

FOREST FINLAND

Finnish Forest Research Institute

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FOREST FINLAND IN BRIEF

provides concise information on forestry and the forest industry in Finland. It is based on statistical data and includes international comparisons. For a more detailed description, the reader is referred to the *Finnish Statistical Yearbook of Forestry*, which includes approximately 230 tables and 80 figures in English.

Ideal growing conditions for conifers, easily workable and valuable tree species, good harvesting conditions and infrastructure, and accessibility to major European markets all combine to make forests a major source of prosperity and well-being in Finland. Finns look upon forests not only in the material sense, but also as a valuable ecological and cultural resource.

Almost two thirds of Finland's commercial forests are held by non-industrial private forest owners. These small-scale family forest holdings number about 300 000. The annual stumpage income of about EUR 1.5 billion is therefore widely distributed, benefiting a considerable number of forest owners. This is particularly important for rural areas, where alternative sources of income are few.

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Martti Aarne

Head of Statistics

Forest Statistics Information Service

Editor:

Yrjö Sevola

Language

consultant:

Peter Ovell

Lay-out, graphs:

A-K Korhonen

Maps: Spatio Oy

Photos:

Erkki Oksanen

Compiled at

The Finnish Forest Research Institute

Forest Statistics Information Service

Unioninkatu 40 A

FIN-00170 Helsinki, Finland

Tel. +358 10 2111, fax +358 10 211 2104

E-mail: yrjo.sevola@metla.fi

Website: www.metla.fi/hanke/3006/index-en.htm

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INTERNATIONAL CONTEXT

Major producers and traders

Finland, with its 23.0 million forest hectares, is an important supplier of forest products to global markets. Its boreal coniferous forests, which include a significant proportion of broad-leaved species, permit annual fellings of over 60 million m³ on a sustainable basis, and the allowable cut is increasing. Moreover, the infrastructure for roundwood procurement is good. The Finnish forest industry is also highly export-oriented, and in most sectors of the industry, 70% to 90% of production goes abroad. Finland is a major exporter of sawn softwood and paper, particularly graphic papers.

Global roundwood production in 2003

(million m³ under bark):

Industrial wood	1 587	Softwood	1 208
Fuelwood&charcoal	1 755	Hardwood	2 134
	3 342		3 342

The total value of the global export trade of forest products amounted to USD 133 billion (f.o.b) in 2002, of which Finland's share was 7.9%. In the following tables, the Russian Federation is included in Europe.

World production of softwood, 2003

World	1 208	mill. m ³ u.b.
Europe	406	
USA	284	
Canada	158	
China	138	
Russia	102	
Sweden	61	
Brazil	53	
Finland	45	

World imports of roundwood and wood chips, 2003

World	165.5	mill. m ³ u.b.
Europe	68.8	
Japan	40.2	
China	29.4	
Finland	14.2	
Sweden	11.4	
Korea Rep.	9.1	
Austria	8.1	
Canada	7.8	

World production of sawn softwood, 2003

World	298.7	mill. m ³
Europe	115.6	
USA	61.2	
Canada	55.9	
Russia	17.7	
Sweden	16.6	
Germany	16.5	
Finland	13.6	
Japan	13.6	
Austria	10.3	
India	8.0	
France	7.2	

World exports of sawn softwood, 2003

World	100.1	mill. m ³
Europe	55.9	
Canada	36.6	
Sweden	11.0	
Russia	10.2	
Finland	8.2	
Austria	6.6	
Germany	3.9	
Latvia	2.6	
Chile	2.1	
New Zealand	1.6	
USA	1.6	

World production of paper and paperboard, 2003

World	328.1	mill. tonnes
Europe	104.3	
USA	80.8	
China	37.9	
Japan	30.5	
Canada	20.1	
Germany	19.3	
Finland	13.1	
Sweden	11.1	
Korea Rep.	10.1	
France	9.9	
Italy	9.4	

World exports of paper and paperboard, 2003

World	102.2	mill. t
Europe	62.9	
Canada	15.4	
Finland	11.7	
Germany	10.4	
Sweden	9.1	
USA	8.3	
France	5.1	
China	4.3	
Austria	3.9	
Netherlands	3.0	
Russia	2.5	

Value of global exports of forest-industries' products, 2002

	USD billion	USD per capita
World	133.2	22
Europe	69.1	95
Canada	22.5	714
USA	13.8	47
Germany	11.2	135
Finland	10.6	2 029
Sweden	9.7	1 088
France	5.3	88
Indonesia	4.6	21

Source: FAO
Yearbook. Forest
Products 2002

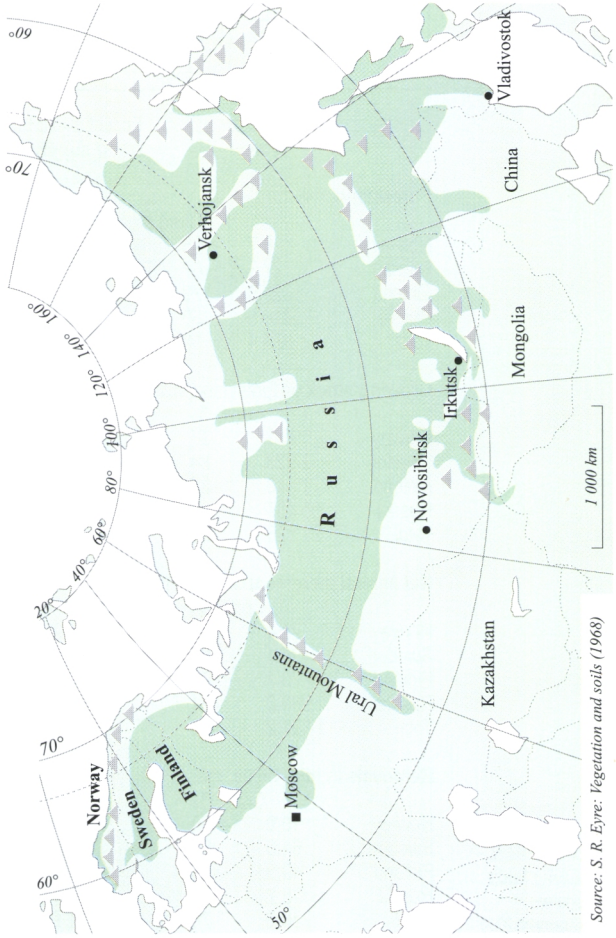
Eurasian boreal forest zone

The Eurasian boreal forest zone extends from the Atlantic coast of Norway to the Russian Pacific coast, a distance of about 9 000 km. In the Nordic countries, the width of the zone is about 1 000 km (60°–70° N); in the east it gradually extends southwards, reaching 50° N in eastern Siberia.

This huge coniferous forest zone of about 900 million hectares is one of the most important providers of roundwood in the world. Scots pine and Norway spruce dominate in the zone's European and western Siberian sections. The most important species in eastern Siberia is the Siberian larch, and in the Russian Far East the Dahurian larch. In the mountainous Far East, the forests are mostly inaccessible.

About 80% of the forests of Norway and Sweden, and almost all the forests of Finland and the Russian Federation belong to the boreal coniferous forest zone. Due to the limited availability of comparable regional forestry information solely on boreal forests, the figures in the next table are national figures.

