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Finland

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Executive summary

Expanded domestic wood product consumption

The recent increases in apparent consumption of wood products in Finland have occurred in plywood and sawn wood, where the domestic consumption has doubled over the last decade. This is partly due to macroeconomic recovery but the parallel promotion programs on wood use in house construction and repair have also contributed to the development.

Diversified non-industrial forest land tenure and commercial timber production

Private ownership is diversified into small ownership units in Finland. The size distribution of private forest holdings is polarised: fragmentation and parcellisation is going on along with consolidation. The major ownership transfers are through bequests and in recent years only about 10% of the holdings have been sold on the free market. The latter restricts effectively the formation of large-scale ownership and the accompanied possibilities on scale economics in commercial forestry as well as the possibilities of effective timber management investments. Joint efforts have been frequently been applied in silvicultural activities, such as road construction and ditching, to achieve positive scale economics. There are some joint owned forests by non-industrial private forest owners (NIPFs) and these forests are managed commercially by experts.

NIPFs, which are the main roundwood source for Finland's forest industries, accounted for close to 47 million m³ (or 85%) of total fellings of commercial roundwood in 2003. The most common commercial timber species are: Scots pine, Norway spruce and Silver birch. In addition, the commercial use of aspen has increased in the recent years. The profitability of timber growing in NIPFs, depending on stumpage prices, cost-effectiveness of production and public subsidies, has remained stable during the last decade. The public investment subsidies on NIPFs have been directed to wood production for the most but investments towards ecological sustainability have increased their share in subsidies since the Forest Act 1996.

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Domestic stumpage prices have become more and more sensitive on the international roundwood markets, mainly those around the Baltic Sea. This development tend to promote diminishing trend in domestic roundwood prices in the long-run and increase pressures to improve the cost-effectiveness of forest investments and management in general.

There is little room for efficiency improvement in thinnings because almost all timber harvests through clear cuttings have already been mechanised. The ever-increasing shortage of labour force together with high unit costs address the need for mechanisation of silvicultural activities. The use of family labour force in forest work, both in logging and silviculture, can compensate cost-effectiveness improvement needs. However, self-activity will most likely diminish in the future along with the increased urbanisation and absenteeism as well as aging of forest owners. Cost efficient timber procurement is a supportive activity towards improved profitability within the wood processing value chain. New roundwood market information services have improved the informational balance between NIPFs and few large buyer companies are in favour of the former.

Current forest policy planning has concentrated on the application of ecological and social sustainability in Finland. The latter has been among the major tasks in the implementation of National Forest Program (NFP) 2010. Contrary to many European industrialised countries public subsidies provided to timber production investments were reaffirmed in Finland's NFP process. Forest policy makers consider short rotation roundwood production for bioenergy a valid potential alternative to long rotation timber production. Subsidies provide incentives to intensify commercial timber production in NIPFs. Multifunctional forest owners, tending to support biodiversity and carbon sink services, shall be subsidised by the state in the future.

Forest owners who are interested in forestry have access to numerous information services arranged by local forest owners associations as well as courses, training, journals and literature. For instance, information on stumpage prices by regions is easily available on Metla's internet pages (www.metinfo.fi) and those of The Central Union of Agricultural Producers and Forest Owners (www.mtk.fi).

Few large international corporations and numerous SMEs occupy wood product industries

No SMEs exist in pulp and paper industries in Finland and the same is true with wood plate industries. These business activities are mainly excluded here and this survey concentrates on wood product industries. Three types of wood product industry firms can currently been identified in Finland: a) sawmills and panel mills of global forest industry corporations having wood product industry activities parallel with their core business interests in pulp, paper and board production, b) large export oriented sawmills and log house producers and c) SMEs in sawing, planing and woodworking industries producing mainly to domestic or local markets. A large majority of sawn timber (70%) is produced in plants with over 50 employees and their number (48) among the sawmill units (1070) is less than one %.

Gross revenue in Finnish wood product industries has more than doubled during the last twenty years but the profitability of business has not achieved a satisfying minimum level in major sub-sectors a) and b) of these industries. Poor long-term profitability and shortage of equity capital are typical especially among the SMEs of the industry. The international competitiveness of Finnish wood product industries has remained modest because of the high unit prices of input factors. High investment costs, price of raw material and dependency on few customers only, however, may be highly risky for new entrepreneurs. The threshold to entrepreneurship is high in wood product industries irrespective the current supportive resources to new entrepreneurship, innovations and heavy public investments into various R&D programmes.

The majority of wood product industry sub-sectors apply low tech production technologies implying large capital input when investing into new plants. Low added value products dominate the export of major sub sectors of wood product industries. There are only few examples of horizontal integration and networking among wood product industry SMEs and the same is valid with vertically integrated partnerships among firms. The latter activities, providing ways to benefit from positive economies of scale in production, have not become common. The lack of qualified potential subcontractors has delayed wood product industry firms to focus on their core competencies and the options to expand added value chains inside the country.

Lack of marketing intelligence and poor familiarity of export markets are often mentioned among the major barriers to new entrepreneurship as well as to the expansion investments among the existing wood product SMEs. Owners of small companies have received vocational training that is most frequently focused on wood engineering. At least 43% of the entrepreneurs have a college-level education and they are active staffing promoting and organising training for their staff. A good education system provides access to high level formal knowledge also among SMEs. The Finnish unemployment benefit system, however, is considered a barrier to new small-scale entrepreneurship. Current small-scale entrepreneurship often "runs in the family" and the smallest companies do not necessary have particular need to grow.

Special roundwood market segments characterised by specific tree species, log dimensions and qualities are frequently essential to SME sawmills applying focusing strategies in their production. Submarkets for these specific roundwood assortments of their interest have never existed in Finland. The latter provides an effective barrier to entry for SMEs in the business. The few buyers for pulpwood and sawmilling residues are at the same time the price leaders in the roundwood market.

Specialized production implies high costs of product variation making cost leadership and product differentiation mutually exclusive among firms in wood product industries. Therefore the design or the value chain and its components can be assumed dependent on the strategy adopted. Factor conditions with respect to labour endowment and labour cost have an impact on the strategies that firms provide to achieve competitive advantages.

Growing entrepreneurship in producing non-wood forest goods and services

The economic role of non-wood forest goods and services (NWFP&S) is still of relatively minor importance compared to the other forms of use of forest resources in Finland. However, there are geographical regions where they already have a significant role that is increasing rapidly. The entrepreneurship related to NWFP&S can be divided to producing commercial goods and non-commercial utilities, mainly services.

The most of non-commercial environmental services (mainly biodiversity related or restoration of recreational areas) are produced and consequently paid by governmental authorities (different kind of subsidies/assistance work for e.g. Metsähallitus (Forest and Park Service)). The entrepreneur occupying private land area is in these cases often the landowner or a forest professional. In public land the work is usually done by an employee or a subcontractor for Metsähallitus and by a municipality employee when municipality land areas are concerned. However, there is an ongoing process in Finland to outsource these services more and more to private commercial companies. The demand for environmental services also in private forests can be estimated to grow in the future along with the structural changes of private forest owners.

Everyman's rights guarantee wide access to all commercial forests in Finland. Therefore people are not very used to pay for common land recreational services. There are numerous recreational dimensions in the use of forests in Finland. Over a half of Finnish people pick berries and approximately 40% pick mushrooms. Approx. 8% of the total population also hunt.

Regardless, nature tourism sector is growing rapidly in Finland. Most companies operating are relatively new (less than 10 years old). It has been estimated that the employing effect of nature tourism was 32,000 person-years in 2000 and by the year 2010 it could be even 64,000 person-years. In northern Lapland the reindeer herding is more and more becoming the secondary economic activity with respect to tourism. The most important commercial NWFP botanical products are forest berries and mushrooms.

The companies operating in the field of NWFP&S are usually quite diversified and often operate without clear business strategies. This, in turn, causes in many cases poor identification of relevant customer groups and their demands. Typically companies are small with limited resources, even though there are some larger ones e.g. in the fields of forest berry or nature tourism. Especially smaller companies would benefit significantly from suitable partners and networks including marketing and supplying channels. The lack of a clear business plan and proper segmentation of the market are among the major weaknesses of this business.

There is a clear need for new innovative off-season activities among the enterprises in NWFP&S sector due to the seasonality of single activities concerned and sector-specific information services due to the low technology level and labour intensive production. The sustainable supply of domestic raw material is also one of the main challenges for the producers of NWFP botanical products.

1 Consumption

1.1 Forest products' consumption and urban population

The population of Finland comprised 5.2 million in 2003, with an increase of 128,000 inhabitants during the last decade. The population is at a constant level as its' growth is annually under 1%. The number of households in Finland was 2.3 million in 2001. The share of urban population has increased over the period 1993–2002 and currently is estimated to be nearly 65% of total population.

The value of annual house construction was in 2003 15.6 billion euro, including new construction (9 billion euro) and repair/renovation construction (6.6 billion euro). The annual residential house construction is about 42,000 apartments/houses (app. 13,000 houses with concrete frame, 22,000 wood frame single houses/row house apartments and 7,000 cottages). The popularity of wood as house frame material has increased during the last decade according to the statistics. The annual use of wood in house frames has increased in Finland. The latter is partly due to the rapid increase in the number of secondary cottages (24% increase in ten years, 368,000 in 1990 compared to 457,000 in 2001).

Expanded construction of single family houses has been an important determinant of the domestic use of wood industry products in Finland. Increased available private incomes among households explain the increased single house construction that in turn explains the consumption of forest products, especially that of wood based panels (plywood particle board and fibreboard). Sawnwood and wood based panels have frequently substituted other materials in other house construction as well as in repair and remodelling investments.

1.2 State of the art on demand for forest products and consumption

Finland is a major exporter of forest industry products in the world. Only 10–30% of the forest industry production is consumed domestically. The share of domestic consumption from total production is 40% for sawnwood, 15% for plywood, 61% for particleboard and 93% for fibreboard. OSB (oriented strand board) and MDF (medium density fibreboard) wood based panels are less used partly because of the lack of domestic production. The domestic use by households and industrial production of value added products are not known. This shows well, for example in the case of sawnwood, where the end use calculations and estimates for the share of value added production do not cover the whole domestic consumption (see e.g., Hänninen and Toppinen 2002). The historical development in per capita apparent consumption during the last decade (1993–2003) is given below for four major groups of forest industry products, i.e., soft sawnwood, plywood, paper and paperboard. Because economic growth (based on increased available private incomes) is the major determinant of consumption for forest industry products, figures also show the change of Gross National Product in Finland during the same time.

Figures 1 to 4 show that the apparent consumption of soft sawnwood, plywood and paperboard reached their record levels in 2003. The consumption of sawnwood has grown to about 1 m^3 per inhabitant in 2003. That is five times higher than the major country averages in the European Union and also higher than in the countries like

Canada (0.4 m^3/a) or the United Sates (0.3 m^3/a) characterised by high preferences on wood use in construction. The consumption of plywood, the major wood based panel product in Finland, has reached a level of 0.03 m^3 per inhabitant in 2003. The consumption of paper had its' highest level in year 2000 (consumption per capita 246 kilograms). Apparent consumption of paperboard was 119 kilograms in 2003 (majority used in packaging).

The apparent consumption in plywood and sawnwood has doubled during the last decade partly due to the macroeconomic recovery and partly due to the effective promotion programs towards increased wood use in house construction and repair construction. The growth of consumption has been, however, faster than the growth of house construction. The explanation can be that the percentage share of single houses and cottages has increased in residential construction during the last decade. Almost all cottages and more than 90% of single houses constructed recently have had a wood frame. This also means that in the future the increase in the domestic use of sawnwood must be achieved in other segments of wood construction that in wood frames.

The domestic consumption of paper and paperboard was 8% of production in 2003. It has increased about one quarter over the last decade. The exact volume of domestic use is, however, an estimation that is based upon annual net trade and production figures, and they do not take into account the possible changes in inventories.

There is a long-term interdependence with the aggregate consumption of forest products and aggregate value of domestic production (GNP Gross National Product). The relationship between the single annual observations (i.e. the annual change of forest products and GNP) does not always match. The inaccurate estimation of apparent consumption levels (due to missing information on industry and consumer inventory changes) can partly explain this. More important, however, are the changes in the GNP-independent use of forest industry products. The annual fluctuations in the production of the construction sector, the main end user of sawnwood and plywood in the country, are stronger than those in the aggregate GNP.

The consumption of non-wood forest products and services in Finland is mainly domestic (household consumption). The annual berry yield is estimated to be approx. 600–1,100 million kg. The yield variations between the years are significant. Annually app. 40 million kg are picked, of which app. 30 million kg end up for the domestic use (Finnish Statistical Yearbook 2003). The average consumption of wild berries is estimated to be approx. 8.3 kg/person/year (Markkula & Rantavaara 1996). Annual mushroom yield varies between 350–1000 million kg. Only less than 1% (approx. 2–10 million kg) is collected and 90% of collected mushrooms is used for domestic use (Finnish Statistical Yearbook 2003). The average consumption of forest mushrooms is 0.4–1.5 kg/person/year. The young people in Finland consume notably less wild mushrooms than the older ones (Feodoroff 1999). More detailed information on economical role of wild berries and mushrooms in Chapter 4.

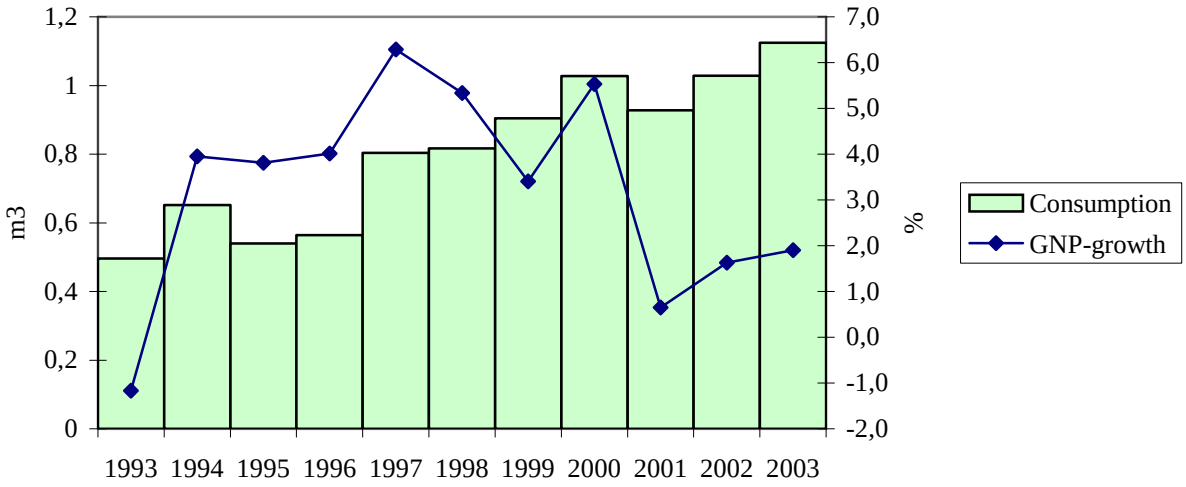

Figure 1. Apparent consumption of sawnwood per capita in Finland compared with GNP growth, 1993–2003.

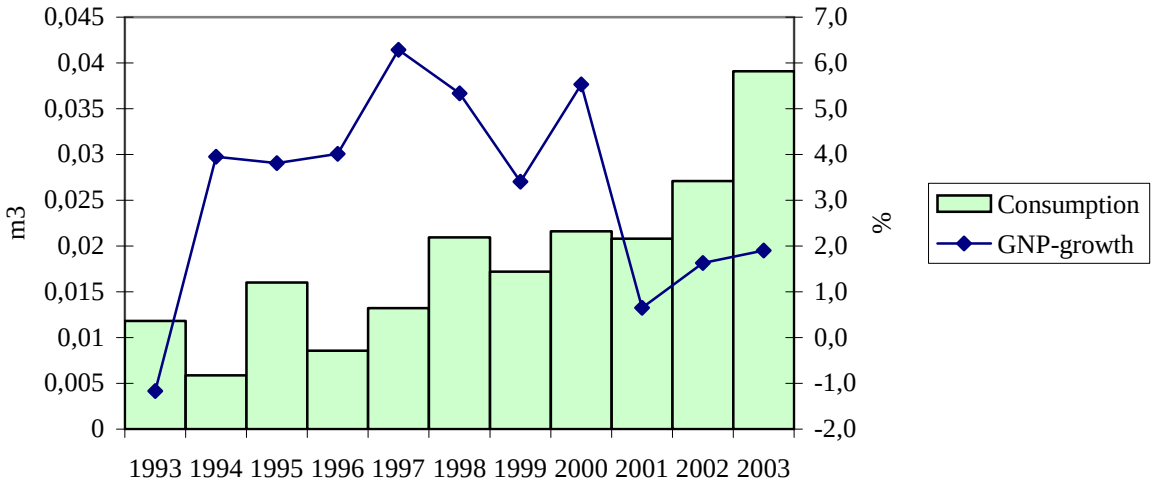

Figure 2. Apparent consumption of plywood per capita in Finland compared with GNP growth, 1993–2003.

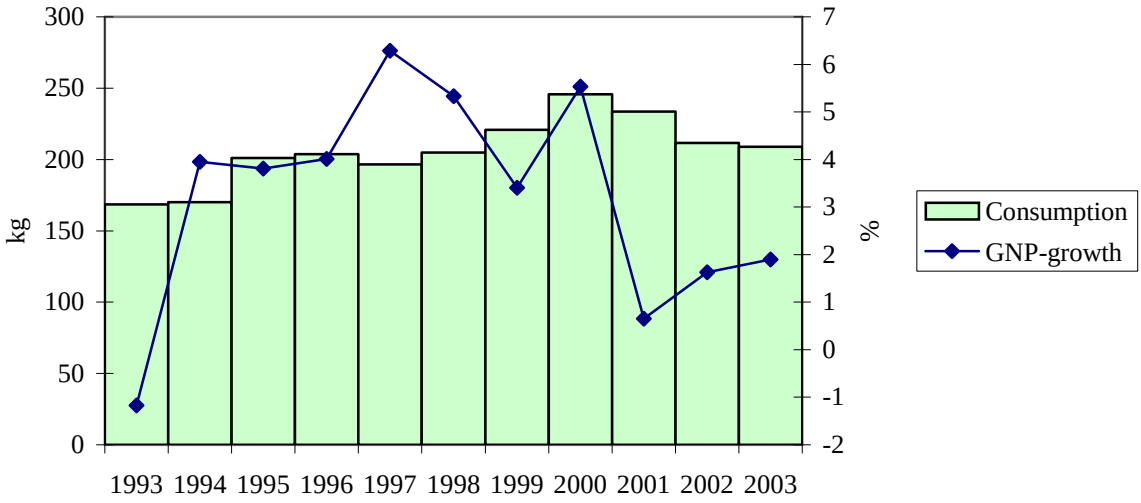

Figure 3. Apparent consumption of paper per capita in Finland compared with GNP growth, 1993-2003.

