

Estonian Private Forestry: a Review of Research and Developments

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Abstract

This review about research and development of private forestry is based on 23 scientific papers and statistical information related to private forestry in Estonia. Such a broader overview about the developments, current state and future prospects of private forest ownership and management in Estonia has yet to be conducted. The aim of this review is to provide a retrospect on research in this field and describe the different developments in the sector based on the reviewed studies. These studies are categorised into more general topics based on their content – land reform, property and tenure rights, structural changes in forest policy, changing forest owners and ownership and forest management and cooperation. All these issues are discussed in both broader and local contexts. In addition, suggestions are made for future research topics in each case.

Keywords: governance, forest policy, transition, forest management, forest owner

Introduction

Different forest-related services have to be maintained as adequately as possible throughout major changes such as ownership restitution and forest privatization. In order to be successful in that, forest policy has to provide the appropriate instruments. However, there have been many known problems in private forestry in Central and Eastern European (CEE) countries (e.g. slow land reform, weak or non-existing institutions for sustainable forest management). The transition processes in CEE countries have provided researchers with a variety of topics to study. Forestry has not been an exception with studies on sustainability (e.g. Nijnik 2004); policy making and reforms (e.g. Kallas 2002, Nilsson 2005, Nordberg 2007, Weiland 2010), forest management (e.g. Brukas and Weber 2009), etc., being conducted in different countries. On the one hand, the new situation has provided researchers with excellent opportunities, and on the other hand, it has posed challenges because new information and approaches are needed to understand the relations between the forest and people.

In Estonia, research on private forestry has been quite fragmented and has addressed fairly specific topics. Therefore, the aim of this paper is twofold: a) to give an overview about the developments and state of the art in scientific private forest research and b) based on the existing literature present a broader outlook on the dif-

ferent developments in private forest ownership and management in Estonia. In addition, potential future developments and research needs will be discussed. The authors review and rely on the existing scientific literature and official statistical data.

Private forest ownership in Estonia

After regaining independence in 1991, private land ownership was re-established in Estonia. Land restitution, which to date is largely completed (Maa-amet 2016), was complemented by the privatization process and the latter is still ongoing. According to the National Forest Inventory (NFI) data from 2014, forest land that was subject to privatization accounted for 8% of the total forest cover (Keskkonnaagentuur 2016). Based on NFI and land reform data, the authors of this review estimate that ~3% of forest land is still under reform and is thus without well-defined ownership.

The restitution process and re-establishment of private forests in 1991 was based on the Land Reform Act, which significantly stimulated the economy (Roose et al. 2013). Before 1991, 60% of the forests belonged to the state and 40% to collective farms (Unwin 1997). With the land reform, former private forests were returned to their rightful owners or their heirs. It has been discussed whether the land reform process should have followed expediency principles rather than principles of historical justice as the latter resulted in difficult and broad owner-

ship structures (Meikar and Etverk 2000). In addition to restitution, privatization of forests occurred and this is to some extent still ongoing. The land subject to privatization was formerly private land where no restitution claims were submitted and which had not been retained in state ownership or transferred into municipal ownership (Jørgensen 2004).

Twenty-five years after regaining independence forest land in Estonia accounts for almost 2.3 million ha of which private ownership accounts for 48% (Keskkonnaagentuur 2016). The Ministry of Environment formulates the overall forest policy. However, with private forestry in the focus, the Ministry of Agriculture also plays a key role as it implements the Rural Development Policy through which some subsidies are paid to the owners of private forestlands. Policy implementation for private forestry is the task of the Private Forest Centre (PFC), a foundation that acts under the Ministry of Environment.

Currently there are more than 100,000 forest owners (Table 1) and during the recent decade, it seems that some structural changes in private forest ownership have occurred. Although more complicated, these changes could be summarised as follows: a) the number of private individual forest owners has increased and the average property size decreased and; b) the relative area of forests belonging to legal owners (companies, firms) has increased significantly.

