

## Comparison of outsourced operations in wood procurement in Finland and Slovakia

Lucia Ambrušová and Juhani Marttila



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<b>Abstract</b> <p>The majority of wood procurement in Europe is conducted by forestry contractors. Thus, the conditions for contractor services vary significantly in different regions. The objective of this paper is to describe the outsourced operations in wood procurement in Finland and Slovakia.</p> <p>Forest machinery and timber haulage are driven mostly by small enterprises in both countries. However, the contractual relations differ significantly. In Finland, forest industry companies generally buy their timber as standing sales and arrange harvesting and transportation with different contractors. Forest harvesting contractors have been responsible for industrial roundwood harvesting for more than 40 years. The biggest customer groups are large industry companies and state forests.</p> <p>In Slovakia, fundamental changes took place in the forest sector in the early 1990s. Nowadays, forest owners typically sell wood to their customers and contract separately with contractors. In general, contractors try to offer as complex a range of services as possible (harvesting, silviculture, transportation, etc.). There are major differences in the amount of harvested timber and the structure in private holdings in these countries. Also, the level of mechanisation differs widely. Nearly all felling in Finland is conducted mechanically by harvesters. In Slovakia, most enterprises carry out manual harvesting operations.</p>			
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## Contents

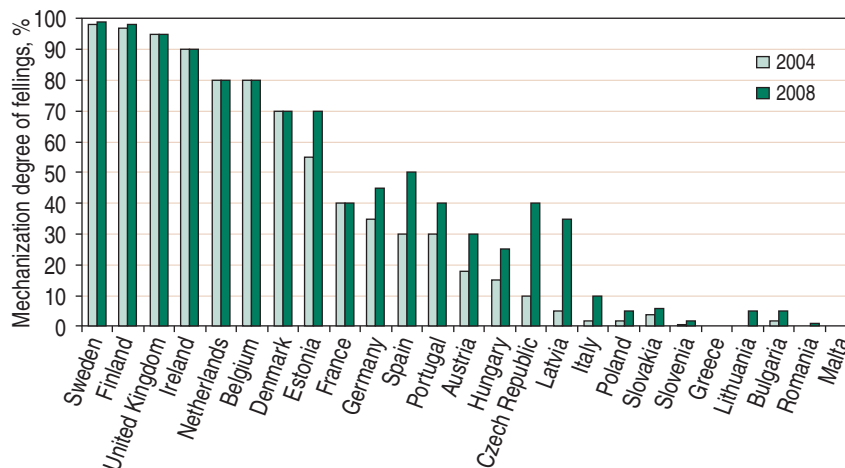
<b>Introduction</b> .....	5
<b>2 Overview of forestry</b> .....	6
2.1 General overview of the Finnish forest sector.....	6
2.2 General overview of the Slovak forest sector.....	7
<b>3 Wood procurement and timber harvesting</b> .....	10
3.1 Wood harvesting and procurement in Finland .....	10
3.2 Wood harvesting and procurement in Slovakia.....	11
<b>4 Characteristics of timber harvesting contracting</b> .....	13
4.1 Structure of the timber harvesting business in Finland .....	13
4.1.1 <i>Overview</i> .....	13
4.1.2 <i>Typical contractual relations</i> .....	15
4.1.3 <i>Harvesting agreement practices</i> .....	15
4.1.4 <i>Challenges in the harvesting business in Finland</i> .....	16
4.2 Business environment in Slovakian forestry .....	16
4.2.1 <i>Development of the harvesting business in Slovakia</i> .....	16
4.2.2 <i>Typical contractual relations</i> .....	17
4.2.3 <i>Harvesting agreement practices</i> .....	17
4.2.4 <i>Challenges in the harvesting business in Slovakia</i> .....	18
<b>5 Conclusion</b> .....	19
<b>References</b> .....	20

## Introduction

Nowadays, contractors related to forest operations conduct the bulk of harvesting work and timber haulage in Europe. Buying forestry-related services (such as felling and timber transportation) from forestry contractors is more profitable than owning the machines and hiring operators (Rummukainen et al. 2006). Forest operations in Europe are mainly carried out by micro, small and medium-sized enterprises (SMEs), which employ up to 250 workers. They are not owners of forest land or wood-processing capacities, but operate as service providers only (Bouriaud et al. 2011). These enterprises often act in rural and remote areas, emphasizing their importance to rural economies. A whole range of forestry services is provided by contracting companies; however, the main services offered include timber harvesting, silviculture operations, biomass harvesting, forest amelioration, timber transport by trucks, etc. (Paluš et al. 2010).

It is estimated that approximately 50,000 mainly small enterprises employ a workforce of about 250,000 people, who today form the bulk of the professional forest workers in European forestry. Contracting companies have different levels of mechanization, which vary among different countries in Europe (in 2008). In Nordic countries, almost all felling (98%) is mechanized, whereas in Western Europe, the level of mechanization is around 72%. The lowest mechanization degree is in Eastern Europe (about 3%), where enterprises still carry out motor manual harvesting and skidding of timber is often performed with farm tractors (Rummukainen et al. 2006, Bouriaud et al. 2011). However, the mechanization degree has increased rapidly in several countries (Figure 1.1).

Contractor services often differ significantly between different regions and countries as a consequence of the geographical, legal, economic, cultural and other conditions. They usually reflect the conceptions of national forestry policies, legal requirements and institutional framework for contract design and administration (Paluš et al. 2010). The objective of this report is to describe the working conditions of contractors in wood procurement and to define the differences and similarities between businesses and practices in Finland and those in Slovakia. Finland and Slovakia were chosen as target countries because the business conditions (for example, the structure of private holdings, amount of annual harvesting and degree of mechanization) differ substantially in these two countries.