Eurasian boreal forest zone



Source: S. R. Eyre: *Vegetation and soils* (1968)

Forest resources of the countries within the Eurasian boreal forest zone at the end of the 1990s

	Forest, total	Forest available for wood supply	
Forest land, mill. ha			
		% of land area	
Norway	8.7	28	6.6
Sweden	27.3	67	21.2
Finland	21.9	72	20.7
Russia	816.5	50	525.2
Total	874.4	50	573.7

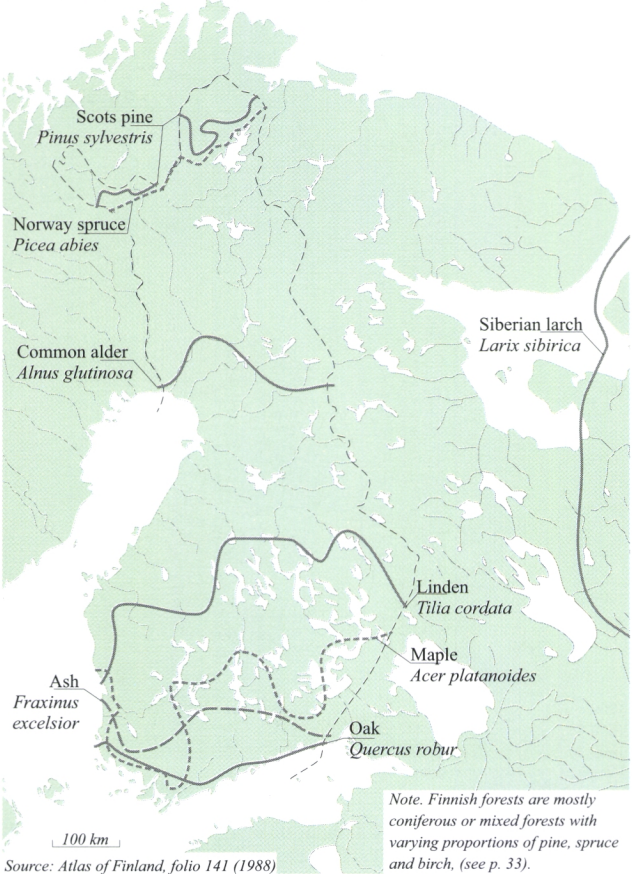
Growing stock on forest land, mill. m³ over bark				
		Conif., %		Conif., %
Norway	771	77	671	80
Sweden	2 928	84	2 567	85
Finland	1 940	82	1 867	82
Russia	85 487	80	60 922	73
Total	91 126	80	66 027	74

Net annual increment on forest land, mill. m³ o.b./yr				
		Conif., %		Conif., %
Norway	24.4	77	22.0	80
Sweden	94.1	83	85.4	84
Finland	73.7	78	72.5	78
Russia	969.0	71	742.0	63
Total	1 161.2	73	921.9	67

Removals in mid-1990s, mill. m³ o.b./yr				
		Conif., %		Conif., %
Norway	10.9	89	10.9	89
Sweden	61.6	87	61.3	87
Finland	49.5	82	49.5	82
Russia	116.2	70	96.4	71
Total	238.2	78	218.1	79

Source: The UN-ECE/FAO Forest Resource Assessment 2000

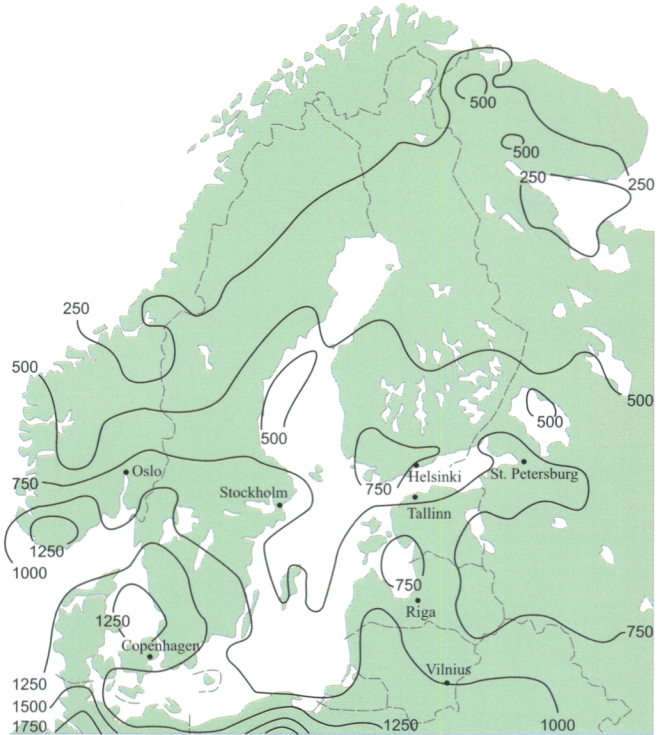
Northern limits of selected tree species in Finland and western limit of Siberian larch



Note. Finnish forests are mostly coniferous or mixed forests with varying proportions of pine, spruce and birch, (see p. 33).

Source: Atlas of Finland, folio 141 (1988)

Combined deposition of sulphur and nitrogen in the Nordic and the Baltic countries in 2000, in eq/ha/yr



Sources: Finnish Meteorological Institute,
EMEP / MSC-West

The depositions are combined as equivalent in relation to their potentially acidifying effect. For example, 500 eq/ha/yr is equivalent to 8 kg (S)/ha/yr.

The European Union, which Finland joined in 1995, is the most important customer region for Finnish forest-industry products, accounting for about 65% of Finland's sawnwood exports and paper and paperboard exports. A strong focus on customers and markets has also led to considerable Finnish investment in forest-product manufacturing in Europe. The EU's eastward enlargement in May 2004 brought an additional 21 million hectares of commercial forests into the Union.

The European Union

Forests available for wood supply in the European Union

Country	Forest area mill. ha	Growing stock mill. m ³	of which conif., %	Increment and Removals in mid-1990s	
				mill. m ³ /yr	mill. m ³ /yr
Austria	3.4	1 037	82	27.3	16.9
Belgium	0.6	140	46	5.1	4.4
Cyprus	0.0	3	100	0.0	0.0
Czech Republic	2.6	668	84	20.4	13.0
Denmark	0.4	54	58	3.2	2.2
Estonia	1.9	307	63	7.1	4.5
Finland	20.7	1 867	82	72.5	49.5
France	14.5	2 836	36	92.3	47.6
Germany	10.1	2 820	69	89.0	38.9
Greece	3.1	140	56	3.5	2.4
Hungary	1.7	295	15	9.9	5.2
Ireland	0.6	43	92	3.5	2.3
Italy	6.0	877	33	18.7	8.4
Latvia	2.4	409	59	11.1	5.5
Lithuania	1.7	314	59	8.5	4.5
Luxembourg	0.1	20	18	0.7	0.4
Malta	0.0	0	..	0.0	0.0
Netherlands	0.3	52	56	2.2	1.2
Poland	8.3	1 771	79	39.4	25.3
Portugal	1.9	188	75	12.9	11.0
Slovakia	1.7	446	48	12.3	5.4
Slovenia	1.0	292	50	6.1	2.3
Spain	10.5	487	59	28.6	13.5
Sweden	21.2	2 567	85	85.4	61.3
United Kingdom	2.1	293	64	14.6	8.2
EU total	116.8	17 925	65	574.3	333.9

Duration of the growing season in Europe

Average periods in days (1961–90) during which daily mean temperatures are above +5 °C

