

The Netherlands

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Summary

In the Netherlands, all forestry can be considered to be small-scale forestry, irrespective of ownership category and holding size. Therefore, this paper describes current issues in forestry in the Netherlands. Special attention is given to the country's specific characteristics: great pressure on land from the large population, intensive use of different functions of forests, a high level of public awareness of environmental issues, much detail in the scale of forestry operations, and an intensive public debate on forestry. The planning and organization of Dutch forests requires a client-oriented, entrepreneurial, multidisciplinary, and skilled staff capable of dealing with a variety of interests and interest groups. Factors that inhibit this are:

- the increasing number of diverse demands and pressures on forests which often conflict;
- the high degree of organization in which almost every opinion or purpose is supported by a detailed network of associations, foundations and groups which pursue their aims in a continuous dialogue with each other;
- the increasing alienation of society from forest and nature, which has among others led to negative public reactions towards tree felling which in turn has influenced the harvesting of wood.
- a high diversity of forest owner types, with a increasing number of forest owners managing their forest from a hobby point of view;
- a lack of knowledge and experience and an attitude for entrepreneurship.
- the rather poorly developed forest chains, e.g. in recreation;
- the disappearance of the forest sector and the appearance of a nature sector (including forests) which makes forests and forest management less visible;
- the output-oriented subsidy system may prevent any further development of products/services by forest holdings;
- the diversity in owners and holding size combined with the wealth of the country has led to a large and increasing number of so-called "hobby forest owners", who manage their forest as a hobby;
- lack of knowledge and experience of forest owners, a lot of the (especially private) forest owners are male, relatively old and have a traditional lifestyle.

1. Consumption

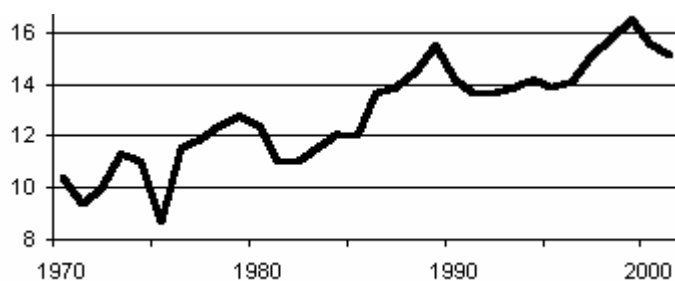
1.1. State of the art and historical development

At the end of the 19th century, the Dutch forests served only a limited number of functions: wood production, stabilisation of sand dunes and soil improvement. Additionally, for a small group of wealthy estate owners forests were a sign of prestige and important for hunting (Van Vliet, 1993; Oosterveld, 1997). Since the beginning of the 20th century forest functions have gradually diversified. Initially the nature function became more and more important (Van Koppen, 2002) and after WWII also the recreational and environmental functions of forests were acknowledged. At present the forests have a multiplicity of functions for Dutch society. The Long-term Forestry Plan of 1984 officially recognized the functions outdoor recreation, wood production, natural values and landscape quality (Ministerie van LNV, 1984). In the 1993 Forest Policy Plan environmental functions were added (Ministerie van LNV, 1993).

1.2. Forest products' and services consumption

Wood production

Wood production is one of the functions of the Dutch forests. Annually between 1.1 and 1.4 million m³ of wood is harvested in the Netherlands. This is only 7-10% of the domestic wood consumption, imported from other European countries or from tropical countries (Probos, 2004). Sawn softwood imports for example come mainly from Europe, half of the sawn hardwood is imported from Malaysia. The Netherlands is nearly self-sufficient in paper production (FAO, 2004). Figure 1 gives an overview of the consumption of wood and wood products the last decennia. Figure 2 shows the consumption, production and trade per product.



Source: CBS and SBH, in Probos, 2004.

Figure 1. Consumption of wood and wood products in million m³ from 1970-2000

NTFP's

Non-timber forest products only play a minor role; only Christmas tree production and horticultural greenery are of commercial interest. The collection of most non-timber forest products such as fruits or mushrooms are mainly recreational activities. Hunting provides on average only 7% of the income of forest owners; most Dutch people are not in favour of hunting (Schmidt et al., 2003).

