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Forest Practices & Climate Change

MINIPAPER 10: Small scale forest management
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Authors

Gunilla Holmberg (Coord.), Daniel Stover, Veronika Valentar, Ana Ventura

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INTRODUCTION - MOTIVATION

What's the minipaper about?

This mini paper is one in a series of mini papers produced by the **EIP-AGRI Focus Group 24 on New forest practices and tools for adaptation and mitigation of climate change**. The scope of the focus group is elaborated in a starting paper. Small scale forest management was identified as one of the key topics at the first meeting of the Focus Group held in Ljubljana, Slovenia, 20-21 June 2017.

The authors of this paper come from Finland, Slovenia, Spain, Portugal and UK. Our common findings regarding to climate changes and the reason to create this paper was the fact that, in the case of natural disasters (e.g. ice break in Slovenia, wind brakes or forest fires in Portugal), small-scale farmers or forest owners could react later than needed. Therefore, the catastrophe could easier develop an unprecedented scale and causes economic, social and ecologic consequences for the whole society.

We need to recognise the differences within the EU, and there cannot be just one solution but several toolkits for adapting to or mitigating climate change. We have different biological conditions and different man-

influenced situations. Land use patterns and history, land ownership, existing forest resources, the role of and importance of forest sector all vary from one country to another. Thus, there are several issues to be considered, at small-scale management.

Real adaptation to climate change occurs at the local level and by local actors in the forest. “The awareness and knowledge of forest owners and practitioners on the impacts of climate change on forests as well as on adaptation measures is important.”¹

Small scale forestry matters

The methodology for composing this paper was a short overview of the situation and forest statistics of each country. Moreover, the paper relates definition and contents from articles and official statistics, published by FAO and Eurostat.

Small scale can be defined according to size of landholding (based on ownership) or size of treatment units, i.e. management units or compartments. How much of forestry is small scale and how important is it in the national economy and in mitigating climate change? What can be considered small scale and what is typical for small scale forest management? -It can be noted that the definition on what is forest varies within Europe.

According to FAO (2015) “Forest” is land spanning more than 0.5 hectares 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. “Other Wooden land” is land not defined as “Forest”, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use. Trees in field, or smaller woodlots are not included in FAO Forest land statistics. But trees will grow and fix carbon regardless of classification.

It can be assumed that what is small-scale-forest-management also has some variation. A definition of what is small scale must be seen in context of local conditions.

In 2015, the EU-28 had approximately 182 million hectares of forests and other wooded land, corresponding to an estimated 41 % of its total area. The EU’s forests and other wooded land covered approximately the same proportion of land area as that used for agriculture². Some 107-million ha of the European forests are privately-owned, and most holdings are of small scale. There are approximately 15 M small-scale forestry holdings in Europe, covering more than 30M ha of land in Western Europe, and 7M ha in Central and Eastern Europe. See Appendix 1, Private Forest Ownership Map of Europe.

Statistical data on forest ownership and its distribution to different ownership classes are traditionally available through National Forest Inventories statistics. Total share of ownership is easily available on an aggregate national level. Forest ownership information is available on more detail e.g. Italy, Ireland, Hungary, Germany, Finland and Austria (Pulla et al 2013).

There are considerable amounts of private forests (more than 75 %) in many or most of their sub-national level polygons in Northern Europe (Finland, Sweden and Norway) and in Portugal, France, Slovenia and Austria. Most European countries are characterized by a share of private forests ranging between 26 and 50 % at subnational level with some exceptions (Pulla et al 2013). At only around 3% of the total forest area, Portugal is the country with the smallest proportion of public forest. Although the number of private forest holdings in the smallest size category (< 10ha) is very high for some countries, their share of the total forest area in all geographical regions is generally relatively limited. Lithuania and some South-East European countries (e.g. Hungary, Romania) have smaller share of private owned forests and larger private holdings (FAO 2007). This high average percentage is influenced by countries in these regions, in which all or nearly all forests are in public ownership, i.e. Belarus, Georgia, Moldova, Ukraine, Malta, Albania and Turkey. Public

¹ Climate Change Impacts and Adaptation in European Forests: EFI Policy Brief 6 2011

² Eurostat Statistics explained Forestry statistics 2017

ownership is dominant in Central-East and South-East Europe where the average share lies between 80 and 90%. A further point of variation is that in some countries privately owned forests are mostly owned by large companies, whereas in others, they are mainly owned by individuals. The number of smallholdings in Central and Eastern Europe has grown as there has been significant shifts in ownership from public to private due to land restitution during the past 15 years –(UNECE/FAO, 2007)

Small-scale foresters in one definition are landowners owning forest smaller than 100 ha and not being full-time employed in their forest enterprise (Wiersum et al, 2005). This size appears to be too high. For nine European countries investigated (Austria, Belgium, Bulgaria, France, Hungary, Latvia, Lithuania, Slovakia and United Kingdom) more than half of private forests (61 %) are below 1 ha in size (Scmithusen and Hirsch 2010).

While the number of private forest holdings is much higher than public holdings, majority of private holdings are forest estates smaller than 10 ha in size and is often delivered to more than one smaller plots³. The European average is less than 4 ha.

