

Follow-up rapport: **SWOT-analysis of the Dutch forest exploitation sector**
 By: Leen Kuiper, Probos
 Date: September 18, 2006

PART 1 OVERVIEW OF THE DUTCH FOREST EXPLOITATION SECTOR

1.1 AVIH

The “Algemene Vereniging Inlands Hout (AVIH)¹ is a branche-organization in The Netherlands of entrepreneurs active in the field of forest management, wood harvesting, round wood trade and round wood processing (saw mills, paper industries, biomass) as well as in consulting services on forest management. The AVIH was founded in 1951 and has 80 participating members. Some of the AVIH-members are actively involved in the field of forest exploitation and timber trade in neighboring countries (Germany and Belgium) as well. The AVIH is participating in the European Network of Forest Entrepreneurs. Since 2000 the AVIH has been member of FSC (Forest Stewardship Council) and, as such, actively supports sustainable forest management and the FSC chain-of-custody.

1.2 Economy of the Dutch forestry and wood processing sector

The Dutch “Economisch Instituut voor het Midden- en Kleinbedrijf (EIM)” has calculated that the harvesting and processing of Dutch round wood (logs) generates an annual turnover of about 300 million euro (excluding VAT). In 2004 a total of 325 companies, registered at the “Bosschap”, were involved in forest exploitation and timber harvesting (table 1), with an annual turnover of 47 million euro directly resulting from work in Dutch woodlands.

Table 1

Overview of registered companies involved in forest exploitation in The Netherlands (data updated through December 2004)

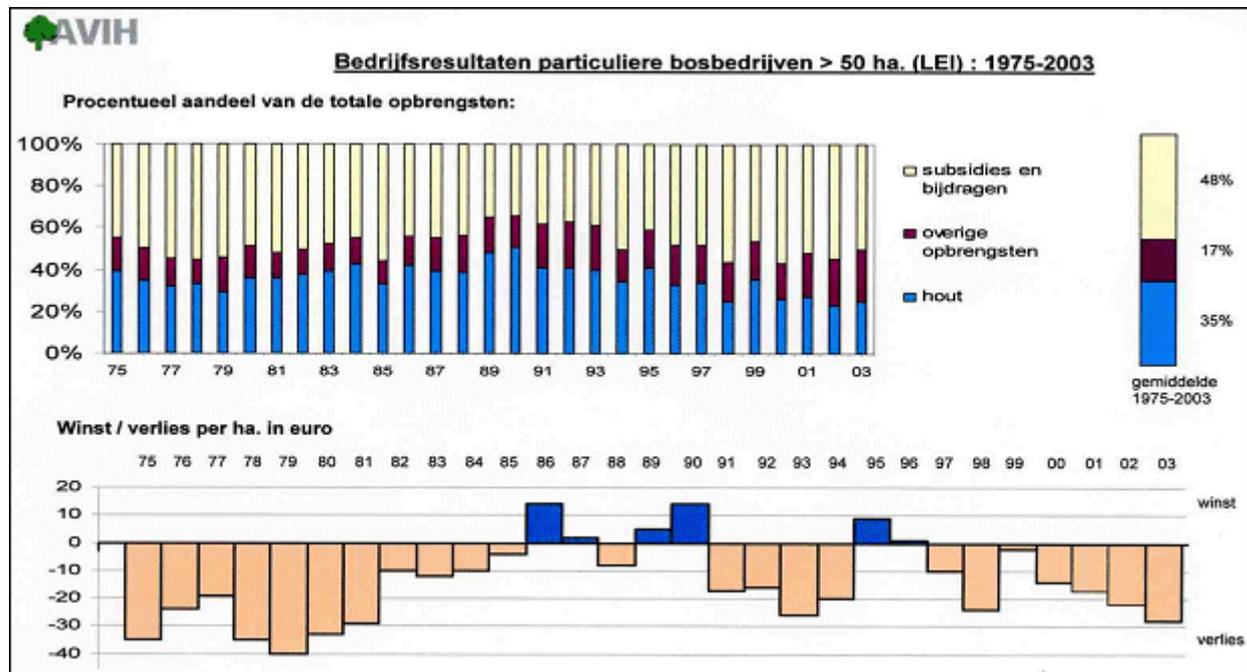
| Annual return category (euros/a) | Number of companies | Total returns form work in the Dutch woodlands (euros) |
|----------------------------------|---------------------|--|
| Less than 11,350 | 70 | 119,300 |
| 11,350 – 45,380 | 88 | 2,567,600 |
| 45,380 – 113,445 | 72 | 5,403,400 |
| 113,445 – 226,890 | 39 | 6,260,950 |
| 226,890 – 453,780 | 32 | 10,530,300 |
| Over 453,780 | 24 | 22,521,700 |
| Total | 325 | 47,404,000 |

