



SUMMARY

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I FOREST RESOURCES

The objective of national forest inventories (NFIs), carried out by the Finnish Forest Research Institute (Metla) since the 1920s, is to produce objective and up-to-date information on forest resources, forest health conditions and their development for national and regional decision-making. The first results of the 10th national forest inventory (NFI10) were published in the summer of 2006. In NFI10, the sampling system was changed from region by region succession to annual measurements of systematically located sample plot clusters throughout the whole country. The new system speeds up the production of inventory results and provides more coherent and regionally comparable data. The latest inventory results were based on the field data measured during 2004–2005.

The land area of Finland totals 30 million ha, of which 26 million ha is classified as *forestry land*. The area of forestry land is sub-divided into *forest land* (20 million ha), *scrub land* (3 million ha) and *waste land*, etc. (3 million ha) according to site productivity (Tables 1.1–1.2). The national definitions of the forestry land categories are as follows:

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

FAO's definition of *forest*, as applied in Global Forest Resources Assessment 2005, differs from the Finnish national term. In Finland, all forest land and most of scrub land meet FAO's definition of forest land.

Mires account for 34% of the forestry land, and their share is even higher in the northern part of the country. More than half of the mires have been drained (Tables 1.3–1.4). During the next two decades, the share of drained peatland forests will be approximately 25% of the total harvesting potential of Finnish forests.

Of the total *forestry land*, non-industrial, private forest owners possess 52%. The proportion owned by the State amounts to 35%, and companies own 8%. The remaining 5% belongs to municipalities, parishes, etc. Contrary to the other ownership categories, state-owned forests are mainly situated in Northern Finland (Tables 1.6–1.7). Regional differences in land ownership are clearly reflected in the distribution by ownership of the growing stock: The State's share of the growing stock volume amounts to only 20% (Table 1.18).

Since the late 1960s, the volume of the growing stock has continuously risen. On forest and scrub land, the total standing volume now amounts to 2 176 million m³ over bark (of which only 61 million m³ on scrub land). Half of the growing stock volume consists of *Scots pine*, less than one third of *Norway spruce*, 12% of *downy birch*, and 4% of *silver birch* (Table 1.17). The proportion of pine is slowly increasing. Of the total growing stock, 2 053 million m³ were on forest and scrub land available for wood supply (Table 1.24).

The volume increment of the growing stock has increased to 97 million m³ per year. The increase is mainly attributable to pine and, to some extent, to broadleaved species, with no significant change in the volume increment of spruce. Pine and broadleaved forests are mostly young stands at the stage of rapid growth. On the other hand, the percentage of mature forests is high in spruce stands. The annual average of total drain has been 69 million m³ during

the last five years. Since the early 1970s, the total drain has been less than the volume increment of the growing stock. Recently the increment of pine and broadleaved species has been significantly more than the drain, meanwhile spruce increment has been slightly lower than the drain (Tables 1.23 and 1.26–1.27).

2 FOREST BIODIVERSITY AND HEALTH

Maintaining the biodiversity in forests is one of the main goals of the Finnish Forest Act and the Nature Conservation Act. Nature conservation areas form the basis for maintaining natural environments. There is a total of 4.8 million ha of land with restrictions on wood production. Strictly protected forests (forest land and scrub land) account for 1.9 million ha of this area. Most of these reserved areas are situated on state land in the northern part of the country, where strictly protected forests account for 15% of the total forest area. In the southern part of Finland their share is 2%. In 2005, about 76 000 ha of new areas were protected in the implementation of nature conservation programmes (Tables 2.1–2.4 and Fig. 2.1).

Nature conservation areas have also been changed by human influence. Restoration measures aim to assist in the recovery of ecosystems. In 2005, more than 4 600 ha of forests managed by Metsähallitus were restored, 4 500 ha of these were in existing conservation areas. Currently, the total area of restored forests is more than 21 000 ha in Finland (Table 2.5).

In 2000, the number of threatened fauna and flora species was estimated as 1 505 of the country's total 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 2.6).

