

Norway

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Summary

Up to ca. 1960, the forest sector was the largest export sector in Norway. Since then its importance has decreased, until in 2003 the export value totalled only 2.5% of the export sector. The import of forest products constituted a relatively higher share of the total import value than the export (about 3.3%). Pulp and paper, mainly newsprint, is the most important export product. The annual cut has declined 30 per cent over the last decade and in 2003 totalled about 7.5 million cubic metres. The reasons for this decline are not fully understood, but changes in ownership structure, low unemployment rates and good job opportunities outside of the forest sector and the abolition of cost-share programs are certainly some of the explanation. Private non industrial owners own 78.5% of the forest area and the average size of a forest property is 57 hectares. Almost all fellings are certified, and there is an intensive ongoing debate on the need for protection of a larger forest area. There is a large potential for developing non-wood products and services, and the forest owners association have companies and organisations dealing with this. There is a demand from both domestic and foreign customers for non-wood products and services but the co-operation with the domestic tourist industry still has to be improved to co-ordinate this effectively.

There is a weak entrepreneurship culture in the forest products industry, with a few regional exceptions. The culture is mainly production oriented and market competence and international orientation is needed. Compared with other industries in Norway the level of education is low in the forest products industry. A large public program was

started in 2002 to stimulate innovation and competence building activities in the forest products sector.

1. Consumption

1.1. State of the art knowledge and historical development

Norway has long traditions for using wood as the main material for construction. There is a total of 1,387,000 residential buildings in Norway. 79% of these are detached houses, of which more than 90% of them are built exclusively of wood. Houses with two dwelling units constitute 9% of all residential buildings, the same percentage as the category 'semi-detached' houses and houses with three or four dwellings". Wood is also to a large degree used in other kinds of buildings than residential houses.

There are considerable research efforts aiming at the use of wood for new purposes. One success story is the new use of laminated wood by the Moelven Group). The largest wooden bridge (the 182 metre long Flisa Bridge (Article on Flisa Bridge construction, Photo of Flisa Bridge under construction, Photos of other wooden Norwegian bridges including Flisa Bridge) the "Vikingskipet" (Viking Ship) speed skating arena built for the Olympic Games in 1994 (Photo revealing design to look like the bottom of a Viking Longboat) and the new Oslo Airport at Gardermoen (Some photos of Gardermoen and its wooden elements) are all examples of implementation of this new technology. There are relatively large research programs going on aiming at the increased use of wood for building purposes, in the fishing industry and other applications.

Considering non-wood products and services (NWFP&S), they traditionally used to be important in Norwegian society. In the farming communities grazing, the collection of fodder etc. constituted a significant part of input to the farms. The picking of berries and mosses were used as a means for monetary income into for the farming households as well as contributing to the household livelihood. As Norwegian society in general and farming households have evolved from an agrarian livelihood to more urban lifestyles, the NWFP&S, apart from hunting and fishing, gradually lost their importance. Today we can observe an increased interest in NWFP&S, as they are considered a possible vehicle of increasing rural economic activity.

1.2 Forest products' and services consumption

There are some 369,000 holiday homes in Norway, most of them owned by urban residents, and almost all of which are built from wood. The annual growth rate in the number of holiday homes over the last decade has been 2-3%. The trend for holiday homes is of growth in size with some of them being quite luxurious. The fastest growth is found around the ski resorts. A large number of the holiday homes are built from logs, which over the last decade has created a new rural-based industry. This industry is, however, quite labour intensive and there is considerable competition from low cost countries. Some Norwegian companies have also outsourced some of their activities to Latvia and Lithuania.

Several authors have been estimating the value of moose hunting in Norway. Henriksen and Storaas (1999) make a review of these studies and find that the yearly economic value of moose hunting is in the range of 60 million euros. Traditionally there has been

a conflict between urban and rural population concerning hunting and fishing. In many communities the local population pays less for hunting and fishing than hunters from the cities and towns. Gradually commercialisation of hunting and fishing is becoming more accepted as a rural industry.

Annual statistics on the total fellings are published yearly by Statistics Norway and roundwood balances and forecasts are published by the Norwegian Institute of Land Inventory (NIJOS). Statistics on home consumption at the farms and statistics on consumption of fuelwood is available but are not very reliable. Statistics on the export/import and consumption of forest products are also available. There are no statistics available about urban/rural consumption of forest products.

1.3. Summarize what are the main problems and research questions in consumption for enterprise development in the forest sector (incl. Wood processing, non-wood utilisation and services)

Some challenges:

- Consumer preferences for wood products versus the major substitutes. There are some studies available, but consumer tastes are changing. This could also include a monitoring system for consumer preferences. One way of studying this would be the use of experiments, which are widely used when studying preferences for food. Another is future forecasting and trend-analysis as is common in general consumer-studies
- Establishment of a better statistical database which can be used when new businesses make their market plans, this concerns both wood and non-wood forest products
- Co-operation between architects, engineers and economists in studying the competitiveness of wood as a raw material for different uses
- Market studies of the demand for non-wood products, both domestic and international customers
- Need for increased co-operation between the research institutes and universities in Norway
- Partnerships between timber based and non-timber based forest users

1.4 Annex to PART A: Organisations studying forest products' consumption and their speciality. Main publications and information sources on forest products' consumption in the country.

There are not many organisations that specialise in studies on forest products consumption. The Norwegian University of Life Sciences (previously known as the Agricultural University of Norway), Department of Natural Resource Management Available only in Norwegian provides research related to their M.Sc. program on Forest Industrial Economics. Some other research institutions have some single projects related to this topic. Statistisk sentralbyrå (Statistics Norway) has some data available but has not done any studies on this topic as an organisation. Some industrial organisations have some relevant activity going on, such as Treindustrien ([The Norwegian Sawmill Industries Association, some English available](#)) and Trefokus ([Wood Focus Norway, available only in Norwegian](#)).

2. Small-scale forestry practises⁵

2.1. State of the art and historical development

Small-scale forestry in Norway, as well as the domestic forest sector in general, is undergoing a significant transition attempting to achieve a greater degree of capability in adjusting to the new conditions. The structure with many small and fragmented properties is challenging both to the development of forest policy and to practical forestry as well as to research priorities. The real price of timber today is only half of what it was in the 1950's. The last decades generally have demonstrated decreasing activity in forestry, and investments in forest roads and silvicultural activities. The state of forest ownership has shown to be in transition: fewer owners combine forestry and agricultural production; larger forest properties tend to harvest more often than smaller ones; and an increasing number of the forest owners work and live away from their properties. A significant development was reached in 1996 when on the average farm, earnings from work outside the farm became more important than net income from the farm itself. In sum these developments put new demands on small-scale forestry practices in Norway.

2.2. Small-scale forest holding

There are approximately 120,000 forest properties in Norway that are potential suppliers of timber, a number that has been fairly stable over the last decades. Most of them are small, non-industrial farm woodlots. The average size of the productive forest area in the forest properties is 57 hectares. However, more than half the number of properties hold less than 25 hectares of productive forestland, and they constitute just over a tenth of the total productive forest area. Only one per cent of the forest owners owned more than 500 hectares of productive forest, while all of these areas made up almost a third of the productive forest area in Norway.