For the sustainable management of Dutch woodlands wood production and the harvesting of round wood provides an important source of income. Subsidies too contribute significantly to the economy of forest enterprises, but it is uncertain how long these subsidies will continue to be provided by the government. The forest owner can decide by himself on the level of wood harvesting in terms of quality, quantity and wood species which he is willing to provide to the market. Since 1950 the Dutch Agricultural Economic Institute (LEI) is monitoring the economic performance of forest companies with more than 50 hectares of woodlands: unfortunately their performance is mostly negative (Figure 2): over the past 30 years only during 6 years the economic returns have been profitable.

¹ Most of the information in Part 1 is derived from <http://www.avih.nl/>

Figure 1

Economic returns from forest companies larger than 50 ha, monitored since 1975.



1.3 Round wood traders

Timber traders involved in forest exploitation take a specific position in the Dutch round wood market: these companies buy standing timber from forest owners and carry out the harvesting, transportation and delivery to the wood processing industries. This implies that the round wood supply chain from woodlands to the industry is in one hand. Consequently, organization of the supply chain is very effective and communication lines are short. The timber traders work closely together with forestry contractors, transportation companies and the wood working industries. In this respect, the timber traders fulfill an important function by signing supply contracts with the wood processing industry and buying contracts with the forest owners. The forest exploitation traders often have their own forest exploitation units and timber transportation capacity. If not sufficiently they hire sub-contractors to do the chain saw work, the skidding and forwarding of the logs to forest roads and the logistics by lorries in combination with railroad transports and sometimes by river barges. About 50 AVIH members are involved in timber harvesting and trading as their main activity, which are responsible for 75 percent of the total Dutch wood harvesting.

Round wood traders deliver various wood assortments to the wood working industries. Firstly, they buy standing timber from forest owners: trees, which are earmarked by the forest managers to be felled. Secondly, the round wood traders carry out all harvesting operations, including the cutting of logs into the desired assortments and the transportation of the round wood assortments to end-users. Round wood traders buy several wood lots from different forest owners (sometimes even from forest owners abroad) to be able to supply a continuous stream of assortments specified to the requirements of the industry. In most cases the round wood traders have their own personnel to carry out the harvesting and they have sufficient lorries for transports. However, frequently the traders hire specialized sub-contractors to carry out specific activities. Especially in the Dutch situation, characterized by many small forest owners, who often lack the required skills and are unable to supply sufficient volumes of wood to be harvested, the round wood traders play an important role in bringing supply and demand together and in achieving an economy of scale.

1.4 Logistics and transportation

The market for Dutch wood is confined to The Netherlands. On the contrary: timber is being traded wide across the countries' boundaries. International supply and demand highly influence the market position of Dutch industrial round wood. Round wood from the Dutch woodlands is almost exclusively transported by lorries. However, transport over water and by rail do play a role at timber imports. But because most Dutch round wood processing industries are not located near waterways or railways, additional road transport by lorries often is required. In the Netherlands over 200 lorries are being used for round wood transports owned by about 50 entrepreneurs. They use modern equipment, including specialized lorries for short sized assortment and for long-sized logs. Most round wood is being transported as short sized assortments. A recent development with the lorries for short sized round wood assortments is that they no longer have their own loading and unloading crane mounted to the lorry. This saves some weight and thus more round wood can be transported. In which case the round wood assortments are being loaded at the forest roads by a forwarder and unloaded by a crane installed at the processing plants.