**Figure 1.1.** Estimation of the mechanisation degree in the EU countries in 2004 and 2008 (Asikainen et al. 2009).

## 2 Overview of forestry

### 2.1 General overview of the Finnish forest sector

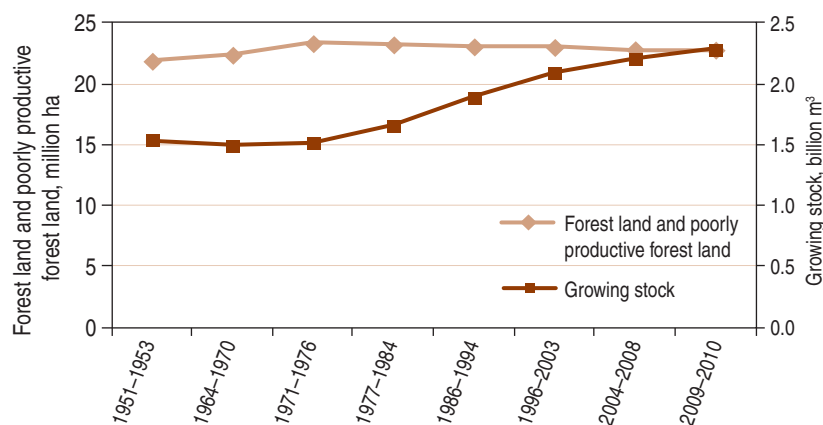
The total area of Finland is 338,424 km<sup>2</sup> and its land area is 304,149 km<sup>2</sup>. According to the national forest inventory, forestry land comprises 26,172,000 hectares and the total area of forest land and poorly productive forest land amounts to 22,777,000 hectares (Suomen metsävaratietoja 2012). This equals 75% of the land area, which is the biggest proportion in the whole of Europe.

The growing stock in forest stands is increasing (Fig. 2.1) and in 2011 it reached 2,305 million m<sup>3</sup> over bark. The average growing stock is 101 m<sup>3</sup> per hectare. The growing stock has increased steadily since the 1970s (Suomen metsävaratietoja 2012). The age structure is well balanced and the age classes 21–40 years and 41–60 years dominate on the country level. Especially in Northern Finland, the oldest age classes have great significance, as well (Finnish Forest Research Institute 2011). The total growth in 2011 was 104 million m<sup>3</sup> (Suomen metsävaratietoja 2012).

A total of 10% of the forest land and poorly productive forest land is protected. In 3% of the forest area, cuttings are allowed but forestry use is restricted. The rest of the forests (87%) are available for wood production. The great majority of protected areas are in Northern Finland and in state forests (Finnish Statistical... 2011). The proportion of protected forests has tripled in 35 years (Suomen metsät... 2012).

Conifers dominate in 80% of forests: the proportion of pine is 50% and that of spruce 30%. The remaining 20% consists of broadleaf species, mostly birch (17%) (Suomen metsävaratietoja 2012).

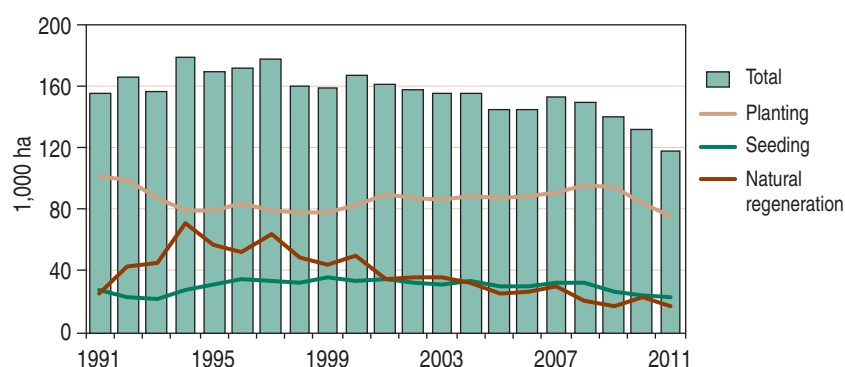
The structure of ownership and forest tenure is given in Table 2.1. A typical characteristic of forestry in Finland is the high share of private ownership. There are 375,000 forest owners who own more than 2 hectares of forests. The mean size of forest property is 30 hectares in this group, which includes private persons, partnerships, undistributed estates, etc. The total number of individuals in the group of forest owners is 737,000 (Leppänen & Sevola 2012). The mean age of forest owners has risen rapidly and was 60 years in 2009. A total of 55% of forest owners live in sparsely populated areas and 45% in population centres (Hänninen et al. 2011). The total gross stumpage earnings were 1.5 billion euros in 2011 in private forests and 0.3 billion euros in



**Figure 2.1.** Dynamics of the total area and volume of Finnish forests (forest land and poorly productive forest lands) in 1951–2010 (Finnish Statistical... 2011).

**Table 2.1.** Forest land by ownership and use in 2010 (Metinfo Forest... 2012). The category “public” includes the state, municipalities, parishes and other public corporations. The category “others” consists of jointly owned forests, foundations, etc.

Category	Ownership category				
	Public	Limited companies	Private	Others	
	forest land				
Ownership	ha	4,742,916	1,574,345	10,462,970	411,932
	%	27.6	9.2	60.9	2.4



**Figure 2.2.** Development of forest regeneration in Finland in 1991–2011 (Metinfo Forest... 2012).

public and company forests. The operating result was 1.1 billion euros in private forests (Metinfo Forest... 2012).

The total regeneration area has been around 150,000 hectares annually. The total extent of natural regeneration has decreased during the 2000s (Fig. 2.2). The total use of roundwood was 70.64 million m<sup>3</sup>. This figure also includes firewood in single-family houses and imported wood (Ylitalo & Aarne 2012). Roundwood imports amounted to 10.4 million m<sup>3</sup> and exports 1.3 million m<sup>3</sup> in 2011 (Peltola 2012).

The value added of forestry was 3.1 billion euros in 2010, and the sectoral contribution to the national GDP was in total 1.8% (Finnish Statistical... 2011).

