

# Prospects for the market supply of wood and other forest products from areas with fragmented forest-ownership structures

## FINAL STUDY REPORT

Vienna, October 2010



# Prospects for the market supply of wood and other forest products from areas with fragmented forest-ownership structures

 <p><b>Lead Contractor</b></p>	<p><b>University of Natural Resources and Applied Life Sciences, Vienna (BOKU)</b></p> <p>Peter SCHWARZBAUER          Institute of Marketing and Innovation          Feistmantelstrasse 4, A-1180 Vienna, Austria          Phone: +43-1-47654-4416          Mail: <a href="mailto:peter.schwarzbauer@boku.ac.at">peter.schwarzbauer@boku.ac.at</a></p>
	<p><b>Confederation of European Forest Owners (CEPF)</b></p> <p>Morten THORØE          Rue du Luxembourg 66, B - 1000 Bruxelles          Phone: +32 2 2392300          Mail : <a href="mailto:morten.thoroe@cepf-eu.org">morten.thoroe@cepf-eu.org</a></p>
	<p><b>Centre Tecnològic Forestal De Catalunya (CTFC)</b></p> <p>Denis BOGLIO          Ctra. de St. Llorenç de Morunys,          Km 2 E-25280 Solsona, Spain          Phone: +34 973 48 1752          Mail: <a href="mailto:denis.boglio@exchange.ctfc.es">denis.boglio@exchange.ctfc.es</a></p>
	<p><b>Albert-Ludwigs-Universität Freiburg (ALUFR)</b></p> <p>Gero BECKER          Institute of Forest Utilisation and Work Science of the Albert-Ludwigs-University in Freiburg in Breisgau          Werthmannstraße 6, 79085 Freiburg          Phone: (+49) 0761 - 203 3764          Mail: <a href="mailto:institut@fobawi.uni-freiburg.de">institut@fobawi.uni-freiburg.de</a></p>
	<p><b>Kompetenzzentrum Holz GmbH (Wood K plus)</b></p> <p>Tobias STERN          Market Analysis and Innovation Research          Feistmantelstrasse 4, A-1180 Vienna, Austria          Phone: +43-1-47654-3581          Mail: <a href="mailto:t.stern@kplus-wood.at">t.stern@kplus-wood.at</a></p>
	<p><b>National Professional Center for Forest Ownership - Institute for Forestry Development (CNPPF-IDF)</b></p> <p>Clotilde GIRY          Institute for Forestry Development          13 Avenue des droits de l'homme, 45921 Orléans Cedex - FRANCE          Phone : (00 33) (0)2 38 71 90 62          Mail: <a href="mailto:clotilde.giry@cnppf.fr">clotilde.giry@cnppf.fr</a></p>

## FINAL STUDY REPORT

Vienna, October 2010

# Executive Summary

## Introduction

Based on the EU Forestry Strategy, the overall aim of the EU Forest Action Plan is to support and enhance sustainable forest management and the multifunctional role of forests. It provides a framework for the implementation of forest-related actions at Community and Member States level, and serves as an instrument of co-ordination between Community actions and forest policies of the Member States. Within Action 5 (Foster the cooperation between forest owners and enhance education and training in forestry), Activity 5.2 of the work programme for implementation of the Action Plan indicates that a study on the market supply of wood and other forest products, in particular on obstacles to mobilisation due to fragmented ownership structures, will be carried out.

## Definition of Fragmented Forest Ownership

In this study, fragmented forest ownership is understood as the presence of a high number of individuals owning small-size forest parcels. Forest fragmentation here is not meant to be mainly addressed from the spatial point of view, considering distribution of individual forest stands in the landscape, even though this may also be viewed as one of the limiting factors for effective mobilisation of wood. Since the average plot size, which may be considered as a small-size forest parcel, may heavily depend on the site conditions (e.g. stock, topography, site development, etc.) the decision on what may be considered as fragmented was taken on a case-by-case basis.

## Background

In 2005, the total area of forest and other wooded land in the EU covered about 177 million hectares and accounted for over 37% of the total EU area. The reported wood supply from these resources is estimated to reach about 67% of the annual increment (FAO, 2006). The share of private ownership in relation to the total forest area is very diverse among the EU member states with the highest proportions to be found in Portugal (93%), followed by Austria (80%), Sweden (80%) and France (74%). While the number of private forest owners is rather high, their share of forest land is comparably small. Hence the average size of forest ownership in the EU is only 12.7 ha in case of private holdings and about 975 ha in case of public holdings. However, there are also considerable differences in the average size of private forest holdings between individual Member States and regions. A further increase in the number of private holdings is expected in several Eastern European countries due to on-going restitution or privatisation processes. In other countries forest holdings may be subdivided, as a rule due to successive inheritances. As a matter of fact, fragmented forest ownership structures will be of increasing relevance for the European forest sector.

The study "Potential Sustainable Wood Supply in Europe" (Hetsch et al., 2008) published the most comprehensive picture of existing and potential wood supply components to date within and outside the forest. This analysis of different sources of wood supply indicated that about an additional 230 million m<sup>3</sup> could be available domestically in Europe under the given assumptions. The largest additional wood supply (60%) could be extracted from Europe's forests according to the data available.

In theory, increased wood demand should result in higher wood prices, which would lead to more wood being placed on the market. However, this theoretic situation is not always present in the private forest sector, especially in case of some fragmented ownership groups. Consequently, a higher price or profitability is an important key, but not the only one to a higher degree of mobilisation.

## **Objective**

As recent market perspectives for the EU show, the overall demand for wood and paper will significantly exceed the actual supply in the near future. One consequence is to undertake efforts to increase the mobilization of wood, especially among small private forest owners who in most cases have underused their harvesting potential.

Hence, the purpose of this project was to:

***“identify the most appropriate measures for increasing the market supply of wood and other forest biomass from the areas where forests are held by many individuals owning relatively small parcels of forest.”***

## **Methods and Materials**

As a first task, secondary data on the wood balance and the private forest sector in the EU was analysed to provide an information base for the subsequent investigations.

The second task was to provide a detailed overview of wood markets and assess the level of private forest owners' participation in the market in eight case study regions. The selected case study regions (Saxony, Austria, Rhône-Alpes, Sweden, Catalonia, England, Hungary and Estonia) included areas from EU 15 and the Member States that joined the EU in 2004 or thereafter, ranging from Member States having respectively high, medium to low proportions of private forest owners and intensities of wood mobilisation. Furthermore the selected case studies included countries with relatively high and relatively low forest cover and with relatively large and medium as well as relatively limited forest industries, whether state-controlled or privately owned. A very important feature is that the selected case studies include different levels of fragmentation (in terms of average size) and wood mobilisation (in terms of harvest related to annual increment). As a matter of fact, the selected case studies were suitable to study factors influencing wood mobilisation in the context of fragmented forest ownership.

In every case, study focus group sessions were held including representatives of forest owners, wood buyers, public authorities and other relevant experts (e.g. from chamber of commerce, researchers, forest administration). These focus group sessions particularly concentrated on all questions that were at least to some extent of qualitative nature (e.g. outlook, motivation, access) and for which no satisfactory secondary data was available.

To develop a list of appropriate measures for wood mobilisation improvements a list of existing wood mobilisation barriers was made first by analysing the case study reports. After having received a list of statements concerning wood mobilisation, mentioned problems were classified by their origin and grouped by the type of barrier. At the end, 32 different types of barriers for wood mobilisation could be extracted. Hereafter, both the general and the regional importance of barriers were evaluated by counting their appearance in each case study report. Since each case study region is part of one of the market conditions categories, relevant barriers could also be evaluated for three different market conditions. Finally, measures

facilitating mobilisation of wood have been identified according to their suitability to increase mobilisation of wood from forests with fragmented ownership under certain market conditions.

## Results

The assessment of mobilization measures by type of market and by type of owner is one of the central achievements of this study. The analysis of the market factors supply, demand, infrastructure and legal framework resulted in a categorisation of three types of dominating market conditions in Europe into which the case study regions were classified:

- Category I: “Strong market” with advantageous conditions of wood mobilisation (Sweden),
- Category II: “Developing market” with mediocre conditions of wood mobilisation (Austria, Estonia, Saxony) and
- Category III: “Weak market” with disadvantageous conditions of wood mobilisation (Rhône-Alpes, Catalonia, England, Hungary).

Regarding forest owners’ related factors it has been found that in general (in all cases with sufficient data available) a significant number of fragmented forest owners show a strong and positive reaction regarding wood price changes<sup>1</sup>. Hence, a huge mobilisation potential can be assumed in case of rising wood prices - a factor that is again linked to the market type. The results indicate that the general positive wood price elasticity of supply of fragmented forest owners is again depending on several factors. First of all it seems that there is (in all regions) a growing group of fragmented forest ownerships that are not participating in wood markets at all. This suggests distinguishing fragmented forest ownerships first of all by their willingness or ability to participate in wood markets as:

### Traditional forest owners (economic-oriented towards wood production)

Those who do participate in wood production for markets or for own use are most likely more traditional forest owners with farming or forestry background and knowledge. They could be characterised by their economic-oriented objective of forest ownership. Their major barriers for wood mobilisation are the unfavourable economic conditions in fragmented forest ownerships. Consequently they have strongly reacted on changes in profitability, be it due to rising demand and prices for wood (mostly) or due to direct or indirect financial incentives that affect the profitability. In the case of these more traditional forest owners the effects of market structures (market types) have been found to play a significant role for the effectiveness of wood price premiums. “Strong markets” show much better performance than “Developing” or “Weak markets”.

---

<sup>1</sup> This applies to wood delivered to markets only whereas household consumption and informal markets can be considered as comparably constant.

### Non-traditional forest owners

These non-traditional forest owners may have no farming or forestry background, hence no forest-related knowledge, and they may live far away from their forest and have typically become forest owners by restitution or inheritance. Probably the most important point to understand this group is to see the diversity of non-economic or at least not wood related oriented motivations in relation to their forest ownership. This growing group of non-traditional forest owners requires a completely new understanding of and new ideas for wood mobilisation. This group is definitely the one lacking a great number of possible mobilisation measures but showing a larger strategic potential for mobilisation in the medium and long term, especially as this group is expected to grow in the future. Although the general knowledge about this group has been found low, it is possible for the purpose of wood mobilisation measures to divide this group into two subunits:

- Owners with no wood-related (often non-economic) objectives
- Uninterested owners (no objectives at all)

In case of forest owners with no wood-related or even non-economic objectives it is clear that a key issue for wood mobilisation lies in knowing and understanding their objectives. So far it seems that these groups are characterized by a great variety of different possible objectives - in some cases even a mixture of various objectives within the one ownership. A few of these objectives may conflict with wood mobilisation<sup>2</sup> in general (e.g. conservation; loss of property value, tourism) but others may be unaffected or even highly convergent to wood mobilisation (e.g. family tradition, leisure, ownership pride). In these cases, a lack of forest-related knowledge, network and service opportunities (in context to market type) may turn out to be the reason why such forest owners do not participate in wood markets. Hence measures targeting this group need to reach their owners with information, guidance and services but not with profitability-related measures.

Uninterested forest owners represent a group that by definition cannot be reached by traditional and general mobilisation measures. Beside the attempt to awake their interest by information campaigns, the probably most efficient measures for this group are those preventing further fragmentation by law or by regulations as well as land consolidation programmes including legal settings that simplify transfer of forest land.

In order to assess the amount of wood that may be available by mobilisation measures from fragmented forest ownership structures the case studies revealed some key figures that however were highly uncertain. It should be noted that in the ongoing structural change in forest ownership, there is still a large part of forest owners that have some family-related connection to agriculture and would be open to traditional forest management services that are offered by neighbours or associations. It can be assumed that those transitional owner categories will change to non-traditional types in the next generation at the latest.

---

<sup>2</sup> None of these objectives and wood mobilisation are necessarily mutually exclusive; of course, it always depends on site conditions and situation.

## Recommendations

The usefulness and efficiency of wood mobilisation measures towards fragmented forest ownerships is extremely dependent on region, market condition and forest owner type. There is neither the one and only perfect mobilisation measure available nor the need to develop many new measures to be applied. The results suggest that the most efficient mobilisation may be achieved by a combination of measures selected according to the regional situation mainly including the market type as well as the distribution of forest owner types, respectively their objectives (see table).

Information aims at imparting knowledge as well as skills. It is especially relevant for the types of non-traditional and uninterested owners, which can mainly be found in regions of market category II and III. Information is subdivided into 'general' information, 'specific' information, 'counselling' and 'training'. While *general information* directs towards the public as a whole and aims at an improvement of the awareness concerning forests, forest management and wood use, receivers of 'specific' information are individuals involved in forestry and wood mobilisation. *Specific information* cannot be given only with the help of special printings and media, but also via internet, via campaigns, fairs or workshops. *Counselling* requires professionals giving advice (mainly) to forest owners, while *training* can be implemented to enhance the skills of people involved in wood harvesting (forest owners, forest operators).

The objectives of non-traditional fragmented forest ownerships need to be known and understood. They need to be analysed towards their convergence and impact on wood mobilisation. This is the base on which efficient communication and information measures need to be building on. Therefore, intensive qualitative and quantitative research is needed to investigate the nature and kind of these objectives (qualitative methods) and to uncover the distribution and frequency of the objectives in certain regions (quantitative methods) to enable optimised communication strategies in the regions. This could be covered by European research projects.

Traditional information channels as for example extension services need to be adapted as well as new channels for information, guidance, forest service and wood distribution developed. Internet-based applications like newsgroups or web-platforms may be ideas that have to be investigated by research and promoted if proven useful. Based on these channels, new forest service operators (or at least new services provided by them) as well as new market places for wood (Wood-e-bay) could be developed. Planning, implementation and efficiency control of such channels will very likely need external support in the beginning but should in the medium term work economically independent.

At first these measures need to be guided on a European level but may be adapted to national scales later on. Financial support for such activities may be possible through rural development programmes (cooperation for innovation). Similarly, such measures can be transferred from public authorities to the private sector as soon as their economic feasibility has been proven.

Cooperation serves to share information and undertake joint activities and is a generic term for all measures related to organisation and networking. While *networking* in the present study is understood as (relatively loose) interaction between the stakeholders of the wood mobilisation process (forest owners, public forest service, forest-based industry, counsellors and operators), *organisation* means an institutionalized cooperation of private forest owners in the form of owners associations or forest management cooperatives.

**Table:** Mobilisation measures in context to market type and forest owner type (X = relevant and recommended)

	Strong market				Developing market				Weak market			
	Traditional owners	Non-traditional owners convergent with mobilisation conflicting with mobilisation no objective			Traditional owners	Non-traditional owners convergent with mobilisation conflicting with mobilisation no objective			Traditional owners	Non-traditional owners convergent with mobilisation conflicting with mobilisation no objective		
<b>Information</b>												
General information	X	X	X	X	X				X			
Specific information	X	X	X	X	X	X	X	X	X	X	X	X
Counselling		X	X	X	X	X	X	X	X	X	X	X
Training		X			X				X	X		
<b>Cooperation</b>												
Networking	X				X				X			
Organisation	X	X	X		X	X	X		X	X		
<b>Infrastructure</b>												
Roads & railways	X				X				X			
<b>Legal framework</b>												
Land consolidation				X				X				X
Transport	X											
Financial incentives					X	X			X	X		
Bureaucracy	X				X	X			X	X		
<b>Specific Instruments</b>												
Pooling activities					X				X			
Forest Information systems	X	X	X	X								
Harvesting technology	X				X							
Contracts	X	X			X	X			X	X		

The promotion of fragmented forest ownerships association (focusing on alliances), forest owner cooperation (focusing on work/services), joint management or even joint lease or ownership is in general a promising measure for wood mobilisation offering a number of proven advantages (e.g. more continuous wood flow for wood demanders, better accessibility of forest owners for all stakeholders, higher cost efficiency for private forest owners etc.). While traditional forest owners are mainly covered by association or cooperation activities, non-traditional owners may demand a different kind and/or level of cooperation. The results regarding forest owner associations show that regardless their success in the past they have proven to always work well with the relatively larger and more traditional forest owners. In order to continue this success story it will be necessary to develop new forms especially focusing on more fragmented non-traditional ownerships and their less wood production-oriented objectives.

Owner associations designed for urban forest owners could for example act as network and service provider located in the cities pooling forest ownerships in different locations. Other associations may target environmental-oriented forest owners, which will have completely different information and knowledge need. Thinking about new forest owner organisation types it is necessary to consider



possible political backgrounds of traditional organisations in some regions that may be a barrier for non-traditional owners. Hence it may be necessary to implement politically neutral association managements.

Infrastructure summarizes all measures that affect the accessibility of forests and wood transportation, e.g. road building and maintenance. Poor access to the forests is a main obstacle to wood mobilisation in fragmented forests. Whereas regions with large ownership units generally have an improved road net, road infrastructure in regions with fragmented properties remains weak. The main measure concerning forest roads is, in general, the improvement of forest accessibility by forest road planning, construction and maintenance. The weighting of the measures showed that the latter were very important for the regions of Category II (developing markets) and III (weak markets). An improvement of existing forest road networks was evaluated as a wood mobilisation measure that is very effective and easy to implement in short-term under strong market conditions. Nevertheless it is often emphasized that a reduction of transport costs (e.g. by lifting weight limits for existing roads) would support wood mobilisation. This process within the mobilization can be considered as a more or less 'natural development': first, a forest road network must be established (categories III and partly II), which can later be adapted to market needs and optimized (categories I and partly II) in a second step. In contrast to financial incentives directly related to wood harvesting, road building and reconstruction programmes as well as liberalisation of transport restrictions (see legal framework) would help owners of fragmented forests to participate in markets without causing a major bias to the markets' demand and supply situation. Such programmes need to be coordinated at national levels.

Legal framework summarizes all measures related to land consolidation, financial incentives, restrictions on transport and bureaucracy. It addresses all types of owners of fragmented private forests. Measures of *land consolidation* should help to overcome the (structural) problem of forest fragmentation, while *financial incentives* serve a number of improvements related to forest management and wood marketing. Specific wood mobilisation measures in the context of the legal framework can also focus problems of *transport* and *bureaucracy* related to forest management and wood marketing. Facilitation of bureaucracy regarding official requirements concerning forest management, harvesting and wood marketing is of high importance for wood mobilisation improvements under all market conditions. It is evaluated as highly effective and easy to implement within a relatively short term. State (forest) agencies are responsible for facilitations of official requirements. Costs will not arise as financing is not necessary. Rather the opposite is true: Facilitations of official requirements can help saving money at the agencies.

Specific instruments for the improvement of wood mobilisation are pooling activities, forest information systems (FIS), harvesting technology and contracts. *Pooling activities* aim at enhanced forest management and wood marketing through "bundling up" forest properties and wood by organisations (e.g. public forest service, forest owners association) or individuals (e.g. forest operators). *Forest information systems* provide information relevant for wood mobilisation activities (e.g. GIS; information regarding forest owners, contracts, payments etc.). *Harvesting technology* describes machinery and technology necessary for forest management and harvesting, while *contracts* form the base for binding agreements within the process of wood mobilisation.

The process of wood quantity bundling as a pooling activity is positively classified for the market categories 'weak markets' and 'developing markets' in relation to its effectiveness. However, the two factors 'simple and short term feasibility' reveals a more critical assessment. The regional organisation for timber mobilisation and marketing is responsible for the pooling process. Depending on the region, these

can, in particular, be forest owners' cooperatives, state forest administration or private service providers. The pooling process requires the trust of the forest owner. Local forestry bodies of forest owners have the advantage of constituting the ideal 'middle-man' between supply and demand.

First-time bundling activities (possibly to be stronger established in the area of 'flagship' projects) and permanent bundling activities have to be distinguished. First-time pooling activities can be supported by the public purse. The permanent bundling activities are connected to costs that can be jointly carried by forest owners and the forest-based industries. In contrast to land consolidation for wood mobilisation pooling is short-term orientated and can involve even smallest properties, but is targeting more towards traditional forest owners.

Flagship projects are recommended to serve as exemplary actions how a selected "package" of measures improves the situation of wood mobilisation in certain regions. Such projects represent the whole process of wood mobilisation activity, provide indications for difficulties and serve public relation. Realisation of flagship projects strongly depends on policy support (i.e. mainly financial incentives). In this case rural development funds may be used (LEADER projects, cooperation for innovation).

Research is needed to establish information systems which can be used for the development of decision support tools for measure implementation, to study the effectiveness of certain measures (e.g. flagship projects), especially the (non-traditional) forest owners' behaviour, attitudes and objectives. Another very important subject is the establishment of new channels for information, guidance, forest service as well as new types of forest owner associations that attract non-traditional forest owners. In this context internet-based applications like newsgroups or web-platforms are ideas that have to be investigated by research and promoted if proven useful. Based on these channels new forest service operators (or at least new services provided by existing operators) as well as new market places for wood (Wood-e-bay) could be developed. Effectiveness and efficiency of wood mobilisation measures have been found rarely evaluated in general. In fact, evaluation is difficult and expensive. Research within flagship projects could develop and implement evaluation procedures.

# Table of contents

<b>1 Analysis of information on wood balance and overview of the private forest sector in the EU (Task 1)</b>	<b>14</b>
1.1 Introduction	14
1.2 Definitions	14
1.3 Wood availability, use and change in the EU	15
1.3.1 Availability of wood in forests	15
1.3.2 Availability of wood on the markets	19
1.3.3 Use of forest resources in the EU	22
1.3.4 Projected future demand of wood in the EU by major users	24
1.3.5 Past, present and projected roundwood imports into the EU	26
1.3.6 Sustainability of mobilization	29
1.4 The structure of the forest-based sector in the EU - Overview of private forest ownership	32
1.4.1 Number of private forest owners and area of private forests in the EU (past, present, and projected)	32
1.4.2 Size, composition and distribution of private forests – an attempt to explain the issue of fragmentation	35
1.4.3 Structures for cooperation of private forest owners and their participation in activities of associations and/or cooperatives	38
1.4.4 Participation of the private forest owners in wood markets	42
1.4.5 Check the availability of adequately skilled, equipped and motivated workforce in private forest ownership	44
1.4.6 Land consolidation processes in the forest sector	45
<b>2 Case studies (Task 2)</b>	<b>48</b>
<b>3 Factors influencing participation of p. forest owners in wood markets (Task 3)</b>	<b>58</b>
3.1 Factors influencing motivation, knowledge and skills of private forest owners	58
3.1.1 Forest owners' characteristics	58
3.1.2 Factors influencing market behaviour	63
3.1.3 Forest Owner Ideal Types	69
3.1.4 Conclusions	71
3.2 How the market structures may influence the decision-making of private forest owners	71
3.2.1 Introduction	71
3.2.2 Pricing analysis	72
3.2.3 Market structures and forces	75
3.2.4 Conclusions	80
3.3 Identification of possible market conditions for mobilisation of wood in the EU	83
3.3.1 Introduction	83
3.3.2 Analysis of the market conditions against the background of wood mobilisation	83

3.3.3	Classification of market conditions	92
3.3.4	Short-term dynamics of the wood market	94
3.3.5	Long-term trends of wood markets and the contribution of fragmented private forest ownership	97
3.3.6	Conclusions	101
<b>4</b>	<b>Identification of measures facilitating mobilisation of wood and other forest biomass from forests with fragmented private forest ownership (Task 4)</b>	<b>104</b>
4.1	Identification of measures to increase mobilisation of wood and other forest biomass from forests with fragmented ownership	104
4.1.1	Barriers of wood mobilisation in Europe	105
4.1.2	Measures to overcome the barriers of wood mobilisation	108
4.1.3	Cooperation of private forest owners	116
4.2	Recommendation of measures for improvements of wood mobilisation	121
4.2.1	Methodology	121
4.2.2	Most promising measures for wood mobilisation	123
4.2.3	Presentation of detailed individual measures	124
4.3	Flagship projects	138
4.4	Conclusion	142
<b>5</b>	<b>Conclusions and recommendations for increasing market supply of wood and other forest biomass from fragmented forest structures (Task 5)</b>	<b>145</b>
5.1	Conclusions	145
5.1.1	Traditional forest owners (economic oriented towards wood prod.)	146
5.1.2	Non-traditional forest owners	146
5.1.3	Rough estimations on mobilisation potentials	147
5.2	Recommendations	148
5.2.1	Information	149
5.2.2	Cooperation	151
5.2.3	Infrastructure	152
5.2.4	Legal framework	152
5.2.5	Specific Instruments	153
5.2.6	Research	154
	<b>Literature</b>	<b>156</b>
	<b>Case Studies</b>	<b>159</b>
	<b>Annex Task 1</b>	<b>160</b>
	<b>Annex Task 2</b>	<b>166</b>
	<b>Annex Task 3</b>	<b>187</b>
	<b>Annex Task 4</b>	<b>214</b>
	<b>Annex Task 5</b>	<b>215</b>

# Figures

Figure 1: The geographical expansion of the European Union (EU 27) being the scope of the study.....	16
Figure 2: Wood demand for the 27 EU countries (Source; Hetsch et al., 2008) .....	26
Figure 3: Net roundwood imports/exports for the 27 EU countries (Source: FAO, 2009b) .....	27
Figure 4: Forest ownership shares (%) public-private in the EU in 2005 (Source FAO, 2006) .....	33
Figure 5: Trends of forests and other wooded land (FOWL) at country level of changes in private ownership between 2000 and 2005 (Schmithüsen and Hirsch, 2009) .....	35
Figure 6: Average forest holding size (ha/holding) (Source: MCPFE/UNECE/FAO 2007) Note: private forest holding size in Greece is out of scale with 934 ha/holding.....	37
Figure 7: Gross annual increment and annual fellings (Source: Schmithüsen and Hirsch, 2009) .....	43
Figure 8: Utilization rate of private forest and public forest, i.e. gross annual increment/annual fellings (Source: Schmithüsen and Hirsch, 2009).....	44
Figure 9: Age distribution of classes among private forest owners (Source: Schmithüsen and Hirsch, 2009) .....	47
Figure 10: Conceptual model underlying Task 3.1 .....	59
Figure 11: Factors for the market behaviour of private forest owners.....	64
Figure 12: Evolution of current price for roundwood and sawnwood in the European Union, (Source: FAOSTAT , 2010) .....	73
Figure 13: The natural potential of wood supply in the European case study regions (Evaluation based on information presented in the case study reports) .....	84
Figure 14: The owners-related potential of wood supply in the European case study regions (Evaluation based on information presented in the case study reports).....	84
Figure 15: The importance of informal markets in the European case study regions.....	85
Figure 16: Wood market conditions in the eight case study regions towards the situation of wood mobilisation .....	93
Figure 17: Expected developments of the structure of wood processing industries and industrial wood energy users in the eight case study regions.....	98
Figure 18: Expected developments of future supply in the eight case study regions.....	99
Figure 19: The importance of wood mobilisation barriers for all case study regions.....	105
Figure 20: Most important barriers of wood mobilisation under market conditions of category I ("strong markets").....	106
Figure 21: Most important barriers of wood mobilisation under market conditions of category II ("developing markets") .....	107
Figure 22: Most important barriers of wood mobilisation under market conditions of category III ("weak markets") .....	107
Figure 23: Categories and sub-categories of measures with influence on wood mobilisation.....	109

Figure 24: Barriers for wood mobilisation in Europe and categories of measures to overcome these obstacles .....	113
Figure 25: The role (effects) of organisation of private forest owners.....	117
Figure 26: Expected future development of forest owner organisations in different market conditions (exemplary regions) .....	118
Figure 27: Measures for improved formal cooperation related to organisations ....	120
Figure 28: Further measures and instruments for improved formal cooperation ...	120
Figure 29: List of most effective measures for each market category (Ranking under consideration of easiness and short-term of implementation) .....	123

## Tables

Tab. 1: Forest area and development, the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex) .....	17
Tab. 2: Wood stock for the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex) .....	17
Tab. 3: Yearly wood stock change for the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex) .....	18
Tab. 4: Table on total wood removals and wood removal rate for the EU 27 total, other Europe and Russian Federation (FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex) .....	20
Tab. 5: Wood production for the EU 27 total, other Europe and Russian Federation (Source: FAO, 2009b) (An extended version including each of the 27 EU countries can be found in the Annex) .....	21
Tab. 6: Absolute and relative importance of different sources of wood supply in the EU 27/EFTA region 2005 (million m <sup>3</sup> roundwood equivalent) (Source: Hetsch, 2008) .....	22
Tab. 7: Roundwood imports/exports for the EU 27 total, other Europe and Russian Federation (Source: FAOSTAT, 2009b) (An extended version including each of the 27 EU countries can be found in the Annex) .....	26
Tab. 8: Roundwood supply versus roundwood required to fulfil EFSOS projections (material use) and policy objectives (use for energy) (EU-25/EFTA) (Source: Hetsch et al., 2008) .....	28
Tab. 9: Forest Producer Organisations in Austria, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Norway, Portugal and Sweden in 2007 (see CEPF, 2008) .....	40
Tab. 10: Harvesting levels in total and in Forest Producer Organisations in Austria, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Norway, Portugal and Sweden in 2007 (see CEPF, 2008) .....	41
Tab. 11: Fact sheet of the case study results .....	50
Tab. 12: Categories of forest owner types, by case study region. ....	60
Tab. 13: Attitudes among private forest owners towards own forests.* .....	61
Tab. 14: Profitability-related factors .....	65
Tab. 15: Wood mobilisation measures, by target group and case study region. ....	67
Tab. 16: Relation of different forest owner typologies. ....	69
Tab. 17: Mobilisation measures presented under 4.1.2.iv in relation to market condition, owner type and objective (X = relevant and recommended) .....	149
Tab. 18: Most promising form of forest owner organisation in context to market condition, owner type and objective .....	151

# **1 Analysis of information on wood balance and overview of the private forest sector in the EU (Task 1)**

## **1.1 Introduction**

The objective of this first chapter is to give an overview of the situation in the wood markets, focusing on supply and use of roundwood and wood biomass, including the role of private forest owners in supply of wood assortments for different end-users in the European Union. Availability of and demand for wood and other forest biomass in the future is identified and projected, based on the best available information. In addition, this task will provide an understanding about the developments in the private forest sector in the EU, in particular on the structures of private forest ownership, changes in these structures as well as private forest owners as market operators, in particular focusing on the role and development of fragmented forest ownership.

## **1.2 Definitions**

### **Fragmented forest ownership**

In this study, fragmented forest ownership is understood as the presence of a high number of individuals owning small-size forest parcels. Forest fragmentation here is not meant to be mainly addressed from the spatial point of view, considering distribution of individual forest stands in the landscape, even though this may also be viewed as one of the limiting factors for effective mobilisation of wood. Since the average plot size, which may be considered as a small-size forest parcel, may heavily depend on the site conditions (e.g. stock, topography, site development, etc.) the decision on what may be considered as fragmented was taken on a case-by-case basis.

### **Private forest ownership**

Forest/other wooded land owned by individuals, families, co-operatives and corporations which may be engaged in agriculture or other occupations as well as forestry; private forest enterprises and industries; private corporations and other institutions (religious and educational institutions, pension and investment funds, nature conservation societies, etc).

### **Forest**

Areas spanning more than 0.5 to 1.0 hectares (depending on national definitions) with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Land registry systems should specify the concerned areas in terms of land use as „forest“.

### **Forest available for wood supply**

Forest where any legal, economic (including sites which do not allow any economic useful harvests, e.g. where harvesting costs will exceed the value of the timber), or specific environmental restrictions do not have a significant impact on the supply of wood. Includes: areas where, although there are no such restrictions, harvestings are not taking place, for example areas included in long-term utilisation plans or intentions.



**Over bark (o.b.):**

The term o.b. is an addition to the volume unit ( $\text{m}^3$ ) for roundwood. It refers to harvests that include bark and harvesting losses. In some statistics these harvests are called “fellings” ( $\text{m}^3$  o.b.), others use the term “removals” ( $\text{m}^3$  o.b.).

**Under bark (u.b.):**

The term u.b. is an addition to the volume unit ( $\text{m}^3$ ) for roundwood. It refers to harvests that exclude bark and harvesting losses and are called “removals” ( $\text{m}^3$  u.b.) in the statistics.

**1.3 Wood availability, use and change in the EU**

Task 1.1 aims to produce an overview of the availability of wood in forests and on the market (also indicating distribution by the type of ownership) as well as projected change. Chapter 2.1 will give a short overview regarding the availability of wood in the European Union and compare the values with other European countries and the Russian Federation. In chapter 2.2 the availability of wood on the markets will be described and a comparison to availability in the forest will be drawn. In order to provide a better understanding of perceived figures within the 27 members of the European Union comparable values for other European countries and the Russian Federation will be presented.

**1.3.1 Availability of wood in forests**

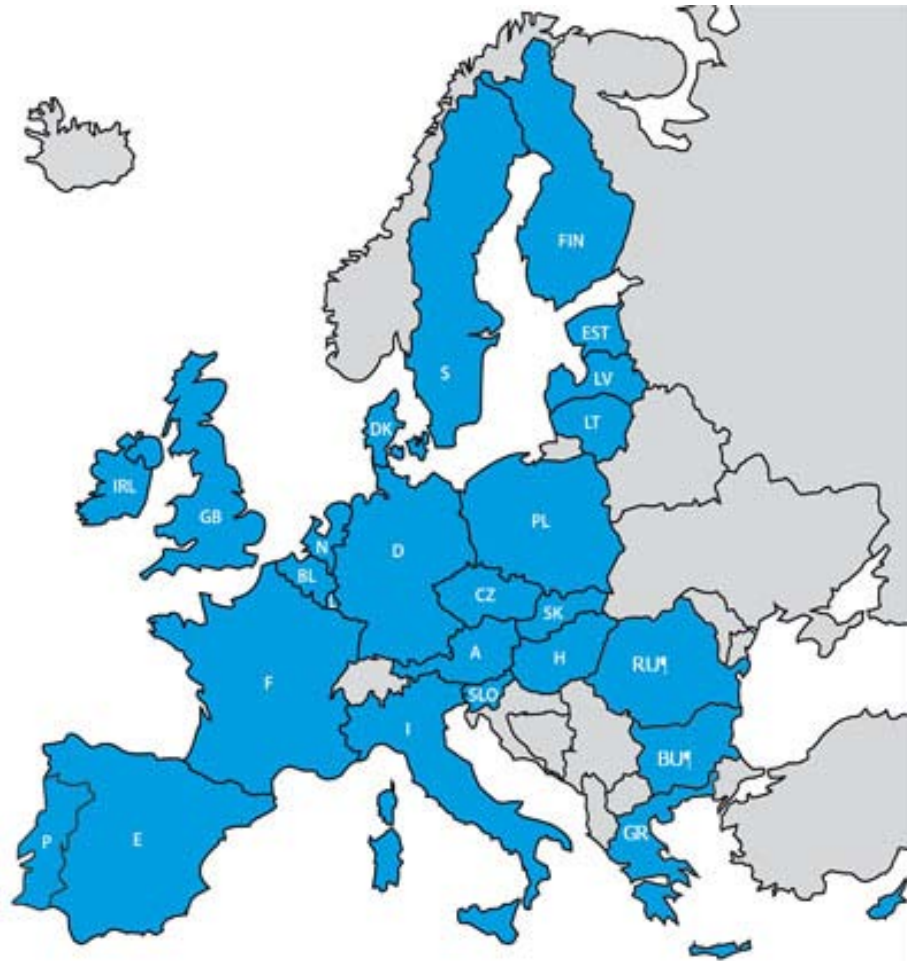
The European Union currently consisting of 27 countries (Figure 1) accounting for an area of about 433 million hectares of which about 156 million or 36% were covered by forests in 2005 according to the Forest Resource Assessment (FRA) by the Food and Agricultural Organisation (FAO, 2006). Other wooded land not defined as forests would account for additional 21 million hectares, while another 2 million hectares can be described as land with tree cover.

Other European countries<sup>3</sup> (excluding the Russian Federation) represent 37 million hectares of forests which equals 24% of their total area. The Russian Federation (the Russian Federation as a whole) which is the most important source for wood imports to the European Union (see section 1.3.5) accounts for a forest area of 809 million hectares which is 47% of its total area (FAO, 2006).

The average forest cover of the European Unions member states is 36% indicating that geographically larger countries in average include significantly higher forest shares in their total area. The forest area within the European Union member states since 1990 increased annually by about 0.50% in average. The growth has been found to slow down slightly towards 2005 (reaching 0.46%p.a.; not in a statistical significant way using paired t-test). In absolute terms the growth decreased most in Spain, France and Italy. There may be various reasons for this trend but most likely it is pressure from other land uses be it agriculture or construction.

---

<sup>3</sup> Albania, Andorra, Belarus, Bosnia and Herzegovina, Channel Islands, Croatia, Faeroe Islands, Gibraltar, Holy See, Iceland, Isle of Man, Liechtenstein, Monaco, Norway, Republic of Moldova, San Marino, Serbia and Montenegro, Switzerland, The former Yugoslav Republic of Macedonia and Ukraine



**Figure 1: The geographical expansion of the European Union (EU 27) being the scope of the study**

European countries outside the European Union also show growing forest areas since 1990 although their growth has been lower (0.24% p.a.) and slowing down a bit faster (reaching 0.17%p.a.). According to the official statistics (FAO, 2006) the Russian forest area can be described as stagnating since 1990 reaching 808.95 million hectares in 1990, 809.27 million hectares in 2000 and 808.79 million hectares in 2005. The majority of the forest area in the European Union is privately owned (58.5 %).

No information is available at this level on gross increases (afforestation) and gross losses (deforestation). Hence such information will be included in the case studies. It is important to note that this relatively small changes in forest area are of minor relevance for wood availability compared to the changes in growing stock.

The stock of wood growing within the European Union's forests is estimated at 23,100 million cubic meters over bark (including bark) in 2005 of which 20,260 million cubic meters over bark, or 88 % were rated as commercial<sup>4</sup>. In consequence

---

<sup>4</sup> The Commercial Growing Stock (CGS) means the volume that may actually be cut and removed from the natural exploitable forests and plantations forests. This volume of wood may include wood for industrial purposes (e.g. sawlogs, veneer logs, etc.) and for local domestic use (poles for construction). Use of wood for fuelwood is not included in this category.

the total average for growing stock per hectare for the EU 27 is 148 cubic meters over bark but ranging from 46 to 307 cubic metres between the countries (FAO, 2006) and higher in some countries and regions, depending on age-class structure, site index and species.

**Tab. 1:** Forest area and development, the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex)

Region	Forest area			
	1990	2000	2005	1990- 2005
	1000 ha	1000 ha	1000 ha	% change p.a.
EU 27	144,645	152,108	155,584	0.50
other Europe	35,885	36,887	37,193	0.24
Russian Federation	808,950	809,268	808,790	0.00

**Tab. 2:** Wood stock for the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex)

Region	Growing stock				
	Area	By area	Total	of which is commercial	of which is commercial <sup>2</sup>
	2005				
	1000 ha	m <sup>3</sup> /ha	M m <sup>3</sup>	%	M m <sup>3</sup>
EU 27	155,584	148	23,100	88	20,260
other Europe	37,193	164	6,105	-	-
Russian Federation	808,790	100	80,479	49	39,596
TOTAL	1,001,567	109	109,684	-	-

In total the growing stock of wood within the European Union has been expanding in recent years indicating that recorded harvest levels did not reach the annual increment on average (see section 1.3.6 for restrictions on this). Basically every net stock change has a direct impact on the NAI and is therefore hard to distinguish in its effect.

Between 1990 and 2000 the growing wood stock in the European Union increased by about 270 million cubic meters over bark per annum. The increase in the annual

wood stock change is most likely to show a growing trend towards 2005<sup>5</sup> reaching about 300 million cubic metres over bark annually. Other European countries outside the European Union except the Russian Federation showed a constant annual increase in wood stocks of 90 million cubic metres over bark. In the Russian Federation the wood stock increased between 1990 and 2000 by 23 million cubic metres over bark annually. Although this figure was clearly increased to 42 million cubic metres in the 2000 to 2005 period the growth per hectare was below 0.1 cubic metres. Within the European Union the wood stock per hectare has been found increasing by 1.2 cubic meters over bark annually between 2000 and 2005. For 21 European countries<sup>6</sup> in the PFO database (UNECE/FAO, 2009) the growing stock in privately owned forests reached 50% of the total stock on 58% of the total forest area.

**Tab. 3:** Yearly wood stock change for the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex)

Region	Change in growing stock			
	(1000 m <sup>3</sup> /yr)		(m <sup>3</sup> /ha/yr)	
	1990-2000	2000-2005	1990-2000	2000-2005
EU 27	270,257	300,774	1.78	1.20
other Europe	90,341	90,701	1.18	1.27
Russian Federation	23,075	41,732	0.02	0.06
TOTAL	383,673	433,207	0.38	0.43

Forest resources in Europe (entire Europe) are expected to continue to expand (FAO, 2009a) although the process is slowing down. The general expectation is lead by declining land dependence and growing concern for protection of the environment. On the other hand rising world food and bio-fuel demand will increase the use of land for agriculture but almost all European countries have laws that make forest clearance and conversion to other land uses extremely difficult. The provision of environmental services are expected to remain a primary concern, especially in Western Europe, and rules and regulations will continue to make wood production less competitive than in other regions (FAO, 2009a). Forest management will continue to serve a wide variety of purposes. Economic viability is likely to remain a challenge, especially for small-scale forest owners, but the increased demand for wood for fuel could continue to change this. While the forest industry, especially in Western Europe, may continue to lose competitiveness with other regions in labour-intensive segments, it is likely to retain leadership in the production of technologically advanced products , such as for example glue and cross

<sup>5</sup> As no values were available for Estonia (for 1990 to 2000) and Germany (for 2000 to 2005) we assumed a decreasing stock for Estonia (by 2.12 million cubic meter a year as during the period from 2000 to 2005) and an increasing stock for Germany (by 62.20 million cubic meter a year as during the period from 1990 to 2000).

<sup>6</sup> Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Finland, France, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Netherlands, Poland, Serbia, Slovakia, Slovenia, Sweden, Switzerland and United Kingdom

laminated timber, Honeycomb boards or wood bio-refinery products. Within the region, the differences in forestry between Eastern<sup>7</sup> and Western Europe<sup>8</sup> are likely to diminish as Eastern Europe catches up economically and hence the meaning of the primary sectors will be reduced (FAO, 2009a).

### 1.3.2 Availability of wood on the markets

The fellings from European Unions forests have increased between 1990 and 2005 by 23% in total or 1.6% per annum and reached 449 million cubic meters over bark in 2005 (FAO, 2006). Anyhow between 2000 and 2005 the growth has slightly slowed down to 1.3% annually. Outside the European Union the fellings in European countries (without Russia) have shown a similar growth of about 1.4% annually between 1990 and 2005 but with a slightly increasing tendency. The fellings from other European countries reached a total of 52 million cubic metres over bark in 2005. The fellings from Russian forests crashed down between 1990 and 2000 from 337 to 152 million cubic metres over bark. Since then the fellings started to increase by reaching about 180 million cubic metres over bark in 2005.

Hence the felling rate in terms of forest area was about 2.88 cubic metres over bark per hectare in the European Union in 2005 (FAO, 2006). The other European countries (except Russia) reached 1.41 and the Russian Federation about 0.22 cubic metres over bark per hectare in 2005. Some of the huge differences between these rates can be most likely explained by the huge difference in forest structure. Other explanations may include differences in infrastructure (roads, harvesting machines, etc.), in wood demand (fuel wood versus industrial roundwood) or even in the completeness of official statistics. In terms of the stock of wood in the forests the fellings within the European Union in 2005 reached 1.94% of the total and 2.22% of the commercial stock. Within other European countries the fellings reached 0.86% of the total and 1.23% of the commercial stock. Whereas in the Russian Federation 0.22% of the total and 0.45% of the commercial stock was harvested in 2005<sup>9</sup>.

At national level within the European Union the felling rates vary from 0.20 % (Cyprus) to 4.30 % (Ireland) of the growing stock with an across countries mean of 1.78 % and a median of 1.85 % of the growing stock (FAO, 2006). Most of this variability must be explained by the differences in forest growth and structure (see section 1.4.4 and figure 7) as not all increment is harvestable. Of the 449 million cubic metres wood harvested in the European Union in 2005 84 % were classified as industrial roundwood and 16 % as wood for fuel. The share of wood for fuel on fellings outside the European Union was considerably higher reaching 32 % in other European countries and 28 % in the Russian Federation. In this context a general connection between economic wealth and the utilisation of wood for fuel seems quite obvious.

---

<sup>7</sup> Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Serbia and Montenegro, Slovakia, Slovenia and The former Yugoslav Republic of Macedonia

<sup>8</sup> Andorra, Austria, Belgium, Channel Islands, Denmark, Faeroe Islands, Finland, France Germany, Gibraltar, Greece, Holy See, Iceland, Ireland, Isle of Man, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Spain, Sweden, Switzerland and United Kingdom.

<sup>9</sup> While data on the distribution of forest areas among ownership categories are available in international forestry statistics the reports on roundwood production are unfortunately not linked to the ownership categories, in particular not to the small fragmented ownership category. However, these data will become available for the case study regions (task 2).

**Tab. 4:** Table on total wood removals and wood removal rate for the EU 27 total, other Europe and Russian Federation (FAO, 2006) (An extended version including each of the 27 EU countries can be found in the Annex)

Region	Removals <sup>10</sup>							
	1990	2000	2005	Annual growth	2000-2005	2005		
	Total	Total	Total	1990-2005		Industrial roundwood	Wood for fuel	% of growing stock
	1000 m <sup>3</sup> o.b.	1000 m <sup>3</sup> o.b.	1000 m <sup>3</sup> o.b.	%		1000 m <sup>3</sup> o.b.	1000 m <sup>3</sup> o.b.	
EU 27	364,054	421,554	448,973	1.56	1.30	378,024	70,949	1.94
other Europe	42,923	48,880	52,435	1.48	1.45	35,467	16,968	0.86
Total Europe	406,977	407434	501,408	1.55	1.32	413,491	87,917	1.83
Russian Federation	336,527	152,316	180,000	-3.10	3.64	129,400	50,600	0.22

Latest FAO (2009b) statistics indicate that the industrial roundwood production in the European Union has reached 379 million cubic metres under bark while the wood for fuel production accounted for 88 million cubic metres under bark in 2007. The second Joint Wood Energy Enquiry (JWEE II), to which 12 European countries responded, showed that out of 185 million cubic meters of wood consumed for energy about 45% came directly from the forest (S1), 49% are co-products (residues) from wood processing industries (S2) and about 6% was recovered/post-consumer wood (S3). The total roundwood equivalent of wood used for energy generation (S1+S2+S3) corresponds to 49 % of the volume of total roundwood consumption in these 12 countries (Steierer et al., 2007).

According to the European wood resource balance by Mantau et al. (2008) the total wood volumes extracted from the forests including industrial roundwood, fuelwood, bark and logging residues, add up to 512 Million cubic meters<sup>11</sup> in the 27 member states of the European Union (EU 27) in 2005. Wood from the forest is the most important source of wood raw material, providing 2/3 of the total wood supply. Woody biomass outside the forest, industry co-products, recovered wood or processed wood for fuels provide only 1/3 of the total supply. These recovered products do not directly come from the forest. Such indirect wood sources seem to play a prominent role (>50 %) for the national supply in the Netherlands, Denmark

<sup>10</sup> Although some statistics refer to harvests over bark as “fellings” the FAO Forest Resource Assessment uses the term “removals” in this case.

<sup>11</sup> Compared to the FAO figures in table 4, the reported figure here is higher, because it definitely includes bark and harvesting losses. Depending on the international trade statistic this difference for the EU-27 in 2005 is 96 million m<sup>3</sup> (JFSQ; reports 416 million) or 58 million m<sup>3</sup> (FAO; reports 454 million).

and Belgium. However, the use of co-products from further processing seems to play a minor role (<20 %) in Hungary, Bulgaria and Poland.

**Tab. 5:** Wood production for the EU 27 total, other Europe and Russian Federation (Source: FAO, 2009b) (An extended version including each of the 27 EU countries can be found in the Annex)

Region	Industrial Roundwood		Wood for fuel		Total
	2007				
	1000 m³	%	1000 m³	%	1000 m³
EU 27	379,105,712	81	88,343,605	19	467,449,317
Other Europe	35,186,800	65	19,268,207	35	54,455,007
Russian Federation	162,000,000	78	45,000,000	22	207,000,000

Post-consumer recovered wood accounts for 29 million cubic meters and represents a significant secondary wood resource (4 % of the total wood supply) already today (Mantau et al., 2008). For balance reasons, only volumes for energy and material use have been considered, whereas landfilled volumes were excluded. Due to the EU Landfill Directive (1999/31/EC) which obliges its member states to reduce the amount of biodegradable waste to 35 % of 1995 levels by 2016 increasing amounts of recovered post-consumer wood for material and energy use can be expected in the future. Processed wood for fuel<sup>12</sup> accounts for only 1 % of the total supply in 2005.

The authors (Mantau et al., 2008) conclude that *“Wood removals from forests are significantly higher than reported by the Joint Forest Sector Questionnaire (JFSQ). Roundwood removals in international trade statistics amount to only 454 (EU27) ... million m<sup>3</sup> (in 2005). Bark and felling/logging residues are not comprised by international definition of roundwood removals. In addition to unclassified products a certain amount of unrecorded wood removals may occur in many countries.”*

Hence, these unrecorded removals are of great importance when for estimating wood balances (Mantau et al., 2008). It is the nature of definitions, reporting structures and value thresholds for reporting that not all wood removals feed into national records. Woody biomass from outside the forest deliberately avoids the JFSQ definition “other wooded land or other felling sites”. Woody biomass from outside the forest seems to play a crucial role in wood supply. Both sources, unrecorded removals and woody biomass outside the forest, are in particular relevant as fuel supply for private users/households. The data coverage about this source is scarce and only some countries could provide (empiric) information on the issue. Woody biomass outside the forest covers a wide range of sources: urban and amenity trees, hedgerows, trees from fruit orchards, etc. The total wood supply in the study by Mantau et al.(2008) is taking into account all multiple sources for wood fibres for further processing: It considers supply from forest and woody biomass outside the forest, as well as chips particles and wood residues, recovered wood for material and energy use (excluding landfill), pulp production co-products and processed wood for fuel, also agricultural sources for some countries.

---

<sup>12</sup> pellets and briquettes

Hetsch (2008) in the study “Potential Sustainable Wood Supply in Europe” published the most comprehensive picture of existing and potential wood supply components to date within and outside the forest. This analysis of different sources of wood supply indicated that about 230 additional million m<sup>3</sup> could be available domestically in Europe under the given assumptions (table 5). The largest potential (60%) could be extracted sustainably from Europe's forests according to the data available. The potential from post-consumer recovered wood could also add substantially to Europe's wood supply. Wood fibre from agriculture residues and forest expansion could add 23 and 19 million m<sup>3</sup> respectively. Data quality on wood supply from trees outside the forest is particularly low; it can be assumed that the real potential is higher than the figures given in this study.

**Tab. 6:** Absolute and relative importance of different sources of wood supply in the EU 27/EFTA region 2005 (million m<sup>3</sup> roundwood equivalent) (Source: Hetsch, 2008)

Source of wood supply	current use (2005)		additional bio-technical potential		additional socio-economic potential	
Stemwood (FAWS)	355.2	68%	232	31%	81.2	35%
Aboveground biomass (FAWS)						
- from current harvest	11.2	2%	148.8	20%	52.1	22%
- from additional harvest		0%	28.8	4%	10.1	4%
Belowground biomass (FAWS)	2.6	1%	176.2	23%	0	0%
Other Wooded Land	1.1	0%	18.7	2%	6.5	3%
Trees outside forest	7.1	1%	3.6	0%	1.3	1%
Forest Expansion	0	0%	65.1	9%	22.8	10%
Wood fibre from agriculture	?	0%	25	3%	18.7	8%
Co-products and residues from wood-processing industry	113.8	22%	2	0%	2	1%
Post-consumer recovered wood	28.6	6%	52.5	7%	39	17%
<b>SUM</b>	<b>519.6</b>	<b>100%</b>			<b>233.7</b>	<b>100%</b>

### 1.3.3 Use of forest resources in the EU<sup>13</sup>

Results of the 2005 wood resource balance (Mantau et al., 2008) indicate that 68 % of the EU/EFTA wood fibre supply comes directly from forests, 3 % of the woody biomass derives from outside the forest, 24 % from co-products of the forest based industries (including chips, particles and black liquor), 4 % from post consumer recovered wood and 1 % from processed wood for fuels (such as pellets and briquettes). With 58 % material use dominates the energy use of wood fibres (42 %)

<sup>13</sup> If not noted otherwise, this subchapter is mainly based on Mantau et al.(2008), because this study gives the most comprehensive overview on all components, both, on the supply and demand side. Beyond the activities of Prof. Mantau, who also was involved in specific studies for Germany (e.g. Mantau, U. and Soergel, C. (2006)), there are only a few others trying to cover all components. A similar approach was used by Hagauer et al. (2007) on the wood flows in Austria 2005.



on the wood use (see the figures and structure of the EU-27/EFTA wood resource balance for 2005 in the Annex).

Material use is any process where wood is used to produce goods like sawnwood, pulp and paper, wood-based panels and other products. All these processes have in common that the wood fibres or particles contained in the products and co-products could potentially be reused in downstream processes, recovery and then re-use or recycling processes. In EU/EFTA the material use of wood accounts for 58 % of the total wood use from all sources (Mantau et al., 2008).

Among the wood-based industries' sector, the sawmill industry is the biggest wood consumer of solid roundwood for material purposes using 209 million m<sup>3</sup> u.b. (EU-27) in 2005 – corresponding to 26 % of total consumption (Mantau et al., 2008). The pulp and paper producing industries are second; accounting for 147 million m<sup>3</sup> u.b. (19 % of total consumption) followed by the panel industry (11 %) consuming 85 million m<sup>3</sup> u.b. respectively.

Each industry has specific requirements for wood qualities. In a material efficient and well-linked forest-based industry, industrial roundwood would enter the sawmill sector before its co-products would be used in other processes such as pulp and paper or wood-based panel industries. In contrast to the sawmill sector, which depends entirely on roundwood supply, the latter use roundwood only to a certain extent (the pulp industry purchases about ¾ and the panel industry about 1/3 of their fibres from roundwood).

The energy use of wood is smaller than the overall material use by all wood based sectors. However, most countries have a much higher proportion of wood use for energy than recorded in international (energy) statistics. About 42 % (repetition), or 332 million cubic meters (EU27) of the total wood volumes available are already used for energy generation (Mantau et al., 2008). According to available statistics, Greece, Hungary and Denmark seem to have exceedingly high %ages of wood use for energy – accounting for more than 80 % of the total national wood consumption (including imports). According to available data and information Belgium, Slovakia and the United Kingdom seem to use less than 25 % of the nationally available wood volumes for energy generation. Reason for these extremes can be identified by empirical research at country level, including the identification of non recorded flows<sup>14</sup>.

The four biggest wood energy producing countries (Sweden, France, Germany and Finland) consume 168 million cubic meters together. This corresponds to almost 50 % of total wood volumes used for energy generation in EU 27 (Mantau et al., 2008).

The wood resource balance (Mantau et al., 2008) contains information on shares of fresh roundwood used by each wood processing sector. With additional in-depth information on the energy generating sector it is possible to derive the fibre qualities that are used for energy and material purposes. Based on these data it is estimated that 62 % of the secondary wood fibres (recovered wood, co-products) are used for energy purposes. Only a smaller proportion of these wood qualities feed into subordinated material application. Fresh wood fibres show a different use pattern. Over 2/3 (71 %) enter processes for material application. Only 29 % of the wood removals from forests and woody biomass from outside of the forest end up in direct energy production.

---

<sup>14</sup> Mantau et al. (2008) are pointing out that the weakness of some data is related to unrecorded flows (e.g. fuelwood removals from forests), accounting re-entering/regained volumes such as post consumer recovered wood and estimated conversion factors.

For data on different end-users or wood assortments for individual types of forest ownership see section 1.4.4, which assess the participation of private forest owners in the wood markets.

#### **1.3.4 Projected future demand of wood in the EU by major users**

In order to build scenarios for future wood supply, forecasts are needed. One main source for future forest products demand and supply is the European Forest Sector Outlook Study (UNECE/FAO, 2005)<sup>15</sup>. The European Forest Sector Outlook Study presents long term trends for supply and demand of forest products (roundwood, sawnwood, panels, pulp, paper, non-wood products) and services up until 2020, in Western and Eastern Europe and four major CIS countries, including Russia. The study reviews trends for the forest resource, trade, markets and recycling. The major drivers for the projections of product demand are GDP and – to a lesser degree – prices.

EFSOS has some serious shortcomings relevant for this project: Firstly, it is always very late and almost outdated when published. Secondly, at the time the demand/supply projections were made, the increase in demand of wood for energy generation was not foreseen (at least not to the extent it is important now). Thirdly, although the projections are made on a long term basis, the (probably) long lasting effect of the current economic crisis is of course not covered at all<sup>16</sup>.

An update on some of the EFSOS-results relating to wood supply/demand has been made by Hetsch et al. (2008). The authors used the baseline scenario of EFSOS since it is considered to best reflect the expected growth rate of the forest-based industries if energy industries enhance competition for the raw material. The reference data (production, net trade, prices, etc) in the original EFSOS model is the average of 1999 – 2001. The annual growth of production, net trade and consumption of wood and wood products in the model is determined by the various input variables and assumptions. As shown by Schulmeyer (2006) the EFSOS model predicts the international developments in forest products demand and supply mostly correctly. However, in some countries production has increased substantially more than predicted by EFSOS. Therefore, the reference data for production and consumption of forest products (sawnwood, panels and pulp) was updated by Hetsch et al. (2008) on the basis of the average data from 2004 – 2006. The annual growth rates (2005 - 2020) for production and net trade were considered to remain unchanged. These growth rates were applied to the new reference data, to obtain forecasts for production and consumption of forest products for 2010 and 2020. Unfortunately the economic crisis could not be incorporated in this update.

The assumption that material efficiency of the wood-processing industries (wood input per unit produced) will remain constant, may lead to a slight over-estimation of the wood consumption in this sector in the future because technologies, products and processes to increase efficiency are developed and implemented in many parts of the sector (e.g. light weight wood-based panels, by-product utilisation). According to EFSOS, the wood-based industries (sawmills, panel and pulp and paper industry) will consume 483 million cubic meters in 2010 and increase to 523 million cubic meters in 2020 (UNECE/FAO, 2005). It is important to note, that these EFSOS

---

<sup>15</sup> On a global level the FAO publication "State of the World Forests 2009" (FAO, 2009a) includes some more up-to-date forecasts on the demand for forest products, but has no data by singly countries – just by region.

<sup>16</sup> The ongoing effort at the UNECE to produce EFSOS II is – among other things – taking into account the increase of renewable energy and the economic crisis.

figures include double counting for raw material (sawmill residues are counted twice: as a share of sawlogs and as input into the panel and pulp industry; Hetsch et al., 2008).

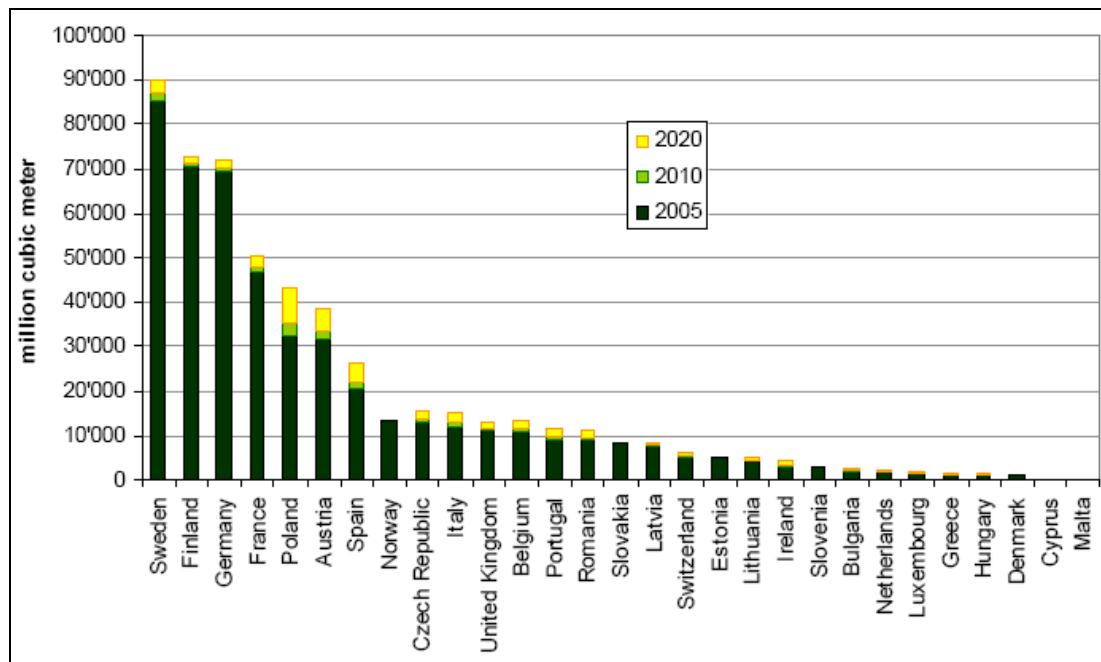
In 1997 the EU set a target for 2010 of having 12% of its primary energy consumption derived from renewable energy sources, such as wood. In 2007, targets were announced for 2020, by when 20% of the energy consumed should come from renewable sources. Biomass constitutes the largest source of renewable energies in the EU (66%), and wood is the major source for biomass (89%). Thus, wood is currently the major source for all renewable energy generation in the EU (Mantau et al., 2008). The EU has developed a Biomass Action Plan (European Commission, 2005), looking at all kinds of biomass (forest-based, agricultural and municipal) and many other countries are designing similar plans or strategies. The EU Biomass Action Plan suggests doubling the production of bioenergy by 2010, which means that the use of wood from the forest for bioenergy can be expected to more than double. In addition, new players might get interested in wood, once second-generation biofuels – producing ethanol and biodiesel from ligno-cellulosic material - are developed and are economically viable (Mantau et al., 2008).

Hetsch et al. (2008) applied certain assumptions on country levels to meet the target for renewable energy in final consumption in the EU 27. To produce this amount of energy 415 million cubic meters wood equivalent were needed in 2010; the same share of wood to other forms of renewable energy as in 2005 was assumed for 2020. When summing up the national targets for all 27 EU member states for 2010, 685 million cubic meters of roundwood equivalent would be required to meet these objectives under the given assumptions<sup>17</sup>.

In the study “Energy vs. material: Economic impacts of a ‘wood-for-energy scenario’ on the forest-based sector in Austria” the impact of the implementation of the „Biomass Action“ plan on the wood markets was tested with a simulation model.

---

<sup>17</sup> Because the share of wood in renewable energy production may not remain constant (as assumed by Hetsch et al., 2008) but decrease (because other renewable energies will develop further and faster due to much lower absolute starting figures), Hetsch et al. (2008) suggest an additional scenario, where the relative share of wood compared to all other renewable energy sources decreases to 75 % of the percent share in 2005 by 2020. 75% is an arbitrary figure between the baseline scenario (100%) and 50% (which would be less than in 2010 in absolute figure, and thus less realistic). For this 75% scenario only 528 million cubic meters of roundwood equivalent would be required in the EU-27 to meet these objectives under the given assumptions.



**Figure 2: Wood demand for the 27 EU countries (Source; Hetsch et al., 2008)**

The analysis shows that the rising fuelwood demand in the “wood-for-energy” scenario would clearly lead to a much stronger competition for small roundwood (pulpwood) and sawmill residues. Compared to the base scenario, this competition would increase pulpwood prices and — to some extent — forest product prices (especially sawmill residues and pulp).

In general, forestry and sawmills would be the winners, the panel and paper industries would be the losers of a “wood-for-energy” policy. The panel and paper industries would face decreased gross profits, because of two developments happening at the same time: a decrease in production and an increase in costs (roundwood and sawmill residues) beyond the increase of forest products prices.

The analysis also reveals that the additional demand for fuelwood could only be met by an additional supply from the Austrian forests—if the fuelwood price was attractive enough (by 2020 more than 50% higher than in the base-scenario) for the forest owners (Schwarzbauer and Stern, 2010).

### 1.3.5 Past, present and projected roundwood imports into the EU

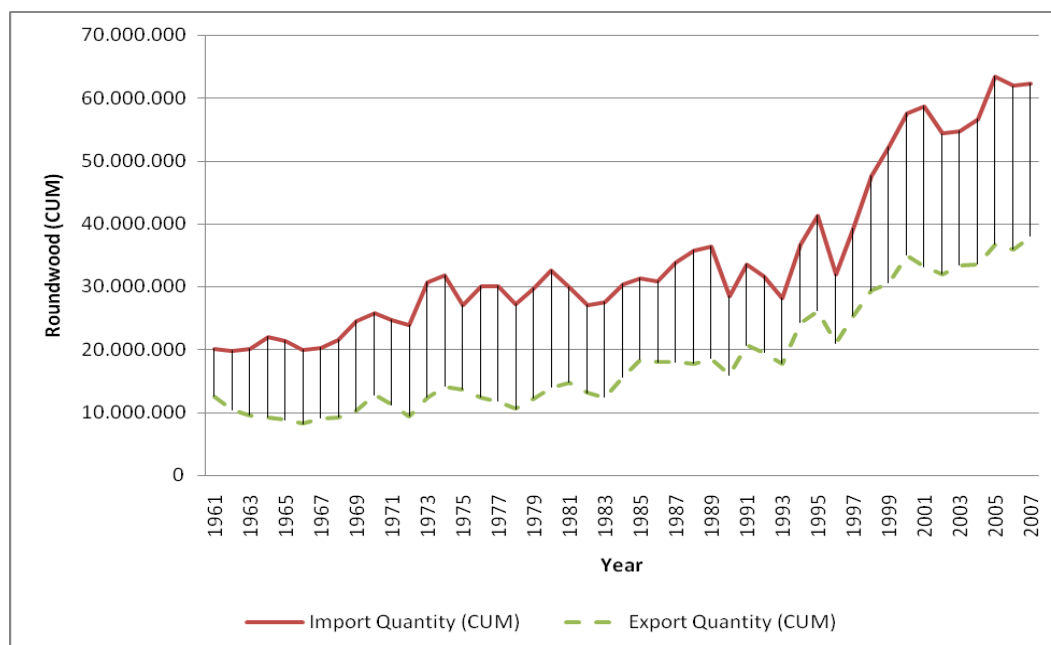
In order to explain the past, present and project roundwood imports into the EU it is necessary to distinguish between trade on the country level which can be considered as mainly internal (from one EU country to the other) and external trade (from outside the EU into the EU) on the European Union level. Most of the roundwood trade in the EU is internal trade, whereas the main focus of this study is the external trade. Still the roundwood flows between European Union member countries are of some interest as they may help to explain existing differences between supply and demand on the regional level that should be taken into account talking about wood mobilization on an international scale.

