



SUMMARY

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I FOREST RESOURCES

The forests of Finland form part of the boreal coniferous forest zone. Finland, situated between 60°N and 70°N, is about 1 100 km long. In the southern part of the country, the conditions are ideal for the growth of coniferous forests. Towards the north, the climate becomes cooler and more humid. Climatic variation is the main cause behind forest increment significantly varying in different parts of the country (e.g. Table 1.28).

The Finnish Forest Research Institute (Metla) has carried out eight nation-wide forest inventories (NFIs). The first NFI was conducted in 1921–24. The 8th and most recent NFI took place during 1986–94. The field work covered two to three administrative areas (forestry board regions, and since 1996 forestry centre regions) each year, and it took nine years to cover the whole of Finland. Due to the decisive role of non-industrial private forestry, these regions are used in the presentation of the inventory results.

The 9th NFI was launched in 1996. The sampling used is based on systematically distributed clusters. In southern Finland, a cluster consists of 14 temporary sample plots placed at intervals of 250 metres. Angle-count sampling is applied on all the plots (Fig. 1.1).

Despite the 12.8% reduction in the country's forested area in 1944, in the aftermath of World War II, Finland's wood resources are currently more plentiful than in the pre-war years (Fig. 1.2). According to the combined results of the 8th and 9th NFIs, the total growing stock volume at the present time is 2 000 mill. m³ and the annual increment is 79.4 mill. m³ for an overall forested area of 23.0 mill. ha. In recent years, the annual volume increment has exceeded drain by about 10 mill. m³ (Fig. 1.3).

The intensive utilisation of forest resources in Finland has led to considerable changes in forest

structure (Fig. 1.4). The high demand for pulpwood has stimulated silvicultural thinnings. The tree-species composition of the growing stock has remained stable for a considerable period of time. The proportion of Scots pine is, however, slowly increasing. According to the combined results of the 8th and 9th NFIs, the tree-species distribution is as follows: Scots pine (*Pinus sylvestris*) 46.9% of the total volume, Norway spruce (*Picea abies*) 34.3%, and broadleaved species (mostly birch, *Betula sp.*) 18.8%. In terms of area, pine is the dominant species on 64.7% of all forest land. A large proportion of the pine stands are young. Native species is used almost exclusively when artificial regeneration is employed.

Of the total land area of Finland (30.5 mill. ha), 26.3 mill. ha are forestry land. Forestry land is grouped into three classes according to site productivity:

- *forest land*, where the potential annual increment is at least 1.0 m³/ha.
- *scrub land (unproductive forest land)* is mainly exposed bedrock and scree or mires, where the potential annual increment is below 1.0 m³/ha but over 0.1 m³/ha.
- *waste land*, unless naturally treeless, produces less than 0.1 m³/ha/year.

The area estimates from the combined 8th and 9th NFIs are as follows:

forest land	20.1 mill. ha
scrub land	2.9 mill. ha
waste land	3.1 mill. ha

Forest roads, timber depots, etc., occupy approx. 0.2 mill. ha of forestry land. These figures include nature conservation areas amounting to 2.7 mill. ha, which are located almost entirely in northern Finland (Table 1.8). Close to half of the nature conservation

areas consist of waste land (47%). Of the total forested area of 23.0 mill. ha, 1.4 mill. ha (6.3%) are nature conservation areas on which all forestry activities are prohibited.

The new international definition of forest land, as applied in the Global Forest Resources Assessment 2000, sets a canopy cover requirement of 10% as the threshold between forest land and other lands. This means that most of the scrub land in Finland will enter the internationally defined concept of forest land.

2 FOREST HEALTH AND BIODIVERSITY

In the course of the two most recent NFIs (1992–2000), it was observed that 4.7 mill. ha (17% of the forest lands in Southern Finland and 32% in Northern Finland) were affected by damage, which had reduced the silvicultural quality of the stands. The most frequent damaging agents were fungi and weather factors (Tables 2.2–2.4).

Tree vitality is being widely studied by estimating defoliation, which reflects the combined effect of several stress factors. Trees are regarded to be afflicted by defoliation if their relative foliage loss exceeds 25%. In 2001, it was estimated that 3% of pines, 26% of spruces, and 9% of broadleaved trees were afflicted by defoliation. Defoliation in Finland is modest in comparison to that observed elsewhere in Europe (Table 2.1 and Fig. 2.4).