Table 1. Private forest ownership characteristics in 2010 and 2015 (Ministry of Environment 2011, 2015)

	2015	2010
Number of individual private forest owners, number (% of total)	107,170 (95%)	93,271 (96%)
Number of private legal entities, number (% of total)	5,752 (5%)	4,001 (4%)
Forest area in individual private ownership, ha (% of total)	688,246 (65%)	747,827 (74%)
Forest area belonging to private legal entities, ha (% of total)	377,747 (35%)	262,960 (26%)
Average holding size for private individual owners, ha	6.4	8.0
Average holding size for private legal entities, ha	65.7	65.7
Individual owners whose forest ownership is less than 5 ha (ownership share of total private forest land)	65.4% (15.6%)	55.8% (13.5%)
Legal entities whose forest ownership is less than 5 ha (ownership share of total private forest land)	58.2% (1.3%)	45.7% (1.2%)

The tree composition of private forests is more inclined towards deciduous trees (e.g. ~ 58% of the area and 52% of the growing stock) while in state forests deciduous trees cover roughly 34% of the forest area and 32% of the growing stock (Keskkonnaagentuur 2016). One of the primary reasons for the greater representation of deciduous species in private forests is that afforestation tended to occur on former (private) agricultural land (Meikar and Etverk 2000). The intensity of total fellings in private forests has been increasing (~2-3 m³/ha/a in the mid-1990s to ~6 m³/ha/a in the first half of the 2010s), whereas in state forests it has been more stable (around 2-3 m³/ha/a) during the last two decades (Keskkonnaagentuur 2016). Nevertheless there is still criticism to-

wards private forest owners for not doing enough investment-based activities such as reforestation or pre-commercial thinnings (Urbel-Piirsalu and Bäcklund 2009).

Material and Methods

Considering the aims of this review, all the materials have been drawn from the existing scientific literature. Databases such as *Scopus*®, *Thomson Reuters*® *Web of Science*TM and *ScienceDirect*® were used to search for scientific papers about forest ownership and owners (and linked issues e.g. land reform, restitution, forest management, harvesting, etc.) in Estonia. The first selection process was based on the content of keywords, title and abstract. The second selection process included a review of the content of the papers. Also, during the second phase, additional relevant literature was found in a “snowballing” way after going through the reference lists of the firstly selected papers. In addition to the scientific literature, statistical data were searched for from different administrative databases. At the end of the second selection process, 23 studies were collected based on their relevance to private forestry research (Table 2). The studies were further classified based on the results of a qualitative content analysis of the title, keywords and content. In the analysis, the open coding technique was used. Many of the reviewed papers touch upon several topics or are more

general in nature. Therefore, the papers were classified under a maximum of two general topics based on how much they covered the respective issues.

Results

Based on the analysis of the papers they were assigned to five categories based on their primary topics – land reform, property and tenure rights, structural changes in forest policy, changing forest owners and ownership and forest management and cooperation (Table 3). More general overviews about private forestry and general sectoral developments emerged in the mid-1990s. Forest policy reforms came into the spotlight in

Table 2. Reviewed studies touching upon Estonian forest owners, ownership and management

Year published	Authors	Title	Journal
1995	Leemet, A. and Karoles, K.	Estonian forests and forestry	Baltic Forestry
1997	Unwin, T.	Agricultural restructuring and integrated rural development in Estonia	Journal of Rural Studies
2000	Meikar, T. and Etverk, I.	Metsaomand Eestis (Forest ownership in Estonia)	Metsanduslikud uurimused Forestry Studies
2002	Kallas, A.	Public forest policy making in post-Communist Estonia	Forest Policy and Economics International Forestry Review
2005	Hain, H. and Ahas, R.	The Structure and Estimated Extent of Illegal Forestry in Estonia 1998–2003	Land and Urban Planning
2005	Hedin, S.	Land restitution in the former Swedish settlement areas in Estonia: consequences for land ownership, land use and landscape	Forest Policy and Economics
2005a	Lazdinis, M. et al.	Innovative use of forest policy instruments in countries with economies in transition: experience of the Baltic States	Society and Natural Resources
2005b	Lazdinis, M. et al.	Forest-sector concerns in the Baltic States: implications for an expanded European Union	Small-scale Forest Economics, Management and Policy
2005	Toivonen, R. et al.	The Challenge of Information Service Development for Private Forest Owners: The Estonia and Finland Cases	Metsanduslikud uurimused Forestry Studies
2006	Muiste, P. et al.	Forest harvesting in Estonia during the transition period	Metsanduslikud uurimused Forestry Studies
2007	Teder, M. et al.	Assessing the alignment and integration of innovation and development policies for the forest sector in Estonia	Fennia
2008	Jørgensen, H. and Stjernström, O.	Emotional links to forest ownership. Restitution of land and use of a productive resource in Põlva County, Estonia	AMBIO: A Journal of the Human Environment
2009	Urbel-Piirsalu, E. and Bäcklund, A-K.	Exploring the Sustainability of Estonian Forestry: The Socioeconomic Drivers	Landscape and Urban Planning journal
2011	Grubbström, A.	Emotional bonds as obstacles to land sale—Attitudes to land among local and absentee landowners in Northwest Estonia	Rural Development 2011
2011	Pöllumäe, P.	Hunting Rights and Property Rights in Estonia ? a Changing Paradigm	Annals of Forest Research
2013	Bouriaud, L. et al.	Governance of private forests in Eastern and Central Europe: An analysis of forest harvesting and management rights	Land Use Policy
2013	Roose, A. et al.	Land use policy shocks in the post-communist urban fringe: A case study of Estonia	Small-scale Forestry
2014a	Pöllumäe, P. et al.	Motives and Incentives for Joining Forest Owner Associations in Estonia	Forest Policy and Economics
2014b	Pöllumäe, P. et al.	Management Motives of Estonian Private Forest Owners	Agraarteadus Journal of Agricultural Science
2015	Pöllumäe, P.	Ülevaade metsaomanike klassifitseerimisest Ida-Euroopa riikides: metodoloogilisi ning metsapolitilisi aspekte (A review on forest owner classifications in Eastern-Europe – methodological and policy-related aspects)	Small-scale Forestry
2015	Sarvašová, Z. et al.	Forest Owners Associations in the Central and Eastern European Region	Forest Policy and Economics
2016	Pöllumäe, P. et al.	Institutional barriers in forest owners' cooperation: The case of Estonia	Land Use Policy
2016	Jürgenson, E.	Land reform, land fragmentation and perspectives for future land consolidation in Estonia	