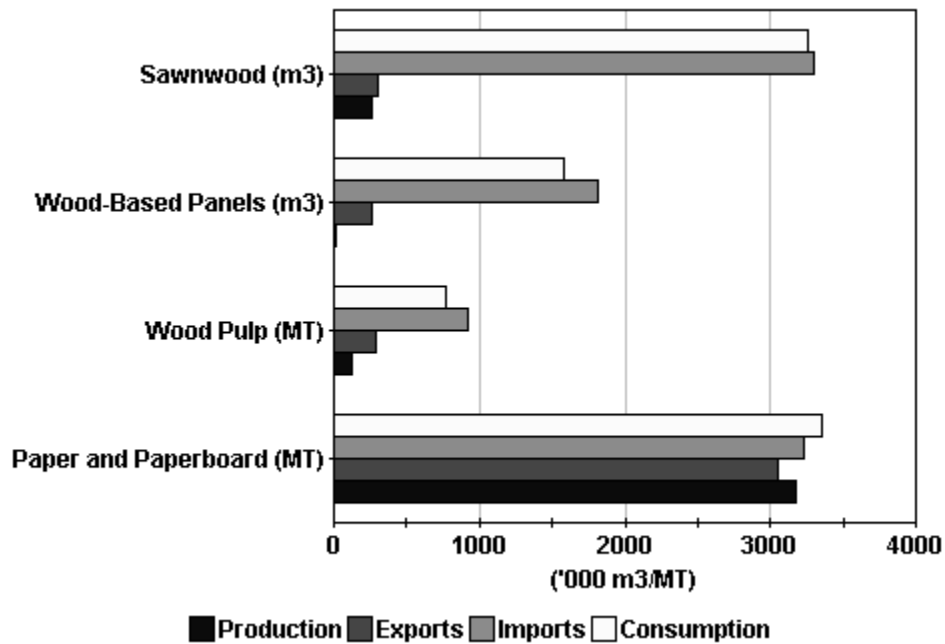


Figure 2. Consumption, production and trade in 2002 (FAO, 2004)

Recreation

Recreation is the most important active use of forest and nature in the Netherlands (CBS et al., 2003). The results of a national survey showed that the Dutch place a high value on the recreational function of forests. As a nation, at this moment around 200 million trips are made to the forest each year; an average of half a million a day. Three-quarters of the population go for a walk in the forests now and again, on average about twice a month. Older people and those who live close to the forest visit forests more frequently (Probos, 2004).

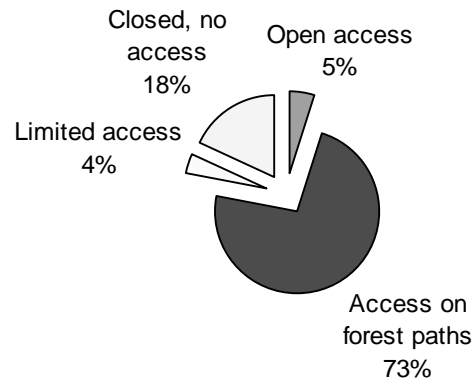
At this moment, about 82% of the forests are open to the public (Probos, 2004) (see Figure 3). A typical visitor goes to the forests to walk or cycle (90%). Other activities are nature research, jogging, walking the dog, sitting around and horse riding. Especially cycling has increased during the last years, the other activities remained the same. Visitors mainly see forests as places where nature can take its course (98%), where the air is purified (96%), and as a venue for recreation (87%). The most used facilities are footpaths, cycle tracks and parking places (CBS et al., 2003).

About 40% of the Dutch are of the opinion that there are not enough forests in their living environment. In the south-western part, in the western part and in the northern part of the Netherlands even 60% of the population feel that there should be more forests (CBS et al., 2003).

Nature

Nature functions of forests are highly valued. This is reflected by the fact that 25% of the total forest cover has a protected nature status and 14% of the non-protected forests are owned by private nature conservation organisations (Elands and Wiersum, 2003). The commitment of the Dutch population to nature (including forest) is determined

annually on the basis of (1) interviews and (2) statistics on the support of people to nature conservation, e.g. through membership of nature conservation organisations and voluntary work in nature conservation (Milieu- en Natuurplanbureau, 2003).



Source: Meetnet Functievervulling in Probos, 2004

Figure 3. Accessibility of Dutch forests

The interviews show that about 95% of the Dutch population considers the protection and conservation of (existing) nature as (very) important. About 75% supports also the development of new nature (CBS et al., 2003). Concerning the membership of the two largest Dutch nature conservation organisations (Natuurmonumenten and the Provincial Landscapes manage 16% of the forest area), after a period of growth the number has stabilized, with around 1 million persons being member of Natuurmonumenten and 250,000 persons having a membership of the Provincial Landscapes (Milieu- en Natuurplanbureau, 2003).

Volunteers are active in nature management (about 22,000 volunteers), nature education (about 16,000 volunteers), ecological monitoring and nature research (about 13,000 volunteers). The number of volunteers has stabilized during the last years (Milieu- en Natuurplanbureau, 2003).

