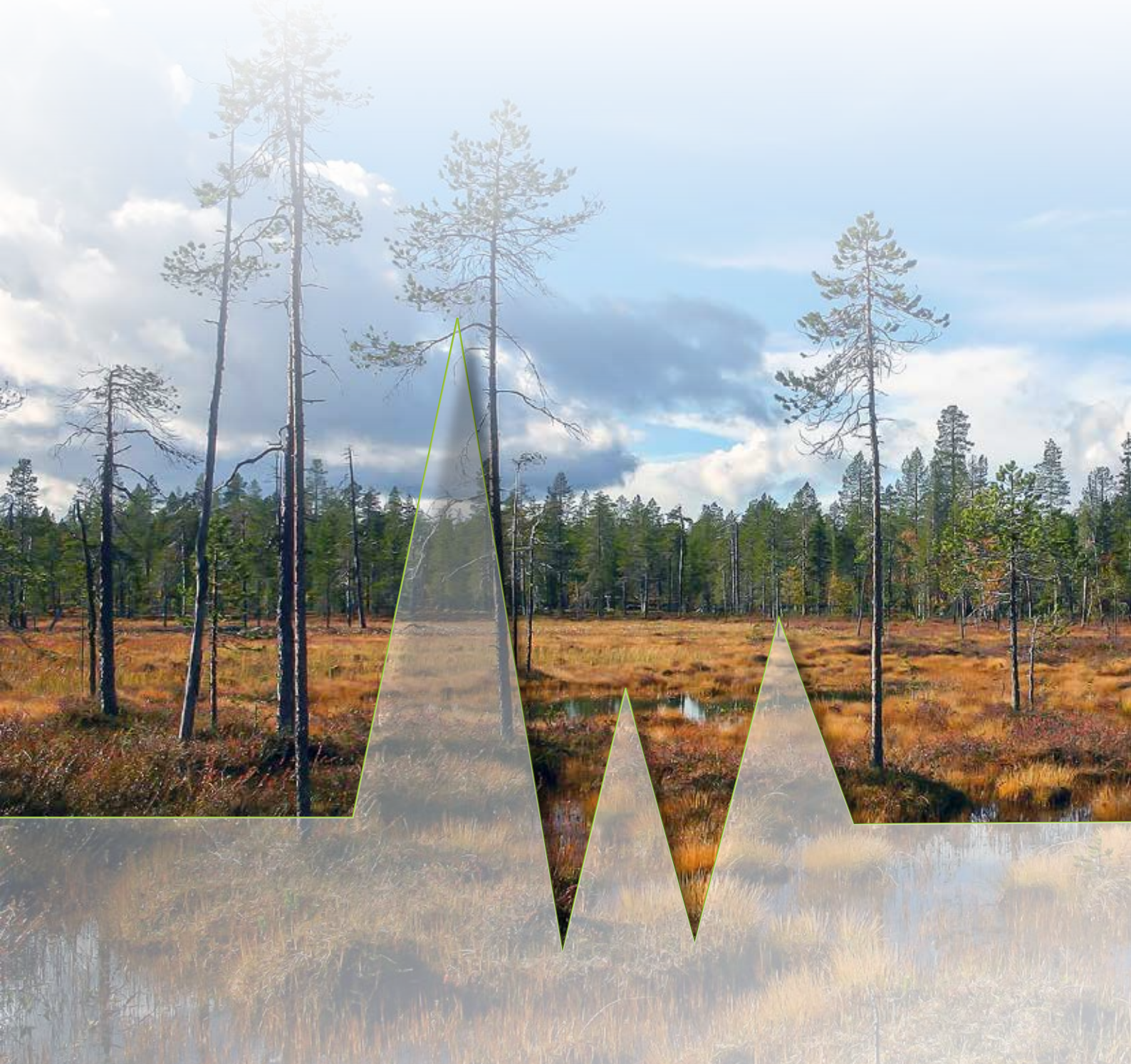
Figure 55. Climate impact from land-use activities 2020 (LULUCF)
Source: UNFCCC, Greenhouse gas profiles, annex 1

¹⁶UNFCCC, Greenhouse gas profiles, Annex 1.

