

FOREST FINLAND

IN BRIEF

2003

Finnish Forest Research Institute

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FOREST FINLAND IN BRIEF

offers a concise description of the Finnish forestry and forest industries in an international context from the viewpoint of forest statistics. For a more detailed description the reader is referred to the Finnish Statistical Yearbook of Forestry with approximately 200 tables and 60 figures in English.

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

Finland has committed itself to sustainable forestry in a broad sense, including biodiversity, social and cultural values of the forests. The reformed forest and nature-conservation legislation, as well as Finland's National Forest Programme 2010, provide a framework for achieving these ends.

Helsinki, August 2003

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INTERNATIONAL CONTEXT

Major producers and traders

Finland, with its 23.0 million forest hectares (0.6% of the world total), is an important supplier of forest products to global markets. Finland's boreal coniferous forests, with their good mixture of broadleaves, enable annual fellings of over 60 million m³ on a sustained basis, and this allowable cut is increasing. The infrastructure for roundwood procurement is good. Finnish forest industries are highly export-oriented. In most branches of these industries, 70% to 90% of the production goes abroad. Finland is a major exporter of sawn softwood and paper, particularly graphic papers.

Global roundwood production in 2001

(million m³ under bark):

Industrial wood	1 543	Softwood	1 169
Fuelwood&charcoal	1 784	Hardwood	2 158
	3 327		3 327

The total value of the global export trade of forest products amounted to USD 132 billion (f.o.b) in 2001, of which Finland's share was 7.6%. In the following tables, the Russian Federation is included in Europe.

World production of softwood, 2001

World	1 169	mill. m ³ u.b.
Europe	385	
USA	284	
Canada	146	
China	138	
Russia	108	
Sweden	57	
Brazil	53	
Finland	44	

World imports of roundwood and wood chips, 2001

World	162.2	mill. m ³ u.b.
Europe	70.1	
Japan	39.6	
China	20.3	
Finland	13.3	
Sweden	10.9	
Canada	8.9	
Korea Rep.	8.8	
Austria	8.6	

World production of sawn softwood, 2001

World	271.4	mill. m ³
Europe	109.5	
USA	59.4	
Canada	46.7	
Russia	17.5	
Sweden	15.6	
Japan	15.0	
Germany	14.9	
Finland	12.7	
Austria	10.0	
Brazil	7.8	
China	4.7	

World exports of sawn softwood, 2001

World	89.9	mill. m ³
Europe	47.7	
Canada	35.1	
Sweden	10.8	
Finland	8.1	
Russia	7.1	
Austria	6.1	
Germany	3.0	
Latvia	2.4	
Czech Rep.	1.6	
New Zealand	1.6	
USA	1.5	

World production of paper and paperboard, 2001

World	320.3	mill. metric tons
Europe	98.4	
USA	81.5	
China	37.9	
Japan	30.7	
Canada	19.8	
Germany	17.9	
Finland	12.5	
Sweden	10.5	
France	9.6	
Korea Rep.	9.3	
Italy	8.9	

World exports of paper and paperboard, 2001

World	94.6	mill. metric tons
Europe	56.7	
Canada	14.5	
Finland	10.9	
Germany	8.8	
Sweden	8.7	
USA	8.4	
France	4.6	
China	3.6	
Austria	3.3	
Netherlands	3.1	
Korea Rep.	2.3	

Value of global exports of forest-industries' products, 2001

	USD billion	USD per capita
World	132.2	22
Europe	66.2	91
Canada	24.3	790
USA	14.1	50
Germany	10.5	128
Finland	10.1	1 941
Sweden	9.1	1 027
France	5.4	92
Indonesia	5.0	24

Source: FAO
Yearbook. Forest
Products 2001

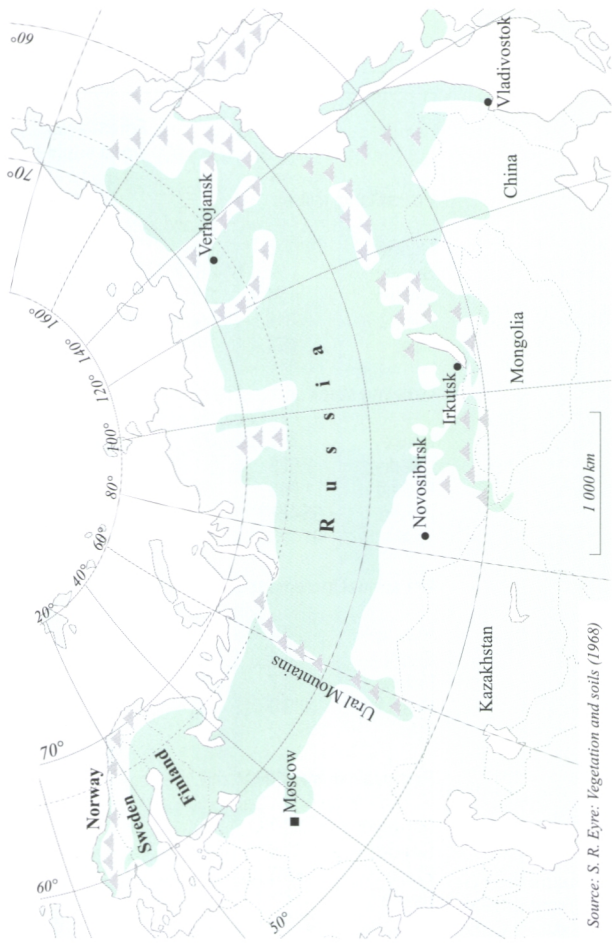
Eurasian boreal forest zone

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 in area is one of the most important providers of roundwood in the world. In the European part and West Siberia, Scots pine and Norway spruce dominate. In East Siberia, Siberian larch, and in the Russian Far East, Dahurian larch are the most important species. In the mountainous Far East, the forests are mostly inaccessible.