In commercial forests, biodiversity can be promoted e.g. by protecting valuable habitats, by increasing the amount of decayed trees in forests, by keeping living trees on felling sites (especially large-sized aspen and other broadleaved trees), and by applying prescribed burning (Tables 2.7–2.12).

In the course of the 9th national forest inventory (1996–2003), 5.0 million ha of forest land (17% of the forest lands in Southern Finland and 34% in Northern Finland) were observed to be affected by damage, which had reduced the silvicultural quality of the stands. The most frequent damaging agents were weather factors and fungi (Tables 2.13–2.15).

Tree vitality is being widely studied by estimating defoliation, which can be explained by the combined effect of several stress factors on forests. Trees are regarded to be afflicted by defoliation if their relative foliage loss exceeds 25%. In 2005, it was estimated that 3% of pine, 22% of spruce, and 7% of broadleaved tree species were damaged by defoliation. Defoliation in Finland is modest in comparison to that observed elsewhere in Europe (Figs. 2.5 and 2.6).

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.

3 SILVICULTURE

In 2005, the amount of almost all silvicultural work decreased compared to the previous year. Forest regeneration was completed on 145 000 ha, of which 119 000 ha were regenerated artificially. The proportions of planted and seeded areas were three quarters and one quarter, respectively. Almost all of the seeding was to propagate pine. Over two thirds of planting areas were regenerated by spruce plants (Tables 3.4–3.6 and Figs. 3.1–3.3). The tending of seedling stands and improving young stands were carried out on 219 000 ha. This area has increased since the mid-1990s because of extension programmes and increasing state subsidies (Tables 3.11–3.12 and Fig. 3.5).

Approximately 4.9 million ha of Finnish mires have been drained. No first-time ditching takes place any more. The area covered by ditch cleaning and supplementary ditching was 69 000 ha. The focus on forest road activities has been transferred from construction to the basic improvements of existing forest roads. Road improvements were carried out on 2 155 km. New forest road construction amounted only to 790 kilometres (Tables 3.15–3.18 and Figs. 3.7–3.8).

In 2005, the total area treated with timber fellings was 511 000 ha, which was 13% less than in the previous year. The proportion of thinnings was 61%, regeneration fellings amounted to 29%, and other fellings were 10% (Tables 3.19–3.20 and Fig. 3.9).

The total costs of silvicultural and forest-improvement works totalled EUR 222 million in 2005. The costs were almost at the same level as in the previous year. The proportion of forest regeneration was 41% of the total costs, and the share for tending of seedling stands and improving young stands was 32%.

Silvicultural work and forest improvement in non-industrial, private forests cost EUR 166 million. Almost a third of these private forest owners' costs were covered by state subsidies (Tables 3.21–3.26 and Figs. 3.10–3.12).

4 ROUNDWOOD MARKETS

Chapter 4 provides a detailed overview of the roundwood markets. Three topics are of special interest: roundwood trade (Tables 4.1–4.4), roundwood prices (Tables 4.5–4.9), and removals (Tables 4.10–4.18). Most of the information refers to 2005 and the period of January–September 2006. These statistics are generated, mainly on a monthly basis, by Metla.

The roundwood markets were exceptionally quiet in 2005, and the forest industries' purchases from non-industrial, private forests decreased by 17% compared with the previous year. This was because the market was affected by the production stoppage caused by the forest industry's seven-week lock-out in May–June. The labour market dispute brought uncertainty also on the roundwood markets and the volumes purchased remained considerably below the long period average as late as in September–November, which usually is the most active period in the roundwood markets.

Year 2005 was also the last year for two parallel forest taxation systems. Non-industrial, private forest owners, who chose the 13 years (1993–2005) transition period in area-based site productivity taxation, accounted for a significantly smaller proportion of roundwood sales than the year before. At the same time, private forest owners already paying sales revenue tax were waiting for the end of the transition time (Table 4.4).

At the beginning of 2006, private forest owners kept watch on the development of the markets following the termination of the old taxation system and consequently, the roundwood supply remained at a relatively low level. Due to a raise in prices for both sawlogs and pulpwood, the supply of roundwood increased considerably in the summer, and by September–October 2006 the roundwood markets were back to the level of normal activity.

