



## Summary

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### I Forest resources

Of the land area in Finland, 86% or 26.3 million ha is classified as forestry land. Based on site productivity, forestry land is divided into forest land (20.1 million ha), scrub land (2.7 million ha) and waste land (3.3 million ha of treeless or almost treeless land). In addition, forestry land also includes 0.2 million ha of forest roads, timber depots, etc. 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 m<sup>3</sup>/ha.
- *Scrub land*: the potential annual average increment of the growing stock is less than 1.0 m<sup>3</sup>/ha, but at least 0.1 m<sup>3</sup>/ha.
- *Waste land*: the potential annual average increment of the growing stock is less than 0.1 m<sup>3</sup>/ha.

FAO's definition of forest differs from the Finnish national classification. According to FAO, almost all forest land and most of the scrubland in Finland would be considered forest land.

Of the total forestry land in Finland, 52% is under non-industrial, private ownership; the State owns 35% and forest industry companies own 8%. The remaining 5% represents forests under municipal, parish, shared or joint ownership. State-owned forests are mainly situated in northern Finland. The State also owns extensive nature conservation and wilderness areas, most of which are located in northern Finland. Almost all of Finland is within the boreal coniferous zone, and growth conditions deteriorate sharply from south to north.

The majority of the Finnish stands grow on areas classified as forest or scrub land. The volume of the growing stock is marginal on scrub land, so practically all forestry activities take place on forest land. The essential forestry

statistics (growing stock volume, increment, etc.) are presented for forest and scrub land stands (or merely for forest land stands). The total area of forest and scrub land in Finland amounts to 22.8 million ha, of which 89% is available for wood supply.

The growing stock volume in Finland amounts to 2 206 million m<sup>3</sup> (over bark). Since 1970s, the standing volume has continuously risen and is now 45% higher than three decades ago. Half of the growing stock volume consists of Scots pine, 30% Norway spruce and 20% broadleaves (mainly birch). The proportion of pine has increased and that of spruce has decreased. The proportion of growing stock on mires is 23%. Draining of mires has improved the growing conditions for trees on peatlands, and hence the importance of growing stocks on mires is increasing. Of the total growing stock volume, 92% grows in forests available for wood supply or under restricted forestry use.

The annual increment of the growing stock in Finland is 100 million m<sup>3</sup>; this is an increase of 74% since the 1970s. The increment consists of 48% for pine, 30% for spruce and 22% for broadleaves. The main contribution to the increase in increment is from pine, due to the large amount of young stands at the stage of rapid growth. The increment of broadleaves has also clearly risen, but that of spruce only slightly. Of the increment, 97% is in forests available for wood supply.

Since 1970s, total drain (removals + natural drain) has continuously remained lower than the volume increment of the growing stock. The 2008 total drain was 70 million m<sup>3</sup>. In 2008, the drain was lower than increment in all regions and in all major tree species. Of the total drain, 43% was pine, 33% spruce and 24% broadleaves. The difference between increment and drain was largest in pine. A major part of the pine- and broadleaved-dominated stands are young stands with rapid growth, but the potential removal is less than the increment. In recent years, spruce drain has represented a markedly

higher proportion of the total drain than the proportion of spruce in increment and volume of the growing stock, and mature spruce stands have been abundant amongst our spruce stands.

Statistics on forest resources in Finland are based on the national forest inventories (NFIs), which were started in the 1920s. The most recent forest resources data is based on the field measurements obtained during the 10th national forest inventory performed over 2004–2008.

Finland is a signatory to the Kyoto Protocol and is committed to limiting its greenhouse gas emissions. In 2007, the annual increase in carbon stocks sequestered by forests was 33 million tons. This means that Finnish forests act as carbon sinks.

## 2 Forest biodiversity and health

Protecting the biodiversity in forests is one of the main goals of the Finnish forest and environmental policies. It is the basis for the essential policies applied in controlling protection and use of forests and the related legislation and recommendations. They protect biodiversity through, for example, establishing protected areas, protecting valuable habitats to save threatened species, and taking into consideration the goals of biodiversity in forestry.

The total area of protected forests and areas under restricted forestry use in Finland is 3.0 million hectares. This amount represents 13% of the total forest area, i.e., forest and scrub land. Most of these areas are located in northern Finland, where they account for 22% of the forest area. Of the total forest area in Finland, 16% in northern Finland and 2% in southern Finland are strictly protected and unavailable as a source of wood supply.