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

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	49	573.7

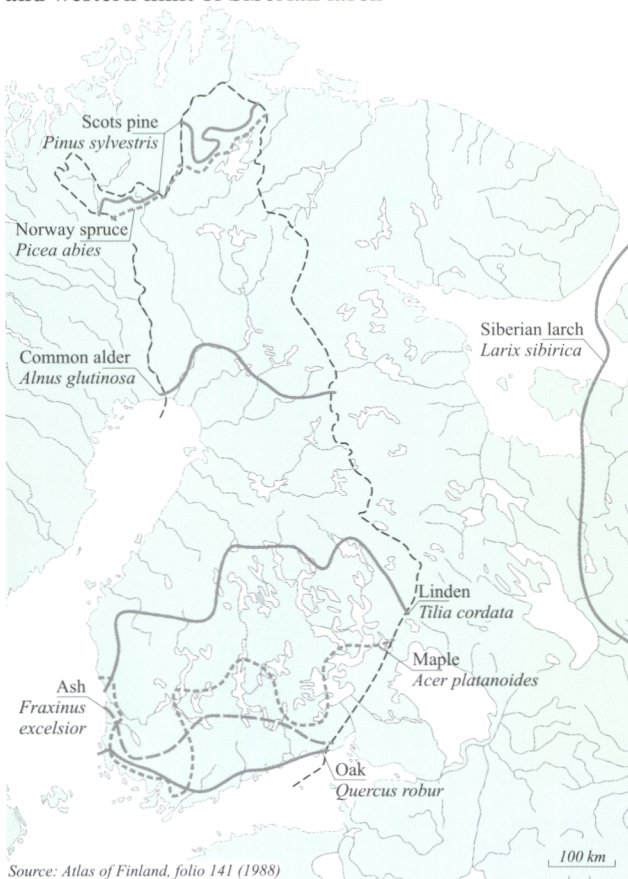
Growing stock on forest land, mill. m³ over bark				
	Conif., %		Conif., %	
Norway	771	77	671	80
Sweden	2 928	84	2 567	85
Finland	1 940	82	1 867	82
Russia	85 487	80	60 922	73
Total	91 126	80	66 027	74

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

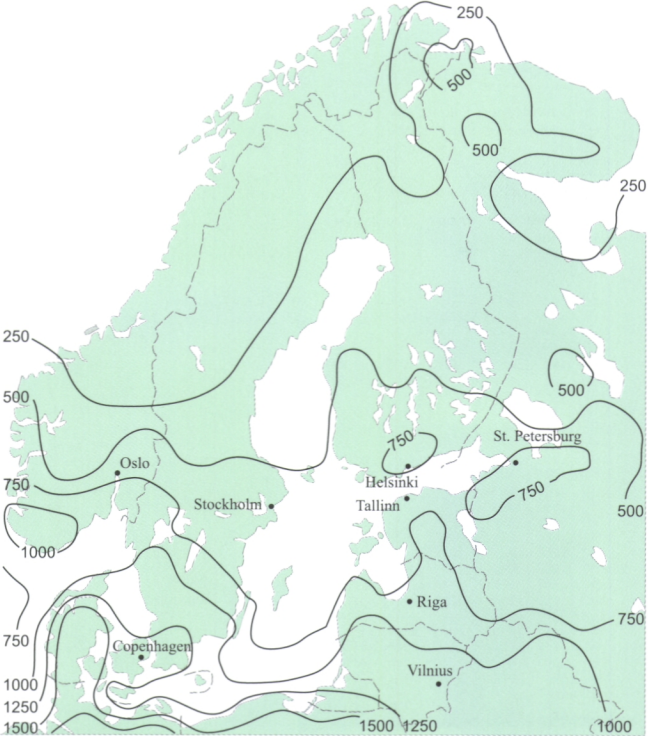
Source: The UN-ECE/
FAO Forest Resource
Assessment 2000

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



Source: Atlas of Finland, folio 141 (1988)

Combined deposition of sulphur and nitrogen in the Nordic and the Baltic countries in 1999, 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, of which Finland became a member in 1995, is the most important customer region for Finnish forest-industries' products; its share is about 65% of both sawn goods and of paper and paperboard exports. Customer-orientation has also led to large Finnish investments in forest-product manufacturing in the region. The capacity of the Finnish-owned paper and paperboard industries in the EU countries other than Finland is about 12 million tonnes, not taking into account M-real's and Stora Enso's paper mills in Sweden.

The forest resources of the European Union roughly doubled in 1995 when forest-rich Finland, Sweden and Austria joined the EU. The EU's eastward enlargement in May, 2004, will bring additional 30 million hectares of commercial forests into the Union.