For taxation purposes in Finland the minimum for land category “forest” is 2 ha; less is considered a “property” with property tax whether the plot has trees or not on it. Finnish forest holdings are small. The number of holdings above two hectares is about 347,000. The average size of these holdings is 30.1 hectares. (Finnish forest association 2017) In UK 30,9 % of total forest area (978 000 ha) is on farmlands which is 42,5 % of private forest area. (In UK average forest area by participants in a survey was 8,1ha; Dan Stover 2017). In Slovenia minimum area for Forest is 0,1 ha (individual trees can be of high commercial value).

In Europe, small landholders in agriculture has been studied and defined by **SALSA project** according to physical size and economic size of their holdings the criteria used drew on the thresholds defined in the project’s conceptual framework of classifying small farms in two ways:

- by physical size (farms with less than 5 ha of Utilized Agricultural Area; UAA) and
- by economic size (farms with less than 8 Economic Size Units; ESU of Standard Gross Margin; SGM). (SALSA, 2017)⁴.

If the same method would be used for defining small land holder in forestry, data on forest land productivity is also needed. More area is needed for the same output (growth or carbon fixed) in Northern Europe compared to the Central or South.

What is the overall role of forestry in the national economy?

Forest resources and the forest industry are more important in Finland and Sweden than in the rest of Europe. Private forest owners can be quite a significant group e.g. in Finland 80% of round wood for industry comes from family forests; in Slovenia, most of the ice-break disaster affected family plots.

The importance of small scale forest (especially in centre and north of Portugal) is evident when $\frac{4}{5}$ parts of Portuguese forest is private and that about 60% are small or very small plots (less than 2 ha). The cork producers usually have bigger plots but are geographically widely distributed. In the case of Portugal alone, the CO₂ retention associated with the forests is about 5 million tonnes / year (5% of total CO₂ emissions in the country). A cork oak tree (*Quercus suber*) fixes, on average, five times more CO₂ during the natural regeneration process than a non-coreless cork oak. It is estimated that Mediterranean mountains each year will retain up to 14 million tonnes of carbon dioxide, a significant contribution to the reduction of greenhouse gases, the main source of climate change.

³ FOREST EUROPE, 2015: State of Europe’s Forests 2015.

⁴SALSA project *The distribution of small farms in Europe. WP2 Estimation of small farms distribution and production capacity*, July 2017 <http://teca.fao.org/sites/default/files/resources/Summary-report-distribution-of-small-farms-in-Europe.pdf>

Family forestry or forests or trees owned by individuals must be recognized as an important group when it comes to any change of forest policy or silvicultural methods, as well as adaptation or mitigation measures related to climate change.

DISSERTATION

Some features for small-scale forest management

Forestry, along with farming, remains crucial for land use and the management of natural resources in the EU's rural areas, and as a basis for economic diversification in rural communities. The EU funds many different measures for rural development that directly benefit forest owners. Rural development policy is part of the EU's common agricultural policy (CAP) which has been the main instrument for implementing forestry measures in recent years in many countries⁵.

Forests are crucial for preservation of biodiversity and are important for tourism and recreational matters. Moreover, through their multipurpose function they enable working places and keep population in rural settlements and diversity of rural areas as well. This non- economic role of forests is for the society as important as incomes from the forest estates.

Small scale ownership typologies

Forest owners, who own small- scale estates (<5 ha), are usually not dependent on incomes from wood, so we can say that the exploitation of resources is less intensive. The consequence is increasing growing stock on the one hand and increasing old forest dependent species the other hand. Due to less intensive interest of the small scale forest owner, there is an increasing risk of forest fires, wind and ice brakes and decomposition of wood biomass.

Depending on profession, occupation and living environment, forest owners are differed to following types⁶:

- Traditional forest owners, who live next to the forest and care for the estate by themselves;
- People, who still live in rural area, but they are employed (or own SMS which has no connection with their estate);
- Urban oriented people who live in the village or in the city and have very low contact with their estate
- Urban forest owners, who live in cities, bigger settlements or abroad and have no contact with their estate.
- The conception of importance of the forest for its owner depends on the position and interest, described above.

Small scale management units. Specific environmental issues that require small management units (plant or animal habitats, borders with lakes or streams) can be addressed both in larger and smaller forest areas. Topography; slope and aspect form a heterogenous landscape and variation of vegetation. In some areas, small treatment or management units must be used due to erosion risks. Small scale can also be found within larger forest estates or in public forest. Even a single tree or a group of plants can be mapped in forest management plans if needed (for biodiversity values, protected species etc) A management unit need to be described or measured in order to be integrated to a management plan (In terms of area maybe 10 m² or 1 a is minimum unless it is a garden plan) or a dot on the map for a protected tree (GPS coordinates given together with descriptive data) There is variation.

Small scale forest management can be promoted by standard silvicultural guidelines. For instance, in Finland when doing a clear cut for regeneration, small groups of trees and undergrowth are to be left undisturbed on the compartment; on those spots the soil is not prepared for planting. The size of clear cuts is regulated, treatment unit are smaller in more populated areas, and the measure may require landscape-permission from

⁵ Eurostat Statistics explained Forestry statistics 2017

⁶Schulungsunterlagen zur Mobilisierung der Waldbesitzer, Poyry, 2008

the municipality. According to Finnish legislation a new seedling stand should be established within 3 years after the final cut.

Large scale as being the opposite, is extensive, and allows for uniform treatment over large areas and has less variation in methods.

