SUMMARY

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1 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 south-north direction. In the southern part of the country, the conditions are ideal for coniferous forests. Towards the north, the climate becomes cooler and more humid (see p. 28–29). Mainly due to climatic variation, forest increment also varies significantly 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 such inventory dates back to 1921–24 while the 8th national forest inventory took place during 1986–94. In the latter inventory, the field work covered two to three administrative areas (then forestry board jurisdictions, since 1996 forestry centre jurisdictions) each year, and it took nine years to cover the whole of Finland. Due to the decisive role of non-industrial, private forestry, these regional areas are applied in the presentation of the inventory results.

The 9th national forest inventory began in 1996. The sampling used is based on systematically distributed clusters. In southern Finland, since the autumn of 1997, 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 forested area in 1944 following 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 inventories, the total growing stock volume at the time was 1 927 mill. m³ and the annual increment was 78.3 mill. m³ with an overall forested area of 23.0 mill. ha. In recent years, the annual volume increment has exceeded drain by more than 10 mill. m³ (Fig. 1.3).

Intensive utilisation of the forest resources in Finland has caused considerable changes in forest structure (Fig. 1.4). The high demand for pulpwood has stimulated silvicultural thinnings. The tree-species distribution of the growing stock has remained stable for a considerable period of time. The proportion of pine is, however, slowly increasing. According to the combined results of the 8th and 9th inventories, the tree-species distribution is as follows: Scots pine (Pinus sylvestris) amounts to 46.4% of the total volume, Norway spruce (Picea abies) to 35.6%, and broadleaved species (mostly birch, Betula sp.) to 18.0%. In terms of area, too, pine is the predominant species occurring on 64.8% of the forest land; this indicates a large proportion of young pine stands. When artificial regeneration is resorted to, native species are used almost exclusively.

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

- *forest land*, where the potential annual increment is at least 1 m³/ha.
- *scrub land (unproductive forest land)* is mainly exposed bedrock and scree or mires, where the potential annual increment is below 1 m³/ha but over 0.1 m³/ha.
- *waste land*, unless naturally treeless, produces less than 0.1 m³/ha/year.

The area estimates of 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 situated almost entirely in northern Finland (Table 1.8). Most of the nature conservation areas consist of waste land (56%). Of the total forested area of 23.0 mill. ha, 1.2 mill. ha (5.1%) are nature conservation areas where all forestry activities are prohibited. The new international definition of forest land, as it has been applied in the Global Forest Resources Assessment 2000, sets a 10% canopy cover requirement 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

Various factors affect the condition of the forests in combination; e.g. climate and soil conditions, air-borne pollutants and forest treatment. The vitality of trees 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 1998, it was estimated that 3% of pines, 26% of spruces and 9% of broadleaved trees were afflicted by defoliation (Table 2.1). Defoliation in Finland is modest in comparison to that observed elsewhere in Europe (Figure 2.5).

In the course of the most recent NFI (1986–98), it was observed that 15% of the forest lands in southern Finland were affected by forest damage reducing the silvicultural quality of stands (Table 2.2). In northern Finland, the corresponding figure was higher, 31%. The most frequent damaging agents were fungi and weather factors (Table 2.4).

Maintaining the biodiversity of forest is one the main goals of the recently reformed Forest Act. Nature conservation areas form the basis for maintaining natural environments. There are 4.5 mill. ha of land with restrictions on wood production. Strictly protected forests (forest and scrub land) account for 1.5 mill. ha of this area. Most of these set-aside areas are situated in the northern part of the country (Table 2.8).

In 1990, the numbers of threatened fauna and flora were estimated to amount to 1 692 of the total of some 42 000 species. Of the threatened species, 138 have disappeared, 217 are endangered, 308 are vulnerable, and 1 029 are in need of monitoring. Forty-eight per cent of all the threatened species inhabit forests and mires (Table 2.12).