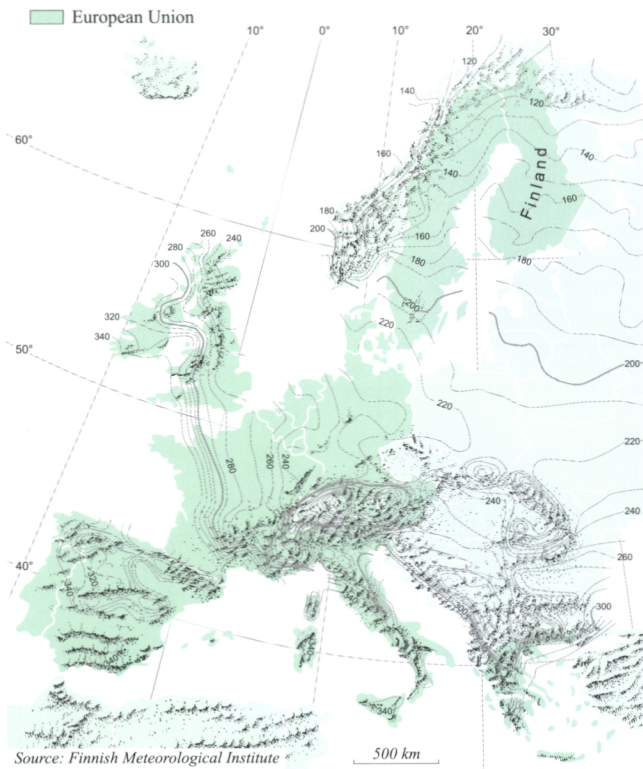
The European Union

Forests available for wood supply in the European Union

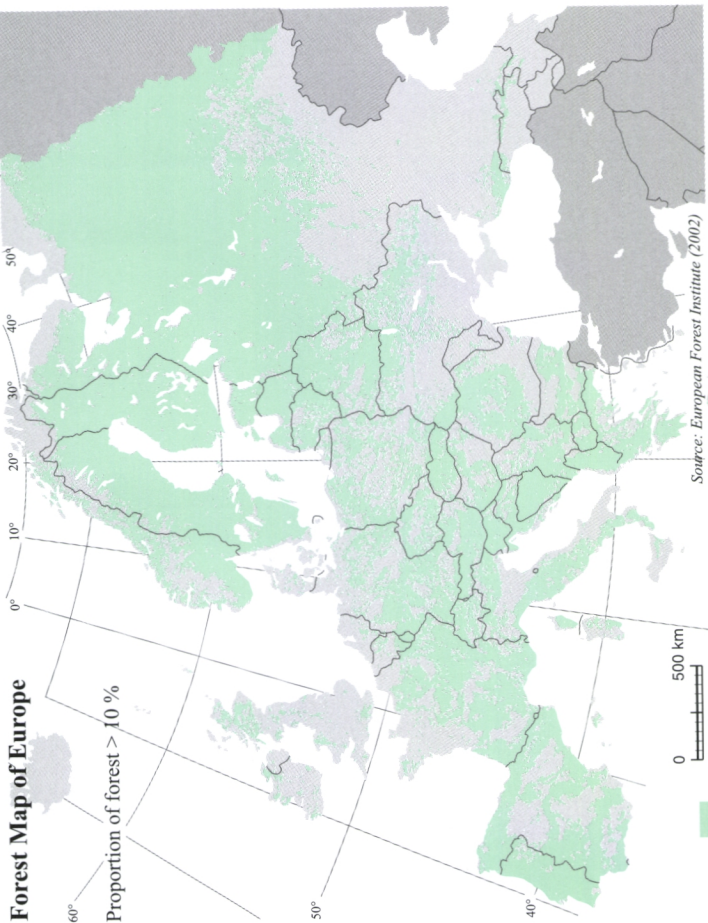
Country	Forest area mill. ha	Growing stock mill. m ³	of which conif., %	Increment in mid-90s mill. m ³ /yr	Removals mill. m ³ /yr
Austria	3.4	1 037	82	27.3	16.9
Belgium	0.6	140	46	5.1	4.4
Denmark	0.4	54	58	3.2	2.2
Finland	20.7	1 867	82	72.5	49.5
France	14.5	2 836	36	92.3	47.6
Germany	10.1	2 820	69	89.0	38.9
Greece	3.1	140	56	3.5	2.4
Ireland	0.6	43	92	3.5	2.3
Italy	6.0	877	33	18.7	8.4
Luxembourg	0.1	20	18	0.7	0.4
Netherlands	0.3	52	56	2.2	1.2
Portugal	1.9	188	75	12.9	11.0
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
Total	95.5	13 420	65	459.5	268.2

Duration of the growing season in Europe

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



Forest Map of Europe



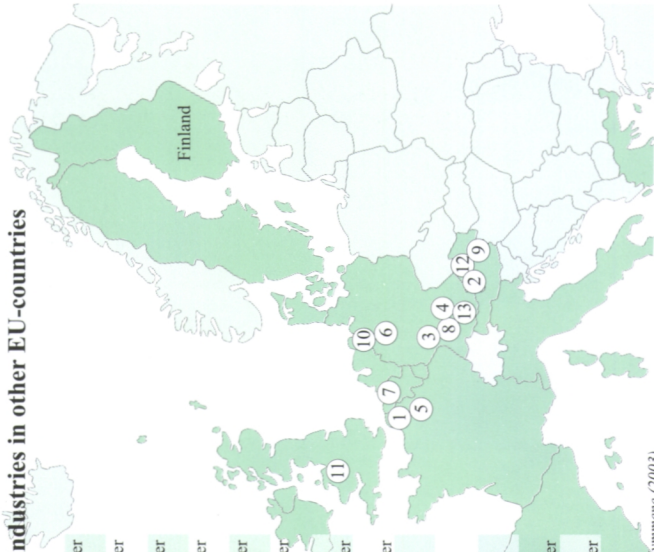
Some major Finnish-owned forest industries in other EU-countries

(excl. Sweden)

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

Stora Enso is a Finnish-Swedish company.

Source: Annual Reports of M-real, Stora Enso and UPM-Kymmene (2003)



Finnish exports of forest-industry products to the European Union, 2002

	Sawn goods 1 000 m ³	Plywood and veneer 1 000 m ³	Particle board	Fibre board 1 000 m.t.	Wood Pulp	Paper and paperboard
Austria	68	30	-	-	20	116
Belgium–Luxemb.	137	21	-	2	117	615
Denmark	458	64	7	5	0	240
France	820	102	0	1	151	684
Germany	745	212	0	9	796	2 201
Greece	150	6	-	1	12	149
Ireland	148	12	1	2	0	38
Italy	251	76	-	1	106	433
Netherlands	558	164	0	8	73	483
Portugal	8	11	-	-	42	80
Spain	285	53	-	-	26	873
Sweden	42	107	14	6	208	289
United Kingdom	1 428	123	152	30	173	1 638
EU, total	5 098	982	174	64	1 723	7 841
% of total exports	62	82	79	88	77	66

Source: National Board of Customs

FINNISH FORESTRY AND FOREST INDUSTRIES

National economy, forestry and the forest industries

In order to achieve economic growth in post-war Finland, investments in pulp and paper industries doubled the production between 1955 and 1965. This trend has continued, and not only in the forest industries, but also in the metal industries and more recently in the high-tech electronic industry.