What is locally seen as “Small scale forest management” is also related to the productivity of different **species** in different areas. It can be, as in Finland or Sweden, extensive economic forest areas with indigenous species (*Pinus sylvestris* and *Picea abies* mixed with some hardwoods as *Betula* sp. *Alnus* sp.) in stands that are managed with varying intensity.

In Central and Southern Europe mountains or remote areas have more remaining forest. Plantations established with exotic species with high yield in larger and smaller stands are also quite frequent (*Pseudotsuga menziesii* and, outside its natural range, *Picea abies* as well as *Eucalyptus* sp. and *Pinus radiata* in southern most Europe). Beyond that and in the case of Portugal draughts and hot climate is decreasing potential productivity in Mediterranean area (very apparent in traditional species as cork oaks).

Small scale forest management can also be part of landscape management, where the landscape could be a village with surrounding fields, pastures, water and smaller forest plots with (indigenous or exotic species). Smaller plots with indigenous species (*Quercus* sp., *Fagus* sp., *Fraxinus* sp.), surrounded by fields are more for recreational use in areas with dense population in Central parts of Europe. The landscape can also be the opposite, extensive forest areas with small patches of fields within as in northern Europe. See Appendix 1. Forest resources map of Europe.

Climate changes gradually influence on conditions of European forests. The frequencies of extreme weather events are rising, which increases the risk vulnerability of forests and demands prompt responsiveness of forest management. The focus group tried to define (S)trengths, W(eaknesses), O(pportunities) and T(hreats) of small scale forest management related to climate changes (Appendix 3).

Who decides how forests are managed?

Policy making involves many owners and other stakeholders as well. Publicly owned forests have many owners (tax payers) with conflicting ideas. Are silvicultural methods research based or politically based? Public opinion may be strongly against clear-cuts near urban area for landscape aesthetics reasons. Continuous forest cover is tried with light demanding species or the highest yielding species is not used as it's being exotic. Are family owned forest closed for public or open to all? Can anybody walk in the forest and for their own eyes see what it looks like?

If we want to influence forest management of small landholders, we need to influence people, i.e. communicate with many land and forest owners. Communication must be a two-way traffic. The decision power of the owner depends on his or her degree of independence, in relation to land title, local legislation and silvicultural guidelines, education and the economic situation of the owner/s. When there is less data on forest owner's extension measures are not as effective. Small scale forest management planning must include different stakeholders, address the rights of the owner, be participatory by its nature and consider the “economic landscape” of each owner.

Ownership objective is mostly “multi-purpose”, in Belgium (66%), Finland (100%) and Latvia (100%). Multi-purpose use includes rather different combinations of management goals and it may be necessary to further substantiate this in further investigations. Production is an important specific objective in Ireland (84%), Hungary (50%) and Belgium (25%). Other objectives that have been mentioned by one or two countries with a frequency below 10% are conservation, protection and social services. In four countries 100% of the owners have defined their objectives fully whereas in Hungary 25% had indicated none or unknown objectives. It is obvious that the data supplied from only five countries forms too small a basis to be representative for the region (Smithies and Hirsch 2010).

Age and gender. There is only a very small number of owners in the age class below 30 years in most countries, Poland indicates 18% of young owners. The same is true for the age class 30 to 60 years, which varies between 32% in Belgium and 70% in Poland. The number of forest owners in the age class above 60 is considerable. Belgium, France, Lithuania, and Romania indicate a share of over 50%, whereas like Hungary, Finland, Slovenia, Switzerland, Norway and Latvia indicate a share ranging between 50% and 30%. Female owners are a minority and the share of forests owned by them varies from around 41% in Latvia to slightly over 17% in Ireland. The age class distribution of females shows a more balanced distribution and stronger representation (between 20% and 30%) in the age class below 30 years (Scmitthusen and Hirsch 2010).

Income and interests, wood and non-wood. Wood production and marketing is of great importance as a source of income for private forest owners, and the economic value of wood production and wood processing remains the backbone of the sector. Its socioeconomic importance is assessed to grow in the future. There are localities and regional settings in which wood production has lost some of its economic significance and where a growing number of forest owners draw diminishing, or no economic benefit from wood utilization and forest management. There are a growing number of owners that draw economic benefits or are ready to engage in marketing of non-wood forest products and to a lesser extent of marketable environmental services. But there is also a group of forest owners with little or no interest in engaging in forestry at all. On the other hand, there are forest owner interests that relate to conservation and protection due to, for instance, family considerations and personal ethical values that may be complementary or contradictory to traditional forestry practices. And there may be owners or even owner groups altogether not having any interest any more in their forest property and sometimes not even knowing where it is located (Schmithüsen and Hirsch 2010).

Trends: Holdings get smaller, more urban people are forest owners, owners live far from their forests and get older; In some areas farming land is abandoned due to loss productivity. At the same time, larger holdings areas formed in some areas when somebody is buying up land and small-scale owners become a large-scale owner. Older forest owners may feel that they will not experience climate change in their lifetime and are less interested in adaptation measures.

A SWOT analysis is presented in appendix 3 on Small-scale forest management in relation to Climate issues for Finland, Great Britain, Portugal and Slovenia.

Some examples on how landowners are organised

To reach many owners when promoting climate adaptation measures is more efficient through already existing groups or organizations. There is usually a reason why people get organised or organise themselves. Traditionally farmers have joined up for producing dairy products, sharing equipment, fighting fires, hunting elks or just for social get together. Today social media and internet enable more flexible structures and people living apart can be part of same "community".