In 2009, the area of statutory nature conservation and wilderness areas on State land was 2.8 million hectares. Conservation areas on private land totalled 0.2 million hectares. The nature conservation areas not yet established in accordance with the various nature conservation programmers totalled 0.6 million hectares.

The range of methods available for maintaining biodiversity has become more diverse over recent years. In selecting new areas for protection, one of the methods applied has been the voluntary participation of forest owners and protection agreements made for fixed-term periods. In 2002, a new forest biodiversity programme for Southern Finland, called the METSO Programme, was adopted. The importance of this programme in its pilot phase in 2002–2007 was, e.g., to test new voluntary means for non-industrial, private forest owners to increase the biodiversity in their forests. During that pilot phase,

almost 8 000 hectares of forests were protected. A new METSO programme for the period of 2008–2016 was presented in spring 2008.

In previously established protected areas, some effects caused by human activities are being removed. For example, during 2008, various restoration procedures were carried out on almost 3 000 hectares of state-owned forest land. In total, the area of forest restoration in Finland amounts to over 31 000 hectares.

In commercial forests, biodiversity is promoted by maintaining valuable habitats, increasing the amount of deadwood and saving large broadleaves in cuttings. Approximately 143 000 hectares of especially valuable habitats, as defined in the Finnish Forest Act, have been found in forests; of which approximately 88 000 hectares in non-industrial, private forests. In 2008, more than 90% of the valuable habitats on felling areas were either preserved or almost preserved during fellings in non-industrial, private forests. The average volume of retained trees in clear fellings was 2.8 m<sup>3</sup> of living trees and 1.2 m<sup>3</sup> of dead trees per hectare.

The latest assessment of threatened species in Finland was made over 1997–2000. Of the total of 43 000 species, 15 000 were known sufficiently to enable the assessment, and 1 505 of them were classified as threatened. Forests and mires were the primary habitat for 631 threatened species. The results of the next assessment will be published in 2010.

Over 2004–2008, damages reducing the silvicultural quality of stands were observed on 4.7 million hectares of forest land available for wood supply, representing 21% of the forest land in southern Finland and 30% of that in northern Finland. The most significant causes of damage were weather factors and fungal diseases.

The increment rate of the growing stock and defoliation, i.e., premature loss of needles and leaves, have also been used as indicators of tree vitality. In 2008, 4% of pine, 22% of spruce and 11% of broadleaves were moderately or severely damaged (proportion of defoliation >25%). The condition of tree crowns has remained stable over recent years. The degree of defoliation is, however, lower in Finland than in most European countries. Forest health in Finland can be regarded as at least satisfactory.

## 3 Silviculture

In 2008, the amounts of the most important silvicultural and forest improvement work increased compared to the previous year, with the exception of ditch-cleaning and

supplementary ditching. Forest regeneration was accomplished on 150 000 hectares in total; 21 000 hectares were regenerated naturally and 128 000 hectares artificially. Of the artificial regeneration area, the proportion of spruce was 53%, that of pine 44%, and the remaining 3% other species. 96 000 hectares were planted and 33 000 hectares seeded. 165 million domestic seedlings were delivered for planting. In addition, 18 million seedlings were imported to Finland, and 2.4 million seedlings were exported. In 2008, 12 000 kilogrammes seed was used in seeding. Of this seed 10 500 kilos were pine, and that amount was almost totally used in forest seeding. Soil preparation was accomplished on 135 000 hectares. Mounding was favoured in 2008: half of the total soil preparation area was mounded, almost a third was harrowed, and scarification was used on less than 20% of the total soil preparation area.

The area of tending of seedling stands and improvement of young stands increased 3% from the previous year, totalling to 256 000 hectares, due to the increased clearings in private forests. The statistics on the amounts of initial clearings of intermediate felling areas have been compiled since 2001. Annually, these initial clearings have been done on about 30 000 hectares, which has been half of the area of the clearings of regeneration areas. In 2008, the amount of initial clearings climbed to 54 000 hectares, of which three-fourths was carried out in private forests.

The area of forest fertilisation amounted to 51 000 hectares, increasing 45% from the previous year. This was due to the rise of the fertilisation for growth both in the forests of the forest industries, from 1 000 ha to 15 000 ha, and the State, which doubled its area to 17 000 hectares. In private forests, the fertilisation area diminished one fifth, when remedial fertilisation halved to 7 000 hectares.

Ditch-cleaning was carried out on 61 000 hectares in 2008, which was the smallest quantity in the 2000s. In private forests, the annual variation of ditch-cleaning has been considerably high. In 2002, the area was 70 000 hectares, but in 2008 it was as low as 48 000 hectares. Almost 3 600 kilometres of forest roads were treated with basic improvement, and 826 kilometres of new forest road were constructed.