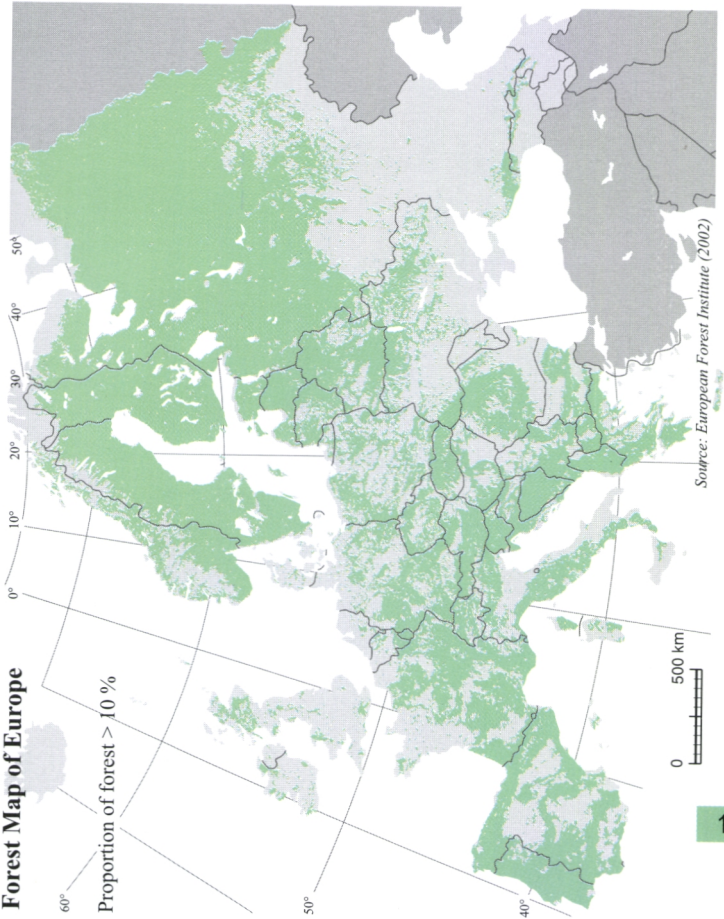


Source: Finnish Meteorological Institute

500 km

Forest Map of Europe

Proportion of forest > 10 %



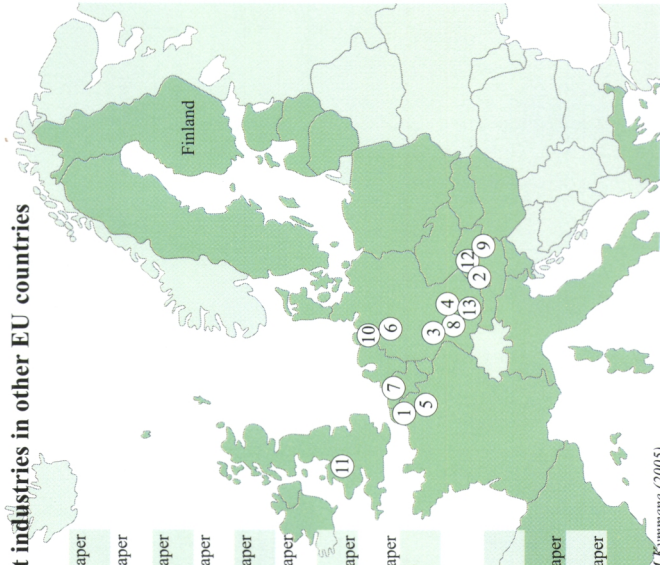
Some major Finnish-owned forest industries in other EU countries

(excl. Sweden)

- | | |
|---|------------------------------|
| 1. <i>M-real Alizay</i> ,
France (M-real) | pulp, fine paper |
| 2. <i>M-real Hallein</i> ,
Austria (M-real) | pulp, fine paper |
| 3. <i>M-real Stockstadt</i> ,
Germany (M-real) | pulp, fine paper |
| 4. <i>MD Papier</i> ,
Germany (Myllykoski) | magazine paper |
| 5. <i>Stora Enso Corbehem</i> ,
France (Stora Enso) | magazine paper |
| 6. <i>Stora Enso Kabel</i> ,
Germany (Stora Enso) | magazine paper |
| 7. <i>Stora Enso Langerbrugge</i> ,
Belgium (Stora Enso) | newsprint,
magazine paper |
| 8. <i>Stora Enso Maxau</i> ,
Germany (Stora Enso) | newsprint,
magazine paper |
| 9. <i>Stora Enso Timber</i> ,
Austria (Stora Enso) | sawn goods |
| 10. <i>Nordland Papier</i> ,
Germany (UPM-Kymmene) | fine paper |
| 11. <i>Shotton Paper</i> ,
United Kingdom (UPM-Kymmene) | newsprint |
| 12. <i>Steyrermühl</i> ,
Austria (UPM-Kymmene) | newsprint,
magazine paper |
| 13. <i>UPM-Kymmene Papier</i> ,
Germany (UPM-Kymmene) | newsprint
magazine paper |

Stora Enso is a Finnish-Swedish company.

Source: Annual Reports of M-real, Stora Enso and UPM-Kymmene (2005)



Finnish exports of forest-industry products to the European Union, 2004

	Sawn goods 1 000 m ³	Plywood and veneer	Particle board	Fibre board 1 000 t	Wood Pulp	Paper and paperboard
Austria	82	23	-	-	17	106
Belgium	159	21	-	2	6	679
Cyprus	15	2	-	0	-	5
Czech Republic	5	6	-	-	16	56
Denmark	377	68	38	2	-	224
Estonia	18	2	9	1	2	45
France	850	108	0	1	193	645
Germany	651	246	-	2	943	2 180
Greece	151	4	-	1	13	165
Hungary	22	4	0	-	0	68
Ireland	189	19	1	3	-	39
Italy	272	64	-	1	83	452
Latvia	1	0	0	0	3	30
Lithuania	7	2	0	-	0	33
Luxembourg	0	0	-	-	-	48
Malta	-	-	-	-	-	1
Netherlands	453	163	-	5	194	406
Poland	8	10	0	-	62	274
Portugal	9	6	-	-	5	79
Slovakia	5	5	-	-	1	28
Slovenia	1	0	-	-	0	9
Spain	305	50	0	0	18	944
Sweden	43	106	13	7	346	305
United Kingdom	1 452	188	121	31	128	1 710
EU, total	5 073	1 096	182	55	2 030	8 532
% of total exports	62	84	75	88	82	65

Source: National Board of Customs

FINNISH FORESTRY AND FOREST INDUSTRY

National economy, forestry and the forest industry

In order to achieve economic growth in post-war Finland, major investment was made in the pulp and paper industry, leading to a doubling of production between 1955 and 1965. While growth has continued in the forest industry, there has also been substantial growth in the metal and engineering industries and, more recently, in the high-tech electronics industry.

In 1970, roundwood and forest-industry products represented 56% of the total value of goods exported from Finland; the corresponding figure in 2004 was 25%. The same diversification of production is also seen in the structure of the gross domestic product: in 1970, forestry accounted for 6.3% of GDP and primary forest-industry production for 6.7%, while in 2004 the respective figures were 1.9% and 4.0%. In employment, forestry accounted for 4.1% and the forest industry for 5.2% of the workforce in 1970. In 2004, the corresponding figures were 1.0% and 2.7%.

Flourishing engineering and service industries have also developed around forestry and the forest industry. Strong mutual connections have contributed to the success of the sector. Finnish engineering and service industry companies are in a strong position globally, e.g. in the manufacture of timber harvesters and paper machines and in providing consultancy services.

Forestry and forest industry in the Finnish national economy, 2004

Gross domestic product

at market prices	EUR 149.7 billion
at basic prices	EUR 128.7 billion
of which forestry	1.9 %
forest industry	4.0 %

Total employment

	2.37 million persons
of which forestry	1.0 %
forest industry	2.7 %

Total exports of goods

	EUR 48.9 billion
of which forestry	0.2 %
forest industry	24.5 %

Source: Statistics
Finland

Finland is among the major suppliers of forest-related products to the world market, particularly printing and writing papers, and one of the biggest importers of roundwood. In 2004, the total export value of Finnish forest-industry products amounted to EUR 12 billion. Germany and the United Kingdom are the foremost importers of Finnish forest-industry products, together accounting for 31% of the total.