In 2005, the stumpage prices were, on average, 0.8% higher than in the previous year. The prices paid for spruce and birch logs rose by 3%, while the price for pine sawlogs declined by 3%. The prices paid for pulpwood recovered from the previous year's trough and rose by 1–2%. The increase was

greater in delivery prices than in stumpage prices in 2005. The delivery price for pine logs fell by 1%, but the delivery prices paid for all other roundwood assortments rose by 2–4%.

In 2005, the total commercial roundwood removals were reduced with 5% from the previous year to 52.6 million m³ (over bark). Non-industrial, private forests are the main roundwood source for Finland's forest industries, accounting in 2005 for 44.2 million m³ or 84% of the total roundwood removals. Removals from the forest industries' own forests totalled 3.8 million m³ and removals from state forests totalled 4.6 million m³. In addition to industrial use, approximately 5 million m³ of fuelwood is annually removed for domestic heating purposes in small-sized dwellings.

In 2005, due to the interruptions in production, the forest industries production declined by 9% from the previous year. Consequently, the roundwood consumption decreased more than the commercial roundwood removals, while at the same time Finland's imports of roundwood reached a new peak of 21.5 million m³ (over bark). As a result, the roundwood inventories of the forest industries increased by 60%, reaching 11.2 million m³.

5 HARVESTING AND TRANSPORTATION OF ROUNDWOOD

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

In 2005, the share of standing sales was 84% of commercial roundwood production (for volumes, see Chapter 4). In standing sales, the share of mechanised felling amounted to 97% (Fig. 5.2). On average, 1 600 harvesters and 1 610 forwarders were used in harvesting and transportation of roundwood in 2005.

The unit costs in harvesting increased by 6% from the previous year. In standing sales, the unit costs amounted to EUR 8.96 per m³. In delivery sales, the degree of mechanisation was much lower, and the unit costs of harvesting were much higher than in the standing sales (Table 5.0).

In Finland, road transportation by lorry is the dominant mode of long-distance transportation of roundwood. In 2005, 80% of domestic roundwood was transported to the mills by road. The average distance from the forest to the mill was 105 km. In

rail transportation logistics, the average distance was 293 km, and in water transportation the average was 311 km. The average unit costs of long-distance transportation were EUR 6.31 per m³ (Table 5.4).

As to the imports of roundwood, 21.5 million m³ of roundwood and wood residues were imported to Finland in 2005. 46% of this amount was imported by rail, 29% by water, and 25% by road. Wood made up almost one-fourth of the total weight of import-related transportation, but in export-related transportation its share was only 3%. On the other hand, forest industry products accounted for 48% of all export transportation from Finland. Almost all forest industry products were exported by ship (Table 5.8).

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 roundwood production, recreation, collecting of wild berries, mushrooms and lichen, forest game and reindeer husbandry. Finally, the chapter provides information on peat resources and peat production.

The main product provided by our forests is roundwood. In 2005, the total commercial roundwood fellings amounted to 53 million m³ and gross stumpage earnings of forests owners amounted to EUR 1.6 billion. These aspects of multiple-use forestry are presented in more detail in Chapters 4 and 11 of this book.

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 picking wild berries and mushrooms. The amount of commercial wild berries and mushrooms collected from the forests in 2005 was 12.5 million kg, and their value totalled EUR 12.9 million. However, much larger amounts of berries and mushrooms were picked for direct household use. The value of lichen exports amounted to EUR 1.1 million (Tables 6.5–6.7).

There are about 300 000 registered hunters in Finland. The overall value of the catch in hunting was estimated to be EUR 71 million in 2005. The most important game species in Finland is the moose. With meat production of 9.7 million kg, it amounted to 70% of the overall value of the catch. Reindeer husbandry is practised in Northern Finland. In the autumn of 2005, approximately 124 000 reindeer were culled, producing 2.8 million kg of meat. After the

culling, the winter herd was reckoned to amount to 198 000 reindeer (Tables 6.1–6.2 and 6.8).