Landowners are organized around forest management and marketing especially in countries where forests have played a significant role in rural livelihood and in development of the national economy (Finland, Sweden).

A small landholder may have other sources of income, stands and the economic size of the forest plot can be of less importance or it can be small in terms of area. But when these small units are managed together jointly, extension efforts, marketing, silvicultural improvement works can be much more effective. Scaling up is possible, which is proved by some examples from Finland:

Forest Owners Associations Almost all family forest owners are members in the 154 local forest management associations (FMA) which are regrouped in the umbrella organization of the Central Union of Agricultural Producers and Forest Owners (MTK) which has 340 000 members in local agricultural producers' organisations and regional forest management associations and is a very influential organisation.

Forest Management Associations at district or regional level have a crucial role in extension work and in promoting sustainable forest management and communicating information among family forest owners. The Forest Management Associations serve forest owners in practical forestry issues and look after the interests of forest owners at the local level. These associations are independently organized for providing support to forest owners on request. The Forestry Management Associations advise their members about forest management and about timber deals. They also undertake forestry work, and many forest owners authorize the association to tender out their timber deals. In addition, the membership guarantees the PEFC certification for the forest holding (Jylhä 2007). Each forest owner still owns his/her plot and can act independently. FMAs provide help in practical management; take on sale commissions, execute sales and check on logging, check on measurements, order and deliver seedlings, carry out planting and silvicultural work and arrange training and activities for their members. Membership is not mandatory since 2015.

Jointly Owned Forests JOF (Forest commonhold land) are managed like cooperatives. The forest area is managed according to fixed plan and by a professional forester. Instead of owning a forest area directly, the forest owner has shares. Decisions are taken by shareholder meetings under the majority rule. Small plots can be managed more effectively; and the next generation of family need not split up inherited land. This is a convenient way to own forest, and an alternative investment form to bonds and shares. Income is split according to shares. There is an incentive, tax on sales income is lower for JOFs than for individual forest holdings. According to the Jointly Owned Forests Act, a Jointly Owned Forest is to be used for sustainable forestry; that is, the management of the forest must be economically, socially and environmentally sustainable. In January 2016, there were 344 Jointly Owned Forests in Finland. The trend is that the number may not increase substantially but present JOFs will get larger as more small plot holders join the cooperative, or the JOF cooperative buys more forest land.

Organized groups of urban forest owners or “forest clubs” is a network of urban forest-owners living away from their land. These groups are found around main cities. E.g. “Pääkaupunkiseudun metsänomistajat” = PKMO, the association of forest owners living in the Helsinki metropolitan area. Similar clubs are found in the bigger cities. E.g. <https://www.pkmo.org/en/>

Examples from Portugal

In Portugal there are several owners and producer’s associations. It’s frequent to furnish technical advice to support implementation of regulations and other services. However, there are a lot of producers and owners (especially among the small-scale ones) who don’t belong to any kind of organisation... Also, usually the management stay on farmers side. Also, there are other experiences of collective management of forested areas:

- a) The “Zonas de Intervenção Florestal” (a considerable number of plots, of different owners, that can arrive to some thousands of hectares, managed by an Association or similar) conceived with the aim to work together, and to get significant support to forest maintenance and increase its production. This form of organization is specially present in south part of the country.
- b) The “Unidades de Gestão Florestal”, aiming to congregate a large number of plots (usually small or very small sized), with a common objective of production of a certain specie or to profit of any specific characteristic. The owners are frequently absent. This kind of management is present in centre and north of the country.

Examples from Slovenia

Forest owners in Slovenia are associated in local association, which are interest groups with the aim of informing and educating forest owners. Presently there are, in Slovenia 29 local societies, joined into the national association- Slovene Forest-owner association, which is a national organization. The most important task so far is a representation of political interest, e.g. cooperation by adoption of national legislation. The other important task is informing (periodic news, web page etc.) and organizing of educational events (courses for safety work, seminars, workshop etc.) Less important is common marketing of wood and wood products as well as organization of care and afforestation, as this is organized and managed by Slovenian Forest Service.

Some good practice examples or handy tools for small scale

Many a structure exists within small scale forests. Software have been more developed to serve bigger organisations and used to be too expensive for a single forest owner. New applications, quicker connections and internet accessibility has given new tools and some specific tools or resources used for small scale management.

UK

1 The UK Forestry Commission publishes a wealth of information on forest management, species selection, disease issues, adaptation to climate change and much more. Accessibility on the web is excellent, one simply needs the motivation to explore the facilities available and act.

2. 'Small Woods', a registered charity, believes that over 50% of small woods are 'neglected, overlooked and undervalued'. The focus of that organisation is to offer support and advice and training in hands on skills for small forest owners. (<http://smallwoods.org.uk/about-us/introduction>)

3. 'Silva Foundation' is a registered charity which operates programmes in four areas: science, education, forestry and wood. Among their offering is an online tool for creating a forest management plan. Similarly, to 'Small Woods' they work to draw attention to the importance and potential of the UK's forests. (<https://sylva.org.uk>)

Finland. Several tools are available for compartment wise forestry management including field tables for estimating the growing stock, potential harvest volume and timber value in digital format. Tools and applications are found on the web, both for the forest owner and for other professional use. (for more in the appendix 3)

Cork growers in Portugal have, in some cases, developed cooperation in round wood marketing; this results in better connection with value chains, forest management associations and digital methods. Also, the implementation of technical knowledge is easier inside this kind of association.