The total area treated with timber fellings in 2008 was 673 000 hectares. In private forests, fellings were performed on 512 000 hectares, and in the forests of the forest industry and the State on 161 000 hectares. The clear felling area was 108 000 hectares, which is the

smallest quantity since 1993. The area of intermediate fellings was more than 500 000 hectares.

In 2008, EUR 304 million were spent on silvicultural and forest improvement work. The costs increased EUR 37 million compared to the previous year. However, these costs are not fully comparable, because the costs of initial clearing of intermediate felling areas – EUR 13 million – were included in 2008 in the total costs for the first time. The costs in private forests were EUR 213 million, EUR 36 million in the forests of the forest industries, and EUR 55 million in the state forests.

## 4 Roundwood markets

Roundwood market statistics are compiled in Finland on roundwood trade volumes, prices and removals. The statistics on roundwood purchases and prices refer to roundwood trade in non-industrial, private forests only. In addition to non-industrial private forests, the statistics on roundwood removals also contain removals from forests owned by forest industry companies and the state. Based on data gained from national forest inventories, estimates are also calculated for annual allowable removals.

In 2008, the roundwood markets were affected by a steep decrease of sawnwood prices. On the other hand, demand on pulpwood was good due to a moderate market situation on pulp and paper products.

The forest industries purchased 29.6 million m<sup>3</sup> of roundwood from non-industrial, private forests. The amount decreased by 27% compared to the previous year, which, however, was the record year in roundwood trade. The trade in sawlogs declined by almost 50%, while trade on pulpwood decreased by only 6%.

A temporary sales income tax relief for private forest owners was operative between 1st April – 31st August. The expiry of the relief pushed roundwood onto the markets temporarily. During two weeks in late August, the roundwood trade exceeded 2 million m<sup>3</sup>, representing the all-time record weeks in roundwood trade. In September, the trade was back on an average level.

In 2008, nominal stumpage prices decreased by 7% on average from the previous year. The highest decrease occurred for softwood logs (12–14%), which had reached record levels in 2007. Due to a better market situation for pulp and paper products, the prices for pine and birch pulpwood increased by 4–5%.

In the first half of 2009, demand and prices for pulpwood were also down, and the roundwood markets were unprecedentedly slow. In January–June the roundwood

trade was reduced to a lower level than during the last depression, in the beginning of the 1990s.

The 2008 commercial roundwood removals were decreased by 10% from the peak of the previous year to 51.7 million m<sup>3</sup> (over bark). Due to the low level of sawnwood production, the sawlog removals decreased by 23% to 21.5 million m<sup>3</sup>. Removals of pulpwood rose to a new record of 30.1 million m<sup>3</sup>.

The non-industrial, private forests' share of total commercial removals accounted for 79%. Also taking into consideration the imports of roundwood, the non-industrial, private forests accounted for 57% of the industrial roundwood procurement in Finland.

Removals from the forest industries' own forests, as well as from the state forests, were both 5.3 million m<sup>3</sup>.

In addition to removals for industrial use, approximately 5 million m<sup>3</sup> of fuelwood is annually harvested for domestic heating purposes in small-sized dwellings (private houses, farms and recreational dwellings).

Imported roundwood (20.3 million m<sup>3</sup> in 2008) is discussed in Chapter 11 and wood-based fuels in Chapter 9.

According to the results gained from the 10th national forest inventory and the calculations on maximum potential removals based on them, wood resources in Finland are not a factor restricting the consumption of domestic wood. The results indicate that the annual increment of the growing stock is 99.5 million m<sup>3</sup> (over bark), and the maximum sustainable removal for the next ten years is 69.7 million m<sup>3</sup> per year. The statistics accumulated over 1999–2008 show an average annual removal of 56.5 million m<sup>3</sup>, i.e., 13.2 million m<sup>3</sup> less than the maximum sustainable removal. Annual allowable removals are calculated for the forest and scrubland available for wood supply. Restricting factors affecting wood production due to other forms of forest use have been taken into account.

## 5 Harvesting and transportation of roundwood

The statistics on roundwood harvesting and transportation mainly cover the roundwood fellings and forest haulage carried out by the forest industries and Metsähallitus. The statistics cover 87% of commercial roundwood production in Finland. Timber fellings performed by the forest industries and Metsähallitus are almost completely mechanized: in 2008, the mechanization degree was 99%. In 2008, the costs of roundwood harvesting

were 16% higher than in 2007, i.e. EUR 10.56/m<sup>3</sup>. The average number of harvesters used by the forest industries and Metsähallitus increased by 30 from the previous year figure to 1 860 machines. The number of forwarders remained at the level of the previous year – 2 020 forwarders.