In the Dutch round wood supply chain the costs for transportation may amount to 20% to 40% of the timber value at the gate of the processing plant. This stresses the need for a high loading rate and is also the reason that short wood lorries are increasingly being used to transport consumer ready wood products from the panel and saw mill industry as a return freight. Unfortunately, the different EU member states do not have uniform and consistent regulations on the maximum allowable lorry weight: in The Netherlands 50 tons lorries are allowed; in Belgium 44 tons and in Sweden and Finland 60 tons.

1.5 Round wood market

The Dutch round wood market is characterized by many different wood species, many suppliers, a supply of small wood lots from often small woodland areas and a wood processing industry which is mostly small-scaled. Round wood imports play an important role on this market. The wood processing industry requires assortments of a certain quality, diameter and length. The Dutch forest owners offer their round wood as standing timber in the forests. Round wood traders combine and join together this very heterogeneous round wood supply into the specific requirements of the industry, both in The Netherlands and abroad. Dutch saw mills no longer deliver sawn wood products from stock, but deliver upon specifications "just-in-time". Thus the supply lines between wood lands and end-users are very short.

Wood fibers are the main product on the Dutch wood market, as a raw material for the pulp and paper industry. Pulp fibers are being made from small sized round wood and from the residues of the sawmill industries. The worldwide demand for paper annually increases by about 2 to 3 percent. Consequently, also the demand for wood fibers increases steadily. This impacts not only the price for small sized round wood, but also for the larger sized saw logs. For the economic performance of the saw mill industry not only the price of the saw products is important but equally the price for its rest products (residues): from each saw log about 50% is being sold as sawn wood products and 50% as residues.

Also the panel industry is active on approximately the same wood market. If the timber demand by the building and construction sector or by the furniture industry increases, this immediately affects the round wood prices in the forests. The price level is restricted at the upper level by the price of alternative materials such as concrete, plastics and metals. Inevitably, wood will out price itself if the same products can be made from a cheaper raw material (e.g plastic garden furniture).

The paper and panel industries provide the largest outlet for small sized round wood. These industries operate at an international market and often belong to large international consortia. The round wood they need has standard dimensions, which allow fast processing of relatively large volumes.

On the other hand, the Dutch saw mill industry delivers their sawn products mainly to the Dutch market. Saw mill for (broadleaved) hard woods generally are smaller in size than saw mills for soft woods (conifers). Therefore, the specifications of the raw material, sawing techniques, economy and market outlets may widely differ between these two sectors. Some of the Dutch saw mills may process both hardwoods and soft woods, in which case the round wood is bought with a specific end-use in mind and can hardly be standardized. Saw mills specialized in soft woods buy their round wood in relatively large and standardized volumes, which allow fast processing and a tight delivery schedule.

Obviously, the Dutch round wood processing industry is subject to competition from similar industries abroad. The demand for (the same) round wood is impacted by players on an international market. This means e.g. that some of the Dutch saw logs of oak are actually being transported to China instead of being processed in The Netherlands; Dutch poplar logs go to Morocco and Dutch beech logs to Denmark.

1.6 Harvesting costs

Round wood can be supplied by the forest owners in different ways:

- As standing timber in the forests
 - As cut down long-sized stems, hauled and forwarded to the forest road
 - As assortments cut to specified dimensions, being stacked in a pile alongside the forest road
- In The Netherlands most round wood is being sold as standing timber. This means that the buyer is responsible for all logging activities, the transportation and supply of the different assortments to the wood working industries, according to their specifications. Harvesting costs may vary according to the harvesting method applied, the type of timber (tree species and volumes) and the specific terrain conditions, such as the presence of dense undergrowth, ditches, hauling distance to the nearest forest road, etc). The harvesting costs of the standing timber method include all costs of felling, pruning, cutting it to smaller sizes by chain saw, skidding and forwarding of the logs and to stacking them into piles. The costs of the long stem method include felling, pruning hauling and stacking.