44 per cent of all forest owners also farmed in 1999, and they owned 43 per cent of the productive forest area in Norway. The number of combined farm-forest owners has dropped in the last 20 years, while the overall number of forest owners has remained fairly constant. The drop in the number of combined farm-forest owners indicates a decrease in active forestry for these areas as historically the forestry activities and farming have been closely linked.

Table 1. Number of forest properties and the share of farm-forests (Statistics Norway, 2001).

	1979	1989	1999
Forest properties (>2,5ha), total	120,930	125,522	120,471
Forest properties with agricultural area in use. (%)	62%	53%	44%

⁵ As will be revealed non-industrial landowners, often in combination with agricultural production, own most of the forest properties in Norway. Statistics for harvesting, investments etc. do not distinguish between ownership groups. But since farm-forestry is so common the figures for development in forestry will be almost fully compatible to small-scale forestry practices.

Non-industrial private forest owners (NIPFs), including farm forests, hold 97% of the forest properties while they own 78% of the forest area. The size and structure of the NIPF holdings have been stable the last decades and forestry in combination with agriculture has traditionally been important for the economy in farms.

Table 2. Number and size of forest properties divided in ownership groups, 1989

	Properties		Forest area	
	number	share of total	thousand hectares	share of total
Private non-industrial owners	122,236	97.4%	5,502	78.5%
Company owned	1,393	1.1%	424	6.0%
Governmental	1,162	0.9%	831	11.8%
Others	731	0.6%	256	3.6%
Total	125,522	100.0%	7,012	100.0%

Source: Statistics Norway, 2004.

Table 3. Distribution of forest properties after size class, 1967-1989.

	Total	2.5-24.9 ha	25-99.9 ha	100-499.9 ha	500 ha >
1967	128,337	81,488	36,025	9,638	1,186
1979	120,930	71,757	37,125	10,856	1,192
1989	125,522	72,485	40,004	11,817	1,216

Source: Statistics Norway, 2004.

Forest owners who also farm have an average of 4.4 fewer hectares of productive forest area than pure forest owners, but with major differences among the counties. On the other hand, in half the counties, combined farmer-forest owners have more productive forest than pure forest owners. There is a correlation between the size of the forest area and farming area in production among combined farmer-forest owners, so that forest owners who farmed lots of land owned a considerable amount of forest and vice versa. Combined farmer-forest owners logged more often than forest owners who did not farm. On a national basis, combined farmer-forest owners accounted for half the quantity cut for sale. Large forest properties were logged more often than small ones (Statistics Norway, 2001).

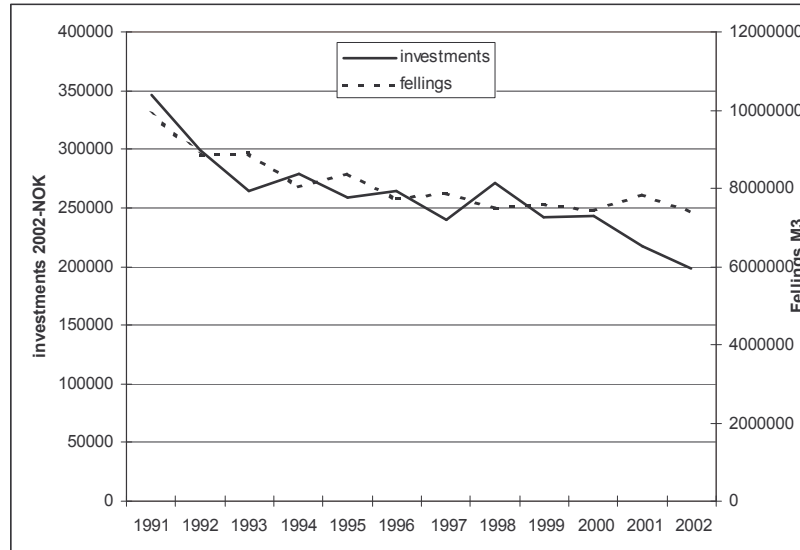
2.3. Small-scale forestry practices

Forestry in Norway faces huge challenges; its share of the gross domestic product has declined significantly over the last decades and now accounts for only 0.2% to the national economy. Approximately 5,500 persons are employed in forestry. With our farm-forest structure, there is also a significant amount of self-employed labour contributed by the farmers (estimated to be 2,200 man-years in 2002/2003⁶). That gives a total of 7,700, some 0.35% of the total employment.

Contrary to the experience in neighbouring countries, the total industrial fellings in Norway (fuelwood and home consumption at the farms excluded), have declined approximately 30% over the last decade and reaching 7.5 million cubic metres in 2002 (Statistics Norway, 2003a). The distribution of species is 77% Norway spruce, 22%

⁶ <http://www.ssb.no/emner/10/04/10/lu/tab-2004-05-07-02.html>

Scots pine and 1% non-coniferous species. Contrary to the developments in domestic cut and exports, imports of timber have increased from 1 million cubic metres to 3 million cubic metres during the same period. The total domestic consumption of timber has consequently been much more stable.



(Statistics Norway, 2004).

Figure 1. Developments in total felling and investments 1991-2002

As Figure 1. shows, a corresponding drop in forestry investments has followed the drop in harvesting. In 2002, there were 26 million euros invested in silvicultural activities, reforestation and drainage. About 16,000 hectares were planted and 8,300 hectares of ground were prepared (Statistics Norway, 2003b). The regulation for forest drainage support has been changed because of the discussion of possible negatively environmental effects of bog drainage. As an effect the extent of forest drainage has declined sharply. In 2002, only 390 hectares were drained, which accounts for a mere 4 per cent of the area drained in 1988 (Rogstad 2003). The drop in investment in silviculture has continued in 2003, the main reason being that cost-share programs to support silvicultural investment were abandoned.

An increasing share of the forest area is no longer subject to active forest management. Just about half of the forest area is now managed with economic profits from harvesting as the objective. The other half is forests that are not suitable for commercial forestry either for biological or economic reasons. To some extent declining timber prices can be outweighed by more efficient harvesting, i.e. an increasing share of the harvests conducted mechanically by others than the owner herself. In the past, the forest owner conducted fellings on the NIPF holdings, but today an increasing share of the fellings are outsourced and conducted mechanically. The 1999 farm census (Statistics Norway, 2001), showed that the forest owners accounted for only 16 per cent of fellings and 18 per cent of hauling. 78 per cent of the timber sold was cut and hauled by forest contractors. The use of harvesters is more common on larger than on smaller properties. Commonly the fellings are clear-cuts with an average size of approximately 1.5 ha. Lately there has been an increased interest in closed-form fellings. Regeneration and

silviculture activities are conducted manually either by the owner or outsourced to others.

Concerns over impacts of the far larger and more powerful forest industry firms led to the establishment of regional forest owners' associations (FOA's) in Norway at the end of the 19th Century. During the first decades the FOA's amalgamated into 19 independent associations. Their main task was to conduct price negotiations with the purchasers, but they also had a significant role in exploiting economics of scale in brokering timber from the small wood lots held by their members. Most forest owners are members of one of the remaining 9 regional associations under the Norwegian Forest Owners Federation. These associations conduct timber sales, consulting activities and forest planning for their members. The significance of the forest owners' cooperative in Norway is illustrated by the fact that three-quarters of the industrial roundwood in Norway today is brokered by the 9 regional FOA's (Størdal, 2004).