7 FOREST SECTOR'S LABOUR FORCE

In 2005, forestry and the forest industries together employed 92 000 persons in Finland, amounting to 4% of the total employment. Of the sector's total, three quarters were employed by the forest industries, while about 23 000 worked in forestry. The sector also has significant indirect employment effects on e.g. the manufacture of furniture, and publishing and printing sectors. The role of the forest sector has continuously diminished for several decades. In the early 1970s, the sector employed more than 200 000 persons, corresponding to almost 10% of the total labour force (Tables 7.1–7.2).

In forestry, the declining trend is mainly due to rapid mechanisation in harvesting of roundwood. Fewer forest workers are needed to carry out manual work in felling and silviculture. The downward trend, however, more or less stabilised in the late-1990s. In silvicultural work, the labour force has decreased less than in motor-manual felling. In 2005, the labour input in forestry remained at the same level as in the preceding year. 8 000 persons worked in timber harvesting and the same amount in the fields of silviculture and other forestry (Tables 7.5–7.6, Fig. 7.2).

In the Finnish forest industries, total employment has fallen from 120 000 (in 1980) to 69 000 (in 2005), a decrease of over 40%. In 2005, contrary to the prevailing trend, the labour force increased in most branches of the forest industries. The development occurred despite the fact that the seven-week labour dispute reduced production volumes by 9%. The industrial action in the paper industry in May–June of 2005 was the largest in Finland since 1995. The wood-products industries employed 33 200 persons, an increase of 7% from the previous year. Within this sector, small and medium-sized companies play important roles especially in sparsely inhabited rural areas. During the past few years, the carpentry industry has expanded, mainly thanks to economic boom in domestic construction. In 2005, this sector had 17 000 employees, which is a quarter of the forest industries' total employment. The pulp and paper industries employed 35 900 persons, an increase of 4% from 2004 (Tables 7.8 and 7.13, Figs. 7.3–7.4).

In 2005, the average daily earnings of forest workers in motor-manual timber felling amounted to EUR 114 per day. The earnings in silvicultural works were EUR 84 per day. In the wood-products industries, average earnings per hour amounted to EUR 13.8, and in the pulp and paper industries to EUR 17.3. The earnings in the forest industries rose by 4% from 2004, slightly more than in the manufacturing sector on average (Tables 7.10–7.11, Fig. 7.6).

Statistics on the forest sector's labour force are mainly produced by Statistics Finland. The primary source is the Labour Force Survey, which provides information on, among other things, employment, working hours, unemployment and labour input by branch of industry (Tables 7.0–7.9).

8 WOOD CONSUMPTION

In 2005, the total roundwood consumption in Finland amounted to 74.9 million m³. This means a decrease of 7.0 million m³ (–8%) compared to the previous year (Table 8.1). The consumption was divided by the category of use as follows:

	million m ³	Change 2005/2004, %
Total	74.9	–8
Forest industries	67.8	–9
Energy generation	5.9	+1
Exports	1.2	+40

More than 90% (67.8 million m³) of roundwood was consumed by the forest industries. There was a decrease of 9% compared to the previous year, which resulted from labour disputes within the pulp and paper industries in spring 2005. The most important consumers in 2005 were the sawmilling industry and the chemical pulp industry, which consumed 27.0 million m³ (40%) of industrial roundwood each (Table 8.0). However, these two branches of industry showed the most substantial reductions in their roundwood consumption compared to the previous year. The most important assortments consumed by the forest industries in 2005 were spruce logs (16.2 million m³) and pine and hardwood pulpwood 13.0 million m³ each.

The decrease in forest industries' roundwood consumption was totally focused on domestic roundwood, especially on pine pulpwood (–24% compared to the previous year) and spruce pulpwood (–16%). The consumption of imported roundwood, however, continued to increase. In 2005, 17.9 million m³ or one fourth of industrial roundwood con-

sumption consisted of imported roundwood. This was an increase of 3% compared to the previous year, which resulted in a new record being achieved in 2005. As shown in Table 8.2 and Figure 8.6, the volumes of imported roundwood have doubled during the past ten years. In addition to roundwood, 11.3 million m³ of sawmill chips and dust were consumed by the forest industries, mainly by the chemical pulp industry.