1.7 Biomass

In the Netherlands power companies provide an additional outlet for small sized timber, logging residues, wood processing residues and used wood to be converted to power and heat in bio-energy plants. Also the co-firing of woody biomass in coal plants is increasing significantly. As a result there is a growing extra demand on the wood market. This may have a positive impact on the market provided that traditional uses are not being out-competed. From an environmental point of view it would be a pity if wood from which many useful products can still be made, would be burned instead. Preferably bio-energy is generated from woody biomass which is not or no longer suited for other end-uses. This implies that forestry biomass which can be used as raw material for the panel and paper industries, should not be used directly as a bio-fuel.

In Scandinavia foresters have some experiences with the harvesting of energy wood. Even in Scandinavia the percentage of fresh wood being harvested uniquely for the purpose of bio-energy is relatively small. Frequently the harvesting is confined to trees suffering from stem-rot or the collection of logging residues on clear cut areas². This has the additional advantage that the clear cut areas can be more easily replanted. If a similar situation would be valid for the Netherlands, this would imply a very limited contribution of forestry biomass to the total volumes of biomass required. In The Netherlands clear cutting is no standard practice. Most wood is being harvested in regular thinning. New developments may include the use multi-stem harvesters, which are currently being tested in Sweden (figure 2). And there are prototypes of baling machines which can bundle tree tops and branches into round bales, which can easier be handled and transported by regular lorries (Figure 3).

² Of all the energy wood derived from Swedish woodlands 10% comes from regular thinning; 20% is from low quality stems being rejected for other uses and 70% from the collection of logging residues from clear-felling.

Figure 2

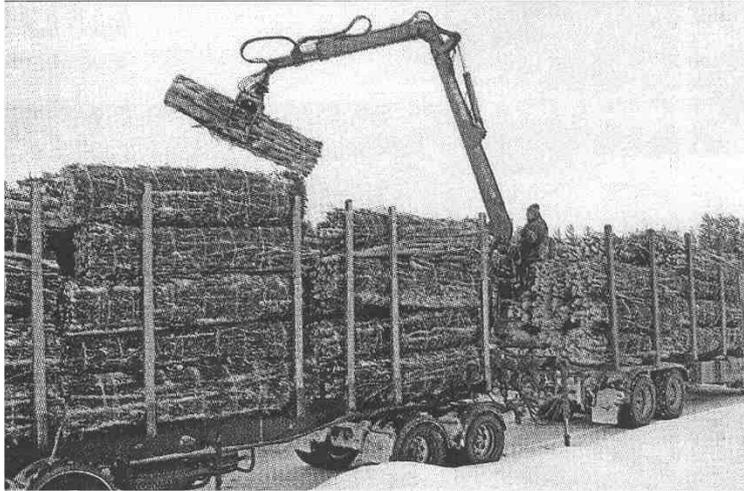
Multi-stem harvester with a felling head which can handle a number of small-sized stems



Figure 3

Swedish machines to bundle treetops and branches for easier handling and transportation





1.8 Energy wood from Dutch forests

Several AVIH-members are active in the field of production, harvesting and trade in woody biomass (table 2). Depending on the conversion technology bio-energy power plants demand specific requirements to the biomass supply in terms of moisture contents, allowable sand fraction, sizes of the chips and percentage leaves and bark.

