
SUMMARY

For the list of figures and tables (Contents), see page 16.

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. 29–30). 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. The 8th national forest inventory took place during 1986–94. The field work covered two to three administrative areas (forestry board jurisdictions, since 1996 forestry centres) 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, a cluster consists of 18 temporary sample plots placed at intervals of 300 metres. Angle-count sampling is applied on all the plots (Fig. 1.1).

In spite of 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 inventory, the total growing stock volume at the time was 1 908 mill. m³ and the annual inc-

rement 77.6 mill. m³ over an overall forested area of 23.0 mill. ha. In recent years, the annual volume increment has exceeded drain by almost 20 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 the carrying out of 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 results of the 8th inventory –, the tree species distribution is as follows: Scots pine (*Pinus sylvestris*) 45.8% of the total volume, Norway spruce (*Picea abies*) 36.6%, and broadleaved species (mostly birch, *Betula sp.*) 17.7%. In terms of area, pine is the dominant species on 64.8% of forest land, indicating 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 8th NFI are as follows:

forest land	20.0 mill. ha
scrub land	3.0 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 (5.0%) are nature conservation areas where all forestry activities are prohibited. The new international definition of forest land, as is to be 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 together affect the condition of forests, e.g. climate and soil conditions, airborne pollutants and forest treatment. The vitality of trees is widely studied by estimating defoliation which reflects the combined effect of several stress factors. In Finland, trees are regarded to be afflicted by defoliation if their relative foliage loss exceeds 20%. In 1997, it was estimated that 8% of pines, 36% of spruces and 13% of broadleaved trees were afflicted by defoliation (Table 2.1). Defoliation in Finland is modest to that observed elsewhere in Europe (Fig. 2.5).

In the course of the most recent NFI (1986–97), 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 weather factors and fungi (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 4.2 mill. ha of land with restrictions on wood production (Table 2.7), and 2.7 mill. ha of this area are statutory nature conservation areas (Table 2.8). Most of these set-aside areas

are situated in the northern part of the country (Fig. 2.6). Besides nature conservation areas, there are especially important habitats as defined in the Forest Act (appr. 1% of the forest land area), and these may not be modified by forestry measures.

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 1997 was 530 000 hectares, which is almost 30% more than in the previous year. The area covered by thinnings increased by 41% (Figure 3.3, Tables 3.3–3.4). In 1997, the area seeded and planted (113 000 hectares) decreased by 5% compared to the year 1996 (Figures 3.4–3.5, Tables 3.7–3.9). Tending of seedling stands was done on 151 000 hectares, which was a little less than year before (Figure 3.6, Tables 3.11–3.12). The amount of forest drainage and construction of forest roads increased. The area of ditch cleaning and supplementary ditching was 81 000 hectares (Figure 3.8, Tables 3.16–3.17). Nearly 2 000 kilometres of new forest roads were built and 1 300 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 1 074 mill. in 1997, i.e. a increase of 5% over the previous year (Figure 3.10 and Table 3.20–3.21). The proportions of different ownership categories of the total in 1997 were as follows: non-industrial, private 85%, State 9% and forest industries 6%. In non-industrial, private forests, the costs are partly covered by State subsidies. In 1997, State grants and loans totalled FIM 295 mill., leaving FIM 618 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 1997 and the first half of 1998. The statistics are generated, mainly on a monthly basis, by METLA.

In 1997, a new system for agreeing on roundwood prices was introduced in Finland. According to the system, timber prices (or rather a common concept of how the prices should develop) are negotiated between buyers and sellers separately for each company. The new agreements on roundwood prices reached in March promised a slight rise in prices. The roundwood supply remained high until the end of the year. In 1997, forest industries purchased a total of 39.8 million cubic metres of roundwood from private forests. In 1997, the stumpage prices of logs were 8–9% higher than in 1996. The stumpage prices of pine and birch pulpwood were, on average, 2% lower, and the price of spruce pulpwood was, on average, 7% higher than in 1996. The delivery prices followed the trend in stumpage prices.

In 1997, the total commercial roundwood fellings amounted to an all-time high of 53 mill. m³. Compared to the preceding year, this was 6.1 mill m³ (13%) higher. Non-industrial, private forests are the main roundwood source for Finland's forest industries, accounting for 89% of the total roundwood fellings in 1997. Timber felling from the forest industries' own forests totalled 1.7 mill. m³ and felling from state forests 4.1 mill. m³.

5 Harvesting and transportation of roundwood

Chapter 5 consists of a report on the forestry machines used in timber harvesting and data on the volumes and costs incurred in the harvesting and transportation of roundwood. The information presented refers mainly to 1997.

Since the mid-1980s, mechanisation in forestry has increased dramatically. The share of mechanised felling in standing sales of timber amounted to 89% in 1997 (Fig. 5.3). In 1997, there were 1 232 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 (62% of the total transport volume in 1997). 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 the harvesting and long-distance transportation of roundwood in recent years (Table 5.6). In 1997, the total costs of harvesting and transportation 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 timber production. 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 1998 (Table 6.1). Most of them are local and are maintained by municipalities.

The amount of commercial wild berries and edible commercial mushrooms collected from the forests in 1997 was 11.6 mill. kg and their value totalled FIM 70 mill. (Tables 6.3–6.4). The value of lichen exports was FIM 8.6 mill. (Table 6.5).