## 2.2 General overview of the Slovak forest sector

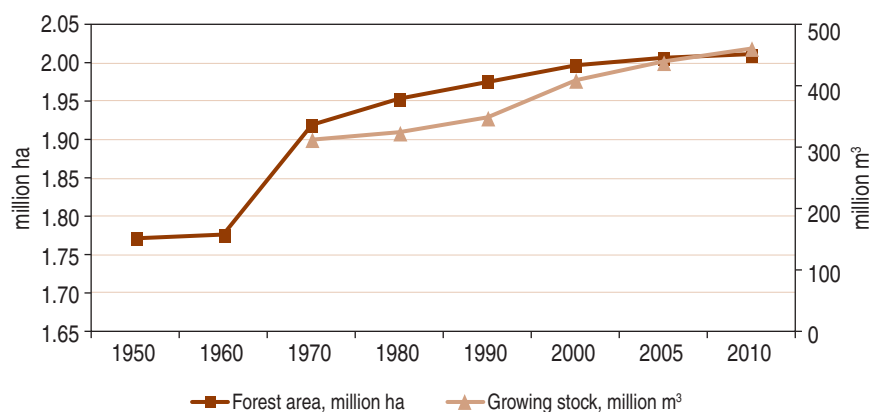
The Slovak Republic represents rather a small area (49,034 km<sup>2</sup>) but has extensive forest cover on the European level. In 2010, the area of forest land reached 2,010,817 ha, while in 1950 forest land covered 1,800,000 hectares (Fig. 2.3). Thus, Slovakia is becoming an increasingly forested country. In 2010, the forest area was estimated at around 41% of the total area (Green Report 2011, Slovstat 2012).

The growing stock in forest stands is increasing and in 2010 it reached 462 million m<sup>3</sup> of raw wood without bark. The average growing stock per hectare is 239 m<sup>3</sup>. The increase in the growing

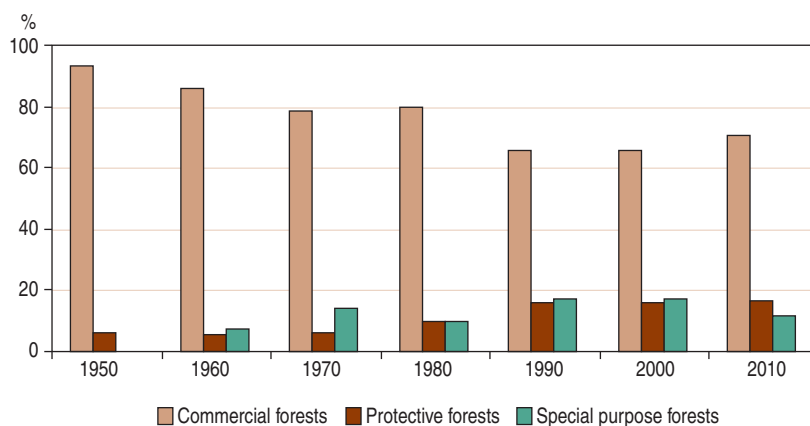
stock is mainly caused by the great share of 50- to 90-year-old forest stands, in which the growing process is fast (Green Report 2011, Slovstat 2012).

Slovak forests are classified into three categories according to their most important functions: commercial forests (71%), mainly producing timber, protective forests (17%) and special-purpose forests (12%), serving first of all non-productive, ecological and social functions, including soil conservation, watershed protection, biodiversity conservation and recreation (Forests in... 2009). Due to the increasing requirements for assuring the public functions of forests, the share of commercial forests is decreasing when compared with that in the past (Fig. 2.4). The area of protection forests and the area of special-purpose forests are increasing.

As regards the tree species composition, there is a long-term requirement for diversity of forest stands. Conifers cover 40% of forest land. The remaining 60% is covered by broadleaf species. Management preferences focus on the establishment of more resistant, biodiversity-rich mixed forest stands. The distribution of the main species groups reads as follows: conifer forests 31%, broadleaved forests 50% and mixed forests 19%. The most abundant tree species include beech (32%), spruce (25%) and oaks (11%).



**Figure 2.3.** Dynamics of the total area and volume of Slovak forests in 1950–2010 (Green Report 2011, Slovstat 2012).



**Figure 2.4.** Development of forest categories according to prevailing functions in Slovakia in 1950–2010 (Forests in... 2009, Slovstat 2012).



The structure of ownership and forest tenure is presented in Table 2.2. In 2010, the state subjects managed 55% of the total area of forests, but held property rights only to 41% of the area. State entities managed 14% of forests pending the restoration of ownership rights, forests of unknown owners and leased forests from non-state subjects (Green Report 2010). The average size of private holdings was 2.8 hectares in 2008 (Sarvašová & Kovalčík 2010).

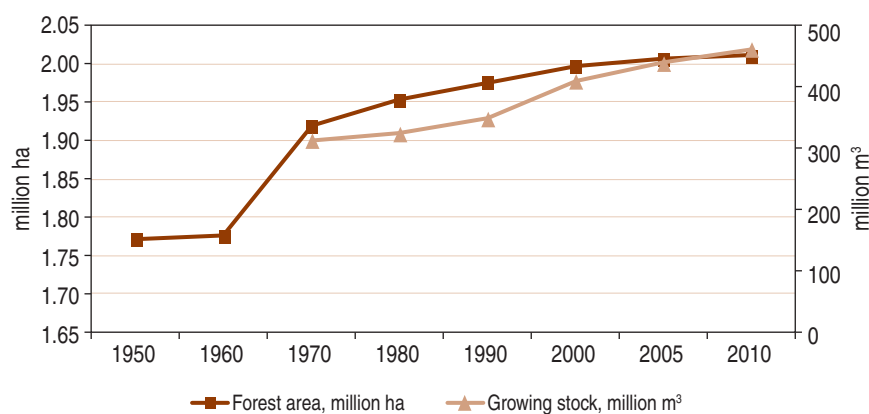
The category of non-state forests includes private, community, church, agricultural cooperatives and municipal forests (Green Report 2011). Non-state subjects who have legally settled their ownership rights own 50% of all forests in Slovakia. In the use of non-state subjects is 45% of total area of forests in Slovakia.