Forest industry: production and exports

Production of Finnish forest industry, 2002–2004

Product	Unit 1 000	2002	2003	2004
Sawn goods	m ³	13 380	13 745	13 545
Plywood	"	1 240	1 300	1 350
Particle board	"	413	399	448
Fibreboard	t	101	101	102
Mechanical pulp	"	4 588	4 598	4 836
Chemical pulp	"	7 143	7 350	7 783
Pulp, total	"	11 731	11 948	12 619
Newsprint	"	1 007	946	729
Magazine paper	"	5 335	5 586	6 114
Fine paper	"	2 621	2 732	3 181
Kraft paper	"	543	532	544
Other paper	"	544	557	610
Paper, total	"	10 050	10 353	11 178
Paperboard	"	2 738	2 706	2 858
Paper and paperboard	"	12 788	13 058	14 036

Source: Finnish Forest Industries Federation

Finnish forest industry exports, 2002–2004

Product	Unit 1 000	2002	2003	2004
Sawn goods	m ³	8 187	8 169	8 226
Plywood	"	1 117	1 172	1 234
Particle board	"	219	199	242
Fibreboard	t	72	68	63
Mechanical pulp	"	156	150	112
Chemical pulp	"	1 958	2 235	2 247
Newsprint	"	749	744	573
Magazine paper	"	5 070	5 317	5 803
Fine paper	"	2 571	2 679	3 093
Kraft paper	"	402	399	408
Other paper	"	324	306	341
Paper, total	"	9 116	9 444	10 218
Paperboard	"	2 310	2 261	2 461
Converted paper products	"	420	402	410
Total paper and paperboard	"	11 846	12 107	13 089

Source: National
Board of Customs

Value of Finnish forest industry exports, 2004

Country					EUR mill.
	Sawn goods	Wood-based panels, other wood products	Pulp	Paper, paper-board, converted products	Total
Austria	15	26	6	70	117
Belgium	20	23	2	407	452
Cyprus	3	1	-	3	7
Czech Republic	1	4	6	36	47
Denmark	64	67	-	153	284
Estonia	4	21	1	46	72
France	147	98	77	426	748
Germany	114	207	365	1 422	2 108
Greece	24	15	5	90	134
Hungary	4	4	0	49	57
Ireland	35	16	-	24	75
Italy	57	43	36	279	415
Latvia	0	3	0	27	30
Lithuania	2	4	0	24	30
Luxembourg	0	0	-	46	46
Malta	-	0	-	1	1
Netherlands	72	69	83	272	496
Poland	2	12	26	184	224
Portugal	2	5	2	45	54
Slovakia	1	7	0	20	28
Slovenia	0	1	0	6	7
Spain	49	42	8	540	639
Sweden	11	125	114	238	488
United Kingdom	267	180	55	1 080	1 582
EU total	895	971	787	5 487	8 140
Other Europe	38	175	45	693	951
Europe total	933	1 146	831	6 180	9 090
Asia	326	134	75	747	1 282
Africa	150	3	8	103	264
North America	9	68	49	812	938
Latin America	0	1	2	183	186
Oceania	2	9	0	166	177
Unspecified	-	-	-	45	45
Grand total	1 420	1 360	965	8 237	11 982

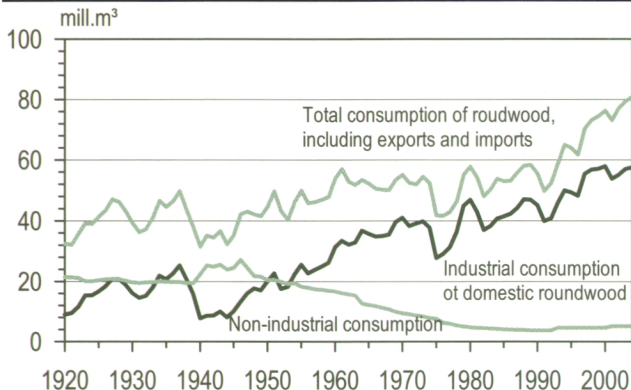
Wood consumption

Despite a multiple increase in wood pulp production, total roundwood consumption in Finland remained at approximately the same level throughout the 30-year period from 1960. A number of structural changes, such as reductions in fuelwood consumption and in roundwood exports, together with an increase in the use of industrial wood residues, contributed to rather modest increases in total wood consumption until the year 1993.

The years 1994 to 1996 were the first in which annual wood consumption exceeded 60 million m³, and since 1997 this has risen to more than 70 million m³. Industrial wood consumption has shown a continuous strong upward trend.

In 2004, total roundwood consumption reached 80.9 million m³ (including imports and exports), of which industrial wood consumption accounted for 74.9 million m³. Imported roundwood (17.4 mill. m³) accounted for 23% of industrial wood consumption.

Roundwood consumption in Finland, 1920–2004



Non-industrial consumption does not include exports of roundwood.

Source: Finnish Forest Research Institute

Roundwood consumption during 5-year periods, 1990–2004

Consumption category	1990–94	1995–99	mill. m ³ /yr 2000–04
Exports	1.0	1.0	0.8
Industrial roundwood	44.4	53.4	56.2
sawmills and panel industr.	20.0	27.1	29.0
pulp industries	24.4	26.3	27.2
Fuelwood and other	4.1	4.6	5.0
Domestic roundwood, total	49.5	59.0	62.0
Imported wood (industry)	6.8	9.8	15.3
Total consumption	56.3	68.8	77.3

In addition, pulp industry uses wood residues which originate mainly from the sawmilling industry. See p. 23.

Source: Finnish Forest Research Institute

Roundwood consumption and roundwood exports, 2002–2004

Consumption category	2002	2003	mill. m ³ 2004
Total consumption in Finland	76.5	78.6	80.1
Pine	27.5	29.2	29.2
Spruce	29.2	29.9	29.7
Hardwood	18.3	17.8	19.0
Unspecified	1.5	1.7	2.2
Domestic roundwood	60.2	62.1	62.7
Pine	24.7	26.3	26.1
Spruce	25.5	26.2	25.9
Hardwood	10.0	9.6	10.7
Imported wood	16.3	16.5	17.4
Pine	2.8	2.9	3.1
Spruce	3.7	3.7	3.8
Hardwood	8.3	8.2	8.3
Unspecified	1.5	1.7	2.2
Exports, incl. poles	0.7	0.8	0.8
Pine	0.6	0.6	0.6
Spruce	0.1	0.1	0.1
Hardwood	0.1	0.1	0.1

Source: Finnish Forest Research Institute

Wood consumption in sawmilling, plywood and pulp industries, 2002–2004

Year	Domestic roundwood		Imported wood	Sawmill chips	Total
	Conif.	Hardwood			
mill. m ³					
Sawmilling					
2002	25.1	0.2	3.5	-	28.8
2003	26.1	0.2	3.6	-	29.9
2004	25.4	0.2	3.7	-	29.2
Plywood and veneer industry					
2002	1.8	0.9	0.9	-	3.6
2003	1.9	1.0	0.8	-	3.7
2004	1.9	1.0	0.9	-	3.8
Mechanical pulp industry					
2002	8.3	0.8	1.5	2.6	13.2
2003	8.3	0.7	1.6	2.7	13.3
2004	8.0	0.8	1.9	2.8	13.5
Chemical pulp industry					
2002	12.5	5.2	10.3	8.3	36.3
2003	13.5	4.9	10.4	8.6	37.4
2004	14.1	5.8	11.0	8.2	39.1

Source: Finnish Forest Research Institute

Labour force

Roundwood harvesting in Finland today relies on the use of efficient, multi-function timber harvesters (numbering about 1500 on an average at work). Mechanization in harvesting has led to a continuous fall in the number of forest workers, and today the professional workforce comprises only about 5 500 full-time forest workers. In addition, the labour input of mainly forest owners is equivalent to approximately 2 500 man-years in harvesting.

Forestry employed 23 000 people in 2004, compared with 63 000 in 1980. The same trend applies to primary forest-industry production, which employed 120 000 people in 1980, but only 65 000 in 2004. However, paper production has more than doubled during the same period. Consequently, even in times of a booming economy, forestry and the forest industry do not have a significant role to play in ameliorating Finland's chronic unemployment problem (10.2% in May 2005).