Forest health in Finland is at least satisfactory. Acidification is not a problem in our forests because of the decreasing amounts of air-borne pollutants. Climate change and increasing ozone are possible future threats to forests.

Maintaining the biodiversity of forests is one of the main goals of the Forest Act. Nature conservation areas form the basis for maintaining natural environments. There are 4.7 mill. ha of land in Finland with restrictions on wood production. Strictly protected forests (forest land and scrub land) account for 1.7 mill. ha of this area. Most of these set-aside areas are situated in the northern part of the country (Tables 2.7–2.10 and Fig. 2.5).

In 2000, threatened fauna and flora were estimated to amount to 1 505 species of the country's total of some 43 000 species. Of the threatened species, 249 are critically endangered, 452 are endangered, and 804 are vulnerable. Forty-two per cent of all the threatened species inhabit forests and mires (Table 2.11).

In commercial forests, biodiversity can be promoted by protecting valuable key biotypes, by increasing the amount of decayed trees in forests, by leaving large-sized trees on the felling areas, and by applying prescribed burning (Tables 2.12–2.14).

3 SILVICULTURE

In 2001, the amounts of most silvicultural work done increased compared to the previous year. Forest regeneration was done on 161 000 hectares of which 126 000 hectares were regenerated artificially. The proportion of planting was 72% and that of seeding 28%. Almost all seeding was done to propagate pine. Most of the planting (60%) was done to establish spruce plantations (Tables 3.3–3.6 and Figs. 3.1–3.2). Tending of seedling stands and improving young stands was carried out on 239 000 hectares. The amounts of tending of seedling stands and improving young stands have been increasing since 1997 because of guidance and increasing state subsidies (Tables 3.10–3.11 and Fig. 3.5). The area covered by ditch cleaning and supplementary ditching was 83 000 hectares. No first-time ditching was done any longer. The focus in forest road construction has been transferred to the basic improvement. In 2001, still 1 600 kilometres new forest road were constructed and 1 340 kilometres of forest roads were treated with basic improvements (Tables 3.13–3.16 and Figs. 3.7–3.8).

The total area treated with timber fellings in 2001 was 524 000 hectares, which is 14% less than in the previous year, but still more than the average for the last 10-year period. The proportion of thinnings was 59%, that of regeneration fellings 29% and other fellings 12% (Tables 3.17–3.18 and Fig. 3.9).

The costs of silvicultural and forest improvement works totalled EUR 237 mill. in 2001, i.e. an increase of 9% over the previous year. The major part (80%) of the costs were incurred in non-industrial, private forests, i.e. EUR 188 mill. One third of these costs were covered by state subsidies. The proportion of forest regeneration of the costs was 43% and that of tending of seedling stands and improving young stands was 29% (Tables 3.19–3.24 and Figs. 3.10–3.12).

4 ROUNDWOOD MARKETS

Chapter 4 provides a detailed overview of the roundwood markets. Two topics are of special interest: roundwood prices (Tables 4.5–4.10), and production (Tables 4.11–4.20). Most of the information refers to 2001 and the first half of 2002. The statistics are generated, mainly on a monthly basis, by Metla.

Roundwood trade was very active during the first months of 2001. After the summer, due to the fall in roundwood prices, there followed a quiet period, which continued until the end of the year. In 2001, the forest industries purchased 29.9 million m³ of roundwood from private forests. This was 22% less than in 2000 and the smallest amount since 1993. In 2001, the stumpage prices were, on average, 3% lower than in previous year. The prices paid for birch logs remained at the 2000 level. The prices of pine logs fell, on average, 3% and the prices of spruce logs by 2%. Pulpwood prices went down as well, the biggest drop focusing on pine pulpwood, which dropped by 6%. The delivery prices remained mainly at the previous year's level.

In 2001, the total commercial roundwood fellings amounted to 53.2 million m³. Compared to the preceding year, the amount was 2.7 million m³ (5%) lower. Non-industrial, private forests are the main roundwood source for Finland's forest industries, accounting for 45.1 million m³ or 85% of the total roundwood fellings. Timber felling from forest industries' own forests totalled 3.5 million m³ and felling from state forests totalled 4.6 million m³.