Table 3. Broader classification of selected research papers

Generalized topics	Papers	Number of papers
Land reform	Leemet and Karoles (1995); Unwin (1997); Meikar and Etverk (2000); Hedin (2005); Jørgensen and Stjernström (2008); Grubbström (2011); Roose et al. (2013); Jürgenson (2016)	8
Property and tenure rights	Pöllumäe (2011); Bouriaud et al. (2013)	2
Structural changes in forest policy	Kallas (2002); Hain and Ahas (2005); Lazdinis et al. (2005a); Lazdinis et al. (2005b); Teder et al. (2007)	5
Changing forest owners and ownership	Leemet and Karoles (1995); Meikar and Etverk (2000); Hedin (2005); Toivonen et al. (2005); Jørgensen and Stjernström (2008); Grubbström (2011); Pöllumäe et al. (2014b); Pöllumäe (2015)	8
Forest management and/or cooperation	Unwin (1997); Muiste et al. (2006); Urbel-Piirsalu and Bäcklund (2009); Bouriaud et al. (2013); Pöllumäe et al. (2014a); Sarvašová et al. (2015); Pöllumäe et al. (2016)	7

the beginning of the 2000s and issues that are more specific thereafter. Over time, research has become more specialized and interdisciplinary however most, if not all, of the up-to-date research focuses on past events or current developments.

Land reform

Most of the developments in private forestry and forest management are linked to property rights. One very influential change in the property rights regime was the land reform and democratization processes initiated in the early 1990s in most CEE countries. Despite their mostly positive treatment, several studies show how the set-up and implementation of land reform principles have led to a higher fragmentation of land use and ownership (Hartvigsen 2014, Jürgenson 2016). In addition, different processes such as natural afforestation of abandoned agricultural land have changed the landscape as many European countries (especially in the CEE) have witnessed a decline in agricultural land use (Abolina and Luzadis 2015). Thus, in some cases the property borders do not always follow the land use patterns.

In Estonia, quite rigid rules were established for the forest land reform process. Due to principles of historical justice, forest management activities were prohibited in former private forests until the legal owners or their successors appeared (Leemet and Karoles 1995). It has been estimated that for example in 1997 the proper management of about 600,000 ha of forestland was obstructed due to this principle (Meikar and Etverk 2000). Jørgensen (2004) discusses that the restitution process seemed to be treated as a separate legal issue which concentrated on establishing historical justice. Jürgenson (2016) concludes that such a rigid approach to the whole process has led to problems such as the lack of access, irregular property shapes, and distance between parcels. One of the reasons for such consequences was the isolated nature of the reform as it was associated with different values compared to other areas of life that went through

post-Soviet transformations and followed “‘extreme’ liberal economic principles” (Jørgensen 2004: 2). Although there is also evidence from Estonian private forestry that shows how land attachment or home-related motivations might influence decision-making (Grubbström 2011, Jørgensen and Stjernström 2008, Pöllumäe et al. 2014b), there is also evidence of other motivations including economic security (Toivonen et al. 2005) or income generation (Pöllumäe et al. 2014b). The management of private forests reflect the values and objectives that the owners have (Bliss and Kelly 2008). However, the physical characteristics also determine if and how some motivations materialize. If forest holdings become more fragmented and smaller, the economic importance of these forests will decrease (Toivonen et al. 2005).