Environmental functions

Forests fulfil different environmental functions, e.g. purification of water and air, shelter against wind and rain, provision of shadow and coolness. As regards carbon dioxide absorption, in 2000 the Dutch forests absorbed in total 68 million tonnes of carbon. Because of the annual net increment, this quantity has now grown by about 0,6 million tonnes. Per ha, the net sink is 2.2 tonnes of CO₂ per year. Another function of increasing importance is the improvement of the living environment of housing areas. In some areas, the vicinity of forests adds up to 10% to the value of real estate property, amounting to billions of guilders in total (Probos, 2004). The environmental functions of forests are increasingly acknowledged and sometimes also financially rewarded. For instance, recently electricity companies are occasionally funding afforestation as a means to sequester carbon-dioxide. Similarly, a water supply company has started a trial to compensate forest owners for switching from coniferous to deciduous species in order to decrease evaporation and thus to reduce parching (Filius & Roosenschoon, 1998).

1.3. Market demand for forest related products and services by urban population

The Netherlands are a small and densely populated country with a high level of urbanisation. Around 45% of the overall Dutch population lives inside the 20 main urban agglomeration (Elands and Wiersum, 2003). According to the OECD (2004) about 2/3 of the Dutch population lives in urban agglomerations, with an urbanisation grade of 90% in 2001. However, as all Dutch inhabitants can be typified as having an urban lifestyle, the whole population can be considered urban.

There is no information available on the specific demand for forest related products and services by the urban population. What is noticed is that people's attitudes to forests are predominantly shaped by the perception of forests as antipoles to urban areas characterized by naturalness and quietness (Elands and Wiersum, 2003).

1.4. Main problems and research questions in consumption for enterprise development

In the Netherlands, wood production plays a minor role. Although wood forms an important product consumed in large quantities by Dutch society, this is mainly imported from other European countries and from tropical countries. Although actions have been and are taken to stimulate Dutch wood production, the low prices and the weakly developed forest-wood chain combined with the negative public reactions from Dutch society towards tree felling have limited the amount of wood harvested from Dutch forests.

As regards the negative public reactions from a part of Dutch society towards tree felling, some people consider logging to be somehow wrong. This has to do with the increasing alienation of Dutch society from nature. At the same time, forest owners and forest managers have to deal with an increased social appreciation of forest combined with increased societal emancipation, meaning that peoples wishes and local initiatives play an increasing role in forest and nature conservation. Members of society call forest managers to account for their management. This has already led to several forestry conflicts in the Netherlands. This development indicates the need for forest managers to improve their skills in the area of communication, conflict handling, negotiation, etc.

The varied demands from different groups of forest users also have technical consequences for forests and forest management. There is, for instance a constant struggle for the space occupied by forests. Increased fragmentation of forests and consequent loss of nature value is a major concern. Other pressures are less threatening but have serious repercussions on forest management. Hunters for example want to maintain a high population of wildlife, while hunting is objected to by animal defence groups, thus affecting the practice of natural regeneration. So, whereas forest managers have to manage their forests towards an increasing number of functions, they also have to incorporate measures to counteract pressures.

Elands and Wiersum (2003) also observe the rather weak forest chains: "traditionally, the forest-wood chain is rather weakly developed" and "there is no forest-recreation chain with structural relations as a consequence of the government policy to subsidise forest owners for providing recreational facilities". These factors combined with the large influence of different NGO's (supported by a large electorate of members) on

policy setting as regards forest management, made Elands and Wiersum (2003) conclude that “social attitudes rather than market forces” are most influential in steering forest management in the Netherlands.

2. Small-scale forestry practises

In the Netherlands, all forestry can be considered to be small-scale forestry, irrespective of ownership category and holding size.