The value of hunting was estimated at FIM 192 mill. in 1997 (Table 6.6–6.7). The foremost game species is the moose (Table 6.8).

Reindeer husbandry is practised in northern Finland, and its annual economic value for the region is approximately FIM 200 mill. The number of reindeer kept is about 200 000 (Table 6.10).

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 7.1–7.7). Among other things, the survey provides information on employment, unemployment and labour input by branch of industry. The same organization is also responsible for collecting and compiling data on salaries (Tables 7.8–7.12), labour disputes (Table 7.13), accidents (Table 7.14) and education (Tables 7.15–7.17) in the forest sector.

The methods applied in the labour-force survey were renewed in 1997-98 to meet the new definitions of ILO and EU. The data presented in the corresponding tables have been updated since 1989 according to the new definitions.

In 1997, an average of 95 000 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). Two thirds, or 72 000, of the employees worked for the forest industries. The further fall in unemployment in 1997 also had an influence on the forestry sector: the number of unemployed people in the forestry sector decreased from approximately 12% in 1996 to 9% in 1997. It must be noted, however, that almost all of this positive development took place in the forest industries: the unemployment rate in forestry, 18%, remained the same as in the previous year (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 (for details, see Chapter 5). In the forest industries, total employment has also fallen (from 120 000 in 1980 to 72 000 in 1997) due to increased automation, which has led to physical work being focused more on control activities. In 1997, the overall unemployment rate in the forest industries was 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

113 000, a rise of 2% over the preceding year (Table 7.10). The corresponding average annual earnings in the wood-products industries were about FIM 127 000 and in the pulp and paper industries FIM 183 000 (Table 7.12), or rises of approximately 5% and 7% in these industries.

8 Wood consumption

The year 1997 was the third year in succession during which total wood consumption exceeded 60 mill. m³, including imports and exports. Industrial wood consumption was 64.9 mill. m³. In 1997, imported roundwood accounted for 15% 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 manifold increases in wood pulp production (Fig. 8.1). This is mainly due to numerous structural changes, such as reduction in the 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 shows, however, a strong upward trend.

9 Forest industries

In 1997, a record of 10.7 million cubic metres of sawn goods were produced. Industrial sawmills worked at 92% capacity utilisation rate and their profitability was generally good. New capacity has been built for plywood, and its production is increasing. The year 1997 was a record year for the paper industries with a 19% rise in production (Table 9.3) over the previous year. The Finnish paper industries are among the major global producers of graphic papers. In the first half of 1998, the forest industries' production was in excess of the corresponding period in 1997. Domestic investments by the forest industries decreased, totalling FIM 6.1 billion, i.e. 7.8% of the annual turnover (Table 9.7).

The domestic demand for sawn goods has been increasing in recent years. As regards domestic paper consumption, more realistic estimations 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, mainly from Russia, amounted to 8.4 mill. m³. The volume of roundwood exported from Finland was 0.9 mill. m³. Compared to imports, Finland's exports of roundwood are rather insignificant (Tables 10.1–10.6).

Detailed data on the foreign trade in forest-industry products are presented for 1997 (Tables 10.7–10.10 and 10.15). In addition, time-series information is presented for the major product groups. In 1997, the value of forest-industry exports amounted to an all-time high of FIM 63 billion. This accounted for 30% 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 1997, the three most important customers were Germany, the United Kingdom and France. Their combined share was 41% of the total value of forest-related products exported from Finland.

11 Forest sector in the national economy

Chapter 11 deals with forestry and the forest industries from the point of view of national economics. Tables 11.1–11.5 have been compiled by Statistics Finland.

In the national accounts, the branch "Forestry" consists of the following three activities: roundwood harvesting, silviculture and what may be called promotion of forestry (i.e. mainly activities performed by local forest management associations). The forest industries are divided into two sub-branches: the wood-products industries, and the pulp and paper industries.

In 1997, Finland's gross domestic product in purchaser's values amounted to FIM 622 bill., showing a volume-weighted increase of 6.0% over the previous year. In 1997, the combined share of the forest sector (i.e. forestry and the forest industries) was 7.9% of the total GDP (Table 11.5).

Tables 11.6–11.9 deals with the profitability of non-industrial, private forestry. These tables have been compiled by METLA in close co-operation with Statistics Finland, and Forestry Development Centre Tapio. Gross-stumpage earnings include the estimated value of the timber used by forest owners for their own purposes. Silviculture and forest improvement cost includes the estimation of the value of the forest owner's own work. "Other administration costs" are estimations made in the context of area based forest taxation.

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 different 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 this Yearbook, the data on the forest resources of Europe (Table 12.2) are based on the preliminary data of the new forest resources assessment (*FRA 2000*), collected in 1998 and to be officially published in 1999. Countrywise information on forest resources and other information related to forestry are available in Forestry Statistics compiled by Eurostat 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 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-related products (Table 12.15), representing approximately 8% of the world total in 1996. The two biggest exporters were Canada and USA. Finland's position among the leading producers and exporters of some major forest-industry products in 1996 is presented in Fig. 12.3. 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 21% (Table 12.13).