3 Silviculture

The total area treated with timber felling in 1998 was 506 000 hectares, which is 4% less than in the previous year (Figure 3.3, Tables 3.3–3.4). The area covered by thinnings was 284 000 hectares and that by clear fellings 116 000 hectares. In 1998, areas seeded and planted (111 000 hectares) decreased by 2% compared to the year 1997 (Figures 3.4–3.5, Tables 3.7–3.9). Tending of seedling stands was carried out on 201 000 hectares, which was notably more than in the year before (Figure 3.6, Tables 3.11–3.12). The amount of forest drainage and construction of forest roads decreased. The area of ditch cleaning and supplementary ditching was 69 000 hectares (Figure 3.8, Tables 3.16–3.17). Nearly 1 700 kilometres of new forest roads were built and 1 200 kilometres were the subject of basic improvement (Figure 3.9, Tables 3.18–3.19).

The costs of silvicultural and forest-improvement works totalled FIM 1 167 mill. in 1998, i.e. an increase of 9% over the previous year (Figure 3.10 and Tables 3.20–3.22). The proportions of different ownership categories of the total in 1998 were as follows: non-industrial, private 84%, State 11% and forest industries 5%. In non-industrial, private forests, the costs are partly covered by State subsidies. In 1998, State grants and loans totalled

FIM 308 mill., leaving FIM 677 mill. to be financed by the private forest owners themselves (Figure 3.11, Tables 3.22–3.24).

4 Roundwood markets

Chapter 4 provides a detailed overview of the activities in the roundwood markets. Two subjects are of special interest: roundwood prices (Tables 4.4–4.8), and production (Tables 4.9–4.13). Most of the information refers to 1998 and the first half of 1999. The statistics are generated, mainly on a monthly basis, by Metla.

The new system for agreeing on roundwood prices, introduced in 1997, was applied also in 1998. A common concept of how prices should develop was negotiated between sellers and buyers separately for each company. In 1998, however, this agreement was reached only between UPM-Kymmene and forest owners. In spite of this, the roundwood markets were active during the second half of the year after a quiet spring season. In 1998, forest industries purchased a total of 36.6 million m³ of roundwood from private forests. In 1998, the stumpage prices of logs were, on average, 3–5% higher than in 1997. The stumpage price of pine pulpwood remained on the previous year's level. The price of spruce pulpwood was, on average, 3% higher and the price of birch pulpwood, on average, 1% higher than in 1997. The delivery prices followed the trend in stumpage prices.

In 1998, the total commercial roundwood fellings amounted to a new record high of 55 million m³. Compared to the preceding year, this was 2 million m³ (4%) higher. Non-industrial, private forests are the main roundwood source for Finland's forest industries, accounting for 89% of the commercial roundwood fellings in 1998. Timber felling from the forest industries' own forests totalled 2.1 million m³ and felling from state forests totalled 4.1 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. The information presented refers mainly to 1998.

Since the mid-1980s, mechanisation in forestry has increased dramatically. The share of mechanised felling in the standing sales of wood amounted to 91% in 1998 (Fig. 5.3). In 1998, there were, on average, 1 296 harvesters in use in Finnish forests (Table 5.1).

In Finland, road transportation by lorry is the dominant method used in the long-distance transportation of roundwood (accounting for 65% of the total transport volume in 1998). The share of water transportation has decreased in the 1980s and 1990s (Table 5.4). The increased proportion of mechanised felling has helped the forest industries to reduce their costs in harvesting (Table 5.6); and the same trend applies also to the long-distance transportation of roundwood. In 1998, the total costs of harvesting and transportation of domestic roundwood were FIM 3.4 billion (Table 5.2).

6 Multiple-use forestry

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

There were approximately 7 500 special outdoor recreation sites in Finland in 1999 (Table 6.1). Most of them were local and maintained by municipalities.

The amount of commercial wild berries and edible commercial mushrooms collected from the forests in 1998 was 9.8 mill. kg and their value totalled FIM 65 mill. (Tables 6.2–6.3). The value of lichen exports was FIM 8.1 mill. (Table 6.4).