5 HARVESTING AND TRANSPORTATION OF ROUNDWOOD

Chapter 5 consists of a report on the forestry machines used in wood harvesting and data on the volumes and costs incurred in the harvesting and transportation of roundwood.

In 2001, the share of standing sales was about 83% of commercial roundwood production (for volumes, see Chapter 4). In standing sales, the share of mechanised fellings amounted to 95% (Fig. 5.3). The degree of mechanisation in regeneration fellings was as high as 97% and in thinnings 91%. Intense mechanisation has helped the forest industries to reduce their unit costs in harvesting. In 2001, however, the unit costs increased 9% from the previous year. In standing sales, the unit costs amounted to EUR 8.54 per m³. In delivery sales, the degree of mechanisation

was much lower and the unit costs of harvesting were much higher than in standing sales (Table 5.0).

In Finland, road transportation by lorry is the dominant mode of long-distance transportation of roundwood. In 2001, 79% of domestic roundwood was transported by road to mills; the average distance from stand to mill being 103 km. In the rail transportation sequence, the average distance was longer, 293 km, and in water transportation sequence it was 283 km. The average unit costs of long-distance transportation were EUR 5.94 per m³ (Table 5.3).

In regard to imports of roundwood, 15.6 mill. m³, or more than 12 mill. tonnes, of roundwood and wood residues were imported to Finland in 2001. Half of it was imported by rail, 28% by road, and 23% by water. Wood made up about one fifth of all imports-related transportation, but in exports-related transportation its share was only 2%. On the other hand, forest industry products accounted for half of all exports transportation of Finland. Almost all forest industry products were exported by ships (Table 5.7).

6 MULTIPLE-USE FORESTRY

Multiple-use forestry includes products and services in addition to wood. In this chapter, the multiple-use of forests is divided into the following sub-categories: forest game, collecting of wild berries, mushrooms and lichen, reindeer husbandry and recreation. Finally, the chapter provides information on peat resources and peat production.

The overall value of the catch in hunting was estimated to be EUR 61 mill. in 2001. The foremost game species in Finland is the moose. The amount of commercial wild berries and mushrooms collected from the forests in 2001 was 8.5 mill. kg and their value totalled EUR 10 mill. Much larger amounts are picked for direct household use. The value of lichen exports amounted to EUR 1.2 mill. Reindeer husbandry is practised in northern Finland. The winter herd 2001/2002 was reckoned to amount to 200 000 head.

Outdoor recreation is an integral part of the Finnish way of life. Traditional free access to forests offers good opportunities for people to go hiking and pick wild berries and mushrooms.

7 FOREST SECTOR'S LABOUR FORCE

In 2001, 94 000 people were employed by forestry and the forest industries. This amounts to approximately 4% of the total number of people employed in Finland (Table 7.2, Fig. 7.1). Two thirds, or 71 000, of those employed worked for the forest industries (Table 7.7). The share of Finland's forest sector of the total value of exports in 2001 was 27% (Table 10.8) and its share of the gross domestic product was more than 7% (Table 11.6).

The unemployment rate in Finland's forest sector in 2001 remained at the same level as in the preceding year (Table 7.8). In 2001, the overall unemployment rate in the forest industries was 6%, significantly less than the average unemployment rate for all branches of industry (9%). Due to the improved employment situation in forestry since 1999, the unemployment rate in forestry was 9% in the year 2001.

The labour force in forestry has decreased by more than 60% since the beginning of the 1980s (Table 7.4). This declining trend is mainly due to mechanisation in wood harvesting (see Fig. 5.3 in Chapter 5). In the forest industries, total employment has also dropped (from 120 000 in 1980 to 71 000 in 2001) due to increased automation, which has led to physical work being focused more on supervision activities.

In 2001, the average daily earnings of forest workers in motor-manual timber preparation amounted to € 93. The corresponding earnings in silvicultural works were € 70. There was no significant increase in the average daily earnings compared to the preceding year (Table 7.9). The average earnings per hour in the wood-products industries (€ 12) and in the pulp and paper industries (€ 15) increased by approximately 6% over the preceding year.

Statistics on the forest sector's labour force are primarily based on the labour-force survey conducted by Statistics Finland (Tables 7.1–7.4 and 7.6–7.8). Among other things, the survey provides information on employment, working hours, unemployment and labour input by branch of industry. Statistics Finland is mainly also responsible for collecting and compiling data on salaries (Tables 7.9–7.10), index of real earnings (Table 7.11), labour disputes (Table 7.12), accidents (Table 7.13), and education and training in the forest sector (Tables 7.14–7.15).