The European Union is a traditional net importer (imports exceed the exports) of roundwood. In 2007 the net import of roundwood amounted to 24 million cubic meters, approximately 5% of roundwood production and consumption. Since

**Tab. 7:** Roundwood imports/exports for the EU 27 total, other Europe and Russian Federation (Source: FAOSTAT, 2009b) (An extended version including each of the 27 EU countries can be found in the Annex)

Region	Roundwood in m <sup>3</sup>					
	1990		2000		2007	
	Import	Export	Import	Export	Import	Export
EU 27	28,559,108	15,945,269	57,571,854	35,075,628	62,321,448	38,007,242
other Europe	1,316,830	1,757,075	3,997,525	6,529,742	3,403,922	9,351,207
Russian Federation			527,000	32,049,000	324,000	49,300,000

1961 (earliest available data) the 27 member states of the European Union (excluding Estonia, Latvia, Lithuania, Slovakia, Czech Republic and Slovenia until the founding of these countries in the early 1990ies) have always been net importers of roundwood (FAO, 2009b). Major net importers are Finland, Austria, Italy, Sweden and Spain, whereas significant net exports come from Germany, Latvia and the Czech Republic. It is essential to note that three countries with a high percentage of forest cover and a highly developed forest-based industry are among the top importers of roundwood in Europe and worldwide, since they are also net exporters of processed forest products.



**Figure 3:** Net roundwood imports/exports for the 27 EU countries (Source: FAO, 2009b)

Other European countries outside European Union<sup>18</sup> (excluding the Russian Federation) have always been net exporters of roundwood since 1999 reaching a volume of 5.8 million cubic meters in 2007. A traditional net exporter of roundwood is the Russian Federation which constantly increased its net exports since the 1990ies culminating between 47.5 and 50.5 million cubic meters in recent years (2005 to 2007).

As the origin of the wood imported to the EU can not be clarified from FAO-Statistical Database (FAO, 2009b) which has been used so far in this study it is necessary for this question to switch to UNO-Comtrade-data (UNO, 2009). According to these statistics the EU was a net importer of about 5.1 million tons of wood for fuel and 10.8 million tons roundwood in 2008. 62% of the roundwood and 26% of wood for fuel imports originated from the Russian Federation. Other significant industrial roundwood exporters to the EU were Switzerland, Belarus, Ukraine and Norway. Fuel wood was predominantly net imported from Canada, Uruguay, Norway, Bosnia, Croatia and Switzerland.

The projections regarding net-trade with roundwood made in the EFSOS-study are outdated, because analysis was made prior to the rising demand for wood for fuel. Hetsch et al. (2008) did an up-date of the EFSOS data (for material use of wood) to include the policy targets for wood for fuel. Table 8 shows that according to these projections the EU-25/EFTA net-import (difference between supply and demand) of roundwood is expected to increase significantly<sup>19</sup>.

EU countries with the highest projected net-import in 2020 of roundwood (annually > 20 mill. m<sup>3</sup>, "normal" scenario) are France (53 mill. m<sup>3</sup> – 36% of consumption), Spain (47 mill. m<sup>3</sup> – 58% of consumption), Germany (46 mill. m<sup>3</sup> – 30% of consumption), Poland (43 mill. m<sup>3</sup> – 47% of consumption), UK (31 mill. m<sup>3</sup> – 60% of consumption), Italy (30 mill. m<sup>3</sup> – 52% of consumption), Portugal (23 mill. m<sup>3</sup> – 59% of consumption) and Belgium (22 mill. m<sup>3</sup> – 63% of consumption) (Hetsch et al., 2008b).

**Tab. 8:** Roundwood supply versus roundwood required to fulfil EFSOS projections (material use) and policy objectives (use for energy) (EU-25/EFTA) (Source: Hetsch et al., 2008)

Year	Total wood supply * (million m <sup>3</sup> )	Wood demand ** (million m3)	Difference
2010	775	909	134
2020	783	1,219	436
* direct from the forest and indirect (EFSOS forecast) ** required to fulfil EFSOS projections and policy objectives			

Whether outdated or not, projections for (net-)roundwood imports are in general based on demand – not on the actual availability of roundwood for international trade. Many roundwood exporting countries have increased capacities for forest-

<sup>18</sup> Albania, Andorra, Belarus, Bosnia and Herzegovina, Channel Islands, Croatia, Faeroe Islands, Gibraltar, Holy See, Iceland, Isle of Man, Liechtenstein, Monaco, Norway, Republic of Moldova, San Marino, Serbia and Montenegro, Switzerland, The former Yugoslav Republic of Macedonia and Ukraine

<sup>19</sup> Due to the economic crisis and the sharply decreasing utilization rates for raw material use and stable (partly) increasing rates for wood for energy the demand projection for 2010 in table 6 may be a severe overestimation. Due to the fact that the current economic crisis may have longer lasting effects also the demand projection for 2020 could be too high.

based industries and thus diminished the amount of roundwood available for exports (e.g. example of Austria regarding the import of coniferous sawlogs; FHP, 2007, 2009). In the future this development will definitely contribute to procurement problems in countries with high-profile forest-based industries.

### **1.3.6 Sustainability of mobilization**

The concept of sustainable forest management has evolved from pure provision of wood to a holistic coverage of multiple forest functions. This also includes non-wood forest products and services which have gained in importance. In recent decades more attention has also been put to the non-wood products and services of forests, as well as their environmental functions. The limits of economic sustainability are hard facts with respect to natural sustainability and subject to mass balance principles as it is possible to measure, calculate and control this in numbers, but with respect to social sustainability as this is complex to measure and hard to control. Timber harvests of today should not impair the future growth potential of the forest. Following the principles of economies of scale, sometimes the area of stability is seen in a global context<sup>20</sup> – which may possibly lead to losing the eye for the need for a local sustainable management of the forest resource. In addition to promoting the economic viability of sustainable forest management, complementary public financial instruments are employed to foster multifunctional aspects of sustainable forest management, in particular, forest protective services, special measures to maintain and increase forest biodiversity, and nature and landscape protection.

Based on the MCPFE report (MCPFE/UNECE/FAO, 2007), many European countries have as their main objective to increase employment through forestry and the forest sector, in particular, in the context of rural development. Policies promoting increased harvesting of wood for energy and enhanced added value in the wood product industry are expected to have positive effects on employment even when taking increased mechanisation into account.

Apart from state forest ownership in which sustainable forest management is often promoted as a matter of major public interest countries promote the viability of sustainable forest management by strengthening the economic situation of private forest enterprises and the efficiency of private forestry production while some countries set measures with the explicit goal to encourage private forest owners to remain active in forest management and to maintain multifunctional production and services. Several EU countries support the formation and/or functioning of private forest owner associations in order to improve the efficiency of forest management.

EU forestry, mainly because of its interconnectedness with the forest-based industry, is affected by economic activity (value-added production, productivity and employment), trade and technology/know-how. The international competitiveness of the forest-based industry directly affects the economic viability and competitiveness of the European model of sustainable forest management (SFM) including the secured provision of many other services that forests provide (often outside markets and without market-based income streams). Environmental issues have become an increasingly important determinant of competitiveness in some markets (UNECE/FAO, 2008a).

---

<sup>20</sup> In the meaning that an overall sustainability may be achieved when focusing on (very) large scales as positive and negative impacts may outweigh each other in a way. Anyhow, this does by no means secure to achieve sustainability on smaller parts of the same area.

Growing trends in wood consumption in general illustrate favourable trends as the increasing use of wood from well-managed forests has overall positive environmental impacts by reducing global warming (trees and wood products act as carbon sinks)<sup>21</sup>. Overall, European timber markets are growing, contributing to increasing demand and timber harvests<sup>22</sup>. In addition, wood is recyclable and can be used as a sustainable energy source. Growing income from wood has a strong positive impact on the economic viability of both forest owners/managers and forest industries.

Sustainable and efficient forest policy, which maintains forest growth and stream of wood, enhances the contribution of forests to the reduction of greenhouse gases. In addition, long-term wood products provide a pool of carbon removed from forests and increased paper and wood recycling, rather than landfilling<sup>23</sup>, prolongs the capacity of wood products to retain carbon. At the same time, the EU's climate change policies have an important impact on pulp, paper and some wood panel production as a consequence of their energy-intensive processes which may decrease their international competitiveness. Fuel and electricity represent between 13 and 18% of the manufacturing cost in EU pulp and paper. Paper mills are big energy consumers, but chemical pulp mills are big energy producers as well<sup>24</sup>.

Wood mobilisation of course means an increasing flow of wood and woody biomass from the forests to all forms of utilisation and therefore touches especially upon the more "traditional" definition of sustainable yield (not cutting more than grows). One simple and typical option to determine wood supply is by looking at net annual increment (NAI) of wood in the forest, which indicates that in many countries there is still a significant wood resource that can possibly be utilized. However according to Hetsch et al. (2008) using NAI as an indicator for potential wood supply is dangerous because it is limited by a number of factors and might lead to the a wrong estimation of wood available (Hetsch et al., 2008). There are factors that could in a way underestimate and others that could overestimate sustainable wood availability:

- NAI is only reported for forest areas available for wood supply, this is however not the potential of wood that can be mobilised from those areas, but just a physical potential.
- NAI only reports stem wood (respectively wood of a certain dimension) in the forests. However, woody raw material can come from other sources, which have to be assessed as well, when determining potential wood supply (e.g. other biomass in and outside of the forest)
- Harvesting NAI in the long term is not necessarily sustainable in the long term. Harvests can for some periods be higher than NAI and still be sustainable in case of over stocked forests (like in Germany), or has to be less like in Ireland, Finland and Sweden due to the forests age structure (when much of the total increment comes from younger trees; see section 1.4.4 and figure 7).

---

<sup>21</sup> Local impacts may be positive, neutral or negative.

<sup>22</sup> This long-term trend is currently interrupted by the economic crisis. It is unclear yet whether this crisis is just a significant but short-term dent or is leading to structural changes in the wood markets.

<sup>23</sup> Which would provide unfavorable emissions like methane

<sup>24</sup> The latest numbers from the Austrian Pulp and Paper Industries for 2008 show that this branch used 4,9 Twh electric power of which 77.4% were produced within the industries and 1.4 TWh of the own power production are considered as eco-power (Austropapier, 2009).



- NAI does not say anything about the economic potential availability. One recent study in Austria e.g. found that the ecological and/or technical potential of wood supply from forests is at a maximum 85% of the physical potential, mainly due to harvesting costs which depend to a high degree on the slope (BFW, 2009). It would be important for countries to conduct studies on national level to assess the potential wood supply.
- Regarding overestimating of wood supply potentials Mantau (2007) found for Germany that the official harvesting statistics most likely underestimate real harvests by 20% (UNECE/FAO, 2008b; see also Mantau, 2007).

The UNECE/FAO “Workshop on Mobilisation” in 2007 (Hetsch, 2007) recommend that strategies and measures to increase wood mobilization must be within the limits of sustainable forest management, keeping relevant environmental, social and economic constraints in mind. In order not to overstep the limits of sustainability the workshop came to the conclusion that every component should be developed. In the medium term, wood supply in Europe to all end-users can be increased through more intensive use of existing forest resources (Hetsch, 2007). In its report to the Standing Forest Committee the ad hoc Working Group II on Mobilisation and Efficient use of Wood and Wood Residues for Energy Generation made recommendations grouped into eight focus areas (Standing Forest Committee ad hoc Working Group II on Mobilisation and Efficient use of Wood and Wood Residues for Energy Generation, 2008)<sup>25</sup>:

- Focus area 1: To improve data on supply and use of wood
- Focus area 2: To develop national / regional wood mobilisation strategies
- Focus area 3: To increase the potential of wood for energy and material use
- Focus area 4: To ensure sustainable provision of forest biomass
- Focus area 5: To develop and maintain efficient wood supply chains and markets
- Focus area 6: To strengthen efforts for forest owner motivation, organisation and awareness-raising
- Focus area 7: To enhance support means, incentives and coordination efforts for wood mobilisation
- Focus area 8: To promote research and technological development in the field of wood production, harvesting technologies and wood utilisation

The chairman of the UNECE/FAO Policy Forum “Opportunities and Impacts of Bioenergy Policies and Targets on the Forest and Other Sectors” concluded that sustainable mobilisation of wood resources requires in particular overcoming legal and institutional constraints (e.g. fragmented forest ownership structures), access to data, forest infrastructure, adequate prices for wood, etc., as well as motivating forest owners to utilise their forests. Supportive laws, regulations and policies are

---

<sup>25</sup> For reasons of space only the focus areas are listed here. Detailed recommendations for each focus area can be found in the original report (Standing Forest Committee ad hoc Working Group II on Mobilisation and Efficient use of Wood and Wood Residues for Energy Generation, 2008).

needed, as well as information and motivation of forest owners and other actors, especially entrepreneurs (UNECE/FAO, 2007).

#### **1.4 The structure of the forest-based sector in the EU - Overview of private forest ownership**

The aim of task 1.2 is to give an overview regarding the structure of private forest ownership in the European Union. It will indicate the number of private forest owners and area of private forests in the EU in the past, the present and a projected future as far as possible from existing sources. The size, composition and distribution of private forest parcels will be presented trying to explain the issue of fragmentation<sup>26</sup>. Furthermore a review of the structures for cooperation of private forest owners and their participation in activities of the interest groups (e.g. associations of private forest owners) will be made. Best available data will be used to assess the participation of the private forest owners in wood markets and to check the availability of an adequately skilled, equipped and motivated workforce in the private forest sector. The task will finally review the land consolidation processes in the forest-based sector (or its absence).

International studies in general lack details regarding private forest ownership. Due to the smallest common denominator they distinguish between public and private forest owners at best. More details on private forest ownership structures can be found in national studies (e.g. Boon et al., 2004; Hogl et al., 2005; Schraml and Volz, 2003) which usually cannot be compared directly because of different terminology and approaches.

Existing international statistics also per definition do not include the so-called “UFOs” (unknown forest owners). The term “unknown” can mean two different aspects here. Actual forest owners disconnected from agriculture may not even know that they own some small parcel of forest land. The other possibility is that forest owners are not covered in the statistics because they are unknown to the people conducting the survey or compiling the data. The number of these “UFOs” therefore is unknown and their relevance for wood mobilisation is not known as well. Hogl et al. (2005) found that there is a certain relationship between holding size and the degree of being (dis-)connected from/to agriculture – being closer to agriculture corresponds to a larger holding. Therefore the hypothesis can be established that UFOs only have very small forest holdings and may therefore be not very relevant for wood mobilisation potential.

For the case studies (Task 2) a consistent approach has been developed to cover these aspects missing in international statistics (see case study protocol, Annex). The main source for this chapter is the publication of Schmithüsen and Hirsch (2009), because it covers the newest available data and is more focused on private forest ownership than other international studies containing forest ownership data.

##### **1.4.1 Number of private forest owners and area of private forests in the EU (past, present, and projected)<sup>27</sup>**

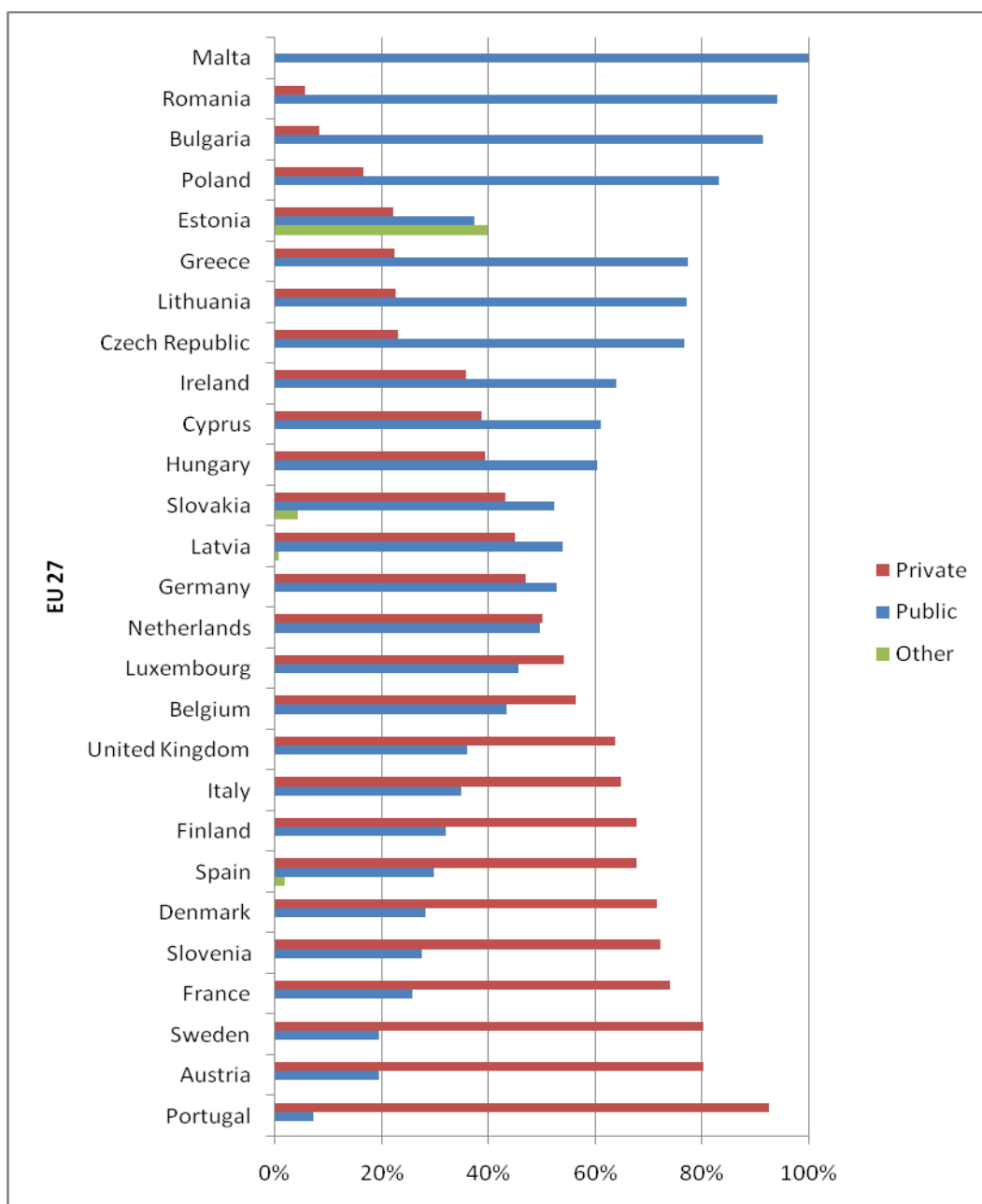
The latest available international data on forest ownership (FAO, 2006) in the EU 27 shows that around 60 % of forest area (excluding other wooded land) is in private

---

<sup>26</sup> See definition in section 1.1

<sup>27</sup> If not noted otherwise, this subchapter is mainly based on Schmithüsen and Hirsch (2009)

ownership, while around 40% are publicly owned. The share of private ownership<sup>28</sup> is very diverse amongst the EU 27 countries. The highest share of privately owned forest area occurs in Portugal (92.7%), followed by Austria (80.4%), Sweden (80.3%) and France (74%) (see figure 4).



**Figure 4: Forest ownership shares (%) public-private in the EU in 2005 (Source FAO, 2006)**

Adding other wooded land, Spain comes in third place, with a total of 78% of forests and other wooded land owned privately. State ownership includes ownership by national or regional, e.g. provincial, bodies, or state-owned commercial enterprises, as in Ireland. In several countries ownership by other public institutions, meaning cities, municipalities, communes and so on, is of considerable importance. Those where this type of ownership accounts for more than half of publicly owned Forest

<sup>28</sup> See definitions in section 1.1

available for wood supply (FAWS) include Belgium (75%), France (61%), Italy (82%), Luxembourg (76%), Portugal (88%), Spain (98%) and Sweden (79%).

In most cases in Central and Eastern European countries, the development of new forest laws has been induced by constitutional changes in the transition process to market economies, which in turn have led to important land tenure reforms and privatisation in the forest sector. Substantial forest resources, it is felt, have to remain state property to secure the provision of social and environmental services of forest resources on a sustainable basis. Most CEE countries have set a policy imposing an upper limit to the privatisation of forest resources.

For instance, in Romania, in 1946, 30% of the forest resources were privately owned and 46% of all forests belonged to the communities. In 1985 private forest was at 0%, increasing to 5% in 1995. Between 1991 and 1999 property was restored/returned according to the Forest Act of 1991, whereby uniform areas of 1 ha of forest were returned to each of the former private forest owners. In a second stage, starting in 2000, the maximum amount of forest restituted was 10 ha. By 2003, a total of 7.8% was private forests; with an average holding size of 0.68 ha (Bouriaud et al., 2005). A new forest restitution law in 2006 has removed forest area restrictions. Roughly half of Romania's forests are now privately owned (July 2010).

In many of the European countries in transition from centrally planned economies of market economies, the privatisation or restitution process is still in evolution and not concluded<sup>29</sup>. While in some countries, such as Poland and the former countries of Yugoslavia, some private ownership did exist in recent times; in others it did not (Albania, Bulgaria, Romania). In Hungary, Latvia and Slovakia private ownership has already grown to account for around 40% or more since the early 1990ies. In the new member states the former overall dominance of the state administration in forest management has somewhat changed with the emerging of new types of forest owners. Due to restitution processes and privatisation the number of private forest holdings increased considerably in Eastern Europe. In most of the countries, the average holding size is very small, usually not exceeding 5 ha. Moreover, many of the new forest owners are in a difficult situation, with often no or little formal training in forest management, less than well developed markets and infrastructure and sometimes little long-term interest in forest management. The high share of non-operational private forests without any management activities and lack of capacity in private forestry is a pervasive issue.

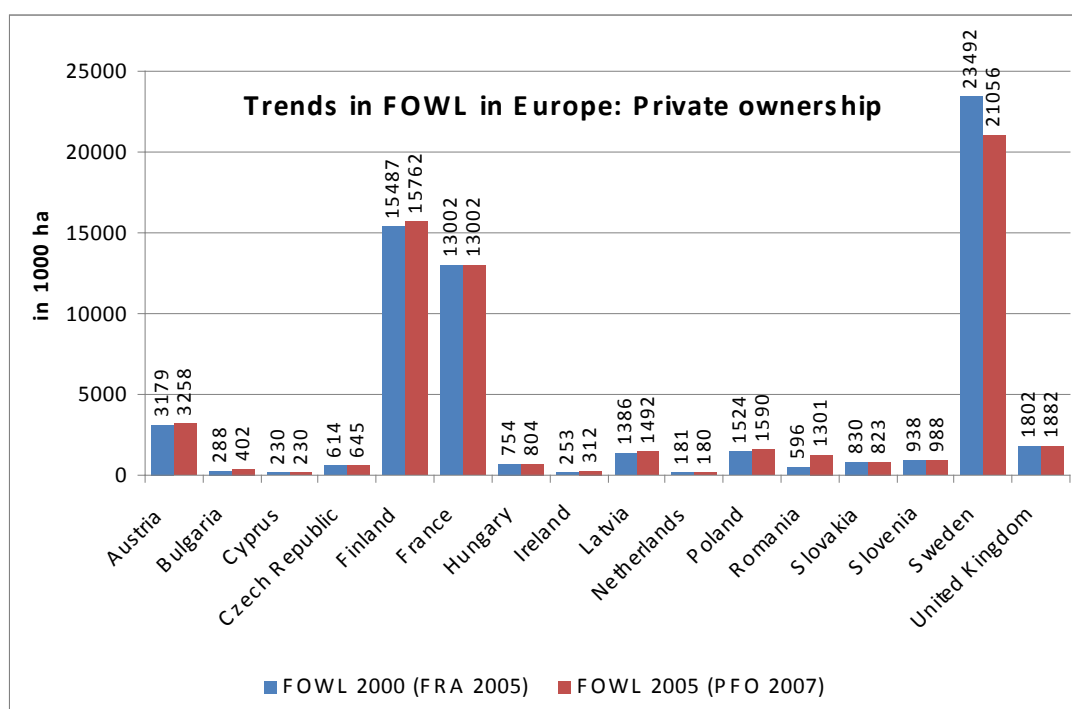
Many, if not most state forest organisations have generally gone through a rather substantial change over the last decade, both in Western Europe, and particularly also in countries that recently joined the EU (see above). One of the most important drivers to move from a national enterprise to Ltd Company was international trends (market economy taking over, globalisation of economics, increasing competition) along with changes in government.

According to MCPFE/UNECE/FAO (2007), the latest more detailed assessment in Europe currently available, there are 64,000 holdings of forest and other wooded land in public ownership and 11.2 million in private ownership<sup>30</sup>. However, there are no data or only partial data available for the holdings of e.g. Austria, Germany, Ireland and some South-eastern European countries.

---

<sup>29</sup> The current status and trends regarding forest ownership structures of the reporting MCPFE countries is listed in detail for each country in chapter 2.6 of Schmithüsen and Hirsch (2009).

<sup>30</sup> In addition to these 11.2 million privately owned forest holdings the CEPF (2009) estimates a total number of 16 million private forest owners.



**Figure 5: Trends of forests and other wooded land (FOWL) at country level of changes in private ownership between 2000 and 2005 (Schmithüsen and Hirsch, 2009)**

Comparing the data available from the Private Forest Ownership (PFO) Database (Schmithüsen and Hirsch, 2009) for those countries which have provided 2005 data, and for which comparable data was available for the year 2000 from the Forest Resources Assessment (FRA) 2005, an increase in private forest ownership at country level is noticeable (see figure 5).

Total private land area of the 14 countries with comparable information has risen by 6% from 28.1 million hectares to 29.7 million hectares between 2000 and 2005. In the private forest ownership enquiry carried out by Schmithüsen and Hirsch (2009) 18 out of the 23 countries indicated an increase in private forest area and in growing stock, mostly due to afforestation. Both, Schmithüsen and Hirsch (2009) as well as MCPFE/UNECE/FAO (2007) state that the number of private forest owners will still rise in the future due to ongoing restitution and privatisation processes, but no quantitative data are given.<sup>31</sup>

#### **1.4.2 Size, composition and distribution of private forests – an attempt to explain the issue of fragmentation<sup>32</sup>**

In terms of numbers of private forest owners as well as distributions of size classes, small scale land holdings prevail in European forests. This is for example demonstrated by the data from responding countries in the study by Schmithüsen and Hirsch (2009) that were able to furnish detailed information on the prevailing land structure of holdings. Aggregated figures<sup>33</sup> show that 61% of all private forest

<sup>31</sup> Expected future changes in forest ownership structures are covered in the case studies (task 2).

<sup>32</sup> See definition in section 1.2

<sup>33</sup> Austria, Belgium, Bulgaria, France, Hungary, Latvia, Lithuania, Slovak Republic and United Kingdom

holdings have an area of less than 1 hectare and 86% of all holdings belong to the size classes of up to 5 hectares. 13% of the private forest holdings are in the size classes from 6 to 50 hectares and around 1% of the owners have forest units over 50 hectares.

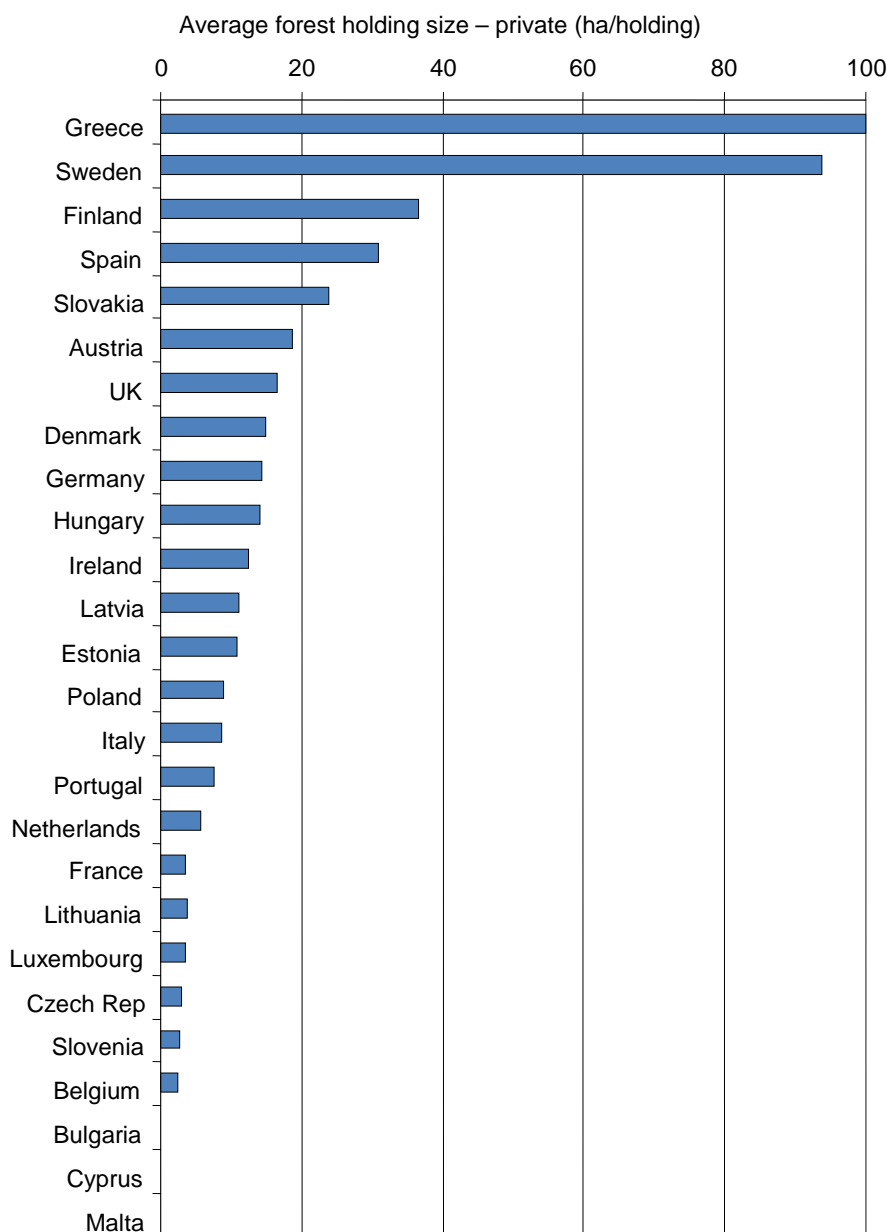
The average size of public holdings is about 975 hectares, while the average size of private holdings is 12.7 hectares (FAO, 2006). However, aggregated data show that 61% of all private forest holdings

have an area of less than 1 hectare and 86% of all holdings belong to the size classes of up to 5 hectares (Schmithüsen and Hirsch, 2009). The Confederation of European Forest Owners (CEPF) refers, for instance, to estimates of up to 16 million private forest owners in Europe (CEPF, 2009). The large majority of forest owners are non-industrial private forest owners. Only in two countries private industries are holding a more substantive share of forest land, in Scandinavian countries. For instance, in Finland industry owns 9% of the productive forest land (METLA, 2006). Ownership sizes vary considerably between private and public forest owners. The average size of private property in Europe is very small (around 10 ha) compared to the average size of public properties (>500 ha). For instance, average sizes of private properties in the Czech Republic or in Slovenia are only 3 hectares. Compared with former forest resource assessments, the number of public holdings decreased (over what period?) while the private holdings increased (MCPFE/UNECE/FAO, 2007). The number of small private forest holdings (less than 10 ha) is expected to grow, mainly due to ongoing restitution and privatisation process. The growth is also influenced by the inheritance division of forest holdings in some countries (e.g. Belgium, Hungary, and Slovenia).

One fact of great importance when it comes to explaining the structure of private forest ownership and the matter of fragmentation is the forest owners' age. The study by Schmithüsen and Hirsch (2009) revealed that in a number of responding countries between 40% and 60% of private forest owners are over 60 years old<sup>34</sup>. With the exception of Poland, forest owners below the age of 30 are only represented to a very minor extent. This has important consequences for management practices and work in the forest. In some cases the older generation keep the responsibility for the forest due to a personal engagement and/or as a resort of material security; in other cases they may keep it because the younger generation has other professional opportunities and visions of life. The younger generation may show a lack of interest perhaps combined with a lack of knowledge and training. It is obvious that the trend of an ageing ownership structure already has and will have even more implications for the future prospects of utilizing and managing forest land in the private sector. Anyhow this development has various impacts on fragmentation. First it must be expected that many private forest holdings in the European Union will be passed on to legal or testamentary heirs during the next decades. This may increase fragmentation not just in a spatial way due to divestiture but also to great extent of fragmentation regarding forest management due to an increasing number of forest owners not living close to their forest holdings and/or not working in agriculture or farming.

---

<sup>34</sup> Although this fact may not be surprising nor differ from other categories of property ownership it is a clear indication for a generational shift in forest ownership to take place.



**Figure 6: Average forest holding size (ha/holding) (Source: MCPFE/UNECE/FAO 2007)**  
**Note: private forest holding size in Greece is out of scale with 934 ha/holding**

Several national correspondents reported to Schmithüsen and Hirsch (2009) that an increasing number of owners already live in urban areas, sometimes at a considerable distance from their property. They stated that the move of owners from rural to urban areas continues or is speeding up. Finland has indicated that the share of urban forest owners has increased from 33% to 40% during the last 15 years, Lithuania reports that almost half of the forest owners are living in urban areas, and Slovenia states that urban forest owners predominate and that they possess more than half of the forest area owned by individuals. In the Netherlands the majority of the country can be considered as urban and it is difficult to distinguish between rural and urban forest owners. In Poland the share of urban forest owners

increased during the last years as a result of national and EU support enhancing afforestation of agricultural land. An increase of the share of urban forest owners is expected to occur, for instance, in Austria (see also Kvarda, 2004), Finland, Iceland, Norway and Sweden. On the other hand no significant changes of the process of owners becoming more urban have been reported by the Czech Republic and France. On the whole there is (too) little information available on this important trend as has been stated by several countries. As it can be assumed that the increase in urban owners will have an impact on the managerial arrangements for forest uses, further research on the effects of this trend is needed.

Although Schmithüsen and Hirsch (2009) found that youth is generally interested in their family forest in the future in some countries (e.g. Norway, Austria) it was also noticed (e.g. Sweden) that following the transfer of forestry estates, the children appear to be less interested than their parents in managing family forests. Reasons that could explain this change of attitudes result from the fact that they live to a lesser extent near the forest estate and receive income from other sources outside the forest. Similar socioeconomic arguments came from the Serbian and Slovenian respondents. In Serbia responding experts stated that families and youth are interested on an average level and that degree of interest depends largely on the size of the property. They (Schmithüsen and Hirsch, 2009) conclude that further research on the attractiveness of forestry activities to youth, and on implications of changes in society as well as on different social patterns by countries would be valuable.

The economic efficiency of European forestry is impaired by a number of factors, including the fragmentation of the ownership which also implies other deficiencies. In the case of Central Europe, Rametsteiner et al. (2006) have found that small-scale forest owners often do not pursue commercial goals with their forest ownership but rather just maintain the capital. It was also found that they are often not trained or educated in forestry. Their business strategies, if they have any, are thus also dominantly “business as usual” (in the meaning of continuing with what has always been done). Their work time spent on forest management is low. As a consequence, the income share to the family/forest owner income is low, and the product mix small. Forests, in sum, are no focus neither for investments nor innovation strategies.

#### **1.4.3 Structures for cooperation of private forest owners and their participation in activities of associations and/or cooperatives**

In most of the member countries of the European Union, private forest owners are organized within the frame of different unions and associations, established as partners and counterweights to the state forest sector. These organisations are present at all levels, from local and regional to national, and with a global-European linkage. Obvious differences between political decisions emphasized at the national level and the economic activities and practical management decisions at the local level determine the different organizational structures of these organizations (Krott et al., 1996; Nonic et al., 2006).

Altogether, there are considerable differences between two basic systems: the obligatory Chambers and voluntary Owners' Associations, not only with reference to the way of initiative for establishment (governmental or independent) and legal form (corporation under public law, or association under private law), but also with respect to their general acceptance and effectiveness in the field. While the Chamber system is organized from top to down, the Owners' Associations arise from the bottom, from members' real interests (Krott et al., 1996; Nonic et al., 2006).



When it comes to management of forests, on the local or regional level, there are again two systems to be mentioned: One is that of the forestry associations, the other one that of Agrarian communities.

Associations are the dominating voluntary organization form which is based on providing considerable economic advantages to their members. Such cooperation of private forest owners, without legally joining their properties, is practically focused on timber marketing, joint use of technical equipment and involvement in specific forest management activities (Höbarth, 2002). The forestry associations are therefore open to all forest ownership categories, independent of the expanse of forests belonging to each individual operation.

Community forestry (Gemeinschaftswald/Cooperatives) in contrast is mainly historically based. In Austria for example such organisations can be traced back to either a settlement-related or an easement-related origin (liberation of farmers in bondage). The administration of these joint ownership structures has been institutionalised in 1853 and since 1950 their legal status has been that of corporations under public law (Agrargemeinschaften, rural common property) (Herbst, 2004). Comparable structures (Waldgenossenschaften) can also be found in Thüringen (Germany). The internal structure of these communities might be different, but they have common ideal social contribution, responsibility and capability of management on one large joined area (Illyés and Nießlein, 1997). For a high percent of forest owners which are not farmers anymore community forestry can turn out to be a proper approach for successful management of such forests.

Forest owner organizations vary according to the relative influence of a number of factors related to both the objective of the organization and the instruments and strategies chosen to achieve them. These factors, which determine the structure, aims and activities of the organization, can be grouped into (FAO, 2000):

1. External factors - which are not under the control of the organization but which affect its structure and development. They include: economic factors, socio-economic factors and political-administrative factors.
2. Internal factors - organizational characteristics, including: purpose of the organization and organizational instruments.
3. Individual choice factors – the members joint or individual decisions regarding expected costs and benefits.

Except CEPF (2009) no other international statistics are currently available compiling national associations and/or cooperatives of private forest owners. Although some of the numbers are questionable (e.g. definitely too low numbers for Austria and France – a question of definition) it is the only source existing. In the case studies (task 2) these issues – including the distinction between associations and cooperatives as well as the distinction between horizontal and vertical cooperation will be addressed in detail.

Traditionally forest owner associations are seen as the most important structural mechanism to overcome the fragmentation of ownership and to help forest owners to help themselves (CEPF, 2009).

The term “forest owner association” although frequently used even in official documents still lacks a concise and unifying definition. The Confederation of European Forest Owners (CEPF, 2008) suggested using the term “forest producers” instead of forest owners to include forest controlled tenants under long term contracts, who do not own the forest land but the forest crop. According to CEPF (2008) a forest producer organisation is:

1. A legal entity whose principal objective is the satisfaction of its member needs and/or the development of their economic activities.
2. An organisation that achieves the main objectives in the forest sector as a producer organisation to market wood and offer advice, harvesting, planning and silvicultural services, to commercialise, make the supply as effective as possible and optimise production, transport and logistic costs. These actions must take place respecting sustainable forest management principles, and with the objective to improve the producers long-term revenues.

Forest producer organisations in Europe are mainly cooperatives (applying the international Co-operatives Alliance principles) but they can also take up other forms as associations or companies.

**Tab. 9:** Forest Producer Organisations in Austria, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Norway, Portugal and Sweden in 2007 (see CEPF, 2008)

Country	Number of producer organisations	Private forest owners	Members	Share (%)	Total private surface (in 1000 ha)	Member surface (in 1000 ha)	Share (%)	Average member size (ha)
Germany	4,550	2,000,000	379,000	19	4,823	3,500	73	9
Estonia	47	55,000	2,000	4	925	100	11	50
France	30	3,500,000	100,200	3	10,500	1,800	17	18
Portugal	30	400,000	12,000	3	3,280	1,200	37	100
Lithuania	15	232,000	-	-	800	-	-	-
Austria	8	150,000	54,800	37	2,525	837	33	15
Denmark	8	25,000	5,441	22	335	78	23	14
Norway	7	120,000	40,000	33	6,000	3,500	58	88
Sweden	6	335,805	107,369	32	11,813	6,375	54	59
Finland	1	920,000	131,032	14	11,800	5,300	45	40
Latvia	0	150,000	-	-	1,390	-	-	-
Total	4,702	7,887,805	831,842	11	54,193	22,690	42	27

According to CEPF (2008) local forest owner or forest producer associations have existed for more than 100 years. In total almost 100 national federations are known to cooperate mainly on a political level (lobbying) with the minority reaching economic activities (e.g. timber sales). A wide variety of organisational structures can be distinguished including forest owners and forest producer organisations, economic cooperatives, political associations and strong combined organisations. A study on 11 European countries (Austria, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Norway, Portugal and Sweden) conducted by CEPF (2008) found member shares from 3 to 37% of the private forest owners and market shares from 3 to 75% of the total harvests in the respective country (see

Tab. 9).

In total 4,702 producer organisations have been found, of which 4,550 originate from Germany. About 832,000 forest producers (excluding Latvia and Lithuania) are registered members in these organisations, reflecting 11% of the total 7,505,805 private forest owners in these countries. Owning 22.7 million hectares of forest or 32 to 42% (depending on the definition of private forest ownership) of the total privately owned forest area the average forest holding size of the organisation members is estimated at 27.3 hectares. This is significantly larger than the total average private forest holding size of 6.9 hectares and almost six times larger than the average private forest holding outside forest producer organisation (reaching only 4.5 ha).

Even if incomplete, the CEPF (2009) numbers show that there is a substantial amount of fragmented forest ownership outside the forest owners' associations and/or cooperatives, which are a main target for mobilisation.

The forest producer organisations in the nine of the 11 countries (excluding Latvia and Portugal) investigated by CEPF (2008) accounted for harvests of 328.6 million cubic meters a year which equals 23% of the total annual harvests made in these countries (see Table 10). Hence the share of harvest volumes of forests in forest producer organisations on the total harvest is slightly above (by 2%) their share on the total forest area. This suggests that privately owned forests within forest producer organisations have above average harvesting rates when compared to the total forest area. As public owned forest holdings have generally a much larger average holding size their harvesting rates are most likely to be found above total average due to economies of scales, infrastructure and full time management. This is also indicated for several countries by Schmithüsen and Hirsch (2009).

**Tab. 10:** Harvesting levels in total and in Forest Producer Organisations in Austria, Denmark, Estonia, Finland, France, Germany, Latvia, Lithuania, Norway, Portugal and Sweden in 2007 (see CEPF, 2008)

<b>Country</b>	<b>Total harvest (M m<sup>3</sup>)</b>	<b>Forest producer organisations harvest (M m<sup>3</sup>)</b>	<b>Forest producer organisations harvest Share (%)</b>
Sweden	95.5	24.3	25
Germany	70.0	15.0	21
Finland	57.8	18.0	31
France	36.0	5.5	15
Austria	21.3	3.3	15
Portugal	12.0	-	-
Norway	11.5	8.6	75
Latvia	11.0	-	-
Estonia	5.9	0.2	3
Lithuania	5.5	0.2	4
Denmark	2.1	0.6	29
<b>Total</b>	<b>328.60</b>	<b>75.70</b>	<b>23</b>

On a country level the average harvesting levels in total and within forest producer organisations differ a lot. While the harvesting levels in forest producer organisation

in Denmark, Finland, Norway and Sweden are clearly above the total average Austria, Estonia and Germany have found to be below the total average harvest per hectare.

Although available data indicate relationships between holding size, forest producer organisation membership and harvesting rates, it is not yet possible to conclude regarding the nature of these relationships. The harvesting rate may solely depend on either holding size or membership as well as on both in different or similar weights. In the same way it would be logical to assume that membership is depending on holding size. Hence the natures of the interactions between these three factors need to be investigated throughout the case studies. These three factors may be overlayed by the fee structures of associations and or cooperatives as well as by the different degrees of compulsion for members to market (all) their harvests through the organisation.

The data reported by 19 countries in Schmithüsen and Hirsch (2009) on the organisational level of forest owner associations show large differences in the share of organized owners. A comparatively high level of organization usually exists in countries which have one or several umbrella organizations, such as federations, at a national level, and thus regroup in different regional or local forest owner associations. Such a model appears to work well, establishing multiple linkages between the various operational and political levels.

#### **1.4.4 Participation of the private forest owners in wood markets**

A first step to assess the participation of private forest owners in wood markets is by investigating the degree of forest management in their holdings. Managed forests and other wooded land can be defined as areas managed in accordance with a formal or an informal plan applied regularly over a sufficiently long period (five years or more). Management operations include the tasks to be accomplished in individual forest stands e.g. compartments during the given period. 14 responding countries in Schmithüsen and Hirsch (2009) have supplied information on the share of managed areas according to ownership categories. In seven of these countries of these countries (Bulgaria, Czech Republic, the Netherlands, Slovakia, Serbia Latvia and Ireland) both private and public forests have been reported to be completely or almost completely under some form of management. In some of these countries, like Bulgaria, governments require the adoption of a management plan for all types of forests, both private and public.

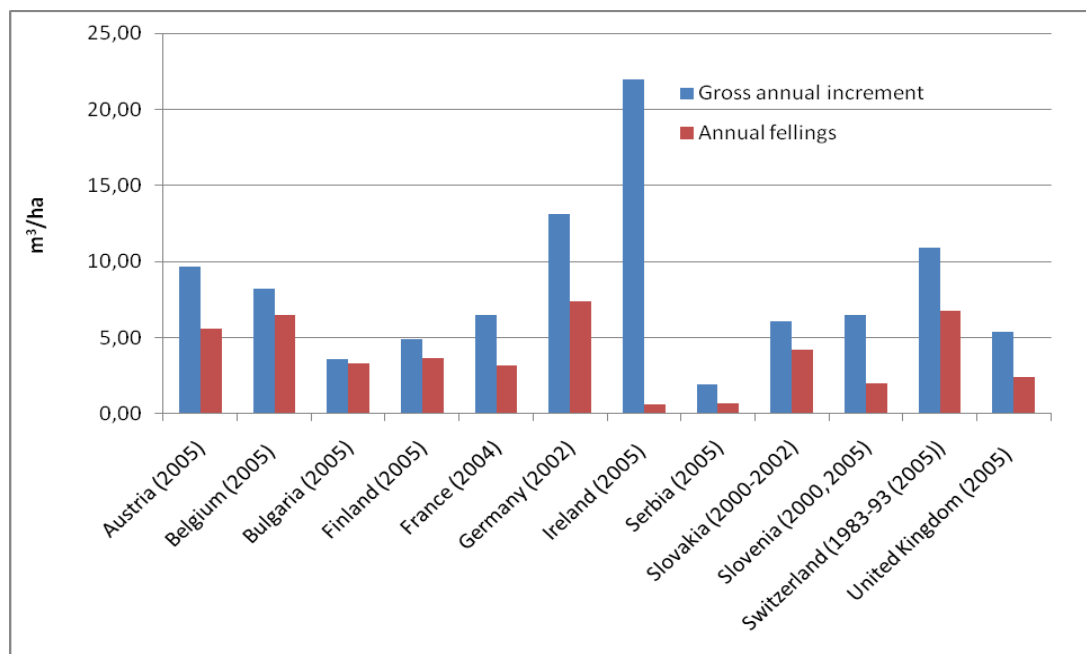
Overall, it remains difficult to draw general conclusions from the presence or absence of a management plan about the sustainability of the forest management. While management plans often contain requirements with regard to sustainable forest management, such requirements differ. Furthermore, the absence of a management plan, in particular in small-scale often privately owned forests, does not necessarily imply that the forest owners do not have the objective to manage their forests sustainable. Moreover, the absence of a plan and of any clear objectives may mean that the forest management is effectively neglected, but it may be perfectly sustainable in any case.

A comparison between gross annual increment and annual fellings on private and public land, provided by correspondents through the private forest ownership enquiry by Schmithüsen and Hirsch (2009), indicates in a number of countries a rather balanced relationship<sup>35</sup>. In other countries there is a notable difference in the

---

<sup>35</sup> For unknown reasons Schmithüsen and Hirsch (2009) have compared gross annual increment – GAI (and not net annual increment – NAI) with fellings. Therefore the reported utilization rates are most likely an underestimation because GAI is per definition higher as NAI.

harvesting potential and the actual annual felling rate between private and public forests<sup>36</sup>. Countries which use their private forests intensively are: Belgium, Bulgaria, Finland and Slovakia. In Austria, France, Germany, Switzerland the UK, annual fellings amount to approximately half of the annual increment of small private forests.



**Figure 7: Gross annual increment and annual fellings (Source: Schmithüsen and Hirsch, 2009)**

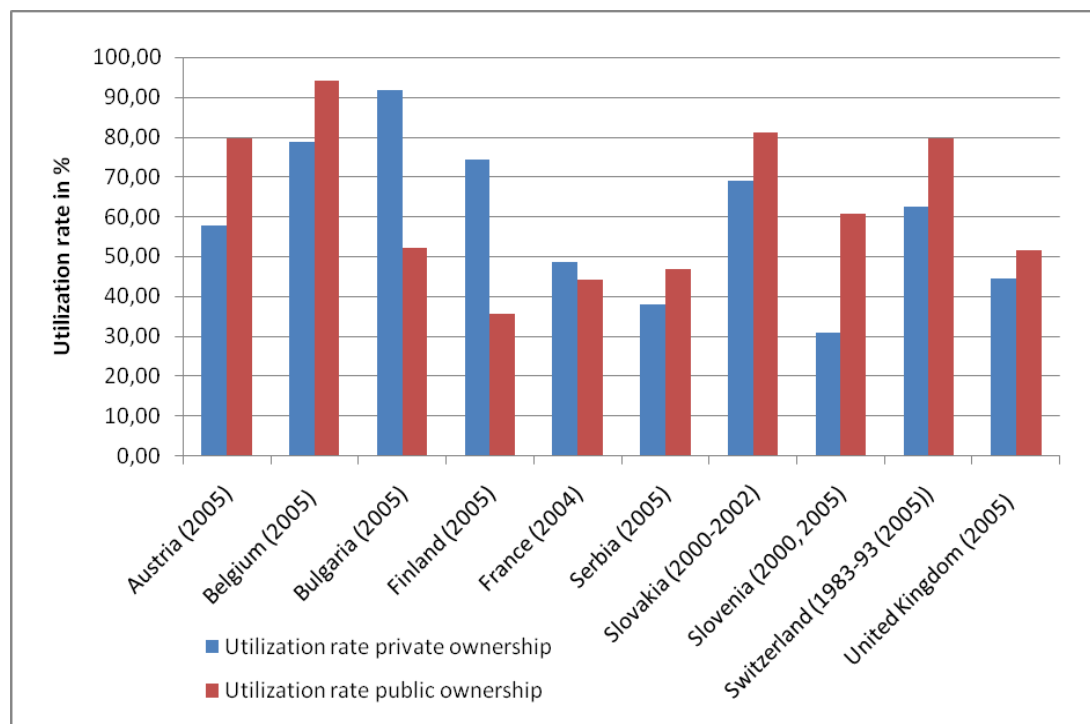
Several factors may determine the relationship between annual increment and annual fellings for individual countries and ownership categories and it is important to take into account the data on real utilization rates. In countries or ownership categories with large areas of plantations that are currently established or have been established recently, such as for instance in private forest in Ireland, gross annual increment is high whereas fellings are still limited due to the large areas of young stands not ready yet for harvesting. Using annual increment as an indicator of potential wood supply is limited by a number of factors (see section 1.3.6).

Wood for fuel especially traditional firewood is an important product from individual and family forests in most European areas. According to Schmithüsen and Hirsch (2009) its importance varies considerably among countries. Hence, the amount of firewood harvesting in individual and family forests is substantial in, for instance, Bulgaria (49%), Romania (35%) and Serbia (43%) whereas it is more limited, for instance, in Belgium (13%), France (8%) and Sweden (8%).

Another notable difference between private and public holdings is the level sustainable forest management of certification. According to Schmithüsen and Hirsch (2009) the private forest sector, with the exception of Austria and Finland reporting 100% respectively 93%, the certification rate is still rather low or even not

<sup>36</sup> However, see section 2.6 regarding the problem of directly taking increment figures as harvesting potentials.

yet existing in most countries. The contrary is the case for public forest holdings for which 10 out of 16 countries reported more than 50% of the area as certified.



**Figure 8: Utilization rate of private forest and public forest, i.e. gross annual increment/annual fellings (Source: Schmithüsen and Hirsch, 2009)**

In general, a comparison of the private forest under management and the utilisation rate (compared to GAI) suggests that while a lot of private forest is unmanaged, a lot of the managed forest may be over utilised. In Finland only ca. 70% of the private forest are managed, but about 75% of GAI is utilised. A similar situation exists e.g. in Belgium where 50% of the private forests are managed, but 79% of the GAI is utilized (Schmithüsen and Hirsch).

Everything said so far is based on reported harvests or harvests covered in the statistics. In addition there exists an informal segment of the roundwood market which may not necessarily be covered in the statistics (unrecorded harvests). Mantau et al. (2008) for the EU/EFTA region in 2005 report an amount of 16 million m<sup>3</sup> unreported harvests of industrial roundwood (4% of reported industrial roundwood) and another 6 million m<sup>3</sup> unreported harvests of fuelwood (8% of reported fuelwood). These numbers on unreported harvests refer to forests only and do not cover wood from outside forests, co-products and recovered wood. They also do not include bark and felling residues.

#### **1.4.5 Check the availability of adequately skilled, equipped and motivated workforce in private forest ownership**

Employment provided by forestry is an important contribution to the socio-economic benefits generated by forests, especially for sustainable rural development. According to data from both FAO (2006) and MCPFE/UNECE/FAO (2007),

employment in forestry in the EU-27 fell from 661 000 to 548 000 person years between 1990 and 2000. This trend has continued to 2005, when the employment reached 450 000 person years.

Regarding mobilisation an important distinction has to be made regarding the workforce in forestry between the external workforce (more in the context of larger estates – entrepreneurs) and the “family” workforce (more in the context of small family owned forests). Information from eight reporting countries shows that the proportion of forest owners engaged in agriculture and forestry ranges from less than 20% in France to over 80% in Ireland (Schmithüsen and Hirsch, 2009). On the whole this category of owners is rather a minority if compared to those engaged outside the primary sector or living as pensioners. In France close to 60% and in Hungary around 50% of all forest owners have been reported as pensioners. Another indicator for the employment structure results from the information that around 80% of the forest owners are fully employed in the agriculture/forestry sector. An exception is Slovenia reporting that more than 80% of forest owners are only part-time employed in the primary sector (Schmithüsen and Hirsch, 2009).

The replies from 15 countries in Schmithüsen and Hirsch (2009) indicate that training and extension activities, in particular in the case of small-scale private forest ownership, play an important role in strengthening the decision-making and implementation capabilities of forest owners. A considerable difference between countries exists with regard to intensity, regularity and content of the training level, ranging from occasional courses to systematic yearly programmes offered either by private forest associations, agriculture chambers or the public forest administration. The congruency of training activities with the requirements and motives of the target group is of considerable importance in order to support the management practices of the land holders directly. This is especially the case if the addressees show little or no interest and do not come forward with an active demand for advisory and supporting services. Private forest associations play a crucial role in reinforcing and/or building up extension services and practical training in forest work, as well as using their outreach by providing information on economic opportunities of wood selling and bio-energy generation and finding new markets for non-wood forest products and environmental services as well as promote sustainable forest management practices. There are indications that countries with higher levels of attendance in training courses and a more organised structure of associations utilise their forests more intensively for wood production. This raises the question as to what extent the private sector is in a position to assume the leading role in carrying out training and advisory tasks and/or whether combined approaches between private and public training and extension systems can offer effective and country specific solutions.

In any case, lack of skilled labour is a problem of forest owners, both public and private, because it clearly is an obstacle to mobilisation.

#### **1.4.6 Land consolidation processes in the forest sector (or their absence)**

Data on forest resources and ownership combined with quantitative and qualitative country information in Schmithüsen and Hirsch (2009), available in the Private Forest Ownership Database (UNECE/FAO, 2009), showed the European forestry sector in a situation of change and expansion.

The majority of European countries have seen notable changes in the structure of forest holdings during the last 15 years. An increase of privately owned area has occurred, for instance, in Ireland and Norway, due to reforestation of marginal private agricultural and pasture land (Schmithüsen and Hirsch, 2009). In Ireland for

instance an estimated number of 15,000 farmers have changed their land use from agriculture to forestry since 1990, thus being the main contributor to a 220,000 hectare increase since 1990. Slovenia reported an increase in private forest area, due to the denationalization process and to abandoned agricultural activities in the last decade. Finland referred to main changes in structure of holdings in the last 15 years are caused by the decline in the number of farmers and an increasing urbanization, along with the ageing of forest owners and a growing proportion of female forest owners. In a number of other countries the structure of holdings has been stable, such as in Austria, Norway and Sweden. France reported that there have been no significant changes, other than that the afforestation of agricultural land through natural colonization or plantations is more important in private rather than public forests.

In particular in Eastern Europe, restitution and privatization have led to an increase in the number of small holdings and fragmented ownership. Restitution of forests acknowledges the continuity of private ownership rights on forestland in rendering them to the former owners or their heirs and/or to local communities and institutions. The term privatisation refers in the present context mainly to the process of creating new private property rights on forest land. It is, however, important to keep in mind that privatization in more general terms has a broader meaning and addresses the transfer of productive assets or economic rights and privileges from the state to individuals or to the private sector as a whole. Privatization increases competition and commercialisation among individuals and private stakeholders by reducing the role of the public sector and is concerned, for instance, with transferring tenure and management rights to private individuals and corporate bodies (Lengyel 1999, 2002).

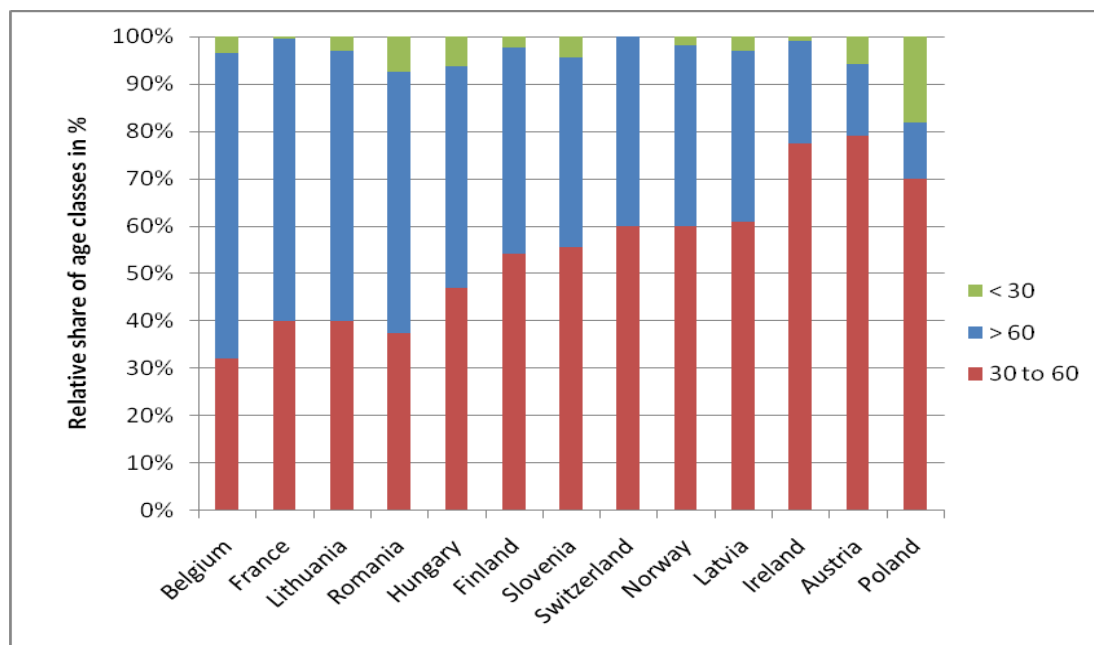
Not in all cases restitution or privatisation led to more fragmentation. As in many cases no rightful owners could be identified, a voucher system was used by which title was distributed by handing out tradable certificates. As a result of this, people with no interest in owning land sold and people with interest bought, creating sometimes large estates and limiting the fragmentation effect.

In Central and Eastern European Countries (CEECs) considerable shifts in ownership structure have occurred due to restitution and privatization processes. In looking at the country specific developments in ownership changes the situation before 1990 should be taken into consideration. In Poland, for example, a proportion of forest land was always in private ownership and the presently occurring changes in ownership patterns result mainly from the purchase of agricultural land for afforestation by urban inhabitants.

According to Schmithüsen and Hirsch (2009) the following countries reported restitution and/or privatisation of forest land within the last 15 years: Bulgaria, Czech Republic, Germany, Hungary, Latvia, Lithuania, Romania, Slovakia, Slovenia and the Republic of Serbia. A strong increase in private forest area, for instance, took place in Bulgaria and Romania. While the process of restitution and/or privatisation nearing completion in most countries, national respondents reported that it is still ongoing in Lithuania, Romania, Slovakia, and Serbia. In Romania for instance another 2 million hectares had yet to be privatized at the time of the enquiry made by Schmithüsen and Hirsch (2009), with impacts on its current, predominantly public, ownership structure. In Hungary, a type of "compensatory" privatization took place, as forests were compensated for other lands. Instead of returning to former properties the legitimated owners or their inheritors received vouchers with nominal value for use as currency on auctions where forests were privatized along with other properties.



Thinking about future developments regarding land consolidation processes in the private forest sector the current forest owner age is one of the few available indicators. As already described in section 1.4.2 a majority of private forest owners in Europe are more than 60 years old (see figure 9).



**Figure 9: Age distribution of classes among private forest owners (Source: Schmithüsen and Hirsch, 2009)**

However the fact that many forest holdings will be passed to legal or testamentary heirs during the next years does not necessarily mean that the average forest holding size will decrease (as in case of more than one heir per holding) or increase (as in case of heirs selling the holding to neighbouring forest owners). One of the few indicators regarding this future development can be found in the structural change of the agricultural sector and the rural societies. Information from eight reporting countries in Schmithüsen and Hirsch (2009) showed that the proportion of forest owners engaged in agriculture and forestry ranges from less than 10% in France to over 60% in Ireland. On the whole this category of owners is a minority compared to those engaged outside the primary sector or living as pensioners. This clearly indicates that these forest holdings are already no longer connected to agricultural business and hence more likely not passed into such.

Several countries have reported to Schmithüsen and Hirsch (2009) on strategies and measures for dealing with the undesirable splitting up of forest land. Austrian forest policy attempts to improve the situation of the difficulty of forest management of small lots in some areas, by encouraging association of small forest owners, e.g. through joint forest management ventures. In France, the Forest Law has established new tools for land reorganization. In Hungary, property concentration is encouraged by the authorities. An incentive system allocates a special type of grant for creating large scale management units through contracts between licensed forest businesses and forest owners (forest management integration system). In Lithuania, according to the Forest Law, it is forbidden to split forest holdings smaller than 5 ha.

## 2 Case studies (Task 2)

According to Yin case study research method is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin, 1984).

There are many different types of case studies mentioned in literature. The case studies carried out in this work can be defined as comparative, explanatory and/or descriptive case studies. *Comparative case studies* are a set of multiple case studies of multiple research entities for the purpose of cross-unit comparison. Both qualitative and quantitative comparisons are generally made. *Explanatory cases* are suitable for doing causal studies.

Five major components of research design are important for case studies:

- A study's questions (see Annex)
- Its propositions, if any
- Its unit(s) of analysis (cases and case selection)
- The logic linking the data to the propositions (case study analysis)
- The criteria for interpreting the findings.

The study's questions and their definition is a very important base for the further development of the case studies. In case of this work the principal question has been formulated as:

*“How to achieve an increase in wood output of EU forests, while respecting the principles of sustainable forest management?”*

The so called case study protocol (see Annex) contains the survey instrument, as well as procedures and general rules that should be followed in using the instrument. In order to improve construct validity each case study used multiple sources of evidence, established a chain of evidence and requested a review of the report draft by key informants. Besides secondary data (literature and archival document review) the case study research used focus group techniques as a major source of information as well as in-depth expert interviewing to gain a comprehensive and well balanced representation of the situations and developments in the case study regions.

The selected regions are best possible representative for the EU in terms of forest related factors as well as in geographical or economic terms. The selected case studies include areas from EU 15 and the Member States that joined the EU in 2004 or thereafter, from Member States having respectively high, medium and low proportions of private forest owners and intensities of wood mobilisation. Furthermore the selected case studies include countries with relatively high and relatively low forest cover and with relatively large, medium and relatively limited forest industries, whether state-controlled or privately owned. A very important feature is that the selected case studies include different levels of fragmentation (in terms of average size) and wood mobilisation (in terms of harvest related to annual increment). As a matter of fact the selected case studies are suitable to study factors influencing wood mobilisation in context to fragmented forest ownership.