Of the other categories of use, the wood consumption in the heating of small-sized dwellings totalled 6.1 million m³, of which the share of roundwood was 5.2 million m³, and wood residues amounted to 1.0 million m³ (Tables 8.1 and 8.13). The volume of roundwood exports was 1.2 million m³ (or 2% of the total wood consumption).

In 2005, the consumption of solid wood fuels (forest chips and by-products of the forest industries, including bark, sawdust, industrial chips, etc.) at power and heating plants accounted for 13.7 million m³. There was a decrease of 5% compared to the previous year resulting mainly from diminished consumption of the forest industries' by-products. In contrast, the consumption of forest chips increased by 13% to 2.6 million m³ (Table 8.13). The total consumption of forest chips, including heating and power plants and small-sized dwellings, amounted to 3.0 million m³. The objective set by the Finland's Forest Sector Future Review is to increase the annual consumption of forest chips to 8.0 million m³ by the year 2015. The share of wood-based fuels (solid wood fuels combined with the waste liquors from the pulp industry) was 20% of the total energy consumption in Finland (Table 8.14, Fig. 8.8).

The data on roundwood consumption are based on statistics compiled by the Finnish Forest Industries Federation, as well as on the Finnish Forest Research Institute's own inquiries. The data on energy consumption by energy sources are compiled by Statistics Finland.

9 FOREST INDUSTRIES

The industrial labour dispute in spring 2005 lasted for seven weeks; its wide-reaching effects significantly reduced the annual production and turnover of the Finnish forest industries. The total production went down by 9% compared to the year before. In the pulp and paper industries, the decline was as high as 12%, whereas in the wood-products industries the volumes fell only 4%. As a result of the dispute, the

annual domestic turnover of the forest industries also decreased by 7%, amounting to EUR 18.7 billion. Of the total turnover, pulp and paper accounted for EUR 12.8 billion (Table 9.6, Figs. 9.1 and 9.5). Half of the Finnish forest companies' turnover came from domestic production plants and half from the units located abroad.

The pulp and paper industries represent two thirds of the total production value of the Finnish forest industries (Fig. 9.2). In 2005, paper and paperboard production totalled 12.4 million metric tons, i.e. 1.7 million m.t. (12%) less than in the year before. The total paper production decreased to 9.8 million m.t., the lowest volume since 1997. Magazine paper, including newsprint, alone accounted for more than 60% of the total paper production in Finland. The production of wood pulp shrunk by 12% to 11.1 million m.t.. Recycled paper and paperboard represent approximately 5% of total raw-material use in these industries. The recovery rate in Finland was 70% of total domestic consumption of paper and paperboard, or 151 kg per capita (Tables 9.2–9.3 and 9.5).

The total production of sawn goods amounted to 12.3 million m³ in 2005, a fall of 9% from the preceding year. Half of the production was spruce sawn goods, and the other half was pine. Since the mid-1990s, the domestic consumption of sawn goods has rapidly risen to world record levels, amounting currently to 1.0 m³ per capita. In 2005, more than 40% of sawn goods (or 5.3 million m³) were delivered to domestic markets. The total manufacture of plywood amounted to 1.3 million m³, a 3% drop from the record volumes of the preceding year (Tables 9.1 and 9.4).

In 2005, domestic investments by the Finnish forest industries totalled EUR 619 million, a decrease of 14% compared to 2004 and the lowest amount since 1984. At the same time, investments abroad have risen, and their share currently amounts to about 70% of the total investments by Finnish forest industry companies. In 2005, more than 70% of domestic investments took place in the pulp and paper industries. The forest industries accounted for 22% of all industrial investments in Finland. The profitability of the forest industries continued to decline in 2005, both in terms of operating margin and total profit. The financial position of forest industry firms also weakened, as total debts rose to an average of 112% of the annu-

al turnover. The corresponding figure for all industrial sectors was 70% (Tables 9.9–9.10, Fig. 9.6).