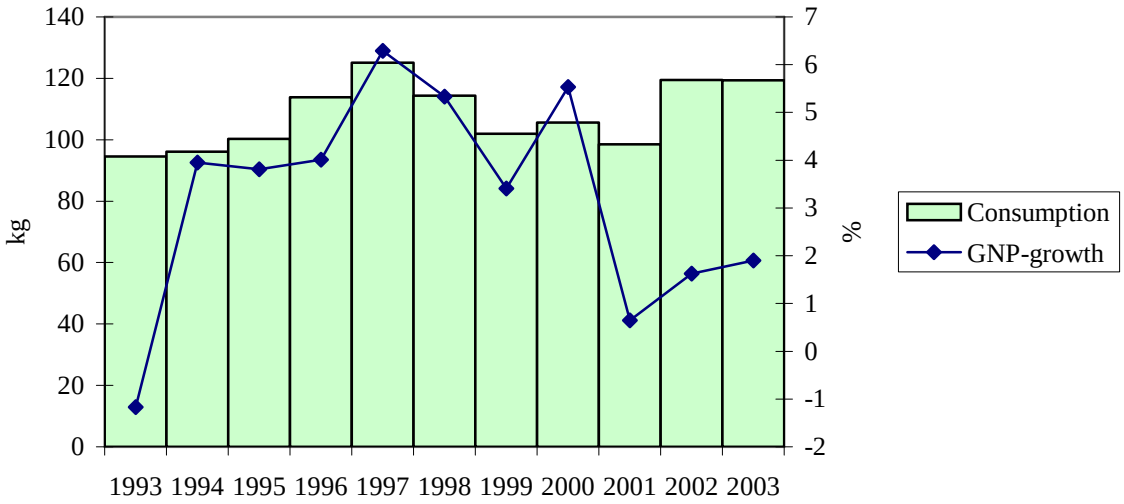

Figure 4. Apparent consumption of paperboard per capita in Finland compared with GNP growth, 1993-2003.

1. 3 Ongoing research and areas for incomplete information

Research on consumption of forest industry products is undertaken e.g., at the Finnish Forest Research Institute (Metla) and the Pellervo Economic Research Institute within their annual outlooks for the forest products markets. Their main focus is, however, on the export markets of these products. The dominant interest of export markets is due to the low share of domestic consumption of forest industry products. VTT Building and Transport[1] also undertakes estimation of wood usage in construction in Finland and participates in European Network of Construction Forecasts (EUROCONSTRUCT). Individual forest industry firms and private commercial research firms make internal and often confidential analyses and forecasts on forest product consumption. The research efforts on modelling domestic consumption are scanty because of the dominant position of exports for the Finnish forest products industry.

Statistics on forest related consumption by the urban population are not available in Finland and urban consumption of forest products is not reliably separable from the aggregate consumption. The only reference on urban consumption available is the share of urban population, about 65% of total population. Other areas with incomplete information involve the consumption of forest related services. However, the demand for wood, non-wood and forest related services in Finland may be approximated with market surveys (for outdoor recreation, see e.g. Sievänen 2001, see also Chapter 4).

1.4 Main problems and research questions in consumption

High values and volumes of forest industry production are mainly due to the export (export share: 90% in paper paperboard, 85% in plywood and 60% in sawn timber). Domestic consumption of sawnwood, going mainly to construction, has increased to 5.5 million m^3 in 2003. Wood based panels are domestic products except plywood. The more than proportionate growth of family houses in house construction is the major cause for the increased domestic use of sawnwood. Also joinery industry has expanded, which shows well in the increase of employees by about 5000 between years 1993–2004. The major problem in consumption research is the scare data available. Majority of statistics on the consumption of forest products are domestic aggregates. Disaggregated information on forest product consumption is gathered by the inquiries of the specific survey studies.

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Finnish Statistical Yearbook of Forestry 2003. Finnish Forest Research Institute.

Markkula, L & Ranta-Vaara, A. 1996. Consumption of mushrooms and other food products in Finland. Published in: Walderhaug, T and Gulaugsson Eo. (eds): Proceedings of the 11th meeting of Nordic society for radiation protection and the 7th Nordic radioecology seminar 26.-29.8.1996

[1] VTT provides research, development and testing services as well as product approval and certification in the field of construction, communities and physical infrastructures

Hänninen, R. & Toppinen, A. 2002. Miten hyvin asuinrakentamisella voi selittää sahatavaran kotimaan kulutusta? (How well does residential construction explain sawnwood consumption in Finland?) In: Hänninen, R. (toim.). Metsäsektorin suhdannekatsaus 2002–2003. Metsäntutkimuslaitos, pp. 53-55.

Sievänen, T. 2001. (ed.) Outdoor recreation 2000. Metsäntutkimuslaitoksen tiedonantoja 802. 204 p. (in Finnish with English summary)

Annex A: Organisations studying forest products' consumption

Federation of Finnish Forest Industries. http://www.forestindustries.fi/

Finnish Forest Research Institute (Metla) http://www.metla.fi/hanke/3338/index.htm

Pellervo Economic Research Institute http://www.ptt.fi/en/index.html

University of Helsinki, Department of Forest Economics.

http://honeybee.helsinki.fi/MMEKN/eng/research/pmark/pmarkres01.htm

VTT Building and Transport http://www.vtt.fi/rte/indexe.html

2 Small-scale forestry practises

Non industrial private forest ownership (NIPFO) is diversified into small tenure units in Finland. These NIPFs are the main domestic roundwood source for Finland's forest industries. The public investment subsidies on NIPFs have been directed to wood production for the most but investments towards ecological sustainability have increased their share in subsidies since the Forest Act 1996. Domestic stumpage prices have become more and more sensitive on international roundwood markets, mainly those in the Baltic Sea area challenging the profitability of timber production and promote efforts towards the cost-effectiveness in forest investments and management in general.

2.1 State of the art knowledge, and historical development at country and regional level on small-scale forestry and its related policy framework.

The organised governing activities of public authorities on private management of forests goes back to the early 1300s under the king of Sweden when the first statements concerning the privatisation rights on common property village forests were announced. The duties on the supervision of private land forest management were delivered to public hunting officers in the mid 1600s. The public arrangements to govern forest management are related slash-and-burn based agriculture in the 1600s. The statements allowing tar burning and slash-and-burn based agriculture in the late 1700s promoted the formation of farming tenures in the remote lands of the kingdom of Sweden.

Private forest ownership in Finland was formally established by the Great Partition legislation in 1757 and 1775. The pressure to create a new land division procedure was caused by practical inconveniences arising from the so-called open field system and the need to revise land taxation. For the first time forest land owned by the villages was divided between the farms in order to stop the devastation of forests. The division was continued and improved by the New Partition in 1917. Forest Law 1886 made devastation cuttings illegal and Forest Degree 1917 regulated cuttings towards adequate regeneration.

Other landmarks in the development of private forestry, which have affected the size distribution of the holdings and other structural characteristics, were the redemption of leasehold properties in 1918 after the Civil War, and the settlement laws of 1922 and 1936. Finland was obliged to cede large territories to Soviet Union after the World War II, which caused the need for massive settlement activities to provide land for refugees, war veterans and war widows (Karppinen 1988).

Comprehensive reform in public administration of private forest management was carried out through a legislative reform in 1928 (Forest Law to govern sustainable forest management in private lands, Forest Improvement Law towards public support of timber production investments and Law on Forest Boards allowing the arrangement of advising and supervising to non industrial private forestry). The governance of private forest management was based on semi-public Forestry Boards and the public supervision arranged through State Forest Board.

The redistribution of agricultural as well as forest land is observable in the development of the size distribution of forest holdings (Table 1). In Finland, forest properties are

mainly inherited from parents or bought from parents or relatives. Only 13% of the holdings are acquired from the free market (Karppinen *et al.* 2002). The inheritance system has been the main reason for structural changes in private forestry since the late 1960s.

Table 1. The development of the size distribution of NIP (Non-Industrial Private) forest holdings 1929–1994 (Ripatti 1996).

	Year				
Size category, ha	**1929-30**	**1959**	**1969**	**1980**	**1994**
	% of the holdings				
1.0-4.9	16	20	16	32	35
5-19.9	32	35	36	29	28
20-49.9	27	28	29	25	23
50-99.9	14	12	13	10	10
Over 100	11	5	6	4	4
In total	100	100	100	100	100
Mean size of holding, ha	45	33	32	27	26

2.2 General information on small-scale forest holdings in the country

The role of private forestry

The aggregate forest land in Finland is about 20 million hectares (see Appendix.). The proportion of NIP forest holdings of this forest land area is 61% (Finnish Statistical... 2003). NIPF is distributed into about 446,000 non-industrial private forest holdings (> 2 ha). The aggregate number of forest owners has been assessed to be at least twice as much as the number of holdings mainly due to the family ownership structures and some types of joint ownerships (Karppinen *et al.* 2002).

NIPFOs provide the major proportion of the roundwood delivered into the roundwood market and finally to forest industry use. The share of NIP forests of the roundwood used by the forest industry has been around three thirds when calculated from the aggregate where roundwood import is included. The gross stumpage earnings from private forestry were 1540 million euro in 2002, i.e. 88% of the total gross stumpage earnings. Around half of the sum was distributed in eastern and central Finland (the so-called Forest-Finland, see Figure 5). Incomes from forestry are important in the economies of rural societies because the major share of the roundwood sales incomes are consumed in the municipality of the forest holding. The latter has remained valid irrespective the structural changes in forest land tenure where the urbanisation among NIPFOs is the most important singe factor concerned (Karppinen *et al*. 2002).

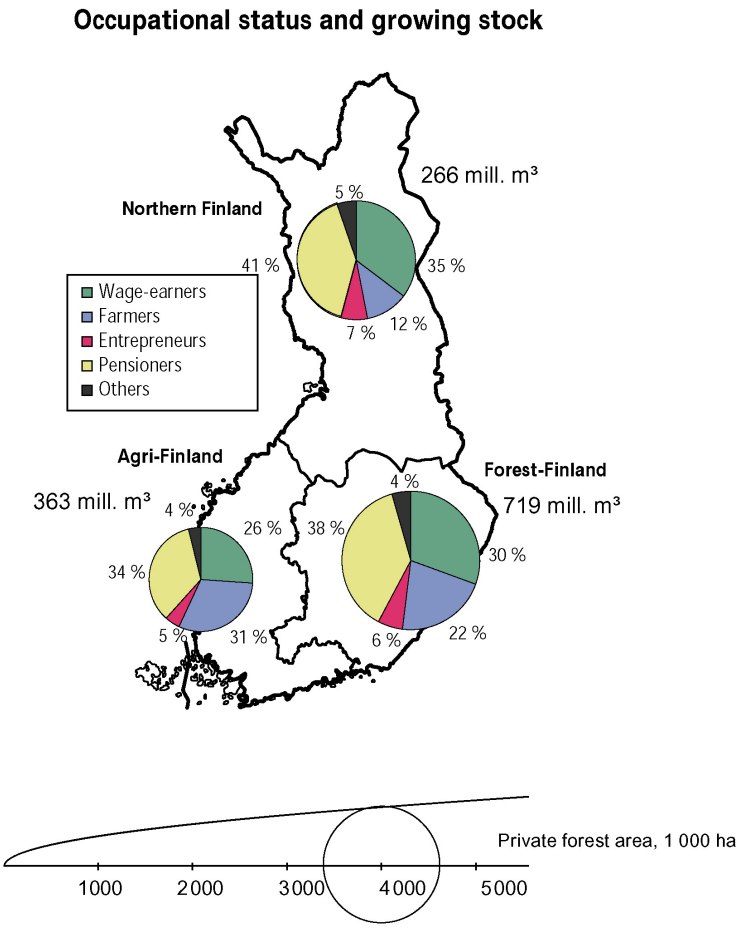

Figure 5. Occupational status of forest owners, growing stock and forest area in private forests by regions in Finland (Karppinen *et al.* 2002).

The structure of private forest ownership and landowner objectives

The main trends in the socio-economic change in Finland have been the occupational and regional differentiation, migration and a general urbanisation of the population during the past thirty years. These trends have been associated with a rising standard of living and wealth. This development has taken place rather late compared with other industrialised countries, but it has been particularly rapid. The general changes have had a powerful impact on private forestry.

The most significant characteristic of the structural change among NIP forest owners in the 1990s has been the ownership transfer from farmers to non-farmers through bequests. Farmers have been the most active owner group that concerns both timber sales and silvicultural activities. The number of full-time forest entrepreneurs has remained modest, only a few thousands in the whole country.

The major structural features of NIPF occupancy along with the major changes are listed shortly below. Forest owners are on average rather old (57 years) and this proportion is still increasing. Also absentee ownership has been growing. However, more than 60% of forest owners live in rural areas and two thirds of the owners live either on the holding or close to it in the same municipality. The basis of forest

ownership is still strongly rural. Forest size distribution has been polarizing which means that especially the number of small holdings but also the number of large holdings is increasing. The mean size of the holdings (exceeding 5 ha) is 37 ha.

Finnish forest owners can be classified into four groups based on their ownership objectives (Karppinen 2000, Karppinen *et al.* 2002). *Multiobjective owners* value both the monetary and amenity benefits of their forests. *Recreationists* emphasize non-timber and amenity aspects of their forest ownership. On the other hand, *self-employed* owners value labour income as well as employment provided by their forests. Finally, *investors* regard their forest property as an asset and a source of economic security, and as a source of regular timber sales income.

Half of the owners were classified as multiobjective owners, one fifth both as recreationists and self-employed owners and over one tenth as investors (Table 2). Self-employed and multiobjective owners were more often farmers than other groups. For instance, one third of the self-employed forest owners were farmers, but almost half of the forest area owned by self-employed owners belonged to farmers (Table 3).

Finland can be divided into three regions based on the forest resources and the means of livelihood. The Eastern and central part of the country can be labelled as "Forest-Finland", the Western part as "Agri-Finland" and the Northern part simply as "Northern Finland". "Forest-Finland" has a dominant position in private forestry, which is indicated by the largest volume of growing stock (Figure 5). The occupational structure of forest owners is similar as the national average. In Northern Finland, the proportion of farmer-entrepreneurs is clearly smaller than in other parts of the country and in "Agri-Finland" their share is largest.

Wood and non-wood production

Commercial roundwood removals from private forests were 46 million m^3 in 2002, corresponding to app. 85% of the total of commercial roundwood removals (Finnish Statistical... 2003). The role of private forests is, despite the rapidly increasing roundwood imports, of crucial importance for the export-oriented forest industries.

Estimations of the value and the volume of non-wood forest products from private forests are not available. Table 4 shows the values for some non-wood and wood forest products in non-industrial private, state-owned and forest industries' forests. Industrial roundwood is by far the most valuable product. Game, mainly moose and other artiodactyls, as well as fuelwood have also a remarkable economic value.

In Finland Everyman’s right guarantees certain rights for the public also in private forests, such as free picking of berries and mushrooms, hiking and camping possibilities. Hunting is, however, licensed by the state, but the fees paid for the access to the forests collected by landowners are rather modest. (For more information on NWFP (Non-wood Forest Products) see Chapters 4 and 5).

Table 2. The size of NIP forest holdings exceeding 5 ha by owner categories and their proportions in 1999 (Karppinen et al 2002).

	Size of forest holding, ha					
	5-19.9	20-49.9	50-99.9	Over 100	In total	Mean size of forest holding, ha
	% of holdings/owners (% of private forest area)					
Occupational status						
Wage-earners	50 (17)	33 (33)	12 (26)	5 (24)	30 (25)	31
Farmers	23 (5)	39 (22)	25 (31)	14 (41)	22 (33)	56
Entrepreneurs	46 (14)	31(26)	17 (31)	6 (29)	6 (6)	36
Pensioners	47(16)	36(34)	13 (28)	4 (22)	37 (32)	32
Others	49(17)	33(34)	13 (28)	5 (21)	5 (4)	31
Place of residence						
Rural area	38 (11)	37(28)	18 (30)	8 (31)	63 (69)	41
Population center/ small town	50 (16)	34 (31)	11 (24)	5 (29)	18 (16)	33
Town (over 20 000 inh.)	53 (19)	31 (32)	12 (28)	4 (21)	19 (15)	29
Control of holding						
Family ownership	42 (12)	35 (29)	15 (28)	7 (31)	75 (76)	38
Private partnership	39 (11)	35 (29)	18 (31)	8 (29)	11(12)	39
Undistributed estate	46 (16)	35 (33)	15 (31)	4 (19)	14 (12)	32
Owner's age						
Below 40 yrs	35 (9)	36 (25)	19 (30)	11(36)	11 (13)	45
40-59 yrs	42 (12)	35 (28)	17 (29)	7 (31)	45 (47)	39
Over 60 yrs	45 (15)	36 (33)	14 (28)	5 (25)	44 (40)	34
Gender						
Male	40 (11)	36 (28)	17 (30)	8 (31)	76 (81)	40
Female	52 (19)	33 (35)	11 (26)	4 (21)	24 (19)	29
Objectives of forest ownership						
Multiobjective owners	34 (9)	37 (27)	20 (31)	9 (33)	48 (59)	45
Recreationists	64 (28)	27 (35)	6 (16)	3 (21)	21 (14)	24
Self-employed owners	42 (13)	34 (29)	17 (31)	7 (27)	18 (18)	38
Investors	54 (22)	32 (36)	11 (29)	3 (13)	13 (9)	28
Region						
Forest-Finland	41(13)	38 (33)	15 (28)	6 (26)		36
Agri-Finland	55 (21)	32 (34)	11 (28)	3 (17)		28
Northern Finland	31 (7)	31 (19)	23 (31)	15 (43)		53
In total	42 (13)	35 (29)	16 (29)	7 (29)		37

Table 3. Forest owners' occupational status by owner categories and their proportions in 1999 (forest holdings exceeding 5 ha) (Karppinen et al 2002).

	Occupational status					
	Wage-earners	Farmers	Entre-preneurs	Pensioners	Others	In total
	% of forest owners (% of private forest area)					
Place of residence						
Rural area	22 (17)	33 (46)	5 (4)	36 (29)	4 (3)	100
Population center/small town	42 (39)	3 (6)	7 (9)	41 (39)	6 (7)	100
Town (over 20 000 inh.)	48 (48)	2 (2)	7 (9)	37 (36)	6 (5)	100
Control of holding						
Family ownership	26 (20)	26 (39)	6 (6)	39 (32)	4 (3)	100
Private partnership	41 (35)	16 (22)	9 (8)	29 (29)	6 (6)	100
Undistributed estate	44 (46)	7 (8)	3 (3)	38 (35)	7 (8)	100
Owner's age						
Below 40 yrs	43 (37)	41(52)	5 (4)	0 (0)	11 (8)	100
40-59 yrs	50 (38)	29 (44)	9 (9)	6 (4)	6 (5)	100
Over 60 yrs	7 (7)	10 (14)	3 (3)	79 (76)	1 (1)	100
Gender						
Male	30 (24)	26 (38)	7 (6)	34 (29)	4 (3)	100
Female	33 (31)	9 (12)	3 (3)	48 (45)	8 (8)	100
Objectives of forest ownership						
Multiobjective owners	23 (20)	26 (36)	5 (5)	43 (36)	3 (3)	100
Recreationists	42 (40)	10 (16)	8 (9)	34 (29)	6 (6)	100
Self-employed owners	32 (26)	34 (46)	5 (5)	24 (19)	5 (4)	100
Investors	35 (33)	12 (17)	7 (5)	42 (40)	4 (5)	100
In total	30 (25)	22 (33)	6 (6)	37 (32)	5 (4)	100

Table 4. Values of non-wood and wood forest products in Finland in 2002 (Finnish Statistical... 2003).