2.1. State of the art and historical development

At the end of the 19th century and the beginning of the 20th century, forest holdings managed their forest mainly from an economical point of view. Forests were mainly monocultures producing wood in order to gain a profit. Harvesting took place via the clear felling system (Probos, 2004). This system was supported by reforestation subsidies granted by the government (Schmidt et al., 2003). Gradually the view on the monoculture systems changed as it caused several difficulties, e.g. it delivered only one type of product and it was very sensitive to calamities as storm, fire and plagues. These factors combined with a decrease in wood prices and an increasing interest of society in the recreational and nature functions of forest made the forest sector think about other silvicultural systems (Probos, 2004). In the 1970's, the concept of multiple use was adopted in Dutch forestry. In the 1980's important changes in the silvicultural practice took place. The severe storms in the 1970's resulting in extensive areas of wind-blown stands were the last drop making the cup run over. The area of wind-blown stands was so large that immediate clearance and reforestation of all the stands was not possible. However, in many areas good natural regeneration took place. This proved that “natural regeneration was silviculturally possible as the ecological conditions had gradually evolved since the first plantations” (Schmidt et al., 2003). At the same time, specific silvicultural practices were developed to enhance the nature function of forest, e.g. the killing of trees by stripping a ring of the bark or the use of large grazing animals (Londo, 1991). As the “close to nature” forestry proved to be interesting for all the different stakeholders (forest managers, policy makers, nature conservationists, recreationists, etc.) the attention for this system increased. In the first half of the 1990's new silvicultural approaches were adopted and developed, “Pro Silva” and “Integrated Forest Management” (*Geïntegreerd Bosbeheer*). Both systems are characterized by efforts to achieve a balanced combination of different forest functions, avoid risks and increase forest stability, use natural processes, and limit investments. In practice, they lead to increased use of natural regeneration, mixed stands, uneven-aged stands, and selective felling. Key-concepts of IFM are that both timber production, nature and recreation are pursued and that the use of natural processes is stimulated. It is estimated that at this moment about ¼ of the Dutch forest owners/managers apply IFM. An information program is established by the Ministry of Agriculture, Nature Management and Fisheries to promote IFM. At the end of the program (in 2005) at least 30% of the Dutch forest managers should apply IFM. This percentage should be extended to 70% in 2020 (Schulting and De Wolf, 2004).

2.2. Small-scale forest holdings

Table 5 and Table 6 show the forest area's distribution per ownership category and holding size class. The characteristics of the most important categories of owners,

- Staatsbosbeheer,
 - municipalities,
 - nature conservation organisations,
 - private forest owners,
- are described in the following.

(1) Staatsbosbeheer

At present, half of the Dutch forests are publicly owned. About 37% of this area is managed by Staatsbosbeheer (the National Forest Service) (Probos, 2004). Staatsbosbeheer is the governmental organisation managing the natural heritage in the Netherlands. Staatsbosbeheer used to be a state company, but is now an independent administrative body whose principal is the Ministry of Agriculture, Nature Management and Food Quality. Since Staatsbosbeheer's independence, annual agreements have been made with the ministry which list the objectives and the price at which these are to be realised. Besides agreements about management, agreements are also made as regards products and services in the field of information, education and socialisation. Staatsbosbeheer annually reports to the Ministry of LNV and to the parliament (Staatsbosbeheer, 2004).

(2) Municipalities

Municipalities own and manage about 16% of Dutch forests. Most of these forest are multifunctional, with a focus on nature and recreation. Because of the small size of some of the areas, a part of the municipalities has contracted out the management of their forests to the forestry groups or to other forest owners as Staatsbosbeheer and the Provincial Landscapes.

(3) Natuurmonumenten & Provincial Landscapes

About 16% of the Dutch forest area is owned and managed by nature conservation organizations as Natuurmonumenten and the Provincial Landscapes (Probos, 2004). Natuurmonumenten is the largest of these organizations with around 946,000 members, managing 88,398 ha of nature area (including forest areas). Natuurmonumenten is founded in 1905 and buys and manages nature areas in order to protect nature and cultural history. Main income sources for Natuurmonumenten are subsidies from the government, private funding and a National Lottery (Natuurmonumenten, 2004).

The 12 Provincial Landscapes manage around 90,000 ha of forest and nature area, supported by approximately 225,000 members. The Landscapes have been founded in the 20's and 30's and focus on the conservation, management and development of nature on a provincial and local level (Landschappen, 2004).

(4) Private forest owners

Private owners account for about 1/3 of the total forest area and can be found in all size groups. Two groups can be distinguished, owners with (equal to or) more than 5 ha forest land and owners with less than 5 ha of forest land. The latter group is not registered and exact information about this group is not available. Considering the private owners with more than (or equal to) 5 ha, Table 1 gives an overview of the average cost and benefits for all private forest holdings. The table shows that forest owners depend to a large extent on subsidies: in 2002 56% of the income was from subsidies. Only 21% were related to the wood production function.

Table 1: Average cost and benefits (Euro per ha) for all forest holdings with areas larger than 5 ha

	2000	2001	2002
Benefits	191	164	188
Sales of wood	45	42	39
Subsidies 'Programma Beheer'	67	71	69
Other subsidies	44	16	37
Hunting	12	11	11
Other (e.g. Christmas trees)	23	24	31
Cost	251	220	261
Overhead	73	68	75
Labour	38	36	39
Third parties	76	51	78
Production	20	18	18
Insurances	29	31	34
Other	16	16	18
Result	-59	-56	-73

Source: Berger et al. 2003

2.3. Small-scale forestry practices

As stated in 2.1. recently new forest management concepts have been introduced in the Netherlands. The Integrated Forest Management approach has been enthusiastically welcomed by a large part of the forest sector. The aim of the IFM approach is a better fulfilment of forest functions by integration the different functions (Filius, 1996). IFM is a form of management which tries to use natural processes as much as possible leading to uneven-aged forests with a mix of species, natural regeneration and small-scale structure.