The long-distance transportation statistics includes the commercial roundwood for which transportation is handled by the shareholding companies of Metsäteho. There was an 11% decrease in this roundwood volume, the 2008 volume being 44 million m<sup>3</sup>. The main long-distance transportation chain in Finland is direct road transportation by trucks to the mills. In 2008, over three-quarters of the roundwood was delivered to the mills using this method of transportation. Normally, road transportation is always used at the beginning of the transportation chain, even when roundwood is transferred by rail or waterway.

On average, 1 410 timber trucks were employed in domestic roundwood transportation. The mean transportation distance of domestic roundwood was 158 km. In road transportation, the mean distance of transportation was 106 km, in rail transportation 311 km and in water transportation it was 303 km. Distances in road transportations remained unchanged, whereas in rail and water transportations the distances grew in 2008 on that of 2007.

There was an increase of 20% in the cost of long-distance transportation of domestic roundwood to the mill: the average cost in 2008 was EUR 7.70/m<sup>3</sup>. The average unit cost for total transport volume (transported volume x number of km) rose by 14% from the level of 2007. In domestic road transportation, forest sector products comprised 16% of the total freight by road, while in rail transportation the proportion was 60%.

The volume of imported roundwood was 20.3 million m<sup>3</sup>. Of this amount, 37% was transported by rail, 43% by water and 20% by road. Exports of roundwood and forest industry products accounted for 46% of freight exported from Finland. The exports of roundwood and forest industry products (altogether 20 million tons) decreased by 10% from the corresponding amount in 2007.

## 6 Multiple-use forestry

In Finland, forests represent a major material as well as a recreational, aesthetic and cultural resource. Forests are also important in, for example, carbon and biodiversity management.

Enonomically, the most important forest-based product is commercial wood. In 2008, commercial roundwood production amounted to 52 million m<sup>3</sup>, which corresponds to more than EUR 1.7 billion in stumpage price earnings. The value of household timber (1 million m<sup>3</sup>) was approximately EUR 50 million. Forests are also an increasingly important source of energy. The value of fuelwood (total amount 10 million m<sup>3</sup>) used on small-sized dwellings or on heating and power plants was more than EUR 200 million in 2008.

Forests represent an extremely important environment for various outdoor recreation activities, as well as a landscape factor supporting both mental and socio-economic well-being. The recreational use of forests in Finland is mainly based on the public right of access, which makes it possible to wander in the forests as well as pick wild berries and mushrooms virtually anywhere. Practically every Finn enjoys nature by, for example, hiking, picking wild berries/mushrooms or hunting. Adult Finns make approximately 600 million recreational visits per year to enjoy nature. The number of overnight visits to nature tourism destinations per year is about 14 million, and together these figures account for 40 million travel days. It is estimated that actual nature tourism accounts for a quarter of all value-added in Finnish tourism.

There are almost 40 edible species of wild berries in Finland, 16 of which are picked for food. The annual estimated harvest of berries is 500–1 000 million kg, of which 30–40% are acceptable for picking. In favourable years, the harvest of lingonberries and bilberries amounts to approximately 50 million kg and the total of other wild berries accounts for 10 million kg. The majority of these are picked for private domestic use. In 2008, about 6 million kg of wild berries were marketed; this was half the amount in 2007. The volume of purchased wild mushrooms, 0.5 million kg, increased by two-fifths from the previous year. The earnings of pickers on wild berries and mushrooms decreased by 25%, amounting to EUR 11 million.

There are approximately 300 000 hunters in Finland, and two of every three of them went hunting at least once during the year. In 2008, 57 000 moose and 26 000 white-tailed deer were bagged by hunters. Of all cervids, the total amount of meat obtained decreased to 8.8 million kg, representing 88% of the total amount of game. The estimated monetary value of this 10.0 million kg of game meat totalled EUR 73 million.

Reindeer husbandry is a traditional and unique means of livelihood in northern Scandinavia. In Finland, the

area of reindeer husbandry is more than one-third of the total area of Finland, and the number of reindeer owners is approximately 4 800. During autumn and winter 2008, 102 000 reindeer were culled. This produced 2.3 million kg of venison with a total value of EUR 15 million. The size of the winter herd after culling was about 200 000 reindeer.