For each of the case studies carried out within the project a so called monograph in form of a separate case study report has been made (presented in Main Report – Volume 2 “accompanying document”). Operating with multiple cases it is important that these reports follow a common structure which allows the user to easily switch and compare between the reports. Hence the proposed structure for these reports is

very much oriented on the case studies questions as given in the annex. This report contains a fact sheet of selected case study results given in table 11.

	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
<b>1. What is the total forest cover in the region?</b>								
i) % of the total area?	47.2%	56.0%	8.4%	37%	19%	48,9%	28 %	63.5%
ii) How did it develop during the last 10 years (approx.)? (change % per annum)	+0.4	Varied between 55.5 and 58.1 since 1923	+0.6%	+2%	+0,2%	n/a (2005 to 2007 - 2,5%)	+0,05%	+0.75%
<b>2. What is the wood mobilisation in terms of annual increment?</b>								
i) Harvest in percent of the increment?	60, 1%	71%	39%	40%	50%	57,9%	~40%	24%
ii) How did it develop during the last 10 years (approx.)? (change % per annum)	-11,3%		NA	-7%	-1,0%	NA	++ (NA)	4.14%
<b>3. Is there legal uncertainty regarding forest ownership? (yes or no)</b>	No	NO	No	No	No	Yes	No	No
<b>4. What is the structure of the regional wood markets, in terms of ....?</b>								
<b>4.1 ...buyer/seller ratio? (number of seller per buyer)</b>	1:78	1:235	NA	1:1000	1:11	NA	1:450	is difficult to tell, some sellers are categorized as forest service companies (all types)
<b>4.2 ...other structural market factors?</b>								
i) Average distance between different types of sellers (e.g. fragmented private forest ownerships) and different types of buyers? (km)	NA	Lorry 79km/ton of roundwood 60-70km/ton of bio-energy assortments	NA	100-300 km	under 100 km	NA	<u>Small:</u> 10-50 <u>Large:</u> 150-200 km	80km
ii) Harvesting costs to forest road by ownership category? (excluding stumpage sales) (€/m³ o.b.)	SSFOS 37.44 €/m³ PFO 21.95 €/m³ AFF 24.40 €/m³	Around 9 € for harvesting and 13 € for thinning	9.99 EUR/cum	20€/m³	10-15€/net m3	16€/m³	€9-13 (st.), €14-17 (pri.)	33 €/m³

**Tab. 11: Fact sheet of the case study results**

	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
iii) The informal market segments (subsistence, supply to family members, neighbours, etc.) in % of total market? (if no data is available please indicate whether or not it is considered to be a relevant segment or not)	20%	Very small	Relevant	40-50%	10-15%	10%	25% (all pr.), 50% (frag.)	Very small
iv) Are informal market segment expected to expand or decrease? (expand, stable or decrease)	Constant	Stable	Expand	Expand	Stable	Stable	Expand	Decrease
v) Do wood price changes influence the regional supply by private forest owners (yes or no)?	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>5. Typical wood sales methods in the region?</b> (e.g. standing, auction, long-term contract, ad-hoc on individual basis, etc.) Please name the most important one or two!	forest- roadside	Delivery timber 33% Standing forest timber 27% Felling by purchaser 26%	Negotiation, Ad hoc	Individual Ad-hoc	Ad-hoc Standing-on stock	Ad-hoc	Individual ad hoc., long-term	33% Auction, 50% individual contract and 17% forest owner associations with technical administration
<b>6. How are the forest owners to be characterised?</b>								
i) % share of "organized" forest owners by number (Forest management organisations e.g. in owners associations, loose groups, cooperatives, co operations – NOT only political organisations!)?	37%	50.00%	NA	5%	78%	5%	2.8% (cooperatives), 4,6% (own. association)	1% (respect all owners)
ii) % share of "organized" forest owners by forest area (Forest management organisations e.g. in owners associations, loose groups, cooperatives, co operations – NOT only political organisations!)?	21.9%	50.00%	NA	10%	78%	7% of total forest area, 20% of private forest	17% (cooperatives) 32% (own association)	37%
iii) % share of roundwood sales by "organized" forest owners (Forest management organisations e.g. in owners associations, loose groups, cooperatives, co operations – NOT only political organisations!)?	18,8		Na	25%	34%	NA	NA	74%

	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
iv) Most frequent types of organized forest owners associations in the region (loose groups, cooperatives, co-operations or unions)?	<i>Co-operations</i>	<i>Forest owners associations</i>	<i>Loose groups</i>	<i>Forest associations Cooperatives</i>	<i>Business companies</i>	<i>Associations (based on ngo law)</i>	<i>Cooperatives</i>	<i>Forest owners associations</i>
v) Is there a trend towards increased cooperation between small/fragmented private forest owners (yes or no)?	Yes	<i>unclear</i>	<i>Yes (slow)</i>	Yes	Yes	Yes	No	<i>Increased</i>
<b>6.2 Are there cross forest owners and wood industry associations in the region?</b> (yes or no)	Yes	<i>no</i>	Yes	No	Yes	No	No	No
<b>7. What is the role of forest authorities regarding fragmented private forest ownerships participation in the wood markets?</b>								
i) On harvests of fragmented private forest ownerships? (guidance, control or none)	<i>Control</i>	<i>Some controls</i>	<i>Guidance/ control</i>	<i>Control</i>	<i>Control</i>	<i>Control, Guidance</i>	<i>Guidance (Control)</i>	<i>Control</i>
ii) On timber sales of fragmented private forest ownerships? (guidance, control or none)	<i>None</i>	<i>Only through the measurement law</i>	<i>Guidance/ control</i>	<i>None</i>	<i>None</i>	<i>Non</i>	<i>Guidance</i>	<i>None</i>
<b>8. Structure of forest ownership in the area in terms of forest resources:</b>								
i) % share of private forest ownership by forest area?	80.6%	50.00%	82%	72%	44%	33%	45%	88%
ii) % share of fragmented private forest ownership by forest area?	49.4%	50.00%	NA	40%	4%	70,7% (from private forest) 23% (from all forest)	20% (<10ha)	31.22%
iii) How did the share of fragmented private forest ownership develop during the last 10 years (approx.)? (change % per annum)	-15% (1999-2007)	<i>same</i>	NA	-1,5%	<i>n.a.</i>	NA	-0.8% abs.(rel. to total area)	NA
iv) Harvest in percent of the increment in fragmented private forest ownerships	46.2%	80.00%	NA	NA	50%	59%	(est. < 20%)	NA

	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
v) How did the harvest in percent of the increment in fragmented private forest ownerships develop during the last 10 years (approx.)? (change % per annum)	-12.5% (1999-2007)	<i>Approximately the same, higher after Gudrun</i>	NA	NA	n.a.	NA	NA	NA
9. <b>Describe the structure of fragmented forest ownership in the area by number...</b> (if information is available only for certain sub-regions please indicate by *)								
i) % share of Non-farm forest ownership?	33% (all private forest owners)	NA	NA	75%	n.a.	60-70%	all PFO: 91-92% area, 96% owners	perception of increasing
ii) % share of Non-resident forest owners? (e.g. more than 15km or 30min away)	6% more than 20km (all private forest owners)	26.00%	NA	35%	n.a.	NA	all PFO: 85% (30min distance)	perception of increasing
iii) % membership in forest owner cooperatives (Forest management organisations e.g. in owners associations, loose groups, cooperatives, co operations – NOT only political organisations!)?	37%(all private forest owners)	50.00%	NA	3%	n.a.	NA	NA	few of the total
iv) % secondary education in forestry and agriculture?	13.8% (all private forest owners)	Small part	NA	NA	n.a.	NA	all PFO: 43% (1999)	few of the total
v) % tertiary education in forestry and agriculture?	4.5% (all private forest owners)	NA	NA	NA	n.a.	NA	all PFO: 8% (1999)	very few
vi) Major attitudes of fragmented private forest ownership towards their forests (e.g. income, family tradition, investment, etc.)?	<i>Ranking (1 highest priority)</i> (1) sustainability (2) own use (3) tradition (4) free time (5) investment (6) hunting (7) income (8) working place all private forest owners	<i>Production, recreation, income, feeling of home etc.</i>	<i>Hobby owner, family, tradition, sporting, investment</i>	<i>Family tradition</i>	<i>Family inheritance</i>	NA	ALL PFO: Tradition/heritage, Asset, Own require. (1999)	<i>The family's patrimony, Aesthetic model, Risk of forest fire, the financial situation of the landowner</i>

	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
iii) Guiding management objectives (e.g. derive income, reserve growing stock, etc)	<i>Ranking (1 highest priority) (1) maintaining capital (2) increasing profit (3)selling the forest (4) abandoning forestry private forest owners less than 10 ha</i>	<i>Economy, environment and recreation</i>	<i>Biodiversity, timber, sporting, production, amenity</i>	<i>Pass on quality forest</i>	<i>n.a.</i>	<i>NA</i>	<i>ALL PFO: own requirements, reserve stock (1999)</i>	<i>Economic and sentimental</i>
iv) Important incentives to join in or delegate forest work?	<i>NA</i>	<i>Time, easier to hire someone</i>	<i>NA</i>	<i>Forest associations Massif development plan</i>	<i>No</i>	<i>NA</i>	<i>NA</i>	<i>Is difficult to delegate the property in the hands of another company, family tradition.</i>
<b>10. What are measures for wood mobilisation from fragmented private forest ownership in the region?</b>								
i) Owner associations / Community Forestry (yes or no)	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes
ii) Forest service companies/Forest management services( yes or no)	Yes	yes	Yes	No	No	Yes	No	Yes
iii) Communication / Advertisements (yes or no)	Yes	yes	Yes	No	No	Yes	Yes	Yes
iv) Forest Management Grants / Financial incentives (yes or no)	Yes	No	Yes	Yes	No	Yes	Yes	yes (aid to improve)
v) Advisory services by authorities (yes or no)	No	Yes to some extent	Yes	Yes	No	Yes	Yes	Yes
vi) Training/ or educational programs by authorities (yes or no)	Yes	No, by forestry associations	Yes	Yes	No	Yes	Yes	Yes
vii) Legal framework to prevent further fragmentation (yes or no)	No	yes	No	No	No	No	No	No
viii) Others (yes or no)	Yes		No	Yes	No	No	Yes	Yes (improving demand)



	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
<b>Structural features</b> Please summarise (using bullet points or keywords) the principal structural factors that have been identified as explanatory to the fragmented forest ownership's participation in wood markets in your region? Distinguish owner related factors (e.g. capacities of the owner) and external factors (e.g. regulations)?	<u>Owner related:</u> Traditional and non-traditional forest owners with different social backgrounds  Number and share of non-traditional forest owners seem to be growing as a result of the ongoing structural change in the agricultural sector  Private small scale forest owners with lacking knowledge in forestry  <u>External:</u> Strong impulse for the debate came with the intensified use of wood biomass from the forest for energy production which on the one side offered a new market for the land owners  Wood biomass a new competition for the material to the pulp and paper and panel industries  Public issues are not strongly debated, such as the possible degradation of the sites through a loss of nutrients, or the positive contribution of forestry and the forest industry to rural development  Austria is a mountainous country which often implies high logging costs, and it is a developed country, which implies high salaries for forest workers  Fragmented structure of the small forest ownership (<200ha)	<u>Owner related:</u> Economy and market prices Owners goals  <u>External:</u> Regulations of wood measurement  Feeling of security and stability of the market actors	<u>Owner related:</u> <b>Barrier:</b> lack of owners forestry knowledge/capacity  <b>Barrier:</b> not the owners' principle or significant income revenue  <b>Barrier:</b> lack of local woodland owner networks  <b>Engagement:</b> woodland projects and cooperatives  <u>External:</u> <b>Barrier:</b> regulatory system perceived as overly bureaucratic and time consuming  <b>Grants:</b> EWGS (management planning), RDPE (capital grants), RHI (demand driver)	<u>Owner related:</u> Education of forest owners Action for grouping  <u>External:</u> Guidance and coordination work	<u>Owner related:</u> Own use, Limited wood volume  <u>External:</u> High VAT, strict regulations	<u>Owner related:</u> Small size (average 10 ha) of ownership does not have economic efficiency. Small size is result of the restitution of farm-related Forests to new owners, who by large are not farm-related. Missing systems to increase fragmented owners c-operation (local association main focus is training, information), wood trading systems established very recently. Wood market dominated by major pulp and saw mills in Finland, Sweden: for them Estonia is a market with secondary importance (used when their local market cannot match the demand). Owners are not managing the supply, but rather following the buyers (inc sales methods) <u>External:</u> Taxation rules: private physical persons cannot deduct forest management costs from sales income before paying income tax. This reduces wood trading profitability.  Truck weight limit of 41 tons: modern, fully loaded truck weight is ca 60 tons. Poor forest road network Ageing community, mostly living in cities, poorly linked to their estates	<u>Owner related:</u> Average PFO property size of 3.2 ha; high degree of fragmentation  Lacking information concerning forest management and wood marketing,  Boundaries of estates are sometimes unknown, Other than economic owner's objectives  <u>External:</u> Small areas result in small amounts of wood (problem for marketing, negligible income-effect)  No publication of (open access to) owners' addresses for other owners/industry etc.  Problems of infrastructure (existence and condition of roads; shape of properties)  Low degree of organisation/cooperation between forest owners (partly influenced by historical developments)	<u>Owner related:</u> Many forest owners have agricultural tradition;  Accessibility; low-value wood  <u>External:</u> Prices, markets, regulations, fire risk,

	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
<b>Forest owners</b> Please summarise (using bullet points or keywords) the most relevant fragmented forest ownership's management-related attitudes, objectives and behavioural intentions influencing participation in forest product markets in your region?	<p>Own wood use (subsistence) of the Austrian small scale forest owners is very high and the level is similar among all sizes of small scale forest ownership (&lt;200ha)</p> <p>Trend in forest management goes away from the bread tree spruce to mixed wood because – discussion about climate change</p> <p>Private small scale forest owners often are not educated or trained for forest management</p> <p>A large part of private small scale forest owners do not have economic-oriented goals for their forest property</p> <p>Forest care is an important goal in the small forest owners milieu</p>	<p>Knowledge-level</p> <p>Economy</p> <p>Will to have a well managed forest</p>	<p>Biodiversity</p> <p>Hobby owner</p> <p>Tradition</p> <p>Self-sufficiency for timber</p> <p>Amenity (e.g. sporting)</p> <p>Landscape</p>	<p>To assure family inheritance, symbolic good to pass on to the next generation</p> <p>To save money for time in need</p> <p>To preserve nature</p> <p>To have social relation through their forest</p> <p>No objective, disappointment</p>	<p>No cooperation attitude</p>	<p>Forest as a source of income. Mainly additional income to daily jobs</p> <p>Forest as a future investment, additional income to pension</p> <p>Ownership as a driver for social value.</p> <p>Family link and tradition.</p> <p>The ownership received in the process of restitution relates the current owners in a meaningful way to their grandparent, who lost forcefully the ownership</p> <p>Potentially large numbers of owners have not thought through the objective of the ownership.</p> <p>The land was received more as largely unexpectedly through restitution, but ownership has not found a role in the owners' life.</p>	<p>“New” forest owners – though only small in number and area - are rather economically interested (i.e. in wood marketing);</p> <p>Others have mainly multiple objectives: fire wood use, “having” an asset , “live” tradition, spending leisure time, enjoy nature (small forest land as an “allotment”)</p>	<p>Most of the Catalan forest owners are aging old, and therefore there is less motivation for performing forest operations and management</p> <p>Owners of new acquisition consider the forest owned as: second residence, investment on patrimony and leisure</p>
<b>Actual behaviour</b> Please summarise (using bullet points or keywords) the most prevalent and actual fragmented forest ownership's management behaviour in your region?	<p>Small scale forest ownerships (&lt;200 ha) in Austria show a strong positive supply reactions towards wood price signals</p> <p>In case of more traditional small scale forest owners and based on the supply behaviour from the past the wood reserves aren't predominantly located in the fragmented private forest ownership because the annual felling rate per ha in this group is higher than in the other ones</p>	<p>Harvest according to price given and market</p> <p>Use of advisory services</p>	<p>Lack of management due to poor knowledge</p> <p>Lack of management due to economic returns</p>	<p>To cover cost</p> <p>To maintain reserve of biodiversity</p> <p>To pass on to next generation</p> <p>To get an income</p>	<p>Urban owners are not interested in the ownership</p> <p>Countryside owners want to use the forest for own.</p>	<p>Minority of owners are actively managing their ownerships, majority are passive owners</p> <p>The dominant sales method is ad hoc sales, with pragmatic aim hit to the highest price; long-term contracts are rare</p> <p>The use of contractors is increasing, logs are sold as assortment, pulpwood as cutting right</p> <p>Wood has important role as raw material for the owner and his family</p> <p>Owners receive and expect to receive financial support from state for the forest management</p>	<p><u>Management</u></p> <p>in most cases: for fire wood use (own requirements, neighbours and friends);</p> <p>in case wood/timber should be sold to the market to derive some income: stumpage sales (forest operators, industry) or assortment sales with the help of the state forestry enterprise</p>	<p>Low yields</p> <p>Little interest in the property,</p>

	Austria	Sweden	England (UK)	Rhone-Alpes (France)	Hungary	Estonia	Saxony (Germany)	Catalonia (Spain)
<b>Which sorts of policy measures (to facilitate participation in forest product market) would the fragmented forest ownerships in your region be more responsive towards?</b>	<p>Forest management plan "light"</p> <p>There is a lack of financing of further actions that would require more personnel that approaches and supports the forest owners</p>	<p>Knowledge increases in different ways</p> <p>Public opinion important</p>	<p>Reduction in bureaucracy</p> <p>Quicker response period to felling licence applications</p> <p>Drivers to increase and (and therefore price for timber), e.g. RHI &amp; the Wood for fuel Strategy for England</p>	<p>Extension of massif development plans which are a local program to implement grouped actions with CRPF guidance and coordination</p> <p>Forest association is a model to develop to increase wood mobilisation on the long term</p>	<p>Less admin</p> <p>National incentives maintained</p> <p>Open land market</p> <p>Enhanced Taxation on SMEs</p> <p>Lower VAT on forest products</p> <p>Investments into energy SMEs</p>	<p>Improve data collection on fragmented forest ownerships (create system, rather than project)</p> <p>Provide incentives for fragmented forest ownerships wood trade (no taxation on income received from sales),</p> <p>Support and develop forest owners economic co-operation,</p> <p>Support for investments to reduce logging costs/route to the market (support road construction investments)</p> <p>Support for silvicultural investments (pre-commercial thinning, young stand treatment)</p> <p>Support for programs that increase forest owners and stakeholders awareness on forestry as well as on wood mobilisation</p>	<p><b>Information/Training and advice (by state forest rangers)</b></p> <ul style="list-style-type: none"> <li>- concerning management, harvesting operations, prices and marketing;</li> <li>- should be existent for a long time period for trust building</li> </ul> <p><b>Subsidies</b></p> <ul style="list-style-type: none"> <li>- indirect: see above (advice, information, training) and via direct infrastructural help (road building)</li> <li>- direct: infrastructure</li> </ul>	<p>Mobilisation of the demand / technological innovation</p> <p>Promote associated management</p> <p>Knowledge increases.</p>
<b>What other factors may be important to describe the fragmented forest ownerships in your case study region?</b>	<p>Chamber of Agriculture advises the private small scale forest owners and initiated together with forest owner cooperatives a network of "wood mobilisers" (Waldhelfer), which has successfully pushed the harvest activities in Austrian small scale forests. The "wood mobilisers" are a part of forest services for wood supply provided by the chamber for fragmented private forest ownership</p> <p>Austrian forest authorities in Austria primarily have a supervising or control and not a guidance function regarding harvests of fragmented private forest ownership</p>	<p>Most of the forest owners are not dependant on their land for income, but still wants to manage their forest well</p>	<p>Heterogeneous profile</p> <p>Multiple objectives</p>	<p>Wood mobilisation is dependent on many factors on the surface area of ownership but also species, fertility of soils, local economy, accessibility are very various in the region and may impact strongly on the wood mobilisation.</p>			<p>Low degree of organisation</p> <p>Fragmentation is expected to continue due to heritage and further partition</p> <p>Willingness to sell the property is presently decreasing (wood energy becomes more important)</p> <p>Road construction is often difficult to organise because of the number and shapes of small forest properties</p>	<p>Many owners depend on resources from outside the property.</p> <p>Little forest tradition, much knowledge and culture have been lost due to the abandonment of the rural areas and the traditional activities</p>

### **3 Factors influencing participation of private forest owners in wood markets (Task 3)**

#### **3.1 Factors influencing motivation, knowledge and skills of private forest owners**

Task 3.1 analyses the background and capacities of the forest owners to participate in the wood market. The aim of this task is to produce an overview and analysis of factors that influence participation in the wood markets by fragmented forest ownership. It also aims to elaborate “forest owner ideal types” that build on forest owner characteristics and bridge to wood mobilisation measures. The primary source of data has been relevant studies and the eight case study reports made in task 2. A comparative analysis of key factors and findings from the case study reports is conducted to identify relevant forest owner characteristics directly or indirectly related to (a) the owners’ participation in forest product markets and (b) to the owners’ responsiveness to different sorts of policy measures that aim at facilitating their participation in these markets.

The overall rationale is to provide an understanding of the structure of forest ownership in terms of (1) structural preconditions, (2) the forest owner typologies, goals, attitudes and behavioural characteristics and its relation to (3) forest policy instruments that facilitate the owners’ participation in the wood market.

##### **3.1.1 Forest owners’ characteristics**

###### **3.1.1.1 Conceptual model**

As was shown in task 1, forest ownership structures in European countries are manifold and in many regions, they are also in a process of significant change. According to Mutz (2007) there are two major causes underlying these changes:

- economic causes related to the structural change of the agricultural sector: forest land is less and less part of a forest or farm holding. First, the number of farm holdings in Europe has decreased, and second, forest parcels are often disconnected from the farm (Härdter, 2003; Volz, 2001).
- a systemic-sociological complex of causes often coined as urbanisation of land owners: forest owners more and more become part of modern systems and take on modern lifestyle patterns. This is particularly the case for non-farm forest owners, but not exclusively (Härdter, 2004).

In addition, forest ownership in Eastern and South-Eastern European countries is frequently undergoing another dramatic change with the restitution of nationalized forest land to the former owners, and other forms of privatisation. The restituted “new” owners lack experience and skills in forest management as well as professional networks and institutional support structures.

In effect, in Western and Eastern European countries, “new” forest ownership types develop and increasingly gain in importance. Ownership is changing e.g. towards owners without agricultural background, more absentee owners, owners in urban settlements, etc. “New” owners are a very inhomogeneous group: they differ with regard to their interests, skills, capacities and forest management practices. A growing share of owners is not member of sector associations; nor embedded in respective information networks. These characteristics influence the owner’s participation in forest product markets and their receptiveness for respective policy measures and incentives. A general trend is that new forest owner types often have non-market oriented goals connected with their ownership why for them the price signal is less important.

A number of terms and concepts are used to characterise new forest owners:

- Non-farm or non-agricultural forest owners: the professional occupation of forest owners is an important factor explaining their attitudes, skills and forest management behaviour (Schraml and Volz, 2003; Kvarda, 2004).
- Non-resident or absentee forest owners: the distance of the owners’ residences to their forests makes their management difficult.
- Urban or non-traditional forest owners: this term refers to either the owners’ residence in cities or their different (namely urban or modern) lifestyles (Härdter, 2003, 2004).

According to Suda et al. (2001), scholars mostly include three interrelated groups of factors in their research that influence forest owners’ behaviour:

- (i) structural features of forest ownership, including resource characteristics and human capacity characteristics,
- (ii) forest owners attitudes, objectives, and behavioural intentions, and
- (iii) actual behaviour of forest owners.

Following this basic logic, the study will look at structural features of forest ownership that directly relate to their motives connected with their forests, the goals and attitudes of forest owners, factors which are related to these (non-market and profitability-related), as well as the question, how owner types might react to wood mobilisation measures. Figure 10 illustrates the conceptual model that underlies the analysis of how motivation for forest ownership and related factors influence participation in the wood market.



**Figure 10: Conceptual model underlying Task 3.1**

### 3.1.1.2 Forest owner typologies

Defining forest owner typologies helps in the analysis of factors that influence forest owners' participation in wood markets and is a useful tool in order to derive practical conclusions. Within the research into private forest owners, typological studies are not very frequent. Boon et al. (2004) provide a broad overview of typological studies. Typologies are overwhelmingly based on ownership objectives (Kuuluvainen et al., 1996; Karppinen, 1998; Volz and Bieling, 1998; Becker et al., 2000; Kline et al., 2000). The study by Hogl et al. (2005) is an example for a typology that is based on structural factors such as the connection to agriculture, residence or occupation. Suda et al. (2001) remark critically that typologies often mix different characteristics of owners which makes it impossible to draw causal inferences, to anticipate future developments and to derive targeted policy measures.

**Tab. 12:** Categories of forest owner types, by case study region.

Case study	Typology	Case study	Typology
<b>Austria*</b>	<ul style="list-style-type: none"> <li>• Farmer forest owners <b>(20%)</b></li> <li>• Part-time farmers <b>(20%)</b></li> <li>• Small-towners with rural background <b>(12%)</b></li> <li>• Forest owners previously employed in agriculture <b>(16%)</b></li> <li>• Farm leavers <b>(10%)</b></li> <li>• Urban forest owners <b>(9%)</b></li> <li>• Forest owners without connection to agriculture <b>(13%)</b></li> </ul>	<b>Sweden</b>	<ul style="list-style-type: none"> <li>• Traditionalist</li> <li>• Economist</li> <li>• Conservationist</li> <li>• Passive forest owner</li> <li>• Optimist</li> <li>• Environmentalist</li> </ul>
<b>England*</b>	<ul style="list-style-type: none"> <li>• Individualist <b>(8%)</b></li> <li>• Multi-functional owners <b>(37%)</b></li> <li>• Private consumers <b>(23%)</b></li> <li>• Conservationists <b>(3%)</b></li> <li>• Investors <b>(18%)</b></li> <li>• Amenity owners <b>(11%)</b></li> </ul>	<b>Rhône-Alpes**</b>	<ul style="list-style-type: none"> <li>• Saver <b>(9.9%)</b></li> <li>• Frustrated owner <b>(13.1%)</b></li> <li>• Local sociable forester <b>(14.3%)</b></li> <li>• Local producer <b>(11.6%)</b></li> <li>• Long term manager <b>(25.9%)</b></li> <li>• "Symbolist" owners <b>(25.2%)</b></li> </ul>
<b>Hungary</b>	<ul style="list-style-type: none"> <li>• N.A.</li> </ul>	<b>Estonia</b>	<ul style="list-style-type: none"> <li>• N.A.</li> </ul>
<b>Saxony</b>	<ul style="list-style-type: none"> <li>• Owners with interest in using forests for firewood</li> <li>• Uninformed / uninterested forest owners</li> <li>• Owners with economic interests</li> <li>• Owners with non-economic interests</li> </ul>	<b>Catalonia</b>	<ul style="list-style-type: none"> <li>• Famer / traditional ownership</li> <li>• Heritage ownership</li> <li>• New acquisition ownership</li> </ul>

\* Distribution of types by owners. \*\* Distribution of types by forest area.

In the case examples used in this study, typologies were not always available: 6 out of 8 case studies (excluding Hungary and Estonia) have provided forest owner typologies (see table 12 and Annex).

The type and range of typologies vary significantly across the case study regions. Different criteria and concepts underlie the given forest owner typologies. In the case of Austria, the forest owner types are based on **structural factors** related to their professional occupation, education or distance to their property. The types provided by Sweden are related to the **motivational factors** underlying their forest ownership (e.g. optimist, environmentalist and passive forest owner). In Saxony, the typology relates to their **use interest** (e.g. economic, non-economic, or not interested). The remaining typologies are based on a mixture of different structural and motivational factors that underlie their forest ownerships.

Because of these differences, they can hardly be merged. The least common denominator seems to be a distinction between **forest owners with economic objectives** and **with non-economic objectives**: the former often have an agricultural background and use the forests economically. The latter is a very inhomogeneous group of owners that are associated with a range non-economic concepts or goals, such as, environment, nature, recreation, symbolism, tradition, ownership pride or heritage. They often do not have an agricultural background. There is additionally a type of **uninterested or passive owners** that have no explicit interests in their property (see table 12).

It is important to note that there are transitional or mixed types between economically or non-economically oriented owners. Most owners have multiple goals connected with their property.

### 3.1.1.3 Forest owners' attitudes and objectives

Looking at forest owner's attitudes and objectives (as regards their forests and management practices) becomes increasingly important as a greater variety of ownership types emerge. A greater plethora of factors and goals influence the behaviour not only of new but also farm forest owners (Schraml and Volz, 2003; Hogl et al., 2005; Van Herzele and Van Gossum, 2008). It is thus important to consider **non-market** as well as **profitability-related factors** when analysing fragmented small scale forest owners and their participation in the wood market and if targeted measures to mobilise wood are to be derived.

For the purpose of our study, four main groups of goals and attitudes seem of particular importance: personal attachment, goals related to the common good, income goals, non-economic goals (table 13).

The results from the case studies indicate that the **personal attachment** of the owners to their property is a decisive factor for their behaviour. Ownership pride and importance of the forests as family tradition are among the strongest attitudes of private forest owners. They are mentioned in most cases, including Western and Eastern European. In Estonia, the social value, tradition and status associated with forest ownership appear to be more important as motivating factors for forest ownership than the income function. The Catalonia case also particularly stresses the importance of moral values (e.g. family patrimony) and the impact of aesthetic perspectives on "how" a forest should look like.

**Tab. 13:** Attitudes among private forest owners towards own forests.\*

Case	Attitudes towards forests management
------	--------------------------------------

study		
<b>Austria</b>	(1) Conserving nature. (2) Personal needs. (3) Family tradition. (4) Ownership pride. (5) Recreational activities.	(6) Forest as a capital asset. (7) Green savings bank (8) Hunting possibilities (9) Source of income. (10) Forest as a workplace.
<b>Sweden</b>	(1) Recreational activities (especially for off-site owners). (1) Fuelwood. (2) Housing. (3) Source of income or savings.. (3) Upkeep contact with family and sense of "heimat".	<i>Other important attitudes:</i> <ul style="list-style-type: none"> <li>• Lack of trust in forest advisors (e.g. catering to industry interests).</li> <li>• Societal views that clear-cuts are "ugly" prevent some owners from felling.</li> <li>• Local community influence the owner's behaviour.</li> </ul>
<b>England</b>	(1) Contributing to nature preservation. (2) Contributing to nature landscape preservation.	(3) Source of income or savings.
<b>Rhône-Alpes</b>	<ul style="list-style-type: none"> <li>• Most forest owners do not see forests as a regular source of income.</li> <li>• Many owners have minimal management in order to cover costs (management, maintenance and planting).</li> <li>• Invested in forest for the forest itself and for the pleasure that forest brings to them.</li> </ul>	<ul style="list-style-type: none"> <li>• Forest represents a space of freedom for them and their family.</li> <li>• Forest management is a way to pass a quality forest to the next generation.</li> <li>• Management objectives differ depending on the forest owner typology</li> <li>• <i>Other attitudes:</i> leisure, hunting, naturalist walking and nature conservation.</li> </ul>
<b>Hungary</b>	<ul style="list-style-type: none"> <li>• N.A</li> </ul>	
<b>Estonia</b>	<ul style="list-style-type: none"> <li>• High social value, tradition and heritage associated with owning a forest.</li> <li>• On-site owners are more interested in wood mobilisation as a source of income.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Urban owners:</i> Forests is something extra or represent a bonus income.</li> <li>• <i>All:</i> "Value stock" for the future.</li> </ul>
<b>Saxony</b>	(1) Tradition and heritage. (2) Land tenure. (3) Fuelwood. (4) Recreational activities. (5) Source of income.	<i>Other important attitudes:</i> <ul style="list-style-type: none"> <li>• Many forest owners consider forest management as economically inefficient.</li> <li>• Small scale forest ownership is more often a question of security (as an asset) and autonomy.</li> <li>• Duties and taxes are too high.</li> <li>• Low acceptance towards forest organisations.</li> </ul>
<b>Catalonia</b>	<ul style="list-style-type: none"> <li>• Source of income or savings.</li> <li>• Family's patrimony (moral norms)</li> </ul>	<ul style="list-style-type: none"> <li>• Aesthetic model (how the forest should look)</li> <li>• Risk of forest fire (to protect the forest property)</li> </ul>

\* Attitudes are ranked in terms of importance (by owners) if the data is available.

There are different implications of these values: They may be the main reason why most owners do not plan to sell their forests even without other strong objectives. The strong personal and family attachment, however, also seems to have the consequence that many owners are not open to a management of their forests through third parties because they fear that they would not be managed accordingly.



A further result of the case studies is that attitudes that are related to the **common good** are of the same importance as personal or economic interests, or they even prevail. In Austria, the goal of preserving nature and catering to subsistence needs are the most important attitudes of private forest owners with equal importance. In Sweden the impact from societal views and local communities on the forest owners' behaviour and attitudes was highlighted as important.

If socially oriented goals prevail, owners might be open to advice or support from institutional actors. The strong influence of public authorities or other powerful groups, however, may also be experienced as threatening: Saxony emphasised the detrimental impact of the old communist regime on trust between forest owners and forest organisations. Also for Sweden a lack of trust is mentioned, here directed towards advisors that may be influenced by industry interests.

Forests still represent a **source of income** for many owners, especially for on-site, or farm owners, respectively. This relates predominantly to traditional forest owners that depend economically on their forest holding, as well as owners that invest in forests as a capital asset. The economic dependence does, however, vary and is often very limited (e.g. only covering the costs of managing and maintaining the forest holding, or only catering to subsistence needs such as fire wood). A number of case studies explicitly mention that many owners do NOT value the forest as an income source, e.g. Saxony or Rhone-Alpes. This is typical for small-scale owners who always have other main occupations.

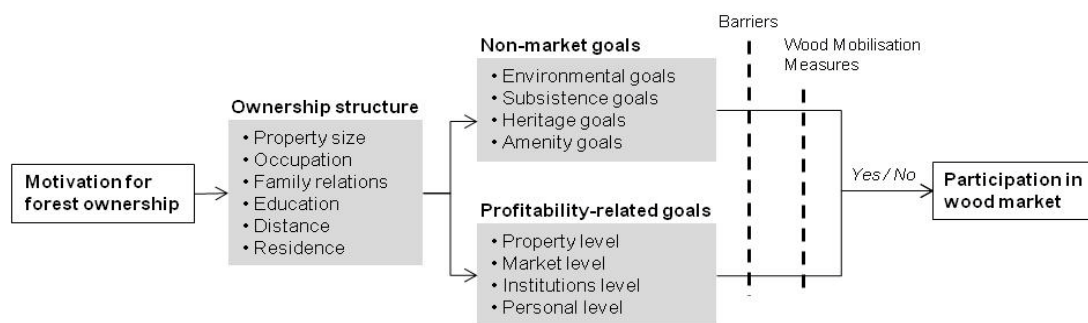
The implication of the limited importance of the small scaled forest properties for the income of the owner is that they focus their economic attention to other areas (e.g. other farm products) or do not consider this opportunity at all. The transaction costs for timber harvest and sale simply prevent any action.

For many (and an increasing share of) private forest owners non-market or **non-economic goals** dominate their attitudes towards their forests. These non-economic goals are manifold and, besides of family tradition and ownership pride, relate specifically to personal needs, nature or landscape conservation and amenities, and leisure activities.

It is evident from many studies that forest owners rarely operate under only profit-oriented goals. However, the attitudes of an owner with non-economic objectives differ significantly from a traditional or economically oriented forest owner: non-market objectives take precedence, the forest is often used only for subsistence needs, or no wood is cut at all. Any advice to this growing group of owners would need to take into account their "non-traditional" or "urban" goals.

### 3.1.2 Factors influencing market behaviour

Following the conceptual model of Task 3.1, the factors that influence the market behaviour of fragmented forest ownerships are structured in the following way as: (1) structural factors; (2) factors related to ownership goals; and (3) factors related to the profitability of forest management (figure 11).



**Figure 11: Factors for the market behaviour of private forest owners.**

### 3.1.2.1 Structural factors

As described in the conceptual framework, some of the factors with influence on the forest owners' goals and behaviour are connected with the structure of ownership ("who" owns the forest?).

Most studies refer to the following factors:

- property size: This is the issue at the bottom of this study of "fragmented" forest owners and is relevant also within the group of fragmented owners: The smaller the property the less relevance it has for the owner in terms of its management. This problem can partly be solved if the forest becomes part of a forest management cooperation of association or other form of joint management.
- connection of the forest to a farm holding: If a forest is part of an agricultural business, the owner usually has some knowledge and experience in forest management, including the forest work itself as well as organisational issues such as access to information and advice. In further detail, also the type of farm becomes relevant, e.g. with regard to the interest and capacities of the owner (or the owners' family) to engage in the forest management work. Farm owners often focus their business efforts on the main farm product or do not have available labour or time resources for the forest management. Also part-time farmers often have very limited capacities for the forest.
- occupation: Owners that are professionally connected to agriculture or forestry, have a basic knowledge and understanding of forest management.
- family relations of the owner to agriculture or forestry: If the owner was raised on a farm or if he or she has relatives with a farm, it is more likely that they have a basic knowledge and understanding of forest management.
- education and training: Owners with agricultural or forestry education or training know how to manage their forests.
- distance to forests: A larger distance of the owners' residence from their forests impedes an intensive forest management.
- residence in cities: Assumable, urban forest owners do not only live far away from their forests but also have a non-agricultural occupation and non-economic goals for their forests.

The two major factors: property size and connection to a farm often imply a number of related factors such as the related education or training and management capacities. These structural factors influence the owners' technical capacities, knowledge and skills, available time for forest management but also their attitude towards forest management.

### 3.1.2.2 Ownership goals

A basic factor for how the forest owners might be reached by mobilisation measures is how they see and which goals they associate with their property. A major factor is then, if they prevalingly have economic (income, workplace) or non-economic goals (nature, leisure) related to their forests.

Non-economic goals are manifold: nature conservation, amenity, recreational activities mere subsistence (e.g. with fire wood), ownership pride and family values, etc.

Owners with economic goals can be assumed to be principally open to wood mobilisation measures which traditionally focus on the income function of forest management. Owners with non-economic goals would have to be addressed by different arguments. As they typically also are not professionally connected to agriculture and use different information channels, also different media would have to be utilised.

### 3.1.2.3 Profitability-related factors

The profitability of forest management is not only determined by the timber prices and the harvesting costs (see table 14). The most significant factors identified in the case studies are linked to profitability at four levels, namely, the **personal level**, **property level**, **market level**, and **institutional level**.

**Personal level factors** for the profitability of small scale forest properties often relate to the fact that the owners have to manage their forest aside of their main occupation. This has impacts on their time resources for but also their attitudes towards and skills of forest management. Owners then often do not see their forest management as profitable. They often only want to use it for catering their subsistence needs with fire wood. Another effect is that they are not part of farmers' information networks. Furthermore, the experiences of the owners with public authorities or other consulting agencies were mentioned in the case studies as important factors for their motivation.

Tab. 14: Profitability-related factors.

Level	Factors	Level	Factors
<i>Personal</i>	<ul style="list-style-type: none"> <li>• Attitude towards forest management.</li> <li>• Knowledge of and experiences with forest management.</li> <li>• Experiences with forest authorities or advisory agencies.</li> </ul>	<i>Property</i>	<ul style="list-style-type: none"> <li>• Harvesting costs.</li> <li>• Infrastructure.</li> <li>• Level of mechanisation.</li> <li>• Low timber quality.</li> <li>• Access to market.</li> </ul>

	<ul style="list-style-type: none"> <li>• Access to information.</li> <li>• Available time resources.</li> </ul>		<ul style="list-style-type: none"> <li>• Distance to market.</li> </ul>
<i>Market</i>	<ul style="list-style-type: none"> <li>• Timber price.</li> <li>• Level of competition among buyers.</li> <li>• Number of competing entrepreneurs.</li> <li>• Availability of labour force.</li> </ul>	<i>Institutional</i>	<ul style="list-style-type: none"> <li>• Role of forest authorities.</li> <li>• Existence and activities of forest owners' associations.</li> <li>• Educational and training programmes.</li> <li>• Taxation.</li> <li>• Financial incentives.</li> </ul>

For small **forest properties** the harvesting costs are often higher because of deficiencies in infrastructures and machinery (e.g. forest roads) and because of the small quantities that are harvested (higher costs for harvesting and transportation). For the small quantities, they also achieve lower prices because of their weak position vis-à-vis the buyer and because the supply from small scale private forest owners is often too small and unsteady for the wood industry. The case studies further mentioned that because of lacking forest management, the timber qualities are often not so good.

**Market factors** are the prices paid for the timber and the costs for harvesting services which depend on international as well as local level competition. A specific problem often mentioned in the case studies is the fact that it often becomes more and more difficult to find professional work force because forest work is not experienced as attractive to young people in rural areas.

On **political-institutional level**, the form and height of taxes on timber sales and the availability of financial incentives for forest management activities are factors reported by the case studies. The roles of forest authorities differ strongly across the case regions, seeming rather positively supporting forest management in Western European countries, but being a strong regulatory factor in the former communist countries in Eastern Europe. Most Western European case studies mention a range of support measures for private forestry, however, for the UK and Catalonia also a high level of bureaucracy is pointed out which makes forest management costly. Many case studies mention that due to decreasing public budgets the authorities cannot provide as much support as before through personal advice. The existence of forest owner associations/cooperatives or other forms of cooperation is a highly relevant factor in supporting owners in their management of the forests. Cooperation is an answer to the very basic structural reason why many fragmented owners hardly manage their forests or sell timber: they provide capacities that the single owners do not have.

#### 3.1.2.4 Wood mobilisation measures

The ongoing wood mobilisation measures in the represented case study regions address different target groups, namely, **forest owners with economic objectives**, **forest owners without economic objectives**, the **wood industry** and the **public** (see table 15 and Annex).

Most of the measures are targeted at **owners with economic objectives** and they embrace the whole range of traditional support measures of public forest policy:

- **Cooperation of owners:** Financial support and advice are offered to induce small scale forest owners' cooperation which may happen in various forms, ranging from loose local cooperation to institutionalised associations. This measure is increasingly applied in many countries.
- **Services for forest management:** They include technical services ranging from forest management planning to harvesting operations. An important service is the joint marketing of timber from small properties that is often done by semi-public institutional actors.
- **Advice and training:** The conventional advisory services are often adapted to the new challenge of wood mobilisation and sometimes, specific training programmes for owners are offered. Other informational instruments are GIS instruments to quantify timber potentials, yearly fairs or awards for good forest management.
- **Financial support:** Many countries offer various forms of financial support for forest management in general, most of which being relevant also for mobilisation (infrastructure, mechanisation, silviculture, marketing, value added production, etc.). Specific subsidy programmes for mobilisation, however, are hardly found.
- **Participatory planning:** Interestingly, instruments for integrated rural development are hardly used for timber mobilisation goals. The French case study reports on one example (massif development plans) where public and private actors are invited to reflect on possible actions.

Measures addressed to new ownership types (**forest owners without economic objectives**) are extremely rare: Only one example (new communication channels) was given in the Austrian case study, however, it is not widely applied there.

Measures addressed to **industry** are manifold, directing at cooperation (e.g. clusters) or financial incentives (e.g. for investments or transport). In Austria, measures are taken to increase the transparency in timber sales in order to improve the trust between actors in the value chain. A specific measure to increase the use of wooden biomass for energy purposes are feed-in tariffs for electricity from renewable sources. Forest owners may also directly benefit from that in case they run power and heating plants (such as in Austria), or indirectly by providing the biomass.

**Tab. 15:** Wood mobilisation measures, by target group and case study region.

Target Group	Wood mobilisation measures	Case study
Owners with economic objectives	• <i>Financing of infrastructure.</i>	AT
	• <i>Financing support for forest owners associations / cooperatives.</i>	AT, DE (Sax.)
	• <i>Financing of development projects.</i>	UK, DE (Sax.)
	• <i>Grants for capital investments.</i>	UK
	• <i>Support for silvicultural measures.</i>	EE
	• <i>Formation of forest owners associations and cooperative.</i>	AT, FR (Rh-A), EE
	• <i>Forest Management Planning.</i>	AT, EE
	• <i>Training.</i>	UK, EE, DE (Sax.)

	<ul style="list-style-type: none"> <li>• <i>Participatory platform for regional development.</i></li> </ul>	FR (RH-A)
	<ul style="list-style-type: none"> <li>• <i>Forest management services.</i></li> </ul>	HU
	<ul style="list-style-type: none"> <li>• <i>Joint timber marketing.</i></li> </ul>	DE (Sax.)
	<ul style="list-style-type: none"> <li>• <i>Advisory services.</i></li> </ul>	AT, HU, EE, DE (Sax.)
	<ul style="list-style-type: none"> <li>• <i>GIS systems for quantifying wood potential.</i></li> </ul>	AT
	<ul style="list-style-type: none"> <li>• <i>Yearly fairs.</i></li> </ul>	DE (Sax.)
	<ul style="list-style-type: none"> <li>• <i>Award for good forest management.</i></li> </ul>	DE (Sax.)
<b>Owners with non-economic objectives</b>	<ul style="list-style-type: none"> <li>• <i>New communication channels targeted at different forest owner types.</i></li> </ul>	AT
	<ul style="list-style-type: none"> <li>• <i>Transparency in timber value chain.</i></li> </ul>	AT
	<ul style="list-style-type: none"> <li>• <i>Cooperation.</i></li> </ul>	FR (Rh-A)
	<ul style="list-style-type: none"> <li>• <i>Cluster initiatives.</i></li> </ul>	DE (Sax.)
<b>Industry</b>	<ul style="list-style-type: none"> <li>• <i>Financial incentives for investment in wood industry.</i></li> </ul>	ES (Cat.)
	<ul style="list-style-type: none"> <li>• <i>Financial incentives for transport and wood storage.</i></li> </ul>	ES (Cat.)
	<ul style="list-style-type: none"> <li>• <i>Feed-in tariffs for electricity production.</i></li> </ul>	ES (Cat.)
	<ul style="list-style-type: none"> <li>• <i>Public relations.</i></li> </ul>	AT
<b>Public</b>	<ul style="list-style-type: none"> <li>• <i>Promote renewable energies.</i></li> </ul>	ES (Cat.)

Measures addressed to the **public** are various public relations activities for the image of wood and forest management, or the promotion of bio-energy use.

The reported measures differ in terms of specificity. Most of the measures are **not specifically related to wood mobilisation** as such, but to forest management in general, related to cooperation, training or advisory services. They are often provided by forest authorities and forest owners associations. Only few measures are **mobilisation-specific** related to financing instruments (e.g. for infrastructure, mechanisation or cooperation), or GIS instruments or other systems for forest management planning.

It is interesting to note some **regional difference**. Most country list measures addressed to forest owners, but only Austria, Saxony, Rhône-Alpes and Catalonia have initiated measures targeting the wood industry. Sweden is one case in which no wood mobilisation measure is identified. The case argues that the utilisation of annual increment by private forest owners is already so high (~80%), and that there is consequently no need to engage in wood mobilisation activities. In comparison to Western European countries, Eastern European countries have less tradition in supporting private forest owners and quite restricted budgets for such measures.

Despite the fact that forest agencies are aware of the growing number of “new”, “absentee” or “urban” forest owners, and despite the fact they report about the difficulties in reaching them, most efforts still aim at their traditional clientele: traditional farm forest owners. Only **few measures target forest owners with non-economic objectives**. Given the increasing prevalence of this category of owners, it would be important to ensure that wood mobilisation measures target these types of forest owners.

### 3.1.3 Forest Owner Ideal Types

The ownership typologies used in the regional case studies do not apply common frameworks in classifying types of forest owners. These mixed definitions prevented a systematic comparison of forest owner groups across the case studies. The problem of multiple frameworks behind forest owner typologies is not limited to this study: Available forest owner studies mostly use a varied representation of structural, and/or motivational characteristics of forest owners and are thus not comparable. Furthermore, they are mostly themselves hardly able to relate structural features with ownership goals and behaviour. This is one of the major future research challenge related to forest owners in general, not only when discussing the issue of wood mobilisation.

In the current study, we were – on the basis of available research and the case studies – able to roughly relate the most prevalent structural and motivational factors. Throughout the study we used a two-fold typology of owners with and without economic goals (with a residual type of “uninterested” owners that have no specific goals with their forest land and which are thus of lesser importance for policy).

This two-fold meta-typology can be related to other typologies: the structurally based typology established by Høgl et al. (2005) distinguishes between more “traditional” owners with connection to a farm and “non-traditional” owners which are disconnected from agriculture. While traditional owners more often have economic goals, the non-traditional owners are mostly less economically interested. A similar connection was done in Hårdter (2004) between the occupation of forest owners (as farmers, part-time farmers or non-farmers) and their lifestyle (traditional or urban). Weiss et al. (2006), in a study that was specifically directed towards wood mobilisation in Austria, concluded that the most relevant structural factor of forest owners that impacts on their forest management behaviour and their responsiveness to wood mobilisation measures is the question if they are farmers or not (see also: Weiss and Bach 2007a; b). Factors can thus be related as follows across different typologies (table 16):

**Tab. 16:** Relation of different forest owner typologies.

Types based on goals	Types based on structural factors	Main occupation
• Owners with economic objectives	• Traditional owners	Farmer
• Owners with non-economic objectives.	• Non-traditional owners	Non-farmer
• Uninterested owners		Non-farmer

The lesson from this table is that the goals of the forest owners may roughly be related to their structural characteristics that can more directly be observed in the field by forest advisors that apply wood mobilisation measures. From these

structural factors such as the occupation or the residence of the owner, the most significant criterion is being a farmer or not. Knowing this, strongly helps in directing any policy measures, even it is only a rough rule.

**Owners with economic goals/traditional forest owners/farm forest owners:**

Farm forest owners are more inclined towards economic goals and rather react to wood price signals. They are, generally, more prone to using traditional information sources and advisory services. They are more receptive to financial incentives (e.g. subsidies) or the removal of profitability-related barriers (e.g. taxation). Traditional wood mobilisation measures may be addressed to this group of owners: forming cooperatives or associations, offering management services, providing information on harvesting potential and markets, etc. The advantages in addressing this type of owners are that they have in average larger forest properties, a basic knowledge of forest management, and income interests from their forests. A further advantage is that the traditional advisory agencies have established instruments and contacts to their clientele. The limited results of applied mobilisation measures are, among others, connected to the fact that these owners have certain interests in and attitudes towards their forests that cannot easily be changed: use of their forests for subsistence or as a savings bank, lacking trust in “third parties” to manage their forests or do harvesting operations, or the conviction that the forest management does not pay.

**Owners without economic goals/non-traditional forest owners/non-farm forest owners:**

New, non-farm, or non-traditional forest owners have hardly any connection to agriculture. They mostly have inherited (or have been restituted) the forest but have not experienced or learned to manage it. They may live in rural or urban settings but mostly follow urban lifestyles and share urban, modern values. They hardly have an interest in income from their piece of forest but have predominantly non-economic goals such as amenity, nature preservation, or leisure. They may even have purchased their forest for leisure activities or for nature conservation purposes. This type of owner sometimes perceives forest management or silvicultural measures as something negative, but most of them would still agree with measures if necessary, however, less related to a “management” or “utilisation” but rather to a “tending” or “preservation” of the forest. The difficulties to reach them with wood mobilisation measures are manifold: they sometimes live in a distance to their forests, they have “urban” non-economic goals, forest agencies have no access to them as they are not part of the farmers’ information networks, and forest advisors have no training in understanding their goals and values. The main hindering factor is that these owners hardly have a personal interest in any wood harvesting or marketing but could only be convinced by arguments that relate to the common good. The limiting factors are thus to be found on two different levels: the technical issue of how to get in contact with them, and the issue of different value systems. A positive factor may be found in the fact that they see themselves as non-experts and that they may thus be open to the experts’ opinions and service offers if those find the right language and convincing arguments. The profitability of the management operations would in this regard be of lesser importance. These forest owners would have to be approached using non-sectoral / non-professional media, including modern ICT technologies, television or general interest newspapers and magazines. Measures would also have to focus on alternative values of forest management (e.g. preventing forest fires, relevance of silvicultural measure to maintain biodiversity).



**Passive or uninterested forest owners:** These are rarely dependent on the forests in terms of income. Instead, they are often urban owners with little knowledge or interest in managing their forest land. The lack of interest represents the most significant barrier to mobilisation measures in this group of owners which prevents any meaningful measures.

#### **3.1.4 Conclusions**

It is apparent that for a considerable share of forest owners, mostly farm owners, the forest still represents a recognised source of income. The available studies hardly quantify the share this type of owners has: In Austria, they are 20% of the owners, but they represent a larger share of forest area because they have larger forest properties than other types. There is, however, no estimation of how big this share is. In Rhone-Alpes, around 60% of the forest land can be related to this owner category of active managers (savers, local social foresters, local producers, long-term managers).

There is a clear trend that this category of forest owner is decreasing in prevalence across most of the case study regions. It should be noted that in the ongoing structural change in forest ownership, there is still a large part of forest owners that have some family-related connection to agriculture and would be open to traditional forest management services that are offered by neighbours or associations. It can be assumed that those transitional owner categories get lost to non-traditional types in the next generation. It is a clear result of this study that this category of forest owners is rarely targeted in current wood mobilisation measures. An important strategy would therefore be to include them into professional networks and information channels as long as they are still relatively easy to be addressed.

Existing forest owner studies and typologies rarely relate the forest owners' structural background (e.g. profession), with their attitudes and goals (e.g. environmental or economic) to their forests. Understanding how these factors interact would help to assess and develop differentiated wood mobilisation measures targeting specific segments of forest owners. The added value for advisors would be to understand their goals as well as to learn how to recognize the target groups in the field. Such studies would have to include an assessment of the shares of hectares of different owner categories and future developments.

### **3.2 How the market structures may influence the decision-making of private forest owners**

#### **3.2.1 Introduction**

The objective of task 3.2 is to analyse the influence of "structural" factors such as physical factors (availability of transport networks, environmental conditions; e.g. wildfires, severe storms), economic conditions (presence and efficiency of markets, transaction costs of getting involved in active forest management, availability of technical capacities of forestry contractors), legal and regulatory instruments, management context (e.g. support in developing forest management plans, timber sales methods, etc.), market price paid for wood and wood biomass on wood

supply. Therefore, task 3.2 is focused on analysing the influence of **market structures and forces** on the decision-making of private forest owners.

A meta-analysis approach summarizes the data from previous tasks, case studies and other studies in order to avoid errors and facilitate further analysis. The meta-analysis approach can be defined as the study of studies. Different facts will be compiled and put into groups according to their characteristics; several hypotheses will be tested statistically. The obtained results will be useful for the subsequent tasks as they will be integrated into a vote counting system (Beach et al., 2005) from which some preliminary conclusions will be drawn; this will allow describing market frameworks and identifying key factors and relevant relationships that influence forest owners' decisions. To integrate the data into the system the researcher first categorizes findings as significantly positive, significantly negative or not significant for each variable (e.g. timber prices). The category with the most entries is then considered the best representation of the relationship between the dependent variable and each of the explanatory variables of interest. For each variable, each study gets to cast a 'vote' in support of one of the three types of relationship — positive, negative and not significant. By counting up the number of votes across the studies, "a winner" can be chosen and a general relationship for that specific variable can be identified. As such, vote counting provides a useful starting point for a systematic assessment of studies within a given research area.

The main data sources have been the 8 case study reports conducted in the previous task (task 2) and the fact sheet documents for the same 8 regions and case studies. Market-structure related articles and statistics sources have also been used.

A high level of heterogeneity has been found in case study reports and fact sheet documents data, and different assumptions have been made in some cases that make some results not conclusive.

### 3.2.2 Pricing analysis

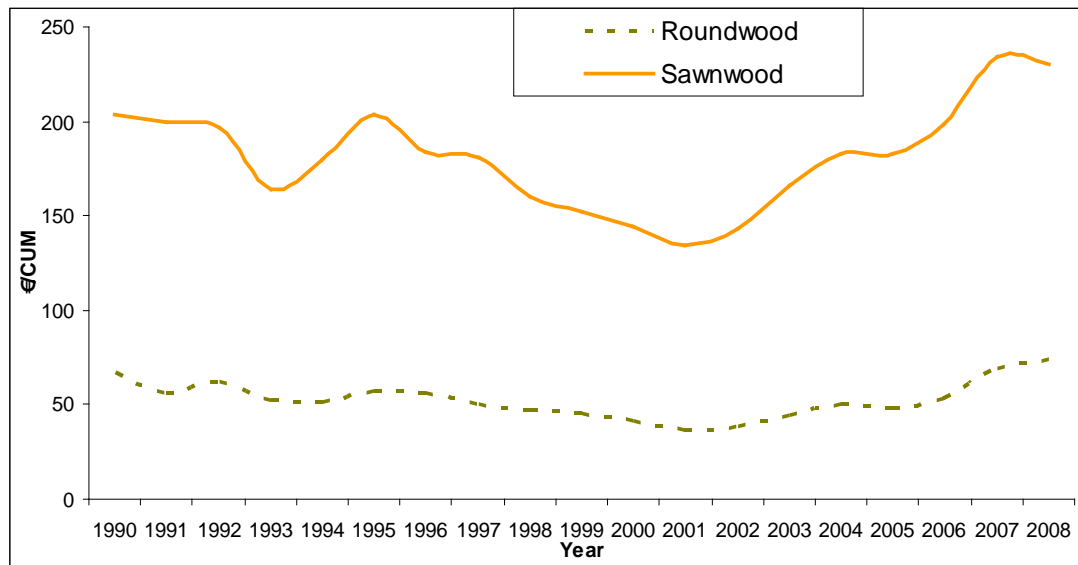
This section is based on the analysis resulting from a meta-study of case studies on the behaviour of private forest owners regarding wood price and harvesting costs, based on the case study reports (2010). Many other references have also been used in order to obtain a better significance and robustness of results (see Annex).

#### 3.2.2.1 Pricing situation in Europe

European wood pricing depends on global market factors and some other regional ones. Market factors are linked to supply-side and demand-side situations, and to local, national and international market fluctuations. The average current **sawnwood** price, for example, came down 27% during the last years of last century and the beginning of the new millennium until 2002 (figure 12). From there onwards, prices increased until 2007 and then started to decrease again due to the economic crisis.

Regarding **roundwood** pricing during last years, similar fluctuations have been observed, but with less volatility as compared to sawmill products (FAOSTAT, 2010). During 2002, a price reduction close to 30% compared to average (period

1990-2008, FAOSTAT, 2010) was the most considerable drop down, whilst the highest increase occurred during 2007 and still 2008.



**Figure 12: Evolution of current price for roundwood and sawnwood in the European Union, (Source: FAOSTAT , 2010)**

Although there is no clear pricing behaviour emerging from the different case studies (raw material, industrial wood, and roundwood), some specific regional exceptions can be observed (see Annex).

Regarding **fuelwood** (see Annex), there is a clear tendency of price increases since the year 2000. The main reason for this price escalation can be found in the increasing demand from combined heat and power plants (Höglund, 2008), due to the need of higher independence from fossil fuels, arising from successive oil price peaks in oil crises from the 70s until now (Ioannou et al., 2009). In many European countries such as Belgium, Finland, the Netherlands, Sweden and the UK, imported biomass contributes already significantly (between 21% and 43%) to the total bio-energy use. This international bio-energy trade is growing rapidly, far beyond what was expected (Junginger et al., 2008). In this context of increasing demand for wood-based energy, there is a parallel trend in increasing prices (Sikkema et al., 2010).

This trend can be observed at a local scale in Saxony and Estonia (see Annex), and to a lesser extent in Austria. In Catalonia's case – where bio-energy development has been low - this rising trend is not so obvious as in Saxony and Estonia. It should be noted that warmer regions, as Catalonia, are developing alternative forms of energy production (sun and wind power) with wood for fuel as a complement.

### 3.2.2.2 Price meta-analysis

According to the European Forest Sector Outlook Study (UNECE & FAO, 2005), wood consumption (coniferous and broadleaves) has always been higher than production in the EU. This means there is a big shortfall that must be compensated with larger imports (see Annex).

There are two general trends in the evolution of prices in the studied regions: sawlog price reduction and fuelwood price increase.

Production costs are one aspect when considering product prices. The difference between roundwood prices and production costs is an estimate of the gross profit margin that will be distributed among owners and, harvesting and transport contractors.

Within the case study regions the production costs (harvesting + transport costs) of roundwood range from 17.26 €/m<sup>3</sup> (Estonia) to 46.44 €/m<sup>3</sup> (Austria). They depend mainly on labour costs, harvesting conditions, topography, availability of resources (essentially level of mechanisation), and accessibility (Wang *et al.*, 2004). These costs are distributed on average between a 70% for harvesting (19.17 €/m<sup>3</sup>o.b.) and a 30% for transport (8.21 €/m<sup>3</sup>o.b.). A maximum transport distance of 120 km is similarly found in all case study regions due to price limitations.

Sometimes, a slight decrease in price has little influence on the market activity of large forest ownership. Some exceptions are found in Saxony and Rhône-Alpes (see cases studies), where large forest ownership have to repay loans for forest purchase or to cope with important felling expenses.

Regarding fragmented forest ownership, a price increase induces wood market participation. Exceptions for this are when the information does not reach the owner.

#### Price reactions

In many case studies the owners show positive reactions to price increases, and this is coupled with an increase in wood mobilization. Some case studies show that some owners carry out forest maintenance even when there is no profitable pricing context. On the other hand there are some other owners who just wait for better circumstances. It is worthy to say that activities of owners in their forests are also influenced by owners' external inputs (Dennis, 1989), especially in the case of fragmented forest ownership which have lower yields and depend on external financing sources apart from their forest properties.

Although there is a descending trend for sawlog prices, fuelwood price is increasing. This is a positive signal for low quality wood mobilisation or wood used for fuel and energy.

It can be concluded that fragmented forest ownership **behaviour is highly dependent on price increases, but only on increases that owners are aware of**. In fragmented and/or small properties, resources are small and disperse, thus working performance and productivity are comparably low and unit costs are higher. On the contrary, big, uniform and cohesive properties have a higher performance and productivity, resources are concentrated both in space and time and even with low prices wood mobilisation is still possible.

### 3.2.3 Market structures and forces

In this section of the market structures and forces are described and analyzed, as related to those factors that most probably have a significant influence on forest owners' market behaviour, most importantly regarding their participation/non participation in forest products markets.

#### 3.2.3.1 Demand side

##### Size and structure (capacities/ productivity)

According to the case study results in most countries a high share of the total volume consumption is handled by a small number of companies. In any case, these figures should be taken with care as most of these figures are based on estimations since "hard" statistics are hardly available.

The main recent changes in all countries can be characterized by a high increase in the number of heating plants and a dramatic drop in the number of sawmills, except in Estonia, where all the wood industry branches seem to be increasing in numbers. At the same time Estonian production increases led to more exports in favour of domestic consumption.

This significant reduction in the number of sawmills has occurred in a period of more than 10 years and still seems not to have concluded. In spite of the number of sawmills closed, in most cases production and consumption is maintained due to an increase in capacity of the remaining ones.

##### Development of annual buying volume during the last 10 years

**Austria:** Except for the sawmill category with only a moderate increase, pulp (+19%), panels (+31%) and heating (+30%) industries strongly increased their purchases.

**Hungary:** The buying volume of sawmills has decreased along with the number of industries. Heating plants have significantly increased their buying volume.

**Rhône-Alps:** The buying tendency is steadily growing and affected by natural disasters. New heating plants projected will increase the purchased volumes in this category.

**Saxony:** Comparing the last two decades shows an increase in sawmills' buying volumes by 67%. Since 2000 wood consumption of the panel industry increased steadily by annually 10% in average. Until 2009 the annual average wood consumption of pulp mills fell by 5%.

**Sweden:** Rough figures show an increase of 14% from 1997 to 2007 in pulp mill consumption. A 500% increase in heating plants consumption was observed.

No such data is available for Catalonia, Estonia and England.

In general, roundwood purchases have increased during the last 10 years and this trend will probably continue. At least in the studied cases company closures were compensated by other companies starting activities or acquiring the abandoned

purchasing volumes. The highest levels of increased purchasing activity were concentrated in heating plants.

#### Development of **wood buyers market structures** during the last 10 years and ongoing trends

**Austria:** The number of small and mid-size sawmills fell down dramatically (-77%) and it has not stabilised yet. In spite of this situation the production levels has increased. The use of biomass for energy is competing with panel and pulp/paper industries, in particular for sawmill residues.

**Catalonia:** Figures from 2005 to 2007 show significant increments but do not reflect the current situation. There is a big expectation regarding a biomass boom but it has still not materialized.

**England:** Sawmills closures are still going on, the downturn in construction stopped. The consumption of roundwood for fencing is still high due to financial incentives. Biomass fuel consumption has boomed and will grow further. There is a loss of professionalism in wood industries due to multiple causes.

**Estonia:** Due to bad reputation and small-scale businesses local traders are disappearing in favour of big industries. The biomass sector is expected to become a key buyer. Sawmill consumption will remain stable. Paper mill demand will drop.

**Hungary:** Only the combined heat and power plant industry is expected to grow. This will influence the market as they are competing with the panel (chipboard) industry. Poor quality wood is, by far, the main market in this region.

**Rhône-Alps:** Except for trade for which no data is available the rest of the wood market is expected to remain stable. The main regional cooperative doubled its sales in the last 7 years.