In 1970, roundwood and forest-industries' products represented 56% of the value of the total exports of goods; their share was 26% in 2002. The same diversification of production is, of course, to be seen in the structure of the gross domestic product. In 1970, the share of forestry of the GDP was 6.3%, and that of basic forest industries, 6.7%. The corresponding figures for the year 2002 were 2.1% and 4.8%. In employment, forestry accounted for 4.1% and forest industries for 5.2% in 1970. In 2002, the corresponding figures were 0.9% and 3.0% respectively.

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

Forestry and forest industries in the Finnish national economy, 2002

Gross domestic product

at market prices	EUR 139.7 billion
at basic prices	EUR 121.4 billion
of which forestry	2.1 %
forest industries	4.8 %

Total employment

	2.37 million persons
of which forestry	0.9 %
forest industries	3.0 %

Total exports of goods

	EUR 47.2 billion
of which forestry	0.2 %
forest industries	25.9 %

Source: Statistics
Finland

Finland is among the major suppliers of forest-related products to the world markets, particularly in printing and writing paper, and is one of the biggest importers of roundwood. In 2002, the total value of forest-industries' products exports amounted to EUR 12 billion. Germany and the United Kingdom are the foremost importers of Finnish forest-industries' products, together accounting for 32% of the total.

Forest industries: production and exports

Production of Finnish forest industries, 2000–2002

Product	Unit 1 000	2000	2001	2002
Sawn goods	m ³	13 400	12 770	13 380
Plywood	"	1 170	1 145	1 240
Particle board	"	462	430	410
Fibreboard	m.t.	100	109	101
Mechanical pulp	"	4 810	4 621	4 587
Chemical pulp	"	7 101	6 548	7 143
Pulp, total	"	11 910	11 169	11 730
Newsprint	"	1 394	1 296	1 007
Magazine paper	"	5 348	5 062	5 335
Fine paper	"	3 005	2 530	2 608
Kraft paper	"	528	494	543
Other paper	"	483	520	544
Paper, total	"	10 758	9 902	10 038
Paperboard	"	2 751	2 601	2 738
Paper and paperboard	"	13 509	12 503	12 776

Source: Finnish Forest Industries Federation

Finnish forest industry exports, 2000–2002

Product	Unit 1 000	2000	2001	2002
Sawn goods	m ³	8 431	8 135	8 187
Plywood	"	1 006	1 009	1 117
Particle board	"	204	218	219
Fibreboard	m.t.	69	72	72
Mechanical pulp	"	96	92	156
Chemical pulp	"	1 583	1 606	1 959
Newsprint	"	1 144	1 041	749
Magazine paper	"	5 095	4 711	5 070
Fine paper	"	2 805	2 316	2 571
Kraft paper	"	376	460	402
Other paper	"	287	366	324
Paper, total	"	9 709	8 894	9 116
Paperboard	"	2 324	2 209	2 310
Converted paper products	"	394	417	420
Total paper and paperboard	"	12 427	11 520	11 846

Source: National
Board of Customs

Value of Finnish forest industry exports, 2002

Country					EUR mill.
	Sawn goods	Wood-based panels, other wood products	Pulp	Paper, paper-board, converted products	Total
Austria	13	32	9	82	136
Belgium-Luxemb.	19	16	53	416	504
Denmark	76	63	0	183	322
France	141	73	65	511	790
Germany	129	193	331	1 561	2 214
Greece	23	10	5	85	123
Ireland	27	13	0	29	69
Italy	53	45	44	297	439
Netherlands	91	76	30	343	540
Portugal	2	6	17	53	78
Spain	45	44	10	552	651
Sweden	10	118	79	236	443
United Kingdom	273	166	80	1 203	1 722
EU total	901	855	721	5 552	8 029
Other Europe	51	236	82	1 046	1 415
Europe total	953	1 091	802	6 599	9 445
Asia	304	143	68	710	1 225
Africa	163	1	8	101	273
North America	20	57	48	763	888
Latin America	0	0	1	180	181
Oceania	2	6	0	147	155
Unspecified	-	-	-	82	82
Grand total	1 441	1 299	927	8 581	12 248

Source: National Board of Customs

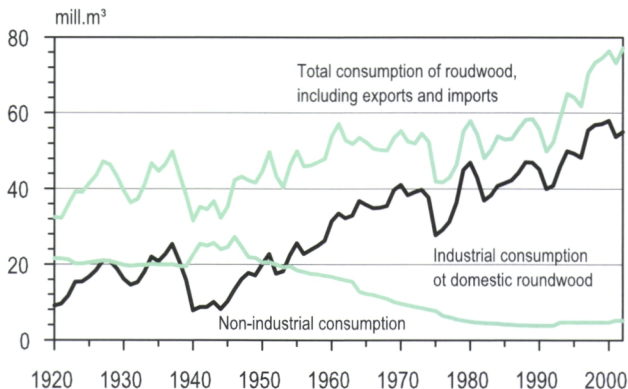
Wood consumption

Despite a multiple increase in wood pulp production, total wood consumption in Finland remained at approximately the same level during the 30-year period from 1960. The years 1994 to 1996 were the first ones in which annual wood consumption exceeded 60 million m³, and since 1997 the consumption has exceeded 70 million m³.

Many structural changes, such as reductions in fuelwood consumption and roundwood exports, as well as the increased use of industrial wood residues, contributed to rather modest increases in total wood consumption until the year 1993. Industrial wood consumption has shown a continuous strong upward trend.

In 2002, total roundwood consumption reached 77.2 million m³, including imports and exports. Industrial wood consumption was 71.3 mill. m³. Imported roundwood (16.3 mill. m³) accounted for 23% of industrial wood consumption.