## 7 Forest sector labour force

Positive developments continued on Finnish labour force markets during 2008, though growth in employment slowed towards the end of the year. In the national economy total, the average number of employed persons went up by 2% from 2007, reaching an all-time high of 2.53 million persons. The unemployment rate decreased further to 6%.

The role of the forest sector (i.e. forestry and the forest industries together) continued to diminish in 2008. The sector provided work for 83 400 persons, corresponding to only 3% of total employment. Of the forest sector's labour force, 70% or 58 600 persons worked within the forest industries, while the remaining 24 800 were employed in various forestry activities. The average unemployment rate of 5.6% within the forest sector remained at the previous year's level, slightly below the average of all industries (6.4%).

The downward trend was mostly due to labour force reductions in the forest industries. In contrast, the employment in forestry, which had already stabilized at the end of the 1990s, has marginally risen in recent years. Even new work opportunities have become available for forestry workers, for example, in the harvesting of energywood and in some silvicultural operations. In 2008, approximately two-thirds of employed persons in forestry were wage and salary earners, whilst one-third consisted of self-employed entrepreneurs and forest owners involved in wood harvesting and silvicultural work in their own forests.

In 2008, the forest industries employed about one-quarter fewer persons than during the 1990s on average. Compared to 2007, the fall in employment was 7%. Finnish forest industries are currently going through substantial structural changes, resulting in capacity reductions and hence less jobs, especially in the pulp and paper industries. The latter employed 27 400 persons in 2008, a decrease of 11% from the preceding year. In the wood-products industries, the employment went down by 3% to 31 200 persons. Within this sector, small and medium-sized companies play an important role

especially in sparsely inhabited rural areas. Nearly half the total labour force in the wood-products industries was employed by the carpentry industry, which mainly supplies domestic markets. However, the employment of the carpentry industry decreased by 11% from 2007, mainly due to reduced construction activity in Finland.

In 2009, the average nominal earnings of felling workers were increased by 16% to EUR 13 per hour. The corresponding statistics in the forest industries concern 2008. In the wood-products industries, the average hourly earnings amounted to EUR 15, and in the pulp and paper industries they were EUR 20.

With reference to labour disputes, only seven were reported in the pulp and paper industries in 2008. In 2007, the number of accidents at work in the forest sector decreased marginally from the year before. A total of 3 700 accidents at work was registered in the forest sector, and more than two-thirds of these occurred in the wood-products industries. In fact, measured as accident frequency, it is the fourth most risk prone branch of industry.

## 8 Wood consumption

In 2008, the roundwood consumption in Finland totalled 72.8 million m<sup>3</sup>. Consumption diminished 11% compared to one the top volumes achieved in the previous year, being now the lowest of the last decade. Of this amount over 90% – or 66.3 million m<sup>3</sup> – was used in the forest industries. Around 6.5 million m<sup>3</sup> was used for energy generation in the heating and power plants and in small-sized dwellings. Wood consumption in energy generation is more precisely presented in Chapter 9, Energy.

The forest industries' roundwood consumption declined more than 9 million m<sup>3</sup> or 12% compared to the previous year, resulting from the global recession, which decimated the demand of forest industry products. Global recession influenced especially on sawmilling, whose roundwood consumption and sawnwood production diminished by one-fifth. In 2008, sawmilling consumed roundwood 22.1 million m<sup>3</sup> – 6 million m<sup>3</sup> less than in the previous year. The chemical pulp industry used the largest volume of roundwood, 30.3 million m<sup>3</sup> (-1.6 mill. m<sup>3</sup> compared to the previous year).

The most important roundwood assortments consumed were pine pulpwood (15.3 mill. m<sup>3</sup>) and hardwood pulpwood (12.7 mill. m<sup>3</sup>). The consumption of domestic pine and spruce logs decreased the most, resulting from the difficulties in the sawmilling industry. Totally, the consumption of domestic roundwood decreased

from the top volume achieved in 2007 by 13%, to 51.5 million m<sup>3</sup>.

In 2008, the consumption of imported roundwood was 14.7 million m<sup>3</sup>, less than 8% compared to the previous year. This decrease resulted mainly from the diminished consumption of imported hardwood pulpwood (mainly birch pulpwood). Despite this, the hardwood pulpwood made up almost half the total consumption of imported roundwood. In the future, the consumption of imported roundwood will further decrease, resulting mainly from the intended increase in customs taxes set by Russia.