		Mill. euros
Industrial roundwood	(stumpage value)	1689
Fuelwood	(stumpage value)	65
Forest chips	(value at use site)	24
Christmas trees	(christmas tree trade)	7
Game	(estimated value)	73
Wildberries	(market supply value)	6
Mushrooms	(market supply value)	1
Lichen	(value of exports)	2
Reindeer husbandry	(value of culled reindeers)	14

2.3 Small-scale forestry practices

Forestry techniques and practices

There are about twenty indigenous tree species growing in Finland, the most common ones are pine (*Pinus silvestris*), spruce (*Picea abies*) and birch (*Betula pendula* and *B. pubescens*). Usually two or three tree species dominate a forest stand. About half of the forest land area consists of mixed stands (Finnish Statistical... 2003). The forests are managed a compartment at a time. The average size of a compartment is usually less than two hectares. Rotation of forests varies between 60 and 120 years depending on the tree species and the composition of the site. The major mode of rotation applied is clear cutting and the establishment of the new tree generation either by natural regeneration or by planting or seedling. Nowadays, about one third of Finnish forests are regenerated naturally and two thirds by planting or seedling (Finnish Statistical... 2003). Before regeneration, the ground on the site has to be prepared. When the new stand has been established, the initial development of the seedlings has to be secured. This includes e.g. removing rivalling grass vegetation, and supplementary seeding or planting whenever needed.

Private forest holdings are usually quite small, on average 20−30 ha (Finnish Statistical... 2003). Still, for many forest owners forest earnings play an important part: an average forest holding under sustainable management may return an annual timber-sales income of about 2500−3300 euro. NIPFOs frequently acquire additional net income over stumpage by carrying out the harvesting themselves. Many forest owners also save in their outlays by carrying out forest management work on their holdings, such as planting and young stand management.

Much of the harvesting is accomplished mechanically (96% of harvesting by forest industry and the Finnish Forest and Park Service), and only some thinning and felling for special purposes is done manually (Finnish Statistical... 2003). Loggings, where larger volumes are harvested at one go, are usually carried out every 3 to 4 years. Forest industry companies generally buy their timber as standing sales, i.e. the company takes care of the logging and hauling using subcontractors. The forest owners can also choose delivery sale, carrying out the felling themselves or using a subcontractor and delivering the timber to a road-side landing. In the delivery sales the share of manual fellings 68% and mechanical fellings 32%. The forest industry companies do not have their own logging machines, which means that they use small contractors for felling and thinning. The trees are felled, trimmed and cut into lengths with a harvester. The timber is then loaded onto a forest tractor and transported to a timber landing.

In Finland, logging is based on the so-called assortment system. This means that a tree trunk is cut immediately after felling into saw-timber and pulpwood, based on its quality and diameter. The butt end of a large tree gives about 2 or 3 logs which can be used for sawn timber, whereas the top is used for making pulp and paper. The thinnest part of the tree top is often used for producing energy.

Management and organisational arrangements

The share of forest owners' own work has decreased in the last decades mainly due to the structural changes in tenure as described earlier. The share of the delivery sale is about 20% of total roundwood removals. However, the share of forest owners' own work (family work) in silvicultural treatments is still remarkable (in monetary terms over 90 million euro annually, see Koho et al. 2004).

Forest management planning document has been produced to holdings covering about 70% of private forest areas (Finnish Statistical... 2003) and about every second forest holding has a valid forest management plan. Regional Forestry Centers (RFC) are carrying out most of the forest planning and in some cases also the Local Forest Management Associations (LFMA). Regional Forestry Centres get state subsidies for forest planning. At the moment, there is debate on the forest policy arena whether to open the forest planning for free competition. There are already now some private entrepreneurs who provide forest planning in the context of forestry services.

Finnish forest owners have easy access to expert advice relating to the management of their forests. There are about 158 LFMAs that provide the forest owners with advisory services relating to forest management and felling as well as other types of related services. The LFMA's task, stipulated by law, is to promote private forestry while securing its economic, ecological and social sustainability. The LFMAs' share of fellings in delivery sales is 37% (Finnish Statistical... 2003). LFMAs are working in a close co-operation with the forest owners in all matters related to forests: as forest management services, training and planning services and timber sales services. As a result, around 80% of the planning and execution of silvicultural measures in private forests and 75% of preliminary planning of timber sales are carried out by LFMAs.

There are about 100,000 timber sales deals made every year between forest owners and forest industry companies. The average sales volume is about 500 m^3. Forest industry companies generally buy their timber as standing sales, i.e. the company takes care of the logging.

Role of forestry on farms

The current tenure proportion (share of units) of full-time farmer entrepreneurs is one fifth, whereas their share of the NIPF land area (share of hectares) is one third (Tables 2 and 3). The mean size of forest holding is 56 ha in farm forests. The number of active farms has decreased from 105,000 farms in 1994 to 73,000 farms in 2002 (The Central Union of Agricultural Producers and Forest Owners 2004). At the same time the mean size of the farms has increased. This means that the economic importance of forestry on farms has in average decreased. But it also can be noticed that some farms have been focusing more on forestry.

Costs, benefits and investments

The gross stumpage earnings in NIP forestry were 1.5 billion euro (115.2 euro/ha) in 2002 (Table 5). The importance of timber sales income especially in Eastern Finland is worth noting (see also Figure 5) The value of investments in private forestry is around 190 million euro annually, as shown in Table 6. Forest regeneration, including planting

and seeding as well as natural reforestation, is the most important silvicultural activity as regards the financing.

Table 5. Incomes and expenditures in non-industrial private forestry, 2002 (Finnish Statistical… 2003).

	1 000 €, Whole country	**€/ha, Whole country**	**€/ha, Western Finland**	**€/ha, Eastern Finland**	**€/ha, Northern Finland**
Gross stumpage earnings	1 542 734	115.2	144.4	160.2	42.5
Total costs	277 184	20.7	23.7	25.6	13
Silviculture and forest	*184 314*				
Forestry administration costs	*92 869*				
Forestry fees	*28 235*				
Services of experts	*6 830*				
Insurance fees	*8 106*				
Travel and course costs	*30 071*				
Other administration costs	*19 627*				
+ State subsidies	*61 222*	*4.6*	*4.2*	*4.5*	*5.1*
Net earnings	**1 326 772**	**99.1**	**124.9**	**139.1**	**34.5**

Table 6. Financing of silvicultural and forest-improvement works in 2001 in NIP forests (Finnish Statistical... 2003) (1000 euro).

	Self financing and own labour input	State loans	State grants	Total
Total	**130 221**	**545**	**57 729**	**188 495**
Forest regeneration	72 828	-	11 254	84 082
Tending of seeding stands, improvement of young stands, energywood harvesting and chipping	23 624	10	29 410	53 044
Pruning	743	-	744	1 487
Remedial fertilization	1 877	-	727	2 604
Ditch cleaning and supplementary ditching	4 271	84	10 885	15 240
Construction and basic improvement of forest roads	25 968	451	4 708	31 127
Other costs	911	-	-	911

Timber markets

The Finnish timber markets are characterised by a small number of large buyers. In 2002, the three largest companies, Stora Enso, UPM and Metsäliitto, purchased 78% of private roundwood. The share of small buyers, buying annually less than 10,000 m^3, was only 1% from total volume (Finnish Statistical... 2003). The share of delivery sales has decreased during last decades being now under 20% of total sales.

Household consumption

Roundwood consumption in Finland was 76.5 million m^3 in 2002, from which forest industry used 71.3 million m^3 (incl. also roundwood consumption of small sawmills) (Finnish Statistical... 2003). The fuelwood used in small-size dwellings was 5.2 million m^3.

Co-operation

As mentioned before, the Local Forest Management Associations are working in close co-operation with the forest owners. This co-operation is based on strong history and traditions. Forest industry firms provide forest service contracts to NIPFOs. These contracts cover forestry activities depending the interests of the NIPFO concerned. The three largest corporations (Stora Enso, UPM and Metsäliitto Group) offer these contracts. One means of co-operation are the so-called joint management forests where forest estate is run businesslike on behalf of the many individual owners. This kind of co-operation may increase in the future due to recent changes in legislation.

Entrepreneurship and innovations

The rate of formation of new enterprise initiatives in small-scale forest farms is rather low in Finland. Although the number of forest owners is high (app. 440,000), only few forest holdings run other types of businesses than farming or forestry. There were, however, 212 heating plants under the management of heating entrepreneurs in 2003. Their number is expected to rise rapidly (Nikkola 2004). Also small-scale sawmills, fully or partly operating, on the basis of owners' forest property is quite common. There are three types of these entrepreneurs: entrepreneurs using light transportable circular saws providing local service, small commercial sawmills and small plants for domestic consumption only. The annual production of these groups is around 1 million m^3 sawn timber, which accounts for 8% of the annual sawn timber production and 30% of the domestic sawn timber trade.

One characteristic of the innovation environment in small-scale forestry is the dominance of the effective large-scale industry. Therefore innovation activities are often focusing on maintenance innovations, mainly on improving the effectiveness of existing processes. However, there are some good examples of new start up enterprises utilizing forest resources in a new innovative way.

2.4 Policy framework and production conditions

Institutions

The forestry administration in Finland is based on organisations occupying three levels in the public-private dimension. (i) Public organisations refer to Ministry of Agriculture and Forestry, Ministry of Environment and Ministry of Finance (only taxation) and their regional organisations. (ii) Semi-public organisations, the Forestry Development Centre Tapio (FDC) and the Regional Forestry Centres (RFC), promote non-industrial private forestry but at the same time occupy also public control duties. Public and extension tasks of the RFC's and FDC are financed from the State Budget. (iii) Private organisations are a) under special laws like the Local Forest Management Associations (LFMAs) or b) private free market forest service enterprises. The LFMAs are controlled by non-industrial private forest owners, but their duties are supervised by the Forestry Centres. The funding of LFMAs is party based on an obligatory fee collected from forest owners. The LFMAs have formed Unions, which are regarded as a part of the organisation of "MTK", the Central Union of Agricultural Producers and Forest Owners. (Leppänen *et al* 2004). The forest service enterprises have started to establish nation-wide co-operation in the form of associations or other kinds of networks.

Legislation

The most important laws concerning private forestry are the Forest Act 1093/1996, the Act on the nature protection 1096/1996, the Act on Financing of Sustainable Forestry 1094/1996 and the Act on Forest Management Associations 534/1998. The control over the forest laws is carried out by regional Forestry Centres and the Nature Protection Law by the Regional Environment Centres. Private forest management is guided by the forest management recommendations of the Forestry Development Centre Tapio. Those recommendations are also applied in NIP forest management plans (Leppänen *et al.* 2004).

The Forest law prohibits devastation of forest, which means that regeneration of forest has to be carried out or ensured after final cuttings. Supplementary decisions restrict in a detailed way also thinning and final harvesting and define e.g. the accepted levels of seedling stands. The Forest Act also concerns forest habitats important for biodiversity, which have to be maintained and the Nature Conservation Act includes a section of nature habitats to be conserved. (Kiviniemi 2004, Leppänen *et al* 2004).

State cost-sharing, forestry planning and extension

The most important law as regards to financing private forest management is the Act on Financing of Sustainable Forestry 1094/1996. The law is aimed to ensure the sustainability of timber production, the maintenance of the biological diversity of the forests and to support forest ecosystem management undertakings. The subsidised measures include forest regeneration under specific circumstances, prescribed burning, tending of a young forest (incl. cleaning, thinning and pruning), harvesting of energy wood, forest remedial fertilisation, renovation ditching and forest road construction and improvement. Many of the measures above are also co-financed by European Union (EU Council regulation 2080/92). Field afforestation is not publicly funded at the moment. Forestry planning is executed by Forestry Centers and estate-level plans are sold to private forest owners at less than full-cost prices. In 1999, more than 60% of the private forest area was covered by holding-level forestry plans (Karppinen *et al* 2002).

The organisations FDC, RFC and LFMA are competent in providing extension services in basic forestry issues. However, even they have not been able to promote new enterprise initiatives in small-scale forestry so far.

The Employment and Economic Development Centre helps to sustain Business Activities in Finland. The Ministry of Trade and Industry, the Ministry of Agriculture and Forestry, and the Ministry of Labour have jointly combined their regional forces in the Employment and Economic Development Centers (T&E Centre). Fifteen centers countrywide provide a comprehensive range of advisory and development services for businesses, entrepreneurs, and private individuals. Each of the Employment and Economic Development Centers countrywide provides a centralised, flexible range of advisory and development services to fulfill the needs in matters concerning employment and economic development. The comprehensive technological expertise of the National Technology Agency of Finland (Tekes) is also under the same roof.

Research and education

The most important research organisation from the point of view of private forestry is the Finnish Forest Research Institute (Metla). Metla is subordinate to the Ministry of Agriculture and Forestry and mostly state budget funded. Metla's social task is to promote – through research – economically, ecologically and socially sustainable management and utilisation of the forests. Metla started its activities in 1917 and since then it has grown considerably. The current network of research centers, research stations and research forests covers the whole country. The total number of permanent staff is around 750, of which 330 are researchers. One research area of Metla is the field of forest economics were about 10 researchers are involved in studying the field of private forestry. Those study topics vary from forest owners' forest management behaviour and the effectiveness of forest policy means on this behaviour to the profitability in private forestry.

The TTS Institute (Work Efficiency Institute) with its staff of about 160 people is a research, development and training institute for agriculture, forestry, home economics and other related fields. The institute operates in four localities. Approximately 80% of the financing comes from projects, publications and membership fees, while the remaining 20% comes from the state budget. The Department of Forestry in the TTS Institute employs a total of 20 people in research and specialist tasks. Research topics concern the behavior of private forest owners, forest work, enterprise economics and the harvesting and utilisation of biofuels. The department has specialised in developing technology for use both in private forestry and by small-scale entrepreneurs in the forest and wood products trade.

The Pellervo Economic Research Institute (PTT) is a non-profit organisation governed by the institutions promoting NIPFO interests. The institute was established in 1979. At the moment there is a staff of 20 people working at the institute. Owner contributions covers 40% of the budget, project financing 35% and 25% comes from donations and the Finnish state. Current studies deal with general economic topics, agriculture and food sectors and forest economic issues. From the point of private forestry, the most interesting studies concern the functioning of roundwood markets in Finland and in the Baltic Sea region, the behaviour of private forest owners and the supply of and markets for wood energy in Finland and the EU.

The Finnish education system comprises two parallel sectors: universities and polytechnics. There are two universities in Finland responsible for University level academic education in the field, the University of Helsinki and the University of Joensuu.

The polytechnics are arranged on regional basis in Finland. Majority of the polytechnics provide forestry related degrees oriented towards working life and base their operations on the high vocational skill requirements.

Vocational colleges, on the other hand, offer professional training in forestry. These institutions arrange adult education and advanced professional courses of study. Additionally, vocational colleges run courses directed at forest owners.

2.5 Conclusions: Supporting and limiting factors for enterprise development in small-scale forestry and barriers to entrepreneurship

Diversified NIP forest tenure dominates in Finland and the number of forest owners is at least twice as much as the number of holdings. High timber production intensity is frequent in NIPF partly due to the easy access to expert advice. Local Forest Management Associations provide advisory services covering to forest management and felling as well as other types of related services. More than half of NIPFOs have access to the forest management plan of their forest holding that provide adequate management planning base. Expectedly, private forests provide the major proportion of the domestic roundwood delivered to forest industries but large percentage of NIPFOs do not manage their forests with commercially dominated targets. Three multinational corporations have vast majority of annual timber trade volumes (about a quarter during recent years). There are variety of long term contract types between NIPFOs and these large forest industry firms that cover forest management activities. These contracts are frequent, however majority of timber trade is based on separate trade contracts. The structural features of roundwood market impede the identification of quality roundwood supply among SME woodworking industry firms.

References

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Annex B: Organisations studying small-scale forestry and their specialty. Main publications and information sources on small-scale forestry in the country.

Main publications

Finnish Forest Research Institute (Metla)

Silva Fennica is a peer-reviewed international journal of forest science. It covers all aspects of forest research, ranging from basic to applied subjects. The journal carries original research articles, review articles, research notes, discussion papers, book reviews, and information on forthcoming events. Silva Fennica is published in English and is open to all authors. The journal is published by the Finnish Society of Forest Science and the Finnish Forest Research Institute (Metla).

Metsätieteen aikakauskirja publishes in Finnish or Swedish original research articles, reviews, research notes and other writings covering all aspects of forestry. It is also a peer-reviewed journal.

Metsäntutkimuslaitoksen tiedonantoja is a series published either in Finnish, Swedish or English. It covers all the aspects of forestry and includes, e.g., scientific monographs, doctoral dissertations, proceedings etc.

Working Papers of the Finnish Forest Research Institute publishes preliminary research results and conference proceedings. The papers published in the series are not peer-reviewed. Working Papers are published on the Internet.

TTS Institute/Work Efficiency Institute

TTS Institute's publication series. This series includes scientific research reports and an English summary.

TTS Institute's pamphlet series. A series including short research reports, preliminary studies, theses and guidebooks, as well as the Annual Report of TTS Institute.

TTS Institute's bulletin series. Agriculture, Forestry and Home Economics bulletins contain studies, surveys and reports in a concise and comprehensible form. Each bulletin comes out 10 to 15 times a year. Usually, each bulletin contains an English summary.

Pellervo Economic Research Institute/PTT

Pellervon taloudellisen tutkimuslaitoksen julkaisuja -sarja /Publikationer / Publications. The series includes dissertations and especially large research reports.

Pellervon taloudellisen tutkimuslaitoksen raportteja -sarja / Forskningsrapporter / Reports. The series includes other large research reports.
Pellervon taloudellisen tutkimuslaitoksen työpapereita -sarja / Diskussionsuderlag / Working Papers. The series includes short and preliminary research reports.

Information on the Internet

Laws

Everyman's right (www.ymparisto.fi/default.asp?contentid=49256&lan=EN)
Forest act 1093/1996 (www.mmm.fi/english/forestry/)
Act on the nature protection 1096/1996
(www.ymparisto.fi/default.asp?contentid=30853&lan=en)
Act on Financing of Sustainable Forestry 1094/1996

Administrative and extension organisations

Forestry Centres (www.metsakeskus.fi/)
Forestry Development Centre Tapio (www.tapio.net/tapionet_eng.html)
Regional Environment Centres
(www.ymparisto.fi/default.asp?node=4661&lan=en).
Ministry of Agriculture and Forestry (www.mmm.fi/english/)
Ministry of Environment (www.environment.fi/)
Local Forest Management Associations (LFMAs) (www.mtk.fi)
Union of Agricultural Producers and Forest Owners
(www.mtk.fi/sivu.asp?path=2918;2935)
The Employment and Economic Development Centre (http://www.te-keskus.fi/).

Research organisations

Finnish Forest Research Institute/Metla (www.metla.fi/)
TTS Institute/Work Efficiency Institute (www.tts.fi/)
Pellervo Economic Research Institute/PTT (www.ptt.fi/)

3 Wood-processing industries

Pulp and paper industries in Finland are carried out by large international corporations (Stora Enso, UPM, M-real) and the same is true with the wood plate industries. These business activities are mainly excluded from this survey due to the SME approach. This survey concentrates on wood product industries. Gross revenue in Finnish wood product industries has more than doubled in the past twenty years but the profitability of business has not achieved a satisfying minimum level among SMEs in the business. The international competitiveness of Finnish wood product industries has remained moderate because of the high unit prices of input factors. Low added value products dominate the export of major sub sectors of wood product industries. There are only few examples of horizontal integration and networking among wood product industry SMEs and the same is valid with vertically integrated partnerships among firms. The latter activities, providing ways to benefit from positive economies of scale in production, have not become common. High investment costs, price of raw material and dependency on few customers are typical in Finland increasing risks among new potential entrepreneurs.