Employment in forestry and forest industry, 2002–2004

	2002	2003	2004
	1 000 persons		
Forestry	21	22	23
Forest industries	71	68	65
Forest sector, total	92	89	88
Employment, total	2 372	2 365	2 365
Unemployed, total	237	235	229
Unemployment rate, %	9.1	9.0	8.8

Source: Statistics
Finland

Employment in forest industry, 2002–2004

Branch of industry	1 000 persons		
	2002	2003	2004
Sawmilling	11	11	9
Plywood and veneer industry	6	6	5
Other board industries	1	1	1
Other wood-products industry ¹	14	14	15
Pulp industry	16	15	14
Paper industry	14	13	12
Paperboard industry	4	4	4
Paper products industry	5	5	5
Forest industry, total	71	68	65

¹ Including carpentry products and pre-fabricated wooden houses.

Sources: Statistics Finland, Finnish Forest Research Institute

Commercial roundwood removals in 2004 amounted to 55.1 million m³, of which 85% came from non-industrial private forests. Fellings have been at a very high level since 1997.

Harvesting in non-industrial private forests is mainly carried out by the forest industry or by its wood-procurement organisations. In 2004, forest owners themselves carried out or organized the harvesting of 8.0 million m³, or 17% of the commercial roundwood removed from their forests.

In real terms, roundwood prices have been declining slightly in recent years.

Roundwood markets

Roundwood procurement and consumption in Finland, 2004

Sources	mill. m ³
Commercial roundwood	
from private-owned forests	46.6
from industry-owned forests	3.8
from state-owned forests	4.7
Non-commercial wood (priv. for.)	6.1
Domestic roundwood, total	61.2
Imported wood	17.5
Roundwood procurement, total	78.7
Consumption	
Sawmilling	29.2
Wood-based panels	3.8
Other wood-based products	0.4
Mechanical pulp industry	10.6
Chemical pulp industry	30.9
Industry, total	74.9
Household fuelwood	5.2
Exports of roundwood	0.8
Roundwood consumption, total	80.9

Over 80% of imported wood comes from Russia. In addition, sawmills furnished pulp industry with 11.0 mill. m³ of wood chips and other residues.

Source: Finnish Forest Research Institute

Roundwood removals by ownership category, 2002–2004

Ownership category	2002	2003	2004
			mill. m ³
Private forests ¹	52.4	52.8	52.7
commercial	46.3	46.7	46.6
non-commercial	6.1	6.1	6.1
Forests industries	3.1	3.5	3.8
Forest and Park Service ²	4.8	4.8	4.7
Commercial, total	54.2	55.0	55.1
Grand total	60.3	61.1	61.2

¹ including municipalities, parishes and some other public owners.

² a state-owned enterprise managing most of the state-owned forests.

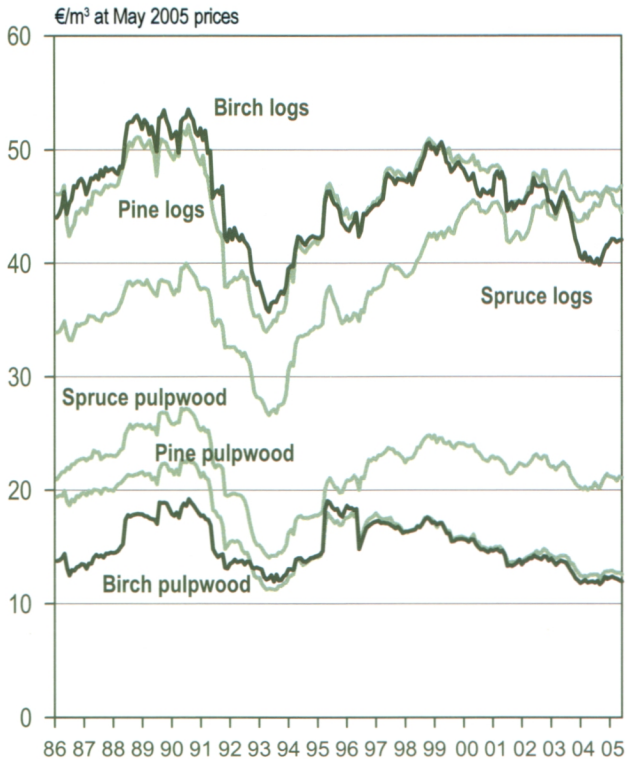
Source: Finnish Forest Research Institute

Removals by roundwood type, 2002–2004

Roundwood type	2002	2003	2004
			mill. m ³
Sawlogs	25.9	26.8	26.4
pine logs	10.4	11.3	10.8
spruce logs	14.3	14.4	14.6
hardwood logs	1.2	1.1	1.0
Pulpwood	28.2	28.2	28.6
pine pulpwood	12.5	12.4	12.7
spruce pulpwood	9.9	9.8	9.9
hardwood pulpwood	5.8	6.0	6.0
Commercial removals, total	54.2	55.0	55.1
Non-commercial removals	6.1	6.1	6.1
Grand total	60.3	61.1	61.2

Source: Finnish Forest Research Institute

Stumpage prices in non-industrial private forestry, 1986–2005



Stumpage prices are unit prices paid for different kinds of standing (uncut) timber.

Source: Finnish Forest Research Institute

Currently, about 110 000–130 000 hectares of Finnish forest land are planted or seeded annually for forestry after clear felling. The species chosen are almost exclusively native tree species. Seed-tree or shelterwood fellings conducted to encourage natural regeneration account for 30 000–40 000 hectares annually.

Silvicultural measures are applied to about 230 000 hectares of seedling stands annually. About half of Finland's mires (wetlands) have been drained for forestry, but nowadays forest ditching has ceased and efforts are concentrated instead on cleaning existing ditches. Forest fertilizers are applied to a minor extent.

The total cost of silvicultural and forest improvement work was EUR 218 million in 2004. Some 66% of the EUR 168 million spent in non-industrial private forestry was accounted for by self-financing or own work input of the forest owners themselves, and the rest was financed through state grants.

Silvicultural and forest improvement work

Felling activities, 2002–2004

Type of felling	1 000 ha		
	2002	2003	2004
Thinnings	337	318	335
Clear fellings	152	147	153
Seed-tree and shelterwood fellings	37	37	33
Removal of seed-tree and shelterwood	53	55	52
Other fellings	12	11	15
Total	591	568	588
% of forest area	2.6	2.5	2.6

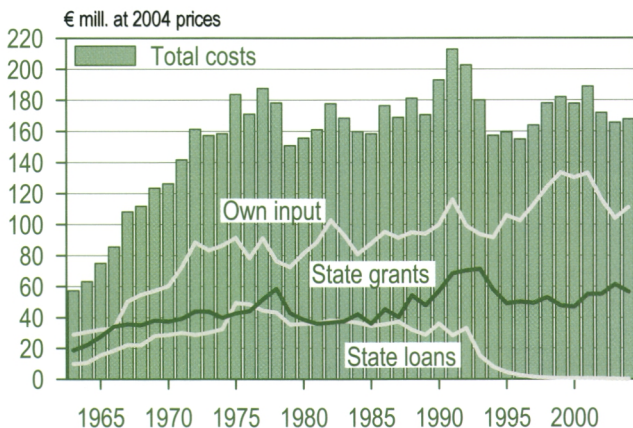
Source: Finnish Forest Research Institute

Silvicultural and forest improvement work, 2002–2004

Type of work		2002	2003	2004
Clearing of regeneration area	1000 ha	66	70	66
Soil preparation	"	125	133	123
Artificial regeneration	"	121	119	123
Seedling stand improvement	"	229	232	236
Forest fertilization	"	27	23	22
Drainage of mires	"	-	-	-
Maintenance of drainage	"	80	68	78
Construction of forest roads	km	1 306	977	831
Improvement of forest roads	"	1 511	1 820	2 046
Total costs	EUR mill.	218	215	218

Source: Finnish Forest Research Institute

Financing of silvicultural and forest-improvement works in non-industrial private forests 1963–2004



Source: Finnish Forest Research Institute

Information on Finland's forest resources is collected through surveys carried out by the Finnish Forest Research Institute. Systematic ground sampling has been used. The periods during which the national forest inventory has been undertaken are as follows:

I	1921–1924	IV	1960–1963	VII	1977–1984
II	1936–1938	V	1964–1970	VIII	1986–1994
III	1951–1953	VI	1971–1976	IX	1996–2003

Despite the 13% reduction in Finland's forest area in the 1940s due to the territory lost in the Second World War, Finland's wood resources are currently more plentiful than in the pre-war years. According to the first national forest inventory, the total growing stock volume was 1 588 million m³. The latest estimate is 2 091 million m³. In recent years, the annual volume increment has exceeded the drain by about 15 million m³.