The basic conditions of IFM are (Province of Gelderland, s.a.):

- small-scale felling where possible (not more than 30 ares);
- natural regeneration where possible;
- more horizontal and vertical structure (clearings, forest floor vegetation, brush and bushes, various stages of development in close proximity to one another);
- mixing with indigenous species (30%);
- large proportion of standing or falling dead trees, preferable thick (5% of timber stock);
- old forests with substantial old trees (60 cm or more).

Another management concept that has come forward in the Netherlands is the Pro Silva movement. Pro Silva aims at timber production in a more natural way; the ecological

function is stimulated in order to serve the timber production function (Filius, 1996). Although both systems are still being developed, they are already widely used by the National Forest Service, provincial, communal and private forest owners. One of their attractive features is that they require less investment than the clearcut system and the replanting systems they replace (Oosterveld, 1997).

2.4. Policy framework and production conditions

The involvement of the Dutch government with forestry starts at the end of the 19th century. The social and economic benefits of forests became gradually acknowledged and there was a growing support for government action in sustaining forest resources. Through the National Forest Service (founded in 1899) public money was used for the purchase of forest and nature reserves and for the afforestation of unproductive land. Additionally, financial support and advice was given to public bodies for similar activities. In 1922 the first Forest Law was enacted. This law safeguarded the forest land base and protected the natural beauty of forests and woodlands. Fiscal measures were taken to support private forest enterprises and afforested country estates (Schmidt et al., 2003).

In the 20th century gradually recreation and nature became more and more important functions of forests. The closure of the coal mining industry, which was a major outlet for inland timber, meant a deterioration of the financial situation of forest owners. The Industrial Board for Forestry urged the government to come with a more regular support to forest owners. Moreover, the board presented some thorough proposals for a Dutch forestry strategy, putting forestry firmly on the political agenda. As a result, in 1977 the Ministry of Agriculture and Fisheries issued a sector study on forests and forestry as a contribution to the national rural planning debate (Ministerie van Landbouw en Visserij, 1977).

In 1984, a major national forestry policy statement was published by the Ministry of Agriculture, Nature Management and Fisheries (in 1990 the name of the ministry was changed to include nature management): the Long Term Forestry Plan. This plan was a reaction on the sector study and reflected society's understanding of how to deal with forestry. The document was followed by the National Forest Policy Plan of 1993 which was based on the results of the evaluation of the Long Term Forestry Plan (Schmidt et al., 2003).

The most recently policy framework as regards Dutch forests is formulated in the document "Nature for People, People for Nature", published by the Ministry of Agriculture, Nature Management and Fisheries in 2000. This document integrates all issues relating to nature, forests and landscape. In this plan, forests in the Netherlands are mainly considered from a nature oriented perspective. The most important policy objectives for forests are (Ministerie van LNV, 2000):

- protection of the forests;
- fulfilment of as many function possibly and meeting the societal demands;
- afforestation;
- more natural forests.

The tools for implementation of the policy plans fall within three major categories:

- legal instruments;
- financial instruments;
- communicative framework.

Legal instruments

The most important legal instruments of Dutch forest policy include (Elands and Wiersum, 2003):

- The Forest Law: influential in the conservation of existing forest areas, it ensures that no forest area is lost by stipulating the obligation to reforest cut forest areas.
- The Nature Protection Act: aims at stimulating nature and landscape protection through acquisition and management obligations.
- Estates act: stimulates forest management and afforestation on estates to ensure aesthetic and recreations values.
- Flora and Fauna Law: aims at the protection of plant and animal species by (1) forbidding practices that are harmful for protected animals or plants and by (2) designating specific areas/objects as protected.
- The Land Use Planning Act: stipulates regulations concerning land use planning, including measures for land-use zoning for forestry, nature, outdoor recreation and cultural history.

Financial instruments

The management of forest areas in the Netherlands depends to a certain extent on public financing. In the Netherlands, about 50-60% of the total revenues of private forestry enterprises are accounted for by subsidies (Blum and Schanz, 2002; Blum and Hoogstra, 2004) (see Table 1).

In 2000, the Dutch subsidy system changed from an input oriented scheme to an output oriented scheme. Input-oriented refers to the public financial support of forest enterprises justified by the assumption of a corresponding stream of societal benefits from forestry to society. Output-oriented refers to defined payments for specified beneficial outputs of forestry (goods and services) by use of public budgets (Blum and Hoogstra, 2004). The new subsidy scheme (the so-called management programme) is a performance-related subsidy for the management of (agricultural) nature, forests and landscape elements and aims at (Hoogstra and Van Blitterswijk, 2002; Blum and Hoogstra, 2004):

- development of a national network for forest and nature areas;
- further integration of the management of forests, nature and landscape;
- stimulation of both agricultural nature management and nature management;
- stimulation of different types of forest and nature owners/managers.