Forest owners' associations in Slovenia, every year organize a timber auction, where they offer about 2.000 m³ best quality wood from Slovene private properties.

Appendix 3 shows more detailed examples on good practices/ best practice /improved practice (joint operations in marketing round-wood; buying seedlings; production needs (technical, human resources, advisement) in EU.

CONCLUSIONS

Many owners, many issues

The continuing urbanization and ageing of owners, the increasing number of smallholdings and the resulting fragmentation of ownership are trends that potentially affect the whole private forest sector and must be considered in policy development and application. Due to scaling-up effect, the efficient wood production in the multitude of small scale forests could provide a considerable contribution to rural livelihood and employment. To achieve economic sustainability; tree planting and other measures need to finance itself in the long run. Marketing smaller amounts jointly give better economic results and provide incentives for small plot holders for silvicultural measures.

New policies or strategies for adaptation to and mitigating of climate change are more difficult to sell to many landowners. Because of high variation in the EU there cannot be one strategy but several ones, adapted to local conditions which applies to small and large. "FMA-Finland" Forest Management Association or JOFs Jointly Owned Forest as a structure can be copied, improved and applied into other areas of EU. Climate

related issues can be integrated into other training activities on forest management and silvicultural practises. It is more efficient to make use of existing structures than to start developing new parallel ones.

Policy making for and with many owners need many tools. A holistic view of land uses, and stakeholders is required when designing measures related to climate change. A Rural Development Toolkit needs interdisciplinary, science based practical knowledge, and participatory methods to motivate people and to ensure local involvement. -In formulating new methods or strategies good knowledge of local conditions is essential. LAGs (Local Action Groups) have good knowledge of grassroots as they carry out Rural Development programs produced by and for locals.

According to the director of the European Forest Institute EFI *the spread of misinformation regarding European forests, and the potential of forestry to address the problem of climate change has been growing* What is the message to the local forest owner? That would depend on the national policy. Discussions on LULUCF and renewable energy sources illustrates that there are different opinions within the EU. There is not one forest policy but several. The aims are on one side the carbon stock or management of carbon reserves, and on the other side carbon sequestration or the growth. With sustainable multipurpose forestry both targets can be achieved.

How to deal with change? Where to get agents of change?

Measures to include forest owners in climate change adaptation and mitigation need to start ASAP and with participatory methods. Extension workers are agents of change. What can be done at farm level/forest level must be worked out locally. When there is lack of data on private forest owners or other data then that needs to be collected, analysed and made use of.

Good skills in extension networks and communication is as essential as it is to know the customer. Methods of how to reach and how to collect knowledge from the grass root level depend on the group in question. For instance, city forest owners have other income sources as well and are not in the same way as a farmer dependent of the logging income or as attached to the land. We need extension methods for many different kind of forest owners and motivation for new and improved methods.

Owning approximately half of Europe's forested area, private forest owners can make an important contribution in promoting the sustainable management of the region's forests and sustaining their productivity, resilience and mitigate effects of climate change.

RESEARCH NEEDS

A lack of information can be observed notably in the private forest owners (PFO) categories, e.g. individual/family owners, forest industries, private institutions and on socioeconomic issues. Data are more easily available on an aggregate national level (PFO total, public forests total), on area and management status, and on holding structures except for small holdings. Basic forest inventory data (growing stock, annual increment) are usually available for public ownership -but not necessarily for small-scale private forest holdings. Demographic information on individual owners (gender, age) are scarce, as well as data on their social background (knowledge, motivation, objectives). Insufficient data were received on volume and value of wood production (notably from private forests) and value of non-wood forest products (NWFP) (Schmithüsen and Hirsch 2010).

These are the related top research-topics as proposed in the 2nd meeting of this focus group:

1. "Landowners get together"

Small units and fragmentation is a problem for private forest ownership. Small narrow holdings are difficult to manage. To address climate issues many owners need to be contacted. Climate related measures as well as timber sales and silvicultural work can be much more effective if small units can be combined in one way or another and their owners addressed as one group. The level of organisation varies within Europe and existing good practises are not widely known.

A study on or research into existing collective arrangements is needed. Joining up gives scaling effect, what are the incentives to form FMAs or JOFs.

What makes an arrangement effective? What are the characteristics of existing arrangements? How much is on voluntary basis and are there laws that regulate min size of forest land and prohibits splitting among next generation. Which are the general features for success, what can be copied, improved and applied. Incentives, motivation for teaming up.

2. "Participatory research methods."

Climate change measures need to be taken at all levels. What are the measures that can be taken at local farm level or forest owner level by the owner. Are there already measures initiated by the forest owner? How can forest owners be included in climate change measures on voluntary basis, what is the motivation? We need to identify different possible measures at local level and what can be done at farm level to help researchers. What measures have already been taken? For instance in cases of pests, identification of resilient tree individuals, could be done by the owner for further research and use. How can local people be further involved and what kind of information is needed and what can be achieved. (windbelts; better roads etc) The possibility of voluntary protection measures, private initiatives for maintaining and increasing biodiversity as part of climate adaptation. What can be done to improve climate adaptation measures by small scale forest owners.