The structure of Finnish forests has changed significantly over the past 80 years. The forests now have a more even age structure. Scots pine accounts for 48% of the growing stock, Norway spruce for 33% and broad-leaved species (mostly birch) for 19%. This distribution has been a stable one. Scots pine is the dominant species on 65% of Finland's forested land area.

The area of productive forest land (i.e. land capable of yielding at least 1 m³/ha/yr) is 20.3 million hectares, and that of other wooded land 2.7 million hectares. Thus, the total wood-growing area is 23.0 million hectares. The amount of this set aside for conservation purposes is 1.52 million hectares (6.6%). This land, on which all forestry activities are prohibited, lies almost entirely in the northern part of the country. According to the internationally defined concept of forest land, which sets a canopy cover of 10% as the threshold between forest land and other land, the forested land area is 21.9 million hectares.

The following tables are based on the ninth national forest inventory. Nature conservation areas are included.

Principal land use categories in Finland, 1996–2003

	mill. ha
Total area	33.8
Inland watercourses	3.4
Land area	30.4
Agricultural land	2.8
Built-up areas	0.9
Transport routes	0.4
Forest land	20.3
Other wooded land	2.7
Unproductive land ¹	3.2
Roads, depots	0.2
Forestry land, total	26.3
(of which nature conservation areas	2.8)

¹ Treeless hills and mires

Source: Finnish Forest Research Institute

A site is recorded as a mire if it is peat-covered or mire plants account for more than three quarters of the field layer flora.

In transforming mires the effect of drainage is perceptible in the growing stock. Transformed mires have reached full post-drainage productivity.

Source: Finnish Forest Research Institute

Mineral soils and mires and their drainage, 1996–2003

	mill. ha
Mineral soils	17.1
Mires	9.1
Roads, depots	0.2
Forestry land, total	26.3
Spruce mires	2.4
Pine mires	5.1
Treeless mires	1.6
Total	9.1
Undrained mires	4.1
Recently drained mires	0.3
Transforming mires	3.1
Transformed mires	1.6
Total	9.1

Dominant tree species of forest stands, 1996–2003

		% ¹
Temporarily non-stocked		1.3
Scots pine	<i>Pinus sylvestris</i>	65.4
Norway spruce	<i>Picea abies</i>	23.7
Other coniferous		0.1
Silver birch	<i>Betula pendula</i>	2.5
Downy birch	<i>Betula pubescens</i>	6.2
Aspen	<i>Populus tremula</i>	0.3
Alder	<i>Alnus sp.</i>	0.4
Other broadleaves		0.0
Total		100.0
Forest land area	(mill. ha)	20.3

¹ of forest land area.
Note that of volume, share of the broadleaved species is much greater.

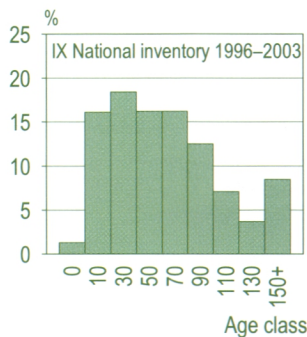
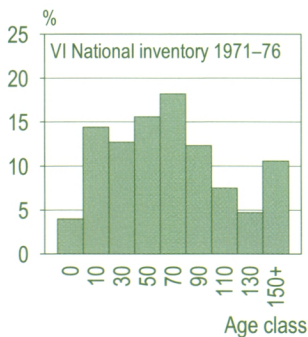
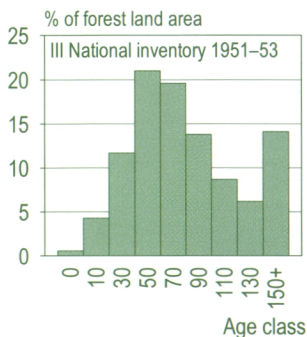
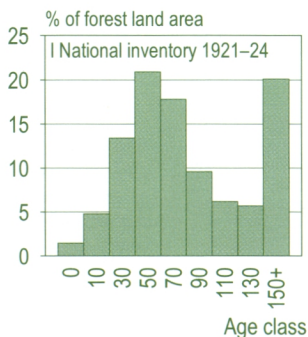
Source: Finnish Forest Research Institute

Timber resources in Finland, 1996–2003

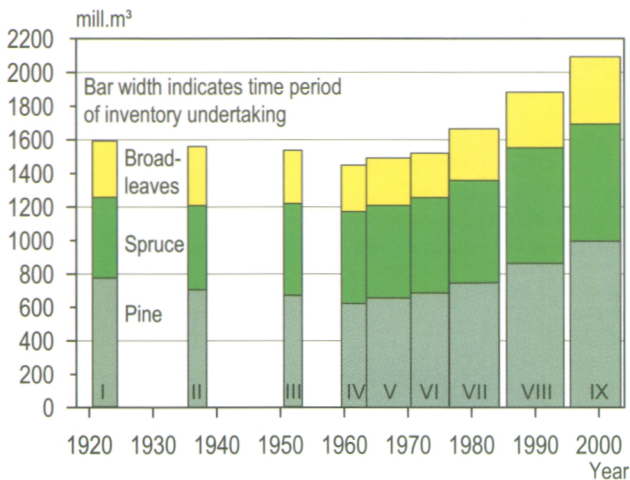
Forest and other wooded land	mill. ha	23.0
Growing stock volume	mill. m ³	2 091
Scots pine	"	1 000
Norway spruce	"	695
Birch	"	325
Other broadleaves	"	72
Volume increment	mill.m ³ /yr	86.7
Scots pine	"	39.5
Norway spruce	"	27.3
Birch	"	15.5
Other broadleaves	"	4.4

Source: Finnish Forest Research Institute

Age structure development of the Finnish forests



Growing stock volumes according to nine national forest inventories



Source: Finnish Forest Research Institute

Forest ownership in Finland, 1996–2003

Ownership category	Forest land mill. ha	Forestry land mill. ha	%
Non-indust.. private	12.2	13.8	52.4
Industrial private	1.8	2.0	7.8
State	5.2	9.1	34.7
Other public	1.1	1.3	5.1
Total	20.3	26.3	100.0

Source: Finnish Forest Research Institute

Non-industrial private ownership of forests, 1999

Ownership group	%	
	On holdings/ owners	On forest land area
Family ownership	75	76
Group ownership	11	12
Heirs ownership	14	12
Farmers	22	33
Other entrepreneurs	6	6
Wage earners	30	25
Pensioners	37	32
Others	5	4
Age < 40 years	11	13
Age 40–59 years	45	47
Age 60+ years	44	40
Reside on holding	50	60
Reside in the same municipality	17	15
Reside elsewhere	33	25

The figures apply to forest holdings with 5+ ha of forest land, of which there are about 320 000, and their corresponding forest land area is 12.2 million ha.