Table 2

AVIH-members, which are actively involved in the production and handling of woody biomass (in alphabetical order).

| Companies | |
|--|-----------------------------------|
| <u>Beeftinken Zn. Fa. A.</u> | <u>Parenco Hout B.V.</u> |
| <u>Bruins & Kwast Groenaanemers B.V.</u> | <u>Silvertand Houthandel</u> |
| <u>DEVOBO Forest Service B.V.</u> | <u>Vliet, Houthandel C.L. van</u> |
| <u>Mensink Loonbedrijf v.o.f.</u> | <u>Weert Rondhout B.V., Van</u> |
| <u>Meulendijks Rondhout B.V.</u> | <u>Weijtmans, Boomrooierij</u> |
| <u>Ned. Rondhout Combinatie B.V.</u> | <u>Willemsen Naaldhout B.V.</u> |

How much energy wood from the Dutch woodlands will become available on the market, very much depends on the price and on the fuel specifications. The fresher the wood, the lower its combustion value. E.g. wood from summer felling contains more moisture and leaves than wood from winter fellings. The comminuting of fresh round wood and logging residues into wood chips for energy purposes can best be done in a large chipper or tub grinder at a central yard near the energy plant than by using small mobile chippers in the forests. Central chipping certainly has advantages for the logistics and economy of the supply chain. In this respect, the paper and panel industry has preceded the bio-energy sector in harvesting and transporting round wood (logs) from the forest to the conversion site and in doing the necessary pretreatment steps at a central yard.

Apart from forestry biomass as a co-products of the management of Dutch woodlands, a lot of woody biomass is being supplied by trees felled for urban development and to make room for new infrastructures (e.g. roads, railways). In addition to prunings from parks and gardens, used wood from demolition sites and wood processing residues, a limited fraction of fresh wood from forests and landscape plantings is actually being used as bio-fuel. Whether or not this is a feasible alternative to traditional uses, is a matter of business economics.

PART 2 SWOT-ANALYSIS

What are the strengths and weaknesses of the Dutch Forest exploitation sector and which opportunities and threads are being experienced by the companies involved? By means of a SWOT-analysis the actual and future situation can be analyzed on the basis of which better choices can be made. In this follow-up study a SWOT-analysis has been carried out in accordance with the planning methodology developed by Santema et al (1997)³ in close collaboration with participants from the sector, of which the main results will be presented.

2.1 Methodology

In short the planning methodology of Santema et al. distinguishes four stages, each with a similar structure: based on an commonly agreed point of departure (e.g “Dutch companies involved in forest exploitation are well organized, knowledgeable and business oriented and are very well able to compete with foreign companies”) data are being collected, analyzed, possible relationships suggested and new ideas generated. With the help of a choice-instrument the collected data are structured and grouped together and priorities given, which will provide a focus. Each stage in this planning process should lead to a concrete result, which forms the point of departure for the next stage.

In the first stage of a SWOT-analysis the internal strengths and weaknesses as well as the external opportunities and threads are presented in an orderly way. In stage 2 the internal and external factors are being related to each other in a so-called confrontation matrix. From this matrix main points of attention are being derived. In stage 3 for each of the main points of attention several options are being generated and priorities given. In stage 4 concrete activities are being formulated to arrive at the desired results.

Stage 1: SWOT-overview of the internal en external surroundings

Summary internal surroundings

| Strengths | Weaknesses |
|-----------|------------|
| S1 | W1 |
| S2 | W2 |
| S3 | W3 |

Summary of external surroundings

| Opportunities | Threats |
|---------------|---------|
| O1 | T1 |
| O2 | T2 |
| O3 | T3 |

³ Santema, S.C, M. Dingema en N. van Dishoeck 1997. Succesvolle marketingplannen. Denken, kiezen, doen. F&G Publishing, Utrecht, 169 p.

Stage 2: from SWOT to main points of attention

Based on the chosen SWOT-elements from stage 1 a confrontation matrix is made to formulate three main points of attention.