3.1 State of the art and historical development

Roundwood and labour markets

The use of roundwood by the forest industry has increased in Finland from the average level of 37 million m^3 in the 1970's up to 49 million m^3 in the 1990's. The share of roundwood used in the wood product industries, i.e. mainly in the primary processing into sawn wood and wooden panels, has increased from the average level of 18 million m^3 to 24 million m^3, meaning that the share has remained constant. The increase in industrial roundwood consumption has been based on roundwood imports, especially from the 1990's onwards. The share of imported roundwood in the wood processing industry in 1990 was 1% of the total volume of 20.3 million m^3, but increased to 14% of total consumption of 32.8 million m^3 in 2002. (Metinfo dataservice 2004).

Total roundwood consumption in the forest industry (wood product industries (WPI) and pulp and paper industries (PPI) taken together) has increased from 50 million m^3 in 1990 to 71 million m^3 in 2002 (a rise of 43%). The use of roundwood in WPI has been slightly smaller than that of the P&PI. Wood raw material input was the largest single production cost in WPI (38%) whereas the wood cost share in P&PI was 14% in 2000 (Finnish Forest Sector Economic Outlook 2000).

Pricing of roundwood has been based on more competitive markets from 1999 onwards after the market information produced by independent institutes has become available for both SMEs and individual NIPF(non-industrial private forests)-owners in the roundwood trade contracting (e.g. METINFO http://www.metla.fi/metinfo/index-en.htm). Competitive roundwood markets have improved the opportunities for SMEs to trade timber assortments most relevant to their products.

The Wood and Allied Workers' Union covers the wage contraction and other labour union activities in mechanical woodworking (sawmills and wood based panels), carpentry, boat building, forestry, drivers of wood processing machines and forest nurseries. This Union has currently some 50,000 affiliated members and their representatives negotiate 13 parallel collective agreements, all of them at the national

level. The average membership level in the trades represented by the Union is some 80%. (Source: http://www.puuliitto.fi)

Ownership & Entrepreneurship

There is a clear distinction between forest industry firms in Finland, which are divided into a) large international public corporations listed in domestic and international Stock Exchanges, b) big family based corporations with either more than 250 employees or turnover of over 40 million euro or a balance sheet of over 27 million euro (http://www.ktm.fi/chapter_files/EUohjelmat.pdf) and c) small and medium size enterprises (SMEs) with properties below the limits of group b).

Big multinational corporations have multi-product distribution and most of them have also international production activities. Their core business interests are in the pulp and paper industries; wood processing industries are mainly of secondary interest in their business and production portfolio. Despite this, the majority of wood processing related to wood based panels in Finland are in the business portfolios of these large corporations. They also produce about 50% of the annual sawn timber production.

Owner leadership and majority ownership of family members is typical for the companies operating in the wood processing industry. The owners lead 93% of companies with less than 100 employees engaged in manufacturing of wooden structures and wooden houses (Petäjistö et al. 2001).

Roundwood consumption of SMEs in the wood processing industry

Industrial sawn wood production in Finland amounted to 13.3 million m^3 in 2002. The share of the 10 biggest producers was about 70% (Toimialaraportit 2004). In 2002, about 12 million m^3 of roundwood or 40% of the total industrial roundwood consumption was used and transformed by small and medium sized mills with processing capacity between 10,000-100,000 m^3 per year into wooden products for final use or further processing. (Metsäteollisuus ry 2004, Toimialaraportit 2004)

The following sources provide an exhaustive statistical overview of forestry and the forest industries in Finland:

- Finnish Forest Industries Federation. Key to the Finnish Forest Industry http://www.forestindustries.fi/files/julkaisut/pdf/key to_the_finnish_forest_industry.pdf
- Finnish Forest Industries. Facts and Figures 2003. http://www.forestindustries.fi/files/julkaisut/pdf/metsateoll_vsk_2003_gb.pdf
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Structure, behavioural characteristics and dynamics of SMEs in the Finnish economy

The Finnish economy is dominated by a relatively small number of large companies. Family enterprises, characterised by owner leadership or majority ownership of family members, account for 86% of all Finnish SMEs. Family members and owners participate in business management and operations in 30% of SMEs. (Heinonen 2002)

Finland was considered a low entrepreneurship activity country in Global Entrepreneurship Monitor Research (Pk-yritysraportti 1999). New enterprises, however, exceeded the number of closed-downs in Finland during the 1990s. The rate of growth in new firms, 2.5% p.a. during 1995–1997, was accompanied with strong regional variation.

Over half of Finnish SMEs are growth-oriented and 6% are proactively growth-oriented (Holm & Kauppi 2003, Pk-yritysten 2003). SMEs with less than 10 employees are considered to have the most promising potential to provide new employment opportunities (Holm 2001). Rural SMEs do not share these potentials (Kupiainen et al. 2000).

Factors affecting the future development of SMEs

The issue of succession is currently seen as a challenge for the continuance of the business operations of family enterprises because a large share of SMEs (18%) will face a change in ownership in the next five years covering 40,000 enterprises and over 100,000 (Pk-yritysbarometri, spring 2003). The lack of strategic plans (positioning) restricts succession and business management in many small companies (Heinonen 2002).

The international competitiveness of Finnish SMEs is poor due to weak home markets in terms of domestic purchasing power. The development of business is hampered by leadership deficiencies due to lack of time and inadequate administrative capabilities of business managers both in business planning and finance acquisition. They share these challenges with SMEs in other OECD (Organisation for Economic Co-operation and Development) countries. Intensified co-operation of SMEs, experts, educational institutions and public administration is therefore needed (Kailaranta 1998, Larimo & Arola 1998, Larimo 2000). The Finnish Unemployment Benefit system is considered a barrier to new entrepreneurship in Finland (Holm & Onnela 2004).

Structure, behavioural characteristics and dynamics among the SMEs of wood product industries

Small enterprises of the Finnish forest and wood sector with less than 100 employees had a 40% share of total turnover and employed 45% of the labour used by the sector in 1991 (Mäkinen 1995). The workforce of SMEs in sawn wood and wood products was 12,000 during 2000–2002 covering about 41% of the total employment provided by the industry. The employment opportunities a single firm offers are small: the average firm employed only five people. (Tilastokeskus/2001-2002).

Only 22% of the small companies engaged in the manufacturing of wooden products have export activities. One fifth of these companies do not practice any marketing for

their products. One third rely on their steady customer base (Pk-yritysbarometri 2003). Marketing is considered as a question of major concern for small companies of the forest-wood chain. Typically small firms start up with the implementation of some invention or product idea, but later they fail to keep up with changing markets and customer needs. Resources are primarily allocated into machinery and equipment. Marketing is not seen as a strategic asset. Small firms do not dispose of marketing competencies to implement differentiation or focusing strategies. Generally there are insufficient competencies in marketing leadership and business accounting. (Enroth 1995)

Employment in logging and wood contracting has diminished rapidly during the four decades. There were approximately 70,000 workplaces in the branch in the 1960s, and only 10% of them in 2000 (Finnish Statistical Yearbook of Forestry 2004). There is regional distribution in the forest related value networks in Finland. Forest-rich Eastern regions in Finland create the fewest jobs of forest industry (Selby & Petäjistö 2002).

House construction is among industries using majority of domestic wood product consumption. The current popularity of wood frame residential construction in Finland may provide wide promotion of wood product consumption also in panel and board industry. Wood panel production is expected to belong the growing sectors in Finnish forest cluster. The annual 4.6% growth in employment in producing building material in 1999 was accompanied by the 7.8% growth in the construction industry (Hernesniemi et al. 2001). The increase by 17 million euro in the consumer demand for domestic wooden furniture is expected to increase employment by 60% more than the same growth of demand in paper and paperboard products. (Lammi 2000)

3.2 Wood-processing industries in Finland

Information used is mainly based on Statistics Finland StatFin-database (StatFin 2004). The systematic of statistics used in chapter 3.2 is presented in Annex C.

Value-added of production and trade

In 2002 the total value-added of Finnish production and services was 93 billion euro, of which the value of TOL 02, TOL 20, and TOL 21[2] comprised 8 billion euro (9.9%). Information of the value-added of TOL 36[3] was not available. The share of forestry and forestry related services (TOL 02) of the total value of Finnish value-added has diminished in the past decades while the proportion of wooden products fabricating (TOL 20) has remained the same and the pulp, paper, and paper products (TOL 21) has increased. In 2002 forestry has been 2.6%, wood-processing 1.35%, and paper and pulp industry 5.95% of the total value-added in Finland. (StatFin 2004).

In 2002, the aggregate value of Finnish exports was 47 billion euro, of which forestry products comprised 12.5 billion euro, or nearly 27%. Over 99% of forestry exports was composed of manufactured goods while less than 1%, was formed by the trade of industrial roundwood and wood residues. (Finnish Statistical Yearbook of Forestry

[2] TOL 02 (forestry and forestry related services), TOL 20 (wooden products fabricating), TOL 21 (pulp, paper and paper products)
[3] TOL 36 (furniture manufacturing)

2002). While in 1970 the share of forest products of the total value of exports (9 billion euro) was over 50% (5 billion euro), by 2002 it had diminished down to 26%. The monetary values are deflated with wholesale price index (1949 = 100) to the values of year 2002.

Structure of wood-processing industry in Finland

There were 9500 Finnish wood-processing business units in the branches of forestry and forestry related services (TOL 02), furniture fabricating (TOL 36), wooden products manufacturing (TOL 20), and pulp, paper and paper products producing (TOL 21) in 2002. By the average amount of employees (max. 250 employees in the company), the role of SMEs was important in forestry and furniture fabricating branches (SMEs 75–85% of business units), while in the wooden products producers there were both SMEs (55% of business units) and large-scale companies. Pulp, paper, and paper products producing is dominated by large-scale international companies (90% of business units). The total employment distributed as follows: forestry and forestry related services 9%, furniture fabricating 14%, wooden products manufacturing 30%, and pulp, paper and paper products producing 47%. (StatFin 2004)

Sawmills in wood product industries

There are 2500 sawmills in Finland using 29 million m^3 roundwood annually (Petäjistö et al. 2000, Metinfo 2004). Over half of them are SMEs. The total turnover of the 1100 sawmill units included into industry statistics was over 3.1 billion euro in 2002 (StatFin 2004). Of this, the sawmills owned by large integrated forestry companies with an annual production capacity of at least 100,000 m^3 estimated to have had a share of 51%, large family enterprises in the same capacity class a proportion of 24%, and sawmills with annual capacity less than 100,000 m^3 the share of 25%. However, this group of sawmills with smaller capacity employed in 2002 as much as 43% of all the workers in the branch with an average amount of 4 employees per business unit. In large sawmills (annual production of at least 100,000 m^3) the corresponding figure was 100 workers.

Regional information on industry

The wood processing industry is highly concentrated in Western and Southern Finland where the majority of consumers also are. 66% of production plants work in western (40%) and southern (26%) parts of the country and the proportion of Western and Southern Finland was over 73% in terms of total employment and turnover. The proportion was rather evenly distributed between the two areas. (StatFin 2004). Majority of forest land and timber resources are in the Eastern part of the country (see chapter 2 above)

3.3 Wood product industry practices

SMEs in wood product industries

The sawmilling, planing of wood and secondary wood processing business are the major domains of small and medium sized companies in Finland (Table 7). There is little research done on business practices in small companies manufacturing wooden buildings, carpentry and joinery (Petäjistö et al. 2001).

Technical characteristics of sawmilling

Large diversity in production technology and the scale of production are typical for the sawmill industry in Finland. Small sawing units producing less than 10,000 m^3 of sawn wood per year on a discontinuous basis in small batch sizes typically use circular or band saws. Sawmills with an annual output of at least 100,000 m^3 (large-scale sawmills) mainly use chipper canter lines, profiling units, circular sawing machines and band sawing machines. The production process includes log sorting and peeling, lumber sorting by quality, dimension, strength and length classes, and packaging. Drying capacity is no bottleneck. Currently there is no major technological innovation to be expected. Automation of processing lines and exploitation of IT-technologies will continue requiring high capital input. Efficient technologies require expensive investments and large production volumes. Therefore small companies are not able to keep pace with technological progress. (Toimialaraportit 2004)

Technical characteristics of secondary wood processing and wood contracting

The business activities classified as secondary wood processing (TOL 203) comprise (i) the manufacture of prefabricated wooden buildings (TOL 20301) as industrially manufactured products, including chalets, huts etc., and (ii) the manufacture of builder's carpentry and joinery, (TOL 20309) i.e. windows, doors, casing, stairs, handrails, roof trusses, parquetry etc.

Industrial capacity structure in these subsectors is concentrated. Majority of annual production is provided by few firms both in pre fabricated wooden buildings and other builder's carpentry.

Table 7a. Wood product industry in Finland: business units, employment, gross and added value of business and export in 2002.

Industry	**Business units**	**Employers**	**Turnover, million €**	**Gross value, million €**	**Value added, million €**
Wood and wood products	2939	27977	5534	5386	1231
Sawmilling and planing 201	1220	8969	3001	2923	428
Veneer sheets, plywood, etc.	69	6668	902	869	301
Builder's carpentry etc. 203	1017	10470	1444	1415	426
Prefabricated wooden buildings 20301	*256*	*3150*	*495*	*494*	*120*
Other builder's carpentry 20309	*761*	*7320*	*950*	*920*	*305*
Wooden containers 204	206	1077	127	121	49
Other products of wood 205	427	793	59	58	27

Table 7b. The shares of the subsectors are measured by relative shares in gross and added value from TOL 20 and added value as a share of gross value in each sub industry (Tilastokeskus/2003).

Industry	**Value added, million €**	**Exports, million €**	**Gross value, % of TOL 20**	**Value added, % of TOL 20 turnover**
Wood and wood products	1231	2693	100	100
Sawmilling and planing 201	428	1629	54	35
Veneer sheets, plywood, etc.	301	604	16	24
Builder's carpentry etc. 203	426	446	26	35
Prefabricated wooden buildings 20301	*120*	*149*	*9*	*10*
Other builder's carpentry 20309	*305*	*297*	*17*	*25*
Wooden containers 204	49	7	2	4
Other products of wood 205	27	6	1	2

Material flows constitute a large share in the purchased inputs (60% of turn-over) in wooden house manufacturing making the management knowledge of major importance. The degree of process integration varies widely. There are companies, whose activities cover sawing, planing and fabrication of components, other companies focus on assembling of components and purchase the product components from subcontractors. Producers make increasingly use of integrated product development and manufacturing information systems and automated processing stations. There has been a trend among firms to outsource their secondary business activities to be able to focus on their core competencies. The latter development has been delayed due to the lack of qualified subcontractors. (Toimialaraportit 2004)

In the furniture industry small companies are frequently engaged in the manufacturing of components but the large ones include also assembling of consumer products into their production.. Business-to-customer business is the domain of large companies as Ikea, Lundia, Martela etc.

Wood contracting has been a major domain of SMEs in wood product value chains. Wood contracting includes the logging chain (felling, bucking, pruning and hauling of wood). The degree of mechanisation of the logging chain used in the procurement of industrial roundwood is about 95%. The typical two-machine logging chain consists of a harvester and forwarder. Only about 3% of the industrial roundwood from final cuttings and 11% from thinnings is harvested using motor-manual techniques.

Delivery sales are the domain of harvesting techniques based on the chain saw as the main tool. About 20% of the harvest of industrial roundwood is sold to industrial users at the roadside. About half of the timber sold in this manner is harvested by NIPF-forest owners themselves using small-scale logging techniques and 36% is transported using agricultural hauling equipment. 37% is organised using harvesting services offered by NIPF-owners' forest management co-operations (NIPF-owners' joint sales) and 13% by NIPF-owners themselves.

Educational background among the owners and the staff, working conditions and business leadership

The educational level of entrepreneurs has increased during the past 20 years (27% of entrepreneurs had college-level education in 1983 and 43% in 2003). However, only 10% of Finland's entrepreneurs have an academic degree and one quarter of entrepreneurs are without any formal vocational education.

On-the-job training of employed staff is seen as a challenge to small and medium-sized companies (Holm et al. 2002). Owners of small companies have received vocational training, most frequently on a professional or college-level in wood engineering in the fields of carpentry or joinery. SMEs assessing themselves successful in inquiries are active in training their manpower (Petäjistö et al. 2001).

Part-time or periodic contracts have become common in SME's lately and one fourth of SMEs does use hired labour (Petäjistö et al. 2001).

Networking and joint ventures among/between industries

Networking and joint venture activities are not common among wood product SMEs in Finland. Only few small wood processing companies with less than 100 employees are members in corporates (joint enterprises) or marketing networks. About one half of these companies are operating as subcontractors or use subcontractors themselves (Petäjistö et al. 2001). At the same time networking is a common business mode among Finnish SMEs. One third (37%) of all SMEs in Finland operate as a subcontractor and about half (51%) use subcontractors themselves and 80% of them co-operate with other companies or partners. Written contracts are the basis for intra- and inter-sectoral business transactions in 58% of co-operating activities between companies. (PK-yritysten… 2003).

For sawmills looking for downstream co-operation with wood processing partners it is a major problem to find qualified candidates. There are only a few opportunities for small firms to co-operate with spearhead companies. There is a shortfall in knowledge and competencies how to build and operate business networks (Vanhanen 1995).

With respect to specialisation and co-operation, the wood processing industry is classified as weakly developed what concerns networking (Value Added Wood Chain, Tekes 2004).

The dominating operating model consists of one business unit organised as a single company and localised in a single production site (Saarikivi & Riihonen 2003). New markets are emerging especially for wooden small houses and low storey-houses in urban residential areas. Rebuilding the forest-wood chain is seen as the prerequisite for the implementation of business model innovations necessary to exploit the business opportunities offered for small and medium sized enterprises by niche markets.

Sales

SMEs in the wood processing industry (incl. mainly sawmilling and secondary wood processing industry; excl. furniture industry) s generated an aggregated turn-over of 1.8 billion euro in average per year over the period 2000–2002 (Tilastokeskus 2004)

Profitability and scale of investments

Operational performance (average turn-over per employee) of SMEs was 155,000 euro during the period 2000–2003 and 211,000 euro in large companies. The average turn-over per company was less than one million euro (Table 8).. The SMEs have increased the return on their invested capital during the latest years. Poor long-term profitability and shortage of equity capital is, however, valid among the small firms in the industry with less than 100 employees (Petäjistö et al.2001). The equity ratio has improved substantially during the last years from its average level of less than 15% in the second half of the 1990s (Toimiala-analyysi 2003).

Table 8. Profitability, equity rate and scale of investments in big companies and SME's in the manufacturing of sawn wood and other wooden products. Average 2000–2002. (Tilastokeskus/2002).

Wood processing industry [1)] 2000-2002	Turnover million € / company	Gross margin	ROI	Total debt net of receivables	Net investment	Equity ratio (gearing ratio)
			% of turn-over			
Large companies	54.1	6.4	5.1	42.4	4.8	46.6
SME's	0.7	8.8	11.5	37.4	5.1	31.8

[1)] TOL 20: sawmilling, wooden panels and secondary wood processing, excluding furnitures.

Competitiveness

Cost efficiency has been the main parameter of competitiveness among the wood processing industry SMEsinstead of the breakthroughs in technologies or products. The quality of wood products as a source of competitive power has been modest(Saarikivi & Riihonen 2003, Toimiala-analyysi 2003). Growth-orientation is more frequent among young than old companies (PK-yritysten… 2003)

Characteristics of innovation behaviour in wood processing industries

Wood processing industry can be characterised as a low-tech industry measured by R&D expenditures. Knowledge embodied in new technologies and spilled over into the industry by investment in machinery and equipment is an important source of innovation while localisation of activities into industrial districts through culture and trust, specialisation and network relationships have provided comparative advantages also in Finland. (Hazley 2000)

3.4 Policy framework and production conditions

Public policy incentive activities fare divided into a) general policy actions provided to business activities without sector specific orientation and b) forest industry specific policy activities below.