The total extent of both natural and artificial regeneration is decreasing (Fig. 2.5). Due to the application of the shelterwood method, the rate of natural regeneration has risen from 10% in 1995 to 39% in 2010.

Timber sales account for around 80% of the sectoral earnings and revenue. They represent the main source of funding for the sustainable management of forest resources and the retention of sectoral employment. The total timber sales earnings in 2010 were 220.22 million euros in the state sector and 156.66 million euros in the non-state sector. The operating result was 2.05 million euros in the state sector and 16.06 million euros in the non-state sector.

**Table 2.2.** Forests by ownership and use in 2010 (Green Report 2010).

Category	Ownership category							Unknown
	State	Municipal	Private	Community	Church	Agri co-op		
	Forest crop land							
Ownership	ha	793,168	181,013	239,030	484,057	57,031	5,514	179,091
	%	40.9%	9.3%	12.3%	25.0%	2.9%	0.3%	9.2%
Use	ha	1,074,278	175,645	124,167	531,301	27,969	5,544	–
	%	55.4%	9.1%	6.4%	27.4%	1.4%	0.3%	–



**Figure 2.5.** Development of forest regeneration in Slovakia in 1950–2010 (Green Report 2010).

A total of 8,916,000 m<sup>3</sup> of timber was supplied to the domestic market in 2010. Slovakia exported 2,564,000 m<sup>3</sup> of timber worth 187.5 million euros and imported 650,000 m<sup>3</sup> of timber worth 21.6 million euros. Of the imported volume, 36.1% was coniferous and 53.5% non-coniferous timber; the remaining 10.4% was fuelwood. In 2010, the sectoral GDP, given as a current price, reached 0.22 billion euros. The sectoral contribution to the national GDP was 0.33% (Green Report 2011).

### 3 Wood procurement and timber harvesting

#### 3.1 Wood harvesting and procurement in Finland

The amount of wood harvesting in Finland has remained at around 50 million m<sup>3</sup> annually during the 2000s. Harvesting dropped in the economic recession in 2008 but had already recovered the following year. Most of the timber comes from private forests (Fig. 3.1). The proportion of timber from thinnings increased during the 2000s.

The total amount of harvested industrial roundwood in Finland was 52.33 million m<sup>3</sup> in 2011. Altogether 11.40 million m<sup>3</sup> was harvested in public forests and 40.93 million m<sup>3</sup> in private forests. In total 46% of harvested logs and pulpwood was pine, 37% spruce and 16% timber from broadleaf species, mostly birch. The proportion of timber from private forests was 78% and from other forests (state, companies, etc.) 22% (Mäki-Simola & Sevola 2012). The annual wood sales amounted to approximately 150,000 (Väkevä 2012). In standing sales of private forests in 2010, a total of 62% of harvested wood came from final fellings and 38% from thinnings (Finnish Statistical... 2011).

In most cases, forest industry companies buy the timber as standing sales, i.e. wood buyers arrange logging and timber transport. These companies do not own machines, so they buy harvesting and transportation services from forest machine enterprises and timber truckers (Forest Facts... 2008b). Another form of timber sales is delivery sales. In this case, felling and timber transport are organized by forest owners, who can carry out these operations themselves or buy them as services from contractors (Rimmler et al. 2004).

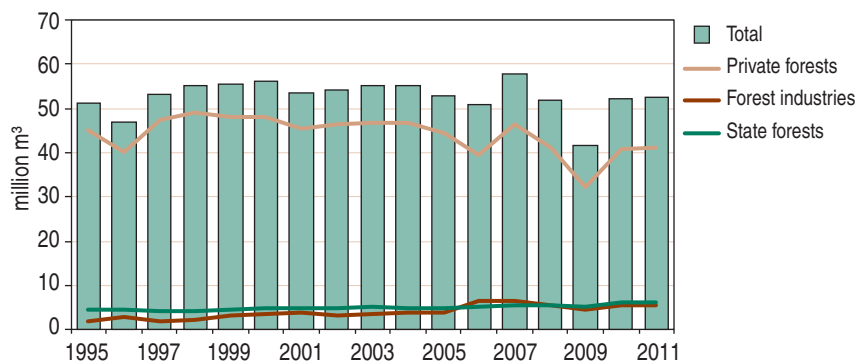
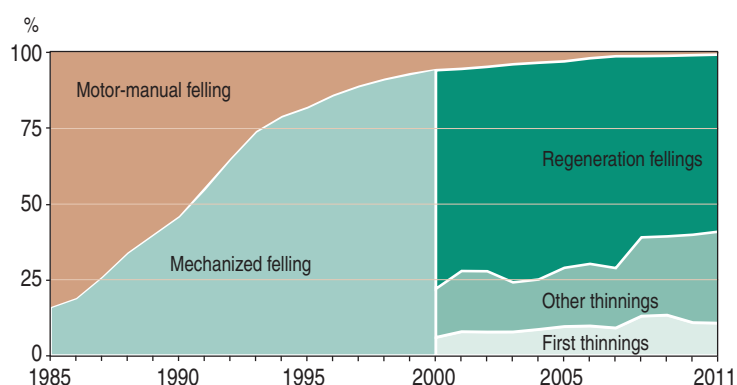


Figure 3.1. Wood harvesting in Finland in 1995–2011 (Metinfo Forest... 2012).