Confrontation matrix

| | Opportunities O1 O2 O3 | | | Threats T1 T2 T3 | | |
|------------------------------|---------------------------|--|--|---------------------|--|--|
| | 1 | | | 2 | | |
| Strengths S1 S2 S3 | 'Attack' | | | 'Defend' | | |
| | 3 | | | 4 | | |
| Weaknesses W1 W2 W3 | 'Maintain' | | | 'Back-off' | | |

By formulating main points of attention it becomes clear which strength or weakness can be related to an opportunity or threat. There are four quadrants in the matrix representing different strategies: "attack" (quadrant 1: strengths/opportunities), "defend" (quadrant 2: strengths/threats); "maintain" (quadrant 3: weaknesses/opportunities) and "back-off" (quadrant 4: weaknesses/threats)

Stage 3: from main points of attention to priorities

For each main point of attention of stage 2 possible options for the realization are being generated. The strategies 'attack, defend, maintain or back-off' point to the direction in which options can be found. To validate these options a set of common criteria will be used, e.g. similar to criteria to evaluate development plans.

Stage 4: from priorities to concrete activities

After proposing as many activities as possible the most desired sequence for the implementation has to be agreed upon. In this stage again priorities are given. The most relevant activities form the basis for a concrete action plan.

2.2 Results of stage 1

The Dutch round wood trade buys standing timber from forest owners in The Netherlands, Belgium and Germany no matter what the conditions for exploitation and no matter the supply possibilities. If the renewable energy sector goes to the market with a clear demand and willing to pay a reasonable price, than the supply of an extra outlet will be no problem for the forest exploitation and timber trade sector. In the past the market has demonstrated to be able to supply new industries such as OSB and MDF. For the wood suppliers it does not really matter which products are being manufactured, be it sawn wood products, paper, OSB, MDF, HDF, poles or green energy.

Different producers compete for the availability of the raw material wood. A company which intends to make green power from energy wood harvested in Dutch woodlands, will have to position itself in this existing field of competition. The same holds true for any other manufacturer who wants to make a new wood product or who will expand his production capacity. The wood supplier will react to the increased demand by supplying more wood of from different qualities or with a different price.

In a SWOT analysis it is important to make clear from which perspective the strengths and weaknesses are being considered. E.g. from the viewpoint of forest exploitation it would seem a weak point that the energy companies are not (yet) involved in the chipping of industrial round wood, as e.g. the paper

and board industries are doing, in which case the biomass supply could easily fit in with the existing round wood logistics. Obviously this is relevant only if energy companies feel the need to diversify their raw material supply, which is not necessarily the case: at present most woody biomass used by the renewable energy sector consists of dried wood pellets instead of fresh round wood from the forests and landscape plantings⁴.

Strengths

S1: many companies combine forest exploitation with round wood trade. This means that the supply chain is in one hand, which guarantees efficient logistics and an optimal use of man and machines.

S2: The sector increasingly uses modern and sophisticated harvesting equipment (harvesters, skidders and forwarders, etc), of which the capacity is well used, e.g. by running these machines in jobs in neighboring countries.

S3: Large Dutch round wood traders are well organized in adjacent countries. It is relatively easy for them to supply energy wood derived from woodlands abroad.⁵ (if needed, lorries can be organized for extra cross country transports)

Weaknesses

W1: Transports and logistics take a relatively large proportion of the wood supply costs, because in The Netherlands there are no outlets for lower grade fiber wood⁶ and because the wood is being supplied in small quantities from many small woodland areas⁷

W2: The structure of the forest exploitation sector is characterized by many small contractors, which may not be as efficient as a limited number of larger companies, but on the other hand it suits the small scale of the Dutch wood supply (Hence, this weakness can also be considered a 'strength', because it enables that small volume of wood can enter the market)

W3: Relationship between woods traders and forest owners lack mutual trust and understanding: the forest owners lack the knowledge, insights and feeling with the market and have not much experience with forest exploitation. That's why more and more wood (and work in the woods) is being offered by tenders. There is a shift from relationships towards more transactions.

W4: The profit on the exploitation and trade of indigenous round wood is small. This is valid for most of Europe, and not really a weakness, but rather a market fact.

Opportunities

O1: Most round wood in The Netherlands is being sold as standing timber, which implies a central role for the forest exploitation and trading companies.