**Saxony:** Industry has been going through a consolidation process under a policy of industrial settlement. Renewable resources increased considerably. Many small sawmills closed (and this will probably continue in the near future) and a big new one (as big as the main wood buyer so far) opened. A pulp factory closed at the end of 2009. Beside the increasing importance of wood for energy and the new projects planned, there are some other heating plants around the region and thus, the significance of all kind of traders is supposed to rise. Also the importance of mobile sawmills is expected to grow.

**Sweden:** The industry has increased its advisory services to forest owners (even more than the forest owners' associations themselves) in order to meet its demand. Regional buying "borders" have fallen; now there are more buyers searching for timber in the same area and thus owners have more potential buyers. There is high confidence between industrial buyers and owners.

In some regions, small sawmills have been closing. Medium-to-big sawmills are expected to some degree to fill the emptiness on the roundwood market created by the closure of small sawmills.

Prospects of forest biomass for energy (bio-energy) seem to be increasing.

#### Share of residues in pulp, paper and heating

There is no clear common pattern in the share of residues used in the different industries. In Austria the panel industry uses an important share of residues (76%), followed by pulp and paper industries (52%). On the other side in Sweden, almost all residues are used for cogeneration, drying and heating.

Some other changes will come from the irruption of biomass (bio-energy) into the market, concerning higher competitiveness for residues and wood chips.

#### Requirements for different assortments and qualities

**Austria:** Pulp and paper industries consume pulpwood (including sawmill residues). The availability of sawmill residues has become a problem in the pulp and paper industry, because sawmills are increasingly using their residues for heating, pellets production and other energy purposes.

**Catalonia:** The following dimensions (size-classes) are needed for the following industries: Chips dbh < 12 cm; curved or branched trees are accepted; Sawmills 60 cm >dbh> 12 cm; Poles 20 cm >dbh> 12 cm straight and cylindrical stems.

**England:** Quality varies.

**Hungary:** Available dimensions do not fully satisfy the needs of the industry.

**Rhône-Alps:** As quality cannot be satisfied locally, sawmills have a larger supply area outside their region to fulfil their necessities. This increases transportation costs.

**Saxony:** Quality requirements are sufficiently met.

**Sweden:** Quality standards are always available for industry except for veneer.

Although quality necessities seems to be fulfilled in most of the countries, some of them report longer supplying distances (up to 500km) to get wood meeting specific technical requirements.

### 3.2.3.2 Infrastructure and sales methods

#### Transport distances

The average distance between sellers and buyers is about 120 km, reaching 300 km in some cases (Rhône-Alpes & Hungary). In every case distance is limited by transport cost, which depends on the type of transport.

Property size is not a limiting factor regarding the distance to the buyer, but industry size is. Distance can be increased strongly in case of regional oversupply due to disasters and, lower pricing, final product added value and quality necessities of buyers.

#### Sales methods

**Austria:** In Austrian forests roadside sale is the most typical method. Stumpage sales were used in the past by state owned Austrian Federal Forests but not considered to be the right strategy. This kind of sale is also used by aged owners and new small owners without agricultural background. More recently, auctions are organized by owner cooperatives for quality hardwood and veneer logs whereas some companies are offering full forest service contracts from the forest to the mill

(sales at the mill site); new small owners without agricultural background are also a target for this method.

Nevertheless, most forest owners prefer direct sales methods. Lots of them sell sawlogs directly to buyers, and low quality sawlogs and pulpwood by means of forest owner associations. In this sense, forest owner associations have gained importance in wood trading as they allow for individual owners to undertake longer commitments by adding up many owners individual production.

**Catalonia:** As 80% of private agreements are verbal, there is a gap of information regarding sales. Fellings on private forest lands are carried out by forest operators or by the industry in most of the cases.

Stumpage is the most common way of selling and in the case of public forests this usually involves complicated procedures to assess wood volume. Sales at the road side are uncommon and most of the wood is not sold by volume, but by weight at the mills.

**England:** Direct negotiation between sellers and buyers is the most common sales method for small lots of stumpage, so there is no way to compare prices. Tender is the most traditionally common way for sales, but needs time to perform it. Auctions are often used for large scale sales of softwood, but they are unlikely for small owners unless they belong to a cooperative. Internet is also used to some extent in wood sales.

**Estonia:** Selling the right to cut standing timber is the most common sale method in Estonia, with price based on estimated and recorded volume. Forested land sale in which the whole property is sold is also used. It is tax free in case of the first time sale after restitution. The method of sales by assortment allows owners to organise felling and look for the buyer, it is currently dominating. Sales through forest owner associations are expected to arise.

In any case, choice of sales method in Estonia seems to depend mainly on taxation matters.

**Hungary:** Standing tree sales is the most common method for private forests. Ad-hoc agreements reach approx. 60% of total while long term contracts are used for pulpwood and wood chips. The less common sales methods are auctions and written contracts. Auctions are done occasionally for high value veneer logs.

**Rhône-Alps:** In standing sales (65% of total sawmills purchase) buyers carry out the felling, so prices can be given for total stump or by assortments. In felled sales the felling is carried out by sellers who sort the wood themselves to sell it (12%) or even deliver it to the industry themselves (23%).

Any of these sales can be made in three different ways: ad-hoc agreements; call for tenders by decreasing or by silent auctions and long-term contracts. 15% of the sales have a long term agreement in specific quantity and quality.

Private owners prefer to sell stumpage in block and by agreement because they have no time or skills to carry out fells whereas public owner Office National des Forêts does it at road side (82%). Cooperatives are selling direct to industry.

**Saxony:** Sales of assortments in Saxony can be before cutting or after cutting. If sale is made before cutting it can be formalized by means of master agreements or



individual contracts. If a sale is made after cutting, it can be formalized by means of auction, stock sale, or individual contract.

Master agreements are the most common, and represent 70% of the total. Individual contracts of standing assortments are made by owners, operators, dealers or cooperatives with the industry but have medium importance. Auctions have very low significance.

Smaller wood volumes are sold by individual contracts. Small private owners prefer stock sales as they do not have to finance the harvesting operations. Informal market deals through this kind of owners are relatively common due to the bureaucracy (e.g. felling permission, tax declaration) in case of regular sales. Sales methods are quite stable in time.

**Sweden:** Five main sales methods by delivery type have been described for Sweden. The first method is used when the industry owns the forest, and they make their own arrangements. The second one takes place when owners deliver wood to the industry. In this case volume and quality are assessed upon delivery according to the Regional Timber Council and the official price list. For standing timber sales volume is estimated by marking the trees to be felled; price is determined prior to felling, and sale is usually carried out by tender. If felling is carried out by the purchaser felled timber is measured at a scale site and assessed through a price list. Felling costs are then deducted from price or can be agreed in advance. Finally, there is delivery by stumpage in which there is a fixed price per volume felled for each assortment or for the whole stump.

The delivery of timber, the standing timber sales and the felling by purchaser account for nearly 90% of the total sales. Felling by purchaser is the most common one through forest associations.

Felling by purchaser is very well accepted as it is a transparent system; it is built on a price list and allows comparisons among operators. Owners may also prefer it as they have often neither knowledge nor equipment to carry out fells by themselves. This sale method will probably increase in the future.

#### Conclusions on sales methods

There is no standard sales method among the countries considered but there is an identifiable trend towards less stumpage in favour of more transparent methods. Stumpage is still common in case of small scale owners and poor developed market countries. This fits to the fact that transparency in prices and sales characterise well established and mature markets.

Regarding the interests of the partners involved, owners always prefer direct sales whereas the industry claims for long term contracts. This kind of contract, however, can not be achieved by small owners, so co-operatives and forest owners associations are playing a significant role in this aspect, since they allow for higher bargaining power and commitments.

Poor diversity in sales methods seems to favour immobilisation of wood resources.

### 3.2.3.3 How market structures may influence the decision making of private forest owners

Results of the metastudy of case studies:

- Access to market information is significantly lower for fragmented forest ownership.
- Self consumption has been observed to be higher in fragmented forest ownership in some countries (37.5% of cases).
- Definitively (62.50-75% of cases) sales of wood are lower (per sale) in fragmented forest ownership.

### 3.2.3.4 Legal framework and regulations

In this section the legal framework and regulatory aspects most probably related to forest owner's market behaviour, regarding their participation in forest product markets, are described and analyzed.

Case studies' analysis shows the presence of some kind of financial incentives or grants in all cases (100%). Also forest regulations, guidance/control on harvests, and wood related taxes are remarkably present: (63% of cases each). Wood trading regulations and guidance/control on wood sales are less common.

The existence of advisory public services, financial incentives and grants are very important factors for enhancing wood market participation of fragmented forest ownership (75-80% and 60-63% of cases respectively). On the contrary, legal frameworks to prevent further fragmentation do not seem to have the desired effect. About this subject, there is detailed qualitative data in 5 of the cases, so further analysis would be interesting in order to understand how legal frameworks regarding fragmentation impact the ownership structures.

Regarding the role of forest authorities on fragmented forest ownership harvesting, in a majority of cases control activities (81%) are dominating and only in a few cases (19%) some guidance is provided. For timber sales of fragmented forest ownership forest authorities do not have any role in the majority of the cases (81%). Only in England and Germany, there is some guidance (13%) or control (6%) on timber sales. Informal markets seem to be expanding in most cases.

### 3.2.4 Conclusions

Fragmented forest-ownership structures should be considered together with other kinds of fragmentation in a broader perspective. By this more inclusive view the higher fragmentation in some of the regions as in Catalonia or Rhône-Alps, where even bigger properties are frequently fragmented by some other reasons such as spatial fragmentation, state of management, woodland species, quality and yield of growing stock, stocking density, etc. will probably be better understood. Saxony and Hungary showed sensibility to some of these facts as well. Land consolidation or owners associations were positive factors regarding forest owners' market participation but with limitations (owner characteristics, property features). A higher degree of fragmentation in general leads to a higher degree of complexity when it comes to promote wood mobilisation and therefore to find new solutions, since the

criteria and the information available will increase. As there is not a common pattern among the regions and many different aspects should be taken in consideration for each country, individual solutions could give better responses.

**The price of roundwood assortments is a fundamental variable for increasing wood mobilization** from fragmented forest ownership, however, it is not the only one since other measures such as financial incentives or grants will also affect harvesting in fragmented forest ownership. Main economic constraints for the fragmented forest ownership to participate in the market are the owners' external financial inputs (income from outside the forests) and the (in many cases very low if existing at all) income or profit from the forests. Therefore, the measures that have been mentioned (financial incentives and grants) coupled with other ones like the creation of associations to get better prices or reduce costs should be successful for wood mobilization in fragmented forest ownership.

In any case, this situation could be counterproductive in the long term since subsidizing is not everlasting and the reaction of owners upon the loss of this economic input is yet unknown. It is expected that fragmented forest ownership with low yield for which financial incentives increase benefit will develop dependence on the economic input of financial incentives.

In regions and countries where indirect measures have been applied there is a greater mobilization from fragmented forest ownership. In the Austrian case, where assistance and advisory services are provided for fragmented forest ownership (communications channels have been established to provide customized information for each forest owner) there is a comparatively higher level of mobilisation of wood. Similarly, technical support and financial incentives to create forest associations were given in the Catalonia case and the Rhône-Alpes case respectively. In both cases there is a comparatively higher wood mobilisation.

In that sense, and regarding state intervention, **financial incentives and advising are relevant for the increase of wood mobilization**. On the contrary, intensive bureaucracy procedures (e.g. felling permission, tax declaration) discourage harvesting and forest operations in general, and seem to be a barrier to be overcome in some few cases. Increasing taxes for fragmented forest ownership will contribute to owners' lack of interest.

**Support and guiding are also important and significant measures for fragmented forest ownership wood mobilization**. Technical support, advising, and technology transfer allow fragmented forest ownership to receive proper information to make wood mobilization easier with tools, methods and appliances developed for these purposes. On the other hand, promoting forest education and information dissemination between owners is an option for less developed forest markets since it is easier to apply than, for example, technology transfer or technical support.

Regarding market structure and dynamics, the analyzed countries show increasing wood imports and **consumption of wood for energy**. There will be an even higher competition for wood biomass between use for energy and for pulp, paper and particle board in the future. On the other hand, the number of buyers is decreasing while the total buying volumes continue to grow or remain constant. In this context the number of small market participants appears to decrease.

The following differences between countries have been detected:

- **Highly consolidated markets:** Austria, Sweden

These are well-developed markets in a wider sense including the state of industry (as buyers) and producers (as suppliers), selling channels (sales methods and intermediaries) and information flow. Threats for these countries come from the steadily ageing population of owners and the increasing number of unknown owners.

- **Markets with structural problems:**

Countries in this segment are in different situations.

**Developing or consolidating markets:** Hungary, Saxony, Rhône-Alps and Estonia. These countries/regions seem to have a potential regarding the markets to develop and their product (quality, yield, etc.). Some are still under restitution processes in which governments are entitling companies to use and management of forests as e.g. in Estonia.

**Undeveloped or unconsolidated markets:** markets with strong difficulties to consolidate, where some part of the market chain is broken. Industry frequently has problems with wood supply. Supply problems vary with countries: lack of raw material (England); high production costs for products with low added value (Catalonia); legal impediments or restrictions to develop the market (England); low productivity (Catalonia).

Sales methods have been identified as being impediments in the sense of market transparency. Stumpage volume estimation is usually burdensome, expensive and difficult to understand. It is an old method which is mainly used by small owners and it is more frequent in unconsolidated markets. On the other hand, wood industry is increasingly requiring medium to long term contracts for wood supply which would favour stumpage sales.

### **3.3 Identification of possible market conditions for mobilisation of wood in the European Union**

#### **3.3.1 Introduction**

Conditions of the wood market are the result of the structure and the dynamics of wood supply and wood demand under the influence of the existing legal framework and relevant infrastructural features.

In task 3.1 of the project structural characteristics and capacities of the wood supply side (forest owners) are described, while task 3.2 is aimed at the description of the structure of the demand side under consideration of infrastructure and general regulations. Task 3.3 will consequently focus on the main findings of supply and demand under consideration of the legal framework and infrastructure, discuss the dynamics that create specific market conditions, focus on long-term trends of the European wood market and the contribution of wood supply from fragmented private forest ownership.

Previously prepared case study reports (task 2) were taken as the main data sources for the analysis at hand. Additional literature was used for verification of data and further information.

#### **3.3.2 Analysis of the market conditions against the background of wood mobilisation**

Wood market conditions are the result of wood supply, wood demand, legal framework and infrastructure. The following analysis of wood market conditions is based on the results of the eight case studies concerning these four components.

##### **3.3.2.1 Supply side**

Conditions of wood supply are quite heterogenic amongst the European case study regions. Forest cover, terrain and increment rates<sup>37</sup> vary to large extent as the share of private forest ownership, its cooperation level and its properties' structure do<sup>38</sup>. Private forest owners attitudes, however, seem to be more homogenous between the case study regions, as they are quite often based on multiple objectives as self-supply with firewood, tradition, nature conservation and recreation.

Sweden, Austria, Estonia and Saxony/Germany are regions with a relatively high natural potential of wood supply when taking into account forest cover, increment rates and terrain conditions as presented in the case study reports and by the fact sheet<sup>39</sup>. Hungary, Catalonia and Rhone-Alpes on the other hand have a quite low natural wood supply potential<sup>40</sup> as it is shown in the following matrix (figure 13).

---

<sup>37</sup> Forest cover, terrain and increment rates are summarized in the following as "natural potential" of wood supply. Detailed information concerning the natural potential is given in the annex of this report.

<sup>38</sup> The level of cooperation amongst private forest owners, its properties structure and (economic) objectives are summarized as "owner-related potential" of wood supply. A detailed description of the owner-related potential can be found in the annex of this report.

<sup>39</sup> All validations (+/o/-) made here and in the following are based on the information given by the case study reports and the fact sheet. There presented data and contexts were taken as valid. Although given information were critically judged, validation of specific aspects of wood mobilisation (potentials)

	Austria	Catalonia	England	Estonia	Hungary	Rhone-Alpes	Saxony	Sweden
Natural potential: <b>Forest cover</b>	+	+	-	+	-	0	0	+
Natural potential: <b>Increment rate</b>	+	-	0	0	0	0	+	0
Natural potential: <b>Terrain conditions</b>	-	-	+	0	0	-	0	0
<b>Natural potential of wood supply</b>	<b>+</b>	<b>-</b>	<b>0</b>	<b>+</b>	<b>-</b>	<b>-</b>	<b>+</b>	<b>+</b>

**Figure 13: The natural potential of wood supply in the European case study regions**  
(Evaluation based on information presented in the case study reports)

The owners-related potential of wood supply is very high in Sweden and somewhat lower in Austria. It is low in England, Rhone-Alpes and Saxony and very low in Catalonia. Figure 14 provides an overview of the owners' supply potential for all case study regions based on assessments of the degree of fragmentation, the economic objectives of forest owners and the level of cooperation amongst them as presented in the case study reports.

	Austria	Catalonia	England	Estonia	Hungary	Rhone-Alpes	Saxony	Sweden
Owners' potential: <b>Low degree of fragmentation</b>	0	-	-	0	-	-	-	+
Owners' potential: <b>Economic objectives</b>	0	-	0	0	0	0	0	+
Owners' potential: <b>Cooperation</b>	+	-	-	-	0	-	-	+
<b>Forest owners potential of wood supply</b>	<b>+</b>	<b>--</b>	<b>-</b>	<b>0</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>++</b>

**Figure 14: The owners-related potential of wood supply in the European case study regions**  
(Evaluation based on information presented in the case study reports)

Comparing the two potentials of wood supply, the owner-related potential is lower than the previously determined natural potential in total. This is not surprising since the current level of wood mobilisation in Europe is rather a result of the structure and behaviour of forest owners than of natural (forest-related) conditions. Anyhow, the forest owners are responsible for the proper management of their forests and the mobilisation of wood resources, rendering the natural potential of a specific region unimportant (in case the resident forest owners show no interest in managing their wood).

---

can therefore not be better than the outlines of the single reports. Values +, 0 and – are to understand as relative gradings, i.e. assessments were made by comparing specific information given by each case study region/report and categorized as “good/strong/high importance”, “medium/intermediate/some importance” and “bad/weak/no importance”.

<sup>40</sup> It is thus not surprisingly, that very large industries or respectively wood buyers are to find only in Sweden, Austria, Estonia and Saxony/Germany, while they are absent in Hungary, Catalonia and Rhone-Alpes.

Catalonia, England, Estonia, and Saxony are regions, where the evaluated natural supply potential is higher than the evaluated owners-related potential of wood supply. Whereas the natural potential of wood supply cannot be improved, the problem of fragmentation, motivation and organisation amongst private forest owners can be addressed by specific measures of wood mobilisation. Therefore the specific potential for mobilisation of wood resources seems to be especially high in these regions.

To conclude, following can be stated: Quite high potentials of wood supply can be found in Sweden and (to some lesser extent) also in Austria. A low wood supply potential is existent in Catalonia/Spain, in Rhone-Alpes/France and in England. These low potentials are reflected in the case studies since all three studies explicitly mention a shortage of high quality wood (which has to be imported).

### 3.3.2.2 Demand side

Harvested wood can be used by the forest owners themselves or be sold to the formal wood market. Since self-supply with wood is an important objective especially of private forest owners with small properties, informal markets<sup>41</sup> are playing a certain role in most of the surveyed case study regions<sup>42</sup>. The following figure summarizes the importance of informal markets in terms of own use in the eight regions as described in the case study reports (or respectively by the fact sheet):

	AUSTRIA	CATALONIA	ENGLAND	ESTONIA	HUNGARY	RHONE-ALPES	SAXONY	SWEDEN
Informal market (own use)	+	-	o	o	+	+	o	-

**Figure 15: The importance of informal markets in the European case study regions**

A relatively high share of informal markets is to find in regions where strong management or harvesting restrictions do not exist and where forestry is not driven by a common and tradition of commercial wood use<sup>43</sup>. Especially in case of small private forest properties and therefore difficult management and sales procedures<sup>44</sup> wood use for own requirements are often the only economic interest of private forest owners. While self supply is an important objective, registration of wood volumes of these informal markets cannot be realised in most cases and is therefore solely based on estimations. Estimations are additionally complicated if there is a high

<sup>41</sup> i.e. the use of wood for own requirements, for neighbours' households etc.

<sup>42</sup> Informal markets cover relatively high proportions of total harvests in Rhone-Alpes (40 to 50 percent), Austria (~20 percent), and Hungary (10 to 15 percent). On the other hand informal markets are very small in Sweden and Catalonia.

<sup>43</sup> The need of a management document in Catalonia (Catalonia: 43) must be seen as an important reason for a very low share of informal markets in the sense of wood use for own requirements. On the other hand the share of informal markets is very low in Sweden since commercial wood use is traditionally very important (forestry is often mentioned as the backbone of the Swedish economy) and wood use for own purposes appears consequently of only secondary importance.

<sup>44</sup> "Difficulty" is not only given by relatively high harvesting and transportation costs for low wood amounts but also through wood marketing procedures (find/contact a buyer, accept a contract, paying taxes etc.).

share of unknown forest owners as it is the case in Catalonia. Consequently MANTAU emphasized repeatedly that the potential of wood mobilisation is often overestimated.

Formal markets consider all wood demanders that depend on wood marketing of forest owners. Wood demand can be structured by size (i.e. volume requirements) and by sector membership (i.e. assortment and quality requirements).

#### *Sizes: Volume requirements*

**Small to medium-scale** wood buyers are to find in each case study region, while very **large-scale buyers** with volume capacities of around one million cubic meters p.a. are limited to the regions with relatively high natural potentials; i.e. Austria, Sweden, Saxony and Estonia<sup>45</sup>.

**Concentration processes**, i.e. the closing of mills with low capacities that leads to a decrease in the number of small to medium-scale demanders in favour of the capacities of larger mills with modern technology, are existent in all European case study regions. At the same time, the interest of private households in (mainly) firewood has increased in the last years. Due to these developments, not only volume requirements have risen, but also the number of (very) small-scale demanders. For small scale private forest owners this consequently means that the situation for contracting for fuel wood has improved while on the other hand contracting for saw logs and industrial wood (pulp wood) became more challenging in the last years<sup>46</sup>

#### *Sectors: Assortment and quality requirements*

Beside **private households** that need wood for energy purposes and construction, wood raw material is demanded to larger extent by wood processing industries (sawmills, panel mills and pulp, paper mills) and heating plants.

**Sawmills** with demand on saw logs are to find in each case study region and have relatively high importance as wood demanders<sup>47</sup>. They are represented in all size categories, albeit there is an omnipresent process of concentration and many

---

<sup>45</sup> England, where a number of large-scale heating plants are presently planned although the natural potential is quite low, may be an exception from this. However, wood imports will guarantee that demand is satisfied. Wood imports are generally important in case volume requirements cannot be met by the regional wood supply. This is not only especially relevant for England, but also for Austria (p. 19).

<sup>46</sup> Unfortunately case study reports do not represent detailed data of the size structure of wood buyers, i.e. a detailed analysis of volume-based market procedures (comparison of demand structures and supply from fragmented private forest ownership) is hardly to implement.

<sup>47</sup> The buying volume of sawmills (demanding saw logs) amounts to 40 to 50 percent for most of the case study regions, and is especially high in Rhone-Alpes (92 percent), and quite low in Hungary (24 percent). The analysis of market structures (task 3.2) found that sawmills represent 51 percent of buyers (no.) and 39 percent of the buying volume in average (see study report 3.2, p. 12f.).



sawmills had to close in the last years<sup>48</sup>. Nevertheless, there has not been an effect on the total demand of the sawmill sector since capacities of larger sawmills increased.

Wood buying **pulp and paper mills** are normally medium to very large sized and demand lower qualities ("pulp wood" or "industrial wood") as well as wood residues. Wood demand of pulp and paper industries plays an important role in Sweden, while it is relative unimportant in the majority of the case study regions<sup>49</sup>.

**Panel mills** are usually medium to large-scaled and do have some importance as wood buyers in the case study regions. Demand on wood ("industrial wood") is, however, relatively small compared to other sectors<sup>50</sup>.

**Heating and power plants** can be small to large-scale demanders for wood of low roundwood qualities and wood residues. The importance of heating plants has been increasing considerably for the last few years and lead to highly competitive situations in the demand for low quality wood. Exploding demand on fuelwood due to an increase in the numbers of heating plants can be found in all case study regions except for Catalonia<sup>51</sup>. A number of woodfuel generation plants are presently planned in the United Kingdom, which will require a very high amount of additional wood and thus highly affect the market. Saturation of the demand will only be possible by wood imports.

Not only requirements in wood volumes, but also requirements in specific assortments and qualities result in **imports** of wood and wood products. This is especially the case for the region of Rhone-Alpes, Catalonia and Hungary, where a lack of high quality softwood for sawmills must be compensated by imports.

Actually, industrial demand on **softwood** is very high for all European case study regions and significantly exceeds the demand on hardwood volumes<sup>52</sup>. However, an

---

<sup>48</sup> For example, the number of (small and mid-sized) sawmills decreased by 62 percent between 1994 and 2004 in England (p. 12) and by 77 percent in the last 45 years in Austria (p. 20).

<sup>49</sup> The share of the pulp & paper industry in Sweden is 55 percent of the consumption of wood processing industries, while there is demand on pulp wood to lesser extent in Estonia (20 percent of the total wood consumption) and Austria (18 percent). Only negligible demand of wood for pulp and paper mills is to find in Rhone-Alpes, Catalonia, Hungary and Saxony. The analysis of market structures (task 3.2) found pulp and paper mills representing five percent of buyers (no.) and 38 percent of the buying volume in average (see study report 3.2, p. 12f.).

<sup>50</sup> Panel mills and relatively important in Saxony. (one third of the total regional wood consumption), England and Hungary (~15 percent) and Austria (10 percent). A lack of panel mills is to find in Catalonia and Rhone-Alpes. The analysis of market structures (task 3.2) found panel mills to represent only one percent of buyers (no.) and five percent of the buying volume in average (see study report 3.2, p. 12f.).

<sup>51</sup> Wood energy in the Catalanian case study report is only vaguely mentioned as driver for improved demand and supply since "no big bioenergy project is in a mature phase of execution" (Catalonia p. 41). On the other hand, the establishment of six heating plants in Hungary has led to significant changes on the regional wood market, where a supply market had changed into a demand market for lower quality round wood since 2002/2003 (Hungary p. 20). The share of wood consumption of heating plants in Hungary amounts for 42 percent of the total regional industrial wood consumption. It is somewhat lower in Austria (33 percent), Saxony (23 percent) and Estonia (21 percent of marketed wood is "fuelwood") and quite small in Rhone-Alpes (9 percent) and Catalonia. The analysis of market structures (task 3.2) found an average buyers share (no.) of 39 percent and a buying volume share of 15 percent in average (see study report 3.2, p. 12f.).

<sup>52</sup> Consequently, the annual increment of coniferous stands is almost fully utilized, while the increment utilization percentage of broadleaved stands is low (e.g. Estonia: 90 percent softwood increment is used, but only 40 percent broadleaved, p. 11). Forest cover composition and wood use requirements

increase in hardwood demand and an improvement in the use of the increment rates is seen in the further development (“boom”) of the fuelwood market. Fuelwood demand is actually recognized as THE driving force for wood market developments and is considered to result in higher prices especially for low quality assortments in future.

Higher wood prices are often mentioned as “mobilisers”<sup>53</sup>. Since wood prices are the result of successful interactions between demanders and suppliers and reflect the situation of the current wood market (i.e. low prices in case of oversupply, high prices if there is a surplus of demand), more forest owners will probably become market participants. But it is not only the price that “links” suppliers and demanders. Some structural features are also necessary that bring forest owners and wood buyers together; as for instance access to market information, a specific level of cooperation, suitable sales methods and contract types or sufficient capacities of forest operators. Beside infrastructure, the legal framework defines rules for market activities. Aspects of infrastructure and the legal framework in the European case study regions are described in the following.

### 3.3.2.3 Legal framework

The legal framework consists of regulations and conditions with influence on demand and supply and can be differentiated into: ‘property rights’, ‘national laws’, ‘indirect regulations’, ‘taxes and fees’, ‘financial incentives’ and ‘private ownership and property rights’.

**Property rights** of ownership were not questioned in any of the case study regions. Not a single case study report mentioned noteworthy restrictions regarding the use of private property concerning logging activities. In some areas land restitution has been an ongoing process until recently (Estonia, Hungary, Saxony), but there are no restrictions of property rights. Land consolidation processes must be mentioned in the context of private ownership and property rights. These processes are aimed at an improvement of the situation of small forest ownerships by forming bigger units with access to forest roads. However, land consolidation is mostly a long-term and expensive process. It is furthermore counteracted by the partition of land due to inheritance cases (e.g. in Hungary or Saxony). A legal regulation that limits the split of properties exists only in Sweden.

**Direct management restrictions** are existent concerning nature conservation and forest management in general. Some case study reports discuss restrictions due to nature conservation requirements. However, these restrictions are not expected to be severe<sup>54</sup> (UNECE/FAO 2007). On the other hand there exist some direct and

---

are therefore presently out of proportion as it is stated for example in the French<sup>52</sup> and Austrian<sup>52</sup> study.

<sup>53</sup> This is also confirmed by the wood price sensitivity analysis in task 3.2 of the present study, which found that “at least 55 percent of owners will have a significant positive reaction to price increases” (study report task 3.2, p. 11).

<sup>54</sup> Although the European *Natura 2000* process is ongoing, no specified statements are to find in the case study reports. Only a general concern is formulated that regulations related to *Natura 2000* are expected to increase.

strong regulations on forest management (which requires management plans or felling licenses) that have indeed influence on wood mobilisation<sup>55</sup>.

**Indirect regulations** as for instance low permissible truck loads inflicting high costs of transport are mentioned as a negative factor in the literature as well as in some case study reports, (e.g. Catalonia p. 39, Estonia p. 30, UNECE, FAO et al. (2007), p. 28, p. 34) UNECE, FAO et al. (2009), p. 15). Weight limits are regarded as a general market restriction rather than specific regional restrictions.

**Specific taxes and fees** for forest or wood are not mentioned in the case study reports<sup>56</sup>. Nevertheless taxes can be of high importance in some regions. In some of the German federal states financial contributions to the existing water and soil associations from small forest ownership are discussed intensively. However, owners are released from taxes on revenues within a certain time period after the forest property has been bought (Sweden, England). There is also a relief of inheritance tax when the property has been owned for a certain time period (England p. 23).

**Financial incentives** are evaluated quite differently amongst the European regions. In the Swedish case it is quoted that financial incentives “are generally small and aimed at environmental measures” and that financial incentives should not be given to production since the market works (Sweden, p. 22). Most of the case study reports state direct financial incentives regarding *silvicultural objectives* or for the *building of forest roads* are mentioned<sup>57</sup>. Direct financial incentives are also paid for measures of *forest protection*, for recovering and removing fallen wood after storm or snow *calamities* and for *afforestation* as well as reforestation with specific tree species (Catalonia p. 40, Saxony p. 35). In other cases direct support is also given to the *wood processing side*<sup>58</sup>. Financial support is also given for the improvement of local *cooperatives and forest owners associations*<sup>59</sup>. In some of the case study regions indirect financial incentives are given for financing state-driven organisations that give guidance to private forest owners and do some coordination<sup>60</sup>.

With respect to the financial incentives, regions can be considered differently: Regions with less fragmentation, a good organisational and infrastructural framework may need less or even no financial incentives. Regions with highly fragmented forests and a lack of infrastructure and organisations depend on organisation-building, improvement of infrastructure and the implementation of

---

<sup>55</sup> The case study report of England for example states “unacceptable cost burden” because of woodland regulations. In some regions it is necessary to send a notification to the Forest Agency before harvesting (Sweden p. 22), in other cases even the smaller forest properties need an approved management plan before management of land is possible (Catalonia p. 39). Restrictions do also exist concerning the area that can be clear-cut (Sweden p. 22, Saxony p. 34).

<sup>56</sup> e.g. Hungary p. 33, England p. 22, Estonia p. 30

<sup>57</sup> These kinds of subsidies help to create productive forests and an infrastructural base for management and logging activities.

<sup>58</sup> The Rhône-Alpes case study report mentions subsidies in *logging machinery* (Rhônes-Alpes p. 25). Subsidies are also offered to the industry after calamities (Catalonia p. 40).

<sup>59</sup> E.g. Rhône-Alpes p. 25; Recently, most of the German federal states implemented a mobilisation bonus program. Forest management cooperatives receive specific subsidies for wood commercialisation. The main aim is to improve the economic situation of local cooperatives, acquire new members and create more professional structures.

<sup>60</sup> E.g. in Rhône-Alpes (p. 25) or Hungary (p. 33). State support in wood selling is also mentioned in the Saxon case.

knowledge and methods. Temporarily offered financial incentives in these cases should lower costs.

To summarize the effects of the legal framework following can be stated:

- No restrictions of property rights exist. Environmental restraints are considered as increasing.
- Land consolidation programmes were sometimes contradicted by the splitting of forest land in the case of inheritance.
- Taxes and fees seem not to hinder the use of fragmented forests. In contrary there are certain tax reliefs for new ownerships, exemptions of inheritance tax or tax reduction after calamities.
- Direct financial incentives in silvicultural work, though often small, are popular.
- Support of the improvement of the private forest owners' cooperation is frequently stated.

Differences in the legal framework exist mainly in the degree of market orientation:

- Market oriented regions (e.g. Sweden) have no or only few indirect financial incentives in the form of public organisations giving guidance and support.
- Less market oriented regions feature indirect financial incentives in terms of state-driven organisations being responsible for guidance, control or even wood marketing. Additionally, direct financial incentives for forest and wood production exist.

So far it has not been proven whether the market oriented or the less-market oriented regions are more successful in mobilisation of the resources<sup>61</sup>. But except for the effects of direct state influence or respectively market-driven developments, programmes to improve forest roads, to intensify forest owners' information or to continue with land consolidation should be pursued.

#### 3.3.2.4 Infrastructure

Infrastructure works as an important link between supply and demand. This linking function can be 'physical infrastructure', 'organisational infrastructure' or 'information'.

**Physical infrastructure:** A lack of forest roads is mentioned as a strong handicap for having access to forest resources<sup>62</sup>, albeit financial incentives for the improvement of forest roads are available in some cases. However, even well-subsidised owners of small forests often refuse to participate in road construction. Therefore access to the forests can be difficult, cost-intensive or in some cases even im-

---

<sup>61</sup> Of course, wood supply from private forests is not a real problem in Sweden, but Swedish forests are not as fragmented as French, Spanish or Austrian ones. Therefore it is difficult to evaluate what kind of support (market-orientated or "state-based") has the best effect on wood mobilisation.

Regardless of subsidies, wood price is evaluated as the strongest driver compared to other factors that have influence on wood mobilisation. This argument supports the market-orientated and subsidy-sceptic group, at least till the current mobilisation programmes are evaluated and have proven validity and efficiency.

<sup>62</sup> E.g. in Austria (p. 61); Rhône-Alpes (p. 40) or England (p. 9)

possible. Furthermore, land consolidation tries to improve the situation by creating larger forest units as well as building forest roads. As an expensive and long-lasting process, the overall effects of land consolidation can be regarded as small<sup>63</sup>.

**Organisational infrastructure:** Industry and fragmented forests need agents to associate small supply quantities with high demand. A variety of organisations can be regarded as “agents”. These are for example state-based entities, owner’s cooperatives or associations as well as private forest service providers and traders. The case study reports mention different stakeholders that recognise themselves as “wood mobilisers”. Mainly owners associations (cooperatives) and state-run organisations emphasize their specific importance for wood mobilisation<sup>64</sup>.

**Information** and training of private forest owners is mentioned in different case study reports as key factors for future wood mobilisation. Information can be obtained by local or regional organisations and by forest operators and wood buyers directly. Also training courses, local trade fairs, information material and specific web pages are offered in a grown number. In some case study reports a certain lack of information is mentioned (Hungary p. 47). Owners have to be active in search for information. Information is provided by local private experts but it is generally not for free. Since consultation of private forest owners requires the availability of the owners’ addresses, access to addresses is also a key factor<sup>65</sup>. There is also a lack of information about the different types of *ownership objectives*. Studies claim for the importance of linking basic natural information with the private owner’s attitudes and motivational background. Any wood mobilisation in fragmented private forests has to take this linking seriously into account (UNECE/FAO 2007). There also exists a general consent towards an improved communicational networking (UNECE/FAO 2007).

To summarize the most important aspects of infrastructure it can be stated that particularly forest roads and information are no critical point within the discussion and further development of wood mobilisation. It is broadly accepted that better roads, more information and better communication improve wood mobilisation from (fragmented) private forests. Concerning the organisational side of infrastructure case study results are quite heterogeneous. Regions with strongly fragmented forest ownership seem to be more often guided by authorities than lesser fragmented forests. Regions which recently joined the free market economy (Estonia, Hungary) seem to be less willing to establish state-driven institutions for the support of private

---

<sup>63</sup> As an additional problem in Saxony forest boundaries are often unmarked. In the former GDR landmarks were dropped as a signal that private property no longer existed. The Austrian case study mentioned the aspect that the location of the forest is sometimes unknown to the owner (Austria p. 8).

<sup>64</sup> As discussed in the previous section, regions or nations with a more market-sceptic position orientate towards state-run organisations. Authorities take the responsibility for guidance and control of small private forest ownership (e.g. France, Spain). More market-orientated regions or nations concentrate on creating an appropriate background for mobilisation. The main work of wood mobilisation should then be done by the market partners themselves (Sweden, Hungary).

Some regions can be described as somehow “in-between”. Whereas the importance of authorities is decreasing, market-driven forces are rising (Saxony). Programmes are implemented to encourage private associations, while authorities are still responsible for guidance, control and partly wood commercialisation at the same time.

<sup>65</sup> Though addresses are known by forest authorities in Saxony they cannot be published to forest management cooperatives for reasons of data protection (Saxony p. 57).

forest owners. In contrast, nations like France, Spain or Germany have higher trust in state-run organisations' ability to mobilise wood.

### 3.3.3 Classification of market conditions

As previously mentioned, market is defined by supply, demand as well as conditions of the legal framework and infrastructure. Based on the findings of the eight case studies that were represented in the last section, a classification of market conditions will be made in the following and discussed towards wood mobilisation.

Conditions of wood supply, wood demand, legal framework and infrastructure of each European case study region are evaluated by using three values<sup>66</sup>. The results of this evaluation are presented in figure 16.

Simplifications help to finally identify three categories of market conditions, under which wood mobilisation is currently taking place:

- **“Strong market”** with advantageous conditions of wood mobilisation, e.g. in Sweden
- **“Developing market”** with mediocre conditions of wood mobilisation, e.g. in Austria, Estonia, Saxony
- **“Weak market”** with disadvantageous conditions of wood mobilisation, e.g. in Catalonia, England, Hungary, Rhone-Alpes

---

<sup>66</sup> As previously done the values are represented by symbols:

+ (strong, high importance), o (intermediate, some importance), - (weak, no importance)

		AUSTRIA	CATALONIA	ENGLAND	ESTONIA	HUNGARY	RHONE-ALPES	SAXONY	SWEDEN
Supply	High natural potential (forest area, increment, terrain)	+	-	o	+	-	-	+	+
Supply	High ownership-related potential (fragmentation, economic objectives, cooperation)	o	-	-	o	o	-	-	+
Demand	Low informal markets (subsistence)	-	+	o	o	-	-	o	+
Demand	Existence of industrial markets (sawmills, pulp and paper, chipboard, wood energy - differing capacities)	+	-	+	+	o	o	+	+
Infrastructure	Well-organised wood marketing (PFO cooperations, authorities support, industry and operators)	o	o	-	-	o	-	o	+
Infrastructure	Good infrastructure (roads, market information, suitable sales methods/contracts)	o	o	o	o	o	o	o	+
Legal Framework	Support of the state (guidance, legal framework, financial support)	o	o	+	o	o	o	+	o
Legal Framework	Low degree of bureaucracy concerning forest management and harvesting operations	+	-	-	+	o	+	+	+
Evaluation in total		o	-	-	o	-	-	o	+

**Figure 16: Wood market conditions in the eight case study regions towards the situation of wood mobilisation**

### **Category I: “Strong market”** with advantageous conditions of wood mobilisation

Regions with a strong market and advantageous conditions of wood mobilisation are characterised by a high natural potential and a wide range of industrial buyer types and demanded wood volumes (i.e. there are very large wood buyers but also small-sized ones). There is rather no fragmentation of ownership structures, i.e. the average size of properties is relatively high. The importance of subsistence economy is negligible. As a consequence of a high share of “traditional” private forest owners in market category I, cooperation is well established as forest-related infrastructure is. Market information is available and market transparency is given for all types of forest owners. There are also no limitations in the availability and quality of forest operators’ work. These favourable conditions are only to find in Sweden.

### **Category II: “Developing market”** with mediocre conditions of wood mobilisation

Estonia and Saxony, but also Austria<sup>67</sup> are regions where market conditions and wood mobilisation are “in development”. Such regions are characterised by moderate to high natural potentials and a relatively wide range of wood demanders. Large-scale buyers exist in all regions of category II. Fragmentation of ownership (i.e. a low average size of private forest land) is existent, but not extremely problematic in most cases. The level of bureaucracy concerning harvesting and wood marketing is relatively low. With regard to infrastructure and legal framework the conditions vary within this category. While some conditions are already well-

<sup>67</sup> Austria is a highly potential region within market category II (trend towards category I) mainly since infrastructure (i.e. especially quite good marketing structures) is more favourable than in other regions

established, others are necessary to be improved (cf. “developing” market). A forest road network is existent, but there is a need for improvements. Limitations in the availability and quality of forest operators’ work can be present (Estonia). Cooperation of private forest owners is low (Saxony and Estonia) to relatively high (Austria) and market information access and transparency is partly limited. Subsistence economy plays a certain role. There is a certain share of traditional and non-traditional forest owners, but obviously no dominance of one of these groups.

### **Category III: “Weak market” with disadvantageous conditions of wood mobilisation**

Weak markets with disadvantageous conditions of wood mobilisation are to find in Catalonia, England, Rhone-Alpes and also in Hungary<sup>68</sup>. Regions of category III have low to moderate natural (supply) potentials, while demand on wood (volumes and assortments) is similarly limited (very large wood buyers are missing). Wood imports are relatively important. Disadvantageous conditions of wood mobilisation are furthermore a result of a high degree of fragmentation (low average property sizes or/and distribution of properties) and a relatively low degree of cooperation amongst private forest owners, whose economic objectives in forest management are mostly restricted to self-supply. There is a relatively high proportion of unknown private forest owners (“UFOs”) in regions of market category III (e.g. in England, Catalonia) and in comparison to other regions a high proportion of owners that are uninterested in their forests at all. Market information and transparency is limited. In general, the majority of conditions is insufficient for wood mobilisation, albeit some positive influences are also existent (e.g. low degree of bureaucracy in Rhone-Alpes, strong wood demand in England).

Described market categories are quite similar to the conclusions in task 3.2 (see study report 3.2). However, discrepancies appear concerning the ranking of Austria and Hungary, whose market conditions were seen more optimistic in task 3.2<sup>69</sup>. Since there is a trend for a better rating also in the present analysis, one should consider Austria and Hungary as highly potential regions within the present market categories II (Austria) and III (Hungary).

#### **3.3.4 Short-term dynamics of the wood market**

Like most markets, the timber market shows ups and downs as opposed to a constant evolution of supply and demand. Possible causes for these market changes are calamities and general changes of wood and related markets.

##### **3.3.4.1 Calamity-driven volatility at the supply side**

Natural disasters like storms or insect calamities often induce regional oversupply. First reactions of the forest owners are often a certain ‘hot-selling’ and quick contracting of service providers. In the following time storage of wood plays an

---

<sup>68</sup> Hungary must be seen as a region with high potential within market category III (trend towards category II)

<sup>69</sup> Austria is categorised as a part of highly consolidated markets (category I) in task 3.2; Hungary is categorised as a part of developing/consolidating markets (category II) in task 3.2 (see study report 3.2, p. 25f.)



important role. Price reductions depend on the amount of wood which was “mobilised” by the calamity.

Public organisations developed a variety of instruments to soften the effects of such calamities for private forest owners. Tax release or reductions for revenues are offered to the forest owners. Recommendations were given to public forests to reduce the felling in less affected regions. Financial incentives on storage, transport and reforestation were offered.

Nevertheless, calamities may influence the wood markets for years. The situation is characterised by a harsh drop of prices and a long-lasting period of price recovery.

The economic effect on owners of fragmented forests is not as distressing as for private owners with larger sized properties and a higher degree of dependency on regular revenues from wood sales<sup>70</sup>. On the other hand well organized private forest owners mostly try to sell their wood quickly and contract forest service providers instantly. This group in general has of good market knowledge and access to important networks.

Summarizing market volatility it can be stated that calamities happen periodically but unforeseeable. Analysis has been done concerning improvements of storage and conservation of wood. Logging machinery has been developed in quality and in capacity. The governments offer tax relief on revenues after calamities. But whether fragmented forest ownership has fully access to these instruments must be in doubt. Strong organisations for small-scale owners would be necessary to have the information available and the contacts working. These strong organisations do not yet exist as the results of the case studies have shown.

#### 3.3.4.2 Market-driven volatility at the demand side

Volatility can be observed on the demand side as well. Economic crisis leads to decreasing demand of wood e.g. for construction or the furniture industry. As far as timber from fragmented forest ownership is more expensive to get out of the forest, in times of crises the wood industry concentrate on cheaper procurement. So the fragmented forest ownerships are the first group cut out from a purchasing process not for the reason of lower prices but for the reason of a less intensive mobilisation.

Price reductions bolster this process. Private forest owners in general are characterized to be motivated by higher prices (Austria p.33, Sweden p.20, France p.23, Estonia p.29, Catalonia p.36). However, for a certain share of small-scaled private owners (uninterested owners or parts of non-traditional owners) wood price is not the main accelerator for mobilisation. In some situations price elasticity for certain assortments can even be negative (UNECE/FAO 2007 p. 8, Austria p. 33).

The challenge seems to be enormous: Private forest owners tend to be sensitive regarding wood prices but high costs have to be paid to get the owners motivated for the use of their small property. Every effort on wood mobilisation can easily be contradicted by falling prices. Once forest owners have the impression that wood was not sold “best price” they probably can no longer easily be convinced to participate in additional felling activities.

---

<sup>70</sup> This is valid regardless of the fact that a small-sized forest owner can “loose” his tree cover completely, while forest owners with larger properties are only partly affected by blow down.

Market-driven volatility in general does not encourage local cooperatives to engage in mobilisation or commercialisation of wood. Employed staff and existing structures need resources. Fix costs need permanent revenues. The main source of revenues is a continuous activity in wood marketing. For this reason, state-driven organisations are quite active in regions with a high degree of fragmentation, while private activities remain still weak. While volatility has therefore a negative influence on the behaviour of cooperatives and associations, volatility should encourage the pooling of wood on the other hand.

Therefore one of the main tasks for the future is to stabilize income opportunities for local cooperatives. Creating cooperatives with responsibility for larger regions is one possible solution. Harvesting should take precedence over maintenance and natural development of the forest. The attempt to sell always at the highest price may result in long waiting periods. Therefore purely economic arguments should be avoided. The integration of larger forest ownerships with regular felling into cooperatives is also a possibility to create regular revenues.

#### 3.3.4.3 Firewood – increasing trend with a certain uncertainty

As a matter of principle firewood (energy wood) has to be differentiated by its use in commercial heating and power plants and private demand for domestic heating.

The results of the case studies show that the commercial sector is growing in capacity and in the number of plants.

These results are consistent with the investigations of the second Joint Wood Energy Enquiry (JWEE II). It is stated that wood energy development is strong in most countries, but it is also mentioned that “in some countries where woody biomass already contributes a high share to the total energy consumption (e.g. Finland and Sweden), the overall importance of wood energy seems to be stagnating or even slightly decreasing. The enquiry could not explain the reasons whether this was influenced by reduced availability of raw material, high raw material prices or substitution by other renewable energy sources (e.g. palm oil).” (UNECE and FAO 2009, p. 5)

Informal markets, which are considered as the main market for firewood used by private households, are “very small” in Sweden and Spain, relevant in England, Estonia and Saxony and relatively high in Austria, Hungary and Rhone-Alpes (cf. fact sheet and single case study reports). Since informal markets are quite important but not covered by any statistics, there is the risk that the potential for additional wood mobilisation is overestimated. MANTAU states the “legend of the woody biomass reserve in Europe” in this context (UNECE/FAO 2007: 16).

Since costs of fossil fuels are rising, the use of wood for energy purposes in private households have been rising and will increase further. At the same time the commercial sector has experienced a significant increase in the number and capacity. Whether further growth will be as high as in the past should be at least questioned. The strong influence of policy decisions and the competition between the energy sector and the wood processing industry plays an important role.

The competition for wood between the energy sector and wood processing industries became recently a subject of discussion. Rising energy prices and offered financial incentives put the energy sector in the position to pay better prices for wood. In contrast, the wood based industry arguments for a “cascade use” of wood

(energetic use of wood at the end of each wooden product chain) to improve the value of the whole production chain. These arguments are more political arguments than strong market signals.

For the fragmented forest ownerships these developments improve the existing efforts for wood mobilisation. The raw material is in the public discussion in a number of countries, the need of wood is expressed anywhere and the buyers may even compete. As the investigations of SCHWARZBAUER have shown however especially for firewood an increasing demand can be associated with negative price elasticity (Austria p. 33). That would mean that an increased demand and higher prices do not lead to a larger supply. On the contrary, the owners of small forests want to hoard the wood for their own use or wait for further price increases. Moreover, the local firewood market is much easier to survey from the owners' point of view. Family members, neighbours or friends seem to be more easily supplied with firewood from the forests. Selling wood to these groups bears no obstacles, because no complicated contracts are necessary, no large harvesting machinery is used and no unknown company touches the private property.

Are there solutions to offer wood from small private forests to the different customer groups, such as industrial purchasers and small local consumers? It is assumed that only strong owners associations with effective structures are able to handle these problems by working closely with the forest owners and transferring specific assortments to different demanders.

### **3.3.5 Long-term trends of wood markets and the contribution of fragmented private forest ownership**

#### **3.3.5.1 Long-term trends of wood markets**

While short-term dynamics due to calamities or market changes will lead to ups and downs of demand, supply and consequently wood prices, the long-term trend of the wood market can generally be seen as challenge for wood buyers and simultaneously as an opportunity for forest owners.

#### Demand

As already described the current wood market development is characterised by concentration processes of the demand side. This trend is also expected to continue in the long-term, i.e. the number of buyers of wood processing sectors will decrease, while demand of wood resources for processing will remain constant or increase slightly. Expectations regarding the long-term trend of wood demand for the case study regions are shown in a simplified manner in figure 17. The results of the European Forest Sector Outlook Study (2005) support the given prognosis concerning the development of the capacities of processing wood industries (see Annex).

Expected developments	AUSTRIA (p. 36)	CATALONIA (p. 42)	ENGLAND (p. 25)	ESTONIA (p. 32)	HUNGARY (p. 35)	RHONE-ALPES (p. 26)	SAXONY (p. 37)	SWEDEN (p. 24)
Buyer units (ex wood energy)	o	-	NA	NA	o	-	-	-
Buyer capacity (ex wood energy)	o	o	NA	NA	+	o	+	o
Wood energy buying units	+	o	+	+	+	+	+	+
Wood energy buying capacities	+	o	+	+	+	+	+	+

**Figure 17: Expected developments of the structure of wood processing industries and industrial wood energy users in the eight case study regions**

Apart from developments of the wood processing industry, the number and capacity of buyers of wood energy is increasing which leads to a highly competitive situation for wood industries already today. This development is mainly seen as a result of the EU energy policy and high energy prices. Only in Catalonia demand on wood for industrial energy purposes is (still) relatively low and no project on wood energy is currently planned (Catalonia p. 41). The increase of fuelwood demand is assumed to slow down in the long-term. However it is difficult to estimate what share of total wood supply will be used as wood for energy by commercial heating plants and private households in the future.

### Prices

Since no considerable changes at the supply side are expected in the long-term, the wood prices should necessarily rise consequently. Thereby the price increase for wood of lower qualities (fuelwood, industrial wood) is expected to be higher than the increase of prices for sawlogs.

In Hungary a somehow specific development of prices is seen (i.e. higher prices for sawlogs, veneer and pulp wood, stable prices for fuelwood), because fuelwood demand is already at a high level. While the (monopolistic) board industry in Hungary determined the wood prices for lower qualities until 2002/2003, the construction and activation of six heating plants and probably also wood demand from neighbouring countries led to competition for these assortments and to higher prices for low quality wood (cf. Hungary p. 20).

But not only increased competition for wood of low qualities is expected in the long term. Softwood supply is another long-term challenge for the wood processing industry. While today's harvesting volumes of softwood are nearly equivalent to the volumes of annual increment, demand is expected to rise (European Forest Sector Outlook Study, 2005). Consequently, prices for softwood are also expected to rise, if wood is not imported to a larger extent than today and if forest owners do not proceed to harvest at a higher rate than the annual increment by reduction of existing growing stock.

These effects on prices may be compensated in the middle-term view by extensions of the supply side. Ongoing efforts of reducing the rotation periods of forests or increasing capacities of plantations for energetic aims should additionally be mentioned.

## Supply

Whereas an increase in demand is seen in all case study regions except for Catalonia, expectations regarding wood supply are quite heterogeneous (see figure 18). It can be concluded that wood supply in total will not change considerably in the long-term as long as the conditions of wood mobilisation will not change significantly for private forest owners. As wood price is regarded as a strong driver for wood mobilisation a certain increase of supply can nevertheless be assumed in the long-term.

Expected developments	AUSTRIA (p. 36)	CATALONIA (p. 42)	ENGLAND (p. 25)	ESTONIA (p. 32)	HUNGARY (p. 35)	RHONE-ALPES (p. 26)	SAXONY (p. 37)	SWEDEN (p. 24)
<b>Supply</b>	<b>+</b>	<b>-</b>	<b>-</b>	<b>o</b>	<b>o</b>	<b>(+)</b>	<b>o</b>	<b>+</b>
<b>Reason (precondition) for the development</b>	more guidance in FPFO	abandonment of activity	dip in the number of trees planted in the 1980s	NA	NA	increase of demand/prices	no changes are expected concerning FPFO	increase in increment and harvesting operations

**Figure 18: Expected developments of future supply in the eight case study regions**

The role of owners of fragmented private forests as wood suppliers in the long term will be discussed in the following.

### 3.3.5.2 Contribution of wood supply from fragmented private forest ownership

Owners of fragmented private forests are characterised by relatively small forest properties and related small harvestable wood amounts per owner. Forest owners' involvement in the wood market solely depends on their personal objectives. In contrast to the objectives of wood buyers, which are purely economic, owners of fragmented forests mostly have multiple objectives and attitudes. Since the share of urban forest owners is increasing for years in most of the countries, the proportion of owners that are not interested in forest management and wood marketing is also rising in most of the regions.

In case (fragmented) private forest owners are interested in the economic use of their forests, i.e. in wood marketing, two preconditions must be fulfilled for any activity: trust in the contract partner and profitability of the harvesting/marketing operation. Trust originates from positive experiences, e.g. appropriate wood prices, careful logging operations, fast payments. It is questionable if owners of fragmented forests can build a trustful relationship with operators/industrial buyers at all, since amounts of harvestable wood are small and marketing activities rarely occur. Nevertheless, since there is an increasing activity of wood industry to work closer with private forest owners (e.g. in Sweden or Hungary), a trustful environment could be established. This is especially valid for members of private forest organisations.

Profitability can be based on low harvesting/marketing costs and/or high wood prices. Low harvesting costs can be the result of joint activities or cooperation, which enables forest owners to use joint machinery and technical equipment, have easy access to information and joint marketing, or participate in the management of pooled properties. However, there is a remarkable high degree of uncertainty regarding the future development of private forest owners' organisation in the case study regions. Only in Catalonia and Rhone-Alpes increasing organisation levels of private forest owners are expected (Catalonia p. 34, Rhone-Alpes p. 22). Increasing

cooperation levels of private owners of fragmented forests are additionally seen in Estonia (p. 27), while there is no development towards a higher share of organised owners of fragmented forests in Saxony (p. 30). This means that today's low level of cooperation amongst European private owners of fragmented forests will at best only slightly improve in the long term. This is not a surprising development since small forest properties, low wood amounts and thus rare wood marketing possibilities do not require a membership in economy-driven associations or cooperatives.

High(er) wood prices can be the result of specific contracts (e.g. high volume contracts of large-scaled forest owners or private forest owners associations) or general market developments. As mentioned before, wood prices are generally expected to rise. Especially prices for low qualities and hardwood are assumed to increase. This puts owners of fragmented private forests into a favourable position since they often own forests with low-quality hardwood. Resulting cost efficiency for private forest owners could thus lead to higher wood supply in the long term. Regardless of cost efficiency, owners of fragmented private forests are only able to market wood seldom and each "large-scaled" wood harvesting operation is a special event for the owner, which makes wood prices particularly important for fragmented private forest ownership (see also Saxony p. 77). A high sensitivity of owners of fragmented private forests related to high wood prices is emphasized in all case study reports<sup>71</sup>.

As a conclusion it can be stated that there will be a higher supply of wood from fragmented private forest ownership in the long term. This supply will however be limited to forest owners with economic objectives and therefore strongly be influenced by increasing urbanity of owners, i.e. a rising share of non-traditional forest owners. In case additional wood supply from owners of fragmented private forests is focussed, owners with other than purely economic objectives must be motivated by using their specific attitudes<sup>72</sup>, i.e. some mobilisation activity is necessary. Nevertheless, cost efficiency and thus high(er) wood prices are also a precondition in these cases, if not recreational or ecological objectives are dominant.

In general, wood supply from fragmented private forest ownership will be restricted to time periods of high wood prices, which means that they will most probably not contribute to the basic market supply. An increased market participation of fragmented private forest ownership as a result of higher wood prices is also seen in the Austrian (p. 44), Saxon (p. 49) and Catalanian study (p. 52). However, financial incentives, specific initiatives and political support are emphasized at least as equally important (Rhone-Alpes, Estonia, Hungary, Saxony, Catalonia) for wood mobilisation from fragmented private forest ownership.

---

<sup>71</sup> No information on this topic is given by England and Hungary.

<sup>72</sup> i.e. owners that focus forest management for self-supply could easily be convinced of fuelwood sales since they have already experienced fire wood production; owners with nature protection aims could be informed of a higher natural diversity in case of thinnings or openings; owners that use their forests for recreation could be made aware of the higher recreational value of woodlands with openings, "traditional" forest owners could be convinced by indicating close similarly "traditional" wood buyers (sawmills) etc.

### 3.3.6 Conclusions

In the previous sections conditions of the European wood market were characterised by the description of the market components supply, demand, infrastructure and legal framework. As a result a categorisation of market conditions in Europe was developed and case study regions were classified. Short-term dynamics (volatility) of the wood market were described afterwards. At last long-term trends of the wood market under special consideration of the contribution of fragmented private forest ownership are represented.

Two components form the potential of the supply side: the natural potential and the ownership-related potential. The natural potential of wood mobilisation is higher than the ownership-related potential of supply in most of the case study regions. This is not surprisingly since it is mainly the ownership structure and not the forest cover, increment or terrain that presently prevents further wood mobilisation. However, while the natural potential of wood mobilisation cannot be improved, there is a big chance (as well as challenge) for improvements of the ownership-related potential of wood supply.

One such improvement could be a higher level of organisation amongst owners of fragmented private forests. The share of fragmented private forest ownerships membership in forest associations or management cooperatives is very low at the moment<sup>73</sup> which leaves high potential for improvements in favour of a number of advantages (e.g. more continuous wood flow for wood demanders, better accessibility of forest owners for all stakeholders, higher cost efficiency for private forest owners etc.).

Nevertheless, it is a quite challenging task to get more owners of fragmented private forests organised in economic-driven associations and cooperatives, since these (increasingly urban) owners have rather multiple than solely economic objectives. Because of these sets of divergent objectives, it generally proves rather difficult to move fragmented private forest ownership into action and determine precise wood volumes that could be mobilised. Nevertheless, precisely because these objectives are multiple and divergent, there seems to be a certain possibility, to motivate said private forest owners to use their wood resources by arousing their subliminal economic interests (e.g. in subsistence/fire wood production) through specific wood mobilisation measures. Additionally, a higher level of wood mobilisation can also be expected if owners of fragmented private forests are convinced by the advantages that forest management could have for their other objectives e.g. for nature conservation or recreation.

From the wood buyers' point of view a higher degree of organisation amongst private forest owners is nevertheless an obvious need especially in the long term, since ongoing concentration processes will result in fewer, but large-sized mills that require continuous flows of considerable wood amounts. Furthermore and regardless of an increase in capacities of wood processing industries, there will be a generally higher future wood demand due to the importance of wood energy. This development is expected to result in higher prices especially for wood of low qualities as it can be derived from the developments of the Hungarian wood market

---

<sup>73</sup> Sweden and Austria with a relatively high level of organisation are exceptions.

since 2002/2003. Increased demand on wood for fuel is a real chance for (small) private forest owners, who often own forests of low quality hardwoods.

However, conditions of the legal framework or existing infrastructure can limit (but also enhance) evolving chances for forest owners. Long-lasting bureaucratic processes concerning forest management and harvesting will hamper wood mobilisation and should thus be avoided. Additionally, legal frameworks should support processes that stop or compensate fragmentation of private forests in favour of wood mobilisation (e.g. land consolidation, laws that prohibit splitting). Financial incentives are furthermore considered as a quite important component of the legal framework. Financial support for infrastructural improvements (road network, cooperation, information etc.) is thereby seen as most significant for wood mobilisation from fragmented private forest ownership.

A categorisation of wood market conditions in Europe that is based on the existing conditions of the infrastructure, legal framework, demand and supply resulted in a three-fold classification of wood markets:

- **Category I: “Strong market” with advantageous conditions of wood mobilisation (Sweden),**
- **Category II: “Developing market” with mediocre conditions of wood mobilisation (Austria, Estonia, Saxony) and**
- **Category III: “Weak market” with disadvantageous conditions of wood mobilisation (Rhône-France, Catalonia, England, Hungary).**

When focussing the deficiencies of wood market conditions, there seems to be a need for action especially in regions of **category III**. However, the natural potential of category III markets is only low, and industrial wood demand is additionally limited – or to accentuate this: if no one is buying there is no need for difficult (and expensive) wood mobilisation. This means that the basic conditions should be altered. While the natural potential is only hardly possible to improve in the short or medium term, activity for wood mobilisation can – and should – primarily focus on a strengthening of industrial wood demand. Furthermore measures of wood mobilisation in regions of category III should aim at an establishment of appropriate infrastructure (including ownership-related supply potential) and legal framework for higher wood mobilisation if positive effects can be expected under consideration of necessary costs.

Additional support of wood mobilisation could be justified in regions of **category II**, where the natural potential and also demand is relatively high. Instead of a basic establishment of demand, appropriate infrastructure (including ownership-related supply potential) or legal framework improvements of already existing structures can be recommended.

In regions of **category I** there seems to be hardly anything to do concerning an improvement of wood mobilisation. Wood mobilisation support should therefore focus on some refinements, but neither basic establishments nor considerable improvements are necessary.



Under consideration of price sensitiveness and elasticity for owners of fragmented private forests<sup>74</sup>, a main part of wood mobilisation activity should focus owners that are totally uninterested or not (only) economically interested (i.e. non-traditional forest owners). Traditional forest owners will be activated mainly by higher wood prices (that are expected for the future), which means that additional and cost-causing mobilisation efforts are rarely necessary. In contrast there can be seen a positive cost-benefit ratio for mobilisation measures as information and counselling when focussing non-traditional (urban) and uninterested forest owners, whose share is relatively high in markets of category II and III.

Measures aimed at an improvement of infrastructure and legal framework should nevertheless consider all types of forest owners in all market categories. This is especially valid since improvements aimed at a specific type of fragmented private forest ownership can positively affect other owners' categories and result in a shift of the distribution of owners' types (for instance previously uninterested owners can become interested in wood marketing in case of improved infrastructure or legal framework).

Regardless of the categorisation of wood market conditions and recommendations of measures, short-term dynamics are existent in all European regions. Short-term dynamics (or volatility) can be caused by calamities or by changes at the demand side (general economic conditions, influence of related markets). In case of calamities affected owners of fragmented private forests have necessarily to "mobilise" wood regardless of the wood price, whereas they will refrain from harvesting for wood marketing purposes in periods of low wood prices caused by decreased demand. A high price sensitivity of (mainly traditional) fragmented private forest ownership is observed in all case study regions, which is not surprisingly since (planned) harvests of these owners take place only seldom (small wood amounts!) and have therefore a special importance for the owner.

Because of this high price sensitivity, the long-term trend of the wood market is seen as quite positive for wood supply from fragmented private forest ownership, since higher prices (especially for low-quality wood) are expected in future. However, since forest management objectives of most fragmented owners are multiple and not purely economic, wood price will only be the driver of a certain level of additional wood mobilisation. Therefore, one main challenge for further mobilisation is to motivate those owners that have no objectives at all or other than economic attitudes for the use of their forests.

---

<sup>74</sup> Price elasticity is high(est) for traditional private forest owners, low for non-traditional and non-existent for uninterested private forest owners.

## **4 Identification of measures facilitating mobilisation of wood and other forest biomass from forests with fragmented private forest ownership (Task 4)**

Task 4 aims at the identification of measures facilitating mobilisation of wood and other forest biomass from forests with fragmented ownership.