There also exist some direct sales to the industry, as well as a few independent brokers. One of the independent brokers is Norskog, which actually also is an FOA that traditionally organized the larger, industrial forest owners, and is thus not a part of the Norwegian agricultural cooperative system. Most timber is sold cut-in-length (logs of specific lengths) by the forest owner. The chronology in the FOA/forest industry price negotiations is that prices are set for different seasons each year (e.g., winter, summer and fall). The FOA informs their members of the outcome, which for sawlogs depends on a price matrix consisting of stem diameter and log length for various grades. A forest owner notifies the FOA of his planned harvesting schedules, which in turn plans transportation and distribution of timber to the mills. The FOA pays the forest owner according to the price matrix, and according to various bonus arrangements.

The Norwegian Agricultural Economics Research Institute's annual account statistics for agriculture (Rogstad 2003) shows that for the farms included in the separate forestry statistics (About 200 properties out of 1000 participating farms), forest income represented 18 per cent of the total net farm income from both forestry and agriculture in 2001. However, the forestry's share of the average household income is only 2 per cent. Even in Eastern Norway, where forestry is relatively important, forestry accounts for only 4 per cent of the total household income for the average property. This means that income from outside the property has become increasingly more important.

Since an increasing share of the forest area is becoming marginal for economic forestry, goods other than wood and fibre have received attention. Some of these goods might be exploited by single owners or by an association of owners. For many of the owners, game and fish resources have become a significant source of income, often combined with offering accommodation and other kinds of arrangements. In many districts the combination of management of deer-game and forest management has not been optimal, especially if one takes grazing damage on young forest stands into account. Moreover, a significant part of the goods related to forests are collective goods like landscape or ecosystems values. Wood for bio-energy purposes will probably be more important in the years to come as well as production of Christmas trees which has turned out to be profitable for an increasing number of forest owners.

Small-scale forestry manages a great number of environmental values. Large numbers of the 'red-listed' species are found in these areas. In connection to the 'Living Forests' project, there was established a consensus on a number of standards for sustainable forestry that were implemented into certification systems. Certification demands good documentation and this is a challenge for small-scale forestry with 120,000 owners where the rotation time is 70-150 years. Further a debate is ongoing concerning the need for and the extent of forest protection. The environmental NGO's claim a need for a 5-15 fold increase of protected areas and that the harvesting in non-protected forests mainly shall be done as closed-form harvesting, i.e. not clear-cutting.

2.4. Policy framework and production conditions

In Norway there are basically three policy levels:

- The national level (Ministry of Agriculture)
- The regional level (County governor)
- The local level (Municipality forester).

The Ministry of Agriculture is responsible for the general forest policy, regulations and the forestry Act. In addition the Ministry of Environment is responsible for certain conservation acts that influence forestry activities.

The County governor has an agricultural division, which has a special responsibility to ensure a sustainable long-term management of the forest as a resource for profitable industries; an infrastructure that allows for effective harvesting; and environmental considerations. The Governor shall co-operate with forest owners and others to encourage small-scale, wood based industries. The Governor helps municipalities in areas like forest road planning, silviculture and environmental questions. Coordinating forestry planning in the county, managing the forest taxation, state grants and supervision.

The Municipality forester is responsible for implementing the state policy at the municipality level and is responsible for contact with the forest owners. A change is planned so the municipality will have a significantly more important role in implementing the forest policy in the years to come, i.e. in distributing state grants on the basis of the municipality's own criteria and priorities.

The forest policy was last revised in 1998 in a White paper to the Storting (Norwegian Parliament). (Stortingsmelding nr.17 [1998-1999]). Here the government presented the guidelines for a comprehensive forest policy for forestry and the forest industry. The government emphasised both forestry's role as an income generator and that forests also play an important role in the conservation of biodiversity, for recreation purposes and thus contribute positively to human health and well-being.

State subsidies and the Forest Trust Fund give the main policy incentives. Traditionally, priority has been given to support silviculture, road construction and forest management schemes. The state subsidies have been reduced over the last years and in 2003 the forestry received about NOK 286 million in public subsidies, corresponding to approximately 12 percent of the gross timber value (Rogstad, 2003). A dedicated programme aiming at supporting value creation from timber utilisation and processing

was launched in 2000. This programme was given NOK 36 million in 2003 from State grants. Silvicultural activities were allocated NOK 14 million in 2003. These subsidies are now being phased out and replaced with more favourable rules for the usage of the Forest Trust Fund. The forest owners are obliged to set aside between 4 and 40 per cent of the income from timber sales. If the withdrawn funds are used for silvicultural measures, up to 60 per cent of the sum remains free of tax.

Sales of agricultural and forest properties are strongly regulated in Norway. The authorities must approve prices and new owners of properties larger than 10 hectares (until 2004: 2.5 hectares). In addition there are regulations that favour transactions within the family and also certain regulations prohibit selling out parts of the property. The regulations for property transaction have been heavily criticised for cementing the structure of the properties and giving no incentives for innovation.

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

Supporting factors

- A dedicated ‘value–creation programme’ for forest-based industries has been launched
- Increased attention toward non-wood forest products such as recreation, hunting and fishing, but also new and increased demand from ‘second-home’ living and cabins. These factors can be a source of future income on the forest properties
- Start-up subsidies and cheap loans from Innovation Norway.

Limiting factors

- Forestry income is becoming marginal to the landowners
- The level of conflict between commercial and multiple-use forestry has become more intense
- The regulation of property transactions is very restrictive to the property structure
- Forestry activities are followed by a number of governmental (nature conservation) and non-governmental regulations (certification)

Annex B: Organisations studying small-scale forestry and main publications and information sources.

Research in forestry is provided by a range of universities and institutions.

- Besides providing research, Universitetet for miljø- og biovitenskap, Institutt for naturforvaltning ([Norwegian University of Life Sciences, Department of Natural Resource Management](#)) is the only institution providing teaching at the Masters and Doctoral levels. The university (UMB) provides research related to all aspects of forestry.
- Bachelor level education is provided by Høgskolen I Hedmark ([Hedmark College](#)) and Høgskolen I Nord-Trøndelag ([Nord-Trøndelag University College](#))
- The leading research institute in areas related to forestry is Skogforsk ([Norwegian Forest Research Institute](#)), which is an autonomous institute under the Ministry of Agriculture. Skogforsk aims to strengthen the scientific basis for the management of forest resources, the creation of wealth from forests and countermeasures against environmental problems in forests.