**Table 3.1.** Work volumes of wood harvesting contractors (Mäki-Simola & Sevola 2012).

Volume of felled timber	2007	2008	2009 Mm <sup>3</sup>	2010	2011
Total	57.74	51.69	41.37	52.00	52.33
from state- and industry-owned forests	11.38	10.64	9.32	11.33	11.40
from private forests					
felling carried out/organized by the contractors (standing sales)	39.11	32.59	25.47	34.46	34.59
felling carried out/organized by the forest owners themselves (delivery sales)	7.25	8.45	6.58	6.21	6.34



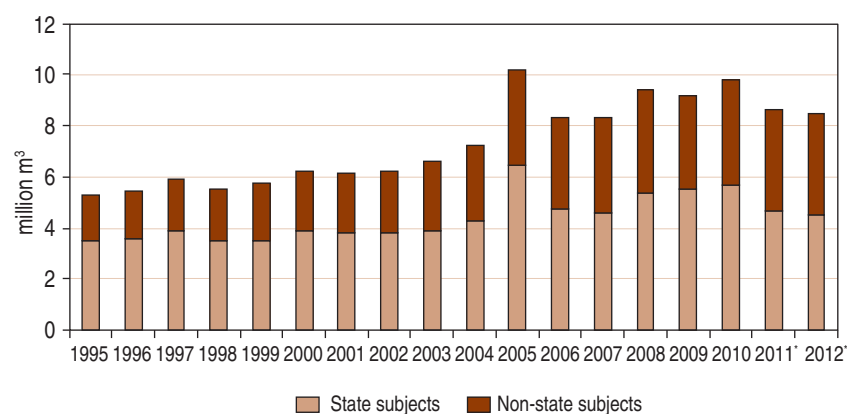
**Figure 3.2.** Development of felling methods in commercial roundwood production by the forest industries and Metsähallitus in 1985–2011 (Metinfo Forest... 2012).

The amount of harvesting carried out or organized by the forest owners themselves totalled 6.34 million m<sup>3</sup>, or 15% of the commercial roundwood removed from private forests (Mäki-Simola & Sevola 2012) (Table 3.1).

Nowadays, nearly all the felling in Finland is carried out mechanically using harvesters and forwarders (Fig. 3.2). Mechanized felling has gained popularity, especially at the end of the 1980s and in the 1990s (Finnish Statistical... 2011). The wood is harvested using the Nordic cut-to-length method, in which the trees are de-limbed and cut to assortments at the harvesting site (Forest Facts... 2008b). The majority of cuttings are made when the soil is frozen (Finnish Statistical... 2011). Thus, balancing the seasonal variations is an important development target in forest harvesting from the point of view of the utilization rate (Asikainen et al. 2009). Mechanized felling has increased the productivity of labour significantly.

### 3.2 Wood harvesting and procurement in Slovakia

The annual volume of felled timber is following a growing trend. In 2010, 9.86 million m<sup>3</sup> of timber was felled: an increase of 59% compared with 2000 (Fig. 3.3). Of this volume, 63% was coniferous wood and 37% timber from broadleaf species. The state forest organizations felled 5.69 million m<sup>3</sup> (58%) of wood. In the non-state sector 4.17 million m<sup>3</sup> (42%) of wood was felled (Green Report 2011, Slovstat 2012).



\* Estimation for 2011, 2012

**Figure 3.3.** Wood harvesting in Slovakia in 1995–2012 (Green Report 2011, Slovstat 2012).

In total 80% of harvested wood came from final fellings and 20% from thinnings in 2010. The volume of incidental felling formed 62% of the total felling volume. The case of coniferous tree species represents a critical situation. Their proportion of the total volume of incidental felling climbed to a staggering 81% (Green Report 2011). Incidental felling can be caused for example by windstorms or insect outbreaks.

The volume of outsourced operations in both state and non-state forests has risen over the last decade. In comparison with the year 2000, the volume of work on contract has more than doubled. According to the official data of the Ministry of Agriculture of the Slovak Republic, nowadays forestry contractors carry out about 95–97% of the total wood harvesting in state and private forests (Table 3.2).

Harvesting is followed by timber transportation. Contractors perform around 58–62% of the timber transport for the state sector and around 78–84% of the timber transport for the non-state sector (Table 3.3). Truck-and-trailer units prevail in long-distance transport.

**Table 3.2.** Volume of felled timber carried out by contractors (Green Report 2007, 2009, 2011).

Volume of felled timber	2006		2007		2008		2009		2010	
	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%
from state forests	4.41	94	4.63	94	2.61	91	5.46	98	5.36	94
from private forests	1.60	44	3.41	92	3.70	91	3.52	95	4.05	97
together	6.01	72	8.04	93	6.31	91	8.98	97	9.41	95

**Table 3.3.** Timber transport carried out by contractors (Green Report 2007, 2009, 2011).

Volume of transported timber	2006		2007		2008		2009		2010	
	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%	Mm <sup>3</sup>	%
state forest	2.50	61	2.53	60	2.77	83	3.30	58	2.64	62
private forests	0.98	47	1.78	71	1.77	69	2.05	78	3.35	84
together	3.48	56	4.31	64	4.54	77	5.35	64	5.99	72

In Slovakia, many enterprises still carry out mainly motor manual harvesting operations. Skidding to the hauling place is often performed with tractors. Forest management organizations and entities providing forestry services are mainly equipped with physically old and out-of-date machinery. In most cases, the machinery and technological equipment that are used in the areas of felling, bucking, skidding, transportation and other mechanized activities do not correspond to the needs of the development of modern technologies. The main reasons for this situation include a lack of internal financial resources to buy modern technologies and dependence on imports of machinery and equipment from abroad (National Forest... 2007). The utilization of harvester technologies is influenced by the terrain conditions because around 60% of the forest land is situated in areas with a slope gradient greater than 40%.

In addition, insufficient density and poor quality of the forest road network are leading to growing distances for timber skidding from the felling place to the hauling place. For these reasons, the tree-length method in felling and tractor skidding of timber to the hauling place prevail. This limits the possibilities for the effective use of multi-operation harvesting machinery and forest cableways and other opportunities for timber use (National Forest... 2007).