Issues of ownership fragmentation could be dealt with through different means. Jørgenson (2016) discusses land consolidation as one way to stop further fragmentation. However, she also stresses the need for political will to do so. However, considering the value-orientation and historical background of the restitution process, it might require a lot of political courage to implement such land consolidation policies. In land management and use, also cooperation between parcels could be one possible way to overcome the negative externalities of fragmentation. The topic of cooperation between forest owners in Estonia will be discussed later in the review.

Structural changes in forest policy

Milbrath (1984:7) has stated that a paradigm is “a society’s dominant belief structure that organises the way people perceive and interpret the functioning of the world around them”. Paradigms cover different areas of life as well as different social groups. The aim of forest policy is to harmonize different individual understandings about forest utilization and protection and provide tools to reach these standardized goals (Krott 2005). Such understandings or paradigms can be of course multidimensional. For example, Brown and Harris (2000) look at paradigm shifts in one particular organization, the US Forest Service, while Raum and Potter (2015) provide a retrospect of forestry paradigm shifts in Britain. Based on literature the latter suggest that even though some significant threshold events can be identified, which initiate a shift, it is nevertheless a result of accumulated ideas from previous periods. It is, therefore, that shifts in these belief structures evolve slowly and are linked to social learning. One of the key processes in forest policy paradigm shifts has been the Ministerial Conference on the Protection of Forests in Europe (MCPFE), which has also influenced forest policy developments in Estonia.

With political and economic changes and in light of international processes (e.g. MCPFE) significant changes occurred also in Estonia. In 1993 the first Forest Act after

regaining independence was brought into force. The new act expanded the meaning of forestry – forests were seen as ecosystems with more emphasis on their protective and environmental functions (Muiste et al. 2005). Before the second Forest Act in 1998, the Estonian Forest Policy was officially introduced (Approval of the Estonian Forest Policy in 1997) indicating the importance of sustainable forest management. Raum and Potter (2015) identify a paradigm shift in Britain in the beginning of the 1990s – shifting from “multifunctional forestry” to “sustainable forestry”. Quite the same shift characterizes also the Estonian situation. The formal forestry policy considered the sustainability pillars – social, economic and environmental – more equally and stipulated their importance for future generations. Formerly these sustainability pillars were not highlighted in such a way. With the transition to the market-based economy there was a need to have proper institutions in place, which was not always the case in the public sector (Kallas 2002, Urbel-Piirsalu and Bäcklund 2009, Hain and Ahas 2005). Therefore, many market intervention instruments in forestry have been used in Estonia (Lazdinis et al. 2005a) and in some cases hindering policy decisions have been made (Teder et al. 2007) yet the sustainability of the forestry sector continues to be questioned (Urbel-Piirsalu and Bäcklund 2009).

Private forestry is still one of the main concerns in forest policy (Lazdinis et al. 2005b) due to the lack (of capacity) of organisational structures, management and forestry knowledge and experience. Despite such criticism, it seems that the Baltic situation, at least from a governance perspective, is slightly better than that in some South-Eastern European countries (Bouriaud et al. 2013). However, state intervention is still significant in policy implementation and control while also many other governance structures are emerging and developing (e.g. certification, forest owners’ associations) further. These processes are highlighting future challenges in forest policy formulation and implementation – is Estonia moving towards a more decentralized private forestry? What will be the roles of different stakeholders in the future?

Considering the identified issues in private forestry, it could be that the formal forest policy paradigm shifts have been ahead of the perception change in the forest owners. However, within this shift the public authorities are promoting and implementing this change using more control-command instruments. Similar conclusions have also been drawn for Lithuania (Brukas 2015), suggesting even that for the state authorities, private forestry has been rather a “nuisance”. The forest owners (and the public) have only started to develop some relations with and understanding of private land ownership. Such institutional and experience-based learning takes time, which in a rigorous legal environment is not a very promising outlook. There is a need for a more balanced environ-

ment between governmental control and private initiative (Weiland 2010).