- The Norsk institutt for jord- og skogkartlegging, NIJOS ([Norwegian Institute of Land Inventory](#)) is Norway's major supplier of data on soil, forest, outfield and landscape resources. The information supplied by NIJOS is vital for agriculture, forestry and other land-based enterprises, as well as for land-use and environmental management. NIJOS provides basic, unbiased biological and environmental data, which is required in order to ensure the sustainable utilization of our natural resources. NIJOS is an independent, public institute under the Norwegian Ministry of Agriculture.
- There are also a number of regional research institutions, of which Østlandsforskning ([Eastern Norway Research Institute](#)), Møreforskning Volda ([Møre Research Volda](#)) and Bygdeforskning ([Centre for Rural Research](#)) are some relevant examples.
- Skogbrukets Kursinstitutt ([Forestry Extension Institute](#)) provides extension services and training related to forestry. In general the role of national state forest services in providing extension services, training education and research is generally good.
- The main publications are the journals *Norsk Skogbruk* ([Available only in Norwegian Only](#)) that is published by Det norske Skogselskap ([The Norwegian Forestry Society, website only in Norwegian](#)) and *Skogeieren* ([Available only in Norwegian](#)) published by the Norges Skogeierforbund ([The Norwegian Forest Owners Federation](#)).
- In addition there are a number of websites where various information (largely directed at forest owners) on Norwegian forestry can be obtained (e.g., www.skogsnorge.no, www.skoginfo.no, www.skog.no)

3. Wood processing industries

3.1 State of the art

Norwegian wood processing industries comprise primary processing activities such as sawmilling, pulp and paper production and the manufacturing of wood panels as well as secondary processing such as millwork, wood working and construction. Value added in primary processing is limited.

The wood processing industries historically have contributed substantially to the domestic economy. After abolishing exclusive timber concessions and sawmilling privileges in the nineteenth century, investments in Norwegian wood processing industry soared, and the sawmilling industry grew rapidly making Norway one of the dominant European sawnwood exporters. The relative importance of the wood processing industries has declined after the Second World War – in particular after the commencement of income from offshore natural gas and oil resources. In 2001 the total domestic output value from primary and secondary wood processing was approximately five percent of GDP. Wood processing industries have, however, remained important in some regional economies.

Research institutions

Research related to entrepreneurship and small scale industries in the forest sector does not have a long tradition in Norway. Three institutions have dominated Norwegian forest research: The Norwegian University of Life Sciences (UMB), the Norwegian Forest Research Institute (SKOGFORSK) and the Norwegian Institute of Land Inventory (NIJOS). Research has mainly focused on silviculture, forest inventory, forest

economics, forest operations and wood technology.

Topics related to wood technology, industrial processing, construction and engineering have also been addressed at Norges teknisk-naturvitenskapelige universitet ([The Norwegian University of Science and Technology, NTNU](#)). NTNU has a strong program in construction and architecture, and are coordinating all efforts on wooden construction in TRESENERET ([Only available in Norwegian](#)). Both the wood processing and the pulp and paper industries have established their own research organisations Norsk treteknisk institutt, NTI ([Norwegian Institute of Wood Technology, some English available](#)) and Papirindustriens forskningsinstitutt, PFI ([Only available in Norwegian](#)), and recently regional research centers Østlandsforskning ([Eastern Norway Research Institute](#)) and Møreforskning Volda ([Møre Research Volda](#)) have contributed to the forest research.

Research questions

Research questions related to the Norwegian wood processing industries and small and medium sized businesses are main issues:

- Business structure; size, economies of scale, raw material procurement, production efficiency
- Location: competitiveness of domestic industry, investments abroad
- Networks: the Norwegian forest cluster, logistics and business environment, technical know-how and entrepreneurial networks
- Competence, educational facilities: relevant programs in education at different levels
- Innovation: investment in research and product development, product development and design: adapt products to markets, ability to implement business ideas
- Niche strategies: development of business opportunities directed towards small defined market segments

3.2 General information on wood processing industries in the country

The lumber industry developed into the most important export industry in Norway around 1500 AD with England being the most important market. The King gave privileges to some business men in the towns and the forest owners were not allowed to saw timber for export purposes. This policy lasted till about 1850, when England introduced an import tax on Norwegian lumber to protect the lumber from Canada, Lumber mills went bankrupt, the King abolished the privileges and many new sawmills were established. The sawmilling industry remained small-scale with many owners until only the last 20-30 years, where there has been a rapid structural development. For some years now, the largest part of the market has consisted of only 3-4 groups, some of them international, these mills concentrate on both export and on large domestic customers. A smaller part of the market, dominated by SME's, concentrate on niche markets and local and regional markets.

There are no studies of entrepreneurship and the wage earner's culture in the wood processing industry in Norway other than some historical works and novels. Historically the wage earner's culture has been very strong in both the saw-milling and the pulp and paper industry. The labour party has always been very strong in places dominated by forest industries. The small firms in the wood processing industry in the countryside are a bit different, here the owner is mostly taking part in the production process and there

is no big difference between the owner and the workers. There are no examples of labour co-ops in this industry in Norway, but the forest owners associations have from time to time been important industrial owners.

There are few examples of fast growing innovative firms in this sector. The sector is known to have a low innovative activity (Jacobsen et al 2001). Industrial clusters can be found in the furniture industry in the Sunnmøre Region (approximately the southern and western 40% of Møre og Romsdal County) in Western Norway. In this area there is limited forestry and a strong fisherman culture. No good explanations for the Sunnmøre Region cluster exist but one hypothesis is the fishermen started furniture production in times with low fishery activity.

3.3 Structure of wood processing industries

Including millwork, furniture and fixtures and construction, the total production value of the wood processing industries account for approximately NOK 76 billion, approximately 5% of the gross domestic product,

Table 4. Production, value added, and employment in the forest sector in 2001. Values in million NOK, employed persons in 1000 persons. Source: Statistics Norway (SN), National accounts.

	Gross Product	Compensation of Employees	Operating Results	Fixed Assets	Export	Import	Employed Persons ¹⁾
Sawmilling and wood processing industry	6,573	4,142	623	8,690	2,824	6,025	15.5
Pulp, paper and paper products	7,369	3,600	987	22,020	14,020	7,022	9.9
Furniture and fixtures	5,755	3,600	1,188		4,651	10,567	14.8
Construction	56,710	42,229	15,144		—	—	135.8
Total Wood Processing Industries	76,407	53,571	17,942	147,920	295,840	591,680	176.0
Total Mainland Norway	1,526,232	677,825	429,187	3,743,194	698,876	441,869	2,315.5

Note: 1) in thousand

Primary processing

The primary wood processing industry produces a wide range of products, cf. Table 5. The pulp and paper industry and sawmilling dominates the domestic primary wood processing industries. Pulp mills are large industrial units located in, or in the vicinity of urban areas. Pulp and paper production is capital-intensive and the business concentrates on capacity and quality rather than value added. The pulp and paper manufacturers depend on large timber procurement areas and imports.

The size of Norwegian sawmills varies considerably, reflecting the fact that goals and production strategies are diverse. Mills are located throughout the forested regions; there are both large mills focusing on capacity and product homogeneity (quality) as well as medium sized and small mills, focusing on product quality, niche strategies and

customised production. Most commercial sawmills use roundwood of local origin. Production of wood based panels is of minor importance.

Table 5. Quantity produced and production value, processed wood products (2001).