Policy activities & financial support for entrepreneurs and business firms

Public support to business firms in general and entrepreneurship in particular comprise an extensive system of subsidies aimed to:

a) new entrepreneurship (start-up) including also start-up aid for the unemployed who start new enterprises;

b) increased employment (regional equalisation) including support for hiring unemployed persons;
c) constituting new international activities (export) and partnership in carrying the business risks of foreign operations;
d) develop new innovations and/or technologies (R&D).

These subsidies favour SME's but all business firms are in principle eligible applicants to these subsidies.

The majority of these subsidies are implemented through a regional network of regional centres. The Ministry of Trade and Industry, the Ministry of Agriculture and Forestry, and the Ministry of Labour have jointly combined their regional forces in the Employment and Economic Development Centres (TE Centre). Fifteen centres countrywide provide comprehensive range of advisory and development services for businesses, entrepreneurs, and private individuals. Their subsidies are aimed to:

- implement regional labour policies;
- plan and organise adult training within the official labour policy framework;
- promote and develop farming and rural enterprise activities;
- influence and participate in regional development in general;
- provide grants for projects promoting energy conservation, improved energy efficiency and the use of renewable energy sources;
- provide subsidies paid for transportation of products manufactured by SMEs located in Lapland, Northern Ostrobothnia, Kainuu, North Karelia and South Savo;
- provide support and advise to SME's at the various stages of their life cycles a) to economic development in general, business policy objectives and employment by means of corporate financing b) to assist the acquisition of fixed assets.

Public subsidies to promote technological development

TEKES (the Finnish National Technology Agency) allocates national funds into research in technologies of strategic importance. TEKES provides financial support to the companies participating in projects, that bear high technological and business risks. Research activities in key technologies are organised in research programmes. TEKES activities are implemented within the framework of operation of the regional TE Centres (Employment and Economic Development Centre).

Public support for international activities

The TE Centres are a significant specialist and contributor of EU funding. Each TE Centre also develops and channels EU co-operation and funding in its own area. Finnvera is a national public institution providing loans and guarantees for business development and growth as well as export credit guarantees for covering against credit risks of exports. NOPEF (Nordic Project Fund) grants favourable loans to Nordic companies for their feasibility expenses of the export or internationalisation projects. The projects must be located outside the EU and EFTA countries.

The forest sector innovation system

Forest sector innovation and R&D activities have been in the public policy agenda in the form of specialised projects from the 1990s onwards. These activities, started through independent projects, have gradually developed into the activities with

accompanied permanent networks of R&D and educational institutions. The major stages and projects to support WPI are presented in the Figure 6 accompanied with the organisations managing the administration.

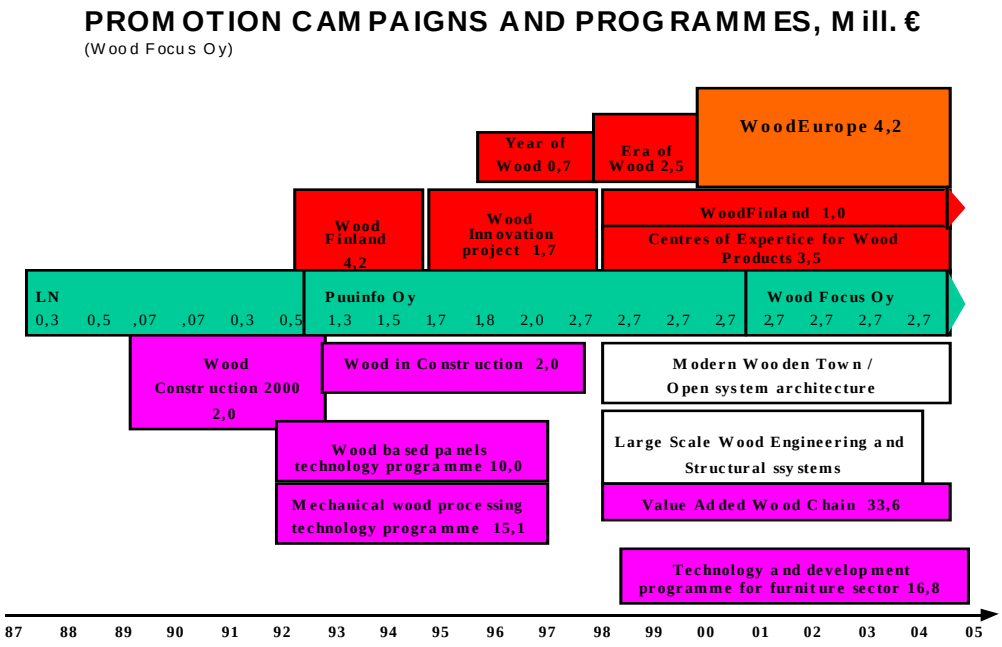

Figure 6. Promotion campaigns of wood production in Finland.

The Finnish government focused particular attention to support and develop the wood construction in Finland. During the first stage, 1990–1995, the first programmes, Puu Finland, Wood Construction 2000, and other separated projects concentrated on separate commercial activities. One of the aims was to formulate a separate sector of "wood construction" among the diversified wood sector SMEs. Major interests were aimed to develop businesses around end products. (Details of the programs see Annex C)

The economic integration in Europe and growth of international competition in general during the second stage of programmes in 1995–2000 caused policy reactions related to the SMEs of wood industry. New programmes, Wood Innovation, Era of Wood, Wood in Construction and the first phase of WOOD WISDOM (1998-2001) were directed more on R&D issues. (Details of the programmes in Annex C)

The National Technology Agency of Finland launched a five-year technology programme in 2003 named Value Networks in Construction (SARA) with an estimated total budget of 33 million euro. Using information technology and managing customer needs, the programme aims to achieve substantial productivity and quality improvements in the Finnish real estate and construction cluster, so that it can become more competitive in the world market. The programme supports efforts to develop product concepts and knowledge intensive services for the building construction industry.

The Establishment of Centres of Expertise for Wood Products/Wood Finland action programme networks in 1999 provided an arena for R&D institutions and companies to develop new R&D projects with extension activities (For details see Annex C).Under development between governmental parties (Ministries) and wood product industries there is a new economic development programme for wood product industries starting in 2005 that will co-ordinate the future organisation of R&D programmes.

3.5 Conclusions: Supporting and impeding factors for enterprise development in wood processing industries and barriers to entrepreneurship

Wood processing industry has constituted slightly smaller proportion in the industrial use of roundwood than that of pulp and paper industry in Finland. Large multinational corporations, having their core business interests in the pulp and paper industries, produce almost all wood based panels and about half of the total annual sawn timber production in the country. In addition to these, there are also a) large export oriented family companies, producing about a quarter of the annual total sawn timber production and b) family owned SMEs with properties below the limits of group a) in sawn timber production. Over half of aggregated industrial sawmill production is exported and mainly sold to European countries. Almost half of firms in the group b) operate in the domestic markets. There are SMEs in planing and secondary wood processing industries. The business activities in secondary wood processing comprise (i) the manufacture of prefabricated wooden houses, and (ii) joinery, including windows, doors, casing, stairs, handrails, roof trusses, flooring etc. One third of the total production in wood houses, doors and parquet is exported. Less than 9 large firms in the group i) and in the subgroups of doors and parquet in ii) cover 80% of the total production in these sub industries concerned. These large firms have their major interests in international markets. Business activities of SMEs focus on the demand segments providing only satisfying level of yield and the interests on the entrepreneurship cover self-employing and social interests in majority of the cases.

The gross value of Finnish wood product industries has more than doubled in twenty years but the profitability has still been equable or in deficient level in many sub-sectors of wood processing industries. Outsourcing and focusing on core competencies has delayed by the lack of qualified potential subcontractors. There are only few examples of horizontal integration and networking among SMEs. There are a few successful examples of partnership sub-contracting between component producers and e.g. large furniture chains. These SME producers can be assessed to aim at economies of scale in production, leaving product design and marketing efforts to the client. There is high threshold to entrepreneurship and expanding business, irrespective the extensive subsidies to new entrepreneurship, innovations and heavy public investments into various R&D programmes. Owners of small companies have received vocational training that is most frequently addressed to wood engineering.

Pricing of roundwood has been based more on competitive markets from 1999 after market information produced by independent institutes has increased competitive features of the roundwood market. Competitive roundwood markets can impede the price /quality ratio for the SMEs dependent on the high-grade wood raw material. Expansion of effective markets due to the enlargement of EU may cause threats especially for Finnish sawmill SMEs but on the other hand, it may also mean

opportunities for innovative high quality special products with competitive price/quality ratios.

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Annex C

1 Statistical Information

The exact number of companies in the branch of wood-processing industries is difficult to assess both because of the characteristics of industries and statistics. The data is not always consistent and detailed enough for profound analysis. Taking these facts into account, the aim of the chapter is to give as good general view as possible of the Finnish wood-processing industries with a special effort on emphasising on the small and medium size enterprises (SMEs). The focus is on following industry branches: sawmilling; pulp, paper and printing; plywood; board producing; carpenter industry; furniture fabrication; and wood contracting.

The data used is classified according to TOL-2002 and received from StatFin dataservice. It follows the European statistical classification NACE (StatFin 2004). The information gathered is mainly based on the following classes: TOL 02013 (Timber harvesting, woodchip producing in forest, and timber transport in forest), TOL 201 (Processing timber by sawing, planing and impregnation), TOL 202 (Fabrication of wood based panels, e.g. veneer, chipboard, fibreboard), TOL 20301 (Wooden buildings made either on industrial or craftsmanlike basis), TOL 20309 (Carpenter products, e.g. doors, windows, and stairs), TOL 21 (Producing pulp, paper, and making refined paper products, e.g. wallpaper), and TOL 361 (Furniture made of wood and other material). The information presented is based on the number of business units, not the number of companies.

In case detailed information of the TOL-classes was not available, the data was gathered at broader, 2-digit level (TOL 02, TOL 20, TOL 21, TOL 36). The regional and country level information from StatFin dataservice are annual averages from years 2001–2002, country aggregates are annual. When applicable, the information received from StatFin dataservice is complemented with other sources.

2 R&D activities in Wood Processing Industries

The Value Added Wood Chain -technology programme 1998–2003 was launched by the National Technology Agency (Tekes). The programme's purpose was to increase the use and value added characteristics of Finnish wood products and promote international co-operation in wood processing and related industries. A total of 206 new projects were started with value of 51.4 million euro (24.5 million euro public finance support). The "Vision 2010" was launched so that by the year 2010, wood would be the leading material for building system solutions and high-quality home and office furnishings in Europe. (Tekes 2004).

The Wood Wisdom Forest-Cluster -research programme stage I was carried out 1998–2006, as a part of the Finnish government’s additional R&D funding scheme with the aim to strengthen the country’s industrial clusters to 1) promote the competitiveness of the Finnish forest cluster, 2) to train specialists in market-driven production and processing wood raw material. The first phase joined the resources of the entire production chain to fulfil the customer's requirements for the end product. It covered both pulp and paper production and mechanical wood processing from end product to raw materials. The first phase of the programme was co-funded by the Academy of Finland, the Ministry of Agriculture and Forestry and the Ministry of Trade and

Industry. Stage II launched in 2003 consists of sub-programmes: a) Wood Material Science to transfer new knowledge and technology from its producers to the users b) International Wood Material Science Programme to establish a sound knowledge base in order to enable the development of innovative forest-based products and to add value in the wood products industry. The programme includes a Finnish-Swedish joint programme to fund organisations to expand the co-operation to the European level and even beyond that to North America and Japan. (WoodWisdom 2005).

3 Organisations & institutions related to R&D activities

The Finnish Timber Council and Finnish Wood Research Ltd. merged into Wood Focus Finland at the end of year 2000.

Wood Focus Finland is a promotion and research organisation of wood industry and trade. It's shareholders are forest industry companies and co-operational companies. http:// www.woodfocus.fi

The Centre of Expertise for Wood Products is an umbrella organisation that takes a market-oriented view of the forestry and wood products business chain. It provides precisely customised, high-quality expertise for R&D projects in various fields. Nominated for the period of 1999–2006 and coordinated by Wood Focus Finland, the Centre of Expertise for Wood Products is part of the national Centre of Expertise Programme. It works in a close co-operation with the Wood Wisdom Research Programme and WoodFinland action programme.

Fields of Expertise with the coordinating organisations:

- Modern Wooden Town and Structural Systems (University of Oulu / Department of Architecture / Wood Studio),
- Large-Scale Wood Engineering and Structural Systems (Tampere University of Technology),
- Living With Wood and Design (University of Art and Design / Department of Design), Diversification of Wood Utilisation (Finnish Forest Research Institute / Joensuu Research Centre),
- Business Based Development of Technology (Lappeenranta University of Technology), New Business Concepts (University of Vaasa / Levón Institute), and
- Developer Forum (Helsinki University of Technology / Department of Forest Products Technology).
- About 60 Finnish research and development units (universities, polytechnics and other organisations) are networked in co-operation. *http://www.puuoske.com/*

The Wood Finland action programme is a nationwide umbrella for regional programmes aiming to develop SMEs specialising in wood products. The network consists of 18 regional representatives in charge of implementing local strategies by activating companies to conduct spearheading development projects. The desired trend is towards more effective development work and a stronger focus on international projects. http://www.puuoske.com

Education and training institutions:

- University of Helsinki, Faculty of Agriculture and Forestry: Programme of Forest Ecology and Forest Resources Management, University of Joensuu, Faculty of Forestry: Programme of Forest Economics and Marketing
- Degree Programmes in Polytechnics: Häme Polytechnic, Kymenlaakso Polytechnic, Mikkeli Polytechnic, North Karelia Polytechnic, Rovaniemi Polytechnic, Tampere Polytechnic, Seinäjoki Polytechnic, Yrkeshögsskolan Sydväst. Upper Secondary Level Education

Extension services:

- Vocational Adult Education (non degree) Many secondary and tertiary level institutions arranging separate courses
- Supplementary education programmes arranged by some universities and polytechnics
- Other institutions arranging adult education (extension) for forestry professionals and forest owners
- The Forestry Development Centre TAPIO, Forestry Centres, Local Forest Management Associations, Pellervo-Institute, Work Efficiency Institute (TTS).

Consulting and guidance

R&D by technology departments of Economic Development Centres, industrial secretaries (teollisuussihteerit), National Technology Agency of Finland, VTT Technical Research Centre of Finland, Design Forum Finland, the National Board of Patents and Registration of Finland, Foundation of Finnish Inventions, Foundation and innovation agents, Finpro, Euro Info Centre, Chambers of commerce, Programme consulting units of Ministry of Trade and Industry, Finnish Standards Association SFS, Invest in Finland Bureau. (PK-yrityksen kehittämis- ja rahoituspalvelut 2000)

4 Case study: In search of customer orientation by new business concepts - *Lessons from four cases in mechanical wood processing industry*

Customer orientation is among the most important means to increase the value-added of SMEs in mechanical wood industry in Finland. It is a source of competitive advantage of firms and a necessary requirement for export activities. Typical wood processing industry SME in Finland is less proactive, has quite traditional practices and is product-oriented. Four examples below characterise the types of customer orientation in Finland.

The focal small firm – a supplier- firm, following business concept called **cost efficiency, is managed by its owner who has systematically developed the concept** for years. The furniture industry firm has concentrated mainly on a single product (a kitchen table) and the main customer is a large international furniture store chain. The supplier has concentrated on producing one product cost efficiently, and thus, the price of the product is competitive in the global market. The case proves that even a small firm can work cost-efficiently provided that it has only one or a few customers.

The firm applying business concept **building a brand** strives to create something that is unique, desirable and valued by the customers by product differentiation. Building a brand is also a demanding business concept because it is built on customer relations in the long run. The focal mid-sized company has focused to become an international brand in massive wood house industry. Its core competences are in processing mass

wood and in international marketing. It has outsourced most of its component production to small firms and the outsourcing is increasing also in the design activities. The logistic chain is well developed from component building to house and yard building. All the suppliers and subcontractors are encouraged to become top performers in their field and they should be initiative and seek better solutions to the problems of the core firm in building the international brand.

Network of firms applying total delivery concept as a group has established a joint marketing company that is responsible for marketing, logistics and production control of the processes of partners. The joint company can co-ordinate some production activities of the firms increasing market power over that of individual companies. The sales company thus has the role of a larger supplier of total furnishing systems. Part of the founders´ production was marketed by the sales company, part was sold through their own distribution channels. However, some problems are imminent in building this kind of concept. The new company requires extra investments and therefore the partners´ business should rest on a solid economic foundation. Total delivery concept produces more value-added to customers because of total systems deliveries, lower transaction costs (fewer relationships), the founders´ access to markets became easier and finally, the joint sales company helped the partners to concentrate on their core production and design competences.

A group of small firms in mechanical wood processing industry applying **reciprocal concept** have produced value-added to their customers through a large, nation-wide distributor. Small firms have joined to the network of the core firm as producing partners. The distributing core firm search markets for the small firms´ products and combine small producers´ tailor made products to meet its own customers´ special needs. The relationship between small firms and the large distributor is reciprocal; all partners gain benefits, they can concentrate on their core competences and the total system produces value-added, tailor-made solutions to customers.

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4 Non-wood forest products and services

Commercial production of non-wood forest goods and services (NWFP&S) is inferior activity compared with the other forms of forest resource use. However, there are regional variations concerning significance. The entrepreneurship related to NWFP&S can be divided to producing commercial goods and non-commercial utilities mainly services. The most of non-commercial environmental services (mainly biodiversity related or restoration of recreational areas) are produced and consequently paid by governmental authorities. Entrepreneur occupying private land area is in these cases often the landowner or forest professional.

4.1 General information on forest related non-wood products and services in Finland

4.1.1 Definition

In the Finnish context non-wood forest products and services (NWFP&S) include utilisation of various non-wood forest products, nature-based tourism, utilisation of reindeer and game populations, conservation of forest environment and recreational use of forest nature (Kangas & Naskali 2001). Furthermore, non-wood products can be divided into forest berries, mushrooms, wild herbs and other products. Good examples of these other products are tarn, tree sap and different kinds of decoration substances (e.g. lichen, salix species, moss). Economically the most important berries are lingonberry (*Vaccinium vitis-idaea),* bilberry *(Vaccinium myrtillus)* and cloudberry *(Rubus chamaemorus*). The most important mushroom species are chanterelle (*Chantarellus cibarius*), ceps (especially *Boletus edulis and B. Pinophilus*) and northern milk cap (*Lactarius trivialis and L. utilis*) (Luonnontuotealan teemaryhmä 2000).

In the field of nature tourism there are a lot of different terms of which some are not yet quite established. Mostly used terms are nature tourism, ecotourism, environmental friendly tourism, sustainable tourism and forest tourism. Nature tourism is tourism, where essential aspects are related to nature (Saarinen 2001). Forest tourism as a term refers to tourism, which aims to introduce different ways of using forests for forestry (Turunen 1995).

Reindeer herding is still an important source of livelihood in northern Finland, especially in northern Lapland. However, the cultural and social aspects of reindeer herding are becoming more important (Kangas & Naskali 2001).

The use of forests for environmental protection purposes aims to preserve biodiversity by controlling the human impact and maintaining esthetical values of forests (Kangas & Naskali 2001). Recreational use of forests is significant in Finland and it includes all kinds of non commercial outdoor activities in forests, e.g. hiking, skiing, bird watching and hunting (Pouta & Sievänen 2001, Liikanen et al. 1993).