O2: Utilization rate (the percentage of the annual increment being felled) is rather low in The Netherlands (and the rest of Europe). An extra outlet for energy wood will increase harvesting levels and as such creates extra work for the sector.

O3: The recent vision on timber harvesting by the Ministry of Agriculture and the Dutch Timber Platform has made harvesting a political topic.

O4: Tree tops and branches could become an additional assortment, but only if it is technically and economically feasible and the forest owners are in favor to do so (and if there are no major negative environmental impacts).

⁴ In addition, the potential of fresh wood harvested from landscape plantings located outside managed woodlands is largely unused: often municipalities and water boards who are the owner of many small wood lots, are obliged by law to manage these plantings in such a way that the branches and tree tops need to be removed from the site at relatively high costs. For this biomass material, which has to be taken care of anyway, the use as a feedstock for bio-energy could be an interesting option.

⁵ If, however, the supply conditions are competitive with the Dutch demand most of the energy wood will stay abroad.

⁶ In The Netherlands two paper mills only offer an outlet for Dutch fiber wood. Fortunately, other outlets, such as Board, MDF, OSB and paper mills in Germany and Belgium are located not very far away from the borders.

⁷ In The Netherlands the maximum load is higher than in Germany and Belgium but lower than in Sweden.

O5: A large part of the Dutch woodland is being certified for sustainable forest management and many contractors are CoC (group) certified. For end-users who require (or at least appreciate) such a certification energy wood can already be supplied with the preferred documents.

Threats

T1: The small and scattered forest ownership inevitably will result in less efficient use of machines and manpower, which is a competitive disadvantage with respect to neighboring countries. This is a give fact for all form of timber use from Dutch woodlands.

T2: Integrated forest management, characterized by small-scaled forest operations and thinnings instead of clear fellings is responsible for increased harvesting costs

T3: many private forest owners do not harvest at all and other much less than they could (and still work in a sustainable way)

T4: A lack of outlets for energy wood from the forests (wood processing residues and used wood are still plenty available and much cheaper)

T5: During some months the Flora en Fauna law puts restrictions on forest work (e.g. only winter felling allowed).

The most important strengths, weaknesses, opportunities and threats are summarized in the table below. The ranking of the top-3 for each category was made by representatives from the forest exploitation and trading sector.

Summary internal environment

| <i>Strengths</i> | <i>Weaknesses</i> |
|---|---|
| S1 Supply chain in one hand | W1 High costs for transport and logistics |
| S2 Modem harvesting equipment | W2 Many small contractors |
| S3 NL trade well organized in neighboring countries | W3 Less relationships and more transactions |

Summary external environment

| <i>Opportunities</i> | <i>Threats</i> |
|---|--|
| O1 Standing timber sales | T1 Scattered small forest ownerships |
| O2 Low utilization rate | T2 Integrated forest management |
| O3 Wood harvesting receives political attention | T3 No harvesting by many private forest owners |

2.2 Results of stage 2: identifying main points of attention

By means of a so called “confrontation matrix” the top-3 of the strengths, weaknesses, opportunities and threats are related to each other to determine which strength or weakness can best be linked to a certain opportunity or treat.

In the “attack” quadrant the strengths are related to the three greatest opportunities. How can we best use our strength to make use of an opportunity?

| “Attack” | Opportunities | | |
|--|-----------------------|----------------------|--|
| | Standing timber sales | Low utilization rate | Wood harvesting receives political attention |
| Strengths | | | |
| Supply chain in one hand | | | X |
| Modem harvesting equipment | | X | |
| NL trade well organized in neighboring countries | X | | |

In the “defend” quadrant the strengths are related to the biggest threats.: how can we use our strength to wear off a threat?

| “Defend” | Threats | | |
|--|-----------------------------------|------------------------------|---|
| Strengths | Scattered small Forest ownerships | Integrated forest management | No harvesting by many private forest owners |
| Supply chain in one hand | | X | |
| Modern harvesting equipment | X | | |
| NL trade well organized in neighboring countries | | | X |

