Facts and Figures from Finnish Forestry

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INTRODUCTION

Finland is about 337,000 square kilometers in extent. It has a population of about 4.7 million people and population density at 15 per square kilometer is very low. As in most European countries, demographic change has been marked over the past 30 years. In 1950 more than 45% of the workforce ws employed in forestry and agriculture. Today only 12.7% of workforce is directly employed on the land, while 87% work in industry and services.

The country stretches from 60° to 70° north latitude and about one-third of it lies within the Artic Circle. However, only the northern tip is tundra and the rest of the country falls within the northern coniferous belt. The climate in general is continental with cold winters and warm summers. The coldest month is usually February, with mean temperatures of –6°C in the south and –14°C within the Artic Circle. The warmest month is July with mean temperatures ranging from 17°C in the south to 14°C in the north. The annual rainfall of about 600mm is evenly distributed throughout the year. The main bedrock type is granite. The soils are derived from this bedrock and are acidic in nature. Glacial ground morraines dominate although post-glacial alluvial sands and clay deposits also occur. Peat soils are common, covering about 30% of the land area. This is usually blanket peat, which seldom exceeds three meters in depth.

About 66% of the land surface is forested and this makes Finland the most densely forested country in Europe (Table 1).

A further 10% is farmland, while 21% of the land is unproductive peatland and tundra.

The forests are mainly on mineral soils but some 5.5 million hectares of peatland have been drained for forestry.

FOREST OWNERSHIP

About two-thirds (13.3 million ha) of all forests are privately owned (Table 2). This is made up of about 350,000 separate holdings each consisting of approximately 40 hectares. State forests tend to be located on the less productive sites and hence their annual increment is low.

IRISH FORESTRY, 1984, Vol. 41, No. 1: 7-13.

Table 1: Area of Forests in Some European Countries.

Country	Forest Area (Millions of ha.)	Forest Area as A % of Toal	Forest Area (ha per capita)
Finland	20	66	4.6
Sweden	23	57	2.7
Norway	8	27	1.9
France	13	25	0.25
West Germany	7	29	0.12
Britain	2	8	0.04
Denmark	0.5	11	0.10
Ireland	0.4	5	0.12

Table 2: Forest Ownership in Finland

	Area (%)	Growing Stock (%)	Increment (%)
Private	63.9	70.5	76.3
State	23.9	18.5	11.7
Companies	8.0	6.9	7.8
Co-Operatives (Communes, Parishes)	4.2	4.3	4.2

Species and Growing Stock

The principal species are Scots pine (45% of growing stock), Norway spruce (37%). Birch (*Betula verrucosa* and *Betula pubescens*) (15%) and Alder plus Aspen (3%). All of these species are indigenous. Trials with exotic species have shown that Lodgepole pine and Siberian larch can give fast growth rates on some sites. However, at the present time there is no demand for the large scale introduction of these exotics. Most of the spruce is found on moist, fertile, mineral soil sites in the southern half of the country. Scots pine is the predominant species on less fertile, dry, mineral soil sites and on most of the drained peatland. As this species is considered a more valuable commercial species, general policy is to extend its use. Birch (*B. verrucosa*) is found principally in central Finland where as hairy birch (*B. pubescens*) in particular is common on drained peatlands all over the country.

The total growing stock in the country has been estimated at about 1640 million m^3 or $81m^3$ per hectare. The mean volume per hectare naturally tends to be higher in the south than in the north ($101m^3$ v. $52m^3$). The total annual increment is about 65 million m^3 or $3.3m^3$ per ha and it has been forecast that this will increase to 75 million m^3 within 25 years. The total growing stock is now larger than it has ever been since the first national inventory in the 1920s. The age-class distribution of the forest estate is normal with a small proportion of overmature stands (Table 3).

Table 3: Age Class Distribution of Finnish Forests by Area (Millions of Ha.).

Age Class	0-20	21-40	41-60	61-80	81-100	101-120	121-140	Over 140
Area	3.80	3.28	3.40	3.92	3.06	1.38	0.46	0.18

The volume of timber harvested in 1980/81 was 56 million m^3, about half of which was sawlog sized material.