Task 4 consists of two parts: The objective of subtask 4.1 is an identification of measures for an increase of wood mobilisation from fragmented ownership, while subtask 4.2 deals with a detailed description of feasible and effective measures appropriate for an easy and short-term implementation. At this background the present report is structured as follows:

First, existing barriers for wood mobilisation in Europe were identified by the analysis of case study reports compiled in task 2. These obstacles were listed by its importance in general as well as for each market condition. Market conditions were adopted from task 3.3, which identified three categories of market conditions: “strong markets” with advantageous conditions of wood mobilisation (category I), “developing markets” with mediocre conditions for wood mobilisation (category II) and “weak markets” with disadvantageous conditions of wood mobilisation (category III). After the evaluation of obstacles general mobilisation measures (i.e. measure categories and subgroups) were developed and related to the existing barriers of wood mobilisation. Afterwards 50 detailed measures were identified and listed by 5 measure categories and 15 measure subgroups. Because of its importance cooperation of private forest owners is discussed in detail at the end of subtask 4.1.

In the second part of this task (task 4.2) an assessment of measures concerning its feasibility, effectiveness, easiness and timing of implementation was carried out first. Most promising measures for each market category were afterwards listed. A selection of following measure complexes is described in detail:

- Facilitation of bureaucracy
- Pooling processes
- Counselling
- Specific information
- Organisation
- Forest roads

### **4.1 Identification of measures to increase mobilisation of wood and other forest biomass from forests with fragmented ownership**

In the following measures for improved wood mobilisation will be described and discussed. Task 4 is based on the results of task 3 which aimed at a presentation of wood market structures and conditions. As measures and instruments must be suitable to existing markets, reference will be made to the categories of wood market conditions as described in task 3.3.

### 4.1.1 Barriers of wood mobilisation in Europe

Unfavourable existing conditions are the basis for developing and implementing measures aimed at improvements. Regarding wood mobilisation a number of barriers are described for the eight European case study regions.

2.2.c - Other than marketing objectives (owner)	8 *
2.4.a - Low profitability (non-profitability) of management	7
2.4.c - Income independency (owner)	7
2.5.a - Knowledge/skills regarding forest management	7
5.c - Cooperation deficiencies	7
2.1.a - Small property size (Fragmentation)	6
3.b - Forest access and road network	5
1.a - General support of fragmented forest owners	4
2.1.b - Forest productivity, Wood quality and Terrain	4
2.3.a - Urbanity & long distances to forests	4
4.2.a - Demand (deficiencies)	4
5.a - Authorities as advisors (deficiencies)	4
6.b - Bureaucracy (management, harvesting)	4
5.b - Other contact persons/advisors (deficiencies)	4
1.b - The image of forestry	3
2.2.a - Lack of interest (no objectives at all)	3
2.2.b - Trust (also: bad experiences)	3
2.3.b - Owners' age	3
2.4.b - Own requirements (self-supply)	3
2.5.b - Knowledge of wood marketing (market access)	3
2.5.c - Knowledge of the forest location	3
4.1 - Volatility of wood prices	3
2.6 - Inappropriate (or no) technical equipment	2
4.2.b - Demand requirements (continuity, volumes etc.)	2
4.2.c - Inappropriate marketing & sales methods	2
6.a - Problem of further fragmentation (inheritance)	2
6.c - Inappropriate subsidies for fragmented forest owners	2
1.c - Compensation of forest-related externalities	1
2.1.c - Restrictions by nature protection	1
3.c - Availability of inventory data	1
4.3.a - Operators' capacity	1
4.3.b - Operators' quality	1
*mentioned as barrier in Xof8 case study reports	

Figure 19: The importance of wood mobilisation barriers for all case study regions

#### 4.1.1.1 Existing barriers of wood mobilisation

To develop a list of appropriate measures for wood mobilisation improvements a listing of existing wood mobilisation barriers was made first by analysing sections 3.2.1<sup>75</sup>, 3.4.1<sup>76</sup>, 3.3.3.ii<sup>77</sup>, 3.5<sup>78</sup>, 4.2.i<sup>79</sup>, and 4.3<sup>80</sup> of each case study report. After having received a list of statements concerning wood mobilisation, mentioned

<sup>75</sup> "Main factors that induce or prevent (...) fragmented private forest owners to participate in wood markets"

<sup>76</sup> "Most important factors that explain why fragmented private forest ownership exploit or not exploit the sustainable harvesting potential of their forests"

<sup>77</sup> "What are possible reasons for non-management of private forests? Other factors relevant in terms of attitudes, objectives and behaviour."

<sup>78</sup> "Indication of other factors and explanation of cause and effect"

<sup>79</sup> "What are barriers for wood mobilisation from fragmented private forest ownership in the region?"

<sup>80</sup> "Which of the factors (...) have the strongest impact on wood mobilisation from fragmented private forest ownership in the region?"

problems were classified by their origin (i.e. society/forest policy, forest owner, infrastructure, market partners, middlemen/consultants, legal framework) and grouped by the type of barrier (e.g. low/no profitability, inappropriate road network etc.). At the end 32 different types of barriers<sup>81</sup> for wood mobilisation could be extracted (see Annex I).

Hereafter both the general and the regional importance of barriers were evaluated by a registration of mention for each case study report. Since each case study region is part of one of the market conditions categories<sup>82</sup>, relevant barriers could also be evaluated for three different market conditions (see report of task 3.3, section 3.3.2: strong – developing – weak markets with advantageous – mediocre – disadvantageous conditions of wood mobilisation).

**Other than wood marketing objectives** of private forest owners were mentioned as a barrier in each case study report and must therefore be seen as the most important factor for wood mobilisation deficiencies in Europe. Barriers that were mentioned in seven of eight case study reports are:

- **Low or even no profitability** of forest management for private forest owners (e.g. taking the cost of regeneration into account)
- **Income independency** of private forest owners (i.e. income from forestry)
- **Lack of knowledge and skills** of forest management by private forest owners
- **Cooperation deficit** between different private forest owners.

Figure 20 gives an overview of the importance of all existing barriers for wood mobilisation in the eight case study regions.

Market conditions - category I: Most important wood mobilisation barriers	
2.2.c - Other than marketing objectives (owner)	3 *
2.4.a - Low profitability (non-profitability) of management	3
2.4.c - Income independency (owner)	2
2.5.a - Knowledge/skills regarding forest management	2
*mentioned as barrier X times	

**Figure 20:** Most important barriers of wood mobilisation under market conditions of category I ("strong markets")

Regarding wood market conditions the most important barriers<sup>83</sup> of category I ("strong market" with advantageous conditions of wood mobilisation: Sweden) are solely related to forest owner's motivation, economy and knowledge. These barriers are identical with the previously mentioned ones except for the problem of cooperation (see figure 21).

<sup>81</sup> Barrier 2.1.a and 3.a are identical factors

<sup>82</sup> Cf. task 3.3, section 3.3.1: Sweden = Category I („strong market“); Austria, Estonia, Saxony = Category II („developing market“); Catalonia, England, Hungary, Rhone-Alpes = Category III („weak market“)

<sup>83</sup> Most important = repeated mention within the Swedish case study report (at an analysis of questions 3.2.1, 3.4.1, 3.3.3.ii, 3.5, 4.2.i and 4.3)

Market conditions - category II: Most important wood mobilisation barriers	
1.a - Policy's support of fragmented private forest owners	3 *
2.1.a - Fragmentation (small size of forest properties)	3
2.2.c - Other than marketing objectives (owner)	3
2.4.a - Low profitability (non-profitability) of management	3
2.4.c - Income independency (owner)	3
2.5.a - Knowledge/skills regarding forest management	3
5.c - Cooperation deficiencies (forest owners' organisation)	3
*mentioned as barrier in X of 3 case study reports	

**Figure 21: Most important barriers of wood mobilisation under market conditions of category II ("developing markets")**

Markets of category II ("developing market" with mediocre conditions of wood mobilisation: Austria, Estonia, Saxony) face problems of forest fragmentation (small property sizes) and forest owners' cooperation as the most important "external" barriers for wood mobilisation<sup>84</sup>. Furthermore low political support of fragmented private forest ownership is seen as a major barrier for wood mobilisation in regions of market category II (see figure 22).

Market conditions - category III: Most important wood mobilisation barriers	
2.1.a - Fragmentation (small size of forest properties)	3 *
2.2.a - Lack of owner's interest (no objectives at all)	3
2.2.c - Other than marketing objectives (owner)	4
2.4.a - Low profitability (non-profitability) of management	3
2.4.c - Income independency (owner)	3
2.5.a - Knowledge/skills regarding forest management	3
3.b - Forest access and road network	3
4.2.a - Demand (deficiencies)	3
5.c - Cooperation deficiencies (forest owners' organisation)	4
*mentioned as barrier in X of 4 case study reports of category III-regions	

**Figure 22: Most important barriers of wood mobilisation under market conditions of category III ("weak markets")**

The most important barriers of market category III<sup>85</sup> ("weak market" with disadvantageous conditions of wood mobilisation: Catalonia, England, Hungary, Rhone-Alpes) are the previously mentioned barriers (except for barrier 1.a) and additionally a lack of owner's (general) interest concerning his forest property, the problem of forest access/an appropriate road network and deficiencies in demand.

There are also five other barriers that were mentioned in every second case study report, but stay relatively independent from the category of wood market conditions, since they are not of considerable importance in any of the market categories. These additional and nonetheless significant barriers of wood mobilisation are:

- 2.1.b: **Unfavourable natural conditions** (forest productivity, terrain, wood quality, difficult regeneration)

<sup>84</sup> Most important = mentioned as barrier in all three case study reports

<sup>85</sup> Most important = mentioned as barrier in at least three of all four case study reports

- 2.3.a: **Urbanity** of private forest owners and/or long distances to forest properties
- 5.a: Lack of or deficiencies in **authorities as advisors**
- 5.b: Lack of or deficiencies in other **contact persons/advisors**
- 6.b: **Bureaucracy** related to forest management or harvesting activity.

#### 4.1.1.2 Wood mobilisation barriers: Interpretation and conclusion

As previously shown, the most important barriers for wood mobilisation are purely owner-related and can be explained mainly with the owner's economic background: Since there is a low profitability of forest management (barrier 2.4.a) and (therefore) independency of forestry-related income (barrier 2.4.c), owners of fragmented private forests do have other than economic (marketing) objectives concerning their property (barrier 2.2.c) and consequently only low knowledge and skills regarding forest management (barrier 2.5.a).

This owner-related 'complex' of barriers can be found in all wood market conditions in Europe, but solely for category I it is the only relevant obstacle regarding wood mobilisation. Other barriers have only marginal importance in regions with a "strong market" and advantageous conditions of wood mobilisation. In regions with a "developing market" and mediocre conditions of wood mobilisation (category II) major barriers are seen in forest fragmentation and owners' cooperation in addition to the before mentioned 'barrier complex' concerning forest owners. Forest-related infrastructure (road network) has some importance in these regions, but it is a much more considerable barrier in regions of category III characterised by "weak markets" and disadvantageous conditions of wood mobilisation. However, it is not only the road network, but also deficient demand and totally uninterested forest owners which present the most important barriers for wood mobilisation in category III-regions.

What does this mean for wood mobilisation activity? Undoubtedly the lack of fragmented private forest ownership's economic interest is the most important barrier in all regions and cannot simply be ignored. However, information, counselling and cooperation seem to be appropriate measures for addressing forest owners with multiple objectives. Regarding the three market categories, simplified recommendations can be given: While market conditions of category I require at most some '**refinements**'; the focus in regions of category II should be on '**improvements**' (defragmentation, better cooperation) for higher wood mobilisation. In category III-regions '**establishments**' (demand, road network, general interest of forest owners) are necessary at first to improve wood market conditions (cf. task 3).

Beyond that mobilisation measures should also focus the problem of urbanity, missing contact persons and natural conditions. What suitable types of measures could be implemented to overcome these barriers is discussed in the following section.

#### 4.1.2 Measures to overcome the barriers of wood mobilisation

In this section wood mobilisation measures are first categorised by their general structure and function. Afterwards measure categories with the potential to overcome the main barriers of wood mobilisation are discussed for each market category. Reference will also be made to an overcoming of further obstacles of

wood mobilisation. Finally a list of detailed measures for wood mobilisation improvements is presented.

#### 4.1.2.1 Categorisation of measures

A number of measures can be implemented to overcome the obstacles of wood mobilisation. In this study wood mobilisation measures are grouped as follows:

Information aims at imparting of knowledge as well as skills. It is especially relevant for the types of non-traditional and uninterested owners which are to find mainly in regions of market category II and III. Information is subdivided into ‘general’ information, ‘specific’ information (including ‘demonstration’), ‘counselling’ and ‘training’. While *general information* directs towards the public as a whole and aims at an improvement of the awareness concerning forests, forest management and wood use, receiver of ‘specific’ information are individuals involved in forestry and wood mobilisation. *Specific information* cannot only be given with the help of special printings and media, but also via internet, via campaigns, fairs or workshops. *Demonstration* is a specific measure of information since it aims at the presentation of complex coherences as for instance harvesting operations or technology. *Counselling* requires professionals giving advice (mainly) to forest owners, while *training* can be implemented for an enhancement of skills of people involved in wood harvesting (forest owners, forest operators).

<b>Information</b>	<ul style="list-style-type: none"> <li>= General information</li> <li>= Specific information</li> <li>= Counselling</li> <li>= Training</li> </ul>
<b>Cooperation</b>	<ul style="list-style-type: none"> <li>= Networking</li> <li>= Organisation</li> </ul>
<b>Legal framework</b>	<ul style="list-style-type: none"> <li>= Land consolidation</li> <li>= Subsidies</li> <li>= Transport (requirements)</li> <li>= Bureaucracy</li> </ul>
<b>Infrastructure</b>	<ul style="list-style-type: none"> <li>= Forest accessibility</li> </ul>
<b>Specific instruments</b>	<ul style="list-style-type: none"> <li>= Pooling activities</li> <li>= Forest Information System</li> <li>= Forestry-related technology</li> <li>= Contracts</li> </ul>

**Figure 23: Categories and sub-categories of measures with influence on wood mobilisation**

Cooperation serves for sharing information and joint activities and is a generic term for all measures related to organisation and networking. While *networking* in the present study is understood as (relatively loose) interaction between the



stakeholders of the wood mobilisation process (forest owners, public forest service, forest based industry, counsellors and operators), *organisation* means an institutionalized cooperation of private forest owners in the form of owners associations or forest management cooperatives.

Legal framework summarizes all measures related to land consolidation, financial incentives, (restrictions on) transport and bureaucracy. It addresses all types of owners of fragmented private forests. Measures of *land consolidation* (should) help to overcome the (structural) problem of forest fragmentation, while *financial incentives* are to serve for a number of improvements related to forest management and wood marketing. Specific wood mobilisation measures in the context of the legal framework can also focus problems of *transport* and *bureaucracy* related to forest management and wood marketing.

Specific instruments for improvements of wood mobilisation are pooling activities, forest information systems (FIS), harvesting technology and contracts. *Pooling activities* aim at enhanced forest management and wood marketing through “bundling up” forest properties and wood by organisations (e.g. public forest service, forest owners association) or individuals (e.g. forest operators). *Forest information systems* provide information relevant for wood mobilisation activities (e.g. GIS; information regarding forest owners, contracts, payments etc.). *Harvesting technology* describes machinery and technology necessary for forest management and harvesting, while *contracts* are the base for binding agreements within the process of wood mobilisation.

Infrastructure summarizes all measures that affect the accessibility of forests and wood transportation, e.g. road building and maintenance. Flagship projects are exemplary projects for wood mobilisation and limited in area and time period. Such projects are sometimes related to forest research. Research as a further measure can focus a number of problems concerning wood mobilisation, e.g. forest owners’ attitudes or harvesting techniques and lead to specific recommendations for improvements.

#### 4.1.2.2 Measures to overcome the most important barriers of different market conditions

What types of measures are generally suitable for an improvement of wood mobilisation in context to the most important obstacles under different market conditions is briefly discussed in the following and refers to the results of the eight case study reports. A detailed valuation concerning individual measures’ effectiveness and feasibility in regions of market categories I, II and III as well as an assessment regarding easiness of implementation and timing, which is neglected here, will be realised in section 4.2.

##### *Market category I; generally most important barriers to overcome*

Other than marketing objectives, low profitability of management, income independency of private forest owners and missing knowledge and skills are the most important barriers for wood mobilisation under all market conditions. Non-traditional and uninterested forest owners should therefore be in the main focus of wood mobilisation activity. **Specific information** and **counselling** are generally seen as appropriate measures for all these obstacles, while **training** can especially be offered to overcome missing skills. Information and counselling should put emphasize on the fact that forest management serves not only for economic, but for a number of other objectives (i.e. biodiversity/nature protection, stability/investment,



attractive forest “image”/recreation). **Organisation** is also a possible measure for overcoming these four previously mentioned owner-related barriers<sup>86</sup>.

**Financial incentives** can additionally give support and **research** can provide necessary background information for wood mobilisation activities. Alongside these measures pooling activities and infrastructural improvements can overcome the problem of low profitability. Adapted harvest technology, specific contracts and flagship projects can have further importance considering the most important barriers for wood mobilisation under all market conditions including category I (“strong market”).

#### *Most important barriers to overcome in category II-markets*

In addition to the before mentioned four solely owner-related barriers problems of fragmentation (small property sizes), cooperation and poor policy support of owners with fragmented private forests are considered as further obstacles for wood mobilisation in regions of market category II (“developing markets”). **Specific information, counselling and organisation** of private forest owners in context with supporting **financial incentives** are seen as generally suitable measures to overcome these barriers. Since private forest owner organisations can help to solve a number of problems related to wood mobilisation (e.g. information and skills deficiencies, lack of appropriate technology) cooperation will be discussed in detail in section 4.1.3.

Pooling activities and land consolidation measures can furthermore reduce the fragmentation problem, while adapted technology meeting the needs of small-scale owners can activate them towards forest management. General information, research and networking are additional measures addressing the problem of low support of fragmented private forest ownership. Also facilitations of official rules (bureaucracy) regarding forest management and harvesting could be pursued.

#### *Most important barriers to overcome in category III-markets*

Except for the problem of low policy support of fragmented private forest ownership the main barriers of market category III are identical with previously mentioned ones in category I and II. Additionally regions with “weak markets” are characterised by a lack of total interest of private forest owners, deficiencies in demand and inappropriate forest infrastructure. Regarding demand deficiencies **general information, financial incentives and research** are seen as the most suitable measures for addressing improvements of wood mobilisation. Uninterested forest owners can be faced with all kinds of information, while research concerning the reasons of the lack of interest is necessary at the same time. A number of additional measures can be appropriate after research, e.g. organisation, financial incentives, bureaucracy, infrastructure and technology. Improvements of wood mobilisation related to forest infrastructure are possible via **specific information and counselling**, road building and maintenance with the help of financial incentives, but also via appropriate technology and also flagship projects.

---

<sup>86</sup> Organisation would not only serve for an exchange of knowledge and experiences (information), but can also result in (possible and cost-efficient) forest management and wood marketing. Forest owners organisations with other than purely economic objectives (e.g. family forestry/tradition, hobby/recreation, nature protection) could bring together similarly interested forest owners. This would – for the members of these organisations – not only result in a sharing of information, experiences and pride, but also in casual wood mobilisation and a possible specific addressing of (pooled) fragmented private forest owners by other public or private organisations.

#### *Additionally important barriers to overcome in all market conditions*

As described in section 4.1.1.1 a lack of advisors (public or private) is furthermore to be seen as an important barrier regarding wood mobilisation. This problem can be addressed by the employment of contact persons (counselling), but also via organisation and financial incentives. Facilitations in bureaucracy will also help to improve the situation of wood mobilisation since requirements of public authorities (felling licenses, management plans) are often recognised as hampering forest management. Regarding the barrier of urbanity (which leads to an increasing share of non-traditional and totally uninterested private forest owners) all kinds of information are appropriate tools to overcome the problems of missing or non-economic interest of private forest owners. Research, flagship projects as well as land consolidation are also measures to address the problem of absent owners. Deficiencies in the natural potential (forest productivity, low quality, terrain) can be overcome by organisation of forest owners and pooling activities, by infrastructural improvements as well as financial incentives and with the help of specific information and counselling.

#### 4.1.2.3 Overcoming other barriers

Appropriate measure categories for addressing the most important obstacles of wood mobilisation in general were mentioned previously. However further barriers were stated in the case study reports for specific European regions. Therefore the following list provides an overview of all wood mobilisation barriers and related measure subgroups for overcoming these problems in general (figure 24).

Market category	General information	Specific information	Counselling	Training	Net-working	Organisation	Land consolid.	Subsidies	Transport	Bureaucracy	Infrastructure	Pooling	FIS	Technology	Contracts	Flagship projects	Research
2.2.c - Other than marketing objectives (owner)	III+II+I *	0	0	0	0	0	0	0			0		0			0	0
2.4.a - Low profitability (non-profitability) of management	III+II+I	0	0	0	0	0	0	0	0		0	0	0	0			0
2.4.c - Income independency (owner)	III+II+I	0	0	0	0	0	0	0				0					0
2.5.a - Knowledge/skills regarding forest management	III+II+I		0	0	0	0		0				0	0	0	0	0	0
5.c - Cooperation deficiencies	III+II		0	0		0	0	0		0		0	0	0	0	0	0
2.1.a - Small property size (Fragmentation)	III+II		0	0		0	0	0		0	0	0	0	0		0	0
3.b - Forest access and road network	III(+II)		0	0		0	0	0	0		0		0	0		0	0
1.a - General support of fragmented forest owners	II	0	0	0		0	0	0		0	0		0	0	0	0	0
2.1.b - Forest productivity, Wood quality and Terrain	III+II		0	0		0		0			0	0	0	0			0
2.3.a - Urbanity & long distances to forests	III+II	0	0	0		0	0						0			0	0
4.2.a - Demand (deficiencies)	III	0				0	0	0	0	0	0				0		0
5.a - Authorities as advisors (deficiencies)	III+II			0													
6.b - Bureaucracy (management, harvesting)	III+II+I		0			0	0			0							
5.b - Other contact persons/advisors (deficiencies)	III+II+I		0	0		0	0	0				0			0	0	
1.b - The image of forestry	III+I	0														0	0
2.2.a - Lack of interest (no objectives at all)	III	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
2.2.b - Trust (also: bad experiences)	III+II		0	0	0	0		0	0	0			0		0		
2.3.b - Owners' age	III+II		0	0			0	0		0		0	0				0
2.4.b - Own requirements (self-supply)	III+II		0	0	0		0			0	0		0	0			0
2.5.b - Knowledge of wood marketing (market access)	III+II		0	0		0		0	0	0	0	0	0		0	0	0
2.5.c - Knowledge of the forest location	III+II		0	0		0	0			0	0	0	0			0	0
4.1 - Volatility of wood prices	III+II		0	0		0	0								0		0
2.6 - Inappropriate (or no) technical equipment	III+II		0	0	0	0		0			0	0	0	0		0	0
4.2.b - Demand requirements (continuity, volumes etc.)	II		0	0	0	0		0		0	0	0	0	0	0		0
4.2.c - Inappropriate marketing & sales methods	II		0	0		0				0		0	0		0		0
6.a - Problem of further fragmentation (inheritance)	III+II	0	0	0		0	0	0		0			0				
6.c - Inappropriate subsidies for fragmented forest owners	III+II					0		0									0
1.c - Compensation of forest-related externalities	III	0						0									
2.1.c - Restrictions by nature protection	III							0					0				
3.c - Availability of inventory data	III	0						0					0				
4.3.a - Operators' capacity	III		0		0	0		0			0	0		0			0
4.3.b - Operators' quality	III		0	0	0	0								0			

\* black: is mentioned as barrier by at least three fourth of all case study regions in the category; grey: is mentioned, but < 3/4 of case study regions

**Figure 24: Barriers for wood mobilisation in Europe and categories of measures to overcome these obstacles**

#### 4.1.2.4 List of wood mobilisation measures

Taking the previously mentioned measure categories and subgroups as a basis, a number of detailed steps can be recommended to overcome the obstacles of wood mobilisation. These detailed measures, listed by the measures' subgroups, are presented in the following.

Information	
<b>General information:</b> Creation of a (higher) public awareness by information about forests, forestry, wood use etc.	
I.1.a	Information of the public about sustainable forestry in general via mass media, product descriptions etc.
I.1.b	Promotion campaigns for the use of wood
<b>Specific information:</b> Provision of specific information to all forest actors	
I.2.a	Provide specific information about forest owners and their holdings (addresses, sizes, volumes, attitudes, former use) to potential contract partners (operators, industry, consultants etc.), to forest owners associations/cooperatives and the forest owners themselves
I.2.b	Provide information about wood mobilisation (marketing) for forest owners and professionals with economic objectives
I.2.c	Give information about the advantages of forest management for nature protection, landscape, biodiversity, recreation etc. to forest owners with non-economic/multiple objectives
I.2.d	Development of certification schemes to guarantee the origin, sustainable forest management practice, quality of production processes etc. to different market partners and consumers
I.2.e	Organisation of campaigns, fairs, "forest owners' days" etc. with a focus on wood mobilisation (i.e. forest management and wood marketing) from fragmented forest owners; target groups are owners themselves and related stakeholders (industry, operators, consultants etc.) within the mobilisation process
I.2.f	Creation and update of a website aimed at forest owners information regarding all ownership issues
I.2.g	Demonstration of forest management and harvesting: e.g. how a "good" forest should look like ("forest images"), harvesting operations, techniques/technology etc.
<b>Counselling:</b> Improvement of direct counselling of private forest owners by professionals (either public or private)	
I.3.a	Offering individual and group advisory to forest owners
I.3.b	Definition and improvement of the role of the forest ranger, either public or private (contact persons – "foresters" – responsible for all forest-related concerns (i.e. management, marketing, fulfilment of requirements regarding nature/soil/water protection etc.) should be easy and continuously available for private forest owners)
I.3.c	Implementing a voucher system for counselling given by private institutions
I.3.d	Use firewood management of fragmented private forest owners as link for wood energy (fuelwood) marketing
<b>Training:</b> Implementation of trainings for forest owners, contractors, counsellors and other actors	
I.4.a	Provide training courses for private forest owners (related to forest management)
I.4.b	Provide specific trainings for professionals (contractors, counsellors) working with owners of fragmented forests
I.4.c	Increase the competences and business skills of forest operators through adequate training
Cooperation	
<b>Networking:</b> Improvements of networking, i.e. interactions between the actors within the process of wood mobilisation	
C.1.a	Improvements of interactions between public forest services, forest-based industry, private counsellors and forest owner associations/cooperatives (e.g. via congresses, workshops)
C.1.b	Improvements of the market partners' behaviour: e.g. by paying fair prices, by assuring quick payments, by harvesting without damages of roads and remaining trees
C.1.c	Improvements of the production chain by intensified networking: e.g. by optimisation of transport distances
<b>Organisation:</b> Creation and support of forms of forest owners cooperation (forest owners associations, cooperatives):	
C.2.a	Subsidizing administration costs of forest owners associations/cooperatives
C.2.b	Subsidies specifically aimed at wood mobilisation, e.g. premium models
C.2.c	Incentives to improve the membership of small forest owners in cooperatives (reduced/no membership fees, information)
C.2.d	Specialisation of work within organisations: separation of profit-orientated tasks (wood commercialization) and non-profit-orientated tasks (member service, acquisition of new members)
C.2.e	Selection of appropriate legal types for associations/cooperatives
C.2.f	Consolidation of small associations/cooperatives to bigger units
C.2.g	Establishment and support of forest owners associations/cooperatives aimed at other than purely economic objectives
Infrastructure	
<b>Roads and railways:</b> Improvement of forests' accessibility and transport	
IS.1	Improvement of road networks (road building)
IS.2	Maintenance of existing roads (reconstruction)
IS.3	Improvement of railway-systems, e.g. access/availability of transport wagons

<b>Legal framework</b>	
<b>Land consolidation:</b> Improvement of land consolidation (mostly related to the legal framework)	
L.1.a	Implementation of land consolidation programmes
L.1.b	Restrictions concerning further forest fragmentation (land split) in case of inheritance
L.1.c	Voluntary exchange of forest properties between private forest owners
L.1.d	Forest property market platforms for private forest owners and potential buyers
<b>Transport:</b> Liberalisation of restrictions on wood transport	
L.2	Enhancement of payload limits for higher cost efficiency
<b>Subsidies:</b> Stimulation of wood mobilisation through financial measures	
L.3.a	Tax reduction on revenues for a certain period after the acquisition of forest land
L.3.b	Fundings for establishing rural development plans (e.g. England) or private forest management planning (e.g. Estonia)
L.3.c	Encouraging investments in forest companies and the sawmill sector by business development programmes
L.3.d	Implementation of wood mobilisation programmes to improve forest owners' organisation level (e.g. wood mobilisation premium)
<b>Bureaucracy:</b> Facilitation of legal requirements and simplification of procedures related to forest management and harvesting	
L.4.a	Facilitation of the acceptance of forest management planning documents
L.4.b	Facilitation of control mechanisms concerning forest management and harvesting, e.g. by renunciation of felling licenses
<b>Specific instruments</b>	
<b>Pooling activities:</b> Implementation or improvement of wood pooling processes	
S.1	Implementation or improvement of wood pooling processes, i.e. either by individuals (operators/contractors) or private and public organisations
<b>Forest Information Systems (FS):</b> Creation and implementation of a forest information system	
S.2.a	GIS-based systems to identify parcels with underlying owners' information (see also measure "specific information")
S.2.b	Customer relationship models to optimize communication with forest owners
S.2.c	Calculation programmes to facilitate harvest calculations and payments
<b>Harvesting technology:</b> Consideration of harvesting techniques and technology adapted to small-scale forest ownership	
S.3.a	Development and implementation of technology adapted to fragmented forests
S.3.b	Optimization of logistic processes under consideration of the owners' participation in logging activities and wood use for own requirements
<b>Contracts:</b> Implementation of adapted contracts according to the needs within the mobilisation chain	
S.4.a	Development and implementation of appropriate buying and selling contracts
S.4.b	Development and implementation of appropriate service provider contracts
S.4.c	Development and implementation of appropriate counselling contracts
S.4.d	Development and implementation of appropriate contracts related to the foundation of forest owners associations or cooperatives

#### 4.1.2.5 Measures for the improvement of wood mobilisation: Interpretation and conclusion

There are a number of different measures aimed at an improvement of wood mobilisation. In this study wood mobilisation measures are divided into 5 categories (e.g. information, cooperation, infrastructure, legal framework), 15 subgroups (e.g. specific information, counselling, organisation, financial incentives, pooling activities, research) and 50 individual measures. Each measure (as well as measure subgroup) differs from another by its effectiveness and economic efficiency regarding wood mobilisation, its feasibility to different market conditions, by its implementation easiness, timescale and the number of involved people/institutions.

Based on the evaluation of existing obstacles for wood mobilisation (section 4.1.1) and their respective importance in the European case study regions, each measure subgroup was assessed concerning its general potential to overcome these present obstacles. As a result *specific information* and *counselling* as well as *organisation* and *financial incentives* can be regarded as the 'measure complexes' with highest relevance for an improvement of wood mobilisation in Europe. These measures are especially important for the most significant obstacles, which is not surprising since these (important) barriers are in the majority related to the owners' motivation, economic background and knowledge. Specific information and counselling are applicable to at least two third of all wood mobilisation barriers. However, this is only a general assessment, which does not consider available resources for information and counselling. Therefore, an adapted assessment (regarding feasibility, effectiveness, easiness of implementation etc.) is realised in task 4.

Organisation of private forest owners and financial incentives are (potentially) applicable to at least half of the existing mobilisation obstacles. Nevertheless, financial incentives are rather “supporting measures” since they assist other measures as for instance infrastructure, research, measures of land consolidation and cooperation. The importance of cooperation of private forest owners for wood mobilisation will be discussed in the following section.

#### **4.1.3 Cooperation of private forest owners**

Cooperation of private forest owners can have a number of positive effects for wood mobilisation as well as forestry in general. Potentials of cooperation will be discussed in the following and compared to the present situation of organisation amongst private forest owners. At the end measures for a facilitation of better organisation will be presented. The main focus will be on cooperation aimed at joint forest management and wood mobilisation, while the representation of policy interests will be of secondary importance.

##### **4.1.3.1 The role of private forest owners organisations**

The term ‘cooperation’ describes an interaction of people regardless of an underlying institutional framework. Since the effects for wood mobilisation are especially high for formal cooperation (i.e. forest owner organisations: partnerships, associations or cooperatives) than for relatively informal ones, organisation is given priority here. ‘Cooperation’ is therefore understood as ‘organisation’ in the following as long as no further specifications are made.

Below the role of forest owner organisations will be discussed. While first the potential role, i.e. the benefits of cooperation will be focussed, the actual importance of organisations is outlined afterwards.

##### **4.1.3.2 Potential roles of forest owner organisations**

Effective cooperation between private forest owners can have a number of benefits not only for forest owners interested in wood marketing. Private forest owners with other than purely economic objectives, all stakeholders involved in the process of wood mobilisation, as well as community as a whole can benefit from close cooperation of private forest owners. This means that organisations do not only have importance for the wood market, but also in the context of other issues than wood marketing. Furthermore, positive effects do exist for private forest owners themselves (“internal” role of organisations) but also for a number of individuals and institutions in the surrounding (“external” role of organisations). Figure 25 gives an overview of the most important effects (roles) of cooperation between private forest owners.

Emphasizing the role of cooperation for wood mobilisation following functions of organisations must be recognised as especially significant from the owner’s point of view under consideration of the most important mobilisation obstacles (see section 4.1.1):

- Provision of information concerning forest management and wood markets
- Overcoming missing skills by joint management
- Market access and profitability due to higher prices and lower costs

Wood buyers will have especially advantages by the guarantee of relatively continuous wood flows and an improvement in addressing (pooled) private forest owners.

These functions are also reflected in the study of BECK (FAO, 2000) which summarizes the following three important effects of small forest owners' associations:

- More effective forestry extension services reaching a larger number of small holders in a wider forest area through co-ordinated effort
- Increased investments in terms of equipment and structural improvements which could become affordable through cost sharing
- Development of an economically viable forest industry which would increase its profitability through bulk purchase and joint marketing operations

	<b>Internal role:</b> Private forest owners	<b>External role:</b> Other stakeholders  market: industry, wood buyers in general, operators non-market: authorities, community in general
Functions/ effects related to the <b>wood market</b>	Information and counselling (management, wood market) Share of experiences Compensation of lacking management skills Share of equipment/technology Access to financial incentives (subsidies) Building of trust Continuity of relationship (permanently available contact person) Possibility of market access Negotiation of better prices (improved conditions for contracting, sale of specific assortments and wood qualities) Lower management costs (pooling activities: properties, wood volumes) Possibility of communication with market partners and authorities & representation of interests Improved situation for forest protection (insects calamities, forest fire etc.) Long-term commitment to sustainable forest management	Improved addressing of private forest owners by operators and wood buyers Possibility of permanent communication & partnership Continuity of wood flow Supply of specific assortments and qualities
Function/ effects <b>out of the wood market</b>	Information and counselling concerning non-economic issues Working with like-minded people: share of experiences, pride, community spirit Possibility of communication with stakeholders & representation of interests Improved situation for forest protection, nature conservation, infrastructure for recreation etc. Long-term commitment to sustainable forest management	Improvements for nature conservation, wildlife habitat etc. Improvements for outdoor recreation opportunities Improvements for forest protection

**Figure 25: The role (effects) of organisation of private forest owners**

In the background of these numerous positive effects one could mean that cooperation of private forest owners would have to be on a high level in Europe. However, this is not the case. The actual importance and future expectations concerning forest owners' organisation is shortly discussed in the following.

#### 4.1.3.3 The actual importance of forest owners organisations

Based on the results of the case studies the most important characteristics of the actual importance are described.

## Types and function of forest owners' organisations in Europe

The existence, structure and function of organisations of private forest owners vary between the European countries. The most important formal types of private forest owners' cooperation in the case study regions are associations (Sweden, Rhone-Alpes, Hungary, Estonia, Catalonia) and cooperatives (Austria, Saxony, Rhone-Alpes) aimed at joint forest management. Associations as the most prevalent type of formal cooperation were also found in previous European research (e.g. FAO 2000). However, there is no such organisation for private forest owners in England. Except for the Hungarian case, associations and cooperatives are engaged not only in forest management but also in marketing activities. Local organisations for forest management of private forest owners can be sub-organisations of a national organisation (Austria, Sweden, Estonia) or exist only with local importance and independently of any other organisation (Saxony, Rhone-Alpes, Hungary, Catalonia). In the first mentioned case of a regional structuring the national/federal association has considerable importance due to lobbying for the interests of its members. In other cases a national lobbying organisation exists independently of organisations for forest management.

## Level of cooperation amongst private forest owners in Europe

The level of organisation of private (individual) forest owners ranges from one to 50 percent (by the number of forest owners). The highest degree of organisation is to find in Sweden. The level is somewhat lower in Austria (37 percent). For the remaining European case study regions the share of organised private owners is between one and twelve percent by number of forest owners and 10 and 27 percent by private forest area. This means that there are a very high number of small private forest owners that do not leverage existing organisations.

## Expectations for the future development of private forest owners' cooperation

	<b>Sweden</b> (Market category I)	<b>Saxony</b> (Market category II)	<b>Catalonia</b> (Market category III)
<b>Number of formal organisations for joint forest management</b>			
<b>Number of organised private forest owners</b>			
<b>Related private forest area</b>			

**Figure 26: Expected future development of forest owner organisations in different market conditions (exemplary regions)**



Expectations regarding the future level of organised private forest owners are generally formulated vaguely for the majority of case study regions. However, based on presented information of the case study reports some regions can be taken as examples for a possible future development of organisations in each market category (see figure 26).

#### 4.1.3.4 Measures and instruments to facilitate better cooperation

In general, people will only join an organisation if they recognise a membership as worthwhile. Considering the general reasons why people are members of diverse associations three motives are seen as most important:

- A membership can reward financial incentives either as cost reductions<sup>87</sup> or additional income<sup>88</sup>
- A membership can be based on individual non-economic interests and the desire to support something 'important'<sup>89</sup>.
- A membership can be formally or informally forced<sup>90</sup>.

Since (formal) compulsory membership of owners with fragmented private forests is not an option especially against the historical background of Eastern European countries, financial incentives and non-economic based desires of private forest owners must be appreciated as drivers for a higher level of cooperation. Against this background and given that most owners of fragmented forests do not have solely economic, but multiple objectives (i.e. there is a high share of non-traditional private forest owners especially in market categories II and III), purely economy-driven organisations seem to be not an appropriate formal type of cooperation for fragmented private forest ownership. Additionally, such (non-traditional) owners with only small forest properties and wood amounts for sale are not dependent on income from forestry and harvest irregularly. Since self-supply with firewood is of some importance, marketable wood amounts are even more reduced. A permanent membership in fee-requiring organisations is therefore questionable if no other incentives except for higher profitability of harvesting operations and wood marketing are relevant. Furthermore, there could be some difficulty to motivate fragmented private owners to join existing organisations because of the membership structure: As the majority of members in present associations and cooperatives own rather larger properties, owners of fragmented private forests could not feel taken seriously. Considering these challenges following measures and instruments for higher cooperation of owners of fragmented private forests seem to be appropriate (see figure 27 and 28):

---

<sup>87</sup> e.g. via free assistance or free support, via collective fee-requiring contracts as insurance agreements etc.

<sup>88</sup> e.g. by access to specific financial resources as subsidies

<sup>89</sup> e.g. environmental association, booster clubs etc.

<sup>90</sup> i.e. forced by law or by society (job, position, etc.)

Measures for improved cooperation related to <b>organisations</b>		
What in general?	What in detail?	Why?
Improvements at <b>existing organisations</b>	<p><b>Gratis membership</b> for fragmented private forest owners</p> <p><b>Special focus</b> on fragmented private forest owners, i.e. provide incentives that go beyond joint forest management and wood marketing as <u>information and counselling</u> (e.g. concerning firewood, nature conservation etc.) or by <u>supporting community spirit</u> (e.g. by joint activities, share of experiences etc.)</p> <p><b>Improve transparency</b> for fragmented private forest owners, i.e. <u>Clear structure</u> of the formal organisation, e.g. national - regional - local representatives  <u>Clear contracts</u>, e.g. concerning membership and wood marketing  <u>Clear public relation</u>, e.g. via websites and printing material</p> <p><b>Separation of tasks:</b> commercial tasks + membership service tasks</p> <p><b>Consolidation</b> of small organisations towards larger, more successful units</p>	<p>FPFO: Small properties, i.e. small wood amounts, i.e. permanent fee-requiring membership would be not worthwhile</p> <p>Most important concerning FPFO = income independency from forests, low income effect and multiple objectives, i.e. FPFO must have other than solely economic incentives of a membership in organisations</p> <p>Organisations must be easy to find for interested fragmented private forest owners; Contracts serve for trust building</p> <p>Create potential for acquisition of FPFO</p> <p>Influence, presence, acknowledgement, capacity for FPFO</p>
Establishment of <b>new organisations</b>	<p>Establishment and support of <b>organisations explicitly for FPFO</b>, i.e. with a focus on firewood, "hobby forestry"/recreation, tradition &amp; family, nature conservation; advantages: pooled forest owners for addressing, wood mobilisation casually</p>	<p>Specific interests of FPFO do often not fit to organisations with large-scaled owners; "community spirit" is important</p>

**Figure 27: Measures for improved formal cooperation related to organisations**

Further measures and instruments for improved cooperation		
What in general?	What in detail?	Why?
<b>Information &amp; counselling</b>	Information ( <b>advertising</b> ) and counselling ( <b>recommending</b> ) membership in organisations, e.g. via websites, printing material, PR campaigns of organisations, recommendations by operators, contractors, organisation's staff etc.	Make FPFO aware of cooperation opportunities
<b>Legal framework</b>	<p><b>Subsidies</b> for (1) administration costs of organisations, (2) wood mobilisation efforts, e.g. via mobilisation premiums</p> <p>Provision of the background for <b>appropriate legal forms</b> of organisations especially aimed at membership of FPFO</p> <p><i>Compulsory membership</i></p>	<p>(1) improvement of the membership service and acquisition of new members; helps to establish new forest owner organisations with other than purely objectives; (2) additional income for FPFO</p> <p>Trust</p> <p><i>hardly possible</i></p>
<b>Research</b>	<b>Research</b> regarding background information of FPFO (motivation for cooperation, attitudes in general etc.)	Background information (general, regional, local)
<b>Flagship' projects</b>	<b>Exemplary projects</b> concerning cooperation of FPFO	Experiences, improvements

**Figure 28: Further measures and instruments for improved formal cooperation**

#### 4.1.3.5 Cooperation of private forest owners: Interpretation and conclusion

There is high potential for improvements of organisation amongst owners of fragmented private forests. The level of (formal) cooperation is presently very low in most of the case study regions<sup>91</sup> and an increase in organisations' membership independently of additional incentives is only expected in regions of market category III. But there is not only potential for improvements of the organisation level, but also concerning the structure of organisations. All local associations/cooperatives in "strong" and "developing" markets (category I and II)<sup>92</sup> aimed at joint forest management are linked with a national representative that is lobbying, while management-related forest owners organisations in "weak" markets have only local importance. A link between local forest owner organisations and the national interest representation of owners must be seen as quite important for flows of information and appropriate lobbying. Additionally transparency of organisations' structure can help to make fragmented private forest ownership aware of formal cooperation.

A number of measures can be applied to activate private forest owners towards organisation. However, compulsory membership is hardly possible in Europe. Generally, development and implementation of measures should consider the specific situation of owners with fragmented forests, i.e. theirs multiple objectives, the low forestry-related income effect and income independency. Purely economic-

<sup>91</sup> Exceptions: Sweden and Austria

<sup>92</sup> Exception: Saxony (at least formally)

driven organisations are therefore assumed as relatively inappropriate for small-scale forest owners. If a higher level of cooperation amongst fragmented private forest ownership should be achieved, existing organisations have to focus on this type of owners explicitly<sup>93</sup>. The establishment and support of explicit fragmented owners' organisations of is seen as a further option<sup>94</sup>. Financial incentives are generally regarded as a necessary tool to improve the level of organisation. Albeit it must be discussed if additionally mobilised wood amounts will justify the efforts, cooperation of owners with fragmented private forests will not only lead to improved forest management, but will also result in a better addressing of (pooled) fragmented owners. This would be a real improvement compared to the present situation.

## **4.2 Recommendation of measures for improvements of wood mobilisation**

Recommendations for an improved wood mobilisation are based on assessments of measures' feasibility, effectiveness, and possibility of easy and short-term implementation. In the following the methodology of measures' evaluation will be presented first. Afterwards appropriate measures for an improvement of wood mobilisation will be described in detail.

### **4.2.1 Methodology**

A list of individual measures for wood mobilisation was presented previously (section 4.1.2). Each listed measure has a specific potential to improve the situation of wood mobilisation, but for early improvements it is important to know what effective measures can be easily implemented in the short-term. Therefore measures were evaluated as presented in the following.

#### **4.2.1.1 Criteria and evaluation of measures**

All 55 measures listed in section 4.1.2 were assessed regarding the three criteria 'effectiveness', 'short-term implementation' and 'easiness of implementation' under three different market conditions ("strong markets", "developing markets", "weak markets") by using three values (+ / o / -). Market conditions were taken into consideration for testing the **feasibility** of measures.

Since each measure is related to one subgroup and one category, the rating of an individual measure led also to an evaluation of a measure subgroup and category. This was realized by the calculation of a mean value based on the values of underlying individual measures or respectively subgroups (without weighting).

The assessment was based on measures presented in the eight case study reports and at the background of individual experiences of the working group members.

The '**effectiveness**' of a measure was evaluated by addressing following questions:

---

<sup>93</sup> By extending its work as for instance by providing embracing information and counselling not only regarding forest management and wood marketing, but also concerning the various interests of fragmented owners, these owners could regard a membership as worthwhile.

<sup>94</sup> While such formal cooperation could give its undivided attention to the various interests of fragmented private forest owners, e.g. firewood production, 'hobby forestry', tradition nature conservation, 'community spirit' is regarded as one major driver for membership. Since the focus of these organisations is not mainly on forest management and wood marketing, wood mobilisation can be expected to occur casually and at the background of forest management for other than purely economic purposes (e.g. recreation, nature conservation).

- Can the measure's effect be quantified (e.g. mobilised amount of wood, reached forest owners, increased organisation level)?
- Does the measure conduce to overcoming at least one obstacle of wood mobilisation mentioned in the case study reports (cf. section 4.1.1)?
- Are there experiences concerning the effectiveness (quantitative or qualitative) with comparable measures?
- Does the measure have the potential to effect wood mobilisation of fragmented private forest ownership in the long term?

Value “+” was given in case the measure was classified as effective or very effective. A classification of medium effectiveness was valued with “o”. For measures that were categorised as hardly or not effective value “-“ was given.

The ‘**easiness of implementation**’ of a measure was evaluated by addressing following questions:

- Are there already organisations that can implement the specific measure (e.g. forest owners associations or cooperatives)?
- Has the issue of wood mobilisation and wood use in fragmented private forests already been discussed in policy and society?
- Are there experiences related to the easiness of implementation with comparable measures?
- Is the measure's addressee (target group) precisely defined?
- Is the responsible institution or initiator well-defined?
- Can the measure be additionally evaluated as (economically) efficient? (In contrast to the “effectiveness” of a measure “efficiency” also refers to the costs of implementation. Since measures are easier to implement if the cost-benefit-effect is visible, efficiency should be taken into consideration for an assessment of easiness of implementation.
- Are preconditions and requirements for financing explicitly considered (who, how much, willingness etc.)?
- Is the complexity of the measure manageable?

Evaluation resulted in “+” if the measure is easy to implement, while “o” was given in case a number of preconditions must be fulfilled for implementation. The measure was assessed with “-“ when its implementation is very difficult or difficult.

Concerning the evaluation of a possible ‘**short-term implementation**’, following questions were addressed:

- Is there a willingness of stakeholders for a commitment when it comes to implementation of the measure (i.e. financial contribution, assumption of responsibility etc.)?
- Are previous achievements available that could benefit short-term implementation (e.g. training material, draft contracts, implementation concepts etc.)?
- Are comparable measures mentioned and assessed in the case study reports or can timing be deduced?

A specific measure is given value “+” when it is possible to implement short-term (within three months); value “o” is given in case implementation requires a period of three to twelve months and “-“ in case of more than twelve months.

The time period between the presentation of an idea related to wood mobilisation, the implementation of the specific mobilisation measure and the measures’ effect is difficult to quantify and to assess. Therefore the time period until implementation was considered here as the time between the decision of responsibilities for the implementation of a specific measure (i.e. formulation of a concrete intent) and its actual execution.

#### 4.2.1.2 Weighting of criteria

Following the evaluation of measures towards underlying market conditions, effectiveness, timing and easiness of implementation assessments were translated into numerical values. “+” was replaced by 2, “o” by 1 and “-“ by 0 (see figure 29). By calculating mean values, subgroups (and measure categories) also received numerical values which allows for sorting.

A ranking was implemented afterwards by sorting received values of subgroups. Thereby priority was given to the effectiveness of a measure subgroup (1<sup>st</sup> sorting criterion, followed by easiness of implementation (2<sup>nd</sup> sorting criterion), and short-term implementation at last (3<sup>rd</sup> sorting criterion).

The reason for this weighting procedure is that the measure’s effectiveness is the basis for its implementation. Only effective or potentially effective measures are to be implemented. An evaluation of the easiness and timing of realisation should be made subsequently. Thereby easiness of implementation depends on complexity, costs, responsibilities and addressees, and is therefore somewhat related to short-term implementation.

#### 4.2.2 Most promising measures for wood mobilisation

As a result of the evaluation and weighted sorting of measures a list of subgroups could be derived and is presented in the following (figure 29) for each market category:

Market category I ("strong")	Market category II ("developing")	Market category III ("weak")
<ol style="list-style-type: none"> <li>1 Forest roads</li> <li>2 Land consolidation</li> <li>3 General information</li> <li>4 Transport</li> <li>5 Bureaucracy</li> <li>6 Specific information</li> <li>7 Networking</li> <li>8 Counselling</li> <li>9 Pooling activities</li> <li>10 Contracts</li> <li>11 Training</li> <li>12 Forest Information System</li> <li>13 Harvesting technology</li> <li>14 Subsidies</li> <li>15 Organisation</li> </ol>	<ol style="list-style-type: none"> <li>1 Pooling activities</li> <li>2 Counselling</li> <li>3 Bureaucracy</li> <li>4 Specific information</li> <li>5 Forest roads</li> <li>6 Contracts</li> <li>7 Harvesting technology</li> <li>8 Organisation</li> <li>9 Training</li> <li>10 Networking</li> <li>11 Forest Information System</li> <li>12 Subsidies</li> <li>13 General information</li> <li>14 Transport</li> <li>15 Land consolidation</li> </ol>	<ol style="list-style-type: none"> <li>1 Pooling activities</li> <li>2 Bureaucracy</li> <li>3 Counselling</li> <li>4 Networking</li> <li>5 Training</li> <li>6 Forest roads</li> <li>7 General information</li> <li>8 Contracts</li> <li>9 Harvesting technology</li> <li>10 Specific information</li> <li>11 Organisation</li> <li>12 Subsidies</li> <li>13 Transport</li> <li>14 Forest Information System</li> <li>15 Land consolidation</li> </ol>

**Figure 29: List of most effective measures for each market category (Ranking under consideration of easiness and short-term of implementation)**

**Bureaucracy** or respectively its facilitation is most effective for an improvement of wood mobilisation under all market conditions. **Pooling activities** as well as **counselling** should especially be considered for improvements of wood mobilisation in “developing” and “weak” markets, albeit both measures are also effective under “strong” market conditions. **“Flagship” projects** should be taken into account for category II and III-markets, while **specific information** has significant effects in “strong” and “developing” markets. Improvements of infrastructure (**forest roads**) have considerable importance in market category I-regions, but it also an effective measure under more unfavourable market conditions II and III. Albeit **organisation** is especially effective in market category II-regions it is nevertheless an important instrument for wood mobilisation. These seven (most promising) measures will be discussed in detail in the following section 4.2.3.

Regarding the measure of land consolidation there is a differentiated situation. Land consolidation was evaluated as an effective measure in category I-markets because of a favourable ownership structure (no fragmentation) and a high degree of traditional forest owners<sup>95</sup>. On the other hand land consolidation was evaluated as relatively ineffective in markets of category II and III mainly due to a high degree of fragmentation (small property sizes). Additionally land consolidation processes are not to implement easy and in the short term especially when there is a relatively high share of non-traditional and uninterested private forest owners as it is the case in “developing” and “weak” markets.

#### 4.2.3 Presentation of detailed individual measures

In this section most promising measures for wood mobilisation improvements - facilitation of bureaucracy, pooling processes, counselling, specific information, organisation and forest roads - are presented and discussed.

##### 4.2.3.1 Pooling process

The process of wood quantity bundling is classified as positive for the market categories ‘weak markets’ and ‘developing markets’ in relation to its effectiveness. However, the two factors ‘simple and short term feasibility’ reveals a more critical assessment.

For the category of ‘strong markets,’ this instrument is only in the mid-range of the ranking. This measure is either already implemented, or due to the smaller fragmentation, less effective than other measures.

#### Description of the measure’s characteristics and underlying measures

By ‘Pooling Process’ the implementation or improvement of wood bundling processes is understood. The pooling process has no concrete sub-measures. It includes rather, a wide range of tasks, central to which is the bundling up of timber from small private forests.

---

<sup>95</sup> In general there is a long tradition and high importance of forestry in Sweden (category I-market). Since forestry is the backbone of the Swedish economy identity with forest management and wood harvesting is differing from other regions. As mentioned in the report of task 3.3 the share of traditional forest owners is high and non-traditional (multiple) objectives as wood use for own requirements is of only minor importance.

In essence, the process includes the following steps:

- Aerial image and GIS supported pre-selection of the forest areas
- Identification, approach and motivation of the forest owner
- Preparation for use
- Implementation and control of use
- Calculations and balancing of timber money for forest owners, purchasers and service providers.

### **Examples from the case study regions**

The pooling process is mentioned several times in the case studies. It is emphasised as a suggested measure in the case studies Rhône-Alpes (p.39) and Saxony (p. 68). Literature mentions as a minimum size for such 'mobilization areas' levels of 10 to 20 ha which could deliver from 300 to 700 m<sup>3</sup>.

### **Responsibilities and Financing**

The regional organisation for timber mobilisation and marketing is responsible for the pooling process. Depending on the region, these can, in particular, be forest owners' cooperatives, state forest administration or private service providers.

The pooling process requires the trust of the forest owner. Local forestry bodies of forest owners have the advantage of the ideal 'middle-man' between supply and demand.

The first time bundling activities (possibly to be stronger established in the area of 'flagship' projects, see 4.3) and the permanent bundling activities have to be distinguished.

First time pooling activities can be supported by the public purse (Saxony, Rhône-Alpes). The permanent bundling activities are connected with the costs that can be carried jointly by forest owners and the declining industry. Permanent participation of the state may be sensible for the smallest parcelled areas (compare premium-model in Saxony). State subsidization is opposed for developed markets (Sweden p.9).

### **Costs**

As absolute costs are not so useful for further interpretation and comparability, costs per mobilised cubic meter seems to be more helpful. Regarding this value only a few data about the pooling costs available.

Analysis points to first time bundling costs of five to ten Euros per cubic meter (see Saxony Case study and Proceedings, Annex I, p. 22, 2007). With increasing experience and length of time these costs can be drastically reduced. Costs of two to four euros per cubic meter have been named.

### **Effects**

The effect of the pooling process is based on the motivation of a large number of forest owners in a defined area. The more participating forest owners and included forest area, the larger the quantity of wood that can be logged. This leads to favourable conditions in the timber harvest. Sales will be improved insofar as an

optimisation of the assortment can be realized. Multiple quantities via bonus arrangements may lead to price mark ups. In this model of bundling even the smallest areas can participate economically in professional commercialization.

This effect may have some influence to the importance of land consolidation (for wood mobilisation!). Land consolidation will take at least several years, seems to be even more difficult in forests due to the long production periods and is very expensive. Pooling is short-term orientated and can involve even smallest properties.

The implementation of pooling processes leads to a constantly growing inventory of forest and forest owner data at the organising entity (e.g. forest owners' cooperative). Repeated intervention becomes more efficient due to lower transaction costs. Forest owners who have had a positive experience with a measure more easily participate in further fellings. And satisfied forest owners in turn motivate forest owners who have to date been sceptical.

The pooling process is not directed to a specific ownership group. Convincing arguments to participate in an organized felling activity are not necessarily related to income effects. Further arguments are also the maintenance of the forest to improve stability and prevent calamities or to influence the composition of the tree species.

### **Overcoming obstacles**

The measure is especially effective in overcoming two of the defined barriers. For one, an existing smallest parcelling can be circumvented via this process. Property sizes in the approach, use and balancing play (almost) no role anymore. Even the smallest areas can be included without additional costs. The approach is made for the entire group of forest owners. In standard letters, forest owner gatherings, or press releases all forest owners of a bundling group are addressed. The balancing is carried out separately for each forest owner in accordance with the actual accumulated quantity of wood.

Bundling measures also have a positive effect on the owner's behaviour. The long term involvement of forest owners cooperatives in pooling activities are confidence building. Involved neighbours and key persons cater for a multiplier effect.

### **Time period and preconditions**

Pooling is an instrument that can be permanently implemented. Optimizations are possible through increased use of supportive technology. Instruments such as Customer Relationship Management-Systems, GIS supported procedures for boundary searches and area selections, and computerized accounting systems are included. However, the availability of all these instruments is not a requirement to start with pooling activities.

Decisive is that one of the actors is prepared to take on the responsibility of pooling. It is helpful if the forest owner has a certain degree of organisation. The support of the existing forest administration is helpful. It is economically advantageous if mid-sized and possibly larger private and communal forest owners join the commercialization.



#### 4.2.3.2 Facilitation of bureaucracy

Facilitation of bureaucracy is of high importance for wood mobilisation improvements under all market conditions<sup>96</sup>. It is evaluated as highly effective and easy to implement within a relatively short term. Facilitation of official requirements regarding forest management, harvesting and wood marketing is per se an improvement and not a specific instrument. Nevertheless it is to be discussed here in the same manner as other measures are described.

##### **Description of the measure's characteristics and underlying measures**

Bureaucracy is here understood as all official requirements concerning forest management, harvesting and wood marketing, i.e. underlying documents and authorisation processes as for instance:

- forest management plans in case of forest management
- felling licenses, notifications in case of harvesting operations
- registrations of forest managers<sup>97</sup>, of activity in wood marketing etc.

In general, fulfilment of official requirements is often time-consuming and instructions sometimes difficult to understand. This is especially true for owners of fragmented private forests that are not involved in permanent forestry activity. Consequently, following improvements could be made:

- adaptation to specific conditions and requirements of fragmented private forest ownership by easing procedures (e.g. harvesting without felling license up to a specific amount of wood<sup>98</sup>, voluntary and/or simple forest management plans up to a specific property size<sup>99</sup>)
- easy applying (e.g. via internet), fast authorisation processes, requiring documents rather after (harvesting) operations than before
- renunciation and simplification of documents and registration procedures (e.g. by requiring only notifications)
- possibility of counselling by authorities regarding official requirements

---

<sup>96</sup> Relatively highest importance of this measure is given under category III-conditions, while importance is somewhat lower in regions of market category II and lowest in regions of market category I.

<sup>97</sup> E.g. in Hungary

<sup>98</sup> E.g. in England: no felling license is needed in case a maximum of 5 cubic meters is harvested in any calendar quarter (England p. 17)

<sup>99</sup> E.g. in Rhone-Alpes: simple management plans for properties smaller than 25 ha

### **Examples from the case study regions**

Examples were already mentioned above. Additional specific obstacles related to bureaucracy in the case study regions are:

- Necessary management plans or (if not available) specific licenses for harvesting (whose authorisation process takes a lot of time) in Catalonia
- Compulsory management plans (until 2009!) in Estonia
- Notifications of harvesting operations (that have to be send to the Forest Agency before harvesting) in Sweden
- Registration of forest owners as business units in case of wood sale in Saxony (which results in additional taxes and annual fees)

### **Responsibilities – Financing – Costs**

State (forest) agencies are responsible for facilitations of official requirements. Costs will not arise as financing is not necessary. Rather the opposite is true: Facilitations of official requirements can help to save money at the agencies.

### **Effects – overcoming obstacles – Time period and preconditions**

Simplifications of officially required documents and processes will result in intensified forest management of fragmented private forest ownership and faster reactions to the wood market. This means not only an improved situation for wood supplier, but also for wood demanders since a higher amount of wood will be supplied.

Facilitations of official requirements will not only be aimed at an overcoming of high bureaucracy (barrier 6.a, see 4.1.1), but can also be seen as a measure for policy support of fragmented private forest ownership (barrier 1.a).

Regarding time and preconditions, facilitation of bureaucracy is simply dependent on decisions for alterations of the legal framework. These can be realised within a relatively short time period. However, the evaluation of effects as well as further improvements will be long-term.

For price-oriented owners, bureaucracy may not be a major obstacle to use forests especially in periods of good or improving prices. For sceptical owners, bureaucratic hurdles can be a decisive argument to abandon a felling activity. The improvement of long lasting authorisation processes therefore has lesser effects on strongly price-orientated owners. But such improvements are important to kick out arguments of lesser interested or indifferent forest owners who mainly try to avoid any additional efforts.

#### **4.2.3.3 Counselling**

Counselling is classified positively in relation to its effectiveness for the market categories ‚weak markets’ (III) and ‚developing markets’ (II). With simple and short term practicability, a critical but nevertheless clearly better classification in comparison to (see 4.3) projects becomes apparent.

For the ‘strong market’ category this instrument is evaluated as clearly less effective. This may be due to the fact that effective counselling already takes place and counselling organisations exist or that the need for counselling is lower due to the

lower fragmentation and a traditionally higher self-interest by the owners in the forest.

### **Description of the measure's characteristics and underlying measures**

Counselling can be defined as any improvement of direct counselling of forest owners by professionals, either by public or private organisations.

Counselling belongs to the 'Information' group of measures, together with general information, specific information and trainings.

Counselling can be differentiated by the following sub-measures:

- Offering individual and group advice to forest owners
- Definition and improving the role of the forest ranger, whether public or private (contact persons – “foresters” – responsible for all forest-related concerns (i.e. management, marketing, fulfilment of requirements regarding nature/soil/water protection etc.).
- Implementing a voucher system for counselling of private institutions
- Use firewood as an argument to get in contact with the forest owner.

### **Examples from the case study regions**

- High quality assistance and advisory service, Personal on-site assistance and advisory services (Austria)
- Individual advisory and group advisory to owners (Estonia)
- Permanent work of forest rangers (Saxony)
- Forestry integrators provide expertise by consulting (Hungary)

### **Responsibilities and Financing**

Private forest service providers, forestry bodies or state forestry personnel may be responsible for counselling.

The state example of Sweden ('strong markets') shows that here the counselling is up to the forest owners' cooperatives. With a high degree of organisation, clearly larger areas of forest ownership and the economic orientation of the forest owners, Sweden has, in this respect, a location advantage.

Biological counselling and technical counselling can be distinguished. The biological counselling lays emphasis on the potential, the forms of treatment and the choice of tree species. The fragmented forest ownership, lacking an economic motive, will not be prepared to pay the costs of acquiring counselling. In this case, the state can offer financially supportive intervention via readiness of counselling foresters or the introduction of a voucher system.

Counselling that places more emphasis on supervision of wood harvesting measures and the sale of wood should take place with the financial participation of the forest ownership. Costs can be classified as direct costs and should be at least partly borne by the forest owners. The acceptance of their payment by the forest owner is often low. Therefore in practice, these costs are often taken into account in the stock prices.

## **Costs**

In the case studies, no comparable data was given on the costs of counselling. Counselling could be regarded as a part within the wood bundling and commercialisation process. Data for polling costs are mentioned in literature and the case studies: first time bundling 5 to 10 Euros per cubic meter, repeated bundling 2 to 4 Euros per cubic meter (Saxony Case study).

Costs of advice regarding forest use may be deducted from the supervised forest areas as there are no commercialisation purposes. The data is as follows: one small private forest area classifiable to one forester amounts to 5,000 hectares, the direct personnel costs amount to 50,000 Euros, the material and overhead costs 20%, therefore 10,000 Euro. As a result, the counselling costs amount to circa 12 Euro per year and hectare. Corresponding to the average forest property size of 2.5 hectares is the amount of 30 Euros per forest owner and year. This figure can be used only as a rough estimate. Decreasing costs for the larger forest properties or progressing costs for the smaller forest properties are not considered here.

## **Effects**

Advice takes effect with direct contact between the advisor and the forest owner. Questions regarding the choice of tree species and wood commercialisation are within the expertise of the advisor. Forest owners averse to exploitation may be convinced by arguments of forest maintenance and stable use. The forest owner's personal contribution or need can be linked to a professional wood harvest. Heterogeneous aims or motives can lead to comparable intrusions in the forest. This arrangement can be reached by individual or group counselling of forest owners.

## **Overcoming obstacles**

Advice leads to wood exploitation not being exclusively connected with economic objectives, but rather aspects of forest maintenance are brought to the fore. This measure tackles the central and most frequently named barrier in the case studies, 'Other than Marketing Objectives (2.2 c).' Barriers based on lacking 'Knowledge/skills regarding forest management (2.5 a)' can also be removed through direct counselling of the forest owner.

Similar to the bundling process, counselling should be dedicated to the non-economic or even uninterested ownership categories. Convincing arguments to participate in a felling activity can be related to environmental arguments as well as in arguments regarding stability of the forests. Counselling therefore should try to find out the main aims of the owners or to give an important support in identifying them. Counselling should therefore be related to the new ownership categories or even towards the unknown or uninterested owners. The discussion of aims and the discussion about the potentials of the forests can help to improve the interest in the forest. The first step must be done by the counselling organization.