Commodity	Unit	Quantity	Value
Wood chips or particles	kg	..	236,500
Wood waste and scrap (including agglomerated), sawdust	kg	..	131,927
Poles	m ³	16,443	50,572
Sawn wood	m ³	..	1,854,283
Other wood	m ³	..	497,908
Planed wood	m ³	1,015,305	2,053,141
Plywood	m ³	..	82,178
Particle boards	m ³	3,876,065	1,168,006
Pulpwood and pulp of other fibrous cellulosic material	kg*	728,428,000	2,829,580
Paper and paperboard	kg	2,321,204,870	11,230,035
Of which :			
Graphic paper, paperboard	kg	596,899,000	3,144,070
Cellulose wadding, crepe paper, tissues, other paper stock for household, kraftliner, kraft paper, fluting paper	kg	332,227,570	1,276,600
Sulphite wrapping paper, paper and paperboard based on waste paper, felt paper and paperboard, filter paper and paperboard	kg	145,202,850	558,070
Other paper and paperboard, paper and paperboard coated with wax, oil, plastics; paper laminated with bitumen; self-copy paper	kg	46,947,650	439,077

* Converted to weight with 10 per cent water.

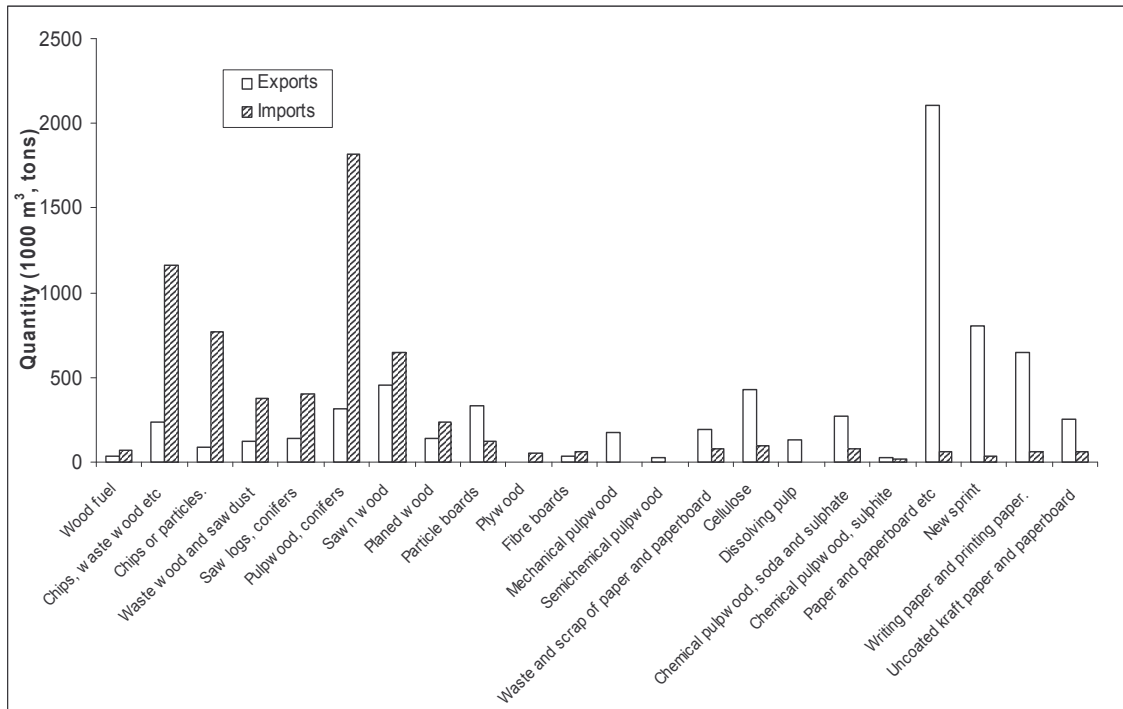
Source: Statistics Norway (SN), National accounts

Table 6 reports economic activity in the primary wood processing industries, value added is mainly from sawmilling and pulp and paper. Products from the pulp and paper and wood based panels industries are exported, while Norway is a net importer of sawnwood, cf. Figure 2.

Table 6. Descriptive statistics, wood processing industries (2001).

	No. Firm s	No. Employe d	Wages (includin g social costs)	Total sales, turnover	Productio n value	Value added (market prices)	Gross investment s
Sawmilling and planing	296	4,365	1,258,501	8,148,956	8,042,506	2,640,564	235,144
Plywood, fibre- and particleboard	29	1,477	481,736	2,042,633	2,019,856	522,931	50,502
Wooden packaging	51	376	92,210	404,055	393,147	122,120	10,879
Other processed wood	89	510	122,613	366,990	335,696	160,618	17,846
Pulp, paper and cardboard	33	5,664	2,335,288	16,391,388	16,429,235	5,632,793	580,769
Items made from paper and cardboard	62	3,083	1,093,484	4,457,271	4,196,470	1,449,129	120,334
Total wood processing	560	15,475	5,383,832	31,811,293	31,416,910	10,528,155	1,015,474

Source: Statistics Norway (SN), National accounts.



Source: Statistics Norway (SN), National accounts.

Figure 2. Imports and exports of processed wood products (2001).

Secondary processing

Construction dominates the secondary processing (refer to Table 7) the construction sector is therefore the largest domestic consumer of lumber and wood-based panels. Due to tradition and customer preferences, Norwegian housings are usually constructed from wood. It should be noted that the numbers reported for construction refers to all construction activity, both wooden and non-wooden constructions. A substantial amount of the inputs used in the construction sector are imported.

Prefabricated housing, millwork and manufacture of furniture and fixtures are the dominant wood consuming industries (refer to Table 7). Prefabricated housing and millwork are important due to the preferences for wooden housing. The production of wooden furniture and household effects has a long tradition in Norway. Even though traditional woodworking was based on craftsmanship, a commercial furniture industry was established during the twentieth century. The furniture industry includes firms making both wooden and non-wooden furniture. Production of wooden households' effects and handicrafts is still conducted, but the economic importance of such activities is limited.

Table 7. Descriptive statistics, furniture manufacture and construction (2001). Includes non-wood inputs.

	No. Firms	No. Employed	Wages (including social costs)	Total sales, turnover	Production value	Value added (market prices)	Gross investments
Prefabricated houses and millwork	484	7,581	2,135,312	8,368,119	7,975,665	2,685,710	195,325
Furniture for housing	144	4,039	1,131,469	4,192,471	4,053,007	1,432,175	109,942
Furniture for offices and shops	75	997	312,051	974,947	933,476	403,259	48,517
Furniture for kitchens	97	1,541	434,172	1,757,850	1,579,259	560,405	18,049
Other furniture	179	2,480	659,950	2,577,019	2,424,230	712,286	108,910
Buildings and multi-storey constructions	11,099	48,105	14,005,800	62,246,700	62,211,500		1,080,200
Roofing	1,084	3,819	1,013.3	3,283.4	3,267		111.1
Total furniture and construction	13,162	68,562	4,687,983	17,935,946	3,267	5,793,835	481,937

Source: Statistics Norway (SN), National accounts

3.4 SME wood processing industries practices

Currently there is no information available on share of wood used by Small and Medium Sized Enterprise (SME). There is also no information available on SME's practices. There are some case studies from certain regions available. They show a large variation within the industry. Most SME's seem to focus on local and regional markets and on survival and not on growth, they are product and not market oriented and they use very little resources on innovation and product development. Most of the workers are unskilled, the salaries mostly low, and the employees do not recommend this type of work to their children. The management is mostly not very professional, and innovation is mostly done as an evening and weekend activity. But at the same time the people working there enjoy their work and seem to be satisfied with their situation.

