

# Private Forestry in Sweden

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The total land area of Sweden is 45 million hectares. About half of the country is forested, 10% is used for agriculture and 9% consists of lakes and rivers. Most of the remainder is accounted for by the mountain regions in the north west. Although this latter area is of little economic importance, it provides invaluable scope for recreational activities such as outdoor sports, fishing and hunting. Sweden has a population of some eight million, with about 90% of the people living in the southern half of the country. One of the reasons for this has been the steady movement of people away from the rural areas in the north west over the past thirty years.

## *Forest Structure*

The Swedish forest estate of about 23.5 million hectares is distributed amongst four major owner categories. The state owns 19%, forest companies 25%, communities and private citizens 48%. There are about 236,000 private owners. The average holding is about 50 hectares, but the size of holding ranges from as small as 0.1 ha to over 400 ha (Table 1). The smallest viable unit from a forestry standpoint is about 30 ha and this is usually worked in conjunction with about 30 ha of arable land. The forest land is usually divided in 3-5 separate blocks or strips.

Table 1 Area of forest and number of holdings in private forestry.

Area (ha)	Number of Holdings
0.1 — 5	38,200
5 — 25	90,430
25 — 50	49,490
50 — 100	34,460
100 — 200	16,450
200 — 400	5,380
400+	1,660

Almost 70% of private forest owners live on their holdings. However, the drift to the urban areas is still quite rapid and more and more small holdings are becoming abandoned. Of those remaining on the land 62% are over 50 years of age. Most forest owners are members of a forestry co-operative. There are nine such co-operatives in Sweden and the bigger ones are very powerful organisations. Their more important tasks are to collect and market timber for their members, and to engage in silvicultural and logging operations. They trade in roundwood, process the timber supplied by members, and provide both information and training. They operate their own field organisations with skilled labour and modern equipment. On a contract basis they carry-out silvicultural work such as site preparation, planting, cleaning, thinning and logging. In addition they provide complete management for absentee owners. They also provide an extension service for members and put on nationwide courses for private owners.

### *Species and Silviculture*

The main species are Scots pine, Norway spruce and birch. Scots pine is the species choice on dry mineral sites and Norway spruce occurs mainly on the moister sites. However, on many sites both species form an intimate mixture. Birch is not planted, but occurs naturally on all sites. It is used mainly for firewood, but it can also form part of the species mix for pulping. Sweden has strict silvicultural laws. For example, according to the law, cleaning should be carried-out before crops reach 3m in height. Cleaning involves the removal of unwanted trees such as birch, aspen, mountain ash and badly formed conifers. Despite the law it is known that large areas in the private forestry sector are badly in need of cleaning and thinning. The stands which are thinned vary enormously in species content, age, volume and stocking density (Table 2). Thinning is carried-out mainly for silvicultural reasons and hence most owners thin as selectively as possible. Most stands are only thinned once and then the stocking density is reduced to 600-800 stems per acre.

Table 2 Stand data for stands requiring thinning.

Variable	Mean	Range
Age (years)	43	19 — 110
Stems/ha.	1957	1000 — 3870
Vol. (m <sup>3</sup> /ha.)	142	39 — 294
D.B.H. (cms.)	11.7	7.6 — 17.3
Height (m)	10.8	5.6 — 17.1
Species (Pine/Spruce/Birch)	8/1/1	—

The average volume removed is about 80m<sup>3</sup>/ha. In thinning, winding strip roads (racks) are first opened up to give access to the stand. Trees are then felled towards the strip roads and the produce is stacked manually. Extraction is usually by horse or by farm tractor, with or without ancillary equipment (Table 3). Clear-fell areas tend to be rather small, usually about 2-2.5 ha. The logging yields in clear-felling from mean yield class sites is about 300m<sup>3</sup>/ha. The actual volume harvested annually increases from North to South, (Table 4) as does productivity.

Table 3 Means of extracting thinnings in private forestry.

	% of Harvested Volume
Horse	15
Farm Tractor	
Without Loading Equipment	21
With Wire Crane	29
With Grapple Loader	8
Forwarder	26
Other Machinery	1

Table 4 Annual cut (m<sup>3</sup>/ha.) by region and forest size.

Region	Forest Area (ha.)					
	25	25-50	50-100	100-200	200	Average
Northern Sweden	2.6	1.7	1.7	1.2	0.9	1.3
Central Sweden	4.3	3.2	2.9	2.6	1.8	2.5
Southern Sweden	4.0	3.0	3.0	3.0	2.6	3.1

Reafforestation nowadays is mainly by planting. In 1982, 67% of the area for reafforestation was planted and the remainder was regenerated by natural means. Prior to planting most owners cultivate by scarification. Planting espacement depends upon site quality, but usually varies from 2.0m on high quality sites to 1.5m on poorer ground. Scarification is a prerequisite for natural regeneration. Norway spruce is not regenerated naturally since good seed years are irregular and seed trees are very likely to be windthrown. Scots pine is often regenerated by the Uniform System. In naturally regenerating Scots pine about 70-100 seed trees/ha are left on the ground. These are removed about 10 years later when regeneration is assured and they then give a very valuable short term boost to the forest income. Private owners do very little beating-up or pruning and the percentage of owners who use fertiliser in their forest is very small.

### *Forest Management*

Forest land is taxed according to site quality. The normal rate is about £0.3/ha. Harvested timber is also subject to tax. However, private owners can claim tax relief for their labour input in their own forest and as a result few farmers pay any tax. Farmers, therefore, prefer to do all their own forest work (Table 5). As a result most timber is sold at roadside, where sawlog and pulpwood are currently valued at about £27/m<sup>3</sup> and £6/m<sup>3</sup>, respectively. However, the use of contractors to do forest work is increasing as owner-occupiers become too old to do the work themselves and as more and more young people migrate to urban areas.

Table 5 The distribution of logging work (% of volume removed) by category of worker.

	Felling	Extraction
Own Management		
Forest Owner and & Family	45	42
Hired Labour	19	24
Forest Owners' Association	14	15
Stumpage Buyer's Contractors Association	22	19

Each forest owner is obliged to follow a ten year working plan. Working plans may be drawn up by inspectors from the State Forest Service or by co-operative extension officers. Owners bear 50% of the cost and the remainder is paid by the State at an agreed rate/ha. Working plans highlight areas which require cleaning, thinning or felling and follow-up inspections are normal in an attempt to see that the work is carried-out. Forest owners are encouraged to road and drain the forest areas and substantial grants are available for these operations. Forest work in private forestry fits easily into the pattern of farmwork for the year. Dairy cows are normally housed at the beginning of October when the season for thinning and felling starts. About 40% (30 million m<sup>3</sup>) of the annual logged volume in Sweden comes from private woodlands and 12 million m<sup>3</sup> of this is pulpwood.

### *The Forest Bank*

It is virtually impossible to estimate the value of forestry to the farm owner in Sweden, because much of the logged produce is retained

on the farm. About  $\frac{1}{3}$  of all the wood cut is retained for firewood. Sawlogs are often processed locally and retained for farm use. In addition many farmers only harvest wood once every five years or so. This is usually in anticipation of some additional expenditure on the farm. In this way the forest becomes the 'standing bank' for the farmer, to which he can turn to purchase a new tractor, replace his dairy herd or expand other aspects of his farming enterprise. This capital function of the forest in the total farming enterprise is quite striking and planting now, to ensure the capital supply for the future, is part of every farmer's thinking.