8 WOOD CONSUMPTION

The total roundwood consumption in Finland in 2001, including imports and exports, amounted to 73.2 mill. m³ (Table 8.0). There was a slight decrease of 4% compared to the preceding year, when the standing record in roundwood consumption was achieved.

More than 90%, or 67.3 mill. m³, of the roundwood was consumed by the forest industries, of which the most important consumers were sawmilling (41%) and chemical pulp industry (38%). The imports of roundwood accounted for 20%, or 13.5 mill. m³, in 2001. As is shown in Table 8.2, the volumes of imported roundwood have clearly increased during the last ten years, resulting in the record achieved in 2001.

Of the other categories of use (Table 8.1), roundwood consumption in the heating of dwellings and consisting of fuelwood, was 5.2 mill. m³. The volume of exports was 0.7 mill. m³, or 1% of the total.

The consumption of solid wood fuels, i.e. forest chips and by-products of the forest industries (bark, sawdust, industrial chips etc.) in 2001 in power and heating plants accounted for 12.4 mill. m³ (Table 8.12). Together with the waste liquors from the pulp industry, the share of wood-based fuels was 20% of the total energy consumption in Finland.

9 FOREST INDUSTRIES

In 2001, the forest industries in Finland decreased production, thereby bringing it into line with the reduced demand. The forest industries failed to continue their recent run of record production.

Paper production totalled 9.9 mill. m.t. and this was 8% less than in the previous year. Half of paper production consisted of magazine paper and a quarter of fine paper. The production of fine paper fell most of, by a total of 16% down to 2.5 mill. m.t. The production of magazine paper amounted to 5.1 mill. m.t. (–5%). The decreased demand for paper and paperboard also reduced the production of pulp (–6%), which totalled 11 mill. m.t. in 2001 (Table 9.2).

In the wood-products industries, the production of sawn goods declined by 5% down to 12.7 mill. m³, and the production of plywood decreased by 3% down to 1.1 mill. m³ (Table 9.1). Nevertheless, the domestic consumption of sawn goods kept on increasing (Table 9.4).

In Finland, the turnover of the forest industries was EUR 19 billion in 2001. The investment rate of the Finnish forest industries was 9.5% (Table 9.7). The wood-products industries were slightly unprofitable, but the manufacturing of pulp and paper products was still very profitable (Fig. 9.4). In Finland, the production of forest industries' products is characterised by its export-orientation and large scale.

The statistics concerning Finnish forest industries are mainly based on the data that the Finnish Forest Industries Federation collects from its member companies.

10 FOREIGN TRADE BY FOREST INDUSTRIES

The imports of roundwood have increased rapidly in the last few years. In 2001, they totalled 15.6 mill. m³ (with bark) and exceeded by 20% the record set in 1999. Roundwood imports are essential to Finnish forest industries, as one fifth of their roundwood consumption is met by imported wood.

Eighty-three per cent of the imported wood came from Russia, and the rest almost entirely from the Baltic countries. The foremost tree species involved in imports was birch, which constituted 7.3 mill. m³ of imports; 94% of this was pulpwood. The amount of imported spruce has tripled during the past five years, and it totalled 3.5 mill. m³ in 2001. Half of imported softwood consisted of logs (Tables 10.1–10.7). Finland is a net importer of wood. The amount of exported wood was only 0.8 mill. m³ (Table 10.1).

The exports of forest industry products fell by 5% from the previous year and totalled EUR 12.5 billion. During the past ten years, the exports of forest industry products have increased continuously except for 1996 (Fig. 10.1). The total value of exports of all goods from Finland amounted to EUR 48 billion, and of this the proportion of forest industry products was 26% (Table 10.0). The products of the pulp and paper industries covered 80% of forest industries' exports (EUR 9.8 billion). Finland is one of the major exporters of paper and paperboard. The exports of the wood-products industries totalled EUR 2.7 billion (Table 10.9).

Two thirds of the forest industries' products were exported to EU member countries. The most important customers were Germany (19% of total value of forest-based products), the United Kingdom (15%) and France (7%). The share of Asia was 9% and that of North America 7% (Table 10.8).