3. "Comparable statistics is needed"

There is lack of information on Private forest owners. More information on forest owners is needed for more effective extension and in designing incentives for cooperation. Comparable statistics on small scale forest and forest owners. Small management units: when and where; what is small in different locations. Economic units calculated on forest land (SALSA project) Less is known of management objectives by forest owners.

Other research needs coming from practice

- What kind of products in terms of service are needed in the future? What kind of expert advice can be provided by small business locally?
- What are the knowledge gaps and educational needs of professionals and laymen?
- What smart management and marketing tools are available for less common species; possibilities for digital marketplaces. Tables for volume/increment estimation in the field, for less economic species; with relascope; other? Knowledge on mixed stand management.
- Management objectives by forest owners. More information on forest owners is needed for more effective extension and in designing incentives for cooperation.
- Climate adaptation at grass root level or "Interdisciplinary Change Groups" in each country. Could this be in connection with Leader LAG? (Climate day activities, like "plant a tree day" youth groups; schools etc)
- Biodiversity and genetic potentials of the small scale owned properties in Europe: Resistance against diseases and possibilities for sustainable renewing with economic interesting tree species. (Silvicultural group?)
- Organization and management of small scale properties in case of natural catastrophes: Models according to different types and interest of forest owners; (European "forest task force" network of machine operators.

Further research needs coming from practice, ideas for EIP AGRI operational groups and other proposals for innovation can be found at the final report of the focus group, available at the FG webpage

<https://ec.europa.eu/eip/agriculture/en/content/focus-groups/new-forest-practices-and-tools-adaptation-and>

IDEAS FOR INNOVATIONS

- Common technical approach in issues like mitigation of climate changes, to be effective and sustainable
- “Get to know your forest” service packages for laymen forest owners, use of digital applications combined with field visits; -Field week-ends, “field vacations” city forest-owners meet local entrepreneurs, foresters on site
- Women forest days training; i.e. in how to use handheld tools; how to use a map; digital tools
- Entrepreneurship at local and regional level. Professionals providing different kinds of service packages
- Digital tools for managing forests and managing/information on forest
 - marketplace for timber of small quantities of less known used species
 - market place for non-timber products and ecosystem services
 - use of social media to attract younger forest owners
- Forest certification for wood trade; is it necessary everywhere? Further development of more effective processes, for owner groups or forest professionals are needed. Individual value trees on agricultural land can provide additional income but is not a forest product. Market driven forest certification may become very costly for smaller individual forest owners and it may not be worth the cost. Forest certification can be a driving force for joining up which will in the long run benefit the owners.
- Economic value of forest resources: Production time or rotation periods in changing climate for better sustainability.
- New forest products and practices; Tourism and conflicts of interests at the small-scale property
- Socioeconomic viability of small properties, in each context
- Market demands about forest products/ selling conditions

Potential EIP operational groups

- Voluntary Small-scale climate & biodiversity measures. Existing, possibilities, mechanisms and results. (Needed extension and incentives)
- What ways are most effective in communication with several owners with different ideas? Can local “Change Groups” be established that work interdisciplinary and that recommend practical local methods.
- Increased use of broadleaved species in regeneration and establishment of new stands.

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<http://www.foresteurope.org/docs/SoeF2015/OUTPUTTABLES.pdf>

Table 42: Ind 6.1.A Ownership of forest, 1990-2010

Table 43: Ind 6.1.B Ownership, number of holdings of forest, 1990-2010

page 53, Table 44: Ind 6.1.C Ownership, area and number of holdings of forest in size classes, 2010

(Table 45: Ind 6.2 Contribution of forest sector to GVA, 2000-2010

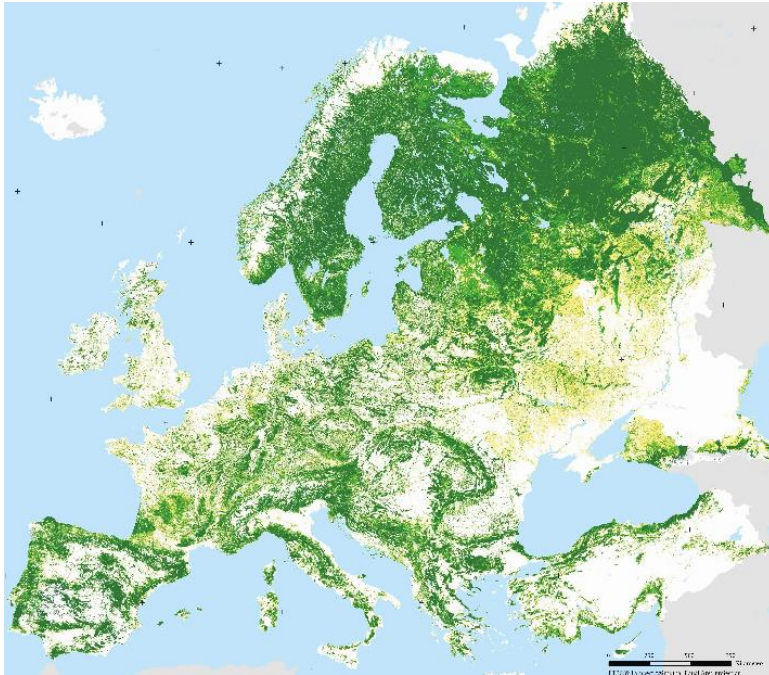
Table 57: Ind 6.10 Accessibility for recreation and intensity of use)

<http://www.unece.org/fileadmin/DAM/timber/publications/SP-26.pdf>

Appendix 1. Forest resources and Private Forest ownership in Europe (EFI).