¹⁷UNFCCC, Greenhouse gas profiles, Annex 1

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Appendix – Forest statistics

Forest resources, Nordic countries

Seeds and seedlings for forest regeneration. NordGen <https://www.nordgen.org/forestseedsandplants/seeds-and-seedlings.html>

Finland

Statistics database. Luke <https://www.luke.fi/en/statistics/forest-resources>

Finnish Statistical Yearbook of forestry 2022. Luke

Sweden

Statistical database. The Swedish Forest Agency <https://pxweb.skogsstyrelsen.se/pxweb/sv/Skogsstyrelsens%20statistikdatabas/?rxid=03eb67a3-87d7-486d-acce-92fc8082735d>

National Forest Inventory. Statistics <https://www.slu.se/en/Collaborative-Centres-and-Projects/the-swedish-national-forest-inventory/foreststatistics/forest-statistics/>

Skogsdata 2022/Forest statistics 2022. SLU <https://www.slu.se/centrumbildning-ar-och-projekt/riksskogstaxeringen/statistik-om-skog/skogsdata/>

Norway

The national forest inventory. Statistisk sentralbyrå <https://www.ssb.no/en/jord-skog-jakt-og-fiskeri/skogbruk/statistikk/landsskogtakseringen>

Skogen i Norge (forest statistics period 2015-2019). Nibio Rapport, 2021, Vol. 7, No 142 https://nibio.brage.unit.no/nibio-xmlui/bitstream/handle/11250/2763651/NIBIO_RAPPORT_2021_7_142.pdf

Landsskogtakseringen. Database from Nibio.

Denmark

Statistics Denmark (Business/forestry) <https://www.statbank.dk/20477>

Skovstatistik 2020 (Nord-Larsen et al. 2021) https://static-curis.ku.dk/portal/files/283138747/Rapport_Skovstatistik_2020_web.pdf%20

Iceland

Forestry in Iceland (2016). Skograektin (Icelandic Forest Service) <https://www.skogur.is/en/forestry/forestry-in-a-treeless-land/forestry-in-iceland-by-the-numbers>

Forest Reference Level 2021-2025: Iceland, National forestry accounting plan Skograektin (Icelandic Forest Service) https://www.skogur.is/static/files/utgafa/nfap_iceland_october_2020.pdf

Environmental indicators

Finland

biodiversity.fi <https://www.biodiversity.fi/en/habitats/forests/>

Sweden

Sveriges miljömål. Levande skogar <https://www.sverigesmiljomal.se/miljomalen/levande-skogar/>

Protected nature (Statistisk Centralbyrå) <https://www.scb.se/hitta-statistik/statistik-efter-amne/miljo/markanvandning/skyddad-natur/pong/statistiknyhet/skyddad-natur-2021-12-31/>

Norway

Naturindeks (Miljødirektoratet) <https://www.naturindeks.no>

Denmark

The Danish sustainability indicators (Statistics Denmark) <https://www.dst.dk/en/Statistik/temaer/SDG/danske-maalepunkter>

Global and European statistics

[UN-ECE. Data on Forest Products Production and Trade. Updated annually](#)

[Forestry database Eurostat](#)

[Global Forest Resources Assessment 2020](#) [FAO](#)

[Global Forest Resources Assessment 2020, database](#) [FAO](#)

[Global Forest Resources Assessment 2020, country reports](#) [FAO](#)

[State of Europe's forests 2020](#) [Forest Europe](#)

[Natura 2000 barometer](#). [European Environment Agency](#)

[Land cover and change accounts 2000-2018](#). [European Environment Agency](#)

[State of Nature in the EU, EEA Report No 10/2020](#) [European Environment Agency](#).

[Greenhouse gas profiles \(LULUCF\)](#), [UNFCCC](#)