Subsidies are granted for fixed nature conservation targets which have been set by the government. These targets specify the quality criteria to be met by the owner in order to receive the grant. The owner is free to deploy his own expertise in order to achieve the target (Hoogstra and Van Blitterswijk, 2002).

Network instruments

Network instruments include education, research and advice, assisting forest owners and the forestry sector at large.

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

In the Netherlands, one can see a gradual disappearance of the forest sector, especially on the national level (Verbij, 2004). Due to the multifunctional approach in landscape, forestry is increasingly “incorporated within the broader context of the social appreciation for nature conservation” (Schmidt et al., 2003). This is demonstrated by the recent policy framework “Nature for People, People for Nature”, which integrates all issues relating to nature, forests and landscape. In this plan, forests in the Netherlands are mainly considered from a nature oriented perspective.

Subsidies form the most important income source for (private) forest owners. However, these subsidies may prevent any further development of products/services by forest holdings. For example, the government policy to subsidise forest owners for providing recreational facilities has prevented a further development of the forestry-recreation chain in the past.

A supporting factor is the tax-situation for forest holdings. Forest holdings in the Netherlands do not have to pay income tax for their holding. This does not only apply to the wood production function but also for other products and services developed within a holding.

3. Forests and ownership

3.1. State of the art and historical development

Forest (*bos*) is defined as a land area covered with trees or bushes with an area of at least 0.5 ha and a minimum width of 30 m (Anonymous, 1995). The Netherlands currently have a total forested area of 339,000 ha (about 10% of its land area, see Table 2). This is approximately 200 m² of forest per person.

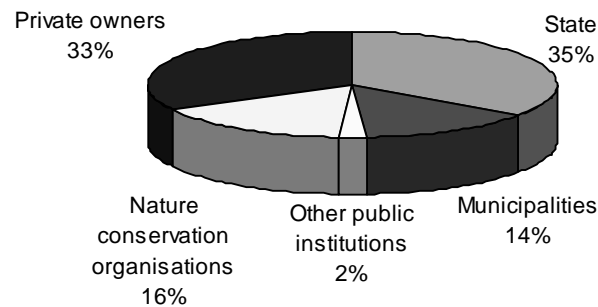
Table 2. Land use in the Netherlands (CBS, 2000)

Land use categories	
Agriculture	56%
Infrastructure and buildings	11%
Water	17%
Nature	3%
Forest	10%
Recreation areas	2%
Remaining	1%

Over the past 170 years, the total area of forest in the Netherlands has grown by more than 90% (Natuur Compendium 2003, 2003). In 1900, only 3-4% of the Netherlands was forest.

The ownership of the Dutch forests is rather diverse, partly for historical reasons. Until the end of the 19th century most of the forests were private property. Increasing

industrialization caused an increasing demand for high quality wood. Forestry adapted to this development and investments in forestry were attractive for both public and private money. Uncultivated areas were afforested both by the state (National Forest Service) and by private persons. At the beginning of the 20th century nature conservation started to rise and the first nature conservation organizations were founded. Some of these organizations also purchased forests. From the 1960's, a falling demand for timber combined with increasing cost for recreation and nature conservation caused that the management of forests was not longer an attractive proposition. Inheritance taxes were sometimes so high that owners preferred to sell their property to the National Forest Service or to one of the nature conservation organizations. This situation lasted until the early 1990s (Al en Kuiper, 2003).



Source: Meetnet Functievervulling Bos in Probos, 2004

Figure 4. Forest ownership in the Netherlands

At this moment about 120,000 ha of the total forest area (33%) is in private hands. Half of this area consists of forest areas of 5 ha or less, owned by approximately 30,000-40,000 private owners. About 50% of the forest area is the property of public bodies, e.g. state, municipalities and other public authorities. The remaining 16% is owned by nature conservation organizations (Meetnet Functievervulling Bos in Probos, 2004). Figure 4 illustrates the ownership situation.

3.2. Forest resources

Although forests have always been the natural vegetation in most parts of the country, there is in fact no natural forest left, the last having been felled in 1868. Virtually all the current woodland has been planted by man, with only a small percentage resulting from spontaneous regeneration (Al and Kuiper, 2000).

