SUMMARY

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1 FOREST RESOURCES

The land area of Finland totals 30 mill. ha, 86% of this is classified as forestry land. The area of *forestry land* (26 mill. ha) is sub-divided into *forest land* (20 mill. ha), *scrub land* (3 mill. ha) and *waste land, etc.* (3 mill. ha) according to the site productivity (Table 1.1). The definitions of the forestry land categories are as follows:

- *Forest land*: the potential annual increment of the growing stock is at least 1.0 m³/ha.
- *Scrub land*: the potential annual increment of the growing stock is less than 1.0 m³/ha, but at least 0.1 m³/ha.
- *Waste land*: unless naturally treeless, the annual increment is less than 0.1 m³/ha.

FAO's international definition of *forest*, as applied in the Global Forest Resources Assessment 2000, sets a canopy cover requirement of 10% as the threshold between forest and other lands. This means that more than half of the Finnish scrub land meets the international definition of forest.

Finland's forest land area has increased by 1.6 mill. ha since the 1960s as a result of afforestation of agricultural lands and peatlands, as well as of intensive forest improvement efforts. Consequently, the share of scrub land has been reduced.

Regarding forestry land, 53% belongs to non-industrial, private forest owners. The State possesses one third, and most of the State-owned forests are located in Northern Finland (Table 1.7). Statutory conservation areas (2.8 mill. ha) are also included in forestry land, and they are located almost entirely in the northern part of Finland (Table 1.6). Northwards, the climate becomes more humid in Finland (for regions, see Map 1 on page 29). Mires account for 34% of the forestry land, and their share is also higher in the northern part of the country. More than half of the mires have been drained (Tables 1.3–1.4).

Since the late 1960s, the volume and increment of the growing stock have continuously risen. The total standing volume now amounts to 2 024 mill. m³ over bark. Half of the growing stock consists of *Scots pine*. The share of *Norway spruce* is 34%, leaving 19% for the broadleaved species, mostly birch. Two-thirds of the growing stock are in Southern Finland (Table 1.16). The mean volume of the growing stock on forest land is 98 m³/ha. In Southern Finland, the mean volume (125 m³/ha) is almost double of the mean volume in Northern Finland (64 m³/ha) (Table 1.17).

The volume increment of the growing stock is 81 mill. m³ per year. From the 1970s to the 1990s, the total drain amounted to about 60–80% of the increment. Ten years ago, the difference between increment and drain diminished, and now the drain is only 10 mill. m³ less than the increment (Tables 1.21 and 1.24).

The objective of national forest inventories (NFIs), carried out by Metla since the 1920s, is to produce objective and up-to-date information of the forest resources, forest health conditions and their development for national and regional decision-making. NFIs are based on field measurements of systematically located sample plot clusters. Finnish forests have now been assessed eight times and the ninth inventory was launched in 1996. The field work of the ninth inventory has now been completed and the results are available, with the exception of the two northernmost forestry centres. This yearbook contains new inventory results for the Forestry Centre of Kainuu.

2 FOREST HEALTH AND BIODIVERSITY

In the course of the two most recent NFIs (1992–2001), it was observed that 4.8 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 2.1–2.3).

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 2002, it was estimated that 3% of pines, 27% of spruces, and 9% of broadleaved trees were afflicted by defoliation. Defoliation in Finland is modest in comparison to that observed elsewhere in Europe (Figs. 2.4–2.5).

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 in forests is one of the main goals of the Finnish Forest Act. Nature conservation areas form the basis for maintaining natural environments. There is a total of 4.7 mill. ha of land 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 2.6–2.8 and Fig. 2.6).

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. 42% of all the threatened species inhabit forests and mires (Table 2.9).

In commercial forests, biodiversity can be promoted by protecting valuable habitats, by increasing the amount of decayed trees in forests, by leaving living trees on felling sites (especially large-sized aspen and other broadleaved trees), and by applying prescribed burning (Tables 2.10–2.12).

3 SILVICULTURE

In 2002, the amounts of most silvicultural work decreased compared to the previous year. Forest regeneration was completed on 158 000 hectares, of which 121 000 hectares were regenerated artificially. The proportions of planted and seeded areas were three quarters and one quarter, respectively. Almost all of the seeding was done to propagate pine. Most of the planting (62%) was done to establish spruce plantations (Tables 3.3–3.7 and Figs. 3.1–3.3). Tending of seedling stands and improving young stands was carried out on 229 000 hectares. The amount of tending of seedling stands and improving young stands has increased since 1997 because of extension programmes and increasing state subsidies (Tables 3.9–3.10 and Fig. 3.5). The area covered by ditch cleaning and supplementary ditching was 80 000 hectares. No first-time ditching took place. The focus in forest road construction has been transferred to the basic improvements which were done on 1 511 kilometres. New forest road construction amounted to 1 306 kilometres (Tables 3.13–3.16 and Figs. 3.7–3.8).