Harvesters were used for the first time in the 1990s in pine stands of the Záhorie region (in the western part of Slovakia). However, the proportion of the machines in timber harvesting operations was negligible (Štollmann & Slugeň 2008). Harvester technologies were broadly used after the windstorm in the High Tatras in November 2004. In total 59 harvesters were used in order to process wood from the wind calamity as quickly and efficiently as possible as well as with the aim of eliminating the possible expansion of bark beetles (Green Report 2006). After the processing of calamity wood, the number of harvesters decreased significantly and the proportion of harvester technologies used in felling operations is now only 3–4% (Štollmann & Slugeň 2008).

The large share of incidental timber felling, mainly due to wind calamities and other abiotic injurious factors, also has an important impact on the application of felling technology and timber skidding. The high rate of incidental felling, which represents approximately more than half of the total annual felling, causes the planned timber harvesting levels to be exceeded. Increased felling leads to higher incomes and economic potential of forest management; however, the future felling possibilities will be reduced by exceeding the current planned volume of incidental felling (National Forest... 2007).

## **4 Characteristics of timber harvesting contracting**

### **4.1 Structure of the timber harvesting business in Finland**

#### **4.1.1 Overview**

Contracting in the Finnish forest sector has a long history. Industrial roundwood harvesting has been carried out by harvesting contractors for more than 40 years. The harvesting business started as one-man enterprises when horse owners moved to farm tractors and later to forwarders. Logging was later mechanized with harvesters (Penttinen et al. 2009b).

Traditionally, the main task of forest machine contractors is the harvesting of industrial roundwood. Often their main equipment includes both harvesters and forwarders. Contractors provide forestry services according to their own capacities. In some cases, they subcontract with other enterprises (Penttinen et al. 2008). Another group of small entrepreneurs that serves the same customers as the forest machine contractors consists of the timber truckers, who ensure that timber is transported to the mill (Mäkinen 1997).

In addition, residual energy wood harvesting is a significant task of contracting companies and its volume is increasing. Other forestry-related services, such as soil preparation, seeding and planting, are traditional tasks of some forest machine entrepreneurs, as well. There have been efforts to provide the whole wood procurement chain from the stump to the mill. However, there was insufficient synergy to have machines both for harvesting and for transportation in the same company (Rummukainen & Tikakoski 2006). It may be an important marketing factor that a forest owner can buy all forestry-related services within one enterprise. This contractor can then handle all the forestry tasks itself or complete its capacities using subcontractors (Rummukainen et al. 2006). Networking with other contracting companies in order to provide the whole range of forestry services could attract new customers (Rummukainen & Tikakoski 2006).

Forestry contractors are traditionally linked to rural areas of Finland, where jobs are generally hard to find; therefore, they play a very important role as employers of local people as well as in the development of the rural regions of Finland. These jobs are much harder to replace than jobs in larger cities (Soirinsuo 2012).

According to Metsähallitus (2011), in Finland around 2,000 companies provide wood felling and transportation services, of which 1,200 are timber harvesting contractors and 800 are the timber truckers responsible for timber haulage. These companies own a total of about 1,300 harvesters, 1,400 forest tractors and 1,000 haulage trucks. According to the Finnish Statistical Yearbook of Forestry (2011), 1,900 harvesters and 1,970 forwarders were used in the harvesting in 2010.

The business is driven mostly by very small enterprises, most of which are family-owned (Penttinen et al. 2010), although with the growing volume of harvesting, there are currently several larger companies in this sector (Metsähallitus 2011). More than half of the contracting enterprises possess up to 2 machines, but their total turnover constitutes only one-third of the sector's total turnover. The biggest companies own about 30 machines and employ some 50 operators. Thus, small enterprises dominate in number but most of the turnover in the business is produced by larger companies (Penttinen et al. 2009a, 2010).

Some contractors in the Finnish forest machine sector have harvesting tasks in Russia, Baltic countries and Central Europe (Forest Facts...2008a). Northwest Russia is an important market for some entrepreneurs. The working conditions there are similar to those in Finland, but cultural and business issues make working there different. Other less important markets are in Central Europe. Several Finnish entrepreneurs have been working for example in Germany and France after large-scale storm damage during the last decades. However, the local competition has strongly increased in those countries (Rimmler et al. 2004).

The main actors in the wood harvesting business are represented by the Trade Association of Finnish Forestry and Earth Moving Contractors (Penttinen et al. 2011). The association represents

machine enterprises and looks after their interests. It also produces training for the members (Rummukainen et al. 2006).

The independence of work in the forests, precise environmental and quality requirements and remote guidance of operations using information technology demand solid relationships between the buyers and the sellers of services (Metsähallitus 2011).

#### 4.1.2 Typical contractual relations

Forestry contractors work for two customer groups – forest industry companies and forest owners (Rummukainen & Tikakoski 2006). The three largest forest industry companies and state forests buy more than 80% of the harvesting and transport services and more than 50% of the energy-wood harvesting services (Penttinen et al. 2011). Forest industry companies do not own machines; therefore, they buy harvesting and transport services from contractors. Timber harvesting is a basic task of forest machine enterprises (Figure 4.1) (Forest Facts... 2008b). The bargaining position of entrepreneurs is weak compared with that of the buyers of their services (Penttinen et al. 2011).

Another group of small entrepreneurs consists of timber truckers, who carry out timber transport to the mill (Forest Facts...2008b). The second form of wood sales is the delivery sale (15%). In this case, forest owners carry out the logging themselves or contract with entrepreneurs (Rimmler et al. 2004).

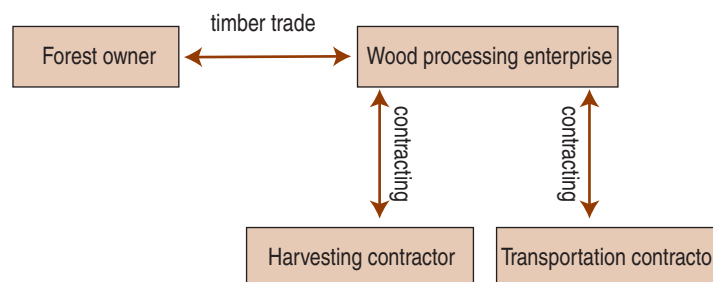


Figure 4.1. Typical contractual relations in Finland.