## **Duration and Requirements**

Counselling forest owners is a task that requires time. Depending on the category, there are differing requirements in the intensity and responsibility for the counselling of forest owners. In places where forest owner cooperatives work with high levels of organisation, the level of counselling intensity can be lower (Category I and possibly II). If these organisations are not present, public advisory foresters or private foresters working with public finance are required for these duties.

#### 4.2.3.4 Specific information

Specific Information is classified very positively in relation to its effectiveness for the market categories 'developing markets.' But also in 'strong markets' the measures of the group specific information are in the top third of measures that are classified as effective. The predominant tendency for simple and short term practicability is a positive classification.

For the category of 'weak markets' this instrument is evaluated as clearly less effective. This may primarily be due to the fact that the mobilisation environment for specific information is not yet sufficient.

#### **Description of the measure's characteristics and underlying measures**

In short, specific information can be described as the offer of mobilisation relevant information for forest actors.

Specific information can be differentiated by the following sub-measures. Only sub-measures which had high effectiveness ratings were chosen.

- **Information about the forest owner**  
Provide specific information about forest owners and their holdings (addresses, sizes, volumes, attitudes, former use) to potential contract partners (operators, industry, consultants etc.), forest owners associations/cooperatives and the forest owners themselves
- **Information about the economic objectives of mobilisation**  
Information about wood mobilisation and the marketing for professionals and forest owners with economic objectives
- **Information about the non-economic objectives**  
Information about the advantages of forest management for nature protection, landscape, biodiversity, recreation etc.
- **Information about the timber supply chain**  
e.g. information about the production process, the importance of assortment and qualities offered to the drivers of wood mobilisation
- **Specific Campaigns**  
Specific Campaigns, fairs, forest owners' days', with focus to mobilization from fragmented forest ownership; target groups are owners themselves and the actors (industry, operators, consultants etc.) within the mobilisation process
- **New forms of information**  
Creation and update of a website aimed at forest owners information regarding all ownership issues
- **Good examples**  
Demonstration of forest management: e.g. how a "good" forest should like ("forest images").

## Examples from the case study regions

The demand for specific information on the forest owner and the wood mobilisation can be derived from the recommendations of the case studies:

- Transparency in timber supply chain; Establishing new communications path to provide specific prepared information for each fragmented forest ownership type (Austria)
- Knowledge of the need for management (Sweden)
- Specific campaigns of forest administration (Saxony)
- Knowledge about possible harvesting potentials (Austria).

In the specific case of new forms of information, information relevant to mobilisation is offered on specific websites. Responsible for this websites are associations, companies or authorities:

- [www.nordicforestry.org/](http://www.nordicforestry.org/)
- [www.familyforestry.net/](http://www.familyforestry.net/)
- [w3.upm-kymmene.com/upm/forestlife](http://w3.upm-kymmene.com/upm/forestlife)
- [www.info-holzmobilisierung.org/](http://www.info-holzmobilisierung.org/)
- [www.privatwald.wald-rlp.de](http://www.privatwald.wald-rlp.de)
- [www.waldwirdmobil.de](http://www.waldwirdmobil.de).

## Responsibilities

The competence for the preparation of particular data has to be discussed with the background of origin and use.

Data for forest owners concerns the geographical location and size of the forest, the address, and possibly also the previous nature of use. This data is at least partially relevant to data protection and the user of the data must demonstrate a justified interest. In the main, public organisations possesses this information and has the power to decide whether it will be forwarded. In the case of strong forest property organisations, this information may also be found at the forest property itself and be available within the scope of mobilisation.

Inventory or aerial image material is frequently compiled with the use of public funds. The state – as owner of this material – may supply this information for free or for a small fee, within the scope of the mobilisation.

Further specific information, such as in information about the timber supply chain, specific campaigns, good examples or the compiling of mobilisation platforms on the internet has to be especially prepared. The use of this measure is similar to flagship-projects (see 4.3). It serves actors who are occupied with mobilisation or forest owners themselves. Individual market partners will only provide this information if they gain a direct resulting advantage. As third party use is not excluded or only excluded with difficulty, the first time provision is in many cases up to the public purse. In the area of 'strong markets,' forest ownership organisations can take on part of the making available of information. These organisations are politically active and strong in the founding of umbrella organisations (Austria, Sweden).

## **Financing and Costs**

Essentially, this measure is financed by the public purse or forest owner organisations. In addition, an integration of the consumer side can be aimed at.

Due to the heterogeneity of measures, no absolute costs or costs related to the mobilised quantity can be represented.

## **Effects**

The effects can be distinguished according to effect on the forest owner and the effect on the actors in wood mobilisation.

In counselling, the forest owner is contacted directly and advised as to the possibilities for his forest. This process is expensive and requires the possibility of direct contact. Specific information can provide important additions to the discussions for forest owners. The forest owner can also be, solely on the basis of this information, put in the position to participate in utilisation. The advantage is that at trade fairs, by representing positive examples or using special websites, a larger number of forest owners can be approached.

Consequently, the effect of specific information is found between general information on forests and use, and the direct consulting of the forest owners as an important element. Forest owners who do not live in the vicinity of their forest, gain improved information options. Interested laypersons can also be offered more in depth information on forests and their use.

## **Overcoming obstacles**

The offer for specific information helps to improve in relation to lacking expert knowledge on existing barriers; the barrier 'Knowledge/skills regarding forest management (2.5 a)' can be named representative for other barriers.

## **Time period and preconditions**

The information on forest owners and the information on actors involved with specific knowledge is a task that requires time and that should be developed permanently:

- Further specific information can be continually added to new research discoveries.
- Databases are extended to include new experiences from further mobilisation activities.
- Internet based information platforms can grow via the user himself.

Above all, for the mobilisation category I and possibly II, specific information appears to be relevant. It required the preparedness for maintenance and the further development of the information sources. But as the readiness to pay for this knowledge, in contrast to its use, is classified highly, the recommendation remains to find the resources for its supply, either through public funds or strong forest property organisations themselves.

#### 4.2.3.5 Organisation

As described in chapter 4.1, powerful and economically driven owners' cooperatives are one of the main components of strong wood mobilisation in fragmented forests. For this reason, the implementation and the improvement of strong owners' organisations is an important measure for the category II and category III regions. In contrast, within strong markets (Category I) these organisations already exist and work efficiently.

#### **Description of the measure's characteristics and underlying measures**

The measure 'Organisation' can be defined as the creation and the improvement of forest owners' cooperatives. A variety of concrete measures must be taken into account which can be grouped into measures to support the owners associations and measures which the owners' associations can establish on its own. In the following, emphasis will be given to the financial incentives offered for building organisational development.

- **Measures to improve the organisational development of forest owners cooperatives:**

Financial incentives for administration costs of forest cooperatives

Financial incentives specifically aimed at wood mobilisation: e.g. premium models

- **Measures by the forest owner associations:**

Incentives to improve the membership of small forest owners in cooperatives (reduced/no membership fees, information)

Specialisation: separation of profit-orientated tasks (wood commercialisation) and non-profit-orientated tasks (service to members, acquisition of new members)

Establishment of forest owners associations aimed at other than purely economic objectives

Selection of appropriate legal forms for associations/cooperations

Consolidation of small cooperatives to bigger units.

#### **Examples from the case study regions**

The Swedish case study, in particular, stresses strong forest owners' associations/cooperatives. Others, in contrast, e.g. the Spanish, Hungarian and German Case study, mention the lack of marketing-active cooperatives.

Literature, too, stresses the importance of active owners' cooperatives (Swedish Södra in: Proceedings, p. 10, 2007; Estonian project in: 'Strategies for increased wood mobilisation from sustainable forests', p.32, 2009; Germany case studies in: Proceedings, Annex I, p. 25, 2007).



## **Responsibilities**

In regions where owners' associations could not emerge on their own, the task of financing at least the first steps and of developing the framework must be taken by the state.

## **Financing**

How to finance the building of owners' cooperatives? Two models of direct financial incentives should be discussed. First, financial incentives can be paid for a limited period to balance the administration costs. The other main source of income is the fees, paid by the owners for the commercialisation of their wood. The advantage of this model is the low risk to start with the mobilisation activities, because there is money even when small quantities of wood are mobilised. The major disadvantage of this model is the weak incentive for the owners' cooperative to mobilise wood.

As a second model, financial incentives can be related to the amount of wood, mobilised from fragmented forest (premium model). Both sources of income, fees and subsidy, depend on the amount of wood mobilised. This model, strictly related to market conditions, seems to build up high hurdles in the case of newcomers to mobilisation. Only regions with good conditions – in relation, for example, to owners' sizes, demand structures or volumes – seem to be appropriate for premium models. Though more difficult to administrate, mixed forms of premium payments and the payment of administrative costs can be recommended.

It can be doubted whether in regions with highly fragmented ownership strong organisations can be created without any infrastructural support or financial incentives. Actual experiences in different regions of Germany show that even existing organizations with good structures do not use even excellent opportunities towards an intensified wood marketing (premium model, see case study Saxony).

## **Costs**

The efforts of mobilisation vary with the existing market conditions. Most case studies mention the price-effect of mobilisation even when the owner is dedicated to aims other than those which are economic. But owners' cooperatives have to work permanently on mobilisation and work continues, regardless whether wood markets are going up or down. Therefore fix costs of the organisation must be covered.

A short example may show the costs and help to derive financial incentives. Experiences in different regions of Germany show that starting with small owner related mobilisation units (cooperatives) annual costs are about 100,000 Euros (1 to 2 persons working, office, mobility). Their main task is to contact owners, motivate them to participate in felling, organize the felling and sell the wood. The costs must be divided among the market partners.

The industries contributions for the mobilisation depend on the market conditions. Their willingness to pay extra is low when wood from bigger private forests or state forests is available. The industries contribution up to now cannot be regarded as a stable source of income.

Owners even of small forests are price-orientated (case studies) and compare prices. Their will to pay for mobilisation (and receive less for their wood) seems also, to be limited. Especially when wood can be spared for own use as firewood, mobilisation costs can be taken as an argument not to supply wood for industrial use.

So finally a premium offered by the state and acceptable fees paid by the owners must cover the costs. Assuming a premium of € 2 (state subsidy) and a fee of € 2 (forest owner) as the major income components, approximately 25,000 cubic meters per year are needed to cover the cost of the former mentioned small cooperative. For beginners in mobilisation, this value is ambitious though not unavailable.

## **Effects**

The effect that can be achieved with that funding is the accelerated formation of owners' cooperatives or their development into professional organisations. As funding is usually limited in time, the question is whether and how these companies can exist without the states' support. Successful cooperatives may serve as an example: the main requirement is growth. Growth can be realized through spatial expansion and more intensive mobilisation of the core region. Expansion possibly is restricted by the neighbours' association. In this case the formation of bigger units must be tried. The formation of umbrella organisations with several neighbours must also be taken into account. Efficiency and consequent independence from the states' financial incentives are only possible when bigger units can be formed.

## **Overcoming obstacles**

Amongst the variety of barriers mentioned in the case studies, cooperation deficiencies (5c) can be overcome by the organisational help offered to the forest owners' cooperatives. This barrier was mentioned in seven of the eight case studies.

## **Time period and preconditions**

Wood markets are generally free markets; financial incentives work contrary to free markets. Financial incentives for the institutional development and improvement must be restricted in time and amount. After an initial period the organisation should be able to create income through growth and professionalisation. In the case of strong regional disadvantages (low volumes, high fragmentation, low growth opportunities, long transport distances) permanent support can be discussed.

### **4.2.3.6 Forest roads**

Poor access to the forests is a main obstacle for wood mobilisation in fragmented forests. Whereas regions with large ownership units generally have an improved road net, road infrastructure in regions with fragmented properties remains weak.

## **Description of the measure's characteristics and underlying measures**

The main measure concerning forest roads is, in general, the improvement of forest accessibility by forest road planning, construction and maintenance. The weighting of the measures showed its major importance for the regions of Category II (developing markets) and III (weak markets).

An improvement of existing forest road networks was evaluated as a wood mobilisation measure that is very effective and easy to implement in short-term under strong market conditions. Nevertheless it is often emphasized that a reduction of transport costs (e.g. by lifting weight limits for existing roads) would support wood mobilisation.

This process within the mobilization can be considered as a more or less 'natural development': first a forest road network must be established (categories III and partly II) which can later be adapted and to market needs and optimized (categories I and partly II) in a second step.

### **Examples from the case study regions**

In several case studies the construction of new forest roads and the improvement of the existing road network in smaller properties are recommended. No exact figures are mentioned in the case studies, but insufficient access to forests, a sparse road network and long transport distances were repeatedly mentioned as hindering for improved wood mobilisation (Austria p.35, Catalonia p. 13, Saxony p. 48, Estonia p. 14).

### **Responsibilities**

Generally, the responsible legal person for forest road building and maintenance are the forest owners themselves. However, often local authorities or forest owners cooperatives have adopted the role of planning and construction management. To convince the forest owners of participating in a road construction project is one important task for said managing organisations. Road-building is often co-financed by national or EU budgets. The costs of road construction vary according to soil, slope and the type of planned roads but are generally relatively low for owners of small forest properties. Of course the main share of the total costs has to be paid by the owners of the small forests involved. Since these roads enable harvests in the first place, the net shares of the cost can be paid out of the revenues of the first harvesting.

### **Effects**

The road network in small private forests is often sparse. It is either designed for small loads or in such bad shape that it cannot be used for commercial transportation. Only with a reconstructed road network the economic use of harvesting machinery, forwarder and trucks is possible. The use of this technology makes the supply of wood economically feasible.

Taking ownership typology into account, any improvement of forest roads facilitates argumentation of felling activities within the wood pooling process. Traditional and mainly income-orientated owners benefit from lower costs in the supply of wood.

### **Overcoming obstacles**

The obstacle to overcome is the lack of forest access and road network (3b). This aspect was mentioned as a barrier in five case study reports.

### **Time period and preconditions**

Road construction must be considered separately from forest road maintenance. For road construction owners generally have to agree, an organisation responsible for the realisation must be found and financing must be clarified. The planning of road building can be time consuming while the execution of its (re-)construction is usually swift.

### **4.3 Flagship projects**

Flagship projects are recommended to act as exemplary actions how a selected “package” of measures improves the situation of wood mobilisation in certain regions. Such projects represent the whole process of wood mobilisation activity, provide indications for difficulties and serve for public relations. The realisation of flagship projects strongly depends on policy support (i.e. mainly financial incentives). In this case rural development funds may be used (LEADER projects, cooperation for innovation). Effectiveness and efficiency of wood mobilisation measures have been found rarely evaluated in general. In fact evaluation is difficult and expensive. Flagship projects could be used to develop and implement evaluation procedures on a scientific level.

The completion and evaluation of flagship projects for the market categories ‘weak markets’ and ‘developing markets’ is among the top ranked measures. Nevertheless, with simple and short term practicability a critical evaluation becomes apparent.

For the ‘strong market’ category this instrument is evaluated as less effective. It is located in the last quarter of evaluated measures. In the mobilisation setting of ‘strong markets’ varied experiences and suitable instruments for wood mobilisation already exist. In addition, the effect of ownership fragmentation is not as heavily encountered there.

#### **Description**

Flagship projects are exemplarily established (limited in duration and affected area) and directed to a variety of aspects of wood mobilisation (e.g. pooling processes, development of specific instruments, information and research). They are not related to certain measures. Mobilisation should be treated in its complexity and less from the point of view of isolated problems. Essential characteristics of flagship projects can be defined as follows:

- time and space limits of the projects
- the nature of the research for the project
- consideration of transferability to other regions
- mix of social, scientific and engineering based components.

#### **Examples from the case study regions**

In case studies and in literature various examples are given that can be categorised as - flagship projects:

- Massif development plans; Case studies Rhône-Alpes – (p.39)
- HAF-Mobilisation project; Case Saxony (p. 68)
- Eifel Wald und Holz Management GmbH, Eifel; Forstwirtschaftliche Vereinigung Eifel (in Strategies for increased wood mobilisation from sustainable Resources, 2009)
- Holz21 (Switzerland); Wald-wird-mobil.de (Germany)

## **Responsibilities and Financing**

As a rule, flagship projects are carried out essentially or solely with public finance. The inclusion of local actors is decisive – from research facilities, the consumer side, the involved organisations and stakeholders.

The assumption of costs by the state can be justified from the perspective of overcoming transaction expenses. The costs are sunk costs that serve to improve the creation of infrastructure for wood mobilisation. This infrastructure is made up of knowledge, suitable instruments and techniques. Market partners would be unlikely to provide the financing, because the discoveries from the projects cannot be used exclusively. The economic advantage is, above all, in the overcoming of initial barriers. The public economic gain – that is the assumption – outweighs the short term investment from the public purse.

## **Costs**

The costs of flagship-projects can vary markedly. Considering a running time lasting multiple years, costs are incurred for personnel, tests - e.g. at wood harvest, or for the development of software for GIS applications. Total costs amounting to several hundred thousand Euros can accumulate during the running time.

## **Effects**

The effect of a flagship-project is based on the improvement of the entire mobilisation process regarding various ways of looking at the problem. Individual instruments can be implemented and be evaluated over a longer period of time. Achieving the goal can be measured in view of additional quantities of wood, areas and forest owners. The goals must be precisely defined and quantified in advance.

For the most part, the projects work in close cooperation with existing organisations. Forestry administration or forest ownership associations are the natural partners of these projects, which need to be strengthened within flagship projects. This might be through an improved data- and knowledge-base, the provision of technical instruments, the adoption of new duties and the creation of adapted structures.

Flagship projects should reveal dynamics so that after the course of the project, stronger mobilisation organisations exist and the success can be measured by larger quantities of wood from small parcelled private forests. Ideally, these projects are run parallel to increased information campaigns, training and adaptation to promotion instruments.

Flagship project necessarily have to be oriented towards the whole variety of ownership categories. If flagship projects are provided with a scientific component, in particular, the linking between ownership categories and measures should be part of the investigation.

## **Overcoming obstacles**

The action works more strongly on the barrier 'middle-men & consultants' and takes effect by removing the lack of existing cooperation (compare Chapter 4.1.1.1 Existing barriers of wood mobilisation). The barrier 'middle-men & consultants' were described as a central hindrance in seven of the eight case studies.

In addition, all barriers can be named that exist in connection with the owners and are positively influenced by flagship projects.

## Time period and preconditions

The duration of flagship projects usually is between one year and several years. Ideally, stable organisations are developed from the project approach. These establish themselves on the market through the supply of additional quantities of wood and the acquisition of forest owners and their areas.

Flagship projects develop, above all, a higher effectiveness when limited experience in wood mobilisation is present in one region and existing experiences from other regions are only restrictedly transferable.

### **INFO BOX: The Eisenstadt Forest Project**

An excellent example of a promising flagship project is currently implemented in Austria targeting an extremely fragmented forest area (see figure 30) with mainly non-traditional forest owners in the Province of Burgenland. The project is covering an area of approximately 500 hectares close to the city of Eisenstadt. The forest is owned by 210 private owners divided in 890 (!) parcels, with an average size of 0.6 hectare per parcel. This example of extreme fragmentation has been a consequence of inheritance. Currently there is de facto no forest management (incl. no harvests) on this area at all. The main barriers for mobilisation so far were:

- Management of single parcels or treatment of timber sales based on single parcels (cooperative timber sales) is too expensive because costs are too high related to output.
- The area is lacking basic infrastructure (e.g. a forest road) to perform substantial and effective harvesting operations.
- Consolidation of single parcels to larger management units failed because it would require a change in ownership (e.g. give up ownership of a specific parcel of land for a (virtual) monetary share in a larger unit). Owners and politicians acted against it.

In order to overcome this unproductive situation and these unfavourable conditions the project aims at land consolidation by leasing the land parcels (without giving up ownership) to an institution managing (not only harvesting) a larger, economically feasible land area. For the lease the owners will receive an annuity based on the value brought into this larger management unit plus additional “fees” depending on increasing increment (as a result of silvicultural management). Furthermore the owners save the costs for a forest-ownership-based statutory insurance.

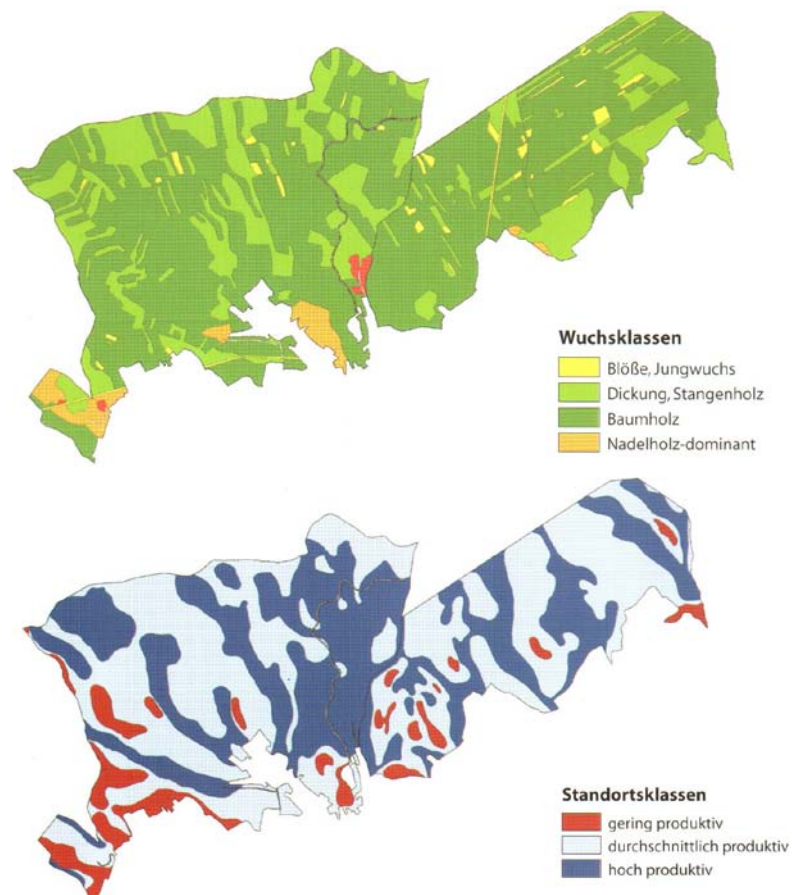
The main precondition to start this project is a valuation of parcels (just the forest stands and their productivity, not the land value, because ownership remains). Figure 31 shows the main parts of this valuation process in the Eisenstadt Forest Project area. This valuation must be fulfilled by a low costs approach (e.g. using GIS applications) as such expenses would endanger the economic feasibility of the project. In fact the valuation process is the only major costs in advance of the project. Based on the valuation long term lease contracts covering at least one rotation period (e.g. not less than 60 years) will be developed and must be agreed with the owners.

Due to the long term nature of the lease contract physical persons seem inappropriate as potential leaseholders. The lease in case of this project will be held by either a large neighbouring forest holding or the local authority (municipality). Although the forest holding would be able to provide professional forest management by itself the forest owners seem to prefer the municipality as a leaseholder due to historical and confidence reasons. In this case the municipality would not perform the forest management itself but contract for example the local

forest owner cooperative or a private forest management provider to carry out the work.



**Figure 30: Distribution of forest ownership parcels in an extremely fragmented forest (Province of Burgenland, Austria) where a flagship project is currently implemented**



**Figure 31: The two major parts of the parcel valuation in case of the Eisentadt Forest Project. The left part of the figure is showing the site productivity (dark blue for high productivity). The right part of the figure shows the status of the forest stands (dark green indicating mature stands). By GIS programs this information is connected to the parcels in figure 30.**

A key factor for implementing such a project is the existence of one person or a group of (very) dedicated persons carrying out the implementation of the project on site. These project implementers need to be locals who are personally known to most of the owners. This is important to improve the acceptance of the idea by forest owners. Currently the valuation of the total area has been completed and the results have been broken down to each individual parcel. The owners of approximately 200 of the 500 total hectares have already agreed to participate in the project. A long-term lease contract model is currently developed with lawyers.

This or a similar project could be used to develop a first manual of project implementation as well as to assess effectiveness and efficiency of such wood mobilisation measures. Such activities need to be organised and financed on national and European levels in form of applied research projects as the results would be exploited and used in other regions.

#### 4.4 Conclusion

Task 4 of the study aimed at an identification and description of measures to increase wood mobilisation from forests with fragmented private ownership. Unfortunately there were almost no genuinely new findings given by the regional case study reports regarding wood mobilisation measures or initiatives and its effects. However, an evaluation of the presented obstacles identified **'other than wood marketing objectives'**, **'low profitability'**, **'independency of forest-related income'** and **'lacking knowledge and skills'** as the most important barriers for wood mobilisation from fragmented forests under all market conditions. Marketing-related factors as for instance self-supply, the availability and quality of harvesting operators or sales methods are only of secondary importance.

**Counselling and information** are appropriate and very effective instruments for overcoming these four most significant and solely owners-related barriers especially when focussing non-traditional and uninterested private forest owners. At the background of different market conditions the effectiveness of information and counselling is however varying between the regions, and highest importance is given for "developing markets" with mediocre conditions of wood mobilisation. Information and counselling are also appropriate measures for a number of other obstacles found in the case study regions as for example 'urbanity', a 'total lack of interest' or 'missing market access'. But who should have responsibility for the provision of information and counselling? And how could it be financed?

**Organisation** of private forest owners, i.e. cooperation like associations and co-operatives is one answer. Another source of information and counselling for fragmented forest ownerships are private consultants or public foresters.

Advantages of formal cooperation are not only seen in the provision of knowledge by information and counselling but also in an overcoming of missing skills, an exchange of experiences and in a higher profitability of forest management because of pooling processes and better wood prices due to high volume contracts. Consequently not only the previously mentioned four obstacles must be overcome, but also additional ones as 'missing forest access', 'missing trust', 'urbanity', a 'forest owner's total lack of interest' or 'low forest productivity, low wood quality and unfavourable terrain conditions'. However, organisations must consider the specific situation of owners with fragmented forests, i.e. their small property sizes and therefore low income possibilities, their income independency and their variety of (non-economic) objectives. Fee-requiring, purely economic-driven organisations with



a high share of “large” private forest owners are considered to be only rarely an option for fragmented private forest ownership’s formal cooperation. Free membership, the extension of organisations’ objectives and activity (e.g. counselling towards firewood use or integrated nature conservation, creation of a ‘community spirit’ by specific events, excursions etc.) or the establishment of exclusively fragmented owners’ organisations with specific objectives (firewood production, tradition/pride, nature conservation, hobby) could improve the situation of a low membership of fragmented owners. As a result an addressing of numerous (pooled) owners of fragmented forests will be possible and information concerning the advantages of forest management for forest stability/protection, nature conservation or recreation is expected to result in a higher amount of mobilised wood.

Financial incentives, especially to cover administration costs of organisations, could help to support an integration of fragmented private forest ownership or an establishment of new organisations exclusively aimed at fragmented forest owners. Compulsory membership is, albeit very effective, not an option for a higher level of cooperation in Europe. In general, local associations and cooperatives should be represented by a national (regional) organisation that is lobbying for the interests of private forest owners<sup>100</sup>. This could help to overcome the obstacle of ‘generally low policy support of owners with fragmented private forests.

**Public foresters** and **private consultants** can also act as a source of information and counselling for private forest owners. As reductions of administration staff have led to a decrease in counselling capacities of public foresters in some countries, private consultants can compensate these deficiencies. Forest consultants should be permanently available for all questions related to forestry (i.e. forest management, wood marketing, property sale, nature conservation, financial incentives etc.) and negotiate between the forest owners and authorities, forest operators or other stakeholders. This will be of course only possible in case of financial support (financial incentives) because of low income from small private forest properties. A voucher system seems to be an appropriate method for subsidizing information and counselling of owners with fragmented forests. Any competitive situation between public foresters and (subsidized) private consultants is expected to hamper wood mobilisation efforts and must therefore be avoided as for instance by a clear and transparent division of tasks.

A lower degree of **bureaucracy** is considered to be very effective for wood mobilisation in all market conditions. Improvements regarding requirements of official documents and processes related to forest management and wood marketing could not only be realised relatively easy and within a short term, but would also lead to cost savings at administration. These resources could be used for intensified counselling (public foresters) or subsidizing measures for wood mobilisation in general.

**Pooling processes** were evaluated as very effective and to be realised in short-term especially under “weak” and “developing” market conditions. But except for pooling activities of organisations, pooling realised relatively spontaneously by individuals (forest operators, foresters etc.) have no long-term effect for wood mobilisation. Such a long-term effect can however be achieved by improvements of the infrastructure, i.e. **road building and reconstruction**. Road building is a highly effective measure for wood mobilisation, but since it requires cooperative work it is not to implement very easy and in short-term especially under “weak” market

---

<sup>100</sup> Otherwise the national lobbying organisation is lacking input, while the local organisations have no channel for output of interests or problems. Local forest management associations are (formally) presented by a national organisation in Austria, Sweden and Estonia, but not in other case study regions.

conditions. This means that cooperation of private forest owners (either informal or formal) is a precondition for infrastructure improvements if road building is not taken over by state entities (e.g. communities) directly.

**Flagship projects** can act as exemplary how e.g. pooling processes and road building improve the situation of wood mobilisation. Such projects represent the whole process of wood mobilisation activity, provide indications for difficulties and serve for public relation. Realisation of flagship projects strongly depends on policy support (i.e. mainly financial incentives).

**Policy support** concerning fragmented private forest ownership should generally be improved by emphasizing the importance of small-scale owners. Counselling and specific information for small-scale owners as well as appropriate financial incentives are seen as measures that could strengthen the position of owners with fragmented private forests and lead to consciousness of their importance not only in the wood market-related discussion.

## **5 Conclusions and recommendations for increasing market supply of wood and other forest biomass from fragmented forest structures in the EU (Task 5)**

In the previous sections the general availability of wood in Europe and the current structure of its forest ownerships were described. Conditions in eight case study regions were analysed in detail focusing on forest owner characteristics, market structures and conditions as well as existing barriers and measures for wood mobilisation. Based on this information this chapter is about the main final conclusions and the recommendations derived thereof. In order to fulfil this aim each project partner organisation was asked to point out their personal conclusions and recommendations in short proposals (see annex task 5). These documents were analysed in order to extract the most valid and general results as well as to uncover underlying structures.

### **5.1 Conclusions**

First of all, several barriers for wood mobilisation from fragmented forest ownerships have been identified which included low or even no profitability of forest management (e.g. taking the cost of regeneration into account), income independency of private forest owners (i.e. income from forestry), lack of knowledge and skills of forest management by private forest owners (e.g. regarding harvesting technique or achievement of felling permission) and cooperation deficit between different private forest owners.

The assessment of mobilization measures by type of market and by type of owner is one of the central achievements of this study. The analysis of the market factors supply, demand, infrastructure and legal framework resulted in a categorisation of three types of dominating market conditions in Europe into which the case study regions were classified:

- Category I: “Strong market” with advantageous conditions of wood mobilisation (Sweden),
- Category II: “Developing market” with mediocre conditions of wood mobilisation (Austria, Estonia, Saxony) and
- Category III: “Weak market” with disadvantageous conditions of wood mobilisation (Rhône-Alpes, Catalonia, England, Hungary).

It is concluded that measures for additional wood mobilisation are necessary in regions of category II (aimed at an “improvement” of existing structures supporting wood mobilisation) and in regions of category III (aimed at an “establishment” of structures supporting wood mobilisation). Hence further concluding analysis as well as recommendations focus on “developing” and “weak markets” whereas “strong markets” (Sweden) are used as a model for possible developments and improvements. Anyhow, measures applied in “strong markets” may be useful to keep the favourable conditions in place. Within market categories II and III a clear relation between fragmentation of ownership and a lack of mobilisation wood has been found in almost all regions. Investigating the underlying factors for this

relationship the analysis of the cases studies results (task 3) showed that forest owner specific factors (owner typologies, motives), market conditions and regional differences must be taken into account to fully understand the relation between fragmented forest ownership and the lack of wood mobilisation.

Regarding forest owners' related factors it has been found that in general (in all cases with sufficient data available) a significant number of fragment forest owners show a strong and positive reaction regarding wood price changes<sup>101</sup>. Hence, a huge mobilisation potential can be assumed in case of rising wood prices - a factor that is again linked to the market type.

#### **5.1.1 Traditional forest owners (economic oriented towards wood production)**

Those who do participate in wood production for markets or for own use are most likely more traditional forest owners with farming or forestry background and knowledge. They could be characterised by their economic-oriented objective of forest ownership. Their major barriers for wood mobilisation are the unfavourable economic conditions in fragmented forest ownerships. Consequently they have strongly reacted on changes in profitability, be it due to rising demand and prices for wood (mostly) or due to direct or indirect financial incentives that affect the profitability. Hence this group is comparably easy to tackle by traditional tools for wood mobilisation but the efficiency of these measures depend on the impact on profitability, their interrelation with changing wood prices and the short-term dynamics (volatility) of the wood market e.g. in relation to calamities.

In the case of these more traditional forest owners the effects of market structures have been found to play a significant role for the effectiveness of wood price premiums. More developed or mature wood markets show much better performance than developing or emerging markets. Mature wood markets have been found in case of regions with a diverse developed wood consuming industry as well as in case of a diversity of forest service and owner association offerings. Furthermore, well established wood selling methods and channels support wood mobilisation in these markets. In the best case (Sweden) such markets are also characterized by a high level of confidence between forest owners and wood industry reaching to various forms of vertical cooperation. All those wood mobilisation measures have to take into account the existence of short term dynamics of wood markets caused mainly by storm events. Hence short term oriented measures have to be applied with great care not to create adverse effects in the medium term in case of such events.

#### **5.1.2 Non-traditional forest owners**

In contrast to traditional forest owners two more main forest owner types have been characterized that may not or only to a minor degree participate in wood markets. These non-traditional forest owners may have no farming or forestry background, hence no forest-related knowledge, and they may live far away from their forest and have typically become forest owners by restitution or inheritance. Probably the most important point to understand this group is to see the diversity of non-economic or at least not wood related oriented motivations in relation to their forest ownership. This growing group of non-traditional forest owners requires a completely new

---

<sup>101</sup> This applies to wood delivered to markets only whereas household consumption and informal markets can be considered as comparably constant.

understanding of and new ideas for wood mobilisation. This group is definitely the one lacking a great number of possible mobilisation measures but showing a larger strategic potential for mobilisation in the medium and long term, especially as this group is expected to grow in the future. Although the general knowledge about this group has been found low, it is possible for the purpose of wood mobilisation measures to divide this group into two subunits:

- Owners with no wood-related (often non-economic) objectives
- Uninterested owners (no objectives at all)

In case of forest owners with no wood-related or even non-economic objectives it is clear that a key issue for wood mobilisation lies in knowing and understanding their objectives. So far it seems that these groups are characterized by a great variety of different possible objectives - in some cases even a mixture of various objectives within the one ownership. A few of these objectives may conflict with wood mobilisation<sup>102</sup> in general (e.g. conservation; loss of property value, tourism) but others may be unaffected or even highly convergent to wood mobilisation (e.g. family tradition, leisure, ownership pride). In these cases, a lack of forest-related knowledge, network and service opportunities (in context to market type) may turn out to be the reason why such forest owners do not participate in wood markets. Hence measures targeting this group need to reach their owners with information, guidance and services but not with profitability-related measures.

Uninterested forest owners represent a group that by definition cannot be reached by traditional and general mobilisation measures. Beside the attempt to awake their interest by information campaigns, the probably most efficient measures for this group are those preventing further fragmentation by law or by regulations as well as land consolidation programmes including legal settings that simplify transfer of forest land.

### 5.1.3 Rough estimations on mobilisation potentials

In order to assess the amount of wood that may be available by mobilisation measures from fragmented forest ownership structures the case studies revealed some key figures that however were highly uncertain. The share of fragmented forest ownerships by total forest area (see section 2, table 11) was found between 20 (Saxony) and 50% (Sweden) in most case studies except Hungary (4%) and England (no estimation available). In those regions where data or estimations were available it was expected that in fragmented forest ownerships the harvests reach only 20 to 50% of the increment with exception of Sweden reaching 80%. Assuming that the total increment is equal distributed over all ownerships the available data and estimations allow to estimate that the total annual amount of wood potential mobilised from fragmented forest ownerships may in the range of 0.9 million cubic meters in case of Rhone-Alpes, 1.5 million cubic meters in Saxony and 8.3 million cubic meters in Austria. Anyhow increment data will definitely tend to over estimate the ecological and economical feasible potential (BFW, 2009) in most regions. On the other hand the assumption of equal distributed increments over ownership types can be considered a conservative assumption.

---

<sup>102</sup> None of these objectives and wood mobilisation are necessarily mutually exclusive; of course, it always depends on site conditions and situation.

Even more difficult and uncertain are estimations regarding the traditional and the non-traditional owners share within these potentials. Available indications are the share of non-farm forest ownerships and non-residential forest ownerships as well as the share of relevant education among forest owners. Such information is always related to the total number of private forest owners and not to the fragmented forest owners or the forest area. Hence the assumption that forest area is equally distributed among private forest owners is necessary to get rough estimations although it is clear that non-traditional forest owners are very likely to own smaller lots than traditional owners. This systematic over estimation is very likely fully or partly compensated by the fact that non-traditional forest owners may be characterized by even lower wood utilisation rates than their traditional counterparts. In Rhone-Alpes these considerations lead to the conclusion that between 0.3 and 0.7 million cubic meters annually or 55% of the potential from fragmented forest ownerships may originate from non-traditional owners. A similar level can be assumed in Saxony (57%) whereas the estimations in the Austrian case study lead to a lower average level (between 5 and 33%). The definition and understanding of what is considered as non-traditional forest owners is vague, varying and depending on regional conditions. Therefore these figures are very difficult to be verified.

Indeed the share of non-traditional forest owners and their share of forest area are widely unknown and are very likely to differ on a regional level. As for example farm owners represent 20% of the owners in Austria but they represent a larger share of forest area because they have larger forest properties than other types. In Rhone-Alpes, around 60% of the forest land can be related to this owner category of active managers (savers, local social foresters, local producers, long-term managers). Anyhow there is a clear trend that this category of traditional forest owners is decreasing in prevalence across most of the case study regions. It should be noted that in the ongoing structural change in forest ownership, there is still a large part of forest owners that have some family-related connection to agriculture and would be open to traditional forest management services that are offered by neighbours or associations. It can be assumed that those transitional owner categories will change to non-traditional types in the next generation latest.

## 5.2 Recommendations

The usefulness and efficiency of wood mobilisation measures towards fragmented forest ownerships is extremely dependent on region, market condition and forest owner type.

There is neither the one and only perfect mobilisation measure available nor the need to develop many new measures to be applied. The results suggest that the most efficient mobilisation may be achieved by a combination of measures selected according to the regional situation mainly including the market type as well as the distribution of forest owner types, respectively their objectives (see table 17).

In a similar way the priority of the recommended measures is dependent on various factors like the objective of mobilisation (e.g. amount of wood, economic efficiency, short or long term effects). Decision on, implementation and efficiency of some measures is depending on other measures (general package, information, knowledge) and hence these measure can seen as important pre-measures.

Flagship projects are recommended to serve as exemplary actions how a selected “package” of measures improves the situation of wood mobilisation in certain regions. Such projects represent the whole process of wood mobilisation activity, provide indications for difficulties and serve public relation. Realisation of flagship projects strongly depends on policy support (i.e. mainly financial incentives). In this

case rural development funds may be used (LEADER projects, cooperation for innovation).

**Tab. 17:** Mobilisation measures presented under 4.1.2.iv in relation to market condition, owner type and objective (X = relevant and recommended)

	Strong market				Developing market				Weak market			
	Traditional owners	Non-traditional owners convergent with mobilisation conflicting with mobilisation no objective			Traditional owners	Non-traditional owners convergent with mobilisation conflicting with mobilisation no objective			Traditional owners	Non-traditional owners convergent with mobilisation conflicting with mobilisation no objective		
<b>Information</b>												
General information	X	X	X	X	X				X			
Specific information	X	X	X	X	X	X	X	X	X	X	X	X
Counselling		X	X	X	X	X	X	X	X	X	X	X
Training		X			X				X	X		
<b>Cooperation</b>												
Networking	X				X				X			
Organisation	X	X	X		X	X	X		X	X	X	
<b>Infrastructure</b>												
Roads & railways	X				X				X			
<b>Legal framework</b>												
Land consolidation				X				X				X
Transport	X											
Financial incentives					X	X			X	X		
Bureaucracy	X				X	X			X	X		
<b>Specific Instruments</b>												
Pooling activities					X				X			
Forest Information systems	X	X	X	X								
Harvesting technology	X				X							
Contracts	X	X			X	X			X	X		

### 5.2.1 Information

Information aims at imparting knowledge as well as skills. It is especially relevant for the types of non-traditional and uninterested owners, which can mainly be found in regions of market category II and III. Information is subdivided into 'general' information, 'specific' information, 'counselling' and 'training'. While *general information* directs towards the public as a whole and aims at an improvement of the awareness concerning forests, forest management and wood use, receivers of 'specific' information are individuals involved in forestry and wood mobilisation. *Specific information* cannot be given only with the help of special printings and media, but also via internet, via campaigns, fairs or workshops. *Counselling* requires professionals giving advice (mainly) to forest owners, while *training* can be implemented to en-

hance the skills of people involved in wood harvesting (forest owners, forest operators).

Lacking opportunity for identification of fragmented forest ownerships is a general barrier for almost all wood mobilisation measures. All tasks of the project uncovered some kind of data or information short comings. Most important short coming in this respect is related to difficulties to identify the owners of certain wood lots. This is a major barrier to decide on and implement effective measures (e.g. consolidation projects), to study forest owner behaviour, attitude and objectives and to facilitate the industries efforts to buy directly from owners.

Information on owners and ownerships (as part of specific information measures) should be collected and organised on a regional basis e.g. data base at local authorities. This requires adaptation of the corresponding legal frameworks as well as a systematic and efficient implementation plan including necessary resources which have to be provided at national or even better at European level. Although this is the most general measure it will provide the base for major improvements in weak and developing markets and with non-traditional forest owners. An ideal solution would integrate this information in a GIS application creating a forest information system (see 5.2.5). Such a system should allow assessing the distribution of forest owner types in a certain region in order to find the most effective bundle of mobilisation measures to set.

The objectives of non-traditional fragmented forest ownerships need to be known and understood. They need to be analysed towards their convergence and impact on wood mobilisation. This is the base on which efficient communication and information measures need to be building on. Therefore, intensive qualitative and quantitative research (see 5.2.6) is needed to investigate the nature and kind of these objectives (qualitative methods) and to uncover the distribution and frequency of the objectives in certain regions (quantitative methods) to enable optimised communication strategies in the regions. This could be covered by European research projects.

Traditional information channels as for example extension services need to be adapted as well as new channels for information, guidance, forest service and wood distribution developed. Internet-based applications like newsgroups or web-platforms may be ideas that have to be investigated by research and promoted if proven useful. Based on these channels, new forest service operators (or at least new services provided by them) as well as new market places for wood (Wood-e-bay) could be developed. Planning, implementation and efficiency control of such channels will very likely need external support in the beginning but should in the medium term work economically independent.

At first these measures need to be guided on a European level but may be adapted to national scales later on. Financial support for such activities may be possible through rural development programmes (cooperation for innovation). Similarly, such measures can be transferred from public authorities to the private sector as soon as their economic feasibility has been proven.

In case of traditional forest owners the focus of economic oriented measures in developing and weak market conditions information measures need to address direct improvement of the profitability. Extension services providing information, counselling or training play a major role in such situations. These are national activities that can be set with a certain regional focus. In some cases (e.g. developing markets) these activities may be already implemented on high level and may be further facilitated by pooling (see 5.2.5) and cooperation measures (see 5.2.2).



## 5.2.2 Cooperation

Cooperation serves to share information and undertake joint activities and is a generic term for all measures related to organisation and networking. While *networking* in the present study is understood as (relatively loose) interaction between the stakeholders of the wood mobilisation process (forest owners, public forest service, forest-based industry, counsellors and operators), *organisation* means an institutionalized cooperation of private forest owners in the form of owners associations or forest management cooperatives.

The promotion of fragmented forest owners association (focusing on alliances), forest owner cooperation (focusing on work/services), joint management or even joint lease or ownership is in general a promising measure for wood mobilisation offering a number of proven advantages (e.g. more continuous wood flow for wood demanders, better accessibility of forest owners for all stakeholders, higher cost efficiency for private forest owners etc.). While traditional forest owners are mainly covered by association or cooperation activities, non-traditional owners may demand a different kind and/or level of cooperation. The results regarding forest owner associations show that regardless their success in the past they have proven to always work well with the relatively larger and more traditional forest owners. In order to continue this success story it will be necessary to develop new forms especially focusing on more fragmented non-traditional owners and their less wood production-oriented objectives.

Owner associations designed for urban forest owners could for example act as network and service provider located in the cities pooling forest ownerships in different locations. Other associations may target environmental-oriented forest owners, which will have completely different information and knowledge need. Thinking about new forest owner organisation types it is necessary to consider possible political backgrounds of traditional organisations in some regions that may be a barrier for non-traditional owners. Hence it may be necessary to implement politically neutral association managements.

**Tab. 18:** Most promising form of forest owner organisation in context to market condition, owner type and objective

Market Condition/Owner Type	Association	Cooperation	Joint management	Lease management	Joint ownership
<b>Strong Market</b>					
Traditional owners					
economic objective	X	X			
Non-traditional owners					
convergent with mobilisation	X	X	X		
conflicting with mobilisation	x	x	x		
no objective				X	X
<b>Developing Market &amp; Weak Market</b>					
Traditional owners					
economic objective	X	X	X		
Non-traditional owners					
convergent with mobilisation	X	X	X		
conflicting with mobilisation	x	x	x		
no objective				X	X

In general, non-traditional forest owners have a higher potential for joint management instead of owner associations or co-operations whereas uninterested owners could be a target group for joint ownership structures (see table 18).

The implementation of such new forest owner organisation types would definitely need support from authorities on European and national levels. Successful implementation in certain selected regions would most likely lead to similar regional activities as well as an integration and transfer of such activities towards the private sector.

Market development by improvement of information access (transparency) in the market (for all participants); this should help improving confidence and vertical cooperation in the sector (networks). Vertical cooperation offers an opportunity for reaching a higher level of organisation. Such measures need to be set on national and regional levels. In the case of Sweden there is a high level of vertical organisation in wood supply. In the biggest Swedish Forest Owner Association Södra the members manage their forests together and they also own wood industry companies.

### 5.2.3 Infrastructure

Infrastructure summarizes all measures that affect the accessibility of forests and wood transportation, e.g. road building and maintenance. Poor access to the forests is a main obstacle to wood mobilisation in fragmented forests. Whereas regions with large ownership units generally have an improved road net, road infrastructure in regions with fragmented properties remains weak. The main measure concerning forest roads is, in general, the improvement of forest accessibility by forest road planning, construction and maintenance. The weighting of the measures showed that the latter were very important for the regions of Category II (developing markets) and III (weak markets).

An improvement of existing forest road networks was evaluated as a wood mobilisation measure that is very effective and easy to implement in short-term under strong market conditions. Nevertheless it is often emphasized that a reduction of transport costs (e.g. by lifting weight limits for existing roads) would support wood mobilisation. This process within the mobilization can be considered as a more or less 'natural development': first, a forest road network must be established (categories III and partly II), which can later be adapted to market needs and optimized (categories I and partly II) in a second step.

In contrast to financial incentives directly related to wood harvesting, road building and reconstruction programmes as well as liberalisation of transport restrictions (see legal framework 5.2.4) would help owners of fragmented forests to participate in markets without causing a major bias to the markets' demand and supply situation. Such programmes need to be coordinated at national levels.

### 5.2.4 Legal framework

Legal framework summarizes all measures related to land consolidation, financial incentives, restrictions on transport and bureaucracy. It addresses all types of owners of fragmented private forests. Measures of *land consolidation* should help to overcome the (structural) problem of forest fragmentation, while *financial incentives* serve a number of improvements related to forest management and wood marketing. Specific wood mobilisation measures in the context of the legal

framework can also focus problems of *transport* and *bureaucracy* related to forest management and wood marketing.

Facilitation of bureaucracy regarding official requirements concerning forest management, harvesting and wood marketing is of high importance for wood mobilisation improvements under all market conditions. It is evaluated as highly effective and easy to implement within a relatively short term. State (forest) agencies are responsible for facilitations of official requirements. Costs will not arise as financing is not necessary. Rather the opposite is true: Facilitations of official requirements can help saving money at the agencies.

In case of traditional forest owners with dominating economic objectives it is necessary to understand the economics of fragmented forest ownership on a regional level to identify the most effective points for improving profitability also in case of financial incentives. The results of this study clearly showed that in case of strong market conditions the economic constraints of the management of fragment forests (e.g. infrastructure, transport) are different from developing or weak market conditions (e.g. training, pooling, financial incentives).

In exceptional weak markets direct financial incentives may be helpful to implement wood market activities. A voucher system for thinning or harvesting operations could be used to attract market participation. Such a measure must aim to produce domino effects by attracting the first forest owner's neighbours to harvest as well.

#### 5.2.5 Specific Instruments

Specific instruments for the improvement of wood mobilisation are pooling activities, forest information systems (FIS), harvesting technology and contracts. *Pooling activities* aim at enhanced forest management and wood marketing through "bundling up" forest properties and wood by organisations (e.g. public forest service, forest owners association) or individuals (e.g. forest operators). *Forest information systems* provide information relevant for wood mobilisation activities (e.g. GIS; information regarding forest owners, contracts, payments etc.). *Harvesting technology* describes machinery and technology necessary for forest management and harvesting, while *contracts* form the base for binding agreements within the process of wood mobilisation.

The process of wood quantity bundling as a pooling activity is positively classified for the market categories 'weak markets' and 'developing markets' in relation to its effectiveness. However, the two factors 'simple and short term feasibility' reveals a more critical assessment. The regional organisation for timber mobilisation and marketing is responsible for the pooling process. Depending on the region, these can, in particular, be forest owners' cooperatives, state forest administration or private service providers. The pooling process requires the trust of the forest owner. Local forestry bodies of forest owners have the advantage of constituting the ideal 'middle-man' between supply and demand.

First-time bundling activities (possibly to be stronger established in the area of 'flagship' projects) and permanent bundling activities have to be distinguished. First-time pooling activities can be supported by the public purse. The permanent bundling activities are connected to costs that can be jointly carried by forest owners and the declining industry. In contrast to land consolidation for wood mobilisation pooling is short-term orientated and can involve even smallest properties, but is targeting more towards traditional forest owners.

As already mentioned (see 5.2.1) internet-based applications like newsgroups or web-platforms may be ideas that have to be investigated by research and promoted

if proven useful. Based on these channels new forest service operators (or at least new services provided by them) as well as new market places for wood (Wood-e-bay) could be developed. Planning, implementation and efficiency control of such channels will very likely need external support in the beginning but should in medium term work economically independent. Financial support for such activities may be possible through rural development programmes (cooperation for innovation). There is still a huge need for research and development in context to these measures. So far they exist mainly as ideas. These measures apply to all market conditions and most of them (especially the internet-based ones) are by nature geographically independent. Hence these measures need to be guided on a European level by now but may be adapted to national scales later on. Similarly such measures can be transferred from public authorities to the private sector as soon as their economic feasibility has been proven.

The development and implementation of harvesting technologies adapted towards fragmented forest ownerships by research projects would be a similar measure but is more time consuming and difficult to fulfil.

### **5.2.6 Research**

Given the lessons learned from carrying out this study the importance of further research has been found regarding several areas. Based on the results four major fields of research can be defined. For many of the proposed measures the improved availability of information (data) would be a pre-requisite for some of the proposed research topics. Hence the establishment of an information system is mentioned here as one relevant point although it is not research per se but very important to develop decision support tools. Furthermore we distinguish mainly between research addressed towards traditional and towards non-traditional forest owners. Finally research attending flagship projects is mentioned.

#### **1. Data collection, information system and decision support tool**

As stated mainly in section 5.2.1 the project uncovered data and information shortcomings starting at the point of forest owner identification. This is a major barrier to develop decision support tools for measure implementation, to study the effectiveness of certain measures (e.g. consolidation projects), especially the forest owner behaviour, attitudes and objectives and to facilitate the industries' efforts to buy directly from owners. Although the collection and provision of such data is not a central task for research the implementation of such information systems should be guided by integrated and preparative research.

The development of a systematic and efficient implementation plan at the European level should definitely be guided by scientific research. An integration of the new information in a GIS application creating a forest information system as mentioned under section 5.2.5 could also be a subject of preparative research. The research should definitely lead to a system for easy assessment of the distribution of forest owner types in a certain region to provide decision support for the most effective bundle of mobilisation measures to implement. These measures could be at first applied in so called flagship projects (see 4.).

#### **2. Research towards non-traditional forest owners**

A main subject in this area is the investigation of non-traditional forest owner's objectives. They need to be analysed towards their convergence and impact on wood mobilisation on a regional basis. This would build up the base on which efficient communication and information measures could be developed. Therefore intensive qualitative and quantitative research is needed to investigate the nature and kind of these objectives (qualitative methods) and to uncover the distribution and frequency of the objectives in certain regions (quantitative methods) to enable optimised and tailored communication strategies in the regions. As such research has been started on regional levels in some cases, this topic would substantially benefit from research projects on the European level (FP 7) designed to foster the interregional exchange and know-how transfer.

Another very important subject are new potential channels for information, guidance, forest service as well as new types of forest owner associations (see 5.2.2) that attract non-traditional forest owners. In this context internet-based applications like newsgroups or web-platforms are ideas that have to be investigated by research and promoted if proven useful. Based on these channels new forest service operators (or at least new services provided by existing operators) as well as new market places for wood (Wood-e-bay) could be developed. Planning, implementation and efficiency control of such channels will very likely need external support in the beginning but should work economically independent in the medium term. Financial support for such activities may be possible through rural development programmes (cooperation for innovation). These measures apply to all market conditions and most of them (especially the internet-based ones) are by nature geographically independent. Hence these measures need to be guided on a European level at first but may be adapted to national scales later on.

### 3. Research towards traditional forest owners

In case of traditional forest owners with dominating economic objectives it is necessary to understand the economics of fragmented forest ownership on a regional level to identify the most effective points for improving profitability. As for example the results of this study clearly showed that in case of strong market conditions the economic constraints of the management of fragmented forests (e.g. infrastructure, transport) are different from developing or weak market conditions (e.g. training, pooling, financial incentives).

For this topic it seems to be useful to first of all coordinate the existing national expertises and research by implementing a coordination and support action (COST). Thereafter the need and focus of a research project could be perfectly evaluated.

Regarding the development and implementation of harvesting technologies adapted towards fragmented forest ownerships it seems necessary to review the existing technologies and projects as for example "Flexible Wood Supply Chain (FLEXWOOD)" before proposing the direction of such research activities.

### 4. Research in flagship projects

As flagship projects are recommended to act as exemplary actions how a selected "package" of measures improve the situation of wood mobilisation in certain regions. They would cover the whole process of wood mobilisation activity. Furthermore flagship projects are perfectly designed to develop and implement evaluation procedures for mobilisation measures. Effectiveness and efficiency of wood mobilisation measures have been found rarely evaluated in general. In fact evaluation is difficult and expensive. Flagship projects could be used to develop and implement evaluation procedures on a scientific level.

# Literature

- Beach, R. H., Pattanayaka, S.K., Yanga, J.-C., Murray, B.C. und Abt, R.C. (2005): Econometric studies of non-industrial private forest management a review and synthesis, *Forest Policy and Economics* 7 (2005) 261-281.
- Becker, G., Borchers, J. and Mutz, R. (2000): Die Motive der Privatwaldbesitzer in NRW. *Allgemeine Forst Zeitschrift*, 55(22):1181-1183.
- BFW (2009): Holz und Biomassestudie. BFW Praxis Information No. 18-2009, Vienna
- Boon, T.E., Meilby, H., Thorsen, B.J. (2004): 'An empirically based typology of private forest owners in Denmark: improving communication between authorities and owners', *Scandinavian Journal of Forest Research*, 19(4): 45-55.
- Bouriaud, L.; Schmithüsen, F., (2005): Allocation of property rights on forests through ownership reform and forest policies in Central and Eastern European countries. *Swiss Forestry Journal*, 156 (2005) 8: 297-305.
- CEPF (2008): European Forest Owner Organisations. Forest Owner Cooperation: Main figures, aims and goals. A study concluded by CEPF, Brussels
- CEPF (2009): Confederation of European Forest Owners (CEPF) – Website: <http://www.cepf-eu.org/index.cfm>
- Dennis, D.F. (1989): An Economic Analysis of Harvest Behaviour: Integrating Forest and Ownership Characteristics, *Forest Science*, Vol. 35, No. 4, pp. 1088-1104.
- European Commission (2005): Biomass action plan. COM(2005) 628 final. 7 December 2005. Brussels, Belgium.
- FAO (2000): Options for the Organization of Small Forest Owners in Central and Eastern Europe for Sustainable Forest Management. Rome, 2000
- FAO (2006): Global Forest Resources Assessment 2005, Main Report. FAO Forestry Paper 147. Rome, 2006.
- FAO (2009a): STATE OF THE World's FORESTS 2009, Rome
- FAO (2009b): FAOSTAT/ForesSTAT. Electronic database, accessed 25.9.2009
- FHP (2009): Branchenstatistik "Holz und Holzprodukte". 1-12/08 endgültige Werte, Wien. <http://www.forstholzpapier.at>
- Härdter, U. (2003): Nicht-bäuerliche Waldbesitzer – Strukturierung und Charakterisierung im Kontext gesellschaftlicher Entwicklungstrends. In Schraml, U. and Volz, K.R. (editors) *Urbane Waldbesitzer: Studien zur Beratung und Betreuung im nicht-bäuerlichen Kleinprivatwald*. Remagen-Oberwinter: Kessel. pp. 25-83.
- Härdter, U. (2004): Waldbesitzer in Deutschland – Zwischen Tradition und Moderne. Eine Untersuchung der neuen Eigentümerstruktur im Kontext gesellschaftlicher Entwicklungstrends. Remagen-Oberwinter: Kessel. 309 p.
- Herbst, P. (2004): Rural Common Property in Austria. International Association for the Study of Common Property (IASCP) Tenth Biennial Conference. Oaxaca, Mexico. <http://www.iascp2004.org.mx>
- Hetsch S.; Steierer F.; Prins Ch.; Mantau U. (2008): Wood resources availability and demands II - future wood flows in the forest and energy sector. European countries in 2010 and 2020, Geneva, 2008
- Hetsch, S. (2007): MOBILIZING WOOD RESOURCES: CAN EUROPE'S FORESTS SATISFY THE INCREASING DEMAND FOR RAW MATERIAL AND ENERGY UNDER SUSTAINABLE FOREST MANAGEMENT? WORKSHOP PROCEEDINGS - JANUARY 2007. Geneva Timber and Forest Discussion Papers No. 48. ECE/TIM/DP/48, Geneva
- Hetsch, S. (2008): Potential Sustainable Wood Supply in Europe. Unpublished. Geneva
- Höbarth, M. (2002): Partnerships in the mobilisation and use of timber: Strategic Positioning of Forestry Alliances in Austria. Federal Silvicultural Association, Vienna.
- Hogl, K; Pregernig M.; Weiss, G. (2005): What is New about New Forest Owners? A Typology of Private Forest Ownership in Austria. *Small-scale Forest Economics, Management and Policy*, 4(3): 325-342
- Höglund, J.,(2008): The Swedish fuel pellets industry: Production, market and standardization. Institutionen för skogens produkter.
- Illyés, B.; Niesslein, E. (1997): Új erdészeti politika piacgazdasági alapjai Magyarországon = Neue Forstpolitik in Ungarn auf marktwirtschaftlicher Grundlage. *Kiadványai/Erdészeti Tudományos Intézet* 6, Hillebrand Nyomda Kft, Sopron. (368 pg.)

- Ioannou, K.; Arabatzis, G.; Lefakis, P. (2009): Predicting the prices of forest energy resources with the use of Artificial Neural networks (ANNs). The case of conifer fuel wood in Greece. *Journal of Environmental Protection and Ecology* 10 (3), pp. 678-694
- Junginger, M.; Bolkesjø, T.; Bradley, D.; Dolzan, P.; Faaij, A.; Heinimö, J.; Hektor, B.; Leistad, Ø.; Ling, E.; Perry, M.; Piacente, E.; Rosillo-Calle, F.; Ryckmans, Y.; Schouwenberg, P-P.; Solberg, B.; Trømborg, E.; Silva Walter, A. da; Wit, M. de. (2008): Developments in international bioenergy trade. *Biomass and Bioenergy* 32 (8): 717-729.
- Kline, J.D., Alig, R.J. and Johnson, R.L. (2000): Forest owner incentives to protect riparian habitat. *Ecological Economics*, 33(1):29-43.
- Krott, M.; Marosi, G.; Gólya, J. (eds.) (1996): Beziehungen der Staatsforstverwaltung zu privaten Waldeigentümern und deren Verbänden - Praxisvergleich in Europa. *Europaforum Forstverwaltung* 6, Mátrafüred. (236 pg.)
- Kuuluvainen, J., Karppinen, H. and Ovaskainen, V. (1996): Landowner objectives and non-industrial private timber supply. *Forest Science*, 42(39): 300-309.
- Kvarda, E., (2004): 'Non-agricultural forest owners' in Austria – a new type of forest ownership. *Forest Policy and Economics* 6: 459-467
- Lengyel, A., (1999): Eigentumsveränderungen in der Forstwirtschaft Ungarns und deren Auswirkungen im 20. Jahrhundert. Dissertation der Fakultät für Forst-, Geo- und Hydrowissenschaften der Technischen Universität Dresden.
- Lengyel, A., (2002): Privatisierung in der historischen Perspektive und ihre Erfahrungen in Ungarns Forstwirtschaft. In: Rankovic, N.; Nonic, D., (eds.) 2002. *Privatisation in Forestry – Volume II*. Belgrade. Finegraf. pp. 29-48.
- Mantau, U., (2007): The legend of the woody biomass reserve in Europe. Powerpoint Presentation at the UNECE/FAO Workshop Mobilizing Wood Resources. January 11-12, 2007, Geneva
- Mantau, U., Steierer F., Hetsch S., Prins Ch. (2008): Wood resources availability and demands – Part I. National and regional wood resource balances 2005; Background paper to the UNECE/FAO Workshop on Wood balances, Geneva
- MCPFE, UNECE and FAO (2007): STATE OF EUROPE'S FORESTS 2007. The MCPFE Report on Sustainable Forest Management in Europe, Warsaw
- METLA (2006): Finnish Statistical Yearbook of Forestry 2005, METLA, Finland
- Nonic, D., Tomic, N., Markovic, J., Herbst, P., and Krajcic, D., (2006): Organization of private forest owners in Serbia compared to Austria, Slovenia and other Central European countries, *Forest Science Contributions; Chair Forest Policy and Forest Economics* 35, Legal Aspects of European Forest Sustainable Development, Proceedings of the 7th International Symposium in Zlatibor Mountain, Serbia, May 2005, 95-106
- Rametsteiner E., Weiss G., Kubezko K. (2006): Innovation and Entrepreneurship in Forestry in Central Europe. EFI Research Report 19, European Forest Institute, Joensuu, Finland.
- Schmithüsen, F. and Hirsch, F. (2009): PRIVATE FOREST OWNERSHIP IN EUROPE. GENEVA TIMBER AND FOREST DISCUSSION PAPERS 25, draft for approval, Geneva – Website: <http://timber.unece.org/fileadmin/DAM/publications/sp-25-forApproval.pdf>
- Schraml, U. (2003): Einführung in das Thema. In Schraml, U. and Volz, K.R. (editors) *Urbane Waldbesitzer: Studien zur Beratung und Betreuung im nicht-bäuerlichen Kleinprivatwald*. Remagen-Oberwinter: Kessel. pp. 1-24.
- Schraml, U. and Volz, K.-R. (eds) (2003): *Urbane Waldbesitzer. Studien zur Beratung und Betreuung im nichtbäuerlichen Kleinprivatwald*, Freiburger Schriften zur Forst- und Umweltpolitik, Bd. 1, Verlag Dr. Kessel, Remagen-Oberwinter
- Schulmeyer, F. (2006): European Forest Sector Outlook Study: Trends 2000-2005 Compared to the EFSOS Scenarios. ECE/TIM/DP/47, New York and Geneva
- Schwarzbauer, P. and Stern, T. (2010): Energy vs. material: Economic impacts of a “wood-for-energy scenario” on the forest-based sector in Austria — A simulation approach. *Forest Policy and Economics* 12 (2010) 31–38
- Sikkema, R., Junginger, M., Pichler, W., Hayes, S., Faaij, A.P.C. (2010): The international logistics of wood pellets for heating and power production in Europe: Costs, energy-input and greenhouse gas balances of pellet consumption in Italy, Sweden and the Netherlands. *Biofuels, Bioproducts and Biorefining* 4 (2), pp. 132-153

- Standing Forest Committee ad hoc Working Group II on Mobilisation and Efficient use of Wood and Wood Residues for Energy Generation (2008): Mobilisation and efficient use of wood and wood residues for energy generation. Report to the Standing Forestry Committee, n.p.
- Steierer, F.; Fischer-Ankern, A.; Francoeur, M.; Wall J. and Prins, K. (2007): Wood energy in Europe and North America: A new estimate of volumes and flows (JWEE II). Draft report presented to the 29th Joint FAO/UNECE Working Party on Forest Economics and Statistics in March 2007, Geneva
- Suda, M., Schaffner, S. and Beck, R. (2001): Kleinprivatwaldforschung – quo vadis?, Paper presented at the 33. Meeting of German-speaking Forest Policy Scientists, 4.–6. April 2001, Göttingen, Germany.
- UNECE and FAO (2009): Joint Wood Energy Enquiry 2008 Background Data Analysis. Geneva, Switzerland, 24 March 2009. Van Herzele, A. and Van Gossum, P. (2008) Typology building for owner-specific policies and communications to advance forest conversion in small pine plantations. *Landscape and urban planning*, 87, 201-209.
- UNECE, FAO et al. (2007): Can Europe's forests satisfy the increasing demand for raw material and energy under Sustainable Forest Management? Mobilizing Wood Resources, Workshop Proceedings, Geneva, Switzerland, 11 – 12 January 2007.
- UNECE, FAO et al. (2009): Strategies for increased wood mobilisation from sustainable sources. Background paper for the workshop, 16 to 18 June 2009, Grenoble (France).
- UNECE/FAO (2005): European Forest Sector Outlook Study - 1960-2000-2020, Main Report. Geneva Timber and Forest Study Paper 20. Geneva, 2005.
- UNECE/FAO (2007): CHAIRMAN'S SUMMARY. UNECE/FAO Policy Forum Opportunities and Impacts of Bio-energy Policies and Targets on the Forest and Other Sectors. What is the future contribution of wood to meeting UNECE region's energy needs? 10 October 2007, Geneva
- UNECE/FAO (2008a): Forest Products Annual Market Review, 2007-2008. ECE/TIM/SP/23, New York and Geneva
- UNECE/FAO (2008b): NATIONAL WOOD RESOURCE BALANCES PROCEEDINGS OF A WORKSHOP HELD IN GENEVA SWITZERLAND 31 MARCH – 1 APRIL 2008. Geneva Timber and Forest Discussion Papers, No. 53, ECE/TIM/DP/53, Geneva
- UNECE/FAO (2009): Private Forest Ownership. at: <http://www.unece.org/timber/fra/PFO.htm> (27.09.2009).
- UNO (2009): Commodity Trade Statistics Database COMTRADE, United Nations Statistics Division, <http://comtrade.un.org/db/mr/daCommodities.aspx>
- Volz, K.R. (2001): Wem gehört eigentlich der Wald? *Der Bürger im Staat*, 51, 51-58.
- Volz, K.-R. (2003): Empfänger unbekannt! Zur aktuellen Entwicklung der Privatwaldberatung, *Allgemeine Forst Zeitschrift*, 58(3): 150-153.
- Volz, K.-R. and Bieling, A. (1998): Zur Soziologie des Kleinprivatwaldes, *Forst & Holz* 53(3): 67-71.
- Wang, J., Long C., McNeel J., & Baumgras J., (2004): Productivity and cost of manual felling and cable skidding in central Appalachian hardwood forests. *Forest Products Journal* 54(12):45-51
- Weiss, G. und C. Bach (2007a): Holzmobilisierungsstrategien auf Basis einer Waldeigentümbefragung. *Ländlicher Raum*, 2007 (Mai), 11 Seiten.
- Weiss, G. und C. Bach (2007b): Holzmobilisierungsstrategien. In: *Forstzeitung* 04/2007, 36-37.
- Yin, R. K. (1984): Case Study Research – Design and Methods, *Applied Social Research Methods Series*, Volume 5, 160



## Case Studies

AUSTRIA (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. University of Natural Resources and Applied Life Sciences (BOKU), Department of Economics and Social Sciences and the Market Analysis & Innovation Research Team of Wood K Plus, 2010.