Forest resources map of Europe. Where is the carbon?

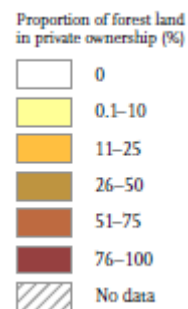
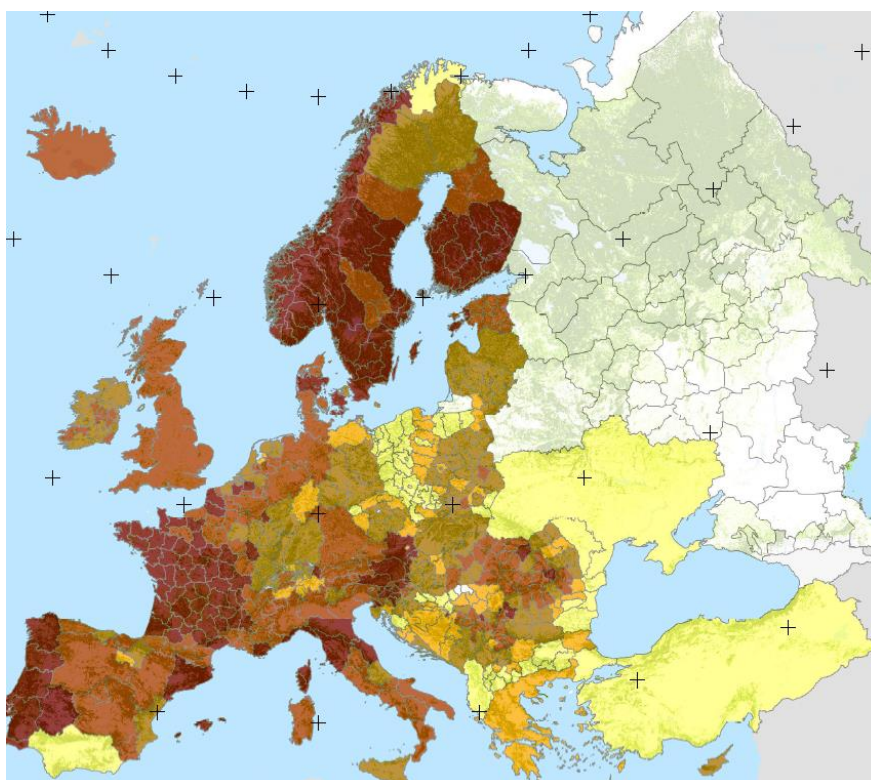
<https://www.efi.int/knowledge/maps/forest>



1. Sweden 28,6 mill ha
2. Finland 22,1 Mill ha
3. Spain 18,2 Mill ha
4. France 15,9 Mill ha
5. Germany 11,4 Mill ha
6. Turkey 11,3 Mill ha
- 7 Norway 10,2 Mill ha

Private Forest Ownership Map of Europe

<https://www.efi.int/publications-bank/mapping-distribution-forest-ownership-europe>



Appendix 2 SWOT

	STRENGTHS	WEAKNESSES
Finland	<ul style="list-style-type: none"> • Forest owners an important group in national policymaking • Long traditions in sustainable use and commitment • Functioning markets, markets for smaller and larger stems • R&D strong in forestry sector 	<ul style="list-style-type: none"> • Age structure of forest owners (only 6 % < 40 years); Owner living elsewhere, • Heated public discussion on forest & climate related issues • Fewer species in boreal forests • Climate change not high on agenda or concrete for individual forest owners
Great Britain	<ul style="list-style-type: none"> • Building enthusiasm among smaller forest owners • Lifestyle desire for small forest ownership driving growth of those • Growth of organisations focused on smaller woodlands 	<ul style="list-style-type: none"> • New small forest owners ill-prepared to manage the forest • Decreased size of forest holdings challenges sustainability of those • Many small forest holdings on farms, and no incentive to manage properly
Portugal	<ul style="list-style-type: none"> • Strong relationship with the land/ forest/ other • Frequent proximity of the land with owner's residence (10 or 20 Km is frequent) • Existence of silvo-pastoralism and/ or other complementary activities • Empirical knowhow about forest potentialities, in terms of production 	<ul style="list-style-type: none"> • Abandonment of very small properties is increasing, desertification • Difficult to find labour force to be employed only some days per year • Lack of collaboration, between landowners, for practical issues • Difficult access to market or to receive a fair price for products • Inefficient organization of farmers/ landowners/ managers
Slovenia	<ul style="list-style-type: none"> • Well organized public forest service; • Long term sustainability and strengthening of biodiversity in forest practices; • Small structured properties enable more biodiversity and protection of genetic potential of forests. 	<ul style="list-style-type: none"> • Lack of professional harvesting companies or entrepreneurs • Lack of forest-owner's economic associations; • Lack of interest / knowledge of forestry management (among the smallest owners); • Very small structured forestry properties;