#### 4.1.3 Harvesting agreement practices

Harvesting is usually carried out under agreements based on bilateral negotiations or bidding (Penttinen et al. 2010). Each harvesting enterprise negotiates a new harvesting agreement with customers, usually once a year (Rummukainen et al. 2006). In addition, customers in the forest industry prefer negotiations with fewer forest customers who might have subcontractors (Penttinen et al. 2011).

Nowadays, entrepreneurs negotiate the payments with customers (wood buyers) directly (Rimmler et al. 2004). The customers may require a certain type of machinery, scaling systems and data transfer systems. The state forest chooses a forest machine enterprise with tendering systems according to the EU requirements. In addition to price, the arguments for tendering may include quality and reliability issues (Rummukainen & Tikakoski 2006). Usually, the contract period is one year. The basis for payment is the harvested or transported volume. In two-thirds of the harvested volume, payments are agreed separately for cutting and forwarding. In the remaining

third, payments are combined for cutting and forwarding (Rimmler et al. 2004). In 2005, rigid one-year agreements were negative from the point of view of forest machine enterprises because of the rises in the oil price and the paper workers' strikes. It proved useful to have price index checks once or twice during the agreement period (Rummukainen & Tikakoski 2006).

Agreements that are established between forest machine enterprises and small sawmills, private forest owners or their Forest Management Associations are usually less official since they target only a few workplaces (Rummukainen & Tikakoski 2006). The contracts are often verbal. Payments per volume may be agreed either separately or combined for cutting and forwarding (Rimmler et al. 2004).

#### **4.1.4 Challenges in the harvesting business in Finland**

Large industrial timber customers renewed their wood procurement organizations during the recession by making them leaner. Accordingly, harvesting agreements with bigger enterprises were preferred. The decision was left to the entrepreneurs whether they would grow by buying new machines or enterprises or whether they would form new umbrella organizations in cooperation with other enterprises when making agreements with customers. Forest harvesting agreements are nowadays based on tender competition. Earlier, this system was used only with state forests. The pressure for structural change and new negotiation systems has put entrepreneurs in a challenging situation. The need to expand requires investments, which are difficult following the recession (Penttinen et al. 2011).

The outlook for business possibilities in the harvesting business is unsatisfactory (Penttinen et al. 2009b). The lack of skilled workers and the inability to secure permanent employment are the biggest problems for the whole harvesting business. In total, 75% of the forest machine enterprises suffer problems in recruiting skilful operators (Tikakoski 2005).

Operators have high skill requirements in order to use the forest machines and to follow the quality and environment requirements, but the enterprises have problems in paying sufficient salaries compared with the needs (Penttinen et al. 2008). Forest work is not very popular among young people, which worsens the situation because of retirements. There is a need to improve the image of forest work so that it would also be tempting to younger generations (Uusitalo & Markkola 2006). Extra challenges for the business are caused by strong economic cycles, the restricting of forest industries and seasonal variations in the wood markets (Penttinen et al. 2009b).

## **4.2 Business environment in Slovakian forestry**

### **4.2.1 Development of the harvesting business in Slovakia**

Slovakia went through fundamental changes during the socio-economic transition in ownership, regulatory systems, economy management, local government, state administration and sectoral institutes. Entrepreneurial activities in forestry were opened by the market economy and political changes (Sarvašová & Svitok 2006).

After 1990, forestry in Slovakia changed significantly because the monopoly of state organizations in this sector was cancelled. The non-state sector was restored in 1991, when the so-called



restitution law came into force, which allowed the return and use of property to the original landowners (Moravčík et al. 2009).

The creation of private forest ownership brought a number of challenges. Private forest owners encountered problems in carrying out forestry activities themselves as they lacked even basic equipment. Organizations started to develop economic effectiveness in these operations. This resulted in the establishment of private enterprises that act as service providers in wood procurement and do not own land or wood-processing mills. However, forestry contractors have not established associations as an umbrella organization (Sarvašová & Svitok 2006).

Forestry work has increasingly contracted out to companies and private entrepreneurs, which has led to a decrease in the number of workers in the state forest organizations. At the same time, a number of small enterprises have begun to form (Sarvašová & Svitok 2006).

Scientific studies on the business sector in Slovakian forestry are rare; only partial information on this sector is available. However, it can be estimated that around 8,500 small entrepreneurs providing forest-related services operate in Slovakia. Due to the oversaturated supply of forestry services, not all service providers have the possibility to gain a contract (Green Report 2010). Even though forestry contractors realize the majority of timber harvesting and timber transport, forest owners retain control over the timber sales and timber handling.

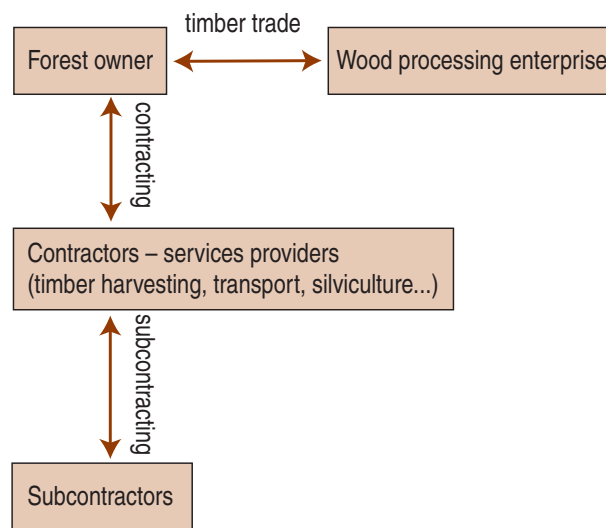
The main service offered by contractors is timber harvesting. In addition to this, contractors offer operations such as artificial regeneration, forest protection, cleaning, skidding and timber transport (Konôpka et al. 2010). Specializing in silviculture or logging operations is not common. In general, forestry contractors try to offer as complex a range of services as possible (from silviculture to timber harvesting operations). It is also more convenient for forest owners to have a contract with one entrepreneur because of better work organization (Paluš et al. 2011).