The total area treated with timber felling in 2002 was 591 000 hectares, which was 13% more than in the previous year. The proportion of thinnings was 57%, regeneration fellings amounted to 32%, and other fellings to 11% (Tables 3.17–3.18 and Fig. 3.9).

State subsidies and loans for silvicultural work in non-industrial, private forests totalled EUR 60 mill. in 2002. Almost half of the subsidies were used for tending of seedling stands and improving young stands (Table 3.24).

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 2002 and the first half of 2003. These statistics are generated, mainly on a monthly basis, by Metla.

A quiet period prevailed on the roundwood market in the beginning of 2002. After June, due to the rise in roundwood prices, the roundwood trade revived and continued exceptionally dynamic until the end of the year. In 2002, the forest industries purchased 38 mill. m³ of roundwood from private forests. This was 8 mill. m³ (27%) more than in 2001. In 2002, the stumpage prices were, on average, 2% higher than in the previous year. The prices paid for pine and spruce logs, as well as for pulpwood, rose by an average of 2%. The prices paid for birch logs and pulpwood remained at the 2001 level. The delivery prices of pine and spruce logs fell by 1%, while corresponding pulpwood species and birch log prices remained unchanged, and the delivery price paid for birch pulpwood fell by 3%.

In 2002, the total commercial roundwood fellings amounted to 54.2 mill. m³. Compared to the previous year, this amount was 0.9 mill. m³ (2%) greater. Non-industrial, private forests are the main roundwood source for Finland's forest industries, accounting for 46.3 mill. m³ (or 85%) of the total roundwood fellings. Timber felling from the forest industries' own forests totalled 3.1 mill. m³ and felling from State forests totalled 4.7 mill. m³.

5 HARVESTING AND TRANSPORTATION OF ROUNDWOOD

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

In 2002, the share of standing sales was about 81% of commercial roundwood production (for volumes, see Chapter 4). In standing sales, the share of mechanised felling amounted to 96% (Fig. 5.3). The degree of mechanisation in regeneration felling was as high as 97% and in thinning 91%. Intense mechanisation has helped the forest industries to reduce their unit costs in harvesting. In 2002, however, the unit costs increased 1% over the previous year. In standing sales, the unit costs amounted to EUR 8.63 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 2002, 81% of domestic roundwood was transported by road to mills, the average distance from the forest to the mill being 106 km. In the rail transportation sequence, the average distance was longer, 289 km, and in the water transportation sequence it was 297 km. The average unit costs of long-distance transportation were EUR 5.88 per m³ (Table 5.3).

With regard to imports of roundwood, 16.2 mill. m³ of roundwood and wood residues were imported to Finland in 2002. Half of this amount was imported by rail, 25% by road, and 25% by water. Wood made up about one-fifth of all the weight of imports-related transportation, but in exports-related transportation its share was less than 2%. On the other hand, forest industry products accounted for 49% of all exports transportation from Finland. Almost all forest industry products were exported by ship (Table 5.7).

6 MULTIPLE-USE FORESTRY

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

The main product provided by Finnish forests is roundwood. In 2002, the total commercial roundwood fellings amounted to more than 54 mill. m³ and gross stumpage earnings were worth EUR 1.8 billion. These aspects of multiple-use forestry are addressed in more detail in Chapters 4, 5 and 11 of this book.

There are about 300 000 registered hunters in Finland. The overall value of the bag in hunting was estimated to be EUR 73 mill. in 2002. The most important game species in Finland is the moose. It amounted, with venison production of 11.1 mill. kg, to almost 80% of the overall value of hunting. The amount of commercial wild berries and mushrooms collected from the forests in 2002 was 5.0 mill. kg and their value totalled EUR 6 mill. However, much larger amounts are picked for direct household use. The value of lichen exports amounted to EUR 1.5 mill. (Tables 6.1–6.2 and 6.5–6.7).

Reindeer husbandry is practised in Northern Finland. In the autumn of 2002, about 106 000 reindeer were culled, producing 2.6 mill. kg of venison. After the culling, the winter herd was estimated to amount to 197 000 reindeer.

Outdoor recreation is an integral part of the Finnish way of life. The traditional right of 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 2002, forestry and the forest industries employed 92 000 people in Finland. This amounts to approx. 3.9% of the total employment. The above figure comprises of 71 000 employed persons in the forest industries and 21 000 in forestry (Tables 7.2 and 7.7, Fig. 7.1).

The unemployment rate in the forest sector in 2002 remained at the same level as in the previous year. In 2002, the overall unemployment rate in the forest industries was 5.4%, which was significantly less than the average figure for all branches of industry (9%). The unemployment rate in forestry was 10.5% (Table 7.8).