Several topics could be of further relevance for forest policy scientists in Estonia. For example, forest certification issues, which have gained more and more attention among social scientists, in particular, is a field which has not been studied that much (Johansson 2012, Halalisan et al. 2016). The biggest contribution to this field is perhaps the work done by Hain (2012). In addition, legitimacy studies of forest and environmental policy would be of interest in the future as the rather new policy situation might provide some interesting relationships between the different stakeholders and forestry. Some interesting studies on this have been done in Finland (e.g. Valkeapää and Karppinen 2013, Vainio 2011).

Changing forest ownership

The scientific community has maybe more than ever acknowledged the different sides of forest ownership change. An illustration of this was the COST (European Cooperation in Science and Technology) action FP1201 "Forest land ownership changes in Europe: significance for management and policy (FACESMAP)" which brought together scientists from 30 countries. The changes in ownership can be seen in different ways. For example, a UNECE (2010) study shows that in nine European countries (Austria, Belgium, Bulgaria, France, Hungary, Latvia, Lithuania, Slovakia and the United Kingdom), 86% of all private forest holdings belong to size classes of up to 5 ha. Nevertheless, the physical fragmentation of forest ownership is only one way of looking at things. Society and societal values constantly change (Blagojević et al. 2016) and so do private forest owners. Changing forest ownership is not only reflected in numbers. Due to political and socio-economic changes, the owners themselves also change in time. Changes in the diversity of forest owners have been reported in many CEE countries (e.g. Malovrh et al. 2015, Mizaraite and Mizaras 2005, Pöllumäe et al. 2014b). These changes are mostly due to the democratization process initiated some two decades ago. However, they present challenges for policy-makers to make sure that forests are sustainably managed.

In 2011, it was estimated that in Estonia 55.8% of private individual forest owners (52,000) own forest properties of up to 5 ha, an area which represents 13.5% (101,000 ha) of the total forests belonging to private persons (Ministry of Environment 2011). The respective figures for private legal entities were 45.7% (~1,800 legal entities) and 1.2% (3,200 ha). In 2015 (Ministry of Environment 2015), these figures in Estonia were already quite different (Table 1). There are indications of a cleavage in private forest ownership, as non-industrial private forest (NIPF) ownership is more fragmented and more forestland is in consolidation with private companies.

There have been also studies focusing on the forest owners in particular. The fact that many of the inhabitants in Estonia were deprived of their rural ownership in the 1940s (Jørgensen and Stjernström 2008) had created absentee forest ownership, which is quite often illustrated with the depletion of the local Swedish settlements (Hedin 2005, Grubbström 2011). The general urbanization trend has contributed to the latter, as well. One of the first studies focusing on Estonian private owners' values and objectives was conducted in 2001 (Toivonen et al. 2005). Investigating larger than average estate owners, Toivonen et al. (2005) concluded that mainly economic and non-monetary values and recreational aspects prevail among Estonian forest owners. In 2008, Sepp (2008) used a cluster analysis approach to develop ownership classifications for Estonia and he distinguished between owner groups who were inactive with regard to the management of their forest: "indifferent forest owners" accounted for 32% and "less active" forest owners for 8%. Pöllumäe et al. (2014b) used principal component analysis and by combining forest owners' values and objectives, they identified a set of motives that were not generalized to a specific group. Instead, they showed that different motives may be present simultaneously and that it is a question of situational aspects if and which of the motives result in a decision regarding the forest.

Much of the research has focused on physical ownership changes (e.g. Meikar and Etverk 2000). However, several studies that are more recent have looked at the forest owners themselves – their management motives (Pöllumäe et al. 2014b), typologies (Pöllumäe 2015, Sepp 2008) and emotional links to their ownership (Grubbström 2011, Jørgensen and Stjernström 2008). Most of these studies have had a quantitative approach. Having a more multidisciplinary approach could be one way of making some progress in this field. For example, the NIPF owner group is one such segment that the abovementioned studies have failed to target in depth. Mostly, the data that has been used reflects persons with larger than average forest ownerships. Qualitative approaches could be one option to fill this gap. There are several qualitative studies both from neighbouring countries (e.g. Stanislovaitis et al. 2015) and from further away (e.g. Lind-Riehl et al. 2015). Having reviewed different ownership typologies in CEE regions, a similar suggestion was also put forward by Pöllumäe (2015).

