

DEVELOPING THE SCOTS PINE RESOURCE



Scots Pine Forest Management Case Study 7: Farm forestry and the use of Scots pine in Western Norway Some trends, facts and figures

Summary

This paper gives a brief description of the pinewoods in western Norway. Due to historical heavy cutting and high browsing pressure, most of the woods are rather small with low growing stock. The pinewoods occupy 340,000 hectares with a growing stock of 35 mill m³ and an annual increment of approximately 750,000 m³. Over the last five years the annual cut of pine in the region has been less than 100,000 m³. Both the pinewood area and the volume stock are growing significantly. On average a forest property in Western Norway is approximately 20 hectares. The pinewoods mainly belong to yield class 2 - 6 m³/ha/yr. With the largest growth potential located in the warm hillsides of the inner fjord districts. The yield class and property size of an average 'pinewood property' correspond to an annual cut of some 50 to 100 m³ and a forestry income, including deer hunting, of 1,000-2,500 Euro. This equals 1-2% of a family income.

In summary, pinewoods are of limited economic importance for most forest owners in W Norway. 'Nature conservation', property ownership (not a forest manager) and 'deer hunting' are the main forest values. This paper mirrors the use of pinewood resources from a farm management point of view.

Introduction

People with some knowledge of Norway are accustomed to think of it as a country with a surplus of forest. This holds true of the country as a whole, but it does not apply to the coastal and fjord districts in the western part, which by no means is self-sufficient in forest products. Hardly more than 15% of West Norway carries forests, and this paucity of tree growth is partly due to the fact that a large proportion of this area is mountain land situated above the climatic forest line. Glacial activity removed the soil from the hill tops of islands and coastal areas, and where hard and often slowly weathering rocks predominate – little new soil has been able to accumulate, apart from thin and rather tough layers of low-scrub peat, dominated by *Calluna*. What little forest there is exists in scattered areas of mainly modest extent. As with elsewhere in the Scandinavia peninsula, the uppermost belt is formed by deciduous woods, with the mountain birch the dominant species. In West Norway, in localities where coniferous forest is present, the birch zone, with its accessory species, is mostly neither as broad nor as marked as it is in Eastern and Central Norway. Where pine exists in the coastal districts it often forms the upper forest line. Pinewoods of greater extent are found in the south-facing hillsides and river-plains in the valley systems in the fjord regions (Øyen 1998).

Most farms in the rain belt districts of Western Norway are too small for a family to live on. By draining, pasture cultivation and better farming practice the yield of the land and livestock and therefore income from the farm can be increased, but only to a limited extent. The farms – often properties having rather small forests areas of 10-50 hectares, and located in the fjord districts in western Norway have seen considerable change in recent years. Demographic change (with farmers and other professionals leaving, and retired people staying behind); development of tourism and recreation (e.g. second homes) leading to significant seasonal variation in the population make-up, and long-distance traffic from the urban settlements, which over the coming decades is expected to grow substantially, are imposing changes to the forests and farming activity. The trend in the W Norway countryside is similar to other 'remote' European regions: increased urbanisation, 'brain-drain' and a scaling down of 'marginal farming'.

The farms and estates closest to urban settlements have become places for living more than properties for sustainable farming. As a consequence, these changes have caused a reduction in agricultural land-use and former fields and pastures are now being invaded by trees and bushes (e.g. birch, rowan, alder, aspen, Scots pine, juniper and goat willow). A shift to plantation forestry was encouraged in the 1960s, 70s and 80s due to most of these farms having some hillside areas available. The condition for growing Norway spruce and to some extent Sitka spruce has proven to be very good indeed, with GYC of some 10-26 m³/ha/yr. Up to the 1980s plantations were therefore substituted for the spontaneous and open grown stands of birch, alder and pine. After the 1990s there has been a collapse in afforestation and presently the plantation area is decreasing.