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

10 FOREIGN TRADE BY FOREST INDUSTRIES

Finland's imports of wood have reached record values for five successive years. In 2005, the volume of imported wood climbed up to 21.5 million m³ (over bark). Finland is among the largest wood importers in the world. In 2004, Finland's position was the third. At the present, the amount of imported wood corresponds approximately to 40% of commercial domestic roundwood fellings.

Although the share of logs in wood imports has grown since the 1990s, 70% of imported wood still consists of pulpwood or chips (Tables 10.1–10.3). In 2005, the amount of imported birch totalled to 7.8 million m³, 89% of which was pulpwood. The forest industry considers imported birch volumes supplementary to inadequate domestic supply. The imports of spruce increased to 6.0 million m³, a growth of 46% compared to 2004. The imports of pine increased 21% from the previous year, reaching 3.5 million m³. The imported wood mainly originates from Russia (79%) although its share has slowly decreased. The remainder mainly comes from the Baltic countries: Latvia (7%) and Estonia (6%) (Tables 10.4–10.5).

Finland is a major net importer of wood. In 2005, the amount of exported wood totalled only 1.5 million m³. Nevertheless, the wood exports increased 38% from the year before. Two thirds of exported wood were transported to Sweden. The exports consist mainly of pine and softwood chips (Tables 10.6–10.8).

In 2005, the value of exports of Finnish forest industry products totalled EUR 10.7 billion. From the forest industries' point of view, year 2005 was quite exceptional. The industrial action in pulp and paper manufacturing from May to June affected the production volumes and exports of forest industry products. The forest industry's share of Finland's total exports accounted for 20%. This was a very high proportion on international comparisons, but the

lowest ever in Finland. The exports of forest sector's products diminished significantly in all product groups. Pulp and paper products (EUR 8.1 billion, a decrease of 12% compared to 2004) constitute 75% of the forest sector's exports. The main products were high-quality magazine and fine papers. The exports of the wood-products industries totalled EUR 2.6 billion (a decrease of 5%). Half of wood-products industries exports consist of sawn goods and more than one fifth of plywood (Table 10.12).

A large majority of the forest industry's production was exported: about 91% of the annual paper production, 85% of paperboard, and 62% of sawmilling products (Fig 10.7). The European Union (EU25) is the main market for Finnish forest products. In 2005, its share of the total value of forest industries' exports was two thirds. The most important customer was Germany, with a share of 17%. The next most important was the United Kingdom, whose share has diminished during the last ten years from 17% to 12% (Tables 10.9–10.10).

The imports of forest industry products amounted to only EUR 1.3 billion. The primary product group was converted paper and paperboard products (Table 10.20).

The National Board of Customs is in charge of compiling Finnish trade statistics. The statistics describe the commodity trade between Finland and other countries. Transit trade is not included. The data collection for statistics is carried out by using two different systems: The data on the European Union's internal trade are obtained from importers' and exporters' statistical reports on that trade (Intrastat system). The data on the European Union's external trade is obtained through the customs clearance system. 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 the data produced by the Board of Customs.

11 FOREST SECTOR IN FINLAND'S NATIONAL ECONOMY

In 2005, the Finnish economy continued to grow at the same rate as during the preceding year. Finland's gross domestic product (GDP) at market prices amounted to EUR 157 billion, indicating an increase of close to 4% from the previous year. Without the seven-week industrial dispute in the forest industries

the growth rate might have been 1% higher. The growth was mostly due to private consumption and increase in investments. The investments in construction grew by 12%, which helped the sawmilling and plywood industries to stay at the previous year's level in spite of the industrial dispute. Due to the industrial action in summer 2005, the value of the pulp and paper industry production fell by 13%. Gross stumpage earnings were EUR 1.6 billion, which was 5% less than in the previous year. Within the forest sector, pulp and paper industries comprise the most important branch, producing 49% of the total value added to the Finnish forest sector in 2005 (Tables 11.0–11.11).