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 the forest industries, total employment has also fallen (from 120 000 in 1980 to 71 000 in 2002) due to increased automation, which has led to physical work being focused more on control activities.

In 2002, the average daily earnings of forest workers in motor-manual timber harvesting amounted to EUR 97. The corresponding earnings in silvicultural works amounted to EUR 68. The average earnings per hour in the wood-products industries (EUR 12.5) and in the pulp and paper industries (EUR 15.5) increased approximately 3.5% over the preceding year.

Statistics on the forest sector's labour force are primarily based on the Labour Force Survey, compiled 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 also mainly 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 (Tables 7.13–7.14), and education and training (Tables 7.15–7.16) in the forest sector.

8 WOOD CONSUMPTION

In 2002, the total roundwood consumption in Finland, including imports and exports, amounted to 77.2 mill. m³, which was the largest consumption figure achieved to date. There was an increase of 4.0 mill. m³ (or 5%) compared to the previous year, and an increase of 0.9 mill. m³ compared to the most recent record from the year 2000 (Tables 8.0 and 8.1).

The record in roundwood consumption resulted from increased industrial wood consumption. In 2002, more than 90% (or 71.3 mill. m³) of the roundwood was consumed by the forest industries, of which the most important consumers were the sawmills (40%) and the chemical pulp industry (39%). With regard to industrial roundwood, 23% (or 16.3 mill. m³) was imported. As is shown in Table 8.2, the volumes of imported roundwood have clearly increased during the past ten years, and this also resulted in a new record being achieved in 2002. In addition to roundwood, 11.9 mill. m³ of sawmill chips were consumed by the forest industries.

Of the other categories of use, the wood consumption in the heating of small-sized dwellings totalled 6.1 mill. m³, of which the share of roundwood was 5.2 mill. m³ and wood residues amounted to 1.0 mill. m³ (Tables 8.1 and 8.12). The volume of roundwood exports was 0.7 mill. m³ (or 1% of the total wood consumption).

The consumption of solid wood fuels, i.e. forest chips and by-products of the forest industries (bark, sawdust, industrial chips, etc.) in 2002 for power and heating plants accounted for 13.3 mill. m³ (Table 8.12). Combined with the waste liquors from the pulp industry, the share of wood-based fuels was 20% of the total energy consumption in Finland.

The data on roundwood consumption are based on statistics compiled by the Finnish Forest Industries Federation, as well as on Metla's own inquiries.

9 FOREST INDUSTRIES

In 2002, industrial production in Finland grew by less than 2%. The forest industries achieved higher growth rates: production was up by close to 4% in both the wood-products and pulp and paper industries. The annual turnover, however, decreased by 3%, down to EUR 20 billion, mainly due to the declining prices of paper products. Forest industry exports fell by 2% over the previous year (Fig. 9.0, Table 9.8).

Paper and paperboard production totalled 12.8 mill. m.t., this was 2% more than in the previous year. Roughly one half of the production in the Finnish paper industry consisted of magazine paper and one quarter of fine paper. The production of magazine paper amounted to 5.3 mill. m.t. (+5% compared to 2001). Fine paper manufacturing was up to 2.6 mill. m.t.; an increase of 3% over 2001. The pulp industries reached record-high volumes, mainly as a result of increased capacities (Tables 9.2–9.3).

In 2002, the production of sawn goods increased by 5% to the record level of 13.4 mill. m^3. Since the mid-1990s, the domestic consumption of sawn goods has significantly risen in Finland. In 2002, some 40% of sawn goods were delivered to domestic markets. The total production of plywood amounted to 1.2 mill. m^3 (+8%) (Tables 9.1 and 9.4).

Investments by the Finnish forest industries dropped significantly in 2002, both at home and abroad. In Finland, investments totalled EUR 705 mill., less than half of the amount invested in 2001. The profitability of the sector was slightly weakened (Tables 9.7–9.8).

The production statistics concerning the Finnish forest industries are compiled by the Finnish Forest Industries Federation. The statistics on investments, turnover, and the profitability and financial position of the forest industries are based on the annual data gathered by Statistics Finland.

10 FOREIGN TRADE BY FOREST INDUSTRIES

In 2002, Finland's imports of wood, including bark, exceeded 16 mill. m^3 for the first time. During the past decade, imported roundwood volumes have doubled. Nowadays, one fifth of the wood consumption of the Finnish forest industries is accounted for by imported wood. In 2002, 83% of the imported wood originated from Russia and the remainder mainly from the Baltic countries. The most important roundwood assortment was birch pulpwood (5.8 mill. m^3), followed by spruce logs (2.4 mill. m^3). Half of the imported softwood consisted of logs, whereas in hardwood imports, only about 12% consisted of logs (Tables 10.1–10.4).