Scots pine in the fjord-districts

In the mid-fjord, outer districts and Islands of Western Norway, the coastal (oceanic) Scots pine forest today occupies approximately 150,000 hectares. In addition the fjord pine (inner fjord districts) occupies approximately 190,000 hectares. Except for approximately 3,500 hectares of plantations all could be classified as semi-natural and natural regenerated pine forests (Øyen et al. 2006).

Knowledge of the history of the coastal pine is vital to understanding the structure of the present native woodlands. Heavy cutting of timber for overseas export to the Netherlands, Scotland and England took place in the 17th and 18th century, driven by available water power and the innovative saw mill technology. In the 18th century the sawmilling activity moved eastwards to the inner fjord districts, north to Central Norway and to the great valleys in southeast Norway. This was due to a great deal of the larger pine trees in the outer regions having been removed, leading to depleted resources in the outer regions. In most pinewoods the dimension cutting resulted in great patches, in woods with a more irregular structure and the cutting left behind rather homogenous shelterwoods and mixed stands. Due to an increase in the population; most of the pine forest areas were heavily grazed by the cattle and sheep of farmers up until the mid 20th century. After that time the eviction of farmers and structural changes turned the most fertile soils close to farms over to cultivated pastures. Simultaneously, numbers of deer rose considerably and have remained high to the present day. All these factors resulted in the large decline in Scots pine forest witnessed today.



Figure 1: Typical SP stand in fjord district of Sunnmøre, W. Norway. The stones seen in front were used for axe-processing in the woods before transport. Photo: Bernt-Håvard Øyen, NFLI.

Timber production, growth and yield, timber quality in the Scots pine forest

The coastal pine forests are characterised with a range in yield class from 2-6 m³/ha/yr, and often the pine is mixed with some downy birch. The bush layer is dominated with juniper. Highly dependent on

initial density and management; quality for timber is usually low to moderate. Duration of the regeneration phase is some 10 to 30 years (dependent on site fertility). A pre-commercial thinning (cleaning) is usually performed when mean heights are approximately 4-6 m, setting an initial density of 1600-2500 stems per ha (Fig. 1). On a few sites, if density allows and the forest owners are interested, a moderate thinning is performed when mean stand height is approximately 14-18 m. About 600-800 stems are left behind for the final harvesting operation after thinning. Pruning is rare in the oceanic pine forests. In protected sites the 'seed tree method' is applied (Fig. 2), in most sites elsewhere small clear-cuts and group cuttings are made. If the terrain allows, a patch scarification using small excavators has become the standard site preparation method. Rotation age varies from 80 years on the warmest fjord sites to more than 160 years on poor sites and in the mountain forests. On favourable sites the amount of saw-wood after a clear cutting could be 50-60 per cent of volume, on most sites 35-50%. Crooked stems, large branches and spike knots are important reasons for low yields on saw-wood. The cut to length limber is used to produce boxes, pallets and firewood. In most districts of W Norway the access to sell pulpwood is restricted and most of the tree is sold or processed for firewood and energy. The dimension for a mature pine tree is some 25 to 40 cm in breast height. Volume of special timber is rather low. However, a growing market is the "ancient villages, 'cultural sites' and conservationists' buying special pinewood qualities.



Figure 2: Seed tree method used in protected fjord site in Sunnmøre, W Norway. 20-40 trees per ha are left for seeding.
Photo: Bernt-Håvard Øyen, NFLI.