Roundwood consumption in Finland, 1920–2002



Non-industrial consumption does not include exports of roundwood.

Source: Finnish Forest Research Institute

Roundwood consumption during 5-year periods, 1990–2002

Consumption category	1990–94	1995–99	mill. m ³ /yr 2000–02
Exports	1.0	1.0	0.8
Industrial roundwood	44.4	53.4	55.6
sawmills and panel industr.	20.0	27.1	28.9
pulp industries	24.4	26.3	26.7
Fuelwood and other	4.1	4.6	5.0
Domestic roundwood, total	49.5	59.0	61.4
Imported wood (industries)	6.8	9.8	14.2
Total consumption	56.3	68.8	75.6

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

Source: Finnish Forest Research Institute

Roundwood consumption and roundwood exports, 2000–2002

Consumption category	2000	2001	mill. m ³ 2002
Total consumption in Finland	75.4	72.5	76.5
Pine	25.9	25.4	27.5
Spruce	30.7	29.3	29.2
Hardwood	17.8	16.4	18.3
Unspecified	1.0	1.3	1.5
Domestic roundwood	62.6	58.9	60.2
Pine	23.9	23.0	24.7
Spruce	28.5	26.4	25.5
Hardwood	10.2	9.6	10.0
Imported wood	12.8	13.5	16.3
Pine	2.1	2.4	2.8
Spruce	2.2	2.9	3.7
Hardwood	7.6	6.9	8.3
Unspecified	1.0	1.3	1.5
Exports, incl. poles	0.9	0.7	0.7
Pine	0.7	0.5	0.6
Spruce	0.1	0.1	0.1
Hardwood	0.1	0.1	0.1

Source: Finnish
Forest Research
Institute

*Pine: Pinus
sylvestris
Spruce: Picea abies
Hardwood: mainly
Betula sp.*

*'Unspecified'
consists of imported
wood chips and
residues.*

Wood consumption in sawmilling, plywood and pulp industries, 2000–2002

Year	Domestic roundwood		Imported wood	Sawmill chips	Total
	Conif.	Hardwood			
	mill. m ³				
	Sawmilling				
2000	27.1	0.2	2.1	-	29.4
2001	24.8	0.2	2.9	-	27.9
2002	25.1	0.2	3.5	-	28.8
	Plywood and veneer industry				
2000	1.7	1.1	0.6	-	3.4
2001	1.6	1.0	0.8	-	3.4
2002	1.8	0.9	0.9	-	3.6
	Mechanical pulp industry				
2000	8.9	0.7	0.9	2.8	13.3
2001	8.4	0.9	1.1	2.6	13.0
2002	8.3	0.8	1.5	2.6	13.2
	Chemical pulp industry				
2000	12.8	5.1	9.2	9.1	36.2
2001	12.0	4.6	8.7	7.9	33.2
2002	12.5	5.2	10.3	8.3	36.3

Source: Finnish Forest Research Institute

Labour force

Efficient multi-function timber harvesters (nowadays numbering about 1500) prevail in logging operations. Mechanization in logging has led to a continuous fall in the number of forest workers. Today, a professional workforce of only about 6 000 men are employed in logging proper. In addition, the labour input of mainly forest owners is equivalent to approximately 3 000 man-years.

Forestry employed 21 000 people in 2002, compared with 63 000 in 1980. The same trend applies to the basic forest industries. They employed 120 000 people in 1980, but only 71 000 in 2002. However, the paper production has more than doubled during the same period. Consequently, forestry and forest industries, even during a boom, have no direct ameliorating effect on Finland's chronic unemployment problem (9.6 % in June 2003).

Employment in forestry and forest industries, 2000–2002

	2000	2001	2002
	1 000 persons		
Forestry	24	23	21
Forest industries	72	71	71
Forest sector, total	96	94	92
Employment, total	2 335	2 367	2 372
Unemployed, total	253	238	237
Unemployment rate, %	9.8	9.1	9.1

Source: Statistics Finland

Employment in forest industries, 2000–2002

Branch of industry	1 000 persons		
	2000	2001	2002
Sawmilling	12	12	11
Plywood and veneer industry	6	6	6
Other board industries	1	1	1
Other wood-products industry ¹	15	15	14
Pulp industry	14	14	15
Paper industry	14	14	15
Paperboard industry	4	4	4
Paper products industry	6	5	5
Forest industries, total	72	71	71

¹ Including carpentry products and pre-fabricated wooden houses.

Sources: Statistics Finland, Finnish Forest Research Institute

Commercial roundwood removals in 2002 amounted to 54.2 million m³, of which 85% came from non-industrial, private forests. Fellings have been at a very high level since 1997.

Logging in non-industrial, private forests is mainly carried out by the forest industries or by their wood-procurement organisations. In 2002, forest owners themselves carried out or organized the logging of 10.3 million m³, or 22% of the commercial roundwood removed from their forests.

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

Roundwood markets

Roundwood procurement and consumption in Finland, 2002

Sources	mill. m ³
Commercial roundwood	
from private-owned forests	46.3
from industry-owned forests	3.1
from state-owned forests	4.8
Non-commercial wood (priv. for.)	6.1
Domestic roundwood, total	60.3
Imported wood	16.2
Roundwood procurement, total	76.5
Consumption	
Sawmilling	28.8
Wood-based panels	3.7
Other wood-based products	0.3
Mechanical pulp industry	10.5
Chemical pulp industry	28.0
Industry, total	71.3
Fuelwood in dwellings	5.2
Exports of roundwood	0.7
Roundwood consumption, total	77.2

Imported wood is mostly birch pulpwood from Russia. In addition, sawmills furnished pulp industry with 10.9 mill. m³ of wood chips and residues.