CATALONIA (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. Centre Tecnològic Forestal De Catalunya (CTFC), Forest Harvesting and Biomass Area, 2010.

ENGLAND (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. Confédération Européen des Propriétaires Forestiers (CEPF) and Sylva Foundation, 2010.

ESTONIA (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. Confédération Européen des Propriétaires Forestiers (CEPF), 2010.

HUNGARY (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. Confédération Européen des Propriétaires Forestiers (CEPF), 2010.

RHONE-ALPES (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. CNPPF-IDF, 2010.

SAXONY (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. Albert-Ludwigs-Universität Freiburg (ALUFR), Institute of Forest Utilisation and Work Science, 2010.

SWEDEN (Case study report, 2010): Prospects for the market supply of wood and other Forest Products from areas with fragmented forest ownership structures. Confédération Européen des Propriétaires Forestiers (CEPF), 2010.

# Annex Task 1

**A 1: Forest area and development, for the 27 EU countries, the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006)**

Country/Region	Forest area			
	1990	2000	2005	2000- 2005
	1000 ha	1000 ha	1000 ha	%
Ireland	441	609	669	3.45
Spain	13,479	16,436	17,915	2.19
Portugal	3,099	3,583	3,783	1.47
Italy	8,383	9,447	9,979	1.27
Greece	3,299	3,601	3,752	0.92
Denmark	445	486	500	0.82
Hungary	1,801	1,907	1,976	0.65
United Kingdom	2,611	2,793	2,845	0.60
Bulgaria	3,327	3,375	3,625	0.60
Cyprus	161	173	174	0.54
Lithuania	1,945	2,020	2,099	0.53
France	14,538	15,351	15,554	0.47
Slovenia	1,188	1,239	1,264	0.43
Latvia	2,775	2,885	2,941	0.40
Netherlands	345	360	365	0.39
Estonia	2,163	2,243	2,284	0.37
Poland	8,881	9,059	9,192	0.23
Germany	10,741	11,076	11,076	0.21
Austria	3,776	3,838	3,862	0.15
Finland	22,194	22,475	22,500	0.09
Luxembourg	86	87	87	0.08
Czech Republic	2,630	2,637	2,648	0.05
Sweden	27,367	27,474	27,528	0.04
Slovakia	1,922	1,921	1,929	0.02
Malta	0	0	0	0.00
Romania	6,371	6,366	6,370	0.00
Belgium	677	667	667	-0.10
<b>EU 27</b>	<b>144,645</b>	<b>152,108</b>	<b>155,584</b>	<b>0.50</b>
<b>other Europe</b>	<b>35,885</b>	<b>36,887</b>	<b>37,193</b>	<b>0.24</b>
<b>Russian Federation</b>	<b>808,950</b>	<b>809,268</b>	<b>808,790</b>	<b>0.00</b>

**A 2: Wood stock and stock change for the 27 EU countries, the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006)**

Country / area	Growing stock								
	Area	By area	Total	of which is commercial	of which is commercial	(1000 m³/yr)		(m³/ha/yr)	
	2005					1990-2000	2000-2005	1990-2000	2000-2005
	1000 ha	m³/ha	M m³	%	M m³				
Germany	11,076	307	3,400	98	3,332	62,200	62,200	4.84	-
Austria	3,862	300	1,159	98	1,132	14,100	14,200	3.27	3.32
Luxembourg	87	299	26	100	26	557	0	6.16	0.00
Slovenia	1,264	283	357	91	326	6,122	4,532	4.00	2.50
Czech Republic	2,648	278	736	97	712	7,370	7,360	2.73	2.56
Belgium	667	258	172	100	172	2,940	2,980	4.69	4.47
Slovakia	1,929	256	494	85	418	6,160	6,240	3.22	3.03
Malta	0	231	0	0	0	0	0	0.00	0.00
Romania	6,370	212	1,347	98	1,320	-110	180	0.00	0.00
Latvia	2,941	204	599	85	511	9,500	10,600	2.67	2.88
Poland	9,192	203	1,864	94	1,760	25,120	25,660	2.44	2.24
Estonia	2,284	196	447	94	419	-2,120	-2,120	-	-1.66
Lithuania	2,099	190	400	86	344	5,270	5,400	2.00	1.18
Netherlands	365	178	65	80	52	900	800	1.87	1.73
Hungary	1,976	171	337	98	329	3,716	2,367	1.06	0.01
France	15,554	158	2,465	94	2,305	17,500	42,200	0.38	2.33
Bulgaria	3,625	157	568	61	347	12,100	8,400	3.41	0.17
Denmark	500	153	76	76	58	940	440	0.70	0.02
Italy	9,979	145	1,447	70	1,014	23,800	31,560	1.11	1.71
United Kingdom	2,845	120	340	88	300	4,200	6,400	0.84	1.85
Sweden	27,528	115	3,155	77	2,423	24,240	24,240	0.84	0.84
Ireland	669	98	65	100	65	740	1,120	-2.06	-0.09
Finland	22,500	96	2,158	84	1,815	16,260	17,600	0.62	0.76
Portugal	3,783	93	350	66	232	7,500	7,400	1.06	1.03
Spain	17,915	50	888	78	689	19,800	19,600	0.41	0.30
Greece	3,752	47	177	88	156	1,400	1,400	-0.01	-0.01
Cyprus	174	46	8	39	3	52	15	-0.01	0.00
<b>EU 27</b>	<b>155,584</b>	<b>148</b>	<b>23,100</b>	<b>88</b>	<b>20,260</b>	<b>270,257</b>	<b>300,774</b>	<b>1.78</b>	<b>1.20</b>
<b>other Europe</b>	<b>37,193</b>	<b>164</b>	<b>6,105</b>	<b>-</b>	<b>-</b>	<b>90,341</b>	<b>90,701</b>	<b>1.18</b>	<b>1.27</b>
<b>Russian Federation</b>	<b>808,790</b>	<b>100</b>	<b>80,479</b>	<b>49</b>	<b>39,596</b>	<b>23,075</b>	<b>41,732</b>	<b>0.02</b>	<b>0.06</b>

**A3: Table on wood removals and wood removal rate for the 27 EU countries, the EU 27 total, other Europe and Russian Federation (FAO, 2006)**

Country / area	Removals <sup>103</sup>							
	1990	2000	2005	1990-2005	2000-2005	2005		
	Total	Total	Total			Indus-trial round-wood	Wood for fuel	% of grow-ing stock
	1000 m <sup>3</sup> o.b.	1000 m <sup>3</sup> o.b.	1000 m <sup>3</sup> o.b.	%	%	1000 m <sup>3</sup> o.b.	1000 m <sup>3</sup> o.b.	
Lithuania	3,651	6,171	7,727	7.44	5.04	5,881	1,846	1.90
Germany	42,177	48,818	60,770	2.94	4.90	54,497	6,273	-
Belgium	4,352	3,526	4,368	0.02	4.78	3,768	600	2.50
Slovenia	2,978	2,547	3,153	0.39	4.76	2,622	531	0.90
Romania	17,218	14,285	17,300	0.03	4.22	11,418	5,882	1.30
Austria	17,318	16,834	20,127	1.08	3.91	15,858	4,269	1.70
Bulgaria	3,400	3,778	4,200	1.57	2.23	3,075	1,125	0.70
Poland	23,617	29,882	33,015	2.65	2.10	31,692	1,323	1.80
Slovakia	5,545	6,150	6,732	1.43	1.89	6,372	360	1.40
Czech Republic	13,030	15,860	17,274	2.17	1.78	16,317	957	2.30
Sweden	58,140	70,570	76,780	2.14	1.76	68,740	8,040	2.40
Finland	47,203	60,603	64,295	2.41	1.22	59,095	5,200	3.00
Portugal	11,922	10,590	11,123	-0.45	1.01	10,433	690	3.20
United Kingdom	7,152	8,471	8,895	1.62	1.00	8,630	265	2.60
Netherlands	1,518	1,147	1,200	-1.40	0.92	860	340	1.80
Ireland	1,789	2,778	2,819	3.84	0.30	2,797	22	4.30
Malta	0	0	0	0.00	0.00	0	0	0.00
Latvia	4,820	11,574	11,500	9.24	0.00	10,580	920	1.90
Spain	18,517	17,965	17,689	-0.30	-0.31	15,741	1,948	2.00
Italy	9,877	10,031	9,600	-0.19	-0.86	3,800	5,800	0.70
Hungary	5,945	5,902	5,528	-0.47	-1.27	3,421	2,107	1.60
France	55,621	58,330	51,475	-0.50	-2.35	33,443	18,032	2.10
Denmark	2,023	2,099	1,807	-0.71	-2.78	900	907	2.40
Estonia	3,206	11,164	9,602	13.30	-2.80	7,502	2,100	2.10
Greece	2,979	2,221	1,842	-2.54	-3.41	438	1,404	1.00
Luxembourg	-	230	139	-	-7.91	135	4	0.50
Cyprus	56	28	13	-5.12	-10.71	9	4	0.20
<b>EU 27</b>	<b>364,054</b>	<b>421,554</b>	<b>448,973</b>	<b>1.56</b>	<b>1.30</b>	<b>378,024</b>	<b>70,949</b>	<b>1.94</b>
<b>other Europe</b>	<b>42,923</b>	<b>48,880</b>	<b>52,435</b>	<b>1.48</b>	<b>1.45</b>	<b>35,467</b>	<b>16,968</b>	<b>0.86</b>
<b>Russian Federation</b>	<b>336,527</b>	<b>152,316</b>	<b>180,000</b>	<b>-3.10</b>	<b>3.64</b>	<b>129,400</b>	<b>50,600</b>	<b>0.22</b>

<sup>103</sup> Although some statistics refer to harvests over bark as “fellings” the FAO Forest Resource Assessment uses the term “removals” in this case.

**A4a: Wood production for the 27 EU countries, the EU 27 total, other Europe and Russian Federation (Source: FAO, 2006)**

Country / area	Industrial Roundwood		Wood for fuel		Total
	2007				
	1000 m³	%	1000 m³	%	1000 m³
Sweden	71,300,000	92	5,900,000	8	77,200,000
Germany	68,028,811	89	8,699,265	11	76,728,076
France	29,330,000	47	33,429,000	53	62,759,000
Finland	51,662,438	91	5,207,321	9	56,869,759
Poland	32,460,959	90	3,473,604	10	35,934,563
Austria	16,520,964	78	4,796,377	22	21,317,341
Czech Republic	16,738,000	90	1,770,000	10	18,508,000
Romania	11,572,000	75	3,769,000	25	15,341,000
Spain	12,546,000	86	1,982,000	14	14,528,000
Latvia	11,144,900	92	1,028,000	8	12,172,900
Portugal	10,204,638	94	600,000	6	10,804,638
United Kingdom	8,559,000	95	459,000	5	9,018,000
Slovakia	8,458,302	95	416,622	5	8,874,924
Italy	2,990,000	37	5,134,000	63	8,124,000
Estonia	4,650,000	79	1,250,000	21	5,900,000
Lithuania	4,540,000	78	1,315,000	22	5,855,000
Bulgaria	3,170,000	56	2,526,000	44	5,696,000
Hungary	2,761,000	49	2,879,000	51	5,640,000
Belgium	4,275,000	86	670,000	14	4,945,000
Slovenia	2,093,373	73	788,277	27	2,881,650
Ireland	2,678,000	99	32,000	1	2,710,000
Denmark	1,460,000	57	1,106,000	43	2,566,000
Greece	948,076	54	794,840	46	1,742,916
Netherlands	732,056	72	290,000	28	1,022,056
Luxembourg	270,253	93	20,569	7	290,822
Cyprus	11,942	61	7,730	39	19,672
Malta	0	0	0	0	0
EU 27	379,105,712	81	88,343,605	19	467,449,317
Other Europe	35,186,800	65	19,268,207	35	54,455,007
Russian Federation	162,000,000	78	45,000,000	22	207,000,000

**A4b: Components of wood supply and consumption in the EU-27/EFTA wood resource balance (Source: Mantau et al, 2008)**

<b>EU / EFTA</b>		<b>2005</b>			
	million m³	%	%	million m³	
<b>Supply from forest &amp; woody biomass outside the forest:</b>					
Industrial Roundwood - JFSQ	381	49%			
Industrial Roundwood*	16	2%	26%	217	Sawmill industry
Fuelwood - JFSQ	79	10%	11%	88	Panel industry
Fuelwood*	6	1%	19%	155	Pulp industry
Bark	25	3%	1%	7	Pellets, briquettes etc. ****
Used logging residues	23	3%	2%	14	Other physical utilization
Woody biomass outside the forest	20	3%			
<b>Supply co-products:</b>					
Chips, particles & wood residues	118	15%			
Pulp production co-products**	70	9%			
<b>Supply recovered wood:</b>					
Recovered wood***	29	4%	6%	49	Power and heat
<b>Supply processed wood fuel:</b>					
Processed wood fuel	7	1%	8%	65	Industrial internal
			11%	92	Private households
			16%	135	Undifferentiated energy use
<b>SUPPLY TOTAL</b>	<b>775</b>		<b>Difference</b>	<b>822</b>	<b>TOTAL USE</b>
			<b>47</b>		
* maximum difference unreported to JFSQ ** black liquor, tall oil, etc. *** post consumer recovered wood for material & energy use **** processed wood fuel industry					

**A 5: Net roundwood imports/exports for the 27 EU countries, the EU 27 total, other Europe and Russian Federation (Source: FAOSTAT, 2006)**

Country / area	Roundwood					
	1990		2000		2007	
	Import	Export	Import	Export	Import	Export
Finland	5,237,074	294,671	10,004,597	533,276	13,097,525	655,804
Austria	4,587,609	1,193,315	8,590,000	942,000	8,983,000	921,000
Sweden	1,956,915	803,814	11,897,535	1,461,813	7,469,196	3,886,000
Italy	6,327,248	35,637	6,295,000	24,380	4,965,000	18,000
Germany	2,016,000	4,523,706	3,596,000	5,604,000	4,417,197	6,710,432
Spain	2,488,024	114,177	3,789,318	369,001	4,001,893	575,795
Belgium			4,024,000	1,181,000	3,622,151	1,153,501
France	1,350,581	5,043,144	2,043,152	5,859,116	2,940,190	4,110,517
Poland	839	407,615	732,400	347,200	2,091,945	387,472
Latvia			136,030	4,353,250	1,697,812	4,139,640
Estonia			346,479	4,431,960	1,433,953	1,543,752
Denmark	286,536	417,731	637,000	877,000	1,152,938	681,479
Czech Republic			954,000	2,030,000	1,105,000	3,141,000
Greece	268,319	49,052	445,371	9,845	908,770	12,517
Portugal	780,667	373,310	1,342,139	570,103	747,000	1,535,000
Hungary	212,043	1,110,287	353,700	1,593,400	496,000	1,274,000
Netherlands	121,867	164,577	388,000	242,000	469,300	732,000
United Kingdom	253,325	161,103	309,000	362,000	464,000	923,000
Slovakia			129,000	1,612,000	413,400	1,533,000
Romania	419,928	3,810	20,400	535,100	411,050	179,000
Lithuania			60,570	1,202,850	394,599	1,718,247
Luxembourg			763,803	228,350	371,453	259,164
Ireland	30,168	37,840	107,000	42,000	272,000	308,000
Slovenia			495,910	303,980	254,778	704,922
Bulgaria		160,484	105,000	360,000	140,600	904,000
Cyprus	4,050	10	2,110	4	698	-
Belgium-	2,191,330	1,050,910				
Malta	26,585	76	4,340	-	-	-
<b>EU 27</b>						
<b>other Europe</b>	<b>1,316,830</b>	<b>1,757,075</b>	<b>3,997,525</b>	<b>6,529,742</b>	<b>3,403,922</b>	<b>9,351,207</b>
<b>Russian</b>			<b>527,000</b>	<b>32,049,000</b>	<b>324,000</b>	<b>49,300,000</b>

# Annex Task 2

## Case study protocol

### Introduction

The objective of this paper is to guide the implementation of the case studies to be carried out as sub-task 2.2.

According to Yin case study research method is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.

There are many different types of case studies mentioned in literature. The case studies to be carried out in this work can be defined as comparative, explanatory and/or descriptive case studies. Comparative case studies are a set of multiple case studies of multiple research entities for the purpose of cross-unit comparison. Both qualitative and quantitative comparisons are generally made. Explanatory cases are suitable for doing causal studies. In very complex and multivariate cases, the analysis can make use of pattern-matching techniques. Descriptive cases require that the investigator begin with a descriptive theory, or face the possibility that problems will occur during the project.

### Background to Research Questions

Based on the Council Resolution of 15 December 1998 on a forestry strategy for the European Union, the report on the implementation of the EU Forestry Strategy and consequent Council Conclusions, the EU Forest Action Plan was adopted on 15 June 2006. The overall aim of the EU Forest Action Plan is to support and enhance sustainable forest management and multifunctional role of forests. It provides a framework for the implementation of forest-related actions at Community and Member States level, and serves as an instrument of co-ordination between different Community actions as well as between Community actions and forest policies of the Member States. The Action Plan has 18 Key Actions of which Key Actions 4 (Promote the use of forest biomass for energy generation) and 5 (Foster the cooperation between forest owners and enhance education and training in forestry) are of major relevance for the theme of this project.

Within Action 5, Activity 5.2 of the work programme for implementation of the Action Plan indicates that a study on the market supply of wood and other forest products, in particular on obstacles to mobilisation due to fragmented ownership structures, will be carried out by the Commission. In charge of the commission the University of Natural Resources and Applied Life Sciences Vienna (BOKU; project leader), the Confederation of European Forest Owners (CEPF), the Forest Technology Centre of Catalonia (CTFC), the Kompetenzzentrum Holz GmbH (Wood K plus), the Institute for Forestry Development (CNPPF-IDF) and the Albert-Ludwigs-University Freiburg (ALUFR) are carrying out such a study regarding the prospects of wood supply from areas with fragmented forest ownership structures.

As recent market perspectives for the EU show the overall demand for wood and paper will exceed the actual supply significantly in the near future. One consequence is the actual effort to increase the mobilization of wood, especially among small private forest owners who in most cases underused their harvesting potential.

### Objective of the Case Studies

The purpose of the overall project work to be undertaken is to: *“identify the most appropriate measures for increasing the market supply of wood and other forest biomass from the areas where forests are held by many individuals owning relatively small parcels of forest.”*



The case studies to be done in eight European regions (Austria, Saxonia, Catalonia, Sweden, Estonia, UK/England, Hungary, Röhne-Alpes) are central to address the main research question:

**How to achieve an increase in wood output of EU forests, while respecting the principles of sustainable forest management?**

The purpose of the overall study is to analyse the conditions under which fragmented ownership can hamper or facilitate the placement of wood on the market and propose solutions to overcome the obstacles for wood mobilisation. As wood has recently experienced a higher demand from the energy sector in addition to the in the long-term rising demand from the European wood-processing industries there is a need to increase the wood supply, but without a negative impact on other forest functions (e.g. biodiversity).

### ***Scope and Definitions of the Case Studies***

The geographical scope of the project is the entire European Union but detailed analyses will be completed for **the selected case study regions**. These regions have been selected to represent the geographic, structural and institutional ranges applying across the EU. Examples from and comparisons with other, non-EU, countries will be provided wherever useful.

The scope of the proposed study is limited to **market supply (mobilisation) of roundwood and other forest biomass from small-size forest parcels owned by private forest owners (fragmented forest ownerships)**.

The following definitions should be used for the case studies:

**1. Fragmented forest ownership**

As **fragmented forest ownership** in this study, we understand the presence of **a high number of individuals owning small-size forest parcels**. Forest fragmentation here is not meant to be addressed mainly from the spatial point of view, considering distribution of individual forest stands in the landscape, even though this may also be viewed as one of the limiting factors for effective mobilisation of wood. As the average plot size that may be considered as a small-size forest parcel may be heavily depending on the site conditions (e.g. stock, topography, site development, etc.) the decision on what may be considered as fragmented has to be taken on a case to case basis.

**2. Private forest ownership**

Forest/other wooded land owned by individuals, families, co-operatives and corporations which may be engaged in agriculture or other occupations as well as forestry; private forest enterprises and industries; private corporations and other institutions (religious and educational institutions, pension and investment funds, nature conservation societies, etc).

**3. Forest**

Areas spanning more than 0.5 to 1.0 hectares (depending on national definitions<sup>104</sup>) with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Land registry systems should specify the concerned areas in terms of land use as „Forest“.

**4. Forest available for wood supply**

Forest where any legal, economic (including sites which do not allow any economic useful harvests, e.g. where harvesting costs will exceed the value of the timber), or specific environmental restrictions do not have a significant impact on the supply of wood. Includes: areas where, although there are no such restrictions, harvestings are not taking place, for example areas included in long-term utilisation plans or intentions.

The **markets of harvested/processed wood products** are covered insofar as their developments have a direct impact on the supply of roundwood or biomass from forest (e.g.

---

<sup>104</sup> The relevant definitions must be provided with the data delivered with the case study reports

the direct relationship of sawnwood and roundwood prices due to the high share of roundwood costs in the sawmill industry).

With regard to the time scope, **the study will be generally forward looking**, starting from the present state of the forest sector. Except from theoretical literature, which can be considerably older, the secondary data used for the analyses should always reflect the present day situation and therefore be as up-to-date as possible. Considerable regional differences can be expected regarding the dynamics of wood market and forest ownership developments. However, **consideration of trends and changes over time** will be taken into account wherever possible and useful by analysing time series data over considerable time periods in the past. Regarding quantitative market outlooks no own or new projections/forecasts will be made but taken from published sources, like EFOS. The time frame for looking forward will therefore mirror the time span of projections in published sources (up to 2020 at most).

The unit of analysis defines what the case is. In the context of this work a geographical selection has been made. Observation of possibly influencing variables will be a very important part of the case studies. To do this, cases have been selected which reflect opposite ends of the dimensions of possible dependent and key independent variables. Such variables are for example:

- total forest cover in the region,
- share of private forest ownership,
- wood mobilisation in terms of annual increment,
- the structure and size of forest industries,
- organization of regional wood markets,
- forest ownership history and tradition (incl. share of “new” forest owners),
- average forest ownership size,
- regional economic situation,
- forest owners degree of organization and
- legal certainty/uncertainty regarding forest ownership (restitution process).

In the literature case studies are classified by purpose, which they differentiate as description, explanation, evaluation or exploratory. In an explanatory case study, such as here, the underlying rationale is the identification of patterns, in which one type of observed variation is systematically related to another type. The results from the case studies will be mainly used for:

- Analysing influencing factors for wood supply from fragmented forest-ownership structures (Task 3)
- Identifying possible measures to increase wood supply from fragmented forest-ownership structures (Task 4)
- Providing case study reports (monographies) to the European Commission in order to provide detailed information to the principal (2<sup>nd</sup> interim deliverable)

The case studies in the according regions (Austria, Saxonia, Catalonia, Sweden, Estonia, UK/England, Rhône-Alpes and Hungary) will be carried out by the organisations given on the front page of this manual.

## Conceptual Background

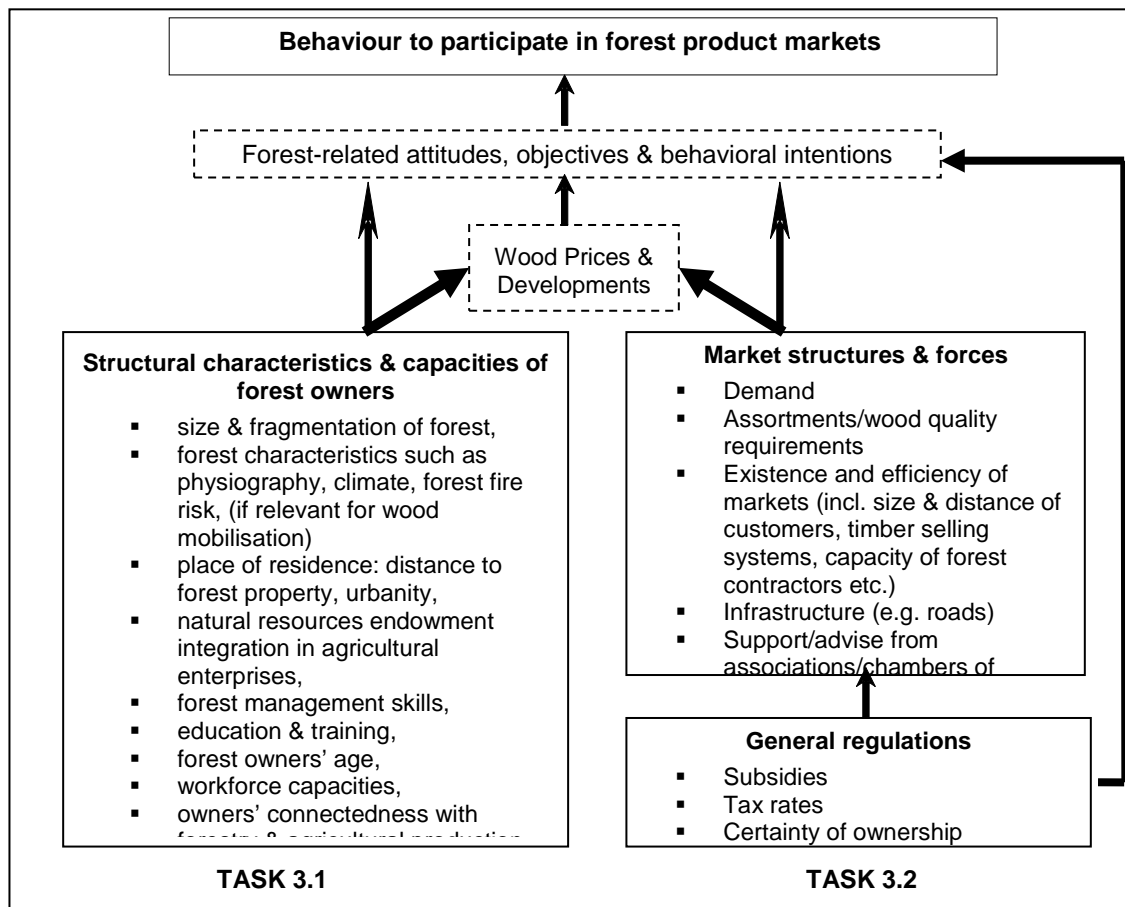


Figure 1: Conceptual framework for analyzing the case studies

The information collected in the case studies will be analysed in task 3 within the conceptual framework shown in the figure above.

### Procedures

Each case study report has to include a collection of data and structured information regarding:

- ⇒ Availability, supply and demand in the regional wood market of the particular region as well as the amount of resources (wood and other forest biomass) with potential to be mobilized from fragmented forest ownership;
- ⇒ Characteristics, number and organization of private forest owners and wood buyers;
- ⇒ Market structures for wood and other forest biomass trade;
- ⇒ The level of private forest owners' participation in the wood markets;
- ⇒ Interest and motivation of private forest owners to actively participate in forestry as well as state-of-the-art in their cooperation;
- ⇒ Possibilities and constraints for market access by private forest owners;
- ⇒ Experiences with wood mobilization programmes in practice
- ⇒ Conclusions and recommendations for options for wood mobilization
- ⇒ Wood mobilization measures, strategies and policies in the region both successful and ineffective ones.

A short description on each case study region and a collection of relevant materials likely to be used for carrying out the work is given in annex I.

Results accumulated by using such **secondary data**/information-collection means as literature and document review or existing survey data etc., should be complemented by expert interviews and data derived from focus groups meetings (see figure 2). Follow-up telephone interviews can be employed as additional means of collecting information. The typical work flow for carrying out each case study is indicated in figure 2.

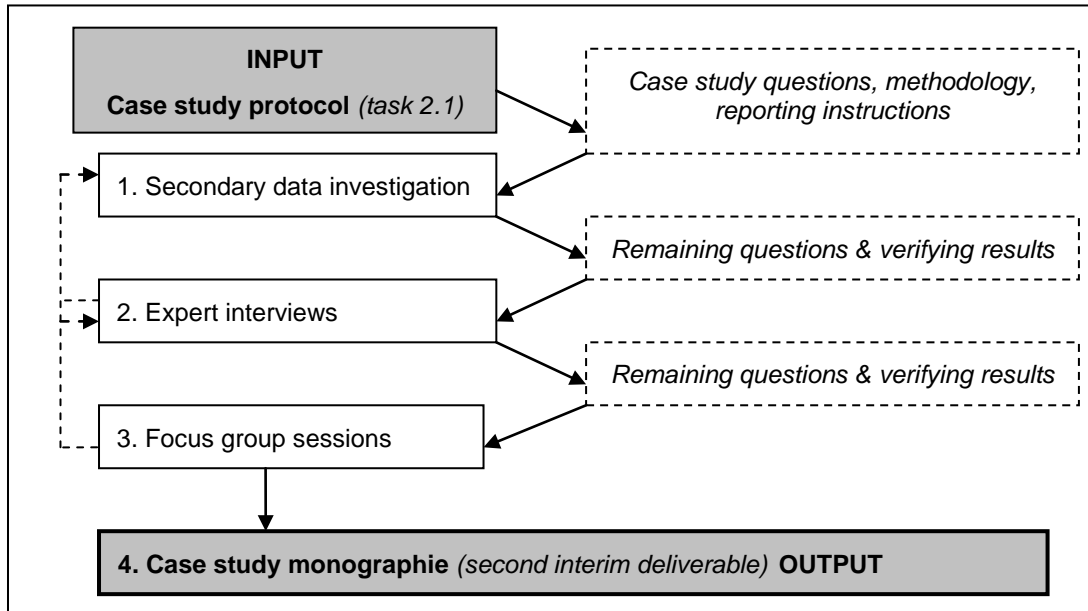


Figure 2: Work flow for carrying out the case studies

As shown in figure 2 each case study will start the implementation of this case study protocol (task 2.1) by investigating the case study questions. Ideally the questions will be investigated by a four step approach beginning by **1) an intensive secondary data investigation**. The results obtained in the first step will **2) verified and extended by means of expert interviews** during the second step. The expert interviews have also to be used to address those questions that could not have been answered in a satisfactory way during the secondary data investigation. Thereafter **3) focus group sessions** will be held in order to verify previous results and to address remaining questions and to discuss conclusions. As indicated in figure 2 by the broken arrows on the left, **4) feedback loops** between steps 1, 2 and 3 can be employed whenever useful. Overall each case study has to provide a comprehensive overview of how these selected wood markets are structured and operate.

## Deadlines

A detailed timetable recommended for the implementation of each case study is given below. It also includes important deadlines for the delivery of certain documents and information.

<b>date</b>	<b>action</b>	<b>responsible</b>	<b>status</b>
<b>31.08.2009</b>	<b><i>draft of the case study protocol send out</i></b>	project leader	<b><i>compulsory</i></b>
<i>thereafter</i>	<i>review draft version</i>	all	
<b>15.09.2009</b>	<b><i>deadline for comments on the draft</i></b>	all	<b><i>compulsory</i></b>
<i>thereafter</i>	<i>start to plan case studies</i>	all	<i>recommended</i>
<b>06.10.2009</b>	<b><i>case study protocol delivered</i></b>	project leader	<b><i>compulsory</i></b>
<i>thereafter</i>	<i>start to prepare the case studies</i>	all	<i>recommended</i>
<b>between 16.10.2009 and 20.10.2009</b>			
	<b><i>project meeting in Brussels</i></b>	all	<b><i>compulsory</i></b>
<b>15.10.2009</b>	<b><i>deliver a preliminary list of experts for interviews and focus group sessions</i></b>	all	<b><i>compulsory</i></b>
15.11.2009	<i>complete first step</i>	all	<i>recommended</i>
01.12.2009	<i>complete second step</i>	all	<i>recommended</i>
25.12.2009	<i>complete third step</i>	all	<i>recommended</i>
<b>15.01.2010</b>	<b><i>send draft case study report</i></b>	all	<b><i>compulsory</i></b>
<i>thereafter</i>	<i>revise case study report</i>	all	
<b>02.02.2010</b>	<b><i>send case study report</i></b>	all	<b><i>compulsory</i></b>

The case study reports have to be completed by the end of month 7 (February 2010) by delivering the case study reports (monographies).

Please note that the bold written actions are compulsory which means that the delivery in time is necessary for us to receive the money from the commission and make the according payments to you.

## Case Study Questions

The research questions to be addressed by the case studies' and their definition are a central step for the further development of the case studies and the overall project. The principal question has been formulated as:

*"How to achieve an increase in wood output of EU forests, while respecting the principles of sustainable forest management?"*

The proposed case studies will contribute to this principal question by addressing the following sub-questions divided into four related sections. The sections are "overview",

“markets”, “owners” and “mobilization”. The questions and their structure are given in **annex II**. All questions should be reviewed in each of the three steps although some of the questions may only be addressed in steps 1 and 2 or 2 and 3. We indicated the most likely step in which each question should be addressed but the conditions in the individual case study regions may require a different course of action. Please be aware that every question that has not been fully addressed in steps 1 or 2 will require some of the limited capacity to address questions within focus group sessions. Also remember that carrying out the focus groups is more time and work consuming than secondary data research or expert interviews. **Hence, try to answer as much as possible within steps 1 and 2 in order to avoid carrying out more focus group sessions than necessary.**

**In order to optimize the process of analyzing the collected data of all eight case studies we also ask you to include a short evaluation and explanation on the questions relevance regarding wood mobilisation from fragmented forest ownerships in the case study region. This evaluation process may also lead to include further questions into the list in annex II.**

## **Step 1: Secondary Data Collection**

Detailed secondary data investigations (step 1) form the base for each case study. The aim of these secondary data collections is to preliminarily answer as many of the questions given in annex II. The results of step one will provide the basis and will be validated and complemented in the steps of primary data collection (steps 2 and 3).

In order to carry out the secondary data collection it is necessary to review international, national and regional sources especially (but not only) such that are only available in your national/regional language. Furthermore it will be very important to consider information not accessible to the general public (i.e. “grey literature” such as local authorities’ data bases, unpublished reports, core data of earlier surveys). As the study is forward-looking, focus should be put on most recent sources referring to current developments whenever possible. We should distinguish two most important kinds of sources, literature and data bases.

### **a) Literature reviews**

Literature review covers publications in journals (reviewed or not), of public bodies and institutions (e.g. research centers) as well as relevant reports from other agencies and institutions. As regards content, the following types of literature have to be considered on regional, national and international levels:

- **Publications on private small forest owners**
- Publications that specifically focus on the issue of mobilisation of wood in small private forest ownerships, including quantitative and qualitative factors affecting wood harvest and market supply behaviour or respective harvest and supply barriers
- Publications about forest owners’ structures, including but not limited to “new” and “urban” forest owners and changes in ownership structure over time
- Publications on private forest owners attitudes, including attitudes beyond economic behaviour and beyond just harvesting issues
- Publications regarding primarily of owners of agricultural land, because of the still existing interaction between agriculture and forestry among many small forest owners
- Publications on general surveys of small forest owners not focusing specifically on any of the above mentioned issues, but including parts of them

- **Publications of/about organisations organising/supporting mobilisation in small private forests**
  - Publications of/about these organisations, in particular on their role regarding mobilisation, including but not limited to forest owners' organisations on a regional, national and EU-level
  - Publications on existing and proposed activities of these organisations and their (potential) impact on mobilisation
- **Publications on roundwood and forest biomass markets, their structures and projected changes**
  - Publications on the (physical) availability of wood and biomass (resources) and future demand and availability on the markets (including possible gaps)
  - Publications on roundwood supply (to the markets) and demand by sectors
  - Publications on projected demand of roundwood and foreign EU trade flows (mainly imports)
- **Publications on employment (workforce), technical and environmental aspects regarding increased mobilisation**

#### b) Database reviews

While distribution of forest resources is generally well covered on an international level (but not on a regional level in case of regional case studies), detailed information on timber supply by ownership category and assortment (or its end-use), participation of private forest owners especially in case of fragmented ownership structures in the wood markets (e.g. sales of wood vs. own use), land consolidation (or its absence), workforce and data as regards other aspects are usually available on a national level. Therefore national statistics and databases (e.g. from national administrations, statistical offices, interest groups, etc.) have to be used for the case studies in addition to international databases. International databases to be considered in the case studies include, e.g.:

- CORDIS database for research activities in FP7
- EUROSTAT structural and sustainability indicator data, EAF data
- FAO/UNECE data
- EFI data (EFISCEN, FPTF)
- rural development project data (EU and MS level)
- FADN and FSS data from those Member States where such data is collected.
- special databases existing for the region

**Please note that for all secondary data used in the case study reports we need an exact reference to the original source to secure the traceability of the entire work.** Especially in case of using data bases and other core data (e.g. from earlier surveys) it will be necessary to get a detailed description on the origin including **who, when and how the data was collected.**

### Primary Data Collection

The primary data collection forms the main work of the case studies and is designed as a two-step or iterative process including expert interviews (step 2) and focus group sessions (step 3). Wherever practicable, expert interviews and focus group sessions should be conducted by two interviewers (as described below these interviewers should be persons

involved in the project team). One speaks to the interviewee or moderates the focus group, while the other takes notes and, if applicable, takes care for tape recording. During the interview, the two interviewers can swap their roles. The advantage of this is that different interviewers think of different questions, and sometimes a respondent will say something to one interviewer but not another. As soon as the interview is finished, the two interviewers can discuss the findings. They can also complete their interview protocol, discuss their techniques of interviewing, the wording they use, and decide on ways to improve.

As indicated above, the principle method of data collection will be qualitative interviews and focus group discussions and not quantitative surveys with pre-formulated, closed-end questions. Therefore, the research questions formulated must not be understood as questions to be literally asked to our interviewees but they are rather questions to the interviewers/researchers. Hence there is not need to ask all questions in all interviews nor have they to be asked a certain order.

Our goal is to find answers to these questions based on empirical evidence. This has serious consequences for the people who do the research. The interviewers must be closely familiar with the case study design, with its basic concepts and the research questions. **Therefore, it is NOT advisable to employ “external” researchers or even inexperienced collaborators, who have not followed the project, to carry out the interviews alone.**

Researchers should immediately signal problems caused by organisations or persons that severely restrict data access. Such conflicts over data access can seriously threaten the success of the case study research project.

All data collected have to be tagged with the exact source and date and filed in an appropriate system for easy retrieval further on. Publications arising from the research, potentially written up by other researchers, will require exact references to sources. Comparison with other material at a later date may require that (other) researchers in the consortium return to the same source material to dig deeper. It is therefore vital that every piece of information is tagged and systematically filed.

Since data have to be exchanged between members of the project, researchers have to clearly mark any confidentiality agreements, especially those made with respondents in interviews. This is to avoid problems arising from unintentional disclosure of confidential sources by other researchers in the project.

Experts for interviews and focus group workshops have to be selected in a case sensitive manner and to be invited after having consulted and agreed upon with the European Commission. The types of participants for the specific focus groups to be approached as information sources will be identified and a draft list of these experts will be given for verification and approval by the Steering Group before starting the data collection. Hence such a list (see annex III) must be prepared for each case study and delivered to the project leader **by 15.10.2009**. Hence a first inventory of possible actors that could be involved within a case study and its different aspects should be produced as early as possible and may be very useful for selecting interviewees.

Still selection of persons to be interviewed or invited into focus group sessions can rely on ‘snowballing’ (i.e., ask one person interviewed for names of other persons to be interviewed – as an iterative process), but great care must be taken that this does not lead to systematic bias in the selection of respondents. Hence the introduction of new interviewees has to be reported to the project leader before carrying out the interview.



## **Step 2: Expert Interviews**

After having done the secondary data collection and analyses, expert interviews will be done as a second step to collect further information from key stakeholders (e.g. from chamber of commerce, researchers, forest administration, forest industry representatives). It is important to balance the number of interviews between representatives of the local authorities, forest owners and the industry sector. These interviews should be used to get answers on those questions that have not or not fully been answered within the secondary data investigation (step 1) and also to validate and verify doubtful, vague or contradictory information received at step 1.

Telephone inquiries with other relevant actors and documents gathered during the visits may provide valuable, complementary information and a chance to ask for further documents and other expert's names. This should be kept in mind during the interviews.

The case studies questions given in annex II should act as an interview guide in sense of a support tool for the researcher (kind of a "check-list"). It is not designed to be strictly followed, like in the case of a standardised questionnaire. Rather, the character of semi-structured interviews that will be applied is similar to an every-day conversation. The interviewed person should be allowed to structure the communication himself or herself - particularly in the beginning; later on, the interviewers add questions that are not yet covered during the interview so far.

The interviewer takes notes all through the interview. Preferably a tape recorder should be used in addition to taking hand notes. It is important for the interviewer to go through the notes immediately after the interview to check for errors or open questions, to complete it with information not yet written down and to summarize. An interview protocol (based on the questions in annex II) gives information about communications prior to the visit/interview and adds relevant observations that are made during the visit. After the interview first ad-hoc hypotheses, conclusions etc. may be formulated and questions for follow-up interviews should be drafted.

Before starting with the interview, the interviewer has to provide brief information on the institutional background of the interviewer, the research project, the goals of the interview and the interview procedures. This information should be very short in order to prevent the interview to start already with the introduction. The goal of the interview is to collect information on the mobilisation of wood from fragmented forest ownership structures. At the beginning of the interview an "icebreaking question" is recommended the function of which is not only a warm-up but also to provide general information on the organisation of the interviewed person and his/her business environment.

The experts contacted should be also used as gatekeeper for the sampling of the later focus groups sessions.

Written and tape recorded references to interviews should include full name, place, and date of the interview, as well as special confidentiality arrangements (if relevant), and name of interviewer.

Immediately after the interviews, the interviewers should write up their notes/report on the interview, comprising the main messages of the interview. Even if the interview has been taped, some nuances will be forgotten as soon as the next interview is done. Also, having notes on each interview makes it easier to interpret the results, and serves as a backup if the tape recording fails.

As a minimum model we recommend tape recording in combination with a report on the interview (instead of a precise and complete transcription, which is labour-intensive). Interview reports should be produced as soon as possible after the interview. Interviewers can make use of the tape recording for particularly interesting quotes or for verification. However, partial transcription of those interview contents which speak to our research questions will allow more traceable and stringent qualitative analyses.

### Step 3: Focus Group Sessions

Focus groups or so called "group depth interviews" can be defined as a group of interacting individuals having some common interest or characteristics, brought together by a moderator, who uses the group and its interaction as a way to gain information about a specific or focused issue.

Ideally a focus group should consist of 6 to 10 people selected because they have certain characteristics in common that relate to the topic to be investigated. The personnel composition of these groups should include some of the experts already interviewed in step 2 (especially in cases where only a limited number of experts on a certain topic is available) but also some additional new people who help to improve validity. The session typically lasts about one to two hours and is run by a moderator who maintains the group's focus. For successful session a permissive environment that encourages different perceptions and points of view, without pressuring participants to vote, plan or reach consensus is needed. The strength of such focus group sessions is to bring out users' spontaneous reactions and ideas as well as group dynamics on complex topics and qualitative questions that cannot be investigated easily in a direct manner.

The focus groups carried out for this project aim public participation, interpretation of preliminary results (steps 1 and 2) and investigation of questions that could not have been answered by steps 1 and 2. Hence, the number of focus group sessions cannot be predefined. The number is solely depending on the needs for answering all questions of annex II.

In order to conduct a focus group session for this project we asked you to:

#### 1. Select about five to six questions

Please ask yourself what problem or question has to be addressed by the information gathered during the respective session. Select the questions from the case study questions. They need to be open-ended questions which should be systematically prepared but has a natural flow to them. It is advisable to get feedback on the set of questions from other people (colleagues) before carrying out the session.

#### 2. Plan the session

Plan the time and place of the meetings as well as the setting and refreshments. For instance you should configure chairs so that all members can see each other and you should provide name tags for members. Consider an agenda like for example: welcome, review of agenda and goal of the meeting, introductions, questions and answers, wrap up. We recommend to record the session with either an audio or audio-video recorder or at least involve a co-facilitator who is there to take notes.

#### 3. Select participants

Select members who are likely to be participative and reflective. Attempt to select members who don't know each other. Focus groups have to comprise experts from forest owner associations or cooperatives, wood buyers, public authorities and other relevant experts (e.g. from chamber of commerce, researchers, forest administration). In any case, the experts invited have to provide:

- (1) a **balanced and due representation** of the major actors active in the market place and involved in wood mobilisation, i.e. where applicable:

- small-scale forest owners,
- representatives of forest owner cooperatives
- representatives of large scale forest owners/state forest enterprises that cooperate with or manage fragmented small scale forest estates,
- forest product industries
- timber trade,
- national/regional forest administrations administering relevant regulations, subsidy schemes, etc.

- forest extension services
- (2) Due representation of geographical sub-units of the study region, as far as they may significantly differ in relevant preconditions as regards wood mobilisation (ownership structures, market structures, supply chain characteristics, etc.)

#### **4. Facilitate the session**

Verify if the recorder used, works throughout the session. Proceed according to the agenda. Never forget to introduce yourself and the co-facilitator, if used. Please explain the means to record the session. It is important to carefully word each question before that question is addressed by the group. Allow the group a few minutes for each member to carefully record their answers.

Then, facilitate discussion around the answers to each question, one at a time. After each question is answered, carefully reflect back a summary of what you heard (the note taker may do this). In case of one or two people dominating the meeting it is advisable to call on others. In such situations it is possible to use a round-table approach, including going in one direction around the table, giving each person a minute to answer the question.

When closing the session it is necessary to tell the members that they will receive a copy of the entire case study report generated from their answers for review to avoid major misinterpretations. Finally, thank them for coming, and adjourn the meeting.

#### **5. Immediately After Session**

Verify if the recorder used, has worked throughout the session. Make any notes on your written notes as for example: clarify any scratching, ensure pages are numbered. Also note where the session did occur and when. Include also a short note on the nature of participation in the group.

In order to validate the results of the final case study report will be send to the participants of the according focus group session to avoid major misinterpretations.

### ***Case study reports - Monographs***

For each of the case studies carried out within the project it is necessary to deliver a so called monograph in form of a case study report. As we are operating with multiple cases it is important to deliver these reports in common structure which allows the user to easily switch and compare between the reports. Hence the proposed structure for these reports is very much oriented on the case studies questions. In addition to the structure of the questions the case study report should deliver a short introduction, a discussion on results and conclusions. The introduction should describe how the case study was carried out.

1. Introduction (Who, What, When, Where)
2. Overview
3. Owners
4. Markets
5. Mobilisation
6. Discussion
7. Conclusions

## Case study questions

Section 1 Overview			
Task: Describe the case study region	Step 1	Step 2	Step 3
<b>1. What is the total forest cover in the region?</b>	x	x	
i) in percent of the total area?	x	x	
ii) how did it develop during the last 10 years (approx.)?	x	x	
iii) what future development can be expected?		x	x
<b>2. What is the wood mobilisation in terms of annual increment?</b>	x	x	
i) how much is the annual harvest in cubic meters over bark?	x	x	
ii) how much is the annual increment in cubic meters over bark?	x	x	
iii) how did it develop during the last 10 years (approx.)?	x	x	
iv) what future development can be expected?		x	x
<b>3. Is there legal uncertainty regarding forest ownership?</b>	x	x	
i) is there an ongoing restitution process?	x	x	
ii) please describe the process?	x	x	
<b>4. How can the forests in the region be characterized?</b>	x	x	
i) average stock per hectare in cubic meters over bark?	x	x	
ii) shares of coniferous/non-coniferous wood?	x	x	
iii) shares of abandoned and/or unmanaged forests, and the role fragmented ownership plays in this?	x	x	x
iii) describe the general topographic situation?	x	x	
iv) describe the tree age (class) distribution in the regions forests?	x	x	
v) describe other factors (e.g. forest fire risk, accessibility for leisure, climatology and wildlife conservation) that may influence wood harvesting in the regions forests?	x	x	
<b>5. What other factors may be important to describe the case study region?</b>	x	x	

## Section 2 Markets

Task: Describe the regional wood markets	Step 1	Step 2	Step 3
<b>1. What is the structure of the regional wood markets, in terms of ....?</b>			
<b>1.1 ... roundwood sellers (forest owners and companies)?</b>			
i) what is the number of roundwood sellers? - distinguish ownership categories: - fragmented private forest ownership, - other non-industrial private, industrial private, public and forest operators? (describe categories if necessary)	x	x	
ii) average (of the last 5 years) annual selling volume in the region by category? (m3 under bark or o.b.???) (add time series data if possible)	x	x	

Description of task	Step 1	Step 2	Step 3
iii) the average annual selling volume by ownership category either by assortments?  Assortments are at least: saw logs (incl. veneer logs), pulpwood (round and split), fuelwood) OR by ownership category (fragmented private forest ownership) and buyer categories (sawmills, panel, pulp and paper mills, heating plants, private)?	x	x	
iv) the average (of the last 5 years) amount of wood that different ownership size categories within the fragmented private forest owners have sold to markets (if available)	x	x	
v) the average amount of wood that fragmented private forest owners (and different ownership size categories within this group - if available) have harvested for their own use (firewood, construction etc.)?	x	x	
vi) indicate the development on the roundwood sellers market structures and explain any significant changes over the last approx. 10 years, as well as ongoing trends.	x	x	x
<b>1.2 ... industrial buyers?</b>			
i) what is the number of industrial buyers in the region - distinguish industrial buyers categories: - sawmills, panel, pulp and paper mills, heating plants and forest operators?	x	x	
ii) how did the numbers develop during the last 10 years (approx.)? Distinguish industrial buyers categories (add time series data if possible)	x	x	
iii) what was the total average (of the last 5 years) annual buying volume by industrial buyer category and/or by assortments? (m3 o.b. or m3 u.b. - specify) (add time series data if possible)	x	x	
iv) how did the total annual buying volume by industrial buyer category and/or by assortments develop during the last 10 years (approx.)? (add time series data if possible)	x	x	
v) share of domestic and imported volume? (In case of entire countries "imported" means from outside the country, in case of regions "imported" means from outside the region - if possible to collect these data) Distinguish industrial buyers categories	x	x	x
vi) in case of pulp mills, panel mills and heating plants: share of sawmill residues?	x	x	
vii) average selling volume by contract and industrial buyer category ? (m3 o.b. or m3 u.b. - specify)	x	x	
viii) number of traders between forest owners and industrial buyer category by industrial buyer category? (with or without forest owner's associations and forest operators)	x	x	
ix) annual wood volumes transferred by regional traders between forest owners and industrial buyer category by industrial buyer category? (with or without forest owner's associations and forest operators)	x	x	
x) indicate the development on the roundwood buyers market structures and explain any significant changes over the last approx. 10 years, as well as ongoing trends.	x	x	x
<b>1.3 ... other market participants?</b>			
i) number of direct private buyers/consumers (mainly fuel wood, but not limited to it)	x	x	X

Description of task	Step 1	Step 2	Step 3
ii) availability and capacity of harvest contractors or forest operators? (capacity in m3 o.b. or m3 u.b. – specify with or without forest owner's associations)	x	x	x
<b>1.4 ... other structural market factors?</b>			
i) average distance between different types of sellers (e.g. fragmented private forest ownerships) and different types of buyers? (km)	x	x	
ii) harvesting costs to forest road by ownership category? (excluding stumpage sales) (€/m3 o.b. or u.b. - specify)		x	x
iii) transportation costs from forest to industrial buyer? (m3 o.b. or m3 u.b. - specify) (consider a difference also between ownership categories)		x	x
iv) black market/illegal logging in fragmented forest ownerships (existence, quantification - if possible, special circumstances or legal requirements)?	x	x	x
v) the approximate volume (if possible) of informal market segments (subsistence, supply to family members, neighbours, etc.) not covered by wood supply statistics to be? What is the particular role of fragmented ownership in this market segment?		x	x
vi) are informal market segment expected to expand or decrease? Why?		x	x
vii) How reliable do you think are statistics available on actual fellings in your region? If there is a systematic over-/underestimation, how well are small properties covered?		x	x
viii) market information access by ownership category (information flows)?	x	x	x
ix) wood quality requirements by buyer category? Do requirements and available quality differ?	x	x	
<b>2. What are typical wood sales methods/marketing channels in the region?</b>			
i) describe sales methods (e.g. standing, auction, long-term contract, ad-hoc on individual basis, etc.)?	x	x	x
ii) describe the importance of these sales methods in the region (percentage of sales methods of total sales)?	x	x	x
iii) sales methods by assortment (percentage of sales methods of total assortment sales)?	x	x	x
iv) importance of the sales methods by ownership category (percentage of sales methods of total sales by ownership category - including if possible different categories of fragmented private forest owners )?	x	x	x
v) explain why categories of fragmented private forest owners prefer some sales methods over others, that are not/hardly used.		x	x
<b>3. How are the wood sellers and buyers to be characterised?</b>			
<b>3.1 forest owners' side</b>			
i) share of "organized" (e.g. in owners associations, loose groups, cooperatives, co operations, unions) and "un-organized" forest owners (all and - if possible by fragmented private forest owners )	x	x	
ii) share of roundwood sales by "organized" and "un-organized" forest owners (all and - if possible by fragmented private forest owners ) by assortments and/or buyer category	x	x	x
iii) explain the types of organized forest owners associations in the region	x	x	x

Description of task	Step 1	Step 2	Step 3
iv) how do these association work (by type of organisation)? Legal set-up, activities (including, but also beyond timber sales), who initiated them and why? Are they linked to special sales methods?	x	x	x
v) how is the degree/level of organization of forest owners expected to develop in future? How are for example the memberships in associations, cooperatives etc. expected to develop?		x	x
vi) is there a trend towards increased cooperation between small/fragmented private forest owners?		x	x
<b>3.2 wood industry side (including forest operators)</b>			
i) share of "organized" and "un-organized" industrial buyers (by buyer type)	x	x	
ii) share of roundwood bought by "organized" and "un-organized" industrial buyers (by buyer type) (add time series data if possible)	x	x	x
iii) types of organized industry associations (cooperatives, co operations, unions)?			
iv) how do these associations work (by type of organisation)? Legal set-up, activities (including, but also beyond timber procurement), who initiated them and why? Are they linked to special sales methods?	x	x	x
v) how is the degree/level of organization of industrial buyers expected to develop in future?		x	x
<b>3.3 cross forest owners and wood industry associations</b>			
i) share of forest owners (by owner type) and industrial buyers (by buyer type) in cross forestry-industry associations	x	x	x
ii) share of roundwood sold/bought by cross forestry-industry associations (add time series data if possible)		x	x
iii) how do these cross forestry-industry association work? Legal set-up, activities (including, but also beyond timber sales), who initiated them and why? Are they linked to special sales methods?		x	x
iv) is there a trend towards more vertical cooperation or integration which involves also small owners?		x	x
v) what is the general atmosphere of the relationship between forest owners, especially fragmented private forest ownerships and the industry?		x	x
<b>4. How do wood prices and wood price changes influence the regional supply?</b>			
i) in context to forest ownership structure? Describe different reactions by ownership category and assortments	x	x	x
ii) price developments during the last 10 years (approx.) (by assortment)? (add time series data if possible)	x	x	
iii) roundwood supply price elasticity's by ownership categories and/or assortments?	x	x	
<b>5. What is the role of forest authorities regarding fragmented private forest ownerships participation in the wood markets?</b>			
i) guidance or control on harvests of fragmented private forest ownerships?	x	x	x
ii) guidance or control on timber sales of fragmented private forest ownerships?	x	x	x

Description of task	Step 1	Step 2	Step 3
iii) forest regulations?	x	x	
iv) wood trading regulations?	x	x	
v) forest or wood related taxes?	x	x	
vi) forest or wood related subsidies?	x	x	x
<b>6. What is the role of representation of interests in forestry? (e.g. chambers of agriculture and forestry, forestry NGOs, environmental NGOs)</b>			
i) regarding harvest activities of fragmented private forest ownerships? (by type of organisation)	x	x	x
ii) regarding timber sales of fragmented private forest ownerships? (by type of organisation)			
iii) regarding overall framework conditions relating to harvests/timber sales of fragmented private forest ownerships?	x	x	x
<b>7. How are the wood markets in that region most likely developing in the future?</b>			
i) regarding prices (by assortments)? Reasons for changes (by assortments)	x	x	x
ii) regarding supply (by assortments)? Reasons for changes (by assortments)?		x	x
iii) regarding demand (by assortments)? Reasons for changes (by assortments)?	x	x	x
iv) regarding their structure? Changes in numbers/size of suppliers and buyers. Reasons for changes	x	x	x
v) regarding imports? (In case studies of entire countries "imported" means from outside the country, for case studies of regions "imported" means from outside the region - if possible to collect these data)		x	x
vi) regarding exports? (In case studies of entire countries "exported" means to outside the country, for case studies of regions "exported" means to outside the region - if possible to collect these data)		x	x
vii) regarding forest authorities and interest representations?		x	x
<b>8. What other factors may be important to describe the wood markets relating to the harvest level/mobilisation?</b>		x	x

### Section 3 Owners

Task: Describe the private forest owners	Step 1	Step 2	Step 3
<b>1. Describe the structure of forest ownership in the area in terms of forest resources:</b>			
<b>1.1 Indicate the:</b> (This seems to overlap with section 2 sellers – consistency has to be maintained)			
i) overall distribution of ownership categories in terms of forest land in hectare,	x	x	



Description of task	Step 1	Step 2	Step 3
ii) the share of private forest ownership,	x	x	
iii) the share of fragmented private forest ownership thereof.	x	x	
iv) Indicate the development and explain any significant changes over the last approx. 10 years, as well as ongoing trends.	x	x	x
<b>1.2 Indicate the:</b>			
i) distribution of ownership size categories within the group of fragmented private forest owners (number of owner and size forests land by category).	x	x	
ii) Indicate the development and explain any significant changes over the last approx. 10 years, as well as ongoing trends.	x	x	x
<b>1.3 Indicate the:</b>			
i) volume of the annual increment (m3 over bark) in fragmented private forest ownerships	x	x	
ii) annual wood fellings (m3 over bark) of fragmented private forest owners (of the last 10 years)	x	x	
iii) describe differences between different ownership size categories within that group of fragmented private forest owners, if applicable.	x	x	x
iv) indicate the development and explain any significant changes over the last approx. 10 years, as well as ongoing trends.	x	x	x
<b>1.4. Describe:</b>			
i) whether, and if so why, significant shares of the annual increment of fragmented private forest owners forestland can not be mobilised for principled reasons (e.g. nature protection sites, ban forests, etc.).	x	x	
ii) Indicate the development and explain any significant changes over the last approx. 10 years, as well as ongoing trends.	x	x	
<b>2. What is the level of fragmented private forest owners' participation in wood markets?</b>			
<b>2.1 Describe (if applicable) the main factors that:</b>			
i) induce or prevent different ownership size categories of fragmented private forest owners to participate in wood markets.	x	x	x
ii) Briefly explain the major chains of cause and effect.	x	x	x
iii) Can increasing participation of small private forest owners in the wood market expected for the future? If yes, what would be the main drivers (general trend, market, mobilization measures etc)?		x	x
<b>3. Characterising fragmented private forest owners</b>			
<b>3.1 fragmented private forest owners-typologies based on socio-demographic variable, owners' values, attitudes, objectives, behaviour etc.:</b>			
i) If available (e.g. from studies, survey), describe <u>typologies of fragmented private forest owners</u> that are available for your region AND that seem to provide relevant information as regards the effectiveness and efficiency of (potential) measures for wood mobilisation targeting fragmented private forest owners (concentrate on things relevant for wood mobilisation from fragmented forest ownerships);	x	x	x

Description of task	Step 1	Step 2	Step 3
ii) Explain how and why the typologies/types are relevant for this project (Please clearly indicate references from which typologies are taken).	x	x	x
<b>3.2 Please indicate, if possible:</b>			
i) the volume of "natural" resource potential of fragmented private forest owners-types as described in 3.1, in terms of previous differences (of the last 10 years) between harvestable annual increment and actual fellings (m3 o.b.) ("what theoretical potential for mobilization by fragmented private forest owners-type?"). (please keep section 2 Question 1.4 sub-questions v – vii regarding informal markets and data reliability in mind)	x	x	x
<b>3.3. Characterise fragmented private forest owners in the case study region as regards the following aspects and, whenever possible, try to relate these characterisations to ownership size categories (see 1.2 --&gt; e.g. indicating "what is the share of full-time farm-fragmented private forest owners" by category), :</b>			
i) socio-demographic aspects: <ul style="list-style-type: none"> <li>- farm-forest owners vs. non-farm forest ownership (also distinguish full-time vs. part-time farmers) with or without agricultural/forestry socialisation (e.g. grew up on farm)</li> <li>- living "next door" to their forests vs. absentee/non-resident forest owners (far away from their forests)</li> <li>- education in forestry and agriculture - no such educational background</li> <li>- owners' capacities available for forest management: knowledge, machinery, man-power (time available)</li> <li>- share of family income derived from forests and derived from agricultural production</li> <li>- membership in forest owner cooperatives and forest owner interest groups</li> <li>- sectoral reachability: regular receiver and user of forest sector information (e.g. publications by forest owner organisations, professional journals)</li> <li>- other socio-demographic characteristics relevant as regards wood mobilization (e.g. forest owner age structures, inheritance, ...)?</li> <li>- expected trends of socio-demographic characteristics relevant as regards wood mobilization?</li> </ul>	x	x	x

Description of task	Step 1	Step 2	Step 3
<p>ii) Attitudes towards forests, forest management objectives, forest management behaviour:</p> <ul style="list-style-type: none"> <li>- Describe the major attitudes of fragmented private forest ownership towards their forests: e.g. forest as a work place and regular source of income, ownership as family tradition/in heritage, as a form of investment, a reserve for times of need, forest as a habitat/nature/site of nature protection, a site for own recreation, hunting site, etc.</li> <li>- Describe guiding management objectives of fragmented private forest ownership: economic vs. non-economic goals, e.g. to derive maximum income, to reserve growing stock for times in need, to keep to protect nature, to conserve forests for next generation, etc.</li> <li>- Describe the fragmented private forest ownership attitudes towards forest management service organisations, such as forest owner cooperatives, harvesting companies, silvicultural services, interest groups, forest authorities (major incentives/pros and barriers/cons to join in or to delegate forest work)</li> <li>- What are the main sources of information as regards forestry matters for the fragmented private forest ownership (professional journals, cooperatives, forest owner interest groups, forest authorities, forest management companies, nature conservation interest groups and authorities, educational organisations, forestry education, science and training centres, .... etc.)</li> <li>- What about fragmented private forest ownership themselves working in their forest vs. commissioning forest work to third parties (to whom? companies, relatives and neighbours,...)</li> <li>- What are possible reasons for non-management of private forests?</li> <li>- Other factors relevant in terms of attitudes, objectives and behaviour (e.g. the legal heirs attitudes, objectives, ...)?</li> <li>- Any expected trends regarding the relevant factors?</li> </ul>	x	x	x
<b>4. Why is there a certain level of motivation to actively participate in forestry?</b>			
<b>4.1 Starting from the forest owners typologies as reported to 3.1 and the fragmented private forest ownership characteristics reported under 3.3., point out those characteristics that are of central importance as regards wood mobilization:</b>			
i) What are significant factors (cf. 3.1. and 3.3!) that explain why fragmented private forest ownership exploit or not exploit the sustainable harvesting potentials of their forests?		x	x
ii) Please describe and explain (cause and effect) these factors in general		x	x
iii) Please describe expected future developments of these factors		x	x
<b>4.2 Also discuss the factors described under 4.1. from the perspective of:</b>			
i) Which incentives could be strengthened and which barriers could be overcome in the short-, medium- or long-term? (NB.: Overall research question: "measures for wood mobilization")		x	x

Description of task	Step 1	Step 2	Step 3
<b>5. What other characteristics of fragmented private forest owners are important to understand their reactions to (potential) measures that aim at mobilizing wood from their forest lands?</b>			
i) Please indicate factors and EXPLAIN cause and effect, as applicable: What factors, how do the impact on wood mobilisation / (potential) measures for mobilisation, relevance for all or specific categories of fragmented private forest owners; relevant in general or only under specific circumstances (which, e.g. in certain market conditions) etc.		x	x

#### Section 4 Mobilisation

Task: Describe the wood mobilisation in the region	Step 1	Step 2	Step 3
<b>1. What are measures for wood mobilisation from fragmented private forest ownership in the region?</b>		x	x
i) what are they, explain?		x	x
ii) who is implementing them? Who is taking the initiative?		x	x
iii) which are successful? Why?		x	x
iv) if available please indicate approximate costs of the taken measures	x	x	x
v) are there any ex-post or ex-ante estimates of the effectiveness of measures in terms of additionally mobilised wood supply?	x	x	x
vi) are measures for wood mobilization expected to be increased or intensified in the future?		x	x
vii) What are currently the main new instruments which are being discussed and why?		x	x
viii) What are the lessons learned from the past?		x	x
<b>2. What are barriers for wood mobilisation from fragmented private forest ownership in the region?</b>		x	x
i) what are they, explain?		x	x
<b>3. Which of the factors described earlier have the strongest impact on wood mobilisation from fragmented private forest ownership in the region?</b>		x	x
i) what are they, explain?		x	x
ii) how do they work?		x	x
<b>4. What other factors may be important regarding wood mobilisation from fragmented private forest ownership?</b>		x	x

## Annex Task 3

### Forest owners' typologies

Case study region	Typology	Characteristics
<b>Austria</b>	<i>Farmer forest owners</i>	Close connection to agriculture. Primarily full-time farmers. Professional training/education in agriculture or forestry. Live in small municipalities, close to their forests. Forests are mainly perceived as employment and source of income. Use traditional, forestry-oriented sources of information.
	<i>Part-time farmers</i>	Close connection to agriculture. No professional training/education in agriculture or forestry. Forest property is primarily seen as part of family traditions. Get information on forests primarily from friends and relatives.
	<i>Rural people with agro background</i>	Mostly live in medium-sized municipalities, still close to their forests. Rather close connection to agriculture.
	<i>Forest owners previously employed in agriculture</i>	Rather close connection to agriculture. Often professional education in agriculture or forestry. Few still active in agriculture and forestry. Forests serve both economic and non-economic goals. Often draw from traditional, forestry-oriented sources of information
	<i>Farm leavers</i>	Grew up on farm. No longer part of farm enterprise. High share of white-collar employees, civil servants, and craftsmen. Forests serve rather recreation purposes. Sceptical towards forestry-oriented sources of information
	<i>Urban forest owners</i>	Live in larger cities, far away from their forests. Hardly no connection to agriculture. High share of white-collar employees, civil servants, and self-employed persons. High level of general education. Forests are a source of income for only few. Rarely seek forest-related information.
	<i>Non-farm related forest owners</i>	Few have professional training/education in agriculture or forestry. Forest holding rarely part of a farm. High share of white-collar employees, civil servants, and craftsmen. Forests are almost never seen in terms of income and employment. Forests often purchased on their own. One quarter does not harvest timber.
<b>Sweden</b>	<i>Traditionalist</i>	Has a forest property within the range of 25-99 ha and is in average 57 years old. The duration of their ownership is quite long and most of them want their children to inherit.
	<i>Economist</i>	Grew up on their forest estates and inherited their forest from their family. The income from their forests is large and half of them have a forest management plan.
	<i>Conservationist</i>	Have small estates and live far away from their forests. They are also younger than the other groups and have acquired their forest holdings by buying them not too long ago from their families
	<i>Passive forest owner</i>	The passive forest owners are older and have a small forest holding that they visit less than 10 times a year. Few of them have a management plan and most expect their children not to inherit the forest.
	<i>Optimist</i>	Have a long duration of their ownership and grew up on the countryside. They have a large proportion of their income from their land and have a higher forest knowledge than the other groups.
	<i>Environmentalist</i>	Generally buys a forest holding for keeping it for environmental purposes and for taking environmental responsibility. He/she is generally well educated and lives far away from the forest holding.
<b>England</b>	<i>Individualist</i>	Strong sense of ownership and privacy. Reluctant to engage with public bodies and are against public access. Least likely to apply for a woodland management grant.
	<i>Multi-functional owners</i>	Motivated by multiple objectives, including amenity, conservation and financial return, alongside personal enjoyment. Pragmatic and often entrepreneurial. Most likely to apply for a grant.
	<i>Private consumers</i>	Predominantly extract wood products of subsistence (e.g. fuelwood and wood logs).
	<i>Conservationists</i>	Maintain woodland as a nature reserve and oppose recreational access.
	<i>Investors</i>	Financially oriented and likely to carry out timber production or other profit-making activities.
	<i>Amenity owners</i>	Favour public access and public amenity.