4.1.2 Economical role of the NWFP&S in Finland

In Finland the economical role of the NWFP&S is still of relatively minor importance compared to the other forms of use of forest resources. However, there are regions where it is already significant and increasing rapidly. In general there are only scattered statistics concerning the NWFP&S and most of the existing figures are based on estimations.

Economic valuation of berry and mushroom harvest

Economically the most important NWFP botanical products in Finland are forest berries and mushrooms (Table 9). However, only 3–10% of the annual yield of berries and less than 1% of eatable mushrooms are collected during a season (Luonnontuotealan teemaryhmä 2000). The annual changes in the yields of wild berries and mushrooms can be significant.

Table 9. Examples of values of commercially used NWFP in Finland (Malin, A 2002 and 2003, Luonnontuotealan teemaryhmä 2000, Kemppainen et al. 2003.).

	Value of commercial utilisation, million €	**Year**
Wild berries	6.48	average 2002–2003
Wild mushrooms	2.52	average 2002–2003
Wild herbs	0.1-0.2	1999, estimate
Reindeer	13.2	season 2001–2002

Annually ¾ of berries and mushrooms picked for commercial use are coming from Eastern and Northern Finland, where the traditions of picking are strong. Most of incomes (80–90%) coming from berry and mushroom picking remain in the rural regions, which means a contribution of approximately 5–11 million euro to these areas (Malin 2001). Although berry picking gives additional incomes to 8–31% of the households in the area, this income is only 3–10% of their total annual income (Kangas 2001).

Approximately 35,000–50,000 persons participate in commercial berry picking annually. This equals 1500–2000 man-years. The food industry employs approximately 850 persons for their upgrading processes round-the-year (Table 10). Also the employing influence on other services supporting the activities of the NWFP sector (Ministry of Agriculture and Forestry 2002) have to be taken into consideration.

Table 10. Number of companies in the wild berry and mushroom sector in Finland (Ministry of Agriculture and Forestry, (MMM) 2002. Marja- ja sienialan erityistoimet - työryhmän muistio.).

Type of company	**Turnover, million €**	**Number**	**Employees**
Wholesales	< 0.17	250	250
Collecting companies	0.17-5	8	80
Small processors	< 0.17	300	400
Bigger processors	> 0.17	12	120
Total		570	850

Approximately one half of the berries and mushrooms picked for commercial use will end up being exported. The annual value of exports is approximately 8–17 million euro. It is difficult to estimate the total value, because e.g. the most important berry in export, lingonberry, does not have a CN-code. In addition, the influence of small exporters is not registered in the statistics (Ministry of Agriculture and Forestry 2002).

Innovative research has taken place during the last few years concerning different kinds of valuable substances found from e.g. bearberry *(Actostaphylos uva-ursi*), sundew (*Drosera* species) or from the seeds of cloudberry. These substances are used e.g. for medical or cosmetic products and therefore they provide a significant value added compared to the traditional use of the raw materials concerned.

Among other products originating from nature, e.g. lichen has some economical importance for the rural region. It is picked up for decoration purposes and mainly exported to Germany and Central Europe (Kangas & Naskali 2001). It has a special economical value as a secondary occupation in the western coast of Finland in Hailuoto and in the costal area between Oulu and Kalajoki. The value of the annual lichen yield (approx. 500,000 kg) was 1.5 million euro in 2002 (Finnish Statistical Yearbook of Forestry 2003).

Annually approximately 1.2 million Christmas trees are harvested in Finland, being mainly Norway spruce (*Picea abies*); about 500,000 of these end up for commercial trade. Only approx. 100,000 of sold Christmas trees are cultivated. It has been estimated that the economical value of Christmas tree trade is 7 million euro per year.

Economics of nature tourism

The regional economical role of nature tourism has become significantly more important over last few years. It is difficult to measure the economical and employing importance of nature tourism, however. In the national statistics nature tourism is a part of tourism in total. In some regions, where the subject has been studied more deeply, the share of nature tourism of total tourism has been remarkable (e.g. Rinne 1999).

The annual employing effect of nature tourism, including jobs in the nature tourism industry and jobs of the state and municipalities related to nature tourism, was 32,000 man-years in 2000 (estimation made by the Ministry of the Environment). Approximately 500 enterprises concentrate especially on nature tourism in Finland. 150 of them are small, operating on a seasonal basis. In addition to them there are approximately 2000 country holiday enterprises, which operate partly in the field of nature tourism (Ministry of the Environment 2002).

The incomes originating from nature tourism remain typically quite well in the rural regions. E.g. according to the visitor survey of Oulanka National Park, 70% of the money used in the region by domestic tourists remained in the area whereas in the case of foreign tourists the proportion was 50% (Honkala 2001). As a labour-intensive industry the employing influence of nature tourism is also significant. There is a need for local knowledge in the business environment and nature-based activities and for skills in recreation services, which encourages the tourism industry to employ local people. For example the tourist companies in the municipality of Kuusamo employed a total of 465 persons during the year 1997, of which 428 were registered as residents in the region (see Saarinen 2003).

The indirect economical impacts are more significant than direct incomes to tourism enterprises. 2/3 of the incomes benefit other businesses than the actual nature tourism entrepreneurs (Ministry of the Environment 2002). The increasing tourism also supports

the development of infrastructure and services in the regions, which is beneficial also to local people.

Economics of hunting

The total value of game bag in 2002 has been estimated to be 73 million euro, the most important species being the moose (*Alces alces*) (Finnish Statistical Yearbook of Forestry 2003). Recreational hunting is very popular in Finland and 300,000 Finnish people have a hunting permit (Finnish Statistical Yearbook of Forestry 2001). Most of the meat is used by private households. Only a very small fraction ends up to commercial use. The economical role of hunting becomes evident through recreational hunting and to some extent through hunting tourism. Hunters use annually approximately 118–130 million euro (Finnish Statistical Yearbook of Forestry 2001) to their hobby and this has influence on the rural regions. At the moment there are only few companies specialising in hunting tourism.

Reindeer husbandry

Reindeer herding has economical importance in northern Lapland. More than 70% of production (see Table 9) goes to further processing, which is a very high percentage compared to game or other products from nature (Kemppainen et al 2003). Reindeers are also used more and more in tourism and the image of reindeer and reindeer herding is very significant in marketing of tourism. There are approximately 1520 reindeer owners in Finland, among whom 690 are full-time reindeer herders (Finnish Statistical Yearbook of Forestry 2003).

Economics of in situ aesthetic values and nature recreation

The economical role of nature conservation areas in the rural regions can vary a lot. If the use of the area is strictly limited, the positive influence can be realised through the imago of the region. On the other hand, national parks, outdoor recreation areas and areas with rich biodiversity attract visitors to the area and their economical role can become quite important. It has been discovered that these areas are highly important for nature tourism (Kangas & Naskali 2001).

Traditionally the recreational role of forests has been significant in Finland. 97% of population go in for some kind of outdoor activity, of which the most are forest related (Sievänen 2001). Over a half of Finnish people pick up berries and approx. 40% pick up mushrooms as leisure activities (Matilainen and Aro 2002, Sievänen 2001). Also 25% of population go hiking and 40% cross country skiing. Approximatly half of Finnish people have a summer cottage of their own or owned by their family. The time spent in summer cottage is in average 31 days/year (Sievänen 2001).

4.1.3. Recent trends in the NWFP&S sector

Currently the value added of the NWFP sector is rather low and most of the turnover comes from wholesales of raw materials and semi-processed products. There are a few bigger companies in the wholesale, whereas more advanced processing takes place in smaller companies (see Table 10). The wholesale is more international, whereas the processing companies focus mainly on the domestic market. (Kangas 2001, Ministry of agriculture and forestry 2002).

The market environment of raw materials has changed significantly since Finland joined the EU in 1995. The economical competitiveness of Finnish raw materials has become weaker due to negative changes in the custom duties, which has increased import mainly from Eastern Europe and Asia. This has decreased the prices paid to natural product pickers and it has been suggested to decrease domestic supply in the future. Another parallel trend has been the ongoing mass migration from rural areas to big cities, which has decreased the number of potential pickers. As a result of this development, the improvement of value added is even more important. This has created a new challenge for the processing industry.

The number of bigger processors is rather low in Finland but the number of smaller companies has increased during the recent years, partly due to public development projects and funding available e.g. from the EU (Ministry of Agriculture and Forestry 2002). Especially the use of more special substances from nature has increased during the last few years and it has created new business opportunities to the NWFP sector.

It is becoming evident that the sustainable development of the Finnish NWFP will require more processed and more innovative products. The rising interest in the healthy, environment-friendly and ethical production among consumers has improved the potential of the NWFP sector and a part of consumers are willing to pay for these values. However, there is a great need for more deep information concerning consumer needs and behaviour when developing new successful products.

Finland has traditionally offered opportunities for nature-based recreational activities to tourists. During the snow-free season the activities have included backpacking, hiking, fishing and hunting and in the wintertime mainly skiing (see Kauppi 1996; Saastamoinen 1982). In addition, canoeing and boating have gained more importance than previously. During the last decade, the use of natural areas for tourism has experienced both quantitative and qualitative changes. Snowmobile trekking has become one of the most central and visible forms of the new nature-based tourism activities in central and northern Finland. Traditional Nordic cross-country skiing is, however, still economically the most important form of nature-based tourism activities in northern Finland. It has been estimated that in Lapland Nordic skiing alone brought approximately a total of 40 million euros of direct tourist income in 1998 (Lapin Matkailumarkkinointi, 1999).

The above nature-based tourism activities entail many characteristics that connect them to the rise of ‘new tourism’ in Finland. Recreation service enterprises offer especially snowmobile trekking, dog sledge safaris, mountain biking and canoeing/kayaking. They benefit from the use of wilderness and the related images and often tailor-make their products to meet the demands and needs of different customer groups. The tours utilise mainly official trails made in close co-operation with land owners and environmental authorities. With careful advance planning it is possible to reduce potential problems from intensive use of trails. The forms of so-called incentive tourism occupy also a large part of the demand of the recreation service enterprises.

Nature tourism has been typically a secondary occupation, partly because of its seasonal nature. At the moment there are some larger companies operating in the field especially

in Lapland. Bigger companies are usually situated especially near the biggest cities but also close to the significant nature attractions. During the latest years there has been a great interest to create and offer comprehensive service packages to tourists. This has increased networking and co-operation between entrepreneurs to a significant extent. Internationalisation is also an important challenge to the nature tourism sector (Elomaa et al 2003).

4.1.4 Laws and regulations related to the NWFP&S

Utilisation of the NWFP&S products is based mainly on the so called Everyman´s rights, which include the entirety of possibilities and limitations related to the use of nature. Everyman´s rights are based on the principle of public right of access to nature and on some laws and regulations related to the use of nature. It is a commonly agreed way of using nature. It is not an actual subjective right, because it has not been especially granted to anyone and there are no legal regulations to implement it. It can be called “right of public use”(Laaksonen 1999).

According to Everyman´s rights hiking, biking or skiing in the nature and picking up natural flowers, berries and mushrooms are allowed regardless of who is the owner of the area concerned. It is also allowed to ice fish, angle, boat and swim freely. Enjoying Everyman´s rights is free, including foreign people and no permit from the landowner is needed. However, Everyman’s rights do not allow causing any damage or disturbance in the nature. It is not allowed e.g. to kill or disturb animals, damage growing trees or collect moss, herbs or wood without the landowner’s permission. It is also forbidden to make an open fire or to drive with motorised vehicle without a permission or to disturb privacy by being too close to settlements. (e.g. Mäntymaa 1997, Laaksonen 1999, Finland's environmental administration 2004).

Fishing (excluding ice fishing and angling) and hunting require special permits. The legislation related to hunting includes regulations e.g. concerning the game species and hunting seasons. In addition, it specifies e.g. hunting methods and the principles of using game meat for commercial use (Suomen laki (Finnish Law): metsästyslaki 1993/615 metsästysasetus 1993/666). Hunters have to pass an approved hunting exam and for some species also a shooting test (Metsästäjäin keskusjärjestö (Central Organisation of Hunters), www.riista.fi 2004).

In some areas like national parks, recreation areas and nature preservation areas, there are limitations to the Everyman´s rights. The use of these areas is regulated by the environmental legislation. The Finnish environmental legislation covers various sectors of environmental protection. This legislation originates mainly from the 1980’s and 1990’s and it has been harmonised with the relevant EC-legislation (www.environment.fi 2004).

Everyman´s rights allow the collection of economically most important berry and mushroom species. However, collecting of many herb species and special products from the nature (e.g. moss and lichen) is not allowed without the landowner’s permission. Additionally, also a special disquisition can be required regarding the impacts of collecting the species (Luonnontuotealan teemaryhmä 2004, www.mmm.fi/luonnontuote). The regulations of eatable mushrooms list the mushroom

species, which can be picked for commercial use (Suomen laki (Finnish Law): ruokasieniasetus1981/871). To be able to pick up wild mushrooms or herbs for commercial use, the pickers are recommended to have a special certificate that proves that they are familiar with the legislation related to picking and have shown adequate knowledge in identification of mushroom or herb species. Byers usually require this certificate from their raw material suppliers.

The income from gathering wild cones, berries, mushrooms and other products used for human nourishment or for medical use is regarded as tax free in the income taxation of the pickers (Luonnontuotealan teemaryhmä 2000). However, the raw-material gathered e.g. for decoration use is not included in this definition. Therefore the income from products gathered from nature can be interpreted differentially in taxation depending on the final use of the raw materials concerned. This has caused some misunderstandings among the pickers. The pickers have to pay the reduced value added tax (VAT) on the income for all products picked up from nature, if the total annual income from sales exceeds 8500 euro. If the annual income exceeds 20,000 euro, the pickers have to pay the full amount of the VAT. The VAT percentage in Finland is 22%. There are few exceptions to this regulation (Luonnontuotealan teemaryhmä 2000).

Despite the Everyman´s rights, the landowner's permission is always required for commercial nature tourism whether the area is owned by a private owner, municipality, or state. Commercial use does no longer fit into the category of private and random use mentioned in the Everyman's rights (Laaksonen 1999). With regard to exploring the nature there are also other forms of legislation that enact and limit the use of nature for tourism, e.g. environmental legislation, legislation of cross-country transportation and legislation of outdoor activities. In addition to the actual legislation and regulations, there are lot of recommendations and codes of good practices related to the NWFP&S products. The most relevant of these focus usually on quality improvement.

4.1.5 Conclusions: Supporting and impeding factors for enterprise development in non-wood forest products and services production and barriers to entrepreneurship

Companies operating in the field of NWFP&S are usually quite diversified. In many cases it is vital to clarify the business strategies to develop and to stand out from the other companies: what is the core of the company´s business strategy, what do they offer and to whom? These questions lead to the need to better understand the different customer groups and their demands. The companies are usually small and therefore they should find suitable partners, including marketing and supplying channels, to fit in their own resources. Also networking with other companies is essential (e.g. Ryymin 2003, Ministry of Agriculture and Forestry 2002, Rutanen & Luostarinen 2000). In a small company it is not possible to divide the limited time and financial resources between too many sectors. Therefore a clear business plan and proper segmentation are even more important.

Potential customers groups of products of NWFP&S sector are mainly from urban areas. Because of this, the distance between companies and customers can be relatively long and most of the products are used outside of the production areas. Small companies alone do not have necessary resources for comprehensive marketing to bring their

products to the common awareness. In the tourism business there are already a lot of marketing organisations. To connect these to even better co-operation would provide more possibilities to obtain wider visibility and accessibility of the products (Ryymin 2003). In the NWFP sector building of a common imago has also been stated to be an important operation in the near future (e.g. Ministry of Agriculture and Forestry 2002, Matilainen & Aro 2002).

Forest berries and mushrooms are currently the major commercial NWFP botanical products in Finland. The sustainable supply of domestic raw material is the main challenge to the producers of NWFP botanical products. The profitability of picking e.g. berries has reduced rapidly and the yield variations can be remarkable. There is also a clear need for further research to find new effective operation models for the companies and to determine new innovative and valuable substances from natural products (Ministry of Agriculture and Forestry 2002). Development of the value added from the sales of raw material to upgrading is essential. Also the need for off-season activities should be resolved both in the NWFP sector and in the service (nature tourism) sector.

4.2 Case studies of successful marketing strategies

4.2.1 Bird watching, Finnature Oy Ltd (www.finnature.com)

Nature is the most significant tourist attraction in Finland (Ministry of Environment 2002). Nature tourism is increasing rapidly. At the moment companies operating in the field of nature tourism are usually small and have limited resources e.g. time and money, which can make it difficult to develop their products to meet the demands of urban, selective consumers. Domestic tourists are still quite capable of roaming through independently in the nature. Also Everyman´s rights and wide network of different kinds of recreation areas and national parks make it possible for them. The domestic customers are not yet accustomed of setting financial value to or pay for the merchandise utilised in nature tourism, like hiking in the forests or watching the wild life. The services bought from nature tourism enterprices are usually very basic ones (accomodation and catering services). However, by offering just the basic services the content of the nature tourism products becomes quite scarce, and wide range of opportunities offered by Finnish nature are not fully utilised.

The highly specialised programme services have been more succesful in the long run than the basic ones. **Bird watching** is a good example of these. However, for specialised products the domestic markets are not very widespread and therefore it can be difficult to find customer group big enough for economically sustainable entrepreneurship. Nevertheless, there are good examples of how these challenges can be overcome. One succesfull story is a company called Finnature Oy Ltd.

Box 1. Finnature Oy Ltd activities

Finnature Oy Ltd is a Finnish company specialised in nature-based tourism. The company was established in 1993 and employs at the moment around ten nature guides with expertise in birds, mammals, and plants. Tours are organised to Finland, northern Norway and Estonia, the focus being mostly on foreign clients arriving from outside Finland. According to the company, its success is based on top quality tour leaders and respect for wildlife.

The idea for this innovative company came to the entrepreneurs from their strong interest on bird watching as a leisure activity. At the beginning operating as an entrepreneur simply gave more possibilities to organise different kind of bird watching tours and made it possible to meet the increasing demand by customers for the guided tours. Already before establishing the company, the entrepreneurs had a strong knowledge on wild life, especially birds, which is an absolute necessity to operate properly in this business sector. During the first years the company form of Finnature developed from the company to limited partnership and further to limited company (Ltd), which gave the opportunity to the entrepreneurs to learn business skills along company development. The development of Finnature has mainly been financed by income financing. This has kept the company on sound foundation during different kind of development phases.

Since its establishment the company has had a very focused strategy based on clear segmentation of clients, good selection of marketing channels and advanced networking culture. From the very beginning Finnature has put a lot of effort to marketing research and has selected their potential customer group very carefully. The company made at very early state of their history the consious decision to target their products directly to foreign tourists. The products are targeted to well-off, strictly defined customer group, which has created a good opportunity to develop first class products for very demanding markets. The average customer of the company is a 65 year old, solvent person interested in the nature and coming from the UK or some other country of the European Union. This has been important for the company's learning process; by using this strategy, the company has been able to avoid the 'trap' of less developed domestic markets. Close co-operation with international travel agencies has been vital and provided valuable information about different consumer segments and their needs, including pricing. The tour development in co-operation with travel agencies has build up trust and commitment and as a result the company has outsourced most of all its marketing and selling activities to experienced travel agencies.