Although the share of the forest industry in gross domestic product has decreased during the last decades, it still is one of the most important industries of the Finnish economy. An increase in demand for forest industry products by EUR 10 million creates a EUR 20 million increase in domestic output. The forest sector's share of net export income was 27% in 2002 (Tables 11.12–11.16).

In non-industrial, private forestry, stumpage earnings decreased by 6% (EUR 106/ha). The total timber production costs in non-industrial, private forestry were EUR 21 per hectare which was one euro less than in the previous year. State subsidies to timber production were EUR 4.3 per hectare. Consequently, the net earnings per hectare, EUR 89 as a national average, were 6% lower than in the preceding year (Tables 11.17–11.18).

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-2005) were published at the beginning of 2006 by FAO (Tables 12.1–12.2). According to the FRA, there are 4.0 billion ha of forests in the world, which makes up about one-third of the total land area and about 0.6 ha per capita in the world. Countries with the largest forest cover are Russia, Brazil, Canada and the USA which together make up almost a half of the world's forest area. The global growing stock amounts to 434 billion m³ (over bark).

Over the period from 2000 to 2005, the forest area of the world diminished by about 7.3 million ha (0.2%) per year. Compared to the earlier assessment (FRA-2000), the rate of area net loss is, however, slowing down. During 1990–2000, the corresponding loss was 8.9 million ha per year. The forest area loss has mainly taken place in Latin America and Africa. On the other hand, the forest area of Asia has, compared to the period 1990–2000, started to increase resulting primarily from the large-scale afforestation reported by China.

Table 12.3 presents data on areas of protection and protective functions of forests in Europe. The data are based on the MCPFE (Ministerial Conference on the Protection of Forests in Europe) classification adopted by the 4th Ministerial Conference on Sustainable Forest Management in Vienna in 2003. It must, however, be noted that the national data are not harmonized on a pan-European level, so the figures presented are based on the information delivered by national correspondents according to their own interpretation of the MCPFE classification.

In 2004, the world's roundwood production was 3.4 billion m³. The largest producer was the United States, amounting to 0.5 billion m³. Globally, more than half of the roundwood produced was fuelwood, the largest producers being Asia, Africa and Latin America (Table 12.6, Fig. 12.1).

The world's production of sawn goods increased from the year 2003 by 6%, and amounted to 422 million m³ in 2004 (Tables 12.7 and 12.16, Fig. 12.2). Three quarters of the total production was sawn softwood. The world's production of paper and paperboard also increased by 4% and totalled 353 million m.t., the largest production achieved to date (Tables 12.8 and 12.17, Fig. 12.3).

The United States is the leading country in the world in the production of different forest products. In addition to roundwood, the USA produces the

largest volumes of sawn goods, pulp, and paper and paperboard products. As an importer and exporter of forest products, the USA is also among the largest.

According to the data for 2004, Finland ranks fourth in the world regarding the value of exports of forest-related products, representing 8% of the world total value (Table 12.15). The three bigger exporters were Canada, Germany 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 19% (Table 12.13). On the other hand, Finland ranks third after Japan and China with respect to the volume of imported wood (Table 12.10).

The forest sector in the world employed 13 million persons or 0.4% of the total labour force in 2000 (Table 12.18). The forest sector's share was largest in Estonia, Latvia and Finland, approximately 4% in each. Globally, the gross value added of the forest sector amounted to 354 billion USD or 1.2% of the total GDP (Table 12.19). The largest proportion, 8%, occurred in Finland, followed by Estonia, Latvia and Malaysia, by approximately 5% each.

The comparison by country of roundwood prices, as presented in Tables 12.20–12.26, should be viewed with caution. Countries tend to differ with respect to trade practices, measuring 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 of each country.

The data on the global forest resources assessment is compiled jointly by the UNECE Timber Committee, Geneva (Forest resources of industrialized temperate/boreal countries) and FAO, Rome (Tropical countries and global summary, FRA-2005). The tables referring to the production and foreign trade of roundwood and forest-industry products originate from FAO's FAOSTAT Forestry on-line database, which includes country-specific forest statistics information since 1961.