#### **4.2.2 Typical contractual relations**

In the predominant sales system, forest owners sell timber to wood-processing companies (Fig. 4.2). Forestry contractors' customers are forest owners. Forest owners are in charge of timber harvesting and transportation. As they do not have enough capacity to carry out these operations themselves, most of them are outsourced, i.e. around 95% of felling and 72% of transportation are bought as services from forestry contractors. It is common for forest owners to contract both harvesting and transportation within one enterprise (in some cases, it is possible to buy all forestry-related services, including silviculture and harvesting operations, from one contractor). Contractors carry out these operations within their own capacities or they subcontract to other enterprises. However, timber trade is realized by forest owners themselves (Paluš et al. 2011).

#### **4.2.3 Harvesting agreement practices**

The concluded contracts are often time flexible. Long-term contracts for specific work are concluded only occasionally. There is no periodicity of services taken into account in the contracts. The exceptions are contracts with state enterprise forests of the Slovak Republic concluded for a period of 3–5 years, although they are updated annually. Timber harvesting in the state forests is carried out by several contractors, which are usually small family enterprises established by former employees of state enterprises (Paluš et al. 2011).



**Figure 4.2.** Typical contractual relations in Slovakia.

The contractors usually perform forest operations themselves without subcontracting other companies as they can manage and organize the work better. However, subcontracting to other companies is used when the volume of work is high (Paluš et al. 2011).

Due to the oversaturated supply of services, the negotiation position of forest owners is stronger and the contracts with new contractors are signed either on the basis of previous references or for a short period only. As there are already existing market relations, the amount of time needed to find a contractor and to settle a contract is often very short. The contract proposal is usually prepared by a forest owner. The contractor's position in negotiating is weaker and there is also less scope to reach the terms that would effectively protect contractors from potential opportunistic behaviour of forest owners. In spite of this, however, the contractor services market is based on long-term relations as new contracts are mostly concluded with the same forest owners (Paluš et al. 2011).

#### **4.2.4 Challenges in the harvesting business in Slovakia**

The main restrictions in increasing the efficiency of the forestry services market are those related, for example, to the weak law enforcement in Slovakia, short-term contracts, disintegrated ownership structure, unstable entrepreneurial environment, low prices paid for contracted services, conservatism of forestry, influence of natural conditions, etc. (Paluš et al. 2011).

Moreover, the subjects providing services to forestry in Slovakia are less competitive than foreign companies, which have up-to-date technology, equipment and experienced management. This fact can adversely affect employment in rural areas (Konôpka et al. 2010).

## 5 Conclusion

Finland and Slovakia represent different European regions in terms of natural conditions, economic development and different stages of development in timber harvesting operations.

Finland is a country with a well-developed market economy and a rather long history and tradition of contracting in forestry operations, when compared with Slovakia. Finnish forest machine entrepreneurship started in the 1960s when the change from horses to tractors and later to forwarders began. Logging also became mechanized ten years later when harvesters started to replace loggers with chain saws (Rummukainen & Tikakoski 2006).

In Slovakia, the transition from a planned to a market-based economy has changed the traditional activities of many foresters to new professions in the context of increasing competitiveness (Sarvašová & Svitok 2006). Since 1990, the processes of reprivatization and restoration of forest land to the original owners have brought new elements to the ownership in Slovakia. The development of private property provided the conditions for the establishment of private enterprises providing forestry services. The emerging market of forestry services was created under unstable and changing conditions of formation of the new property rights to forest land (Paluš et al. 2011). Thus, the operational environment has been undergoing rapid change.

The forest machine and timber haulage sectors in both countries are driven mostly by small business entities, although there are a few larger enterprises in the industry. Around 2,000 companies (mainly small family businesses) operate in the Finnish logging and transportation sector. Forestry services in Slovakian forestry are usually provided by individual entrepreneurs and their number is estimated at around 8,500. The harvested volume in Finland is also much bigger than that in Slovakia.

Typical contractual relations differ fundamentally in Finland and Slovakia. The proportion of standing sales is high in Finland. This is an easier option for forest owners as they do not need to organize harvesting by themselves but forest owners will not be able to affect bucking. However, according to Mäki-Simola and Sevola (2011), in certain regions, such as on the south coast in Finland, delivery sales have quite a strong position, as well. In Slovakia, forest owners typically take care of contracting service providers in timber harvesting and even in transportation. This might lead to differences in bargaining power among timber harvesting companies because the number of customers is significantly higher in Slovakia than in Finland. On the other hand, the mean size of private forest holding is much bigger in Finland than in Slovakia, offering higher productivity in timber harvesting. However, the small size of private holdings makes it easier for forest owners to manage harvesting, which explains the differences in contractual relations between Finland and Slovakia.

Harvesting contractors usually offer a wide range of services in Slovakia. From the point of view of forest owners, these kinds of diversified companies simplify contractual relations. There has been a tendency to develop forest contractors with a complex range of services in Finland, as well. However, the synergy has been insufficient. Because the average timber sales are much smaller in Slovakia, vertical integration offers relatively more benefits there. However, networking with other companies might provide new business opportunities for wood procurement companies in Finland.

In Finland, the proportion of mechanization is near to 100%. In Slovakia, harvesting technologies are developing. However, the lack of financial resources, dependence on imports and geographical conditions in Slovakia hinder mechanization. Mechanization has strongly been linked to incidental felling, which has felled large amounts of wood.

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