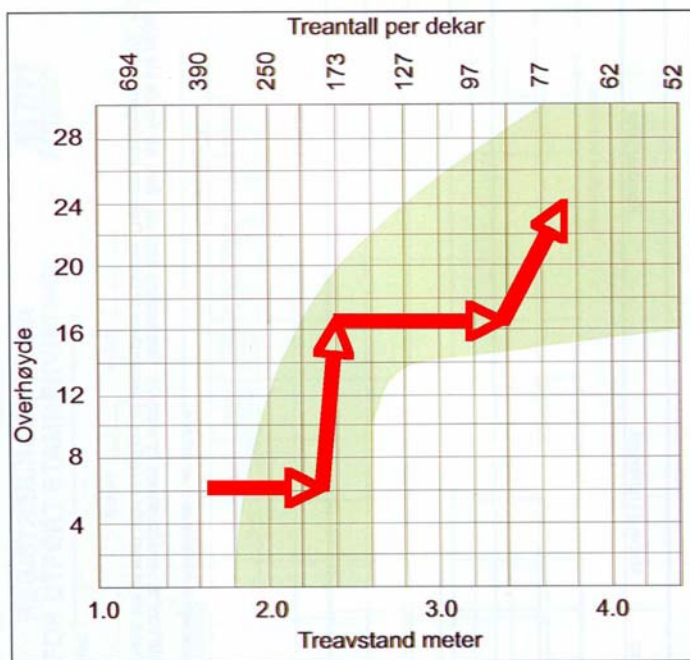


Figure 1: Density diagram for Scots pine in W Norway.
Program: A pre-commercial thinning at top height 6 m and a thinning at top height 16 m is proposed. Treantall per dekar=Density*0.1 ha. Overhøyde=Top height (m).

Casestudy – a ‘pinewood property’ in Sunnmøre, W Norway

To highlight the potential economic outcome from farm forestry we gathered some key data from a ‘typical farmer’ located in Sunnmøre, midway between the major cities Bergen and Trondheim, in Møre og Romsdal County. Mean summer temperature (June-Sept) is 11.8° C and the precipitation is approximately 1,600 mm. Some key figures are presented in tables 1, 2 and 3 below:

Table 1: Key figures on land area, timber volumes and annual cuts

Total area of the property	146.5 ha
Field land for agriculture	9.4 ha
Productive forest land	82.6 ha
Standing volume	Pine 5,553 m ³ , Spruce 2,382 m ³ , Birch 633 m ³
Recommended annual cut	250 m ³ (in latest forestry plan)
Annual cut	117 m ³ (from official statistics)

Table 2: Potential income from farm forestry.

Sale of firewood	75,000 NOK (50 m ³)
Sale of timber	78,000 NOK (50 m ³)
Sale from own sawmilling	200,000 NOK

Table 3: Activity data (official statistics) from the property 2006-2010.

Year	Cutting (m ³)	Timber prices	Value (NOK)	Planting (Nos.)	Pre-commercial thinning (ha)
2010	115	345	39,675	1,000	1.0
2009	168	190	31,920	1,500	0
2008	180	531	95,580	1,000	0
2007	41	489	20,049	0	3.5
2006	83	390	32,370	0	0
Total	587	1,945	219,594	3,500	4.5
Mean	117	389	43,919	700	0.9

All the firewood, planks, boards and beams are sold to the local market in the villages Nordfjordeid, Volda and Ørsta. When selling all available wood (Table 2) a possible annual income for this farm is approx 153,000 NOK or 1,852 NOK/ha (equals 247 Euro/ha). If time and suitable saw mill equipment is available for wood processing the potential income could be increased by about 50,000 NOK to 200,000 NOK. This particular farmer and his family do the final cutting, tending and some wood processing. Very often the forestry work is set aside to entrepreneurs outside the local community.

Acknowledgements

This work was financially supported by the projects 'Developing Scots Pine' and 'From ten to one'. I am very grateful to Elaine Anderson for comments on the draft.

References

- Øyen, B.-H. 1998. Scots pine forest in western Norway and some affinities with Scots pine forests in Scotland. *Norw. Jour of Botany* 56, 108-119.
- Øyen, B.-H. et al. 2006. Ecology, history and silviculture of Scots pine (*Pinus sylvestris* L.) in western Norway – a literature review. *Forestry* 79(3), 319-329.

Contact information

Bernt-Håvard Øyen

Norwegian Forest and Landscape Institute
Regional office of W Norway
Fanaflaten 4, 5244 Fana, Bergen, Norway.

E-mail: OYB@skogoglandskap.no