SILVICULTURE

All mature stands are more or less natural. Natural regeneration is still widely used in reafforestation but this technique is more commonly practised in Scots pine plantations than in Norway spruce stands. The pine grows on poorer sites where vegetation regrowth does not unduly interfere with natural regeneration. The silvicultural systems used to obtain regeneration are the shelterwood uniform systems for both spruce and pine and clearfelling in strips for pine. Where the uniform system is used the number of seed trees remaining on the ground is usually 50-100 per ha for pine and 200 per ha for spruce. The use of bare-rooted and containerised planting stock for reafforestation is, however, increasing (Table 4). Total annual plant production is 230 million and about 40% of this is container grown. The usual containers are paper pots and peat pots.

Dry mineral soils are scarified with heavy disc ploughs before planting. These help to break down and windrow the lop and top as well as giving mechanical preparation of the planting site. Moist sites and shallow peat soils are ploughed and deep drains are excavated where necessary. The spoil from deep drains is spread to provide mounds for planting. Planting is at a rate of 2000 per hectare. In all reafforestation weed control is a major operation due to the natural regeneration of unwanted species. Weeding is frequently chemical or by using rotary disc saws. First thinning is

carried-out when crops are about 10m high and at 10-20 year intervals thereafter. Fertiliser application is necessary on some peatland and the poorest peats may need repeated applications of N, P and K every 15 years to prevent crops from stagnating. Boran deficiencies have also been noted in crops growing on peat. Spruce crops are not pruned but selective pruning of Scots pine crops is becoming more popular. However, pruning is confined to the final crop trees in the best quality stands. Rotation lengths vary according to species but are about 60-70 years for birch, 80-100 for spruce and 80-130 for pine. The lower figures generally apply to the southern half of the country.

Table 4: Methods of Forest Regeneration.

Method	% of Total	System	Quantities Per Ha
Natural	40	Shelterwood Uniform System for Pine and Spruce. Clearcutting in Strips for pine.	50-200 Seed Trees
Artificial	60	Direct Seeding	0.3-0.5kg Seed
		Planting Pine or Spruce Stock	2000 Plants
		Planting Birch or Larch	1600 Plants

HARVESTING AND PROCESSING

Logging is mainly motor-manual, with conversion into pulpwood and sawlog at stump. Extraction is mainly by forwarders but many farmers use ordinary farm machinery. Current standing prices are about £25/m^3, £20/m^3 and £22/m^3 for pine, spruce and birch sawlog respectively. Pulp sells for approximately £12/m^3. These current prices are well below the peak prices of 1974/75 (Fig 1). For the past twenty years Finnish wood processing industries have fully utilised the annual cut of about 60 million m^3 and currently imports an additional 3-5 million m^3 of wood per annum. The emphasis now is upon the manufacture and export of high value processed products. Thus the export of wood pulp has decreased dramatically while the export of paper products has greatly increased (Table 5). Wood processing industries in Finland are modern and highly integrated. Because of this they have been able to survive the difficulties created by high energy costs, high raw material costs, and stringent