Source: Finnish Forest Research Institute

Growing stock volume by ownership category, 1996–2003

Ownership category	Scots pine	Norway spruce	Broad-leaves	mill. m ³	
				Total	%
Non-indust. private	591	521	279	1 392	66.5
Industrial private	99	51	29	178	8.5
State	254	89	67	411	19.7
Other public	56	34	21	111	5.3
Total	1 000	695	396	2 091	100.0

Source: Finnish Forest Research Institute

Annual volume increment by ownership category, 1996–2003

Ownership category	Scots pine	Norway spruce	Broad-leaves	mill. m ³ /yr	
				Total	%
Non-indust. private	23.4	21.2	14.7	59.2	68.3
Industrial private	4.7	2.2	1.5	8.4	9.7
State	9.2	2.6	2.7	14.5	16.7
Other public	2.2	1.3	1.0	4.6	5.3
Total	39.5	27.3	19.9	86.7	100.0

Source: Finnish Forest Research Institute

Mean growing stock volume and annual increment by ownership category, 1996–2003

The data refer to stands on forest land.

State forests are located mainly in northern Finland where the climate is less favourable.

Source: Finnish Forest Research Institute

Ownership category	Mean volume m ³ /ha	Increment m ³ /ha/yr	Increment %
Non-industrial, private	112	4.8	4.3
Industrial, private	97	4.7	4.8
State	73	2.6	3.6
Other public	101	4.3	4.3
Total	100	4.2	4.2

Increment (I) and drain (D) in 5-year periods

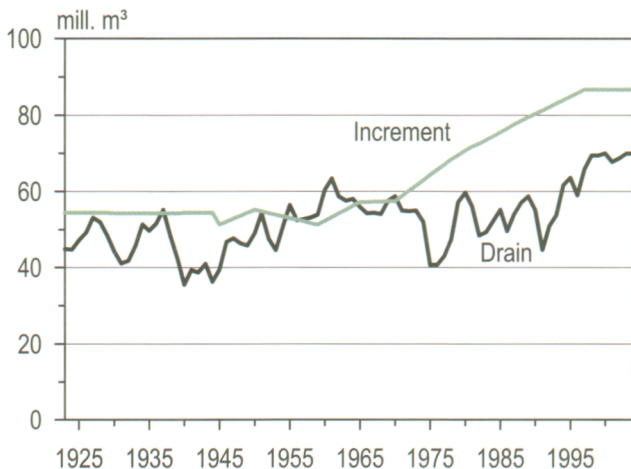
Increments for 2000–04 are forecasts.

Drain refers to losses in growing stock due to fellings, silvicultural measures and natural mortality.

Source: Finnish Forest Research Institute

		1990–94	1995–99	mill. m ³ /yr 2000–04
Scots pine	I	36.2	39.3	39.5
	D	20.0	25.1	27.6
Norway spruce	I	27.5	27.2	27.3
	D	22.3	27.8	28.3
Broadleaves	I	18.5	19.7	19.9
	D	11.0	12.5	13.3
Total	I	82.2	86.2	86.7
	D	53.2	65.4	69.2

Increment and drain of the growing stock , 1923–2004



Multiple production of forests, 2002–2004

Product		2002	2003	2004
Commercial roundwood	mill. m ³ o.b.	54	55	55
Non-commercial roundwood	mill. m ³ o.b.	6	6	6
Commercial forest berries	t ¹	4 797	7 771	3 122
Commercial forest mushrooms	t ¹	219	1 664	357
Lichen picked for exporting	t	319	313	287
Deer venison	t	12 120	12 236	10 083
Hare venison	t	502	501	512
Forest game birds	t	189	244	210
Fur-bearing animals	1000 indiv.	224	260	266
Reindeer meat production	t	2 400	2 600	2 500

¹ Quantities offered for sale, in tonnes.

Sources: Finnish Forest Research Institute, Finnish Game and Fisheries Research Institute

Forest condition in Finland, 1996–2003

Forest land area, total 20.3 mill. ha

Extent of damage affecting stand quality	% of forest land
Totally damaged	0.4
Severely damaged	5.0
Moderately damaged	19.3
Total	24.6

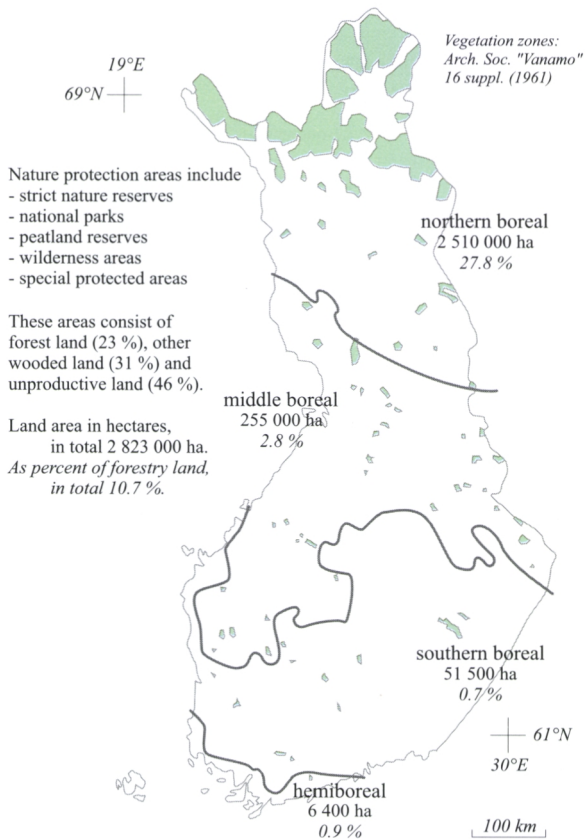
Damage agents

	Natural competition	0.7
	Climatic factors	5.4
	Harvesting damages	1.1
	Moose	1.9
	Voles	0.0
	Insects	0.3
	Fungi	5.2
	Unidentified	10.1
	Total	24.6

In two-storeyed stands only damage affecting the dominant storey is taken into account.

Source: Finnish Forest Research Institute

Nature protection areas by vegetation zone



Source: Finnish Environment Institute (2005)

KEY CONTACTS IN FINNISH FOREST RESEARCH

FINNISH FOREST RESEARCH INSTITUTE

(Metsäntutkimuslaitos, METLA)

- **Vantaa Research Centre, Helsinki Unit**

Unioninkatu 40 A, FIN-00170 Helsinki

Tel. +358 10 2111, fax +358 10 211 2101

Website: www.metla.fi

(Forest Resources and Economics, Administration)

- **Vantaa Research Centre, Vantaa Unit**

Jokiniemenkuja 1, FIN-01300 Vantaa

Tel. +358 10 2111, fax +358 10 211 2202

Website: www.metla.fi/va

(Forest Ecology and Production)

- **Joensuu Research Centre**

Yliopistokatu 6, FIN-80100 Joensuu

Tel. +358 10 2111, fax +358 10 211 3113

Website: www.metla.fi/jo

(Silviculture and Forest Management)

Research Stations of the Finnish Forest Research Institute:

- **Kannus Research Station**

Silmäjärventie 2, FIN-69100 Kannus

Tel. +358 10 2111, fax +358 10 211 3401

Website: www.metla.fi/ka

(Peatland Forestry, Bioenergy)

- **Kolari Research Station**

Muoniontie 21 A, FIN-95900 Kolari

Tel. +358 10 2111, fax +358 10 211 3501

Website: www.metla.fi/ko

(Timberline research)

- **Muhos Research Station**

Kirkkosaarentie 7, FIN-91500 Muhos

Tel. +358 10 2111, fax +358 10 211 3701

Website: www.metla.fi/mu

(Forest Condition, Forest Regeneration)

- **Parkano Research Station**

Kaironiementie 54, FIN-39700 Parkano

Tel. +358 10 2111, fax +358 10 211 4001

Website: www.metla.fi/pa

(Peatland Forestry, Forest Regeneration)