<b>Rhône-Alpes</b>	<i>Saver</i>	Wood is saved for family events or big investments, as such, these owners buy more parcels than average (constituting a saving). Management takes place punctually. They are generally farmers, employed or unemployed owners. Forests are limited to the questions of saving, investment, and patrimonial transfer.
	<i>Frustrated owner</i>	Disappointed owners: Old, they can't anymore handle their forest; They were deceived by the next generation; They don't appreciate the intervention of association for environment protection; They are worried by climatic hazards; They just inherited the forest and feel embarrassed by this situation (e.g. distance to forest holding, lack of knowledge).
	<i>Local sociable forester</i>	More present in local reunions of foresters. Active for professional cooperation. Feel proud of being a forest owner. Income of their forest is not their unique objective. Forest is a base for positive social relations.
	<i>Local producer</i>	Do the forest works by themselves (maintenance, thinning, pruning, and logging). Invest in the local economy, produce value added for them and the forest industry, and try to improve their forest incomes.
	<i>Long term manager</i>	Main source of income is through the exploitation of timber, pulpwood, fuelwood or hunting. High degree of patrimony. Open to other global objectives (e.g. as contributing to protection of biodiversity). Forest represents an open land to everybody locally. It is a space allowing relation between persons. Owners of this profile are open to both economical and environmental incentives.
	<i>"Symbolist" owners</i>	Forest ownership is base on intrinsic and moral values, these values are naturalistic or ecological. Also related to personal pleasure, freedom and patrimony. These owners do not like collective enterprise nor new standards on logging. Income is not an objectives but logging is necessary for forest maintenance.
<b>Hungary</b>	<b>N.A.</b>	<b>N.A.</b>
<b>Estonia</b>	<b>N.A.</b>	<b>N.A.</b>
<b>Saxony</b>	<i>Owners with interest in using forests for firewood</i>	The main motivation of owners is self-supply with firewood that creates independence from rising energy prices. Furthermore, own work can be invested in a region where unemployment rates are very high. The access to additional and cheap manpower is easy.
	<i>Uninformed / uninterested forest owners</i>	Only low income possibilities, the owners' age, missing tradition due to expropriation of the former forest owners by the GDR and other factors are relevant to understand the behaviour of forest owners.
	<i>Owners with economic interests</i>	New forest owners, with recently bought forests. Have a higher interest in forest management and wood marketing. Important category as they act as an example for other private forest owners.
	<i>Owners with non-economic interests</i>	Environmental aims (e.g. protection), heritage of forests to children, land tenure (without using) can be motives of owners within this group.
<b>Catallonia</b>	<i>Famer / traditional ownership</i>	Farming is their main activity, forestry is most often a complementary activity. Tend to be rural landowners. Main economic source is linked to the property and resides close to the forest property. Understands forest management. Motivated to do things related to forest ownership and forestry work. Normally well informed and interested in information about the forestry sector.
	<i>Heritage ownership</i>	Main economical activity is not related to the forest. No strong link with the forest ownership. They can be of rural origin or not. Main goal is to maintain the property. Predominantly an urban resident.
	<i>New acquisition ownership</i>	Reside on the forest property. Newly acquired for farming or for leisure activities. Owners of urban origin (newly acquired) see the property as recreational space or simply as the residence. Owners of urban origin are more dynamic and innovative.

## Incentives for improving participation in wood markets.

Case study	Incentives
<b>Austria</b>	<ul style="list-style-type: none"> <li>• <i>Short term:</i> Locally accessible personal assistance and advice.</li> <li>• <i>Middle term:</i> Infrastructure development, new product development, market accessibility, financial incentives, education, and provide information through interest groups and forest owner associations.</li> <li>• <i>Long term:</i> Strengthen political goals, account for generational shifts, new technologies for SSFO and PR.</li> </ul>
<b>Sweden</b>	<ul style="list-style-type: none"> <li>• There are good conditions for wood mobilization as the market is well structured, organized and have a good competitive level between different clear and well known actors.</li> </ul>
<b>England</b>	<ul style="list-style-type: none"> <li>• Underlying capital growth of the land asset.</li> <li>• Woodland ownership and management is a cost operation rather than profitable enterprise.</li> <li>• Smaller commercial forests (25-50ha) have maintained exceptional value.</li> </ul>
<b>Rhône-Alpes</b>	<ul style="list-style-type: none"> <li>• <i>Short term:</i> Stimulate cooperation among SSFO.</li> <li>• <i>Long term:</i> Increased governmental incentives and higher wood prices.</li> </ul>
<b>Hungary</b>	<ul style="list-style-type: none"> <li>• N.A.</li> </ul>
<b>Estonia</b>	<ul style="list-style-type: none"> <li>• Taxation relief to support harvests.</li> </ul>
<b>Saxony</b>	<ul style="list-style-type: none"> <li>• <i>Short term:</i> Access to forest owners data for interest organisations and reduce costs.</li> <li>• <i>Middle term:</i> Replace institutional subsidies with direct subsidies and improve infrastructure.</li> <li>• <i>Long term:</i> Provide information about management and increase membership in forest associations.</li> </ul>
<b>Catalonia</b>	<ul style="list-style-type: none"> <li>• <i>Moral:</i> Information tools to increase social recognition. Should emphasise value and tradition behind forest management.</li> <li>• <i>Archetype:</i> Influence through the transfer of knowledge to increase understanding and change prevalent mental models.</li> <li>• <i>Forest fire:</i> Provides an incentive to clean forests and engage in silvicultural activities.</li> <li>• <i>Economic:</i> Provide economic incentives that fit the needs of forest owners (e.g. cost sharing)</li> </ul>

## Wood mobilisation measures, by case study region.

Case study	Wood mobilisation measures
<b>Austria</b>	<ul style="list-style-type: none"> <li>• <i>Personal on site assistance and advisory services for fragmented owners</i>: Aim to raise trust and awareness.</li> <li>• <i>Public relations work</i>: Establish a positive public opinion.</li> <li>• <i>Improving / enforcing GIS systems for quantifying wood potential</i>: Data for planning and management.</li> <li>• <i>Transparency in timber supply chain</i>: Increasing transparency, securing payments and reducing uncertainties and mistrust.</li> <li>• <i>New communication channels</i>: Provide specific information for each forest owner type. Raise awareness of potential harvest and management possibilities.</li> </ul>
<b>Sweden</b>	<ul style="list-style-type: none"> <li>• No measure for wood mobilisation in the region</li> </ul>
<b>England</b>	<ul style="list-style-type: none"> <li>• <i>Rural Development Plan for England (RDPE)</i>: Provides funding opportunities to (1) Improve woodland management by increasing financial returns from forest management and adding value to woodland products; (2) Grants on capital investments and training; and (3) Productive woodland management training.</li> </ul>
<b>Rhône-Alpes</b>	<ul style="list-style-type: none"> <li>• <i>Massif development plans</i>: Involved parties (e.g. owners and local representatives) are invited to reflect on actions that can be taken for wood mobilization. Stimulate joint management schemes in the region.</li> <li>• <i>Creation of forest associations</i> (e.g. grouped management plans, collecting subsidies, creating new tools to support forest management).</li> <li>• <i>Drying plant</i>: Grouping sellers to increase value of wood.</li> <li>• <i>Certification schemes</i>.</li> </ul>
<b>Hungary</b>	<ul style="list-style-type: none"> <li>• No measure for wood mobilisation.</li> <li>• Forest integrator entities call together SSFO's and provide management.</li> </ul>
<b>Estonia</b>	<ul style="list-style-type: none"> <li>• A range of Government support measures: (1) Private Forest Management Planning; (2) Reforestation; (3) Soil scarification; (4) Tending of young stands; (5) Small scale project of economic co-operation; (6) Training activities; and (7) Base financing of consultants. For all activities, see the case study.</li> </ul>
<b>Saxony</b>	<ul style="list-style-type: none"> <li>• <i>Cluster initiative</i>: Getting forest owners to cooperate on fabricating biogas, fuelwood and electricity.</li> <li>• <i>HAF mobility project in the Luasitz</i>: Support to local forest cooperatives.</li> <li>• <i>Specific campaigns by forest authorities</i>: Yearly fairs, award for good forest management, and training.</li> <li>• <i>Permanent activities of the forest authorities</i>: Provide advice and council to forest owners. Financially support activities to commercialize wood from private owners.</li> <li>• <i>Small scale measure with local focus</i>: Projects supported by communities or local companies.</li> </ul>
<b>Catalonia</b>	<ul style="list-style-type: none"> <li>• <i>For forest owners</i>: Subsidies that aim to stimulate forest management and maintenance, prevent forest fires, maintaining forest activity. Mainly address properties with formal planification documents.</li> <li>• <i>For industry</i>: Public subsidies to (1) transform the wood industry; and (2) for transport and wood stockage.</li> <li>• <i>Other</i>: Measure to promote renewable energies (biomass) and Feed-in tariffs for electricity production.</li> </ul>



## Barriers for wood mobilisation measures, by case study region.

Case study	Factors	
<b>Austria</b>	<ul style="list-style-type: none"> <li>• Lack of financial resources.</li> <li>• Inadequate timber market.</li> <li>• Misleading motivation and lack of cooperation.</li> <li>• Lack of property and forest site data.</li> <li>• Lack of infrastructure and technologies for SSFO.</li> </ul>	<ul style="list-style-type: none"> <li>• Misleading marketing strategies, and bad experiences among private entrepreneurs.</li> <li>• Lack of knowledge about harvesting potential, market values and marketing channels.</li> <li>• Lack of local actors and education.</li> </ul>
<b>Sweden</b>	<ul style="list-style-type: none"> <li>• Personal decisions are most important.</li> </ul>	
<b>England</b>	<ul style="list-style-type: none"> <li>• Woodland regulation carries high costs for the management and financial viability of woodland.</li> <li>• Difficult for SSFO to compete internationally.</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease of suitable hardwood cause sawmill industries to decline and increase dependence on imports.</li> </ul>
<b>Rhône-Alpes</b>	<ul style="list-style-type: none"> <li>• Grouping owners is time consuming and not profitable as they are to numerous.</li> </ul>	<ul style="list-style-type: none"> <li>• Access to parcels.</li> <li>• Owner's motivation to realize felling.</li> </ul>
<b>Hungary</b>	<ul style="list-style-type: none"> <li>• No forest policy instruments for wood mobilisation.</li> <li>• State forest management organisations are excluded from the options to manage non-forest land.</li> </ul>	<ul style="list-style-type: none"> <li>• Domestic industry has not addressed wood mobilisation.</li> <li>• Lack of information.</li> </ul>
<b>Estonia</b>	<ul style="list-style-type: none"> <li>• <i>Urban owners</i>: Competence is missing, making SSFO vulnerable on the market, also a lack of access to local networks.</li> </ul>	<ul style="list-style-type: none"> <li>• Taxation.</li> <li>• Regional support for long-distance transportation would help.</li> </ul>
<b>Saxony</b>	<ul style="list-style-type: none"> <li>• N.A.</li> </ul>	
<b>Catalonia</b>	<ul style="list-style-type: none"> <li>• <i>Negative social and political influence</i>: Social movement for conservationism and Catalan administration follows a protectionist policy.</li> <li>• Degraded infrastructure.</li> <li>• Low profitability coupled with high exploitation costs.</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Lacking forest culture</i>: Disappearance of professional forest workers due to low economic motivation.</li> <li>• Lack of up to date technology and machinery.</li> <li>• Zones of protection limit potential forest work.</li> </ul>

## Price analysis

### Evolution and average price for wood

#### Data and variables

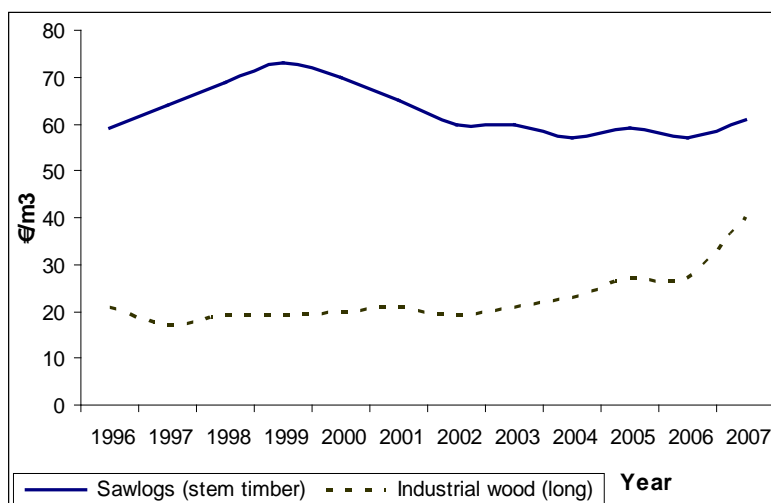
Variables evaluated in this section are those related to prices, costs, and its influence –if available data- with wood mobilization or forest owner behaviour. So selected variables are:

- Average prices and balance of trade at the EU
- Wood production cost estimates (harvesting plus transport)
- Sensibility to price increase
- Sawlog and fuelwood price development
- Price elasticity

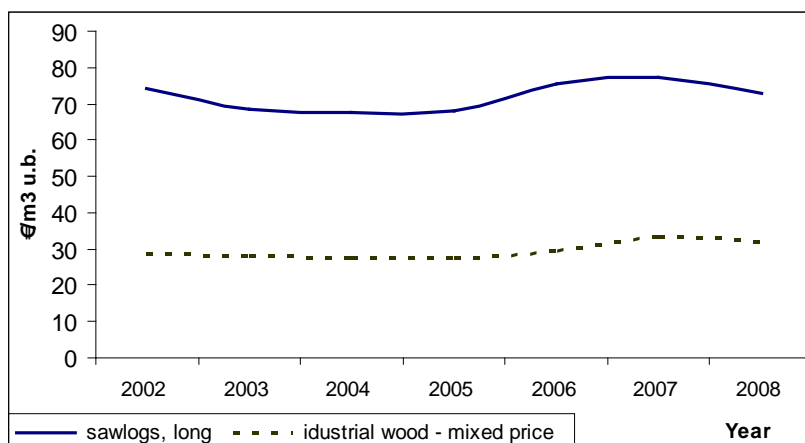
Anyway, it is difficult to assess and analyze economic related behaviour of Fragmented Forest Ownership (FFO) at a global scale through the case studies,

since many of these CSs don't give specific figures for FFO. It has been also difficult to get a roundwood annual gross consumption due to distorted figures containing secondary and by-products in most cases.

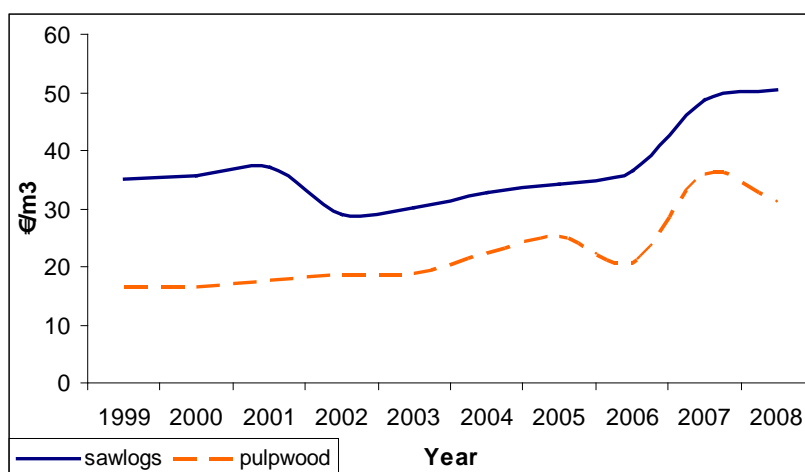
NOTE: Current prices have been used in all cases.



**Figure 32: Wood products price development in Saxony (case study, 2010)**



**Figure 33: Wood products price development in Austria (case study, 2010)**



**Figure 34: Wood products price development in Estonia (case study, 2010)**

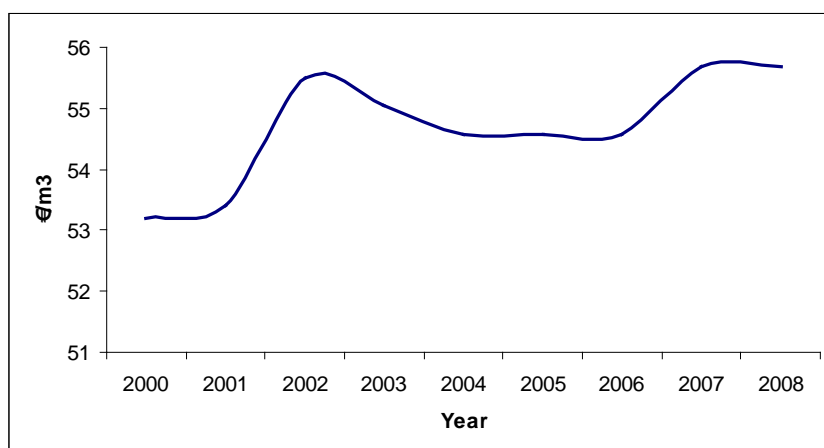


Figure 35 : Sawlogs price development in Catalonia (case study, 2010)

Table 1: Latest price of sawlogs in the different EU regions (Source: case study reports, 2010)

<i>Prices</i>	<i>units</i>	<i>sawlog</i>	<i>Year/clarification</i>
<b>Austria</b>	€/m3 under bark	73.0	2008/ sawlog long
<b>Catalonia</b>	€/m3	55.6	2008
<b>Estonia</b>	€/m3	50.5	2008
<b>Hungary</b>	€/net m3	39.8	2004
<b>Rhône-Alpes</b>	€/m3	59.0	2007/ roundwood
<b>Saxony</b>	€/m3	61.0	2007/ Stem timber
<b>Sweden</b>	€/m3	45.8	2009/ timber
<b>Average</b>		<b>55.0</b>	

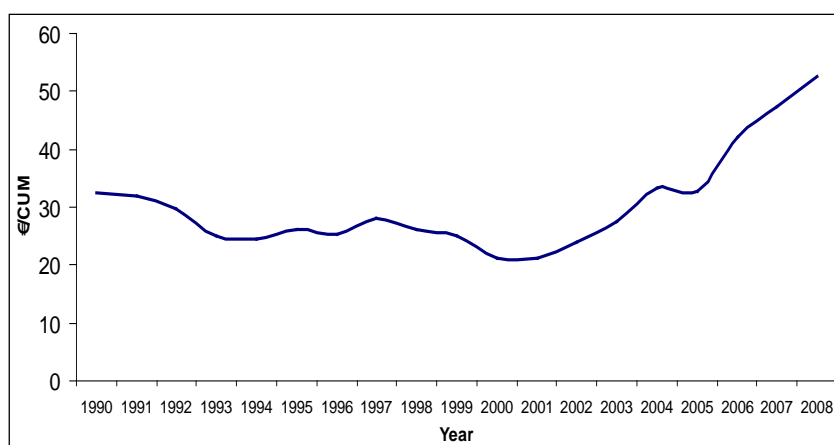
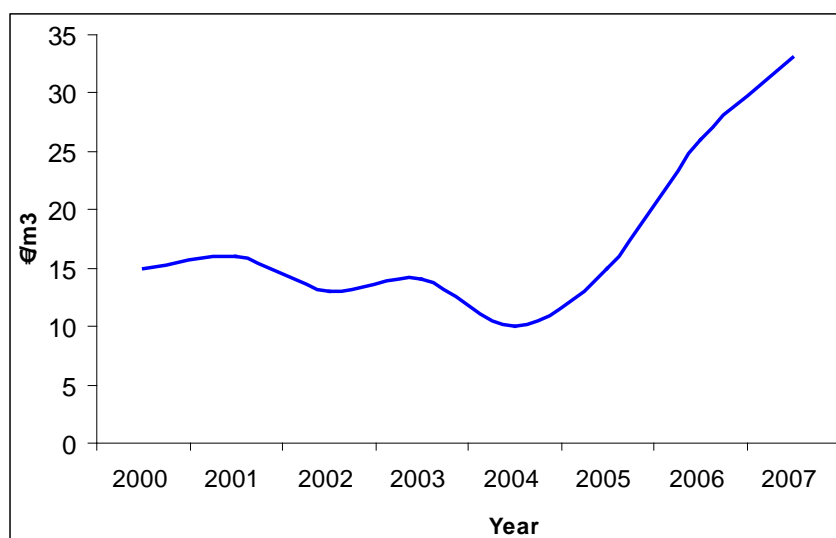


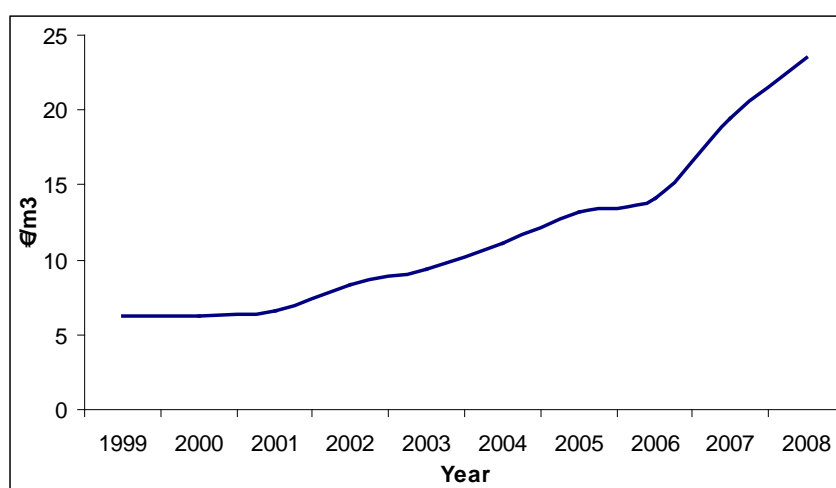
Figure 36: Evolution of current price for fuelwood in EU, €/Cubic Meters (Source: FAOSTAT, 2010)

**Table 2: Latest price of fuelwood in different EU regions (Source: case study reports, 2010)**

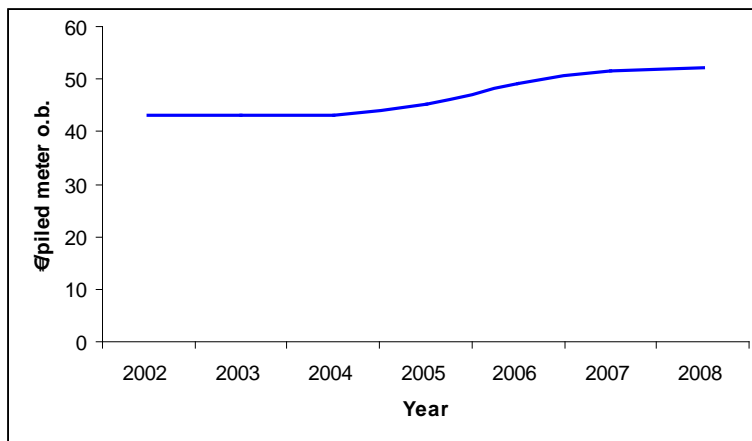
<b>Austria</b>	piled meter o.b.	44.1	2008
<b>Catalonia</b>	€/m3	42.3	2008
<b>Estonia</b>	€/m3	23.5	2008
<b>Hungary</b>	€/net m3	25.9	2004
<b>Saxony</b>	€/m3	33.0	2007
<b>Average</b>		33.7	



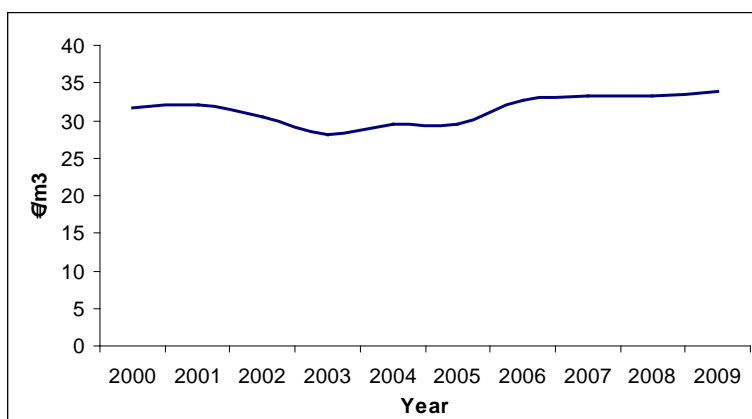
**Figure 37: Fuelwood price development in Saxony (case study, 2010)**



**Figure 38: Fuelwood price development in Estonia (case study, 2010)**



**Figure 39: Fuelwood (hard) price developments in Austria (case study, 2010)**



**Figure 40: Fuelwood price developments in Catalonia (case study, 2010)**



Table 3: Annual trade of the main forest products in UE (Source: FAOSTAT, 2010)

<i>Product</i>	<i>Average 1990-2008</i>	
	<i>Balance of trade (k€)</i>	<i>price (€/m<sup>3</sup>)</i>
<i>Industrial Roundwood</i>	-31,220,910	57.41
<i>Roundwood</i>	-32,315,369	56.63
<i>Sawnwood</i>	-21,906,374	193.58
<i>Wood for fuel</i>	-1,094,460	31.95

Table 4: Harvesting costs estimate in different EU regions (Source: case study reports, 2010)

<i>Region</i>	<i>Units</i>	<i>Harvesting (average felling and thinning)</i>	<i>Transport</i>	<i>TOTAL</i>
<i>Austria</i>	€/m3	37.44	9	46.44
<i>Catalonia</i>	€/m3	24.08	8.5	32.58
<i>England</i>	-	-	-	-
<i>Estonia</i>	€/m3 (o.b.)	13.66	3.6	17.26
<i>Hungary</i>	€/net m3	13.50	10	23.5
<i>Rhône-Alpes</i>	€/m3 (o.b)	17.00	11.5	28.5
<i>Saxony</i>	€/m3	15.50	9	24.5
<i>Sweden</i>	€/m3	13.00	5.91	18.91
<b>Average</b>	€/m3	<b>19.17</b>	<b>8.21</b>	<b>≈27.38</b>
<b>Average distribution %</b>		<b>70%</b>	<b>30%</b>	<b>100%</b>

Price Meta-analysis

Table 5: Variable description for vote counting analysis of price development and effects

<i>Cod e</i>	<i>Variable</i>	<i>Description</i>	<i>Response</i>
A	Sensibility to wood price	Influence on mobilization	+ = price increase induces increase wood mobilization - = price increase induces reduction of wood mobilization 0 = price development is not significant
B	Sawlog price development	Description of price development	+ = increase evolution - = descending evolution 0 = no changes
C	Fuelwood price develop.		
D	Price elasticity	Influence on production	+ = Positive elasticity - = Negative elasticity 0 = Not significant/negligible elasticity

Besides CSs, some more studies have been used for data widening in order to improve significance and robustness of results. These studies mainly provided information regarding sensibility of ownerships to mobilize wood depending on price evolution (variable A).

**Table 6: Vote counting analysis of economic variables description and influence with wood mobilization**

<b>Source\ Variable</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>Austria CS</b>	+	-	+	+
<b>Catalonia CS</b>	+	-	-	0
<b>England CS</b>		-		
<b>Estonia CS</b>	0	+	+	
<b>Hungary CS</b>			+	
<b>Rhône-Alpes CS</b>	+	-	+	0
<b>Saxony CS</b>	+	-	+	0
<b>Sweden CS</b>	+	0	+	0
<b>BOKU &amp; WoodKPlus 2010</b>	+			
<b>Haynes R. 2003</b>	+			
<b>BolkesjØ &amp; Solberg 2003</b>	+			+
<b>Favada et al 2007</b>	+			+
<b>Beach et al 2005</b>	+			
<b>Dennis D 1989</b>	0			
<b>BolkesjØ &amp; Baardsen 2002</b>	+			+
<b>Ovaskainen et al 2006</b>	+			
<b>UNECE &amp; FAO, 2005</b>		-	-	
<b>Nr. included</b>	14	8	7	8
<b>Nr. significant</b>	12	7	6	4
<b>Positive</b>	12	1	5	4
<b>Negative</b>	0	5	1	0
<b>Nr. Not significant</b>	2	1	0	4
<b>% included</b>	82.35%	47.06%	41.18%	47.06%
<b>% significant (from included)</b>	85.71%	87.50%	85.71%	50%
<b>% significant (from all)</b>	70.59%	41.18%	35.29%	23.53%

The influence of price on wood mobilisation is significant and positive in 71% of all studies, and in 86% of those that included this variable. Price elasticity is positive in most of the significant cases, although only is significant in 63% of the studies that include this variable.

Anyway, price elasticity is not conclusive and significant. In 50% of cases there is a positive price elasticity regarding wood mobilization. This lack of significant can be due to many factors. On one side many forest owners like to keep forest operations as they are planned in management plans, or simply they are not only interested in monetary benefits. On the other side, other distorting factors can be covering the effects of the price factor in respect to wood mobilization.



In some cases production decrease has been found in times of increasing or constant prices (wood supply price elasticity in Catalonia case study). A possible explanation may be that the owners prefer to keep their forests well stocked instead of maximizing income (wood supply price elasticity in Rhône Alpes case study).

**Table 7: Binomial test for economic variables**

	<i><b>Sensibility to price increase</b></i>	<i><b>Sawlog price developmen t (decreased)</b></i>	<i><b>Fuelwood price development (increased)</b></i>	<i><b>Price elasticity</b></i>
Binomial test	0.9935	0.8554	0.9375	0.6367
p-value	0.0064*	0.1445	0.0625	0.3632
Minimum	54.55%	42.12%	35.87%	18.40%
Maximum	98.07%	99.63%	99.57%	90.10%
Probability of success	84.61%	85.71%	83.33%	57.14%

\* More than 95% significant.

The only high significance is observed in case of sensibility to price increase (Table 7). Taking this result and general price elasticity results into account it is clear that price increase is a key factor –but not the only- in wood mobilization.

## Market size and structures

Table 8: Number of industrial buyers (Source: case study reports, 2010)

	sawmills	pulp/paper***	panel	heating	others
<b>Austria</b>	1,156	36	25	634	
<b>Catalonia</b>	45		2	0	7
<b>England</b>	250	3	8	0	64
<b>Estonia</b>	11	1	3	0	5
<b>Hungary</b>	310*	0	3	6	2,504**
<b>Rhône-Alps</b>	317	51****	0	324	-
<b>Saxony</b>	83	64	1	21	2
<b>Sweden</b>	170*****	86	8	750	
<b>Average</b>	51.36%	5.39%	1.09%	38.68%	3.48%
* Estimation					
** 2500 are joinery factories which usually buy roundwood					
*** higher figures probably show paper mills that do not buy wood but pulp					
**** on the 51 paper mill only one buys wood and from sawmills residues					
***** only sawmills with more than 10,000 m3 consumption					

Table 9: Share of domestic and imported volume (Source: case study reports, 2010)

	sawmills		pulp/paper		panel		heating		Others	
	DOM	IMP	DOM	IMP	DOM	IMP	DOM	IMP	DOM	IMP
<b>Austria</b>	11.0	6.1	6.1	1.7	2.2	1.1				
<b>Catalonia</b>	Not reliable data available regarding imports from Spanish state. Approx. 43% total imports									
<b>England</b>	UK imports approx. 94%									
<b>Estonia</b>	32 % imports									
<b>Hungary*</b>	0.56	0.37	0	0.10	0.36	0.29			0.14	0.5
<b>Rhône-Alps</b>	81%	19%					100%			
<b>Saxony</b>		20%	100%		20%					
<b>Sweden**</b>		0.3		3.0		1.7				
DOM=DOMESTIC, IMP= IMPORTS										
If not stated otherwise, in million tonnes										
* 2008 data in Million tonnes										
** Swedish data are confusing but general imports will not reach 10%										

Data shows not only generalised imbalance at the EU regarding timber consumption but non domestic consumption at the case study area.

Table 10: Average annual buying volume (m<sup>3</sup>) (Source: case study reports, 2010)

	sawmills	pulp/paper	panel	heating	others
Austria	17,159,849	7,847,400	4,362,247	14,671,500*	
Catalonia	5,034,400	881,020			250,850
England	N,A,				
Estonia	7,000,000				
Hungary	1,200,000	635,000		3,000,000**	114,500
Rhône-Alps	2,000,000	0	0	174,166	
Saxony	1,300,000	0	1,083,300	413,000	
Sweden	38,200,000	47,900,000	1,200,000		
Average	39.07%	38.27%	5.02%	14.87%	2.77%
* only 2 years statistic records; remaining are a 5 yrs average.					
** included household consumption.					

Table 11: Number of private buyers (Source: case study reports, 2010)

	n° households	fuelwood	pellets/briquette	by-products
Austria	1,360,000	1,159,409	157,092	45,413
Catalonia	N,A,			
England	N,A,			
Estonia	N,A,			
Hungary	500,000			
Rhône-Alps	N,A,			
Saxony	660,000 (2,000*)	200,000		
Sweden	345,000	6,800,000**	470,000***	927,000**
* Direct buyers				
** Volume (m <sup>3</sup> ) consumed				
*** tones				

Table 12: Development of industries number during last 10 yrs (Source: case study reports, 2010)

	sawmills	pulp/paper	panel	heating	others
Austria	▼	▲	▼	▲	
Catalonia	▼		◀▶		
England	Home-grown wood has fallen almost 50% in 8 yrs				
Estonia	▲	▲	▲		▲
Hungary	▼	◀▶	◀▶	▲	
Rhône-Alps	▼			▲	
Saxony	▼	▼	▲		
Sweden	▼		▼	▲	

**Table 13: Vote counting analysis of industry number development (Source: case study reports, 2010)**

	sawmills	pulp/paper	panel	heating	others
Austria	-	+	-	+	
Catalonia	-		0		
England					
Estonia	+	+	+		+
Hungary	-	0	0	+	
Rhône-Alps	-			+	
Saxony	-	-	+		
Sweden	-		-	+	
included	7	4	6	4	1
Significant	7	3	4	4	1
Positive	1	2	2	4	1
Negative	6	1	2	0	0
Not significant	0	1	2	0	0
Percent included	87.50%	50.00%	75.00%	50.00%	12.50%
Percent significant (included)	100.00%	75.00%	66.67%	100.00%	100.00%
Percent significant (all)	87.50%	37.50%	50.00%	50.00%	12.50%

**Table 14: Share of residues in pulp, paper & heating (Source: case study reports,2010)**

	pulp/paper	panel	heating
Austria	52%	76%	16%*
Catalonia	23%		
England	N.A.		
Estonia	14%		
Hungary	Problems to interpret figures		
Rhône-Alps	51% is exported. About 17%of green chips comes from residues		
Saxony	20-62%**	10-15%	N.A. but high
Sweden	99% of residue is used for co-generation drying and heating		
* Data from 2005 only			
** Data from outside Saxony			

**Table 15: Distance between sellers and buyers (km) (Source: case study reports,2010)**

	sawmills	pulp/paper	board/veneer	heating	maximum
<b>Austria</b>	64	78			120
<b>Catalonia</b>	80				150
<b>England</b>	N.A.				
<b>Estonia</b>	60				
<b>Hungary</b>	>100		250-300	<200	
<b>Rhône-Alps</b>	100	300			250
<b>Saxony</b>	10-50:small;150-200:big				
<b>Sweden</b>	79			60-70	

### 5.2.7 Market structures meta-analysis

**Table 16: Following meta-study has been developed regarding influencing factors over property size (Source: case study reports, 2010)**

+ means positively or arise with property size

- means negatively or decrease with property size

0 means no influence

	Market informat ion access	Average amount of wood sold	Self consu mption	Sales		Illegal activitie s
<b>Austria</b>				+	+	
<b>Catalonia</b>			-	+	+	
<b>England</b>						
<b>Estonia</b>						
<b>Hungary</b>	+			0	+	-
<b>Rhône-Alps</b>	+		-	+	+	
<b>Saxony</b>	+	+	-	+	+	
<b>Sweden</b>	+			-	-	
<b>included</b>	4	1	3	6	7	1
<b>Significant</b>	4	1	3	5	6	1
<b>Positive</b>	4	1	0	5	5	
<b>Negative</b>	0		3	1	1	1
<b>Not significant</b>	0		0	1	0	
<b>Percent included</b>	50%	12%	37%	75%	87%	12%
<b>Percent significant (incl.)</b>	100%	100%	100%	83%	85%	100%
<b>Percent significant (all)</b>	50.00%	12.50%	37 %	62%	75%	12%

## Legal framework

This section is divided into two blocks: variables arising from the case studies and variables from the fact sheets.

### 5.2.8 Case studies data

In the case of the CSs the data mainly showed the presence/absence of the legal framework factors not directly related forest ownership behaviour. These results do not allow concluding whether or not these variables are significant for wood mobilization.

**Table 17: Variable description for vote counting analysis of legal framework**

Code	Variable/question	Response
A	Guidance or control on harvests of fragmented private forest ownerships?	Yes = presence Not = absence 0 = no data
B	Guidance or control on wood sales of fragmented private forest ownerships?	
C	Forest regulations?	
D	Wood trading regulations?	
E	Forest or wood related taxes?	
F	Forest or wood related subsidies?	

**Table 18: Vote counting of legal framework and regulation variables (Source: case study reports, 2010)**

Source\ Variable	A	B	C	D	E	F
<b>Austria CS</b>	yes	yes	no	no	0	yes
<b>Catalonia CS</b>	yes	no	yes	yes	no	yes
<b>England CS</b>	no	yes	no	0	yes	yes
<b>Estonia CS</b>	yes	no	yes	no	no	yes
<b>Hungary CS</b>	yes	no	yes	0	no	yes
<b>Rhône-Alpes CS</b>	yes	no	Yes	yes	yes	yes
<b>Saxony CS</b>	no	no	no	no	yes	yes
<b>Sweden CS</b>	no	yes	yes	yes	yes	yes
<b>included</b>	8	8	8	8	8	8
<b>significant</b>	8	8	8	6	7	8
<b>significant positive</b>	5	3	5	3	4	8
<b>significant negative</b>	3	5	3	3	3	0
<b>not significant</b>	0	0	0	2	1	0
<b>Percent included</b>	100.00%	100.00%	87.50%	75.00%	87.50%	100.00%
<b>Percent significant (incl.)</b>	62.50%	37.50%	62.50%	37.50%	50.00%	100.00%
<b>Percent significant (all)</b>	62.50%	37.50%	62.50%	37.50%	50.00%	100.00%

### 5.2.9 Fact sheets data

In the case of data from Fact sheets (FSs) information is more clearly focused on the possible influence on wood mobilization from FFO. Subsequently further consultations were made to the teams working on the different case studies in order to clarify and go deeper into data explaining influences on wood mobilization in FFO.

**Table 19: Variable description for vote counting analysis of legal framework**

Code	Variables/questions	Response
H	Forest Management Grants / Subsidies	Yes = Influence* Not = No infl
I	Advisory services by authorities	
J	Legal framework to prevent further fragmentation	
K	Informal markets	+ = Expanding - = Decreasing 0 = Constant/stable

\*Influence regarding wood in mobilization in FFO.

**Table 20: Vote counting of legal framework and regulation variables (Source: Fact Sheets, 2010)**

	H	I	J	K
<b>Austria</b>	No	No	No	0
<b>Sweden</b>	no	Yes	yes	0
<b>England</b>	Yes	Yes	No	+
<b>Rhône-Alpes (France)</b>	Yes	Yes	No	+
<b>Hungary</b>	No	No	No	+
<b>Estonia</b>	Yes	Yes	No	0
<b>Saxony (Germany)</b>	Yes	Yes	No	+
<b>Catalonia (Spain)</b>	yes	Yes	No	-
<b>included</b>	8	8	8	8
<b>Significant</b>	5	6	1	4
<b>Positive</b>	5	6	1	3
<b>Negative</b>	0	0	0	1
<b>Not significant</b>	3	2	7	4
<b>Percent included</b>	100	100	100	100
<b>Percent significant (incl.)</b>	62.5	75	12.5	50
<b>Percent significant (all)</b>	62.5	75	12.5	50

**Table 21** Vote counting of legal framework and regulation variables influence on FFO wood mobilization (Source: personal communication with case study report authors, 2010)

+ = Increase participation - = Decrease participation 0 = No influence				
	Forest Management Grants / Subsidies	Advisory services by authorities	Legal framework to prevent further fragmentation	Informal markets
<b>Austria</b>	+	0	0	0
<b>Sweden</b>	0	+	+	0
<b>Rhône-Alpes (France)</b>	+	+	-	0
<b>Saxony (Germany)</b>	0	+	0	+
<b>Catalonia (Spain)</b>	+	+	0	0
<b>included</b>	5	5	5	5
<b>significant</b>	3	4	2	1
<b>significant positive</b>	3	4	1	1
<b>significant negative</b>	0	0	1	0
<b>not significant</b>	2	1	3	4
<b>Percent included</b>	100%	1	1	1
<b>Percent significant (included)</b>	60%	80%	40%	20%
<b>Percent significant (positive)</b>	60%	80%	20%	20%



Table 22: Vote counting of the role of forest authorities (Source: Fact Sheets, 2010)

	On harvests of fragmented private forest ownerships?	On timber sales of fragmented private forest ownerships?
<b>Austria</b>	<i>Control</i>	<i>None</i>
<b>Sweden</b>	<i>Some controls</i>	<i>Only through the measurement law</i>
<b>England</b>	<i>Guidance/control</i>	<i>Guidance/control</i>
<b>Rhône-Alpes (France)</b>	<i>Control</i>	<i>None</i>
<b>Hungary</b>	<i>Control</i>	<i>None</i>
<b>Estonia</b>	<i>Control, Guidance</i>	<i>Non</i>
<b>Saxony (Germany)</b>	<i>Guidance (Control)</i>	<i>Guidance</i>
<b>Catalonia (Spain)</b>	<i>Control</i>	<i>None</i>
<b>Control</b>	6,5	0,5
<b>Guidance</b>	1,5	1
<b>None</b>	0	6,5
<b>Total</b>	8	8
<b>%control</b>	81,25%	6,25%
<b>%guidance</b>	18,75%	12,50%
<b>%none</b>	0,00%	81,25%

Table 23: Vote counting from influence to the role of forest authorities (Source: personal communication with case study report authors, 2010)

+ = Increase participation - = Decrease participation 0 = No influence		
	On harvests of fragmented private forest ownerships	On timber sales of fragmented private forest ownerships
<b>Austria</b>	0	0
<b>France</b>	-	0
<b>Germany</b>	+	+
<b>Catalonia (Spain)</b>	-	0
<b>included</b>	4	4
<b>significant</b>	3	1
<b>significant positive</b>	1	1
<b>significant negative</b>	2	0
<b>not significant</b>	1	3
<b>Percent included</b>	1	1
<b>Percent significant (included)</b>	75%	25%
<b>Percent significant (positive)</b>	25%	25%

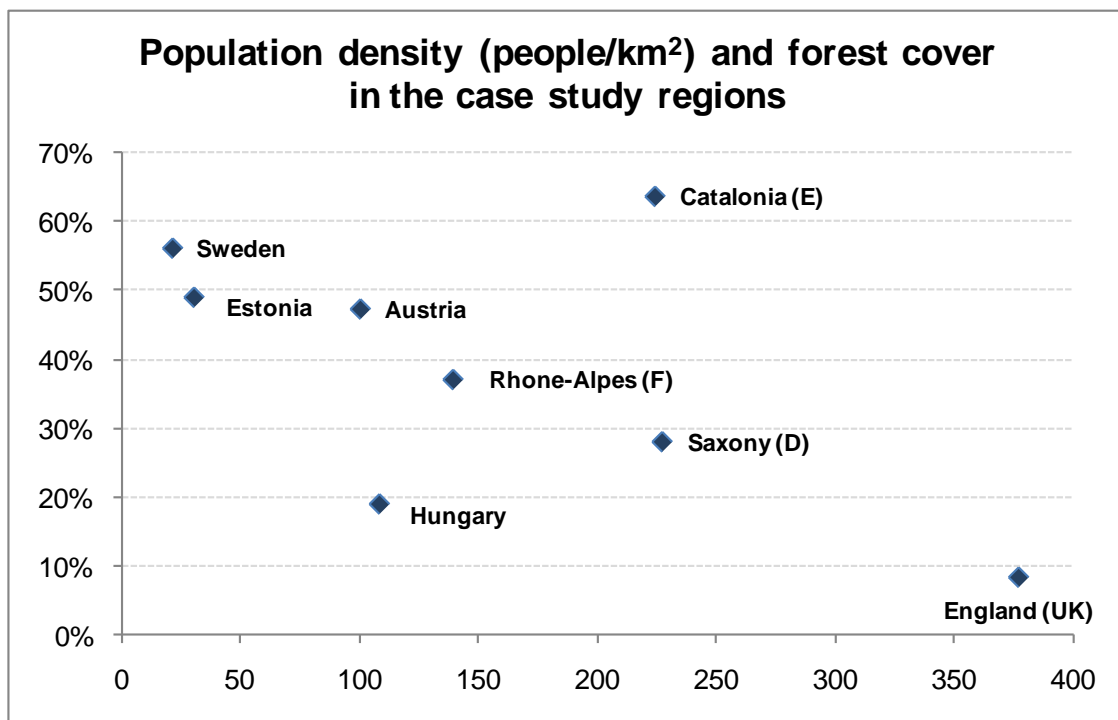
## Supply side (Natural and owners-related potential)

Each market is determined by supply and demand. The supply side of the European wood market, i.e. all forest owners who can market their wood, is not only characterised by the fact that a number of potential wood suppliers is unknown (so called “UFOs”, unknown forest owners), but also by a high degree of heterogeneity. This heterogeneity is not only caused by a variety of different forest ownership types as state, communities, other public institutions, the church, industry and private, but also through differing natural potentials and forest property structures, as well as varying degrees of owners’ knowledge and motivation and levels of aggregation (i.e. cooperation).

### The natural potential

Natural conditions are the fundamental basis for wood supply. The higher the regional forest cover, the better the soil and climatic conditions, the more valuable the existing tree species, and the more accessible the geographical terrains are, the higher is the availability of wood resources and thus the natural potential of supply.

### *Forest cover*



**Figure 41: Population density and forest cover in the eight case study regions**

Although a high forest cover does not necessarily mean large amounts of wood, it is nevertheless a good indicator for the natural potential of wood supply. Considering the eight case study regions, forest cover ranges from 63.5 percent (Catalonia/Spain) and 56 percent (Sweden) to 8.4 percent (England). As forest cover is often a result of human influence (land pressure), there is a trend that the

denseness of forest cover is diametrically opposed to population density. This dependency becomes obvious in figure 2.

#### *Annual increment*

Conditions of soil fertility and climate result in a specific annual increment of tree species. While soil fertility can be considered as relatively similar amongst the case study regions, climatic conditions of the regions vary considerable. As a result of a

Annual increment [cum/ha]	
Austria	9,3
Saxony/Germany	8,9
Hungary	6,8
Rhone-Alpes/France	6,3
Estonia	5,7
Sweden	5,5
England	NA
Catalonia/Spain	2,6

differing length of the annual vegetation period and intensity of precipitation, average annual increment rates range from 2.6 cubic meters per hectare (Catalonia/Spain) to 9.3 cubic meters per hectare (Austria). Beside Catalonia also Sweden (5.5 cum/ha) and Estonia (5.7 cum/ha) have relatively low increment rates in comparison to Austria or Saxony/Germany (8.9 cum/ha). Figure 3 gives an overview of the increment rates of all surveyed regions.

**Figure 42: Annual increment rates in the case study regions**

#### *Tree species and terrain*

Coniferous tree species (forest area share)		
	coniferous	mixed
Sweden	80%	
Saxony/Germany	68%	
Austria	67%	
Catalonia/Spain	55%	
Estonia	52%	
Rhone-Alpes/France	28%	22%
England	26%	12%
Hungary	13%	

**Figure 43: The share of coniferous tree species (softwood) in the case study regions**

Except for the forest cover and annual increment rates, tree species composition and conditions of terrain have influence on wood supply. Supply of softwood plays an important role in Europe, especially for wood processing industries namely sawmills. Sweden, Austria and Saxony/Germany are the case study regions where the share of coniferous species is especially high (more than two third of the total forest cover). On the other hand Austria is a very mountainous region where some forested areas are accessible and harvestable only at increased expenses

(due to road building or cable logging). Catalonia as well as Rhone-Alpes are as well mountainous regions and have therefore a limited natural potential of wood supply. Figure 4 shows the coniferous shares for all case study regions.

#### The ownership potential

Aside from the natural potential characteristics of forest owners determine the potential of wood supply.

Structural factors as the average size of woodland properties and their shapes have large impact on the economy of harvesting operations and consequently on the supply of wood. The influence of size is particularly relevant for the continuity of wood supply, i.e. owners of small forest estates are naturally not able to harvest larger amounts of wood on a sustained basis, while large forest properties (e.g. state or large private forest owners) can guarantee a steady flow of wood.

Beyond that, wood supply is strongly depended on the motivation of forest owners, i.e. their awareness, objectives, skills and experiences. Economic objectives exists beside non-economic ones.

Cooperation between forest owners can partly overcome the heterogeneity of the wood suppliers' side by pooling activities and potentials. The level of cooperation is therefore another important factor to characterise the wood supply side.

#### *Forest owner properties' structures*

Wood supply potential is strongly influenced by the structure of the woodland properties. As public holdings in Europe are relatively large (i.e. 975 ha in average) and private holdings are quite small (average: 12.7 ha; cf. FAO 2006), a high degree of private forest ownership does principally mean higher fragmentation of the forest area. Fragmentation (or respectively small property sizes) does not only result in higher costs for management and harvesting operations, but also in difficulties to

supply wood resources continuously. This consequently means that the wood supply potential is the higher, the lower the share of private forests in a region is.

Except for Sweden, private forest ownership is characterised by a relatively high degree of fragmentation in all case study regions. This means that a high proportion of private owners hold properties of a very small average size. The problem of fragmentation is especially high in England, Hungary, Saxony, Rhone-Alpes and Catalonia. Figure 6 summarizes the fragmentation characteristics of these regions.

Share of private forest ownership (by area)	
Catalonia/Spain	87%
England	82%
Austria	81%
Rhone-Alpes/France	76%
Sweden	50%
Saxony/Germany	45%
Hungary	44%
Estonia	26%

**Figure 44: The shares of private forest ownership (PFO) in the case study regions**

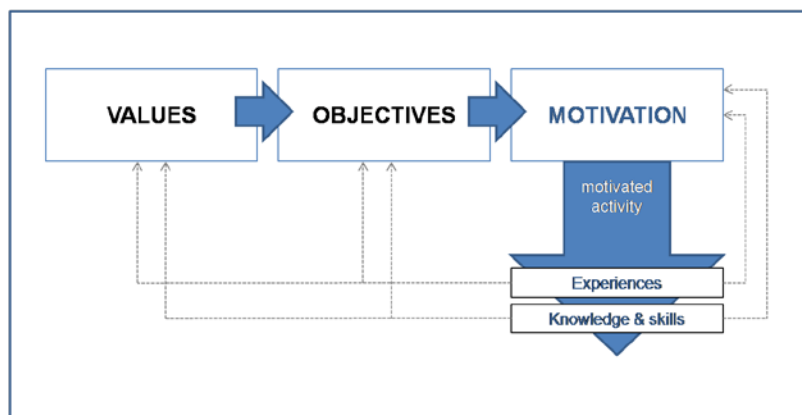
The problem of fragmentation	
Catalonia/Spain	"average property size = 2.7 ha; each PFO holds 2-3 properties in average"
England	"75% of forest properties have a size of 0.45 ha at average"
Rhone-Alpes/France	"74% of all forest owners hold properties smaller than 10 ha"
Saxony/Germany	"average property size = 3.2 ha; 96% of PFO hold properties smaller than 10 ha"
Hungary	"average property size lies between 1 and 2 ha"

**Figure 45: Case study regions that are most affected by fragmentation of private forest ownership**

### *Forest owners' motivation*

Natural potentials as well as structural property features are absolutely unimportant if forest owners do not see themselves as wood suppliers. Forest owners can simply be uninterested in managing their property (i.e. being unaware of the economic potential and/or being ignorant regarding forest management and wood marketing) or they do not recognise harvesting for wood marketing as worthwhile. Second can be the case if other objectives than wood marketing are more valuable for the owner (e.g. self sufficiency/fire wood, family tradition, nature protection, recreation etc.) or if harvesting and marketing activities are considered to be economically inefficient (i.e. very low or negative income).

The owners' objectives as a result of owners' values are thus most important for wood supply. Knowledge and skills as well as experiences are consequences of motivated activities, which reversely again have influence on the values, objectives and the motivation (see figure 7).



**Figure 46: Motivation as a result of values and objectives and the influence of knowledge/skills and experiences**

Private forest owners with properties of small sizes have only limited economic objectives. This is an obvious result of the survey of the eight European case study regions. While only the Swedish private forest owners' behaviour is driven by economic objectives to larger extent, the majority of small private forest owners of other regions seems not to have an economic interest at all (e.g. Catalonia) or is at least interested in harvesting for own requirements (e.g. Austria, Rhone-Alpes, Saxony to larger extent; England, Estonia, Hungary to some extent).

Most fragmented private forest owners do not have a single dominant objective, but a number of attitudes at the same time. These multiple objectives can be a set of the following interests that were mentioned in the case study reports:

- "Tradition", "family inheritance", "symbolic good"
- "Recreation", "leisure time", "working place", "sporting", "hobby"
- "Forest as a second residence", "feeling home"

- “Nature”, “landscape”, “biodiversity”
- “Subsistence”, “additional income”, “investment/asset”, “have it for times in need”

The use of these objectives to win private forest owners for additional management and harvesting activity is a challenge for all actors that are interested in wood mobilisation.

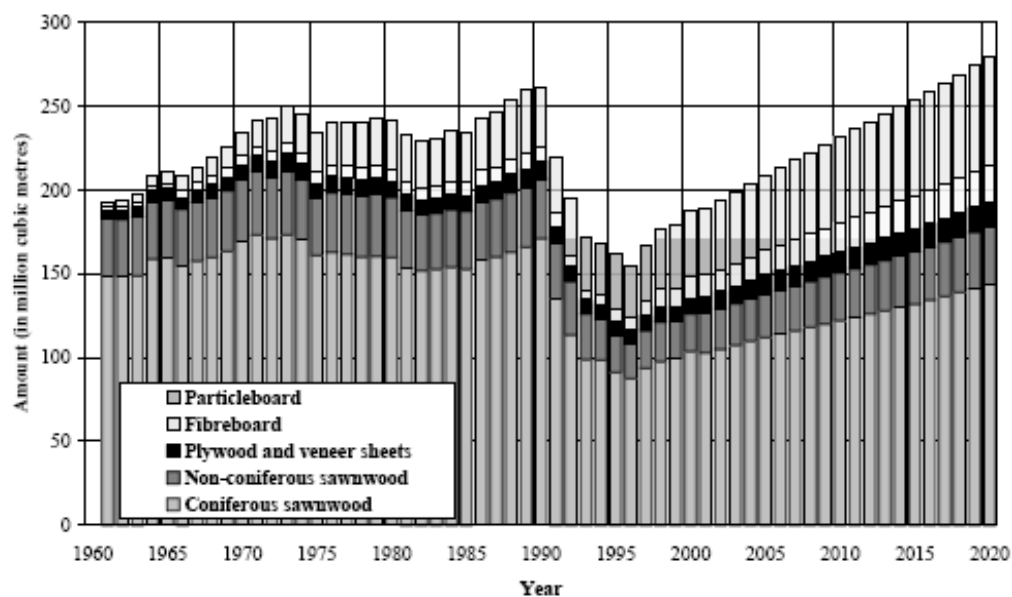
#### *Forest owners’ cooperation (organisation)*

Forest owner organisations can be interest representations in policy development or can focus joint forest management and wood marketing activities. This second mentioned type of organisation has a mean importance for wood supply of private forest ownerships, since structural disadvantages (i.e. small/fragmented forest properties, lack of information and knowledge concerning forest management and wood marketing, lack of harvesting skills and technique, missing market access due to low amounts of wood etc.) can be overcome. Cooperation results thus in higher cost efficiency not only because of reduced harvesting costs but also because of higher prices due to higher and more continuous wood volumes that can be offered to wood buyers, e.g. via long-term contracts. Additionally, cooperation of private forest owners can overcome the obstacles of limited market access (e.g. because wood buyers require specific volumes or wood assortments).

Associations and cooperatives are the most prevalent types of private forest owner organisations concerning joint forest management and wood marketing. The degree of cooperation differs considerably between the case study regions. While a very long tradition in Sweden results in a present share of 50 percent of organised forest owner families, less than five percent of private forest owners are members of organisations in Catalonia, in Saxony, in Estonia and in the region of Rhone-Alpes. It is also assumed that the degree of cooperation of all private forest owners is very low in England and Hungary (no reliable and comprehensive data exist), while on the other hand the share is relatively high in Austria (37 percent).

Industrial activities of PFO associations seem to be a function of long tradition and/or of a high number of organised PFO (Swedish as well as Austrian forest owner associations are also large wood consumers). Scepticism against forest owner organisations could exist due to negative experiences of owners in Estonia, Saxony and Hungary during the years of socialism.

## Forecasts (European Forest Outlook Study, 2005)



Source: trends (to 2000) derived from FAOSTAT production and trade statistics and projections (2001- 2020) from Kangaz and Baudin (2003).

**Figure 47: Trends and projections for the consumption of sawnwood and wood based panels in Europe under the baseline scenario (European Forest Sector Outlook Study, 2005)**

## Annex Task 4

Categories of barriers for wood mobilisation in Europe derived from assessments of the case study reports

Society & forest policy	1.a - General support of fragmented private owners
	1.b - The image of forestry
	1.c - Compensation of externalities
Forest owner: natural resources	2.1.a - Small property size (Fragmentation)
	2.1.b - Forest productivity, Wood quality and Terrain
	2.1.c - Restrictions by nature protection
Forest owner: behaviour	2.2.a - Lack of interest (no objectives at all)
	2.2.b - Trust (also: bad experiences)
	2.2.c - Other than marketing objectives
Forest owner: circumstances of life	2.3.a - Urbanity & long distances to forests
	2.3.b - Age of the owner
Forest owner: economy	2.4.a - Low profitability (non-profitability) of management
	2.4.b - Own requirements (self-supply)
	2.4.c - Income indepenency
Forest owner: knowledge and skills	2.5.a - Knowledge/skills of forest management
	2.5.b - Knowledge of wood marketing (market access)
	2.5.c - Knowledge of the forest location
Forest owner: equipment	2.6 - Inappropriate (or no) technical equipment
Infrastructure	3.a - Fragmentation of forests (small property sizes)
	3.b - Forest access and road network
	3.c - Availability of inventory data
Market: Volatility	4.1 - Volatility of wood prices
Market: Demand	4.2.a - Demand (deficiencies)
	4.2.b - Requirements (continuity, volumes, quality)
	4.2.c - Marketing & sales methods
Market: Operators	4.3.a - Operators' capacity
	4.3.b - Operators' quality
"Middlemen" & Consultants	5.a - Authorities as advisors (deficiencies)
	5.b - Other contact persons/advisors (deficiencies)
	5.c - Cooperation deficiencies
Legal framework	6.a - Problems of further fragmentation (inheritance)
	6.b - Bureaucracy (management, harvesting)
	6.c - Inappropriate subsidies for fragmented owners



## Annex Task 5

Overview on Conclusions (C) and Recommendations (R) proposed by the project partners

	CTFC	ALUFR	BOKU	Wood K plus	CEPF
owner related information needed		C&R	C&R	C&R	
access to addresses		R	R	R	
ownership types	C		C	C	C
owner objectives		C	C	C	C
target owner types			C&R		C&R
economics of fragmented forestry	C	C	C		
level of fragmentation	C	C		C	C
fragmentation prevention					R
market category	C	C	C	C	C&R
joint management	R	R		R	C&R
objective of joint management		R		R	C&R
provide information	R	R		C&R	
demand stimulation/price	R	R	C	C&R	
reduction of bureaucracy	R			R	
harvesting technologies	R		R		
Infrastructure		R		R	
research		R	R		
political support		R			
prevent conflicts		R		R	
guidance	R	R		R	
flagship projects		R			
efficiency testing			R		
Indirect measures				R	C&R
direct subsidies					R