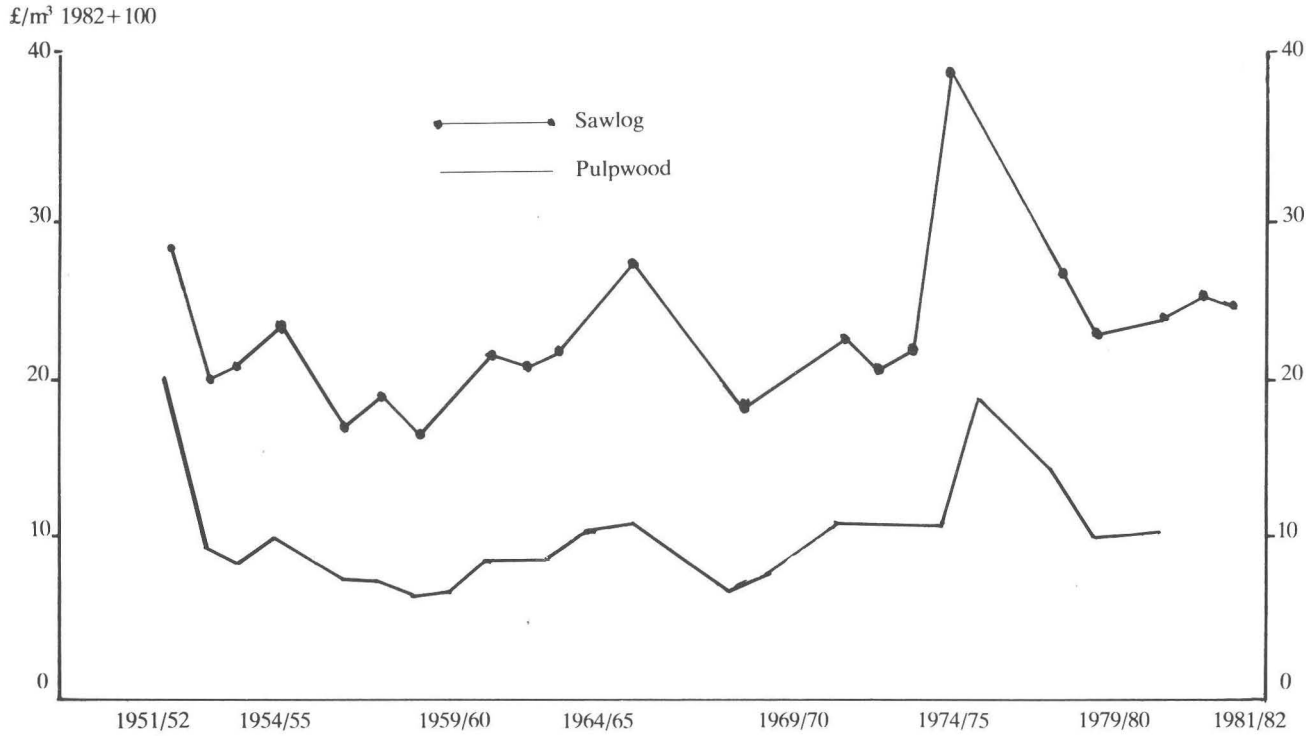

Fig 1: Stumpage Prices in Finnish Forests in the Period 1951-1952 in 1982 Money Value.

environmental quality standards. The main problem of industry is the low amount of own-captial. Industry is also very worried if the private owners will, in the future, sell enough wood at a price which industry can pay without losing competitiveness. The number of people in processing wood is around 100,000 and it has been estimated that a further 250,000 jobs in service industries depend upon forestry. The number of people directly employed in forestry is about 50,000. This number includes 30,000 forest workers, 14,000 foresters and 6,000 transport workers. The number of foresters represents one forester to every 4700 hectares.

Table 5: Finnish Forest Industry in 1982.

Production Plant	No. of Mills	Production	Exported (%)
Sawmills	320*	7,300,000m^3	63
Plywood & Veneer Mills	28	596,000m^3	87
Particle Board Mills	12	636,000m^3	38
Wallboard Mills	5	136,000 t	46
Mechanical Pulp Mills	22	2,326,000 t	1
Semi-Chemical Pulp Mills	3	309,000 t	—
Kraft Pulp Mills	18	3,488,000 t	31
Sulphite Pulp Mills	8	591,000 t	59
Paper Mills	30	3,672,000 t	82
Paperboard Mills	16	1,451,000 t	80

*This figure does not include 8500 local sawmills.

Thus, the total employment attributable to forestry comes to 400,000 or 20% of the labour force.

PRIVATE FORESTRY

In general one family in every three owns a woodlot of approximately 40 hectares. The proportion is higher for rural families but about 40% of woodlots have either been inherited or purchased by people other than farmers. Local management associations provide a professional advisory service for private owners. There are 377 such associations (one per district) and each maintains a staff of foresters and forest workers. Many owners carry out their own forest operations but many contract their forest work to the local management associations. Provincial forestry boards supervise the work of the management associations and provide specialised services such as the drawing-up of working plans, the provision of planting stock, the development of forest roads and regional drainage. The average income from a woodlot is

in the region of £1500/£2000. Generally forest owners pay for the services provided by the management associations and the provincial boards. However, if the income from clear-felling is below a certain threshold, loans and grants are available for reafforestation. Loans and grants are also available to all woodlot owners for weed control, fertiliser application, drainage of peatland, pruning and road construction. These finds are made available from the central exchequer but are channelled through the provincial forestry boards.

Forestry provides the raw material for a vast export industry in Finland. In recent years forest producers made up about one-third of all exports and have been valued at around £5566 million per annum. Forests also have a great non-commercial value since they dominate the landscape and provide a refuge for wildlife. They are also extensively used for jogging, orienteering, hunting, berry-picking and skiing. The Finnish people are very much aware of the overriding importance of forestry to their ecomony. They are aware too of many problems within the industry and of the increasingly stiff competition for world markets. However, forest management is good and the forest industries have all the advantages that modern equipment and scale can create. So they are confident that their forest products can compete on the world's markets and can continue to bring foreign exchange.