The foreign trade in forest industry products is very export-oriented. The imports of forest industry products amounted to only EUR 1.0 billion in 2001. The foremost product group was converted paper and paperboard products, which constituted 22% of all imports of forest-based products (Table 10.17).

The data on foreign trade in Finland is collected by the National Board of Customs. The basic data are classified according to the Combined Nomenclature (CN), which is the classification system for goods traded within the European Union. All official foreign trade statistics in Finland are aggregated from this data.

11 FOREST SECTOR IN FINLAND'S NATIONAL ECONOMY

After seven successive years of rapid economic growth, the Finnish economy as a whole came close to a standstill in 2001. Finland's gross domestic product (GDP) at market prices amounted to EUR 136 billion, indicating a modest increase of 0.7% over the previous year. In the forest industries, the production went down by 6%, while the average drop for total manufacturing was only 0.7%. In primary production, including agriculture and forestry, the production decreased by 3.5%. Within the forest sector, pulp and paper industries play a decisive role, producing in 2001 close to 60% of the total value added of the Finnish forest sector (Tables 11.3–11.6)

In non-industrial, private forestry, stumpage earnings decreased by some 10%, amounting to EUR 1.5 billion. This was primarily due to diminished removal volumes and reduced stumpage prices of coniferous logs. Contrary to earnings, the total costs in non-industrial, private forestry went up by 5% when compared to the year 2000. Consequently, net earnings per hectare – EUR 94 as a national average – were 12% lower than in the preceding year (Table 11.11).

The data in Chapter 11 are mainly based on Finnish national accounts compiled by Statistics Finland. The accounts have been revised to fully comply with the European System of Accounts, as applied in the EU.

12 INTERNATIONAL FOREST STATISTICS

The latest results of the Global Forest Resources Assessment (FRA-2000) were published in 2001 by

FAO (Tables 12.1 and 12.2). There are about 3.9 billion hectares of forest in the world, which makes up about one-third of the total land area. The total volume of the growing stock is 386 billion m³. The countries with the largest forest covers are as follows: Russia, Brazil, Canada, the United States, and China. In the 1990s, the forest area of the world has diminished by about 9 mill. hectares (0.2%) per year, and this loss has mainly taken place in Africa and Latin America.

In 2000, the world's roundwood production was approximately 3.4 billion m³ (Table 12.4, Fig. 12.2). The largest volume, 0.5 billion m³, was produced in the United States. Globally, more than a half of the roundwood produced was fuelwood, the largest producers being Asia, Africa and Latin America.

The world's production of sawn goods decreased from 1999 by 1% down to 424 mill. m³ (Table 12.5, Fig. 12.3). Three quarters of the total production was sawn softwoods. One fifth of the sawn wood was produced in the European Union.

The world's production of paper and paperboard continued to grow (Table 12.6, Fig. 12.3). According to the FAO, paper and paperboard production in 2000 amounted to 324 mill. m.t., which was approximately 3% more than in the previous year. In 2001, the production is expected to decrease down to 316 mill. m.t. (Table 12.16).

According to the data for 2000, Finland ranks 4th in the world as regards the value of exports of forest-

related products, representing thus approximately 8% of the world total (Table 12.14). The three biggest exporters were Canada, the United States and Germany. Finland's position as a significant paper and paperboard exporter is based on the country's leading position as an exporter of printing and writing paper, its share being 19% (Table 12.12).

The comparison by country of roundwood price data as presented in Tables 12.17–12.23 should be viewed with caution. Countries tend to differ as regards trade practices, measurement units, assortments, tree species, and measurement and quality requirements. Therefore, the price data presented by a particular country should be primarily used to monitor the internal price development of each country.

The aid grants for Finnish forest-sector-related development projects carried out in different countries totalled EUR 16.4 mill. in 2001, approximately 8% less than in the previous year (Table 12.24).

The data on global forest resources assessment is compiled jointly by the FAO/ECE Secretariat, Geneva (Forest Resources of Industrialized Temperate/Boreal Countries, acronym TBFRA-2000) and FAO, Rome (Tropical Countries and Global Summary). The tables referring to the production of and foreign trade in roundwood and forest-industry products originate from Eurostat (Table 12.3) and FAO's FAOSTAT forestry on-line database (Tables 12.4–12.6 and 12.8–12.16), which includes country-specific forest statistics information since 1961.