More than half of the Dutch forests (57%) have coniferous trees as main tree species, mostly Scots pine, Douglas fir, larch and Norway spruce. The remaining area consists of stands with deciduous trees (oak, beech, birch and poplar) as main tree species. About 1/3 of the forest area is mixed forest. Table 3 gives an overview of the areas of deciduous, coniferous and mixed forests (based on the main tree species). When comparing the current areas with the situation 20 years ago, it can be concluded that the area of mixed deciduous/coniferous forests and mixed deciduous forests have increased, while the area of (un)mixed coniferous forests has decreased. The reason is that more and more endemic broadleaved trees are favored and coniferous forests are succeeded by deciduous forests (Probos, 2004).

Table 3. Areas of deciduous, coniferous and mixed forests

Type of forest	Hectares	Percentage
Unmixed deciduous forest (<20%)	64,385	21.8%
Mixed deciduous forest	44,240	15.0%
Deciduous forest mixed with conifers	20,935	7.1%
Unmixed coniferous forest (<20%)	88,875	30.1%
Mixed coniferous forest	16,985	5.7%
Coniferous forest mixed with deciduous trees	42,265	14.3%
Open/young forest	17,775	6.0%
Total	295,460	100%

Source: Meetnet Functievervulling Bos in Probos, 2004

Over the last 20 years, not only the composition (tree species) of the Dutch forests changed, also the structure altered: Dutch woodlands grow older. Surveys of tree diameters clearly show this (see Table 4).

Table 4. Tree diameters during the last 20 years (Probos, 2004)

Maximum dbh	1984	1990	1994	2002
20-40 cm	136,796	136,393	135,952	116,639
40-60 cm	44,481	54,695	63,513	83,257
>60 cm	7,901	9,480	11,747	20,069

The standing stock in the Netherlands amounts to more than 58 million m³ (or 198 m³ per ha). In 1992 these figures were 48 million m³ of standing stock, with 161 m³ per ha. This increase has to do with a shift in the focus of forest managers: recreation and nature has become more and more important and the application of the IFM system has lead to longer rotations and an increased mean age (Ministerie van LNV, 2003). It is expected that the increase will continue the coming years.

As regards the macro-economic significance of Dutch forests, the number of people working directly or indirectly in the production, harvesting and processing of forest products and services is 42,500. For forest holdings and direct suppliers this is equal to 1 job per 200 m³ harvested wood. For the whole chain, this is 1 job per 300 m³ harvested wood. The total turnover of the forest and timber sector is around 5 billion euro. However, as 90% of the wood is imported, the part of the total turnover that is directly related to the harvest and processing of native wood is about 230 million euro (Probos, 2004).

3.3. Forest ownership

Although forests are officially defined as having a minimum size of 0.5 ha, for practical policy purposes 5 ha is often considered to be a minimum size. For instance, only holdings with areas above 5 ha are registered by the Dutch Industrial Forestry Board ("Bosschap"). Therefore, the exact number of Dutch forest holdings (including holdings with 5 ha or less) is unknown. Detailed information is available about the ownership situation of holdings of 5 ha or more (see Table 5, Table 6).

In order to support forest owners who not always have the necessary time, expertise and experience to manage their property themselves, so-called Forest Support Groups have been established. A Forest Support Group is a co-operative with the objective to promote the interests of its members. Among the members are private owners, nature conservation organizations and municipalities. Activities include the management of forest areas, the sale of timber, support in subsidy applications, provision of information. The Forest Support Groups are regional groups with an umbrella organization which has contacts with the government, research institutes and major consumers of timber. At this moment, the Forest Support Groups have in total 1100 members, representing about 196,000 ha forest and nature area.

3.4. Main problems and research questions in forest resources and ownership for enterprise development in the forest sector

One of the limiting factors on entrepreneurship in the Netherlands is the diversity in owners and holding size combined with the wealth of the country. A large and increasing number of forest owners are so-called “hobby owners”, where forestry is not seen as a business which should provide an income. These owners are not interested in enterprise development as their forest is a leisure activity, sometimes even an extension of their garden (Hoogstra and Flier, 2004).

For other owners, the management of multifunctional forests requires also a client-oriented, entrepreneurial, multidisciplinary, and skilled staff capable of dealing with a variety of interest groups. The question is if Dutch forest managers have this knowledge and experience. A lot of the (especially private) forest owners are male, relatively old and have a traditional lifestyle.