The value of hunting was estimated at FIM 215 mill. in 1998 (Table 6.5–6.6). The foremost game species is the moose (Table 6.7).

Reindeer husbandry is practised in northern Finland and its annual economic value for the region is approximately FIM 200 mill. The winter herd amounts to approx. 200 000 (Table 6.9).

7 Forest sector's labour force

Statistics on the forest sector's labour force are primarily based on the annual labour-force survey, compiled by Statistics Finland (Tables 7.1–7.3 and 7.5–7.7). Among other things, the survey provides information on employment, unemployment and labour input by branch of industry. The same government agency is mainly also responsible for collecting and compiling the data on salaries (Tables 7.8–7.10), labour disputes (Table 7.11), accidents (Table 7.12) and education (Tables 7.13–7.15) in the forest sector.

The methods applied in the labour-force survey were renewed in 1997–98 to meet the new definitions of the ILO and the EU. Thus, the data presented in the corresponding tables have been updated since 1989 to meet the new definitions compared, for example, to the data presented in the Finnish Statistical Yearbook of Forestry 1997.

In 1997, an average of 96 000 people were employed by forestry and forest industries. This amounts to approximately 4% of the total number of people employed in Finland (Table 7.2, Figure 7.1). Two thirds, or 72 000, of the employees worked for the forest industries. The further fall in unemployment in 1998 also impacted on the forest sector and especially on forestry: the number of unemployed people in forestry decreased from approximately 18% in 1997 to 15% in 1998. However, the unemployment rate in forestry is still higher than the total national unemployment rate, which at the moment is 11% (Table 7.7).

The labour force in forestry has decreased by more than 60% since the beginning of the 1980s (Table 7.3). This declining trend is mainly due to mechanisation in wood harvesting (see Figure 5.3 in Chapter 5). In the forest industries, total employment has also fallen (from 120 000 in 1980 to 72 000 in 1998) due to increased automation, which has led to manual work being focused more on control activities. In 1998, the overall unemployment rate in the forest industries was approximately 6%, which was significantly less than the average unemployment rate for all branches of industry.

In 1997, the average annual earnings of forest workers amounted to more than FIM 115 000, a rise of 2% over the preceding year (Table 7.9). The corresponding average annual earnings in the wood-products industries were about FIM 136 000 and in the pulp and paper industries FIM 193 000 (Table 7.10), representing rises of approximately 8% and 5% in these industries.

8 Wood consumption

The year 1998 was the fifth year in succession during which total wood consumption in Finland exceeded 60 mill. m³, including imports and exports. Industrial wood consumption was 67.7 mill. m³. In 1998, imported roundwood accounted for 16% of industrial wood consumption (Table 8.2). Recycled fibre accounted for 5% of the fibre supply for paper and paperboard industries.

Total wood consumption has remained rather stable during the last 30 years despite manyfold increases in wood pulp production (Fig. 8.1). This is mainly due to numerous structural changes, such as diminished non-industrial use of wood, reduction in roundwood exports, increased use of industrial wood residues, and the increased share of mechanical pulping and less-wood-containing products. Industrial wood consumption is, however, showing a strong upward trend.

9 Forest industries

In 1998, a record of 11.4 million m³ of sawn goods were produced. Industrial sawmills worked at 94% capacity utilisation rate. New capacity has been built for plywood, and its production is increasing. The year 1998 was a record year for the paper industries with a 6% rise in production (Table 9.4) over the previous year. The Finnish paper industries are among the major global producers of graphic papers. In the first half of 1999, the wood-products industries produced 0–2% more, and the paper industries 4–5% less than in the corresponding period in 1998. Domestic investments by the forest industries totalled FIM 5.8 billion, i.e. 6.8% of their annual turnover (Table 9.7).