Source: Finnish Forest Research Institute

Roundwood removals by ownership category, 2000–2002

Ownership category	2000	2001	mill. m ³ 2002
Private forests ¹	53.6	51.2	52.4
commercial	48.0	45.1	46.3
non-commercial	5.6	6.1	6.1
Forests industries	3.3	3.5	3.1
Forest and Park Service ²	4.6	4.6	4.8
Commercial, total	55.9	53.2	54.2
Grand total	61.5	59.4	60.3

¹ including communes, parishes and some other public owners.

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

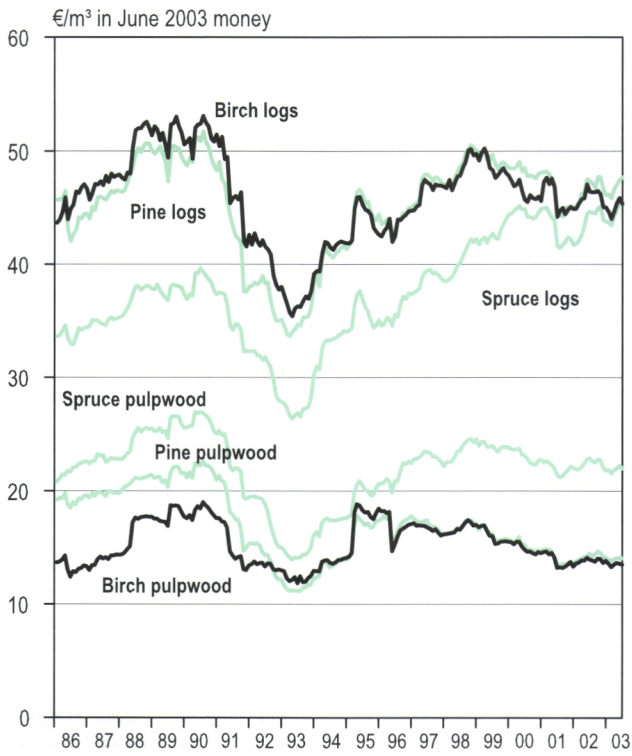
Source: Finnish Forest Research Institute

Roundwood removals by assortment, 2000–2002

Roundwood assortment	2000	2001	mill. m ³ 2002
Logs	28.3	25.4	25.9
pine logs	10.9	10.1	10.4
spruce logs	16.0	14.0	14.3
hardwood logs	1.3	1.3	1.2
Pulpwood	27.6	27.8	28.2
pine pulpwood	12.4	12.3	12.5
spruce pulpwood	9.9	9.9	9.9
hardwood pulpwood	5.3	5.6	5.8
Commercial removals, total	55.9	53.2	54.2
Non-commercial removals	5.6	6.1	6.1
Grand total	61.5	59.4	60.3

Source: Finnish Forest Research Institute

Stumpage prices in non-industrial, private forestry, 1986–2003



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

Source: Finnish Forest Research Institute

Currently, about 110–130 000 hectares of forest land are planted or seeded annually for forestry after clear fellings, and favouring almost exclusively native tree species. Seed-tree or shelterwood fellings aimed for natural regeneration account for 40–50 000 hectares annually.

About 220 000 hectares of seedling stands are treated annually with silvicultural measures. About half of Finland's mires (wetlands) have been drained for forestry, but nowadays this draining activity has ceased, and ditch cleaning has taken the place of it. Forest fertilization is applied to a minor extent.

The total costs of silvicultural and forest improvement work were EUR 237 million in 2001. Of the EUR 188 million spent in non-industrial, private forestry, forest owners' own financing or work accounted for 69 %, and the rest was financed through state grants.

Silvicultural and forest improvement work

Felling activities, 2000–2001

Type of felling	1 000 ha	
	2000	2001
Thinnings	328	309
Clear fellings	156	118
Seed-tree and shelterwood fellings	51	35
Removal of seed-tree and shelterwood	68	51
Other fellings	8	11
Total	610	524
% of forest area	2.7	2.3

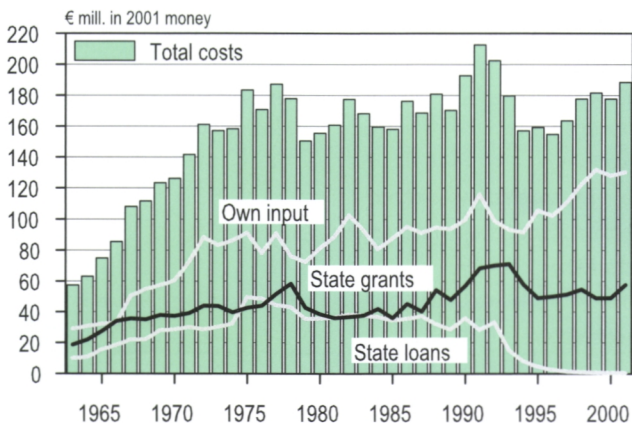
Source: Finnish Forest Research Institute

Silvicultural and forest improvement work, 2000–2001

Type of work		2000	2001
Clearing of regeneration area	1000 ha	70	67
Soil preparation	"	120	132
Artificial regeneration	"	117	126
Seedling stand improvement	"	223	239
Forest fertilization	"	21	19
Drainage of mires	"	1	-
Maintenance of drainage	"	74	83
Construction of forest roads	km	1 385	1 604
Improvement of forest roads	"	1 410	1 341
Total costs	EUR mill.	217	237

Source: Finnish Forest Research Institute

Financing of silvicultural and forest-improvement works in non-industrial, private forests 1963–2001



Source: Finnish Forest Research Institute

Information on Finland's forest resources is based on surveys carried out by the Finnish Forest Research Institute. Systematic ground sampling has been used. Satellite imagery and digital map data are employed when results are needed for small areas. The inventory years to date have been as follows:

I	1921–24	IV	1960–63	VII	1977–84
II	1936–38	V	1964–70	VIII	1986–94
III	1951–53	VI	1971–76	IX	1996–

Despite the 13% reduction in forest area in 1944 due to the losses of land in the war, Finland's wood resources are currently more plentiful than in the pre-war years.