We think this quite negative characteristic of the wood processing industry applies to most of the SME's in this industry. There are, however, some new firms which seem to have better profitability, more professional management and growth aspirations. In one study those firms were found to have clear goals (a written business plan) and also good co-operation with their customers.

There are some formal networks. Those networks that seem to work well are those that originated based on a need from the actors themselves. One example is Norsk Bygdesag Forening ([The Organisation of Rural Sawmills, available only in Norwegian](#)). This organisation has 431 members all over Norway and supplies the members with very relevant services. Networks that are created by public authorities seem to exist for as long as they get public sponsorship, after that the activity decreases.

In Norway there is statistics available on new enterprise formation generally, but not specifically for our industries. Case study evidence, however, indicates that the business turbulence is relatively low and the same applies to the rate of formation of new businesses.

3.5 Policy framework and production conditions

The policy framework related to research, education and training has become more business oriented, and now has a stronger focus on entrepreneurship and business development. For example, the Norwegian Ministry of Agriculture has established Treprogrammet ([Available only in Norwegian](#)), a public fund devoted to business development in the domestic forest sector. Effort has also been directed towards developing educational programs that are relevant for commercial forestry and forest industries. At UMB a masters program in Forestry Business is established and a program focusing on regional economies and nature based value creation is currently under development.

At the business level, efforts are made to facilitating the establishment and success of small scale forest industries, i.e. through earmarked transfers to regional business. The political impact of the forest sector and small scale industries is, however, limited. Family-ownership is common, and the Forest Owners' Organisations have made strategic investments in wood processing industry. Large forest industry receives less public economic support. Capital is usually provided by private (and institutional) investors. The large forest processing enterprises can, to a certain extent, influence policymaking and political decision making power, mainly because of its regional importance.

3.6 Annex to part C: Organisations studying wood processing and their speciality. Main publications and information sources on wood processing industries in the country

There are a number of organisations that study aspects related to wood processing:

- Norsk Treteknisk Institutt ([The Norwegian Institute for Wood Technology](#)) is a research institute owned by the saw-milling and woodworking industry.
- Universitetet for miljø- og biovitenskap, Institutt for naturforvaltning ([Norwegian University of Life Sciences, Department of Natural Resource Management](#)) and Skogforsk ([Norwegian Forest Research Institute](#)), both have a significant activity and co-operates with the Norsk treteknisk institutt, NTI ([Norwegian Institute of Wood Technology, some English available](#)) in the umbrella organisation [Treforsk, available only in Norwegian](#).
- Norges teknisk-naturvitenskapelige universitet ([The Norwegian University of Science and Technology, NTNU](#)) in Trondheim has a Wood research centre and Innovasjon Norge [Innovation Norway, limited English availability](#) has a large Research and Development program on wood-based value creation.
- The business schools in Bergen and Oslo have also had some studies of aspects of the wood processing industry and its competitiveness in Norway.
- Some regional research institutes have some research activity too.

4. Non-wood forest products and services

4.1 General information on forest related non-wood products and services in the country.

Non-wood products (and services) were traditionally an important part of the general livelihood for Norwegian farmers and were harvested for use at home. Grazing, collecting grass and leaves for fodder, berry picking, hunting and fishing, cutting peat for heating and cooking, and various plants/trees had their uses in traditional medicine.

During the 20th century the Norwegian society experienced major changes that to a large degree have affected the traditional use of these non-wood products and services. The large-scale afforestation of (western) Norway and the intensive use of infield crops as a substitute for the extensive use of outfields-grazing, along with the general trends such as industrialisation, urbanisation and a general increase in wealth, rendered the various out-field and forest activities relatively unprofitable. The historical 'Everyman's right' to access and use of most non-wood resources serves as an obstacle to the establishment of commercial resource use but perhaps also serves to prevent the dangers of commercial over-exploitation.

These societal, economic and environmental changes also led to increased numbers and ranges of large mammals like moose (*Elg, Alces alces*), deer (*Hjort, cervus elaphus*), reindeer (*Villrein, Rangifer tarandus*) etc., and this led to increased hunting. Hunting is excluded from the everyman's right and thus can be viewed as having economic potential for the landowner. The marketing of meat, hunting rights and complete packages for travel, accommodation and hunting all are potentially economically viable.

Today there is again a focus on non-wood activities in Norway. This results from both national and local efforts attempting to countermeasure the decrease in local-based economic activities, rural out-migration etc. New niche opportunities, such as some non wood-products, and especially services, are viewed as potential vehicles for creating rural economic development.

NWFP&S definition, classification and relevance in rural economies

1. Biological products:

Hazelnuts:

(*Hassel, Corylus avellana*) were traditionally a marketed product. Due to the general climate in Norway, they were grown only in southern parts and some 'pockets' along the coast (e.g. Innerdalen in Møre og Romsdal). There is no longer any commercial activity in this field.

Bark:

Bark, especially from birch (*Bjork, Betula spp.*) was collected for various usages. The main use of the birch bark was to use it as the underlying layer beneath sod or grass roofs that historically were extensively used in Norwegian rural housing. Bark was also collected for use in various handcrafted products, baskets, etc. Bark today is of negligible commercial value, but the skills of using it are kept alive by voluntary efforts in local societies.

Branches, roots and seedlings:

As for bark, these were also collected for various uses in handicrafts. There can be observed an increased attention to such commodities today, but mostly for hobbies etc. No commercial importance.

Berries:

Berry-picking was an important non-wood product at the farm household level, first and foremost for self-consumption, but also to some degree for commercial exploitation. Today the commercial activity is mainly connected to Northern Norway where cloudberries (*Molte*, *Rubus chamaemorus*) are picked for sale (the commercial picking of cloudberries is by law exempted from the everyman's right in Northern Norway)

Herbs:

Herbs have been used in local medicine and for assisting in death. Currently herbs have little commercial value but do offer potential for future pharmaceutical development as well as for niche products, soap, perfume etc.

Grass and fodder:

This was the most important component in traditional Norwegian society. The right to extensive summer grazing and gathering of fodder from the out-fields were an important part of farm activities up until the 1930's. Since then it has lost much of its significance for cattle but remains a major activity for handling sheep and goat grazing. The Norwegian society experiences a conflict of interest regarding this grazing, as it conflicts with the re-introduction of carnivores such as wolves and bears.

Greeneries (For florists and decorators):

We have seen an evolving market for this, as there is an increased demand for various greeneries to be used for decorative purposes. According to estimates from Norsk Pyntegrønt ([Available only in Norwegian](#)), the Norwegian annual consumption is approximately 800,000 kg, of which the domestic production amounts to some 250,000 kg.

Moss and Lichen:

Moss and lichen were used in traditional society for animal fodder, for building insulation and so on. Today they still are important as food for the domesticated reindeer herds of the Sámi people. There is minor consumption in connection with greeneries but no comprehensive overview exists of this use.