The domestic demand for sawn goods has been increasing in recent years. As regards domestic paper consumption, new, more realistic estimates have been worked out at the Finnish Forest Industries Federation. The calculation method starts from domestic deliveries of paper and takes into account net exports of printed products, wrappings of exported products and other indirect exports (Table 9.6).

10 Foreign trade by the forest industries

Chapter 10 provides data on the foreign trade in roundwood and forest-industry products. The primary statistics are produced by the National Board of Customs. The main groups of goods presented in this chapter are based on what are called Combined Nomenclature (abbr. CN). The CN classification is a standard within the European Union for compiling statistics on foreign trade.

Imports dominate Finland's foreign trade in roundwood. Imports of roundwood and wood residues, mainly from Russia, reached a new record in 1998, totalling 12.0 mill. m^3. The volume of roundwood and wood residues exported from Finland was 1.0 mill. m^3. Compared to imports, Finland's exports of roundwood are fairly insignificant (Tables 10.1–10.7).

Detailed data on the foreign trade in forest-industry products are presented for 1998 (Tables 10.1, 10.8–10.11 and 10.16). In addition, time-series information is presented for the major product groups. In 1998, the value of forest-industry exports amounted to an all-time high of FIM 67 billion. This accounted for 29% of the total value of all exports from Finland. The forest-industry products' share of all exports has, however, gradually decreased.

The major markets for Finnish forest-industry products are in Western Europe. In 1998, the three most important customers were Germany, the United Kingdom and France. Their combined share was 42% of the total value of forest-based products exported from Finland.

11 Forest sector in the national economy

Chapter 11 deals with forestry and the forest industries from the perspective of national economics. Tables 11.1–11.6 have been compiled by Statistics Finland.

Finnish national accounts have been revised to fully comply with the European System of Accounts, as applied in the EU. The industry titled 'forestry' consists of the following five sub-branches: forest regeneration, silviculture, harvesting of roundwood, other forestry activities and forestry related service activities (i.e. mainly activities performed by local forest management associations). The forest industries can be divided into two sub-branches: wood-products industries, and pulp and paper industries.

In 1998, Finland's gross domestic product at market prices amounted to FIM 686 bill., showing an increase of around 6% over the previous year. In 1998, the combined share of the forest sector (i.e. forestry and the forest industries) was 8% of the total GDP. Close to 80% of the total value added in the forest industries is produced by the pulp and paper industries (Tables 11.4–11.6).

Tables 11.7 and 11.8, produced mainly by Metla, deal with the profitability of non-industrial, private forestry during 1994–98. Due primarily to record-high removals, both gross and net stumpage earnings of private forest owners have increased significantly over the last few years. Finally, Tables 11.9 to 11.13 set forth basic information, in the format of input-output tables, on the effects of an increase in demand for final products on domestic output, value added and employment.

12 International forest statistics

This chapter is primarily concerned with information on forest resources and production of and foreign trade in roundwood and forest-industry products from the international point of view. These statistics are mainly based on the various forest statistics produced by FAO.

Since the 1950s, global forest resource assessments (FRA) have been carried out at approximately 10-year intervals. The data of the last assessment, implemented jointly by the FAO (Rome) and the FAO/ECE Secretariat (Geneva), refer to 1990 (FRA-1990, Table 12.1). In the present Yearbook, the data on the forest resources of Europe (Table 12.2) are based on the preliminary data of a new forest resource assessment (TBFRA-2000). Country-specific information on forest resources and other information related to forestry are also available in Eurostat Forestry Statistics as well as in the UN-ECE/FAO's Timber Database (see the Literature).

Tables referring to the production of and foreign trade in roundwood and forest-industry products originate from the FAO's FAOSTAT on-line database (Tables 12.3–12.5 and 12.9–12.15). According to the data included, Finland ranks 4th in the world as regards the value of exports of forest-based products (Table 12.15), representing approximately 8% of the world total in 1997. The two biggest exporters were Canada and the United States. Finland's position among the leading producers and exporters of some major forest-industry products in 1997 is presented in Fig. 12.4. 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 22% (Table 12.13).