In addition to roundwood, the forest industries used 9.6 million m<sup>3</sup> of sawmill chips and dust originating from the sawmilling and plywood industries. This assortment was mainly consumed by the pulp and mechanical pulp industries: in both branches, the consumption of sawmill chips and dust was next to one-fifth of total wood consumption. Additionally, in 2008 the paper and paperboard industries consumed recovered fibre 0.7 million m.t. for raw material (see Table 10.5). The consumption of saw and cutter dust for the manufacture of wooden pellets was 0.8 million m<sup>3</sup>. The volume of exported wood was 1.5 million m<sup>3</sup>.

## 9 Energy

Energy consumption in Finland reached 1 407 petajoules (PJ) in 2008 (preliminary data), which was 5% less than that of the previous year. The decrease in consumption was mainly influenced by the reduction in industrial production resulting from the global recession. A mild climate during 2008 also diminished general heating needs.

The most important energy source in 2008 were oil products, also including oil consumed by transportation, which made up approximately one-fourth (352 PJ) of the total energy consumption. Compared to the previous year, the consumption of hydro power increased the most (+10 PJ), reaching the highest level ever. Correspondingly, the consumption of coal (-50 PJ) and peat (-22 PJ) decreased the most. The electricity generation by coal-consuming condensation power plants was replaced by hydro power generation. The consumption of peat diminished because of the collapse in peat production due to the rainy summers in 2007 and 2008.

In 2008, wood-based fuels covered one fifth (302 PJ) of the total energy consumption in Finland, and they are the second most important source of energy after oil products. This makes Finland one of the leading EU

countries when it comes to utilizing wood for energy purposes. When compiling statistics, wood-based fuels are divided into industrial waste liquors (mainly black liquor produced by pulp industries) and solid wood fuels. Solid wood fuels can be further divided into wood fuels consumed by heating and power plants and fuelwood consumed by small-sized dwellings (i.e., private houses, farms and recreational housing).

The consumption of wood-based fuels was in 2008 on the same level as during the previous year. Almost half of wood-based fuel consumption – 144 petajoules – was covered by waste liquors. This consumption decreased slightly compared to the year 2007 because of the reduction in the forest industries production. Forest industries are, however, the largest consumer of wood-based fuels, which in 2008 made up 75% of all mill fuels used by the forest industries.

Solid wood fuels were consumed to the total of 153 petajoules or 21.0 million m<sup>3</sup>, 6% more than in the previous year. Of this the heat and power plants accounted for 99 petajoules or 14.3 million m<sup>3</sup>. The consumption of solid wood fuels increased by 1.3 million m<sup>3</sup> resulting mainly of the increased consumption of forest chips. On the contrary, the consumption of forest industry by-products – 9.5 million m<sup>3</sup> – fell in 2008 to the lowest level on this decade. Of these, the combustion of bark, with a volume of 7.1 million m<sup>3</sup>, exceeded that of other by-products. The small-sized dwellings currently use 6.7 million m<sup>3</sup> of wood for heating. Together with the wood consumed in different office buildings, the energy content of fuelwood used by this group reached 55 PJ.

The consumption of forest chips achieved the top volume in 2008. Heating and power plants burned 4.0 million m<sup>3</sup> of forest chips in 2008, one and a half as much as in the previous year. When the consumption by small-sized residential housing is added to this, the total consumption of forest chips reached as high as 4.7 million m<sup>3</sup>. Finland aims to increase the annual consumption of forest chips to 10–11 million m<sup>3</sup> by the year 2020.

## 10 Forest industries

In 2008, forest industry production in Finland decreased by 11% from the year before. Due to the steepening downturn on export markets, demand for wood products in particular weakened substantially towards the end of 2008. This forced the industry to cut its production volumes in the form of shutdowns and capacity reductions. On an annual basis, the production volumes of the

wood-products industries went down by 17%, while in the pulp and paper sector the decline was less drastic: 8%. During the first half of 2009, forest industry production fell by one-fourth compared to the corresponding period in 2008.

In 2008, the production of sawn goods amounted to 9.8 million m<sup>3</sup>, a fall of one-fifth from the preceding year. The production was reduced mainly due to falling export prices and slowdown in construction activities on both domestic markets and in Central Europe. Domestic consumption of sawn goods went down by 11%, amounting to 4.7 million m<sup>3</sup> in 2008. The manufacture of plywood, totalling 1.3 million m<sup>3</sup>, decreased by one-tenth.