Table 5. Type of owners related to forest size (size > 5 ha) (Bosschap, 2003)

	Size categories (hectares)							Total
	5-25	26-50	51-100	101-250	251-500	501-1000	> 1000	
Private owners	896	170	121	62	25	11	2	1287
Municipalities	99	40	46	54	29	14	6	288
Provinces	2	1	2	4	1	1	0	11
National Forest Service	0	0	0	0	0	0	1	1
State (other)	4	1	1	1	0	0	4	11
Water authorities	5	2	2	4	0	0	0	13
Nature conservation org.	1	0	2	1	1	0	8	13
Corporations, associations	82	28	14	10	1	4	3	142
Recreation boards	7	5	8	4	1	0	0	25
Water companies	3	0	2	0	3	0	2	10
Total	1099	247	198	140	61	30	26	1801

Table 6. Type of owners related to forest size (size > 5 ha) (Bosschap, 2003)

	Size categories (hectares)							Total
	5-25	26-50	51-100	101-250	251-500	501-1000	> 1000	
Private owners	10404	6124	8387	9033	8540	7218	3004	52710
Municipalities	1433	1510	3117	8528	10169	8665	8868	42290
Provinces	32	47	159	659	251	550	0	1698
National Forest Service	0	0	0	0	0	0	85471	85471
State (other)	46	29	80	222	0	0	21580	21957
Water authorities	80	96	167	608	0	0	0	951
Nature conservation org.	17	0	185	182	348	0	45201	45933
Corporations, associations	1067	1047	919	1614	252	2841	5119	12859
Recreation boards	88	165	570	700	252	0	0	1775
Water companies	55	0	148	0	980	0	2723	3906
Total	13222	9018	13732	21546	20792	19274	171966	269550

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Annex A: Organisations studying forest products' consumption and main publications and information sources.

- Centraal Bureau voor de Statistiek (Statistics Netherlands)
<http://www.cbs.nl/en>
- FAO Forestry
<http://www.fao.org/forestry/index.jsp>
- Pro-forest Foundation (Stichting Probos)
<http://www.probos.net/index.php?cat=home&top=english&frames=>
- Wageningen University and Research Centre
 - Forest and Nature Conservation Policy Group
<http://www.dow.wur.nl/UK/cl/org/fnp>
 - Socio-Spatial Analysis Group
<http://www.dow.wur.nl/UK/cl/org/sal/>
 - Alterra - Research Institute for the Green Living Environment
<http://www.alterra.wur.nl/UK/Home.htm>
 - Agricultural Economics Research Institute LEI
<http://www.lei.nl/uk/>
- Leisure Innovation Centre (Stichting Recreatie)
<http://www.stichting-recreatie.nl/english/index.html>
- Association for Inland Wood (Algemene Vereniging Inlands Hout)
<http://www.avih.nl/> (only in Dutch)
- Wood Centre (Centrum Hout)
<http://www.centrum-hout.nl/>
- Face Foundation (Stichting Face)
<http://www.stichtingface.nl/>
- Milieu- en Natuurplanbureau (Environmental Assessment Agency)
http://www.rivm.nl/en/overrivm/Milieu_en_Natuurplanbureau.jsp
- Rijksinstituut voor Volksgezondheid en Milieu (Research for Man and Environment)
<http://www.rivm.nl/en/>
- Staatsbosbeheer (National Forest Service)
<http://www.staatsbosbeheer.nl/pagina.asp?id={0913CA5D-27E1-4A98-804A-92A9C704AFDA}>

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

- Pro-forest Foundation (Stichting Probos)
<http://www.probos.net/index.php?cat=home&top=english&frames=>
- Wageningen University and Research Centre
 - Forest and Nature Conservation Policy Group
<http://www.dow.wur.nl/UK/cl/org/fnp>
 - Alterra - Research Institute for the Green Living Environment
<http://www.alterra.wur.nl/UK/Home.htm>
 - Agricultural Economics Research Institute LEI
<http://www.lei.nl/uk/>
- Milieu- en Natuurplanbureau (Environmental Assessment Agency)
http://www.rivm.nl/en/overrivm/Milieu_en_Natuurplanbureau.jsp
- Rijksinstituut voor Volksgezondheid en Milieu (Research for Man and Environment)
<http://www.rivm.nl/en/>
- Staatsbosbeheer (National Forest Service)
<http://www.staatsbosbeheer.nl/pagina.asp?id={0913CA5D-27E1-4A98-804A-92A9C704AFDA}>
- Ministerie van Landbouw, Natuurbeheer en Voedselkwaliteit (Ministry of Agriculture, Nature management and Food Quality)
http://www9.minlnv.nl/servlet/page?_pageid=163&_dad=portal30&_schema=PORTAL30
- Federation of Forest Support Groups (Unie van Bosgroepen)
<http://www.bosgroepen.nl/> *In Dutch*
- Federatie Particulier Grondbezit (Association for Private Landownership)
<http://www.grondbezit.nl/> *In Dutch*
- Natuurmonumenten
<http://www.natuurmonumenten.nl/> *In Dutch*
- Provinciale Landschappen (Provincial Landscapes)
<http://www.landschappen.nl/> *In Dutch*