	OPPORTUNITIES	THREATS
Finland	<ul style="list-style-type: none"> • New wood and forest-based products and ecosystem services • Forest grow more due to climate change, more income • Forest owners among all political parties • Networking among forest owners • Efficient management tools being further developed • 	<ul style="list-style-type: none"> • Mild winters; More insect damages and pesticides; Short winter, logging damages • Silvicultural works neglected, less usable wood available in future • Policymakers getting more urban, less understanding of forestry economics or forestry management • Conflicting views of needed reserved areas over-rule more urgent climate adaptation measures • EU regulations, very long distance from EU

		MEPs to forest sites.
Great Britain	<ul style="list-style-type: none"> Reconsider incentives and regulation in light of stated need to get more forests under active management Greatly increase level of public awareness of benefits of forests and what is required to manage those 	<ul style="list-style-type: none"> Failure to achieve coherent policy and administration leads to loss of forest cover Requirement for timber imports grows Attractiveness of forestry careers declines
Portugal	<ul style="list-style-type: none"> Perception of forests by those who do not depend directly on them Financial support to build strong associations of producers Increased attention of public administration to forest More scientific knowledge available for forest protection and development 	<ul style="list-style-type: none"> Competition between traditional indigenous species and faster growing exotic ones Abandonment due to difficulties in collaboration with other owners and, on the other hand, due to the high price of maintenance (shrub control, labour force, ...) Difficulty in access to proper extension services
Slovenia	<ul style="list-style-type: none"> Creating/ supporting forest owners' associations; New business models for very small properties; 	<ul style="list-style-type: none"> Many owners and small structures disabled for timely measures in case of natural catastrophes;

Appendix 3 Best practice examples

Finland Some digital management tools, presently ongoing development

metsaan.fi Metsään.fi is a portal which offers the latest information to forest owners on their properties. As soon as they log in, users can see what should be done in their forests right now. Information is displayed for each forest stand compartment, broken down by soil type, tree type and natural occurrence, and possible logging or forestry actions are suggested, including income and cost estimates. Maps and aerial photographs clearly show where properties are located and what they look like. Users log in securely using their online banking codes. Metsään.fi is a service provided by the Finnish Forest Centre, which is a state-funded organisation for promoting sustainable forestry and forest-based livelihoods. The portal's membership for forest owners is free of charge.

wuudis.com Provided by MHG systems <http://www.mhgsystems.com/> similar features as metsaan but developed more for practical use. The basic use of the service is free for all the forest owners. <https://www.wuudis.com/en/forest-owners/>
Forest operators pay a monthly fee. <https://www.wuudis.com/en/forest-operators/>

kuutio.fi A very recent, open marketplace on the web for forest owners, timber buyers, and other forestry actors.
<https://kuutio.fi/kuutio-palvelu/#/>

PORTUGAL

The so called "Zonas de Intervenção Florestal" (a considerable number of plots, of different owners, that can arrive to some thousands of hectares, managed by an Association or similar) conceived with the aim of conduce to the possibility of work together, get significant support to the forest maintenance and increase its production. The main problems that arise are related with different objectives, different analysis and some inconsistency at management level. The results don't be evident, often. *There are, also, areas of common

use for forest complementary activities, like cattle, sheep, goats, honey. They are more frequent where the areas are really very small (sometimes not even 1ha, each) in centre and north of the country.

SLOVENIA

BENEFITS OF SLOVENIA FOREST SERVICE FOR THE SMALL SCALE PROPERTIES

According to the Slovene Forest act, Forest management plans shall be produced as overall plans for all forests irrespective of ownership, taking into consideration the particularities of individual regions. All Slovene forest owners are entitled to the silvicultural plan, which is an implementation plan and is defined according to individual forest ecosystem or their parts: forest silviculture objectives, guidelines and measures for management; the extent, intensity and urgency of silviculture and protection work; areas in which individual selections of trees for possible cutting are not obligatory; temporal and spatial extent of logging operations; ways and conditions for obtaining timber; guidelines and work for simultaneously preserving and enhancing the ecological and social functions of a forest.

In regards to climate changes, the biggest advantage of this system is, that the state service observe all forests and take measures in time. They also help to define borders between plots and advise by choosing trees for cutting. Based on sustainable and multifunctional approach and due to climate and geographical circumstances, Slovenia has got one of the most quality timber reservoirs in Europe.

Forest owners in Slovenia, joined to the Forest owners association, every year organize a timber auction, where they offer about 2.000 m³ best quality wood from Slovene private properties. The prices reach very high values (up to 11.000 €/m³). Slovenia forest association as well as other professional organizations see this event as a very efficient awareness rising campaign, which strengthen the meaning of forest management and economic value of Slovene forests.

UNITED KINGDOM

1. The UK Forestry Commission publishes a wealth of information on forest management, species selection, disease issues, adaptation to climate change and much more. Accessibility on the web is excellent, one simply needs the motivation to explore the facilities available and take action.
2. 'Small Woods', a registered charity, believes that over 50% of small woods are 'neglected, overlooked and undervalued'. The focus of that organisation is to offer support and advice and training in hands on skills for small forest owners. (<http://smallwoods.org.uk/about-us/introduction>)
3. 'Sylva Foundation' is a registered charity which operates programmes in four areas: science, education, forestry and wood. Among their offering is an online tool for creating a forest management plan. Similarly to 'Small Woods' they work to draw attention to the importance and potential of the UK's forests.