A total of 13.1 million tons of paper and paperboard was produced in 2008, indicating a decrease of 8% from the record level the year before. Of the total production in Finland, magazine paper and newsprint together accounted to close to a half. Its production fell by 13% to 5.9 million tons in 2008. In fine papers, the drop in production figures was as marginal as 2%. In 2008, a total of 7.2 million tons of chemical pulp was produced in Finland; that was 7% less than in the preceding year. Recycled paper and paperboard represented 6% of total raw-material use in these industries. The collection rate amounted to 62% of total domestic consumption of paper and paperboard, or 152 kg per capita.

Approximately half of the Finnish forest companies' turnover is generated in their foreign production units. In 2008, contrary to other main industrial branches, the domestic turnover of the forest industries decreased by 7% to EUR 22 billion. Close to 70% of this originated from the pulp and paper sector. Small and medium-sized industries play an important role in the wood-products industries, where they generate one-third of the total turnover. In 2008, the forest industries represented only 14% of the total manufacturing turnover, while in the mid-1990s the share was a quarter.

In 2008, domestic investments of the forest industries increased by 5% to EUR 0.8 billion, which is the highest figure since 2001. Approximately 75% of the investments were made in the pulp and paper industries. The profitability development in the sub-branches of the sector was opposite. In the wood-products industries, the profitability deteriorated significantly, primarily due to decreased business revenues. In the pulp and paper industries, the profitability improved marginally, both in terms of operating margin and total profit. This positive development was primarily due to reduced operating costs. In the forest industries as a whole, the total operating

margin decreased to EUR 1.2 billion, corresponding to 5% of the annual domestic turnover.

In 2007, the quantity of Finland's greenhouse gas emissions corresponded to 78.3 Mt of CO<sub>2</sub>. This was 2% less than in 2006 and 10% more than the commitment under the Kyoto Protocol. In 2007, fuel-based emissions by the forest industries amounted to 5.6 million tons, corresponding to 7% of total greenhouse gas emissions in Finland.

### II Foreign trade by forest industries

In 2008, the total volume of wood imported into Finland increased to 20.3 million solid cubic metres (over bark). The amount was the second largest ever imported, and corresponds to almost 40% of domestic commercial roundwood removals. During recent years, Finland has been the third largest wood importer in the world. Contrary to imported volumes, exports of roundwood from Finland are of minor importance.

12.2 million m<sup>3</sup> of wood imports originated from Russia. Earlier, Russia's share of the wood flow to Finland used to be about 80%. The share has decreased over the last two years, and it ended up as a total of 60% in 2008. However, the threat of the increase of wood export duties at the beginning of 2009 kept the wood flow from Russia constant until the turn of the year. Sweden and Latvia were the second and third most important suppliers with imported wood volumes of 2.1 million m<sup>3</sup> and 1.8 million m<sup>3</sup>, respectively. The wood imports from Sweden have increased rapidly, whereas the role of Estonia as a wood supplier has decreased.

The most important assortment was birch pulpwood, representing more than one-third (7.4 million m<sup>3</sup>) of the total imports of roundwood. Chips (4.1 million m<sup>3</sup>) were the second most important assortment procured abroad. The amount of imported chips increased 45% compared to the previous year. Imports of logs amounted to 2.0 million m<sup>3</sup> and that of pulpwood (incl. chips) 17.5 million m<sup>3</sup>. The imports focused more and more on pulpwood. Roundwood is mainly imported to meet the needs of the pulp industries in eastern Finland. The real prices of imported pulpwood peaked in 2007, and during 2008 the price level has gradually lowered.

In 2009, the level of wood imports halved. The Finnish forest industries had a lot of inventories of imported roundwood and the global recession cut down the need of industrial roundwood. Although Russia postponed

its increase of roundwood export duties, the amount of imported roundwood remained low.

In 2008, the value of exports of Finnish forest industry products declined 11% from the previous year. Their value totalled EUR 11.4 billion, accounting for 17% of Finland's total exports of commodities (EUR 65.6 billion). The proportion of Finnish forest industry exports was high by international comparison, but it was the lowest ever in Finland. In the value of exports of forest industry products, 78% represented pulp and paper industries, and the remaining 22% was wood products industries. The most important export products were magazine paper (EUR 2.9 billion) and fine paper (EUR 1.9 billion). The largest proportion of Finnish forest industry production is exported. In 2008, exports accounted for 91% of paper production, 90% of paperboard, 61% of sawn goods and 86% of plywood. The export prices of sawn goods peaked in the autumn 2007, but after that the prices plummeted. The export price level changed much less in paper and paperboard, and their prices remained low also during 2008. In 2009, the stagnation deepened, strongly reducing the exports of forest industry products.

Finnish exports – especially exports of forest industry products – are in the hands of just a few companies. Looking at product groups, this centralization is most intensive for pulp, paper and paperboard products, where five companies accounted for 73% of the total corresponding exports in 2008.