Private forest management and cooperation

The sustainable use of natural resources has gained more and more attention among both scholars and policy-makers. Much of this scientific debate has started from the "tragedy of the commons" (Hardin 1968) and the use of natural resources without defined rules. It has however reached also a policy level with the Brundtland Com-

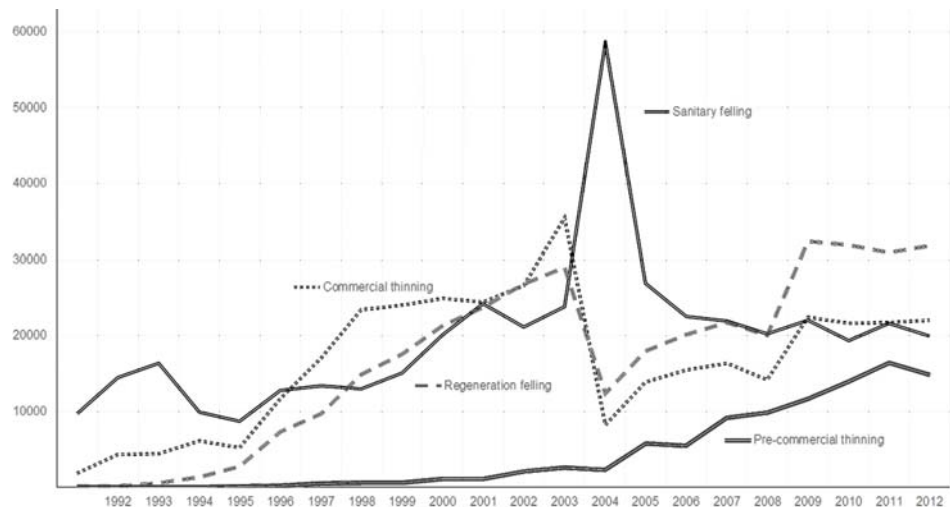
mission defining sustainable development (WCED 1987) and the MCPFE setting down guidelines for sustainable forest management (SFM) (MCPFE 1993). However, given that SFM is such a broad concept, it relies on a common understanding of what the components and their significance are (Blagojević et al. 2016). The concept moves beyond that of the “sustained yield of timber” and its implementation is the task of the countries as there is no legally binding agreement. Therefore, any assessment of forestry sustainability could be seen (if desired) as too narrow or biased.

In Estonia, since the beginning of the 1990s the harvesting levels have gone up (Figure 1). Many situational aspects (e.g., the storm Gudrun in 2005 which increased sanitary cuttings), market interventions (thinnings have been financially supported since 2006) and the legislative environment (in 2009 forest management plans (FMP) were no longer compulsory and the state ceased requiring a reforestation deposit) have influenced this trend. In the 1990s illegal logging was a major problem. Results from Hain and Ahas (2005) indicate that up to 70% of timber harvesting in private forests was related to some type of violation of legislation in 1998–2002. Unwin (1997) has pointed out that rumours existed that even the illegal export of timber occurred. Kallas (2002) indicated that violations occurred due to the understaffed State For-

literature (Leemet and Karoles 1995, Meikar and Etverk 2000, Ministry of Environment 2003, and Ahas 2005). One aspect that promotes such a lack of knowledge has been the instability of the forestry (Muiste et al. 2006, Urbel-Piirsalu and Bäcklund 2009) and land reform related (Leemet and Karoles 1995) legislative environment. For example, there have been different approaches towards FMPs. In some periods, the production of FMPs has been mandatory and during other periods, they have had a more advisory role and been voluntary. The Forest Act has been frequently amended (Muiste et al. 2006) and harvesting has been strictly regulated through high rotation ages (Korjus et al. 2011).

A lack of management has also been identified. The forestry industry has gradually increased its role in forestland management (Table 1) and non-industrial small-scale ownership has been criticized for the lack of management in the conventional way (Unwin 1997, Ministry of Environment 2003). This is something that has been also reported in other countries, e.g. in the US (Zhang et al. 2005). Most of such criticism is due to the low amount of reforestation activities and pre-commercial thinning conducted in private forests (e.g. Unwin 1997, Ministry of Environment 2010). In addition, Urbel-Piirsalu and Bäcklund (2009:105) conclude: “From the analysis of statistical evidence about logging and regeneration together

Figure 1. Harvesting activities (ha) in private forests based on logging documentation (data source: Statistics Estonia 2016)



estry Board who lacked the capacity to keep an eye on the activities on private lands. Nevertheless, official statistics show that during 2001 and 2014 the number of violations in forestry have decreased more than ten times (Keskkonnaagentuur 2016). Nowadays, illegal logging and other violations are no longer the pressing issues they were in the 1990s. There are several reasons why such illegal activities took place. Firstly, many violations happened because private forest owners lacked forestry knowledge, a fact that has been reported widely in the

with the clarifications received from the interviews it can be concluded that Estonian forestry is not on a sustainable path”.