Mushrooms:

Mushrooms or fungi of any kind have never been an important part of Norwegian cuisine. The use of mushrooms is generally considered to be practised by urban and higher educated people and thus, the typical mushroom picker will not be amongst the forest-owners or the local population. Despite this, we see increased mushroom picking for self-consumption under everyman's right. There are a few attempts of commercial usage of mushrooms (Norsopp, [Available only in Norwegian](#)) as an example).

Honey, Beeswax:

Beekeeping has been a traditional activity in Norway although never on a large scale. In total some 5,000 people in Norway are involved in honey production, with only half being involved commercially. The yearly average production has been approximately 780,000 kg. The national cooperative for honey-producers [Honningcentralen AL \(only in Norwegian\)](#) has 10 employees and an annual turnover of 6 million euro.

Christmas trees:

Norway has approximately two million households and traditionally virtually every household has to have a Christmas tree. This was traditionally a side-activity for forest-owners, using thinnings etc. to supply the market. Recently, Christmas trees are increasingly being considered a ‘crop’. This is a highly competitive market especially with regards to imported Danish trees. Also, in local rural areas, there have been problems with marketing (as the trees are grown rurally and often far from the population centres), quality control etc. Despite these challenges, the sector is considered a promising one with increased growth anticipated. Perhaps the greatest opportunity may be in the periurban areas where the cutting of the Christmas trees can be marketed as an ‘adventure’, so you sell the experience of getting the tree as well as the tree itself. The annual consumption amounts to some 2 million trees. If we correct for the use of plastic trees and trees cut from people’s own forests, the total market is around 1.6 million trees, out of which some 400,000 are imported.

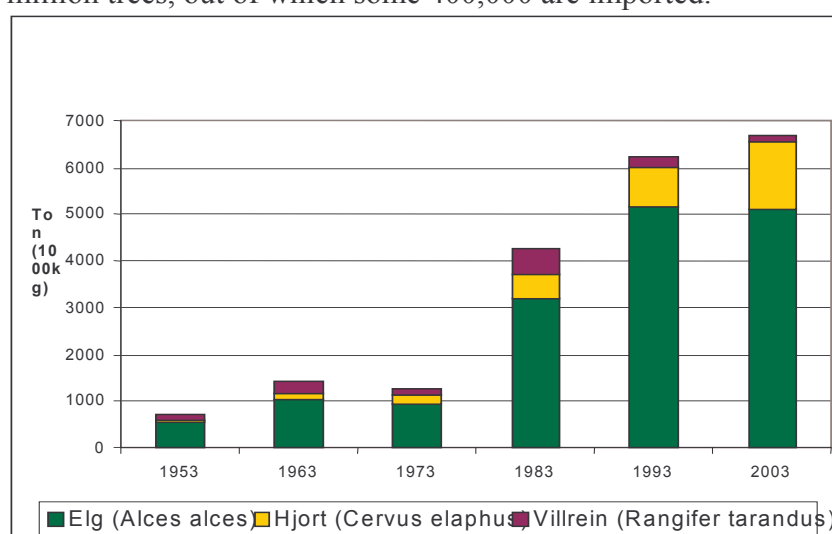


Figure 1 Big game hunting, dressed meat weight, 1953 - 2003, 10 year intervals

Hunting and fishing:

In its various forms, this is the largest activity. As mentioned earlier, one of the effects we’ve had from the restructuring of Norway into an urban society has been increased ranges and populations for the larger wild animals such as moose and deer. One result of this can be seen in Figure 1 showing the increase. The total volume has increased from ca 700 tons (in the ‘50s) up to almost 70,000 tons today.

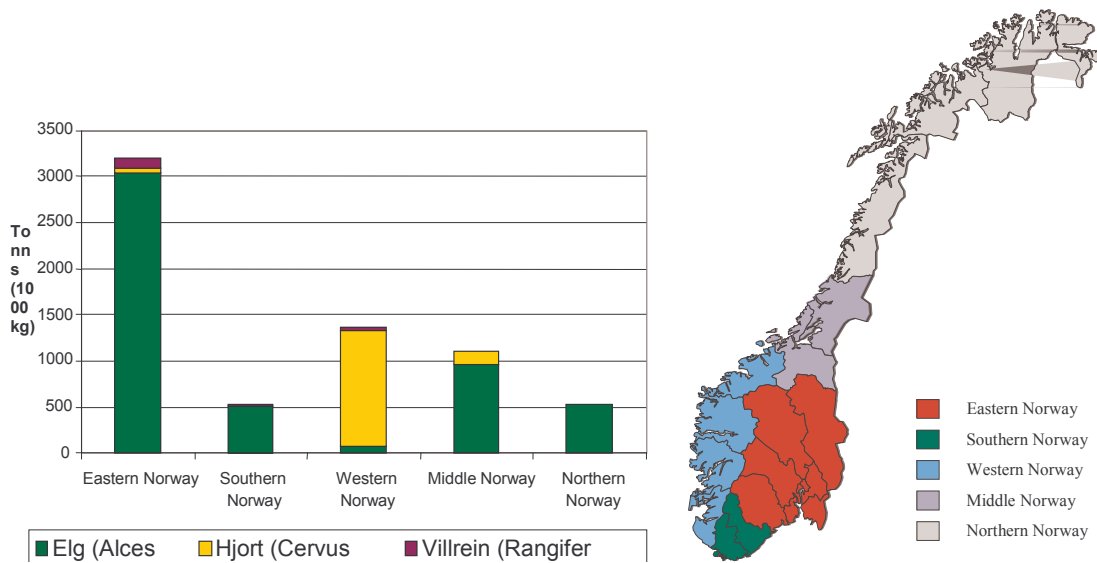


Figure 2 Big game hunting, distributed by regions 2003. Figure 3 Norway's Regions

The second graph shows how hunting of the various species is distributed around the country. Eastern Norway being the main region and moose being the main species. Deer is almost exclusively hunted in western Norway. Reindeer is also mainly hunted in the mountainous areas in eastern Norway. The production of domesticated reindeer by the Sami people is not included in this statistic.

The right to use of the resource is exclusively connected to ownership of land (forest or other kinds of outfield), and it has evolved from a way of getting meat for the household into a commercial and marketable product that in many cases has higher value for the forest owner than what can be gained from traditional forest products. The total value of hunting is hard to estimate, as we have no good system for gathering information about the sale of hunting rights, lodging, food, transportation etc. When we calculate the first hand value of the dressed meat alone, using a standard number of 50 NOK/Kg, the meat value, using this primitive evaluation approach amounted to 360 million NOK in 2001 (44 million euro).

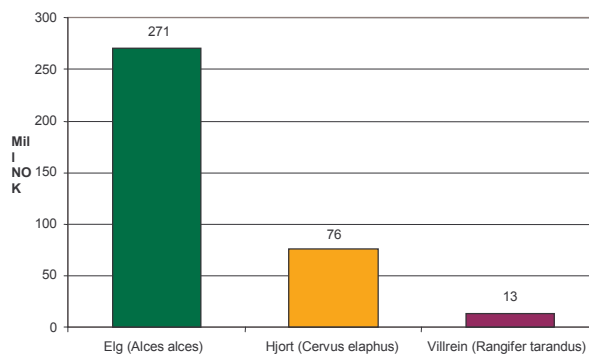


Figure 4 Estimated value of meat, 2001

The corresponding value to forest owners from logging was 2.8 billion NOK. From this we learn that the total value from hunting is significant, compared to the value from timber.