Being a very demanding and selective business partner, Finnature has created a well working business network where activities other than guidance are produced by its partners, including transportation, accommodation and food services. The outsourcing strategy was motivated by the avoidance of high risks of investments, but it has proven to be a successful way to proceed also from other points of view. Finnature has had the needed resources to concentrate on their special area of expertise: guidance and bird watching. Since there has not been a need to disperse their limited resources too widely, they have had a change to develop the high quality of their first class products with low investment level. They have managed to penetrate to the "first class tourism markets", which is usually very difficult for small companies. Finnature's tours utilise mostly state owned forests and national parks. Finnature has grown steadily and it aims to keep the size in which it is able to control the quality of services also in the future.

4.2.2 Birch sap, Oy Aurinkolehto Ltd (www.aurinkolehto.fi)

The utilisation of special products gathered from nature (e.g. tarn, tree sap, lichen, salix species, moss) is a very small- scale production in Finland. However, these products can offer a lot of new innovative business possibilities for rural areas, not yet fully utilised. They also can have a significant role in local economics in regional level (e.g. lichen). Typical problems for small companies operating in the sector are the lack of objective research information and low level of technology. Due to the lack of correct information the risk of failure increases and entrepreneurs are not willing to invest significantly in the companies. This along with low technology level leads to small production amounts, which is one of the main problems for e.g. in marketing and logistical solutions. Also finding the suitable marketing channels is typically one of the biggest barriers for

economical utilisation of specialised products from nature. In addition, sometimes there are problems with the raw-material supply and storage due to the collecting seasons.

Box 2. Oy Aurinkolehto Ltd activities

Oy Aurinkolehto Ltd has solved these problems by long term investments on research and development activities. Aurinkolehto is specialized in industrial production of birch (*Betula pendula*) sap. Bottled sap is used e.g. as refreshment, dietary and sports beverage as well as to accompany meals. Birch sap is a very special product and the economical role in national level is marginal. It is easily perishable raw-material and the collecting season is short during the spring time. Therefore it is seldom found in shops. However, by utilizing this special raw material combined with high production technology and specified marketing channels, Aurinkolehto has managed to establish a profitable company in a remote rural area. The company is a good example of innovative businesses in rural areas.

The company was established in 1996. The business idea was fixed after very analytic research on different kind of possibilities for successful entrepreneurship in rural areas. The main motivation was to find a source of livelihood, which would make it possible for the owners to move from urban area to the countryside. The owners did not have previous experience on birch sap, but they invested a lot of time to collect and analyse information widely, before making the decision to specialize in it.

The entrepreneurs have developed an innovative collection and production system for industrial-scale production of sap. This system also enables serial production, which makes it possible to produce sap in large scale necessary e.g. for export activities. The production capacity of Aurinkolehto's current equipment is approximately 150,000 liters per year. The raw material is gathered from company's own forests.

With this high technology innovation the company has solved the main obstacles to commercial use of birch sap. The unique technology also guarantees a long preservation time for birch sap bottles unopened in room temperature. Aurinkolehto's Koivu™ birch sap is 100% natural, without any additives or preservatives. Koivu™ birch sap has also a certificate of organic production of Finland and the EU. Most of Aurinkolehto's production capacity is exported e.g. to Japan, Korea and Central Europe.
The company continues to develop its technology and automation even further. In development work Aurinkolehto has utilized financing and developing services offered to SMEs by the Employment and Economic Development Centre, Finnvera and Tekes. In 2002 Aurinkolehto received the President's InnoFinland Prize as national recognition for their innovativeness.

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Annex D.

1. Organisations related to NWFP in Finland

NWFP&S products relate closely to many different industries. Therefore, there are also a lot of different kinds of actors in the field of NWFP&S. In addition, to the list below e.g. many polytechnic schools have development departments that may have development projects and other activities related to NWFP&S.

Over all in Finland the research related to products of nature as raw materials or the amounts of tourists in nature tourism destinations are quite widely studied. Also the environmental aspects have been in the centre of interest. Influences to rural economics and social and economical role to the regions are, on the other hand, not yet so well studied. Also there is no actual research material related e.g. on special products of nature.

Research:

Agriculture Research Centre, MTT
- research on e.g. natural ecosystems, environmental research, rural entrepreneurship etc.

European Forest Institute EFI
- conducts forest research, compiles forest information and organises meetings on a European scale

Finland's environmental administration (Ministry of the Environment, Regional Environment Centres, Finnish Environment Institute)
- works to promote ecological sustainability and the economic and social and cultural preconditions for achieving this sustainability.

Finnish Game and Fisheries Research Institute, RKTL
- produces high-quality scientific data about fisheries, game and reindeer.

Finnish Forest research Institute, METLA
- research on e.g. berry yields (annual estimates), multiple use forestry, estimating immaterial values of forests, recreational use of forests, tree breeding etc.)

Geological Survey of Finland, GTK
- research centre that provides geoscientific information and services essential for assessment of raw materials, environmental studies, construction and land use planning.

Kajaani University Consortium
- research, education, development e.g. on utilisation of products of nature, biotechnology of berries

Network University of Tourism
- research related to tourism, including sustainable development, ecotourism etc.

Tampere University of Technology
- natural fibres, research and experiments, wood information centre

The Archipelago Research Institute
- research is focused on Archipelago Sea- as well as Baltic Sea studies

The Plant Production Inspection Centre, KTTK
- supervises organic production of wild berries, mushrooms and other products from nature

Thule Institute
- an independent national institute for northern and arctic research

Technical Research Centre of Finland, VTT
- an expert organisation that carries out technical and technoeconomic research and development work

TTS Institute (Work Efficiency Institute)

- a research, development and training institute for agriculture, forestry, home economics and other related fields., products from nature, fiber plants

University of Helsinki

- especially: forest sciences, Foodcenter, faculty of food technology, faculty of pharmacy)

University of Helsinki, Institute for Rural Research and Training, UHEL SIRRT

- research and development projects e.g. on nature-based entrepreneurship, rural entrepreneurship

University of Joensuu

- research e.g. on multiple use forestry, forest scenery, products from nature

University of Jyväskylä

- research on e.g. peatland ecology, fishery, recreational use of nature

University of Kuopio

- research on e.g. ingredients of berries and herbs, biotechnology, rural economics)

University of Lapland

- research e.g. on nature tourism and rural development

University of Oulu

- research on regional development

University of Turku

- especially faculty of biochemistry, biochemistry in food sciences, Biocity

University of Turku, department of continuing education

- nature tourism, environmental aspects of nature tourism

Advisory and development organisations:

Forest Management Associations

- advisory organisation for private forest owners. Provides e.g. forest planning services. Offices around Finland.

Metsäkeskus (Forest Centre)

- provides information, consultation and education on forest related matters, mainly to private forest owners. Offices in every region around Finland

Rural Advisory Centre

- provides information, consultation to the entrepreneurs, tailor-made services in all aspects of rural business life. Offices in every region around Finland

The Women's Advisory Organisation for Development of Rural Areas

- nationwide organisation for advice directed at households and consumers, promotion of landscape management and small enterprises in rural areas

Non-Governmental Organisations:

Arctic Flavours

- association for Non-Wood Products in Finland. Promoting Finnish forest berries, mushrooms and herbs.

Christmas tree association

- promotes e.g. breeding and treatment experiments related to growing Christmas trees

Finnish Nature-based Entrepreneurship Association

- a national network, main tasks are to increase and improve co-operation between entrepreneurs and organisations, reinforce and increase a positive public image and to improve and increase quality and sustainability of nature-based entrepreneurship

Finnish Peatland Society

- a scientific society, aims to encourage the study and research of peat and peatlands in all aspects and to promote their sustainable and socio-economic use.

Metsästäjäin Keskusjärjestö (Finnish Hunters Central Orgnanisation)

- organise and coordinates hunting associations

MTK, The Central Union of Agricultural Producers and Forest Owners

- NGO, represents an industry that uses renewable natural resources in a sustainable and economical way. Takes care of various interests and living conditions of farmers, forest owners, rural entrepreuners and rural people.

Suomen Latu - The Central Association for Recreational Sports and Outdoor Activities

- produces, supplies and developes recreational sport and outdoor activities services, and related education, to municipalities, organisations, schools, societies and companies. Suomen latu also implements different kind of development and research projects related to nature tourism and recreational use of nature.

Wild Organic Product Industries' Association

- association promoting berry mushroom and herb industry

Others:

Berry- & Gardenknowhow-centre

- developing and training services for berry growing, horticulture and the food industry

Forest and Park Service, Metsähallitus

- administers the state's land and water areas e.g. nature parks and recreational areas. Also governs the protected areas in state´s land.

Foodwest Oy

- development and consulting organisation for food enterprises

Game management districts

- e.g. grant hunting permits, developers of game management

Jalasjärvi Vocational Adult Education Centre, JAKK

- development projects on upgrading of natural fibres (cotton crass, peat)

Pori Forest Institute, Porin metsäopisto

- compile statistics on mushroom and herb picking permits and inspectors of gathered products

Regional and multiregional tourist boards

- development projects related to nature tourism

The Finnish 4H federation

- in some areas acts as berry and mushroom supplying organisation

The Finnish Tourist Board, MEK

- works in close cooperation with and for the Finnish tourist and travel industry, implementing and financing marketing projects jointly with the industry. One of the joint goals is to develop more enticing, competitive products for tourists.

Wine Knowledge Centre, Viinitietokeskus

- development, research and training organisation, promotes upgrading berries and fruits

2 Information sources, statistical information

Statistical information related to NWFP&S is usually more or less hidden in general statistics. E.g. statistics concerning nature tourism are in official statistics a part of tourism in total. There are a lot of very small companies operating in the NWFP&S sector or NWFP&S sector maybe a secondary occupation for the entrepreneur. Therefore the business of these entrepreneurs is not usually compiled in official statistics.

Products from nature:

Suomen Gallup Elintarviketieto Oy

- statistics on traded berries and mushrooms (MARSI) annually.

Finnish Forest Research Institute, METLA

- research and statistical information about multiple-use of forests, yield forecasts for the wild berries etc.

Food Composition Database Fineli,

- database contains information for 290 nutrient factors and over 2500 foods of which half is mixed dishes

National Theme group of products from nature

- research and statistical (partly estimated) information related to products from nature

Pori Forest Institute

- statistics on authorised mushroom and herb pickers and inspectors

The Plant Production Inspection Centre, KTTK

- statistics on organic berries and mushrooms, amounts, picking areas etc.

Nature tourism:

Finnish Forest Research Institute, METLA

- research and statistical information about multiple-use of forests

Forest and Park Service, Metsähallitus

- statistics and research on users of national parks (amounts, some demographical information)

National Theme group of rural tourism

- e.g. statistics on utilisation rate of rural accommodation enterprises

The Finnish Tourist Board, MEK

- research and statistic information on tourism in Finland and towards Finland

Others:

Environmental administration (Ministry of the Environment, Regional Environment Centres, Finnish Environment Institute)

- statistics on nature protection areas, endangered species

Finnish Game and Fisheries Research Institute, RKTL

- official statistics on game and fish management. Statistics e.g. on game population, hunting amounts, the value estimations annually

Geological Survey of Finland, GTK

- estimations of peat resources, stone occurrences

Ministry of Agriculture and Forestry, MMM

- statistics on reindeer farming

Statistics Finland

- administratively under the Ministry of Finance, official statistics on entrepreneurship, employment, regional development etc.

5 Forests and ownership

5.1 State-of-the-art knowledge and historical development in the country on forest resources, forest ownership, forest production, wood procurement and employment in the forest sector

Forest resources and forest ownership

The information on Finland's forest resources is based on national forest inventories (NFIs), carried out by the Finnish Forest Research Institute (Metla) since the beginning of the 1920s. Finnish forests have been assessed nine times, and the field work of the 10th inventory was launched in the summer of 2004.

In recent decades, several forest programmes have aimed at increasing Finnish forest resources. The main focus in the 1960s was on increasing wood production, but in the 1980s and 1990s, non-wood values and uses of forests have emerged alongside with wood production as important guiding management principles. In the current National Forest Programme 2010, new issues (e.g. ecological, social and cultural sustainability) have received more attention than before (State of Forestry... 2001).

The total forested area (forest land and scrub land together) in Finland amounts to 23.1 million ha. In addition, there are 3.0 million ha of treeless and sparsely stocked waste land. Roads, depots, etc., occupy less than 0.2 million ha. In total, the forestry land area of 26.3 million ha covers 86% of the land area of Finland (Table 11).

Since the 1960s, Finland’s forest land area has increased by 1.6 million ha, primarily as a result of the drainage of peatlands and afforestation of agricultural lands, as well as of intensive forest improvement efforts. Consequently, the share of scrub land has been reduced. Mires, at present, account for 34% of forestry land, and their share is significantly higher in the northern part of the country. More than half of mires has been drained (4.9 million ha). No first-time ditching takes place any more. Instead, the focus is now on ditch-cleaning and supplementary ditching.

Since the late 1960s, the volume and increment of the growing stock have continuously risen (Figure 8). The total standing volume now amounts to 2049 million m³ over bark. In 1951–1953 (at the time of the third NFI), the corresponding figure was 1538 million m³. The volume increment of the growing stock is 83 million 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 annual volume increment exceeds drain by approximately 10 million m³ (Figure 9, Table 13).

In regard to the area of forestry land, 53% belongs to non-industrial private forest owners. The State owns one third of forestry land with most of the State-owned forests being located in northern Finland. The share of companies is 8% (Finnish Statistical... 2004).

Forest production and wood procurement

In recent years, roundwood fellings have remained at a very high level. In 2003, approximately 55 million m³ (over bark) of industrial roundwood was harvested from Finnish forests (cf. to the annual average of 43 million m³ during 1970–2002). In

addition to industrial use, some 5 million m³ of fuelwood is annually removed for domestic heating purposes.

Non-industrial private forests are the main roundwood source for Finland's forest industries. In 2003, they accounted for close to 47 million m³ (or 85%) of total fellings of commercial roundwood. Roundwood felling from the forest industries' own forests totalled 3.5 million m³, leaving the remaining amount of approx. 5 million m³ to be supplied from State forests. In the past few years, about half of the annual felling volume has consisted of logs and the other half of pulpwood (Figure 10) (Finnish Statistical... 2004).

Over 80% of the roundwood volume is harvested by forest-industry companies and by the Finnish Forest and Park Service (operating in State-owned forests), and the remaining one-fifth by non-industrial private forest owners, who engage in delivery sales. In standing sales, intense mechanisation has helped the forest industries to reduce their costs. The share of mechanised fellings is currently at the level of 96%. Multi-function harvesters, numbering about 1500, prevail in logging operations (Torvelainen 2003).

On the national scale, non-wood forest products and services are of marginal importance in comparison with income earned from roundwood sales. In 2003, gross stumpage earnings in roundwood sales were estimated at 1.8 billion euro. The overall value of the bag in hunting was estimated to be 76 million euro. The value of commercial wild berries and mushrooms collected from the forests totalled approx. 12 million euro (Finnish Statistical... 2004). However, much larger amounts are picked for direct household use.

Employment in the forest sector

The role of the forest sector as an employer has continuously diminished for several decades. At the beginning of the 1970s, the sector employed more than 200,000 persons, corresponding to close to 10% of the total labour force. In 2003, the figures were 89,000 and 4%, respectively. Of the sector's total of employed persons in 2003, three-quarters were employed by the forest industries, while about 22,000 were working in forestry (Figure 11).

The declining trend in forestry is mainly due to rapid mechanisation in timber harvesting. Less forest workers are needed to carry out manual work in felling and also in silvicultural works.

In the forest industries, due to increased automation, total employment has fallen from 120,000 (in 1980) to 68,000 in 2003, a decrease of 43%. This decline has occurred despite the fact that the production of sawnwood has doubled, and the production of paper has more than tripled since 1970 (Figs. 12 and 13) (Aarne 2004).

The employing effect of nature tourism and non-wood forest services has been estimated to grow rapidly. In 2000 the employing effect was around 32,000 man-years and it has been estimated that by the year 2010 it could be even 64,000 man-years. In commercially most important NWFP sector, forest berries, annually 35,000–50,000

people (1500–2000 man-years) take part in commercial picking. In addition, upgrading processes in berry business have been estimated to employ 850 persons round-the-year.

5.2 Forest resources

Area distributions, growing stock and increment

The land area of Finland totals 30.4 million ha, 86% of this is classified as forestry land. The area of *forestry land* (26.3 million ha) is sub-divided into *forest land* (20.3 million ha), *scrub land* (2.8 million ha) and *waste land, etc.* (3.2 million ha) according to the site productivity. The national definitions of the forestry land categories are as follows:

1) *Forest land*: Potential annual increment of the growing stock is at least 1.0 m³/ha.
2) *Scrub land*: Potential annual increment of the growing stock is less than 1.0 m³/ha, but at least 0.1 m³/ha.
3) *Waste land:* Unless naturally treeless, the annual increment is less than 0.1 m³/ha.

The total standing volume amounts to 2049 million m³ over bark. Almost 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 located in Southern Finland. The tree species structure of the growing stock has remained relatively stable for a considerable period of time. The proportion of pine is, however, slowly increasing (Table 13) (Forest Finland... 2003).

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 that in Northern Finland (66 m³/ha). The volume increment of the growing stock on forest land and scrub land amounts to 83 million m³. The mean increment on forest land is estimated to be 4.1% (Table 14) (Finnish Statistical... 2004).

Protected forests and forests under restricted forestry use

Maintaining forest biodiversity 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 million ha of land with restrictions on wood production. Strictly protected forests (forest land and scrub land) account for 1.7 million ha of this area. Most of these set-aside areas are situated in the northern part of the country (Finnish Statistical... 2003). In the last 25 years, the area of protected forests in Finland has increased considerably (Table 15).

Afforestation of agricultural land

Since the 1970s, approximately 240,000 ha of agricultural land have been afforested with State support. In 2003, only 2000 ha of arable land were afforested (Table 16) (Finnish Statistical... 2004).

5.3 Forest ownership

Of the total *forestry land*, non-industrial private owners possess 53%. The proportion owned by the State amounts to 34% and that by companies to 8%. The remaining 5% belong to municipalities, parishes, jointly-owned forests, etc. Contrary to other ownership categories, State-owned forests are mainly situated in Northern Finland, where the State owns 55% of the total forestry land. In Southern Finland, the

corresponding share is only 8%. It is also worth mentioning that the statutory nature conservation and wilderness areas are mainly located on State land in the northern part of the country (Finnish Statistical... 2003).

Of forest land, non-industrial private owners possess 61%, corresponding to 12.3 million ha. The shares of the other ownership categories are as follows: State 25%, companies 9%, and others 5%.

Regional differences in land ownership are clearly reflected in the distribution by ownership of the growing stock and, especially, of the annual increment. Although the State owns one-third of forestry land, its share of the total volume of the growing stock amounts to only 18%. The corresponding proportions of other categories are as follows: non-industrial private owners 68%, companies 9%, and others 5%. Of the annual increment, the share of non-industrial private owners is even more significant, being 70% (Figure 7).

Share and number of non-industrial private forest holdings

There are 445,000 non-industrial private forest holdings (>2 ha) in Finland corresponding to 10.5 million ha of forest land. Private forest holdings are relatively small: on the average, they cover 24 ha of forest land (holdings of over one hectare). Almost half of the number of holdings belong to the category having less than 10 ha of forest land. In recent years, middle-sized forest holdings (20–50 ha) have decreased in number, while the numbers of small and large holdings have increased (Finnish Statistical... 2003).

The right to collect and sell NWFP

Access to and recreational use of forests is free for all in Finland. Everyman's right bestows on all people a free right to use land owned by others to travel on foot, skis, bicycle or horseback, provided that they do not cause any damage. Other activities freely permitted on other people's land are e.g. picking wild berries and mushrooms (State of Forestry... 2001). In some areas e.g. natural parks and nature preservation areas Everyman’s rights are limited with other legislation. Hunting and fishing (excluded ice fishing and angling) are licensed by the state. In addition also landowners permit (usually chargeable) is required.