There are several ways to respond to this criticism of low management activities. Firstly, some of this can be attributed to the lack of knowledge that was already briefly mentioned earlier. Another part of this problem lies in the low profitability of forest management. In the case of scattered small-scale forestry, the direct and indirect costs are higher than in the case of larger-scale management.

In addition, taxation influences decision-making and Meikar and Etverk (2000) have criticised the high land and income taxes in Estonia. Theoretical calculations on the profitability of private forestry in Estonia show that in 2010–2012 the net revenue was 90–112 €/ha (Estonian University of Life Sciences 2014). Not focusing on long-term investments such as reforestation or young stand tending helps to increase short-term profitability, but creates difficulties for the economy in the long term (Unwin 1997). Sirgmetts et al. (2011) found in their analysis that the average long-term net revenue could be around 130 €/ha which could decrease by up to 24% if management restrictions are applied, as well. For example, the Nature Conservation Act regulates a significant area of forests as management restrictions apply to roughly one third of Estonian forests (Sirgmetts et al. 2011). The problem raised with restricted management lies in the fact that forest owners are of the opinion that they should be compensated for their forgone income (Leemet and Karoles 1995).

One of the main answers to these management-related problems has been the promotion of forest owners' associations (FOA). The approval of the Estonian Forest Policy (1997) highlighted that due to the low profitability of small-scale forestry the state will provide assistance to form larger management units by supporting forest owners' cooperation. The amount of scholarly literature about forest owners' cooperation is quite extensive as Pöllumäe et al. (2014a) show. It seems that cooperation is more common among owners with larger forest units and

more economically oriented objectives (Pöllumäe et al. 2014a). However, such cooperation cannot be a universal or perfect tool to overcome all the different issues in private forestry (Kittredge 2005).

The first FOAs were established already in the beginning of the 1990s. The second wave of FOA establishment in Estonia was in the beginning of the 2000s with organisations turning more towards non-profit principles. This conceptual change also meant that the services were mostly limited to advisory and extension counselling. After a decade of developments, the membership of these organisations was still small and only in 2006, the PFC compiled the first adequate reporting on FOA memberships (Figure 2). Now there are about 32 active organisations according to the Private Forest Centre (2016a), however the total number is greater as some smaller or less active FOAs are not listed by the PFC. The state subsidizes more active FOAs annually with the general activity support, extension support and also with economic cooperation support. The latter was established in 2009 and to date provides FOAs with a rough average of 1€ m⁻³ when joint timber sales are conducted. For example, according to the Private Forest Centre (2016b) such financial support was used by the FOAs in 2012 and 2013 to market about 200,000 m³ of timber annually. With these processes, economic cooperation has started to develop quite well. In addition, the membership of FOAs has grown rapidly during the recent decade and the average forest holding size of an FOA member has decreased since 2009.