Finland is a net importer of wood. The amount of exported wood totalled only 0.9 mill. m^3 in 2002. Half of the exported wood was transported to Sweden and 10% to Egypt. Wood exports have remained more or less unchanged since the 1960s (Tables 10.5–10.7).

The value of exports of forest industry products has decreased for two years in a row. Their value totalled EUR 12.2 billion in 2002. The total value of exports of all goods from Finland was EUR 47 billion, and the proportion of forest industry products was 26% of this. Two-thirds of forest industry products remained within the European Union. The most important customers were Germany (18% of total value of forest-based products), the United Kingdom (14%) and USA (7%). The most important product group was pulp and paper products. They accounted for 78% (EUR 9.5 billion) of all forest sector products. The most important customer for Finland's pulp and paper industries was Germany. The exports of wood-products industries totalled EUR 2.7 billion, and the most important customer was the United Kingdom (Tables 10.8–10.18).

The foreign trade in forest industry products is very much export-oriented in Finland. However, imports of forest industry products amounted to EUR 1.0 billion. The foremost product group was converted paper and paperboard products (Table 10.19).

The data on foreign trade in Finland are 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 these data.

11 FOREST SECTOR IN FINLAND'S NATIONAL ECONOMY

Slow economic growth continued to influence the Finnish economy in 2002. Finland's gross domestic product (GDP) at market prices amounted to EUR 140 billion, indicating an increase of 2.2% over the previous year. The average decline in total manufacturing was 1.7%. In the forest industries, the development was dichotomous. While the sawmilling and plywood industries gained 8% in value, the pulp and paper industries went down by 10%. In primary production, including agriculture and forestry, production increased by 2.7%. Gross stumpage earnings totalled EUR 1.75 billion. Within the forest sector, pulp and paper industries constitute the most important branch of industry, producing 55% of the total value added of the Finnish forest sector in 2002 (Tables 11.1–11.11).

Although the importance of the forest sector has decreased during the past few decades, it still performs a vital role in the Finnish economy. Increase in demand by EUR 10 mill. in forest industries creates an increase of EUR 20 mill. in domestic output. The forest sector's share of net export income was 30% in 2000 (Tables 11.12–11.16).

In non-industrial private forestry, stumpage earnings increased by some 4%, amounting to EUR 115 per hectare. This was primarily due to an increase in removal volumes and stumpage prices. The total costs in private forestry remained at the same level compared to the year 2001 (preliminary estimate, October 2003). Consequently, the net earnings per hectare – EUR 99 as a national average – were 5% higher than in the previous year (Tables 11.17 and 11.18).

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 the FAO (Tables 12.1 and 12.2). According to these data, there are about 3.9 billion hectares of forest in the world, covering about one third of the total land area. The total volume of the global growing stock is 386 billion m³. Countries with the largest forest cover are Russia, Brazil, Canada, USA and China. In the 1990s, the forest area of the world has diminished by about 9 mill. ha (0.2%) per year, and this loss has mainly taken place in Africa and Latin America.

In 2001, the world's roundwood production was approximately 3.3 billion m³ (Table 12.4, Fig. 12.2). The largest country-specific volume, 0.5 billion m³, was produced in the United States. Globally, more than half of the roundwood was fuelwood, the largest producers being Asia, Africa and Latin America. The world's production of sawn goods decreased from year 2000 by 3% to 377 billion m³ (Tables 12.5 and 12.15, Fig. 12.3). Approximately 75% of the total production was softwood, and 20% of the sawn goods was produced in the European Union.

The world's production of paper and paperboard decreased slightly (1%) compared to the previous year (Tables 12.6 and 12.16, Fig. 12.3). According to the FAO, paper and paperboard produced in 2001 amounted to 320 mill. m.t. In 2002, the production is expected to increase to approximately same level as in 2000, i.e. 323 mill. m.t.

According to the data for 2001, Finland ranks third in the world with regard to the value of exports of forest-related products, representing approximately 8% of the world total value (Table 12.14). The two largest exporters were Canada and the United States. 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 18% of the global market (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 regarding trade practices, measurement units, assortments, tree species, and measurement and quality requirements. Therefore, the price data presented by country should be used only to monitor the internal price development within each country.

The foreign aid grants for Finnish forest sector related development projects conducted in various countries totalled EUR 15.3 mill. in 2002, approximately 7% less than in the previous year (Table 12.24).

The data on the global forest resources assessment is compiled jointly by the FAO/ECE Secretariat, Geneva (Forest Resources of Industrialized Temperate/Boreal Countries, acronym TBFRA-2000) and the 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 FAOSTAT forestry on-line database, which includes country specific forest statistics since 1961.