In the “maintain” quadrant weaknesses of the sector are related to the greatest opportunities: how can we strengthen our weaknesses to be able to take advantage of an opportunity?

| “Maintain” | Opportunities | | |
|--|-----------------------|----------------------|--|
| Weaknesses | Standing timber sales | Low utilization rate | Wood harvesting receives political attention |
| High costs for transport and logistics | | X | |
| Many small contractors | | | X |
| Less relationships and more transactions | X | | |

In The “back-off” quadrant weaknesses are related to the main threats: how can we strengthen our weaknesses in order to wear off a threat?

| “back-off” | Threats | | |
|--|-----------------------------------|------------------------------|---|
| Weaknesses | Scattered small Forest ownerships | Integrated forest management | No harvesting by many private forest owners |
| High costs for transport and logistics | X | | |
| Many small contractors | | X | |
| Less relationships and more transactions | | | X |

The main points of attention for an attack strategy are:

1. How can the most prominent strength of the sector, i.e. the whole supply chain in one hand, be used to put wood harvesting high on the political agenda?
2. How can the use of modern harvesting equipment be helpful to harvest more of the annual increment?
3. How can the good business relationship of the Dutch forest exploitation sector in countries abroad be used to buy more standing timber?

The main points of attention for a possible defend strategy are:

4. How can the main strength of the sector, i.e. the whole supply chain in one hand, be used to counteract the negative impacts of integrated forest management?
5. How can the use of modern harvesting equipment be used to mitigate the consequences of forest small holdings?
6. How can the good business relationship of the Dutch forest exploitation sector in countries abroad be used to wear off the threat that many private forest owners are reluctant to harvest wood?
- 7.

In a similar way the main points of attention can be formulated for the maintain and back-off strategies..

2.4. Results of stage 3: generate options for the implementation

In this stage for each main point of attention possible options for the implementation have to be generated, preferably by a multi-disciplinary team. Try to use different approaches and angles to look at it. All ideas which spontaneously come up must be collected.

For instance, for the main attention point “How can the use of modern harvesting equipment be helpful to harvest more of the annual increment?”, an possible way of looking at options could be: technology assessment, economy, reduce negative impacts for the natural environment, public support, improving the quality of the harvested forest products, increasing the scale or noise reduction
When taking a technology angle, harvesting machines may be rented or bought, which are adapted to the small scale and heterogeneous conditions which prevail in Dutch wood lands, e.g. machines with low wheel pressure (caterpillars) and with a narrow working bases so that small forest roads may be used to haul out the logs, etc . The most appropriate options for the implementation form the basis for a concrete plan of activity (stage 4). In this follow-up study, however, we have restricted ourselves to the identification of main points of attention for the attack and defend strategies.

PART 3 CONCLUSIONS

1. This SWOT analysis has clearly demonstrated that trying to increase the harvesting rate of energy wood in Dutch woodlands is not so much a matter of improving the technological and organizational structure of the forest exploitation sector (because they are top of the bill already), but rather to fully utilize market opportunities.
2. The wood harvested will only be used for energy purposes if wood price and supply conditions are competitive with other uses. Thus it is mainly an economic issue. And because the demand for energy wood is not yet competitive with the traditional uses, for the time being very little forestry biomass is being used for renewable energy.
3. Should, however, the demand for energy wood increase in the near future, the Dutch forest exploitation and timber trading sector is ready to deliver. In which case the energy companies (utilities) must be willing to act as a common industrial round wood user in an existing market and willing to pay the same round wood prices. At the moment, however, cheaper biomass steams are available in sufficient quantities.
4. When the market for second generation (ligno-cellulose) bio-fuels starts to develop, which requires rather strict specifications of the raw material, than industrial round wood seems a logical choice: the whole supply chain is already fully operational and can be carried out efficiently by professionals in the business.
5. Thus it seems that the Dutch forest exploitation sector has a strong position to offer professional services to this emerging market.