- **Punkaharju Research Station**

Finlandiantie 18, FIN-58450 Punkaharju

Tel. +358 10 2111, fax +358 10 211 4201

Website: www.metla.fi/pu

(Forest Genetics)

- **Rovaniemi Research Station**

Eteläranta 55, FIN-96300 Rovaniemi

Tel. +358 10 2111, fax +358 10 211 4401

Website: www.metla.fi/ro

(Forest Condition, Forest Regeneration)

- **Suonenjoki Research Station**

Juntintie 40, FIN-77600 Suonenjoki

Tel. +358 10 2111, fax +358 10 211 4801

Website: www.metla.fi/su

(Ecophysiology, Regeneration Research)



European Forest Institute

(Euroopan Metsäinstituutti)

Torikatu 34, FIN-80100 Joensuu

Tel. +358 13 252 020, fax +358 13 124 393

Website: www.efi.fi

(Independent, Non-governmental Research Unit)

Finnish Game and Fisheries Research Institute

(Riista- ja kalatalouden tutkimuslaitos)
Viikinkaari 4, FIN-00720 Helsinki
Tel. +358 205 7511 , fax +358 205 751 201
Website: www.rktl.fi

Finnish Pulp and Paper Research Institute (KCL)

(Keskuslaboratorio)
Tekniikantie 2, FIN-02150 Espoo
Tel. +358 9 43 711 , fax +358 9 464 305
Website: www.kcl.fi
(Owned by paper industry)

Finnish Society of Forest Science

(Suomen Metsätieteellinen Seura)
Unioninkatu 40 A, FIN-00170 Helsinki
Tel. +358 10 211 2144, fax +358 10 211 2102
Website: www.metla.fi/org/sms

The Finnish Society of Forest Science and the Finnish Forest Research Institute jointly publish *Silva Fennica*.

Silva Fennica is a peer-reviewed international journal of forest science. It covers all aspects of forest research. In addition to original research articles, the journal publishes review articles, research notes, discussion papers, book reviews, and information on forthcoming events. In 2000, the other scientific journal, *Acta Forestalia Fennica*, was amalgamated into *Silva Fennica*. The scope of *Silva Fennica* was broadened, so that *Silva* now publishes more extensive papers as *Silva Fennica Monographs*.

Editorial office:

METLA/ Editorial Office
Unioninkatu 40 A, FIN-00170 Helsinki
Tel. +358 10 2111, fax +358 10 211 2101
Website: www.metla.fi/silvafennica

Metsäteho

Snellmaninkatu 13, FIN-00170 Helsinki
Tel. +358 9 132 521, fax +358 9 659 202
Website: www.metsateho.fi
(R&D Unit for Timber Procurement and Production,
mainly owned by Forest Industries)

Pellervo Economic Research Institute PTT

(Pellervon taloudellinen tutkimuslaitos PTT)
Eerikinkatu 28 A, FIN-00180 Helsinki
Tel. +358 9 3488844, fax. +358 9 34888500
Website: www.ptt.fi
(Related to the Finnish cooperative movement)

University of Helsinki

Faculty of Agriculture and Forestry
Forestry Departments
Latokartanonkaari 7, FIN-00710 Helsinki
Tel. +358 9 1911

Viikki Science Library of Helsinki University

(Applied biosciences)
Viikinkaari 11 A, FIN-00710 Helsinki
Tel. +358 9 191 58028, fax +358 9 191 58011
Website: www.tiedekirjasto.helsinki.fi

University of Joensuu

Faculty of Forestry
Yliopistokatu 7, FIN-80100 Joensuu
Tel. +358 13 251 111, fax +358 13 2513 590
Website: gis.joensuu.fi

TTS Work Efficiency Institute

(Työtehoseura)
Melkonkatu 16 A, FIN-00210 Helsinki
Tel. +358 9 2904 1200, fax +358 9 6922 084
Website: www.tts.fi
(Small-scale forestry, Forest work)

Other useful contacts

Ministry of Agriculture and Forestry

(Maa- ja metsätalousministeriö)
Hallituskatu 3 A, FIN-00170 Helsinki
Tel. +358 9 16001, fax +358 9 16052 190
Website: www.mmm.fi

Ministry of the Environment

(Ympäristöministeriö)
Kasarmikatu 25, FIN-00130 Helsinki
Tel. +358 9 16 007, fax +358 9 1603 9545
Website: www.ymparisto.fi

Finnish Environment Institute

(Suomen ympäristökeskus)
Mechelininkatu 34 a, FIN-00260 Helsinki
Tel. +358 9 403 000, fax +358 9 4030 0190
Website: www.ymparisto.fi
(Governmental expert management of environment)

Finnish Forest and Park Service

(Metsähallitus)
Vernissakatu 4, FIN-01300 Vantaa
Tel. +358 205 64100
Website: www.metsa.fi
(State-owned enterprise managing most of state forests)

Finnish Meteorological Institute

(Ilmatieteen laitos)
Erik Palménin aukio 1, FIN-00560 Helsinki
Tel. +358 9 19291, fax +358 9 179581
Website: www.ilmatieteenlaitos.fi

Forestry Development Centre Tapio

(Metsätalouden kehittämiskeskus Tapio)
Soidinkuja 4, FIN-00700 Helsinki
Tel. +358 9 15 621, fax +358 9 1562 232
Website: www.tapio.net
(Provides expertise particularly for private forestry)

MTK Forest Group

(MTK, Metsäryhmä)

Simonkatu 6, FIN-00100 Helsinki

Tel. +358 20 4131, fax +358 20 413 2403

Website: www.mtk.fi

(MTK is the Finnish Federation of Agricultural and Forestry Producers)

Finnish Forest Industries Federation

(Metsäteollisuus ry)

Snellmaninkatu 13, FIN-00170 Helsinki

Tel. +358 9 13 261, fax +358 9 132 4445

Website: www.forestindustries.fi

Finnish Forest Association

(Suomen Metsäyhdistys)

Salomonkatu 17 A, FIN-00100 Helsinki

Tel. +358 9 685 0880, fax +358 9 6850 8820

Website: www.smy.fi

(Joint association for those related to forestry and forest industry)

Statistics Finland

(Tilastokeskus)

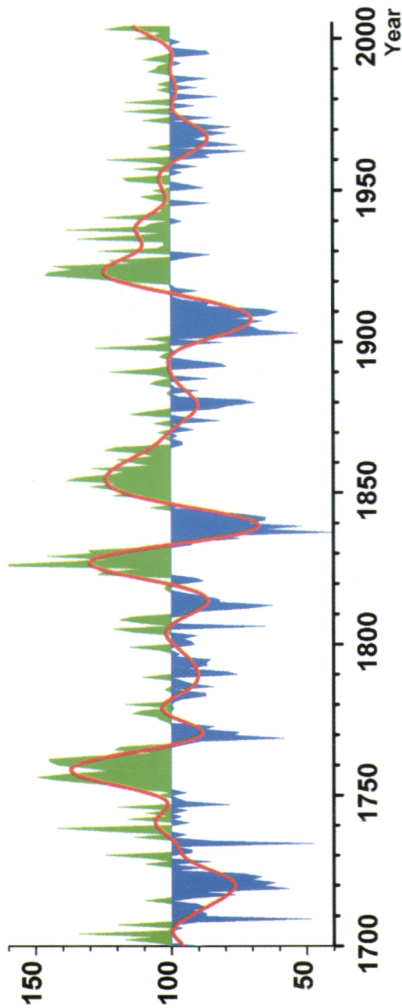
Työpajakatu 13, FIN-00580 Helsinki

Tel. +358 9 17 341, fax +358 9 1734 2750

Website: www.stat.fi

Source: Finnish Forest Association

A 305-year tree-ring calendar of timberline Scots pine in Finland



Mean growth level during 1700-2004 equals 100

Source: The Finnish Forest Research Institute