4.2. Services

4.2.1. Services with a market

As a consequence of the everyman's right and Norwegian traditions, developing such services has proved difficult. Access to forestlands is free, so is the use of forest roads for cycling, trekking etc. The most successful stories can be found around hunting and fishing, as those are excluded from everyman's right and are exclusive to the owners (be that private individuals, groups, communities or the state). There is a growing interest concerning the potential to develop such services, and they are generally considered to have a large economic potential

There are several problems or obstacles with the largest being a multitude of small, individual owners (actors) which makes it difficult to market integrated (packaged) products. There is little tradition for producing up/downstream products, like accommodation, transportation, etc. Still this is being attempted, e.g. through the forest owners associations, where owners pool together to create larger, more stable production units.

It is also the subject of attention for various public actors on local, regional and national levels, where the challenge is being attacked from many sides (education, training, financing, marketing, etc.)

4.2.2. Services without market

Norway's government and forest owners, along with most other countries are investigating how to best utilise the multiple economic opportunities of the forest. Sustainable management to secure biodiversity, prevent erosion, and support/promote the preservation/development of cultural landscapes etc.

The problem is that there is no easily accessible 'market' for such services. If the owner manages for such objectives there are no automatic market mechanisms that will ensure compensation for his/her efforts; no easy way of getting paid for the value of the service.

Norwegian society has always viewed outdoor activities as positive and healthy. Sunday walks in the forest for the whole family, the use of forests by school classes as part of the education, spending holidays in cabins and lodges, fishing and hunting. This is a part of how we Norwegians tend to look upon ourselves, and mostly these activities have been non-marketable and within the scope of the everyman's right.

In later years such voluntary forest related exercise activities have declined with a simultaneous increase of more individually based, commercially orientated products (instead of taking exercise by wandering in the forest it is taken at a gym or club). At the same time we've had a general acknowledgement that everybody has to take a larger responsibility for their own health and well-being and to use regular exercise as a tool to increase their health.

Property rights regulation system (access)

Three quarters of Norwegian forest lands are in private ownership, the major part owned by farmers (full time, part time or former). In general there is no difference between these and the public owned land in relation to public access and the use of most non-wood products and services for personal use. This is founded on the everyman's right that is remains strong in Norway. There is in preparation an update of laws and regulation for outdoor activities, where the general trend rather is to broaden the scope for this right than to narrow it down. Regarding the potential use of NWFP&S commercially, this can be viewed as an obstacle for local-based exploitation, as it secures the same availability for everybody.

Formally the everyman's right is restricted to non-commercial usage. This is not contested in the update; rather it has and has had a broad interpretation. In recent years we have had a few examples of people being charged for picking berries and mosses illegally as they had been considered as doing it for commercial aspects, not for their own consumption, without acquiring permission from the landowners.

One of the obstacles for increased local activities is that indirect commercial effects are hard to regulate. A commercial tour-operator might have contracts with hotels; transporters etc, and thus sell a product like trekking without any need to involve local forest owners to get access to the area. In this respect there exists a substantial subsidising from the owners to various commercial actors

4.2.3. List of statistical information sources

There has been little attempt to really measure the value of Norwegian NWFP&S industry. There has been published a national report "Strategisk plan Næringsutvikling i utmark" that was partly made by the Ministry of Agriculture and partly by the organisation Innovasjon Norge ([Innovation Norway, mainly in Norwegian](#)). In this report there were some suggestions made of how to measure the value of NWFP&S in Norway. Their 'guesstimate' is 8.1 billion Euro/year, but the reliability of this number can be questioned. Otherwise, there is not too much 'out there' that is really reliable when comes to measure the real contribution of NWFP&S in a local economy.

4.2.4. National and local organisations studying NWFP&S.

There are several organisations studying NWFP&S in Norway. The Norwegian University of Life Sciences ([Previously known as the Agriculture University of Norway NLH, Some English](#)) together with Skogorsk ([The Norwegian Forest Research Institute, Some English](#)) are the leading institutions of research related to the topic of NWFP&S.

There are also some activities related to regional research institutions like Møreforskning (www.moreforsk.no), Telemarksforskning ([Telemark Research Institute, some English](#)), and Østlandsforskning ([Eastern Norway Research Institute, some English](#)). Also Norsk institutt for naturforskning ([Norwegian Institute for Nature Research, Some English](#)) has contributed in the field of NWFP&S. Norges Skogeierforbund ([The Forest Owners Association of Norway](#)) is carrying out a project in the field of increasing income to the forest owner through the utilizing of out-fields.

The common way of looking at the value-added aspect regarding the utilisation of outfields in the context of rural development is through the perspective of the land/forest owner as the entrepreneur. At present there is some work going on at Skogforsk ([Norwegian Forest Research Institute, some English](#)) that is focusing on how to involve more than just the landowner in such activities. Part of the thinking behind the work is that we can only reach a marginal part of the potential that is in the market when only looking at the forest owner as an entrepreneur. We should look at all institutions involving in a local innovation system to reach the goal of local economic development based on resources from the outlying field.

4.3. Case study:

An interesting case in Norway is the “Norsk bygdeturismelag” (NBT - The association for rural tourism in Norway). NBT is an umbrella organisation for 13 regional NBT's all over Norway. We are presenting the division of the NBT in Southern Norway - “Norsk Bygdeturismelag Sørlandet” (NBT-S) - that was established in 1996. The purpose of the association was to establish an independent trade organisation that should take care of the micro enterprises in the field of tourist industry in the region. Main product of the micro enterprises involving in the association is overnight stop, food and drink and activities in an atmosphere of rural Norway.

NBT-S is representing 30 micro enterprises. Despite that the members of the NBT-S is representing a marginal part of the total supply of the experience industry in Southern Norway, each of the micro enterprises is relatively important in the local community where they are situated. All of the micro enterprises involving in the NBT-S are one-man firms related to the utilisation of resources connected to a farm. All of the enterprises are situated in rural areas.

Many of these enterprises are supported by the rural development support scheme in Norway (RDSS). The purpose of the RDSS is to support local economic development with the basis of human resources and the natural resources connected to a farm. The RDSS has been evaluated by many agencies, both at National as well as local level, in purpose of making the support scheme more efficient. Today the RDSS is controlling 500 million NOK (60 million euro) each year in purpose of the creation of new jobs in rural Norway. However, one might assume there is need for more information and knowledge around the use of public money going into such activities as the RDSS in Norway (Vennesland 2004).

Annual sales of each member of the NBT-S are about 400,000 NOK pr. Year (50.000 euro).

An interesting task regarding the members of the NBT-S is that it is the landowner him or her self that is the owner (and very often the worker) in the micro enterprise themselves.

When analysing the NBT-S there is no real innovative productions. The best one can find is an adoption of known packages of products and markets.

The members of the NBT-S are seen as a part of the total supply of tourist industry in Southern Norway.

There are some areas showing better results than other areas in the production of NWFS like what we see in NBT-S. However, there has been no attempt to investigate such relationships. This could be an interesting topic in further research related to the topic.

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