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Annex E

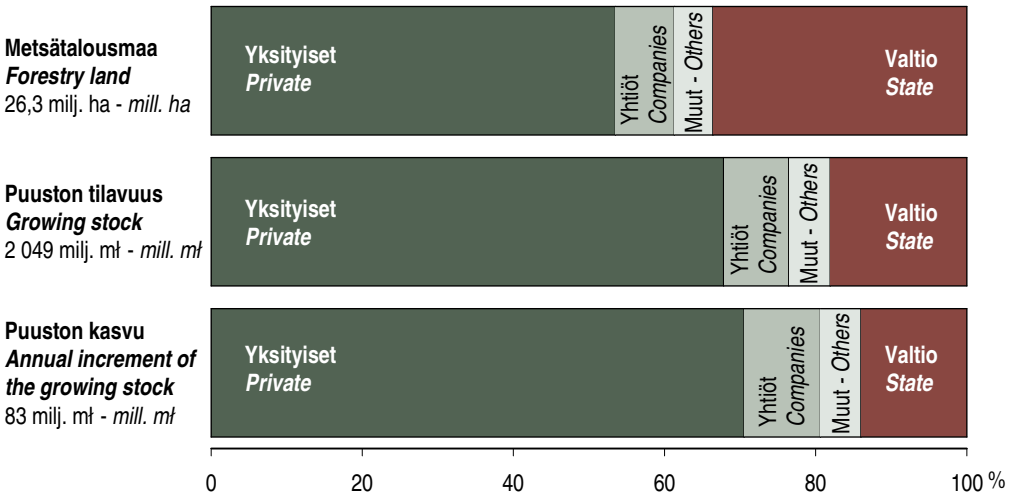

Figure 7. Forestry land, growing stock and annual increment of the growing stock by forest ownership category (Source: Metla, NFI).

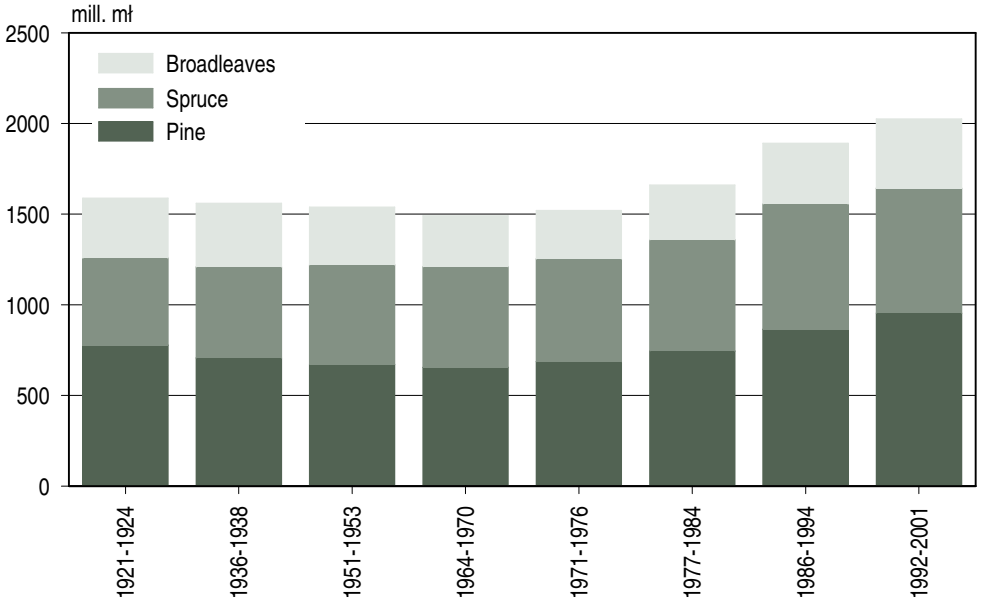

Figure 8. Growing stock volumes since the 1920s (Source: Metla, NFI).

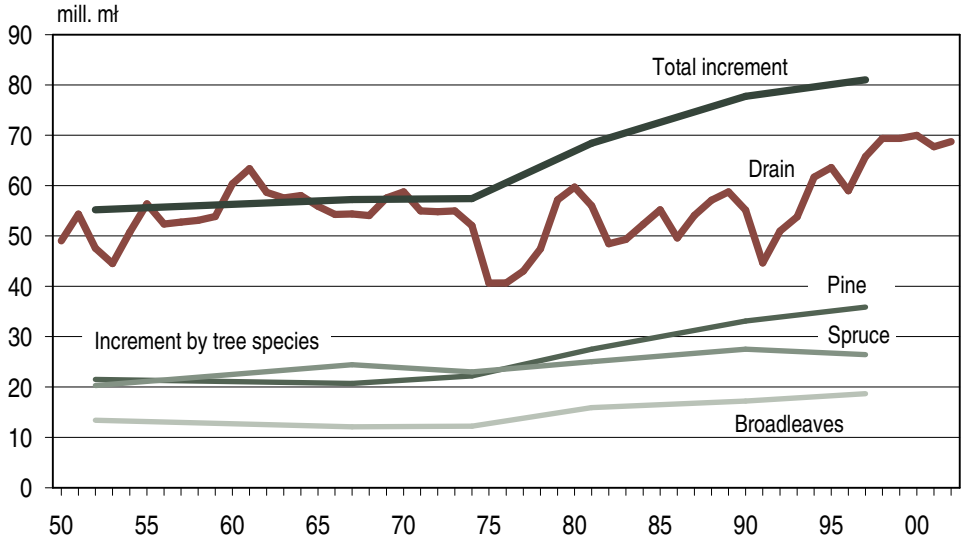

Figure 9. Annual increment of the growing stock and growing stock drain, 1950–2002 (Source: Metla, NFI and Forest Statistics).

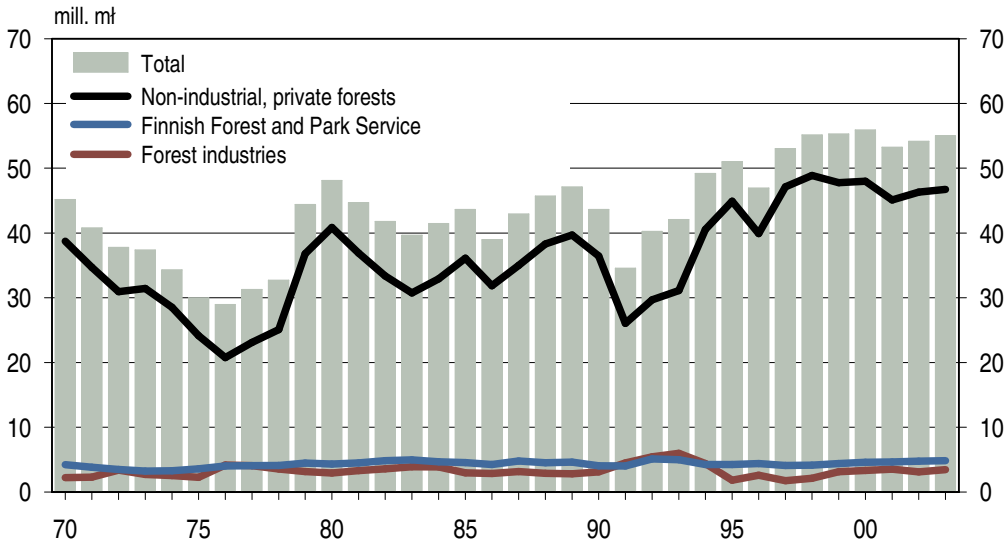

Figure 10. Commercial roundwood production 1970–2003, by forest ownership category (Source: Metla, Forest Statistics).

Figure 11. Persons employed in forestry, 1970–2003 (Source: Statistics Finland).

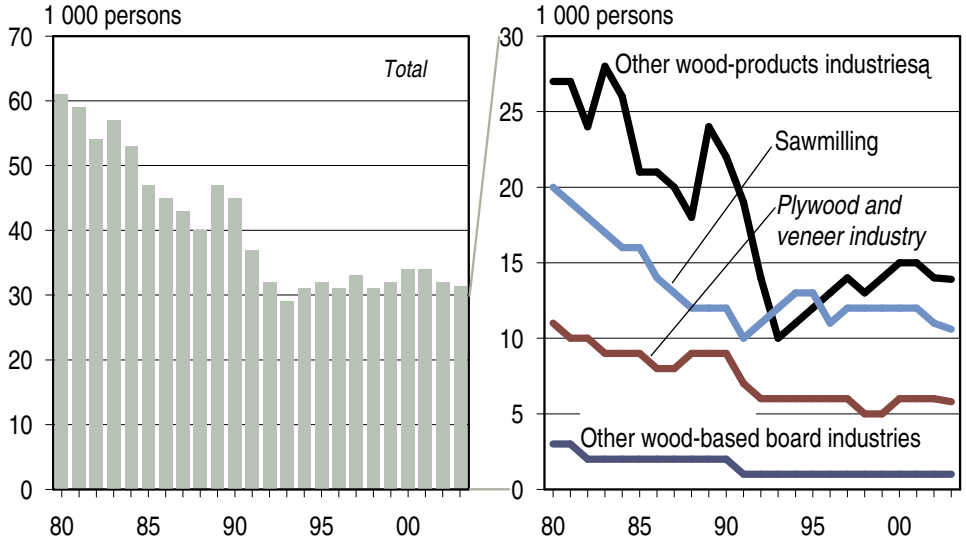

Figure 12. Persons employed in wood-products industries, 1970–2003 (Source: Statistics Finland and Metla).

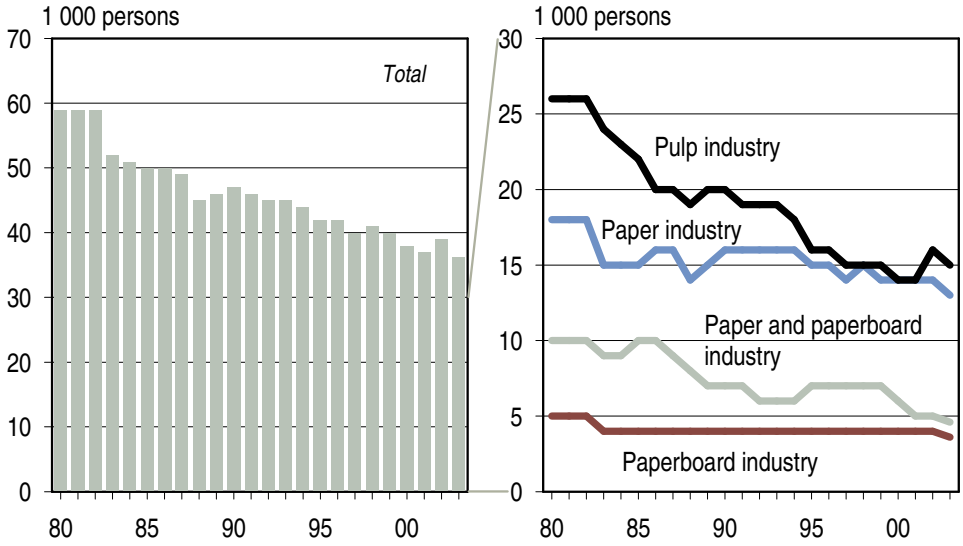

Figure 13. Persons employed in pulp and paper industries, 1970–2003 (Source: Statistics Finland).

Table 11. Finland's forest resources in brief (Source: Finnish Forest Research Institute, NFI)

	Unit	Forest ownership categories				
		Private	Companies	State	Other	Total
Total land area of Finland	1000 ha					**30447**
Forestry land	1000 ha	**14027**	**2041**	**8882**	**1327**	**26277**
Forest land	1000 ha	12334	1816	5089	1064	**20303**
Scrub land	1000 ha	960	115	1602	118	**2794**
Other	1000 ha	734	110	2192	145	**3180**
Growing stock	million m^3 o.b.	**1386**	**176**	**378**	**109**	**2049**
Pine	million m^3 o.b.	589	97	232	55	**973**
Spruce	million m^3 o.b.	519	50	85	33	**688**
Broadleaves	million m^3 o.b.	278	28	62	21	**388**
Annual increment of the growing stock	million m^3 o.b.	**58.2**	**8.3**	**12.0**	**4.4**	**82.9**
Pine	million m^3 o.b.	22.8	4.6	7.5	2.1	**37.0**
Spruce	million m^3 o.b.	20.9	2.2	2.4	1.3	**26.7**
Broadleaves	million m^3 o.b.	14.5	1.5	2.2	1.0	**19.2**
Growing stock drain	million m^3 o.b.					**69.9**
Pine	million m^3 o.b.					**28.3**
Spruce	million m^3 o.b.					**28.0**
Broadleaves	million m^3 o.b.					**13.6**

Table 12. Land use in Finland from the 1950s to the 2000s (Source: Finnish Forest Research Institute, NFI).

1000 ha

Land use	1951–53	1964–70	1992–2002
TOTAL AREA	33701	33704	33814
Total land area	**30540**	**30548**	**30447**
Forestry land	26315	26667	26277
Forest land	17352	18697	20303
Scrub land	4522	3674	2794
Waste land	4441	4226	3030
Roads, depots, etc.	..	70	150
Agricultural land	3965	3331	2822
Other	260	550	1354
Built-up areas	..	266	957
Transport routes, etc.	..	284	397
Inland watercourses	**3161**	**3156**	**3367**

Table 13. Growing stock volumes, 1992–2002 (Source: Finnish Forest Research Institute, NFI).

Part of the country/ Ownership category	Inventory	Pine	Spruce	Birch	Other broadleaves	Total volume	%
		million m³ o.b.					
WHOLE COUNTRY	**1992–2002**	**973**	**688**	**316**	**72**	**2049**	**100.0**
Private		589	519	222	56	1386	67.6
Companies		97	50	24	4	176	8.6
State		232	85	55	7	378	18.4
Others		55	33	16	5	109	5.3
Southern Finland	**1996–2000**	**583**	**558**	**206**	**60**	**1408**	**68.7**
Private		421	463	164	49	1097	53.5
Companies		76	44	18	4	142	6.9
State		50	22	12	3	87	4.2
Others		37	29	12	5	81	4.0
Northern Finland	**1992–2002**	**390**	**130**	**110**	**12**	**641**	**31.3**
Private		168	56	57	7	289	14.1
Companies		21	6	6	1	33	1.6
State		182	63	43	4	291	14.2
Others		18	5	4	1	28	1.4
Whole country, previous inventories (NFIs)							
NFI 1	1921–24	777	481	290	40	1588	
NFI 2	1936–38	707	502	295	56	1560	
NFI 3	1951–53	672	549	282	35	1538	
NFI 5	1964–70	655	555	244	37	1491	
NFI 6	1971–76	686	568	224	42	1520	
NFI 7	1977–84	745	613	249	53	1660	
NFI 8	1986–94	865	691	277	58	1890	

Table 14. Annual increment of the growing stock of forest and scrub land (Source: Finnish Forest Research Institute, NFI).

Part of the country/ Ownership category	Inventory	Pine	Spruce	Birch	Other broadleaves	Total	Mean annual increment
		million m³ o.b./year					m³ o.b./ha
WHOLE COUNTRY	1992–2002	**36.99**	**26.72**	**14.74**	**4.42**	**82.86**	**3.6**
Private		22.82	20.90	10.94	3.53	**58.16**	4.4
Companies		4.59	2.17	1.23	0.25	**8.26**	4.3
State		7.46	2.38	1.87	0.32	**12.04**	1.8
Others		2.12	1.26	0.71	0.32	**4.40**	3.7
Southern Finland	1996–2000	**23.30**	**22.90**	**10.14**	**3.83**	**60.16**	**5.2**
Private		16.24	18.98	8.09	3.14	**46.41**	5.4
Companies		3.58	1.92	0.93	0.22	**6.67**	4.8
State		2.06	0.89	0.58	0.18	**3.73**	4.2
Others		1.42	1.11	0.53	0.28	**3.35**	4.8
Northern Finland	1992–2002	**13.70**	**3.81**	**4.60**	**0.59**	**22.70**	**2.0**
Private		6.58	1.93	2.85	0.39	**11.75**	2.5
Companies		1.01	0.25	0.30	0.03	**1.60**	3.0
State		5.40	1.49	1.28	0.13	**8.30**	1.4
Others		0.70	0.14	0.17	0.04	**1.05**	2.2
Whole country, former inventories (NFIs 1–8)							
NFI 1	1921–24	24.8	15.4		14.3	**54.5**	
NFI 2	1936–38	22.7	17.6		14.0	**54.3**	
NFI 3	1951–53	21.5	20.3		13.4	**55.2**	
NFI 5	1964–70	20.7	24.4	10.3	1.8	**57.2**	
NFI 6	1971–76	22.2	23.0	10.0	2.2	**57.4**	
NFI 7	1977–84	27.5	25.0	12.8	3.1	**68.4**	
NFI 8	1986–94	33.1	27.5	13.1	4.1	**77.7**	

Table 15. Areas of protected forests and areas under restricted forestry use by land class, 2002 (Source: Finnish Ministry of Agriculture and Forestry, 2002)

Classification	Forest land	Scrub land	Total of forest and scrub land	Waste land	Other land classes	Total land area
				1000 ha *%*		
Category 1: Strictly protected forests	834 *4.1*	831	1 665 *7.2*	1 606	32	3 306 *10.8*
Category 2a: Protected forests where minor fellings are possible	79 *0.4*	19	98 *0.4*	16	2	116 *0.4*
Protected forests: Total of categories 1 and 2a	**912** ***4.5***	**850**	**1 762** ***7.6***	**1 622**	**34**	**3 422** ***11.2***
Category 2b: Areas under restricted forestry use	652 *3.2*	386	1 038 *4.5*	246	24	1 308 *4.3*
Total of all categories	**1 565** ***7.7***	**1 236**	**2 800** ***12.1***	**1 868**	**58**	**4 730** ***15.5***

Forest land: 20 153 142 ha, total of forest and scrub land: 23 023 206 ha, total land area of Finland: 30 459 382 ha.

Table 16. Arable land afforested, 1990–2003 (Source: Finnish Forest Research Institute, Forest Statistics Information Service).

Year	Hectares			
	Non-industrial, private etc.	Forest industries	State	Total
1990	8524	10	11	8545
1991	10439	14	4	10457
1992	17057	12	12	17081
1993	17683	1	4	17688
1994	8799	-	2	8801
1995	4131	-	6	4137
1996	9024	-	7	9049
1997	9293	-	10	9303
1998	7116	6	13	7135
1999	6153	-	10	6163
2000	5777	-	5	5782
2001	6008	-	1	6009
2002	2698	-	7	2705
2003	1952	-	4	1956

Table 17. The annual harvest of berries and mushrooms (Finnish Statistical Yearbook of Forestry 2003).

	Annual yield	Amount picked up	Amount picked for commercial use
	million kg	million kg	million kg
Wild berries	600–1100	40	10
Wild mushrooms	350–1000	2–10	0.2–1
Wild herbs	No estimations	No estimations	0.01

Table 18. Bogs of game and reindeer (Finnish Statistical Yearbook of Forestry 2003).

	1000 individuals	Meat	Calculatory value of the meat	Year of measurement
		1000 kg	1000 €	
Reindeer meat	106	2600	1100–1400	2002–2003
Wild game, moose and other artiodactylus	108	12120	59950	2002
Wild game, waterfowl	469	248	3797	2002
Wild game, grouse	315	189	2824	2002
Wild game, hares	258	501	2483	2002