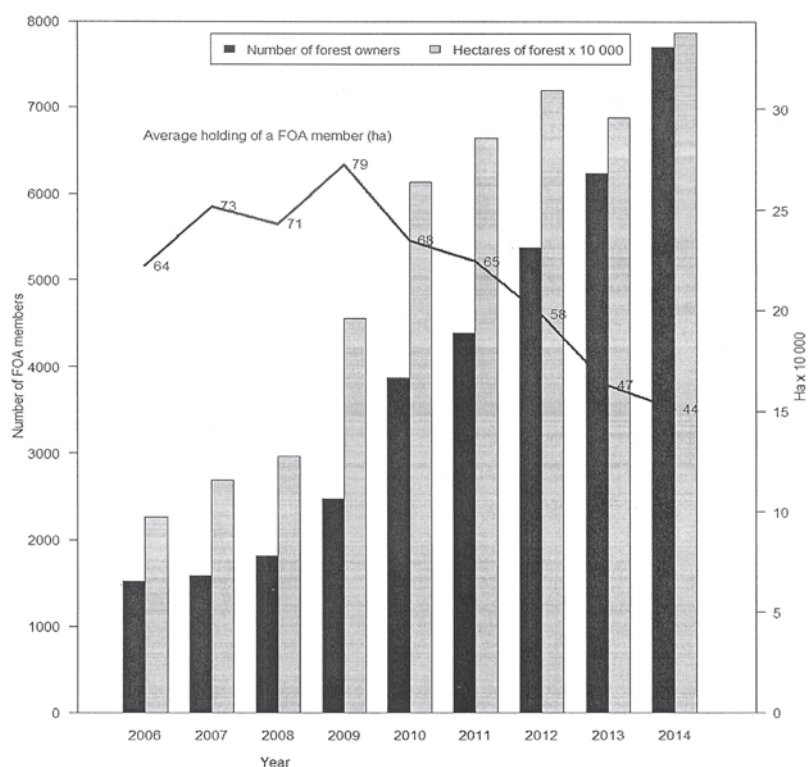


Figure 2. Changes in FOA membership between 2006 and 2014 (data source: Private Forest Centre 2015)

The latter is a good indication that small-scale owners are increasingly becoming FOA members. There have been two years when membership has grown more rapidly – 2010 and 2014. In 2009, a cooperative was established by the FOAs themselves (for joint timber sales). In addition, there were policy changes that took place in 2014 including a decision by the state to support only FOAs with more than 200 members. Moreover, some of the support for forest owners started to go through FOA joint applications only. In many aspects, Estonian developments regarding FOAs have followed paths similar to those in other CEE countries (Sarvašová et al. 2015).

FOA membership provides a variety of incentives to owners, but these incentives have to motivate people. Pöllumäe et al. (2014b) illustrated the diversity of forest owners with different forest management motives that are present at the same time. This makes forest owners' decision-making, i.e. the realization of a particular motive, dependent on situational and legislative aspects (Karppinen 1998). If such cooperation relies merely on financial motives with the state encouraging it one-sidedly the potential of forest owners' cooperation might not be reached, as there are also other (intangible) products and services that private forests provide. Moreover, the FOAs themselves could start functioning as *de facto* policy tools not as voluntary organisations (Pöllumäe et al. 2016). Considering the state of affairs in this specific field there is still much to investigate. For example, there is the question of how to sustain such cooperation. Since it relies much on trust between individuals an empirical approach measuring social capital could be one way to address this issue. There are some examples in this field (e.g. Guillén et al. 2015) and indications that aspects of social capital differ significantly between Eastern and Western European countries (Chloupkova et al. 2003). The current reporting of FOA membership to the Private Forest Centre might not describe cooperative developments adequately as the time span is long and small-scale owners' activities in the forest are quite infrequent. Thus, the current reporting approach is quantitative, but new knowledge about the quality could help develop FOAs and cooperation further.

Conclusions

Private forestry has developed rather spontaneously and survived several political challenges in Estonia. Applied policy tools are mostly regulatory, but also financial and informational tools are gradually implemented. Nevertheless, private forestry is still quite strictly regulated and influenced by the state, and, in general, follows processes similar to those in other Central and Eastern European countries.

This review on the developments and situation in private forestry has led to the following concluding remarks:

1) The main issues in private forestry have been feeble efforts to enhance reforestation activities, continuously changing forestry legislation, lack of interest in forest management, low harvesting rates, and violations of forestry legislation.

2) The international processes, the re-establishment of a market economy and private property have been the threshold events in a new forestry paradigm shift. The change in different policy processes and ownership structure is a continuous process.

3) A shift in the formal policy towards sustainable forest management has been in front of the change in the perceptions of forest owners as the concept of ownership is still developing. In addition, the state aims to minimize any risks by implementing this shift using more of a command-and-control perspective.

4) Research has increased the knowledge level about private forest ownership and management during the recent decade. However, there are still topics to study that could be also useful from a policy perspective. A more *ex-ante* approach using multidisciplinary approaches would be welcome in the future.

5) The ownership change has occurred in many ways. Firstly, private forest ownership has increased in general and secondly, forest owners have diversified. If guided properly by policy, this could be a potential way to implement sustainable forestry even more successfully.

6) There are signs of a cleavage in private forest ownership – on the one hand, larger industrial owners are enhancing their activities and on the other hand, small-scale ownership is becoming more and more fragmented.

7) Further fragmentation of ownerships may lead to a decrease in the economic importance of small-scale forestry, as scattered owners might set aside their forests from active management.

8) The participation of forest owners in cross-border cooperation has increased significantly since the 1990s, but there is room for improvement.

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