According to the 1st national forest inventory, the total growing stock volume was 1 588 million m³. The newest estimate, based mostly on the 9th inventory, is 2 024 million m³. In recent years, the annual volume increment has exceeded the drain by about 10 million m³.

During the past 70 years, the structure of Finnish forests has changed significantly. They now have a more even age structure. Scots pine's share of the growing stock is 47% and that of Norway spruce 34%, leaving 19% for the broadleaved species, mostly birch. This distribution has been a stable one. However, Scots pine is the dominant species on 65% of the forest land area.

The area of productive forest land (i.e. land capability to yield at least 1 m³/ha/yr) is 20.2 million hectares and that of other wooded land 2.8 million hectares. Thus, the total wood-growing area is 23.0 million hectares. Of this, 1.46 million hectares (6.3%) have been set aside for conservation purposes. These areas, in which all forestry activities are prohibited, lie almost entirely in the northern part of the country. According to the internationally defined forest-land concept, which sets a canopy cover of 10% as the threshold between forest lands and other lands, the forest land area is 21.9 million ha.

The following tables are based on the combined 8th and 9th national forest inventories in such a way that always the most recent regional data have been used. Nature conservation areas are always included.

Principal land use categories in Finland, 1992–2001

	mill. ha
Total area	33.8
Inland watercourses	3.3
Land area	30.5
Forest land	20.2
Other wooded land	2.8
Waste land ¹	3.1
Roads, depots	0.2
Forestry land, total	26.3
(of which nature conservation areas	2.8)
Agricultural land	2.8
Built-up areas	1.0
Transport routes	0.4

¹ Treeless mountains 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, 1992–2001

	mill. ha
Mineral soils	17.2
Mires	8.9
Roads, depots	0.2
Forestry land, total	26.3
Spruce mires	2.3
Pine mires	4.9
Treeless mires	1.7
Total	8.9
Undrained mires	4.1
Recently drained mires	0.5
Transforming mires	2.9
Transformed mires	1.4
Total	8.9

Dominant tree species of forest stands, 1992–2001

		% ¹
Temporarily non-stocked		1.4
Scots pine	<i>Pinus sylvestris</i>	64.9
Norway spruce	<i>Picea abies</i>	23.9
Other coniferous		0.1
Silver birch	<i>Betula pendula</i>	2.5
Downy birch	<i>Betula pubescens</i>	6.5
Aspen	<i>Populus tremula</i>	0.3
Alder	<i>Alnus sp.</i>	0.3
Other broadleaves		0.0
Total		100.0
Forest land area	(mill. ha)	20.2

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

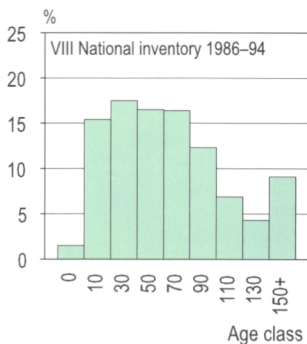
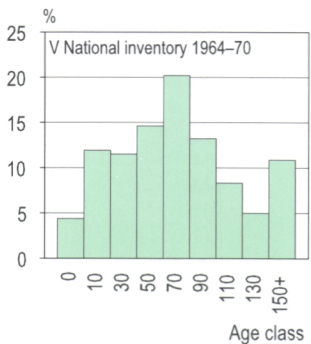
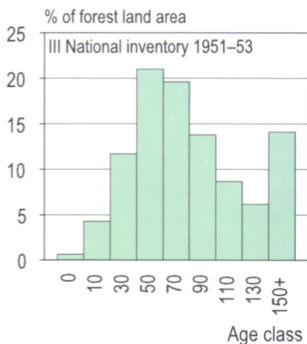
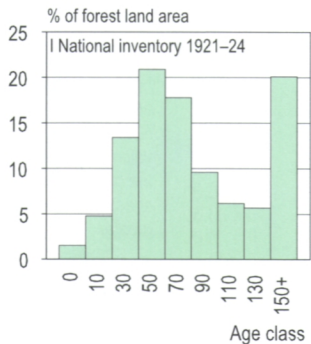
Source: Finnish Forest Research Institute

Timber resources in Finland, 1992–2001

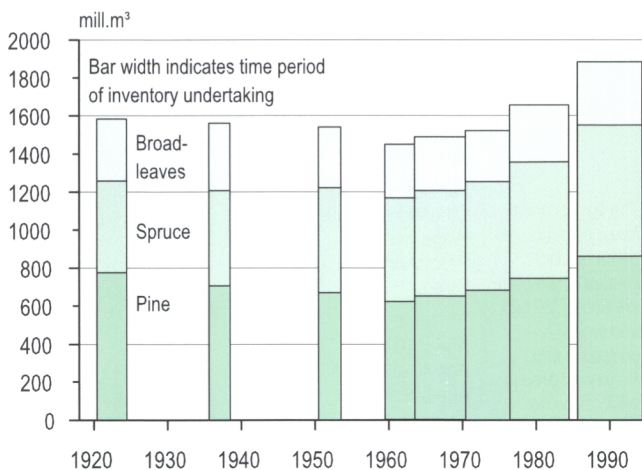
Forest and other wooded land	mill. ha	23.0
Growing stock volume	mill. m ³	2 024
Scots pine	"	954
Norway spruce	"	688
Birch	"	311
Other broadleaves	"	71
Volume increment	mill.m ³ /yr	81.0
Scots pine	"	36.0
Norway spruce	"	26.4
Birch	"	14.3
Other broadleaves	"	4.3

Source: Finnish Forest Research Institute

Age structure development of the Finnish forests



Growing stock volumes according to eight national forest inventories



Source: Finnish Forest Research Institute

Forest ownership in Finland, 1992–2001

Ownership category	Forest land mill. ha	Forestry land mill. ha	%
Non-indust., private	12.3	14.1	53.5
Industrial, private	1.8	2.1	7.8
State	5.0	8.8	33.6
Other public	1.1	1.3	5.1
Total	20.2	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 12.3 million ha.