The European Union (EU27) is the main market area for Finnish forest industry products, accounting for 63% of exports in 2008. As the second important market area, Asia's share was 12%. Germany was still the most important customer, receiving EUR 2.1 billion worth of Finnish forest industry products. Germany's share of the total exports of forest industry products was 19%. As previously, the United Kingdom was Finland's second most important trade partner with a value of EUR 1.2 billion and a share of 11%.

Imports of forest industry products to Finland were minimal, amounting to only EUR 1.6 billion. The most important product group was converted paper and paperboard products (EUR 0.3 billion). 27% of forest industry product imports originated from Sweden.

The Finnish foreign trade statistics on forestry products are based on data compiled by the National Board of Customs.

## 12 Forest sector in Finland's national economy

The Finnish national economy was still growing in 2008, though the signs of recession were clear during the second half of the year. The gross national product (GDP) at market prices rose 3% from the preceding year, reaching EUR 185 billion. The recession hit the forest sector earlier than the national economy on average. Its value added in real value fell by 18% to EUR 8.2 billion and its share of GDP sank to 5%. In forestry, the value added was EUR 3.6 billion (-7%), in the wood products industries 1.2 (-46%) and in the pulp and paper industries 3.4 (-18%).

At the beginning of the 1980s, the total value added in forest sector represented more than 10% of the total value added in GDP. After that, the share has been declining and in the 2000s, the slope has been even steeper. The major reason for the decline has been the diversification in the industrial structure, particularly the growth in electronics and metal industries. One reason for the steeper decline in the 2000s has been the weak price development for paper products.

In non-industrial, private forestry, gross stumpage earnings in 2008 were EUR 1.6 billion. It was in real value 26% less than 2007, the peak year, but only 8% less than the five-year average. For the total of ownership categories, stumpage earnings totalled EUR 1.9 billion (-26%). A total of EUR 291 million was invested in silvicultural and forest improvement works, of which EUR 203 million was spent on private forests. The operating profit for non-industrial, private forests sank to EUR 99 per hectare, which is EUR 12 less than the average for the preceding five-year period. The decrease in stumpage prices, especially softwood logs, diminished the real return on timber production to minus 9%.

## 13 International forest statistics

About 30% of the global total land area is covered by forests. This amounts to nearly 4 billion hectares of forest land. The countries with the largest forest cover are Russia, Brazil and Canada, which together make up almost 40% of the total forest area. The global growing

stock volume (over bark) is estimated to be 434 billion m<sup>3</sup>. One-third of the growing stock is found in South America, where Brazil has the world's largest volume of 81 billion m<sup>3</sup>. The growing stock volume in Europe is 109 billion m<sup>3</sup>, of which Russia accounts for 80 billion m<sup>3</sup>. The forest land area of the European Union is 156 million hectares and the growing stock amounts to 23 billion m<sup>3</sup>.

Approximately 5% or 47 million ha of Europe's forests are currently protected. Protected forests are categorized according to the MCPFE (*Ministerial Conference on the Protection of Forests in Europe*) -classification into four different classes. About 27 million ha of the protected forests are found in the area of the European Union. This represents 18% of the Union's forest land area. In the EU, Germany has the largest area of protected forests: almost 8 million ha, or 70% of its forest land area. Europe's largest areas of protected forests are in Russia – altogether 16 million ha.

In 2007, the global roundwood production (removals) amounted to 3.6 billion m<sup>3</sup> (without bark) and the production of sawnwood to 431 million m<sup>3</sup>. Compared to the previous year, the production of roundwood and sawnwood increased slightly. The production of wood-based panels has grown steadily and reached the volume of 266 million m<sup>3</sup> in 2007, which was 2% larger than in 2006. Paper and paperboard production, 384 million tons, exceeded the volumes of the previous year by 5%.

The EU has an important role as a producer of forest products. In 2008, the production of roundwood amounted to 429 million m<sup>3</sup>, which was 8% less than the production of the previous year. About one-fourth of the world's sawnwood, 106 million m<sup>3</sup> in 2008, is produced in the EU. The EU also maintains the leading position as a producer of wood-based panels and paper and paperboard. In 2008, the EU's production of wood-based panels amounted to 64 million m<sup>3</sup> and the production of paper and paperboard to 99 million tons.

Globally speaking, the forest sector employed 13.8 million persons in 2006. This represents 0.4% share of the total labour force. The forest sector's contribution to the world's GDP total was only one per cent.