Source: Finnish Forest Research Institute

Growing stock volume by ownership category, 1992–2001

Ownership category	Scots pine	Norway spruce	Broad-leaves	mill. m ³	
				Total	%
Non-indust., private	579	521	273	1 373	67.8
Industrial, private	96	50	28	174	8.6
State	224	82	60	366	18.1
Other public	55	35	21	111	5.5
Total	954	688	382	2 024	100.0

Source: Finnish Forest Research Institute

Annual volume increment by ownership category, 1992–2001

Ownership category	Scots pine	Norway spruce	Broad-leaves	mill. m ³ /yr	
				Total	%
Non-indust., private	22.2	20.7	14.2	57.1	70.5
Industrial, private	4.6	2.2	1.5	8.3	10.2
State	7.0	2.3	2.0	11.3	14.0
Other public	2.1	1.3	1.0	4.3	5.3
Total	36.0	26.4	18.6	81.0	100.0

Source: Finnish Forest Research Institute

Mean growing stock volume and annual increment by ownership category, 1992–2001

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	110	4.6	4.2
Industrial, private	95	4.5	4.7
State	67	2.1	3.1
Other public	101	4.0	4.0
Total	98	3.9	4.0

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

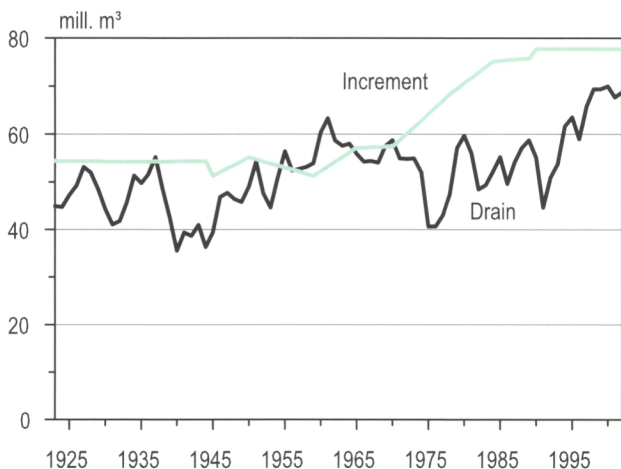
Increments for 1995–99 are forecasts.

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 2000–02
Scots pine	I	34.0	34.5	..
	D	20.0	25.1	27.2
Norway spruce	I	26.4	25.5	..
	D	22.3	27.8	28.4
Broadleaves	I	17.4	17.8	..
	D	11.0	12.5	13.2
Total	I	77.8	77.8	..
	D	53.2	65.4	68.8

Growing stock increment and drain, 1923–2002



Multiple production of forests, 2000–2002

Product		2000	2001	2002	
Commercial roundwood	mill. m ³ o.b.	56	53	54	
Non-commercial roundwood	mill. m ³ o.b.	6	6	6	
Commercial forest berries	m.t. ¹	5 806	7 785	4 797	¹ Quantities offered for sale, in metric tons.
Commercial forest mushrooms	m.t. ¹	982	672	219	
Lichen picked for exporting	m.t.	314	287	319	
Deer venison	m.t.	9 015	9 495	12 120	Sources: Finnish Forest Research Institute, Finnish Game and Fisheries Research Institute
Hare venison	m.t.	662	520	502	
Forest game birds	m.t.	184	184	189	
Fur-bearing animals	1000 indiv.	275	308	224	
Reindeer meat production	m.t.	2 100	2 000	2 400	

Forest condition in Finland, 1992–2001

Forest land area, total 20.2 mill. ha

Extent of damage affecting stand quality	% of forest land
Totally damaged	0.3
Severely damaged	4.1
Moderately damaged	19.1
Total	23.5

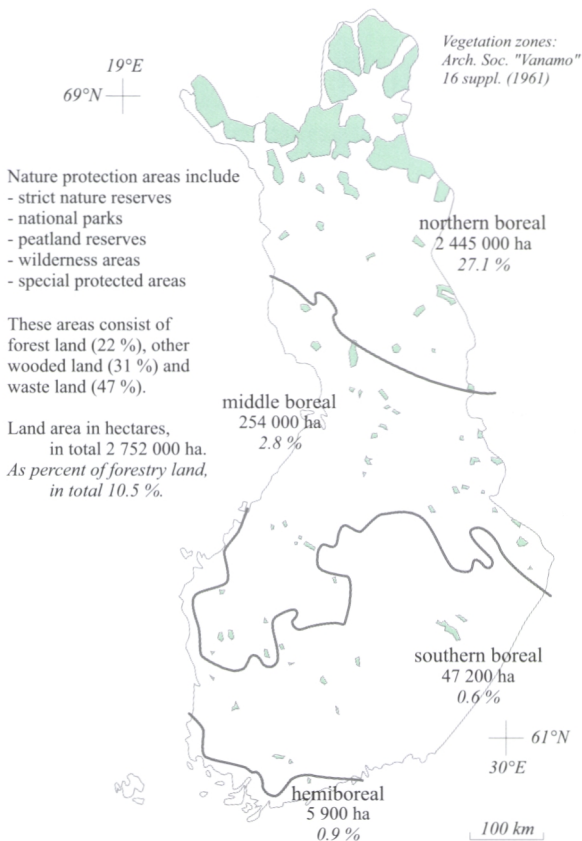
Damaging agents

Natural competition	1.4
Climatic factors	5.7
Harvesting damage	1.1
Moose	1.5
Voles	0.0
Insects	0.3
Fungi	6.2
Unidentified	7.3
Total	23.5

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 (2003)

KEY CONTACTS IN FINNISH FOREST RESEARCH

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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*.

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Website: www.stat.fi

Source: *Finnish Forest Association*

Old-growth forest stand in northern Finland



Source: Finnish Forest Research Institute